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

Original report release date: March 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.



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Wood Buffalo Environmental Association

FEBRUARY 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 FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort February 1, 2023 10:45 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 January 5, 2023 14:21	
		Calibration St	andards		
Cal Gas Concentration:	49.19	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	CC486642				
Removed Cal Gas Conc:	49.19	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565	
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609	
		Analyzer Info	rmation		
Analyzer make:	Thermo 43i		Analyzer serial #:	IC1501301448	
Analyzer Range			Analyzer serial #.	301301301440	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998187	0.998801	Backgd or Offset:	19.1	19.0
Calibration intercept:	-0.293417	-0.333078	Coeff or Slope:	0.891	0.891
		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	0.1	
as found span	4918	81.3	799.9	797.8	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4918	81.3	799.9	799.2	1.001
second point	4959	40.7	400.4	398.5	1.005
third point	4979	20.3	199.7	199.2	1.003
as left zero	5000	0.0	0.0	0.3	
as left span	4918	81.3	799.9	799.6	1.000
			Averag	ge Correction Factor	1.003
Baseline Corr As found:	797.70	Previous response	798.20	*% change	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
PL		/ ii 0.0pc.		intercepti	

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

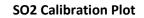
Calibration Performed By:



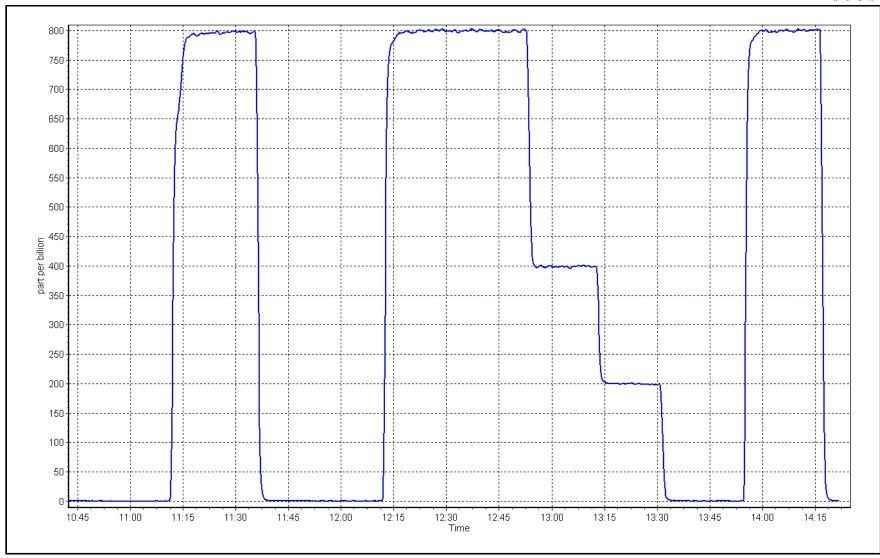
SO₂ Calibration Summary

WBEA					Version-01-2020
		Station	Information		
Calibration Date:	February	1, 2023	Previous Calibration:	January	, 5, 2023
Station Name:	Bertha Ganter	-Fort McKay	Station Number:	AM	1501
Start Time (MST):	art Time (MST): 10:45		End Time (MST):	14	1:21
Analyzer make:	alyzer make: Thermo 43i		Analyzer serial #:	JC1501	1301448
		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	0.999995	≥0.995
799.9	799.2	1.0009		0.555555	≥0.995
400.4	398.5	1.0048	- Slope	0.998801	0.90 - 1.10
199.7	199.2	1.0027	Siope	0.00001	0.00 1.10











TRS Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
itation Name: Calibration Date: itart time (MST): Reason:	Bertha Ganter-Fort February 13, 2023 11:12 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 January 10, 2023 17:19	
		Calibration S	tandards		
Cal Gas Concentration:	5.10	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	<u>CC511749</u> 5.10 <u>N/A</u> Teledyne API T700 Teledyne API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:		
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CD Nova 0 - 100 ppb		Analyzer serial #: Converter serial #:	1218153461 470	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.998364 0.059997	0.995507 0.059999	Backgd or Offset: Coeff or Slope:		2.30 0.919
		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	4921	78.4	80.0	79.6	1.006
as found 2nd point	4960	39.2	40.0	39.8	1.008
as found 3rd point	4980	19.6	20.0	20.2	0.995
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	0.1	
high point	4921	78.4	80.0	79.7	1.004
second point	4960	39.2	40.0	39.9	1.002
third point	4980	19.6	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.1	
as left span	4921	78.4	80.0	79.6	1.005
O2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber cha	\$	December 17, 2021	L	Ave Corr Factor	1.004
ate of last converter ef	ficiency test:				efficiency
Baseline Corr As found:	79.5	Prev response:	79.92	*% change:	-0.5%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	39.7 20.1	AF Slope: AF Correlation:		AF Intercept:	0.180003
				* = > +/-5% change initiate	s investigation

Notes:

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

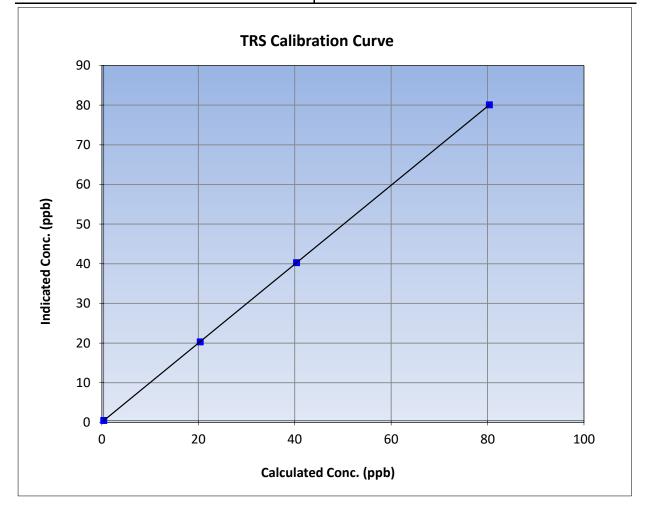


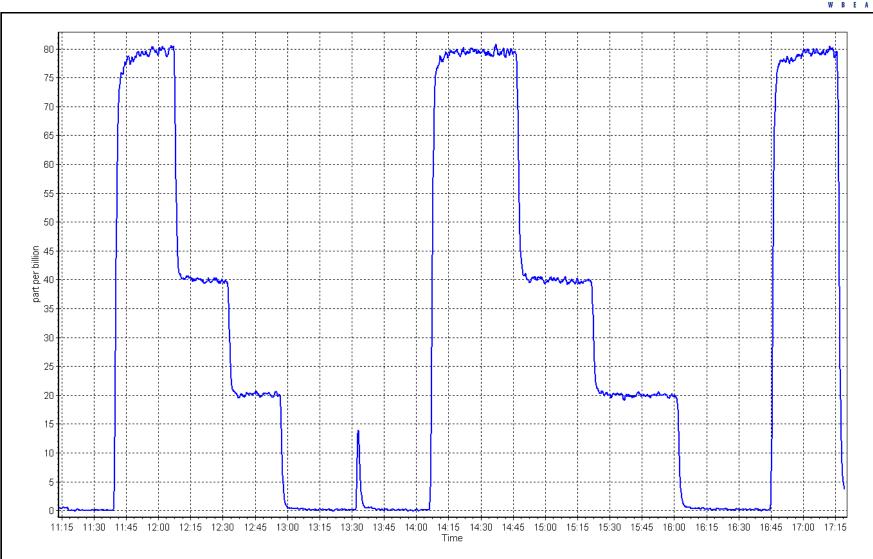
TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 13, 2023	Previous Calibration:	January 10, 2023				
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01				
Start Time (MST):	11:12	End Time (MST):	17:19				
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	0.1		Correlation Coefficient	0.999998	≥0.995	
80.0	79.7	1.0037	correlation coefficient	0.999996	20.333	
40.0	39.9	1.0025	Slope	0.995507	0.90 - 1.10	
20.0	19.9	1.0049	Slope	0.995507	0.30 - 1.10	
			- Intercept	0.059999	+/-3	





TRS Calibration Plot

Date: February 13, 2023

Location: Bertha Ganter-Fort McKay





H₂S Calibration Report

WBEA		-			Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort February 13, 2023 11:12 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 January 10, 2023 17:19	
		Calibration S	tandards		
Cal Gas Concentration:	5.10	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	<u>CC511749</u> 5.10 N/A	ppm	Rem Gas Exp Date: Diff between cyl:	N/A	
Calibrator Make/Model: ZAG Make/Model:			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	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.996946	0.996946	Backgd or Offset:	1.94	1.95
Calibration intercept:	0.161599	0.361624	Coeff or Slope:	1.014	1.014
		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	-0.1	
as found span	4921	78.4	80.0	80.0	0.998
as found 2nd point	4960	39.2	40.0	40.3	0.990
as found 3rd point	4980	19.6	20.0	20.2	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/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	78.4	80.0	79.9	1.001
second point	4961	39.2	40.0	40.7	0.983
third point	4980	19.6	20.0	20.2	0.990
as left zero	5000	0.0	0.0	0.4	
as left span	4921	78.4	80.0	78.7	1.016
O2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber cha		March 21, 2022		Ave Corr Factor	0.991
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	80.1	Prev response:	79.89	*% change:	0.3%
Baseline Corr 2nd AF pt:	40.4	AF Slope:		AF Intercept:	0.079998
Baseline Corr 3rd AF pt:	20.3	AF Correlation:			

Notes:

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

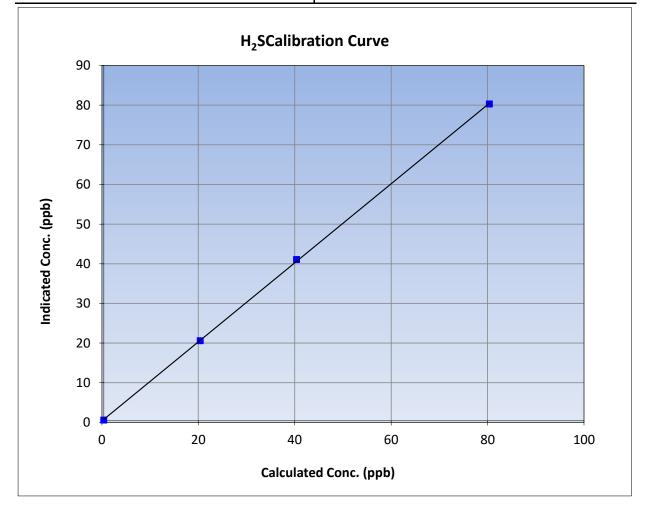


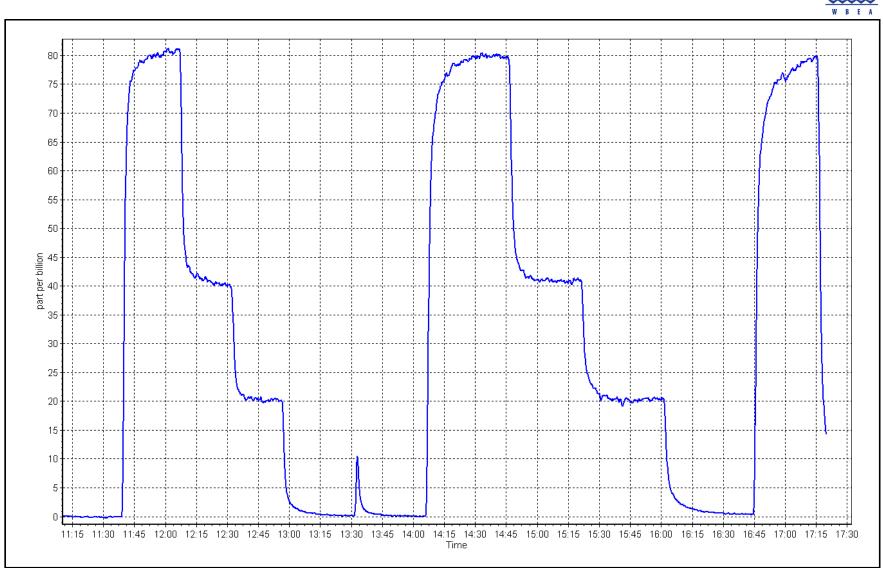
H₂S Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 13, 2023	Previous Calibration:	January 10, 2023				
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01				
Start Time (MST):	11:12	End Time (MST):	17:19				
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1200326167				

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	0.999913	≥0.995
80.0	79.9	1.0012	correlation coefficient	0.999913	20.333
40.0	40.7	0.9826	Slope	0.996946	0.90 - 1.10
20.0	20.2	0.9900	Slope	0.990940	0.90 - 1.10
			Intercept	0.361624	+/-3





H₂S Calibration Plot

Location: Bertha Ganter-Fort McKay





THC / CH_4 / NMHC Calibration Report

		Statio	on Information		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fo February 1, 2023 10:45 Routine	•	Station number: AMS01 Last Cal Date: January 24, 2023 End time (MST): 14:21		
		Calibra	ation Standards		
Gas Cert Reference:	CC	2486642	Cal Gas Expiry Date: Fe	bruary 23, 202	5
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 T70		Serial Number: 35	65	
ZAG make/model:	Teledyne API T70)1	Serial Number: 56	609	
		Analy	zer Information		
Analyzer make: THC Range (ppm):			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	: 2.54E-04	2.52E-04	NMHC SP Ratio:	5.11E-05	5.06E-05
CH4 Retention time:	: 14.4	14.4	NMHC Peak Area:	179761	181561

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	17.25	1.002	
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	17.21	1.004	
second point	4959	40.7	8.65	8.56	1.011	
third point	4980	20.3	4.32	4.27	1.011	
as left zero	5000	0.0	0.00	0.00		
as left span	4918	81.3	17.29	17.10	1.011	
			A	Average Correction Factor	1.009	
Baseline Corr AF:	17.25	Prev response	17.28	*% 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 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	9.22	0.998
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	9.15	1.005
second point	4959	40.7	4.60	4.56	1.010
third point	4980	20.3	2.30	2.28	1.009
as left zero	5000	0	0.00	0.00	
as left span	4918	81.3	9.19	9.07	1.014
			1	Average Correction Factor	1.008
Baseline Corr AF:	9.22	Prev response	9.20	*% 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	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 Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	8.09	8.03	1.008
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	8.06	1.004
second point	4959	40.7	4.05	4.00	1.012
third point	4980	20.3	2.02	1.99	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	8.09	8.03	1.007
			A	verage Correction Factor	1.010
Baseline Corr AF:	8.03	Prev response	8.09	*% change	-0.7%
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:		0.999160		0.995861	
THC Cal Offset:		0.008295		-0.022506	
CH4 Cal Slope:		0.998842		0.996625	
CH4 Cal Offset:		0.003433		-0.014967	
NMHC Cal Slope:		0.999663		0.994978	
NMHC Cal Offset:		0.004462		-0.007938	

Changed out the inlet filter and N2 cylinder after as founds. Adjused span only.

Calibration Performed By:



THC Calibration Summary

Calibration Date: Station Name: Start Time (MST): Analyzer make: Calculated concentration (ppm) (Cc) 0.00 17.29 8.65 4.32	February Bertha Gante 10: Thern Indicated concentration (ppm) (Ic) 0.00 17.21 8.56 4.27	/ 1, 2023 rr-Fort McKay :45 no 55i	nformation Previous Calibration: Station Number: End Time (MST): Analyzer serial #: tion Data Statistical Evalu Correlation Coefficient Slope	January 2 AM 14: 118032 nation	501 21
Station Name: Start Time (MST): Analyzer make: Calculated concentration (ppm) (Cc) 0.00 17.29 8.65	Bertha Gante 10: Thern Indicated concentration (ppm) (Ic) 0.00 17.21 8.56	er-Fort McKay :45 no 55i Calibra Correction factor (Cc/lc) 1.0044 1.0107	Station Number: End Time (MST): Analyzer serial #: tion Data Statistical Evalu	AM 14: 11803	501 21 20040 <u>Limits</u>
Start Time (MST): Analyzer make: Calculated concentration (ppm) (Cc) 0.00 17.29 8.65	10: Thern Indicated concentration (ppm) (Ic) 0.00 17.21 8.56	:45 no 55i Calibra Correction factor (Cc/Ic) 1.0044 1.0107	End Time (MST): Analyzer serial #: tion Data Statistical Evalu Correlation Coefficient	14: 11803. nation	21 20040 <u>Limits</u>
Analyzer make: Calculated concentration (ppm) (Cc) 0.00 17.29 8.65	Thern Indicated concentration (ppm) (Ic) 0.00 17.21 8.56	no 55i Calibra Correction factor (Cc/lc) 1.0044 1.0107	Analyzer serial #: tion Data Statistical Evalu Correlation Coefficient	11803	20040 <u>Limits</u>
Calculated concentration (ppm) (Cc) 0.00 17.29 8.65	Indicated concentration (ppm) (Ic) 0.00 17.21 8.56	Calibra Correction factor (Cc/lc) 1.0044 1.0107	tion Data Statistical Evalu Correlation Coefficient	ation	<u>Limits</u>
(ppm) (Cc) 0.00 17.29 8.65	(ppm) (Ic) 0.00 17.21 8.56	Correction factor (Cc/Ic) 1.0044 1.0107	Statistical Evalu		
(ppm) (Cc) 0.00 17.29 8.65	(ppm) (Ic) 0.00 17.21 8.56	 1.0044 1.0107	Correlation Coefficient		
17.29 8.65	17.21 8.56	1.0044 1.0107		0.999988	≥0.995
8.65	8.56	1.0107			_0.000
			Slope		
4.32	4.27	1.0113		0.995861	0.90 - 1.10
			Intercent	0.0225.05	
			Intercept	-0.022506	+/-0.5
20.0		THC Calibratio	n Curve		
18.0					
16.0					
14.0					
u 12.0					
j 10.0					
0.0 bm 10.0 bm 0.0 bm					
ip 6.0					
4.0					
2.0					
0.0	F	0	10.0	15.0	20.0
0.0	5.		10.0 Conc. (ppm)	15.0	20.0



CH₄ Calibration Summary

		Chatien l			
			nformation		
alibration Date:			January 24, 2023		
tation Name:		er-Fort McKay	Station Number:	AMS	
tart Time (MST):):45	End Time (MST):	14:	
nalyzer make:	Ther	mo 55i	Analyzer serial #:	118032	20040
		Calibra	tion Data		
alculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 8.09	0.00 8.06	1.0038	Correlation Coefficient	0.999978	≥0.995
4.05 2.02	4.00 1.99	1.0121 1.0144	Slope	0.996625	0.90 - 1.10
			Intercept	-0.014967	+/-0.5
8.0 7.0 6.0					
Indicated Conc. (ppm) 0.2 0.4 0.5 0.6					
OD 4.0					
- 0.6 dicate					
= 2.0 -					
1.0 -					
0.0	2.0	4.0	6.0	8.0	10.0
	2.0	7.0	0.0	0.0	

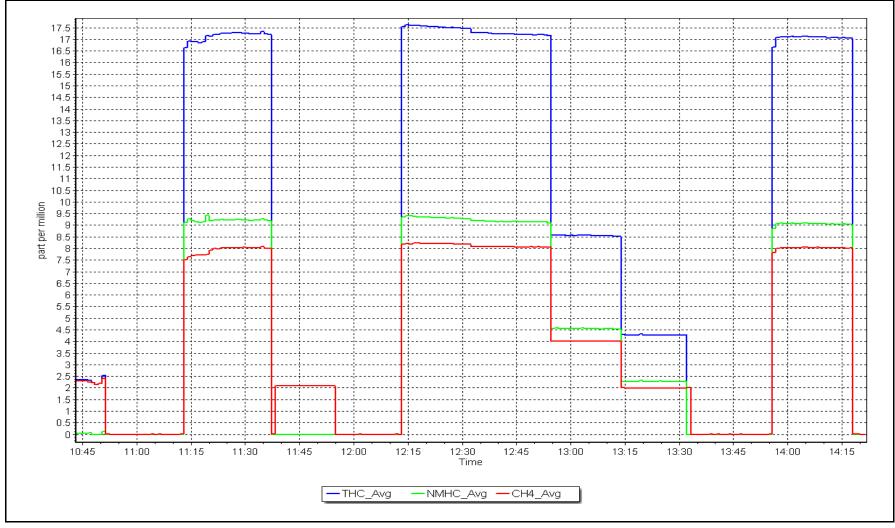


NMHC Calibration Summary

			Station I	nformation		
Calibration Da	te:	Febru	ary 1, 2023	Previous Calibration:	January 2	24, 2023
Station Name:		Bertha Gar	nter-Fort McKay	Station Number:	AM	501
Start Time (MS	ST):	:	10:45	End Time (MST):	14:	21
Analyzer make	e:	The	ermo 55i	Analyzer serial #:	11803	20040
			Calibra	tion Data		
Calculated concer (ppm) (Cc)		Indicated concentratio (ppm) (Ic)	On Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 9.19		0.00 9.15	1.0051	Correlation Coefficient	0.999993	≥0.995
4.60		4.56	1.0100			
2.30		2.28	1.0090	Slope	0.994978	0.90 - 1.10
				Intercept	-0.007938	+/-0.5
9.0 8.0 7.0)					
6.0 (bbm) 5.0 Conc.)					
5.0)					
5 4.0)					
4.0 3.0) 					
2.0) 					
1.0)					
0.0						
	0.0	2.0	4.0	6.0	8.0	10.0
			Coloulator	l Conc. (ppm)		









CH4 SP Ratio:

CH4 Retention time:

Set Point

as found zero

as found span

as left zero

as left span

Baseline Corr AF:

Baseline Corr 2nd AF:

Baseline Corr 3rd AF:

as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point 2.52E-04

14.4

Dil air flow rate

5000

4918

5000

4918

17.09

NA

NA

Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC SP Ratio:

NMHC Peak Area:

Calc conc (ppm) (Cc)

0.00

17.29

0.00

17.29

17.19

5.06E-05

181561

Ind conc (ppm) (Ic)

0.00

17.09

0.01

16.93

*% change

AF Intercept: * = > +/-5% change initiates investigation

Average Correction Factor

Version-01-2020

			Station	Information				
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter- February 21, 20 11:32 Cylinder Chang)23	1	Station number: AMS01 Last Cal Date: February 1, 2023 End time (MST): 14:31				
			Calibrat	ion Standards				
Gas Cert Reference:	(CC486642		Cal Gas Expiry Date: Feb	ruary 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: NA				
Removed CH4 Conc.	497.7	ppm		CH4 Equiv Conc.	1063.1	ppm		
Removed C3H8 Conc.	205.6	ppm		Diff between cyl (THC):				
Diff between cyl (CH ₄)	:			Diff between cyl (NM):				
Calibrator Model:	Teledyne API T	700		Serial Number: 356	5			
ZAG make/model:	Teledyne API T	701		Serial Number: 560	9			
			Analyze	r Information				
Analyzer make THC Range (ppm)				Analyzer serial #: 118	0320040			
NMHC Range (ppm)				CH4 Range (ppm): 0 - 1	l0 ppm			
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>		

THC Calibration Data

2.52E-04

14.4

Source gas flow rate

0.0

81.3

0.0

81.3

Prev response

AF Correlation:

AF Slope:

5.06E-05

181561

CF Limit= 0.95-1.05

1.011

1.021

-0.6%



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 <i>Limit=</i> 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	as found span 4918		9.19	9.05	1.016
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0	0.00	0.00	
as left span	4918	81.3	9.19	8.95	1.028
			Avera	ge Correction Factor	
Baseline Corr AF:	9.05	Prev response	9.14	*% change	-1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation

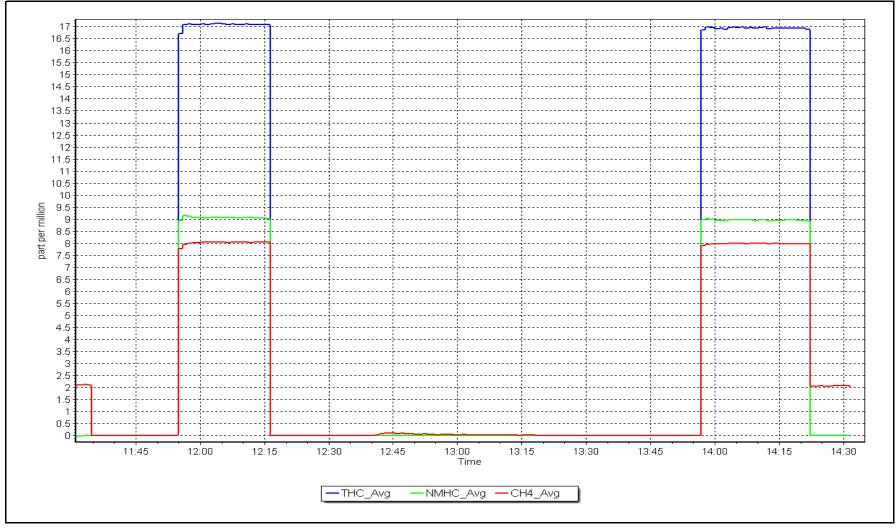
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	8.09	8.04	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.01	
as left span	4918	81.3	8.09	7.98	1.014
			Avera	age Correction Factor	
Baseline Corr AF:	8.04	Prev response	8.05	*% change	-0.2%
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:		0.995861			
THC Cal Offset:		-0.022506			
CH4 Cal Slope:		0.996625			
CH4 Cal Offset:		-0.014967			
NMHC Cal Slope:		0.994978			
NMHC Cal Offset:		-0.007938			

Changed out the H2 cylinder.

Calibration Performed By:

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Station number: AMS01

End time (MST): 16:07

Last Cal Date: January 6, 2023

Version-04-2020

Station Information

Station Name:	Be
Calibration Date:	Fe
Start time (MST):	1
Reason:	R

Bertha Ganter-Fort McKay Gebruary 2, 2023 1:23 Routine

Calibration Standards

NO Gas Cylinder #:	T2Y1P9L		Cal Gas Expiry Date: December 11, 2023				
NOX Cal Gas Conc:	50.84	ppm	NO Cal Gas Conc:	50.04	ppm		
Removed Cylinder #:		NA	Removed Gas Exp Date:		NA		
Removed Gas NOX Conc:	50.84	ppm	Removed Gas NO Conc:	50.04	ppm		
NOX gas Diff:			NO gas Diff:				
Calibrator Model:	Teledyne API T	700	Serial Number:	3565			
ZAG make/model:	Teledyne API T701		Serial Number:	5609			

Analyzer Information

Analyzer make: Th NOX Range (ppb): 0 ·			Analyzer serial #: 12	Analyzer serial #: 1218153357				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>			
NO coeff or slope:	1.453	1.440	NO bkgnd or offset:	6.9	6.8			
NOX coeff or slope:	0.990	0.990	NOX bkgnd or offset:	7.0	6.9			
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	199.5	198.9			

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999269	0.997218
NO _x Cal Offset:	-0.220000	0.060000
NO Cal Slope:	1.000842	0.998701
NO Cal Offset:	-0.900000	-0.400000
NO ₂ Cal Slope:	0.996966	0.997388
NO ₂ Cal Offset:	-0.078101	-0.442888



$NO_X \setminus NO \setminus NO_2$ 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	0.2	0.2	0.0		
as found span	4920	80.0	813.4	800.6	12.8	821.9	806.2	15.7	0.9897	0.9931
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0		
high point	4920	80.0	813.4	800.6	12.8	811.3	799.5	11.7	1.0026	1.0014
second point	4960	40.0	406.7	400.3	6.4	405.7	399.2	6.5	1.0025	1.0028
third point	4980	20.0	203.4	200.2	3.2	202.5	198.7	3.9	1.0042	1.0073
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.2	0.2		
as left span	4920	80.0	813.4	413.7	399.7	805.5	408.0	397.5	1.0099	1.0141
							Average C	orrection Factor	1.0031	1.0039
Corrected As fo	ound NO _x =	821.7 ppb	NO =	806.0 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	1.1%
Previous Respo	onse NO _x =	812.6 ppb	NO =	800.4 ppb				*Percent Chang	ge NO =	0.7%
Baseline Corr 2	and 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 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)	793.8	406.9	399.7	398.5	1.0030	99.7%
2nd GPT point (200 ppb O3)	793.8	585.2	221.4	220.1	1.0059	99.4%
3rd GPT point (100 ppb O3)	793.8	689.3	117.3	116.1	1.0103	99.0%
				Average Correction Factor	1.0064	99.4%

Notes:

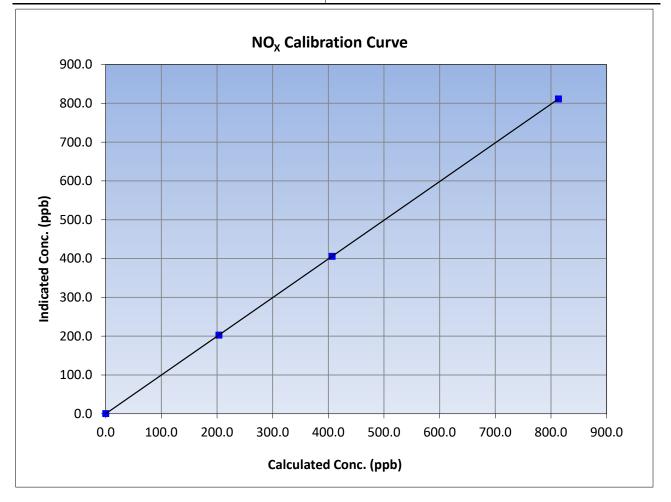
Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

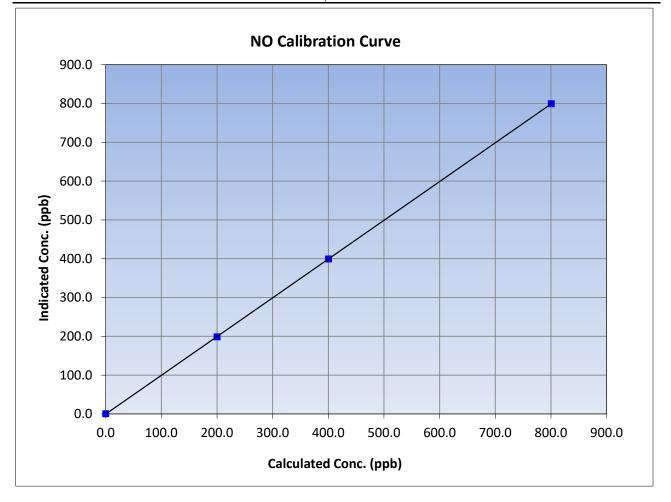
WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	6, 2023
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01
Start Time (MST):	11	:23	End Time (MST):	16	:07
Analyzer make:	Therr	mo 42i	Analyzer serial #:	53357	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999999	≥0.995
813.4	811.3	1.0026	correlation coefficient	0.5555555	20.995
406.7	405.7	1.0025	Clana	0.997218	0.90 - 1.10
203.4	202.5	1.0042	Slope	0.997218	0.90 - 1.10
			Intercept	0.060000	+/-20





NO Calibration Summary

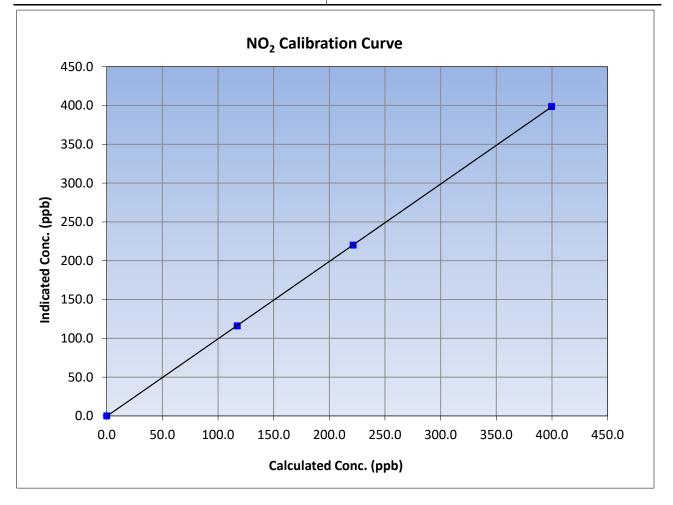
WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	6, 2023
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01
Start Time (MST):	11:23		End Time (MST): 16:		:07
Analyzer make: Thermo 42i			Analyzer serial #:	53357	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999996	≥0.995
800.6	799.5	1.0014	correlation coefficient	0.555550	20.995
400.3	399.2	1.0028	Clana	0.998701	0.90 - 1.10
200.2	198.7	1.0073	Slope	0.998701	0.90 - 1.10
			Intercept	-0.400000	+/-20





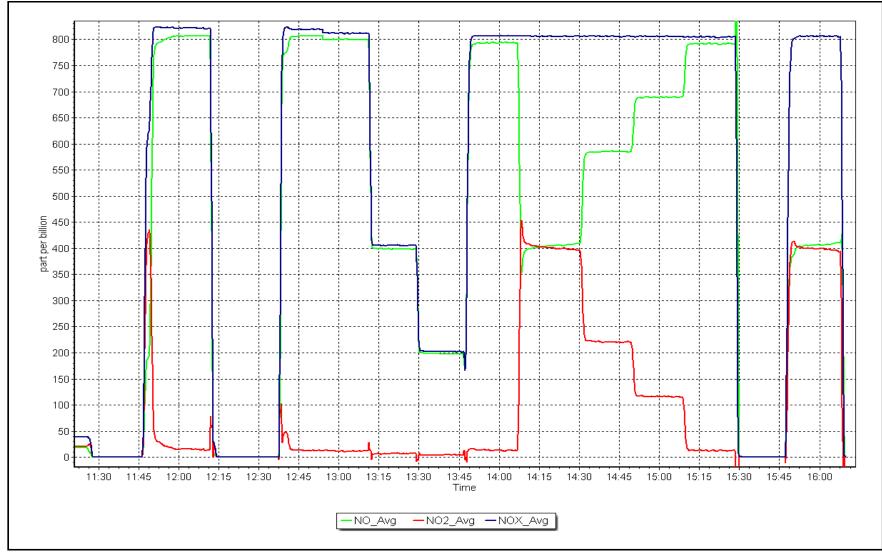
NO₂ Calibration Summary

WBEA					Version-04-202	
		Station	Information			
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	uary 6, 2023	
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01	
Start Time (MST):	11	:23	End Time (MST):	16	:07	
Analyzer make:	Therr	no 42i	Analyzer serial #:	53357		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999993	≥0.995	
399.7	398.5	1.0030	correlation coefficient	0.5555555	20.333	
221.4	220.1	1.0059	Clana	0.997388	0.90 - 1.10	
117.3	116.1	1.0103	Slope	0.997566	0.90 - 1.10	
			Intercept	-0.442888	+/-20	











O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort February 8, 2023 11:06 Routine	МсКау	Station number: Last Cal Date: End time (MST):	January 4, 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 e 0 - 500 ppb		Analyzer serial #:	1107	
Calibration slope: Calibration intercept:	<u>Start</u> 1.001400 0.480000	<u>Finish</u> 1.000086 0.760000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 2.4 1.016
		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	-0.4	
as found span	5000	855.5	400.0	399.3	1.002
as found 2nd point as found 3rd point					
calibrator zero	5000	0.0	0.0	0.5	
high point	5000	855.5	400.0	400.6	0.999
second point	5000	738.6	200.0	201.1	0.995
third point	5000	649.2	100.0	100.9	0.991
as left zero	5000	0.0	0.0	0.3	
as left span	5000	855.5	400.0	402.8	0.993
			Avera	ge Correction Factor	0.995
Baseline Corr As found:	399.7	Previous response	401.0	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

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

Calibration Performed By:

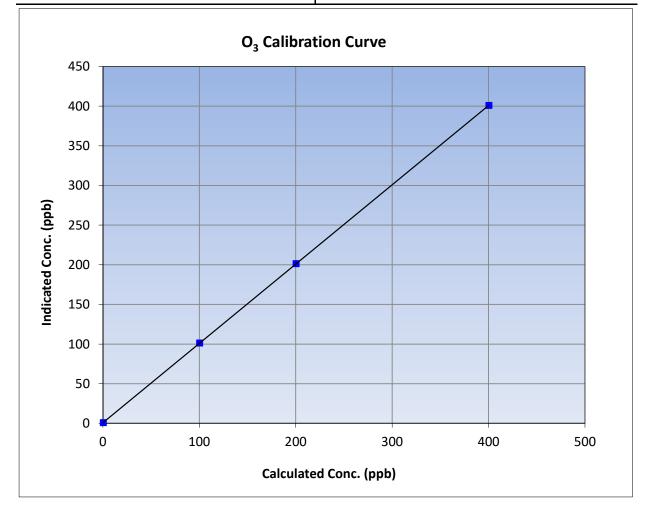


O₃ Calibration Summary

WBEA			Version-01-2020							
Station Information										
Calibration Date:	February 8, 2023	Previous Calibration:	January 4, 2023							
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01							
Start Time (MST):	11:06	End Time (MST):	14:30							
Analyzer make:	Teledyne API T400	Analyzer serial #:	1107							

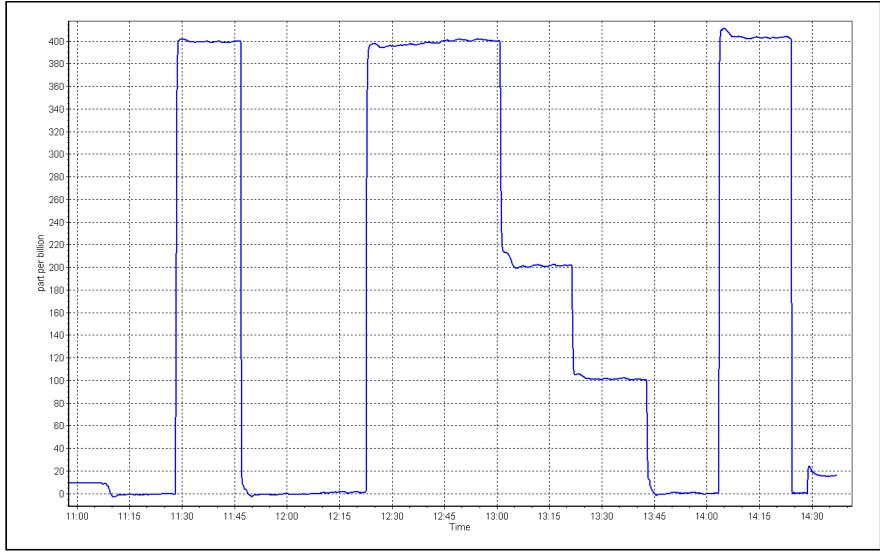
Calibration Data

Calculated concentration (ppb) (Cc)	ulated concentration Indicated concentration Con (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	ation	<u>Limits</u>	
0.0	0.5		Correlation Coefficient	0.999997	≥0.995	
400.0	400.6	0.9985	correlation coefficient	0.999997	20.335	
200.0	201.1	0.9945	Slope	1.000086	0.90 - 1.10	
100.0	100.9	0.9911	Slope	1.000080	0.30 - 1.10	
			Intercept	0.760000	+/- 5	











T640 PM_{2.5} CALIBRATION

WBEA						Version-01-202
		Station Informatio	n			
Station Name:	Fort McKay - Bertha	Ganter	AMS 01			
Calibration Date:	February 16, 2023		Last Cal Date:	January 23,	2023	
Start time (MST):	12:45		End time (MST):	13:46		
Analyzer Make:	API T640		S/N:	306		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Delta Cal		S/N:	1450		
Temp/RH standard:	Delta Cal		S/N:	1450		
		Monthly Calibration	Test			
Parameter	<u>As found</u>	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-7.6	-8.2	-7.6			+/- 2 °C
P (mmHg)	724.1	723.2	724.1			+/- 10 mmHg
flow (LPM)	5.00	5.03	5.00			+/- 0.25 LPM
Leak Test:	Date of check:	February 16, 2023	Last Cal Date:	January 2	4, 2023	
	PM w/o HEPA:	7.5	PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be	e completed before the	quarterly work and will	serve as the pre ma	intenance le	ak check	
Inlet cleaning :	Inlet Head					
		Quarterly Calibration	Test			
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>		Adjusted	(Limits)
PMT Peak Test						11.3 +/- 0.5
Post-maintenanc	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Chan		December 1	,			<0.2 ug/m3
Disposable Filte	r Changed:	December 1	19, 2022			
		Annual Maintenan	се			
Date Sample Tu	be Cleaned:	August 31	. 2022			
Date RH/T Sens		December 1				
Notes:		Flow, temperature and	pressure verified. Leal	k check passe	d.	
NOLES.		,			-	
Calibration by:	Rene Chamberland					
constation sy.						

ration by: Rene Cr



TN - NO_X - NH_3 Calibration Report

			Χ 5	•	
WBEA					Version-11-20
		Station	Information		
tation Name:	Bertha Ganter-Fo	ort McKay	Station number:	AMS01	
NOX Cal Date:	February 16, 202	3	Last Cal Date:	January 26, 2023	
tart time (MST):	11:12		End time (MST):	15:18	
NH3 Cal Date:	February 16, 2023		Last Cal Date:	January 26, 2023	
Start time (MST):	15:50		End time (MST):	18:20	
Reason:	Removal				
		Calibrati	on Standards		
NOX Cal Gas Conc:	50.84		NO Gas Cylinder #:	T2Y1P9L	
NOX Cal Gas Conc:	50.04	ppm	NO Cal Gas Expiry:	March 3, 2028	
Removed NOX Conc:	50.84	ppm ppm	Removed Cylinder #:	NA	
Removed NO Conc:	50.04		Removed cyl Expiry:	NA	
	50.04	ppm	NO gas Diff:	NA	
NOX gas Diff:	72.93	nnm	-	CC281298	
NH3 Cal Gas Conc:	12.93	ppm	NH3 Gas Cylinder #: NH3 Cal Gas Expiry:	February 28, 2023	
Removed NH3 Conc:	72.93	nnm	Removed Cylinder #:	NA	
NH3 gas Diff:	12.33	ppm	Removed cyl Expiry:	NA	
Calibrator Model:	Tolody	ne API T700	Serial Number:	3565	
ZAG make/model:		ne API T700	Serial Number:	5609	
Ad makey model.	Teledy		Senar Number.	5005	
		Analyze	r Information		
Analyzer model	: Teledyne API T20)1E	Analyzer serial #	: 56	
-	Teledyne API T50		Converter serial #		
NH3 Range (ppb)	dag 0002 - 0		Reaction cell Press	: 4.90	
NOX Range (ppb)			Sample Flow		
	Start	Finish	00p.01.01	Start	Finish
NO coefficient		<u>rmsn</u>	TN coefficient		FIIIISII
NOX coefficient:			NO bkgrnd		
NO2 coefficient			NOX bkgrnd		
NH3 coefficient			TN bkgrnd		
	0.515			. 3.100	
			ion Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	1.001644		0.986302	
NO _x Cal Offset	:	-0.440000		-0.180000	
NO Cal Slope	:	1.001856		0.988309	
NO Cal Offset	:	-1.080000		-0.560000	
NO ₂ Cal Slope	:	0.999297		0.982947	
NO ₂ Cal Offset	:	0.756159		-0.400969	
NH3 Cal Slope	:	0.988888		1.009740	
NH3 Cal Offset	:	14.116543		1.383893	
TN Cal Slope	:	0.996806		1.017473	
TN Cal Offset	:	16.482567		1.877552	



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) <i>Limit = 0.95-1.05</i>
as found zero										
as found NO										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.8	-0.8		
high NO point	4920	80.0	813.4	813.4		802.5	802.8	-0.2	1.014	
NO/O3 point										
as found NH3										
new NH3 cyl rp										
first NH3	3413	86.4	1800.6		1800.6	1839.0		1824.3	0.979	0.987
second NH3	3452	48.0	1000.2		1000.2	1004.7		996.8	0.996	1.003
third NH3	3476	24.0	500.1		500.1	522.3		518.3	0.957	0.965
							Average C	Correction Factor	1.0136	0.9851
Corrected As fou	und TN =	NA ppb	NO _X = NA	ppb NH3 =	NA ppb			*Percent Change	e TN =	NA
Previous Respon	nse TN =	NA ppb	NO _X = NA	ppb NH3 =	NA ppb			*Percent Change	e NO _x =	NA
								*Percent Change	e NH3 =	NA
		$n_{01} = 01.00/$						* - > +/-5% chango i	nitiatos invostigati	on.

NH3 Previous Converter Efficiency = 91.9%

NH3 Current Converter Efficiency =

* = > +/-5% change initiates investigation



NO_x - NO - NO₂ Calibration Report

Version-11-2021

	Dilution Calibration Data									
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.8	1.0	0.1		
as found span	4920	80.0	813.4	800.6	813.4	802.8	791.0	802.5	1.0133	1.0122
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.8	1.0	0.1		
high point	4920	80.0	813.4	800.6	813.4	802.8	791.0	802.5	1.0133	1.0122
second point	4960	40.0	406.7	400.3	406.7	399.9	395.8	397.9	1.0171	1.0114
third point	4980	20.0	203.4	200.2	203.4	199.8	194.7	199.8	1.0178	1.0280
							Average C	Correction Factor	1.0160	1.0172
Baseline Corr A	s fnd TN =	802.4 ppb	NO _x = 802.0	ppb NO =	790.0 ppb			*Percent Chang	e TN =	-3.1%
Previous Respo	nse TN =	827.3 ppb	NO _x = 814.3	ppb NO =	801.0 ppb			*Percent Chang	e NO _x =	-1.5%
								*Percent Chang	e NO =	-1.4%
								* = > +/-5% change	initiates investigat	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	-0.2					
calibration zero			0.0	-0.2					
1st GPT point (400 ppb O3)	784.3	392.6	404.5	398.6	1.0148	98.5%			
2nd GPT point (200 ppb O3)	784.3	583.3	213.8	205.9	1.0384	96.3%			
3rd GPT point (100 ppb O3)	784.3	682.6	114.5	114.4	1.0009	99.9%			
				Average Correction Factor	1.0180	98.3%			

Notes:

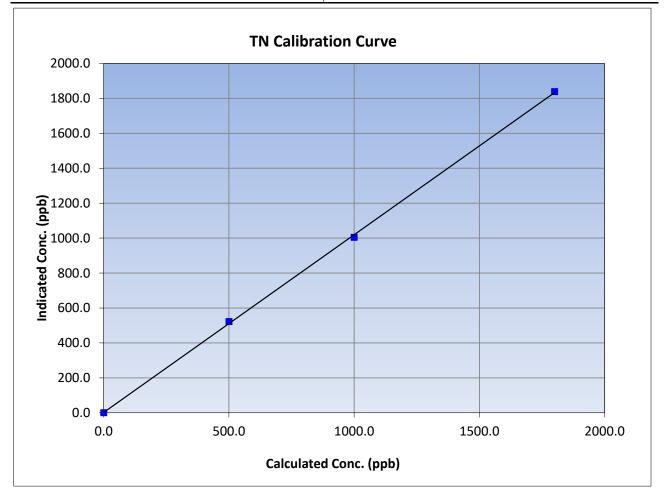
Completing multi point as founds. Removing the analyzer/converter.

Calibration Performed By:



TN Calibration Summary

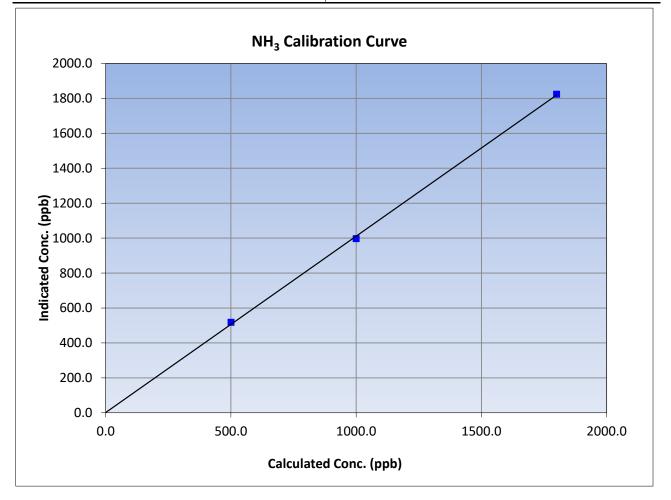
WBEA					Version-11-202
		Station	Information		
Calibration Date:	February 16, 2023		Previous Calibration:	Januai	ry 26, 2023
Station Name:	Bertha Ganter-Fort McKay		Station Number:	AMS01	
Start Time (MST):	11:12		End Time (MST):	15:18	
Analyzer make:	Teledyne API T201E		Analyzer serial #:	56	
		Calibra	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	0.999791 ≥ <i>0.9</i>	≥0.995
1800.6	1839.0	0.9791			20.333
1000.2	1004.7	0.9955	Slope	1.017473	0.90 - 1.10
500.1	522.3	0.9575			
			Intercept	1.877552	+/-20





NH₃ Calibration Summary

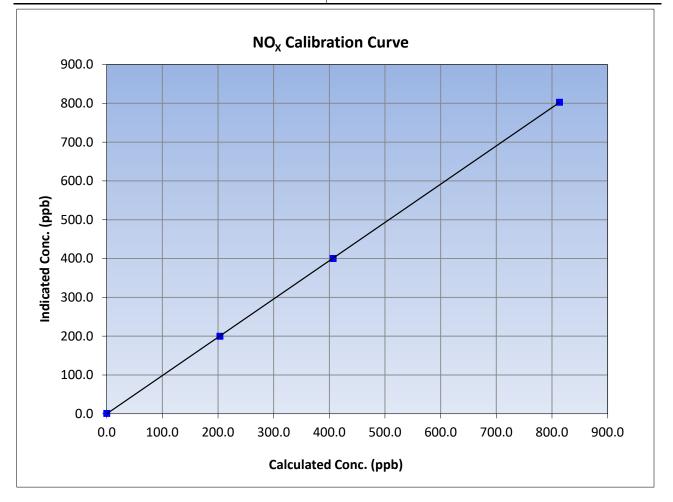
WBEA		o			Version-11-202
		Station	Information		
Calibration Date:	February 16, 2023		Previous Calibration:	January 26, 2023	
Station Name:	Bertha Ganter-Fort McKay		Station Number:	AMS01	
Start Time (MST):	11:12		End Time (MST):	15:18	
Analyzer make:	Teledyne API T201E		Analyzer serial #:	56	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.8		Correlation Coefficient	0.999789 ≥ <u>0.9</u>	≥0.995
1800.6	1824.3	0.9870		0.999789	20.395
1000.2	996.8	1.0034	Slope	1.009740	0.90 - 1.10
500.1	518.3	0.9649			0.90 - 1.10
			Intercept	1.383893	+/-20





NO_x Calibration Summary

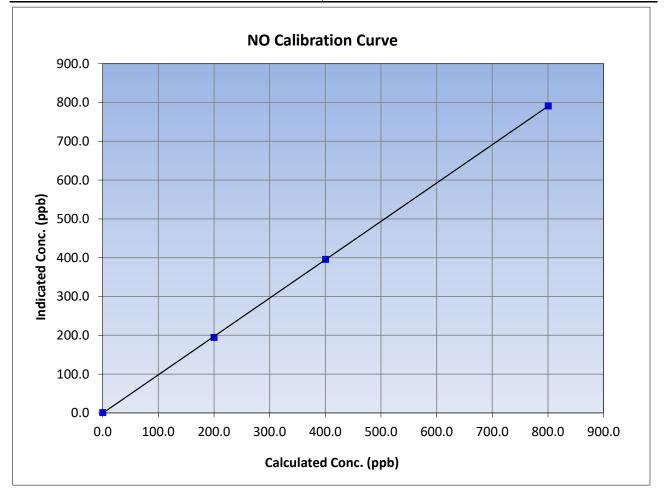
WBEA					Version-11-2
		Station	Information		
Calibration Date:	February	16, 2023	Previous Calibration:	January	y 26, 2023
Station Name:	Bertha Ganter-Fort McKay		Station Number:	Station Number: AN	
Start Time (MST):	11:12		End Time (MST):	15:18	
Analyzer make:	Teledyne	Analyzer serial #: 56		56	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.8		Correlation Coefficient	0.999992	≥0.995
813.4	802.8	1.0133	correlation coefficient	0.555552	20.333
406.7	399.9	1.0171	Slope	0.986302	0.90 - 1.10
203.4	199.8	1.0178	Slope	0.980502	0.90 - 1.10
			Intercept	-0.180000	+/-20





NO Calibration Summary

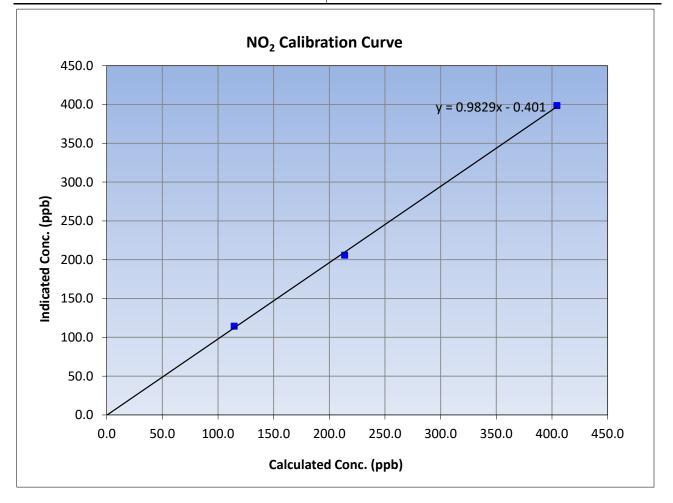
		Station I	nformation		Version-11-2
Calibration Date: Station Name: Start Time (MST): Analyzer make:	Bertha Gante 11	16, 2023 er-Fort McKay :12 API T201E	Previous Calibration: Station Number: End Time (MST): Analyzer serial #:	AN 15	26, 2023 4501 5:18 56
Calculated concentration	Indicated concentration		tion Data Statistical Evalua	ation	
(ppb) (Cc)	(ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua		<u>Limits</u>
(ppb) (Cc) 0.0 800.6 400.3	(ppb) (Ic) <u>1.0</u> <u>791.0</u> <u>395.8</u>	 1.0122 1.0114	Correlation Coefficient	0.999972	<u>Limits</u> ≥0.995

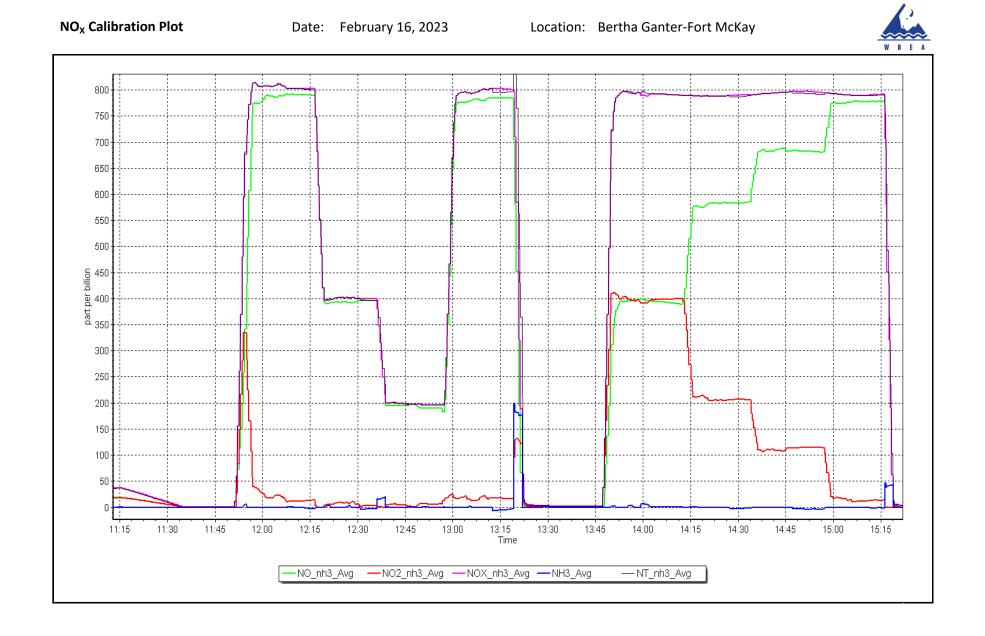




NO₂ Calibration Summary

WBEA		Station	Information		Version-11-
Calibration Date: Station Name: Start Time (MST): Analyzer make:	Bertha Gante 11	2 16, 2023 er-Fort McKay :12 API T201E	Previous Calibration: Station Number: End Time (MST): Analyzer serial #:	AN 1	/ 26, 2023 //S01 5:18 56
Calculated concentration	Indicated concentration	Calibra	ation Data Statistical Evalu	ation	Limits
(ppb) (Cc)	(ppb) (Ic) -0.2				
404.5	398.6	1.0148	Correlation Coefficient	0.999743	≥0.995
213.8 114.5	205.9 114.4	1.0384 1.0009	Slope	0.982947	0.90 - 1.10
			Intercept	-0.400969	+/-20













TN - NO_X - NH_3 Calibration Report

W B E A					Version-11-202
		Statio	n Information		
Station Name:	Bertha Ganter-For	t McKay	Station number:	AMS01	
NOX Cal Date:	February 17, 2023		Last Cal Date:	NA	
Start time (MST):	11:32		End time (MST):	15:30	
NH3 Cal Date:	February 17, 2023		Last Cal Date:	NA	
Start time (MST):	15:50		End time (MST):	18:15	
Reason:	Install				
		Calibra	tion Standards		
NOX Cal Gas Conc:	50.84	ppm	NO Gas Cylinder #:	T2Y1P9L	
NO Cal Gas Conc:	50.04	ppm	NO Cal Gas Expiry:	March 3, 2028	
Removed NOX Conc:	50.84	ppm	Removed Cylinder #:	NA	
Removed NO Conc:	50.04	ppm	Removed cyl Expiry:	NA	
NOX gas Diff:			NO gas Diff:		
NH3 Cal Gas Conc:	72.93	ppm	NH3 Gas Cylinder #:	CC281298	
			NH3 Cal Gas Expiry:	February 28, 2023	
Removed NH3 Conc:	72.93	ppm	Removed Cylinder #:	NA	
NH3 gas Diff:			Removed cyl Expiry:	NA	
Calibrator Model:	Teledyr	e API T700	Serial Number:	3565	
ZAG make/model:	Teledyr	e API T701	Serial Number:	5609	
		Analyz	er Information		
	: Teledyne API T201		Analyzer serial #	‡: 808	
Converter model	: Teledyne API T501	L	Converter serial #	t: 824	
NH3 Range (ppb):	: 0 - 2000 ppb		Reaction cell Press	s: 5.10	
NOX Range (ppb):	: 0 - 1000 ppb		Sample Flow: 470		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	Finish
NO coefficient		0.833	TN coefficien	t:	0.828
NOX coefficient		0.834	NO bkgrnd		-11.017
NO2 coefficient		1.000	NOX bkgrnd	1:	-10.278
NH3 coefficient	:	0.854	TN bkgrnd	1:	-4.631
		Calibra	ation Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope:	:			1.000885	
NO _x Cal Offset:				0.380000	
NO Cal Slope:				0.999215	
NO Cal Offset				-0.780000	
NO ₂ Cal Slope	:			0.999881	
NO ₂ Cal Offset	:			0.372129	
NH3 Cal Slope	:			1.010718	
NH3 Cal Offset	:			-8.022555	
TN Cal Slope	:			1.015098	
TN Cal Offset	:			-7.787324	



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) <i>Limit = 0.95-1.05</i>
as found zero										
as found NO										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high NO point	4920	80.0	813.4	813.4		812.9	814.6	-1.9	1.001	
NO/O3 point										
as found NH3										
new NH3 cyl rp										
first NH3	3413	86.4	1800.6		1800.6	1817.8		1809.8	0.991	0.995
second NH3	3452	48.0	1000.2		1000.2	1021.0		1016.3	0.980	0.984
third NH3	3476	24.0	500.1		500.1	480.9		478.2	1.040	1.046
							Average C	Correction Factor	1.0007	1.0083
Corrected As fo	ound TN =	NA ppb	NO _x = NA	ppb NH3 =	NA ppb			*Percent Change	e TN =	NA
Previous Respo	nse TN =	NA ppb	NO _x = NA	ppb NH3 =	NA ppb			*Percent Change	e NO _x =	NA
								*Percent Change	e NH3 =	NA

NH3 Previous Converter Efficiency =

NH3 Current Converter Efficiency = 85.4%

* = > +/-5% change initiates investigation



NO_x - NO - NO₂ Calibration Report

....

Version-11-2021

				Dilutio	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										
as found span										
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1		
high point	4920	80.0	813.4	800.6	813.4	814.6	799.8	812.9	0.9986	1.0011
second point	4960	40.0	406.7	400.3	406.7	406.9	398.2	406.9	0.9996	1.0053
third point	4980	20.0	203.4	200.2	203.4	204.8	199.0	204.0	0.9930	1.0058
							Average C	Correction Factor	0.9970	1.0041
Baseline Corr As	s fnd TN =	NA ppb	NO _x = NA	ppb NO =	NA ppb			*Percent Chang	e TN =	NA
Previous Respon	nse TN =	NA ppb	NO _x = NA	ppb NO =	NA ppb			*Percent Chang	e NO _x =	NA
								*Percent Chang	e NO =	NA
								* = > +/-5% change i	nitiates 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								
calibration zero			0.0	0.1				
1st GPT point (400 ppb O3)	795.6	393.9	414.5	414.9	0.9990	100.1%		
2nd GPT point (200 ppb O3)	795.6	594.5	213.9	213.7	1.0009	99.9%		
3rd GPT point (100 ppb O3)	795.6	693.9	114.5	115.6	0.9905	101.0%		
			l	Average Correction Factor	0.9968	100.3%		

Notes: Installing a new NH3 analyzer/converter. Changed the inlet filter. Adjusted both zero and span. Used the 2nd GPT point. Adjusted the NH3 span.

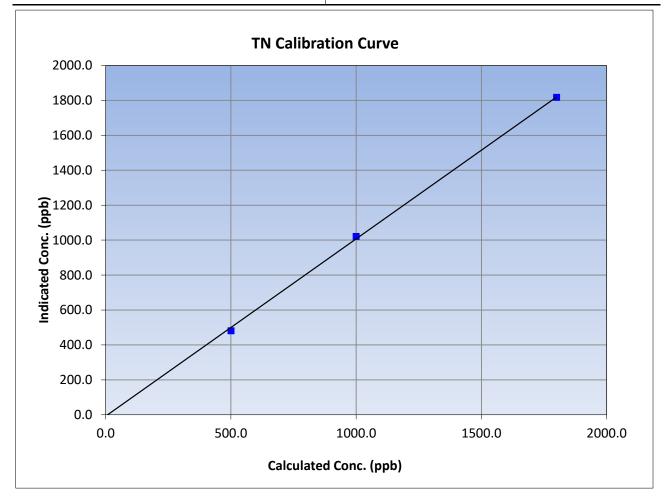
Calibration Performed By:

Rene Chamberland



TN Calibration Summary

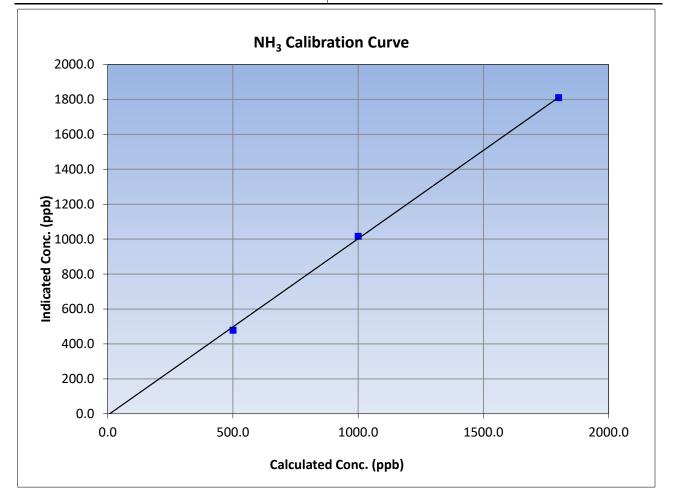
WDEA					Version-11-202
		Station	Information		
Calibration Date:	February	17, 2023	Previous Calibration:		NA
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01
Start Time (MST):	11:32		End Time (MST):		15:30
Analyzer make:			Analyzer serial #:		808
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coofficient	0.000000	× 0.005
1800.6	1817.8	0.9906	Correlation Coefficient	0.999668	≥0.995
1000.2	1021.0	0.9796	Slope	1.015098	0.90 - 1.10
500.1	480.9	1.0399	Slope	1.015098	0.30 - 1.10
			Intercept	-7.787324	+/-20





NH₃ Calibration Summary

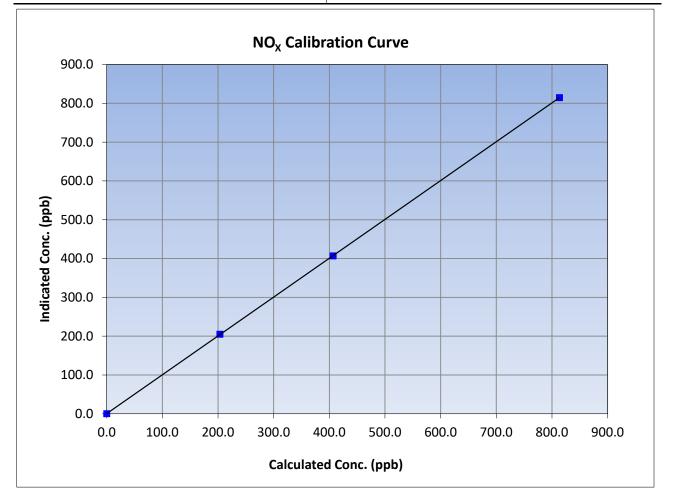
WBEA					Version-11-202	
		Station	Information			
Calibration Date:	February	17, 2023	Previous Calibration:		NA	
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01	
Start Time (MST):	11:32		End Time (MST):		15:30	
Analyzer make:	Teledyne	Analyzer serial #:		808		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999659	≥0.995	
1800.6	1809.8	0.9949	correlation coernelent	0.999039	20.333	
1000.2	1016.3	0.9841	Slope	1.010718	0.90 - 1.10	
500.1	478.2	1.0458	Siope	1.010718	0.90 - 1.10	
			Intercept	-8.022555	+/-20	





NO_x Calibration Summary

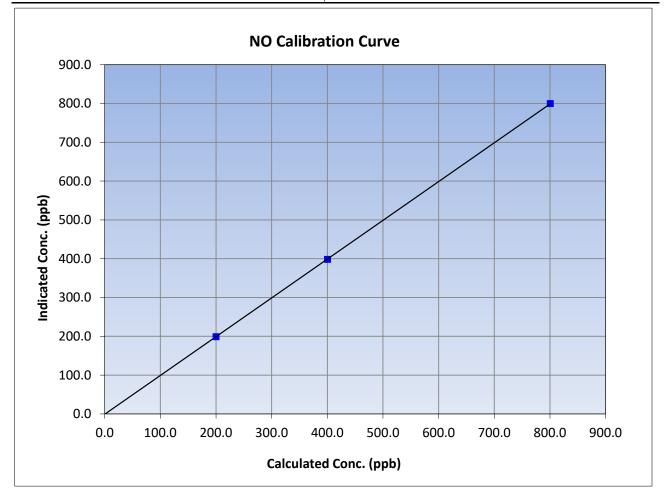
WBEA					Version-11-202	
		Station	Information			
Calibration Date:	February	17, 2023	Previous Calibration:		NA	
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01	
Start Time (MST):	11:32		End Time (MST):		15:30	
Analyzer make:	make: Teledyne API T201		Analyzer serial #:		808	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999997	≥0.995	
813.4	814.6	0.9986	correlation coernelent	0.555557	20.333	
406.7	406.9	0.9996	Slope	1.000885	0.90 - 1.10	
203.4	204.8	0.9930	Slope	1.000865	0.90 - 1.10	
			Intercept	0.380000	+/-20	





NO Calibration Summary

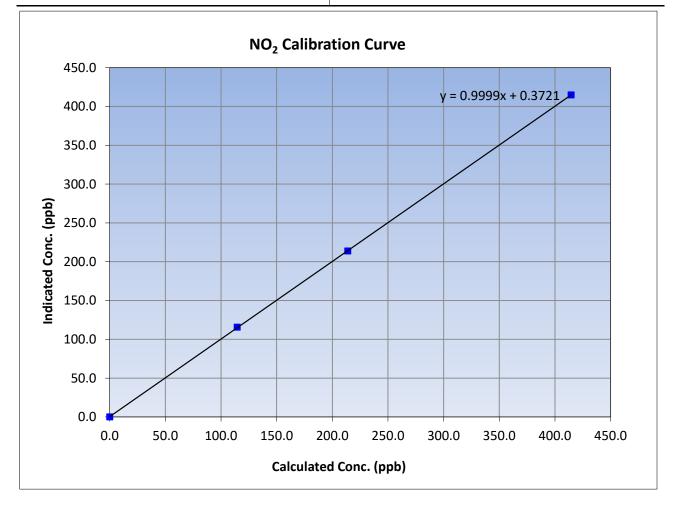
		Charles and	a familia a tana			
		Station	nformation			
Calibration Date:	February	17, 2023	Previous Calibration:		NA	
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01	
Start Time (MST):	11:32		End Time (MST):		15:30	
Analyzer make:	lyzer make: Teledyne API T201		Analyzer serial #:		808	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
		Correction factor (Cc/Ic)				
(ppb) (Cc)	(ppb) (Ic)		Statistical Evaluation	ation 0.999995	<u>Limits</u> ≥0.995	
(ppb) (Cc) 0.0	(ppb) (lc) -0.1		Correlation Coefficient	0.999995	≥0.995	
(ppb) (Cc) 0.0 800.6	(ppb) (Ic) -0.1 799.8	1.0011				

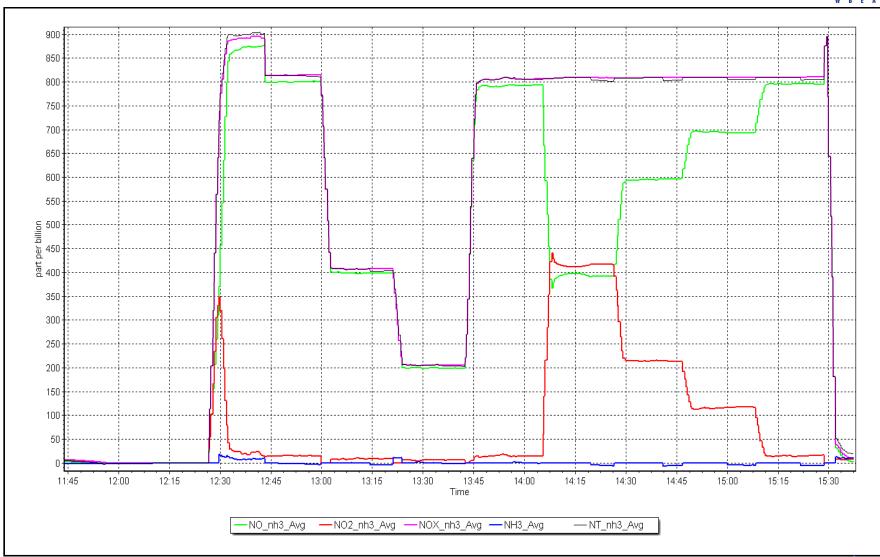




NO₂ Calibration Summary

WDLA					Version-11-202	
		Station	Information			
Calibration Date:	February	17, 2023	Previous Calibration:		NA	
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01	
Start Time (MST):	11:32		End Time (MST):		15:30	
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	0.1		Correlation Coefficient	0.999990	≥0.995	
414.5	414.9	0.9990	correlation coefficient	0.5555550	20.995	
213.9	213.7	1.0009	Slope	0.999881	0.90 - 1.10	
114.5	115.6	0.9905	Slope	0.999001	0.90 - 1.10	
			Intercept	0.372129	+/-20	





NO_x Calibration Plot

Date: February 17, 2023 Location: Bertha Ganter-Fort McKay











CO Calibration Report

Version-01-2020

					Version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort February 15, 2023 11:15 Maintenance	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 January 11, 2023 15:35	
		Calibration Sta	andards		
Cal Gas Concentration: Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	<u>3040</u> <u>ALM042207</u> <u>3040</u> <u>NA</u> Teledyne API T700 Teledyne API T701	ppm ppm	Cal Gas Exp Date: Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	December 1, 2028 NA 3565 5609	
		Analyzer Info	rmation		
Analyzer make Analyzer Range	: Teledyne API T300 : 0 - 50 ppm	-	Analyzer serial #:	3520	
Calibration slope: Calibration intercept:	<u>Start</u> 0.999735 0.169836	<u>Finish</u> 1.001201 0.093816	Backgd or Offset: Coeff or Slope:		<u>Finish</u> -0.012 0.991
		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/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.1	
as found span	4933	66.7	40.6	40.2	1.008
as found 2nd point	4966	33.3	20.2	20.4	0.991
as found 3rd point	4983	16.7	10.2	10.1	1.010
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4933	66.7	40.6	40.6	0.999
second point	4966	33.3	20.2	20.6	0.982
third point	4983	16.7	10.2	10.3	0.991
as left zero	5000	0.0	0.0	0.0	
as left span	2960	40.0	40.5	40.2	1.010
			Avera	ge Correction Factor	0.991
Baseline Corr As found:	40.36	Prev response:	40.72	*% change:	-0.9%
Baseline Corr 2nd AF pt:	20.6	AF Slope:		AF Intercept:	-0.022146
Baseline Corr 3rd AF pt:	10.2	AF Correlation:	0.999867	·	
				* = > +/-5% change initiate	es investigation

Notes:

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

Calibration Performed By:

Rene Chamberland

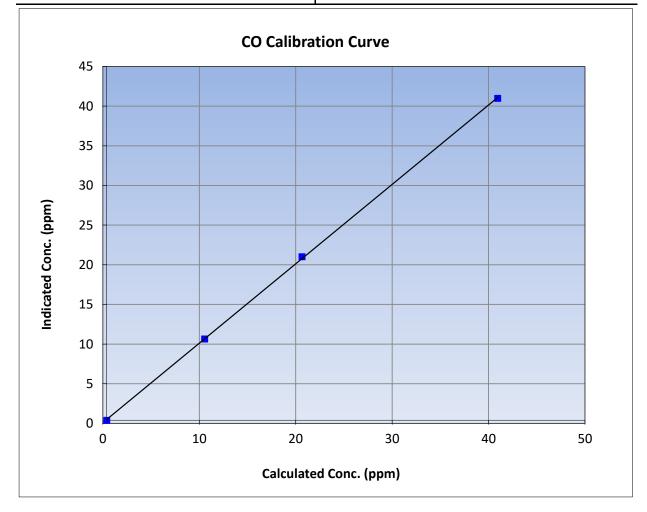


CO Calibration Summary

WBEA			Version-01-2020
	Station	Information	
Calibration Date:	February 15, 2023	Previous Calibration:	January 11, 2023
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:15	End Time (MST):	15:35
Analyzer make:	Teledyne API T300	Analyzer serial #:	3520

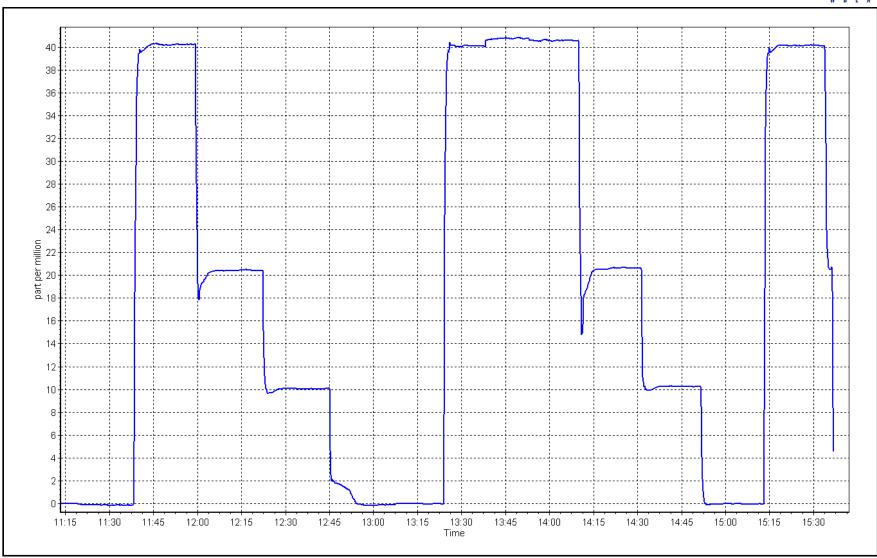
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999905	≥0.995
40.6	40.6	0.9994	correlation coefficient	0.999905	20.333
20.2	20.6	0.9825	Slope	1.001201	0.90 - 1.10
10.2	10.3	0.9907	Slope	1.001201	0.30 - 1.10
			Intercept	0.093816	+/-1.5











CO₂ Calibration Report

Version-01-2020

		Station Infor	mation		version-01-202
Chatles News	Deutles Conton Ford			414604	
Station Name:	Bertha Ganter-Fort	мскау	Station number:	AMS01	
Calibration Date: Start time (MST):	February 7, 2023 10:46		Last Cal Date: End time (MST):	January 16, 2023 14:02	
Reason:	Routine		End time (wist).	14.02	
Reason.	Routine				
		Calibration St	andards		
Cal Gas Concentration:	60,200	ppm	Cal Gas Exp Date:	December 1, 2028	
Cal Gas Cylinder #:	ALM042207	ppin	cui dus Exp Dute.	2020	
Removed Cal Gas Conc:	<u>60,200</u>	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA	P.D	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565	
N2 Gen Make/Model:	Peak Sci NG5000		Serial Number:	7220900034	
		Analyzer Info	rmation		
Analyzer make	: Teledyne API 360		Analyzer serial #:	442	
Analyzer Range	e 0 - 2,000 ppm				
	Start	Finish		Start	Finish
Calibration slope:	1.002131	0.999874	Backgd or Offset:		0.037
Calibration intercept:	-6.480000	-5.820000	Coeff or Slope:		0.883
	0.100000	5.620000		0.000	0.000
		CO ₂ Calibration	on Data		
		C	Calculated	Indiana	
Set Point	Dilution air flow rate	Source gas flow rate (sccm)	concentration (ppm)	Indicated concentration (ppm) (Ic)	Limit = 0.95 - 1.05
	(sccm)	(seem)	(Cc)	(ppiii) (ic)	Linin - 0.95-1.05
as found zero	3000	0.0	0.0	-0.4	
as found span	2920	80.0	1605.3	1601.0	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.1	
high point	2920	80.0	1605.3	1602.5	1.002
second point	2960	40.0	802.7	792.9	1.012
third point	2980	20.0	401.3	390.4	1.028
as left zero	3000	0.0	0.0	-0.4	
as left span	2960	40.0	802.7	780.8	1.028
			Averag	e Correction Factor	1.014
Baseline Corr As found:	1601.40	Prev response:	1602.27	*% change:	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		E -	

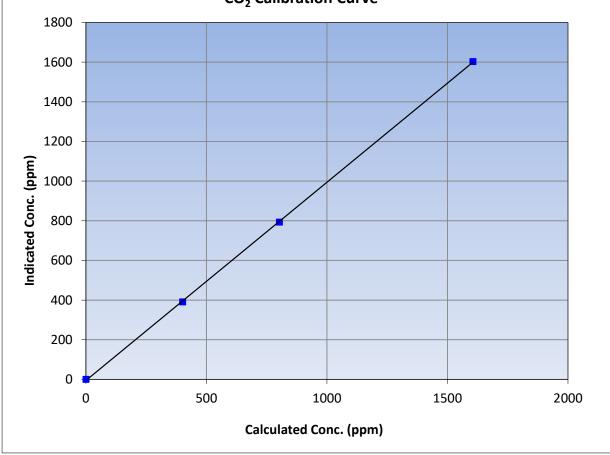
Changed the inlet filter after as founds. No adjustments made.

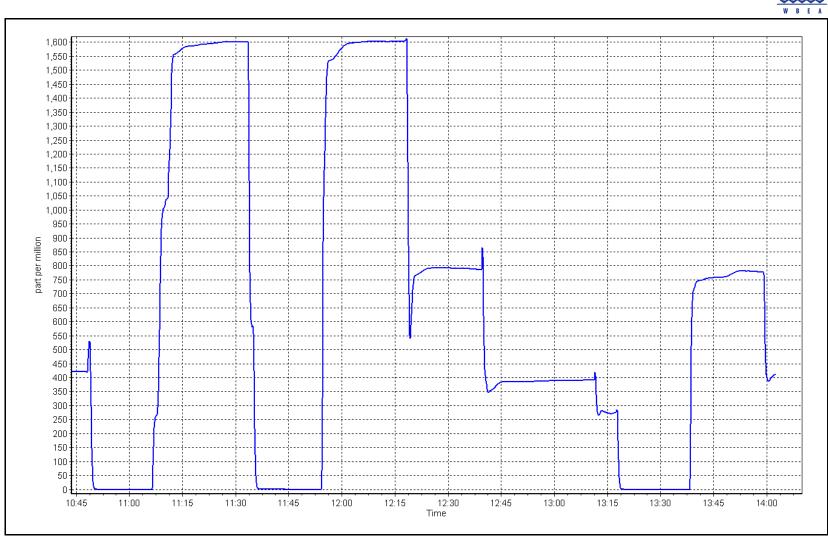
Calibration Performed By:



CO₂ Calibration Summary

WBEA					Version-01-2
		Station	Information		
Calibration Date	February	7, 2023	Previous Calibration	January	16, 2023
Station Name	Bertha Ganter	-Fort McKay	Station Number	AN	IS01
Start Time (MST)	10:4	46	End Time (MST)	14	:02
Analyzer make	Teledyne	API 360	Analyzer serial #	4	42
		Calibi	ration Data		
lculated concentration Ir (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0 1605.3	-0.1	1.0018	Correlation Coefficient	0.999941	≥0.995
802.7	1602.5 792.9	1.0123			
401.3	390.4	1.0280	Slope	0.999874	0.90 - 1.10
			Intercept	-5.820000	+/-10
			<u>.</u>		
		CO ₂ Calibr	ation Curve		
1800					





Date: February 7, 2023

Location: Bertha Ganter-Fort McKay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Mildred Lake February 8, 2023 9:57 AM Routine		Station number: Last Cal Date: End time (MST):	AMS02 January 3, 2023 13:07	
		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 #:			Diff between cyl:	1105	
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701		Serial Number: Serial Number:	1185 5608	
	AFITIOI		Senai Number.	5008	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	JC1404901075	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.996082	1.002695	Backgd or Offset:	17.8	17.9
Calibration intercept:	-0.526045	-0.144667	Coeff or Slope:	0.816	0.827
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	orrection factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)		<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	
as found span	4920	80.2	801.6	793.0	1.011
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.2	801.6	803.7	0.997
second point	4960	40.1	400.8	402.0	0.997
third point	4980	20.0	199.9	199.7	1.001
as left zero	5000	0.0	0.0	0.3	
as left span	4920	80.2	801.6	807.8	0.992
			Averag	ge Correction Factor	0.999
Baseline Corr As found:	793.00	Previous response	797.98	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

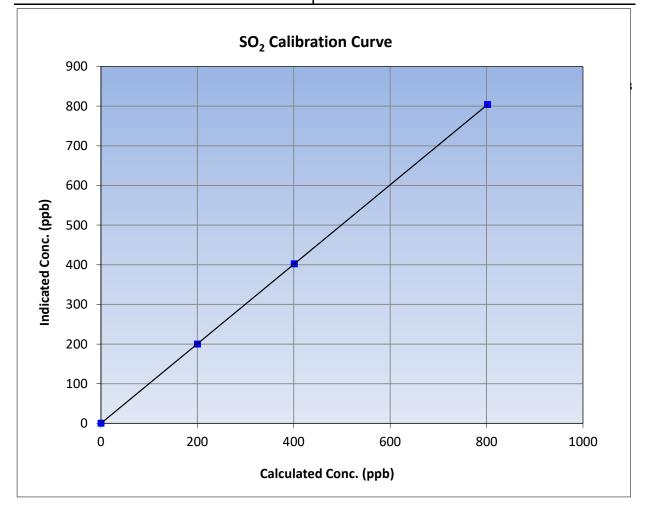


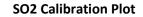
SO₂ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	February 8, 2023	Previous Calibration:	January 3, 2023
Station Name:	Mildred Lake	Station Number:	AMS02
Start Time (MST):	9:57	End Time (MST):	13:07
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075

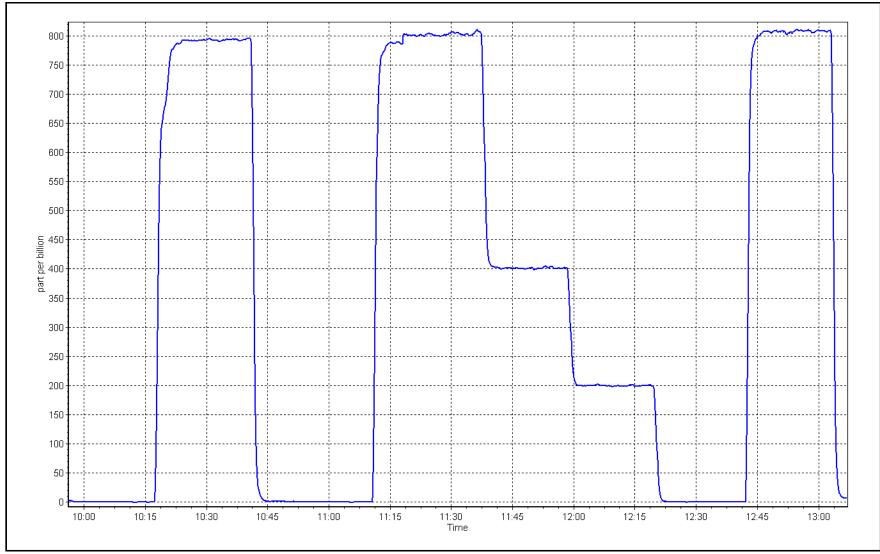
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999998	≥0.995
801.6	803.7	0.9974	correlation coefficient	0.999998	20.333
400.8	402.0	0.9971	Slope	1.002695	0.90 - 1.10
199.9	199.7	1.0011	Slope	1.002095	0.90 - 1.10
			Intercept	-0.144667	+/-30











H₂S Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Mildred Lake February 6, 2023 10:07 Routine		Station number: Last Cal Date: End time (MST):	AMS02 January 17, 2023 14:25	
		Calibration S	tandards		
Cal Gas Concentration:	5.29	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	CC345191 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	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.010965 -0.179192	0.993964 -0.059204	Backgd or Offset: Coeff or Slope:		1.83 0.844
		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	79.7	1.002
as found 2nd point	4962	37.8	40.0	40.1	0.995
as found 3rd point	4981	18.9	20.0	19.8	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 facto (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4924	75.6	80.0	79.4	1.007
second point	4962	37.8	40.0	39.9	1.002
third point	4981	18.9	20.0	19.6	1.020
as left zero	5000	0.0	0.0	0.1	
as left span	4924	75.6	80.0	79.9	1.001
O2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber cha		12-Sep-22		Ave Corr Factor	1.010
Date of last converter eff	iciency test:				efficiency
Baseline Corr As found:	79.8	Prev response:		*% change:	-1.1%
Baseline Corr 2nd AF pt:	40.2	AF Slope: AF Correlation:		AF Intercept:	-0.059199

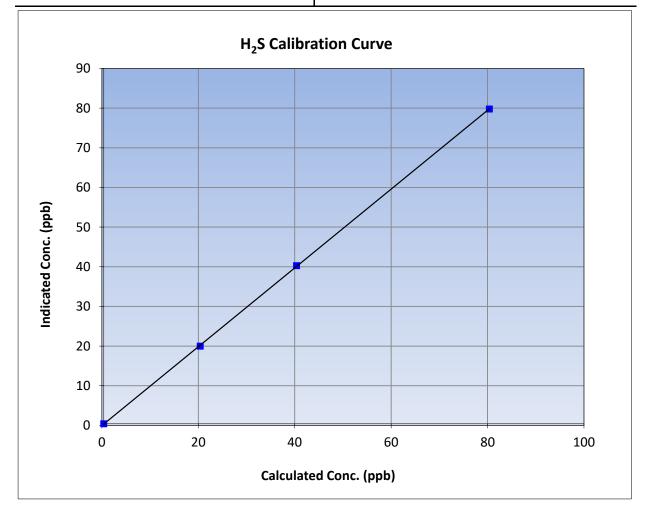
Notes:

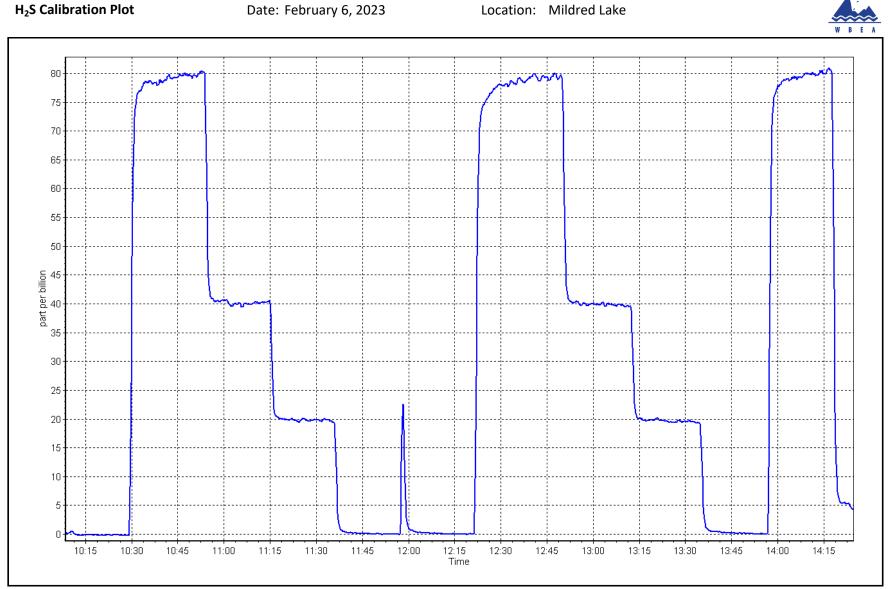
Changed the inlet filter after as founds. Ran a SO2 scrubber check after calibrator zero. No adjustment made.



H₂S Calibration Summary

WBEA		Chatian	1		Version-11-2
		Station	Information		
Calibration Date:	February	6, 2023	Previous Calibration:	January	17, 2023
Station Name:	Mildred	Lake	Station Number:	AN	1502
Start Time (MST):	10:0)7	End Time (MST):	14	1:25
Analyzer make:	API T	700	Analyzer serial #:	1:	185
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0				
80.0	79.4	1.0074	Correlation Coefficient	0.999972	≥0.995
40.0	39.9	1.0024		0.000000	
20.0	19.6	1.0202	Slope	0.993964	0.90 - 1.10
			Intercept	-0.059204	+/-3





Location: Mildred Lake



THC / CH_4 / NMHC Calibration Report

		Ctatia	n Information		
		Statio	n Information		
Station Name:	Mildred Lake		Station number: Al		
Calibration Date:	February 8, 2023	8	Last Cal Date: Ja	•	
Start time (MST):	9:57		End time (MST): 13	3:07	
Reason:	Routine				
		Calibra	tion Standards		
Gas Cert Reference:	C	2501209	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 T70	00	Serial Number: 11	.85	
ZAG make/model:	Teledyne API T70	01	Serial Number: 56	508	
		Analyz	er 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:	2.87E-04	2.80E-04	NMHC SP Ratio:	4.52E-04	4.43E-04
CH4 Retention time:	14.6	14.4	NMHC Peak Area:	194883	198634
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.2	16.82	17.13	0.982		
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	16.80	1.001		
second point	4960	40.1	8.41	8.36	1.005		
third point	4980	20.0	4.19	4.15	1.011		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	16.82	16.81	1.000		
				Average Correction Factor	1.006		
Baseline Corr AF:	17.13	Prev response	16.85	*% change	1.6%		
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-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	8.80	8.98	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	80.2	8.80	8.80	1.000		
second point	4960	40.1	4.40	4.40	1.000		
third point	4980	20.0	2.19	2.19 2.19 1.001			
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	8.80	8.84	0.995		
			ŀ	Average Correction Factor	1.000		
Baseline Corr AF:	8.98	Prev response	8.79	*% change	2.1%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>			

CH4 Calibration Data	CH4	Calibration	Data
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		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= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4920	80.2	8.02	8.15	0.985	
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	8.01	1.002	
second point	4960	40.1	4.01	3.97	1.012	
third point	4980	20.0	2.00	1.96	1.021	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.2	8.02	7.97	1.007	
			Av	verage Correction Factor	1.011	
Baseline Corr AF:	8.15	Prev response	8.06	*% change	1.1%	
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: 1.003029			0.999735			
THC Cal Offset:		-0.014898		-0.023917		
CH4 Cal Slope:		1.006623		0.999431		
CH4 Cal Offset:		-0.017040		-0.023056		
NMHC Cal Slope:		0.999387		1.000064		
NMHC Cal Offset:		0.002541		-0.001060		

Notes:

Changed inlet filter and N2 cylinder after as founds. Adjusted span.

Calibration Performed By:

Sean Bala



THC Calibration Summary

		Station In	nformation		
Calibration Date:	February	y 8, 2023	Previous Calibration:	January	3, 2023
station Name:	Mildred Lake		Station Number:	AM	502
start Time (MST):	9:	57	End Time (MST):	13:	07
analyzer make:	Thern	no 55i	Analyzer serial #:	11803	20038
		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	0.999990	≥0.995
16.82	16.80	1.0008			
8.41 4.19	8.36 4.15	1.0054 1.0107	Slope	0.999735	0.90 - 1.10
		1.0107	Intercept	-0.023917	+/-0.5
16.0					
18.0				_	
14.0					
12.0					
Ed 10.0					
10.0 (bbm) 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0					
8.0 -					
0.0 q					
— 0.6 cate					
4.0					
2.0					
0.0					
	E	.0	10.0	15.0	20.0
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

					Version-06-20
		Station I	nformation		
Calibration Date:	Febr	uary 8, 2023	Previous Calibration:	January	3, 2023
Station Name:	Mi	ldred Lake	Station Number:	AM	502
start Time (MST):		9:57	End Time (MST):	13:	07
Analyzer make:	Tł	nermo 55i	Analyzer serial #:	11803	20038
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	ion Indicated concentrat (ppm) (Ic)	ion Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999958	≥0.995
8.02	8.01	1.0016			
4.01 2.00	3.97 1.96	1.0117 1.0208	Slope	0.999431	0.90 - 1.10
2.00	1.50	1.0200	Intercept	-0.023056	+/-0.5
8.0 - 7.0 - 6.0 - Ê					
Indicated Conc. (ppm) - 0.5 0.6					
- 0.4 O - 0.0					
- 0.6 dicat					
– 2.0 –					
1.0 -					
0.0					
		10	C 0	0 0	10.0
0.	0 2.0	9 4.0	6.0	8.0	10.0

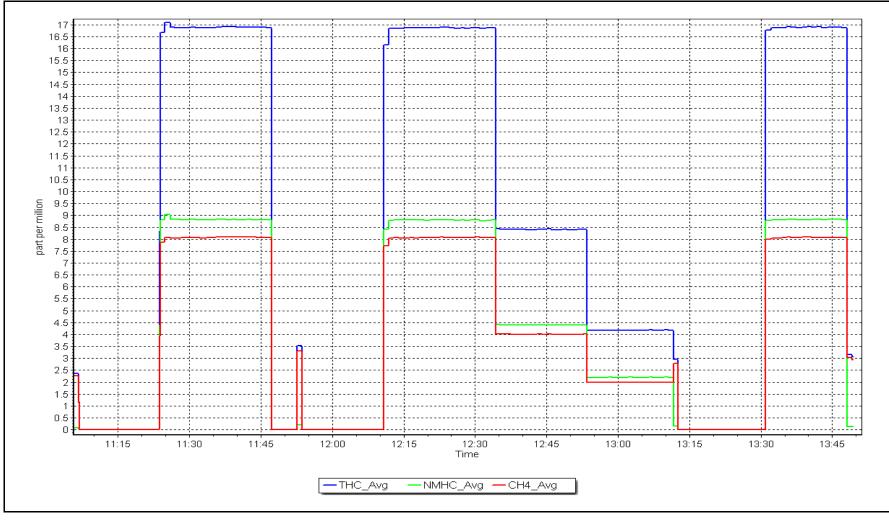


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	Februar	y 8, 2023	Previous Calibration:	January	3, 2023
Station Name:	Mildred Lake		Station Number:	AMS	502
Start Time (MST):	9	:57	End Time (MST):	13:	07
Analyzer make:	Ther	mo 55i	Analyzer serial #:	118032	20038
		Calibra	tion Data		
Calculated concentration I (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00 8.80		Correlation Coefficient	1.000000	≥0.995
8.80	4.40	1.0000 1.0002			
2.19	2.19	1.0011	Slope	1.000064	0.90 - 1.10
			Intercept	-0.001060	+/-0.5
9.0 8.0 7.0 6.0					
(m 6.0 bbm) 5.0					
Indicated					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
0.0	2.0		l Conc. (ppm)	0.0	10.0

NMHC Calibration Plot







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT FEBRUARY 2023

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

March 31, 2023







SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint February 10, 2023 7:18 Routine		Station number: Last Cal Date: End time (MST):	AMS04 January 12, 2023 10:59	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.02 CC470284	ppm	Cal Gas Exp Date:	September 9, 2028	
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 T701		Serial Number: Serial Number:	2445 5611	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	JC1327300932	
Calibration slope: Calibration intercept:	<u>Start</u> 0.998800 0.680000	<u>Finish</u> 0.998701 1.140000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 21.5 0.869
		SO ₂ 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
as found zero	5000	0.0	0.0	0.7	
as found span	4920	80.0	800.3	763.8	1.048
as found 2nd point	4960	40.0	400.2	374.0	1.070
as found 3rd point	4980	20.0	200.1	188.0	1.064
new cylinder response					
calibrator zero	5000	0.0	0.0	0.9	
high point	4920	80.0	800.3	800.2	1.000
second point	4960	40.0	400.2	401.2	0.997
third point as left zero	<u> </u>	20.0	200.1	201.0 0.8	0.995
as left span	4920	80.0	800.3	798.5	1.002
as ielt spall	4320	00.0		ge Correction Factor	0.998
Baseline Corr As found:	763.10	Previous response	800.04	*% change	-4.8%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	373.30 187.30	AF Slope: AF Correlation:		AF Intercept: * = > +/-5% change initiat	-2.340000 es investigation

Notes:

As found Span is low, nightly spans around 800ppb. After filter change spans around 800ppb. No Maintenance or adjustments done.

Calibration Performed By:

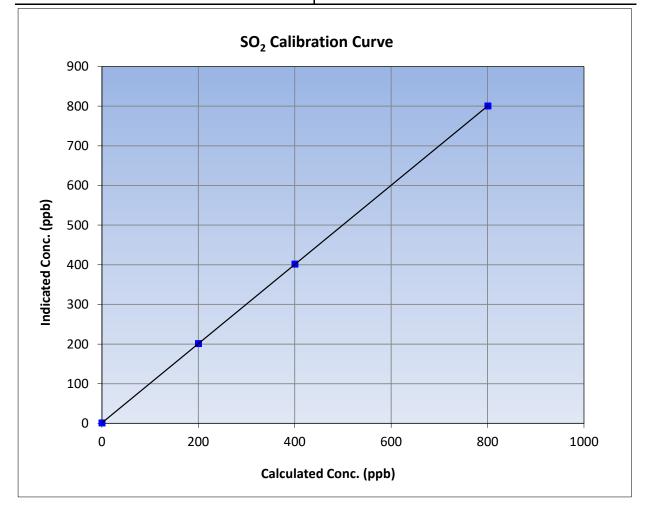


SO₂ Calibration Summary

Version-01-2020 Station Information							
Calibration Date:	February 10, 2023	Previous Calibration:	January 12, 2023				
Station Name:	Buffalo Viewpoint	Station Number:	AMS04				
Start Time (MST):	7:45	End Time (MST):	10:59				
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1327300932				

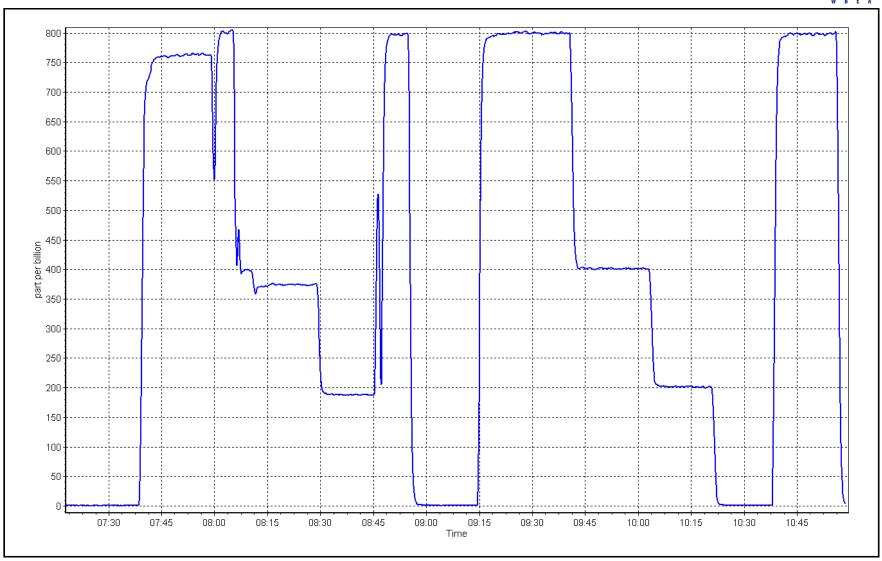
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.9		Correlation Coefficient	0.999999	≥0.995
800.3	800.2	1.0001	correlation coefficient	0.9999999	20.335
400.2	401.2	0.9974	Slope	0.998701	0.90 - 1.10
200.1	201.0	0.9954	Slope	0.998701	0.90 - 1.10
			- Intercept	1.140000	+/-30











H₂S Calibration Report

WBEA		-		-	
WDEA		Chatlen Info			Version-11-20
Station Name:	Buffalo Viewpoint	Station Info	Station number:	AMS04	
Calibration Date:	February 15, 2023		Last Cal Date:	January 16, 2023	
Start time (MST):	7:20		End time (MST):	11:19	
Reason:	Routine			11.15	
	Routine				
		Calibration S	tandards		
Cal Gas Concentration:	5.42	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #:	CC345266				
Removed Cal Gas Conc:	5.42	ppm	Rem Gas Exp Date:	January 4, 2025	
Removed Gas Cyl #:	CC345266		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	3060	
ZAG Make/Model:	API T701H		Serial Number:	362	
		Analyzer Info	ormation		
Analyzer make:	Thermo 450i		Analyzer serial #:	1336160094	
Converter make:	NA		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	Start	Finish		Start	Finish
Calibration clone:	<u>Start</u> 1.000770	1.001200	Packed or Offcot:	<u>Start</u> 20.1	<u>Finish</u> 18.7
Calibration slope:	0.002271		Backgd or Offset: Coeff or Slope:		
Calibration intercept:	0.002271	0.162167	coen or slope.	1.119	1.080
		H ₂ S As Four	nd Data		
			Calculated		Baseline Adjusted
Set Point	Dilution air flow rate	Source gas flow rate	concentration (ppb)	Indicated	Correction factor
	(sccm)	(sccm)	(Cc)	concentration (ppb) (Ic)	(Cc/(Ic-AFzero))
as found zoro	5000	0.0	0.0	-0.4	Limit = 0.90-1.10
as found zero	4926	74.1	80.3	82.9	
as found span as found 2nd point	4928	37.0	40.1	41.5	0.964
	4982	18.5	20.1	20.6	0.957
as found 3rd point new cylinder response	4962	10.5	20.1	20.0	0.955
		H ₂ S Calibrat	ion Data		
		-	Calculated		Correction factor
Set Point	Dilution air flow rate	Source gas flow rate	concentration (ppb)	Indicated	(Cc/Ic)
	(sccm)	(sccm)	(Cc)	concentration (ppb) (Ic)	<i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.2	
high point	4926	74.1	80.3	80.6	0.997
second point	4963	37.0	40.1	40.3	0.995
third point	4982	18.5	20.1	20.2	0.993
as left zero	5000	0.0	0.0	0.3	
as left span	4926	74.1	80.3	80.6	0.997
SO2 Scrubber Check	4920	80.0	800.0	-0.2	
Date of last scrubber cha	inge:			Ave Corr Factor	0.995
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	83.3	Prev response:	80.39	*% change:	3.5%
Baseline Corr 2nd AF pt:	41.9	AF Slope:		AF Intercept:	-0.256912
Baseline Corr 3rd AF pt:	21.0	AF Correlation:			
•				* = > +/-5% change initiat	or investigation

Notes:

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

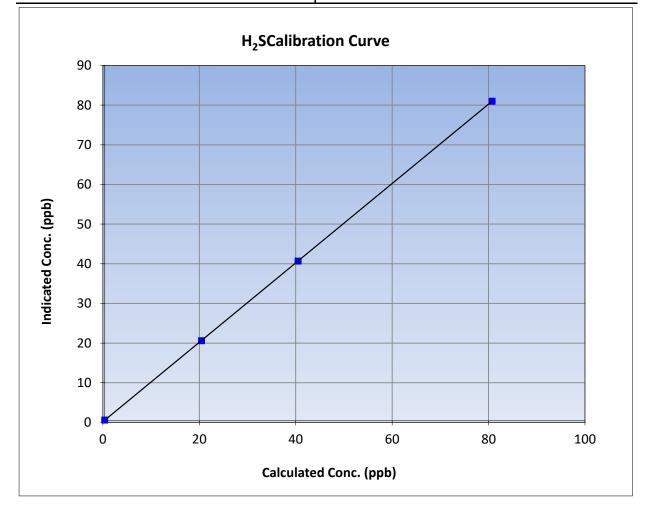


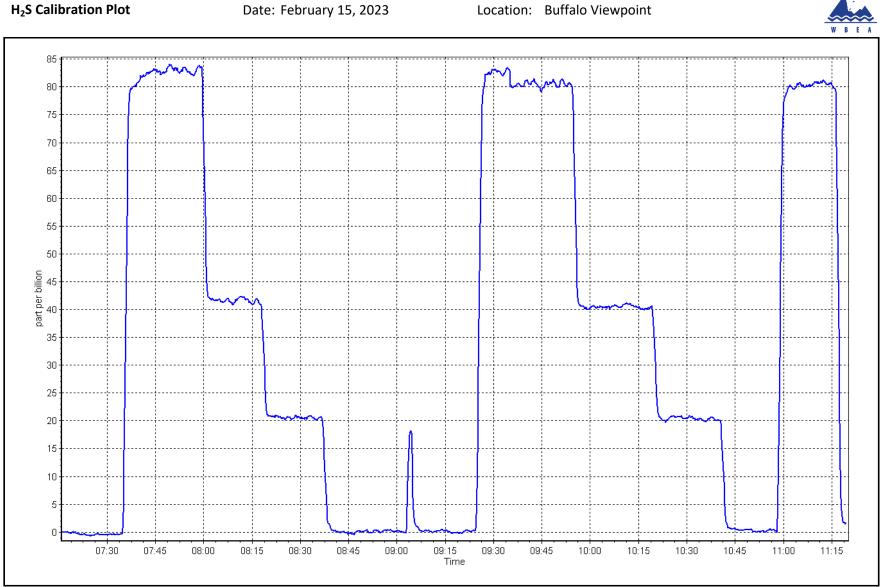
H₂S Calibration Summary

Version-11-2021 Station Information						
Calibration Date:	February 15, 2023	Previous Calibration:	January 16, 2023			
Station Name:	Buffalo Viewpoint	Station Number:	AMS04			
Start Time (MST):	7:20	End Time (MST):	11:19			
Analyzer make:	Thermo 450i	Analyzer serial #:	1336160094			

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999999	≥0.995
80.3	80.6	0.9966	correlation coefficient	0.9999999	20.333
40.1	40.3	0.9952	Slope	1.001200	0.90 - 1.10
20.1	20.2	0.9927	Slope	1.001200	0.90 - 1.10
			Intercept	0.162167	+/-3





Location: Buffalo Viewpoint



THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Station	n Information		
Station Name:	Buffalo Viewpo	int	Station number: Al		
Calibration Date:	February 10, 2023		Last Cal Date: Ja	nuary 12, 2023	3
Start time (MST):	7:18		End time (MST): 10):58	
Reason:	Routine				
		Calibrat	tion 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: 24	145	
ZAG make/model:	API T701		Serial Number: 36	52	
		Analyze	er Information		
Analyzer make: Thermo 55i			Analyzer serial #: 1426262594		
THC Range (ppm):	: 0 - 20 ppm				
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	Finish
CH4 SP Ratio	: 3.070E-04	3.070E-04	NMHC SP Ratio:	6.120E-05	6.120E-05
CH4 Retention time:	: 13.6	13.6	NMHC Peak Area:	147690	147690

THC Calibration Data						
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	80.0	17.01	16.86	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	80.0	17.01	17.07	0.996	
second point	4960	40.0	8.50	8.35	1.018	
third point	4980	20.0	4.25	4.16	1.022	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.0	17.01	17.06	0.997	
			ŀ	Average Correction Factor	1.012	
Baseline Corr AF:	16.86	Prev response	17.03	*% change	-1.0%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	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	80.0	9.04	8.87	1.019
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	4.49	1.007
third point	4980	20.0	2.26	2.26	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	9.04	9.03	1.001
			ŀ	Average Correction Factor	1.002
Baseline Corr AF:	8.87	Prev response	9.05	*% 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 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	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	7.99	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	7.96	8.04	0.991
second point	4960	40.0	3.98	3.87	1.029
third point	4980	20.0	1.99	1.91	1.043
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	7.96	8.03	0.992
			Av	verage Correction Factor	1.021
Baseline Corr AF:	7.99	Prev response	7.99	*% 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: 1.005648			1.004640		
THC Cal Offset:		-0.070000	70000 -0.080000		
CH4 Cal Slope:		1.011450	1.011594		
CH4 Cal Offset:		-0.062000		-0.070000	
NMHC Cal Slope:		1.001675		0.999400	
NMHC Cal Offset:		-0.010000		-0.006000	

Notes:

No maintenance or adjustments done.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

Version-01-2020

					Version-01-202
		Station I	nformation		
Calibration Date:	February	10, 2023	Previous Calibration:	January	12, 2023
Station Name:	Buffalo V	ïewpoint	Station Number:	AM	S04
Start Time (MST):	7:	7:18		10:	58
Analyzer make:	Thermo 55i		Analyzer serial #:	14262	62594
		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	0.999848	≥0.995
17.01	17.07	0.9963			
8.50 4.25	8.35 4.16	1.0184	Slope	1.004640	0.90 - 1.10
4.25	4.10	1.0220			
			Intercept	-0.080000	+/-0.5
18.0		THC Calibratio	n Curve		
16.0					
14.0					
12.0					
(u da) 10.0					
0.8 Couc					
Indicated Conc. (ppm)					
E 4.0					
2.0					
0.0	_	2	10.0	45.0	20.2
0.0	5.	0	10.0	15.0	20.0



CH₄ Calibration Summary

Version-01-2020

					Version-01-20	
		Station I	nformation			
alibration Date:	Februar	y 10, 2023	Previous Calibration:	January 1	2, 2023	
tation Name:	Buffalo	Viewpoint	Station Number: AN		504	
tart Time (MST):	7	:18	End Time (MST): 1		:58	
nalyzer make:	Ther	mo 55i	Analyzer serial #:	Analyzer serial #: 1426262594		
		Calibra	tion Data			
alculated concentration (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999529	≥0.995	
7.96	8.04 3.87	0.9906 1.0290				
1.99	1.91	1.0425	Slope	1.011594	0.90 - 1.10	
			Intercept	-0.070000	+/-0.5	
8.0 7.0 6.0						
Indicated Conc. (ppm)						
O 4.0						
- 0.6 dicate						
2.0						
1.0						
0.0 +	2.0	4.0	6.0	8.0	10.0	
			l Conc. (ppm)			



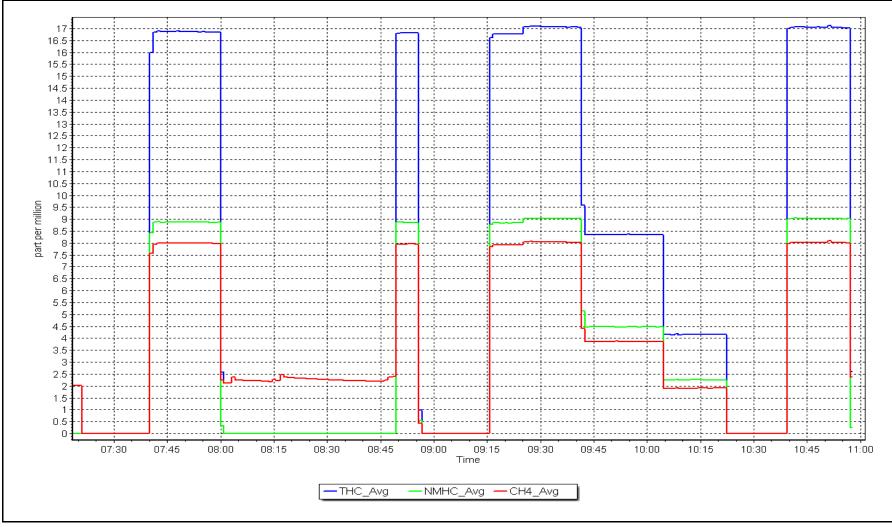
NMHC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	February	/ 10, 2023	Previous Calibration:	January 2	2, 2023
tation Name:	Buffalo	/iewpoint	Station Number:	AMS	504
itart Time (MST):	7	:18	End Time (MST):10:5Analyzer serial #:142626		58
analyzer make:	Ther	no 55i			52594
		Calibra	ation Data		
Calculated concentrati (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999985	≥0.995
9.04 4.52	9.04	1.0002 1.0069			
2.26	2.26	1.0069	Slope	0.999400	0.90 - 1.10
	-		Intercept	-0.006000	+/-0.5
8.0 - 7.0 -					
(bbu) - 0.0 - - 5.0 -					
5.0					
- 0.4					
2.0					
1.0 -					
0.0 🕊					
	0 2.0	4.0	6.0	8.0	10.0
0.0	2.0				









as left zero

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

W B E A					Version-01-20			
		Station Ir	nformation					
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint February 16, 2023 11:25 Cylinder Change		Station number: AMS04 Last Cal Date: February 10, 2023 End time (MST): 12:44 gen Cylinder Change					
		Calibratio	n Standards					
Gas Cert Reference:	CC4	70284	Cal Gas Expiry Date:	September 9, 2028	3			
CH4 Cal Gas Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	ppm			
C3H8 Cal Gas Conc.	205.5	ppm	•					
Removed Gas Cert:		NA	Removed Gas Expiry:	NA				
Removed CH4 Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	ppm			
Removed C3H8 Conc.	205.5	ppm	Diff between cyl (THC):					
Diff between cyl (CH ₄):			Diff between cyl (NM):					
Calibrator Model:	API T700	Serial Number: 2445						
ZAG make/model:	API T701		Serial Number:	362				
		Analyzer I	nformation					
Analyzer make:	Thermo 55i		Analyzer serial #:	1426262594				
THC Range (ppm):	0 - 20 ppm							
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm				
	<u>Start</u>	Finish		Start	Finish			
CH4 SP Ratio:		3.070E-04	NMHC SP Ratio:	6.120E-05	6.120E-05			
CH4 Retention time:		13.6	NMHC Peak Area:	147690	147690			
		THC Calib	ration Data					
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.0			
as found zero	5000	0.0	0.00	0.00				
as found span	4920	80.0	17.01	17.11	0.994			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.0	17.01	17.03	0.999			
second point								
third point								

as left span					
			Ave	erage Correction Factor	0.999
Baseline Corr AF:	17.11	Prev response	17.01	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates in the second s	nvestigation



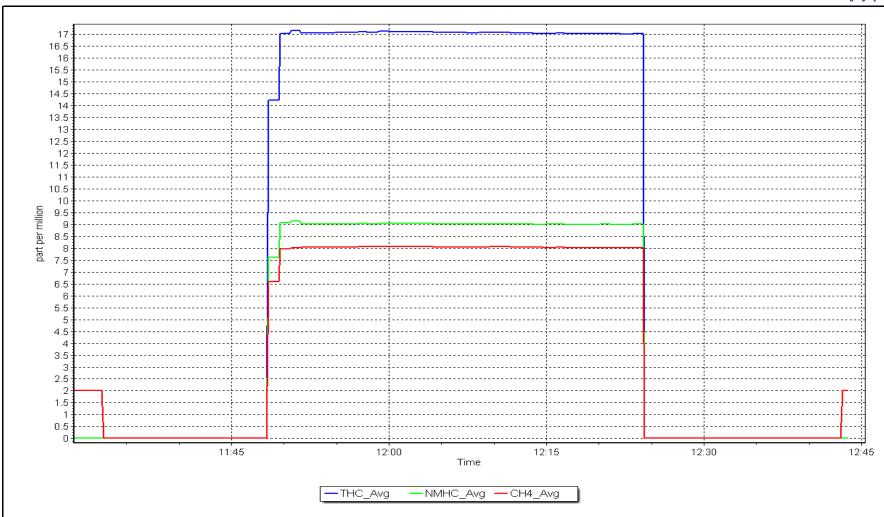
THC / CH_4 / NMHC Calibration Report

Version-01-2020

Dil air flow rate 5000 4920 5000 4920	Source gas flow rate 0.0 80.0 0.0 80.0 80.0	Calc conc (ppm) (Cc) 0.00 9.04 0.00	Ind conc (ppm) (Ic) 0.00 9.04	CF <i>Limit=</i> 0.95-1.05	
4920 5000	80.0	9.04		1.000	
5000	0.0		9.04	1.000	
		0.00			
		0.00			
		0.00			
		0.00			
4920	80.0		0.00		
		9.04	9.00	1.005	
		Avera	ge Correction Factor	1.005	
9.04	Prev response	9.03	*% change	0.1%	
NA	AF Slope:		AF Intercept:		
NA	AF Correlation:		* = > +/-5% change initiate	es investigation	
	CH4 Calibrat	tion Data			
Dil air flow rate			Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
				0.988	
4520	00.0	7.50	0.00	0.500	
5000	0.0	0.00	0.00		
				0.992	
4520	00.0	7.50	0.00	0.552	
		Avera	ge Correction Eactor	0.992	
8.06	Drey response			0.9%	
		1.55	-	0.978	
				es investigation	
INA		Ctatistics		25 Investigation	
		Statistics			
	-0.006000		0.000000		
	NA	NA AF Slope: AF Correlation: CH4 Calibra Dil air flow rate Source gas flow rate 5000 0.0 4920 80.0 5000 0.0 4920 80.0 5000 0.0 4920 80.0 5000 0.0 4920 80.0 8.06 Prev response NA AF Slope: NA AF Correlation: Calibration Start 1.004640 -0.080000 1.011594 -0.070000 0.999400 -0.006000	9.04 Prev response 9.03 NA AF Slope: NA NA AF Correlation: CH4 Calibration Data Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) 5000 0.0 0.00 4920 80.0 7.96 5000 0.0 0.00 4920 80.0 7.96 5000 0.0 0.00 4920 80.0 7.96 5000 0.0 0.00 4920 80.0 7.96 Avera 8.06 Prev response 7.99 NA AF Slope: AF Slope: NA AF Correlation: Avera Calibration Statistics Start 1.004640 -0.080000 1.011594 -0.070000 0.999400 -0.006000	NA AF Slope: AF Intercept: NA AF Correlation: * = > +/-5% change initiate CH4 Calibration Data Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) Ind conc (ppm) (lc) 5000 0.0 0.00 0.00 4920 4920 80.0 7.96 8.06 5000 0.0 0.00 0.00 4920 80.0 7.96 8.03 5000 0.0 0.00 0.00 4920 80.0 7.96 8.03 5000 0.0 0.00 0.00 4920 80.0 7.96 8.03 5000 0.0 7.96 8.03 5000 0.0 7.96 8.03 5000 0.0 7.96 8.03 5000 0.0 7.99 *% change NA AF Slope: AF Intercept: NA AF Correlation: * => +/-5% change initiate <th cols<="" td=""></th>	

Calibration Performed By:

Melissa Lemay



NMHC Calibration Plot

Location: Buffalo Viewpoint





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Name: Buffalo Viewpoint Station number: AMS04 Calibration Date: February 13, 2023 Last Cal Date: January 13, 2023 Start time (MST): 8:00 End time (MST): 11:00 Reason: As Found Calibration Standards NO Gas Cylinder #: T36RH1F Cal Gas Expiry Date: August 18, 2023 NOX Cal Gas Conc: 51.16 ppm NO Cal Gas Conc: 50.91 ppm Removed Gas NOX Conc: 51.16 ppm Removed Gas NO Conc: 50.91 ppm NOX gas Diff: NO gas Diff: NO gas Diff: NO gas Diff: NO gas Diff: Station NO gas Diff: Calibrator Model: API T700 Serial Number: 2445
NO Gas Cylinder #:T36RH1FCal Gas Expiry Date:August 18, 2023NOX Cal Gas Conc:51.16ppmNO Cal Gas Conc:50.91ppmRemoved Cylinder #:NARemoved Gas Exp Date:NARemoved Gas NOX Conc:51.16ppmRemoved Gas NO Conc:50.91ppmNOX gas Diff:NO gas Diff:Calibrator Model:API T700Serial Number:2445
NOX Cal Gas Conc:51.16ppmNO Cal Gas Conc:50.91ppmRemoved Cylinder #:NARemoved Gas Exp Date:NARemoved Gas NOX Conc:51.16ppmRemoved Gas NO Conc:50.91ppmNOX gas Diff:NO gas Diff:Calibrator Model:API T700Serial Number:2445
NOX Cal Gas Conc:51.16ppmNO Cal Gas Conc:50.91ppmRemoved Cylinder #:NARemoved Gas Exp Date:NARemoved Gas NOX Conc:51.16ppmRemoved Gas NO Conc:50.91ppmNOX gas Diff:NO gas Diff:Calibrator Model:API T700Serial Number:2445
Removed Cylinder #:NARemoved Gas Exp Date:NARemoved Gas NOX Conc:51.16ppmRemoved Gas NO Conc:50.91ppmNOX gas Diff:NO gas Diff:NO gas Diff:100Serial Number:2445
NOX gas Diff:NO gas Diff:Calibrator Model:API T700Serial Number:2445
Calibrator Model: API T700 Serial Number: 2445
ZAG make/model:API T701Serial Number:362
Analyzer InformationAnalyzer make: API T200 NOX Range (ppb): 0 - 1000 ppbAnalyzer serial #: 723NOX Range (ppb): 0 - 1000 ppbStartFinishStartFinishNO coeff or slope:1.204NOX coeff or slope:1.2031.203NOX bkgnd or offset:-0.1-0.1NO2 coeff or slope:1.000Reaction cell Press:6.4
Calibration Statistics
<u>Start</u> <u>Finish</u>
NO _x Cal Slope: 1.000402
NO _x Cal Offset: 0.466890
NO Cal Slope: 1.001422
NO Cal Offset: -0.653871
NO ₂ Cal Slope: 1.000220
NO ₂ Cal Offset: 1.229528



$NO_X \setminus NO \setminus NO_2$ 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) 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	0.9	0.4	0.6		
as found span	4922	78.1	799.1	795.2	3.9	772.1	767.9	4.2	1.0350	1.0355
as found 2nd	4961	39.1	400.1	398.1	2.0	385.8	382.6	3.2	1.0370	1.0405
as found 3rd	4981	19.5	199.5	198.5	1.0	193.9	189.5	4.4	1.0289	1.0476
new cyl resp										
calibrator zero										
high point										
second point										
third point										
as left zero										
as left span										
							Average C	orrection Factor	-	
Corrected As for	und NO _X =	771.2 ppb	NO =	767.5 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO _x =	-3.7%
Previous Respor	nse NO _X =	799.9 ppb	NO =	795.7 ppb				*Percent Chan	ge NO =	-3.7%
Baseline Corr 2r	nd pt NO _x =	384.9 ppb	NO =	382.2 ppb	As foun	d $NO_{X} r^{2}$:	0.999996	Nx SI: 0.9647	/11 Nx Int:	0.847
Baseline Corr 3r	rd pt NO _x =	193.0 ppb	NO =	189.1 ppb	As foun	d NO r ² :	0.999984	NO SI: 0.9659	NO Int:	-1.014
	Ň				As foun	d $NO_2 r^2$:	0.999972	NO2 SI: 0.9948	NO ₂ Int:	1.558

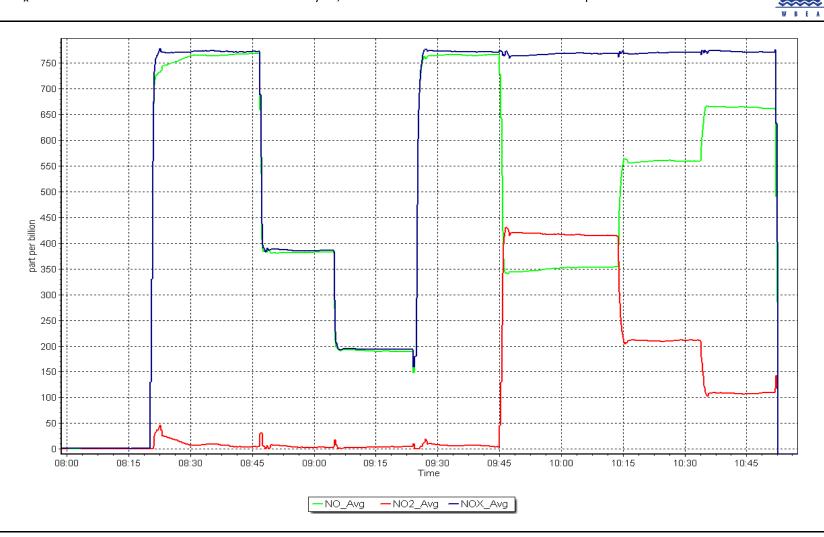
GPT Calibration Data

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	0.6		
as found GPT point (400 ppb NO2)	765.7	353.5	416.1	414.9	1.0029	99.7%
as found GPT point (200 ppb NO2)	765.7	559.6	210.0	211.4	0.9934	100.7%
as found GPT point (100 ppb NO2)	765.7	663.2	106.4	108.1	0.9843	101.6%
1st GPT point (400 ppb O3)						
2nd GPT point (200 ppb O3)						
3rd GPT point (100 ppb O3)						
			Ave	erage Correction Factor		

Notes:

As Founds for Cleaning Reaction Cell and replacing critical flow orifices.

Calibration Performed By:







NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint February 14, 2023 7:40 Routine		Station number: Last Cal Date: End time (MST):	February 13, 2023	
		Calibratio	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: NOX gas Diff:	51.16	ppm	Removed Gas NO Conc: NO gas Diff:	50.91	ppm
Calibrator Model:	API T700		Serial Number:	2445	
ZAG make/model:	API T701		Serial Number:	362	
		Analyzer	Information		
Analyzer make: NOX Range (ppb):			Analyzer serial #:	723	
	0 - 1000 ppb				
	0 - 1000 ppb <u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope	<u>Start</u>	<u>Finish</u> 0.993	NO bkgnd or offset:	<u>Start</u> -0.3	<u>Finish</u> -9.0
	<u>Start</u> : 1.204		NO bkgnd or offset: NOX bkgnd or offset:		
NO coeff or slope	<u>Start</u> : 1.204 : 1.203	0.993	-	-0.3	-9.0
NO coeff or slope NOX coeff or slope	<u>Start</u> : 1.204 : 1.203	0.993 0.988 1.000	NOX bkgnd or offset:	-0.3 -0.1	-9.0 -9.0
NO coeff or slope NOX coeff or slope	<u>Start</u> : 1.204 : 1.203	0.993 0.988 1.000	NOX bkgnd or offset: Reaction cell Press:	-0.3 -0.1	-9.0 -9.0
NO coeff or slope NOX coeff or slope	Start : 1.204 : 1.203 : 1.000	0.993 0.988 1.000 Calibrati	NOX bkgnd or offset: Reaction cell Press:	-0.3 -0.1 7.6	-9.0 -9.0
NO coeff or slope NOX coeff or slope NO2 coeff or slope	Start 1.204 1.203 1.000	0.993 0.988 1.000 Calibrati <u>Start</u>	NOX bkgnd or offset: Reaction cell Press:	-0.3 -0.1 7.6	-9.0 -9.0
NO coeff or slope NOX coeff or slope NO2 coeff or slope NO2 coeff or slope	Start 1.204 1.203 1.000	0.993 0.988 1.000 Calibrati <u>Start</u> 1.000402	NOX bkgnd or offset: Reaction cell Press:	-0.3 -0.1 7.6 <u><i>Finish</i></u> 1.000759	-9.0 -9.0
NO coeff or slope NOX coeff or slope NO2 coeff or slope NO _x Cal Slope NO _x Cal Slope	Start 1.204 1.203 1.000	0.993 0.988 1.000 Calibrati <u>Start</u> 1.000402 0.466890	NOX bkgnd or offset: Reaction cell Press:	-0.3 -0.1 7.6 <u><i>Finish</i></u> 1.000759 0.966826	-9.0 -9.0

1.229528

-0.612933



$NO_X \setminus NO \setminus NO_2$ 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										
as found span										
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.4	0.1		
high point	4922	78.1	799.1	795.2	3.9	800.6	798.9	1.7	0.9981	0.9954
second point	4961	39.1	400.1	398.1	2.0	401.0	398.8	2.2	0.9977	0.9983
third point	4981	19.5	199.5	198.5	1.0	201.6	199.3	2.3	0.9896	0.9961
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0		
as left span	4922	78.1	799.1	358.0	441.1	795.5	357.8	437.8	1.0045	1.0006
							Average C	orrection Factor	0.9951	0.9966
Corrected As fo	ound NO _x =	NA ppb	NO =	NA ppb	* = > +/-59	% change initiates	investigation	*Percent Chan	ge NO _x =	NA
Previous Respo	onse 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	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)	796.0	358.8	441.1	438.1	1.0069	99.3%
2nd GPT point (200 ppb O3)	796.0	574.5	225.4	224.1	1.0058	99.4%
3rd GPT point (100 ppb O3)	796.0	683.5	116.4	113.8	1.0229	97.8%
			ŀ	Average Correction Factor	1.0119	98.8%

Notes:

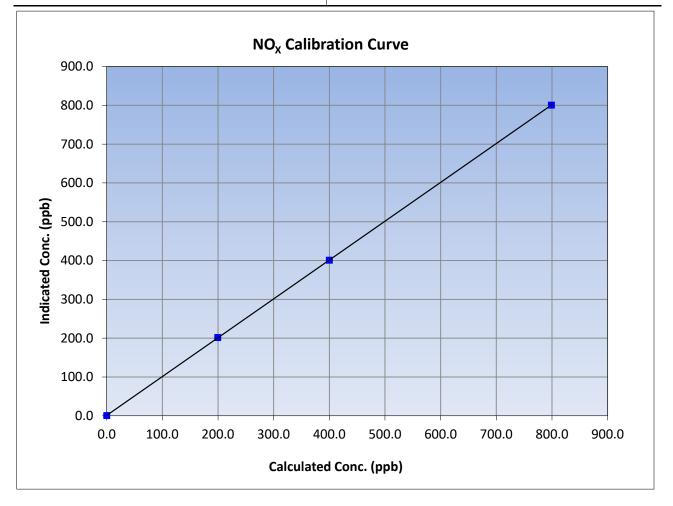
Calibration after Cleaning Reaction Cell and replacing critical flow orifices. Zero and Span adjusted.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

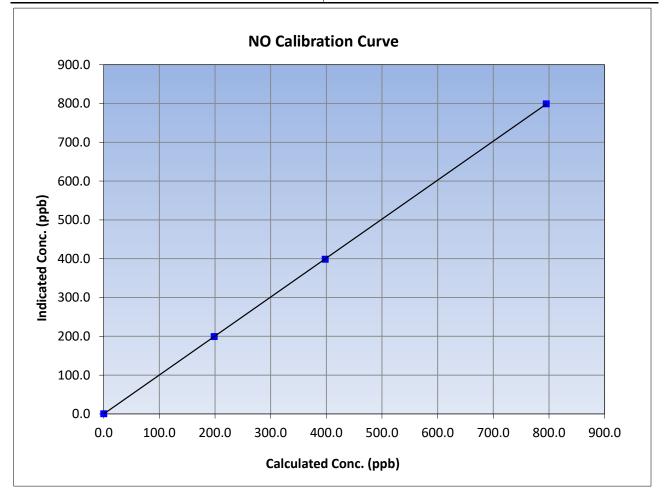
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	February	14, 2023	Previous Calibration: Feb		ruary 13, 2023	
Station Name:	Buffalo Viewpoint		Station Number:	AN	/IS04	
Start Time (MST):	7:	40	End Time (MST):	1:	1:16	
nalyzer make: API T200			Analyzer serial #: 7		723	
		Calibra	ation 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	0.999996	≥0.995	
799.1	800.6	0.9981	correlation coefficient	0.999990	20.333	
400.1	401.0	0.9977	Slope	1.000759	0.90 - 1.10	
199.5	201.6	0.9896	Siope	1.000759	0.90 - 1.10	
			Intercept	0.966826	+/-20	





NO Calibration Summary

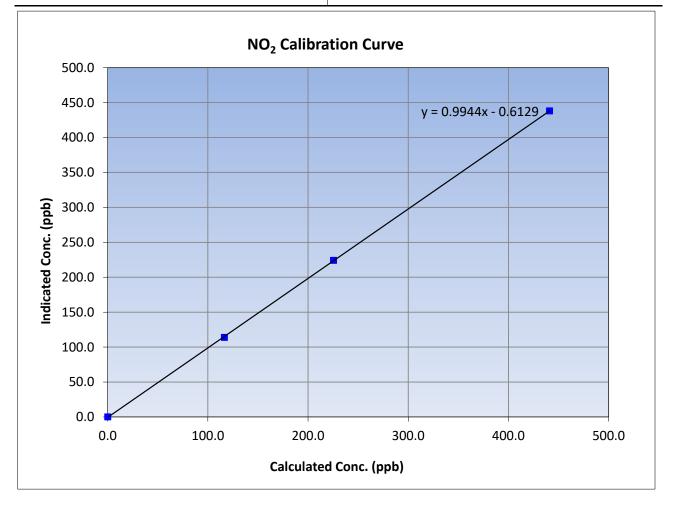
WBEA					Version-04-202	
		Station	Information			
Calibration Date:	February 14, 2023		Previous Calibration:	Februa	February 13, 2023	
Station Name:	Buffalo V	/iewpoint	Station Number:	А	MS04	
Start Time (MST):	7:40		End Time (MST):	1	1:16	
Analyzer make:	API T200		Analyzer serial #:		723	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)) Statistical Evaluation		<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999996	≥0.995	
795.2	798.9	0.9954	correlation coefficient	0.999990	20.995	
398.1	398.8	0.9983	Slopp	1.004151	0.90 - 1.10	
198.5	199.3	0.9961	Slope	1.004151	0.90 - 1.10	
			Intercept	-0.053156	+/-20	

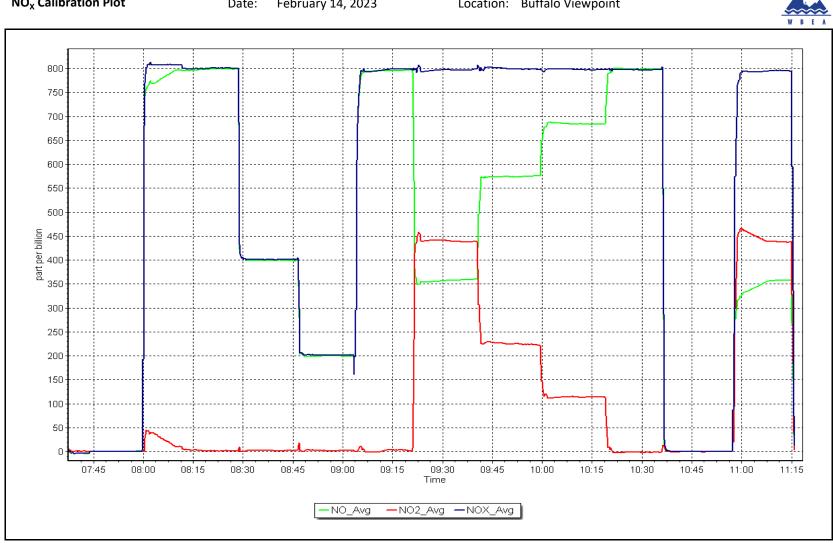




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	February 14, 2023		Previous Calibration:	Februar	February 13, 2023	
Station Name:	Buffalo V	'iewpoint	Station Number:	AN	v1S04	
Start Time (MST):	7:	7:40		1	1:16	
Analyzer make:	API T200		Analyzer serial #:	-	723	
		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	0.999975	≥0.995	
441.1	438.1	1.0069	correlation coefficient	0.555575	20.333	
225.4	224.1	1.0058	Slope	0.994427	0.90 - 1.10	
116.4	113.8	1.0229	Siope	0.334427	0.90 - 1.10	
			Intercept	-0.612933	+/-20	







O₃ Calibration Report

Version-01-2020

					version-01-20
		Station Infor	mation		
Station Name:	Buffalo Viewpoint		Station number:	AMS04	
Calibration Date:	February 10, 2023		Last Cal Date:	January 12, 2023	
Start time (MST):	10:55		End time (MST):	13:26	
Reason:	Routine				
		Calibration St	andards		
O3 generation mode:	Photometer				
Calibrator Make/Model:	API T700		Serial Number:	2445	
ZAG Make/Model:	API T701		Serial Number:	362	
		Analyzer Info	rmation		
Analyzer make	: API T400		Analyzer serial #:	2961	
Analyzer Range					
	Start	Finish		Start	Finish
Calibration slope:	0.992571	0.988657	Backgd or Offset:	-3.3	-3.3
Calibration intercept:	2.700000	3.560000	Coeff or Slope:	1.065	1.065
		O ₃ Calibratio	on Data		
		J			
Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration C	•
	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.5	
as found span	5000	1160.2	400.0	398.3	1.004
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	1.2	
high point	5000	1161.4	400.0	397.8	1.006
second point	5000	919.0	200.0	202.6	0.987
third point	5000	788.4	100.0	104.7	0.955
as left zero	5000	0.0	0.0	1.1	
as left span	5000	1159.5	400.0	397.2	1.007
			Averag	ge Correction Factor	0.983
Baseline Corr As found:	397.8	Previous response	399.7	*% change	-0.5%
	NA	AF Slope:		AF Intercept:	
Baseline Corr 2nd AF pt:	INA	AI JIUDE.			
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA	AF Correlation:		i intercepti	

Notes:

No maintenance or adjustments done.

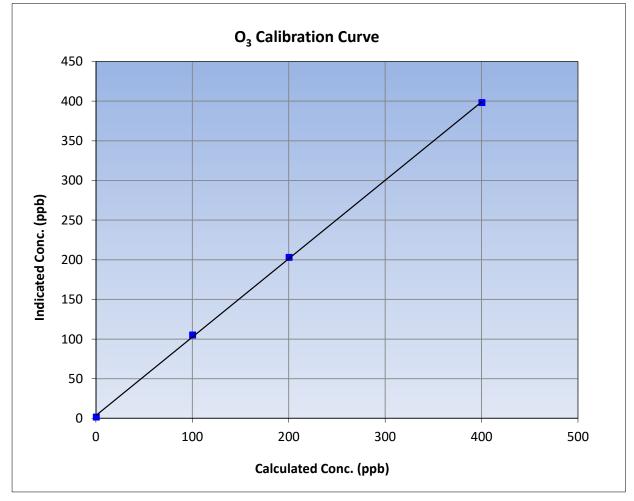
Calibration Performed By:

Melissa Lemay



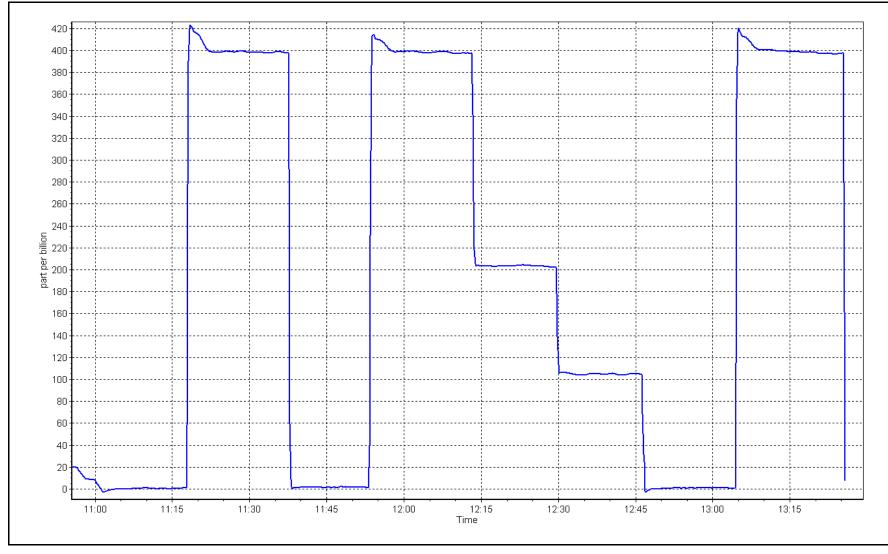
O₃ Calibration Summary

		Station	Information		Version-01-2
		Station	information		
Calibration Date:	February 1	.0, 2023	Previous Calibration:	January	12, 2023
Station Name:	Buffalo Vie	ewpoint	Station Number:	AM	1SO4
Start Time (MST):	10:5	5	End Time (MST):	13:26	
Analyzer make:	API T4	100	Analyzer serial #:	29	961
		Calibr	ation Data		
Calculated concentration (ppb) (Cc)		Correction factor	Statistical Evalua	tion	<u>Limits</u>
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	Statistical Evalua	tion	<u>Limits</u>
(ppb) (Cc) 0.0	(ppb) (lc) 1.2	(Cc/Ic)	Statistical Evalua	tion 0.999837	<u>Limits</u> ≥0.995
(ppb) (Cc)	(ppb) (Ic) 1.2 397.8	(Cc/Ic)	Correlation Coefficient	0.999837	≥ <i>0.995</i>
(ppb) (Cc) 0.0 400.0	(ppb) (lc) 1.2	(Cc/lc) 1.0055			











T640 PM_{2.5} CALIBRATION

W B E A					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Buffalo Viewpoint February 15, 2023 9:46		Station number: AN Last Cal Date: Jar End time (MST): 10	nuary 16, 2023	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 84	4	
Flow Meter Make/Model:	AliCat		S/N: 22	8085	
Temp/RH standard:	AliCat		S/N: 22	8085	
		Monthly Calibration	Test		
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-19.1	-18.8	-19.1		+/- 2 °C
P (mmHg)	734.8	736.6	734.8		+/- 10 mmHg
flow (LPM)	5	4.80	5	\checkmark	+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	February 15, 2023 5.1	Last Cal Date: PM w/ HEPA:	January 16, 2023 0	
Inlet cleaning :	Inlet Head	\checkmark			
		Quarterly Calibration	Test		
<u>Parameter</u> PMT Peak Test	<u>As found</u>	Measured	<u>As left</u>	Adjusted	(Limits) 10.9 +/- 0.5
Date Optical Cham	nber Cleaned:	December 1	3. 2022		
Disposable Filte	-	December 1			
		Annual Maintenan	ice		
Date Sample Tul	be Cleaned:	September 1	5, 2022		
Date RH/T Sense		September 1			
Notes:		No adjustments	done. Inlet head clear	ned.	
Calibration by:	Melissa Lemay				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Mannix February 21, 2023 10:52 Routine		Station number: Last Cal Date: End time (MST):	AMS05 January 20, 2023 13:57	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.02 XC026809B	ppm	Cal Gas Exp Date:	January 12, 2029	
Removed Cal Gas Conc:	50.02	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	621	
ZAG Make/Model:	API T701H		Serial Number:	832	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1008841399	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.996673	0.996758	Backgd or Offset:		8.8
Calibration intercept:	0.800000	-0.080000	Coeff or Slope:	0.914	0.914
		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	0.1	
as found span	4920	80.0	800.3	796.2	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.0	800.3	797.5	1.004
second point	4960	40.0	400.2	399.5	1.002
third point	4980	20.0	200.1	198.5	1.008
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.0	800.3	800.6	1.000
			Averag	ge Correction Factor	1.004
Baseline Corr As found:	796.10	Previous response		*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:			

Notes:

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

Calibration Performed By:

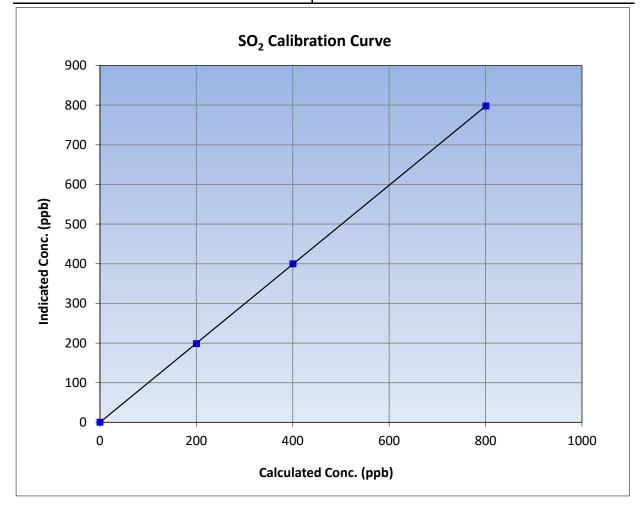


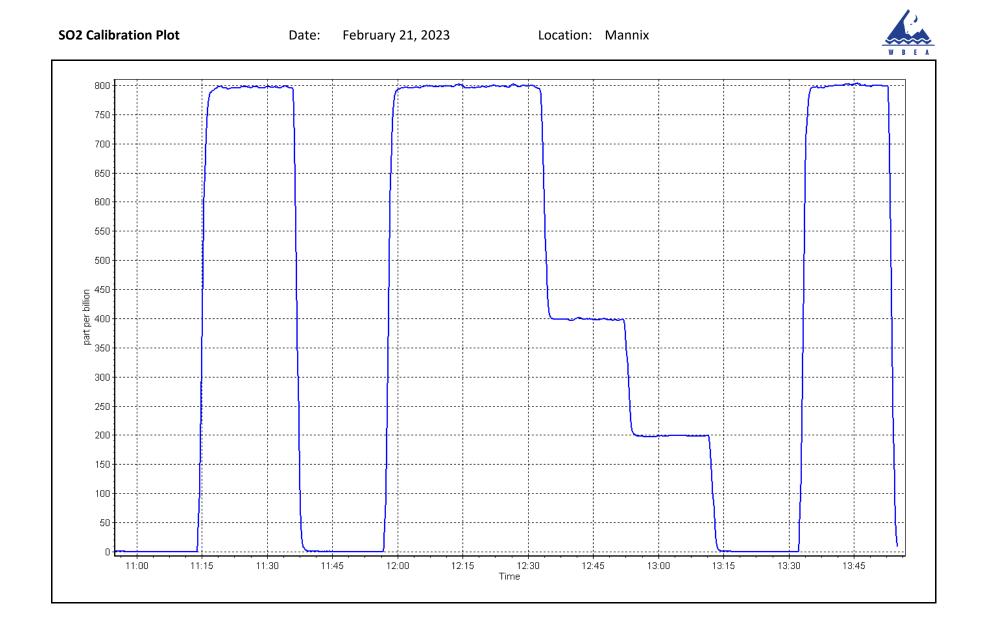
SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: February 21, 2023 **Previous Calibration:** January 20, 2023 Station Name: Mannix Station Number: AMS05 Start Time (MST): 10:52 End Time (MST): 13:57 Analyzer make: Thermo 43i Analyzer serial #: 1008841399

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	0.999996	≥0.995
800.3	797.5	1.0035	correlation coefficient	0.999990	20.333
400.2	399.5	1.0017	Slope	0.996758	0.90 - 1.10
200.1	198.5	1.0080	Slope	0.990738	0.90 - 1.10
			- Intercept	-0.080000	+/-30







H₂S Calibration Report

WBEA					Varsian 11.2
		Station Info	rmation		Version-11-2
Station Name: Calibration Date: Start time (MST): Reason:	Mannix February 7, 2023 10:35 Routine		Station number: Last Cal Date: End time (MST):	AMS05 January 3, 2023 15:10	
		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:	4.92 NA	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 1845	
ZAG Make/Model:	API 1700 API T701H		Serial Number:	832	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Global 0 - 100 ppb		Analyzer serial #: Converter serial #:	1203169745 2022-196	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.998045 0.340531	0.998613 0.220652	Backgd or Offset: Coeff or Slope:	2.09 0.822	2.09 0.822
		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	0.2	
as found span	4919	81.3	80.0	80.7	0.994
as found 2nd point	4960	40.7	40.0	40.8	0.986
as found 3rd point	4980	20.3	20.0	20.4	0.989
new cylinder response					
		H ₂ S Calibrati	ion Data		
Set Point	Dilution air flow rate	Source gas flow rate (sccm)	Calculated concentration (ppb)	Indicated concentration (ppb) (Ic)	Correction facto (Cc/Ic)
	(sccm)	(sccm)	(Cc)		Limit = 0.95 - 1.05
calibrator zero	(sccm) 5000	0.0	(Cc) 0.0	0.2	Limit = 0.95-1.05
calibrator zero high point	. ,	, , ,		0.2 80.1	Limit = 0.95-1.05 0.999
	5000	0.0	0.0		
high point	5000 4919	0.0 81.3	0.0 80.0	80.1	 0.999
high point second point	5000 4919 4960	0.0 81.3 40.7	0.0 80.0 40.0	80.1 40.2	 0.999 0.996
high point second point third point	5000 4919 4960 4980	0.0 81.3 40.7 20.3	0.0 80.0 40.0 20.0	80.1 40.2 20.2	0.999 0.996 0.989
high point second point third point as left zero as left span 502 Scrubber Check	5000 4919 4960 4980 5000 4919 4920	0.0 81.3 40.7 20.3 0.0	0.0 80.0 40.0 20.0 0.0	80.1 40.2 20.2 0.5	0.999 0.996 0.989
high point second point third point as left zero as left span 502 Scrubber Check	5000 4919 4960 4980 5000 4919 4920	0.0 81.3 40.7 20.3 0.0 81.3	0.0 80.0 40.0 20.0 0.0 80.0	80.1 40.2 20.2 0.5 78.8	0.999 0.996 0.989 1.015
high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha	5000 4919 4960 4980 5000 4919 4920 ange:	0.0 81.3 40.7 20.3 0.0 81.3	0.0 80.0 40.0 20.0 0.0 80.0	80.1 40.2 20.2 0.5 78.8 0.0	0.999 0.996 0.989 1.015
high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter eff	5000 4919 4960 4980 5000 4919 4920 ange:	0.0 81.3 40.7 20.3 0.0 81.3	0.0 80.0 40.0 20.0 0.0 80.0 800.0	80.1 40.2 20.2 0.5 78.8 0.0	0.999 0.996 0.989 1.015 0.995
high point second point third point as left zero	5000 4919 4960 4980 5000 4919 4920 ange: ficiency test:	0.0 81.3 40.7 20.3 0.0 81.3 80.0	0.0 80.0 40.0 20.0 0.0 80.0 800.0 80.18	80.1 40.2 20.2 0.5 78.8 0.0 Ave Corr Factor	0.996 0.989 1.015 0.995 efficiency

Notes:

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

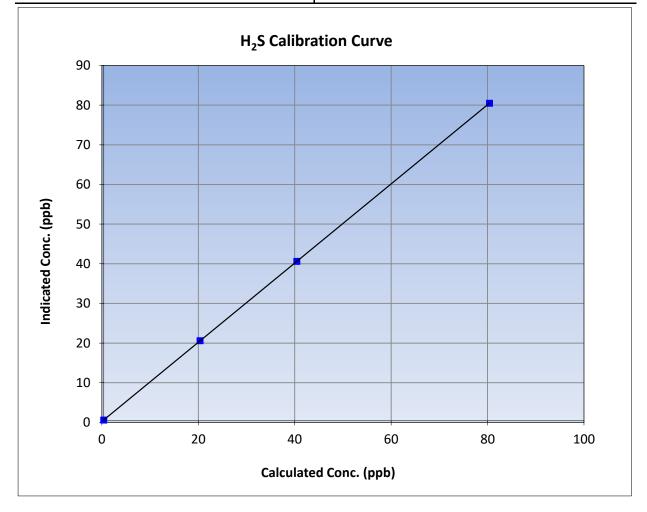


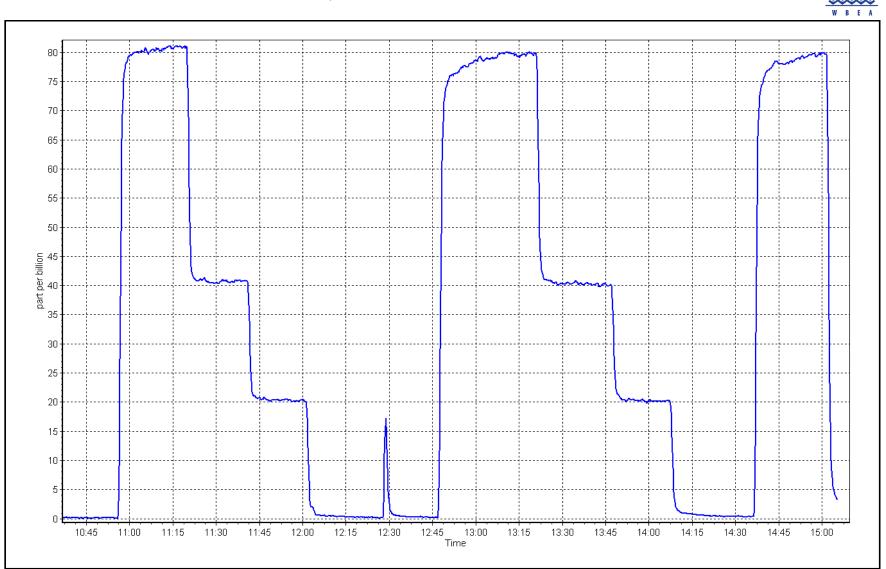
H₂S Calibration Summary

WBEA	Stati	on Information	Version-11-20
Calibration Data			January 2, 2022
Calibration Date:	February 7, 2023	Previous Calibration:	January 3, 2023
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:35	End Time (MST):	15:10
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1203169745

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	1.000000	≥0.995
80.0	80.1	0.9987	correlation coefficient	1.000000	20.333
40.0	40.2	0.9961	Slope	0.998613	0.90 - 1.10
20.0	20.2	0.9888	Slope	0.998013	0.90 - 1.10
			Intercept	0.220652	+/-3





H₂S Calibration Plot

Location: Mannix



THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Name: Calibration Date: Start time (MST): Reason:	Mannix February 21, 2 10:52 Routine	023	Station number: AN Last Cal Date: Jar End time (MST): 13	nuary 20, 2023	
			Calibration Standards		
Gas Cert Reference:	>	(CO268098	Cal Gas Expiry Date: Jar	nuary 12, 2029	
CH4 Cal Gas Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
C3H8 Cal Gas Conc.	207.9	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:		
Removed CH4 Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
Removed C3H8 Conc.	207.9	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄)	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 62	1	
ZAG make/model:	API T701H		Serial Number: 83	2	
			Analyzer 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> </u>	- <u>inish</u>	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 2.57E-04	2.	56E-04 NMHC SP Ratio:	4.41E-05	4.36E-05
CH4 Retention time	: 15.00	1	15.00 NMHC Peak Area:	207495	209913

Station Information

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.0	17.23	17.56	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	80.0	17.23	17.18	1.003		
second point	4960	40.0	8.61	8.58	1.004		
third point	4980	20.0	4.31	4.27	1.008		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.0	17.23	17.27	0.998		
				Average Correction Factor	1.005		
Baseline Corr AF:	17.56	Prev response	17.27	*% change	1.7%		
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	0.00	0.00			
as found span	4920	80	9.15	9.34	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	9.12	1.003		
second point	4960	40	4.57	4.57	1.002		
third point	4980	20	2.29	2.28	1.004		
as left zero	5000	0	0.00	0.00			
as left span	4920	80	9.15	9.18	0.996		
			ŀ	Average Correction Factor	1.003		
Baseline Corr AF:	9.34	Prev response	9.17	*% change	1.9%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		

		CH4 Calibra	lion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	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	8.08	8.23	0.982
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	8.06	1.003
second point	4960	40.0	4.04	4.01	1.008
third point	4980	20.0	2.02	2.00	1.012
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	8.08	8.09	0.999
			Av	verage Correction Factor	1.008
Baseline Corr AF:	8.23	Prev response	8.10	*% change	1.5%
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:		1.004873		0.997356	
THC Cal Offset:		-0.040600		-0.010200	
CH4 Cal Slope:		1.006140		0.997864	
CH4 Cal Offset:		-0.026000		-0.012000	
NMHC Cal Slope:		1.003542		0.997020	
NMHC Cal Offset:		-0.015000		0.000600	

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:	February	21, 2023	Previous Calibration:	January 2	20, 2023
Station Name:	Ma	nnix	Station Number:	AM	S05
Start Time (MST):	10	:52	End Time (MST):	13:	57
Analyzer make:	Therr	no 55i	Analyzer serial #:	11524	30011
		Calibra	tion Data		
Calculated concentratio (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00 17.23	0.00 17.18	1.0030	Correlation Coefficient	0.999998	≥0.995
8.61 4.31	8.58 4.27	1.0043 1.0076	Slope	0.997356	0.90 - 1.10
			Intercept	-0.010200	+/-0.5
20.0		THC Calibratio			
18.0					
16.0					
14.0 —					
E 12.0					
(md 12.0					
— 0.8 d					
0.8 Indicated					
4.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

Station Name:MStart Time (MST):1	y 21, 2023 annix 0:52 mo 55i Calibra	Information Previous Calibration: Station Number: End Time (MST): Analyzer serial #: Analyzer serial #: Correlation Coefficient Correlation Coefficient Intercept	AMS 13: 11524: valuation	S05 57
tation Name: M tart Time (MST): 1 nalyzer make: Then Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic) 0.00 0.00 8.08 8.06 4.04 4.01 2.02 2.00 9.0 8.0 6.0	annix 0:52 mo 55i Calibra Correction factor (Cc/Ic) 1.0027 1.0080 1.0123	Station Number: End Time (MST): Analyzer serial #: ation Data Statistical E Correlation Coefficient Slope Intercept	AMS 13: 11524: valuation 0.999989 0.997864	S05 57 30011 <i>Limits</i> ≥0.995 0.90 - 1.10
Start Time (MST): 1 Analyzer make: Then Calculated concentration (ppm) (Cc) Indicated concentration (ppm) (Ic) 0.00 0.00 8.08 8.06 4.04 4.01 2.02 2.00 9.0	0:52 mo 55i Calibra Correction factor (Cc/lc) 1.0027 1.0080 1.0123	End Time (MST): Analyzer serial #: Ation Data Statistical E Correlation Coefficient Slope Intercept	13: 11524 valuation 0.999989 0.997864	57 30011 <u>Limits</u> ≥0.995 0.90 - 1.10
Analyzer make: The Calculated concentration (ppm) (Cc) Indicated concentration (ppm) (Ic) 0.00 0.00 8.08 8.06 4.04 4.01 2.02 2.00 9.0	rmo 55i Calibra Correction factor (Cc/lc) 1.0027 1.0080 1.0123	Analyzer serial #: ation Data Statistical E Correlation Coefficient Slope Intercept	11524: valuation 0.999989 0.997864	30011 <u>Limits</u> ≥0.995 0.90 - 1.10
Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic) 0.00 0.00 8.08 8.06 4.04 4.01 2.02 2.00 9.0 8.0 7.0 6.0	Calibra Correction factor (Cc/lc) 1.0027 1.0080 1.0123	ation Data Statistical E Correlation Coefficient Slope Intercept	valuation 0.999989 0.997864	<u>Limits</u> ≥0.995 0.90 - 1.10
(ppm) (Cc) (ppm) (lc) 0.00 0.00 8.08 8.06 4.04 4.01 2.02 2.00 9.0 8.0 7.0 6.0	Correction factor (Cc/Ic) 1.0027 1.0080 1.0123	Statistical E Correlation Coefficient Slope Intercept	0.999989 0.997864	≥0.995 0.90 - 1.10
(ppm) (Cc) (ppm) (lc) 0.00 0.00 8.08 8.06 4.04 4.01 2.02 2.00 9.0 8.0 7.0 6.0	Correction factor (Cc/lc)	- Correlation Coefficient - Slope - Intercept	0.999989 0.997864	≥0.995 0.90 - 1.10
8.08 8.06 4.04 4.01 2.02 2.00 9.0 8.0 7.0 6.0	1.0027 1.0080 1.0123	- Slope - Intercept	0.997864	0.90 - 1.10
4.04 4.01 2.02 2.00 9.0 8.0 7.0 6.0	1.0080 1.0123	Intercept		
9.0 8.0 7.0 6.0			-0.012000	+/-0.5
8.0 7.0 6.0	CH ₄ Calibratio	n Curve		
5.0 bb 4.0 3 .0				
0.4 Conception 10.4 Conception				
0.6 cate				
2.0				
1.0				
0.0 0.0 2.0			8.0	10.0
0.0 2.0	4.0	6.0	0.0	±0.0



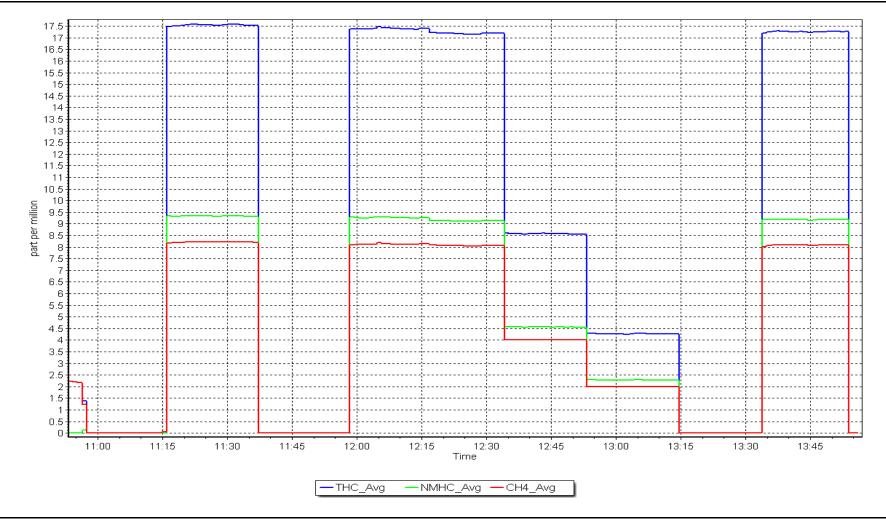
NMHC Calibration Summary

			Station I	nformation		
Calibratio	on Date:	ete: February 21, 2023		Previous Calibration:	January 2	20, 2023
Station Na	ame:	Ma	nnix	Station Number:	AMS	505
Start Time	e (MST):	10):52	End Time (MST):	13:	57
Analyzer i	make:	Ther	mo 55i	Analyzer serial #:	11524	30011
			Calibra	ition Data		
	ated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic) Correction factor (Cc/Id		:) Statistical Evaluation		<u>Limits</u>	
	0.00	0.00		Correlation Coefficient	0.999999	≥0.995
	0.15	9.12	1.0031			
	.57 29	4.57	1.0017 1.0039	Slope	0.997020	0.90 - 1.10
				Intercept	0.000600	+/-0.5
(9.0 8.0 7.0					
Conc. (ppm)	6.0 - 5.0 -					
ouc	5.0		, j			
	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: Mannix







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS06 PATRICIA MCINNES FEBRUARY 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: Start time (MST): Reason:	Patricia McInnes February 16, 2023 10:16 Routine		Station number: Last Cal Date: End time (MST):	AMS06 January 9, 2023 13:48	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	49.78 AAL070632	ppm	Cal Gas Exp Date:	September 9, 2024	
Removed Cal Gas Conc:	49.78	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	N/A	P	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	689	
ZAG Make/Model:	API T701		Serial Number:	3566	
		Analyzer Info	rmation		
Analyzer make	• Thermo 43i	,,	Analyzer serial #:	1160290013	
Analyzer Range			Allalyzer serial #.	1100290013	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.992084	0.993085	Backgd or Offset:	17.2	17.2
Calibration intercept:	1.741680	1.541481	Coeff or Slope:	0.907	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	-0.3	
as found span	4920	80.3	799.5	794.3	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.3	799.5	794.7	1.006
second point	4960	40.2	400.2	399.8	1.001
third point	4980	20.1	200.1	201.8	0.992
as left zero	5000	0.0	0.0	-0.1	
as left span	4920	80.3	799.5	795.6	1.005
			Averag	ge Correction Factor	1.000
Baseline Corr As found:	794.60	Previous response	794.88	*% change	0.0%
	NA	AF Slope:		AF Intercept:	
Baseline Corr 2nd AF pt:	NA	/ a biopei			

Notes:

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

Calibration Performed By:

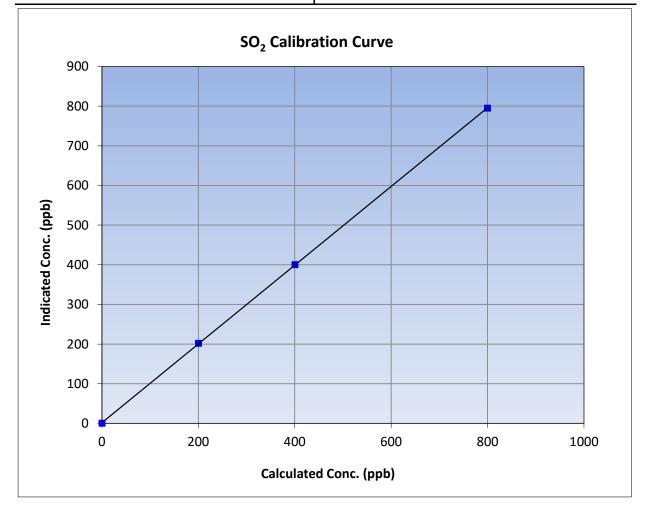


SO₂ Calibration Summary

	Stati	on Information	
Calibration Date:	February 16, 2023	Previous Calibration:	January 9, 2023
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:16	End Time (MST):	13:48
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

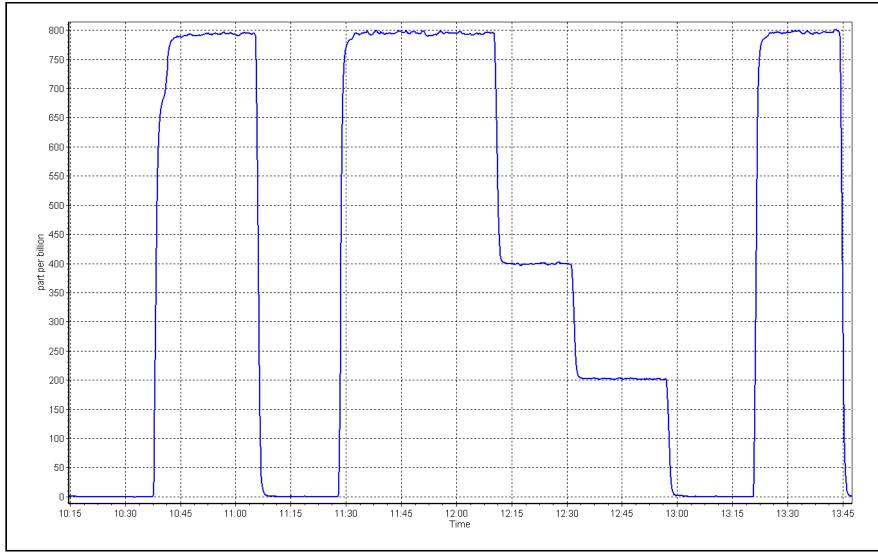
Calibration Data

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	794.7	1.0060	correlation coefficient	0.999903	20.335
400.2	399.8	1.0011	Slope	0.993085	0.90 - 1.10
200.1	201.8	0.9917	Slope	0.993085	0.90 - 1.10
			- Intercept	1.541481	+/-30











H2S Calibration Report

				•	
WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInnes February 6, 2023 10:23 Routine		Station number: Last Cal Date: End time (MST):	AMS 06 January 3, 2023 14:43	
		Calibration S	tandards		
Cal Gas Concentration:	5.38	ppm	Cal Gas Exp Date:	March 2, 2023	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	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		
Analyzer make: Converter make: Analyzer Range	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>
Calibration slope: Calibration intercept:	0.997488 0.117191	0.990341 0.217319	Backgd or Offset: Coeff or Slope:		1.82 1.049
		H2S 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	-0.6	
as found span	4926	74.3	79.9	78.5	1.011
as found 2nd point	4963	37.2	40.0	39.4	1.001
as found 3rd point	4981	18.6	20.0	19.5	0.996
new cylinder response					
		H2S 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	4926	74.3	79.9	79.3	1.008
second point	4963	37.2	40.0	39.9	1.003
third point	4981	18.6	20.0	20.3	0.986
as left zero	5000	0.0	0.0	0.1	
as left span	4926	74.3	79.9	79.4	1.007
SO2 Scrubber Check	4920	80.3	803.0	0.1	
Date of last scrubber cha	nge:	December 20, 2021	L	Ave Corr Factor	0.999
Date of last converter eff	iciency test:	·			efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt:	79.1 40.0	Prev response: AF Slope:	0.988770	*% change: AF Intercept:	-1.0% -0.402701
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999964	* = > +/-5% change initiate	es investigation

Notes:

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

Max Farrell

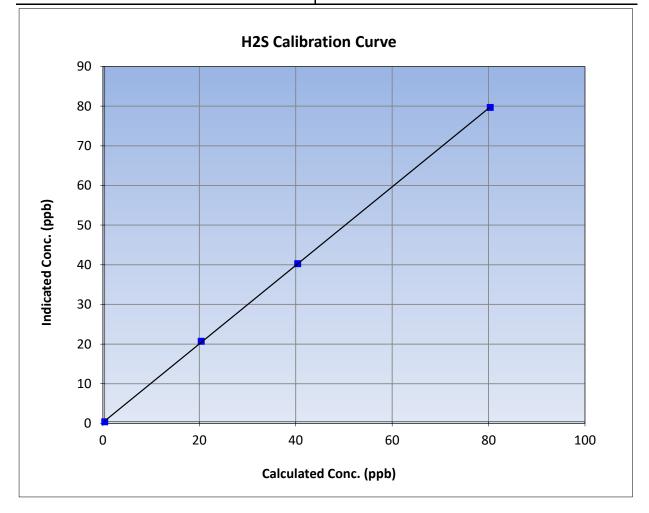


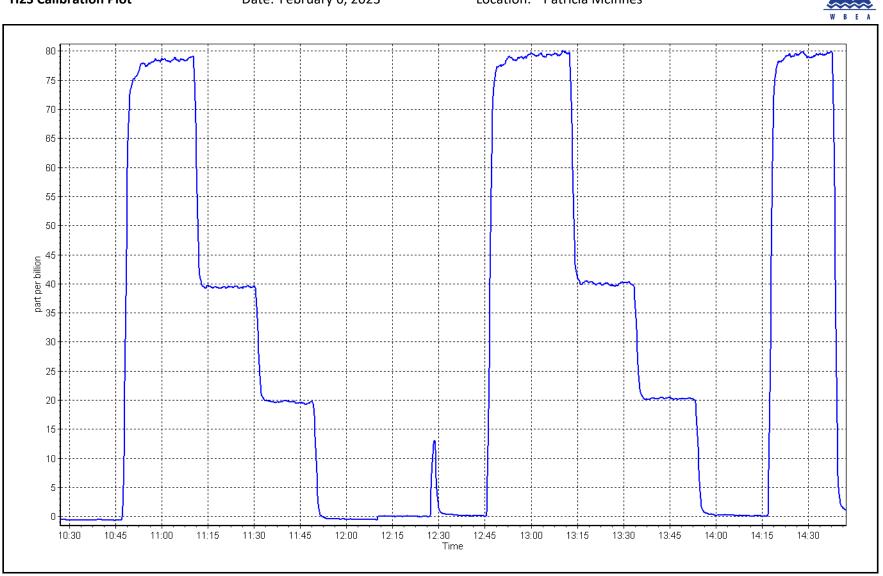
H2S Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	February 6, 2023	Previous Calibration:	January 3, 2023
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:23	End Time (MST):	14:43
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

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	0.999964	≥0.995
79.9	79.3	1.0081	correlation coefficient	0.999904	20.995
40.0	39.9	1.0031	Slope	0.990341	0.90 - 1.10
20.0	20.3	0.9860	Slope	0.990341	0.30 - 1.10
			- Intercept	0.217319	+/-3





H2S Calibration Plot

Location: Patricia McInnes



THC / CH₄ / NMHC Calibration Report

		Stat	ion Information		
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInne February 16, 20 10:17 Routine		Station number: AN Last Cal Date: Jai End time (MST): 13	nuary 9, 2023	
		Calib	ration Standards		
Gas Cert Reference:	A	AL070632	Cal Gas Expiry Date: Se	ptember 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/	Ά	
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: 68	9	
ZAG make/model:	API T701		Serial Number: 35	66	
		Anal	yzer Information		
Analyzer make THC Range (ppm)			Analyzer serial #: 11	80320037	
NMHC Range (ppm)			CH4 Range (ppm): 0 -	10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>

CH4 SP Ratio:	3.19E-04	3.19E-04	NMHC SP Ratio:	5.63E-05	5.63E-05
CH4 Retention time:	13.8	13.8	NMHC Peak Area:	161210	161210

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	16.74	1.023		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.3	17.12	17.14	0.999		
second point	4960	40.2	8.57	8.56	1.001		
third point	4980	20.1	4.29	4.32	0.992		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.3	17.12	17.14	0.999		
			A	verage Correction Factor	0.997		
Baseline Corr AF:	16.74	Prev response	17.12	*% change	-2.3%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	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 Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4920	80.3	9.07	8.85	1.025
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	9.08	0.999
second point	4960	40.2	4.54	4.55	0.999
third point	4980	20.1	2.27	2.29	0.989
as left zero	5000	0	0.00	0.00	
as left span	4920	80.3	9.07	9.09	0.998
			ŀ	Average Correction Factor	0.995
Baseline Corr AF:	8.85	Prev response	9.06	*% change	-2.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation

CH4 Calibration Data

			lion Dala		
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	8.06	7.89	1.021
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	8.06	8.06	1.000
second point	4960	40.2	4.03	4.02	1.004
third point	4980	20.1	2.02	2.03	0.994
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.06	8.06	1.000
			A	verage Correction Factor	1.000
Baseline Corr AF:	7.89	Prev response	8.06	*% change	-2.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	es investigation

Start Finish THC Cal Slope: 1.000499 1.000113 THC Cal Offset: -0.007453 0.008939 CH4 Cal Slope: 1.001107 0.999419 CH4 Cal Offset: -0.004401 0.000800 NMHC Cal Slope: 1.000174 1.000630 NMHC Cal Offset: 0.008539 -0.003652

Notes:

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

Calibration Performed By:

Max Farrell



THC Calibration Summary

		Station I	nformation		
Calibration Date:	February	16, 2023	Previous Calibration:	January	9, 2023
tation Name:	Patricia	McInnes	Station Number:	AM	S06
itart Time (MST):	10	:17	End Time (MST):	13:	49
Analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20037
		Calibra	tion Data		
alculated concentrati (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999992	≥0.995
17.12	17.14	0.9991		0.00000	
8.57 4.29	<u>8.56</u> 4.32	1.0014 0.9917	Slope	1.000113	0.90 - 1.10
4.29	4.52	0.9917	Intercept	0.008939	+/-0.5
				_	
18.0				_	
16.0 -					
14.0 -					
12.0					
udd 10.0					
- 0.8 Conc					
ndicated Conc. (ppm) - 0.8 - - 0.9 -					
<u>ة</u> 4.0 –					
2.0 -					
0.0 🖛	/				
0.0) 5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	February	/ 16, 2023	Previous Calibration:	January	9, 2023
tation Name:		McInnes	Station Number:	AM	
itart Time (MST):):17	End Time (MST):	13:	
nalyzer make:		mo 55i	Analyzer serial #:	11803	
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999988	≥0.995
8.06 4.03	8.06 4.02	0.9998			
2.02	2.03	0.9943	Slope	0.999419	0.90 - 1.10
			Intercept	0.000800	+/-0.5
7.0 6.0 (Ed 5.0					
<u>э.</u> о					
9 4.0					
Indicated Conc. (ppm) 0.4 0.4 0.5 0.6					
2.0					
1.0					
1.0					
	2.0	4.0	6.0	8.0	10.0

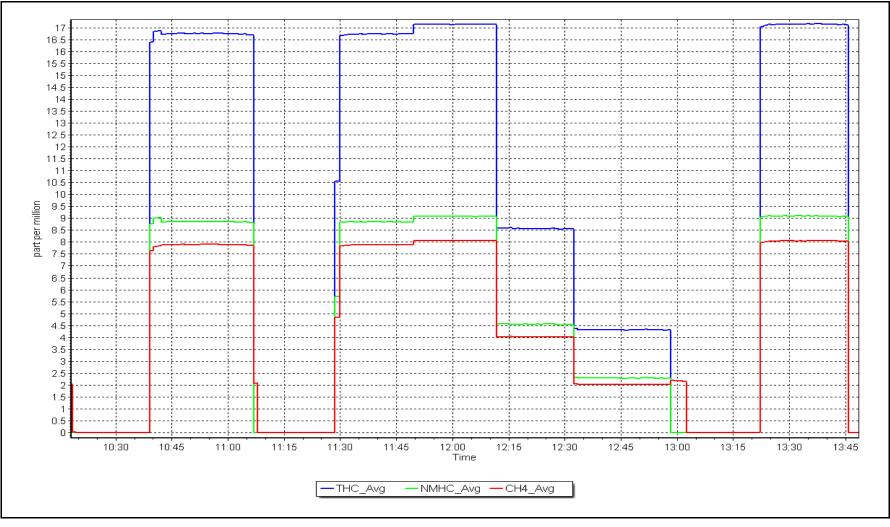


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	February	16, 2023	Previous Calibration:	January	9, 2023
Station Name:	Patricia McInnes		Station Number:	AM	S06
Start Time (MST):	10	:17	End Time (MST):	13:	49
Analyzer make:	Thern	no 55i	Analyzer serial #:	11803	20037
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999993	≥0.995
9.07 4.54	9.08 4.55	0.9986			
2.27	2.29	0.9985	Slope	1.000630	0.90 - 1.10
			Intercept	0.008539	+/-0.5
8.0					
(m 6.0 5.0 Couc					
5.0					
4.0 3.0					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
0.0	2.0			2.0	

NMHC Calibration Plot







THC / CH₄ / NMHC Calibration Report

Diff between cyl (NM):

Serial Number: 3566

Version-01-2020

Station Name:	Pat
Calibration Date:	Feb
Start time (MST):	10:5
Reason:	Mai

tricia McInnes bruary 25, 2023 :52 aintenance

Station number: AMS06 Last Cal Date: February 16, 2023 End time (MST): 17:04

ppm

ppm

	Calibration Standards				
Gas Cert Reference:	A	AL070632	Cal Gas Expiry Date: Septe	mber 9, 20	24
CH4 Cal Gas Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	I
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	I
Removed C3H8 Conc.	205.3	ppm	Diff between cyl (THC):		

Removed C3H8 Conc.	205.
Diff between cyl (CH ₄):	
Calibrator Model:	API T700
ZAG make/model:	API T701

Serial Number: 261

Station Information

		Analyzer In	formation				
Analyzer make: Th THC Range (ppm): 0			Analyzer serial #: 11	80320037			
•	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:	3.19E-04	3.26E-04	NMHC SP Ratio:	5.63E-05	5.79E-05		
CH4 Retention time:	13.8	14.0	NMHC Peak Area:	161210	156880		

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	14.77	1.159
as found 2nd point	4960	40.2	8.57	7.37	1.163
as found 3rd point	4980	20.1	4.29	3.70	1.158
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	17.12	17.14	0.999
second point	4960	40.2	8.57	8.54	1.004
third point	4980	20.1	4.29	4.29	0.999
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.12	17.09	1.002
			Aver	age Correction Factor	1.000
Baseline Corr AF:	14.77	Prev response	17.13	*% change	-16.0%
Baseline Corr 2nd AF:	7.4	AF Slope:	0.862320	AF Intercept:	-0.003271
Baseline Corr 3rd AF:	3.7	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	7.58	1.196
as found 2nd point	4960	40.2	4.54	3.79	1.199
as found 3rd point	4980	20.1	2.27	1.90	1.196
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80.3	9.07	9.08	0.999
second point	4960	40.2	4.54	4.54	1.001
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	9.06	1.001
			Ave	rage Correction Factor	0.998
Baseline Corr AF:	7.58	Prev response	9.08	*% change	-19.8%
Baseline Corr 2nd AF:	3.8	AF Slope:	0.836122	AF Intercept:	-0.002285
Baseline Corr 3rd AF:	1.9	AF Correlation:	0.999998	* = > +/-5% change initiat	es investigation

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.0
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	8.06	7.19	1.121
as found 2nd point	4960	40.2	4.03	3.59	1.125
as found 3rd point	4980	20.1	2.02	1.80	1.118
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	8.06	8.06	0.999
second point	4960	40.2	4.03	4.00	1.007
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	8.03	1.003
			Aver	age Correction Factor	1.003
Baseline Corr AF:	7.19	Prev response	8.05	*% change	-12.0%
Baseline Corr 2nd AF:	3.59	AF Slope:	0.891680	AF Intercept:	-0.000785
Baseline Corr 3rd AF:	1.80	AF Correlation:	0.999995	* = > +/-5% change initiat	tes investigation

Calibration Statistics

	<u>Start</u>	<u>Finish</u>	
THC Cal Slope:	1.000113	1.000813	
THC Cal Offset:	0.008939	-0.008055	
CH4 Cal Slope:	0.999419	1.000524	
CH4 Cal Offset:	0.000800	-0.008597	
NMHC Cal Slope:	1.000630	1.001070	
NMHC Cal Offset:	0.008539	0.000542	

Notes:

Changed pump after MAF's. Adjusted span only.

Calibration Performed By:

Mohammed Kashif



THC Calibration Summary

		Station I	nformation		
Calibration Date:	February 25, 2023		Previous Calibration:	February 16, 2023	
Station Name:	Patricia McInnes		Station Number:	AM	
Start Time (MST):		:52	End Time (MST):	17:	
Analyzer make:		no 55i	Analyzer serial #:	11803	
,			,		
		Calibra	tion Data		
Calculated concentratio (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00 17.14	0.9989	Correlation Coefficient	0.999991	≥0.995
8.57	8.54	1.0039	Slope	1.000813	0.90 - 1.10
4.29	4.29	0.9986	ыорс	1.000015	0.50 1.10
			Intercept	-0.008055	+/-0.5
18.0		THC Calibration	n Curve		
16.0 —					
14.0					
12.0 —					
(md 10.0 -					
Couc					
Indicated Conc. (ppm)					
ق 4.0 –					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0
		Calculated	Conc. (ppm)		



CH₄ Calibration Summary

		Station I	nformation		Version-01-2020
Calibration Date:	Februa	ry 25, 2023	Previous Calibration:	February	16, 2023
Station Name:		a McInnes	Station Number:	AMS06	
Start Time (MST):	1	.0:52	End Time (MST):	17:	04
Analyzer make:	The	rmo 55i	Analyzer serial #:	11803	20037
		Calibra	ation Data		
Calculated concentra (ppm) (Cc)	tion Indicated concentration (ppm) (Ic)	n Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 8.06	0.00 8.06	0.9992	Correlation Coefficient	0.999979	≥0.995
4.03	4.00	1.0075	Clana	1 000524	0.00 1.10
2.02	2.01	1.0017	Slope	1.000524	0.90 - 1.10
			Intercept	-0.008597	+/-0.5
8.0 - 7.0 - 6.0 -					
(mdd) 5.0 - 50 - 50 - 50 -					
၀၄ 4.0 -					
ndicated 0					
2.0 -					
1.0 -					
0.0	.0 2.0	4.0	6.0	8.0	10.0
	2.0			0.0	20.0
		Calculated	d Conc. (ppm)		

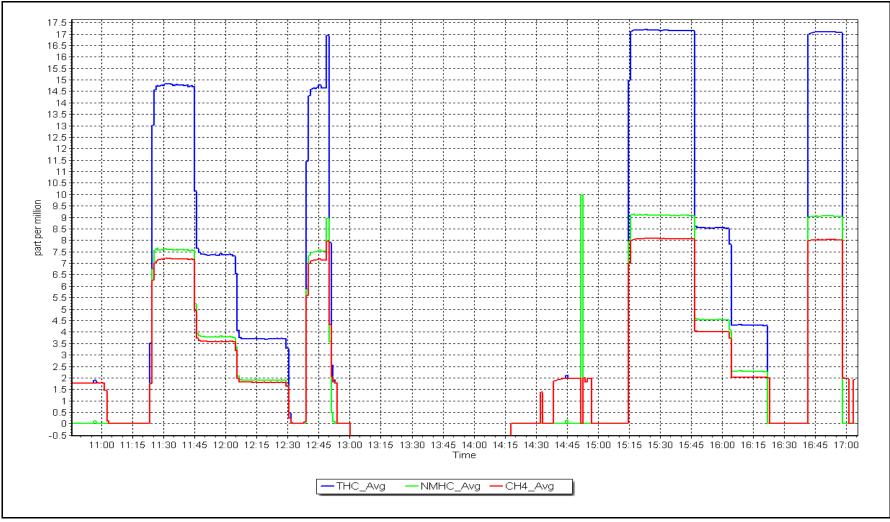


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	Februar	y 25, 2023	Previous Calibration:	February	16, 2023
Station Name:	Patricia	Patricia McInnes		AMS06	
Start Time (MST):	10):52	End Time (MST):	17:	04
Analyzer make:	Ther	mo 55i	Analyzer serial #:	20037	
		Calibra	ition Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic) Correction factor (Cc/Ic)		Statistical Evalu	lation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
9.07 4.54	9.08 4.54	0.9986			
2.27	2.28	0.9959	Slope	1.001070	0.90 - 1.10
			Intercept	0.000542	+/-0.5
9.0 8.0					
7.0					
(m 6.0 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
		Calculated	l Conc. (ppm)		

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:	Patricia McInnes February 2, 2023 9:39 Routine	Station number: Last Cal Date: End time (MST):	January 5, 2023		
			Calibration Standards		
NO Gas Cylinder #:	T26D9MR		Cal Gas Expiry Date:	August 18, 2023	
NOX Cal Gas Conc:	52.51	ppm	NO Cal Gas Conc:	51.98	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date:	N/A	
Removed Gas NOX Conc: NOX gas Diff:	52.51	ppm	Removed Gas NO Conc: NO gas Diff:	51.98	ppm
Calibrator Model:	Teledyne API T700		Serial Number:	3566	
ZAG make/model:	Teledyne API T701		Serial Number:	689	
			Analyzer Information		
Analyzer make: NOX Range (ppb):			Analyzer Information Analyzer serial #:	1172750022	
			-	1172750022 <u>Start</u>	<u>Finish</u>
-	0 - 1000 ppb <u>Start</u>		Analyzer serial #:		<u>Finish</u> 3.2
NOX Range (ppb):	0 - 1000 ppb <u>Start</u> 0.818		Analyzer serial #:	<u>Start</u>	

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000715	1.004307
NO _x Cal Offset:	2.680164	2.260596
NO Cal Slope:	0.999284	1.003971
NO Cal Offset:	1.700041	1.260503
NO ₂ Cal Slope:	1.007019	1.009891
NO ₂ Cal Offset:	0.124373	0.497022



$NO_X \setminus NO \setminus NO_2$ 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	-0.3	0.1	-0.3		
as found span	4923	76.9	807.6	799.5	8.2	815.2	802.4	12.8	0.9907	0.9963
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2		
high point	4923	76.9	807.6	799.5	8.2	812.5	803.6	8.9	0.9940	0.9948
second point	4962	38.5	404.3	400.2	4.1	408.6	402.9	5.7	0.9895	0.9934
third point	4981	19.2	201.6	199.6	2.0	207.6	203.2	4.4	0.9713	0.9823
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.3		
as left span	4923	76.9	807.6	388.2	419.5	810.2	389.2	421.0	0.9968	0.9973
							Average C	orrection Factor	0.9849	0.9902
Corrected As fo	ound NO _x =	815.5 ppb	NO =	802.3 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	0.6%
Previous Respo	onse NO _x =	810.9 ppb	NO =	800.6 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 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)	799.4	388.1	419.5	423.7	0.9900	101.0%
2nd GPT point (200 ppb O3)	799.4	594.2	213.4	216.4	0.9859	101.4%
3rd GPT point (100 ppb O3)	799.4	696.5	111.1	113.3	0.9802	102.0%
				Average Correction Factor	0.9853	101.5%

Notes:

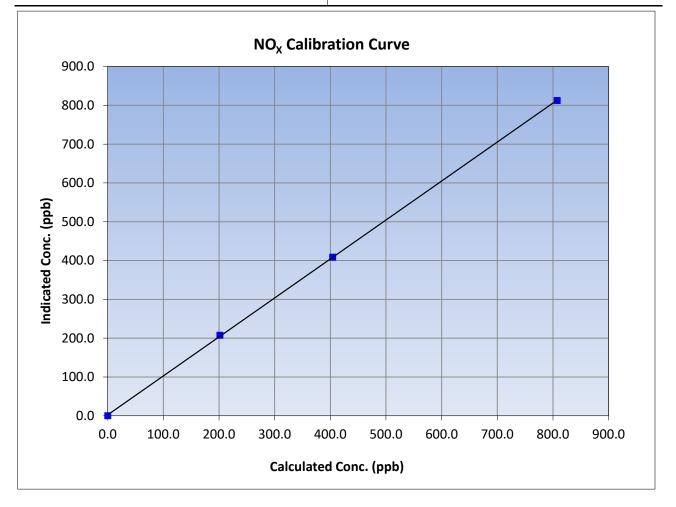
Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

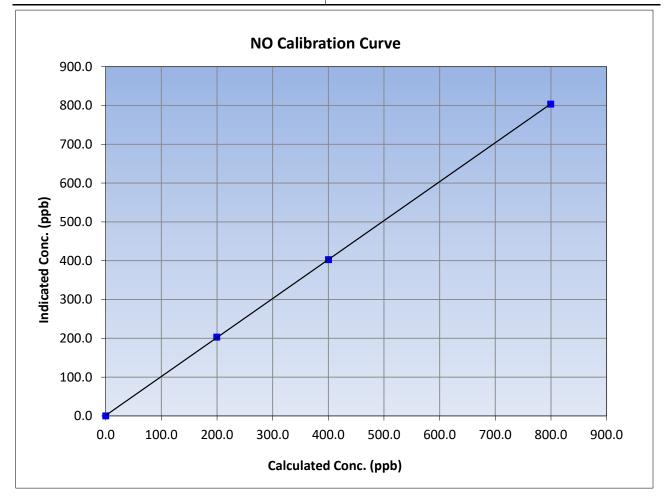
WBEA					Version-04-202	
		Station	Information			
Calibration Date:	Februar	y 2, 2023	Previous Calibration: Januar		5, 2023	
Station Name:	Patricia	McInnes	Station Number:	AM	S06	
Start Time (MST):	9:	:39	End Time (MST):	14	:14	
Analyzer make:	Thermo 42i		Analyzer serial #:	Analyzer serial #: 1172750022		
		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	0.999961	≥0.995	
807.6	812.5	0.9940	correlation coefficient	0.333301	20.995	
404.3	408.6	0.9895	Slope	1.004307	0.90 - 1.10	
201.6	207.6	0.9713	Siope	1.004507	0.90 - 1.10	
			Intercept	2.260596	+/-20	





NO Calibration Summary

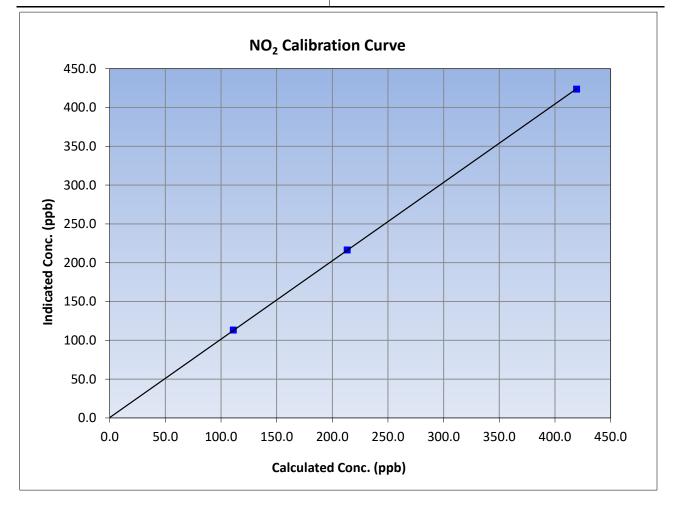
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	Februar	y 2, 2023	Previous Calibration: January		5, 2023	
Station Name:	Patricia	McInnes	Station Number:	AMS06		
Start Time (MST):	9:	39	End Time (MST):	14	14:14	
Analyzer make:	Thermo 42i Analyzer serial #:				1172750022	
		Calibra	ation 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	0.999990	≥0.995	
799.5	803.6	0.9948	correlation coefficient	0.999990	20.995	
400.2	402.9	0.9934	Slope	1.003971	0.90 - 1.10	
199.6	203.2	0.9823	Siohe	1.005971	0.90 - 1.10	
			Intercept	1.260503	+/-20	





NO₂ Calibration Summary

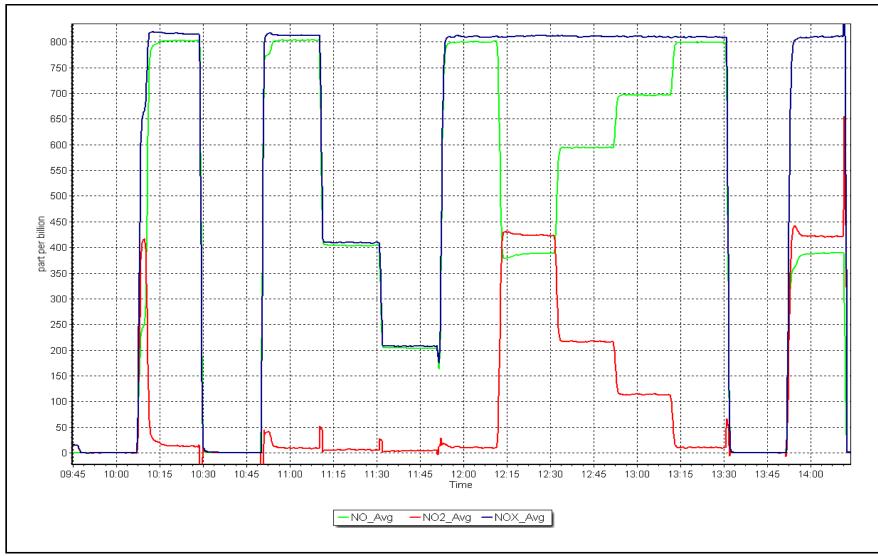
WBEA					Version-04-202	
		Station	Information			
Calibration Date:	February	y 2, 2023	Previous Calibration:	us Calibration: January !		
Station Name:	Patricia	McInnes	Station Number:	AM	S06	
Start Time (MST):	9:	39	End Time (MST):	14	:14	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1172750022		
		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	0.999987	≥0.995	
419.5	423.7	0.9900	correlation coefficient	0.555567	20.335	
213.4	216.4	0.9859	Slope	1.009891	0.90 - 1.10	
111.1	113.3	0.9802	Slope	1.009691	0.90 - 1.10	
			Intercept	0.497022	+/-20	













O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Patricia McInnes		Station number:	AMS06	
Calibration Date:	February 8, 2023		Last Cal Date:	January 12, 2023	
Start time (MST):	10:19		End time (MST):	13:52	
Reason:	Routine				
		Calibration St	andards		
D3 generation mode:	Photometer				
Calibrator Make/Model:	API T700		Serial Number:	3566	
ZAG Make/Model:	API T701H		Serial Number:	689	
		Analyzer Info	rmation		
Analyzer make:	Thermo 49i		Analyzer serial #:	1300156234	
Analyzer Range	0 - 500 ppb				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004914	1.005057	Backgd or Offset:	-1.2	-1.2
Calibration intercept:	1.440000	1.240000	Coeff or Slope:	1.019	1.019
		O ₃ Calibratio	on Data		
	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration C	orrection factor (Cc/I
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	orrection factor (Cc/l Limit = 0.95-1.05
Set Point as found zero		•			
	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	(sccm) 5000	Voltage Drive 800.0	concentration (ppb) (Cc)	(ppm) (Ic) 0.4	Limit = 0.95-1.05
as found zero as found span	(sccm) 5000	Voltage Drive 800.0	concentration (ppb) (Cc)	(ppm) (Ic) 0.4	Limit = 0.95-1.05
as found zero as found span as found 2nd point	(sccm) 5000	Voltage Drive 800.0	concentration (ppb) (Cc)	(ppm) (Ic) 0.4	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000 5000	Voltage Drive 800.0 1303.0	concentration (ppb) (Cc) 0.0 400.0	(ppm) (Ic) 0.4 403.3	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero	(sccm) 5000 5000 5000	Voltage Drive 800.0 1303.0 800.0	concentration (ppb) (Cc) 0.0 400.0 0.0 0.0	(ppm) (Ic) 0.4 403.3 0.6	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point	(sccm) 5000 5000 	Voltage Drive 800.0 1303.0 800.0 1303.0	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0	(ppm) (Ic) 0.4 403.3 0.6 402.8	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	(sccm) 5000 5000 5000 5000 5000	Voltage Drive 800.0 1303.0 800.0 1303.0 966.5	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0	(ppm) (Ic) 0.4 403.3 0.6 402.8 203.0	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 5000	Voltage Drive 800.0 1303.0 800.0 1303.0 966.5 794.3	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0	(ppm) (Ic) 0.4 403.3 0.6 402.8 203.0 102.1	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	Voltage Drive 800.0 1303.0 800.0 1303.0 966.5 794.3 800.0	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0	(ppm) (Ic) 0.4 403.3 0.6 402.8 203.0 102.1 0.9	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	Voltage Drive 800.0 1303.0 800.0 1303.0 966.5 794.3 800.0	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0	(ppm) (IC) 0.4 403.3 0.6 402.8 203.0 102.1 0.9 405.4	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 as left zero as left span	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Voltage Drive 800.0 1303.0 800.0 1303.0 966.5 794.3 800.0 1303.0 1303.0	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Average	(ppm) (Ic) 0.4 403.3 0.6 402.8 203.0 102.1 0.9 405.4 ge Correction Factor	Limit = 0.95-1.05

Notes:

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

Calibration Performed By:

Max Farrell

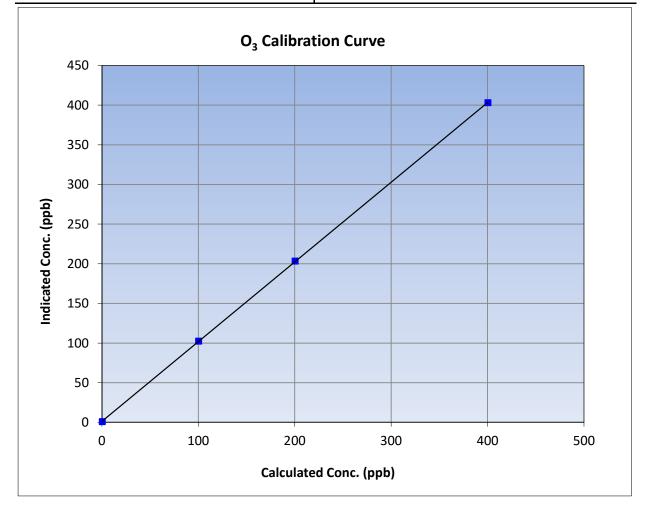


O₃ Calibration Summary

Station Information								
Calibration Date:	February 8, 2023	Previous Calibration:	January 12, 2023					
Station Name:	Patricia McInnes	Station Number:	AMS06					
Start Time (MST):	10:19	End Time (MST):	13:52					
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234					

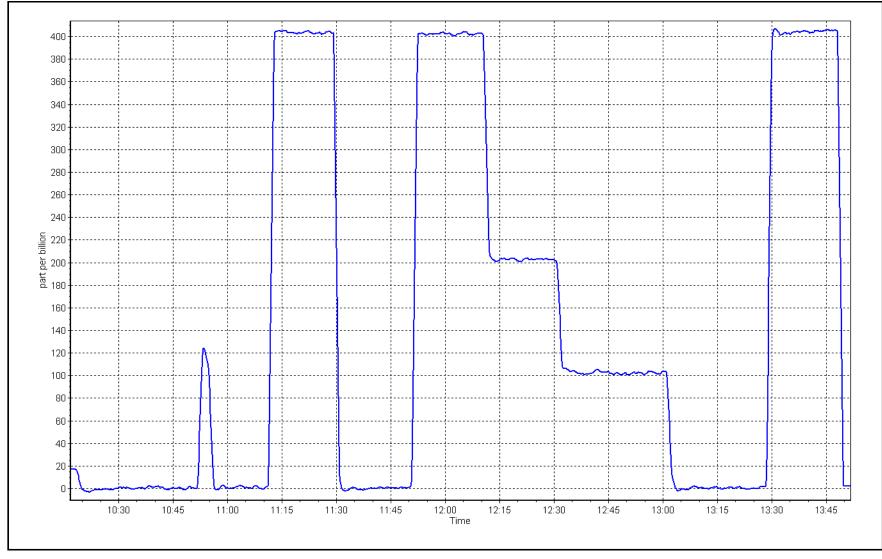
Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (IC)				Statistical Evaluation		<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999985	≥0.995		
400.0	402.8	0.9930	correlation coefficient	0.999965	20.995		
200.0	203.0	0.9852	Slope	1.005057	0.90 - 1.10		
100.0	102.1	0.9794	Siope	1.005057	0.90 - 1.10		
			Intercept	1.240000	+/- 5		











T640 PM_{2.5} CALIBRATION

W B E A						Version-01-2023
		Station Information	n			
Station Name: Calibration Date:	Patricia McInnes February 16, 2023		Station number: Last Cal Date:		2023	
Start time (MST):	14:29		End time (MST):	15:08		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	766		
Flow Meter Make/Model:	Delta Cal		S/N:	628		
Temp/RH standard:	Delta Cal		S/N:	628		
		Monthly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-6.5	-7.2	-6.5			+/- 2 °C
P (mmHg)	715.9	713.3	715.9			+/- 10 mmHg
flow (LPM)	5.02	5.1	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	February 16, 2023	Last Cal Date:	January	9, 2023	
	PM w/o HEPA:	9.1	PM w/ HEPA:	(-	<0.2 ug/m3
Note: this leak check will be	e completed before the	quarterly work and will	serve as the pre ma	intenance le	eak check	
Inlet cleaning :	Inlet Head					
		Quarterly Calibration	Test			
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>		Adjusted	(Limits)
PMT Peak Test						11.3 +/- 0.5
Post-maintenanc	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Chan	nber Cleaned:	January 9,	2023			<0.2 ug/m3
Disposable Filte	er Changed:	January 9,	2023			
		Annual Maintenand	ce			
Date Sample Tul	be Cleaned:	August 28,	, 2020			
Date RH/T Sense	or Cleaned:	August 28,	, 2020			
Notes:	PMT Peak	test completed last mor	nth. Leak check pass	ed. No adju	stments ma	de.
Calibration by:	Max Farrell					
	an i un en					



TN - NO_X - NH_3 Calibration Report

WBEA					Version-11-202
		Statio	n Information		
Station Name: NOX Cal Date:	Patricia McInnes February 7, 2023		Station number: Last Cal Date:	AMS 06 January 11, 2023	
Start time (MST):	9:09		End time (MST):	13:20	
NH3 Cal Date:	February 7, 2023		Last Cal Date:	January 11, 2023	
Start time (MST): Reason:	13:21 Routine		End time (MST):	15:25	
Reason.	Koutine				
		Calibra	tion Standards		
NOX Cal Gas Conc:	52.51	ppm	NO Gas Cylinder #:	T26D9MR	
NO Cal Gas Conc:	51.98	ppm	NO Cal Gas Expiry:	August 18, 2023	
Removed NOX Conc:	52.51	ppm	Removed Cylinder #:	N/A	
Removed NO Conc:	51.98	ppm	Removed cyl Expiry:	N/A	
NOX gas Diff:			NO gas Diff:		
NH3 Cal Gas Conc:	73.9	ppm	NH3 Gas Cylinder #:	CC430800	
			NH3 Cal Gas Expiry:	January 7, 2023	
Removed NH3 Conc:	73.9	ppm	Removed Cylinder #:		
NH3 gas Diff:			Removed cyl Expiry:		
Calibrator Model:	AP	I T700	Serial Number:	3566	
ZAG make/model:	AP	I T701	Serial Number:	689	
		Analyz	er Information		
Analyzer model			Analyzer serial #		
Converter model			Converter serial #		
NH3 Range (ppb)			Reaction cell Press:		
NOX Range (ppb)	: 0 - 1000 ppb		Sample Flow:	: 531	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient		0.853	TN coefficient:		0.851
NOX coefficient		0.855	NO bkgrnd:		-0.1
NO2 coefficient		1.000	NOX bkgrnd:		0.0
NH3 coefficient	: 0.951	0.951	TN bkgrnd:	0.0	0.0
		Calibra	ation Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	0.996497		0.994899	
NO _x Cal Offset	:	1.220653		2.960281	
NO Cal Slope	:	1.002531		0.994939	
NO Cal Offset	:	-0.260924		1.319966	
NO ₂ Cal Slope		1.003819		0.993439	
NO ₂ Cal Offset	:	1.157200		1.205483	
NH3 Cal Slope		0.998364		0.998917	
NH3 Cal Offset		7.107284		8.375709	
TN Cal Slope		1.003901		1.004451	
TN Cal Offset	:	5.611013		8.831802	



TN - NOX - NH₃ Calibration Report

Version-11-2021

				Dilut		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) <i>Limit = 0.95-1.0</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.4	-0.3	0.7		
as found NO	4923	76.9	807.6	807.6		796.1	790.1	5.9	1.014	
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	0.4	0.2		
high NO point	4923	76.9	807.6	807.6		802.1	805.3	-3.2	1.007	
NO/O3 point	4923	76.9	807.6	807.6		803.5	802.8	0.7	1.005	
as found NH3	3415	85.3	1801.0		1801.0	1813.5		1803.1	0.993	0.999
new NH3 cyl rp										
first NH3	3415	85.3	1801.0		1801.0	1813.5		1803.1	0.993	0.999
second NH3	3453	47.4	1000.8		1000.8	1017.3		1011.3	0.984	0.990
third NH3	3476	23.7	500.4		500.4	520.9		517.6	0.961	0.967
							Average C	orrection Factor	1.0060	0.9851
Corrected As fo	ound TN =	795.7 ppb	NO _x = 790.4	ppb NH3 =	1802.4 ppb			*Percent Chang	e TN=	-2.6%
Previous Respo	nse TN =	816.4 ppb	NO _x = 806.0	ppb NH3 =	1805.2 ppb			*Percent Chang	e NO _x =	-2.0%
NH3 Previous C	onverter Efficie	ncy = 95.1%						*Percent Chang * = > +/-5% change		-0.2% 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	0.4	0.4		
as found span	4923	76.9	807.6	799.5	807.6	790.1	782.9	796.1	1.0222	1.0211
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.3	0.6		
high point	4923	76.9	807.6	799.5	807.6	805.3	796.2	802.1	1.0029	1.0041
second point	4962	38.5	404.3	400.2	404.3	406.1	400.1	405.0	0.9956	1.0004
third point	4981	19.2	201.6	199.6	201.6	206.4	200.9	205.1	0.9769	0.9935
							Average C	Correction Factor	0.9918	0.9993
Baseline Corr A	s fnd TN =	795.7 ppb	NO _x = 790.4	ppb NO =	782.5 ppb			*Percent Chang	e TN =	-2.6%
Previous Respo	nse TN =	816.4 ppb	NO _x = 806.0	ppb NO =	801.2 ppb			*Percent Chang	e NO _x =	-2.0%
								*Percent Chang	e NO =	-2.4%
								* = > +/-5% change	initiates investigati	on

		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	-0.7		
calibration zero			0.0	0.1		
1st GPT point (400 ppb O3)	796.9	385.8	419.3	416.9	1.0056	99.4%
2nd GPT point (200 ppb O3)	796.9	592.6	212.5	213.5	0.9951	100.5%
3rd GPT point (100 ppb O3)	796.9	693.5	111.6	112.7	0.9898	101.0%
				Average Correction Factor	0.9968	100.3%

Notes:

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

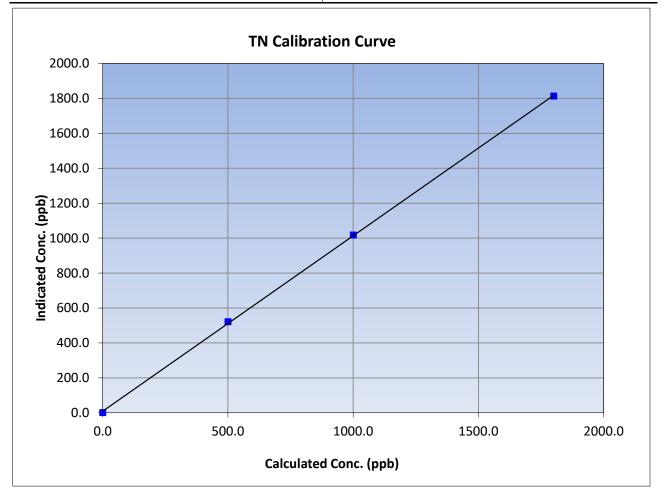
Calibration Performed By:

Max Farrell



TN Calibration Summary

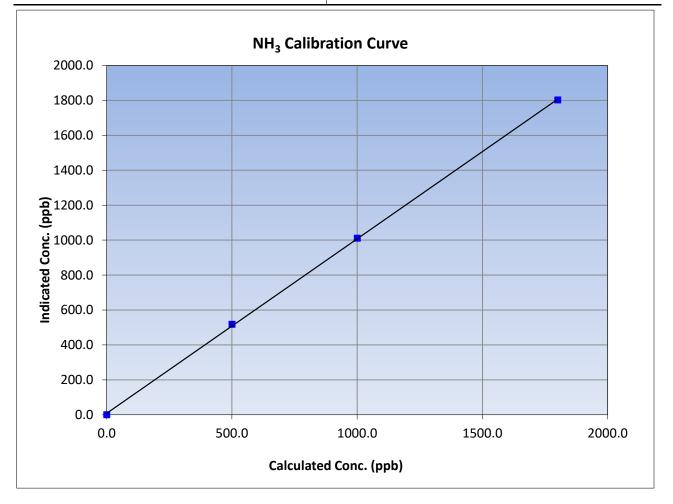
WBEA					Version-11-20
		Station	Information		
Calibration Date: February 7, 2023		February 7, 2023 Prev		Januar	y 11, 2023
Station Name:	: Patricia McInnes		Station Number: A		VIS 06
Start Time (MST): 9:09		09	End Time (MST):	1	3:20
Analyzer make: API T201		T201	Analyzer serial #:		152
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999896	≥0.995
1801.0	1813.5	0.9931	correlation coernelent	0.999890	20.333
1000.8	1017.3	0.9838	Slope	1.004451	0.90 - 1.10
500.4	520.9	0.9607	Slope	1.004451	0.90 - 1.10
			Intercept	8.831802	+/-20





NH₃ Calibration Summary

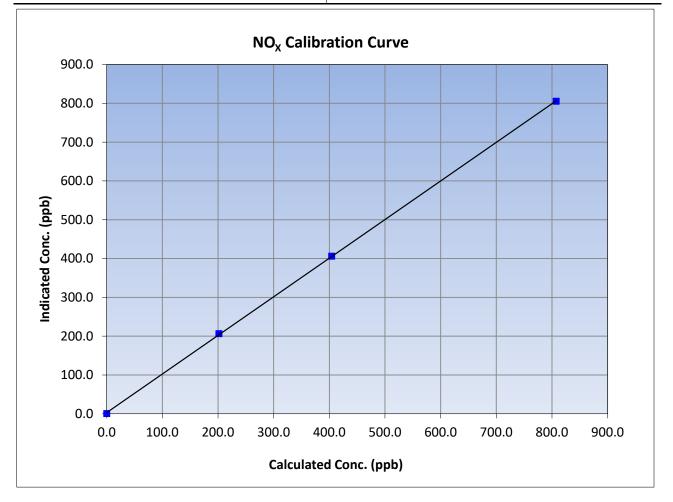
WBEA		Station	Information		Version-11-2
		Station	information		
Calibration Date:	Date: February 7, 2023		Previous Calibration:	January	11, 2023
Station Name:	Patricia McInnes		Station Number: AN		IS 06
Start Time (MST):	rt Time (MST): 9:09		End Time (MST): 1		3:20
Analyzer make: API T201		Analyzer serial #:		152	
		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	0.999896	≥0.995
1801.0	1803.1	0.9989	correlation coefficient	0.999890	20.995
1000.8	1011.3	0.9896	Slope	0.998917	0.90 - 1.10
500.4	517.6	0.9668	Slope	0.998917	0.30 - 1.10
			Intercept	8.375709	+/-20





NO_x Calibration Summary

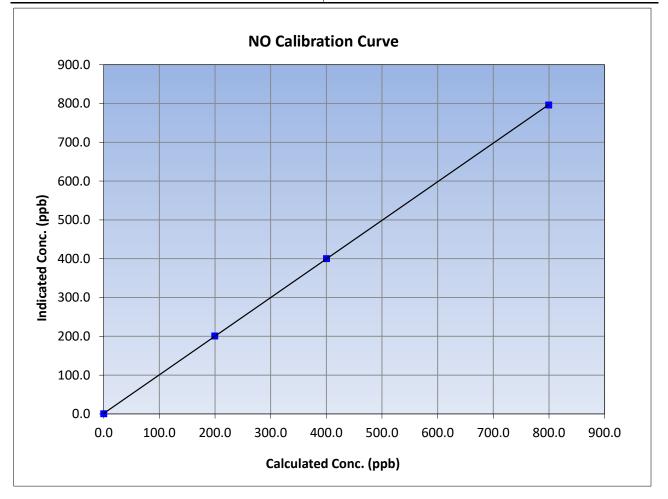
WBEA					Version-11-2
		Station	Information		
Calibration Date:	February 7, 2023		Previous Calibration: Jan		/ 11, 2023
Station Name:	Patricia McInnes		Station Number: AN		/IS 06
Start Time (MST): 9:09		End Time (MST):	1	3:20	
Analyzer make: API T201		Analyzer serial #:		152	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999953	≥0.995
807.6	805.3	1.0029	correlation coernelent	0.5555555	20.333
404.3	406.1	0.9956	Slope	0.994899	0.90 - 1.10
201.6	206.4	0.9769	Slope	0.994699	0.90 - 1.10
			Intercept	2.960281	+/-20





NO Calibration Summary

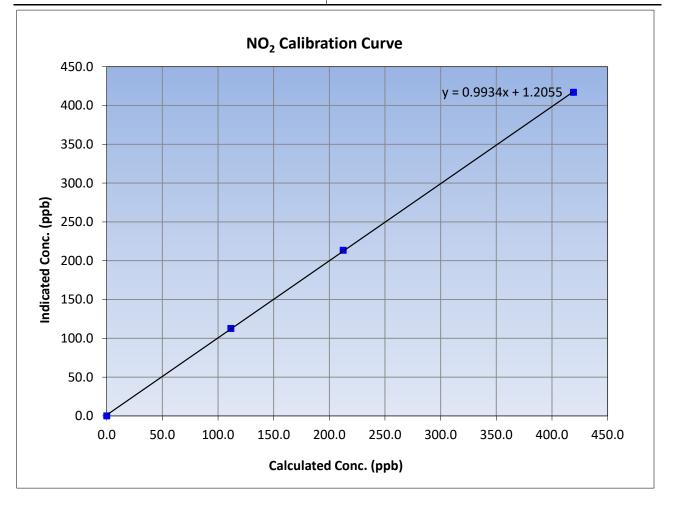
WBEA		Chatian			Version-11-20	
		Station	Information			
Calibration Date:	tion Date: February 7, 2023		Previous Calibration:	Januai	ry 11, 2023	
Station Name:	Patricia McInnes		Station Number:	A	MS 06	
Start Time (MST):	Time (MST): 9:09		End Time (MST):	:	13:20	
Analyzer make: API T201		T201	Analyzer serial #:		152	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999992	≥0.995	
799.5	796.2	1.0041	correlation coernelent	0.999992	20.333	
400.2	400.1	1.0004	Slope	0.994939	0.90 - 1.10	
199.6	200.9	0.9935	Slope	0.994959	0.90 - 1.10	
			Intercept	1.319966	+/-20	

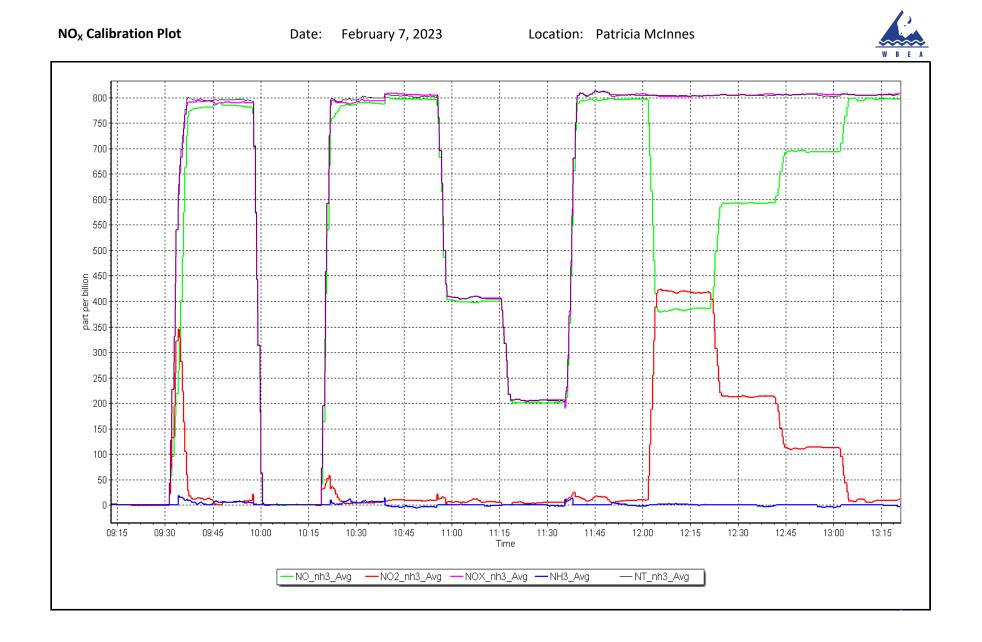


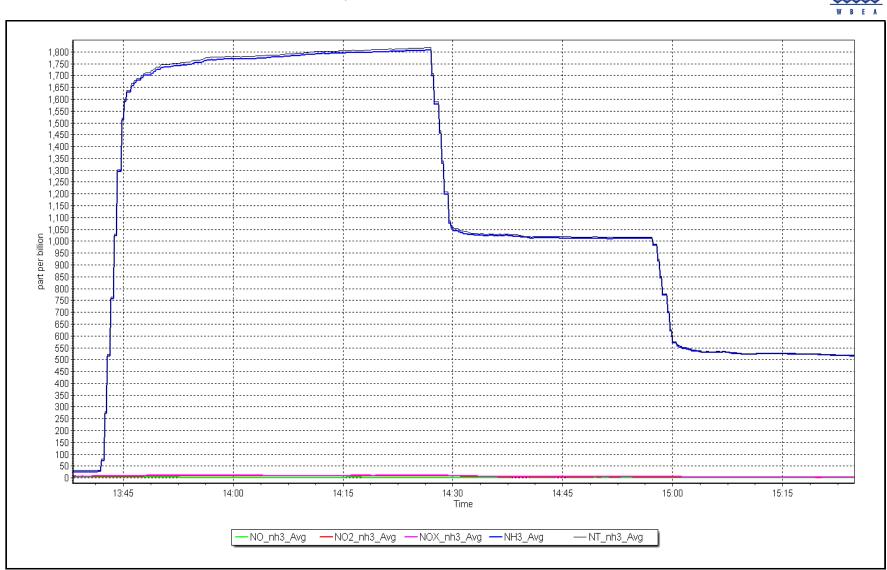


NO₂ Calibration Summary

WBEA					Version-11-20
		Station	Information		
Calibration Date: February 7, 2023		y 7, 2023	Previous Calibration:	January	/ 11, 2023
Station Name:	Patricia McInnes		Station Number:		/IS 06
Start Time (MST): 9:09		End Time (MST):		3:20	
Analyzer make: API T201		T201	Analyzer serial #:		152
		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	0.999959	≥0.995
419.3	416.9	1.0056	correlation coefficient	0.5555555	20.333
212.5	213.5	0.9951	Slope	0.002420	0.90 - 1.10
111.6	112.7	0.9898	Slope	0.993439	0.90 - 1.10
			Intercept	1.205483	+/-20







NH₃ Calibration Plot

Location: Patricia McInnes



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley February 1, 2023 7:20 Routine		Station number: Last Cal Date: End time (MST):	AMS07 January 16, 2023 10:22	
		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 ADI TZOO		Diff between cyl:	2005	
Calibrator Make/Model: ZAG Make/Model:	API T700 API 701H		Serial Number: Serial Number:	3805 198	
	AFI /UIN		Serial Number.	190	
		Analyzer Info	rmation		
Analyzer make Analyzer Range	: Thermo 43i-LTE e 0 - 1000 ppb		Analyzer serial #:	1507864683	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997038	0.998179	Backgd or Offset:	2.70	2.71
Calibration intercept:	1.683589	1.983813	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 ((ppb) (Ic)	Correction factor (Cc/lc Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.3	801.2	802.5	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	79.3	801.2	800.3	1.001
second point	4960	39.6	400.2	403.9	0.991
third point	4980	19.8	200.1	202.4	0.988
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.2	800.2	801.8	0.998
			Averag	ge Correction Factor	0.993
	802.60	Previous response	800.51	*% change	0.3%
Baseline Corr As found:					
Baseline Corr As found: Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

Notes:

No adjustments or maintenance done.

Calibration Performed By:

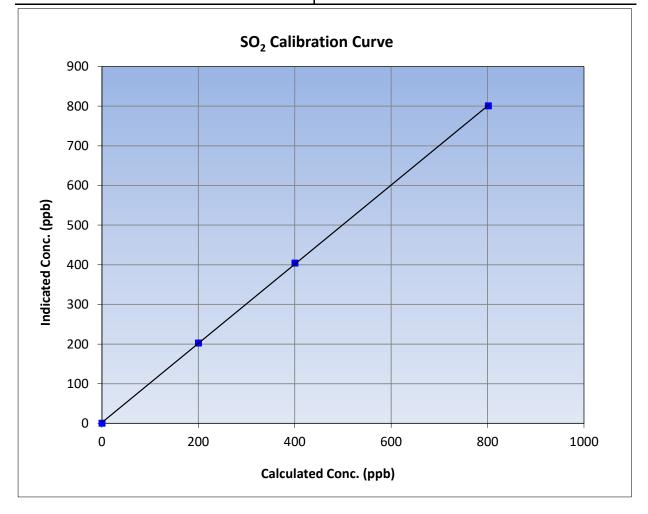


SO₂ Calibration Summary

W B E A			Version-01-2020
	Stati	on Information	
Calibration Date:	February 1, 2023	Previous Calibration:	January 16, 2023
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	7:20	End Time (MST):	10:22
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1507864683

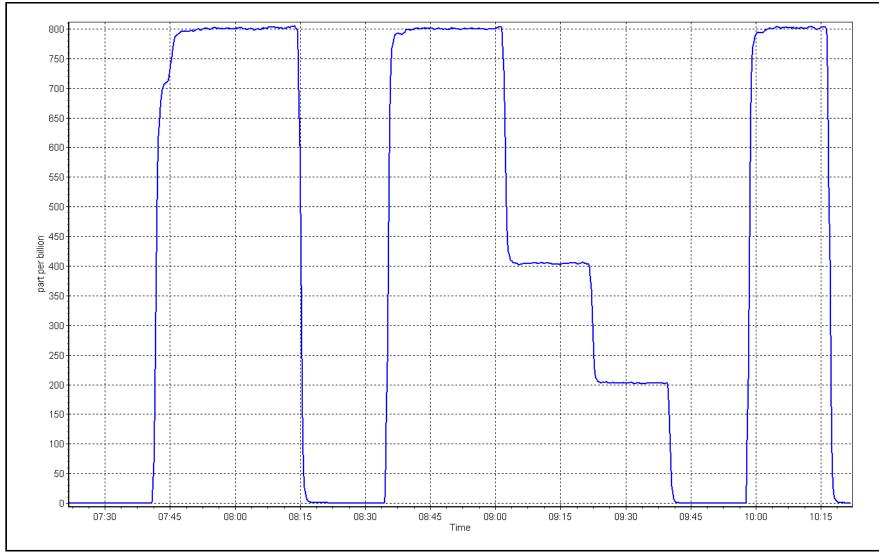
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999966	≥0.995
801.2	800.3	1.0011	correlation coefficient	0.999900	20.333
400.2	403.9	0.9907	Slope	0.998179	0.90 - 1.10
200.1	202.4	0.9885	Slope	0.998179	0.90 - 1.10
			Intercept	1.983813	+/-30











TRS Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley February 6, 2023 8:15 Routine		Station number: Last Cal Date: End time (MST):	AMS07 January 17, 2023 14:20	
		Calibration S	tandards		
Cal Gas Concentration:	4.94	ppm	Cal Gas Exp Date:	February 9, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	EY0002277 4.94 NA	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	•	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	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>
Calibration slope:	0.987815	0.988807	Backgd or Offset:	2.18	2.33
Calibration intercept:	0.181600	0.421592	Coeff or Slope:	0.834	0.886
		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	0.0	
as found span	4918	81.6	80.6	78.6	1.026
as found 2nd point	4959	40.8	40.3	39.2	1.028
as found 3rd point	4980	20.4	20.2	19.4	1.039
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	0.5	
high point	4918	81.6	80.6	80.2	1.005
second point	4959	40.8	40.3	40.2	1.003
third point	4980	20.4	20.2	20.3	0.993
as left zero	5000	0.0	0.0	0.4	
as left span	4918	81.6	80.6	79.5	1.014
SO2 Scrubber Check	4921	79.2	800.2	-0.4	
Date of last scrubber cha	-	25-Feb-22		Ave Corr Factor	1.000
Date of last converter eff	ficiency test:	April 22, 2022		98.5%	efficiency
Baseline Corr As found:	78.6	Prev response:	79.83	*% change:	-1.6%
Baseline Corr 2nd AF pt:	39.2	AF Slope:		AF Intercept:	-0.118432
Baseline Corr 3rd AF pt:	19.4	AF Correlation:		•	
				* = > +/-5% change initiat	tes investigation

Notes:

Sox scrubber failed and Beads replaced. Sox scrubber hydrated for 20mins. Sox scrubber passed after replacing beads. Span adjusted.

Calibration Performed By:

Melissa Lemay

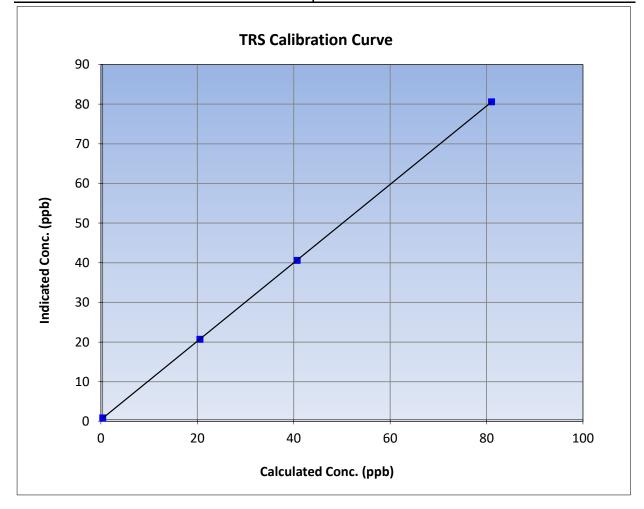


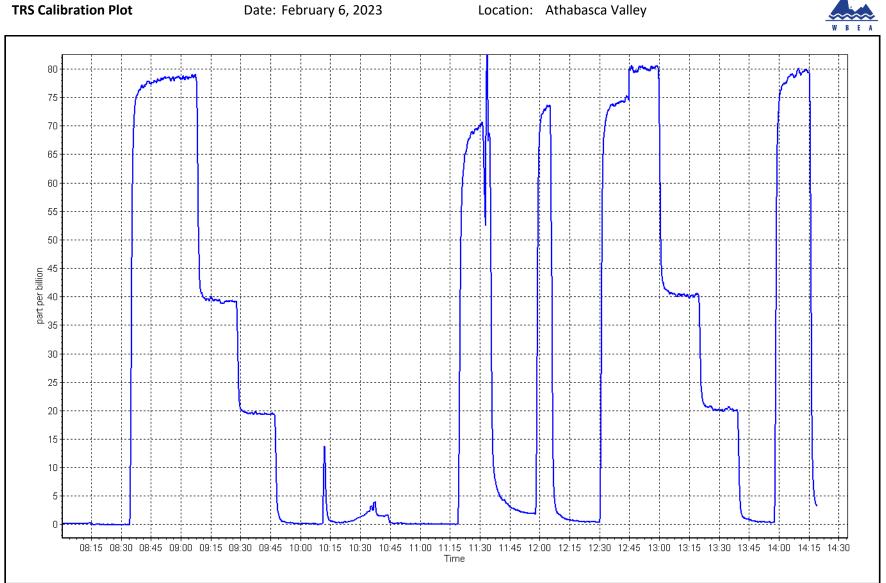
TRS Calibration Summary

	Stati	on Information	Version-11-2021
Calibration Date:	February 6, 2023	Previous Calibration:	January 17, 2023
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	8:15	End Time (MST):	14:20
Analyzer make:	CDN-101	Analyzer serial #:	551

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)				Statistical Evalua	ation	<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999995	≥0.995		
80.6	80.2	1.0053	correlation coefficient	0.999995	20.335		
40.3	40.2	1.0028	Slope	0.988807	0.90 - 1.10		
20.2	20.3	0.9928	Slope	0.988807	0.30 - 1.10		
			- Intercept	0.421592	+/-3		





TRS Calibration Plot



THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020			
		Stat	ion Information					
Station Name: Calibration Date:	Athabasca Valle February 1, 202		Station number: AMS07 Last Cal Date: January 16, 2023					
Start time (MST): Reason:	7:20 Routine		End time (MST): 10:21					
		Calib	oration Standards					
Gas Cert Reference:	C	C282115	Cal Gas Expiry Date: D	ecember 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: N	A				
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: 3	805				
ZAG make/model:	API 701H		Serial Number: 1	98				
		Anal	yzer Information					
Analyzer make	: Thermo 55i		Analyzer serial #: 13	317958219				
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	: 0.000270	0.00027	0 NMHC SP Ratio:	4.42E-05	4.42E-05			
CH4 Retention time	: 13.4	13.4	NMHC Peak Area:	205840	205840			

THC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	79.3	17.05	17.08	0.998			
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	17.15	0.994			
second point	4960	39.6	8.52	8.58	0.993			
third point	4980	19.8	4.26	4.33	0.983			
as left zero	5000	0.0	0.00	0.00				
as left span	4921	79.2	17.03	17.14	0.994			
			ŀ	Average Correction Factor	0.990			
Baseline Corr AF:	17.08	Prev response	16.97	*% 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	0.00	0.00					
as found span	4921	79.3	9.10	9.14	0.996				
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	9.15	0.995				
second point	4960	39.6	4.55	4.59	0.990				
third point	4980	19.8	2.27	2.32	0.980				
as left zero	5000	0.0	0.00	0.00					
as left span	4921	79.2	9.09	9.15	0.994				
			A	Average Correction Factor	0.988				
Baseline Corr AF:	9.14	Prev response	9.04	*% change	1.1%				
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

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	4921	79.3	7.95	7.94	1.001		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4921	79.3	7.95	8.00	0.994		
second point	4960	39.6	3.97	3.99	0.995		
third point	4980	19.8	1.98	2.00	0.992		
as left zero	5000	0.0	0.00	0.00			
as left span	4921	79.2	7.94	8.00	0.992		
			А	verage Correction Factor	0.994		
Baseline Corr AF:	7.94	Prev response	7.94	*% change	0.0%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		
		Calibration	Statistics				
		<u>Start</u>		<u>Finish</u>			
THC Cal Slope:		0.994820		1.004980			
THC Cal Offset:		0.009674		0.021918			
CH4 Cal Slope:		0.998255		1.006293			
CH4 Cal Offset:		0.002012		-0.000176			
NMHC Cal Slope:		0.992058		1.004211			
NMHC Cal Offset:		0.007463		0.018094			

Notes:

Hydrogen and Nitrogen Changed. No adjustments done.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	February	y 1, 2023	Previous Calibration:	January	16 2023
Station Name:		ca Valley	Station Number:	AM	
Start Time (MST):		20	End Time (MST):	10	
Analyzer make:		 no 55i			58219
			,, ,		
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
17.05	17.15	0.9942			
8.52 4.26	<u>8.58</u> 4.33	0.9925 0.9833	Slope	1.004980	0.90 - 1.10
4.20	7.35	0.5855	Intercept	0.021918	+/-0.5
20.0					
18.0 -					
16.0 -					
14.0 -					
ີ ພູ 12.0 -					
ן יכי 10.0 – טס					
Indicated Conc. (ppm)					
udi 6.0 –					
4.0 -					
2.0 -					
0.0) 5	.0	10.0	15.0	20.0
5.0	<u> </u>		Conc. (ppm)		_0.0



CH₄ Calibration Summary

Version-01-2020

		Station	nformation		Version-01-20	
	F alaman			1	16 2022	
Calibration Date:		γ 1, 2023	Previous Calibration:	January 16, 2023 AMS07		
Station Name:		sca Valley	Station Number:			
Start Time (MST):		:20	End Time (MST):		10:21	
Analyzer make:	Ther	mo 55i	Analyzer serial #:	13179	58219	
		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	0.999999	≥0.995	
7.95	8.00	0.9936		0.00000		
3.97	3.99	0.9949	Slope	1.006293	0.90 - 1.10	
1.98	2.00	0.9924				
			Intercept	-0.000176	+/-0.5	
9.0 8.0 7.0		CH ₄ Calibration				
6.0						
(mdd 5.0 						
200 4.0						
Indicated 0						
2.0						
1.0						
0.0	2.0	4.0	6.0	8.0	10.0	



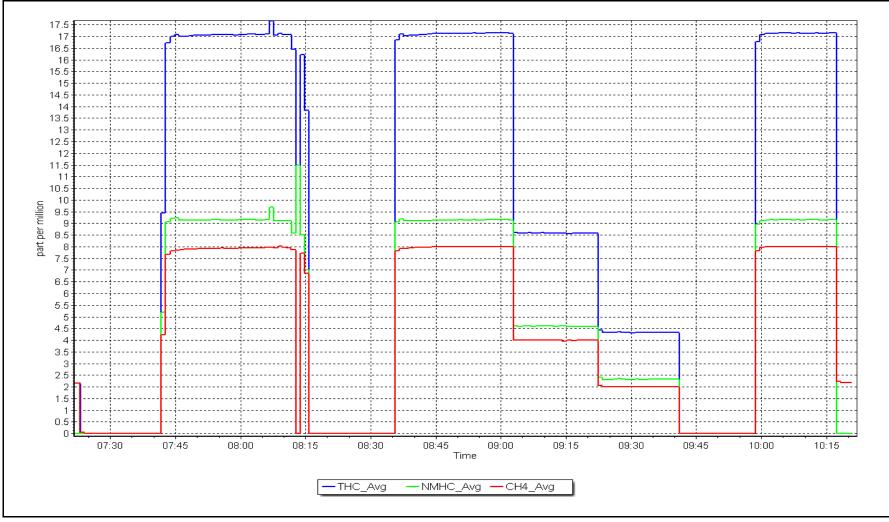
NMHC Calibration Summary

Version-01-2020

			Station I	nformation			
Calibration D	ate:	February	y 1, 2023	Previous Cali	bration:	January 1	16, 2023
Station Name	e:	Athabas	ca Valley	Station N	Number:	AMS	507
Start Time (N	1ST):	7:	20	End Time	e (MST):	10:	21
Analyzer mak	ke:	Thern	no 55i	Analyzer serial #: 1317958			58219
			Calibra	ation Data			
Calculated conc (ppm) (C		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	lc) Statistical Evaluati		ation	<u>Limits</u>
0.00		0.00		Correlation Co	efficient	0.999982	≥0.995
9.10		9.15	0.9947				
4.55		4.59	0.9904	Slope		1.004211	0.90 - 1.10
				- Intercep	ot	0.018094	+/-0.5
10. 9.							
8.	0						
7.	0				_/		
(ша 6.	0						
(mdd) 5.	0						
	0						
1. 1. 3.	0						
2.	0						
1.	0						
0.	0						
	0.0	2.0	4.0	6.0		8.0	10.0
			Calculated	d Conc. (ppm))		

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Sta	ation Information					
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley February 7, 2023 7:22 Routine	Station number: AMS07 Last Cal Date: January 19, 2023 End time (MST): 11:41						
		Cal	ibration Standards					
NO Gas Cylinder #:	T2Y1KA4		Cal Gas Expiry Date:	November 30, 20	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:					
Calibrator Model:	API T700		Serial Number:	3805				
ZAG make/model:	API T701H		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	Fini. 1.04 0.99 1.00	NO bkgnd or offset:NOX bkgnd or offset:	1160120024 <u>Start</u> 7.3 7.5 197.9	<u>Finish</u> 7.3 7.5 197.9			
		Cal	libration Statistics					
		Sta		<u>Finish</u>				
NO _x Cal Slope		0.991	445	0.991039				
NO _x Cal Offset		1.137	-	1.157178				
NO Cal Slope		0.991		0.991042				
NO Cal Offset		0.993		0.933204				
NO ₂ Cal Slope		1.002		1.000742				
NO ₂ Cal Offset	:	0.326	300	0.457636				



$NO_X \setminus NO \setminus NO_2$ 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/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as found span	4920	80.2	816.7	800.7	16.0	808.6	791.4	17.1	1.0100	1.0117
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
high point	4920	80.2	816.7	800.7	16.0	809.8	793.6	16.2	1.0086	1.0089
second point	4960	40.1	408.4	400.4	8.0	407.2	399.3	7.9	1.0029	1.0026
third point	4980	20.0	203.7	199.7	4.0	203.4	199.0	4.4	1.0014	1.0034
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4920	80.2	816.7	399.5	417.2	811.5	390.9	420.6	1.0064	1.0220
							Average C	orrection Factor	1.0043	1.0050
Corrected As fo	ound NO _x =	808.6 ppb	NO =	791.5 ppb	* = > +/-5%	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-0.3%
Previous Respo	onse NO _x =	810.9 ppb	NO =	794.6 ppb				*Percent Chan	ge NO =	-0.4%
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	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 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)	791.9	390.7	417.2	417.7	0.9989	100.1%
2nd GPT point (200 ppb O3)	791.9	595.5	212.4	213.7	0.9941	100.6%
3rd GPT point (100 ppb O3)	791.9	694.2	113.7	114.2	0.9960	100.4%
				Average Correction Factor	0.9963	100.4%

Notes:

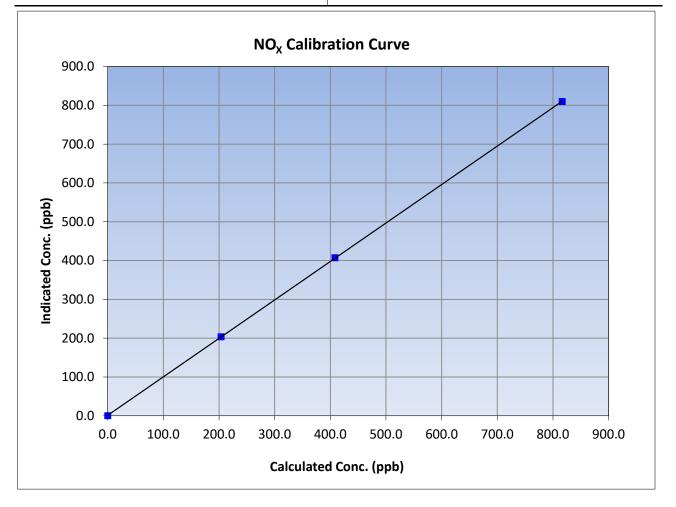
No maintenance or adjustments done.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

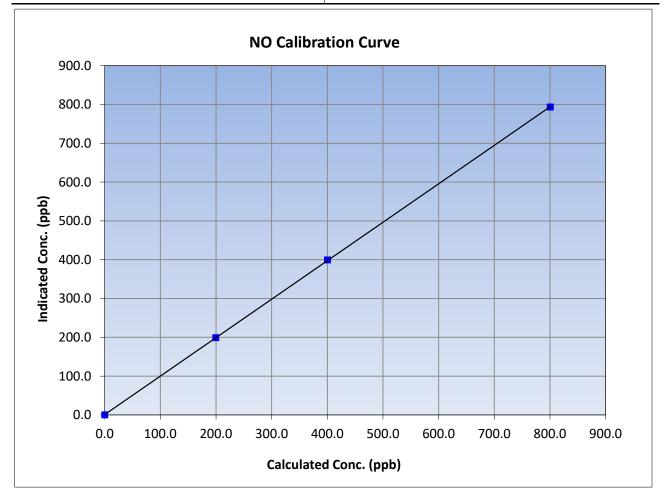
WBEA					Version-04-202	
		Station	Information			
Calibration Date:	: February 7, 2023		Previous Calibration:	January	January 19, 2023	
Station Name:	Athabasca Valley		Station Number:	AM	S07	
Start Time (MST):	7:22		End Time (MST):	11	:41	
Analyzer make: Thermo 42i Analyzer ser			Analyzer serial #:	11601	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	0.999990	≥0.995	
816.7	809.8	1.0086	correlation coernelent	0.5555550	20.333	
408.4	407.2	1.0029	Slope	0.991039	0.90 - 1.10	
203.7	203.4	1.0014	Slope	0.991039	0.30 - 1.10	
			Intercept	1.157178	+/-20	





NO Calibration Summary

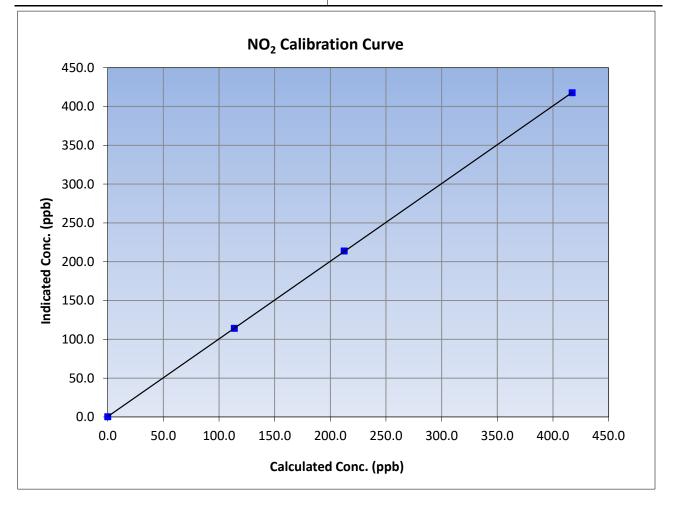
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February 7, 2023		Previous Calibration:	January	19, 2023
Station Name:	Athabasca Valley		Station Number:	AM	S07
Start Time (MST):	7:22		End Time (MST):	11	:41
Analyzer make: Thermo 42i Analyzer s		Analyzer serial #:	11601	20024	
		Calibra	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	0.999988	≥0.995
800.7	793.6	1.0089	correlation coefficient	0.555588	20.333
400.4	399.3	1.0026	Slope	0.991042	0.90 - 1.10
199.7	199.0	1.0034	Slope	0.991042	0.90 - 1.10
			Intercept	0.933204	+/-20

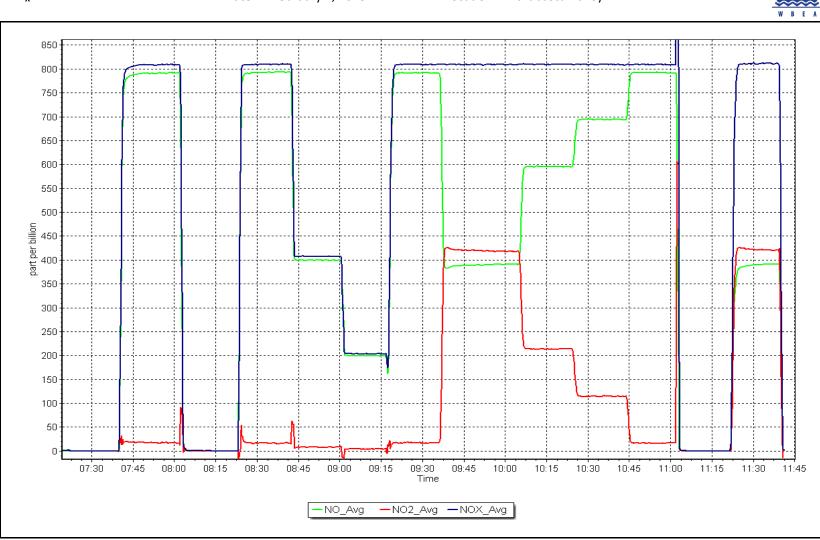




NO₂ Calibration Summary

WBEA					Version-04-202	
		Station	Information			
Calibration Date:	February 7, 2023		Previous Calibration:	January	January 19, 2023	
Station Name:	Athabasca Valley		Station Number:	AM	S07	
Start Time (MST):	7:22		End Time (MST):	11	:41	
Analyzer make:	zer 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	0.999994	≥0.995	
417.2	417.7	0.9989	correlation coefficient	0.555554	20.335	
212.4	213.7	0.9941	Slope	1.000742	0.90 - 1.10	
113.7	114.2	0.9960	Slope	1.000742	0.90 - 1.10	
			Intercept	0.457636	+/-20	









O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Athabasca Valley		Station number:	AMS07	
Calibration Date:	February 8, 2023		Last Cal Date:	January 20, 2023	
Start time (MST):	7:45		End time (MST):	10:52	
Reason:	Routine				
		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				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995429	0.995429	Backgd or Offset:	-0.6	-0.6
Calibration intercept:	1.500000	1.600000	Coeff or Slope:	1.102	1.119
		O ₃ Calibratio	on Data		
	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration C	Correction factor (Cc
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
Set Point as found zero		•			
	(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) -0.3	Limit = 0.95-1.05
as found zero as found span	(sccm) 5000	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic) -0.3	Limit = 0.95-1.05
as found zero as found span as found 2nd point	(sccm) 5000	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic) -0.3	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000 5000	Voltage Drive 0.0 1378.0	concentration (ppb) (Cc) 0.0 400.0	(ppm) (Ic) -0.3 397.5	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero	(sccm) 5000 5000 5000	Voltage Drive 0.0 1378.0 0.0	concentration (ppb) (Cc) 0.0 400.0 0.0	(ppm) (Ic) -0.3 397.5 0.4	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point	(sccm) 5000 5000 	Voltage Drive 0.0 1378.0 0.0 1378.4	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0	(ppm) (Ic) -0.3 397.5 0.4 399.1	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	(sccm) 5000 5000 	Voltage Drive 0.0 1378.0 0.0 1378.4 1022.6	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0	(ppm) (lc) -0.3 397.5 	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	Voltage Drive 0.0 1378.0 0.0 1378.4 1022.6 844.7	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0	(ppm) (Ic) -0.3 397.5 0.4 399.1 201.5 102.2	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 third point as left zero	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Voltage Drive 0.0 1378.0 0.0 1378.4 1022.6 844.7 0.0	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0	(ppm) (Ic) -0.3 397.5 	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	Voltage Drive 0.0 1378.0 0.0 1378.4 1022.6 844.7 0.0	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0	(ppm) (Ic) -0.3 397.5 0.4 399.1 201.5 102.2 0.4 392.6	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	Voltage Drive 0.0 1378.0 0.0 1378.4 1022.6 844.7 0.0 1374.5	concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Average	(ppm) (Ic) -0.3 397.5 0.4 399.1 201.5 102.2 0.4 392.6 ge Correction Factor	Limit = 0.95-1.05

Notes:

No Maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay

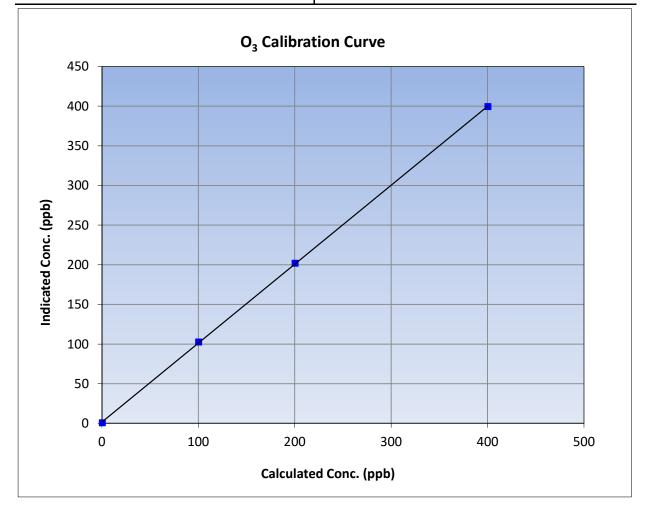


O₃ Calibration Summary

WBEA			Version-01-2020				
Station Information							
Calibration Date:	February 8, 2023	Previous Calibration:	January 20, 2023				
Station Name:	Athabasca Valley	Station Number:	AMS07				
Start Time (MST):	7:45	End Time (MST):	10:52				
Analyzer make:	Thermo 49i	Analyzer serial #:	1507964700				

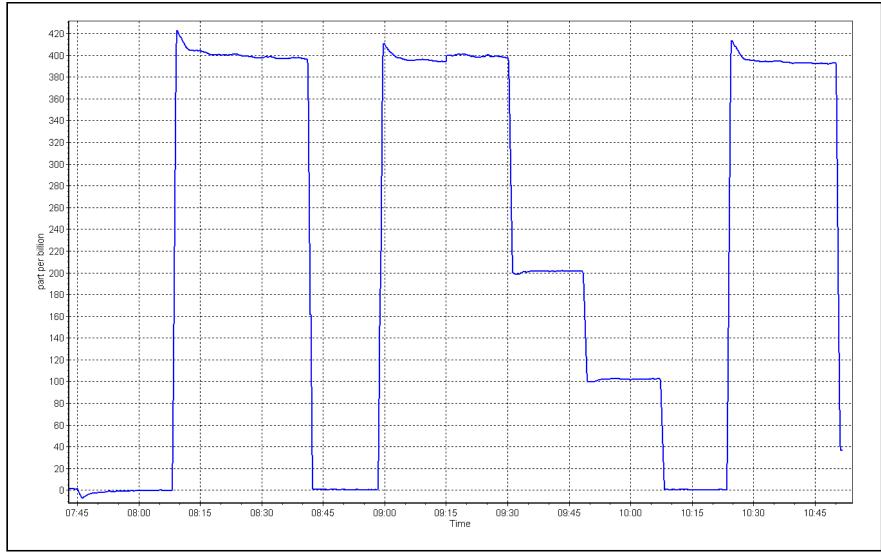
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999958	≥0.995
400.0	399.1	1.0023	correlation coefficient	0.999930	20.335
200.0	201.5	0.9926	Slope	0.995429	0.90 - 1.10
100.0	102.2	0.9785	Slope	0.993429	0.90 - 1.10
			- Intercept	1.600000	+/- 5











T640 PM_{2.5} CALIBRATION

WBEA					Version-01-2023
		Station Informatio	n		
Station Name:	Athabasca Valley		Station number:	AMS 07	
Calibration Date:	February 1, 2023		Last Cal Date:	January 19, 2023	
Start time (MST):	10:25		End time (MST):	11:48	
Analyzar Makay			C /Ni	226	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	320	
	11112.3				
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388753	
Temp/RH standard:	Alicat FP-25BT		S/N:	388753	
		Monthly Calibration 1	ſest		
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
Т ([°] С)	-24	-24.4	-24		+/- 2 °C
P (mmHg)	746	747.7	746		+/- 10 mmHg
flow (LPM)	5	5.1	5		+/- 0.25 LPM
Leak Test:	Date of check:	February 1, 2023	Last Cal Date:	January 19, 2023	
	PM w/o HEPA:	4.1	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will	serve as the pre mai	intenance leak check	_
Inlet cleaning :	Inlet Head	\checkmark			
		Quarterly Calibration	Test		
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test	10.6	N/A	10.6		10.9 +/- 0.5
D				(1155.4	
Post-maintenanc Date Optical Chan		PM w/o HEPA: December !	5 2022	w/ HEPA:	10 2 ··· a / m 2
Disposable Filte	-	December !			<0.2 ug/m3
Disposable Titte	- Changeu.	Determber	5, 2022		
		Annual Maintenand	ce		
Date Sample Tul	be Cleaned:	December !	5. 2022		
Date RH/T Sens	or Cleaned:	December !			
Notes:	Re	moval Calibration done.	Original AMU T640	being put back in.	
Calibration by:	Melissa Lemay				

by:

a Lemay



T640 PM_{2.5} CALIBRATION

WBEA					Version-01-2023
		Station Informatio	n		
Station Name: Calibration Date: Start time (MST):	Athabasca Valley February 1, 2023 10:25		Station number: Last Cal Date: End time (MST):		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	645	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT			388753 388753	
		Monthly Calibration	Test		
<u>Parameter</u> T (°C) P (mmHg)	<u>As found</u> -21.9 748.9	<u>Measured</u> -22 747.7	<u>As left</u> -21.9 748.9	Adjusted	(<i>Limits</i>) +/- 2 °C +/- 10 mmHg
flow (LPM) Leak Test:	5 Date of check: PM w/o HEPA:	5.1 February 1, 2023 1.2	5 Last Cal Date: PM w/ HEPA:	0	+/- 0.25 LPM
Inlet cleaning :	Inlet Head		_		
		Quarterly Calibration			
<u>Parameter</u> PMT Peak Test	<u>As found</u> 9	Post maintenance 10.9	<u>As left</u> 10.9	<u>Adjusted</u> ✓	(Limits) 10.9 +/- 0.5
Post-maintenance Date Optical Chan Disposable Filte	nber Cleaned:	PM w/o HEPA:		w/ HEPA:	<0.2 ug/m3
		Annual Maintenan	се		
Date Sample Tul Date RH/T Sense		December December			
Notes:		Install Calibration. AM	U T640 being put ba	ick into station.	
Calibration by:	Melissa Lemay				



CO Calibration Report

Version-01-2020

		Station Infor	mation		
tation Name: Calibration Date: Start time (MST):	Athabasca Valley February 8, 2023 10:50		Station number: Last Cal Date: End time (MST):	AMS07 January 20, 2023 13:39	
leason:	Routine		, , , , , , , , , , , , , , , , , , ,		
		Calibration Sta	andards		
Cal Gas Concentration:	3,000	ppm	Cal Gas Exp Date:	December 12, 2026	
Cal Gas Cylinder #:	LL66942				
Removed Cal Gas Conc:	3,000	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	3805	
ZAG Make/Model:	API 700H		Serial Number:	198	
		Analyzer Info	rmation		
Analyzer make	: Thermo 48i-LTE		Analyzer serial #:	1408761381	
Analyzer Range	: 0 - 50 ppm				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.999713	0.997345	Backgd or Offset:	3.600	3.651
Calibration intercept:	0.044565	0.018531	Coeff or Slope:	1.079	1.079
		CO Calibratio	n Data		
			n Data Calculated		Correction factor
Set Point	Dilution air flow rate	Source gas flow rate		Indicated concentration	Correction factor (Cc/Ic)
Set Point	Dilution air flow rate (sccm)		Calculated	Indicated concentration (ppm) (Ic)	
Set Point as found zero		Source gas flow rate	Calculated concentration (ppm)		(Cc/Ic)
	(sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	(ppm) (Ic)	(Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	(ppm) (Ic) 0.1	(Cc/lc) <i>Limit = 0.95-1.05</i>
as found zero as found span	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	(ppm) (Ic) 0.1	Limit = 0.95-1.05
as found zero as found span as found 2nd point	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	(ppm) (Ic) 0.1	(Cc/Ic) 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 (ppm) (Cc) 0.0	(ppm) (Ic) 0.1	(Cc/lc) <i>Limit = 0.95-1.05</i>
as found zero as found span as found 2nd point as found 3rd point new cylinder response	(sccm) 5000 4933	Source gas flow rate (sccm) 0.0 66.7	Calculated concentration (ppm) (Cc) 0.0 40.0	(ppm) (Ic) 0.1 40.1	(Cc/lc) <i>Limit = 0.95-1.05</i> 0.998
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	(sccm) 5000 4933 	Source gas flow rate (sccm) 0.0 66.7 0.0	Calculated concentration (ppm) (Cc) 0.0 40.0	(ppm) (Ic) 0.1 40.1 0.0	(Cc/Ic) <i>Limit = 0.95-1.05</i> 0.998
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	(sccm) 5000 4933 5000 4933	Source gas flow rate (sccm) 0.0 66.7 0.0 66.7	Calculated concentration (ppm) (Cc) 0.0 40.0 0.0 40.0	(ppm) (lc) 0.1 40.1 0.0 39.9	(Cc/lc) <i>Limit = 0.95-1.05</i> 0.998 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	(sccm) 5000 4933 	Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3	Calculated concentration (ppm) (Cc) 0.0 40.0 	(ppm) (lc) 0.1 40.1 0.0 39.9 20.0	(Cc/lc) Limit = 0.95-1.05 0.998 1.003 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	(sccm) 5000 4933 5000 4933 4967 4983	Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3 16.7	Calculated concentration (ppm) (Cc) 0.0 40.0 0.0 40.0 20.0 10.0	(ppm) (IC) 0.1 40.1 0.0 39.9 20.0 10.0	(Cc/lc) Limit = 0.95-1.05 0.998 1.003 0.998 1.002
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 4933 5000 4933 4967 4983 5000	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 40.0 	(ppm) (IC) 0.1 40.1 0.0 39.9 20.0 10.0 0.0	(Cc/lc) Limit = 0.95-1.05 0.998 1.003 0.998 1.002
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 4933 5000 4933 4967 4983 5000 4933	Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3 16.7 0.0 66.7	Calculated concentration (ppm) (Cc) 0.0 40.0 	(ppm) (Ic) 0.1 40.1 0.0 39.9 20.0 10.0 0.0 39.9 20.0 10.0 0.0 39.9 20.0 10.0 0.0 39.9	(Cc/lc) Limit = 0.95-1.05 0.998 1.003 0.998 1.002 1.003 1.003 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 as left zero	(sccm) 5000 4933 5000 4933 4967 4983 5000	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 40.0 	(ppm) (ic) 0.1 40.1 0.0 39.9 20.0 10.0 0.0 39.9	(Cc/lc) Limit = 0.95-1.05 0.998 1.003 0.998 1.002 1.003

Notes:

No Maintenance done. Zero adjusted.

Calibration Performed By:

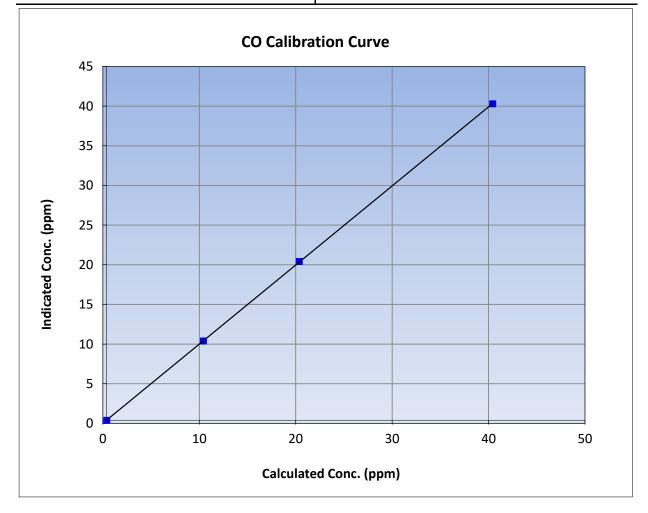


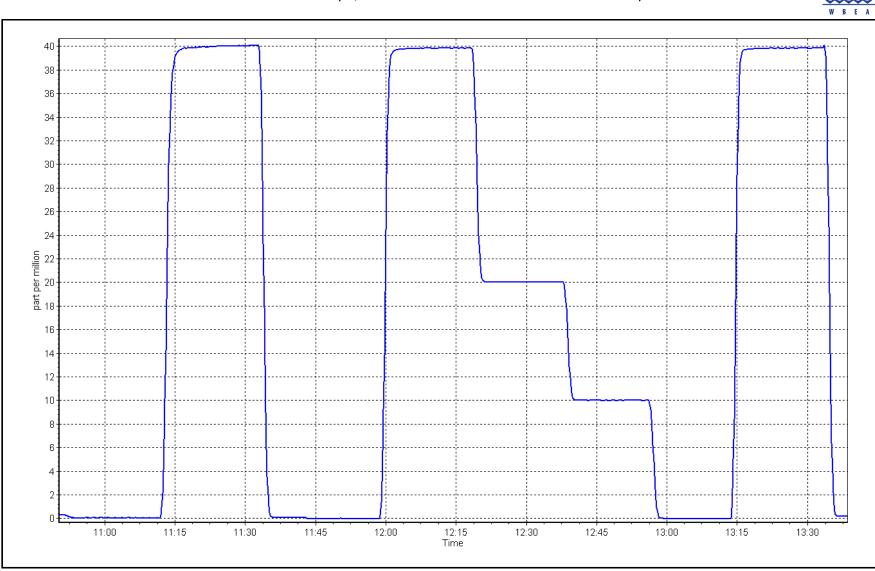
CO Calibration Summary

Version-01-2020 **Station Information** Calibration Date: February 8, 2023 **Previous Calibration:** January 20, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:50 End Time (MST): 13:39 Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

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	0.999991	≥0.995
40.0	39.9	1.0031	correlation coefficient	0.999991	20.333
20.0	20.0	0.9979	Slope	0.997345	0.90 - 1.10
10.0	10.0	1.0021	Slope	0.997345	0.90 - 1.10
			Intercept	0.018531	+/-1.5





Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

WBEA					Version-01-2020
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan February 10, 2023 14:06 Routine		Station number: Last Cal Date: End time (MST):	AMS08 January 11, 2023 4:42 PM	
		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> 1.000787 0.415954	<u>Finish</u> 0.996661 1.336570	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 1.32 1.006
		SO ₂ 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
as found zero	5000	0.0	0.0	0.1	
as found span	4920	80.3	800.4	795.6	1.006
as found 2nd point					
as found 3rd point					
new cylinder response	F000	0.0	0.0	0.2	
calibrator zero	5000 4920	0.0	0.0	0.2 799.1	1.002
high point second point	4920	80.3 40.2	800.4 400.7	399.4	1.002
third point	4980	20.1	200.4	203.4	0.985
as left zero	5000	0.0	0.0	0.2	
as left span	4920	80.3	800.4	800.1	1.000
		2010		ge Correction Factor	0.997
Baseline Corr As found:	795.50	Previous response	801.43	*% change * = > +/-5% change initiat	-0.7% es investigation

Notes:

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

Calibration Performed By:

Morgan Voyageur & Matthew Courtoreille

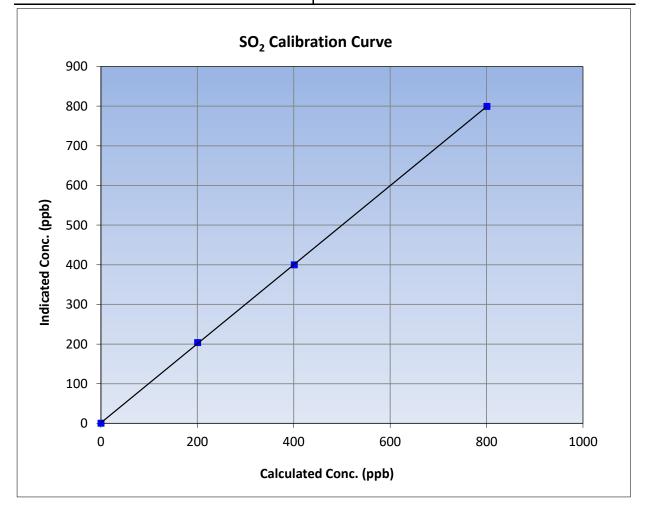


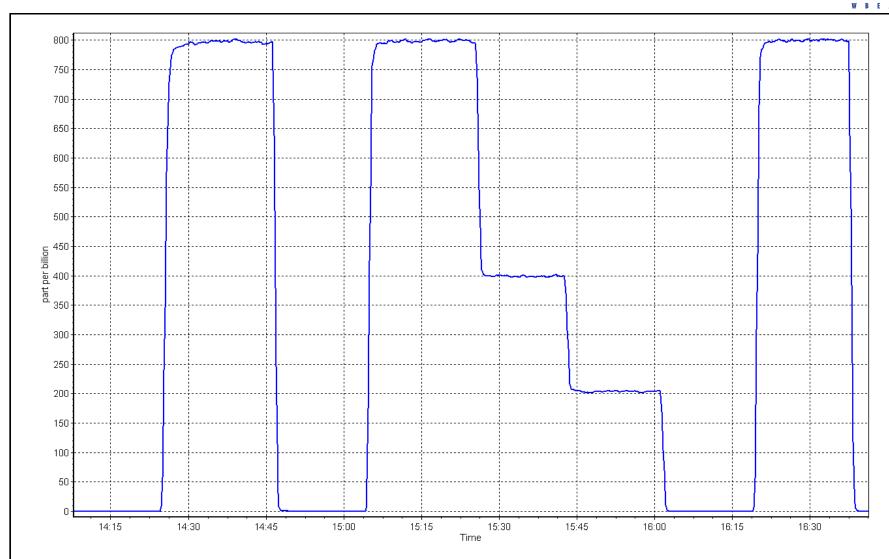
SO₂ Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	February 10, 2023	Previous Calibration:	January 11, 2023					
Station Name:	Fort Chipewyan	Station Number:	AMS08					
Start Time (MST):	14:06	End Time (MST):	16:42					
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241					

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999975	≥0.995	
800.4	799.1	1.0016	correlation coefficient	0.999975	20.335	
400.7	399.4	1.0032	Slope	0.996661	0.90 - 1.10	
200.4	203.4	0.9850	Slope	0.990001	0.90 - 1.10	
			- Intercept	1.336570	+/-30	





Location: Fort Chipewyan





TRS Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan February 10, 2023 9:24 Routine		Station number: Last Cal Date: End time (MST):	AMS08 January 11, 2023 13:29	
		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		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:	0.999140 0.018799	1.000139 0.058837	Backgd or Offset: Coeff or Slope:		1.43 0.743
		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	4920	80.5	80.0	79.8	1.003
as found 2nd point	4960	40.2	40.0	40.1	0.996
as found 3rd point	4980	20.1	20.0	19.9	1.004
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	4920	80.5	80.0	80.0	1.000
second point	4960	40.2	40.0	40.2	0.994
third point	4980	20.1	20.0	20.0	0.999
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.5	80.0	80.2	0.998
SO2 Scrubber Check	4919.7	80.3	803.0	0.1	
Date of last scrubber cha	-	March 7, 2022		Ave Corr Factor	0.998
Date of last converter ef	ficiency test:	March 15, 2022		100.7%	efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	79.8 40.1 19.9	Prev response: AF Slope: AF Correlation:	0.997854	*% change: AF Intercept:	-0.2% 0.038791
				* = > +/-5% change initiat	es investigation

Notes:

Sample inlet filter changed after as founds. Scrubber check passed. No adjustments made.

Morgan Voyageur & Matthew Courtoreille

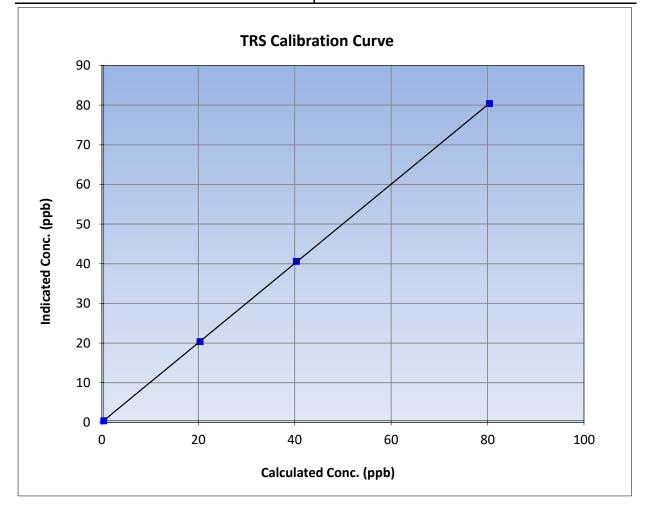


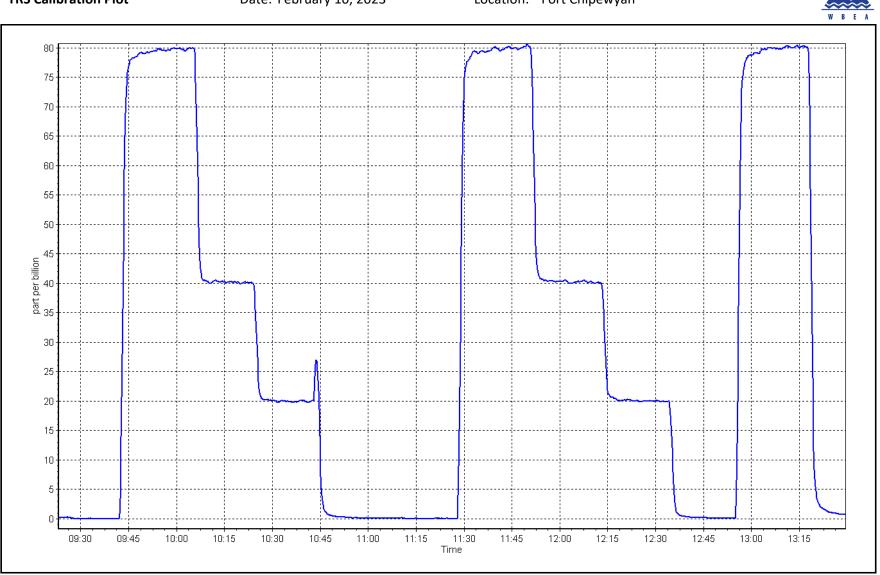
TRS Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	February 10, 2023	Previous Calibration:	January 11, 2023					
Station Name:	Fort Chipewyan	Station Number:	AMS08					
Start Time (MST):	9:24	End Time (MST):	13:29					
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744					

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	0.999988	≥0.995
80.0	80.0	1.0001	correlation coefficient	0.999900	20.995
40.0	40.2	0.9940	Slope	1.000139	0.90 - 1.10
20.0	20.0	0.9990	Slope	1.000135	0.30 - 1.10
			Intercept	0.058837	+/-3





Location: Fort Chipewyan



Station Name:

Reason:

Calibration Date:

Start time (MST):

Fort Chipewyan

10:03

Routine

February 6, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS08 Last Cal Date: January 10, 2023 End time (MST): 14:19

		C	Calibration Standards		
NO Gas Cylinder #:	CC363447		Cal Gas Expiry Date:	February 2, 2024	
NOX Cal Gas Conc:	48.80	ppm	NO Cal Gas Conc:	48.80	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	48.80	ppm	Removed Gas NO Conc:	48.80	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3252	
ZAG make/model:	Teledyne API T701	4	Serial Number:	260	

Analyzer make: T NOX Range (ppb): C		Analyzer serial #: 1426262592			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.844	1.844	NO bkgnd or offset:	6.9	6.9
NOX coeff or slope:	0.993	0.993	NOX bkgnd or offset:	6.9	6.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	252.6	252.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.995345	0.986463
NO _x Cal Offset:	0.840000	2.200000
NO Cal Slope:	0.998815	0.990518
NO Cal Offset:	-0.200000	1.180000
NO ₂ Cal Slope:	0.991767	0.996180
NO ₂ Cal Offset:	-0.832054	-1.402288



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Dilu Set Point					ition Calibratio					
	ution 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	1.4	1.4	0.0		
as found span	4918	82.0	800.3	800.3	0.0	799.5	798.1	1.2	1.0010	1.0028
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	1.3	1.3	0.0		
high point	4918	82.0	800.3	800.3	0.0	791.6	794.4	-2.9	1.0110	1.0075
second point	4959	41.0	400.2	400.2	0.0	396.3	396.2	0.1	1.0097	1.0100
third point	4980	20.5	200.1	200.1	0.0	201.2	200.1	1.1	0.9944	0.9999
as left zero	5000	0.0	0.0	0.0	0.0	1.4	1.4	0.0		
as left span	4918	82.0	800.3	407.8	392.5	793.8	405.3	388.5	1.0082	1.0062
							Average Co	orrection Factor	1.0051	1.0058
Corrected As found	d NO _x =	798.1 ppb	NO =	796.7 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _X =	0.1%
Previous Response	e NO _x =	797.4 ppb	NO =	799.2 ppb				*Percent Chang	ge NO =	-0.3%
Baseline Corr 2nd p	pt NO _x =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3rd p	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) (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						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	792.2	399.7	392.5	390.0	1.0064	99.4%
2nd GPT point (200 ppb O3)	792.2	600.9	191.3	189.3	1.0106	99.0%
3rd GPT point (100 ppb O3)	792.2	697.7	94.5	90.8	1.0407	96.1%
			A	Average Correction Factor	1.0192	98.1%

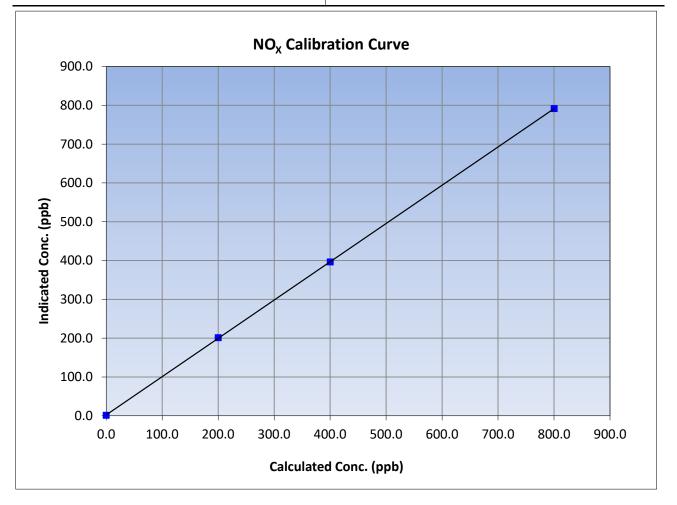
Notes:

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



NO_x Calibration Summary

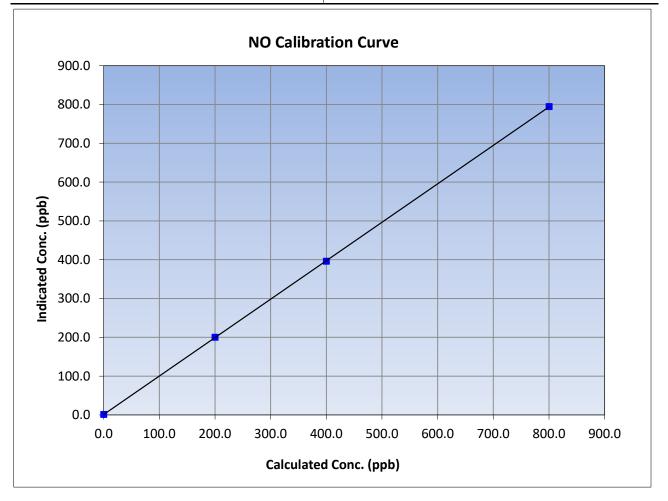
WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	February 6, 2023		January	10, 2023
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08
Start Time (MST):	10	10:03		End Time (MST): 14:19	
Analyzer make:	Thern	no 42i	Analyzer serial #:	62592	
		Calibr	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	c) Statistical Evaluation Lin		<u>Limits</u>
0.0	1.3		Correlation Coefficient	0.999989	≥0.995
800.3	791.6	1.0110	correlation coernelent	0.5555555	20.995
400.2	396.3	1.0097	Clone	0.986463	0.90 - 1.10
200.1	201.2	0.9944	Slope	0.980403	0.90 - 1.10
			Intercept	2.200000	+/-20





NO Calibration Summary

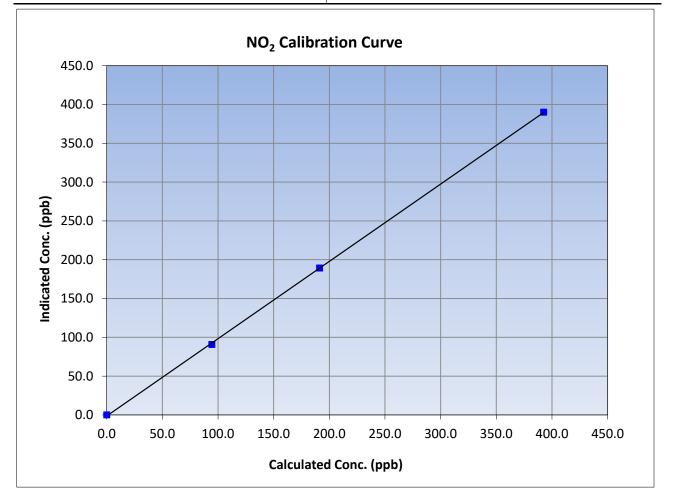
WBEA					Version-04-2
		Station	Information		
Calibration Date:	February 6, 2023		Previous Calibration:	January	10, 2023
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08
Start Time (MST):	10:03		End Time (MST):	14	:19
Analyzer make:	Thern	no 42i	Analyzer serial #: 1426262		62592
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	1.3		Correlation Coefficient	0.999992	≥0.995
800.3	794.4	1.0075	correlation coefficient	0.999992	20.995
400.2	396.2	1.0100	Slope	0.990518	0.90 - 1.10
200.1	200.1	0.9999	Slope	0.990518	0.90 - 1.10
			Intercept	1.180000	+/-20

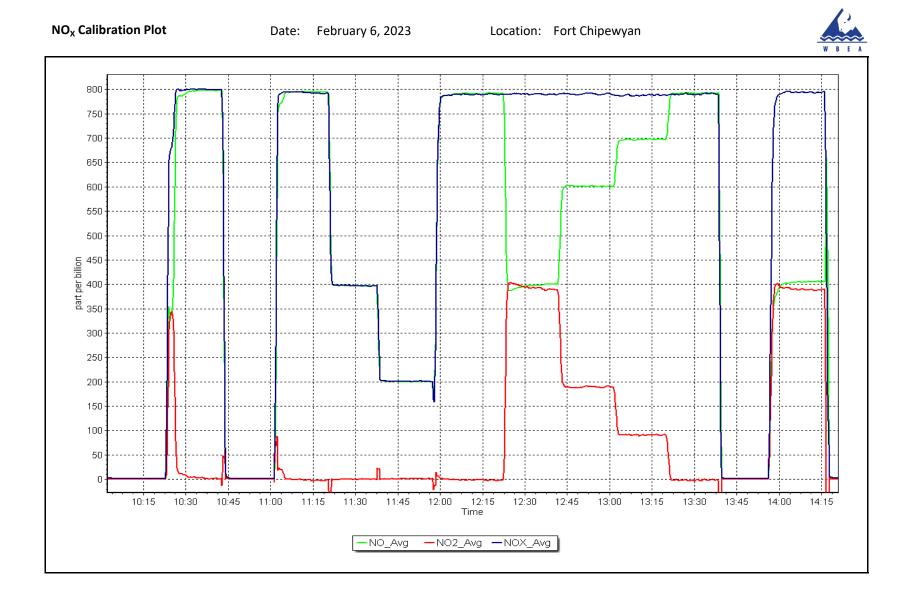




NO₂ Calibration Summary

WBEA					Version-04-20	
		Station	Information			
Calibration Date:	Februar	February 6, 2023		January	10, 2023	
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08	
Start Time (MST):	10	:03	End Time (MST):	14	:19	
Analyzer make:			Analyzer serial #:			
		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	0.999930	≥0.995	
392.5	390.0	1.0064	correlation coefficient	0.999930	20.995	
191.3	189.3	1.0106	Clana	0.996180	0.90 - 1.10	
94.5	90.8	1.0407	Slope	0.990100	0.90 - 1.10	
			Intercept	-1.402288	+/-20	







O₃ Calibration Report

Version-01-2020

					Version-01-202
		Station Infor	mation		
Station Name: Calibration Date:	Fort Chipewyan February 6, 2023		Station number: Last Cal Date:	AMS08 January 10, 2023	
Start time (MST): Reason:	14:22 Routine		End time (MST):	• •	
		Calibration St	andards		
O3 generation mode:	Photometer				
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3252	
ZAG Make/Model:	Teledyne API T701		Serial Number:	260	
		Analyzer Info	rmation		
Analyzer make Analyzer Range	: Teledyne API T400 e 0 - 500 ppb		Analyzer serial #:	3872	
	Start	Finish		Start	Finish
Calibration slope:	1.011486	1.007143	Backgd or Offset:	-2.0	-2.0
Calibration intercept:	-0.960000	-0.600000	Coeff or Slope:	1.036	1.036
		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	NA	0.0	0.1	
as found span	5000	963.6	400.0	402.8	0.993
as found 2nd point					
as found 3rd point					
calibrator zero	5000	NA	0.0	0.7	
high point	5000	961.7	400.0	402.8	0.993
second point	5000	810.3	200.0	200.5	0.998
third point	5000	701.3	100.0	98.6	1.014
as left zero	5000	NA	0.0	0.5	
as left span	5000	963.3	400.0	404.4	0.989
			Avera	ge Correction Factor	1.002
Baseline Corr As found:	402.7	Previous response	403.6	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
					co investigation

Notes:

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

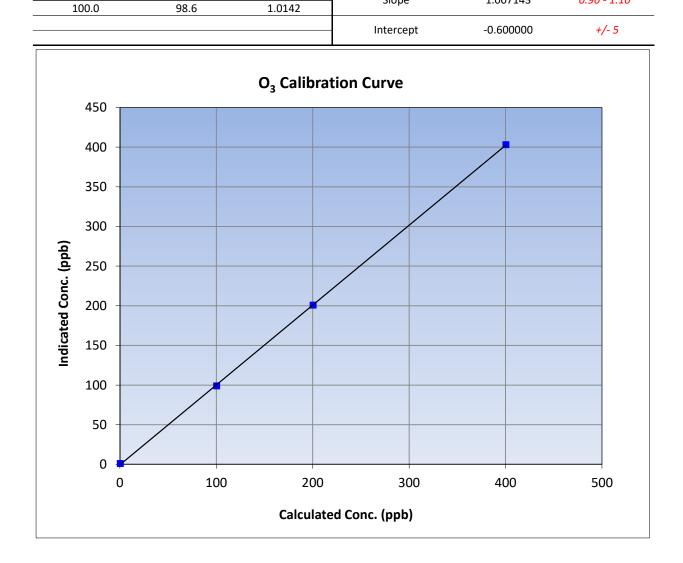
Calibration Performed By:

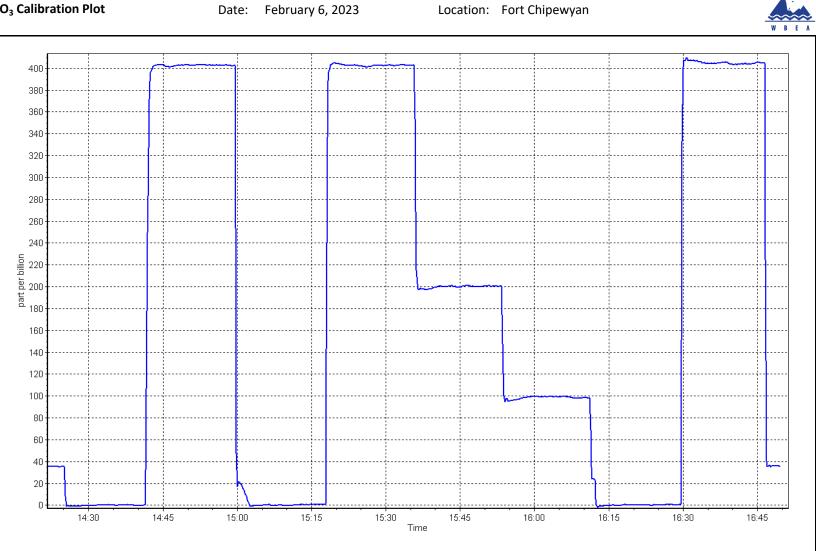
Morgan Voyageur, Matthew Courtoreille



O₃ Calibration Summary

WBEA					Version-01-202
		Station	Information		
Calibration Date:	February	6, 2023	Previous Calibration:	January	/ 10, 2023
Station Name:	Fort Chip	ewyan	Station Number:	AN	/IS08
Start Time (MST):	14:2	22	End Time (MST):	16	6:49
Analyzer make:	Teledyne A	API T400	Analyzer serial #:	3	872
		Calib	ration Data		
Calculated concentration I (ppb) (Cc)	ndicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.7		Correlation Coefficient	0.999951	≥0.995
400.0	402.8	0.9930		0.555551	≥0.995
200.0	200.5	0.9975	Slope	1.007143	0.90 - 1.10
100.0	98.6	1 01/12	Siope	1.007145	0.50 - 1.10









T640 PM_{2.5} CALIBRATION

W D E A					Version-01-2023
		Station Information	1		
Station Name:	Fort Chipewyan		Station number:	AMS 08	
Calibration Date:	February 15, 2023		Last Cal Date:	January 11, 2023	
Start time (MST):	13:07		End time (MST):	14:30	
Analyzer Make:			S/N:	216	
Particulate Fraction:	PM2.5		0,111		
Flow Meter Make/Model:	Delta Cal		S/N:	1212	
Temp/RH standard:	Delta Cal		S/N:	1212	
		Monthly Calibration T	est		
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-21.2	-21.2	-21.2		+/- 2 °C
P (mmHg)	743.2	733.8	743.2		+/- 10 mmHg
flow (LPM)	5.00	4.89	5.00		+/- 0.25 LPM
Leak Test:		February 15, 2023	Last Cal Date:	January 11, 2023	
	PM w/o HEPA:	1.6	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be			serve as the pre mai	ntenance leak check	
Inlet cleaning :	Inlet Head	\checkmark			
		Quarterly Calibration 1	ſest		
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test					11.3 +/- 0.5
Post-maintenanc	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Chan	-	December 5	2022	w, ner, .	<0.2 ug/m3
Disposable Filte		December 5			
		Annual Maintenanc	e		
Date Sample Tu	be Cleaned:	July 14, 2	022		
Date RH/T Sens	or Cleaned:	July 14, 2	022		
Notes:		No adj	ustment needed.		
Calibration by:	Morgan Voyageur				



CO Calibration Report

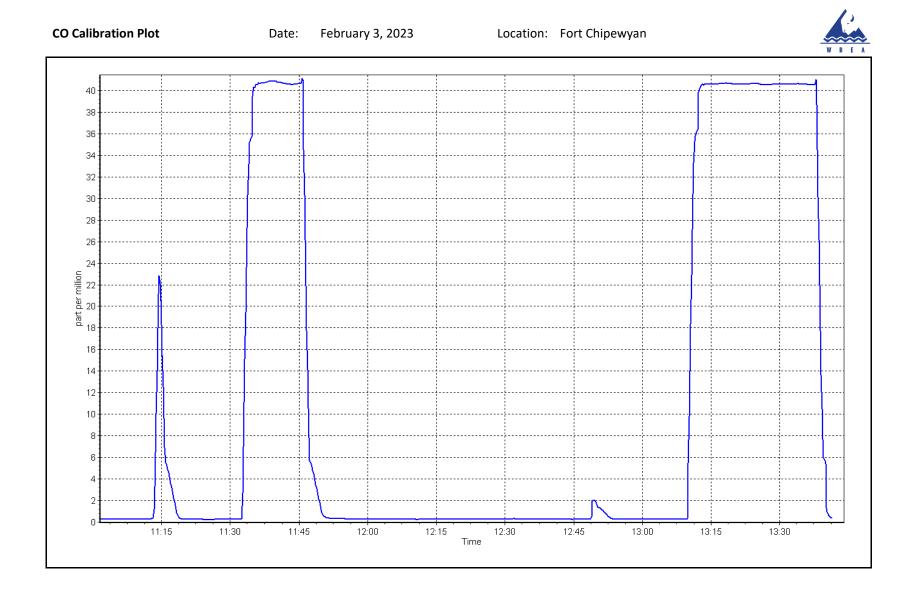
Version-01-2020

		Station Infor	mation		VEISIOII-O1-20
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan February 3, 2023 11:11 Maintenance		Station number: Last Cal Date: End time (MST):	AMS08 January 13, 2023 13:45	
		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 #:			Diff between cyl:	5070	
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701H		Serial Number: Serial Number:	5272 197	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	3505	
Calibration slope: Calibration intercept:	<u>Start</u> 0.995217 0.070924	<u>Finish</u>	Backgd or Offset: Coeff or Slope:		<u>Finish</u> NA NA
		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/lc) <i>Limit = 0.95-1.05</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.0	0.3	
as left span	2960	40.0	40.4	40.6	0.995
			Avera	ge Correction Factor	
Baseline Corr As found:	NA	Prev response:	NA	*% change:	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			
				* = > +/-5% change initiate	es investigation

Notes:

Unable to complete as founds due to pressure warnings on calibrator. Changed out the flow controller in the Nitrogen generator.

Calibration Performed By:





CO Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan February 14, 2023 9:20 Maintenance		Station number: Last Cal Date: End time (MST):	AMS08 January 13, 2023 12:49	
		Calibration St	andards		
Cal Gas Concentration:	3,030	ppm	Cal Gas Exp Date:	December 1, 2028	
Cal Gas Cylinder #:	ALM014846				
Removed Cal Gas Conc:	3,030	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	5272	
ZAG Make/Model:	API T701H		Serial Number:	197	
		Analyzer Info	rmation		
Analyzer make	: API T300		Analyzer serial #:	3505	
Analyzer Range					
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995217	0.983508	Backgd or Offset:	-0.013	-0.013
Calibration intercept:	0.070924	0.322926	Coeff or Slope:	0.999	0.987
		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/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.19	
as found span	4933	66.7	40.4	40.6	0.996
as found 2nd point	4967	33.3	20.2	20.5	0.983
as found 3rd point	4983	16.7	10.1	10.5	0.968
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4934	66.7	40.4	40.0	1.010
second point	4967	33.3	20.2	20.3	0.995
third point	4983	16.7	10.1	10.3	0.979
as left zero	5000	0.0	0.0	0.2	
as left span	2960	40.0	40.4	39.8	1.015
			Avera	ge Correction Factor	0.995
Baseline Corr As found:	40.41	Prev response:	40.30	*% change:	0.3%
Baseline Corr 2nd AF pt:	20.3	AF Slope:	0.998924	AF Intercept:	0.278520
Baseline Corr 3rd AF pt:	10.3	AF Correlation:	0.999975		
				* = > +/-5% change initiate	es investigation

Notes:

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

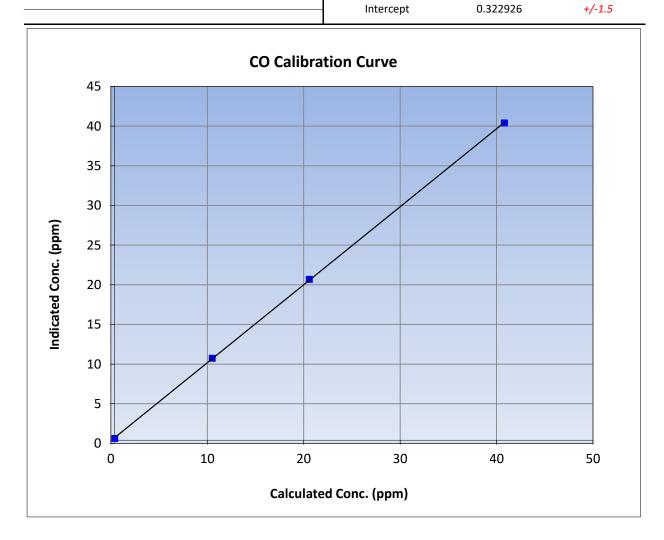
Calibration Performed By:

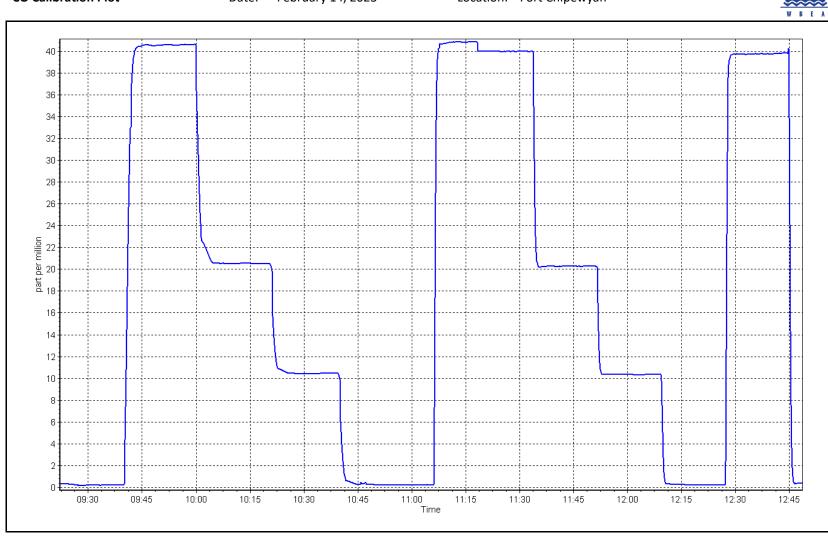
Matthew Courtoreille & Morgan V



CO Calibration Summary

WBEA					Version-01-
		Station	Information		
Calibration Date:	February 14, 2023		Previous Calibration:	January	13, 2023
Station Name:	Fort Chip	ewyan	Station Number:	AN	/IS08
Start Time (MST):	ime (MST): 9:20		End Time (MST):	12	2:49
Analyzer make:	nalyzer make: API T300		Analyzer serial #:	3	505
		Calib	ration Data		
Calculated concentration I (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999963	≥0.995
40.4	40.0	1.0104	correlation coefficient	0.999903	20.995
20.2	20.3	0.9951	Slope	0.983508	0.90 - 1.10
10.1	10.3	0.9787	Siope	0.303300	0.90 - 1.10





Location: Fort Chipewyan





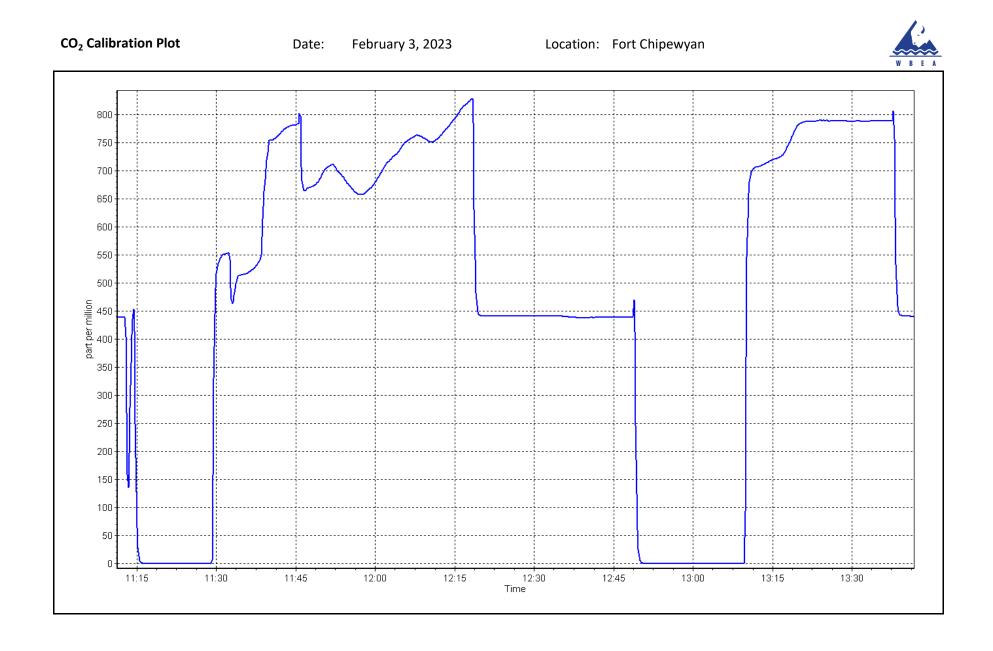
CO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Fort Chipewyan		Station number:	AMS08	
Calibration Date:	February 3, 2023		Last Cal Date:	January 13, 2023	
Start time (MST):	11:11		End time (MST):	13:45	
Reason:	Maintenance				
		Calibration St	andards		
Cal Gas Concentration:	60,220	ppm	Cal Gas Exp Date:	December 1, 2028	
Cal Gas Cylinder #:	ALM014846	ppin	Cal Gas Exp Date.	December 1, 2028	
Removed Cal Gas Conc:	60,220	nnm	Rem Gas Exp Date:	ΝΔ	
		ppm	•	NA	
Removed Gas Cyl #:			Diff between cyl:	5272	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	-	
N2 Gen Make/Model:	NG 5000		Serial Number:	771048318	
		Analyzer Info	rmation		
Analyzer make	: Teledyne API T360	,	Analyzer serial #:	289	
Analyzer Range				203	
	Start	Finish		Start	Finish
	<u></u>	<u> </u>			NA
Calibration slope.	0 998112		Backed or Offset	0.019	
Calibration slope: Calibration intercept:	0.998112 -5.540000		Backgd or Offset: Coeff or Slope:	0.019 1.011	NA
-			•		
		CO ₂ Calibratio	Coeff or Slope:		
-		CO ₂ Calibration Source gas flow rate (sccm)	Coeff or Slope:		NA
Calibration intercept:	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/I
Calibration intercept: Set Point	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/I
Calibration intercept: Set Point as found zero	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/I
Calibration intercept: Set Point as found zero as found span	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/I
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/I
Calibration intercept: Set Point as found zero as found span as found 2nd point	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/I
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/I
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/
Calibration intercept: 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	-5.540000 Dilution air flow rate	Source gas flow rate	Coeff or Slope: on Data Calculated concentration (ppm)	1.011 Indicated concentration	NA Correction factor (Cc/
Calibration intercept: 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	-5.540000 Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Coeff or Slope: Dn Data Calculated concentration (ppm) (Cc)	1.011 Indicated concentration ((ppm) (Ic)	NA Correction factor (Cc/I <i>Limit = 0.95-1.05</i>
Calibration intercept: 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	-5.540000 Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Coeff or Slope: Dn Data Calculated concentration (ppm) (Cc)	1.011 Indicated concentration ((ppm) (Ic)	NA Correction factor (Cc/I Limit = 0.95-1.05
Calibration intercept: 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	-5.540000 Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Coeff or Slope: Dn Data Calculated concentration (ppm) (Cc) 0.0 802.9	1.011 Indicated concentration ((ppm) (Ic)	NA Correction factor (Cc/ <i>Limit = 0.95-1.05</i>
Calibration intercept: 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	-5.540000 Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Coeff or Slope: Dn Data Calculated concentration (ppm) (Cc) 0.0 802.9 Average	1.011 Indicated concentration ((ppm) (Ic) 0.1 788.8 ge Correction Factor	NA Correction factor (Cc/ <i>Limit = 0.95-1.05</i>
Calibration intercept: 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:	-5.540000 Dilution air flow rate (sccm) 	Source gas flow rate (sccm)	Coeff or Slope: Dn Data Calculated concentration (ppm) (Cc) 0.0 802.9 Averag NA	1.011 Indicated concentration ((ppm) (lc) 0.1 788.8 ge Correction Factor *% change:	NA Correction factor (Cc/ Limit = 0.95-1.05
Calibration intercept: 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: Baseline Corr 2nd AF pt:	-5.540000 Dilution air flow rate (sccm) 	Source gas flow rate (sccm)	Coeff or Slope: Dn Data Calculated concentration (ppm) (Cc) 0.0 802.9 Averag NA	1.011 Indicated concentration ((ppm) (Ic) 0.1 788.8 ge Correction Factor	NA Correction factor (Cc/ <i>Limit = 0.95-1.05</i>
Calibration intercept: 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	-5.540000 Dilution air flow rate (sccm) 	Source gas flow rate (sccm)	Coeff or Slope: Dn Data Calculated concentration (ppm) (Cc) 0.0 802.9 Averag NA	1.011 Indicated concentration ((ppm) (lc) 0.1 788.8 ge Correction Factor *% change:	NA Correction factor (Cc/I Limit = 0.95-1.05

controller in the Nitrogen generator.

Calibration Performed By:





CO₂ Calibration Report

Version-01-2020

					Version-01-2020
		Station Infor	mation		
Station Name:	Fort Chipewyan		Station number:	AMS08	
Calibration Date:	February 15, 2023		Last Cal Date:	January 13, 2023	
Start time (MST):	9:02		End time (MST):	12:12	
Reason:	Routine			12.12	
Reason.	Noutine				
		Calibration St	andards		
Cal Gas Concentration:	60,220	ppm	Cal Gas Exp Date:	December 1, 2028	
Cal Gas Cylinder #:	ALM014846	ppin	cui dus Exp Dute.	2020	
Removed Cal Gas Conc:	60,220	ppm	Rem Gas Exp Date:	ΝΔ	
Removed Gas Cyl #:	NA	ppin	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5272	
N2 Gen Make/Model:	NG 5000		Serial Number:	771048318	
		Analyzer Info	rmation		
Analvzer make	: Teledyne API T360		Analyzer serial #:	289	
,	e 0 - 2,000 ppm		, and yzer beriar in		
/ maryzer hange	2,000 ppm				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998112	1.006830	Backgd or Offset:	0.019	0.019
Calibration intercept:	-5.540000	-1.740000	Coeff or Slope:	1.011	1.011
		CO ₂ Calibratio	on Data		
	Dilution air flow rate	Courses and flow rate	Calculated	Indicated concentration	Correction factor (Collo
Set Point	(sccm)	Source gas flow rate (sccm)	concentration (ppm)	Indicated concentration (ppm) (Ic)	<i>Limit = 0.95-1.05</i>
	(sccm)	(seem)	(Cc)	(ppiii) (ic)	Linint - 0.95-1.05
as found zero	3000	0.0	0.0	0.6	
as found span	2920	80.0	1605.9	1617.8	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	1.0	
high point	2920	80.0	1605.9	1620.1	0.991
second point	2960	40.0	802.9	794.4	1.011
third point	2980	20.0	401.5	407.0	0.986
as left zero	3000	0.0	0.0	0.8	
as left span	2960	40.0	802.9	791.8	1.014
as icit span	2300	-0.0		ge Correction Factor	0.996
	101-00				
Baseline Corr As found:	1617.20	Prev response:	1597.29	*% change:	1.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			
				* = > +/-5% change initiat	

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

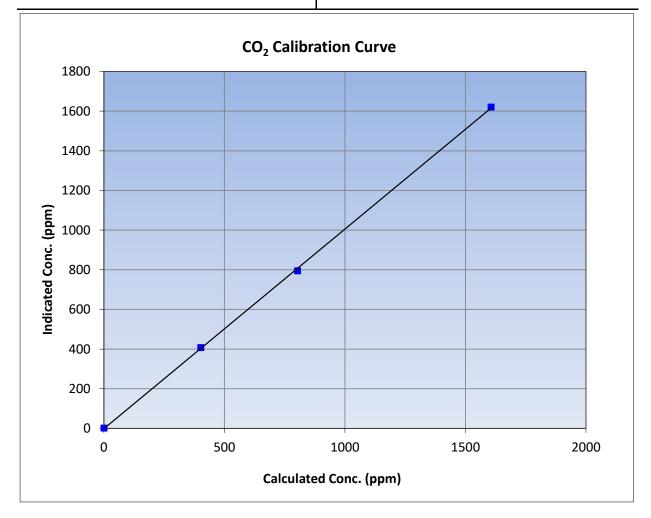
Calibration Performed By:

Matthew Courtoreille & Morgan Voyageur



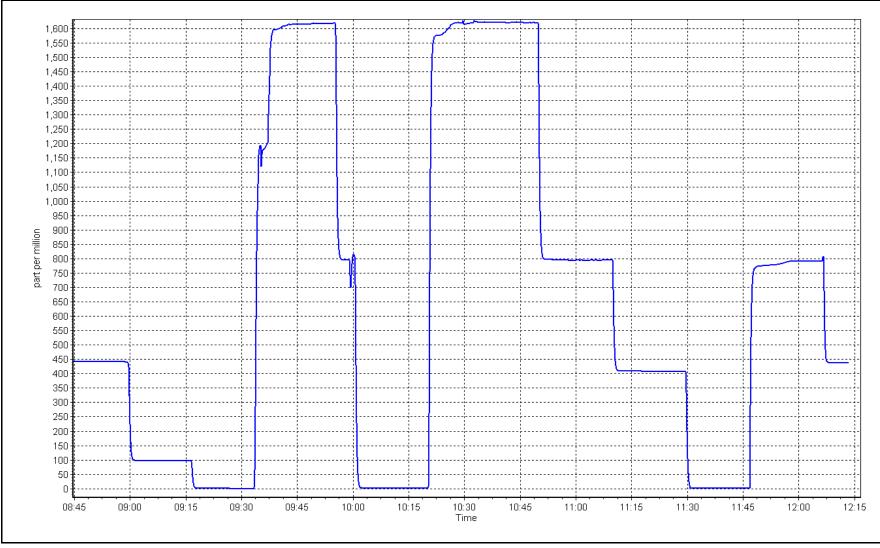
CO₂ Calibration Summary

W B E A					Version-01-20
		Station	Information		
Calibration Date	February 1	5, 2023	Previous Calibration	January	13, 2023
Station Name	Fort Chip	ewyan	Station Number	AM	1508
Start Time (MST)	9:02	2	End Time (MST)	12	2:12
Analyzer make	Teledyne A	PI T360	Analyzer serial #	2	89
		Calibu	ration Data		
alculated concentration Ir (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0 1605.9	1.0 1620.1	 0.9912	Correlation Coefficient	0.999857	≥0.995
802.9	794.4	1.0107			
401.5	407.0	0.9864	Slope	1.006830	0.90 - 1.10
			Intercept	-1.740000	+/-20











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS09 BARGE LANDING FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing February 3, 2023 10:20 Routine		Station number: Last Cal Date: End time (MST):	AMS09 January 13, 2023 13:38	
		Calibration St	andards		
Cal Gas Concentration:	49.96	ppm	Cal Gas Exp Date:	January 5, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc:	CC151285 49.96	222	Rem Gas Exp Date:	NIA	
Removed Gas Cyl #:	49.96 NA	ppm	Diff between cyl:	NA	
Calibrator Make/Model:	API T700		Serial Number:	3812	
ZAG Make/Model:	API T701		Serial Number:	4888	
	,,				
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1118148498	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.994624	1.002493	Backgd or Offset:	9.8	9.8
Calibration intercept:	-0.310040	0.431711	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	803.0	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4919	80.2	801.5	804.0	0.997
second point	4959	40.1	400.8	401.9	0.997
third point	4980	20.0	199.8	201.0	0.994
as left zero	5000	0.0	0.0	0.3	
as left span	4919	80.2	801.5	804.0	0.997
			Averag	ge Correction Factor	0.996
Baseline Corr As found:	802.90	Previous response	796.87	*% change	0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

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

Calibration Performed By:

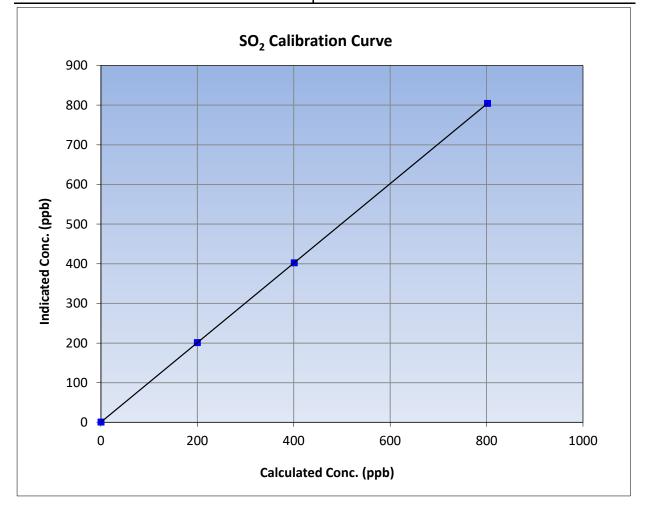


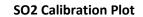
SO₂ Calibration Summary

	Stati	on Information	
Calibration Date:	February 3, 2023	Previous Calibration:	January 13, 2023
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	10:20	End Time (MST):	13:38
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148498

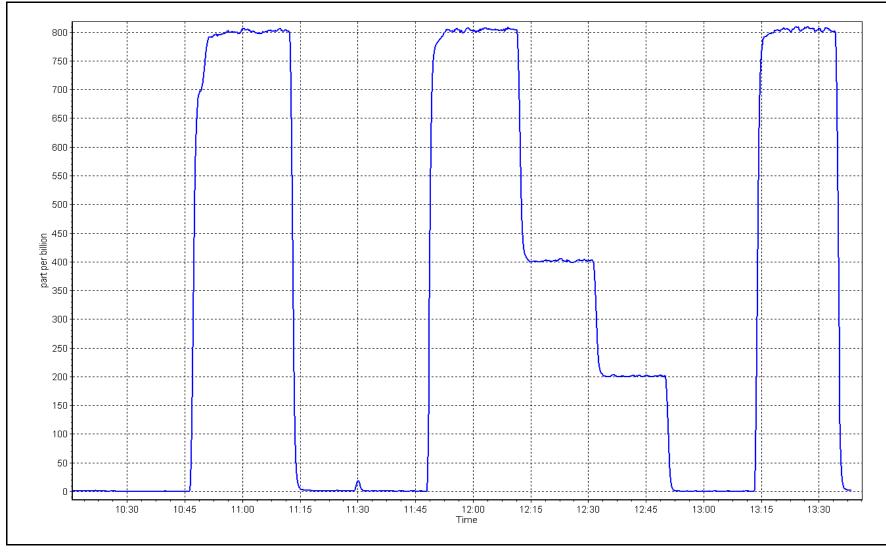
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	1.000000	≥0.995
801.5	804.0	0.9969	correlation coefficient	1.000000	20.995
400.8	401.9	0.9971	Slope	1.002493	0.90 - 1.10
199.8	201.0	0.9942	Slope	1.002495	0.90 - 1.10
			Intercept	0.431711	+/-30











TRS Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing February 28, 2023 10:44 Routine		Station number: Last Cal Date: End time (MST):	AMS09 January 23, 2023 19:03	
		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:	4.87 NA API T700 API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3812 4888	
ZAG Make/Model:	API 1701		Serial Number:	4888	
		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>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.003148 -0.000990	1.003148 -0.000990	Backgd or Offset: Coeff or Slope:		2.65 1.094
		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	4918	82.1	80.0	79.9	1.002
as found 2nd point	4959	41.1	40.0	40.1	1.001
as found 3rd point	4979	20.5	20.0	20.1	0.998
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	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	0.0	
high point	4918	82.1	80.0	80.2	0.997
second point	4959	41.1	40.0	40.2	0.996
third point	4979	20.5	20.0	20.0	0.998
as left zero	5000	0.0	0.0	0.1	
as left span	4918	82.1	80.0	80.4	0.995
SO2 Scrubber Check	4920	80.2	802.0	0.1	
Date of last scrubber cha	inge:	28-Feb-23		Ave Corr Factor	0.997
Date of last converter ef	ficiency test:				efficiency
Baseline Corr As found:	79.8	Prev response:	80.21	*% change:	-0.5%
Baseline Corr 2nd AF pt:	40.0	AF Slope:		AF Intercept:	0.139041
Baseline Corr 3rd AF pt:	20.0		0 00000		
	20.0	AF Correlation:	0.999999	* = > +/-5% change initiate	es investigation

Changed sample inlet filter after as founds. Changed scrubber beads after elevated 40ppb cal point. Second scrubber check passed. Adjusted zero and span.

Calibration Performed By:

Notes:

Braiden Boutilier

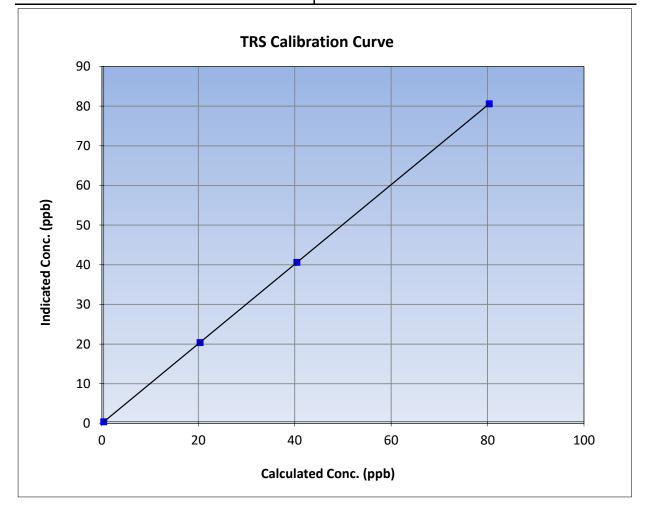


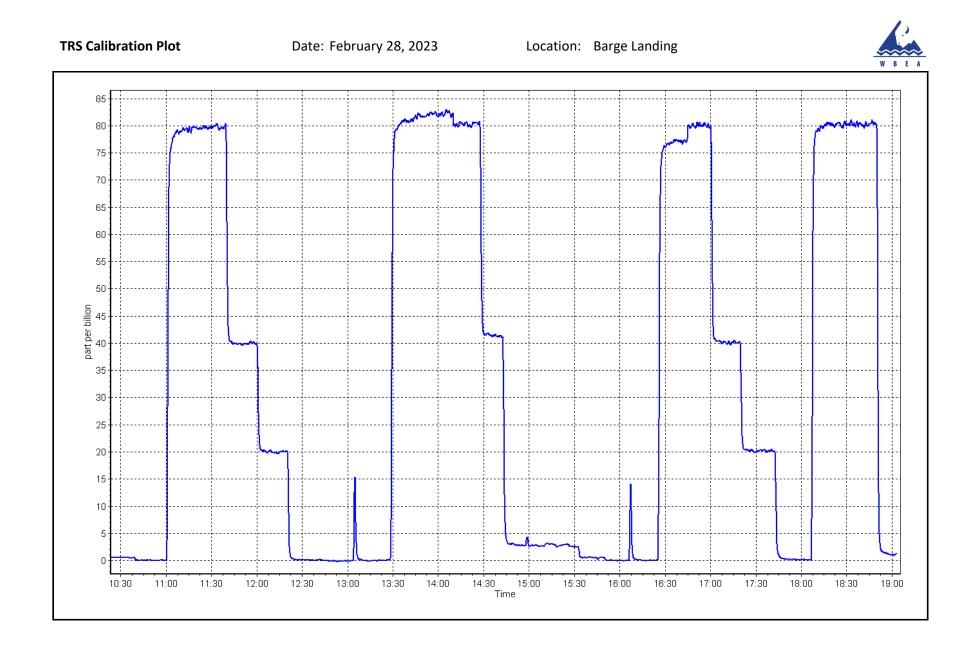
TRS Calibration Summary

WBEA			Version-11-2021			
Station Information						
Calibration Date:	February 28, 2023	Previous Calibration:	January 23, 2023			
Station Name:	Barge Landing	Station Number:	AMS09			
Start Time (MST):	10:44	End Time (MST):	19:03			
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	0.999999	≥0.995
80.0	80.2	0.9971	correlation coefficient	0.555555	20.333
40.0	40.2	0.9958	Slope	1.003148	0.90 - 1.10
20.0	20.0	0.9984	Slope	1.003148	0.90 - 1.10
			Intercept	-0.000990	+/-3







THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Statio	on Information		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing February 3, 2023 10:20 Routine		Station number: Al Last Cal Date: Ja End time (MST): 13	3	
		Calibra	ation 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: N	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	312	
ZAG make/model:	API T701		Serial Number: 48	388	
		Analy	zer Information		
Analyzer make			Analyzer serial #: 11	70050131	
THC Range (ppm) NMHC Range (ppm)			CH4 Range (ppm): 0	- 50 ppm	
	<u>Start</u>	Finish		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 1.99E-04	1.99E-04	NMHC SP Ratio:	4.28E-05	4.28E-05
CH4 Retention time	: 12.2	12.2	NMHC Peak Area:	213327	213327

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	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	17.13	0.999	
second point	4960	40.1	8.56	8.48	1.009	
third point	4980	20.0	4.27	4.20	1.016	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	80.2	17.12	17.10	1.001	
			A	verage Correction Factor	1.008	
Baseline Corr AF:	17.07	Prev response	17.11	*% change	-0.2%	
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	0.0	
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	9.09	1.005
second point	4960	40.1	4.57	4.51	1.013
third point	4980	20	2.28	2.22	1.025
as left zero	5000	0	0.00	0.00	
as left span	4919	80.2	9.14	9.07	1.007
			ŀ	Average Correction Factor	1.014
Baseline Corr AF:	9.08	Prev response	9.15	*% 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	Cal	ibration	Data
CIT	Cu	is a cion	Dutu

	CH4 Calibra	lion Data		
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	80.2	7.98	7.99	0.999
5000	0.0	0.00	0.00	
4919	80.2	7.98	8.04	0.993
4960	40.1	3.99	3.97	1.006
4980	20.0	1.99	1.98	1.005
5000	0.0	0.00	0.00	
4919	80.2	7.98	8.03	0.994
		A	verage Correction Factor	1.001
7.99	Prev response	7.95	*% change	0.5%
NA	AF Slope:		AF Intercept:	
NA	AF Correlation:		* = > +/-5% change initiat	es investigation
	Calibration	Statistics		
	<u>Start</u>		<u>Finish</u>	
	1.002709		1.001427	
	-0.059558		-0.043961	
	1.000454	1.007423		
	-0.035549		-0.020126	
	1.004517		0.996127	
	-0.024610		-0.024834	
	5000 4919 5000 4919 4960 4980 5000 4919 7.99 NA	Dil air flow rate Source gas flow rate 5000 0.0 4919 80.2 5000 0.0 4919 80.2 4960 40.1 4980 20.0 5000 0.0 4919 80.2 4960 40.1 4980 20.0 5000 0.0 4919 80.2 7.99 Prev response NA AF Slope: NA AF Correlation: Calibration Start 1.002709 -0.059558 1.000454 -0.035549 1.004517	Dil air flow rate Source gas flow rate Calc conc (ppm) (C 5000 0.0 0.00 4919 80.2 7.98 5000 0.0 0.00 4919 80.2 7.98 4960 40.1 3.99 4980 20.0 1.99 5000 0.0 0.00 4919 80.2 7.98 4960 40.1 3.99 4980 20.0 1.99 5000 0.0 0.00 4919 80.2 7.98 AF Slope: A NA AF Slope: A NA AF Correlation: A Calibration Statistics Start 1.002709 -0.059558 1.000454 -0.035549 1.004517	5000 0.0 0.00 0.00 4919 80.2 7.98 7.99 5000 0.0 0.00 0.00 4919 80.2 7.98 7.99 5000 0.0 0.00 0.00 4919 80.2 7.98 8.04 4960 40.1 3.99 3.97 4980 20.0 1.99 1.98 5000 0.0 0.00 0.00 4919 80.2 7.98 8.03 Average Correction Factor 7.99 Prev response 7.95 *% change NA AF Slope: AF Intercept: AF Intercept: NA AF Correlation: * = > +/-5% change initiat Calibration Statistics Start <u>Finish</u> 1.001427 -0.059558 -0.043961 1.007423 -0.035549 -0.020126 1.004517 0.996127

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

Calibration Performed By: Braiden Boutilier



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	Februar	y 3, 2023	Previous Calibration:	January	13, 2023
Station Name:	Barge I	anding	Station Number:	AM	509
Start Time (MST):	10	:20	End Time (MST):	13:	38
Analyzer make:	Therr	no 55i	Analyzer serial #:	11700	50131
		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	0.999964	≥0.995
17.12	17.13	0.9994			
8.56 4.27	8.48	1.0092 1.0156	Slope	1.001427	0.90 - 1.10
4.27	4.20	1.0130	Intercept	-0.043961	+/-0.5
16.0					
18.0				_	
14.0					
12.0					
Ed 10.0					
<u>a</u> 10.0					
Indicated Conc. (ppm)					
Ū 0.0 D					
ate					
dici					
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		
Calibration Date:	February	3, 2023	Previous Calibration:	January 2	13, 2023
Station Name:	Barge L	anding	Station Number:	AMS	S09
Start Time (MST):	10:	20	End Time (MST):	13:	38
Analyzer make:	Thern	no 55i	Analyzer serial #:	11700	50131
		Calibra	tion Data		
Calculated concentration I (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999946	≥0.995
7.98	8.04	0.9929			
3.99 1.99	3.97 1.98	1.0062 1.0047	Slope	1.007423	0.90 - 1.10
			Intercept	-0.020126	+/-0.5
8.0 7.0 6.0					
Indicated Conc. (ppm)					
O 4.0					
0.6 udicat					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
	2.0		l Conc. (ppm)	5.0	20.0



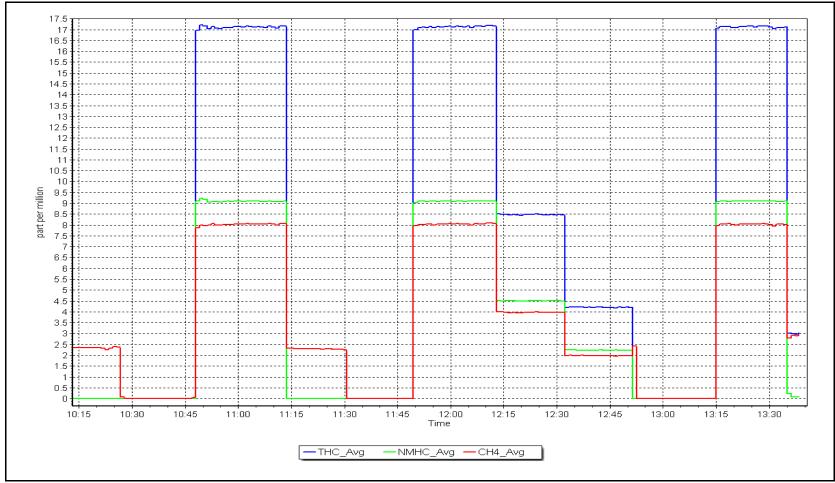
NMHC Calibration Summary

			Station I	nformation		
Calibration	Date:	Februar	y 3, 2023	Previous Calibration:	January	13, 2023
Station Na	me:	Barge	Landing	Station Number:	AM	S09
Start Time	(MST):	10	:20	End Time (MST):	13:	38
Analyzer m	nake:	Therr	no 55i	Analyzer serial #: 1170050131		50131
			Calibra	tion Data		
Calculated co (ppm)		n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eva	aluation	<u>Limits</u>
0.0		0.00		Correlation Coefficient	0.999966	≥0.995
9.1		9.09	1.0051		0.00000	
4.5		4.51	1.0130 1.0252	Slope	0.996127	0.90 - 1.10
	20	2.22	1.0252	Intercept	-0.024834	+/-0.5
				intercept	0.02 100 1	.,
	0.0		NMHC Calibra	tion Curve		
	8.0 —					
	7.0 -					
(mqq	6.0 -					
Indicated Conc. (ppm)	5.0 -					
ated (4.0 +					
Indic	3.0 -					
	2.0 -					
	1.0 -					
	0.0		10		0.0	10.0
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		











Station Name:

Calibration Date:

Start time (MST):

Barge Landing

9:55

February 22, 2023

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station number: AMS09 Last Cal Date: January 20, 2023 End time (MST): 14:48

		Calib	ration Standards		
NO Gas Cylinder #:	DT0036634		Cal Gas Expiry Date: Jan	uary 28, 2024	4
NOX Cal Gas Conc:	50.00	ppm	NO Cal Gas Conc:	49.70	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date: NA		
Removed Gas NOX Conc:	50.00	ppm	Removed Gas NO Conc:	49.70	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	3812	
ZAG make/model:	API T701		Serial Number:	4888	

NOX Range (ppb): 0 ·	- 1000 ppb				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.182	1.146	NO bkgnd or offset:	10.6	10.3
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	10.6	10.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	172.5	179.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998369	0.998455
NO _x Cal Offset:	0.728922	0.648644
NO Cal Slope:	0.997899	1.000928
NO Cal Offset:	-0.272767	-0.732611
NO ₂ Cal Slope:	1.000917	1.000063
NO ₂ Cal Offset:	0.473394	-1.156786



$NO_X \setminus NO \setminus NO_2$ 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	0.0	0.0	0.0		
as found span	4919	80.5	805.1	800.3	4.8	834.7	826.6	8.2	0.965	0.968
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.1	0.1		
high point	4919	80.5	805.1	800.3	4.8	804.3	800.7	3.5	1.001	0.999
second point	4959	40.2	402.1	399.7	2.4	402.3	398.8	3.5	0.999	1.002
third point	4979	20.1	201.0	199.8	1.2	201.7	198.5	3.2	0.997	1.007
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4919	80.5	805.1	444.9	360.2	796.7	440.0	356.7	1.011	1.011
							Average C	orrection Factor	0.999	1.003
Corrected As fo	ound NO _x =	834.7 ppb	NO =	826.6 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	3.6%
Previous Respo	nse NO _x =	804.5 ppb	NO =	798.3 ppb				*Percent Chang	ge NO =	3.4%
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) (Cc	Indicated NO2) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	794.9	439.5	360.2	359.5	1.002	99.8%
2nd GPT point (200 ppb O3)	794.9	662.8	136.9	135.4	1.011	98.9%
3rd GPT point (100 ppb O3)	794.9	726.9	72.8	70.4	1.035	96.7%
			A	verage Correction Factor	1.016	98.4%

Notes:

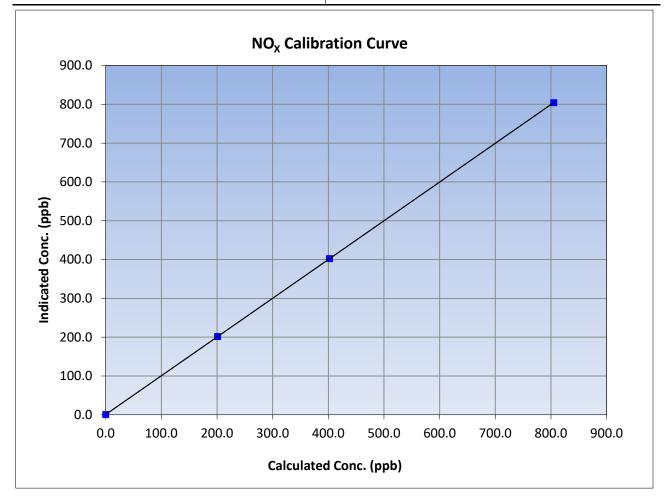
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

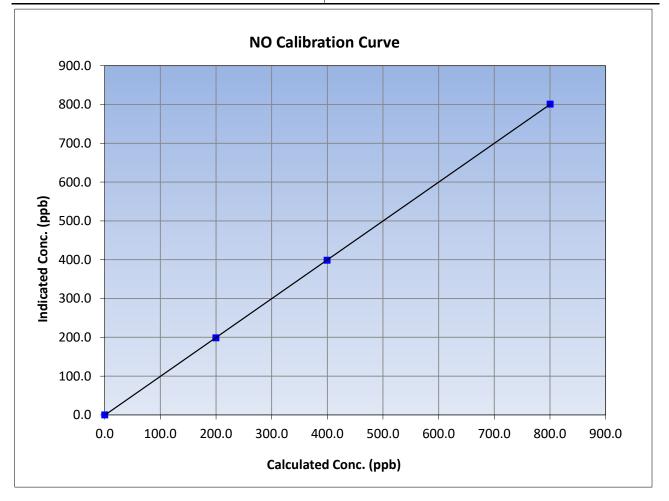
WBEA					Version-04-20
		Station	Information		
Calibration Date:	libration Date: February 22, 2023 Previous C		Previous Calibration:	January	20, 2023
Station Name:	Barge Landing		arge Landing Station Number:		S09
Start Time (MST):	9:	55	End Time (MST):	14	:48
Analyzer make:	Therr	no 42i	Analyzer serial #:	1426262593	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999999	≥0.995
805.1	804.3	1.0010	correlation coefficient	0.5555555	20.995
402.1	402.3	0.9994	Class 0.000455		0.90 - 1.10
201.0	201.7	0.9967	Slope	0.998455	0.90 - 1.10
			Intercept	0.648644	+/-20





NO Calibration Summary

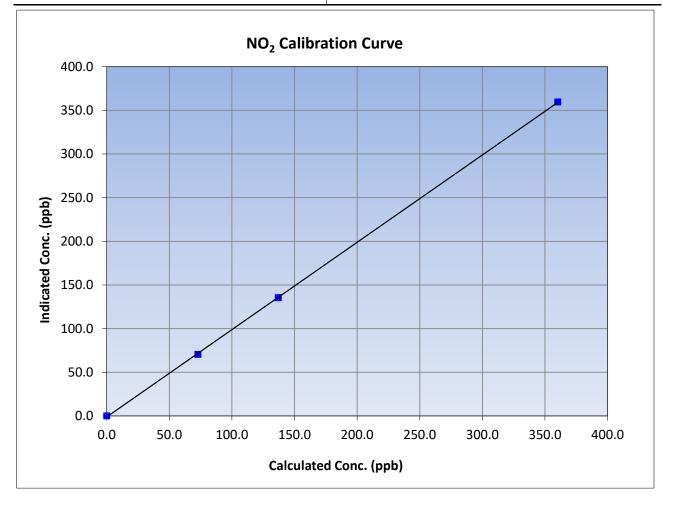
WBEA					Version-04-2
		Station	Information		
Calibration Date:	ration Date: February 22, 2023 Previous Calibratic		Previous Calibration:	January	20, 2023
Station Name:	Barge Landing		Station Number:	AM	S09
Start Time (MST):	9:	55	End Time (MST):	14	:48
Analyzer make:	Therr	no 42i	Analyzer serial #:	1426262593	
		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	0.999995	≥0.995
800.3	800.7	0.9994	correlation coernicient	0.3333333	20.333
399.7	398.8	1.0021	Class 4 000020		0.90 - 1.10
199.8	198.5	1.0067	Slope	1.000928	0.90 - 1.10
			Intercept	-0.732611	+/-20

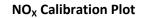




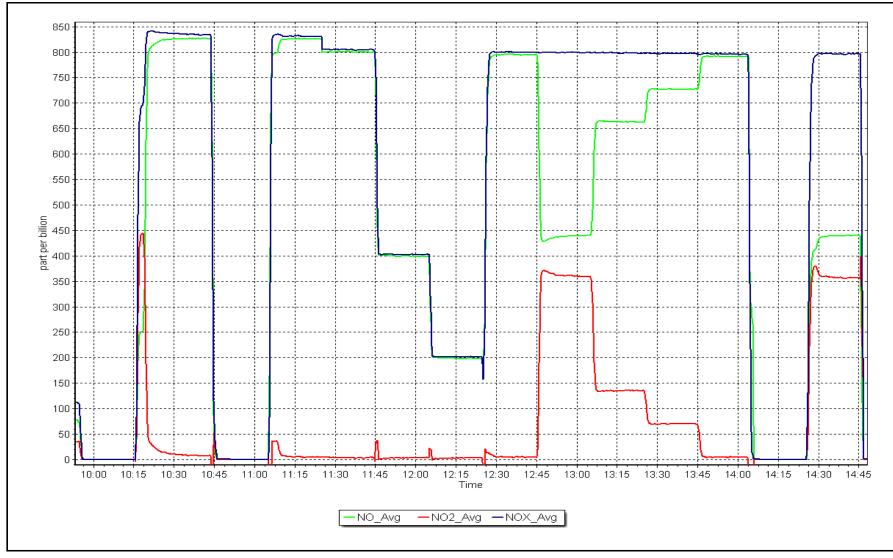
NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	22, 2023	Previous Calibration: January 2		20, 2023
Station Name:	Barge	Landing	Station Number:	AM	S09
Start Time (MST):	9:	55	End Time (MST):	14	:48
Analyzer make:	Therr	no 42i	Analyzer serial #:	1426262593	
		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	0.999951	≥0.995
360.2	359.5	1.0020	correlation coefficient	0.555551	20.333
136.9	135.4	1.0113	Class 4 000000		0.90 - 1.10
72.8	70.4	1.0345	Slope	1.000063	0.90 - 1.10
			Intercept	-1.156786	+/-20











T640 PM_{2.5} CALIBRATION

	WDEA					Version-01-2023
Calibration Date: February 28, 2023 Start time (MST): 10:46 Last Cal Date: January 27, 2023 End time (MST): 12:56 Analyzer Make: API T640 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388753 Temp/RH standard: Alicat FP-			Station Information	1		
Start time (MST): 10:46 End time (MST): 12:56 Analyzer Make: API T640 S/N: 321 Particulate Fraction: PM2.5 S/N: 388753 Flow Meter Make/Model: Alicat FP-25BT S/N: 388753 Temp/RH standard: Alicat FP-25BT S/N: 388753 Monthly Calibration Test Measured As left Adjusted (Limits) T (°C) -15.7 -16.3 -15.7 +/- 2°C P (mmHg) 733.1 734.6 733.1 +/- 10 mmHg flow (LPM) 4.99 5.16 4.99 -/- 0.25 LPM Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 <0.2 ug/m3	Station Name:	Barge Landing		Station number:	AMS 09	
Analyzer Make: API T640 S/N: 321 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388753 Temp/RH standard: Alicat FP-25BT S/N: 388753 Monthly Calibration Test Measured As left Adjusted (Limits) T (°C) -15.7 -16.3 -15.7 +/-2°C P (mmHg) 733.1 734.6 733.1 -//-2°C <0.2 Up/M3	Calibration Date:	February 28, 2023		Last Cal Date:	January 27, 2023	
Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388753 Temp/RH standard: Alicat FP-25BT S/N: 388753 Temp/RH standard: Alicat FP-25BT S/N: 388753 Monthly Calibration Test Parameter As found Measured As left Adjusted (Limits) T (°C) -15.7 -16.3 -15.7 -15.7 +/- 2 °C P (mmHg) 733.1 734.6 733.1 +/- 10 mmHg flow (LPM) 4.99 5.16 4.99 - +/- 0.2 co.2 ug/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 Parameter As found Post maintenance As left Adjusted (Limits) Inlet Cleaning : Inlet Head (Limits) PMT Peak Test 6.0 11.0 11.0 - 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: <u>5.7</u> w/ HEPA: 0.0 Post-maintenance leak check: PM w/o HEPA: <u>5.7</u> w/ HEPA: 0.0 February 28, 2023 - 0.2 ug/m3 Disposable Filter Changed: <u>February 28, 2023</u> - 0.0 February 28, 2023 - 0.0 February 28, 2	Start time (MST):	10:46		End time (MST):	12:56	
Flow Meter Make/Model: Alicat FP-25BT S/N: 388753 Temp/RH standard: Alicat FP-25BT S/N: 388753 Monthly Calibration Test Adjusted (Limits) T (°C) -15.7 -16.3 -15.7 -/-2°C P (mmHg) 733.1 734.6 733.1 -/+2°C +/-2°L P (mMHg) 733.1 734.6 733.1 -/+/-2°C +/-0.25 LPM Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 <0.2 ug/m3	Analyzer Make:	API T640		S/N:	321	
Temp/RH standard: Alicat FP-25BT S/N: 388753 Monthly Calibration Test Adjusted (Limits) T (°C) -15.7 -16.3 -15.7 -/-2°C P (mmHg) 733.1 734.6 733.1 -/+2°C P (mmHg) 733.1 734.6 733.1 -/+2°C P (mmHg) 733.1 734.6 733.1 -/+10 mmHg flow (LPM) 4.99 5.16 4.99 -/+0.25 LPM Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check 0.2 <0.2 ug/m3	Particulate Fraction:	PM2.5				
Monthly Calibration Test Parameter As found Measured As left Adjusted (Limits) T (°C) -15.7 -16.3 -15.7 -4/.2 °C +/.2 °C P (mmHg) 733.1 734.6 733.1 -+/.2 °C +/.2 °C P (mmHg) 733.1 734.6 733.1 -+/.2 °C P (mmHg) 733.1 734.6 733.1 -+/.2 °C P (mmHg) 4.99 5.16 4.99 -+/.2 °C Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 PM w/o HEPA: 5.7 PM w/ HEPA: 0.2 <0.2 ug/m3	Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388753	
Parameter As found Measured As left Adjusted (Limits) T (°C) -15.7 -16.3 -15.7 - +/- 2°C P (mmHg) 733.1 734.6 733.1 - +/- 10 mmHg flow (LPM) 4.99 5.16 4.99 +/- 0.25 LPM Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check o.2 <0.2 ug/m3	Temp/RH standard:	Alicat FP-25BT		S/N:	388753	
T (°C) -15.7 -16.3 -15.7 -+/-2°C P (mmHg) 733.1 734.6 733.1 -+/-2°C flow (LPM) 4.99 5.16 4.99 +/- 0.25 LPM Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 PM w/o HEPA: 5.7 PM w/ HEPA: 0.2 <0.2 ug/m3			Monthly Calibration Te	est		
P (mmHg) 733.1 734.6 733.1 - +/- 0.0mHg flow (LPM) 4.99 5.16 4.99 - +/- 0.25 LPM Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 PM w/o HEPA: 5.7 PM w/ HEPA: 0.2 <0.2 ug/m3	Parameter	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
flow (LPM) 4.99 5.16 4.99 +/- 0.25 LPM Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 PM w/o HEPA: 5.7 PM w/ HEPA: 0.2 <0.2 ug/m3	⊤ (°C)	-15.7	-16.3	-15.7		+/- 2 °C
Leak Test: Date of check: February 28, 2023 Last Cal Date: January 27, 2023 <0.2 ug/m3	P (mmHg)	733.1	734.6	733.1		+/- 10 mmHg
PM w/o HEPA: 5.7 PM w/ HEPA: 0.2 <0.2 ug/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 Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test 6.0 11.0 11.0 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: 5.7 w/ HEPA: 0.0 Date Optical Chamber Cleaned: February 28, 2023 <0.2 ug/m3	flow (LPM)	4.99	5.16	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 cleaning : Inlet Head Quarterly Calibration Test Parameter As found PMT Peak Test 6.0 Post-maintenance leak check: PM w/o HEPA: Date Optical Chamber Cleaned: February 28, 2023 Disposable Filter Changed: February 28, 2023 Annual Maintenance November 15, 2022	Leak Test:	Date of check:		Last Cal Date:	January 27, 2023	
Inlet cleaning : Inlet Head Parameter As found PMT Peak Test 6.0 Post-maintenance leak check: PM w/o HEPA: Date Optical Chamber Cleaned: February 28, 2023 Disposable Filter Changed: February 28, 2023 Vanual Maintenance November 15, 2022			-	-		<0.2 ug/m3
Quarterly Calibration Test Parameter As found PMT Peak Test 6.0 Post-maintenance As left Post-maintenance leak check: PM w/o HEPA: Date Optical Chamber Cleaned: February 28, 2023 Disposable Filter Changed: February 28, 2023 Variable Filter Changed: November 15, 2022	Note: this leak check will be		quarterly work and will s	erve as the pre ma	intenance leak check	
Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test 6.0 11.0 11.0 11.0 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: 5.7 w/ HEPA: 0.0 Date Optical Chamber Cleaned: February 28, 2023 <0.2 ug/m3	Inlet cleaning :	Inlet Head				
Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test 6.0 11.0 11.0 11.0 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: 5.7 w/ HEPA: 0.0 Date Optical Chamber Cleaned: February 28, 2023 <0.2 ug/m3 Disposable Filter Changed: February 28, 2023 <0.2 ug/m3 Annual Maintenance Date Sample Tube Cleaned: November 15, 2022						
Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test 6.0 11.0 11.0 11.0 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: 5.7 w/ HEPA: 0.0 Date Optical Chamber Cleaned: February 28, 2023 <0.2 ug/m3			Owentanto Calibratian T	to at		
PMT Peak Test 6.0 11.0 11.0 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: 5.7 w/ HEPA: 0.0 Date Optical Chamber Cleaned: February 28, 2023 <0.2 ug/m3	D					<i>(</i> , , , , , , , , , , , , , , , , , , ,
Post-maintenance leak check: PM w/o HEPA: 5.7 w/ HEPA: 0.0 Date Optical Chamber Cleaned: February 28, 2023 <0.2 ug/m3					Adjusted	
Date Optical Chamber Cleaned: February 28, 2023 <0.2 ug/m3	PMT Peak Test	6.0	11.0	11.0		11.3 +/- 0.5
Disposable Filter Changed: February 28, 2023 Annual Maintenance Date Sample Tube Cleaned: November 15, 2022	Post-maintenance	e leak check:	PM w/o HEPA:	5.7	w/ HEPA:	0.0
Annual Maintenance Date Sample Tube Cleaned: November 15, 2022	Date Optical Cham	nber Cleaned:	February 28	, 2023		<0.2 ug/m3
Date Sample Tube Cleaned: November 15, 2022	Disposable Filte	r Changed:	February 28	, 2023		
Date Sample Tube Cleaned: November 15, 2022						
Date Sample Tube Cleaned: November 15, 2022			Annual Maintenance	a		
			Annual Maintenance	-		
Date RH/T Sensor Cleaned: November 15, 2022						
	Date RH/T Sense	or Cleaned:	November 15	5, 2022		
Initial leak check failed. PMT test was low before cleaning. Leak check after cleaning passed, PMT Notes: peak test passed after cleaning. No adjustments made.	Notes:	Initial leak check fa		-	• •	bassed, PMT
Calibration by: Braiden Boutilier	Calibration by:	Braiden Boutilier				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS11 LOWER CAMP FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Lower Camp February 7, 2023 9:53 Routine		Station number: Last Cal Date: End time (MST):	AMS11 January 20, 2023 13:19	
		Calibration St	andards		
Cal Gas Concentration:	49.25	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	CC2216 49.25 NA	ppm	Rem Gas Exp Date:	NA	
Calibrator Make/Model:	Teledyne API T700		Diff between cyl: Serial Number:	3807	
ZAG Make/Model:	Teledyne API T700		Serial Number:	196	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	100841398	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.996844	0.992304	Backgd or Offset:		14.3
Calibration intercept:	-0.548951	-0.508143	Coeff or Slope:	1.051	1.051
		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	81.3	800.8	795.0	1.007
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	800.8	795.1	1.007
second point	4959	40.7	400.9	395.0	1.015
third point	4980	20.3	199.9	198.5	1.007
as left zero as left span	5000 4919	0.0 81.3	0.0 800.8	0.2 795.7	1.006
as ieit spaii	4717	01.3		ge Correction Factor	1.008
				-	
Baseline Corr As found:	794.90	Previous response	797.68	*% change	-0.3%
Baseline Corr As found: Baseline Corr 2nd AF pt:	794.90 NA	Previous response AF Slope:		*% change AF Intercept:	-0.3%

Notes:

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

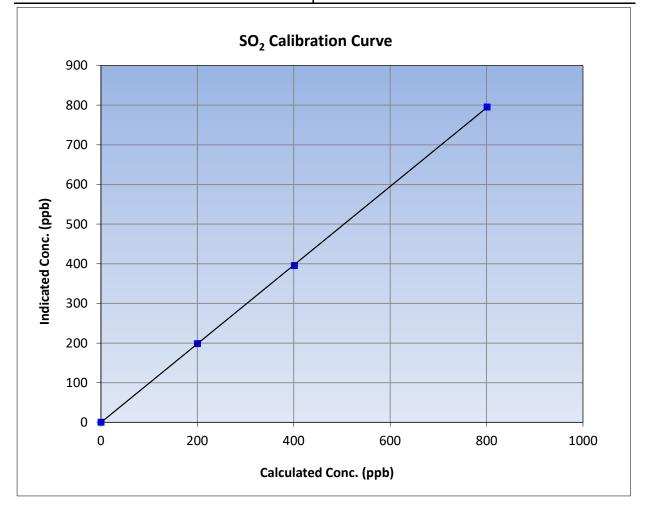


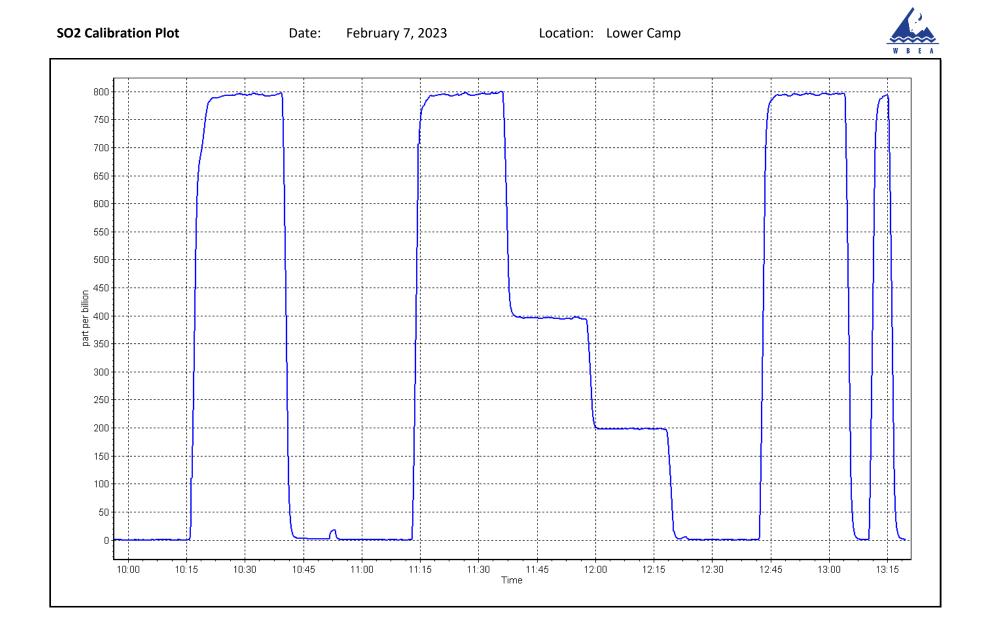
SO₂ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	February 7, 2023	Previous Calibration:	January 20, 2023
Station Name:	Lower Camp	Station Number:	AMS11
Start Time (MST):	9:53	End Time (MST):	13:19
Analyzer make:	Thermo 43i	Analyzer serial #:	100841398

Calibration Data

Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999979	≥0.995
800.8	795.1	1.0071	correlation coefficient	0.555575	20.333
400.9	395.0	1.0150	Slope	0.992304	0.90 - 1.10
199.9	198.5	1.0073	Slope	0.992304	0.90 - 1.10
			Intercept	-0.508143	+/-30







H₂S Calibration Report

Calibration Date:February 8, 2023Start time (MST):10:06Reason:RoutineCal Gas Concentration:5.429Cal Gas Cylinder #:CC501097Removed Cal Gas Conc:5.429Removed Gas Cyl #:NACalibrator Make/Model:API T700ZAG Make/Model:API T701HAnalyzer make:Thermo 450iQConverter make:NAAnalyzer Range0 - 100 ppbCalibration slope:1.000040Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found zero5000as found zero5000as found 3rd point4982new cylinder responseDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4926second point4963third point4926second point4963third point4926second point4963third point4926second point4963third point4926solo flast scrubber change:5000Date of last scrubber change:5020Date of last scrubber change:502Date of last scrubber change:502Date of last scrubber change:502Date of last converter efficiency test:			•	Version-11-2
Calibration Date:February 8, 2023Start time (MST):10:06Reason:RoutineCal Gas Concentration:5.429Cal Gas Cylinder #:CC501097Removed Cal Gas Conc:5.429Removed Gas Cyl #:NACalibrator Make/Model:API T700ZAG Make/Model:API T701HAnalyzer make:Thermo 450iQConverter make:NAAnalyzer Range0 - 100 ppbCalibration slope:1.000040Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found zero5000as found 3rd point4982new cylinder response4963Set PointDilution air flow rate (sccm)calibrator zero5000as found 3rd point4982new cylinder response5000As left zero5000as left span4926second point4963third point4926second point4963third point4926<	Station Info	rmation		v C131011-11-2
Cal Gas Cylinder #:CC501097Removed Cal Gas Conc:5.429Removed Gas Cyl #:NACalibrator Make/Model:API T700ZAG Make/Model:API T701HAnalyzer make:NAConverter make:NAAnalyzer Range0 - 100 ppbCalibration slope:1.000040Calibration slope:0.055163Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found span4926as found span4982new cylinder responseDilution air flow rate (sccm)Calibrator zero5000as found 3rd point4982new cylinder responseDilution air flow rate (sccm)Calibrator zero5000As left zero5000as left zero5000as left zero5000as left span4926Soz Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:		Station number: Last Cal Date: End time (MST):	AMS11 January 19, 2023 14:47	
Cal Gas Cylinder #:CC501097Removed Cal Gas Conc:5.429Removed Gas Cyl #:NACalibrator Make/Model:API T700ZAG Make/Model:API T701HAnalyzer make:NAConverter make:NAAnalyzer Range0 - 100 ppbCalibration slope:1.000040Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found span4926as found span4926as found span4982new cylinder responseDilution air flow rate (sccm)Calibrator zero5000high point4963third point4926second point4963third point4926as left zero5000as left span4926Go2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	Calibration S	tandards		
Removed Cal Gas Conc:5.429Removed Gas Cyl #:NACalibrator Make/Model:API T700ZAG Make/Model:API T701HAnalyzer make:NAConverter make:NAAnalyzer Range0 - 100 ppbCalibration slope:1.000040Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found span4926as found 3rd point4982new cylinder responseDilution air flow rate (sccm)calibrator zero5000as found 3rd point4982new cylinder responseDilution air flow rate (sccm)calibrator zero5000as found 3rd point4982new cylinder responseDilution air flow rate (sccm)calibrator zero5000as left zero5000as left zero5000as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	ppm	Cal Gas Exp Date:	January 4, 2025	
Converter make:NAAnalyzer Range0 - 100 ppbCalibration slope:1.000040Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found zero5000as found zero5000as found zero4926as found 2nd point4963as found 3rd point4982new cylinder responseDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4926second point4963third point4926Sol point4963third point4926Sol point4963third point4926Sol Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3807 196	
Converter make:NAAnalyzer Range0 - 100 ppbAnalyzer Range0 - 100 ppbCalibration slope:1.000040Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found zero5000as found zero5000as found appoint4963as found 3rd point4982new cylinder responseDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4926second point4963third point4926solond point4963third point4926solond point4963third point4926solond point4926solond point4926second point4926So2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	Analyzer Info	ormation		
Calibration slope:1.000040Calibration intercept:0.055163Set PointDilution air flow rate (sccm)as found zero5000as found span4926as found 2nd point4963as found 3rd point4982new cylinder responseDilution air flow rate (sccm)calibrator zero5000high point4926second point4926second point4926second point4963third point4926second point4963third point4926solution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4926sol converter5000as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:		Analyzer serial #: Converter serial #:	CM20080003 NA	
Calibration intercept:0.055163Dilution air flow rate (sccm)as found zero5000as found span4926as found 2nd point4963as found 3rd point4982new cylinder responseDilution air flow rate (sccm)Calibrator zero5000high point4926second point4963third point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Set Point(sccm)as found zero5000as found span4926as found 2nd point4963as found 3rd point4982new cylinder response900Dilution air flow rate (sccm)calibrator zero50005000high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	0.997193 0.454865	Backgd or Offset: Coeff or Slope:		14.0 1.043
Set Point(sccm)as found zero5000as found span4926as found 2nd point4963as found 3rd point4982new cylinder response900Dilution air flow rate (sccm)calibrator zero50005000high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	H ₂ S As Fou	nd Data		
as found span4926as found 2nd point4963as found 3rd point4982new cylinder responseDilution air flow rate (sccm)Set PointDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjuste Correction facto (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found 2nd point4963as found 3rd point4982new cylinder responseDilution air flow rate (sccm)Set PointDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	0.0	0.0	0.2	
as found 3rd point4982new cylinder responseDilution air flow rate (sccm)Set PointDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4982as left zero5000as left zero5000as left span4926502 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	73.6	79.9	80.1	1.000
new cylinder responseSet PointDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	36.8	40.0	39.9	1.007
Set PointDilution air flow rate (sccm)calibrator zero5000high point4926second point4963third point4982as left zero5000as left span4926502 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	18.6	20.2	19.9	1.025
Set Point(sccm)calibrator zero5000high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:				
Set Point(sccm)calibrator zero5000high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	H ₂ S Calibrat	ion Data		
high point4926second point4963third point4982as left zero5000as left span4926SO2 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction facto (Cc/lc) Limit = 0.95-1.05
second point4963third point4982as left zero5000as left span4926502 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	0.0	0.0	0.1	
third point4982as left zero5000as left span4926502 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	73.6	79.9	79.9	1.000
as left zero5000as left span4926602 Scrubber Check4919Date of last scrubber change:Date of last converter efficiency test:	36.8	40.0	40.7	0.982
as left span 4926 602 Scrubber Check 4919 Date of last scrubber change: Date of last converter efficiency test:	18.6	20.2	20.8	0.971
O2 Scrubber Check 4919 Date of last scrubber change: Date of last converter efficiency test:	0.0	0.0	0.8	
Date of last scrubber change: Date of last converter efficiency test:	73.6	79.9	80.4	0.994
Date of last converter efficiency test:	81.1	811.0	0.4	
· · · · · · · · · · · · · · · · · · ·			Ave Corr Factor	0.984
Raceline Corr As found: 70.0				efficiency
Jasenne CULLAS IOULIU. 19.9	Prev response:	79.98	*% change:	-0.1%
Baseline Corr 2nd AF pt: 39.7	AF Slope:	1.001457	AF Intercept:	-0.044467
Baseline Corr 3rd AF pt: 19.7	AF Correlation:	0.999956		

Notes:

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

Calibration Performed By:

Mohammed Kashif

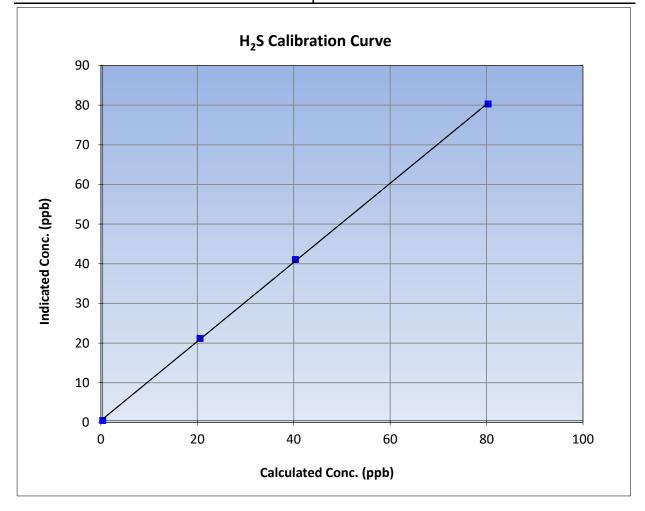


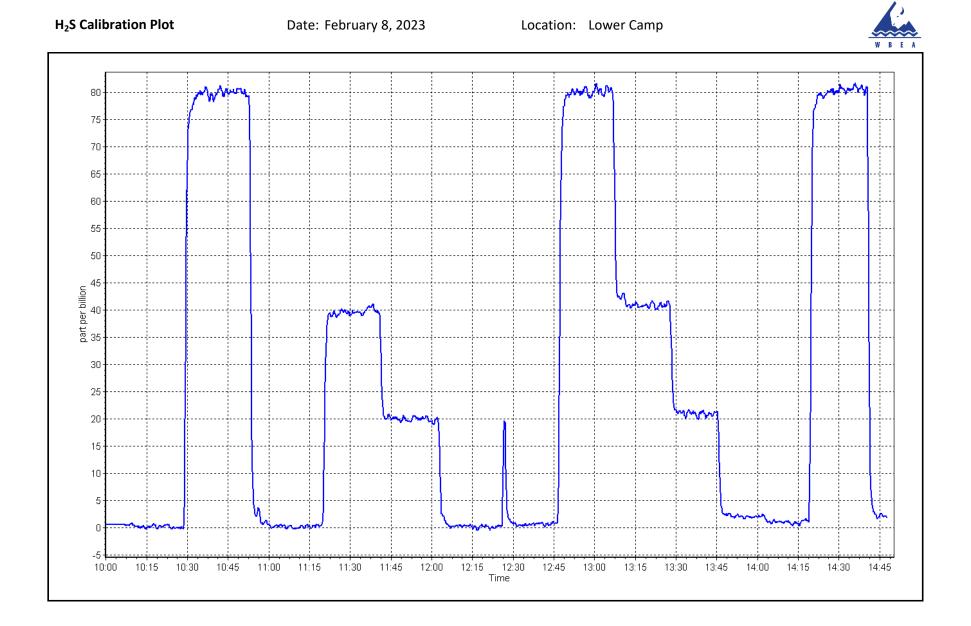
H₂S Calibration Summary

Version-11-2021 **Station Information** Calibration Date: February 8, 2023 **Previous Calibration:** January 19, 2023 Station Name: Lower Camp Station Number: AMS11 Start Time (MST): 10:06 End Time (MST): 14:47 Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

Calibration Data

Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)				Statistical Evaluation	
0.0	0.1		Correlation Coefficient	0.999887	≥0.995
79.9	79.9	1.0003	correlation coefficient	0.999007	20.333
40.0	40.7	0.9818	Slope	0.997193	0.90 - 1.10
20.2	20.8	0.9708	Slope	0.997195	0.90 - 1.10
			- Intercept	0.454865	+/-3







THC / CH₄ / NMHC Calibration Report

WBEA					Version-01-20		
		Stati	on Information				
Station Name:	Lower Camp		Station number: Al	VIS11			
Calibration Date:	February 7, 202	3	Last Cal Date: Ja	nuary 20, 2023			
Start time (MST):	9:53		End time (MST): 13	8:19			
Reason:	Routine						
		Calibr	ration Standards				
Gas Cert Reference:		CC2216	Cal Gas Expiry Date: Fe	bruary 23, 202	5		
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			
		Analy	zer Information				
Analyzer make:	Thermo 55i		Analyzer serial #: 15	05164381			
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:	3.09E-04	3.09E-04	NMHC SP Ratio:	5.97E-05	5.97E-05		
CH4 Retention time:	14.0	14.0	NMHC Peak Area:	153551	153551		

THC Calibration Data									
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	81.3	17.35	17.40	0.997				
as found 2nd point									
as found 3rd point									
new cylinder response									
calibrator zero	5000	0.0	0.00	0.00					
high point	4919	81.3	17.35	17.44	0.995				
second point	4959	40.7	8.69	8.67	1.003				
third point	4980	20.3	4.33	4.33	1.001				
as left zero	5000	0.0	0.00	0.00					
as left span	4919	81.3	17.35	17.49	0.992				
			А	verage Correction Factor	1.000				
Baseline Corr AF:	17.40	Prev response	17.40	*% change	0.0%				
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:					
Baseline Corr 3rd AF:	NA	AF Correlation:	elation: * = > +/-5% change initiates 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	81.3	9.19	9.18	1.001				
as found 2nd point									
as found 3rd point									
new cylinder response									
calibrator zero	5000	0.0	0.00	0.00					
high point	4919	81.3	9.19	9.20	0.999				
second point	4959	40.7	4.60	4.58	1.004				
third point	4980	20.3	2.29	2.29	1.001				
as left zero	5000	0.0	0.00	0.00					
as left span	4919	81.3	9.19	9.25	0.994				
			/	Average Correction Factor	1.002				
Baseline Corr AF:	9.18	Prev response	9.19	*% change	-0.1%				
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:					
Baseline Corr 3rd AF:	NAAF Correlation:* = > +/-5% change initiates investigation								

CH4	Cali	ibratio	n Data
CIT	Cull	Diacio	Dutu

Set Point Dil air flow rate Source gas flow rate Calc conc (ppm) (IC) Ind conc (ppm) (IC) CF Limit=0.95-1.05 as found zero 5000 0.0 0.00 as found span 4919 81.3 8.16 8.23 0.992 as found 2nd point as found 3rd point new cylinder response calibrator zero 5000 0.0 0.00 high point 4919 81.3 8.16 8.23 0.992 second point 4959 40.7 4.09 4.09 1.000 third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 as left span 4919 81.3 8.16 8.24 0.990 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 3rd AF: <td< th=""><th></th><th></th><th>CH4 Calibra</th><th>tion Data</th><th></th><th></th></td<>			CH4 Calibra	tion Data				
as found span 4919 81.3 8.16 8.23 0.992 as found 2nd point	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 2nd point as found 3rd point new cylinder response Calibrator zero 5000 0.0 0.00 high point 4919 81.3 8.16 8.23 0.992 second point 4959 40.7 4.09 4.09 1.000 third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 as left span 4919 81.3 8.16 8.24 0.990 Average Correction Factor 0.997 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 2nd AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Slope: +-+5% change initiates investigation THC Cal Slope: 1.004292 1.004951 THC Cal Slope: 0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Slope: 1.00192 1.001278	as found zero	5000	0.0	0.00	0.00			
as found 3rd point new cylinder response calibrator zero 5000 0.0 0.00 high point 4919 81.3 8.16 8.23 0.992 second point 4959 40.7 4.09 4.09 1.000 third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 as left zero 5000 0.0 as left span 4919 81.3 8.16 8.24 0.990 Average Correction Factor 0.997 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 3rd AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Correlation: *=>+/-5% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951 THC Cal Slope: 1.007657 1.008833	as found span	4919	81.3	8.16	8.23	0.992		
new cylinder response calibrator zero 5000 0.0 0.00 high point 4919 81.3 8.16 8.23 0.992 second point 4959 40.7 4.09 4.09 1.000 third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 as left zero 5000 0.0 0.00 as left zero 5000 0.0 0.00 0.00 as left zero 0.990 as left span 4919 81.3 8.16 8.24 0.990 Average Correction Factor 0.997 as left span 4919 81.3 8.16 8.21 *% change 0.2% Baseline Corr AF: 8.23 Prev response 8.21 *% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951 THC C	as found 2nd point							
calibrator zero 5000 0.0 0.00 0.00 high point 4919 81.3 8.16 8.23 0.992 second point 4959 40.7 4.09 4.09 1.000 third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 0.00 as left zero 5000 0.0 0.00 0.00 as left zero 5000 0.0 0.00 as left zero 0.990 as left span 4919 81.3 8.16 8.24 0.990 Mercage Correction Factor 0.997 0.997 0.997 0.997 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 3rd AF: NA AF Correlation: *=>+/-5% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951 <td>as found 3rd point</td> <td></td> <td></td> <td></td> <td></td> <td></td>	as found 3rd point							
high point 4919 81.3 8.16 8.23 0.992 second point 4959 40.7 4.09 4.09 1.000 third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 as left zero 5000 0.00 as left zero 5000 0.0 0.00 0.00 as left zero 0.990 as left span 4919 81.3 8.16 8.24 0.990 Average Correction Factor 0.997 0.997 0.997 0.997 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 3rd AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Correlation: * = > +/-5% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951 -0.022988 CH4 Cal Slope: 1.007657 1.008833 -0.014688 NMHC Cal Slope: 1.001092	new cylinder response							
Second point 4959 40.7 4.09 4.09 1.000 third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 as left zero 5000 as left zero 5000 0.0 0.00 as left zero 0.990 as left span 4919 81.3 8.16 8.24 0.990 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Correlation: * => +/-5% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951	calibrator zero	5000	0.0	0.00	0.00			
third point 4980 20.3 2.04 2.04 1.000 as left zero 5000 0.0 0.00 0.00 as left zero 5000 0.0 0.00 as left span 4919 81.3 8.16 8.24 0.990 Average Correction Factor 0.997 0.997 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 2nd AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Correlation: * => +/-5% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951 THC Cal Offset: -0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278	high point	4919	81.3	8.16	8.23	0.992		
as left zero 5000 0.0 0.00 0.00 as left span 4919 81.3 8.16 8.24 0.990 Average Correction Factor 0.997 Average Correction Factor 0.997 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 2nd AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Correlation: * = > +/-5% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951 THC Cal Slope: -0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278	second point	4959	40.7	4.09	4.09	1.000		
as left span 4919 81.3 8.16 8.24 0.990 Average Correction Factor 0.997 Baseline Corr AF: 8.23 Prev response 8.21 *% change 0.2% Baseline Corr 2nd AF: NA AF Slope: AF Intercept: Baseline Corr 3rd AF: NA AF Correlation: * = > +/-5% change initiates investigation Calibration Statistics Finish THC Cal Slope: 1.004292 1.004951 THC Cal Slope: 1.007657 1.008833 CH4 Cal Slope: 1.0016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278	third point	4980	20.3	2.04	2.04	1.000		
Average Correction Factor0.997Baseline Corr AF:8.23Prev response8.21*% change0.2%Baseline Corr 2nd AF:NAAF Slope:AF Intercept:Baseline Corr 3rd AF:NAAF Correlation:* = > +/-5% change initiates investigationCalibration StatisticsFinishTHC Cal Slope:1.0042921.004951THC Cal Offset:-0.024989-0.022988CH4 Cal Slope:1.0076571.008833CH4 Cal Offset:-0.016486-0.014688NMHC Cal Slope:1.0010921.001278	as left zero	5000	0.0	0.00	0.00			
Baseline Corr AF:8.23Prev response8.21*% change0.2%Baseline Corr 2nd AF:NAAF Slope:AF Intercept:Baseline Corr 3rd AF:NAAF Correlation:* => +/-5% change initiates investigationCalibration StatisticsFinishTHC Cal Slope:1.0042921.004951THC Cal Slope:-0.024989-0.022988CH4 Cal Slope:1.0076571.008833CH4 Cal Offset:-0.016486-0.014688NMHC Cal Slope:1.0010921.001278	as left span	4919	81.3	8.16	8.24	0.990		
Baseline Corr 2nd AF:NAAF Slope:AF Intercept:Baseline Corr 3rd AF:NAAF Correlation:* = > +/-5% change initiates investigationCalibration StatisticsFinishTHC Cal Slope:1.0042921.004951THC Cal Offset:-0.024989-0.022988CH4 Cal Slope:1.0076571.008833CH4 Cal Offset:-0.016486-0.014688NMHC Cal Slope:1.0010921.001278				A	verage Correction Factor	0.997		
Baseline Corr 3rd AF: NA AF Correlation: * = > +/-5% change initiates investigation Calibration Statistics Start Finish THC Cal Slope: 1.004292 1.004951 THC Cal Offset: -0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278	Baseline Corr AF:	8.23	Prev response	8.21	*% change	0.2%		
Start Finish THC Cal Slope: 1.004292 1.004951 THC Cal Slope: -0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278	Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Start Finish THC Cal Slope: 1.004292 1.004951 THC Cal Offset: -0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278	Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		
THC Cal Slope: 1.004292 1.004951 THC Cal Offset: -0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278			Calibration	Statistics				
THC Cal Offset: -0.024989 -0.022988 CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278			<u>Start</u>		<u>Finish</u>			
CH4 Cal Slope: 1.007657 1.008833 CH4 Cal Offset: -0.016486 -0.014688 NMHC Cal Slope: 1.001092 1.001278	THC Cal Slope:		1.004292		1.004951			
CH4 Cal Offset:-0.016486-0.014688NMHC Cal Slope:1.0010921.001278	THC Cal Offset:		-0.024989		-0.022988			
NMHC Cal Slope: 1.001092 1.001278	CH4 Cal Slope:		1.007657		1.008833			
•	CH4 Cal Offset:		-0.016486		-0.014688			
NMHC Cal Offset:	NMHC Cal Slope:		1.001092	1.001278				
	NMHC Cal Offset:		-0.007903	-0.007900				

Notes:

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

Calibration Performed By: Mo

Mohammed Kashif



THC Calibration Summary

		Station I	nformation			
Calibration Date:	February	7, 2023	Previous Calibration:	January 2	20. 2023	
Station Name:	Lower		Station Number:		AMS11	
Start Time (MST):		53	End Time (MST):	13:		
Analyzer make:		no 55i	Analyzer serial #:	15051		
analyzer make.	mem		Analyzer Schul #.	15051	04301	
		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	0.999983	≥0.995	
17.35	17.44	0.9951		0.00000		
8.69	8.67	1.0025	Slope	1.004951	0.90 - 1.10	
4.33	4.33	1.0010				
			Intercept	-0.022988	+/-0.5	
20.0		THC Calibration	n Curve			
18.0						
16.0						
14.0						
<u>ل</u> 12.0						
ີ ແມ່ນ 12.0 ເບັນນີ້ 10.0						
0.8 dC						
0.8 u 0.8 u 0.0 u						
4.0						
2.0						
0.0	E	.0	10.0	15.0	20.0	
0.0	5	.0	10.0	13.0	20.0	



CH₄ Calibration Summary

			Station	nformation		•••	rsion-01-20
Colibration 5	Data	Fab			tion	January 20, 2022	
Calibration [ry 7, 2023	Previous Calibration: Station Number:		January 20, 2023	
Station Nam			r Camp			AMS11	
Start Time (I			:53	End Time (I		13:19	
Analyzer ma	ike:	Ther	mo 55i	Analyzer sei	rial #:	1505164381	
			Calibra	tion Data			
Calculated con (ppm) (Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Stati	stical Evaluation	<u>Lii</u>	<u>nits</u>
0.00		0.00 8.23	0.9915	Correlation Coeffi	cient 0.9999	75 ≥0	.995
4.09	Ð	4.09 2.04	1.0004 1.0005	Slope	1.0088	33 0.90	- 1.10
				Intercept	-0.0146	i88 +,	/-0.5
8	9.0 3.0 7.0						
/	.0						
	5.0						
1 dd) ;	5.0						
4 Cone	.0 —						
Indicated Conc. (ppm) 5 5 5	8.0						
	2.0						
1	0						
0	0.0	2.0	1.0			10	0
	0.0	2.0	4.0	6.0	8.0	10	.0
			Calculated	l Conc. (ppm)			

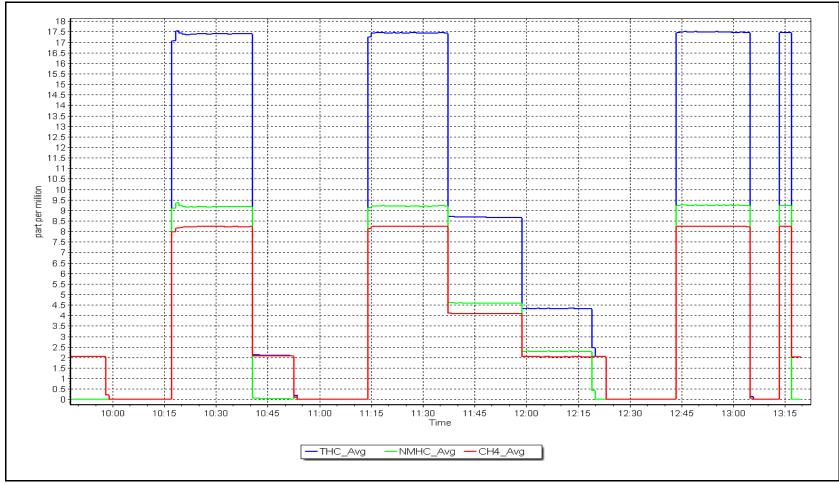


NMHC Calibration Summary

			Sta	tion I	nformation			VEI3011-01-202
Calibrati	ion Date:	Feb	ruary 7, 2023		Previous Ca	alibration:	January 2	20, 2023
Station N	Name:	Lo	ower Camp		Station	Number:	AMS11	
Start Tim	ne (MST):		9:53		End Tir	ne (MST):	13:	19
Analyzer	r make:	Т	hermo 55i		Analyze	er serial #:	15051	64381
			C	alibra	tion Data			
				andra				
(pp	om) (Cc)	ion Indicated concentra (ppm) (Ic)	tion Correction factor	(Cc/Ic)		Statistical Evalu	lation	<u>Limits</u>
	0.00	0.00			Correlation C	oefficient	0.999990	≥0.995
	9.19 4.60	9.20 4.58	0.9986					
	2.29	2.29	1.0014		Slop	e	1.001278	0.90 - 1.10
					Interce	ept	-0.007900	+/-0.5
	10.0		NMHC Cal	ibra [.]	tion Curve	2		
	9.0 -							*
	8.0 -							
	7.0 -							
(md	6.0 -							
Conc. (ppm)	5.0 -							
ted Co	4.0 -				•			
Indicated	3.0 -							
	2.0 -							
	1.0 -							
	0.0		-			-		
	0.	0 2.	0 4	.0	6	.0	8.0	10.0
			Calcu	lated	l Conc. (ppn	n)		

NMHC Calibration Plot







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South February 2, 2023 9:48 Routine		Station number: Last Cal Date: End time (MST):	AMS13 January 16, 2023 12:50	
		Calibration St	andards		
Cal Gas Concentration:	50.55	ppm	Cal Gas Exp Date:	December 29, 2028	
Cal Gas Cylinder #: Removed Cal Gas Conc:	CC260812 50.55	nnm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	N/A	ppm	Diff between cyl:	N/A	
Calibrator Make/Model:	API T700		Serial Number:	2448	
ZAG Make/Model:	API 701		Serial Number:	1117	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Schull Humber.	111,	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	599	
	Start	Finish		Start	Finish
Calibration slope:	1.003886	1.001413	Backgd or Offset:		77.5
Calibration intercept:	-3.178199	-2.738219	Coeff or Slope:		0.735
		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/ Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.9	
as found span	4921	79.1	799.7	796.3	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.1	799.7	799.4	1.000
second point	4961	39.5	399.3	396.0	1.008
third point	4980	19.8	200.2	194.7	1.028
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.1	799.7	798.9	1.001
			Averag	ge Correction Factor	1.012
Baseline Corr As found:	797.20	Previous response	799.61	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:			

Notes:

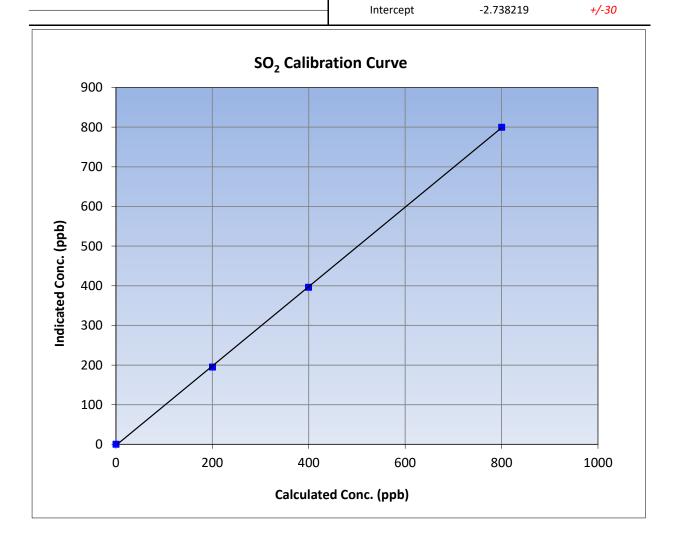
Changed the inlet filter after as founds. Adjusted zero and span.

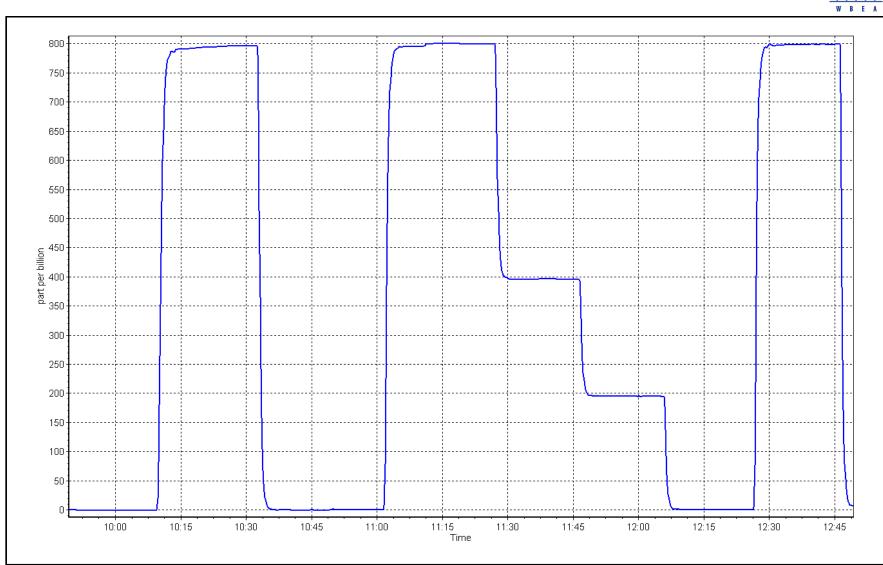
Calibration Performed By:



SO₂ Calibration Summary

WBEA					Version-01-2020
		Station	Information		
Calibration Date:	February	2, 2023	Previous Calibration:	January	16, 2023
Station Name:	Fort McKa	y South	Station Number:	AN	/IS13
Start Time (MST):	9:4	8	End Time (MST):	12	2:50
Analyzer make: API T10		100	Analyzer serial #:	599	
		Calib	ration Data		
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ition	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999942	≥0.995
799.7	799.4	1.0004	correlation coefficient	0.999942	20.333
399.3	396.0	1.0083	Slope	1.001413	0.90 - 1.10





Location: Fort McKay South





TRS Calibration Report

WBEA					Version-11-2
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South February 7, 2023 9:31 Routine		Station number: Last Cal Date: End time (MST):	AMS13 January 17, 2023 14:05	
		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: ZAG Make/Model:	CC500241 5.34 NA Teledyne API T700 Teledyne API 701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	2448 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:	0.999228	1.002489	Backgd or Offset:	3.69	3.69
Calibration intercept:	-0.042157	-0.082182	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 Adjuster Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.4	
	5000	0.0	0.0	0.1	
as found span	4925	75.5	80.6	80.6	1.002
as found span as found 2nd point					
	4925	75.5	80.6	80.6	1.002
as found 2nd point	4925 4962	75.5 37.7	80.6 40.3	80.6 40.0	1.002 1.009
as found 2nd point as found 3rd point	4925 4962	75.5 37.7	80.6 40.3 20.2	80.6 40.0	1.002 1.009
as found 2nd point as found 3rd point	4925 4962	75.5 37.7 18.9	80.6 40.3 20.2 On Data Calculated concentration (ppb)	80.6 40.0	1.002 1.009 1.035 Correction facto (Cc/lc)
as found 2nd point as found 3rd point new cylinder response Set Point	4925 4962 4981 Dilution air flow rate (sccm)	75.5 37.7 18.9 TRS Calibration Source gas flow rate (sccm)	80.6 40.3 20.2 On Data Calculated concentration (ppb) (Cc)	80.6 40.0 19.6 Indicated concentration (ppb) (Ic)	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero	4925 4962 4981 Dilution air flow rate (sccm) 5000	75.5 37.7 18.9 TRS Calibration Source gas flow rate (sccm) 0.0	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0	80.6 40.0 19.6 Indicated concentration (ppb) (Ic) 0.1	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925	75.5 37.7 18.9 TRS Calibration Source gas flow rate (sccm) 0.0 75.5	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6	80.6 40.0 19.6 Indicated concentration (ppb) (Ic) 0.1 80.8	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05 0.998
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962	75.5 37.7 18.9 TRS Calibrati Source gas flow rate (sccm) 0.0 75.5 37.7	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3	80.6 40.0 19.6 Indicated concentration (ppb) (Ic) 0.1 80.8 40.3	1.002 1.009 1.035 Correction facto (Cc/Ic) Limit = 0.95-1.05 0.998 0.999
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981	75.5 37.7 18.9 TRS Calibrations Source gas flow rate (sccm) 0.0 75.5 37.7 18.9	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2	80.6 40.0 19.6 Indicated concentration (ppb) (Ic) 0.1 80.8 40.3 19.9	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05 0.998 0.999 1.014
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981 5000	75.5 37.7 18.9 TRS Calibrations Source gas flow rate (sccm) 0.0 75.5 37.7 18.9 0.0	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2 0.0	80.6 40.0 19.6 Indicated concentration (ppb) (Ic) 0.1 80.8 40.3 19.9 0.3	1.002 1.009 1.035 Correction factor (Cc/lc) Limit = 0.95-1.05 0.998 0.999 1.014
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981 5000 4925	75.5 37.7 18.9 TRS Calibrations Source gas flow rate (sccm) 0.0 75.5 37.7 18.9 0.0 75.5	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2 0.0 80.6	80.6 40.0 19.6 0.1 0.1 80.8 40.3 19.9 0.3 80.7	1.002 1.009 1.035 Correction facto (Cc/Ic) Limit = 0.95-1.05 0.998 0.999 1.014
as found 2nd point 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	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981 5000 4925 4925 4921	75.5 37.7 18.9 TRS Calibratio Source gas flow rate (sccm) 0.0 75.5 37.7 18.9 0.0 75.5 79.1	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2 0.0	80.6 40.0 19.6 Indicated concentration (ppb) (Ic) 0.1 80.8 40.3 19.9 0.3 80.7 0.0	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05 0.998 0.999 1.014 0.999
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981 5000 4925 4925 4921 nge:	75.5 37.7 18.9 TRS Calibrations Source gas flow rate (sccm) 0.0 75.5 37.7 18.9 0.0 75.5	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2 0.0 80.6	80.6 40.0 19.6 0.1 0.1 80.8 40.3 19.9 0.3 80.7	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05 0.998 0.999 1.014 0.999 1.014 1.004
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber char Date of last converter effi	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981 5000 4925 4921 nge: ciency test:	75.5 37.7 18.9 TRS Calibration Source gas flow rate (sccm) 0.0 75.5 37.7 18.9 0.0 75.5 37.7 18.9 0.0 75.5 79.1 20-Mar-20 NA	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2 0.0 80.6 791.0	80.6 40.0 19.6 0.1 80.8 40.3 19.9 0.3 80.7 0.0 Ave Corr Factor	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05 0.998 0.999 1.014 0.999 1.014 1.004 efficiency
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber char Date of last converter effi Baseline Corr As found:	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981 5000 4925 4921 nge: ciency test: 80.5	75.5 37.7 18.9 TRS Calibration Source gas flow rate (sccm) 0.0 75.5 37.7 18.9 0.0 75.5 37.7 18.9 0.0 75.5 79.1 20-Mar-20 NA Prev response:	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2 0.0 80.6 791.0 80.52	80.6 40.0 19.6 0.1 80.8 40.3 19.9 0.3 80.7 0.0 Ave Corr Factor *% change:	1.002 1.009 1.035 Correction facto (Cc/lc) Limit = 0.95-1.05 0.998 0.999 1.014 0.999 1.014 1.004 efficiency 0.0%
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber char Date of last converter effi	4925 4962 4981 Dilution air flow rate (sccm) 5000 4925 4962 4981 5000 4925 4921 nge: ciency test:	75.5 37.7 18.9 TRS Calibration Source gas flow rate (sccm) 0.0 75.5 37.7 18.9 0.0 75.5 37.7 18.9 0.0 75.5 79.1 20-Mar-20 NA	80.6 40.3 20.2 on Data Calculated concentration (ppb) (Cc) 0.0 80.6 40.3 20.2 0.0 80.6 791.0 80.52 1.000788	80.6 40.0 19.6 0.1 80.8 40.3 19.9 0.3 80.7 0.0 Ave Corr Factor	1.002 1.009 1.035 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.998 0.999 1.014 0.999 1.014 1.004 efficiency

Notes:

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

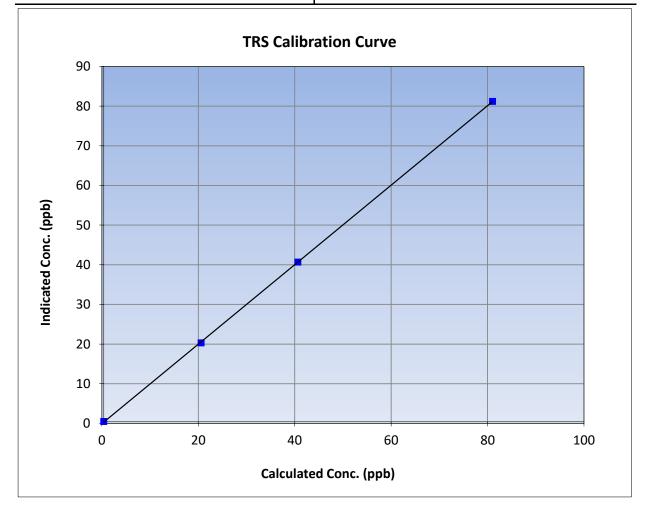


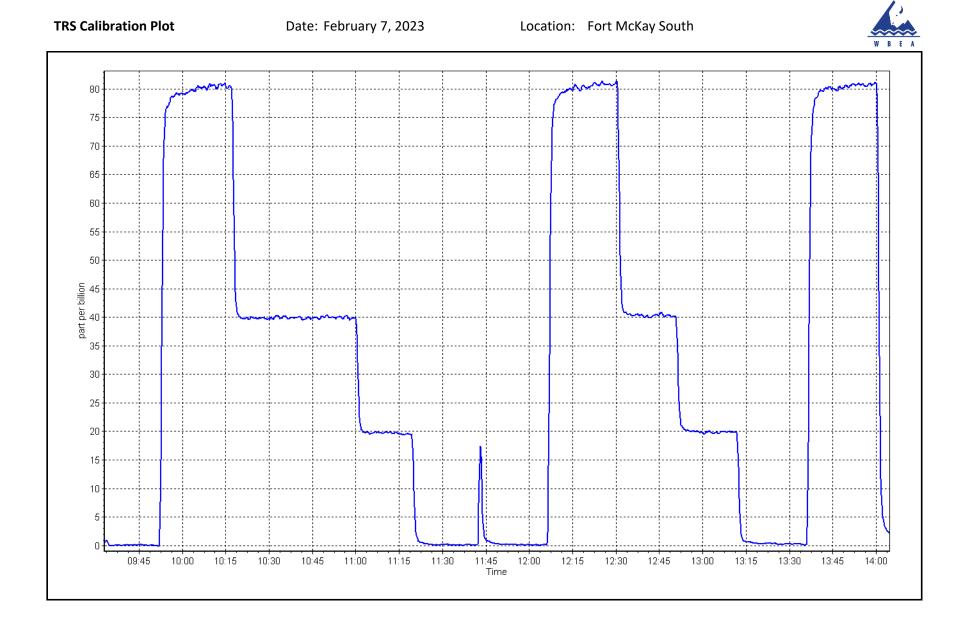
TRS Calibration Summary

WBEA			Version-11-2021			
Station Information						
Calibration Date:	February 7, 2023	Previous Calibration:	January 17, 2023			
Station Name:	Fort McKay South	Station Number:	AMS13			
Start Time (MST):	9:31	End Time (MST):	13:36			
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1180540017			

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999972	≥0.995
80.6	80.8	0.9978	correlation coefficient	0.333372	20.333
40.3	40.3	0.9992	Slope	1.002489	0.90 - 1.10
20.2	19.9	1.0144	Slope	1.002489	0.90 - 1.10
			Intercept	-0.082182	+/-3







THC / CH₄ / NMHC Calibration Report

WBEA		Ch - 11-	. Information		Version-01-202
		Statio	n Information		
Station Name:	Fort McKay South		Station number: Al	VIS13	
Calibration Date:	February 2, 202	3	Last Cal Date: Ja	• •	3
Start time (MST):	9:48 End time (MST): 12:50				
Reason:	Routine				
		Calibra	tion Standards		
Gas Cert Reference:	C	C260812	Cal Gas Expiry Date: De	ecember 29, 20)28
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	17	
		Analyze	er Information		
Analyzer make:	Thermo 55i		Analyzer serial #: 11	152430012	
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	2.38E-04	2.39E-04	NMHC SP Ratio:	4.74E-05	4.69E-05
CH4 Retention time:	12.0	12.0	NMHC Peak Area:	191456	193720

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	4921	79.1	17.05	17.14	0.994	
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	17.04	1.001	
second point	4961	39.5	8.51	8.35	1.019	
third point	4980	19.8	4.27	4.08	1.046	
as left zero	5000	0.0	0.00	0.00		
as left span	4921	79.1	17.05	17.09	0.998	
			A	verage Correction Factor	1.022	
Baseline Corr AF:	17.14	Prev response	17.02	*% change	0.7%	
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 Limit= 0.95-1.05	
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	9.06	1.002	
second point	4961	39.5	4.53	4.46	1.016	
third point	4980	19.8	2.27	2.18	1.042	
as left zero	5000	0	0.00	0.00		
as left span	4921	79.1	9.08	9.07	1.001	
			ŀ	Average Correction Factor	1.020	
Baseline Corr AF:	9.20	Prev response	9.08	*% change	1.3%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>		

	-		
CH4	Cal	ibration	Data

			liun Dala		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.1	7.97	7.95	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.1	7.97	7.97	0.999
second point	4961	39.5	3.98	3.89	1.022
third point	4980	19.8	1.99	1.90	1.050
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	7.97	8.01	0.995
			Av	verage Correction Factor	1.024
Baseline Corr AF:	7.95	Prev response	7.94	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

	<u>Start</u>	<u>Finish</u>	
THC Cal Slope:	1.000765	1.002074	
THC Cal Offset:	-0.043424	-0.104181	
CH4 Cal Slope:	1.000366	1.003774	
CH4 Cal Offset:	-0.031817	-0.056196	
NMHC Cal Slope:	1.001015	1.000594	
NMHC Cal Offset:	-0.011206	-0.047785	

Notes:

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

Calibration Performed By:

Sean Bala



THC Calibration Summary

		Station I	nformation		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	16 2023
Station Name:		(ay South	Station Number:	AM	
Start Time (MST):		48	End Time (MST):	12:	
Analyzer make:		no 55i	Analyzer serial #:	11524	
anaryzer make.	men		Analyzer Schurw.	11524	30012
		Calibra	tion Data		
(ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999826	≥0.995
17.05 8.51	<u> </u>	1.0006			
4.27	4.08	1.0456	Slope	1.002074	0.90 - 1.10
			Intercept	-0.104181	+/-0.5
18.0				/	
16.0 -					
14.0					
12.0 —					
(udd 10.0 -					
– 0.8 Conc					
10.0 (bbm) 0.8 0.0					
<u>د</u> 4.0 –					
2.0					
0.0		-			
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

		Station I	nformation		
alibration Date:	Fabruar		Previous Calibration:	January 1	16 2022
tation Name:	February 2, 2023 Fort McKay South		Station Number:	January 1 AMS	
		-			
tart Time (MST):			End Time (MST):	12:50	
nalyzer make:	Thermo 55i		Analyzer serial #:	1152430012	
		Calibra	tion Data		
alculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 7.97	0.00 7.97	0.9991	Correlation Coefficient	0.999763	≥0.995
3.98 1.99	3.89 1.90	1.0218 1.0497	Slope	1.003774	0.90 - 1.10
	1.50	1.0707	Intercept	-0.056196	+/-0.5
8.0 7.0 6.0					
Indicated Conc. (ppm) 0.5 0 0.0 0					
OD 4.0					
0.6 dicate					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
0.0	2.0	ч.0	0.0	0.0	10.0

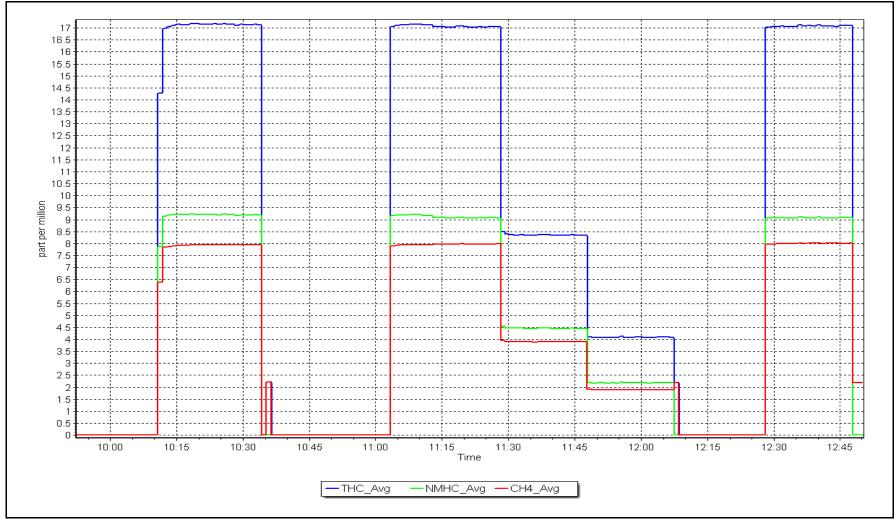


NMHC Calibration Summary

		Station I	nformation			
Calibration Date:	February 2, 2023		Previous Calibration: January		16, 2023	
Station Name:	Fort Mck	ay South	Station Number:	AM	S13	
Start Time (MST): 9:48		48	End Time (MST):	12:50		
Analyzer make: Thermo 55i		no 55i	Analyzer serial #: 1152		2430012	
		Calibra	tion Data			
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999873	≥0.995	
9.08 4.53	9.06	1.0019 1.0163				
2.27	2.18	1.0421	Slope	1.000594	0.90 - 1.10	
			Intercept	-0.047785	+/-0.5	
9.0 8.0 7.0						
(Line 6.0 5.0 Couc						
5 .0						
0.4 dicated 3.0						
2.0						
1.0						
0.0						
0.0	2.0	4.0	6.0	8.0	10.0	

NMHC Calibration Plot







high point

second point third point as left zero 4921

Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

WBEA						Version-01-2020
			Station Inf	ormation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South February 2, 2023 10:10 Cylinder Change		Station number: AMS13 Last Cal Date: February 2, 2023 End time (MST): 11:37			
			Calibration	Standards		
Gas Cert Reference:	CC260812 Cal Gas Expiry Dat			Cal Gas Expiry Date:	December 29, 202	8
CH4 Cal Gas Conc.	503.6	ppm		CH4 Equiv Conc.	1077.5	ppm
C3H8 Cal Gas Conc.	208.7	ppm		·		
Removed Gas Cert:		NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	503.6	ppm		CH4 Equiv Conc.	1077.5	ppm
Removed C3H8 Conc.	208.7	ppm		Diff between cyl (THC):		
Diff between cyl (CH ₄):				Diff between cyl (NM):		
Calibrator Model:	Calibrator Model: API T700 Serial Number: 2448					
ZAG make/model:	API 701			Serial Number:	1117	
			Analyzer In	formation		
Analyzer make:	Thermo 55i			Analyzer serial #:	1152430012	
THC Range (ppm):						
NMHC Range (ppm):	0 - 10 ppm			CH4 Range (ppm):	0 - 10 ppm	
	<u>Start</u>	ŀ	- inish		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.39E-04	2.	39E-04	NMHC SP Ratio:	4.69E-05	4.69E-05
CH4 Retention time:	12.0		12.0	NMHC Peak Area:	193720	193720
			THC Calibra	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	4921		79.1	17.05	16.97	1.005
as found 2nd point						
as found 3rd point						
new cylinder response	E000		0.0	0.00	0.00	
calibrator zero	5000		0.0	0.00	0.00	

17.05

16.95

79.1

1.005



THC / CH₄ / NMHC Calibration Report

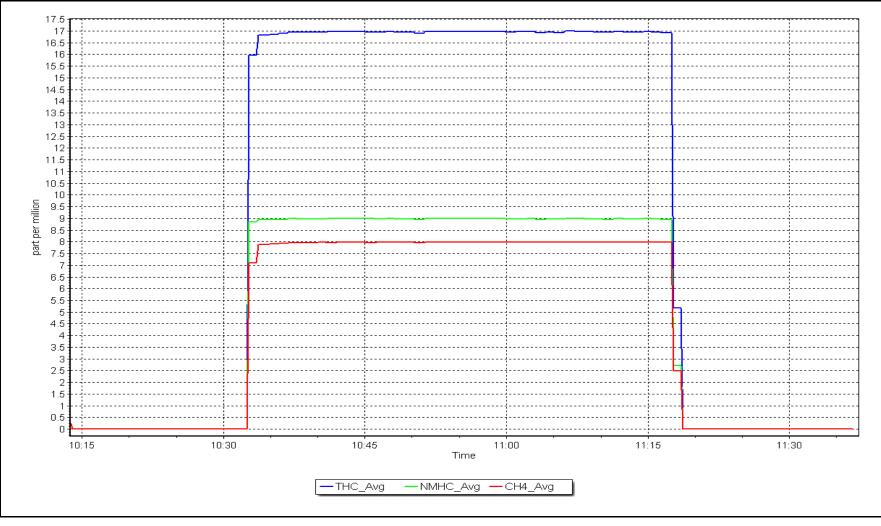
Version-01-2020

		NMHC Calibra			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4921	79.1	9.08	8.99	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
nigh point	4921	79.1	9.08	8.97	1.012
second point					
hird point					
as left zero					
as left span		79.1			
		-	Ave	rage Correction Factor	1.012
Baseline Corr AF:	8.99	Prev response	9.04	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:	0101	AF Intercept:	0.070
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	es investigation
					Ŭ
		CH4 Calibrat	tion 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	0.00	0.00	
as found span	4921	79.1	7.97	7.98	0.999
as found 2nd point	4921	79.1	7.97	7.50	0.555
as found 3rd point					
•					
new cylinder response	5000	0.0	0.00	0.00	
calibrator zero	5000		0.00	0.00	
nigh point	4921	79.1	7.97	7.98	0.998
second point					
third point					
as left zero		70.4			
as left span		79.1			
				rage Correction Factor	0.998
Baseline Corr AF:	7.98	Prev response	7.94	*% change	0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		1.002074		0.994538	
THC Cal Offset:		-0.104181		0.000000	
CH4 Cal Slope:		1.003774		1.001783	
CH4 Cal Offset:		-0.056196		0.000000	
		1.000594			
NMHC Cal Slope:				0.988070	
NMHC Cal Offset:		-0.047785		0.000000	

Calibration Performed By:









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	Information			
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South February 10, 2023 10:16 Routine		Station number: AMS 13 Last Cal Date: January 19, 2023 End time (MST): 14:37			
		Calibrati	on Standards			
NO Gas Cylinder #:	T2Y1P76		Cal Gas Expiry Date: De	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/	/Α		
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		
		Analyze	r Information			
Analyzer make:	Thermo 42i	Analyze	r Information	10661329		
Analyzer make: NOX Range (ppb):		Analyze	r Information Analyzer serial #: 14	10661329		
•		Analyze <u>Finish</u>		10661329 <u>Start</u>	<u>Finish</u>	
•	0 - 1000 ppb <u>Start</u>				<u>Finish</u> 9.5	
NOX Range (ppb):	0 - 1000 ppb <u>Start</u> 1.200	<u>Finish</u>	Analyzer serial #: 14	<u>Start</u>		
NOX Range (ppb): NO coeff or slope:	0 - 1000 ppb <u>Start</u> 1.200 0.992	<u>Finish</u> 1.204	Analyzer serial #: 14 NO bkgnd or offset:	<u>Start</u> 9.6	9.5	
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> 1.200 0.992	<i>Finish</i> 1.204 0.992 1.000	Analyzer serial #: 14 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.6 9.6	9.5 9.6	
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> 1.200 0.992	<i>Finish</i> 1.204 0.992 1.000	Analyzer serial #: 14 NO bkgnd or offset: NOX bkgnd or offset:	<u>Start</u> 9.6 9.6	9.5 9.6	
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> 1.200 0.992	<i>Finish</i> 1.204 0.992 1.000	Analyzer serial #: 14 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.6 9.6	9.5 9.6	
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> 1.200 0.992 1.000	<i>Finish</i> 1.204 0.992 1.000 Calibrat	Analyzer serial #: 14 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.6 9.6 194.1	9.5 9.6	
NOX Range (ppb): NO coeff or slope: NOX coeff or slope: NO2 coeff or slope:	0 - 1000 ppb <u>Start</u> 1.200 0.992 1.000	<u>Finish</u> 1.204 0.992 1.000 Calibrat <u>Start</u>	Analyzer serial #: 14 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.6 9.6 194.1 <u>Finish</u>	9.5 9.6	

-3.105090

1.006533

-0.433464

-3.145082

0.996233

-0.877794



$NO_X \setminus NO \setminus NO_2$ 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	0.0		
as found span	4919	81.1	826.9	800.0	26.9	824.2	797.8	26.3	1.0033	1.0027
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4919	81.1	826.9	800.0	26.9	825.0	800.2	24.8	1.0023	0.9997
second point	4960	40.6	413.9	400.4	13.5	410.5	396.7	13.7	1.0083	1.0094
third point	4980	20.3	207.0	200.2	6.7	202.5	194.5	8.0	1.0221	1.0294
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0		
as left span	4919	81.1	826.9	383.2	443.7	835.9	386.1	449.7	0.9892	0.9924
							Average C	orrection Factor	1.0109	1.0128
Corrected As fo	ound NO _x =	824.4 ppb	NO =	798.0 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	0.0%
Previous Respo	nse NO _x =	824.3 ppb	NO =	798.5 ppb				*Percent Chan	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 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)	797.2	380.4	443.7	441.6	1.0048	99.5%
2nd GPT point (200 ppb O3)	797.2	587.2	236.9	235.0	1.0082	99.2%
3rd GPT point (100 ppb O3)	797.2	691.8	132.3	129.8	1.0195	98.1%
				Average Correction Factor	1.0108	98.9%

Notes:

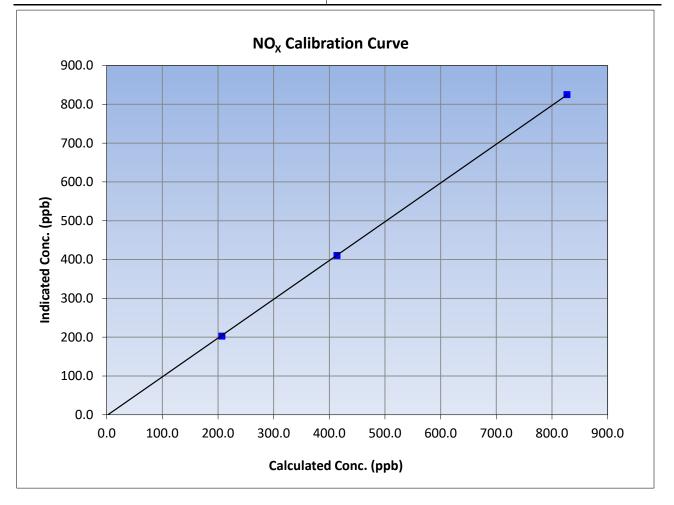
Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

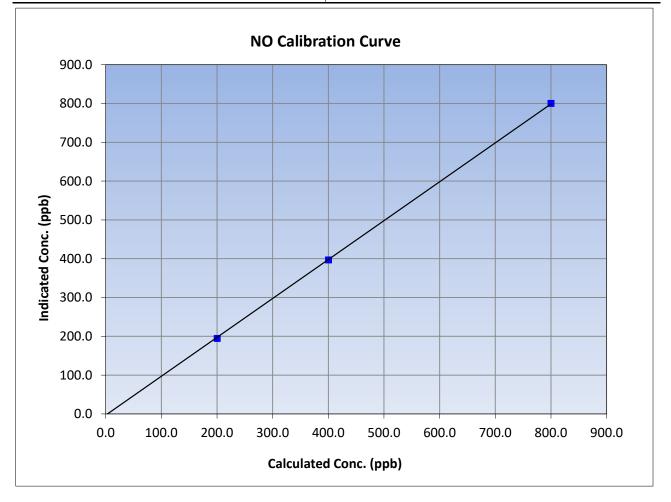
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	February	10, 2023	Previous Calibration:	January	19, 2023	
Station Name:	Fort Mck	ay South	Station Number:	AM	S 13	
Start Time (MST):	10:16		End Time (MST):	14	:37	
Analyzer make:	Therr	no 42i	Analyzer serial #:	14106	1410661329	
		Calibra	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	
826.9	825.0	1.0023	correlation coefficient	0.555572	20.333	
413.9	410.5	1.0083	Clana	0.000120	0.90 - 1.10	
207.0	202.5	1.0221	Slope	0.999138	0.90 - 1.10	
			Intercept	-2.151243	+/-20	





NO Calibration Summary

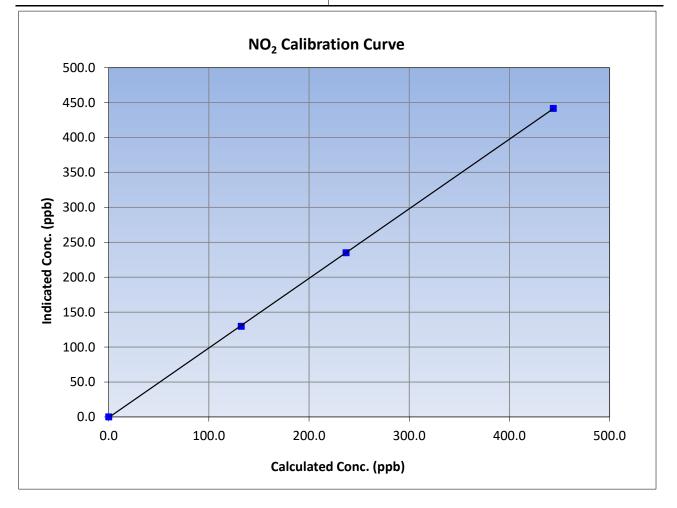
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	February	10, 2023	Previous Calibration:	January	anuary 19, 2023	
Station Name:	Fort Mck	(ay South	Station Number:	AM	S 13	
Start Time (MST):	t Time (MST): 10:16		End Time (MST):	14	:37	
Analyzer make:	Therr	no 42i	Analyzer serial #:	14106	61329	
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/lc)	ation Data Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999934	>0.005	
800.0	800.2	0.9997	correlation coefficient	0.999954	≥0.995	
400.4	396.7	1.0094	Slope	1.002334	0.90 - 1.10	
200.2	194.5	1.0294	Slope	1.002554	0.90 - 1.10	
			Intercept	-3.145082	+/-20	

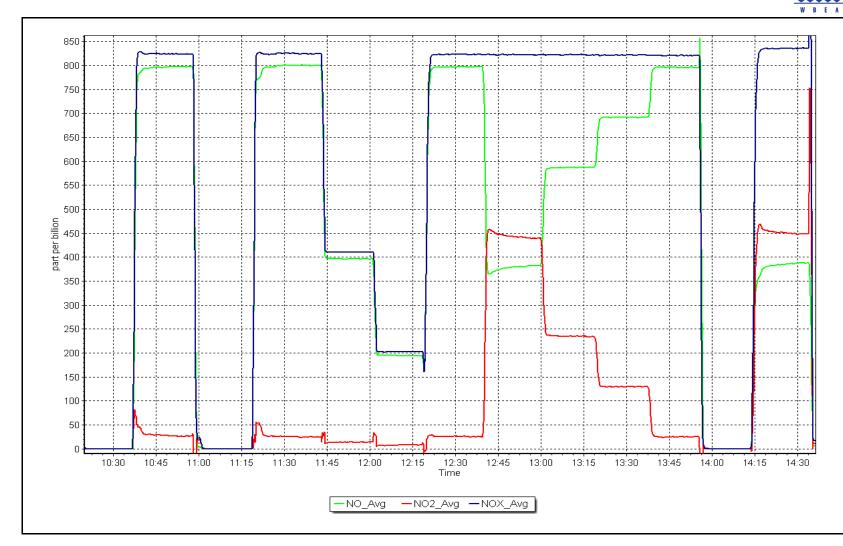




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	February	10, 2023	Previous Calibration: Ja		19, 2023
Station Name:	Fort Mck	(ay South	Station Number:	AM	S 13
Start Time (MST):	10:16		End Time (MST):	14	:37
Analyzer make:	Therr	no 42i	Analyzer serial #:	14106	61329
		Calibr	ation Data		
		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	0.999978	>0.005
443.7	441.6	1.0048	correlation coefficient	0.999978	≥0.995
236.9	235.0	1.0082	Slope	0.996233	0.90 - 1.10
132.3	129.8	1.0195	Siope	0.330233	0.30 - 1.10
			Intercept	-0.877794	+/-20





Location: Fort McKay South





O₃ Calibration Report

Version-01-2020

					Version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South February 3, 2023 9:56 Routine		Station number: Last Cal Date: End time (MST):	January 18, 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 e 0 - 500 ppb		Analyzer serial #:	3871	
Calibration slope: Calibration intercept:	<u>Start</u> 0.996143 1.300000	<u>Finish</u> 0.997629 1.040000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 2.7 0.962
		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	-0.1	
as found span	5000	969.9	400.0	399.7	1.001
as found 2nd point as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.2	
high point	5000	980.6	400.0	399.4	1.002
second point	5000	838.0	200.0	201.4	0.993
third point	5000	735.3	100.0	101.9	0.981
as left zero	5000	0.0	0.0	0.1	
as left span	5000	979.1	400.0	401.7	0.996
			Avera	ge Correction Factor	0.992
Baseline Corr As found: Baseline Corr 2nd AF pt:	399.8 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 inlet filter after as founds. No adjustment made.

Calibration Performed By:

Sean Bala



100.0

101.9

Wood Buffalo Environmental Association

O₃ Calibration Summary

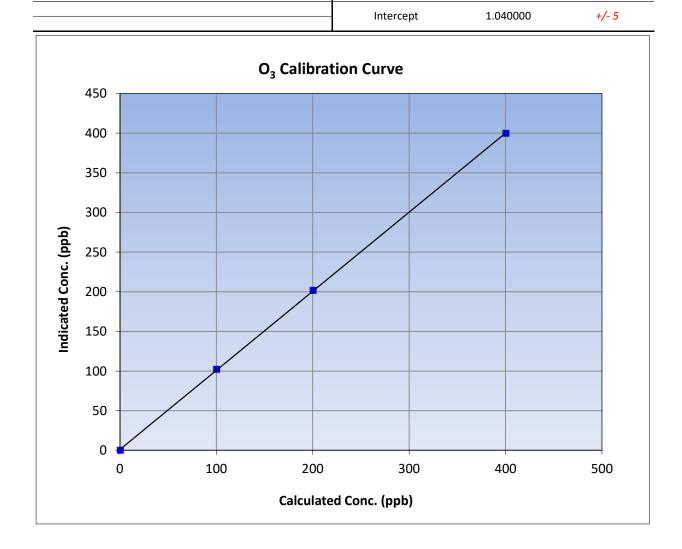
Slope

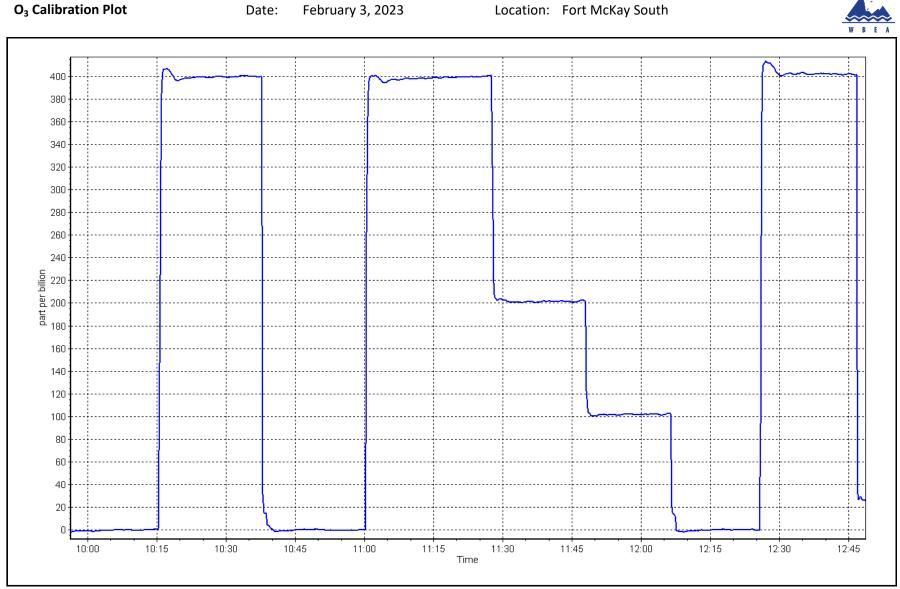
0.997629

0.90 - 1.10

WBEA					Version-01-2020
		Station	Information		
Calibration Date:	February	3, 2023	Previous Calibration:	Januar	y 18, 2023
Station Name:	Fort McKa	y South	Station Number:	A	MS13
Start Time (MST):	9:5	6	End Time (MST):	1	2:50
Analyzer make:	Teledyne A	API T400	Analyzer serial #:	3	871
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ition	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999955	≥0.995
400.0	399.4	1.0015	correlation coefficient	0.333333	20.995
200.0	201.4	0.9930	Slope	0 997629	0 90 - 1 10

0.9814





O₃ Calibration Plot

Location: Fort McKay South



T640 PM_{2.5} CALIBRATION

WDEA					Version-01-2023
		Station Information	n		
Station Name:	Fort McKay South		Station number:	AMS 13	
Calibration Date:	February 16, 2023		Last Cal Date:	January 19, 2023	
Start time (MST):	11:37		End time (MST):	11:53	
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		
Parameter	<u>As found</u>	Measured	<u>As left</u>	Adjuste	ed (Limits)
T (°C)	-10.0	-9.4	-10.0		+/- 2 °C
P (mmHg)	726.1	725.6	726.1		+/- 10 mmHg
flow (LPM)	5.01	5.04	5.01		+/- 0.25 LPM
					., 0.25 21 10
Leak Test:	PM w/o HEPA:	February 16, 2023 11.0	Last Cal Date: PM w/ HEPA:	January 19, 2023 0.0	<0.2 ug/m3
Note: this leak check will be		-	-		
Inlet cleaning :	Inlet Head		p		-
inice cicaning .	inicerredu				
		Quarterly Calibration	Test		
Parameter	<u>As found</u>	Post maintenance	As left	Adjuste	ed <i>(Limits)</i>
PMT Peak Test	<u></u>	<u>. oot mantenance</u>	<u></u>		10.9 +/- 0.5
					10.5 +7- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Chan	nber Cleaned:	December 1	3, 2022		<0.2 ug/m3
Disposable Filte	r Changed:	December 1	3, 2022		
		Annual Maintenanc	e		
Date Sample Tul		June 29, 2			
Date RH/T Sense	or Cleaned:	June 29, 2	2022		
Notes:	No adjustment	made. Leak check passe	ed. Built up of snow	on the inlet head ar	nd clean it.
Calibration by:	Sean Bala				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS14 ANZAC FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac February 21, 2023 10:28 Routine		Station number: Last Cal Date: End time (MST):	AMS 14 January 24, 2023 13:02	
		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 #:			Diff between cyl:	E 2 2 0	
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701H		Serial Number: Serial Number:	5239 357	
	AFITIOIN		Senai Number.	227	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	0710321322	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998268	0.993711	Backgd or Offset:	25.1	25.1
Calibration intercept:	-1.664595	-1.045321	Coeff or Slope:	0.795	0.795
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	orrection factor (Cc/lc)
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)		<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.3	
as found span	4920	80.1	800.2	791.6	1.011
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4920	80.1	800.2	794.8	1.007
second point	4960	40.0	399.6	395.4	1.011
third point	4980	20.0	199.8	196.0	1.019
as left zero	5000	0.0	0.0	0.4	
as left span	4920	80.1	800.2 Averag	796.8 ge Correction Factor	1.004
Baseline Corr As found:	791.30	Previous response		*% change	-0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

No Maintenance or adjustments done.

Calibration Performed By:

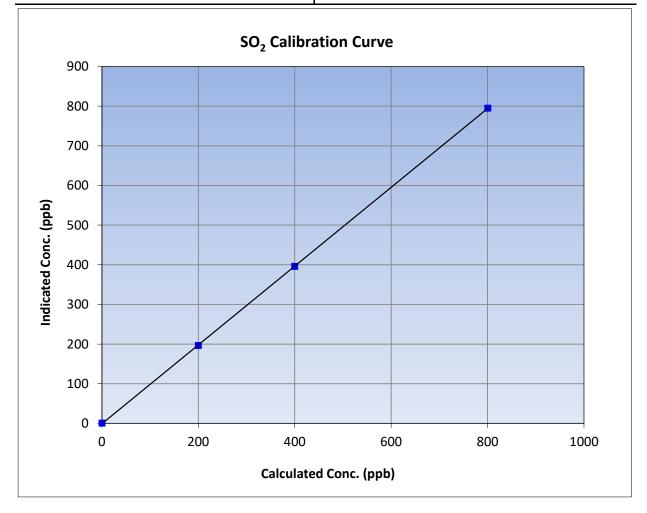


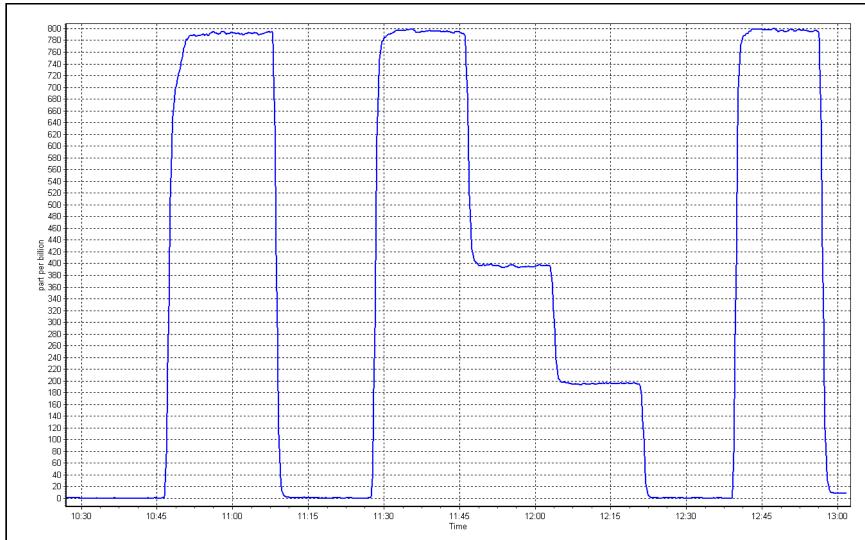
SO₂ Calibration Summary

Station Information							
Calibration Date:	February 21, 2023	Previous Calibration:	January 24, 2023				
Station Name:	Anzac	Station Number:	AMS 14				
Start Time (MST):	10:28	End Time (MST):	13:02				
Analyzer make:	Thermo 43i	Analyzer serial #:	0710321322				

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	0.999985	≥0.995
800.2	794.8	1.0068	correlation coefficient	0.999985	20.995
399.6	395.4	1.0106	Slope	0.993711 0.9	0.90 - 1.10
199.8	196.0	1.0194	Siope		0.30 - 1.10
			- Intercept	-1.045321	+/-30









TRS Calibration Report

				•	
WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac February 3, 2023 7:55 Routine		Station number: Last Cal Date: End time (MST):	AMS14 January 6, 2023 12:20	
		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:	1.003842	1.004840	Backgd or Offset:		5.66
Calibration intercept:	0.038815	-0.021121	Coeff or Slope:	0.990	1.008
		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	0.2	
as found span	4925	74.3	80.0	78.3	1.024
as found 2nd point	4962	37.2	40.0	39.3	1.024
as found 3rd point	4981	18.6	20.0	19.2	1.053
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	0.4	
high point	4925	74.3	80.0	80.5	0.993
second point	4962	37.2	40.0	40.1	0.998
third point	4981	18.6	20.0	19.6	1.021
as left zero	5000	0.0	0.0	0.4	
as left span	4925	74.3	80.0	79.9	1.001
SO2 Scrubber Check	4920	80.0	800.0	0.0	
Date of last scrubber cha				Ave Corr Factor	1.004
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	78.1	Prev response:	80.30	*% change:	-2.8%
Baseline Corr 2nd AF pt:	39.1	AF Slope:		AF Intercept:	-0.020730
Baseline Corr 3rd AF pt:	19.0	AF Correlation:		-	
				* = > +/-5% change initiat	es investigation

Notes:

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

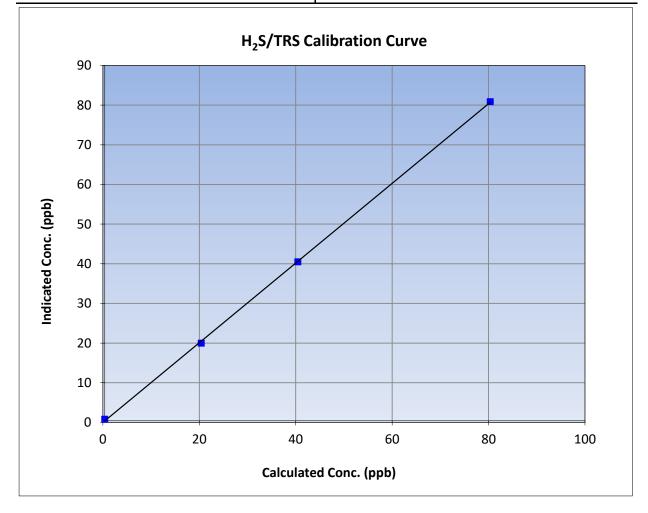


TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 3, 2023	Previous Calibration:	January 6, 2023				
Station Name:	Anzac	Station Number:	AMS14				
Start Time (MST):	7:55	End Time (MST):	12:20				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540019				

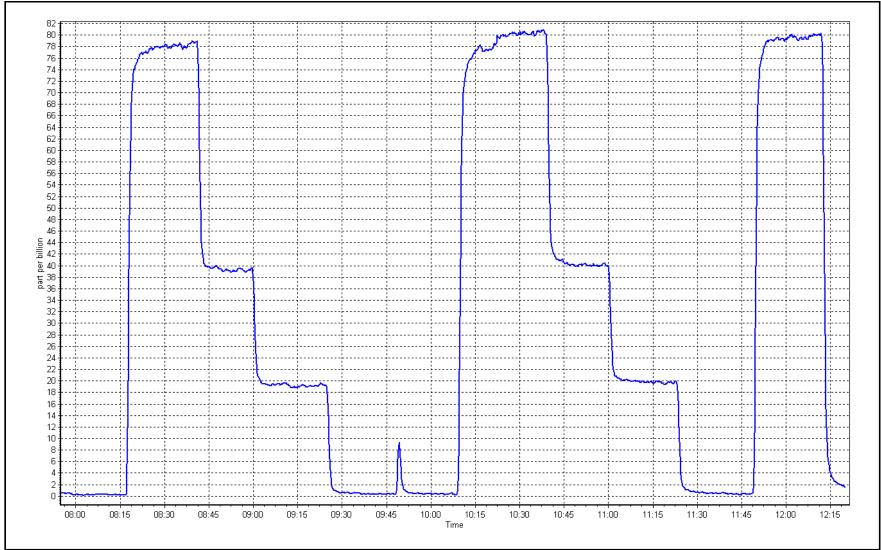
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999870	≥0.995
80.0	80.5	0.9933	Correlation Coefficient	0.333870	20.333
40.0	40.1	0.9983	Slope	1.004840	0.90 - 1.10
20.0	19.6	1.0212	Siope		0.30 - 1.10
			Intercept	-0.021121	+/-3











THC / CH_4 / NMHC Calibration Report

		Statio	on Information			
Station Name: Calibration Date:	Anzac February 21, 20	023	Station number: AMS 14 Last Cal Date: January 23, 2023			
Start time (MST):	10:28	10:28 End time (MST): 13:01				
Reason:	Routine					
		Calibra	ation Standards			
Gas Cert Reference:		CC279389	Cal Gas Expiry Date: Ja	nuary 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: 52	252		
ZAG make/model:	API 701H		Serial Number: 35	57		
		Analy	zer Information			
Analyzer make	: Thermo 55i		Analyzer serial #: 11	18148494		
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	: 3.85E-04	3.85E-04	NMHC SP Ratio:	4.46E-05	4.46E-05	
CH4 Retention time	: 12.00	12.00	NMHC Peak Area:	204554	204554	

THC Calibration Data						
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	16.95	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	17.12	16.92	1.012	
second point	4960	40.0	8.55	8.45	1.012	
third point	4980	20.0	4.28	4.19	1.020	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.1	17.12	17.03	1.005	
			A	Average Correction Factor	1.015	
Baseline Corr AF:	16.95	Prev response	17.13	*% change	-1.1%	
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 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	9.04	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	80.1	9.12	9.02	1.011
second point	4960	40.0	4.56	4.49	1.015
third point	4980	20.0	2.28	2.22	1.026
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.1	9.12	9.08	1.005
				Average Correction Factor	1.017
Baseline Corr AF:	9.04	Prev response	9.03	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

СЦЛ	Cal	ibration	Data
CH4	Cai	INIALIOII	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	7.91	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	80.1	8.00	7.99	1.001
second point	4960	40.0	3.99	3.96	1.009
third point	4980	20.0	2.00	1.97	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.1	8.00	7.95	1.006
			A	verage Correction Factor	1.008
Baseline Corr AF:	7.91	Prev response	8.10	*% change	-2.4%
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>		<u>Finish</u>	
THC Cal Slope:		1.001116		0.988889	
THC Cal Offset:		-0.010387		-0.013842	
CH4 Cal Slope:		1.012466	0.999568		
CH4 Cal Offset:		0.001594		-0.016046	
NMHC Cal Slope:		0.991290		0.989676	
NMHC Cal Offset:		-0.011980		-0.015788	

Notes:

No Maintenance or adjustments done.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

		Station I	nformation		
Calibration Date:	February	21, 2023	Previous Calibration:	January	23, 2023
station Name:		zac	Station Number:	AMS	
start Time (MST):		:28	End Time (MST):	13:	
Analyzer make:		no 55i	Analyzer serial #:	11181	
, 					
		Calibra	tion Data		
(ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
17.12 8.55	16.92 8.45	1.0120 1.0119			
4.28	4.19	1.0204	Slope	0.988889	0.90 - 1.10
			Intercept	-0.013842	+/-0.5
18.0					
16.0					
14.0					
12.0					
udd 10.0					
0.8 					
Indicated Conc. (ppm)					
<u>ة</u> 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		
Calibration Date:	February	21, 2023	Previous Calibration:	January 2	23, 2023
tation Name:	An	Anzac		AMS	5 14
itart Time (MST):	10	:28	End Time (MST):	13:	01
analyzer make:	Therr	no 55i	Analyzer serial #:	111814	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	0.999978	≥0.995
3.99	3.96	1.0087	Slope	0.999568	0.90 - 1.10
2.00	1.97	1.0138	Intercept	-0.016046	+/-0.5
8.0 7.0 6.0					
0.0 10 0.7 0.7 0.0 0.0 0.0 0.0 0.0 0.					
ouo 4.0					
- 0.6 dicate					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0

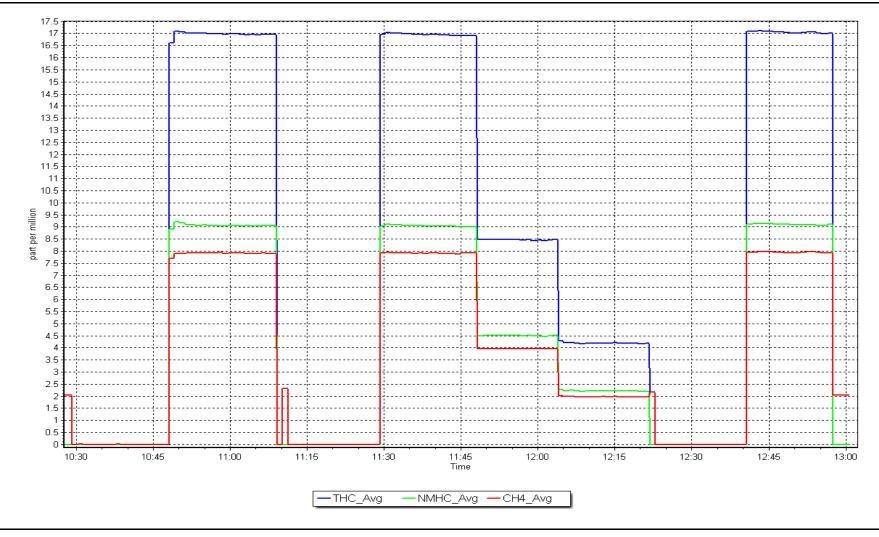


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	February	21, 2023	Previous Calibration:	January 2	23, 2023
itation Name:	An	zac	Station Number:	AMS	5 14
itart Time (MST):	10	:28	End Time (MST):	13:	01
Analyzer make:	Thern	no 55i	Analyzer serial #:	11181	48494
		Calibra	tion Data		
Calculated concentration I (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999985	≥0.995
9.12 4.56	9.02 4.49	<u>1.0115</u> 1.0147		-	
2.28	2.22	1.0147	Slope	0.989676	0.90 - 1.10
			Intercept	-0.015788	+/-0.5
9.0 8.0 7.0 E 6.0					
6.0 (bbm) 5.0 (bbm)					
5 .0					
4.0					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
0.0	2.11	4.0	0.0	0.0	TO'O









Station Name:

Reason:

Calibration Date:

Start time (MST):

Anzac

7:45

Routine

February 2, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS 14 Last Cal Date: January 4, 2023 End time (MST): 12:33

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

Analyzer Information

Analyzer make: Th NOX Range (ppb): 0 -		Analyzer serial #: 1426262592			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.361	1.361	NO bkgnd or offset:	3.7	3.7
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	3.7	3.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	164.2	163.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999876	1.011937
NO _x Cal Offset:	-0.745750	-0.743109
NO Cal Slope:	1.001401	1.013337
NO Cal Offset:	-1.789671	-1.947043
NO ₂ Cal Slope:	1.002246	1.000011
NO ₂ Cal Offset:	0.204305	0.089892



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Dilution Calibration Data										
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) <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	78.6	800.5	786.8	13.7	811.8	796.3	15.5	0.9861	0.9881
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	4921	78.6	800.5	786.8	13.7	809.5	796.2	13.4	0.9889	0.9883
second point	4961	39.3	400.2	393.4	6.8	404.5	396.1	8.4	0.9894	0.9931
third point	4980	19.6	199.6	196.2	3.4	200.1	194.8	5.3	0.9976	1.0072
as left zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	0.1		
as left span	4921	78.6	800.5	389.3	411.2	806.2	395.5	410.7	0.9930	0.9844
							Average C	orrection Factor	0.9920	0.9962
Corrected As fo	ound NO _x =	812.0 ppb	NO =	796.5 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	1.5%
Previous Respo	nse NO _x =	799.7 ppb	NO =	786.2 ppb				*Percent Chang	ge NO =	1.3%
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/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)	790.4	392.9	411.2	411.3	0.9997	100.0%
2nd GPT point (200 ppb O3)	790.4	584.6	219.5	219.5	0.9999	100.0%
3rd GPT point (100 ppb O3)	790.4	686.5	117.6	117.7	0.9990	100.1%
				Average Correction Factor	0.9995	100.0%

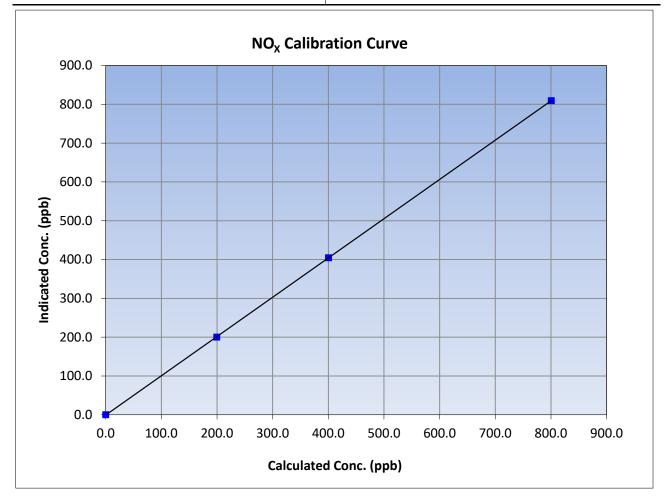
Notes:

No maintenance or adjustments done.



NO_x Calibration Summary

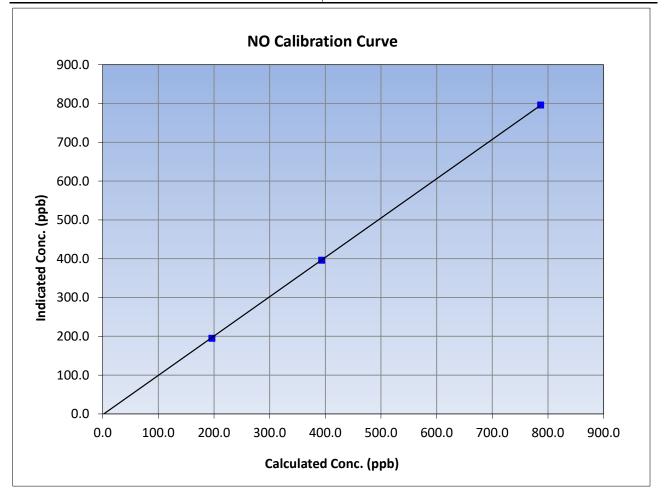
WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	4, 2023
Station Name:	An	zac	Station Number:	AM	S 14
Start Time (MST):	7:	45	End Time (MST):	12	:33
Analyzer make:	Thern	no 42i	Analyzer serial #:	1426262592	
		Calibra	ation Data		
Calculated 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
800.5	809.5	0.9889	correlation coernelent	0.555554	20.995
400.2	404.5	0.9894	Classe	1.011937	0.90 - 1.10
199.6	200.1	0.9976	Slope	1.011957	0.90 - 1.10
			Intercept	-0.743109	+/-20





NO Calibration Summary

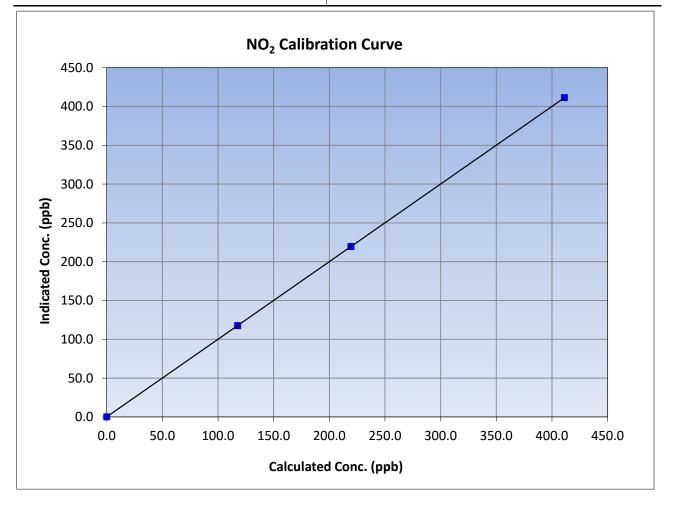
WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	4, 2023
Station Name:	An	zac	Station Number:	AM	S 14
Start Time (MST):	7:	45	End Time (MST):	12	:33
Analyzer make:	ke: Thermo 42i		Analyzer serial #:	14262	62592
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999975	≥0.995
786.8	796.2	0.9883	correlation coefficient	0.555575	20.995
393.4	396.1	0.9931	Clana	1.013337	0.90 - 1.10
196.2	194.8	1.0072	Slope	1.013337	0.90 - 1.10
			Intercept	-1.947043	+/-20

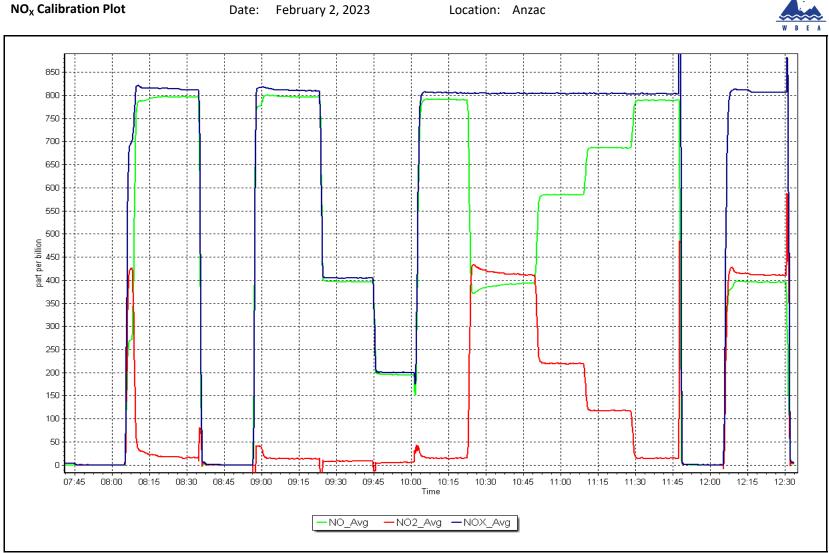




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	February	y 2, 2023	Previous Calibration:	January	4, 2023
Station Name:	An	zac	Station Number:	AM	S 14
Start Time (MST):	7:45		End Time (MST):	12	:33
Analyzer make:	Thermo 42i		Analyzer serial #:	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	1.000000	≥0.995
411.2	411.3	0.9997	correlation coefficient	1.000000	20.995
219.5	219.5	0.9999	Slope	1.000011	0.90 - 1.10
117.6	117.7	0.9990	Slope	1.000011	0.90 - 1.10
			Intercept	0.089892	+/-20







O₃ Calibration Report

Version-01-2020

					Version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac February 21, 2023 7:44 Routine		Station number: Last Cal Date: End time (MST):	January 24, 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> 1.005686 -1.420000	<u>Finish</u> 0.995743 0.420000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 0.9 1.499
		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	5000	0.0	0.0	-1.0	
as found span	5000	877.7	400.0	396.9	1.008
as found 2nd point as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.2	
high point	5000	877.7	400.0	398.3	1.004
second point	5000	746.2	200.0	200.2	0.999
third point	5000	669.6	100.0	100.4	0.996
as left zero	5000	0.0	0.0	-0.5	
as left span	5000	924.8	400.0	397.5	1.006
			Averag	ge Correction Factor	1.000
Baseline Corr As found: Baseline Corr 2nd AF pt:	397.9 NA	Previous response AF Slope:		*% change AF Intercept:	-0.7%
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

No maintenance done. Zero adjusted.

Calibration Performed By:

Melissa Lemay

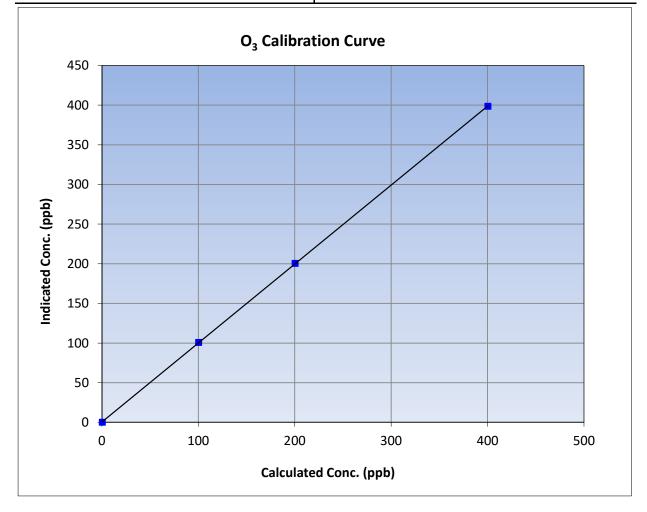


O₃ Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	February 21, 2023	Previous Calibration:	January 24, 2023					
Station Name:	Anzac	Station Number:	AMS14					
Start Time (MST):	7:44	End Time (MST):	10:30					
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595					

Calibration Data

Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>		
0.0	-0.2		Correlation Coefficient	0.999987	≥0.995	
400.0	398.3	1.0043	correlation coefficient	0.999987	20.335	
200.0	200.2	0.9990	0.9990 Slope		0.90 - 1.10	
100.0	100.4	0.9960	Slope	0.995743	0.90 - 1.10	
			- Intercept	0.420000	+/- 5	







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ρ)7:45	08:00	08	:15	08:	30 08:	45	09:	00	09:15 (D9:30	0 09:	45	10	:00	10-	15	1
		20.00	00						Time		20.00	- 00.		.0				



T640 PM_{2.5} CALIBRATION

WDEA					Version-01-2023					
		Station Information	ı							
Station Name:	Anzac									
Calibration Date:	February 22, 2023		Last Cal Date:	January 24, 2023						
Start time (MST):	8:48		End time (MST):	9:15						
Analyzer Make:	API T640	S/N: 825								
Particulate Fraction: PM2.5										
Flow Meter Make/Model:	Alicat FP-25	S/N: 388753								
Temp/RH standard:	Alicat FP-25	S/N: 388753								
		Monthly Calibration T	est							
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)					
T (°C)	-25.3	-25.6	-25.3		+/- 2 °C					
P (mmHg)	727.7	728.7	727.7		+/- 10 mmHg					
flow (LPM)	5	5.2	5		+/- 0.25 LPM					
				Lanuary 24, 2022	., 0.25 21 10					
Leak Test:	PM w/o HEPA:	February 22, 2023 3.4	Last Cal Date: PM w/ HEPA:	January 24, 2023 0	<0.2 ug/m3					
Note: this leak check will be		-	-		<0.2 ug/115					
Inlet cleaning :	Inlet Head		· · · · · · · ·							
0										
		Quarterly Calibration	Гest							
Parameter	As found	Post maintenance	<u>As left</u>	Adjusted	(Limits)					
PMT Peak Test					11.3 +/- 0.5					
Post-maintenance		PM w/o HEPA:		w/ HEPA:						
Date Optical Chan	-	December 1			<0.2 ug/m3					
Disposable Filte	r Changed:	December 14	4, 2022							
		Annual Maintenanc	e							
Date Sample Tul	be Cleaned:	June 21, 2	2022							
Date RH/T Sense		June 21, 2								
			done. Inlet Head c	la a mad						
Notes:		no aujustments								
Calibration by:	Melissa Lemay									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu February 14, 2023 11:04 Routine		Station number: Last Cal Date: End time (MST):	AMS17 January 10, 2023 14:08	
		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: ZAG Make/Model:	ALM066507 50.38 <u>n/a</u> API T700 API 701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	n/a 2449 359	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1218153459	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.999825 -1.319798	1.000068 -1.979730	Backgd or Offset: Coeff or Slope:		12.5 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	0.5	
as found span	4921	79.4	800.0	796.7	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.4	800.0	799.5	1.001
second point	4960	39.7	400.0 199.5	395.8	1.011
third point as left zero	4980 5000	<u> 19.8</u> 0.0			1.016
as left span	4920	79.4	0.0 800.1	0.1 800.3	1.000
as ieit spail	7720	73.4		ge Correction Factor	1.000
Baseline Corr As found:	796.20	Previous response		*% change	-0.3%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA NA	AF Slope: AF Correlation:		AF Intercept:	0.070
				* = > +/-5% change initiate	es investigation

Notes:

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

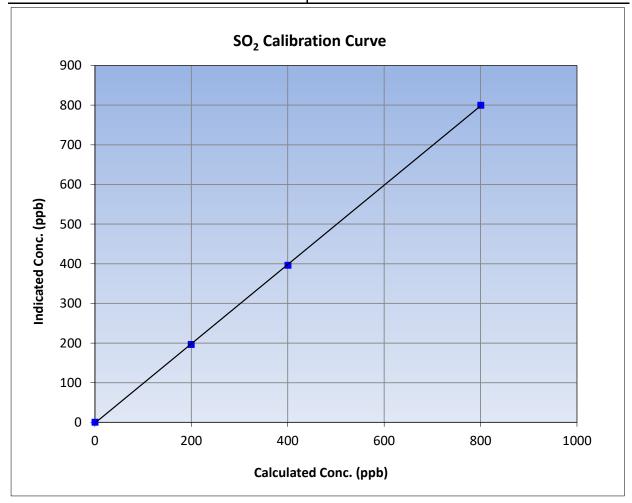
Calibration Performed By:

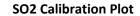


SO₂ Calibration Summary

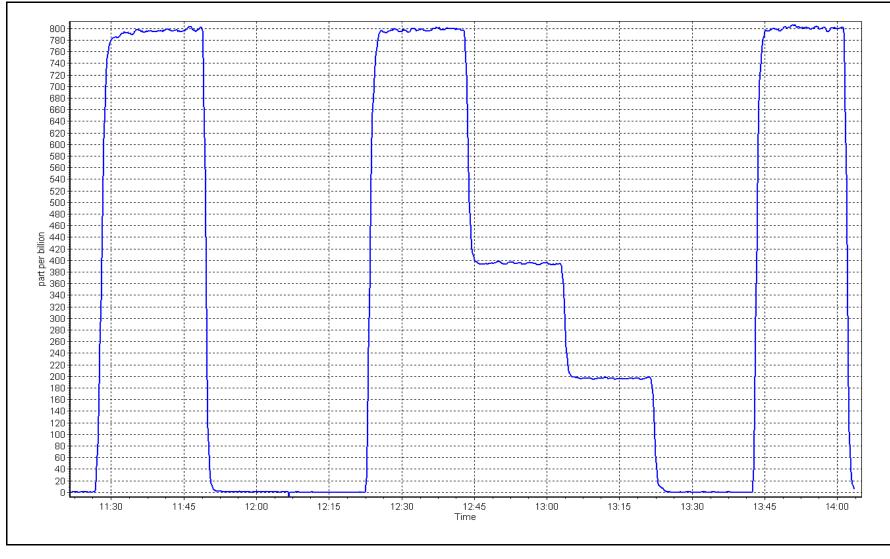
Station Information									
February 14, 2023	Previous Calibration:	January 10, 2023							
Wapasu	Station Number:	AMS17							
11:04	End Time (MST):	14:08							
Thermo 43i	Analyzer serial #:	1218153459							
	February 14, 2023 Wapasu 11:04	February 14, 2023Previous Calibration:WapasuStation Number:11:04End Time (MST):							

Calculated concentration (ppb) (Cc)	n Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999962	≥0.995	
800.0	799.5	1.0006	correlation coefficient	0.999902	20.333	
400.0	395.8	1.0107	Slope	1.000068	0.90 - 1.10	
199.5	196.3	1.0164	Slope	1.000008	0.90 - 1.10	
			Intercept	-1.979730	+/-30	











H₂S Calibration Report

Lad Gas Cylinder #:CC511852NumberLemoved Cal Gas Conc:5.076ppmRem Gas Exp Date:n/aLadibrator Make/Model:API T700Serial Number:2449AG Make/Model:API T701HSerial Number:359Analyzer make:Thermo 450iAnalyzer serial #:1218153583Converter make:n/aConverter serial #:1218153583Converter make:n/aStartFinishCalibration slope:1.0022820.995568Backgd or Offset:12.9Lalibration intercept:0.3208010.080792Coeff or Slope:1.085Set PointDilution air flow rateSource gas flow rate (scom)Calculated concentration (ppb) (ic)Correction facto (Cc/)as found zero50000.00.00.00.3as found span492178.880.079.81.003as found afd point498019.720.020.11.010new cylinder responseH2Calibration DataCorrection facto (Cc/)Correction facto (Cc/)Set PointDilution air flow rate (scom)Coulated (scom)Indicated co	Calibration Date: February 16, 2023 Attart time (MST): 10:28 Reason: Routine Cal Gas Concentration: 5.076 ppm Cal Gas Cylinder #: CC511852 Removed Cal Gas Conc: 5.076 ppm Removed Gas Cyl #: n/a Calibrator Make/Model: API T700 CAG Make/Model: API T701H Analyzer make: Thermo 450i Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u>	Calibration S n Analyzer Info <u>Finish</u> 0.995568	Station number: Last Cal Date: End time (MST): tandards Cal Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Serial Number: Diff between cyl: Serial Number: Serial Number: Backgd or Offset:	January 5, 2023 14:50 September 16, 2024 n/a 2449 359 1218153583 n/a <u>Start</u>	Finish
Allbration Date: February 16, 2023 tart time (MST): Last Cal Date: January 5, 2023 January 5, 2023 al Gas Concentration: 5.076 al Gas Concentration: ppm Cal Gas Exp Date: September 16, 2024 al Gas Concentration: 5.076 al Gas Cyl H: n/a Diff between cyl: January 5, 2023 allbrator Make/Model: API T701H Serial Number: 2449 AG Make/Model: API T701H Serial Number: 2449 allbrator Make/Model: API T701H Serial Number: 2449 allbration slope: 1/0 Opb Analyzer serial #: 1218153583 anverter make: n/a Converter serial #: 1218153583 anilibration slope: 1/0 O2282 0.995558 Backgd or Offset: 12.9 13.0 allbration slope: 1/0 O2282 0.995558 Backgd or Offset: 1.0.9 1.085 as found 2 app oint 4980 19.7 20.0 0.0 0.3	alibration Date: February 16, 2023 tart time (MST): 10:28 eason: Routine al Gas Concentration: 5.076 ppm al Gas Cylinder #: CC511852 emoved Cal Gas Conc: 5.076 ppm emoved Gas Cyl #: n/a alibrator Make/Model: API T700 AG Make/Model: API T701H analyzer make: Thermo 450i converter make: n/a analyzer Range 0 - 100 ppb <u>Start</u>	Analyzer Info <u>Finish</u> 0.995568	Last Cal Date: End time (MST): tandards Cal Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Diff between cyl: Serial Number: Diff between cyl: Serial Number: Backgd or Offset:	January 5, 2023 14:50 September 16, 2024 n/a 2449 359 1218153583 n/a <u>Start</u>	Finish
Lail Gas Concentration: 5.076 ppm Cal Gas Exp Date: September 16, 2024 Lai Gas Cylinder #: CCS11852 ppm Rem Gas Exp Date: n/a Lai Gas Cylinder #: CCS11852 ppm Rem Gas Exp Date: n/a Lai Gas Cylinder #: CCS11852 ppm Rem Gas Exp Date: n/a Lai Gas Conc: 5.076 ppm Rem Gas Exp Date: n/a Lai Gas Conc: 5.076 ppm Rem Gas Exp Date: n/a Lai Gas Conc: 5.076 ppm Rem Gas Exp Date: n/a Lai Gas Conc: Analyzer Information Serial Number: 359 Analyzer make: n/a Converter serial #: 1218153583 Converter make: n/a Converter serial #: 1218153583 Calibitration slope: 1.002282 0.995568 Backgd or Offset: 12.9 13.0 Calibitration intercept: 0.320801 0.080792 Coeff or Slope: 1.085 1.085 Stord Span 4921 78.8 80.0 80.4 0.999 1.001 1.010 1.010 1.010 neet cylinet espose <th>Cal Gas Concentration: 5.076 ppm Cal Gas Cylinder #: CC511852 Removed Cal Gas Conc: 5.076 ppm Removed Gas Cyl #: n/a Calibrator Make/Model: API T700 ZAG Make/Model: API T701H Analyzer make: Thermo 450i Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u></th> <th>Analyzer Info <u>Finish</u> 0.995568</th> <th>Cal Gas Exp Date: Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Drmation Analyzer serial #: Converter serial #: Backgd or Offset:</th> <th>n/a 2449 359 1218153583 n/a <u>Start</u></th> <th>Finish</th>	Cal Gas Concentration: 5.076 ppm Cal Gas Cylinder #: CC511852 Removed Cal Gas Conc: 5.076 ppm Removed Gas Cyl #: n/a Calibrator Make/Model: API T700 ZAG Make/Model: API T701H Analyzer make: Thermo 450i Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u>	Analyzer Info <u>Finish</u> 0.995568	Cal Gas Exp Date: Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Drmation Analyzer serial #: Converter serial #: Backgd or Offset:	n/a 2449 359 1218153583 n/a <u>Start</u>	Finish
Cal Gas Cylinder #:CC511852Permoved Gas Conc:S.076ppmRem Gas Exp Date:n/aLemoved Gas Cyl #:n/aDiff between cyl:Calibrator Make/Model:API T701Serial Number:2449Calibrator Make/Model:API T701HSerial Number:2449Converter make:Thermo 450iAnalyzer InformationAnalyzer make:Thermo 450iAnalyzer InformationConverter make:n/aAnalyzer Make:StortFinishStortFinishCoverter areial #:1218153583Coverter make:n/aAnalyzer InformationStortFinishStortFinishStortFinishCovertor for Slope:1.0851.085IndicatedCorrection factoCovertor for Slope:1.085Baseline AdjusteStortFinishStortFinishStortStortElisterStortStort <t< td=""><td>Cal Gas Cylinder #: CC511852 Removed Cal Gas Conc: 5.076 ppm Removed Gas Cyl #: n/a Calibrator Make/Model: API T700 ZAG Make/Model: API T701H Analyzer make: Thermo 450i Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u></td><td>Analyzer Info <u>Finish</u> 0.995568</td><td>Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Drmation Analyzer serial #: Converter serial #: Backgd or Offset:</td><td>n/a 2449 359 1218153583 n/a <u>Start</u></td><td><u>Finish</u></td></t<>	Cal Gas Cylinder #: CC511852 Removed Cal Gas Conc: 5.076 ppm Removed Gas Cyl #: n/a Calibrator Make/Model: API T700 ZAG Make/Model: API T701H Analyzer make: Thermo 450i Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u>	Analyzer Info <u>Finish</u> 0.995568	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Drmation Analyzer serial #: Converter serial #: Backgd or Offset:	n/a 2449 359 1218153583 n/a <u>Start</u>	<u>Finish</u>
Removed Cal Gas Conc: 5.076 moved Gas Cyl #: ppm n/a Rem Gas Exp Date: n/a Calibrator Make/Model: API T700 Serial Number: 2449 ZAG Make/Model: API T701H Serial Number: 359 Analyzer make: Thermo 450i Analyzer Information Analyzer serial #: 1.218153583 Converter make: n/a Converter serial #: 1.218153583 Einish Calibrator Make/Model: Start Finish Converter serial #: 1.218153583 Calibration slope: 1.002282 0.995568 Backgd or Offset: 12.9 13.0 Calibration intercept: 0.320801 0.080792 Coeff or Slope: 1.085 1.085 Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Indicated concentration (ppb) Indicated Concentration (ppb) Corection facto (Cc/(tc-Rareo) Imit of algo point 4980 19.7 20.0 20.1 1.001 as found 2rd point 4980 19.7 20.0 0.0 0.0 Corcentration (ppb) (Cc)	Removed Cal Gas Conc: 5.076 ppm Removed Gas Cyl #: n/a Calibrator Make/Model: API T700 ZAG Make/Model: API T701H Analyzer make: Thermo 450i Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u>	Analyzer Info <u>Finish</u> 0.995568	Diff between cyl: Serial Number: Serial Number: Dormation Analyzer serial #: Converter serial #: Backgd or Offset:	2449 359 1218153583 n/a <u>Start</u>	Finish
Analyzer make: Converter make: Analyzer RangeThermo 450i n/aAnalyzer serial #: Converter serial #: n/a 1218153583 Converter serial #: n/a Analyzer Range0 - 100 ppbEntish Calibration slope: 0.320801Start 0.0985568Entish Backgd or Offset: Coeff or Slope:Start 1.085Finish 1.085Calibration intercept:0.3208010.0980792 0.320801Coeff or Slope: coeff or Slope:1.0851.085H2S As Found DataSet PointDilution air flow rate (scm)Source gas flow rate (scm)Calculated concentration (ppb) (Cc)Baseline Adjuste Correction facto (CC/IC-AFzero) Limit # 0.90-110as found zero50000.00.00.3 Coeff or Slope:A found zero50000.00.00.00.3 Coercetion facto (CC/IC-AFzero) Limit # 0.90-110as found zero50000.00.00.00.3 Coercetion facto (CC/ICDilution air flow rate (scm)Source gas flow rate (scm)Calculated concentration (ppb) (C)Indicated concentration (ppb) (IC)Correction facto (CC/ICSet PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (CC)Indicated concentration (ppb) (IC)Correction facto (CC/ICDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (CC)Indicated concentration (p	Analyzer make: Thermo 450i Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u>	<u>Finish</u> 0.995568	Analyzer serial #: Converter serial #: Backgd or Offset:	n/a <u>Start</u>	<u>Finish</u>
Converter make: Analyzer Rangen/aConverter serial #: n/an/aAnalyzer Range0 - 100 ppb55Finish 0.995568StartFinish 12.913.0Calibration slope: Calibration intercept:0.3208010.080792Coeff or Slope: Coeff or Slope:1.0851.085Set PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Baseline Adjuste Correction facto (Cc/(CAFterof)) Limit = 0.90-11Cas found zero50000.00.00.3 concentration (ppb) (Cc)Indicated concentration (ppb) (le)Baseline Adjuste Correction facto (Cc/(CAFterof)) Limit = 0.90-11Cas found zero50000.00.00.3 concentration (ppb) (le)Indicated (Cc/(CAFterof)) Limit = 0.90-11Cas found 3rd point496139.440.040.11.005as found 3rd point498019.720.020.11.010new cylinder responseFinish (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (lc)Correction factor (Cc/(C)as left zero50000.00.00.2 concentration (ppb) (lc)Imdicated (Cc/(C)as left zero50000.00.00.5 concentration (ppb) (lc)Imdicated (Cc/(C)as found 2rd point496139.440.039.81.005calibrator zero50000.00.0<	Converter make: n/a Analyzer Range 0 - 100 ppb <u>Start</u>	0.995568	Converter serial #: Backgd or Offset:	n/a <u>Start</u>	<u>Finish</u>
Calibration slope: 1.002282 0.995568 Backgd or Offset: 12.9 13.0 Calibration intercept: 0.320801 0.080792 Coeff or Slope: 1.085 1.085 H2S As Found Data Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Indicated concentration (ppb) (Cc) Indicated concentration (ppb) (IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		0.995568			<u>Finish</u>
Calibration intercept: 0.320801 0.080792 Coeff or Slope: 1.085 1.085 Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Indicated concentration (ppb) (Cc) Baseline Adjuste Correction facto (Cc/It-AFzerO) Limit = 0.991.12 as found zero 5000 0.0 0.0 0.3 as found 2nd point 4961 39.4 40.0 40.1 1.005 as found 3rd point 4960 19.7 20.0 20.1 1.010 new cylinder response H2S Calibration Data Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Indicated (scc/It) (Imit = 0.95-102 calibrator zero 5000 0.0 0.0 0.2 high point 4961 39.4 40.0 39.8 1.003 second point 4961 39.4 40.0 39.8 1.003 second point 4961 39.4 40.0 39.8 1.005 shift point <t< td=""><td>Calibration slope: 1.002282</td><td></td><td></td><td>12 0</td><td></td></t<>	Calibration slope: 1.002282			12 0	
Set PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (C)Indicated concentration (ppb) (ic)Baseline Adjuste Correction facto (C/(L-AFzer)) Limit = 0.30-1100as found zero50000.00.00.3as found span492178.880.080.40.999as found 2nd point496139.440.040.11.005as found 3rd point498019.720.020.11.010new cylinder responseCalculated concentration (ppb) (CC)Indicated (CC/IC)Correction facto (CC/IC)Set PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (CC)Indicated concentration (ppb) (CC)Correction facto (CC/IC)calibrator zero50000.00.00.2high point492178.880.079.81.003second point496139.440.039.81.003second point496139.440.039.81.005third point492178.880.079.31.005as left zero50000.00.00.1as left span492179.4800.0-0.1Date of last converter efficiency test:n/aAve Corr Factor1.004Date of last converter efficiency test:n/aAve Corr Factor1.004Date of last converter efficiency test:	Calibration intercept: 0.320801		Coeff or Slope:		
Set PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (C)Indicated concentration (ppb) (C)Correction facto (CC/(Ic-AFzero)) Limit = 0.90-1.10as found zero 5000 0.0 0.0 0.3 as found span 4921 78.8 80.0 80.4 0.999 as found 2nd point 4961 39.4 40.0 40.1 1.005 as found 3rd point 4980 19.7 20.0 20.1 1.010 new cylinder responseH2S Calibration DataSet PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated (ccc)Correction facto (CC/(c) Limit = $0.95-1.05$ calibrator zero 5000 0.0 0.0 0.2 high point 4921 78.8 80.0 79.8 1.003 second point 4961 39.4 40.0 39.8 1.003 second point 4961 39.4 40.0 39.8 1.005 third point 4921 78.8 80.0 79.3 1.005 as left zero 5000 0.0 0.0 0.1 as left span 4921 78.8 80.0 79.3 1.005 as left span 4921 79.4 800.0 -0.1 Date of last scrubber change: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: <td></td> <td>H₂S As Four</td> <td>nd Data</td> <td></td> <td></td>		H ₂ S As Four	nd Data		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Set Point	-	concentration (ppb)		Correction facto (Cc/(Ic-AFzero))
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	as found zero 5000	0.0	0.0	0.3	
as found 3rd point 4980 19.7 20.0 20.1 1.010 new cylinder response H2S Calibration Data H2S Calibration Data Indicated concentration (ppb) (ic) Correction factor (cc/(c) Limit = 0.95-1.05) Indicated concentration (ppb) (ic) Correction factor (cc/(c) Limit = 0.95-1.05) calibrator zero 5000 0.0 0.0 0.2 high point 4921 78.8 80.0 79.8 1.003 second point 4961 39.4 40.0 39.8 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 79.3 1.009 302 Scrubber Check 4921 79.4 800.0 -0.1 Date of last scrubber change: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: n/a	as found span 4921	78.8	80.0	80.4	0.999
new cylinder responseH2S Calibration DataSet PointDilution air flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (IC)Correction factor (Cc/IC) Limit = 0.95-1.05calibrator zero50000.00.00.2high point492178.880.079.81.003second point496139.440.039.81.005third point498019.720.019.91.005as left zero50000.00.00.5as left span492178.880.079.31.009502 Scrubber Check492179.4800.0-0.1Date of last scrubber change:n/aAve Corr Factor1.004Date of last converter efficiency test:n/aefficiencyBaseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796	as found 2nd point 4961	39.4	40.0	40.1	1.005
H2S Calibration DataSet PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Ic)Correction factor (CC/LC) Limit = 0.95-1.05calibrator zero50000.00.00.2high point492178.880.079.81.003second point496139.440.039.81.005third point498019.720.019.91.005as left zero50000.00.00.5as left span492178.880.079.31.009602 Scrubber Check492179.4800.0-0.1Date of last scrubber change:n/aAve Corr Factor1.004Date of last converter efficiency test:n/aefficiencyefficiencyBaseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796	as found 3rd point 4980	19.7	20.0	20.1	1.010
Set PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Ic)Correction factor (Cc/Ic) Limit = 0.95-1.02calibrator zero50000.00.00.2high point492178.880.079.81.003second point496139.440.039.81.005third point498019.720.019.91.005as left zero50000.00.00.5as left span492178.880.079.31.009302 Scrubber Check492179.4800.0-0.1Date of last scrubber change:n/aAve Corr Factor1.004Date of last converter efficiency test:n/aefficiencyBaseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796	new cylinder response		-		
Set PointDilution air flow rate (sccm)Source gas flow rate (sccm)concentration (ppb) (Cc)Indicated concentration (ppb) (IC)(Cc/L) Limit = 0.95-1.05calibrator zero50000.00.00.2high point492178.880.079.81.003second point496139.440.039.81.005third point498019.720.019.91.005as left zero50000.00.00.5as left span492178.880.079.31.009502 Scrubber Check492179.4800.0-0.1Date of last scrubber change:n/aAve Corr Factor1.004Date of last converter efficiency test:n/aefficiencyBaseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796		H ₂ S Calibrat	ion Data		
high point 4921 78.8 80.0 79.8 1.003 second point 4961 39.4 40.0 39.8 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 zero 5000 0.0 0.0 0.5 as left span 4921 78.8 80.0 79.3 1.009 SO2 Scrubber Check 4921 79.4 800.0 -0.1 Date of last scrubber change: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: n/a efficiency Baseline Corr As found: 80.1 Prev response: 80.50 *% change: -0.5% Baseline Corr 2nd AF pt: 39.8 AF Slope: 1.001854 AF Intercept: 0.160796	Set Point	-	concentration (ppb)		(Cc/Ic)
second point 4961 39.4 40.0 39.8 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 79.3 1.009 502 Scrubber Check 4921 79.4 800.0 -0.1 Date of last scrubber change: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: n/a efficiency Baseline Corr As found: 80.1 Prev response: 80.50 *% change: -0.5% Baseline Corr 2nd AF pt: 39.8 AF Slope: 1.001854 AF Intercept: 0.160796	calibrator zero 5000	0.0	0.0	0.2	
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 79.3 1.009 GO2 Scrubber Check 4921 79.4 800.0 -0.1 Date of last scrubber change: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: n/a efficiency Baseline Corr As found: 80.1 Prev response: 80.50 *% change: -0.5% Baseline Corr 2nd AF pt: 39.8 AF Slope: 1.001854 AF Intercept: 0.160796	high point 4921	78.8	80.0	79.8	1.003
as left zero 5000 0.0 0.0 0.5 as left span 4921 78.8 80.0 79.3 1.009 GO2 Scrubber Check 4921 79.4 800.0 -0.1 Date of last scrubber change: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: n/a efficiency Baseline Corr As found: 80.1 Prev response: 80.50 *% change: -0.5% Baseline Corr 2nd AF pt: 39.8 AF Slope: 1.001854 AF Intercept: 0.160796	second point 4961	39.4	40.0	39.8	1.005
as left span 4921 78.8 80.0 79.3 1.009 GO2 Scrubber Check 4921 79.4 800.0 -0.1 Date of last scrubber change: n/a Ave Corr Factor 1.004 Date of last converter efficiency test: n/a efficiency Baseline Corr As found: 80.1 Prev response: 80.50 *% change: -0.5% Baseline Corr 2nd AF pt: 39.8 AF Slope: 1.001854 AF Intercept: 0.160796	•		20.0		1.005
SO2 Scrubber Check492179.4800.0-0.1Date of last scrubber change:n/aAve Corr Factor1.004Date of last converter efficiency test:n/aefficiencyBaseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796					
Date of last scrubber change:n/aAve Corr Factor1.004Date of last converter efficiency test:n/aefficiencyBaseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796					1.009
Date of last converter efficiency test:n/aefficiencyBaseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796		79.4	800.0		
Baseline Corr As found:80.1Prev response:80.50*% change:-0.5%Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796					
Baseline Corr 2nd AF pt: 39.8 AF Slope: 1.001854 AF Intercept: 0.160796	Date of last converter efficiency test: n/a				efficiency
Baseline Corr 2nd AF pt:39.8AF Slope:1.001854AF Intercept:0.160796	Baseline Corr As found: 80.1 F	Prev response:	80.50	*% change:	-0.5%
		•		0	
		•			

Notes:

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

Calibration Performed By:

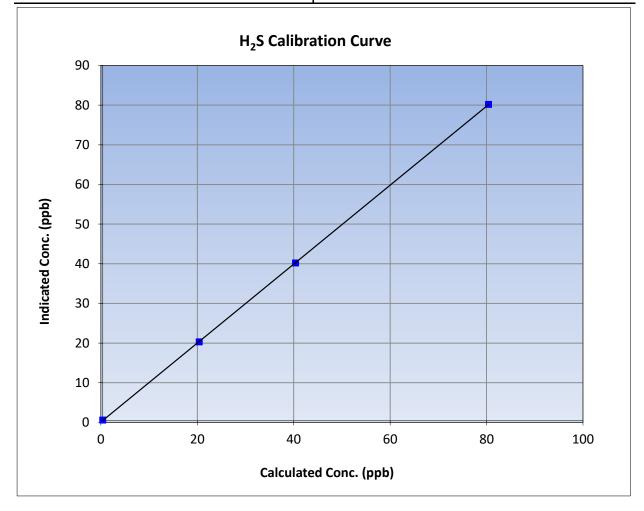
Karan Pandit



H₂S Calibration Summary

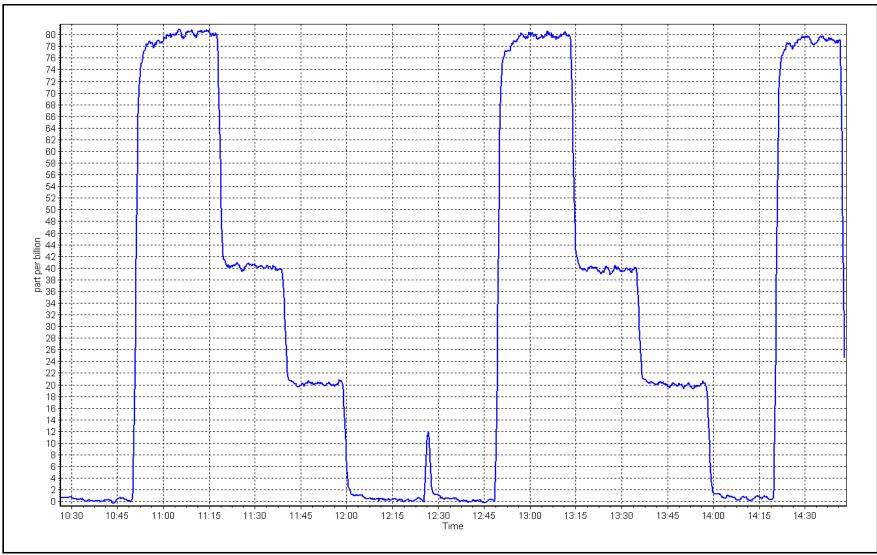
Previous Calibration:	January 5, 2023
Station Number:	AMS17
End Time (MST):	14:50
Analyzer serial #:	1218153583
	Station Number: End Time (MST):

Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999989	≥0.995
80.0	79.8	1.0025	correlation coefficient	0.999909	20.995
40.0	39.8	1.0049	Slope	0.995568	0.90 - 1.10
20.0	19.9	1.0051	Slope	0.995508	0.90 - 1.10
			Intercept	0.080792	+/-3











THC Calibration Report

Version-01-2020

		Station Info	rmation			
Station Name:WapasuCalibration Date:February 14, 2023Start time (MST):11:04Reason:Routine		Station number: Last Cal Date: End time (MST):		AMS17 January 10, 2023 14:08		
		Calibration S	tandards			
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	ALM(<u>503.5</u> <u>208.3</u>	066507 ppm ppm	Cal Gas Expiry Date: CH4 Equiv Conc.	January 12, 2029 1076.3	ppm	
Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model:	r <u>503.5</u> <u>208.3</u> API T700 API 701H	n/a ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	v Conc. 1076.3 ppm een cyl: nber: 2449		
		Analyzer Info	ormation			
Analyzer make Analyzer Range	: Thermo 51i-LT : 0 - 20 ppm		Analyzer serial #:	1218153352		
Calibration slope: Calibration intercept:	<u>Start</u> 1.003975 0.033881	<u>Finish</u> 1.011424 -0.037301	Background: Coefficient:		<u>Finish</u> 3.090 4.324	
		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/Ic) Limit = 0.95-1.05	
as found zero	5000	0.0	0.00	0.11		
as found span	4921	79.4	17.09	17.30	0.988	
as found 2nd point as found 3rd point new cylinder response						
calibrator zero	5000	0.0	0.00	0.01		
high point	4921	79.4	17.09	17.29	0.989	
second point	4960	39.7	8.55	8.54	1.000	
third point	4980	19.8	4.26	4.25	1.002	
as left zero	5000	0.0	0.00	-0.01		
as left span	4920	79.4	17.09	17.36	0.985	
	47.00	Due te u		ge Correction Factor	0.997	
Baseline Corr As found:	17.20	Previous response	17.19	*% change	0.0%	
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA NA	AF Slope: AF Correlation:		AF Intercept: * = > +/-5% change initia		

Notes:

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

Calibration Performed By:

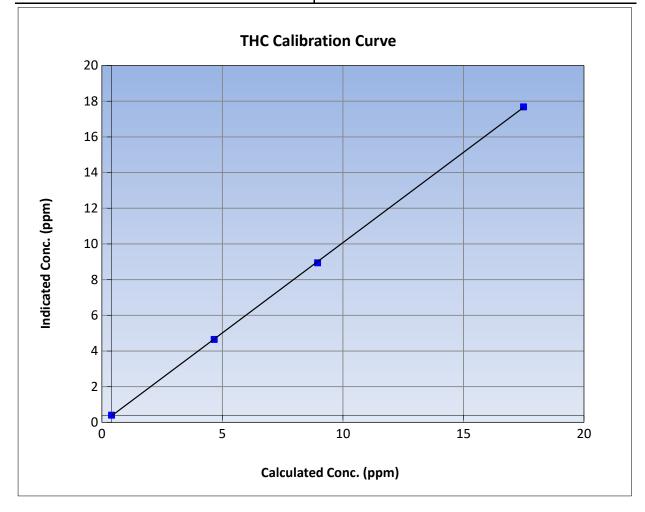


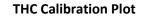
THC Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	February 14, 2023	Previous Calibration:	January 10, 2023					
Station Name:	Wapasu	Station Number:	AMS17					
Start Time (MST):	11:04	End Time (MST):	14:08					
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352					

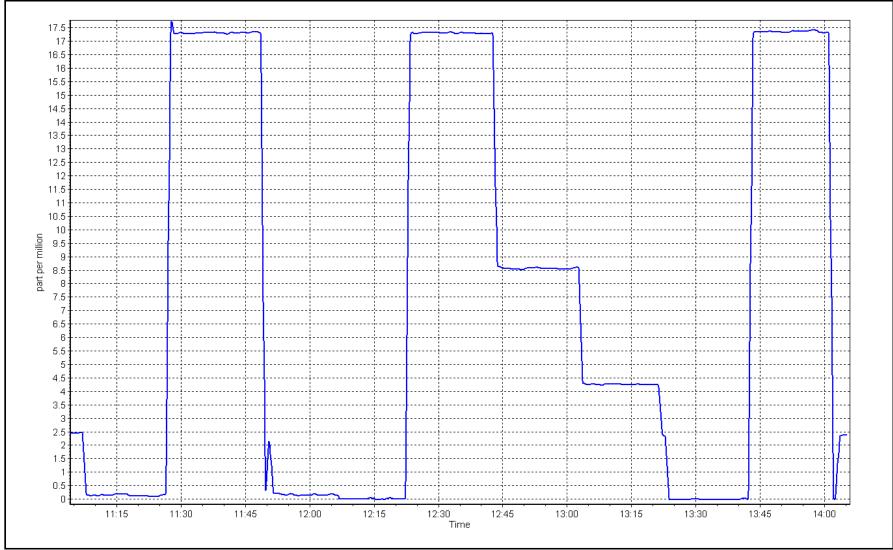
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.00	0.01		Correlation Coefficient	0.999952	≥0.995
17.09	17.29	0.9888	correlation coefficient	0.999952	20.333
8.55	8.54	1.0003	Slope	1.011424	0.90 - 1.10
4.26	4.25	1.0020	510pe	1.011424	0.30 - 1.10
			Intercept	-0.037301	+/-1.5











$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu February 23, 202 11:33 Routine	MS17 anuary 19, 2023 5:52	3			
			Calibrati	on Standards		
NO Gas Cylinder #:	T3	375YK8		Cal Gas Expiry Date: A	pril 13, 2025	
NOX Cal Gas Conc: Removed Cylinder #:	<u>49.11</u>	ppm		NO Cal Gas Conc: Removed Gas Exp Date:	<u>48.07</u>	ppm
Removed Gas NOX Conc: NOX gas Diff:	<u>49.11</u>	ppm		Removed Gas NO Conc: NO gas Diff:	<u>48.07</u>	ppm
Calibrator Model: ZAG make/model:	API T700 API T701H					
			Analyzei	Information		
Analyzer make: NOX Range (ppb):	Teledyne API T20 0 - 1000 ppb	0		Analyzer serial #: 8	33	
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.820		0.820	NO bkgnd or offset:	0.1	0.1
	0.812		0.812	NOX bkgnd or offset:	-0.4	-0.4
NOX coeff or slope:	0.812		0.011		0.4	0.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999578	0.989719
NO _x Cal Offset:	-1.120000	-1.420000
NO Cal Slope:	1.000973	0.990300
NO Cal Offset:	-2.440000	-1.880000
NO ₂ Cal Slope:	0.996862	0.986936
NO ₂ Cal Offset:	-0.247483	-0.501997



$NO_X \setminus NO \setminus NO_2$ 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	0.2		
as found span	4917	83.2	817.2	799.9	17.3	805.7	790.7	15.0	1.0143	1.0116
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3		
high point	4917	83.2	817.2	799.9	17.3	808.6	791.4	17.3	1.0106	1.0107
second point	4958	41.6	408.6	399.9	8.7	401.2	392.8	8.5	1.0184	1.0182
third point	4979	20.8	204.3	200.0	4.3	199.4	194.3	5.1	1.0246	1.0292
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.1	0.2		
as left span	4917	83.2	817.2	403.5	413.7	797.3	389.7	407.5	1.0249	1.0354
							Average C	orrection Factor	1.0179	1.0194
Corrected As fo	ound NO _x =	805.6 ppb	NO =	790.8 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-1.3%
Previous Respo	onse NO _x =	815.7 ppb	NO =	798.2 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 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)	790.5	394.1	413.7	408.2	1.0135	98.7%
2nd GPT point (200 ppb O3)	790.5	588.5	219.3	215.7	1.0167	98.4%
3rd GPT point (100 ppb O3)	790.5	690.0	117.8	114.8	1.0262	97.4%
			/	Average Correction Factor	1.0188	98.2%

Notes:

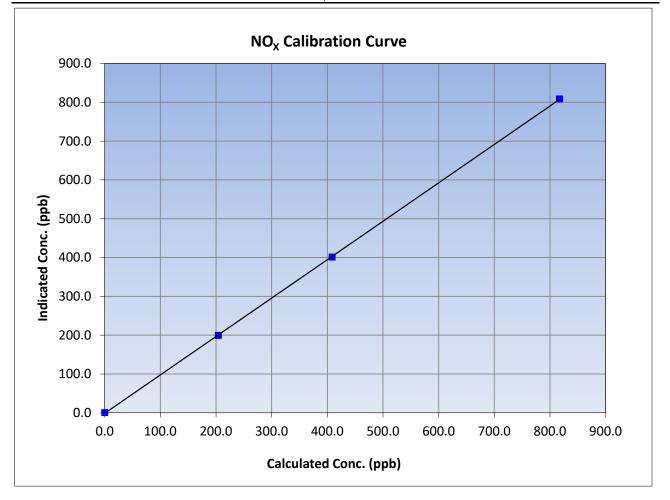
Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

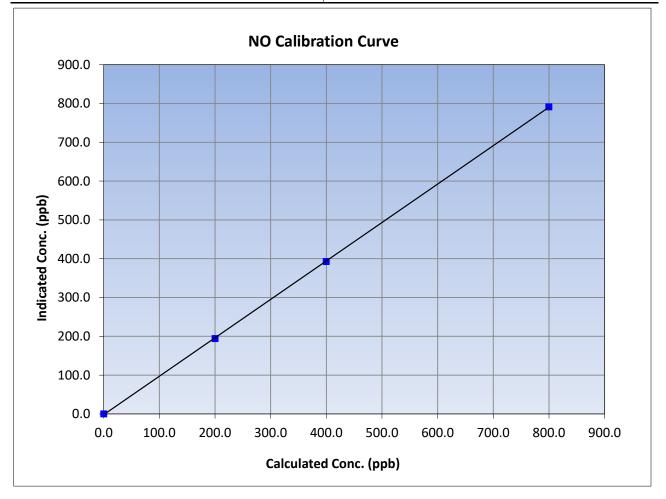
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	23, 2023	Previous Calibration:	Januar	ry 19, 2023
Station Name:	Wa	pasu	Station Number:	А	MS17
Start Time (MST):	11:33		End Time (MST):	-	15:52
nalyzer make: Teledyne API T200		Analyzer serial #:			
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999971	≥0.995
817.2	808.6	1.0106	correlation coernelent	0.555571	20.000
408.6	401.2	1.0184	Slope	0.989719	0.90 - 1.10
204.3	199.4	1.0246	Slope	0.989719	0.90 - 1.10
			Intercept	-1.420000	+/-20





NO Calibration Summary

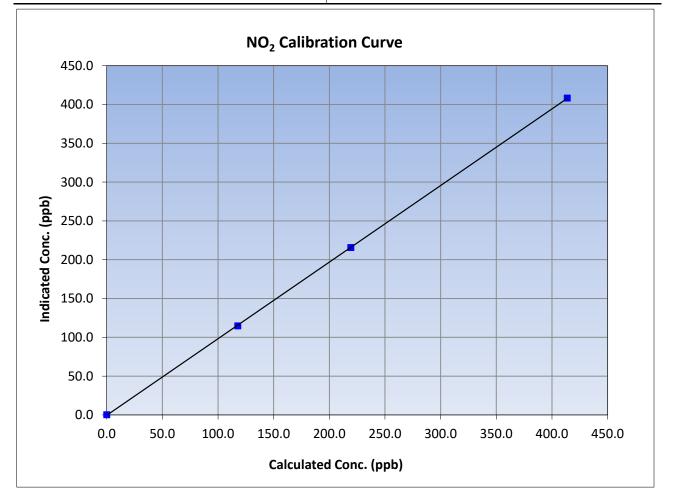
WBEA					Version-04-2
		Station	Information		
Calibration Date:	February	/ 23, 2023	Previous Calibration:	Januar	y 19, 2023
Station Name:	Wa	pasu	Station Number:	А	MS17
Start Time (MST):	11:33		End Time (MST):	1	.5:52
Analyzer make:	alyzer make: Teledyne API T200		Analyzer serial #:		833
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999968	≥0.995
799.9	791.4	1.0107	correlation coefficient	0.999908	20.333
399.9	392.8	1.0182	Slope	0.990300	0.90 - 1.10
200.0	194.3	1.0292	Slope	0.990300	0.90 - 1.10
			Intercept	-1.880000	+/-20

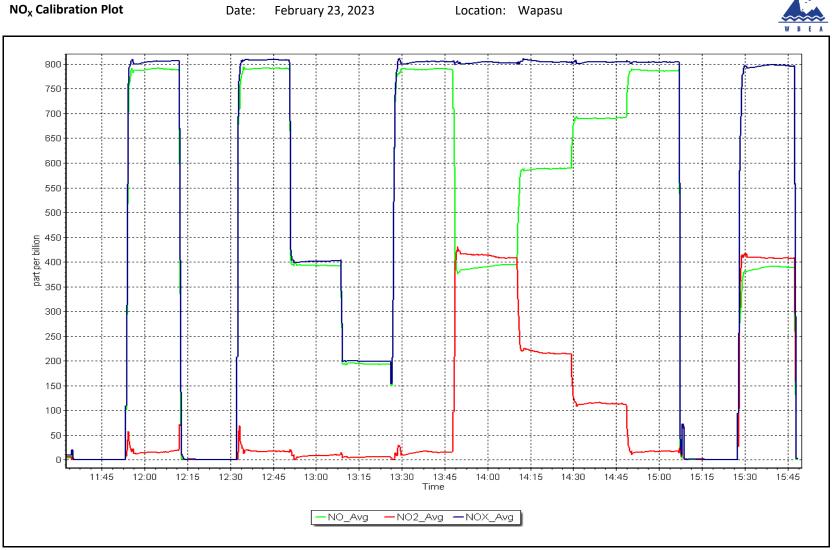




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	23, 2023	Previous Calibration:	January	/ 19, 2023
Station Name:	Wa	pasu	Station Number:	AN	MS17
Start Time (MST):	11:33		End Time (MST):	1	5:52
nalyzer make: Teledyne 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	0.3		Correlation Coefficient	0.999980	≥0.995
413.7	408.2	1.0135	correlation coefficient	0.555580	20.333
219.3	215.7	1.0167	<u>Class</u>	0.986936	0.90 - 1.10
117.8	114.8	1.0262	Slope	0.960950	0.90 - 1.10
			Intercept	-0.501997	+/-20





Location: Wapasu





O₃ Calibration Report

Version-01-2020

				Version-01-202
	Station Infor	mation		
Wapasu February 6, 2023 11:05		Last Cal Date:	January 4, 2023	
Routine				
	Calibration St	andards		
Photometer				
API T701H		Serial Number:	359	
	Analyzer Info	rmation		
: API T400		Analyzer serial #:	3870	
e 0 - 500 ppb				
Start	Finish		Start	Finish
		Backad or Offset		-1.8
		-	-	1.020
	O ₃ Calibratio	on Data		
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>
5000	0.0	0.0	0.1	
5000	1077.3	400.0	403.2	0.992
5000	0.0	0.0	0.2	
5000	1077.3	400.0	402.1	0.995
5000	900.3	200.0	200.9	0.996
5000	789.5	100.0	99.5	1.005
5000	0.0	0.0	-0.1	
5000	1077.3	400.0	405.9	0.985
5000		Averag	e Correction Factor	0.998
403.1	Previous response	Averag 401.8	e Correction Factor *% change	0.998
403.1	Previous response		*% change	
	February 6, 2023 11:05 Routine Photometer API T700 API T701H API T701H	Wapasu February 6, 2023 11:05 Routine Calibration St Photometer API T700 API T701H Analyzer Info 2 API T701H 2 Start 1.005486 1.005686 -0.360000 -0.320000 2 O3 Calibratic Total air flow rate Calibrator Lamp (sccm) Voltage Drive 5000 0.0 5000 1077.3 5000 900.3 5000 789.5	February 6, 2023 Last Cal Date: 11:05 End time (MST): Routine Calibration Standards Photometer Serial Number: API T700 Serial Number: API T701H Serial Number: API T400 Analyzer Information API T400 Analyzer serial #: 0 - 500 ppb 5tart Start Finish 1.005486 1.005686 -0.360000 Coeff or Slope: O3 Calibration Data Total air flow rate Calibrator Lamp Voltage Drive Calculated concentration (ppb) (Cc) 5000 0.0 0.0 0.0 5000 0.0 0.0 0.0 5000 1077.3 400.0 5000 1077.3 400.0 5000 1077.3 400.0 5000 1077.3 400.0	Wapasu Station number: AMS17 February 6, 2023 Last Cal Date: January 4, 2023 I1:05 End time (MST): 13:58 Routine Calibration Standards Photometer Serial Number: 2449 API T700 Serial Number: 359 API T701H Serial Number: 359 API T701H Serial Number: 3870 0 - 500 ppb Analyzer Information Start Finish 1.005486 1.005686 -0.360000 -0.320000 Coeff or Slope: 1.020 O3 Calibration Data Calculated Total air flow rate Calibrator Lamp Calculated Indicated concentration (ppb) (Cc) S000 0.0 0.0 0.1 5000 5000 0.0 0.0 0.2 5000 0.0 0.0 0.2 5000 0.0 0.0 0.2 5000 0.0 0.0 0.2 5000 0.0 0.0 0.2 5000 0.0 0.0 0.2 5000 0.0 0.0 9.5

Notes:

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

Calibration Performed By:

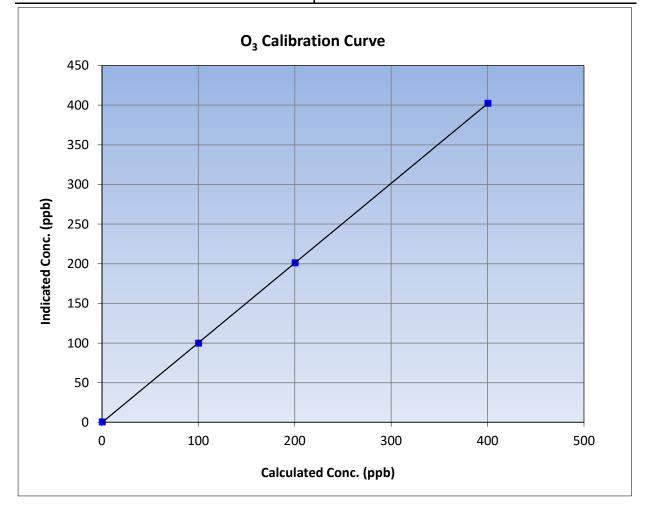
Karan Pandit

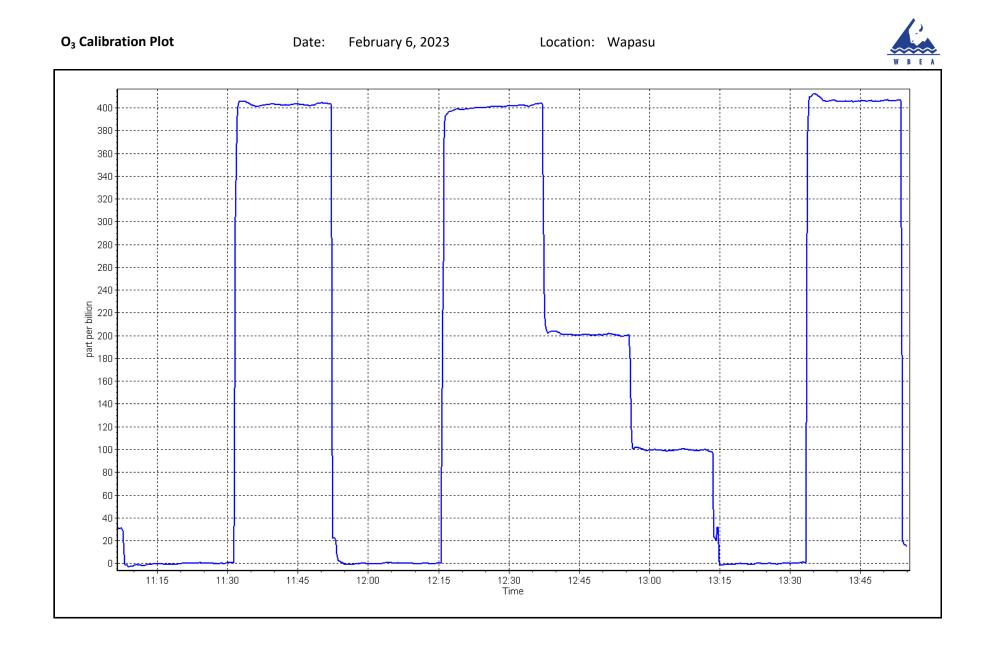


O₃ Calibration Summary

	Station	Information	
Calibration Date:	February 6, 2023	Previous Calibration:	January 4, 2023
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	11:05	End Time (MST):	13:58
Analyzer make:	API T400	Analyzer serial #:	3870
	Calibi	ration Data	
Calculated concentration India	cated concentration Correction factor	Statistical Evaluation	Limits

	(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	Statistical Evaluation Limits		Limits
	0.0	0.2		Correlation Coefficient	0.999990	≥0.995
	400.0	402.1	0.9948	correlation coernicient	0.555550	20.333
	200.0	200.9	0.9955	Slope	1.005686	0.90 - 1.10
	100.0	99.5	1.0050	Slope	1.005080	0.90 - 1.10
_				Intercept	-0.320000	+/- 5







T640 PM_{2.5} CALIBRATION

WBEA					Version-01-2023
		Station Information	1		
Station Name:	Wapasu		Station number:	AMS 17	
Calibration Date:	February 23, 2023		Last Cal Date:	January 19, 2023	
Start time (MST):	12:16		End time (MST):	12:47	
Analyzer Make:	API T640		s/N·	1183	
Particulate Fraction:	PM2.5		5,11	1100	
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>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
Т ([°] С)	-21.8	-22.3	-21.8		+/- 2 °C
P (mmHg)	730.2	730.9	730.2		+/- 10 mmHg
flow (LPM)	5.02	4.98	5.02		+/- 0.25 LPM
Leak Test:	Date of check:	February 23, 2023	Last Cal Date:	January 19, 2023	
	PM w/o HEPA:		PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will	serve as the pre ma	intenance leak check	
Inlet cleaning :	Inlet Head				
D		Quarterly Calibration		A 19 - 1	<i>(</i> , , , ,)
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	ber Cleaned:	December 1	5, 2022	·	<0.2 ug/m3
Disposable Filte	r Changed:	December 1	5, 2022		
		Annual Maintenanc	e		
Date Sample Tub	an Claanad:				
Date Sample Tu					
Notes:		No adjustments	made. Leak check	passed.	
Calibration by:	Karan Pandit				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN FEBRUARY 2023

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

March 31, 2023



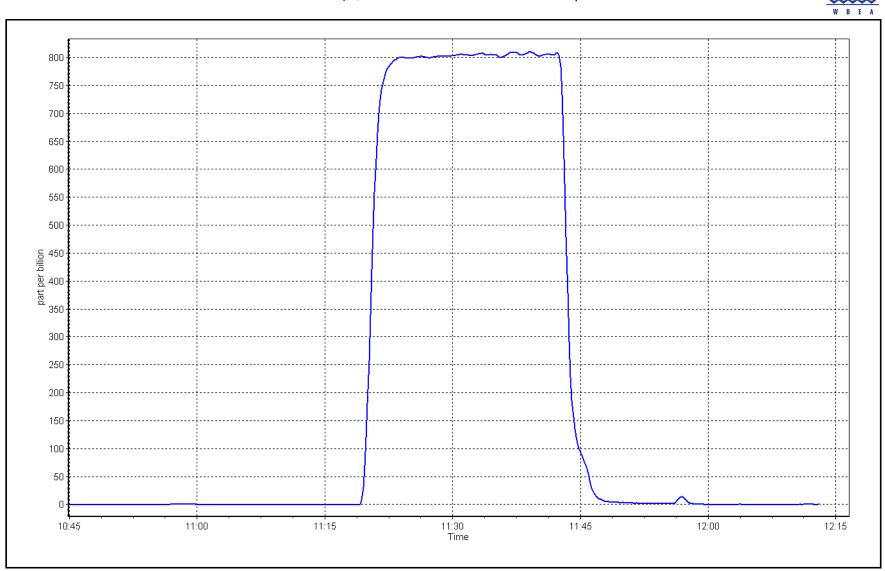
SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain February 3, 2023 10:55 As Found		Station number: Last Cal Date: End time (MST):	AMS 18 January 16, 2023 12:12	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	49.40 CC463851	ppm	Cal Gas Exp Date:	February 23, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	49.40 NA Teledyne API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 2658	
ZAG Make/Model:	Teledyne API 701H		Serial Number:	360	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	JC1501301453	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.003075		Backgd or Offset:	23.0	23.0
Calibration intercept:	-1.143339		Coeff or Slope:	0.817	0.817
		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	5009	0.0	0.0	-0.6	
as found span	4919	81.0	800.3	804.9	0.994
as found 2nd point					
as found 3rd point					
new cylinder response	5000			0.5	
calibrator zero	5009	0.0	0.0	-0.5	
high point second point					
third point					
as left zero					
as left span					
			Avera	ge Correction Factor	
Baseline Corr As found:	805.50	Previous response	801.60	*% change	0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
Notes:		No ch	anges/adjustments	made.	

Calibration Performed By:

Mohammed Kashif



Location: Stony Mountain



SO₂ Calibration Report

Version-01-2020

Stony Mountain		Station number:	AMS 18	
February 17, 2023		Last Cal Date:	January 16, 2023	
10:55		End time (MST):	13:59	
Routine				
	Calibration St	andards		
49.40			February 23 2025	
	ppin	cal das Exp Date.	1001001 y 20, 2020	
	nnm	Rom Gas Evn Dato	NA	
	ppin		NA	
			2650	
Teledyne API 701H		Serial Number:	360	
	Analyzer Info	rmation		
Thermo 43i	-		JC1501301453	
0 - 1000 ppb				
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
1.003075	1.008829	Backgd or Offset:	23.0	23.0
-1.143339	-0.882227	Coeff or Slope:	0.817	0.817
	SO ₂ Calibration	on 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
5009	0.0	0.0	-0.3	
4919	81.0	800.3	804.2	0.995
5000	0.0	0.0	-0.1	
4919	81.0	800.3	806.6	0.992
4959	40.5	400.2	403.2	0.993
4979	20.2	199.6	199.2	1.002
5000	0.0	0.0	-0.2	
4919	81.0	800.3	806.6	0.992
				0.996
804.50	Previous response	801.60	*% change	0.4%
			0	0.170
			Ai intercept.	
	February 17, 2023 10:55 Routine 49.40 CC463851 49.40 NA Teledyne API 7700 Teledyne API 7701H Thermo 43i 0 - 1000 ppb <u>Start</u> 1.003075 -1.143339 Dilution air flow rate (sccm) Dilution air flow rate (sccm) 5009 4919 5000 4919 4959 4979 5000	Seburary 17, 2023 Calibration St A9.40 ppm CC463851 49.40 49.40 ppm CC463851 49.40 A9.40 ppm NA ppm Teledyne API T700 Teledyne API 701H Thermo 43i 0 - 1000 ppb Start Finish 1.003075 1.008829 -1.143339 -0.882227 Dilution air flow rate (sccm) Source gas flow rate (sccm) 5009 0.0 4919 81.0 4959 40.5 4979 20.2 5000 0.0 4919 81.0 4959 40.5 4979 20.2 5000 0.0 4919 81.0 4919 81.0 4959 40.5 4919 81.0 4919 81.0 4959 40.5 4919 81.0 4959 AF Slope:	February 17, 2023 Last Cal Date: Routine End time (MST): A9.40 ppm Cal Gas Exp Date: 49.40 ppm Rem Gas Exp Date: CC463851 A9.40 ppm A9.40 ppm Rem Gas Exp Date: NA Diff between cyl: Diff between cyl: Teledyne API 7700 Serial Number: Teledyne API 701H Serial Number: Start Finish 1.003075 1.008829 Start Finish 1.003075 1.008829 Backgd or Offset: Coeff or Slope: Dilution air flow rate Source gas flow rate Calculated (sccm) 0.0 0.0 4919 81.0 800.3 4959 40.5 400.2 4979 20.2 199.6 5000 0.0 0.0 4919 81.0 800.3 4959 40.5 400.2 4979 20.2 199.6 5000 0.0 0.0 4919 81.0 800.3	February 17, 2023 10:55 Routine Last Cal Date: January 16, 2023 End time (MST): 49.40 CC463851 49.40 NA ppm Cal Gas Exp Date: February 23, 2025 (CC463851 (A9.40) A9.40 NA ppm Rem Gas Exp Date: NA NA Diff between cyl: Serial Number: 2658 360 Teledyne API 700H Serial Number: 360 Start Finish 1.003075 Analyzer Information Thermo 43i 0 - 1000 ppb Analyzer Information Start Start 1.003829 Backgd or Offset: concentration (ppb) (Cc) 23.0 (ppb) (lc) SO2 Collibration Data Source gas flow rate concentration (ppb) (Cc) Indicated concentration O (ppb) (lc) S009 0.0 0.0 -0.3 4919 81.0 800.3 804.2 S000 0.0 0.0 -0.1 4919 81.0 800.3 806.6 4959 40.5 400.2 403.2 4919 81.0 800.3 806.6 4919 81.0 800.3 806.6 4959 40.5 400.2

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

Calibration Performed By:

Karan Pandit and Karina Fenwick

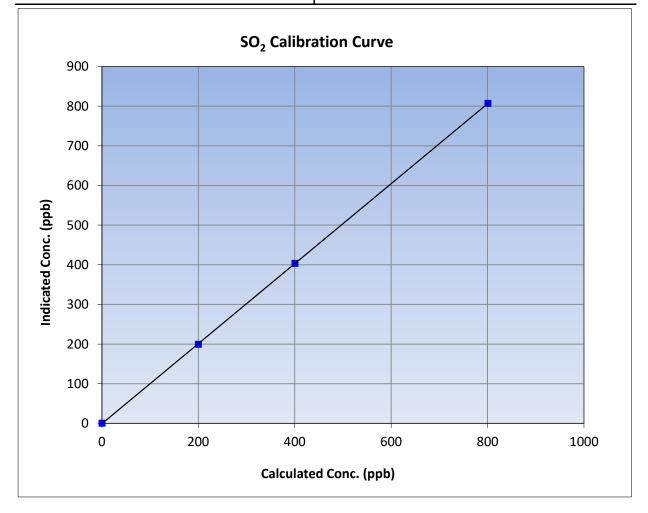


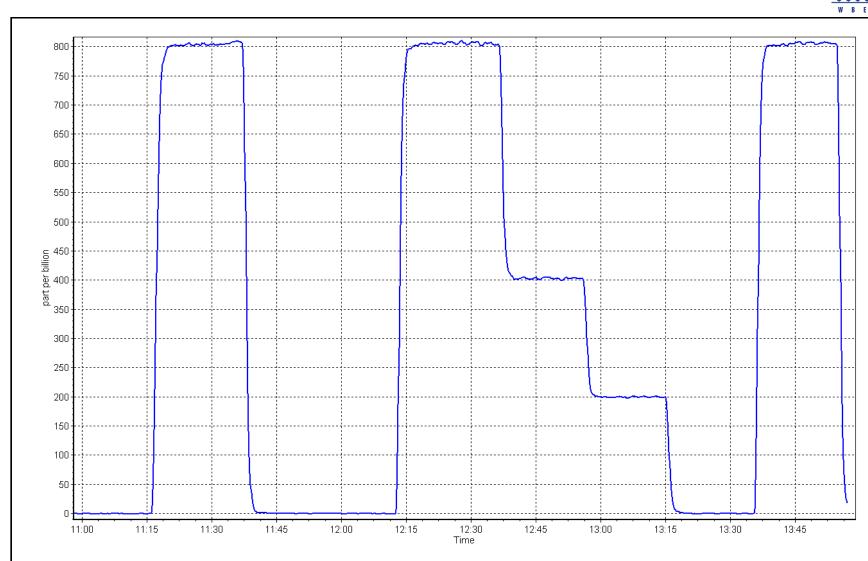
SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: February 17, 2023 **Previous Calibration:** January 16, 2023 Station Name: Stony Mountain Station Number: AMS 18 Start Time (MST): 10:55 End Time (MST): 13:59 Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

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	0.999993	≥0.995
800.3	806.6	0.9922	correlation coefficient	0.999995	20.333
400.2	403.2	0.9925	Slope	1.008829	0.90 - 1.10
199.6	199.2	1.0020	Slope		0.90 - 1.10
			Intercept	-0.882227	+/-30





Location: Stony Mountain



TRS Calibration Report

· · · · · ·		_			
WBEA					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain February 13, 2023 11:14 Routine		Station number: Last Cal Date: End time (MST):	AMS18 January 18, 2023 15:35	
		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:	0.989724	1.000870	Backgd or Offset:	2.55	2.63
Calibration intercept:	0.201244	0.161019	Coeff or Slope:	1.129	1.151
		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 Adjuste Correction facto (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	76.6	1.046
as found 2nd point	4964	36.5	40.0	38.1	1.052
as found 3rd point	4983	18.3	20.0	18.9	1.066
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb)	Indicated concentration (ppb) (Ic)	Correction facto (Cc/Ic)
calibrator zero	5000	0.0	(Cc) 0.0	0.2	Limit = 0.95-1.05
high point	4927	73.0	80.0	80.2	0.997
second point	4927	36.5	40.0	40.3	0.997
third point	4983	18.3	20.0	20.1	0.992
as left zero	5000	0.0	0.0	0.3	
as left span	4927	73.0	80.0	79.7	1.004
602 Scrubber Check	4923	73.0	771.0	-0.1	1.004
		17-Dec-21	//1.0	Ave Corr Factor	0.996
)ate of last scrubber cha		1, DCC 21		AVE CUTI FACIUI	efficiency
	ficiency test:				
Date of last scrubber cha Date of last converter eff Baseline Corr As found:		Prey response:	79 37	*% change:	
Date of last converter eff Baseline Corr As found:	76.5	Prev response:		*% change:	-3.8%
Date of last converter eff		Prev response: AF Slope: AF Correlation:	0.957571	*% change: AF Intercept:	

Notes:

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

Calibration Performed By:

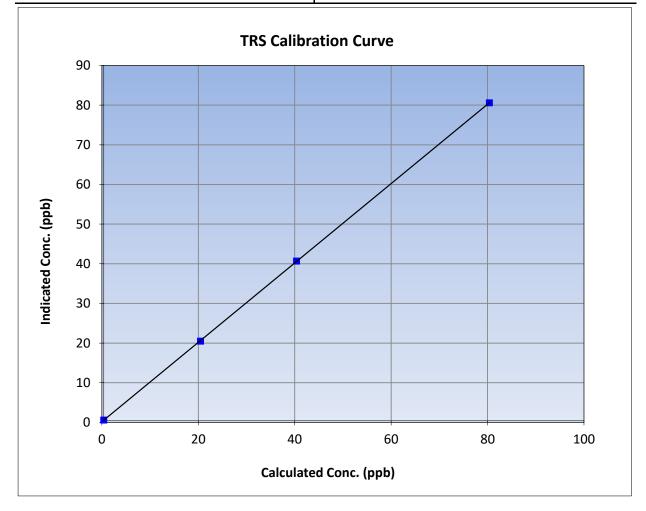


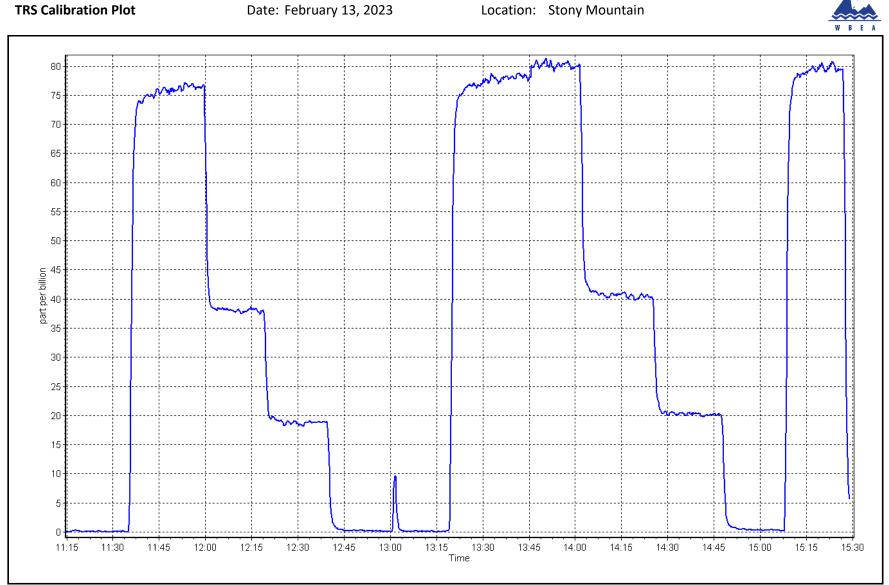
TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 13, 2023	Previous Calibration:	January 18, 2023				
Station Name:	Stony Mountain	Station Number:	AMS18				
Start Time (MST):	11:14	End Time (MST):	15:35				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359				

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evaluation		<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999991	≥0.995	
80.0	80.2	0.9974	correlation coefficient	0.999991	20.333	
40.0	40.3	0.9924	Slope	1.000870	0.90 - 1.10	
20.0	20.1	0.9974	Slope		0.90 - 1.10	
			- Intercept	0.161019	+/-3	









THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-202
			Station Information		
Station Name:	Stony Mountair	1	Station number: A	MS 18	
Calibration Date:	February 3, 202	3	Last Cal Date: Ja	anuary 16, 2023	
Start time (MST):	10:55		End time (MST): 1	2:43	
Reason:	Cylinder Change	5			
		(Calibration Standards		
Gas Cert Reference:	C	C463851	Cal Gas Expiry Date: Fo	ebruary 23, 202	5
CH4 Cal Gas Conc.	500.8	ppm	CH4 Equiv Conc.	1066.8	ppm
C3H8 Cal Gas Conc.	205.8	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry: N	A	
Removed CH4 Conc.	500.8	ppm	CH4 Equiv Conc.	1066.8	ppm
Removed C3H8 Conc.	205.8	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄):	:		Diff between cyl (NM):		
Calibrator Model:	Teledyne API T7	00	Serial Number: 2	658	
ZAG make/model:	Teledyne API T7	'01H	Serial Number: 3	60	
			Analyzer Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 1	180320039	
THC Range (ppm):	: 0 - 20 ppm				
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	Fi	nish	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	: 3.06E-04	3.0	6E-04 NMHC SP Ratio:	5.66E-05	5.66E-05
CH4 Retention time:	: 14.60	1	4.60 NMHC Peak Area:	162130	162130

THC Calibration Data						
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4919	81.0	17.28	17.22	1.004	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero						
high point						
second point						
third point						
as left zero	5000	0.0	0.00	0.00		
as left span	4919	81.0	17.28	17.23	1.003	
			Aver	age Correction Factor		
Baseline Corr AF:	17.22	Prev response	17.24	*% change	-0.2%	
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	0.00	0.00	
as found span	4919	81.0	9.17	9.10	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0	0.00	0.00	
as left span	4919	81	9.17	9.11	1.006
			Aver	age Correction Factor	
Baseline Corr AF:	9.10	Prev response	9.14	*% change	-0.4%
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
-					

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.0	8.11	8.11	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	8.11	8.12	0.999
			Aver	age Correction Factor	
Baseline Corr AF:	8.11	Prev response	8.10	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.998211			
THC Cal Offset:		-0.008790			
CH4 Cal Slope:		0.999750			
CH4 Cal Offset:		-0.013212			
NMHC Cal Slope:		0.996638			
NMHC Cal Offset:		0.005021			

Notes:

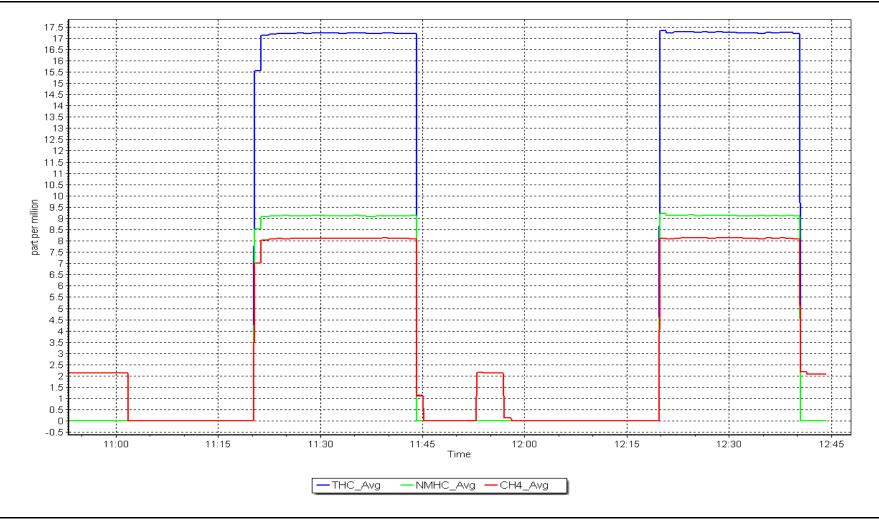
Changed the N2 cylinder after as founds.

Calibration Performed By:

Mohammed Kashif









THC / CH_4 / NMHC Calibration Report

Version-01-2020

ppm

ppm

	Station Information				
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain February 17, 2023 11:55 Routine		Station number: AMS 18 Last Cal Date: January 16, 2023 End time (MST): 13:59		
			Calibration Standards		
Gas Cert Reference:	(CC463851	Cal Gas Expiry Date: February 23, 2025		
CH4 Cal Gas Conc.	500.8	ppm	CH4 Equiv Conc. 1066.8		
C3H8 Cal Gas Conc.	205.8	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry: NA		
Removed CH4 Conc.	500.8	ppm	CH4 Equiv Conc. 1066.8		
Removed C3H8 Conc.	205.8	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄)	:		Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number: 2658		
ZAG make/model:	Teledyne API T701H		Serial Number: 360		

		Analyzer In	formation				
Analyzer make: Th THC Range (ppm): 0			Analyzer serial #: 11	.80320039			
•	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:	3.06E-04	3.06E-04	NMHC SP Ratio:	5.66E-05	5.66E-05		
CH4 Retention time:	14.60	14.60	NMHC Peak Area:	162130	162130		

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	81.0	17.28	17.31	0.998		
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	17.32	0.998		
second point	4959	40.5	8.64	8.65	0.999		
third point	4979	20.2	4.31	4.30	1.002		
as left zero	5000	0.0	0.00	0.00			
as left span	4919	81.0	17.28	17.32	0.998		
			ŀ	Average Correction Factor	1.000		
Baseline Corr AF:	17.31	Prev response	17.24	*% 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-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	4919	81.0	9.17	9.16	1.001	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0	0.00	0.00		
high point	4919	81.0	9.17	9.16	1.001	
second point	4959	40.5	4.58	4.60	0.997	
third point	4979	20.2	2.29	2.30	0.994	
as left zero	5000	0	0.00	0.00		
as left span	4919	81	9.17	9.17	1.000	
			/	Average Correction Factor	0.997	
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:		<pre>* => +/-5% change initiates investigation</pre>		

CH4	Cal	ibration	Data

			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	4919	81.0	8.11	8.15	0.995	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4919	81.0	8.11	8.17	0.994	
second point	4959	40.5	4.06	4.06	1.000	
third point	4979	20.2	2.02	2.00	1.012	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	81.0	8.11	8.15	0.995	
			A	verage Correction Factor	1.002	
Baseline Corr AF:	8.15	Prev response	8.10	*% change	0.7%	
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:		0.998211		1.002575		
THC Cal Offset:		-0.008790		-0.009777		
CH4 Cal Slope:		0.999750		1.007610		
CH4 Cal Offset:		-0.013212		-0.020602		
NMHC Cal Slope:		0.996638		0.998345		
NMHC Cal Offset:		0.005021		0.010426		

Notes:

Sample inlet filter and hydrogen cylinder changed after as founds. No adjustments were made

Calibration Performed By:

Karan Pandit and Karina Fenwick



THC Calibration Summary

Version-01-2020

		Station	nformation		Version-01-202	
			nformation			
Calibration Date:	,	17, 2023			uary 16, 2023	
Station Name: Stony M			Station Number:	AMS 18		
Start Time (MST): 11			End Time (MST): 13:59			
Analyzer make: The		no 55i	Analyzer serial #:	1180320039		
		Calibra	tion Data			
Calculated concentra (ppm) (Cc)	tion Indicated concentration (ppm) (Ic)	Correction tactor (Cc/lc)		Statistical Evaluation		
0.00	0.00		Correlation Coefficient	0.999998	≥0.995	
17.28	17.32	0.9978				
8.64 4.31	<u>8.65</u> 4.30	0.9988	Slope	1.002575	0.90 - 1.10	
		1.0024	Intercept	-0.009777	+/-0.5	
20.0 - 18.0 -						
18.0 -						
16.0 -						
14.0 -						
u 12.0 -						
1) 10.0 -						
- 12.0 - 10.0 - 8.0 - 6.0 - 6.0 -						
- 0.6 -						
4.0 -						
2.0 -						
0.0		-				
0.	.0 5	.0		15.0	20.0	
		Calculated	Conc. (ppm)			



CH₄ Calibration Summary

Version-01-2020

		Station	eformation		Version-01-20
			nformation		
Calibration Date:		, 17, 2023	Previous Calibration:	January :	
itation Name:		lountain	Station Number:	AMS 18	
itart Time (MST):		:55	End Time (MST): 13:59 Analyzer serial #: 118032003		
nalyzer make:	Therr	Thermo 55i		1180320039	
		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		Correlation Coefficient	0.999971	≥0.995
8.11	8.17	0.9936			
4.06	4.06	1.0005 1.0123	Slope	1.007610	0.90 - 1.10
			Intercept	-0.020602	+/-0.5
8.0 7.0 6.0					
Indicated Conc. (ppm) 4.0 3.0					
ndicate					
2.0 -					
1.0 —					
0.0 🚅 0.0	0 2.0	4.0	6.0	8.0	10.0



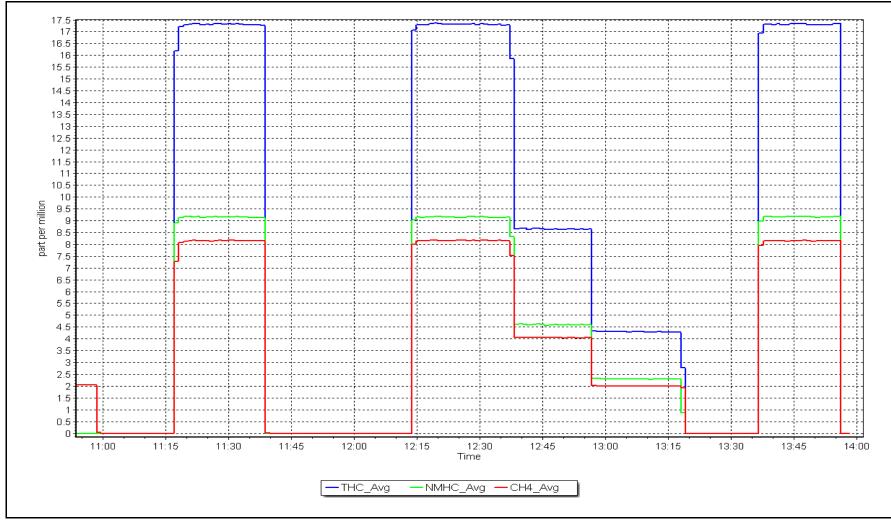
NMHC Calibration Summary

Version-01-2020

		Station	Information		
Calibration Date:	Febru	uary 17, 2023	Previous Calibration:	January 2	16, 2023
Station Name:	Stor	ny Mountain	Station Number:	AMS	5 18
Start Time (MST)	:	11:55	End Time (MST):	13:	59
Analyzer make:	TI	nermo 55i	Analyzer serial #:	11803	20039
		Calibra	ation Data		
Calculated concentra (ppm) (Cc)	ation Indicated concentrat (ppm) (Ic)	tion Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		- Correlation Coefficient	0.999993	≥0.995
9.17	9.16	<u> </u>			
4.58	2.30	0.9973	– Slope	0.998345	0.90 - 1.10
			- Intercept	0.010426	+/-0.5
9.0 - 8.0 - 7.0 -					
- 0.0 0.0 0.0					
5.0 -					
0 - 4.0 -					
110 - 3.0					
2.0 -		×			
1.0 -					
0.0					
	.0 2.0	0 4.0	6.0	8.0	10.0
		Calculate	d Conc. (ppm)		

NMHC Calibration Plot







Station Name:

Reason:

Calibration Date:

Start time (MST):

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Stony Mountain February 22, 2023 10:55 Routine

Station numb

Station number: AMS 18 Last Cal Date: January 24, 2023 End time (MST): 15:25

Calibration S	Standards
---------------	-----------

NO Gas Cylinder #:	T2XX7ME		Cal Gas Expiry Date:	January 14, 2024	
NOX Cal Gas Conc:	50.48	ppm	NO Cal Gas Conc:	49.22	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	50.48	ppm	Removed Gas NO Conc:	49.22	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	2658	
ZAG make/model:	Teledyne API 701H		Serial Number:	360	

Analy	vzer	Inform	ation

Analyzer make: ⁻ NOX Range (ppb): (Analyzer serial #: 13	36160088	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.043	1.043	NO bkgnd or offset:	2.9	2.9
NOX coeff or slope:	0.987	0.987	NOX bkgnd or offset:	2.9	2.9
NO2 coeff or slope:	0.999	0.999	Reaction cell Press:	218.6	222.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000554	1.002587
NO _x Cal Offset:	0.069933	0.289742
NO Cal Slope:	1.001394	1.003123
NO Cal Offset:	-0.829546	-0.910073
NO ₂ Cal Slope:	1.001873	0.999064
NO ₂ Cal Offset:	0.315702	0.020158



$NO_X \setminus NO \setminus NO_2$ 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	0.0	-0.1	0.0		
as found span	4919	81.3	820.8	800.3	20.5	824.5	801.4	23.2	0.9955	0.9986
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	822.9	802.1	20.9	0.9974	0.9977
second point	4959	40.7	410.9	400.7	10.3	412.9	401.2	11.8	0.9952	0.9987
third point	4980	20.3	204.9	199.8	5.1	205.6	198.2	7.4	0.9968	1.0082
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	388.1	432.7	826.3	390.3	436.0	0.9933	0.9943
							Average C	orrection Factor	0.9965	1.0015
Corrected As fo	ound NO _x =	824.5 ppb	NO =	801.5 ppb	* = > +/-5%	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	0.4%
Previous Respo	onse NO _x =	821.3 ppb	NO =	800.6 ppb				*Percent Chan	ge NO =	0.1%
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	ord 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 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)	802.7	390.5	432.7	432.4	1.0007	99.9%
2nd GPT point (200 ppb O3)	802.7	591.0	232.2	231.8	1.0017	99.8%
3rd GPT point (100 ppb O3)	802.7	697.5	125.7	125.6	1.0007	99.9%
				Average Correction Factor	1.0010	99.9%

Notes:

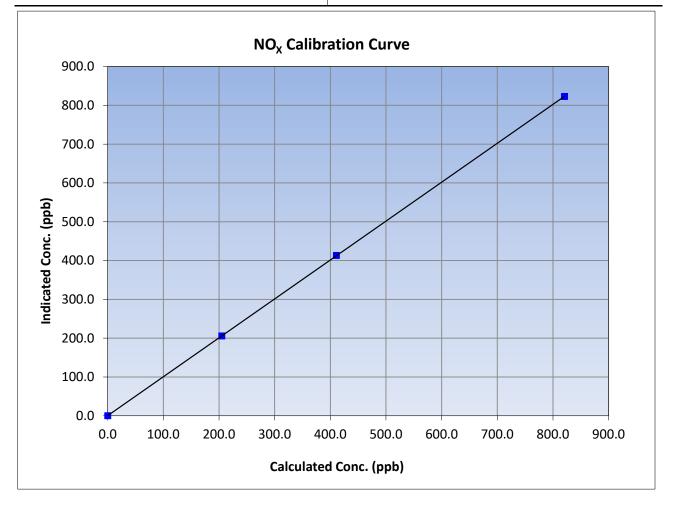
Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

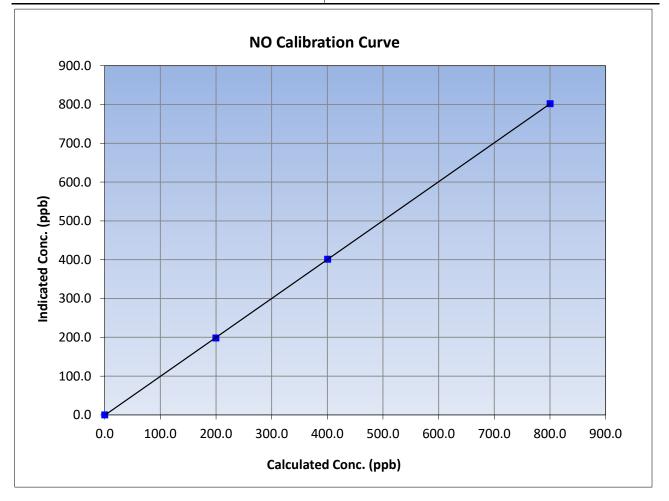
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	22, 2023	Previous Calibration:	January	24, 2023
Station Name:	Stony Mountain		Station Number:	AM	S 18
Start Time (MST):	10:55		End Time (MST):	15	:25
Analyzer make:	Thermo 42i		Analyzer serial #: 1336		5160088
		Calibra	ation Data		
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
820.8	822.9	0.9974	correlation coernelent	0.9999999	20.995
410.9	412.9	0.9952	Clana	1.002587	0.90 - 1.10
204.9	205.6	0.9968	Slope	1.002587	0.90 - 1.10
			Intercept	0.289742	+/-20





NO Calibration Summary

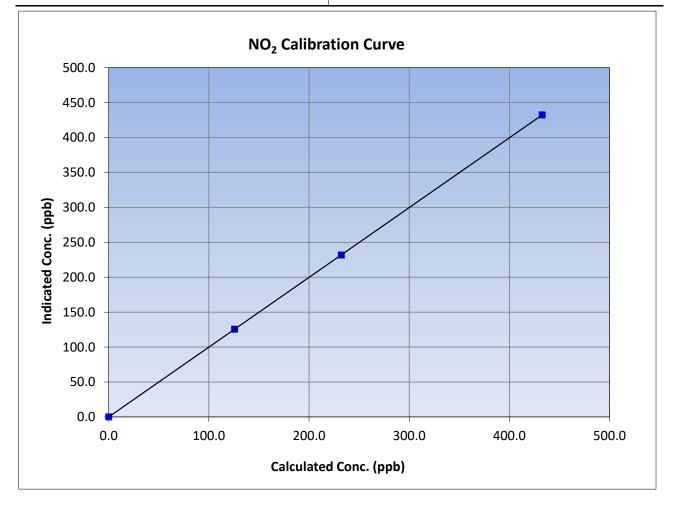
WBEA					Version-04-2
		Station	Information		
Calibration Date:	February	22, 2023	Previous Calibration: January 2		24, 2023
Station Name:	Stony N	Iountain	Station Number:	AM	S 18
Start Time (MST):	10	:55	End Time (MST):	15	:25
Analyzer make:	Thermo 42i		Analyzer serial #:	13361	60088
		Calibra	ation 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	0.999992	≥0.995
800.3	802.1	0.9977	correlation coernelent	0.555552	20.333
400.7	401.2	0.9987	Slope	1.003123	0.90 - 1.10
199.8	198.2	1.0082	Slope	1.005125	0.90 - 1.10
			Intercept	-0.910073	+/-20

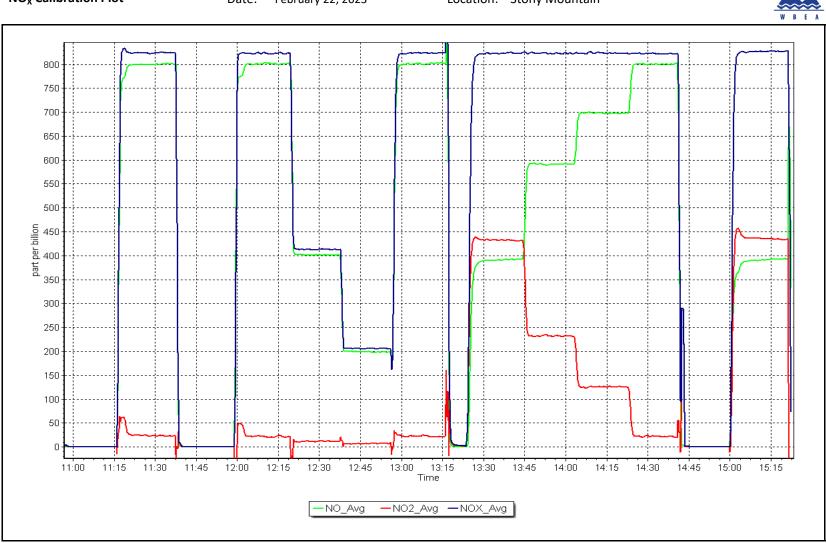




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	February	February 22, 2023		January	24, 2023
Station Name:	Stony Mountain		Station Number:	AM	S 18
Start Time (MST):	10:55		End Time (MST):	15	:25
Analyzer make:	Therr	no 42i	Analyzer serial #:	13361	60088
		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
432.7	432.4	1.0007	Correlation Coefficient	0.9999999	20.995
232.2	231.8	1.0017	Slope	0.999064	0.90 - 1.10
125.7	125.6	1.0007	Sibpe	0.999004	0.90 - 1.10
			Intercept	0.020158	+/-20







O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain February 15, 2023 10:34 Routine		Station number: Last Cal Date: End time (MST):	January 9, 2023	
		Calibration St	andards		
O3 generation mode:	Photometer				
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658	
ZAG Make/Model:	Teledyne API T701H		Serial Number:	360	
		Analyzer Info	rmation		
Analyzer make:	API T400		Analyzer serial #:	825	
Analyzer Range	e 0 - 500 ppb				
	Start	Finish		Start	Finish
Calibration slope:	0.993114	1.001514	Backgd or Offset:	1.000	1.000
Calibration intercept:	-0.320000	-0.040000	Coeff or Slope:	0.976	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, Limit = 0.95-1.05
as found zero	5000	800.0	0.0	-0.3	
as found zero as found span	5000 4888	800.0 1096.9	0.0 400.0	-0.3 395.5	 1.011
as found span					
as found span as found 2nd point					
as found span as found 2nd point as found 3rd point	4888	1096.9	400.0	-0.2 400.4	1.011
as found span as found 2nd point as found 3rd point calibrator zero	4888 5000	1096.9 800.0	400.0 0.0	-0.2	
as found span as found 2nd point as found 3rd point calibrator zero high point	4888 5000 4888	1096.9 800.0 1101.7 863.9 741.4	400.0 0.0 400.0	-0.2 400.4	1.011 0.999
as found span as found 2nd point as found 3rd point calibrator zero high point second point	4888 5000 4888 4888	1096.9 800.0 1101.7 863.9 741.4 800.0	400.0 0.0 400.0 200.0	-0.2 400.4 200.6 100.1 0.2	1.011 0.999 0.997
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point	4888 5000 4888 4888 4888	1096.9 800.0 1101.7 863.9 741.4	400.0 0.0 400.0 200.0 100.0	-0.2 400.4 200.6 100.1	1.011 0.999 0.997 0.999
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	4888 5000 4888 4888 4888 5000	1096.9 800.0 1101.7 863.9 741.4 800.0	400.0 0.0 400.0 200.0 100.0 0.0 400.0	-0.2 400.4 200.6 100.1 0.2	1.011 0.999 0.997 0.999
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	4888 5000 4888 4888 4888 5000	1096.9 800.0 1101.7 863.9 741.4 800.0	400.0 0.0 400.0 200.0 100.0 0.0 400.0	-0.2 400.4 200.6 100.1 0.2 402.7	1.011 0.999 0.997 0.999 0.993
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:	4888 5000 4888 4888 4888 5000 4812	1096.9 800.0 1101.7 863.9 741.4 800.0 1097.9 Previous response	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	395.5 -0.2 400.4 200.6 100.1 0.2 402.7 ge Correction Factor *% change	1.011 0.999 0.997 0.999 0.993 0.998
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	4888 5000 4888 4888 4888 5000 4812 395.8	1096.9 800.0 1101.7 863.9 741.4 800.0 1097.9	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	-0.2 400.4 200.6 100.1 0.2 402.7 ge Correction Factor	1.011 0.999 0.997 0.999 0.993 0.998

Notes:

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

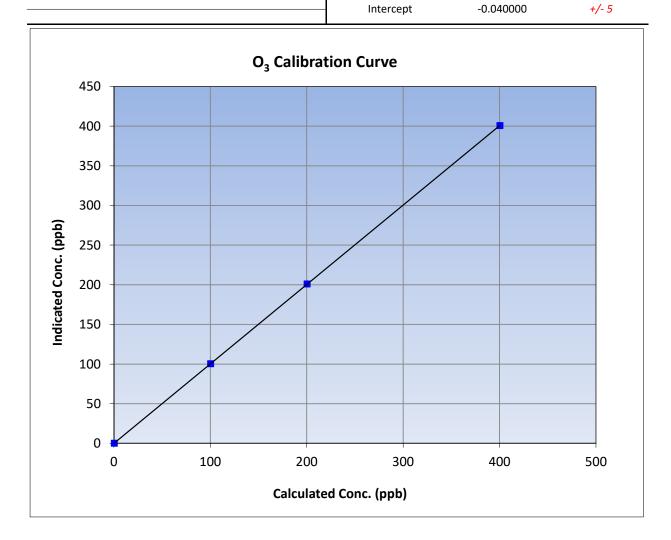
Calibration Performed By:

Karan Pandit



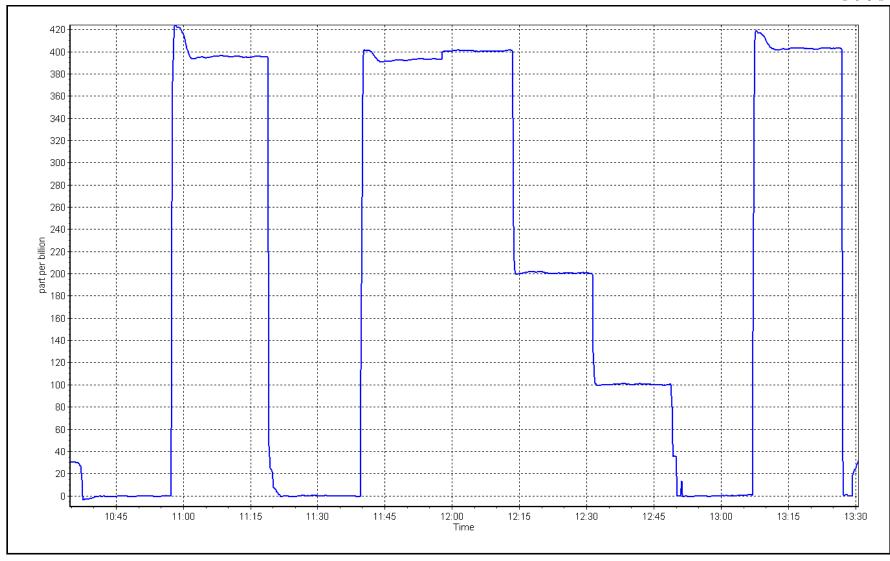
O₃ Calibration Summary

WBEA					
		Station	Information		
Calibration Date:	February 15, 2023		Previous Calibration:	January	y 9, 2023
station Name:	Stony Mo	Stony Mountain		AM	1518
itart Time (MST):	10:34		End Time (MST):	13	3:34
Analyzer make: API T400		00	Analyzer serial #:	8	25
		Calibr	ration Data		
Calculated concentration Ir (ppb) (Cc)	ndicated concentration (ppb) (Ic)	Calib Correction factor (Cc/Ic)	ration Data Statistical Evalua	ation	<u>Limits</u>
		Correction factor	Statistical Evalua		
(ppb) (Cc)	(ppb) (Ic)	Correction factor (Cc/Ic)		ation 0.999998	<u>Limits</u> ≥0.995
0.0	(ppb) (Ic) -0.2	Correction factor (Cc/Ic)	Statistical Evalua		











T640 PM_{2.5} CALIBRATION

W B E A						Version-01-2023
		Station Information	n			
Station Name:	Stony Mountain		Station number:			
Calibration Date:	February 24, 2023			January 24, 202	23	
Start time (MST):	12:02		End time (MST):	12:24		
Analyzer Make:	API T640		S/N:	1335		
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>	Measured	<u>As left</u>	Ad	<u>justed</u>	(Limits)
т (°С)	-17.9	-18.3	-17.9			+/- 2 °C
P (mmHg)	698.8	699.6	698.8			+/- 10 mmHg
flow (LPM)	5.02	4.98	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	February 24, 2023	Last Cal Date:	January 24, 2	2023	
	PM w/o HEPA:		PM w/ HEPA:	0.0		<0.2 ug/m3
Note: this leak check will be	completed before the	e quarterly work and will s	serve as the pre ma	intenance leak o	check	
		Quarterly Calibration	Test			
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	Ad	<u>justed</u>	(Limits)
PMT Peak Test						11.3 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham		November 1				<0.2 ug/m3
Disposable Filte	r Changed:	November 1	6, 2022			
		Annual Maintenanc	æ			
Date Sample Tul		August 30,				
Date RH/T Sense	or Cleaned:	August 30,	2022			
					<u> </u>	
Notes:	No a	djustments made to tempe	rature, pressure or fl	ow. Leak check p	assed.	

Calibration by:

Karan Pandit



CO Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain February 24, 2023 11:05 Routine		Station number: Last Cal Date: End time (MST):	AMS 18 January 6, 2023 13:53	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	3,050 ALM063503	ppm	Cal Gas Exp Date:	December 1, 2028	
Removed Cal Gas Conc:	3,050	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA Taladara ADI T700		Diff between cyl:	2650	
Calibrator Make/Model: ZAG Make/Model:	Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:	2658 360	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	3504	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	Finish
Calibration slope:	1.018233	0.997892	Backgd or Offset:	-0.009	-0.009
Calibration intercept:	0.009764	0.161801	Coeff or Slope:	0.916	0.904
		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/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4933	66.7	40.7	41.7	0.976
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4933	66.7	40.7	40.7	1.000
second point	4966	33.3	20.3	20.6	0.985
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	41.0	0.993
			Avera	ge Correction Factor	0.992
Baseline Corr As found:	41.59	Prev response:		*% change:	0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			
				* = > +/-5% change initiate	and the second second second

Notes:

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

Calibration Performed By:

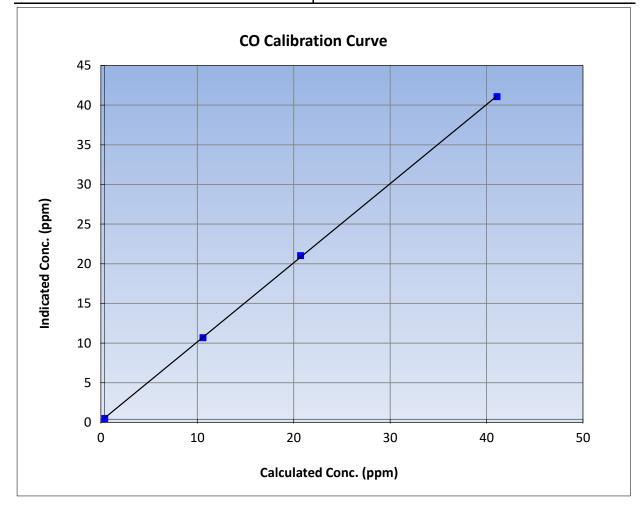


CO Calibration Summary

W B E A			Version-01-2020			
Station Information						
Calibration Date:	February 24, 2023	Previous Calibration:	January 6, 2023			
Station Name:	Stony Mountain	Station Number:	AMS 18			
Start Time (MST):	11:05	End Time (MST):	13:53			
Analyzer make:	API T300	Analyzer serial #:	3504			

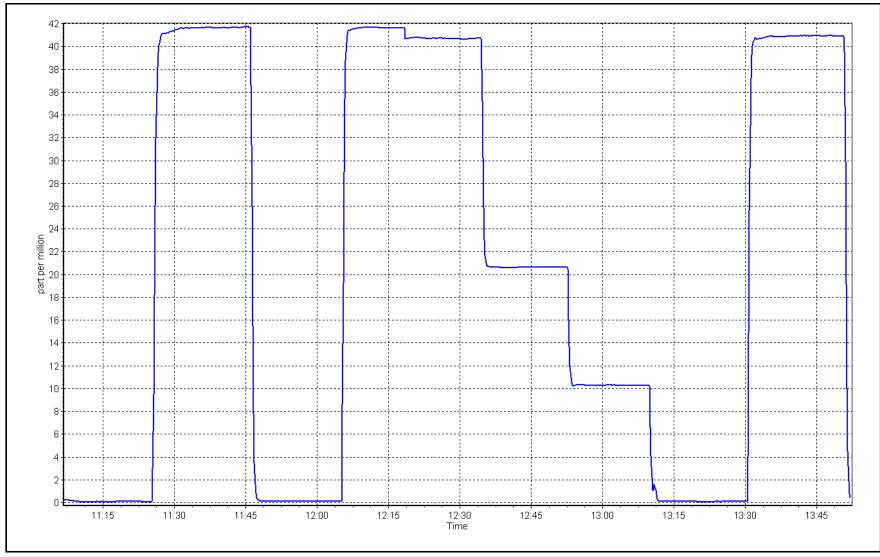
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999943	≥0.995
40.7	40.7	1.0002	correlation coefficient	0.999945	20.335
20.3	20.6	0.9848	Slope	0.997892	0.90 - 1.10
10.2	10.3	0.9910	Slope	0.997892	0.30 - 1.10
			Intercept	0.161801	+/-1.5











CO₂ Calibration Report

Version-01-2020

					Version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain February 8, 2023 11:15 Maintenance		Station number: Last Cal Date: End time (MST):	AMS 18 January 12, 2023 16:07	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	60,220 ALM063503	ppm	Cal Gas Exp Date:	December 1, 2026	
Removed Cal Gas Conc: Removed Gas Cyl #:	60,220 NA	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: N2 Gen Make/Model:	Teledyne API T700 Peak Scientific		Serial Number: Serial Number:	2658 771048317	
		Analyzer Info	rmation		
Analyzer make Analyzer Range	: API T360 e 0 - 2,000 ppm		Analyzer serial #:	283	
Calibration slope: Calibration intercept:	<u>Start</u> 1.000425 5.520000	<u>Finish</u> 0.999561 1.700000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> -0.059 1.066
		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/I Limit = 0.95-1.05
as found zero	3000	0.0	0.0	1.7	
as found span	2930	80.0	1600.5	1583.5	1.011
as found 2nd point	2970	40.0	800.3	803.8	0.996
as found 3rd point	2990	20.0	400.1	401.8	0.996
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.1	
high point	2930	80.0	1600.5	1598.4	1.001
second point	2970	40.0	800.3	809.2	0.989
third point	2990	20.0	400.1	399.0	1.003
as left zero	3000	0.0	0.0	-0.3	
as left span	2930	80.0	1600.5	1606.2	0.996
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	1581.80	Prev response:		*% change:	-1.6%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	802.1 400.1	AF Slope: AF Correlation:		AF Intercept:	5.800000
				* = > +/-5% change initiat	es investigation

Sample pump started to fail. Completed multipoint as founds. Changed the pump and sample inlet filter. Adjusted the zero only.

Calibration Performed By:

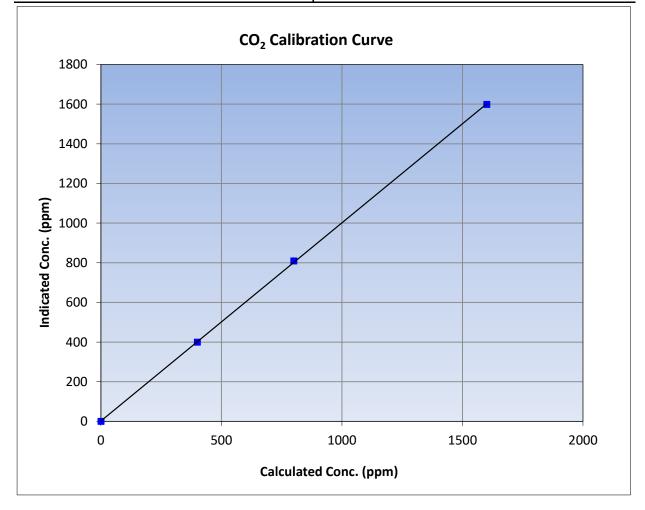
Karan Pandit and Karina Fenwick



CO₂ Calibration Summary

W B E A			Version-01-2020
	St	ation Information	
Calibration Date	February 8, 2023	Previous Calibration	January 12, 2023
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:15	End Time (MST)	16:07
Analyzer make	API T360	Analyzer serial #	283
		Calibration Data	
Calculated concentration Indica	ated concentration Correction fa	actor Statistical Evaluation	<u>Limits</u>

(ppm) (Cc)	(ppm) (lc)	(Cc/Ic)			
 0.0	-0.1		Correlation Coefficient	0.999945	≥0.995
1600.5	1598.4	1.0013	correlation coefficient	0.999943	20.335
800.3	809.2	0.9890	Slope	0.999561	0.90 - 1.10
400.1	399.0	1.0028	310pe	0.999901	0.90 - 1.10
			Intercept	1.700000	+/-10
			intercept	1.700000	17-10







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS19 FIREBAG FEBRUARY 2023

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

March 31, 2023







SO₂ Calibration Report

Version-01-2020

Firebag		Station number:	ANAC 10	
February 7, 2023 11:41 Routine		Last Cal Date: End time (MST):	AMS 19 January 26, 2023 14:46	
	Calibration St	andards		
49.29	ppm	Cal Gas Exp Date:	February 23, 2025	
	nnm	Bom Cas Eve Data		
49.29	ppm	-		
ΔΡΙ Τ700			1607	
//////		Schull Humber.	1110	
	Analyzer Info	rmation		
Thermo 43i 0 - 1000 ppb		Analyzer serial #:	1410661308	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
0.997774	0.998105	Backgd or Offset:	10.2	10.3
-0.381080	-0.121714	Coeff or Slope:	0.987	0.987
	SO ₂ Calibratio	on Data		
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
4999	0.0	0.0	-0.5	
4919	81.1	799.5	796.6	1.004
	81.1			1.002
4959	40.6	400.3	399.6	1.002
				1.002
4919	81.1			1.003
		Averag	ge Correction Factor	1.002
797.10	Previous response	797.31	*% change	0.0%
NA	AF Slope:		AF Intercept:	
NA	AF Correlation:			
	49.29 CC716618 49.29 API T700 API T701 Thermo 43i 0 - 1000 ppb <u>Start</u> 0.997774 -0.381080 Dilution air flow rate (sccm) 4999 4919 4919 4919 4959 4959 4980 4959 4980 4999 4919 797.10 NA	Calibration St 49.29 ppm CC716618 ppm 49.29 ppm API T700 API T701 API T701 Analyzer Information St API T701 Start Finish 0.997774 0.998105 -0.381080 -0.121714 SO2 Calibration Dilution air flow rate (sccm) Source gas flow rate (sccm) 4999 0.0 4919 81.1 4999 0.0 4919 81.1 4999 0.0 4919 81.1 4999 0.0 4919 81.1 4959 40.6 4999 0.0 4919 81.1 4959 40.6 4999 0.0 4919 81.1 4959 40.6 4999 0.0 4919 81.1 4959 40.6 4959 40.6 4959 40.6	Calibration Standards 49.29 ppm Cal Gas Exp Date: CC716618 49.29 ppm Rem Gas Exp Date: API 7700 Serial Number: Diff between cyl: API T701 Serial Number: Analyzer Information Analyzer serial #: 0.1000 ppb Analyzer serial #: Start Finish 0.997774 0.998105 Backgd or Offset: Coeff or Slope: Dilution air flow rate Source gas flow rate Calculated (sccm) 0.0 0.0 4999 0.0 0.0 4999 0.0 0.0 4999 0.0 0.0 4999 0.0 0.0 4999 0.0 0.0	Calibration Standards 49.29 ppm Cal Gas Exp Date: February 23, 2025 CC716618 49.29 ppm Rem Gas Exp Date: Diff between cyl: API T700 Serial Number: 1607 API T701 Serial Number: 1118 Analyzer Information Thermo 43i Analyzer Information Start Finish Start 0.997774 0.998105 Backgd or Offset: 10.2 -0.381080 -0.121714 Coeff or Slope: 0.987 Dillution air flow rate Source gas flow rate Calculated Indicated concentration of (sccm) 4999 0.0 0.0 -0.5 4919 81.1 799.5 796.6 4999 0.0 0.0 -0.3 399.6 4980 20.3 200.1 199.7 4999 0.0 0.0 -0.2 4919 81.1 799.5 797.3 4999 0.0 0.0 -0.0

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

Calibration Performed By:

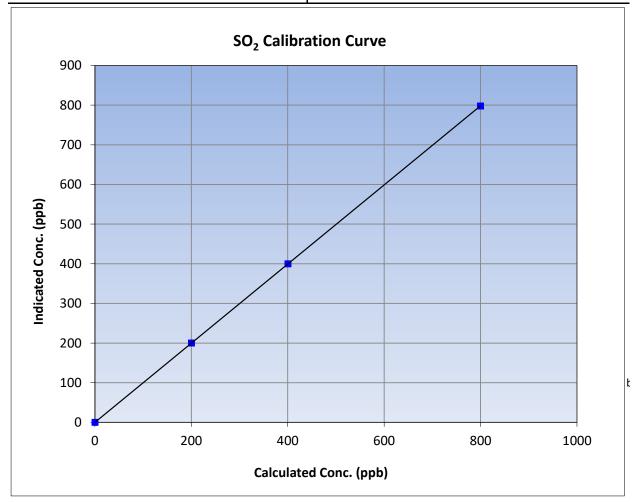
Braiden Boutilier



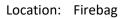
SO₂ Calibration Summary

Previous Calibration:	January 26, 2023
Station Number:	AMS 19
End Time (MST):	14:46
Analyzer serial #:	1410661308
	Station Number: End Time (MST):

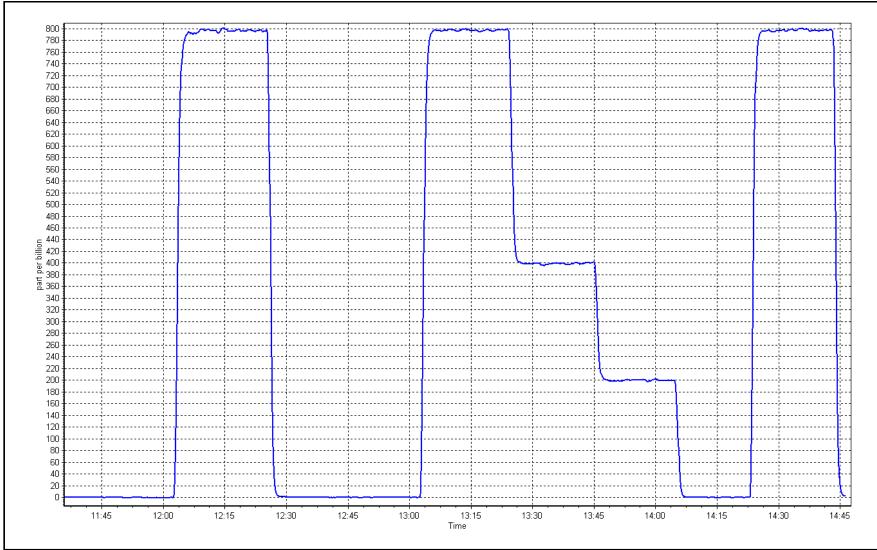
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.3		Correlation Coefficient	1.000000	≥0.995
799.5	797.7	1.0022	correlation coefficient	1.000000	20.333
400.3	399.6	1.0017	Slope	0.998105	0.90 - 1.10
200.1	199.7	1.0020	Siope	0.998105	
			Intercept	-0.121714	+/-30













H₂S Calibration Report

WBEA					\/
		Station Info	rmation		Version-11-2
Station Name: Calibration Date: Start time (MST): Reason:	Firebag February 6, 2023 11:02 Routine	Station mo	Station number: Last Cal Date: End time (MST):	AMS19 January 18, 2023 15:18	
		Calibration S	tandards		
Cal Gas Concentration:	5.114	ppm	Cal Gas Exp Date:	February 5, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	•	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	1607	
ZAG Make/Model:	Teledyne API T701		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: Calibration intercept:	0.998910 0.058437	0.997909 0.118481	Backgd or Offset: Coeff or Slope:	2.88 0.955	2.96 0.979
		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 Adjuste Correction facto (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	78.2	1.024
as found 2nd point	4961	39.1	40.0	39.0	1.028
as found 3rd point	4980	19.6	20.0	19.5	1.033
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/lc) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4922	78.2	80.0	79.9	1.001
second point	4961	39.1	40.0	40.1	0.997
third point	4980	19.6	20.0	20.1	0.997
as left zero	5000	0.0	0.0	0.2	
as left span	4922	78.2	80.0	79.8	1.002
SO2 Scrubber Check	4922	78.3	800.2	0.0	
Date of last scrubber cha		December 9, 2021		Ave Corr Factor	0.999
Date of last converter eff	-	n/a			efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt:	78.1 38.9	Prev response: AF Slope:	0.977040	*% change: AF Intercept:	-2.4% -0.001035
Baseline Corr 3rd AF pt:	19.4	AF Correlation:	0.999992		

SOx scrubber check done after calibrator zero. Adjusted span. Changed sample inlet filter after MPAF's.

Calibration Performed By:

Notes:

Braiden Boutilier

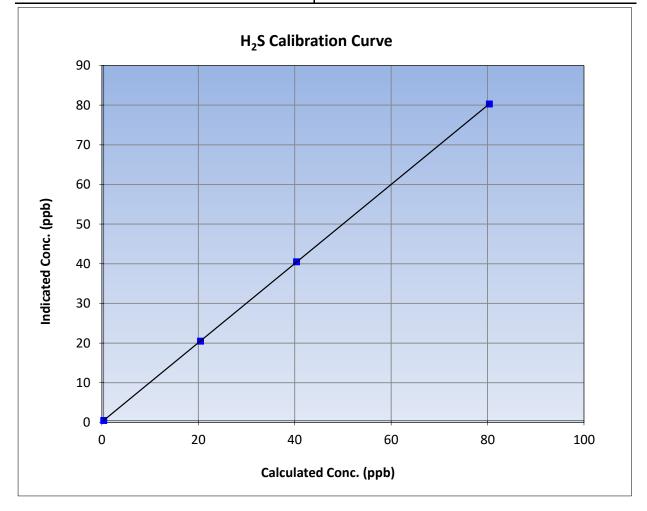


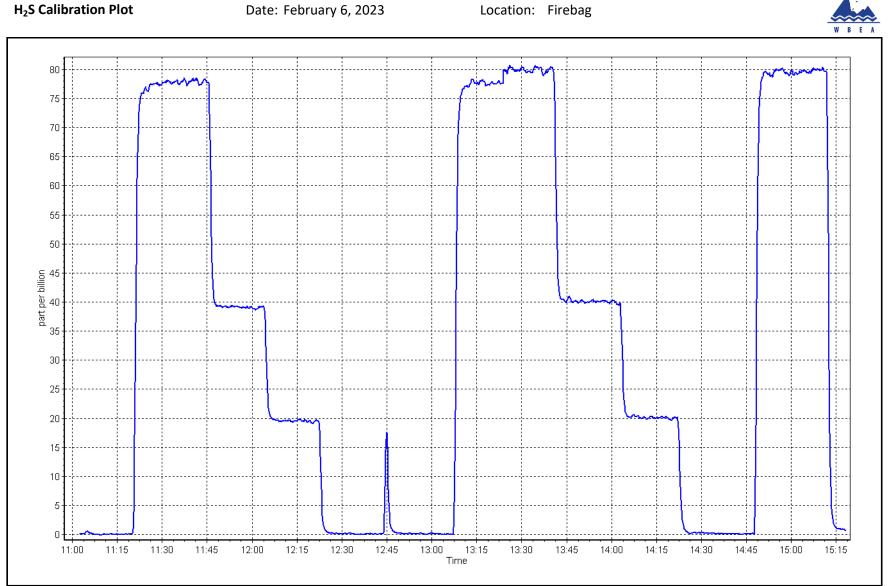
H₂S Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	February 6, 2023	Previous Calibration:	January 18, 2023
Station Name:	Firebag	Station Number:	AMS19
Start Time (MST):	11:02	End Time (MST):	15:18
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1336160090

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999998	≥0.995
80.0	79.9	1.0010	correlation coefficient	0.999998	20.335
40.0	40.1	0.9973	Slope	0.997909	0.90 - 1.10
20.0	20.1	0.9974	Slope	0.997909	0.90 - 1.10
			Intercept	0.118481	+/-3







THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag February 7, 2023 11:41 Routine		Station number: Last Cal Date: End time (MST):	AMS 19 January 26, 2023 14:46	
		Calibration S	tandards		
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	, mary zer min	Analyzer serial #:	1336160089	
Calibration slope: Calibration intercept:	<u>Start</u> 1.001270 -0.051562	<u>Finish</u> 0.986792 0.033117	Background: Coefficient:		<u>Finish</u> 2.11 3.748
		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	-0.12	
as found span	4919	81.1	17.31	17.18	1.007
as found 2nd point as found 3rd point					
new cylinder response	4000	0.0	0.00	0.00	
calibrator zero	4999	0.0	0.00	0.08	
high point second point	4919 4959	81.1 40.6	<u> </u>	17.14 8.54	1.010 1.015
third point	4959 4980	20.3	4.33	4.27	1.015
as left zero	5000	0.0	0.00	0.05	
as left span	4919	81.1	17.31	17.29	1.001
		01.1		ge Correction Factor	
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	17.30 NA NA	Previous response AF Slope: AF Correlation:	17.28	*% change AF Intercept:	0.1%
				* = > +/-5% change initia	tes investigation

Changed sample inlet filter after as founds. Adjusted zero.

Calibration Performed By:

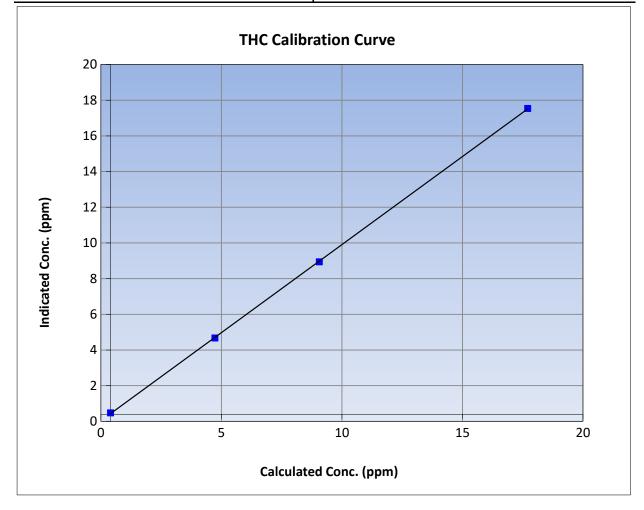


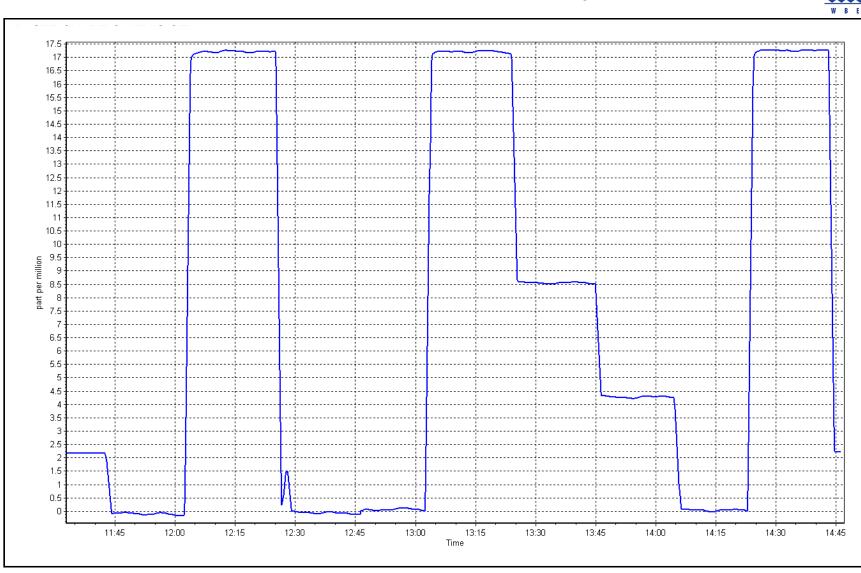
THC Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	February 7, 2023	Previous Calibration:	January 26, 2023
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:41	End Time (MST):	14:46
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>	
0.00	0.08		Correlation Coefficient	0.999961	≥0.995
17.31	17.14	1.0096	correlation coefficient	0.999901	20.333
8.66	8.54	1.0145	Slope	0.986792	0.90 - 1.10
4.33	4.27	1.0139	510pe	0.980792	0.90 - 1.10
			Intercept	0.033117	+/-1.5





THC Calibration Plot

Date: February 7, 2023

Location: Firebag



NO₂ Cal Slope:

NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		9	Station Information		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag February 8, 2023 10:48 Routine		Station number: Last Cal Date: End time (MST):	January 19, 2023	
		C	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: NOX gas Diff:	51.12	ppm	Removed Gas NO Conc: NO gas Diff:	49.40	ppm
Calibrator Model:	Teledyne API T700		Serial Number:	1607	
ZAG make/model:	Teledyne API T701		Serial Number:	1118	
Analyzer make: NOX Range (ppb):	0 - 1000 ppb		nalyzer Information Analyzer serial #:		Finish
NO coeff or slope:	<u>Start</u> 1.041	<u>Fin</u>	NO bkgnd or offset:	<u>Start</u> 7.2	<u>Finish</u> 7.3
NOX coeff or slope:			NOX bkgnd or offset:	7.2	7.3
NO2 coeff or slope:			Reaction cell Press:	207.8	210.9
		C	alibration Statistics		
		Ste	art	Finish	
NO _x Cal Slope:			 0896	0.997423	
NO _x Cal Offset:		0.57	4492	0.135510	
NO Cal Slope:			1188	0.998470	
NO Cal Offset:			7030	-0.351682	

1.003489

-1.311603

0.999864

-0.568980



$NO_X \setminus NO \setminus NO_2$ 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	4999	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as found span	4919	81.0	828.1	800.3	27.9	830.0	799.7	30.7	0.9978	1.0007
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
high point	4919	81.0	828.1	800.3	27.9	826.0	798.8	27.4	1.0026	1.0019
second point	4960	40.5	414.0	400.1	13.9	413.4	399.1	14.3	1.0015	1.0025
third point	4980	20.2	206.5	199.6	6.9	206.1	198.6	7.6	1.0020	1.0049
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	359.5	468.7	819.0	350.5	468.8	1.0112	1.0256
							Average C	orrection Factor	1.0020	1.0031
Corrected As fo	ound NO _x =	830.1 ppb	NO =	799.9 ppb	* = > +/-59	% change initiates i	investigation	*Percent Chang	ge NO _x =	1.1%
Previous Respo	nse NO _x =	821.2 ppb	NO =	793.3 ppb				*Percent Chang	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)	791.4	350.6	468.7	468.4	1.0006	99.9%
2nd GPT point (200 ppb O3)	791.4	570.2	249.1	248.2	1.0035	99.7%
3rd GPT point (100 ppb O3)	791.4	680.6	138.7	137.3	1.0099	99.0%
			ŀ	Average Correction Factor	1.0047	99.5%

Notes:

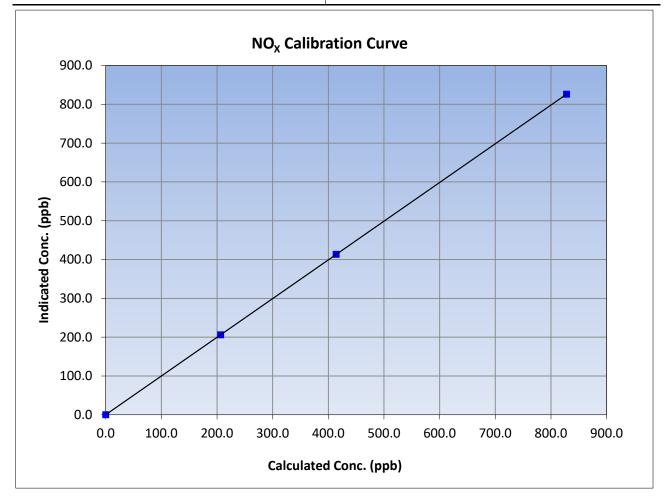
No adjustments made. Changed sample inlet filter after as founds.

Calibration Performed By:



NO_x Calibration Summary

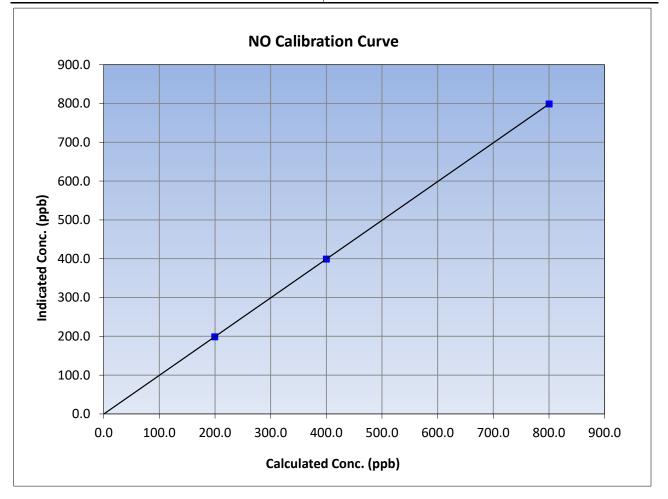
WBEA					Version-04-202
		Station	Information		
Calibration Date:	Februar	y 8, 2023	Previous Calibration:	January	19, 2023
Station Name:	Fire	ebag	Station Number:	AM	S 19
Start Time (MST):	10	:48	End Time (MST):	15	:35
Analyzer make:	Therr	Thermo 42i Analyzer serial #: 14106			
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	1.000000	≥0.995
828.1	826.0	1.0026	correlation coefficient	1.000000	20.333
414.0	413.4	1.0015	Slope	0.997423	0.90 - 1.10
206.5	206.1	1.0020	Slope	0.997425	0.90 - 1.10
			Intercept	0.135510	+/-20





NO Calibration Summary

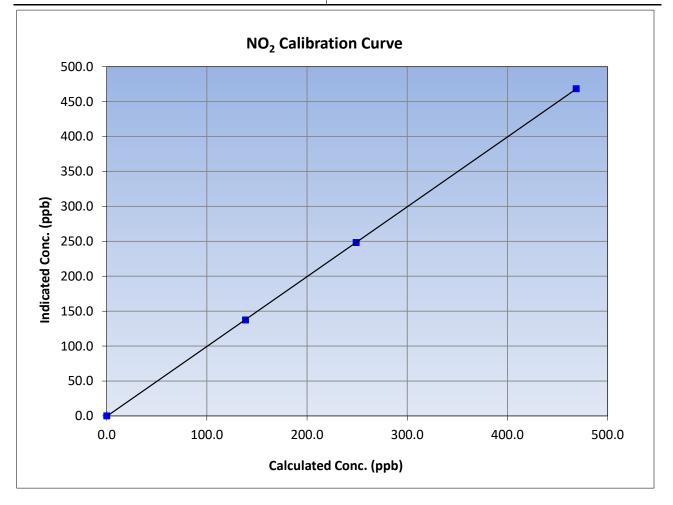
WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	y 8, 2023	Previous Calibration:	January	19, 2023
Station Name:	Fire	ebag	Station Number:	AM	S 19
Start Time (MST):	10	:48	End Time (MST):	15	:35
Analyzer make:	Thermo 42i		Analyzer serial #:	14106	61309
		Calibra	ation Data		
Calculated 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
800.3	798.8	1.0019	correlation coernelent	1.000000	20.333
400.1	399.1	1.0025	Clana	0.998470	0.90 - 1.10
199.6	198.6	1.0049	Slope	0.998470	0.90 - 1.10
			Intercept	-0.351682	+/-20

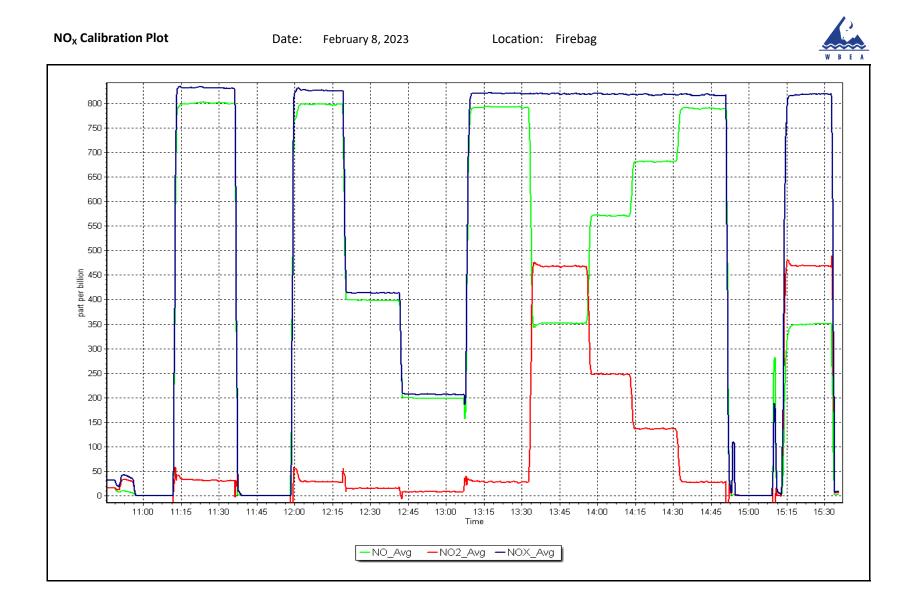




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	Februar	y 8, 2023	Previous Calibration:	January	19, 2023
Station Name:	Fire	ebag	Station Number:	AM	S 19
Start Time (MST):	10	:48	End Time (MST):	15	:35
Analyzer make:	Therr	mo 42i	Analyzer serial #:	14106	61309
		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
468.7	468.4	1.0006	correlation coefficient	0.999909	20.995
249.1	248.2	1.0035	Slope	0.999864	0.90 - 1.10
138.7	137.3	1.0099	Slope	0.999804	0.90 - 1.10
			Intercept	-0.568980	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS20 MACKAY RIVER FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River February 1, 2023 10:09 Routine		Station number: Last Cal Date: End time (MST):	AMS20 January 17, 2023 13:52	
		Calibration St	andards		
Cal Gas Concentration:	49.22	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 #: Calibrator Make/Model:	<u>NA</u> Teledyne API T700		Diff between cyl: Serial Number:	1220	
ZAG Make/Model:	Teledyne API 700		Serial Number:	4522	
				1322	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1501301450	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.993569	0.999451	Backgd or Offset:	18.6	18.6
Calibration intercept:	3.910928	2.850831	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/lc Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.4	
as found span	4919	81.3	800.3	797.8	1.003
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	801.4	0.999
second point	4959	40.7	400.7	404.1	0.992
third point	4980	20.3	199.8	206.1	0.970
as left zero	5000	0.0	0.0	0.1	
as left span	4919	81.3	800.3 Averae	804.8 ge Correction Factor	0.994 0.987
	700.00			÷	
Baseline Corr As found:	798.20	Previous response		*% change	-0.1%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:			

Notes:

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

Calibration Performed By:

Mohammed Kashif

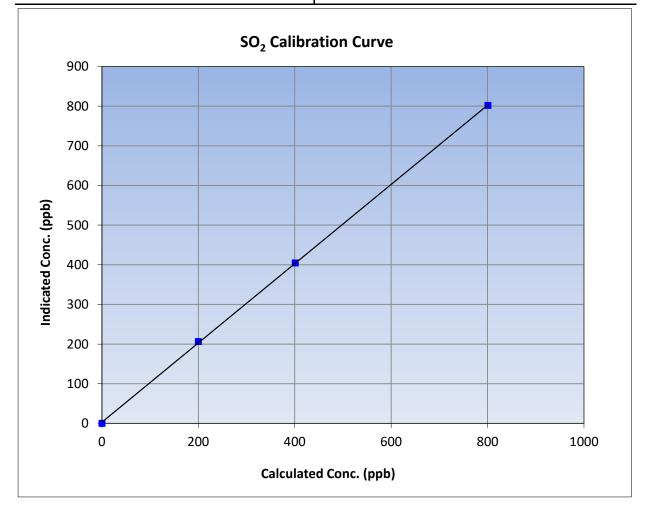


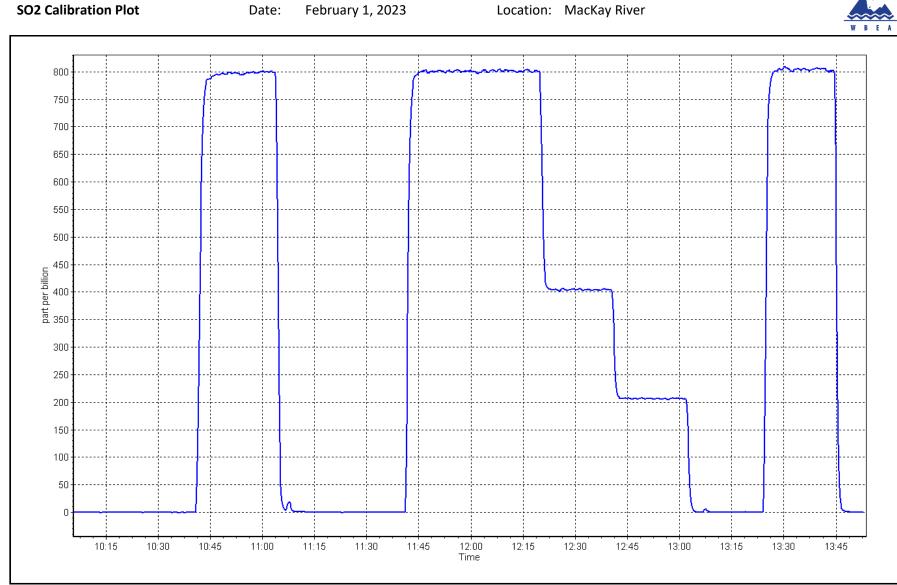
SO₂ Calibration Summary

Station Information								
Calibration Date:	February 1, 2023	Previous Calibration:	January 17, 2023					
Station Name:	MacKay River	Station Number:	AMS20					
Start Time (MST):	10:09	End Time (MST):	13:52					
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999931	≥0.995
800.3	801.4	0.9986	correlation coefficient	0.999931	20.333
400.7	404.1	0.9915	Slope	0.999451	0.90 - 1.10
199.8	206.1	0.9695	Slope	0.999431	0.90 - 1.10
			Intercept	2.850831	+/-30





February 1, 2023

Location: MacKay River



H₂S Calibration Report

WBEA					Version-11-2021
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River February 13, 2023 10:56 Routine		Station number: Last Cal Date: End time (MST):	AMS20 January 23, 2023 16:00	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.87 EY0001922	ppm	Cal Gas Exp Date:	May 5, 2023	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:		••	Rem Gas Exp Date: Diff between cyl: Serial Number:	1220	
ZAG Make/Model:	Teledyne API 701		Serial Number:	4522	
		Analyzer Info	rmation		
Analyzer make: Converter make: Analyzer Range	Teledyne API T101 Internal 0 - 100 ppb		Analyzer serial #: Converter serial #:	196 NA	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.999429 0.379115	0.990859 0.878999	Backgd or Offset: Coeff or Slope:	46.3 0.981	46.3 0.981
		H ₂ S 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	0.6	
as found span	4918	82.1	80.0	81.5	0.988
as found 2nd point	4959	41.1	40.0	41.2	0.986
as found 3rd point	4979	20.5	20.0	21.2	0.969
new cylinder response					
		H ₂ S Calibrati	on Data		
Set Point	Dilution air flow rate	Source gas flow rate	Calculated concentration (ppb)	Indicated	Correction factor (Cc/Ic)
	(sccm)	(sccm)	(Cc)	concentration (ppb) (Ic)	<i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.5	
high point	4918	82.1	80.0	79.9	1.001
second point	4959	41.1	40.0	40.8	0.981
third point	4979	20.5	20.0	21.0	0.951
as left zero	5000	0.0	0.0	0.5	
as left span	4918	82.1	80.0	79.1	1.011
SO2 Scrubber Check	4919	80.0 December 15, 2020	800.2	0.1	
Date of last scrubber cha Date of last converter eff	-	December 15, 2020	1	Ave Corr Factor	0.978 efficiency
		_			
Baseline Corr As found:	80.9	Prev response:	80.30	*% change:	0.7%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	40.6 20.6	AF Slope: AF Correlation:	1.010147 0.999973	AF Intercept:	0.779094
·				* = > +/-5% change initiate	es investigation

Notes:

Changed inlet filter after multi point as founds. Scrubber test after calibrator zero. No adjustments

made.

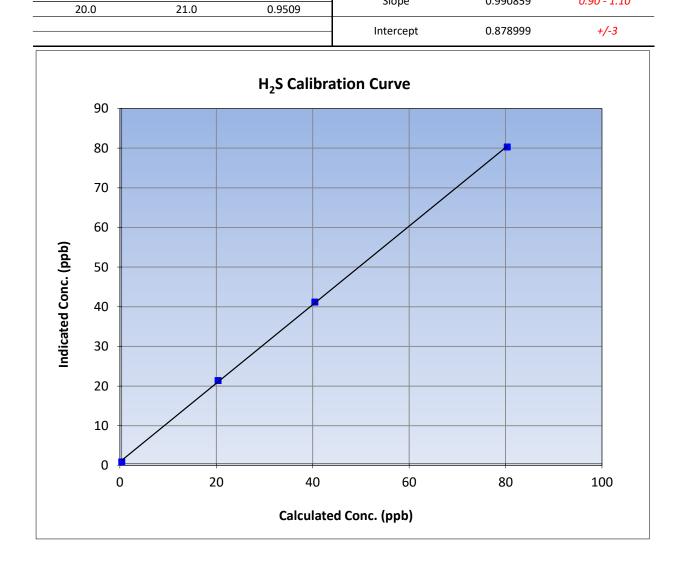
Calibration Performed By:

Mohammed Kashif



H₂S Calibration Summary

WBEA					Version-11-202
		Station	Information		
Calibration Date:	February 13, 2023		Previous Calibration:	January	23, 2023
Station Name:	МасКау	River	Station Number:	AN	1S20
Start Time (MST):	10:56		End Time (MST):	16	5:00
Analyzer make: Teledyne AF		nake: Teledyne API T101		1	96
		Calib	ration Data		
Calculated concentration Indicated concentration Corr (ppb) (Cc) (ppb) (lc)		Correction factor (Cc/lc)	Statistical Evaluation		<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999893	≥0.995
80.0	79.9	1.0008		0.333035	≥0.995
40.0	40.8	0.9811	- Slope	0.990859	0.90 - 1.10
20.0	21.0	0 9509	Siope	0.330833	0.30 - 1.10





Location: MacKay River





THC Calibration Report

Version-01-2020

		Station Info	ormation		
Station Name:MacKay RiverCalibration Date:February 1, 202Start time (MST):10:09Reason:Routine			Station number: Last Cal Date: End time (MST):	AMS20 January 17, 2023 13:52	
		Calibration S	itandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC30 <u>499.40</u> <u>206.20</u>	6868 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:	moved Gas Cert: NA moved CH4 Conc. <u>499.40</u> ppm moved C3H8 Conc. <u>206.20</u> ppm librator Make/Model: Teledyne API T700		Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	1066.45 ppm	
		Analyzer Info	ormation		
Analyzer make Analyzer Range	:: Thermo 51i-LT :: 0 - 20 ppm	·	Analyzer serial #:	1501663727	
Calibration slope:	<u>Start</u> 0.986110	<u>Finish</u> 0.996170	Background:	<u>Start</u> 3.180	<u>Finish</u> 3.440
Calibration intercept:	0.143798	0.044213	Coefficient:		5.402
	0.143798		Coefficient:		
	0.143798 Dilution air flow rate (sccm)	0.044213	Coefficient:		5.402
Calibration intercept:	Dilution air flow rate	0.044213 THC Calibrat Source gas flow rate	Coefficient: tion Data Calculated Concentration	5.471 Indicated Concentration	5.402 Correction factor (Cc/lc)
Calibration intercept: Set Point as found zero as found span	Dilution air flow rate (sccm)	0.044213 THC Calibrat Source gas flow rate (sccm)	Coefficient: tion Data Calculated Concentration (ppm) (Cc)	5.471 Indicated Concentration (ppm) (lc)	5.402 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point	Dilution air flow rate (sccm) 5000	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00	5.471 Indicated Concentration (ppm) (Ic) 0.27	5.402 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
Calibration intercept: 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	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00	5.471 Indicated Concentration (ppm) (Ic) 0.27	5.402 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
Calibration intercept: 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 4919	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0 81.3	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00 17.34	5.471 Indicated Concentration (ppm) (Ic) 0.27 17.75	5.402 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> 0.977
Calibration intercept: 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 4919 5000	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0 81.3 0.0	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00	5.471 Indicated Concentration (ppm) (lc) 0.27 17.75 -0.03	5.402 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> 0.977
Calibration intercept: 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 4919 5000 4919	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0 81.3 0.0 81.3	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00 17.34	5.471 Indicated Concentration (ppm) (lc) 0.27 17.75 -0.03 17.29	5.402 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> 0.977 1.003
Calibration intercept: 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 4919 5000 4919 4959 4959 4980 5000	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00	5.471 Indicated Concentration (ppm) (lc) 0.27 17.75 	5.402 Correction factor (Cc/lc) Limit = 0.95-1.05 0.977 1.003 0.998 0.973
Calibration intercept: 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 4919 5000 4919 4959 4980	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00 17.34	5.471 Indicated Concentration (ppm) (lc) 0.27 17.75 	5.402 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> 0.977 1.003 0.998 0.973 0.998
Calibration intercept: 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 4919 5000 4919 4959 4959 4980 5000	0.044213 THC Calibrat Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0	Coefficient: tion Data Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00 17.34 Aver 17.24	5.471 Indicated Concentration (ppm) (lc) 0.27 17.75 	5.402 Correction factor (Cc/lc) Limit = 0.95-1.05 0.977 1.003 0.998 0.973 0.998 0.991 1.4%

Sample inlet filter changed after as founds. Zero and span adjusted.

Calibration Performed By:

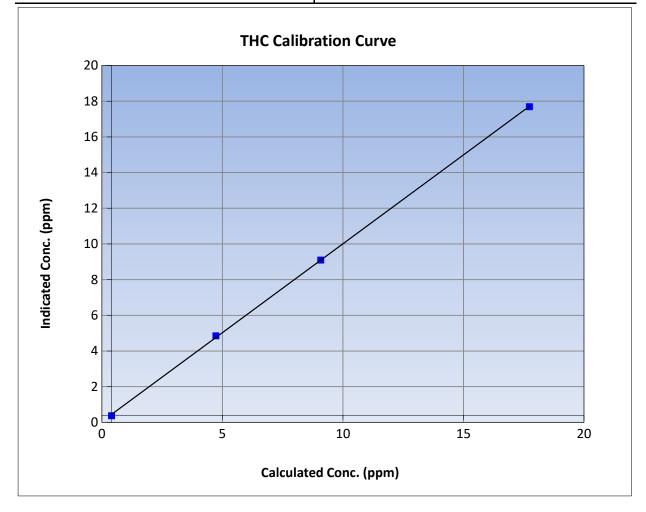


THC Calibration Summary

W B E A			Version-01-2020					
Station Information								
Calibration Date:	February 1, 2023	Previous Calibration:	January 17, 2023					
Station Name:	MacKay River	Station Number:	AMS20					
Start Time (MST):	10:09	End Time (MST):	13:52					
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727					

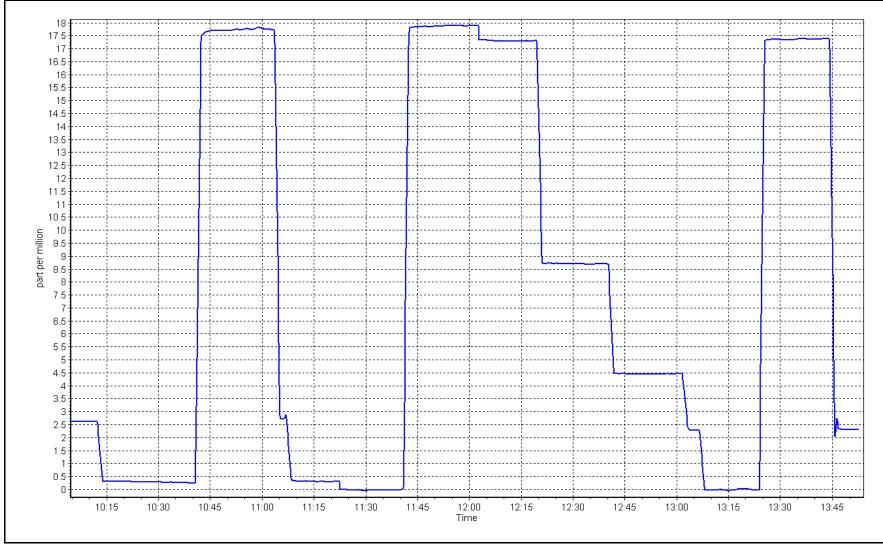
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	-0.03		Correlation Coefficient	0.999913	≥0.995
17.34	17.29	1.0027	correlation coefficient	0.999913	20.333
8.68	8.70	0.9982	Slope	0.996170	0.90 - 1.10
4.33	4.45	0.9731	510pe	0.330170	0.50 - 1.10
			Intercept	0.044213	+/-1.5











Station Name:

Reason:

Calibration Date:

Start time (MST):

MacKay River

10:20

Routine

February 2, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS20 Last Cal Date: January 24, 2023 End time (MST): 15:53

			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> ppm			
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> ppm			
NOX gas Diff:			NO gas Diff:			
Calibrator Model:	Teledyne API T7	00	Serial Number: 1220			
ZAG make/model:	Teledyne API 70)1	Serial Number: 4766			
Analyzer Information						

Analyzer make: Th NOX Range (ppb): 0 -		-	Analyzer serial #: 15	05164379	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.409	1.364	NO bkgnd or offset:	3.9	3.8
NOX coeff or slope:	0.995	0.990	NOX bkgnd or offset:	3.9	3.8
NO2 coeff or slope:	0.995	0.995	Reaction cell Press:	175.0	176.8

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.996925	0.993580
NO _x Cal Offset:	2.570800	3.070250
NO Cal Slope:	0.998231	0.997347
NO Cal Offset:	1.372065	1.531522
NO ₂ Cal Slope:	1.007507	0.998061
NO ₂ Cal Offset:	-1.673176	-1.818500



$NO_X \setminus NO \setminus NO_2$ 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	0.0		
as found span	4917	83.3	819.5	800.3	19.2	854.9	831.8	23.0	0.9585	0.9621
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	4917	83.3	819.5	800.3	19.2	816.2	799.4	16.6	1.0040	1.0011
second point	4956	41.7	410.4	400.8	9.6	411.0	400.6	10.4	0.9986	1.0006
third point	4979	20.8	204.6	199.9	4.8	210.4	203.5	6.9	0.9726	0.9821
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4917	83.3	819.5	458.8	360.7	811.3	451.9	359.5	1.0101	1.0153
							Average C	orrection Factor	0.9917	0.9946
Corrected As fo	ound NO _x =	855.0 ppb	NO =	832.0 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	4.2%
Previous Respo	onse NO _x =	819.5 ppb	NO =	800.3 ppb				*Percent Chang	ge NO =	3.8%
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) (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)	791.8	450.3	360.7	359.2	1.0041	99.6%
2nd GPT point (200 ppb O3)	791.8	614.0	197.0	194.2	1.0142	98.6%
3rd GPT point (100 ppb O3)	791.8	698.4	112.6	108.1	1.0412	96.0%
			ŀ	Average Correction Factor	1.0198	98.1%

Notes:

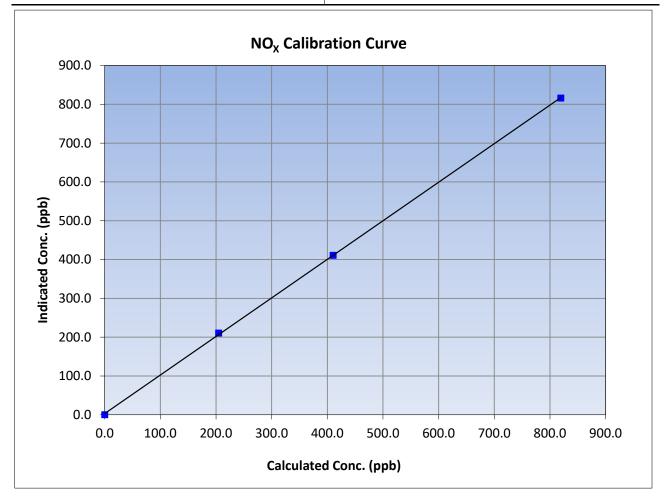
Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

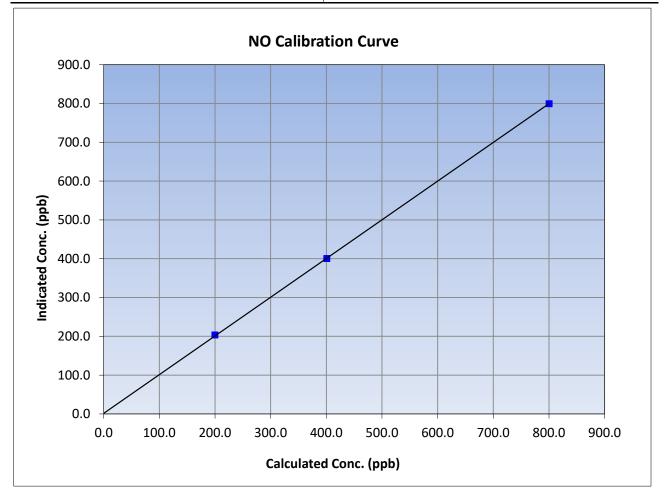
WBEA					Version-04-202
		Station	Information		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	24, 2023
Station Name:	MacKay River		Station Number:	AM	S20
Start Time (MST):	10:20		End Time (MST):	15	:53
Analyzer make: Thermo 42i		Analyzer serial #: 150516		64379	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	lc) Statistical Evaluation <u>Limit</u>		
0.0	0.0		Correlation Coefficient	0.999927	≥0.995
819.5	816.2	1.0040	correlation coernelent	0.555527	20.333
410.4	411.0	0.9986	Clana	0.002580	0.90 - 1.10
204.6	210.4	0.9726	Slope	0.993580	0.90 - 1.10
			Intercept	3.070250	+/-20





NO Calibration Summary

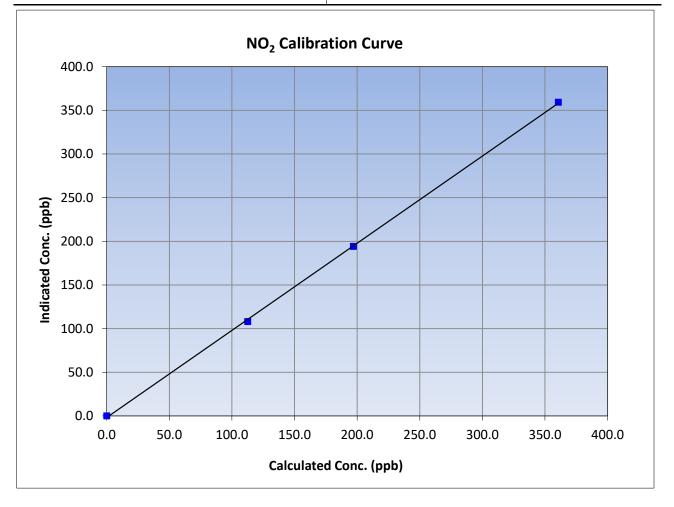
WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	24, 2023
Station Name:	MacKay River		Station Number:	AM	IS20
Start Time (MST):	10:20		End Time (MST):	15	:53
Analyzer make: Thermo 42i		Analyzer serial #:	15051	.64379	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	(Cc/Ic) Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999971	≥0.995
800.3	799.4	1.0011	correlation coernelent	0.555571	20.555
400.8	400.6	1.0006	Slope	0.997347	0.90 - 1.10
199.9	203.5	0.9821	Siope	0.337347	0.30 - 1.10
			Intercept	1.531522	+/-20

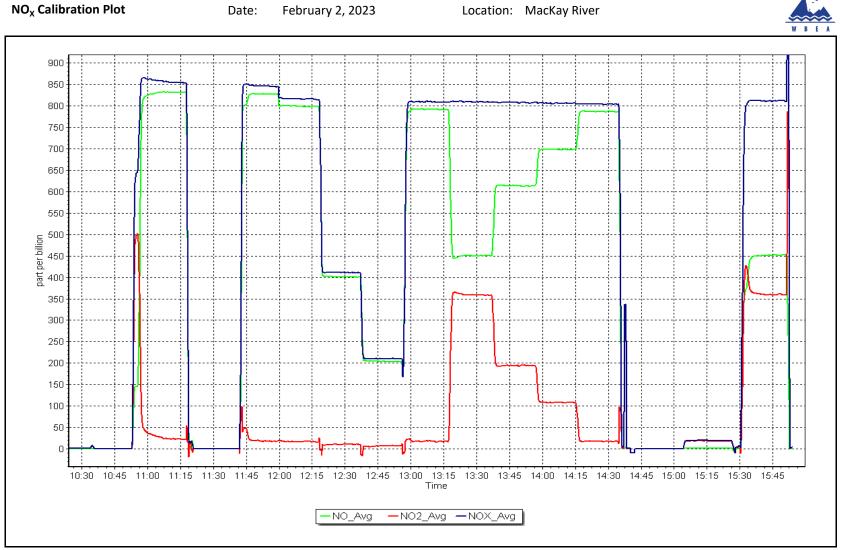




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	Februar	y 2, 2023	Previous Calibration:	January	24, 2023
Station Name:	MacKay River		Station Number:	AM	S20
Start Time (MST):	10:20		End Time (MST):	15	:53
Analyzer make: Thermo 42i		Analyzer serial #: 15051		164379	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	/lc) Statistical Evaluation <u>Limit</u>		
0.0	0.1		Correlation Coefficient	0.999841	≥0.995
360.7	359.2	1.0041	correlation coefficient	0.555641	20.333
197.0	194.2	1.0142	Clana	0.998061	0.90 - 1.10
112.6	108.1	1.0412	Slope	0.998061	0.90 - 1.10
			Intercept	-1.818500	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS21 CONKLIN FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Conklin February 6, 2023 10:51 Routine		Station number: Last Cal Date: End time (MST):	AMS21 January 3, 2023 13:30	
		Calibration St	andards		
Cal Gas Concentration:	49.93	ppm	Cal Gas Exp Date:	January 5, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	<u>CC259455</u> 49.93	ррт	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	Teledyne API T700 Teledyne API 701		Serial Number: Serial Number:	3810 262	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1428701363	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.003298 0.595998	0.999888 0.415841	Backgd or Offset: Coeff or Slope:	27.9 0.914	27.9 0.914
		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	5005	0.0	0.0	0.1	
as found span	4920	80.2	800.8	801.4	0.999
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5005	0.0	0.0	0.0	
high point	4920	80.2	800.8	801.1	1.000
second point third point	<u>4960</u> 4980	40.1 20.0	400.4 200.1	400.6 201.2	1.000 0.995
as left zero	5005	0.0	0.0	0.0	0.995
as left span	4920	80.2	800.8	802.0	0.999
us icit span	7720	00.2		ge Correction Factor	0.998
Baseline Corr As found: Baseline Corr 2nd AF pt:	801.30 NA	Previous response AF Slope:	804.08	*% change AF Intercept:	-0.3%
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

No adjustments required.

Calibration Performed By:

Denny Ray Estador

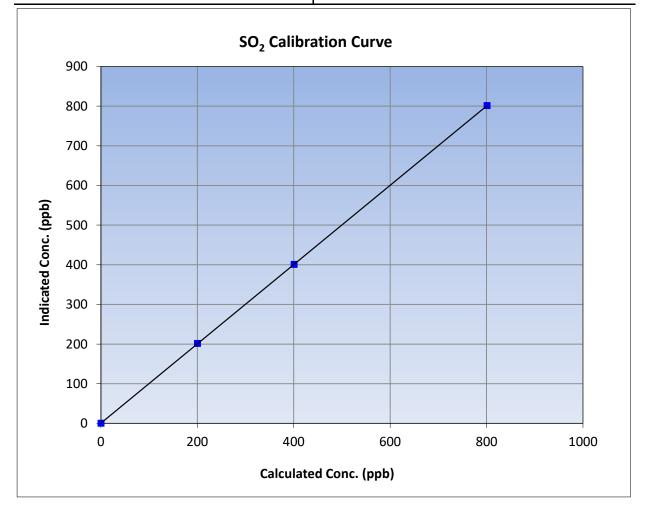


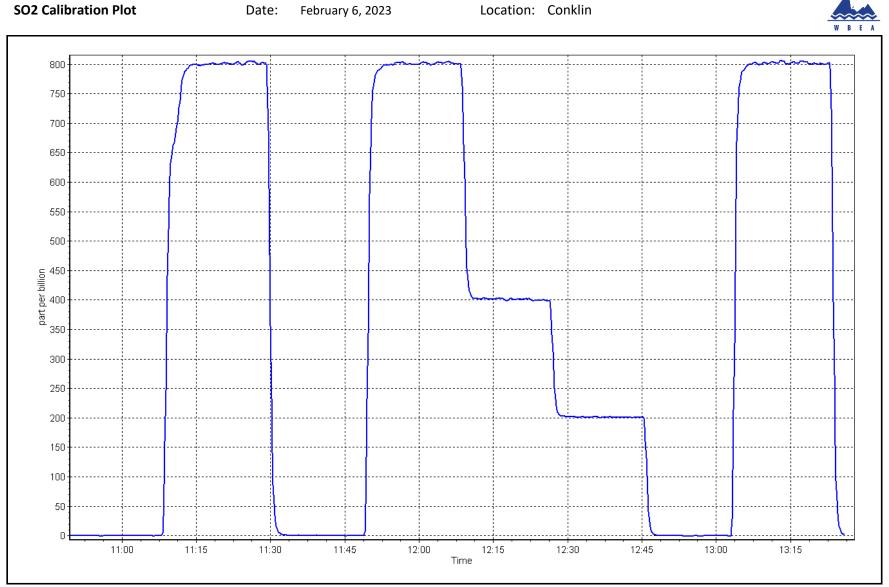
SO₂ Calibration Summary

WBEA			Version-01-2020			
Station Information						
Calibration Date:	February 6, 2023	Previous Calibration:	January 3, 2023			
Station Name:	Conklin	Station Number:	AMS21			
Start Time (MST):	10:51	End Time (MST):	13:30			
Analyzer make:	Thermo 43i	Analyzer serial #:	1428701363			

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
800.8	801.1	0.9997	correlation coefficient	0.999996	20.335
400.4	400.6	0.9996	Slope	0.999888	0.90 - 1.10
200.1	201.2	0.9946	Slope	0.999000	0.90 - 1.10
			- Intercept	0.415841	+/-30





February 6, 2023

Location: Conklin



TRS Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Conklin February 8, 2023 9:02 Routine		Station number: Last Cal Date: End time (MST):	AMS21 January 9, 2023 12:55	
		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:	CC505493 5.03 NA API T700 API 701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3810 263	
		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: Calibration intercept:	1.005143 -0.162334	0.983711 0.237934	Backgd or Offset: Coeff or Slope:		2.8 0.951
		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	78.5	1.014
as found 2nd point	4960	39.8	40.0	39.5	1.004
as found 3rd point	4980	19.9	20.0	19.8	0.991
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	4921	79.5	80.0	78.7	1.016
second point	4960	39.8	40.0	40.0	1.001
third point	4980	19.9	20.0	20.0	1.001
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.5	80.0	78.6	1.017
SO2 Scrubber Check	4920	80.2	802.0	-0.2	
Date of last scrubber cha	-			Ave Corr Factor	1.006
Date of last converter ef	ficiency test:				efficiency
Baseline Corr As found:	78.9	Prev response:		*% change:	-1.7%
Baseline Corr 2nd AF pt:	39.9	AF Slope:		AF Intercept:	-0.142040
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999949	* = > +/-5% change initiat	as investigation
				- > +/-5% change initiat	es investigation

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador

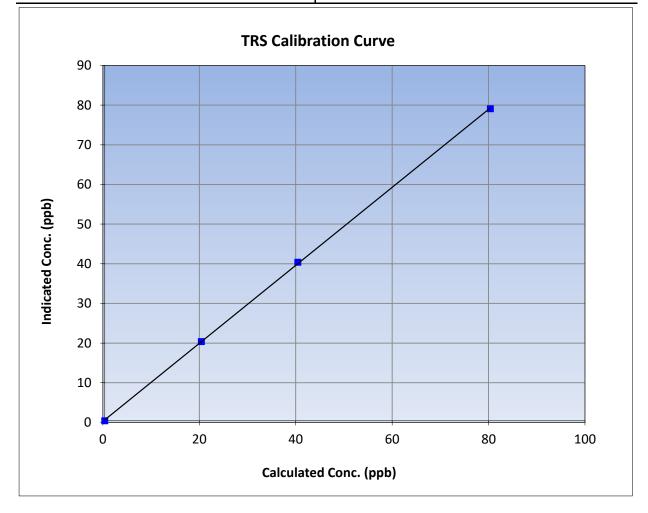


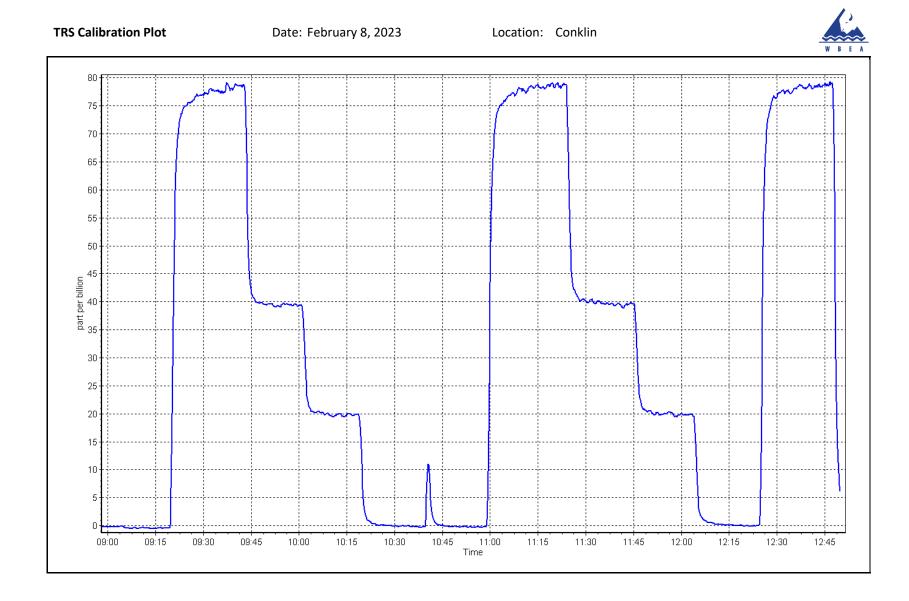
TRS Calibration Summary

WBEA			Version-11-2021		
Station Information					
Calibration Date:	February 8, 2023	Previous Calibration:	January 9, 2023		
Station Name:	Conklin	Station Number:	AMS21		
Start Time (MST):	9:02	End Time (MST):	12:55		
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1236656116		

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	0.999928	≥0.995
80.0	78.7	1.0161	correlation coefficient	0.999928	20.995
40.0	40.0	1.0010	Slope	0.983711	0.90 - 1.10
20.0	20.0	1.0010	Slope	0.985711	0.30 - 1.10
			Intercept	0.237934	+/-3







THC / CH_4 / NMHC Calibration Report

		Stat	ion Information			
Station Name:	Conklin		Station number: AMS21			
Calibration Date:	February 3, 202	3	Last Cal Date: Jar	nuary 4, 2023		
Start time (MST):	12:08		End time (MST): 17	:16		
Reason:	Routine					
		Calib	ration 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	A		
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	/00	Serial Number: 3810			
ZAG make/model:	Teledyne API 70	01	Serial Number: 691			
		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:	1.85E-04	1.86E-0	4 NMHC SP Ratio:	4.66E-05	4.56E-05	
CH4 Retention time:	12.20	12.60	NMHC Peak Area:	196117	200658	

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	80.2	17.13	17.31	0.989
as found 2nd point	4960	40.1	8.56	8.65	0.989
as found 3rd point	4980	20.0	4.27	4.35	0.982
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	17.13	17.13	0.999
second point	4960	40.1	8.56	8.57	0.999
third point	4980	20.0	4.27	4.35	0.982
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	16.95	1.011
			Ave	erage Correction Factor	0.994
Baseline Corr AF:	17.31	Prev response	17.12	*% change	1.1%
Baseline Corr 2nd AF:	8.7	AF Slope:	1.010198	AF Intercept:	0.012422
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999996	* = > +/-5% change initiat	es investigation



THC / CH_4 / NMHC Calibration Report

Version-06-2022

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.2	9.14	9.36	0.976		
as found 2nd point	4960	40.1	4.57	4.67	0.978		
as found 3rd point	4980	20.0	2.28	2.36	0.968		
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	4.58	0.999		
third point	4980	20.0	2.28	2.36	0.968		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	9.14	9.03	1.012		
			Aver	age Correction Factor	0.989		
Baseline Corr AF:	9.36	Prev response	9.14	*% change	2.4%		
Baseline Corr 2nd AF:	4.7	AF Slope:	1.023526	AF Intercept:	0.006684		
Baseline Corr 3rd AF:	2.4	AF Correlation:	0.999992	* = > +/-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) (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	7.95	1.005		
as found 2nd point	4960	40.1	3.99	3.98	1.004		
as found 3rd point	4980	20.0	1.99	1.99	0.999		
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.2	7.99	8.00	0.998		
second point	4960	40.1	3.99	3.99	1.001		
third point	4980	20.0	1.99	1.99	0.999		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	7.99	7.92	1.009		
			Aver	age Correction Factor	0.999		
Baseline Corr AF:	7.95	Prev response	7.99	*% change	-0.6%		
Baseline Corr 2nd AF:	3.98	AF Slope:	0.994544	AF Intercept:	0.006137		
Baseline Corr 3rd AF:	1.99	AF Correlation:	0.999997	* = > +/-5% change initiat	es investigation		
		Calibration	Statistics				
		<u>Start</u>		Finish			
THC Cal Slope:		0.999155		0.998993			
THC Cal Offset:		0.013380		0.030589			
CH4 Cal Slope:		1.000338	1.001541				
CH4 Cal Offset:		0.001151		-0.002053			
NMHC Cal Slope:		0.998171		0.996416			
NMHC Cal Offset:		0.013029		0.033041			

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

Calibration Performed By:

Denny Ray Estador and Mohammed Kashif



THC Calibration Summary

		Station I	nformation		
Calibration Date:	Februar	y 3, 2023	Previous Calibration:	January	4, 2023
Station Name:	Cor	ıklin	Station Number:	AM	S21
Start Time (MST):	12	:08	End Time (MST):	17:	16
Analyzer make:	Therr	no 55i	Analyzer serial #: 118148495		18495
		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	0.999975	≥0.995
17.13	17.13	0.9995			
8.56 4.27	8.57 4.35	0.9994 0.9820	Slope	0.998993	0.90 - 1.10
י.27	т.35	0.9020	Intercept	0.030589	+/-0.5
16.0					
14.0					
12.0					
(mdd) 10.0					
0.01 (bbm) 0.02 (bbm)					
0.0 Undicated					
드 4.0					
2.0					
0.0		_			
0.0	5	.0	10.0	15.0	20.0



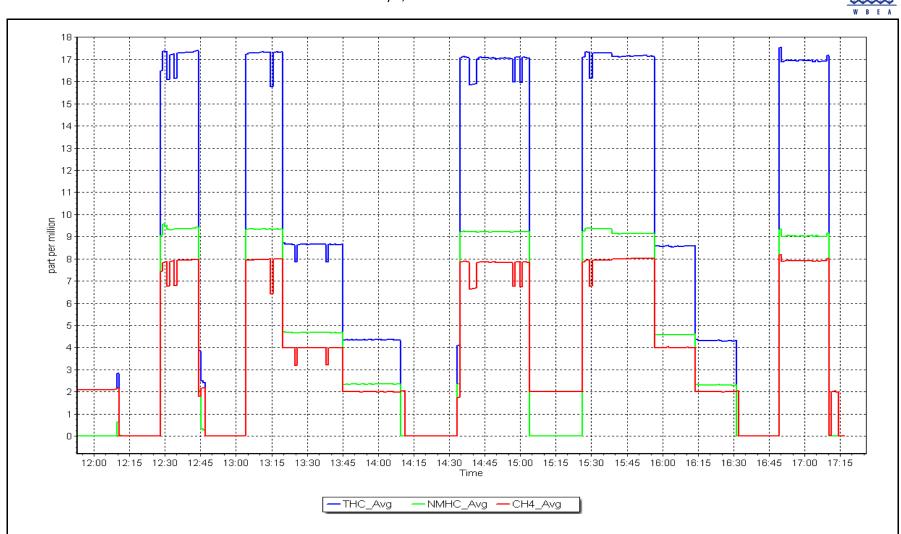
CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	Februar	y 3, 2023	Previous Calibration:	January	4, 2023
tation Name:	Conklin		Station Number:	AMS21	
tart Time (MST):	12	:08	End Time (MST):	17:	16
nalyzer make:	Therr	no 55i	Analyzer serial #: 118148495		
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00 7.99	0.00 8.00	 0.9984	Correlation Coefficient	0.999999	≥0.995
3.99 1.99	3.99 1.99	1.0005 0.9988	Slope	1.001541	0.90 - 1.10
			Intercept	-0.002053	+/-0.5
8.0 7.0 6.0					
(mdd 5.0 					
0.6 Indicated					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
		Calculated			



NMHC Calibration Summary

			Station I	nformation			
Calibration	Date:	Februar	y 3, 2023	Previous Calibration:	January	4, 2023	
Station Nan	me:	Conklin Station Number:		AM	S21		
Start Time ((MST):	12	:08	End Time (MST):	17:	:16	
Analyzer ma	iake:	Therr	mo 55i	Analyzer serial #: 118148495			
			Calibra	tion Data			
Calculated cor (ppm)		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>	
0.0 9.1		0.00 9.13	1.0008	Correlation Coefficient	0.999915	≥0.995	
4.5	57	4.58	0.9986	Slope	0.996416	0.90 - 1.10	
2.2	28	2.36	0.9678	Intercept	0.033041	+/-0.5	
10	0.0		NMHC Calibrat				
	9.0						
٤	8.0						
	8.0						
-							
-	7.0						
Conc. (ppm)	7.0						
cated Conc. (ppm)	7.0 6.0 5.0						
Indicated Conc. (ppm)	7.0						
Indicated Conc. (ppm)	7.0 6.0 5.0 4.0 3.0 2.0 1.0						
Indicated Conc. (ppm)	7.0 6.0 5.0 4.0 3.0 2.0	2.0	4.0	6.0	8.0	10.0	



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 February 24, 2023 9:10 Routine

Station number: AMS21 Last Cal Date: January 17, 2023 End time (MST): 13:05

Calibration Standards

NO Gas Cylinder #:	T2Y1P1H			Cal Gas Expiry Date: Dece	mber 11, 2	023
NOX Cal Gas Conc:	51.09) b	opm	NO Cal Gas Conc:	50.39	ppm
Removed Cylinder #:	n/a			Removed Gas Exp Date: n/a		
Removed Gas NOX Conc:	51.09) t	opm	Removed Gas NO Conc:	50.39	ppm
NOX gas Diff:				NO gas Diff:		
Calibrator Model:	Teledyne Al	PI T750		Serial Number:	282	
ZAG make/model:	Teledyne Al	PI T701		Serial Number:	361	

Analyzer Information

Analyzer make: T NOX Range (ppb): 0			Analyzer serial #: 15	01663731	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.144	1.144	NO bkgnd or offset:	11.7	11.6
NOX coeff or slope:	1.001	1.001	NOX bkgnd or offset:	11.9	11.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	226.7	224.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001997	1.004927
NO _x Cal Offset:	1.704503	1.765059
NO Cal Slope:	0.998723	1.004393
NO Cal Offset:	1.321276	0.961963
NO ₂ Cal Slope:	0.999769	1.001583
NO ₂ Cal Offset:	-0.317822	-0.384496



$NO_X \setminus NO \setminus NO_2$ 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	-0.3	-0.2	-0.1		
as found span	4921	79.4	811.2	800.1	11.1	818.3	804.8	13.5	0.9914	0.9942
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.1		
high point	4921	79.4	811.2	800.1	11.1	816.2	804.1	12.1	0.9939	0.9951
second point	4960	39.7	405.7	400.1	5.6	410.1	403.4	6.7	0.9892	0.9919
third point	4980	19.8	202.3	199.6	2.8	207.0	202.3	4.7	0.9774	0.9864
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	381.6	429.6	814.0	388.4	425.6	0.9966	0.9826
							Average C	orrection Factor	0.9869	0.9911
Corrected As fo	ound NO _x =	818.6 ppb	NO =	805.0 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _X =	0.5%
Previous Respo	nse NO _x =	814.6 ppb	NO =	800.4 ppb				*Percent Chang	ge NO =	0.6%
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)	800.8	382.3	429.6	430.0	0.9991	100.1%
2nd GPT point (200 ppb O3)	800.8	599.8	212.1	212.1	1.0001	100.0%
3rd GPT point (100 ppb O3)	800.8	700.3	111.6	111.0	1.0055	99.4%
			4	Verage Correction Factor	1.0016	99.8%

Notes:

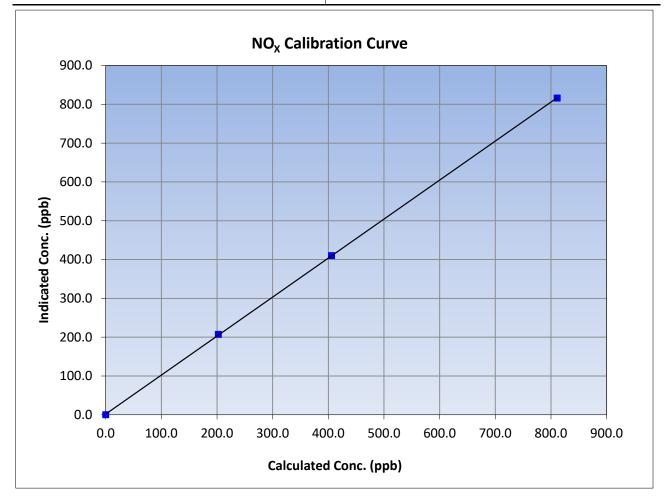
No adjustments required.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

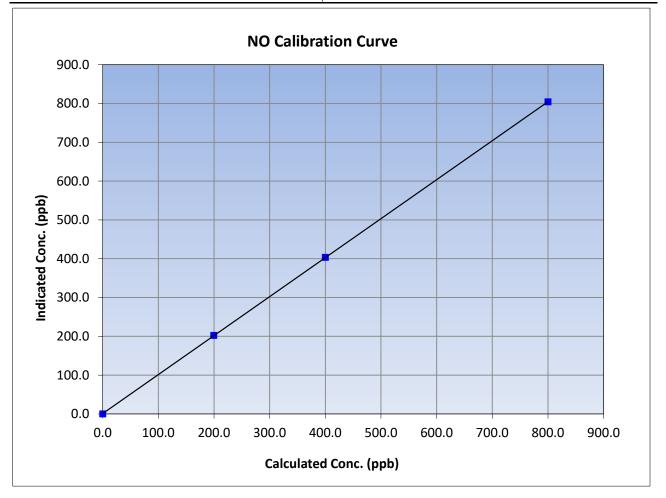
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	24, 2023	Previous Calibration:	January	17, 2023
Station Name:	Cor	nklin	Station Number:	AM	S21
Start Time (MST):	9:	10	End Time (MST):	13	:05
Analyzer make:	Therr	no 42i	Analyzer serial #:	15016	63731
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999978	≥0.995
811.2	816.2	0.9939	correlation coernelent	0.555578	20.995
405.7	410.1	0.9892	Slope	1.004927	0.90 - 1.10
202.3	207.0	0.9774	Slope	1.004927	0.90 - 1.10
			Intercept	1.765059	+/-20





NO Calibration Summary

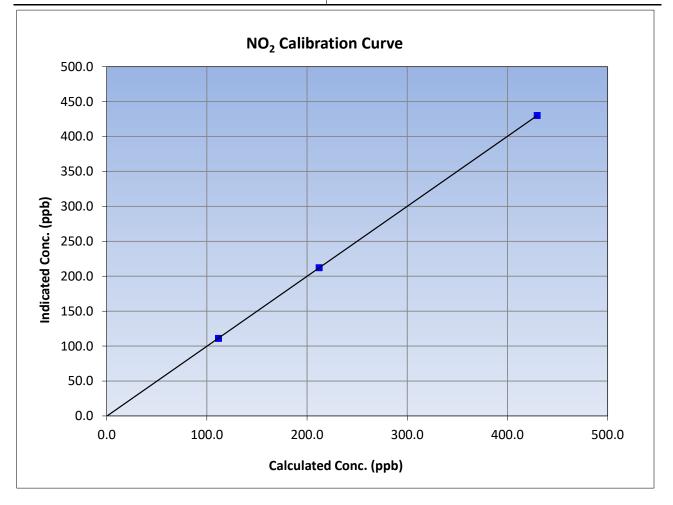
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February 24, 2023		Previous Calibration:	January 17, 2023	
Station Name:	Conklin		Station Number:	AM	IS21
Start Time (MST):	9:10		End Time (MST):	13:05	
Analyzer make:	: Thermo 42i		Analyzer serial #:	1501663731	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999993	≥0.995
800.1	804.1	0.9951		0.5555555	20.995
400.1	403.4	0.9919	Slope	1.004393	0.90 - 1.10
199.6	202.3	0.9864		1.004393	0.90 - 1.10
			Intercept	0.961963	+/-20

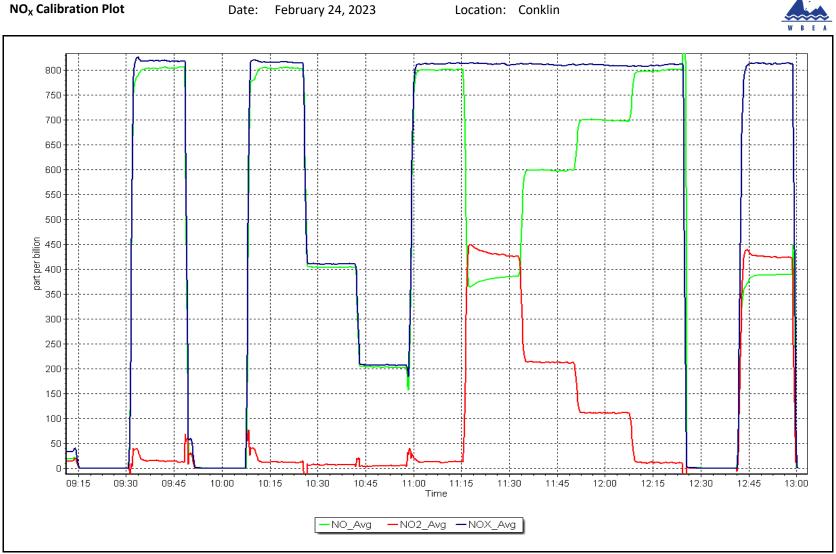




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	February 24, 2023		Previous Calibration:	January	17, 2023
Station Name:	Conklin		Station Number:	AM	S21
Start Time (MST):	9:10		End Time (MST):	13	:05
Analyzer make:	er make: Thermo 42i		Analyzer serial #:	1501663731	
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.00007	
429.6	430.0	0.9991		0.999997	≥0.995
212.1	212.1	1.0001	Slope	1.001583	0.90 - 1.10
111.6	111.0	1.0055	51096	1.001303	0.50 1.10
			Intercept	-0.384496	+/-20







O₃ Calibration Report

Version-01-2020

		Station Infor	mation			
Station Name:	Caraldia	Station mon		MC21		
Station Name:	Conklin	Station number: AMS21				
Calibration Date:	February 3, 2023	Last Cal Date: January 20, 2023				
Start time (MST):	8:56	End time (MST): 12:15				
Reason:	Routine					
		Calibration St	andards			
O3 generation mode:	Photometer					
Calibrator Make/Model:	Teledyne API T700		Serial Number: 3	810		
ZAG Make/Model:	Teledyne API 701					
		Analyzer Info	rmation			
Analyzer make:	: Thermo 49i		Analyzer serial #: 1	501663734		
Analyzer Range	e 0 - 500 ppb					
	Start	Finish		<u>Start</u>	Finish	
	0.997857	1.001543	Backgd or Offset:	-0.3	-0.7	
Calibration slope:						
Calibration slope: Calibration intercept:	0.200000	0.380000	Coeff or Slope:	1.011	1.002	
			•	1.011	1.002	
			Coeff or Slope:	1.011	1.002	
	0.200000	0.380000 O ₃ Calibratio	Coeff or Slope:			
	0.200000 Total air flow rate	0.380000 O ₃ Calibratio	Coeff or Slope: In Data	ndicated concentration C	Correction factor (Co	
Calibration intercept:	0.200000 Total air flow rate (sccm)	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc)	ndicated concentration C (ppm) (Ic)		
Calibration intercept: Set Point as found zero	0.200000 Total air flow rate (sccm) 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0	ndicated concentration C (ppm) (Ic) -0.8	Correction factor (Co <i>Limit = 0.95-1.05</i> 	
Calibration intercept: Set Point as found zero as found span	0.200000 Total air flow rate (sccm) 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0	ndicated concentration C (ppm) (Ic) -0.8 398.7	Correction factor (Co Limit = 0.95-1.05 1.003	
Calibration intercept: Set Point as found zero as found span as found 2nd point	0.200000 Total air flow rate (sccm) 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0	Correction factor (Co Limit = 0.95-1.05 1.003 1.000	
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2	Correction factor (Co Limit = 0.95-1.05 1.003 1.000 0.998	
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 0.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1	Correction factor (Co Limit = 0.95-1.05 1.003 1.000 0.998 	
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 0.0 400.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7	Correction factor (Co Limit = 0.95-1.05 1.003 1.000 0.998 0.998	
Calibration intercept: Set Point as found zero as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000 50	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0 799.4	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 0.0 400.0 200.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7 201.3	Correction factor (CC Limit = 0.95-1.05 1.003 1.000 0.998 0.998 0.994	
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 0.0 400.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7	Correction factor (Co Limit = 0.95-1.05 1.003 1.000 0.998 0.998	
Calibration intercept: 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	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0 799.4	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 0.0 400.0 200.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7 201.3	Correction factor (CC Limit = 0.95-1.05 1.003 1.000 0.998 0.998 0.994	
Calibration intercept: Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0 799.4	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 100.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7 201.3 100.5	Correction factor (Co Limit = 0.95-1.05 1.003 1.000 0.998 0.998 0.994 0.995	
Calibration intercept: 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	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0 799.4	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 100.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7 201.3	Correction factor (CC Limit = 0.95-1.05 1.003 1.000 0.998 0.998 0.994	
Calibration intercept: 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	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0 799.4	Coeff or Slope: on Data Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 100.0	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7 201.3 100.5	Correction factor (Co Limit = 0.95-1.05 1.003 1.000 0.998 0.998 0.994 0.995	
Calibration intercept: 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	0.200000 Total air flow rate (sccm) 5000 5000 5000 5000 5000 5000 5000 5000 5000 5000	0.380000 O ₃ Calibratio Calibrator Lamp Voltage Drive 0.0 935.6 799.4 701.9 0.0 933.0 799.4 701.9	Coeff or Slope: Calculated Ir concentration (ppb) (Cc) 0.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 Average	ndicated concentration C (ppm) (Ic) -0.8 398.7 200.0 100.2 0.1 400.7 201.3 100.5 - Correction Factor	Correction factor (Co Limit = 0.95-1.05 1.003 1.000 0.998 0.998 0.994 0.995 0.996	

Notes:

Changed the pump after the MPAFs. Adjusted both zero and span. No as lefts.

Calibration Performed By:

Denny Ray Estador

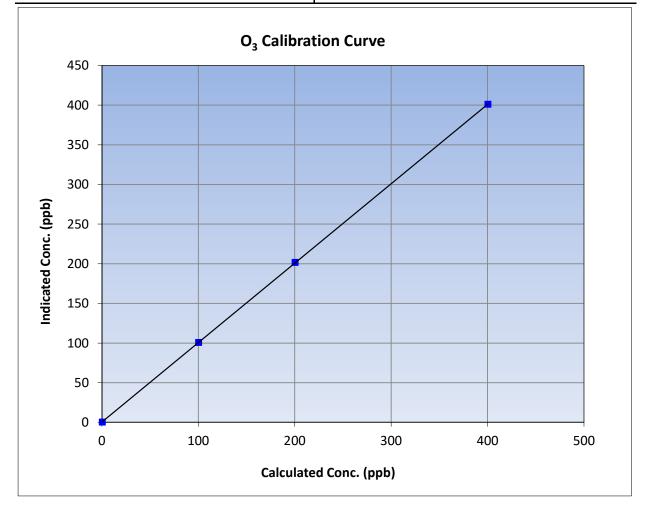


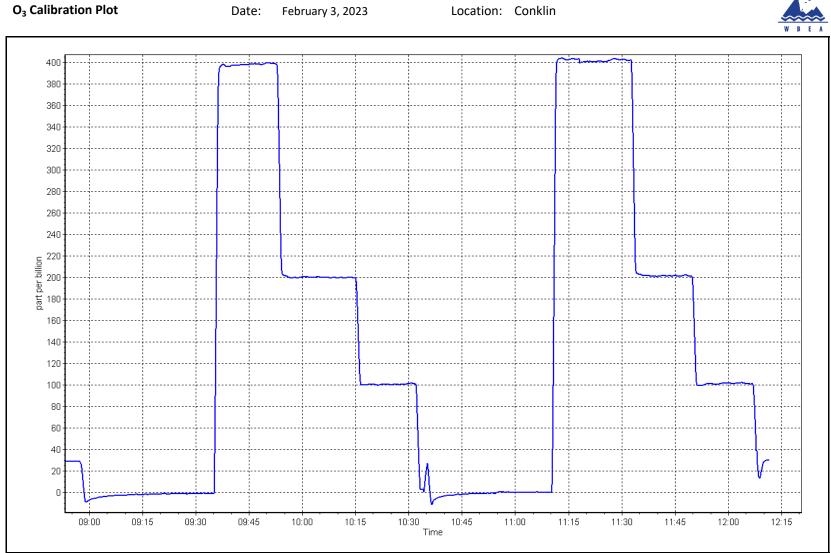
O₃ Calibration Summary

WBEA			Version-01-2020			
Station Information						
Calibration Date:	February 3, 2023	Previous Calibration:	January 20, 2023			
Station Name:	Conklin	Station Number:	AMS21			
Start Time (MST):	8:56	End Time (MST):	12:15			
Analyzer make:	Thermo 49i	Analyzer serial #:	1501663734			

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	0.999994	≥0.995
400.0	400.7	0.9983		0.9999994	20.333
200.0	201.3	0.9935	Slope	1.001543	0.90 - 1.10
100.0	100.5	0.9950		1.001343 0.	0.90 - 1.10
			Intercept	0.380000	+/- 5









T640 PM_{2.5} CALIBRATION

W B E A						Version-01-2023
		Station Information	l			
Station Name:	Conklin		Station number:	AMS 21		
Calibration Date:	February 8, 2023		Last Cal Date:	January 4, 2023	3	
Start time (MST):	10:43		End time (MST):	11:00		
Applyzor Makor	API T640		S/N:	1 5 4 7		
Analyzer Make: Particulate Fraction:	PM2.5		5/ N.	1547		
Flow Meter Make/Model:	DeltaCal		S/N:	954		
Temp/RH standard:	DeltaCal		S/N:	954		
		Monthly Calibration Te	est			
<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	Ad	justed	(Limits)
Т ([°] С)	-2.5	-2.4	-2.5			+/- 2 °C
P (mmHg)	713.7	709.5	713.7			+/- 10 mmHg
flow (LPM)	5	5.07	5			+/- 0.25 LPM
Leak Test:	Date of check:	February 8, 2023	Last Cal Date:	January 4, 2	023	
	PM w/o HEPA:		PM w/ HEPA:	0	025	<0.2 ug/m3
Note: this leak check will be			-	ntenance leak	check	-
Inlet cleaning :	Inlet Head					
		Quarterly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>	Ad	justed	(Limits)
PMT Peak Test						11.3 +/- 0.5
Post-maintenance		PM w/o HEPA:		w/ HEPA:		
Date Optical Cham Disposable Filte						<0.2 ug/m3
Disposable Titte	a changeu.					
		Annual Maintenance	e			
Data Samala Tul	ha Claanad					
Date Sample Tul Date RH/T Sense						
Notes:		No adjustments made. I	nspect inlet head; r	elatively clean.		
		-		·		
Calibration by:	Denny Ray Estador					
canoration by.	Denny hay Estador					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS22 JANVIER FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Janvier February 22, 2023 12:33 Routine		Station number: Last Cal Date: End time (MST):	AMS 22 January 17, 2023 16:31	
		Calibration St	andards		
Cal Gas Concentration:	50.11	ppm	Cal Gas Exp Date:	January 18, 2029	
Cal Gas Cylinder #: Removed Cal Gas Conc:	CC281519 50.11	nnm	Rem Gas Exp Date:	ΝΑ	
Removed Gas Cyl #:	NA	ppm	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:	1.000335	1.000663	Backgd or Offset:	19.2	21.4
Calibration intercept:	0.604356	0.364554	Coeff or Slope:	1.007	1.031
		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	2.0	
as found span	4920	79.8	799.8	806.7	0.991
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	79.8	799.8	800.2	0.999
second point	4960	39.9	399.9	401.8	0.995
third point	4980	20.0	200.4	200.3	1.001
as left zero	5000	0.0	0.0	0.2	
as left span	4920	79.8	799.8	802.9	0.996
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	804.70	Previous response	800.66	*% change	0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Babeline een Enara per					

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

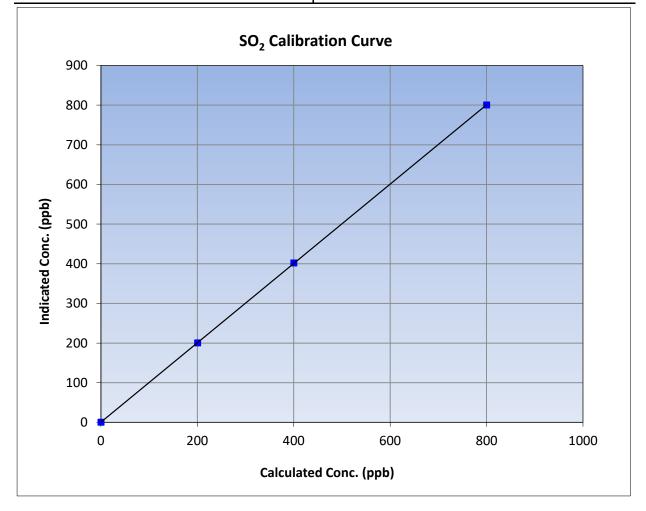
Calibration Performed By:



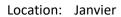
SO₂ Calibration Summary

WBEA			Version-01-2020				
Station Information							
Calibration Date:	February 22, 2023	Previous Calibration:	January 17, 2023				
Station Name:	Janvier	Station Number:	AMS 22				
Start Time (MST):	12:33	End Time (MST):	16:31				
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006				

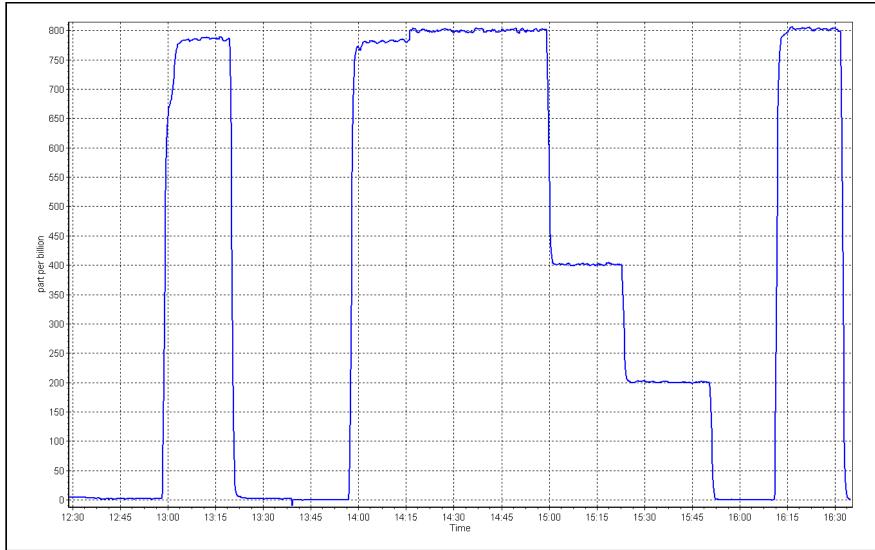
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999993	≥0.995
799.8	800.2	0.9995	correlation coefficient	0.999993	20.333
399.9	401.8	0.9952	Slope	1.000663	0.90 - 1.10
200.4	200.3	1.0007	Slope	1.000005	0.90 - 1.10
			Intercept	0.364554	+/-30













TRS Calibration Report

		_			
WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Janvier February 24, 2023 12:12 Routine		Station number: Last Cal Date: End time (MST):	AMS22 January 20, 2023 17:09	
		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 #:	DT0018680 5.03 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:	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:	1.005365	1.002650	Backgd or Offset:	3.42	3.56
Calibration intercept:	0.000881	0.120931	Coeff or Slope:	1.239	1.239
		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	0.3	
as found span	4920	79.5	80.0	80.2	1.001
as found 2nd point	4960	39.8	40.0	40.3	1.001
as found 3rd point	4980	19.9	20.0	19.0	1.071
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	4920	79.5	80.0	80.3	0.996
second point	4960	39.8	40.0	40.4	0.991
second point third point			40.0 20.0	40.4 20.0	0.991
	4960	39.8			
third point	4960 4980	39.8 19.9	20.0	20.0	1.001
third point as left zero as left span	4960 4980 5000	39.8 19.9 0.0	20.0 0.0	20.0 0.3	1.001
third point as left zero as left span O2 Scrubber Check	4960 4980 5000 4920 4920	39.8 19.9 0.0 79.5	20.0 0.0 80.0	20.0 0.3 80.4 0.1	1.001 0.995
third point as left zero as left span O2 Scrubber Check Date of last scrubber cha	4960 4980 5000 4920 4920 inge:	39.8 19.9 0.0 79.5	20.0 0.0 80.0	20.0 0.3 80.4	1.001 0.995
third point as left zero as left span 502 Scrubber Check Date of last scrubber cha Date of last converter ef	4960 4980 5000 4920 4920 inge: ficiency test:	39.8 19.9 0.0 79.5 79.8	20.0 0.0 80.0 798.0	20.0 0.3 80.4 0.1 Ave Corr Factor	1.001 0.995 0.996 efficiency
third point as left zero as left span O2 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found:	4960 4980 5000 4920 4920 inge: ficiency test: 79.9	39.8 19.9 0.0 79.5 79.8 Prev response:	20.0 0.0 80.0 798.0 80.41	20.0 0.3 80.4 0.1 Ave Corr Factor *% change:	1.001 0.995 0.996 efficiency -0.6%
third point as left zero	4960 4980 5000 4920 4920 inge: ficiency test:	39.8 19.9 0.0 79.5 79.8	20.0 0.0 80.0 798.0 80.41 1.004505	20.0 0.3 80.4 0.1 Ave Corr Factor	1.001 0.995 0.996 efficiency

Changed out the inlet filter after as founds. Scrubber check passed. Increased the converter temperature to 860C. Adjusted zero only.

Calibration Performed By:

Notes:

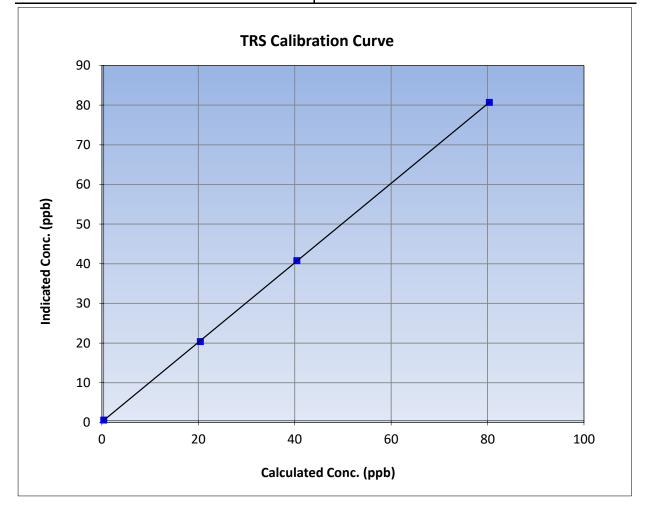
Rene Chamberland

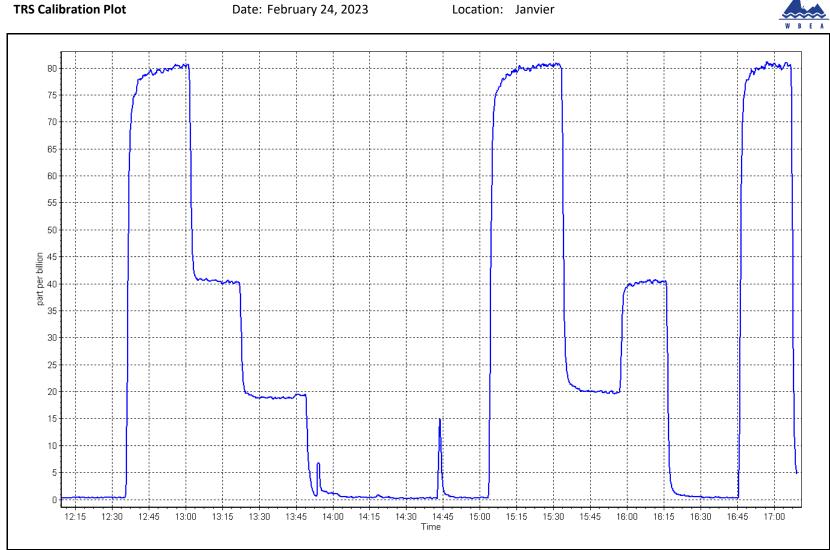


TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 24, 2023	Previous Calibration:	January 20, 2023				
Station Name:	Janvier	Station Number:	AMS22				
Start Time (MST):	12:12	End Time (MST):	17:09				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680031				

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	80.3	0.9961	correlation coefficient	0.999982	20.333
40.0	40.4	0.9911	Slope	1.002650	0.90 - 1.10
20.0	20.0	1.0010	Slope	1.002050	0.30 - 1.10
			Intercept	0.120931	+/-3









THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Sta	tion Information		
Station Name:	Janvier		Station number: AN	AS 22	
Calibration Date:	February 22, 20	23	Last Cal Date: Jai	nuary 17, 2023	}
Start time (MST):	12:33		End time (MST): 16	:31	
Reason:	Routine				
		Calil	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/	'A	
Removed CH4 Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm
Removed C3H8 Conc.	208.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄)	:		Diff between cyl (NM):		
Calibrator Model:	Teledyne API 70	00	Serial Number: 38	06	
ZAG make/model:	Teledyne API 70)1	Serial Number: 48	90	
		Ana	lyzer 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>Finish</u>	<u>l</u>	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 2.180E-04	2.180E-	04 NMHC SP Ratio:	4.69E-05	4.50E-05
CH4 Retention time	: 13.00	13.20	NMHC Peak Area:	195272	203120

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	17.43	0.985		
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	17.23	0.997		
second point	4960	39.9	8.59	8.57	1.002		
third point	4980	20.0	4.30	4.27	1.008		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	79.8	17.17	17.33	0.991		
			A	Average Correction Factor	1.002		
Baseline Corr AF:	17.43	Prev response	17.12	*% change	1.8%		
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 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	79.8	9.15	9.40	0.974		
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	9.17	0.997		
second point	4960	39.9	4.57	4.58	0.999		
third point	4980	20.0	2.29	2.28	1.005		
as left zero	5000	0	0.00	0.00			
as left span	4920	79.8	9.15	9.25	0.989		
			A	Average Correction Factor	1.001		
Baseline Corr AF:	9.40	Prev response	9.10	*% change	3.1%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>			

СН4	Cal	libra	tion	Data
CIII	Ca	i Di a	CIOIL	ναια

		CH4 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	79.8	8.03	8.04	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	79.8	8.03	8.06	0.996	
second point	4960	39.9	4.01	4.00	1.004	
third point	4980	20.0	2.01	1.99	1.010	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	79.8	8.03	8.08	0.994	
			A	verage Correction Factor	1.004	
Baseline Corr AF:	8.04	Prev response	8.02	*% change	0.2%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>		
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		
THC Cal Slope:		0.999594		1.003856		
THC Cal Offset:		-0.041578		-0.027606		
CH4 Cal Slope:		1.001935		1.004586		
CH4 Cal Offset:		-0.020955		-0.017766		
NMHC Cal Slope:		0.997466		1.003078		
NMHC Cal Offset:		-0.020822		-0.009039		

Notes:

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

Calibration Performed By:

Rene Chamberland



THC Calibration Summary

Version-01-2020

Calibration Date: February 22, 2023 Previous Calibration: January 17, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 12:33 End Time (MST): 16:31 Analyzer make: Thermo 55i Analyzer serial #: 1172750023			Station I	nformation			
Start Time (MST): 12.33 End Time (MST): 16.31 Analyzer make: Thermo 55i Analyzer serial #: 1172750023 Calibration Data Calibration Coefficient 0.999988 20.995 0.00 0.00 0.00 0.0958 17.17 17.23 0.9968 0.909 0.09958 4.30 4.27 1.0079 Slope 1.003856 0.90-1.10 1 Intercept -0.027606 +/4.5 THC Calibration Curve 0.0027606 +/4.5	Calibration Date:	February	22, 2023	Previous Calibration:	January 2	17, 2023	
Analyzer make: Thermo 551 Analyzer serial #: 1172750023 Calibration Data Calibration Data Control of the concentration (ppm) (c) Statistical Evaluation Control of the concentration (ppm) (c) Control of the concentration (ppm) (c) Statistical Evaluation Control of the concentration (ppm) (c) Control of the concentration (ppm)	Station Name:	Jan	vier	Station Number:	AMS	AMS 22	
Calibration Data Calibration Data Calculated concentration (ppm) (IC) Correction factor (Cc/IC) Statistical Evaluation Limits 0.00 0.00	Start Time (MST):	12	:33	End Time (MST):	16:	31	
Calculated concentration (ppm) (Cq) indicated concentration (ppm) (Cq) Correction factor (Cc/lc) Statistical Evaluation Limits 0.00 0.00	Analyzer make:	Therm	no 55i	Analyzer serial #:	11727	50023	
(ppm) (cc) (ppm) (tc) Correction factor (Co/c) Statistical Evaluation Lints 0.00 0.00			Calibra	tion Data			
17.17 17.23 0.9968 Correlation Coefficient 0.99988 2095 8.59 8.57 1.0018 Slope 1.003856 0.90-1.10 4.30 4.27 1.0079 Intercept -0.027606 +/0.5 THC Calibration Curve 16.0 14.0 12.0 10.0 10.0 10.0 10.00 8.0 6.0 4.0			Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
17.17 17.23 0.9968 8.59 8.57 1.0018 4.30 4.27 1.0079 Intercept -0.027606 4/0.5 THC Calibration Curve 100 100 100 100 100 100 100 10				Correlation Coefficient	0.999988	≥0.995	
4.30 4.27 1.0079 Stope 1.003856 0.90-1.10 Intercept -0.027606 +/-0.5 THC Calibration Curve 100 100 100 100 100 100 100 100 100 100							
Intercept -0.027606 -4.05				Slope	1.003856	0.90 - 1.10	
$\begin{array}{c} 20.0\\ 18.0\\ 16.0\\ 14.0\\ 12.0\\ 10.0\\ 8.0\\ 6.0\\ 4.0\\ 2.0\\ 0.0 \end{array}$				Intercept	-0.027606	+/-0.5	
14.0 12.0 10.0 8.0 6.0 4.0 2.0 0.0							
14.0 12.0 10.0 8.0 6.0 4.0 2.0 0.0	18.0 —						
12.0 10.0 8.0 6.0 4.0 2.0 0.0	16.0 -						
4.0 2.0 0.0	14.0 —						
4.0 2.0 0.0	E 12.0						
4.0 2.0 0.0	ق 2 10.0						
4.0 2.0 0.0	0 C						
4.0 2.0 0.0	- 0.6 udicat						
0.0							
	2.0 -						
0.0 5.0 10.0 15.0 20.0		/					
	0.0	5	.0	10.0	15.0	20.0	
Calculated Conc. (ppm)			Calculated	Conc. (ppm)			



CH₄ Calibration Summary

Version-01-2020

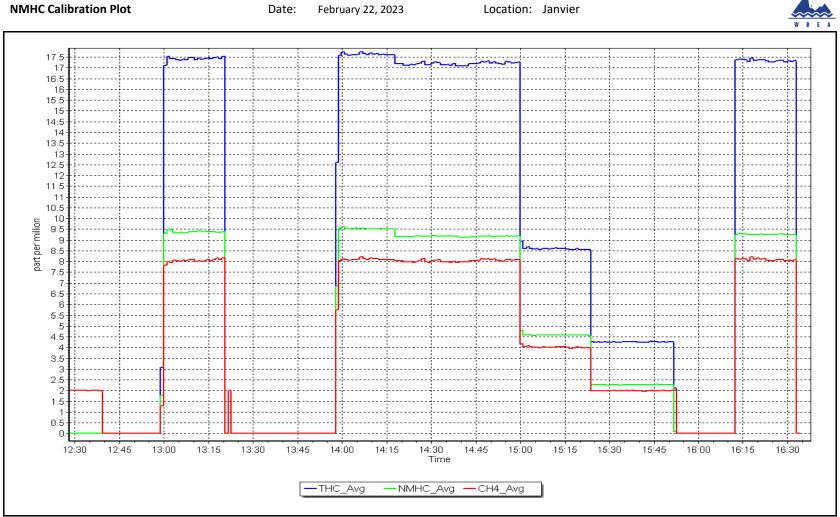
			Station	nformation		Version-01-20
Calibration Da	-+	Fabrua		Previous Calibration:	lanuari	17 2022
Lalibration Da			ry 22, 2023 nvier	Station Number:		17, 2023
			2:33		AM5 16:	
Start Time (M				End Time (MST):		
Analyzer mak	e:	Iner	mo 55i	Analyzer serial #:	11727	50023
			Calibra	tion Data		
Calculated conce (ppm) (Co		Indicated concentratior (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eva	luation	<u>Limits</u>
0.00 8.03		0.00 8.06	0.9962	Correlation Coefficient	0.999974	≥0.995
4.01		4.00	1.0044 1.0101	Slope	1.004586	0.90 - 1.10
				Intercept	-0.017766	+/-0.5
8.1	0					
6.0 Ed						
dd 5.0 5 u						
၀၄ 4.0 စစ္	0 +					
Indicated Conc. (ppm)	0					
– 2.0	0 -					
1.0	0 -					
0.						10.0
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		



NMHC Calibration Summary

Version-01-2020

Calibration Date: tation Name: tart Time (MST): nalyzer make:	Jai 1	y 22, 2023 nvier	Previous Calibration: Station Number:	January 1	
tart Time (MST):	1		Station Number:		
				AIVIS	22
nalyzer make:	Ther	2:33	End Time (MST):	16:	31
	· · · · ·	mo 55i	Analyzer serial #:	117275	50023
		Calibra	tion Data		
Calculated concentration Inc (ppm) (Cc)	dicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
9.15 4.57	9.17 4.58	0.9975			
2.29	2.28	1.0054	Slope	1.003078	0.90 - 1.10
			Intercept	-0.009039	+/-0.5
9.0 8.0 7.0					
6.0 (bbm) 5.0 Couc					
ວບ 5.0 OO					
0.4 udicated					
2.0					
1.0					
0.0	2.0		6.0	8.0	10.0
0.0	2.0	4.0	6.0 d Conc. (ppm)	8.0	10.0





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station Name: Calibration Date: Start time (MST): Reason: Janvier February 23, 2023 12:21 Routine

Station number: AMS 22 Last Cal Date: January 26, 2023 End time (MST): 17:33

Calibration Standards

NO Gas Cylinder #:	CC424183		Cal Gas Expiry Date:	April 16, 2023	
NOX Cal Gas Conc:	48.60	ppm	NO Cal Gas Conc:	48.60	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	48.60	ppm	Removed Gas NO Conc:	48.60	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700)	Serial Number:	3806	
ZAG make/model:	Teledyne API T70	L	Serial Number:	4890	

Analyzer Information

Analyzer make: NOX Range (ppb):	Teledyne API T200 0 - 1000 ppb		Analyzer serial #: 71	17	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.015	1.019	NO bkgnd or offset:	-0.3	-0.3
NOX coeff or slope:	1.004	1.009	NOX bkgnd or offset:	0.4	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	5.1	5.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004514	1.000016
NO _x Cal Offset:	-0.271695	0.328470
NO Cal Slope:	1.003357	0.999486
NO Cal Offset:	-0.891348	-0.011076
NO ₂ Cal Slope:	1.001018	0.999574
NO ₂ Cal Offset:	0.153243	0.324675



$NO_X \setminus NO \setminus NO_2$ 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	-0.3		
as found span	4918	82.3	799.9	799.9	0.0	794.3	790.8	3.5	1.0071	1.0115
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	4918	82.3	799.9	799.9	0.0	799.9	799.5	0.5	1.0000	1.0005
second point	4959	41.2	400.4	400.4	0.0	401.4	400.3	1.0	0.9976	1.0004
third point	4980	20.6	200.2	200.2	0.0	200.7	199.9	0.8	0.9975	1.0015
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2		
as left span	4918	82.3	799.9	395.8	404.1	797.4	402.1	395.3	1.0031	0.9844
							Average C	orrection Factor	0.9984	1.0008
Corrected As fo	ound NO _x =	794.6 ppb	NO =	790.9 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	-1.1%
Previous Respo	nse NO _x =	803.2 ppb	NO =	801.7 ppb				*Percent Chang	ge NO =	-1.4%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$NO_{\rm X} r^2$:		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	$1 NO_2 r^2$:		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)	798.0	393.9	404.1	403.9	1.0005	100.0%
2nd GPT point (200 ppb O3)	798.0	599.3	198.7	199.5	0.9960	100.4%
3rd GPT point (100 ppb O3)	798.0	699.7	98.3	98.9	0.9939	100.6%
			ŀ	Verage Correction Factor	0.9968	100.3%

Notes:

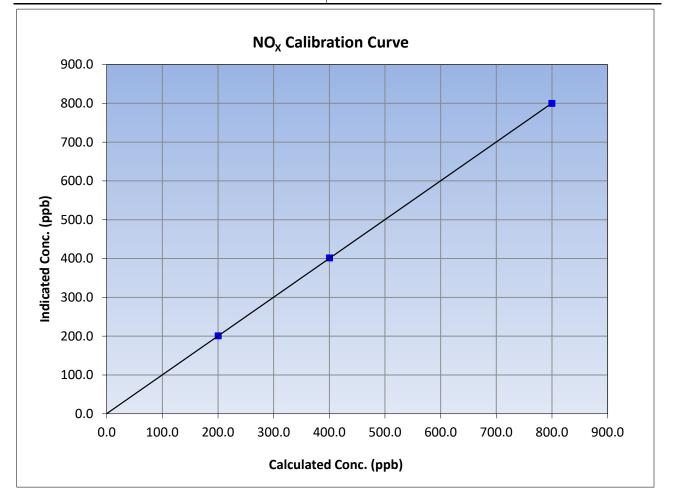
Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

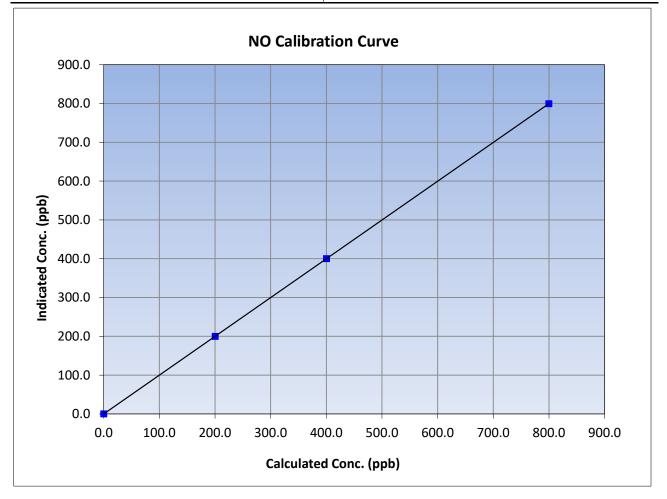
WBEA					Version-04-202
		Station	Information		
Calibration Date:	February	23, 2023	Previous Calibration:	Januar	y 26, 2023
Station Name:	Jan	vier	Station Number:	A	VIS 22
Start Time (MST):	12	:21	End Time (MST):	1	.7:33
Analyzer make:	Teledyne	e API T200	Analyzer serial #:	7	7117
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999998	≥0.995
799.9	799.9	1.0000	correlation coefficient	0.999998	20.555
400.4	401.4	0.9976	Slopp	1.000016	0.90 - 1.10
200.2	200.7	0.9975	Slope	1.000018	0.90 - 1.10
			Intercept	0.328470	+/-20





NO Calibration Summary

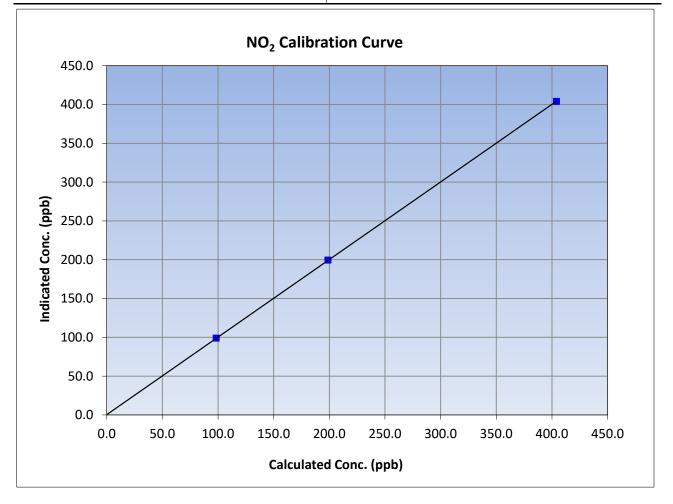
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	23, 2023	Previous Calibration:	Januai	ry 26, 2023
Station Name:	Jan	vier	Station Number:	A	MS 22
Start Time (MST):	12	:21	End Time (MST):	:	17:33
Analyzer make:	Teledyne	API T200	Analyzer serial #:		7117
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	1.000000	≥0.995
799.9	799.5	1.0005	correlation coefficient	1.000000	20.995
400.4	400.3	1.0004	Slope	0.999486	0.90 - 1.10
200.2	199.9	1.0015	Siope	0.999480	0.90 - 1.10
			Intercept	-0.011076	+/-20

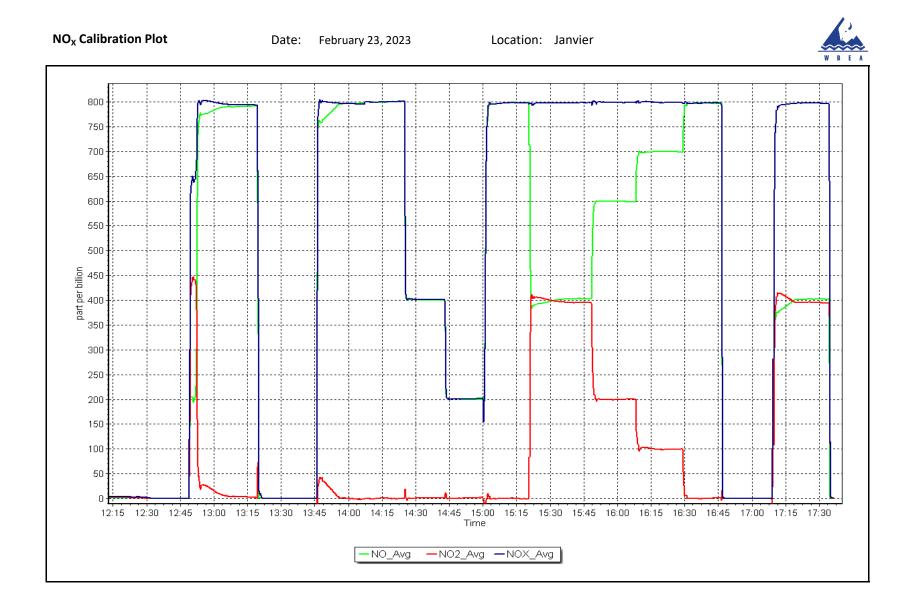




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	23, 2023	Previous Calibration:	January	26, 2023
Station Name:	Jan	vier	Station Number:	AN	1S 22
Start Time (MST):	12	:21	End Time (MST):	17	7:33
Analyzer make:	Teledyne	e API T200	Analyzer serial #:	7	117
Calculated concentration	Indicated concentration	Calibra	ation Data		
(ppb) (Cc)	(ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999991	≥0.995
404.1	403.9	1.0005	correlation coernelent	0.5555551	20.000
198.7	199.5	0.9960	Slope	0.999574	0.90 - 1.10
98.3	98.9	0.9939	Slope	0.999574	0.90 - 1.10
			Intercept	0.324675	+/-20







O₃ Calibration Report

Version-01-2020

					Version-01-202		
		Station Infor	mation				
Station Name: Calibration Date:	Janvier February 14, 2023		Station number: Last Cal Date:	AMS 22 January 25, 2023			
Start time (MST): Reason:	11:15 Routine	End time (MST): 14:07					
		Calibration St	andards				
O3 generation mode:	Photometer						
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3806			
ZAG Make/Model:	Teledyne API T701		Serial Number:	201			
		Analyzer Info	rmation				
Analyzer make Analyzer Range	: Teledyne API T400 e 0 - 500 ppb		Analyzer serial #:	3869			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>		
Calibration slope:	0.998486	1.000057	Backgd or Offset:	-2.0	-2.0		
Calibration intercept:	0.240000	0.440000	Coeff or Slope:	1.011	1.011		
		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/Ic Limit = 0.95-1.05		
as found zero	5000	800.0	0.0	-0.3			
as found span	4893	897.4	400.0	400.5	0.999		
as found 2nd point							
as found 3rd point							
calibrator zero	5000	800.0	0.0	0.2			
high point	4893	897.4	400.0	400.3	0.999		
second point	4893	752.6	200.0	200.7	0.997		
third point	4893	653.0	100.0	100.6	0.994		
as left zero	5000	800.0	0.0	0.4			
as left span	4816	897.4	400.0	402.0	0.995		
			Avera	ge Correction Factor	0.997		
Baseline Corr As found:	400.8	Previous response	399.6	*% change	0.3%		
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. No adjustments made.

Calibration Performed By:

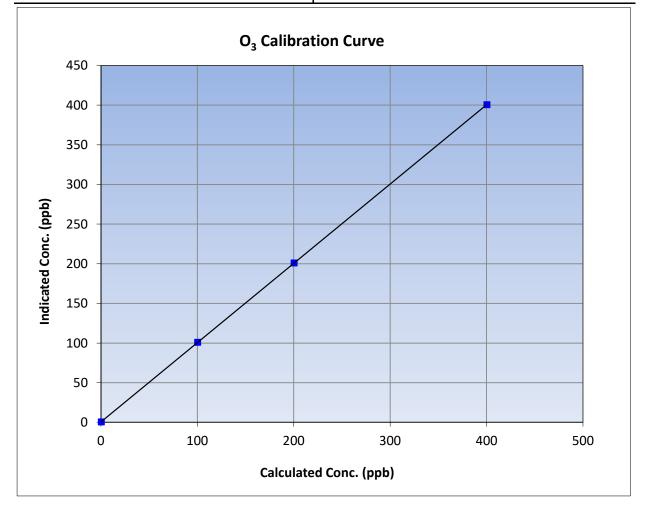
Rene Chamberland



O₃ Calibration Summary

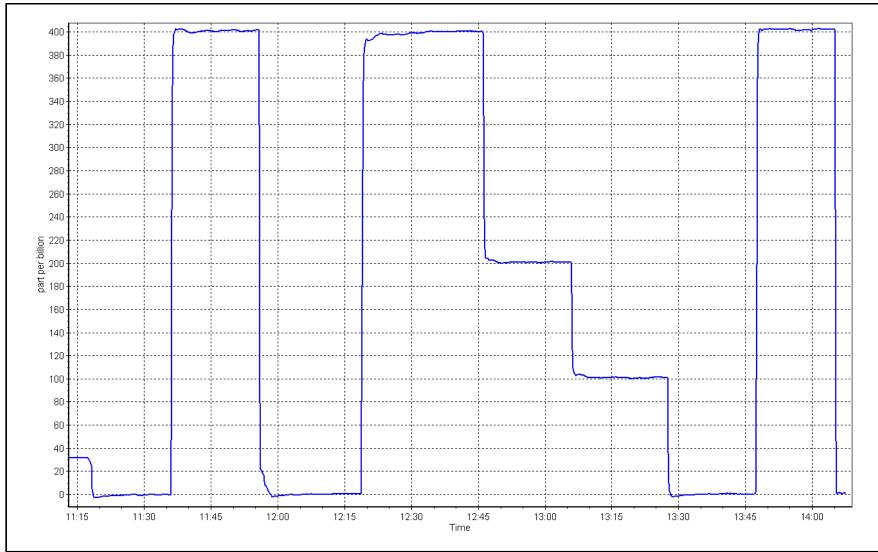
WBEA			Version-01-2020				
Station Information							
Calibration Date:	February 14, 2023	Previous Calibration:	January 25, 2023				
Station Name:	Janvier	Station Number:	AMS 22				
Start Time (MST):	11:15	End Time (MST):	14:07				
Analyzer make:	Teledyne API T400	Analyzer serial #:	3869				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999998	≥0.995
400.0	400.3	0.9993	correlation coefficient	0.999996	20.333
200.0	200.7	0.9965	Slope	1.000057	0.90 - 1.10
100.0	100.6	0.9940	Slope	1.000057	0.30 - 1.10
			Intercept	0.440000	+/- 5











T640 PM_{2.5} CALIBRATION

W D E A						Version-01-2023
		Station Information	ı			
Station Name:	Janvier		Station number:	AMS 22		
Calibration Date:	February 24, 2023		Last Cal Date:	January 26, 2	023	
Start time (MST):	14:17		End time (MST):	16:09		
Applyzor Makor	Taladuna ADI TE40		S/N:	275		
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		5/ N.	525		
	1 1012.5					
Flow Meter Make/Model:	Delta Cal		S/N:	1450		
Temp/RH standard:	Delta Cal		S/N:	1450		
		Monthly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u> </u>	<u>Adjusted</u>	(Limits)
T (°C)	-14.4	-14.7	-14.4			+/- 2 °C
P (mmHg)	716.4	714.2	716.4			+/- 10 mmHg
flow (LPM)	5.01	5.07	5.01			+/- 0.25 LPM
Leak Test:	Date of check:	February 24, 2023	Last Cal Date:	January 26	5 2023	
	PM w/o HEPA:	2.6	PM w/ HEPA:	0	, 2020	<0.2 ug/m3
Note: this leak check will be		quarterly work and will s		ntenance lea	k check	-
Inlet cleaning :	Inlet Head					
		Quarterly Calibration	Гest			
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>/</u>	Adjusted	(Limits)
PMT Peak Test						11.3 +/- 0.5
		_				
Post-maintenanc		PM w/o HEPA:		w/ HEPA:		
Date Optical Chan		January 26,			<0.2 ug/m3	
Disposable Filte	er Changed:	January 26,	2023			
		Annual Maintenanc	e			
Date Sample Tu	he Cleaned:	October 6,	2022			
Date Sample Tu Date RH/T Sens		October 6,				
Notes:		Verified flow, temperat	ture, and pressure. Leak	test passed.		
Calibration by:	Rene Chamberland					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS23 FORT HILLS FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills February 1, 2023 10:42 Routine		Station number: Last Cal Date: End time (MST):	AMS23 January 4, 2023 13:41	
		Calibration St	andards		
Cal Gas Concentration:	49.76	ppm	Cal Gas Exp Date:	January 5, 2025	
Cal Gas Cylinder #:	CC281425		Dave Cas Eve Data	NI / A	
Removed Cal Gas Conc:	49.76	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #: Calibrator Make/Model:	N/A API T700		Diff between cyl: Serial Number:	451	
ZAG Make/Model:	API 1700 API 1701		Serial Number:	5611	
	AITI/01		Senar Number.	5011	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1160290012	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.999236	0.997162	Backgd or Offset:	18.1	18.1
Calibration intercept:	-0.603450	-0.103174	Coeff or Slope:	1.048	1.048
		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/le Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.3	799.1	797.8	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.3	799.1	796.8	1.003
second point	4960	40.2	400.1	398.9	1.003
third point	4980	20.1	200.0	198.9	1.006
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.3	799.1	800.1	0.999
			Averag	ge Correction Factor	1.004
Baseline Corr As found:	797.90	Previous response		*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

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

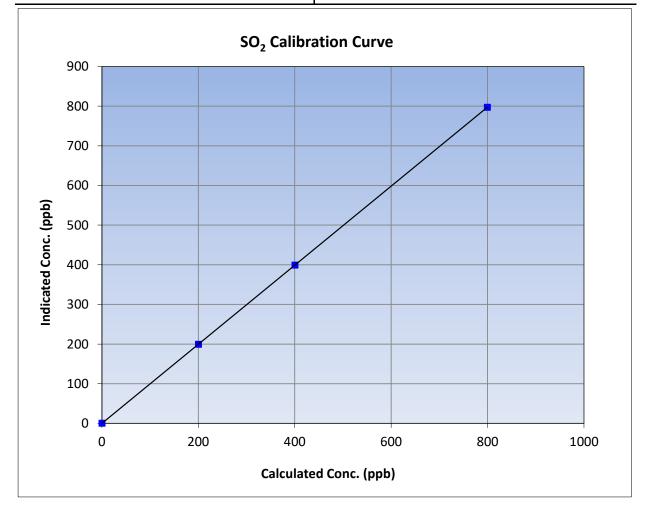
Calibration Performed By:

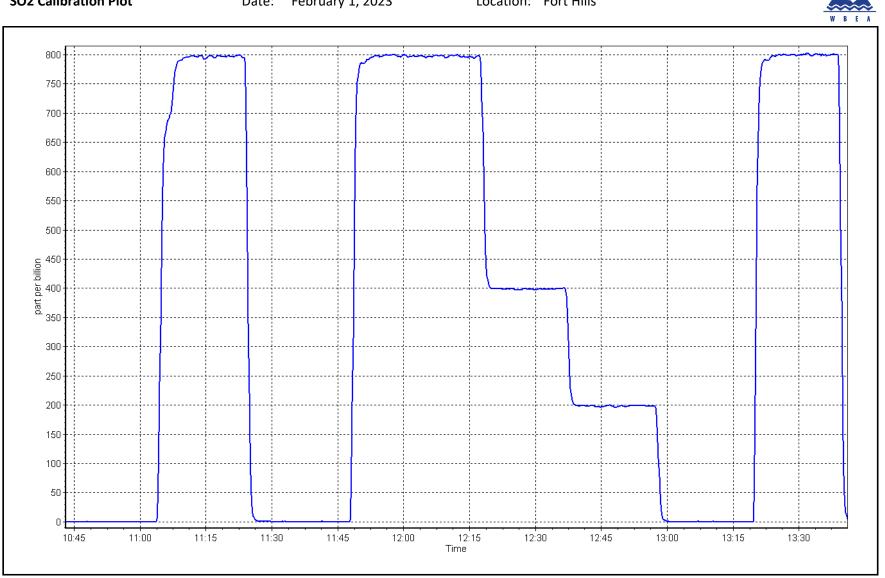


SO₂ Calibration Summary

Version-01-2020 Station Information						
Calibration Date:	February 1, 2023	Previous Calibration:	January 4, 2023			
Station Name:	Fort Hills	Station Number:	AMS23			
Start Time (MST):	10:42	End Time (MST):	13:41			
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290012			

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
799.1	796.8	1.0029	correlation coefficient	0.9999999	20.335
400.1	398.9	1.0029	Slope	0.997162	0.90 - 1.10
200.0	198.9	1.0057	Slope	0.997102	0.90 - 1.10
			- Intercept	-0.103174	+/-30





Location: Fort Hills



TRS Calibration Report

WBEA				•	V
		Station Info	rmation		Version-11-2
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills February 13, 2023 10:36 Routine	Station mo	Station number: Last Cal Date: End time (MST):	AMS23 January 10, 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:	N/A 451 5611	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQ TLE CDN-101 0 - 100 ppb	, mary 201 million	Analyzer serial #: Converter serial #:	12113311965 594	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.988739 0.581876	0.998176 -0.098303	Backgd or Offset: Coeff or Slope:	0.96 0.714	0.96 0.714
		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 Adjuste Correction facto (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4923	77.0	80.0	79.6	1.006
as found 2nd point	4962	38.5	40.0	39.6	1.013
as found 3rd point	4981	19.2	19.9	20.1	0.997
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 facto (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4923	77.0	80.0	79.8	1.003
second point	4962	38.5	40.0	39.9	1.002
third point	4981	19.2	19.9	19.5	1.023
as left zero	5000	0.0	0.0	0.1	
as left span	4923	77.0	80.0	80.1	0.999
602 Scrubber Check	4922	78.3	783.0	0.0	
Date of last scrubber cha				Ave Corr Factor	1.009
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	79.5	Prev response:	79.68	*% change:	-0.2%
buschine con As round.		AF Slope:		AF Intercept:	0.121822

Changed the inlet filter after as founds, ran a SO2 scrubber check after calibrator zero. No Notes: adjustments made. There are random spikes that are occurring, suspecting a problem with the calibrator, the dilution reading goes up during the spikes. Max Farrell

Calibration Performed By:

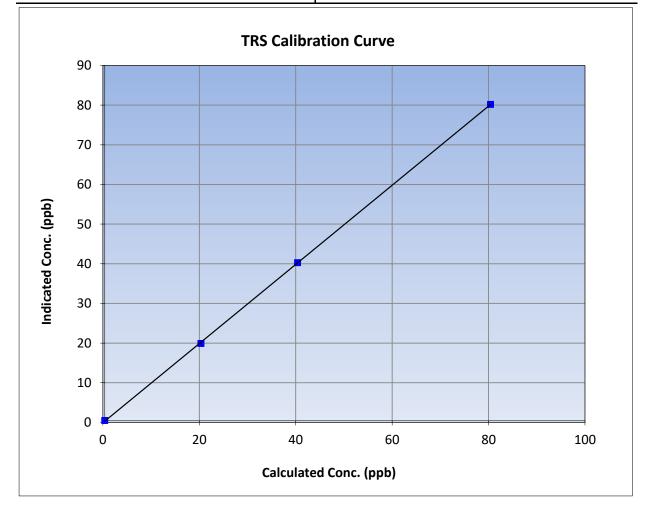
CALS 425

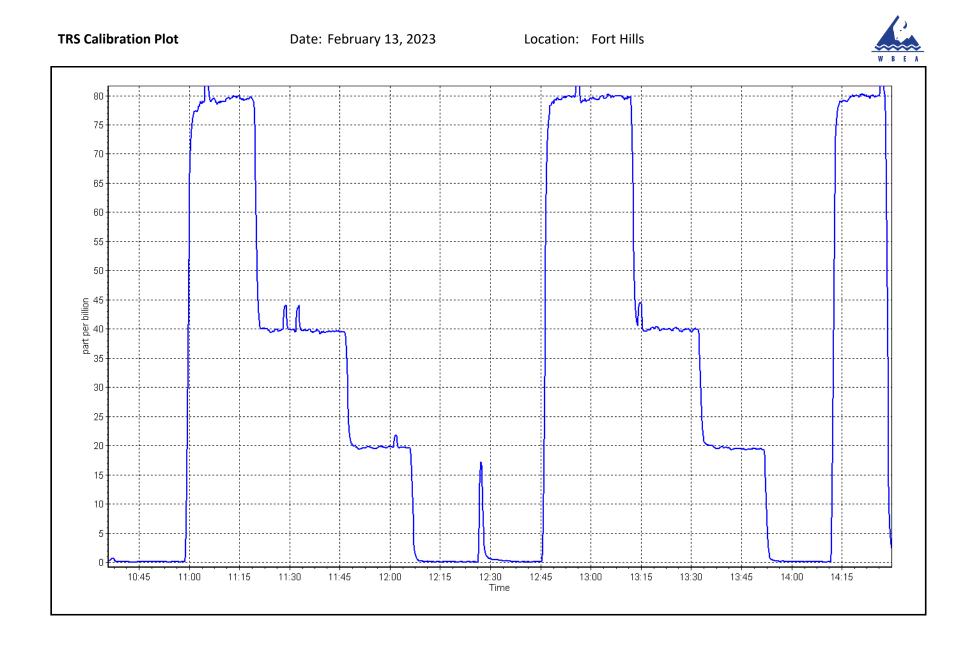


TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 13, 2023	Previous Calibration:	January 10, 2023				
Station Name:	Fort Hills	Station Number:	AMS23				
Start Time (MST):	10:36	End Time (MST):	14:30				
Analyzer make:	Thermo 43iQ TLE	Analyzer serial #:	12113311965				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999959	≥0.995	
80.0	79.8	1.0025	correlation coefficient	0.555555	20.333	
40.0	39.9	1.0024	Slope	0.998176	0.90 - 1.10	
19.9	19.5	1.0230	Slope	0.998170	0.90 - 1.10	
			Intercept	-0.098303	+/-3	







TRS Calibration Report

WBEA				•	Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills February 14, 2023 13:00 Maintenance		Station number: Last Cal Date: End time (MST):	AMS23 February 13, 2023 16:23	
		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:	N/A 451 5611	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQ TLE CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	12113311965 594	
Calibration slope: Calibration intercept:	<u>Start</u> 0.998176 -0.098303	<u>Finish</u> 1.004890 -0.158196	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 0.96 0.714
		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	0.2	
as found span	4923	77.0	80.0	80.3	0.999
as found 2nd point	4962	38.5	40.0	40.0	1.005
as found 3rd point	4981	19.2	19.9	19.6	1.028
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	0.1	
high point	4923	77.0	80.0	80.3	0.996
second point	4962	38.5	40.0	40.1	0.997
third point	4981	19.2	19.9	19.5	1.023
as left zero	5000	0.0	0.0	0.1	
as left span	4923	77.0	80.0	80.0	1.000
02 Scrubber Check	4922	78.3	783.0	0.0	
Date of last scrubber cha	inge:			Ave Corr Factor	1.006
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	80.1	Prev response:	79.76	*% change:	0.4%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	39.8 19.4	AF Slope: AF Correlation:	1.003318	AF Intercept:	-0.078208
				* = > +/-5% change initiate	es investigation

 Internal pump randomly drops in flow, turned off the internal pump and hooked up an external

 Notes:
 pump after multipoint as founds. No adjustments made. More spikes detected on the third point, will monitor the instrument.

Calibration Performed By:

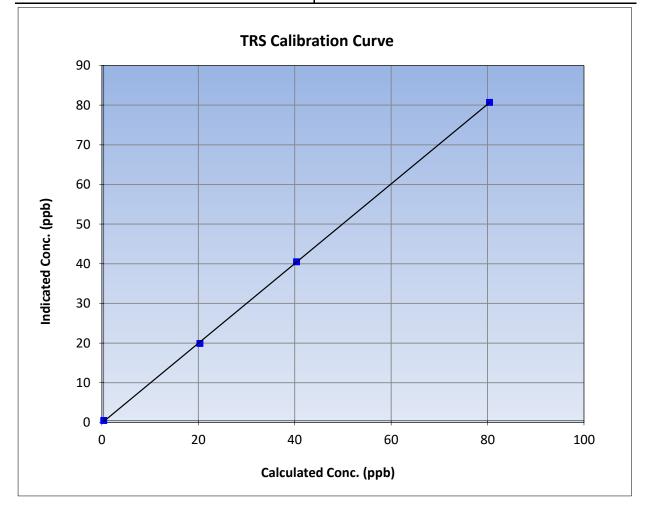
Max Farrell

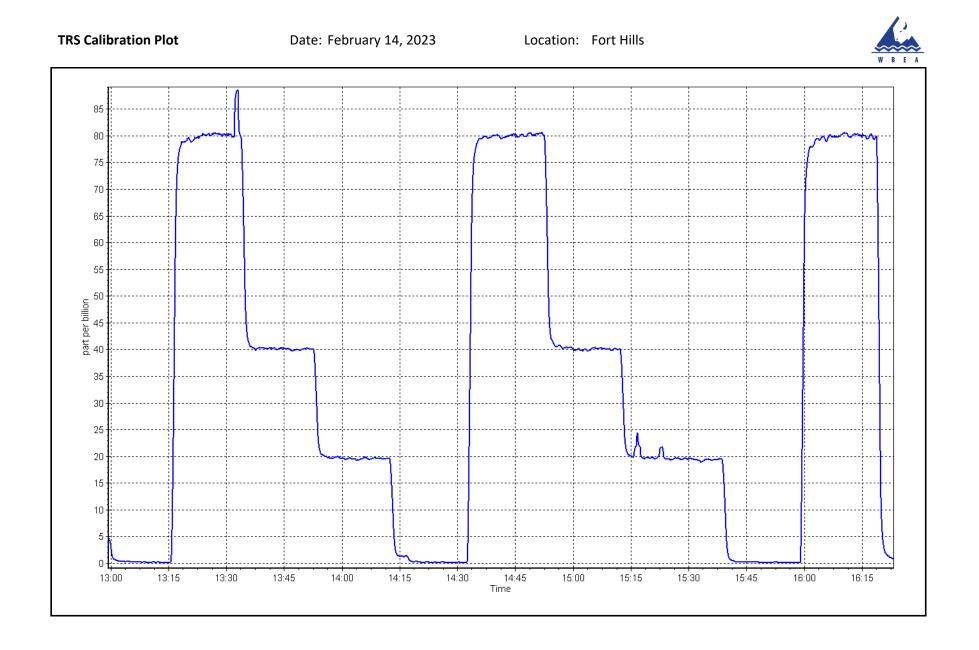


TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 14, 2023	Previous Calibration:	February 13, 2023				
Station Name:	Fort Hills	Station Number:	AMS23				
Start Time (MST):	13:00	End Time (MST):	16:23				
Analyzer make:	Thermo 43iQ TLE	Analyzer serial #:	12113311965				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999936	≥0.995	
80.0	80.3	0.9963	correlation coefficient	0.999930	20.333	
40.0	40.1	0.9974	Slope	1.004890	0.90 - 1.10	
19.9	19.5	1.0230	Slope	1.004890	0.90 - 1.10	
			Intercept	-0.158196	+/-3	







THC / CH_4 / NMHC Calibration Report

WBEA						Versi	on-01-202
			Station	Information			
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills February 1, 20 10:42 Routine)23	Station number: AMS23 Last Cal Date: January 18, 2023 End time (MST): 13:41				
			Calibrati	on Standards			
Gas Cert Reference:	CC281425			Cal Gas Expiry Date: January 5, 2025			
CH4 Cal Gas Conc.	500.2	ppm		CH4 Equiv Conc.	1070.6	ppm	
C3H8 Cal Gas Conc.	207.4	ppm					
Removed Gas Cert:		N/A		Removed Gas Expiry: N	/A		
Removed CH4 Conc.	500.2	ppm		CH4 Equiv Conc.	1070.6	ppm	
Removed C3H8 Conc.	207.4	ppm		Diff between cyl (THC):			
Diff between cyl (CH ₄):	:			Diff between cyl (NM):			
Calibrator Model:	API T700			Serial Number: 45	51		
ZAG make/model:	API T701			Serial Number: 56	511		
			Analyzei	⁻ Information			
Analyzer make: Thermo 55i THC Range (ppm): 0 - 20 ppm			Analyzer serial #: 1193585648				
NMHC Range (ppm): 0 - 10 ppm			CH4 Range (ppm): 0 - 10 ppm				
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Fini</u>	<u>sh</u>
CH4 SP Ratio	: 2.33E-04	. 2	.28E-04	NMHC SP Ratio:	5.01E-05	5.01	E-05
CH4 Retention time:	: 13.0		13.0	NMHC Peak Area:	180258	1802	258

THC 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	80.3	17.19	17.65	0.974			
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	17.29	0.995			
second point	4960	40.2	8.61	8.60	1.000			
third point	4980	20.1	4.30	4.32	0.996			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.3	17.19	17.33	0.992			
			A	verage Correction Factor	0.997			
Baseline Corr AF:	17.65	Prev response	17.18	*% change	2.7%			
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	4920	80.3	9.16	9.36	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	80.3	9.16	9.20	0.996			
second point	4960	40.2	4.59	4.62	0.993			
third point	4980	20.1	2.29	2.34	0.980			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.3	9.16	9.18	0.998			
			A	Average Correction Factor	0.990			
Baseline Corr AF:	9.36	Prev response	9.15	*% change	2.2%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>				

СЦЛ	Cal	ibration	Data
CH4	Cai	INIALIOII	Dala

		CIT+ Calibra	tion Data				
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (lc)	CF <i>Limit=</i> 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.3	8.03	8.29	0.969		
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	8.08	0.994		
second point	4960	40.2	4.02	3.99	1.009		
third point	4980	20.1	2.01	1.98	1.015		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.3	8.03	8.14	0.987		
			A	verage Correction Factor	1.006		
Baseline Corr AF:	8.29	Prev response	8.03	*% change	3.1%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation			
		Calibration	Statistics				
		<u>Start</u>		Finish			
THC Cal Slope:		0.998822		1.005188			
THC Cal Offset:		0.006016		-0.012392			
CH4 Cal Slope:		1.001922		1.007325			
CH4 Cal Offset:		-0.016245		-0.029242			
NMHC Cal Slope:		0.996115		1.003089			
NMHC Cal Offset:		0.022460		0.017251			

Notes:

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

Calibration Performed By:

Max Farrell



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	Februar	y 1, 2023	Previous Calibration:	January	18, 2023
Station Name:	Fort	: Hills	Station Number:	AM	S23
Start Time (MST):	10	:42	End Time (MST):	13:	41
Analyzer make:	Therr	no 55i	Analyzer serial #:	11935	85648
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	ion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999989	≥0.995
17.19	17.29	0.9946			
8.61 4.30	8.60 4.32	1.0005 0.9960	Slope	1.005188	0.90 - 1.10
+.30	7.52	0.5500	Intercept	-0.012392	+/-0.5
20.0 - 18.0 -					
16.0 -					
14.0 -					
ີ ຍຸດ 12.0 -					
ີ ແມ່ 12.0 - ອີງ ເມີດ ອີງ ເມີດ -					
ated C -					
– 0.8 – – 0.6 –					
4.0 -					
2.0 -					
0.0	0 5	.0	10.0	15.0	20.0
0.	U D	Calculated		13.0	20.0



CH₄ Calibration Summary

Version-01-2020

		Station	Information		
Calibration Date	: Feb	ruary 1, 2023	Previous Calibration:	January	18, 2023
Station Name:		Fort Hills	Station Number:	ÂM	
Start Time (MST)	:	10:42	End Time (MST):	13	41
Analyzer make:		hermo 55i	Analyzer serial #:	11935	85648
		Calib	ration Data		
Calculated concentra (ppm) (Cc)	ation Indicated concentra (ppm) (Ic)	tion Correction factor (Cc/Io	c) Statistical Eva	luation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999921	≥0.995
8.03	8.08 3.99	0.9937			
2.01	1.98	1.0089	Slope	1.007325	0.90 - 1.10
			Intercept	-0.029242	+/-0.5
9.0 8.0 7.0 6.0					
(udd) 5.0 Couc: 4.0					
ndicated 3.0					
2.0					
1.0					
0.0	0.0 2.	0 4.0	6.0	8.0	10.0
			ed Conc. (ppm)		



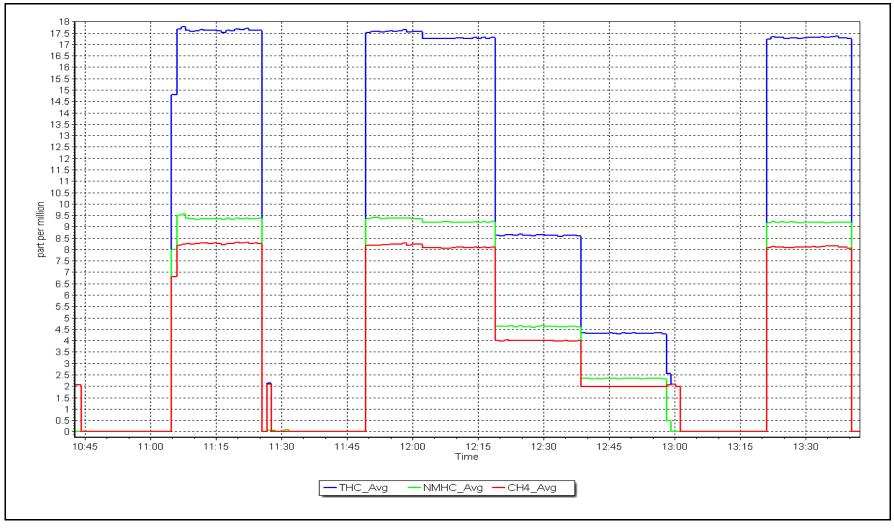
NMHC Calibration Summary

Version-01-2020

			Station I	nformation			
Calibration	Calibration Date: February 1, 2023		Previous Calibration: Januar		January 1	8, 2023	
Station Nan	ation Name: Fort Hills		Station Nur	mber:	AMS	23	
Start Time (MST):	1	0:42	End Time (I	MST):	13:4	11
Analyzer ma	ake:	Ther	mo 55i	Analyzer se	rial #:	119358	5648
			Calibra	ation Data			
Calculated cor (ppm)		ion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Stati	stical Evaluation		<u>Limits</u>
0.0		0.00		Correlation Coeffi	icient 0.9	999981	≥0.995
9.1		9.20	0.9957				
2.2		2.34	0.9932	Slope	1.0	003089	0.90 - 1.10
		-		- Intercept	0.0)17251	+/-0.5
(mqq)	0.0 - 9.0 - 8.0 - 7.0 - 5.0 - 5.0 -						
ed Cor	4.0 -						
ndicate	3.0 -						
	2.0 -						
	1.0 -						
).0 -						
	0.	0 2.0	4.0	6.0		8.0	10.0
			Calculated	d Conc. (ppm)			

NMHC Calibration Plot







Station Name:

Reason:

Calibration Date:

Start time (MST):

Fort Hills

10:01

Routine

February 17, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS23 Last Cal Date: January 24, 2023 End time (MST): 14:49

Calibra	ation	Stand	lards

NO Gas Cylinder #:	CC332703		Cal Gas Expiry Date: Janua	ary 28, 202	4
NOX Cal Gas Conc:	49.7	ppm	NO Cal Gas Conc:	49.7	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date: N/A		
Removed Gas NOX Conc:	49.7	ppm	Removed Gas NO Conc:	49.7	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T750)	Serial Number:	275	
ZAG make/model:	Teledyne API T751	н	Serial Number:	307	

Analyzer make: NOX Range (ppb):			Analyzer serial #: 11	52430007	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.527	1.565	NO bkgnd or offset:	4.3	4.4
NOX coeff or slope:	0.997	0.997	NOX bkgnd or offset:	4.7	4.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	225.4	230.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999637	1.000236
NO _x Cal Offset:	0.644160	0.184305
NO Cal Slope:	0.999282	0.999895
NO Cal Offset:	-0.256715	-0.496226
NO ₂ Cal Slope:	1.001046	0.995394
NO ₂ Cal Offset:	0.284247	-0.512082



$NO_X \setminus NO \setminus NO_2$ 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	0.0	-0.3		
as found span	4920	80.5	800.2	800.2	0.0	781.1	777.7	3.4	1.024	1.029
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3		
high point	4920	80.5	800.2	800.2	0.0	799.9	799.4	0.5	1.000	1.001
second point	4960	40.2	399.6	399.6	0.0	401.3	400.1	1.2	0.996	0.999
third point	4980	20.1	199.8	199.8	0.0	199.7	197.9	1.8	1.000	1.010
as left zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.2	-0.3		
as left span	4920	80.5	800.2	435.3	364.9	799.7	435.1	364.5	1.001	1.000
							Average C	orrection Factor	0.999	1.003
Corrected As fo	ound NO _x =	781.4 ppb	NO =	777.7 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-2.4%
Previous Respo	nse NO _x =	800.5 ppb	NO =	799.3 ppb				*Percent Chang	ge NO =	-2.8%
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/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	433.4	364.9	362.7	1.006	99.4%
2nd GPT point (200 ppb O3)	798.3	616.5	181.8	180.7	1.006	99.4%
3rd GPT point (100 ppb O3)	798.3	704.2	94.1	92.7	1.015	98.5%
			A	Average Correction Factor	1.009	99.1%

Notes:

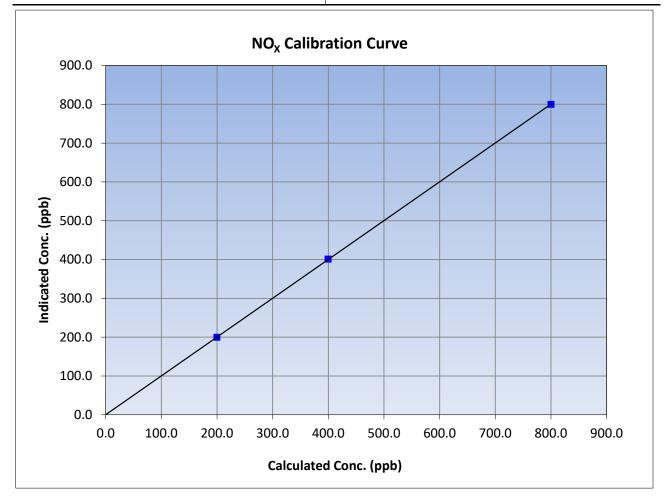
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

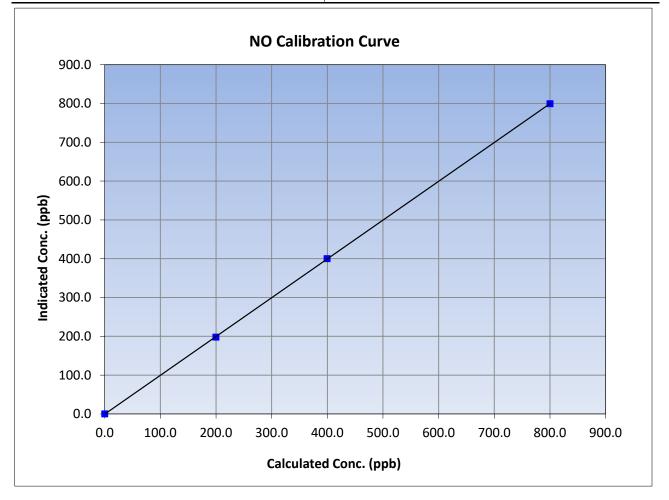
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	February	February 17, 2023		January	24, 2023	
Station Name:	Fort	Hills	Station Number:	AM	S23	
Start Time (MST):	ST): 10:01		End Time (MST):	14	:49	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1152430007		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.3		Correlation Coefficient	0.999992	≥0.995	
800.2	799.9	1.0003	correlation coernelent	0.555552	20.333	
399.6	401.3	0.9957	Slope	1.000236		
199.8	199.7	1.0005	Slope	1.000250	0.90 - 1.10	
			Intercept	0.184305	+/-20	





NO Calibration Summary

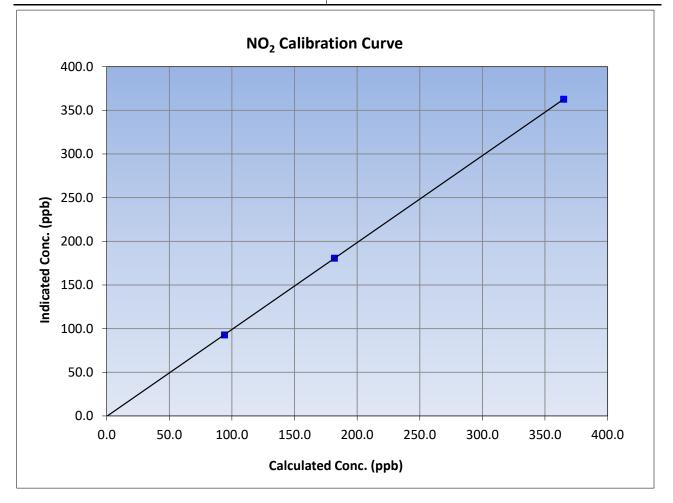
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	17, 2023	Previous Calibration:	January	24, 2023
Station Name:	Fort	Hills	Station Number:	AM	IS23
Start Time (MST):	ne (MST): 10:01		End Time (MST):	14	:49
Analyzer make:	Therr	no 42i	Analyzer serial #:	1152430007	
		Calibra	ation 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	0.999991	≥0.995
800.2	799.4	1.0010	correlation coernelent	0.999991	20.333
399.6	400.1	0.9987	Slope	0.999895	0.90 - 1.10
199.8	197.9	1.0096	Slope	0.999695	0.90 - 1.10
			Intercept	-0.496226	+/-20

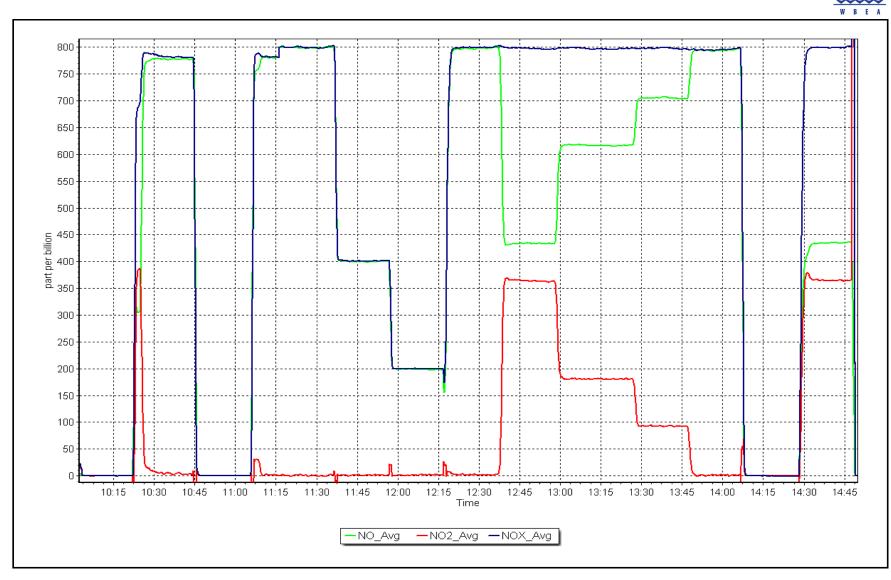




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	February 17, 2023		Previous Calibration: Jar		24, 2023
Station Name:	Fort	Hills	Station Number:	AM	S23
Start Time (MST):	ne (MST): 10:01		End Time (MST):	14	:49
Analyzer make:	Therr	no 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	-0.3		Correlation Coefficient	0.999996	≥0.995
364.9	362.7	1.0061	correlation coernelent	0.5555550	20.999
181.8	180.7	1.0061	Slope	0.995394	0.90 - 1.10
94.1	92.7	1.0151	Slope	0.995594	0.30 - 1.10
			Intercept	-0.512082	+/-20





Location: Fort Hills



NO_x Cal Offset:

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 Ir	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills February 23, 2023 10:56 Maintenance	Pump o	change	Station number: Last Cal Date: End time (MST):	February 17, 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	P P · · · ·		Removed Gas Exp Date:	-	F F
, Removed Gas NOX Conc:	49.7	ppm		Removed Gas NO Conc:	49.7	ppm
NOX gas Diff:				NO gas Diff:		
Calibrator Model:	Teledyne API T750	1		Serial Number:	275	
ZAG make/model:	Teledyne API T751	4		Serial Number:	307	
			Analyzer I	nformation		
Analyzer make:	Thermo 42i			Analyzer serial #:	1152430007	
NOX Range (ppb):						
0 (11)			ettk		Charact	E ta ia h
	<u>Start</u>	-	Finish		<u>Start</u>	<u>Finish</u>
NO coeff or slope			1.815	NO bkgnd or offset:	4.4	5.1
NOX coeff or slope			0.996	NOX bkgnd or offset:	4.8	5.6
NO2 coeff or slope	: 1.000		1.000	Reaction cell Press:	266.6	266.3
			Calibratio	n Statistics		
		:	<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	1.	000236		1.004364	

0.184305

0.999895

-0.496226

0.995394

-0.512082

0.065025

1.005722

-0.434914

0.999767

-0.637319



$NO_X \setminus NO \setminus NO_2$ 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/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2		
as found span	4920	80.5	800.2	800.2	0.0	699.4	697.6	1.8	1.144	1.147
as found 2nd	4960	40.2	399.6	399.6	0.0	350.2	347.6	2.6	1.1410	1.1495
as found 3rd	4980	20.1	199.8	199.8	0.0	174.3	172.2	2.2	1.1462	1.1602
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.2		
high point	4920	80.5	800.2	800.2	0.0	803.2	804.0	-0.9	0.996	0.995
second point	4960	40.2	399.6	399.6	0.0	402.5	402.6	-0.1	0.993	0.992
third point	4980	20.1	199.8	199.8	0.0	200.6	199.4	1.2	0.996	1.002
as left zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.3	-0.2		
as left span	4920	80.5	800.2	430.6	369.6	801.8	432.1	369.8	0.998	0.996
							Average C	orrection Factor	0.995	0.997
Corrected As fo	ound NO _x =	699.6 ppb	NO =	697.6 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO _x =	-14.4%
Previous Respo	onse NO _x =	800.5 ppb	NO =	799.6 ppb				*Percent Chan	ge NO =	-14.6%
Baseline Corr 2	nd pt NO _X =	350.4 ppb	NO =	347.6 ppb	As foun	d $NO_{\chi} r^2$:	0.999997	Nx SI: 0.8745	40 Nx Int:	-0.062
Baseline Corr 3	rd pt NO _X =	174.5 ppb	NO =	172.2 ppb	As foun	d NO r ² :	0.999991	NO SI: 0.8725	57 NO Int:	-0.943
					As foun	d $NO_2 r^2$:	1.000000	NO2 SI: 1.0034	30 NO ₂ Int:	-0.200

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			0.0	-0.2		
as found GPT point (400 ppb NO2)	694.7	374.0	320.7	321.6	0.9972	100.3%
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	800.5	430.9	369.6	369.0	1.002	99.8%
2nd GPT point (200 ppb O3)	800.5	617.0	183.5	182.9	1.003	99.7%
3rd GPT point (100 ppb O3)	800.5	706.4	94.1	92.8	1.014	98.6%
			ŀ	Average Correction Factor	1.006	99.4%

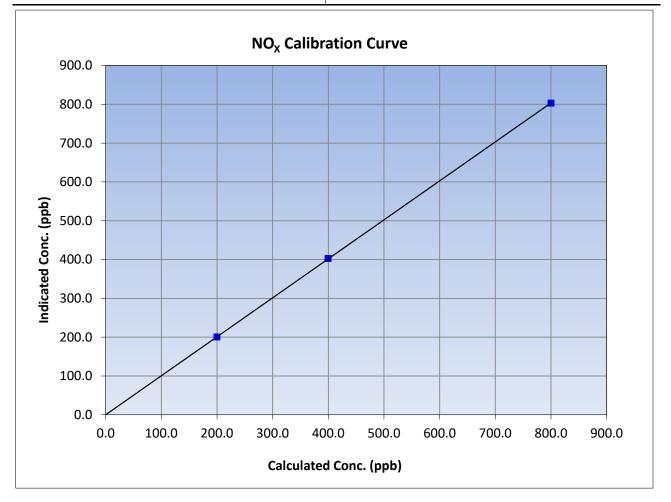
Notes: Daily span is 13% low and pump flow went down since yesterday. Swapped out the pump after multi-point as founds. Chamber pressure stayed the same with the new pump. There is possibly a leak somewhere inside the instrument. Adjusted the span only. Check Doctit for more info.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

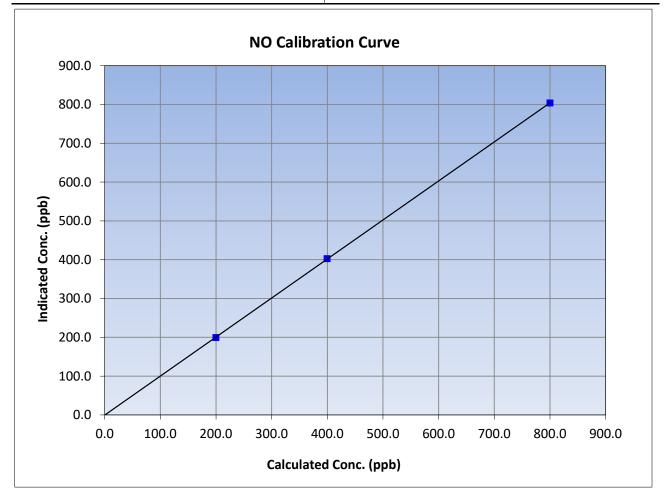
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	February	23, 2023	Previous Calibration:	February	17, 2023	
Station Name:	Fort	Hills	Station Number:	AM	S23	
Start Time (MST):	T): 10:56		End Time (MST):	17	:40	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1152430007		
		Calibra	ation 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	0.999995	≥0.995	
800.2	803.2	0.9962	correlation coernelent	0.999995	20.995	
399.6	402.5	0.9927	Slope	1.004364	0.90 - 1.10	
199.8	200.6	0.9960	Slope	1.004304	0.90 - 1.10	
			Intercept	0.065025	+/-20	





NO Calibration Summary

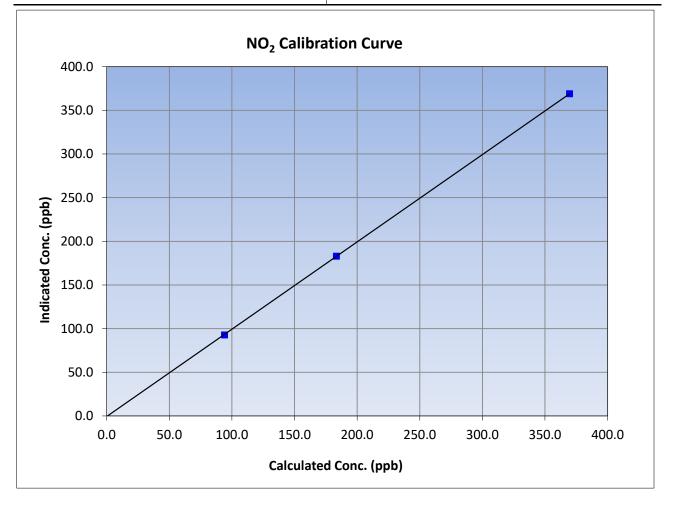
WBEA					Version-04-2
		Station	Information		
Calibration Date:	February	23, 2023	Previous Calibration:	February	17, 2023
Station Name:	Fort	Hills	Station Number:	AM	S23
Start Time (MST):	(MST): 10:56		End Time (MST):	17	:40
Analyzer make:	Therr	no 42i	Analyzer serial #:	1152430007	
		Calibra	ation Data		
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
800.2	804.0	0.9952	correlation coernelent	0.555552	20.995
399.6	402.6	0.9925	Slope	1.005722	0.90 - 1.10
199.8	199.4	1.0020	Siope	1.003722	0.90 - 1.10
			Intercept	-0.434914	+/-20

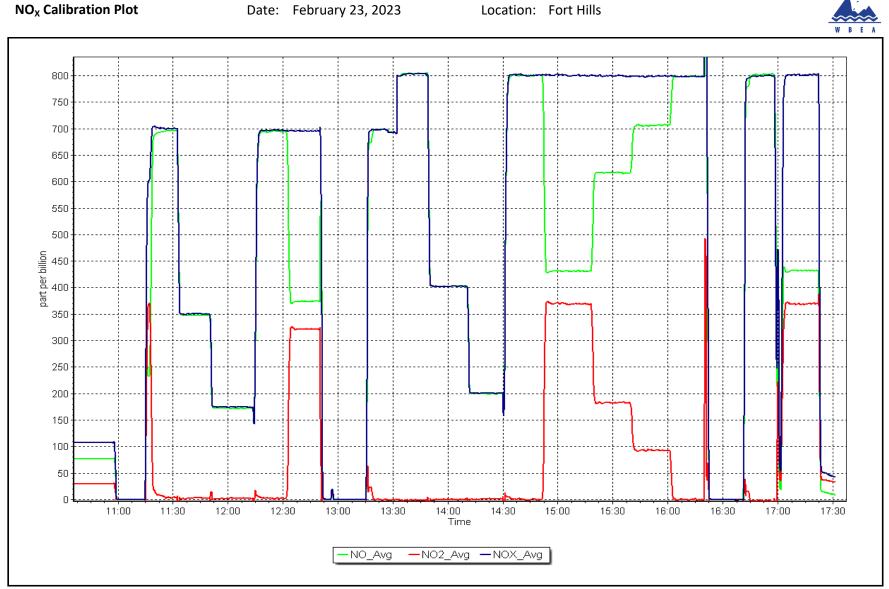




NO₂ Calibration Summary

WBEA					Version-04-202	
		Station	Information			
Calibration Date:	alibration Date: February		Previous Calibration:	February	17, 2023	
Station Name:	Fort	Hills	Station Number:	AM	S23	
Start Time (MST):	ST): 10:56		End Time (MST):	17	:40	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1152430007		
		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	
369.6	369.0	1.0016	correlation coernelent	0.555552	20.999	
183.5	182.9	1.0033	Slope	0.999767		
94.1	92.8	1.0140	Slope	0.999707	0.90 - 1.10	
			Intercept	-0.637319	+/-20	







T640 PM_{2.5} CALIBRATION

WDEA						Version-01-2023
		Station Information	n			
Station Name:	Fort Hills		Station number:	AMS 23		
Calibration Date:	February 17, 2023		Last Cal Date:	January 18, 2023	3	
Start time (MST):	10:40		End time (MST):	11:14		
			c (b)	44.60		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	1162		
Particulate Fraction:	PIVIZ.5					
Flow Meter Make/Model:	DeltaCal		S/N:	141229		
Temp/RH standard:	DeltaCal		S/N:	141229		
		Monthly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjı</u>	usted	(Limits)
T (°C)	-17.5	-17.5	-17.5			+/- 2 °C
P (mmHg)	734.5	728.4	734.5	[+/- 10 mmHg
flow (LPM)	5.02	4.95	5.02	[+/- 0.25 LPM
Leak Test:	Date of check:	February 17, 2023	Last Cal Date:	January 18, 20)23	
	PM w/o HEPA:	9.2	PM w/ HEPA:	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 ch	neck	
Inlet cleaning :	Inlet Head	\checkmark				
		Quarterly Calibration	Test			
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adju</u>	usted	(Limits)
PMT Peak Test				[11.3 +/- 0.5
Post-maintenance		PM w/o HEPA:		w/ HEPA:		
Date Optical Chan	-	December 8				<0.2 ug/m3
Disposable Filte	er Changed:	December 8	3, 2022			
		Annual Maintenanc	e			
Date Sample Tul	be Cleaned:	September 2	6, 2022			
Date RH/T Sens	-	September 2	,			
Notes:	Quarterly calib	ration completed in Dec	ember. No adjustmo	ents made. Leak	check	passed.
Calibration by:	Max Farrell					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date:	Waskow ohci Pimat March 15, 2023	isiwin	Station number: Last Cal Date:	AMS25 January 3, 2023	
Start time (MST): Reason:	10:00 Install		End time (MST):	12:12	
		Calibration St	andards		
Cal Gas Concentration:	52.4	ppm	Cal Gas Exp Date:	October 19, 2022	
Cal Gas Cylinder #:	ET0016672				
Removed Cal Gas Conc:	52.4	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:			Diff between cyl:	747	
Calibrator Make/Model:	API T700		Serial Number:	747	
ZAG Make/Model:	API T701		Serial Number:	261	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1118148497	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.999783	1.006789	Backgd or Offset:	11.0	10.1
Calibration intercept:	-0.314119	-0.116149	Coeff or Slope:	1.212	1.039
		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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4924	76.3	799.6	804.6	0.994
second point	4962	38.2	400.3	403.9	0.991
third point	4981	19.1	200.2	200.6	0.998
as left zero	5000	0.0	0.0	0.4	
as left span	4924	76.3	799.6	808.9	0.988
			Averag	ge Correction Factor	0.994
Baseline Corr As found:	NA	Previous response	NA	*% change	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		•	

Notes:

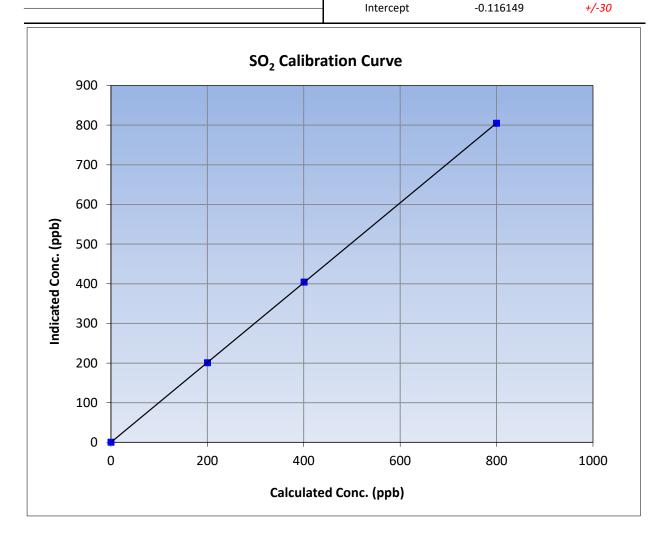
Install calibration from power being put back on. Flash lamp adjustment and Initial flash reference done. Zero and Span adjusted.

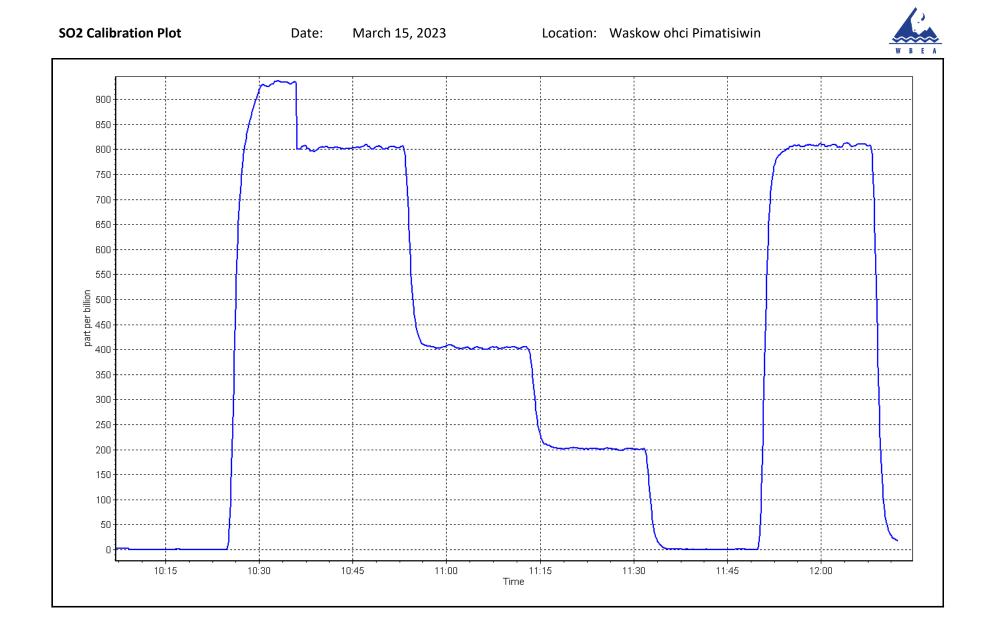
Calibration Performed By:



SO₂ Calibration Summary

WBEA					Version-01-20
		Station	Information		
Calibration Date:	March 15, 2023		Previous Calibration:	January	/ 3, 2023
tation Name:	ne: Waskow ohci Pimatisiwin		Station Number:	AN	1S25
tart Time (MST):	Time (MST): 10:00		End Time (MST):	12	2:12
Analyzer make:	Thermo 43i		Analyzer serial #:	11182	L48497
		Calibr	ation Data		
Calculated concentration li (ppb) (Cc)	ndicated concentration (ppb) (lc)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Constantion Confficient	0.000005	> 0.005
799.6	804.6	0.9938	Correlation Coefficient	0.999995	≥0.995
400.3	403.9	0.9911	Slope	1.006789	0.90 - 1.10
200.2	200.6	0.9978	Siope	1.000789	0.90 - 1.10
				0.4464.40	100







H₂S Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Waskow ohci Pima March 16, 2023 7:20 Install	tisiwin	Station number: Last Cal Date: End time (MST):	AMS25 January 11, 2023 10:14	
		Calibration S	tandards		
Cal Gas Concentration:	4.90	ppm	Cal Gas Exp Date:	May 5, 2023	
Cal Gas Cylinder #:	LL119538		·	, .	
Removed Cal Gas Conc:	4.90	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:			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				
, 0	Charact	Finish		Charact	Finish
Calibration clone:	<u>Start</u> 1.002738	<u>Finish</u> 1.003738	Backad or Officiate	<u>Start</u> 3.3	<u>Finish</u> 3.3
Calibration slope: Calibration intercept:	0.341605	0.281608	Backgd or Offset: Coeff or Slope:		5.5 1.085
and atton intercept.	0.341003	0.281008	coen 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)) 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	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	concentration (ppb)	Indicated concentration (ppb) (Ic)	(Cc/Ic)
	(sccm)	(sccm)	concentration (ppb) (Cc)	concentration (ppb) (Ic)	
calibrator zero	(sccm) 5000	(sccm) 0.0	concentration (ppb) (Cc) 0.0	concentration (ppb) (Ic) 0.2	(Cc/lc) <i>Limit = 0.95-1.05</i>
calibrator zero high point	(sccm) 5000 4918	(sccm) 0.0 81.6	concentration (ppb) (Cc) 0.0 80.0	concentration (ppb) (Ic) 0.2 80.5	(Cc/Ic) Limit = 0.95-1.05 0.993
calibrator zero high point second point	(sccm) 5000 4918 4959	(sccm) 0.0 81.6 40.8	concentration (ppb) (Cc) 0.0 80.0 40.0	concentration (ppb) (Ic) 0.2 80.5 40.5	(Cc/lc) <i>Limit = 0.95-1.05</i> 0.993 0.987
calibrator zero high point second point third point	(sccm) 5000 4918 4959 4980	(sccm) 0.0 81.6 40.8 20.4	concentration (ppb) (Cc) 0.0 80.0 40.0 20.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4	(Cc/Ic) Limit = 0.95-1.05 0.993
calibrator zero high point second point third point as left zero	(sccm) 5000 4918 4959 4980 5000	(sccm) 0.0 81.6 40.8 20.4 0.0	concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2	(Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980
calibrator zero high point second point third point as left zero as left span	(sccm) 5000 4918 4959 4980 5000 4912	(sccm) 0.0 81.6 40.8 20.4 0.0 88.3	concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0	(Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980 0.996
calibrator zero high point second point third point as left zero as left span 502 Scrubber Check	(sccm) 5000 4918 4959 4980 5000 4912 4924	(sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3	concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2	(Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.996
calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha	(sccm) 5000 4918 4959 4980 5000 4912 4924 ange:	(sccm) 0.0 81.6 40.8 20.4 0.0 88.3	concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor	(Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987
calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef	(sccm) 5000 4918 4959 4980 5000 4912 4924 ange: ficiency test:	(sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 19-Jul-10	concentration (ppb) (Cc) 80.0 40.0 20.0 0.0 800.0 800.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor	(Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987 efficiency
calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found:	(sccm) 5000 4918 4959 4980 5000 4912 4924 ange: ficiency test: NA	(sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 19-Jul-10 Prev response:	concentration (ppb) (Cc) 80.0 40.0 20.0 0.0 800.0 800.0 800.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor *% change:	(Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987 efficiency NA
calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef	(sccm) 5000 4918 4959 4980 5000 4912 4924 ange: ficiency test:	(sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 19-Jul-10	concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0 800.0 800.0	concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor	(Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987 efficiency

Notes:

Sox scrubber checked after the calibrator zero. No adjustments done. Install Calibration after power put back on.

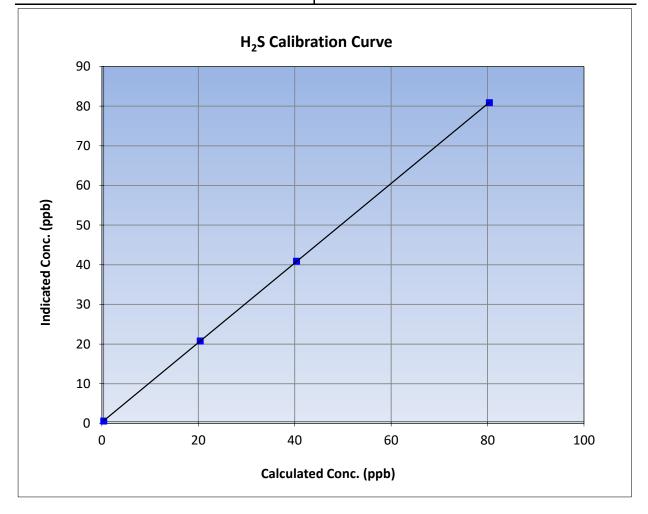


H₂S Calibration Summary

WBEA			Version-11-2021			
Station Information						
Calibration Date:	March 16, 2023	Previous Calibration:	January 11, 2023			
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS25			
Start Time (MST):	7:20	End Time (MST):	10:14			
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1170050146			

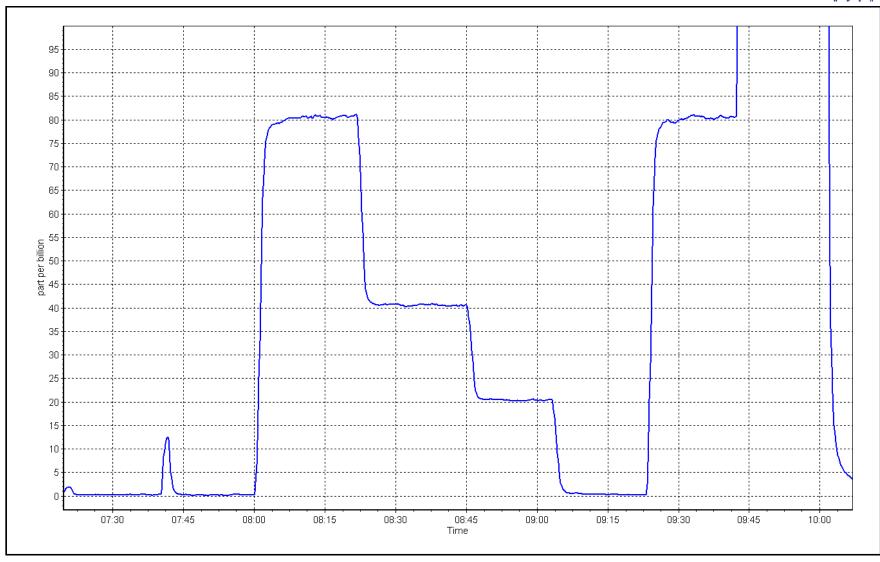
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999994	≥0.995	
80.0	80.5	0.9935	correlation coefficient	0.555554	20.333	
40.0	40.5	0.9873	Slope	1.003738	0.90 - 1.10	
20.0	20.4	0.9799	Slope	1.003738	0.90 - 1.10	
			Intercept	0.281608	+/-3	











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake February 14, 2023 13:41 Routine		Station number: Last Cal Date: End time (MST):	AMS 26 January 25, 2023 16:38	
		Calibration St	andards		
Cal Gas Concentration:	49.56	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	<u>CC362134</u>				
Removed Cal Gas Conc:	49.56	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	<u>NA</u>		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	2447	
ZAG Make/Model:	API T701		Serial Number:	953	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1173410001	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.000779	0.994255	Backgd or Offset:	16.4	16.4
Calibration intercept:	-2.876133	-2.695113	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/le Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	
as found span	4919	80.6	799.0	789.6	1.012
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4919	80.6	799.0	793.1	1.007
second point	4960	40.3	399.4	393.1	1.016
third point	4980	20.2	200.2	193.4	1.035
as left zero	5000	0.0	0.0	0.2	
as left span	4919	80.6	799.0	795.9	1.004
			Averag	ge Correction Factor	1.020
Baseline Corr As found:	789.60	Previous response	796.72	*% change	-0.9%
Baseline Corr As found: Baseline Corr 2nd AF pt:	789.60 NA	Previous response AF Slope:		*% change AF Intercept:	-0.9%

Notes:

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

Calibration Performed By:

Mohammed Kashif

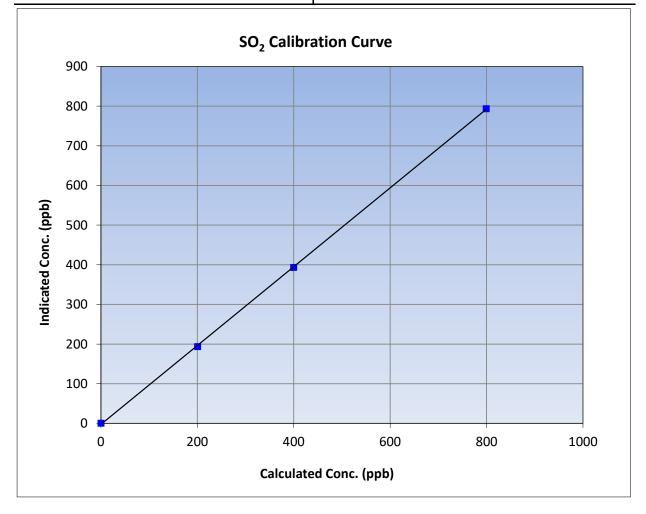


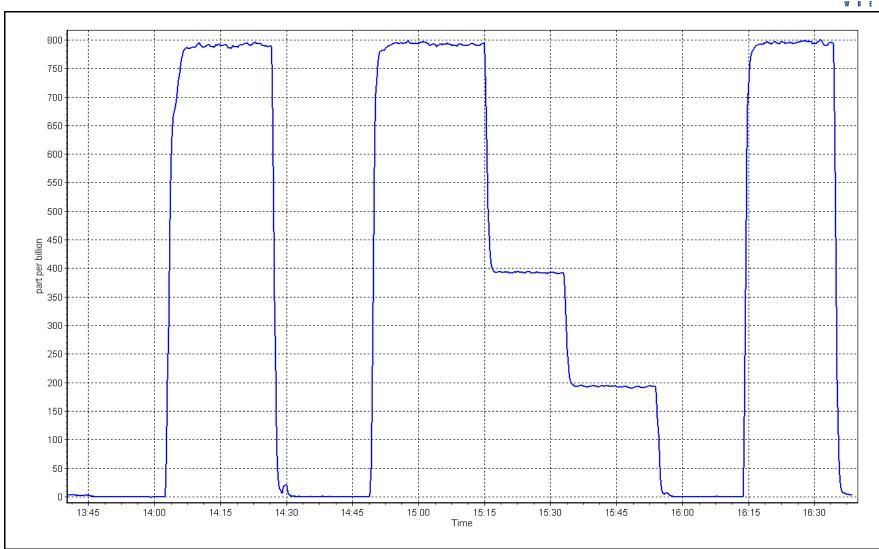
SO₂ Calibration Summary

WBEA			Version-01-2020		
Station Information					
Calibration Date:	February 14, 2023	Previous Calibration:	January 25, 2023		
Station Name:	Christina Lake	Station Number:	AMS 26		
Start Time (MST):	13:41	End Time (MST):	16:38		
Analyzer make:	Thermo 43i	Analyzer serial #:	1173410001		

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	0.999939	≥0.995	
799.0	793.1	1.0074	correlation coefficient	0.555555	20.333	
399.4	393.1	1.0161	Slope	0.994255	0.90 - 1.10	
200.2	193.4	1.0352	Slope	0.994255	0.90 - 1.10	
			Intercept	-2.695113	+/-30	





Location: Christina Lake





H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake February 15, 2023 11:04 Routine		Station number: Last Cal Date: End time (MST):	AMS26 January 25, 2023 15:50	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.89 <u>EY0002466</u>	ppm	Cal Gas Exp Date:	February 9, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #:	4.89 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	АРІ T750 АРІ T751H		Serial Number: Serial Number:	282 322	
		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>
Calibration slope:	1.010037	0.996758	Backgd or Offset:	33.3	33.6
Calibration intercept:	0.159267	0.098881	Coeff or Slope:	1.113	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	0.1	
as found span	4918	81.8	80.0	78.5	1.020
as found 2nd point	4959	40.9	40.0	39.6	1.013
as found 3rd point	4979	20.4	20.0	19.4	1.034
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	0.5	
high point	4918	81.8	80.0	80.1	0.999
second point	4959	40.9	40.0	39.6	1.010
third point	4979	20.4	20.0	19.7	1.013
as left zero	5000	0.0	0.0	0.6	
as left span	4918	81.8	80.0	79.9	1.001
SO2 Scrubber Check	4919	80.6	806.1	0.2	
Date of last scrubber cha	nge:	27-Feb-19		Ave Corr Factor	1.007
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	78.4	Prev response:	80.97	*% change:	-3.3%
Baseline Corr 2nd AF pt:	39.5	AF Slope:		AF Intercept:	0.058616
	19.3			•	
Baseline Corr 3rd AF pt:	19.5	AF Correlation:	0.999957		

Changed sample inlet filter after MAF's, ran scrubber check after calibrator span. Adjusted span only.

Calibration Performed By:

Notes:

Mohammed Kashif

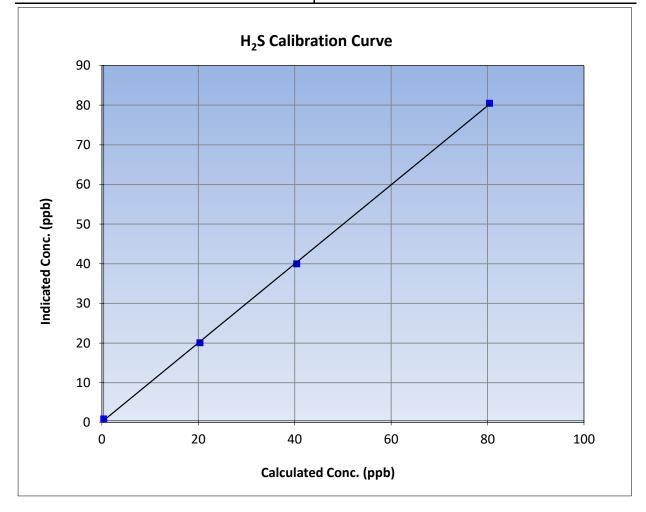


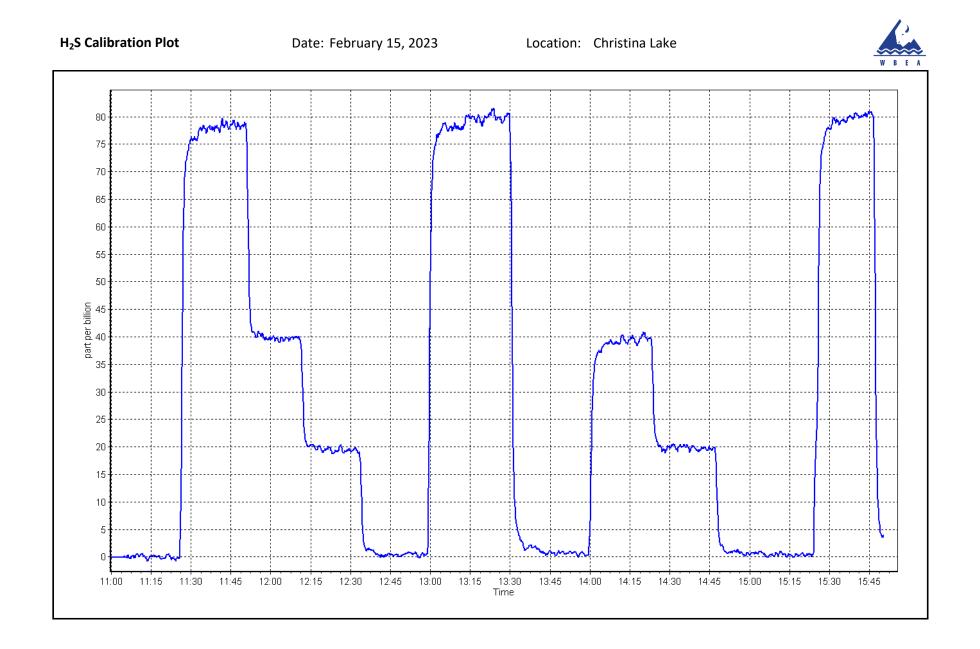
H₂S Calibration Summary

	Stati	on Information	
Calibration Date:	February 15, 2023	Previous Calibration:	January 25, 2023
Station Name:	Christina Lake	Station Number:	AMS26
Start Time (MST):	11:04	End Time (MST):	15:50
Analyzer make:	Thermo 450i	Analyzer serial #:	1180030032

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.5		Correlation Coefficient	0.999872	≥0.995	
80.0	80.1	0.9988	correlation coefficient	0.999872	20.333	
40.0	39.6	1.0101	Slope	0.996758	0.90 - 1.10	
20.0	19.7	1.0129	Slope	0.990758	0.90 - 1.10	
			Intercept	0.098881	+/-3	







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station	Information			
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake February 16, 2023 10:27 Routine			Station number: Al Last Cal Date: Ja End time (MST): 14	nuary 24, 2023	3	
			Calibratio	on Standards			
NO Gas Cylinder #:	T2Y1P4C			Cal Gas Expiry Date: N	ovember 12, 2	023	
NOX Cal Gas Conc: Removed Cylinder #:	50.82 NA	ppm		NO Cal Gas Conc: Removed Gas Exp Date: N	50.02 A	ppm	
Removed Gas NOX Conc: NOX gas Diff:	50.82	ppm		Removed Gas NO Conc: NO gas Diff:	50.02	ppm	
Calibrator Model:	API T700			Serial Number:	2447		
ZAG make/model:	API T701			Serial Number:	953		
			Analyzer	Information			
Analyzer make: NOX Range (ppb):				Analyzer serial #: 12	173480006		
	<u>Start</u>		<u>Finish</u>		<u>Start</u>		<u>Finish</u>
NO coeff or slope:	1.647		1.713	NO bkgnd or offset:	2.7		2.8
NOX coeff or slope:	0.996		0.996	NOX bkgnd or offset:	2.8		2.9
NO2 coeff or slope:	1.000		1.000	Reaction cell Press:	190.1		191.9
			Calibrati	on Statistics			

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000028	1.000661
NO _x Cal Offset:	-2.400000	-1.500000
NO Cal Slope:	1.000828	1.000043
NO Cal Offset:	-3.180000	-2.080000
NO ₂ Cal Slope:	0.997345	1.003073
NO ₂ Cal Offset:	-0.231843	-0.020912



$NO_X \setminus NO \setminus NO_2$ 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	0.2	-0.1	0.2		
as found span	4920	80.0	813.1	800.3	12.8	782.3	768.4	13.9	1.0394	1.0415
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.2	0.2		
high point	4920	80.0	813.1	800.3	12.8	813.1	799.3	13.8	1.0000	1.0013
second point	4960	40.0	406.6	400.2	6.4	404.4	397.3	7.0	1.0053	1.0072
third point	4980	20.0	203.3	200.1	3.2	200.0	195.5	4.5	1.0164	1.0234
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1		
as left span	4920	80.0	813.1	389.5	423.6	815.6	392.2	423.5	0.9970	0.9932
							Average C	orrection Factor	1.0073	1.0106
Corrected As fo	ound NO _x =	782.1 ppb	NO =	768.5 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-3.7%
Previous Respo	nse NO _x =	810.7 ppb	NO =	797.8 ppb				*Percent Chan	ge NO =	-3.8%
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)	799.6	388.8	423.6	424.9	0.9969	100.3%
2nd GPT point (200 ppb O3)	799.6	600.5	211.9	212.7	0.9962	100.4%
3rd GPT point (100 ppb O3)	799.6	704.7	107.7	107.6	1.0009	99.9%
			/	Average Correction Factor	0.9980	100.2%

Notes:

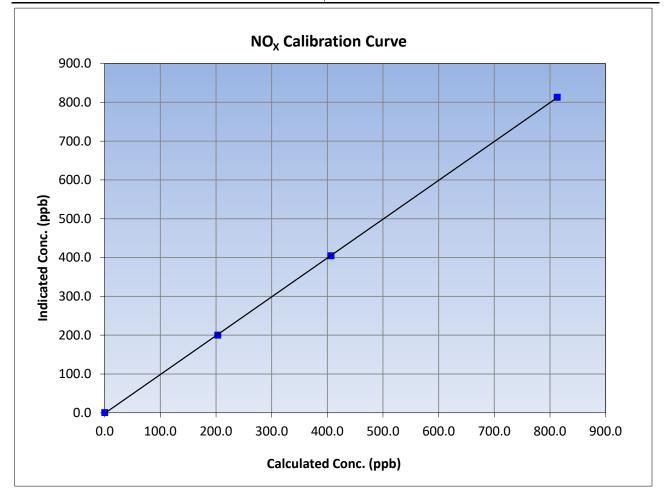
Changed sample inlet filter after as founds. Adjusted span only.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

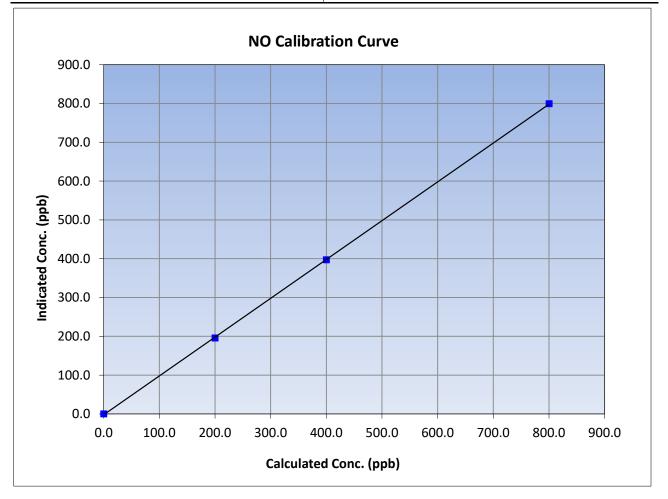
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	February	16, 2023	Previous Calibration:	January 24, 2023		
Station Name:	tation Name: Christina Lake			AN	MS 26	
Start Time (MST):	10	:27	End Time (MST):		14:48	
Analyzer make:	Therr	no 42i	Analyzer serial #: 1			
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999975	≥0.995	
813.1	813.1	1.0000	correlation coernelent	0.333375	20.995	
406.6	404.4 1.0053		Slope	1.000661	0.90 - 1.10	
203.3	200.0	1.0164	Slope	1.000001	0.90 - 1.10	
			Intercept	-1.500000	+/-20	





NO Calibration Summary

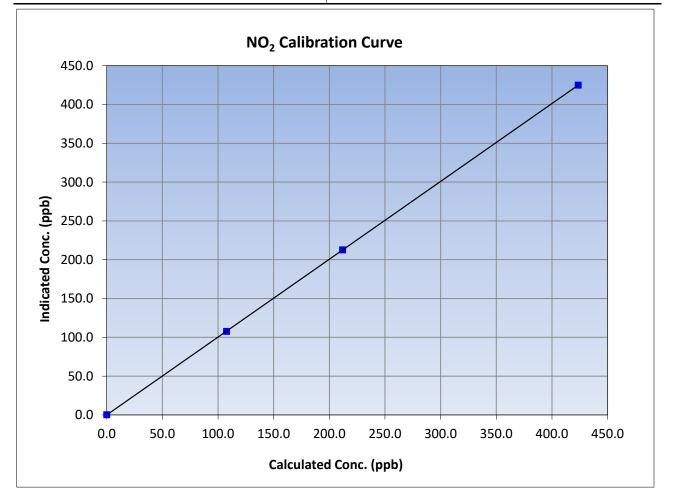
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	ibration Date: February 16, 2023			Januar	inuary 24, 2023	
itation Name: Christina Lake			Station Number:	AMS 26		
Start Time (MST):	10	:27	End Time (MST):	1	4:48	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1	14:00	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999962	≥0.995	
800.3	799.3	1.0013	correlation coefficient	0.555502	20.333	
400.2	397.3 1.0072		Clana	1.000043	0.90 - 1.10	
200.1	195.5	1.0234	Slope	1.000043	0.90 - 1.10	
			Intercept	-2.080000	+/-20	

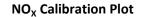




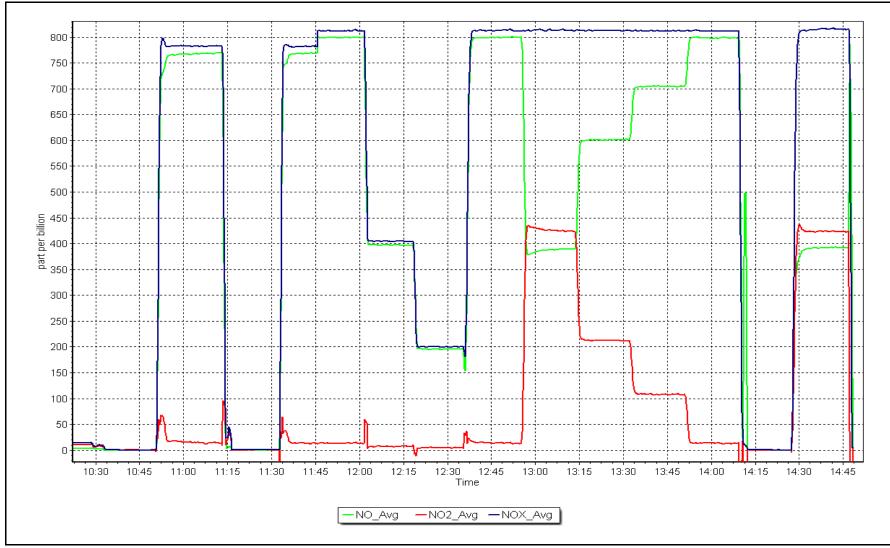
NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	February 16, 2023		Previous Calibration:	Januar	y 24, 2023
Station Name:	Christi	na Lake	Station Number:	AN	MS 26
Start Time (MST):	10:27		End Time (MST):	1	4:48
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	0.2		Correlation Coefficient	0.999998	≥0.995
423.6	424.9	0.9969	correlation coernelent	0.999990	20.333
211.9	212.7	0.9962	Slope	1.003073	0.90 - 1.10
107.7	107.6	1.0009	Slope	1.003073	0.90 - 1.10
			Intercept	-0.020912	+/-20











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS27 JACKFISH 2/3 FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Inforn	nation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 February 14, 2023 10:57 Routine		Station number: Last Cal Date: End time (MST):	AMS 27 January 19, 2023 13:40	
		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 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	API T700 API 701		Serial Number: Serial Number:	3811 364	
		Analyzer Infor	mation		
Analyzer make Analyzer Rang			Analyzer serial #:	12124313138	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.001858 -1.876897	1.001161 -1.757862	Backgd or Offset: Coeff or Slope:		7.4 0.979
		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)	Correction factor (Cc/lc 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) 0.0 800.0	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) (Ic) 0.0 800.0 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) (Ic) 0.0 800.0 0.1 800.0	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 4921 4961	Source gas flow rate (sccm) 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) (Ic) 0.0 800.0 0.1 800.0 398.1	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 second point third point	(sccm) 5000 4921 5000 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) (Ic) 0.0 800.0 0.1 800.0 398.1 196.4	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 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) (Ic) 0.0 800.0 0.1 800.0 398.1 196.4 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 second point third point	(sccm) 5000 4921 5000 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) (Ic) 0.0 800.0 0.1 800.0 398.1 196.4 0.1 805.0	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 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) (Ic) 0.0 800.0 0.1 800.0 398.1 196.4 0.1 805.0 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 as left span Baseline Corr As found:	(sccm) 5000 4921 5000 4921 4961 4980 5000 4921 5000 4921	Source gas flow rate (sccm) 0.0 79.1 0.0 79.1 39.5 19.8 0.0 79.1 Previous response	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 799.77	(ppb) (Ic) 0.0 800.0 0.1 800.0 398.1 196.4 0.1 805.0 ge Correction Factor *% change	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 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 0.0 800.2 Average 799.77	(ppb) (Ic) 0.0 800.0 0.1 800.0 398.1 196.4 0.1 805.0 ge Correction Factor	Limit = 0.95-1.05

No adjustments have been made.

Calibration Performed By:

Denny Ray Estador

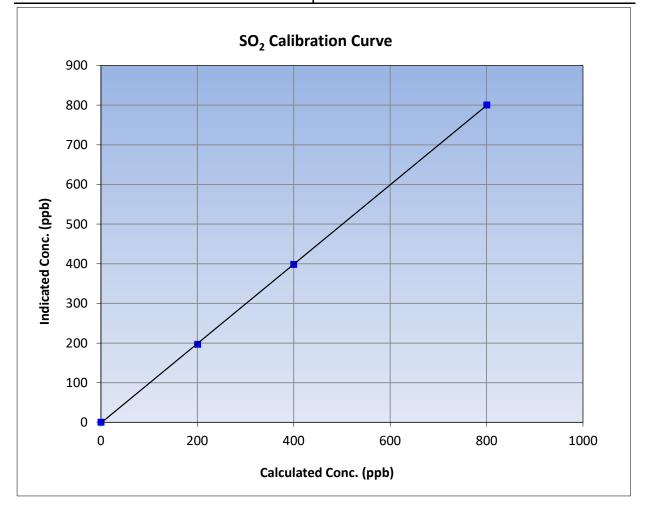


SO₂ Calibration Summary

	Statio	on Information	
Calibration Date:	February 14, 2023	Previous Calibration:	January 19, 2023
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	10:57	End Time (MST):	13:40
Analyzer make:	Thero 43iQ	Analyzer serial #:	12124313138

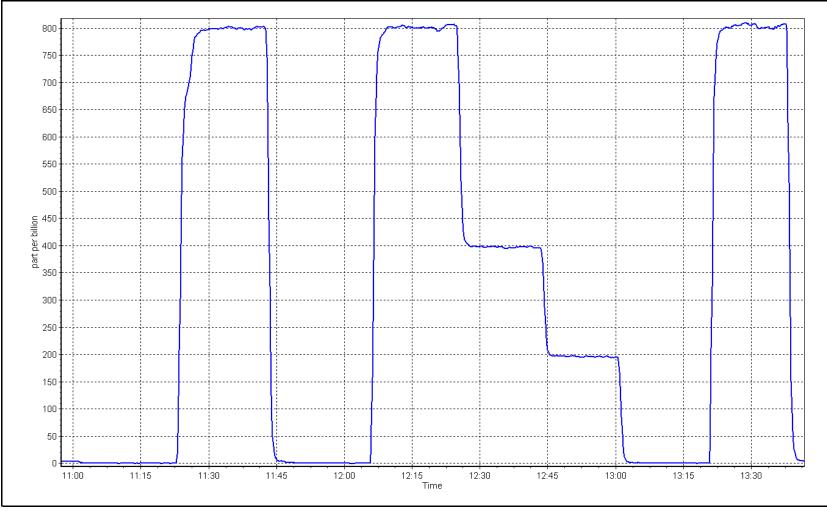
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999973	≥0.995
800.2	800.0	1.0002	correlation coefficient	0.999973	20.995
399.5	398.1	1.0036	Slope	1.001161	0.90 - 1.10
200.3	196.4	1.0199	Slope	1.001101	0.90 - 1.10
			Intercept	-1.757862	+/-30











H₂S Calibration Report

WBEA		2		•	
		Station Info			Version-11-202
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 February 7, 2023 9:20 Routine	Station info	Station number: Last Cal Date: End time (MST):	AMS27 January 11, 2023 13:50	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	5.41 CC345023 5.41 NA API T700 API 701	ppm ppm	Cal Gas Exp Date: Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	January 4, 2025 NA 3811 364	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	API T101 0 - 100 ppb		Analyzer serial #: Converter serial #:	621	
Calibration slope: Calibration intercept:	<u>Start</u> 0.997920 0.042016	<u>Finish</u> 1.000628 -0.177928	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 25.4 0.949
		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	74.1	80.2	82.0	0.984
as found 2nd point	4963	37.0	40.0	41.0	0.988
as found 3rd point	4982	18.5	20.0	20.2	1.016
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) <i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.0	
high point	4926	74.1	80.2	80.1	1.001
second point	4963	37.0	40.0	39.9	1.003
third point	4982	18.5	20.0	19.6	1.021
as left zero	5000	0.0	0.0	0.1	
as left span	4926	74.1	80.2	79.8	1.005
SO2 Scrubber Check	4921	79.1	791.0	0.1	
Date of last scrubber cha				Ave Corr Factor	1.008 efficiency
Date of last converter eff	inciency test.				eniciency
Baseline Corr As found:	81.5	Prev response:		*% change:	1.8%
Baseline Corr 2nd AF pt:	40.5	AF Slope:		AF Intercept:	0.202428
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999930	* = > +/-5% change initiat	es investigation

Notes:

Adjusted both zero and span.

Calibration Performed By:

Denny Ray Estador

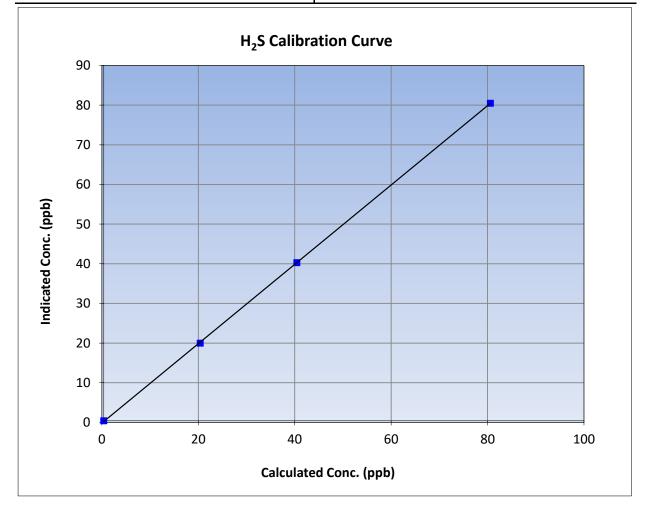


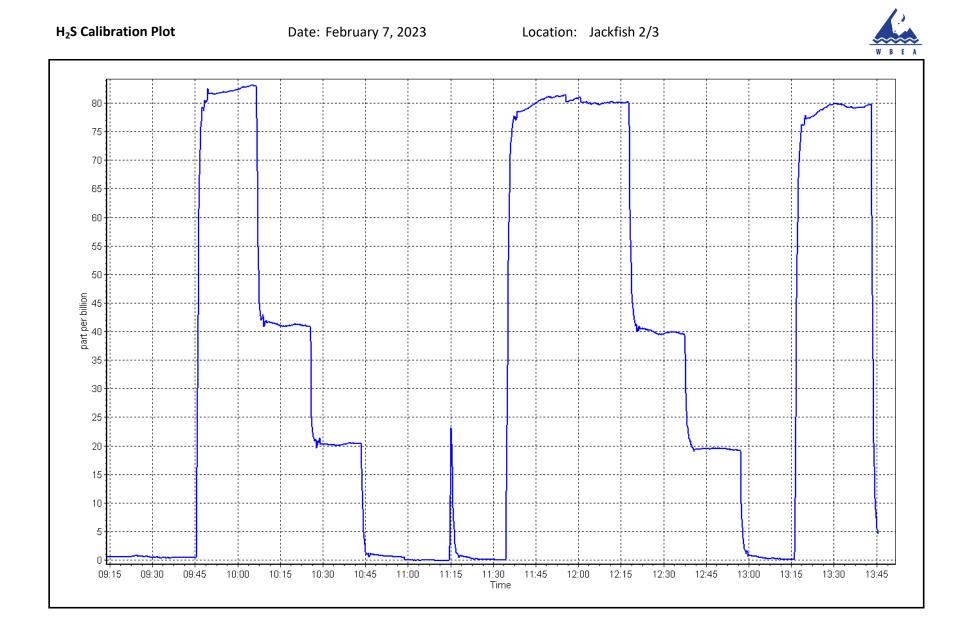
H₂S Calibration Summary

	Stati	on Information	
Calibration Date:	February 7, 2023	Previous Calibration:	January 11, 2023
Station Name:	Jackfish 2/3	Station Number:	AMS27
Start Time (MST):	9:20	End Time (MST):	13:50
Analyzer make:	API T101	Analyzer serial #:	621

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	0.999972	≥0.995
80.2	80.1	1.0009	correlation coefficient	0.999972	20.333
40.0	39.9	1.0034	Slope	1.000628	0.90 - 1.10
20.0	19.6	1.0212	Siope	1.000028	0.90 - 1.10
			Intercept	-0.177928	+/-3







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

		S	Station Information		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 February 22, 2023 9:27 Routine		Station number: AN Last Cal Date: Jan End time (MST): 13	nuary 18, 2023	
		Ca	alibration Standards		
NO Gas Cylinder #:	T2Y1P35		Cal Gas Expiry Date: De	ecember 11, 20	23
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:	API T750		Serial Number:	282	
ZAG make/model:	API 751H		Serial Number:	321	
		A	nalyzer Information		
Analyzer make: NOX Range (ppb):			Analyzer serial #: 44	60	
	<u>Start</u>	<u>Fir</u>	nish	<u>Start</u>	<u>Finish</u>
NO coeff or slope:	: 1.241	1.	NO bkgnd or offset:	0.9	0.9
NOX coeff or slope:	: 1.228	1.	NOX bkgnd or offset:	0.9	0.9
NO2 coeff or slope	: 1.000	1.	000 Reaction cell Press:	4.3	4.4
		С	alibration Statistics		
		<u>St</u>	t <u>art</u>	<u>Finish</u>	
NO _x Cal Slope:	:	1.00	01608	0.998669	
NO _x Cal Offset:	:	-3.4	16967	-3.017307	
NO Cal Slope	:	1.00	05444	1.000287	
	•	1.00		1.000207	

-4.300508

0.998544

0.230642

-2.020303

0.990573

-1.100427



$NO_X \setminus NO \setminus NO_2$ 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	-0.7	-0.9	0.2		
as found span	4921	79.4	816.8	800.3	16.5	810.0	798.9	11.5	1.0084	1.0017
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	4921	79.4	816.8	800.3	16.5	814.0	799.2	14.7	1.0034	1.0014
second point	4960	39.7	408.5	400.2	8.3	404.0	398.1	5.9	1.0110	1.0053
third point	4980	19.8	203.7	199.6	4.1	197.0	195.2	1.8	1.0341	1.0225
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4921	79.4	816.8	403.7	414.2	812.1	399.0	413.1	1.0058	1.0118
							Average C	orrection Factor	1.0162	1.0097
Corrected As fo	ound NO _X =	810.7 ppb	NO =	799.8 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _X =	-0.5%
Previous Respo	nse NO _x =	814.7 ppb	NO =	800.3 ppb				*Percent Chang	ge NO =	-0.1%
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 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/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)	801.0	403.3	414.2	410.0	1.0103	99.0%
2nd GPT point (200 ppb O3)	801.0	611.7	205.8	201.6	1.0209	98.0%
3rd GPT point (100 ppb O3)	801.0	712.0	105.5	102.6	1.0284	97.2%
				Average Correction Factor	1.0199	98.1%

Notes:

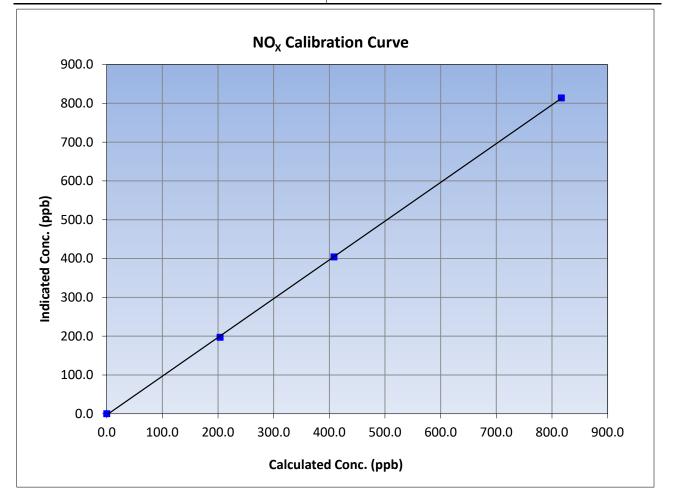
No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

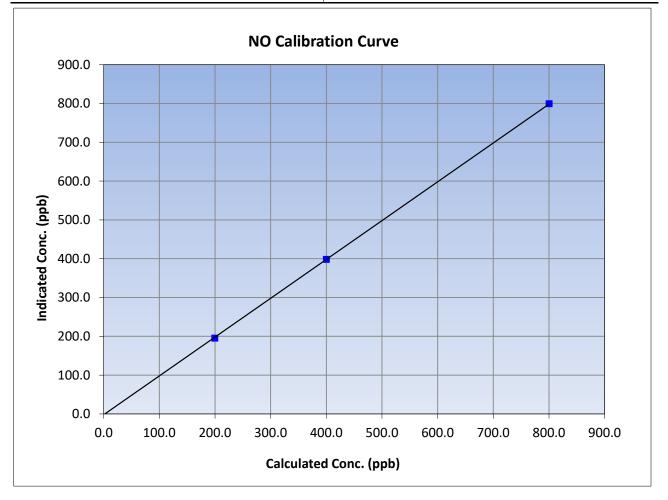
WBEA		Ctation	Information		Version-04-20
		Station	Information		
Calibration Date:	February 22, 2023		Previous Calibration:	Januar	y 18, 2023
Station Name:	Jackfi	sh 2/3	Station Number:	A	MS27
Start Time (MST):	9:	27	End Time (MST):	1	3:20
Analyzer make:	API	T200	Analyzer serial #:	4	460
		Calibra	ation 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	0.999936	≥0.995
816.8	814.0	1.0034	correlation coefficient	0.555550	20.393
408.5	404.0	1.0110	Clana	0.998669	0.90 - 1.10
203.7	197.0	1.0341	Slope	0.996009	0.90 - 1.10
			Intercept	-3.017307	+/-20





NO Calibration Summary

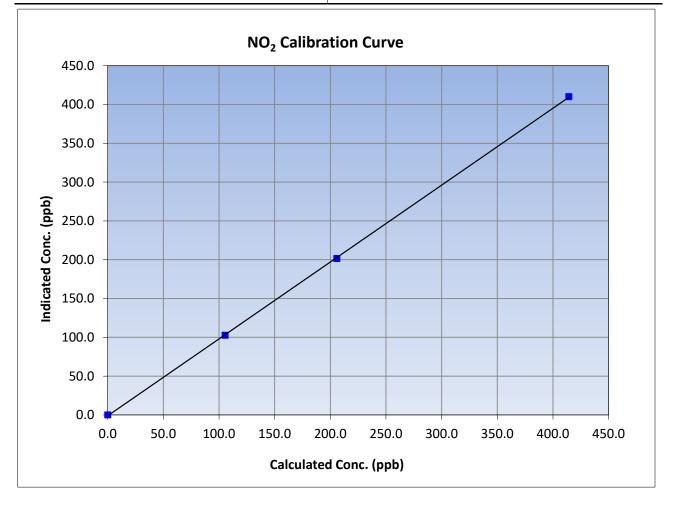
WBEA		Station	Information		Version-04-20
		Station	intornation		
Calibration Date:	February	February 22, 2023		Januar	y 18, 2023
Station Name:	Jackfi	sh 2/3	Station Number:	A	MS27
Start Time (MST):	9:	27	End Time (MST): 13		3:20
Analyzer make:	API	T200	Analyzer serial #:	2	1460
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999971	≥0.995
800.3	799.2	1.0014	correlation coefficient	0.333371	20.333
400.2	398.1	1.0053	Slope	1.000287	0.90 - 1.10
199.6	195.2	1.0225	Siope	1.000287	0.90 - 1.10
			Intercept	-2.020303	+/-20

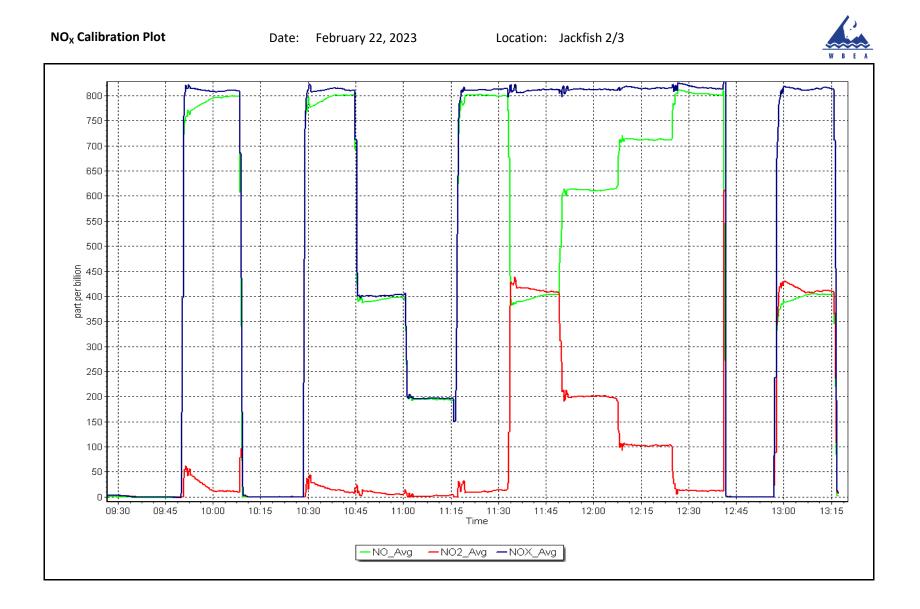




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	February 22, 2023		Previous Calibration:	January	y 18, 2023
Station Name:	Jackfi	sh 2/3	Station Number:	AN	MS27
Start Time (MST):	9:27		End Time (MST):	1	3:20
Analyzer make:	API T200		Analyzer serial #:	4	460
		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	0.999955	≥0.995
414.2	410.0	1.0103	correlation coefficient	0.5555555	20.995
205.8	201.6	1.0209	Slope	0.990573	0.90 - 1.10
105.5	102.6	1.0284	Siope	0.330373	0.90 - 1.10
			Intercept	-1.100427	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS29 SURMONT 2 FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 February 16, 2023 13:10 Routine		Station number: Last Cal Date: End time (MST):	AMS29 January 3, 2023 17:09	
		Calibration St	andards		
Cal Gas Concentration:	<u>49.21</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	<u>CC356008</u>		Rom Cas Even Data	NA	
Removed Cal Gas Conc: Removed Gas Cyl #:	<u>49.21</u> NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5258	
ZAG Make/Model:	Teledyne API T700		Serial Number:	4297	
	reledyne / ir r / or		Schull Wullber.	7237	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1170050150	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997244	0.999443	Backgd or Offset:		12.5
Calibration intercept:	-0.565207	-2.985140	Coeff or Slope:	0.966	0.934
		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	4919	81.3	800.1	824.0	0.971
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	800.1	798.2	1.002
second point	4959	40.7	400.6	395.6	1.013
third point	4979	20.3	199.8	194.2	1.029
as left zero	5000	0.0	0.0	-0.1	
as left span	4919	81.3	800.1 Averag	803.0 ge Correction Factor	0.996
				· · · · · · · · · · · · · · · · · · ·	
Baseline Corr As found:	823.90	Previous response		*% change	3.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

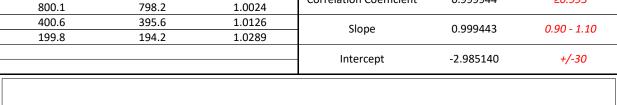
Changed sample inlet filter after as founds. Adjusted zero and span.

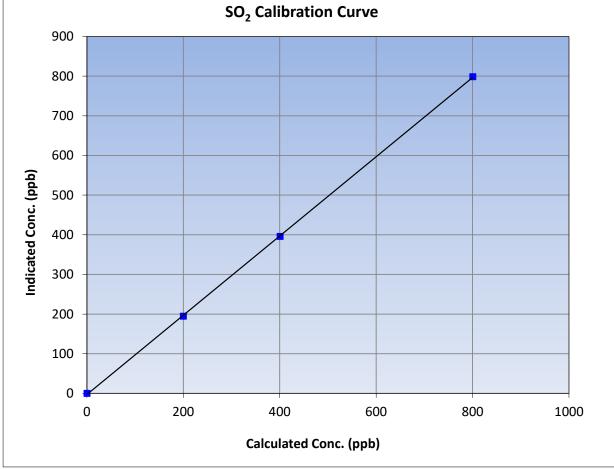
Calibration Performed By:



SO₂ Calibration Summary

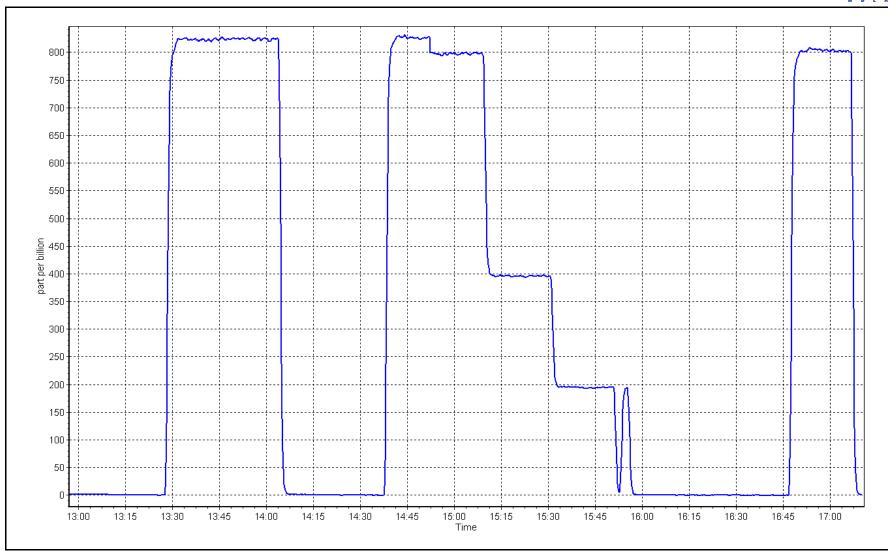
WBEA					Version-01-2020
		Station	Information		
Calibration Date:	February 1	16, 2023	Previous Calibration:	January	3, 2023
Station Name:	Surmo	ont 2	Station Number:	AM	S29
Start Time (MST):	13:1	LO	End Time (MST):	17:09	
Analyzer make:	Thermo 43i		Analyzer serial #:	1170050150	
		Calib	ration Data		
Calculated concentration I (ppb) (Cc)	ndicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	n	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999944	≥0.995
800.1	798.2	1.0024	correlation coefficient	0.999944	20.990













H₂S Calibration Report

WDEA					
WBEA					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 February 13, 2023 11:03 Routine		Station number: Last Cal Date: End time (MST):	AMS29 January 9, 2023 15:54	
		Calibration S	tandards		
Cal Gas Concentration:	<u>5.391</u>	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	<u>CC508338</u> <u>5.391</u> <u>CC508338</u>	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:	3808 4297	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450i Internal 0 - 100 ppb		Analyzer serial #: Converter serial #:	1170050142 NA	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.996612	0.994905	Backgd or Offset:	16.0	17.0
Calibration intercept:	0.177532	-0.062658	Coeff or Slope:	1.024	1.024
		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 facto (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4926	74.2	80.0	81.7	0.980
as found 2nd point	4963	37.2	40.1	41.2	0.976
as found 3rd point	4982	10.0	20.1	20 5	
		18.6	20.1	20.5	0.983
new cylinder response				20.5	0.983
new cylinder response		18.6 H ₂ S Calibrat		20.5	0.983
new cylinder response Set Point	Dilution air flow rate (sccm)			Indicated concentration (ppb) (Ic)	Correction facto (Cc/lc)
· · ·	Dilution air flow rate	H ₂ S Calibrat	ion Data Calculated concentration (ppb)	Indicated	Correction facto
Set Point calibrator zero	Dilution air flow rate (sccm)	H ₂ S Calibrat Source gas flow rate (sccm)	ion Data Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction facto (Cc/Ic) Limit = 0.95-1.05
Set Point	Dilution air flow rate (sccm) 5000	H ₂ S Calibrat Source gas flow rate (sccm) 0.0	ion Data Calculated concentration (ppb) (Cc) 0.0	Indicated concentration (ppb) (Ic) -0.1	Correction facto (Cc/Ic) Limit = 0.95-1.05
Set Point calibrator zero high point	Dilution air flow rate (sccm) 5000 4926	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0	Indicated concentration (ppb) (Ic) -0.1 79.5	Correction facto (Cc/Ic) <i>Limit = 0.95-1.05</i> 1.006
Set Point calibrator zero high point second point	Dilution air flow rate (sccm) 5000 4926 4963	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9	Correction facto (Cc/Ic) Limit = 0.95-1.05 1.006 1.005
Set Point calibrator zero high point second point third point	Dilution air flow rate (sccm) 5000 4926 4963 4982	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2 18.6	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 20.1	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9 19.9	Correction facto (Cc/lc) Limit = 0.95-1.05 1.006 1.005 1.008
Set Point calibrator zero high point second point third point as left zero as left span	Dilution air flow rate (sccm) 5000 4926 4963 4982 5000	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2 18.6 0.0	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 20.1 0.0	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9 19.9 0.1	Correction facto (Cc/Ic) Limit = 0.95-1.05 1.006 1.005 1.008
Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check	Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2 18.6 0.0 74.2	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 20.1 0.0 80.0 80.0	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9 19.9 0.1 78.7	Correction factor (Cc/Ic) Limit = 0.95-1.02 1.006 1.005 1.008 1.017
Set Point calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha	Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919 ange:	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2 18.6 0.0 74.2 81.3	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 20.1 0.0 80.0 80.0	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9 19.9 0.1 78.7 0.1	Correction facto (Cc/lc) Limit = 0.95-1.05 1.006 1.005 1.008 1.017
Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter ef	Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919 ange: ficiency test:	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2 18.6 0.0 74.2 81.3 15-Apr-21	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 20.1 0.0 80.0 813.0	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9 19.9 0.1 78.7 0.1 Ave Corr Factor	Correction facto (Cc/Ic) Limit = 0.95-1.05 1.006 1.005 1.008 1.017 1.006 efficiency
Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found:	Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919 ange: ficiency test: 81.6	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2 18.6 0.0 74.2 81.3 15-Apr-21 Prev response:	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 20.1 0.0 80.0 813.0 79.91	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9 19.9 0.1 78.7 0.1 Ave Corr Factor *% change:	Correction facto (Cc/Ic) Limit = 0.95-1.05 1.006 1.005 1.008 1.017 1.006 efficiency 2.1%
Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter ef	Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919 ange: ficiency test:	H ₂ S Calibrat Source gas flow rate (sccm) 0.0 74.2 37.2 18.6 0.0 74.2 81.3 15-Apr-21	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 20.1 0.0 80.0 813.0 79.91 1.020479	Indicated concentration (ppb) (Ic) -0.1 79.5 39.9 19.9 0.1 78.7 0.1 Ave Corr Factor	Correction facto (Cc/Ic) Limit = 0.95-1.05 1.006 1.005 1.008 1.017 1.006 efficiency

Notes:

Changed sample inlet filter after MAF's. Conducted SOx scrubber check after calibrator zero. Adjusted zero.

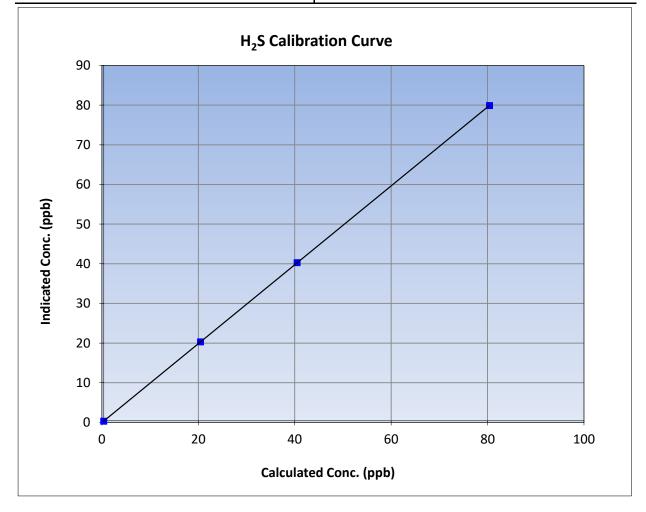


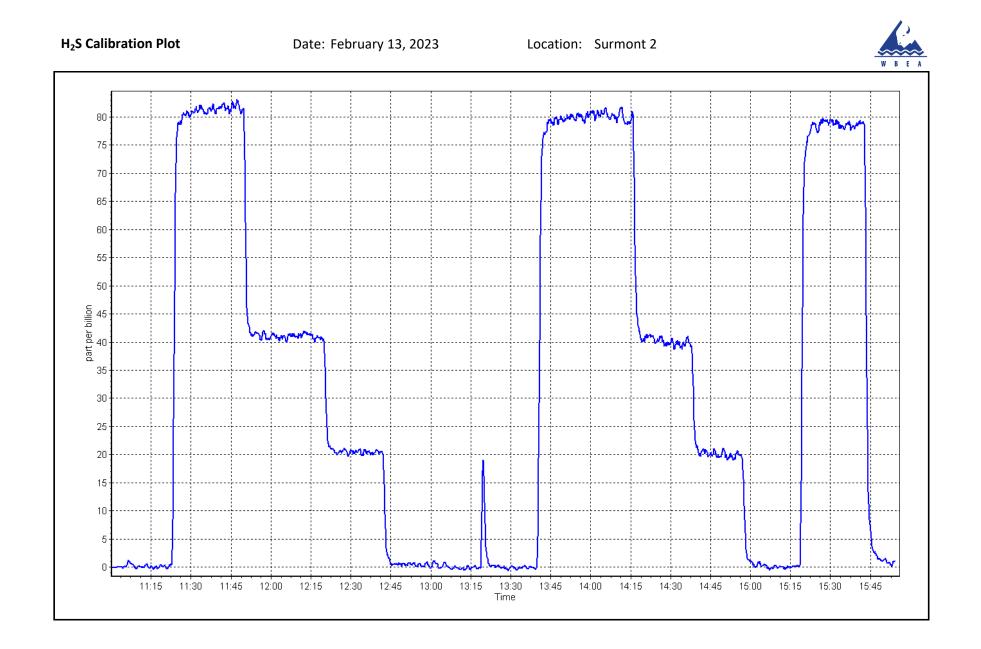
H₂S Calibration Summary

Station Information					
Calibration Date:	February 13, 2023	Previous Calibration:	January 9, 2023		
Station Name:	Surmont 2	Station Number:	AMS29		
Start Time (MST):	11:03	End Time (MST):	15:54		
Analyzer make:	Thermo 450i	Analyzer serial #:	1170050142		

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
80.0	79.5	1.0063	correlation coefficient	0.999990	20.333
40.1	39.9	1.0052	- Slope	0.994905	0.90 - 1.10
20.1	19.9	1.0077			0.90 - 1.10
			Intercept	-0.062658	+/-3







THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 February 16, 2023 13:10 Routine		Station number: Last Cal Date: End time (MST):	AMS29 January 3, 2023 17:09	
		Calibration S	tandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC35 <u>499.0</u> <u>205.7</u>	6008 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:		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> 0.999326 -0.002444	<u>Finish</u> 0.995950 0.026135	Background: Coefficient:		<u>Finish</u> 4.36 5.223
		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/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	-0.13	
as found span	4918	81.3	17.31	17.35	0.998
as found 2nd point as found 3rd point new cylinder response					
calibrator zero	5000	0.0	0.00	0.09	
high point	4918	81.3	17.31	17.30	1.001
second point	4959	40.7	8.67	8.63	1.004
third point	4979	20.3	4.32	4.27	1.013
as left zero	5000	0.0	0.00	0.08	
as left span	4918	81.3	17.31	17.44	0.993
	47.40	Due te e		ge Correction Factor	1.006
Baseline Corr As found:	17.48	Previous response	17.30	*% change	1.0%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA NA	AF Slope: AF Correlation:		AF Intercept: * = > +/-5% change initia	tos invostigation

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

Calibration Performed By:

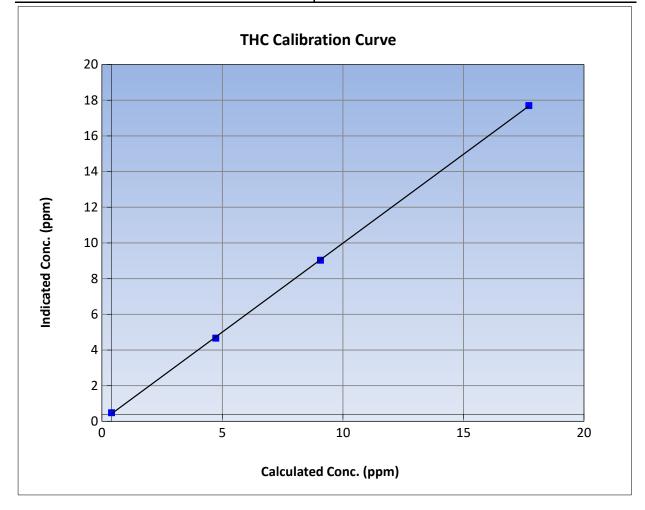


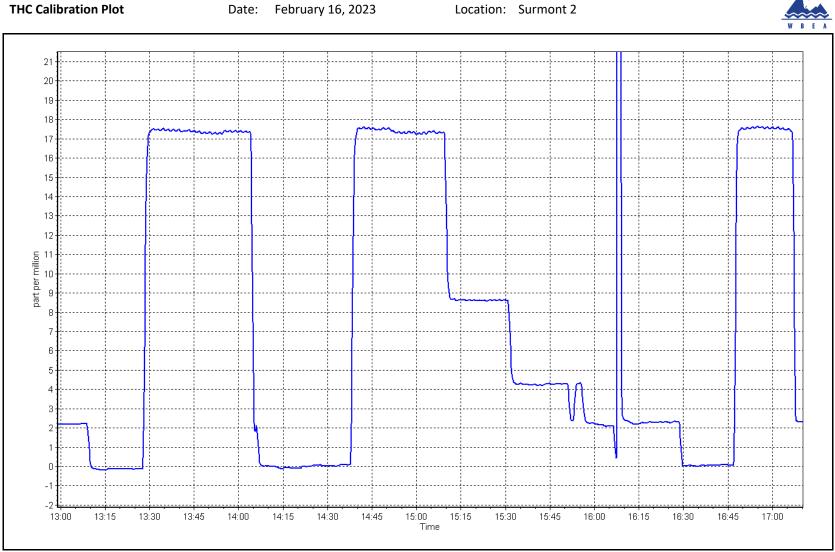
THC Calibration Summary

WBEA			Version-01-2020		
Station Information					
Calibration Date:	February 16, 2023	Previous Calibration:	January 3, 2023		
Station Name:	Surmont 2	Station Number:	AMS29		
Start Time (MST):	13:10	End Time (MST):	17:09		
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149		

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.00	0.09		Correlation Coefficient	0.999941	≥0.995
17.31	17.30	1.0008	correlation coernelent	0.555541	20.333
8.67	8.63	1.0043	Slope	0.995950	0.90 - 1.10
4.32	4.27	1.0129			0.30 - 1.10
			Intercept	0.026135	+/-1.5









NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Calibration Date: Start time (MST): Reason: Surmont 2 February 17, 2023 10:46 As Found

Station number: AMS29 Last Cal Date: January 1, 2023 End time (MST): 13:50

Calibration Standards

NO Gas Cylinder #:	1	12YYFE	Cal Gas Expiry Date: Oct	ober 30, 202	4
NOX Cal Gas Conc:	47.46	ppm	NO Cal Gas Conc:	47.46	ppm
Removed Cylinder #:		NA	Removed Gas Exp Date: NA		
Removed Gas NOX Conc:	47.46	ppm	Removed Gas NO Conc:	47.46	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T7	00	Serial Number: 525	8	
ZAG make/model:	Teledyne API T7	01	Serial Number: 429	17	

Analyzer Information

Analyzer make: Th NOX Range (ppb): 0 -			Analyzer serial #: 11	70050148	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.445	1.445	NO bkgnd or offset:	1.4	1.4
NOX coeff or slope:	0.995	0.995	NOX bkgnd or offset:	1.5	1.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	168.4	168.4

Calibration Statistics

	<u>Start</u>
NO _x Cal Slope:	0.998337
NO _x Cal Offset:	0.787346
NO Cal Slope:	1.000325
NO Cal Offset:	-0.232760
NO ₂ Cal Slope:	0.997537
NO ₂ Cal Offset:	-0.620843

<u>Finish</u>



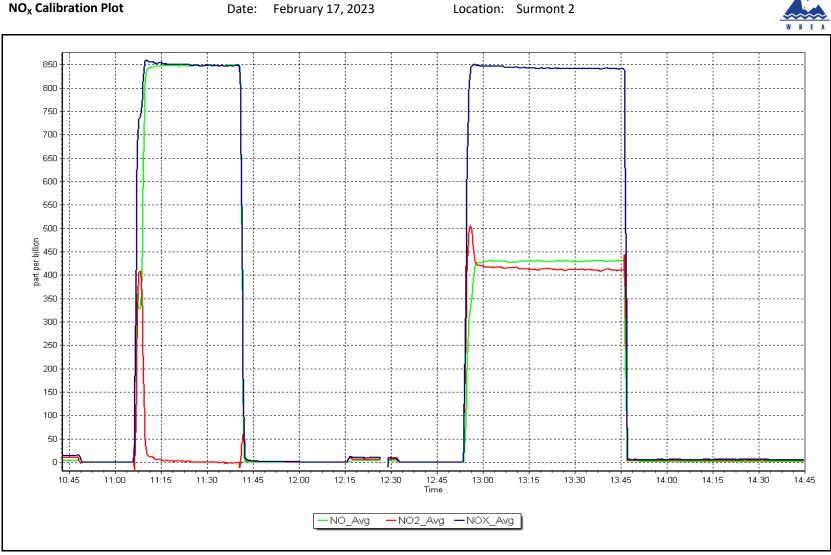
$NO_X \setminus NO \setminus NO_2$ Calibration Report

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/Ic) <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	-0.2	0.0		
as found span	4916	84.2	799.2	799.2	0.0	848.0	849.0	-0.6	0.9424	0.9413
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero										
high point										
second point										
third point										
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0		
as left span	4916	84.2	799.2			842.0	429.1	413.1	0.9492	
							Average C	Correction Factor		
Corrected As for	und NO _x =	848.2 ppb	NO =	849.2 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	5.8%
Previous Respor	nse NO _x =	798.7 ppb	NO =	799.2 ppb				*Percent Chang	ge NO =	5.9%
Baseline Corr 2r	nd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO _x r ² :	:	Nx SI:	Nx Int:	
Baseline Corr 3r	d 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:	
				G	PT Calibration	Data				
O3 Setpoi	nt (ppb)	Indicated NO Ref concentration		cated NO Drop entration (ppb)	Calculated N concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = C	0.95-1.05	rter Efficiency n Limit = 96-104%
as found (GPT zero									
as found GPT poin	it (400 ppb NO2)									
as found GPT poin	t (200 ppb NO2)									
as found GPT poin	it (100 ppb NO2)									
1st GPT point ((400 ppb O3)									
2nd GPT point	(200 ppb O3)									
3rd GPT point	(100 ppb O3)									
						Average Co	orrection Factor	r		

Notes: Attempted calibration after changing the dilution calibrator. A portable calibrator will be brought to verfiy readings before making any large adjustments. Only as founds, GPTPS points and as lefts done.

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: Surmont 2 February 22, 2023 11:23 Routine

Station number: AMS29 Last Cal Date: January 1, 2023 End time (MST): 16:18

Calibration Standards

NO Gas Cylinder #:	T12YYFE		Cal Gas Expiry Date: Octo	4	
NOX Cal Gas Conc:	47.46	ppm	NO Cal Gas Conc:	47.46	ppm
Removed Cylinder #:		NA	Removed Gas Exp Date: NA		
Removed Gas NOX Conc:	47.46	ppm	Removed Gas NO Conc:	47.46	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T7	50	Serial Number: 282		
ZAG make/model:	I: Teledyne API T751		Serial Number: 321		

Analyzer Information

Analyzer make: Th NOX Range (ppb): 0 -			70050148		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.445	1.340	NO bkgnd or offset:	1.4	1.3
NOX coeff or slope:	0.995	0.998	NOX bkgnd or offset:	1.5	1.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	168.4	168.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998337	1.000440
NO _x Cal Offset:	0.787346	0.326827
NO Cal Slope:	1.000325	1.000353
NO Cal Offset:	-0.232760	-0.592834
NO ₂ Cal Slope:	0.997537	1.006976
NO ₂ Cal Offset:	-0.620843	1.486191



$NO_X \setminus NO \setminus NO_2$ 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/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0		
as found span	4916	84.2	799.2	799.2	0.0	861.0	861.0	0.3	0.9282	0.9282
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	4916	84.2	799.2	799.2	0.0	799.6	799.1	0.5	0.9995	1.0001
second point	4958	42.1	399.6	399.6	0.0	400.6	399.0	1.6	0.9975	1.0015
third point	4979	21.1	200.3	200.3	0.0	200.8	199.2	1.6	0.9974	1.0054
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	414.6	384.6	797.5	395.4	402.1	1.0021	1.0485
							Average C	Correction Factor	0.9981	1.0023
Corrected As fo	ound NO _x =	861.2 ppb	NO =	861.2 ppb	* = > +/-5%	6 change initiates i	investigation	*Percent Chang	ge NO _x =	7.3%
Previous Respo	onse NO _x =	798.7 ppb	NO =	799.2 ppb				*Percent Chang	ge NO =	7.2%
Baseline Corr 2	2nd pt NO _x =	NA ppb	NO =	NA ppb	As found	$NO_{\rm X} r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	$1 NO r^2$:		NO SI:	NO Int:	
					As found	$1 NO_2 r^2$:		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)	793.3	408.7	384.6	387.8	0.9917	100.8%
2nd GPT point (200 ppb O3)	793.3	606.2	187.1	191.4	0.9775	102.3%
3rd GPT point (100 ppb O3)	793.3	697.7	95.6	98.7	0.9686	103.2%
			ŀ	Average Correction Factor	0.9793	102.1%

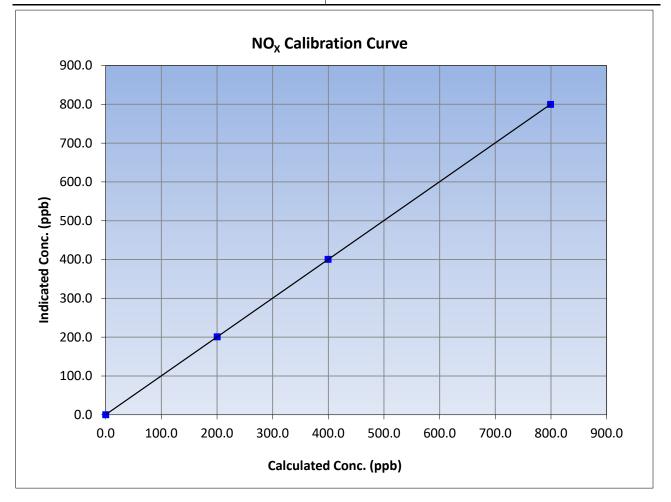
Notes: Calibration done with a portable calibrator and ZAG as the new calibrator installed this month has high readings compared to the old calibrator. Adjusted

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

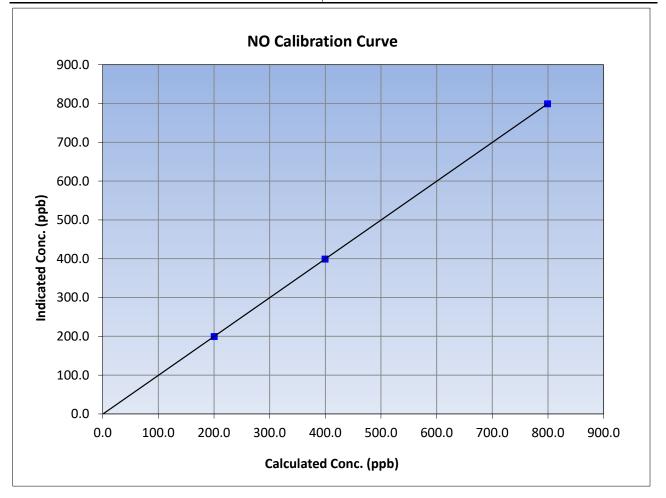
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	February	22, 2023	Previous Calibration:	January	1, 2023	
Station Name:	Surm	iont 2	Station Number:	AM	S29	
Start Time (MST):	art Time (MST): 11:23			16:18		
Analyzer make: Thermo 42i			Analyzer serial #: 1170		0050148	
		Calibra	ation 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	0.999999	≥0.995	
799.2	799.6	0.9995	correlation coefficient	0.9999999	20.995	
399.6	400.6	0.9975	Classe	1.000440	0.90 - 1.10	
200.3	200.8 0.9974		Slope	1.000440	0.90 - 1.10	
			Intercept	0.326827	+/-20	





NO Calibration Summary

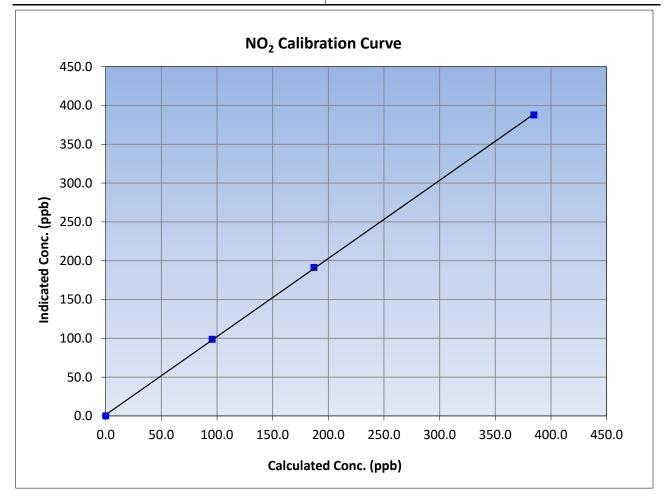
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	February	22, 2023	Previous Calibration:	January	1, 2023	
Station Name:	Surm	nont 2	Station Number:	AM	IS29	
Start Time (MST):	tart Time (MST): 11:23			End Time (MST): 16:		
Analyzer make: Thermo 42i			Analyzer serial #: 11700		050148	
		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	0.999998	≥0.995	
799.2	799.1	1.0001	correlation coefficient	0.999998	20.333	
399.6	399.0	1.0015	Slope	1.000353	0.90 - 1.10	
200.3	199.2	1.0054	Slope	1.000353	0.50 - 1.10	
			Intercept	-0.592834	+/-20	

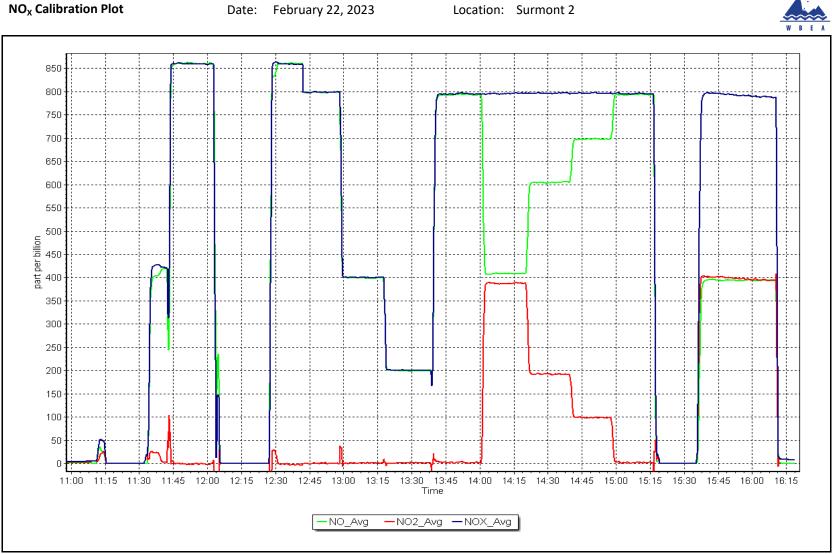




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	February	22, 2023	Previous Calibration:	January	1, 2023
Station Name:	Surm	iont 2	Station Number:	AM	S29
Start Time (MST):	11	End Time (MST):	16	:18	
Analyzer make:	Therr	no 42i	Analyzer serial #:	50148	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999923	≥0.995
384.6	387.8	0.9917	correlation coernelent	0.555525	20.999
187.1	191.4	0.9775	Slope	1.006976	0.90 - 1.10
95.6	98.7	0.9686	Slope	1.000970	0.90 - 1.10
			Intercept	1.486191	+/-20









T640 PM_{2.5} CALIBRATION

WBEA					Version-01-2023
		Station Information			
Station Name: Calibration Date: Start time (MST):	Surmont 2 February 17, 2023 13:25	Station number: AMS 29 Last Cal Date: January 12, 2023 End time (MST): 15:00			
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	253	
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388753	
Temp/RH standard:	Alicat FP-25BT		S/N:	388753	
		Monthly Calibration Te	est		
Parameter	<u>As found</u>	Measured	<u>As left</u>	<u>Adjust</u>	<u>ed</u> (Limits)
T (°C)	-10.8	-10.7	-10.8		+/- 2 °C
P (mmHg)	706.1	707.0	706.1		+/- 10 mmHg
flow (LPM)	5.01	5.36	5.01	\checkmark	+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	February 17, 2023 3.8	Last Cal Date: PM w/ HEPA:	January 12, 2023 0	3<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 cheo	ck
Inlet cleaning :	Inlet Head				
		Quarterly Calibration T			
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	Adjust	<u>ed</u> (Limits)
PMT Peak Test	11.3	11.3	11.3		11.3 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	3.8	w/ HEPA:	0.0
Date Optical Cham	nber Cleaned:	February 17, 2023			<0.2 ug/m3
Disposable Filte	r Changed:	February 17	, 2023		
		Annual Maintenance	9		
Date Sample Tul	be Cleaned:	September 30	1. 2022		
Date RH/T Sensor Cleaned:		October 6,			
		Adju	sted flow only.		
Notes:					
Calibration by:	Braiden Boutilier				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS30 ELLS RIVER FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Ells River February 15, 2023 9:56 Routine		Station number: Last Cal Date: End time (MST):	AMS 30 January 10, 2023 12:50	
		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 Т700 АРІ Т701Н		Serial Number: Serial Number:	3061 358	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1008841397	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.003501 -2.675936	1.006172 -2.436019	Backgd or Offset: Coeff or Slope:	9.3 0.988	9.2 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/ Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.4	
as found span	4921	79.2	800.4	801.3	0.999
as found 2nd point					
as found 3rd point					
new cylinder response	F000	0.0	0.0	0.0	
calibrator zero high point	5000 4921	0.0	0.0 800.4	0.0 804.0	0.995
second point	4921	39.6	400.2	399.3	1.002
third point	4980	19.8	200.1	196.3	1.019
as left zero	5000	0.0	0.0	-0.1	
as left span	4921	79.2	800.4	808.0	0.991
•			Averag	ge Correction Factor	1.006
Baseline Corr As found:	800.90	Previous response	800.49	*% change	0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

No adjustments have been made.

Calibration Performed By:

Denny Ray Estador

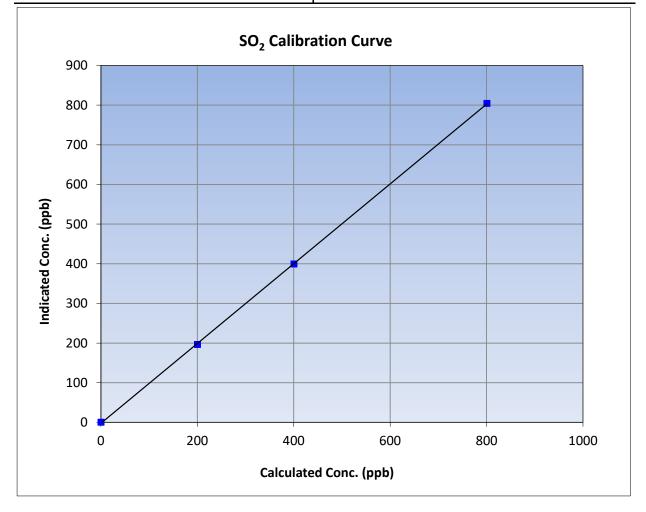


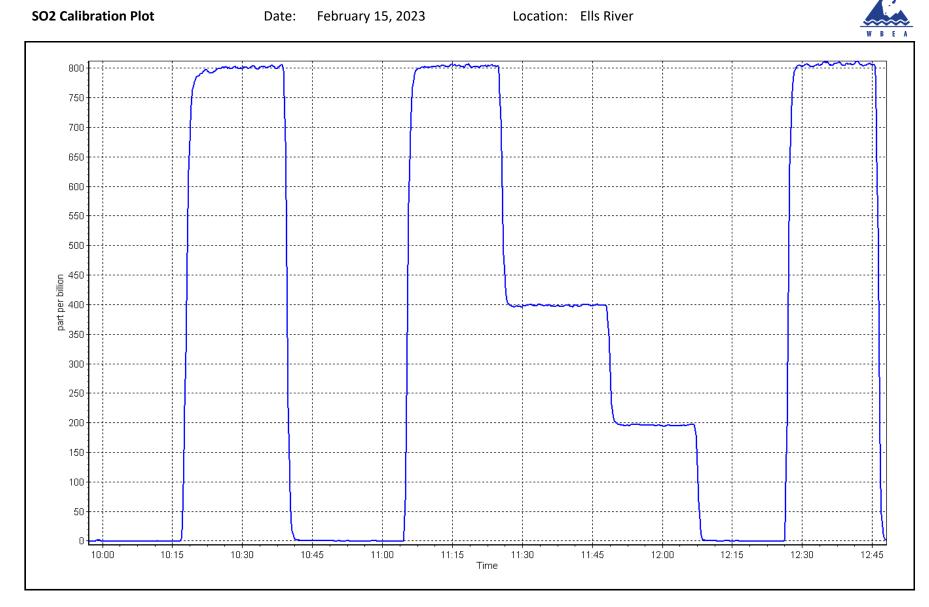
SO₂ Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	February 15, 2023	Previous Calibration:	January 10, 2023					
Station Name:	Ells River	Station Number:	AMS 30					
Start Time (MST):	9:56	End Time (MST):	12:50					
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841397					

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	0.999958	≥0.995
800.4	804.0	0.9955	correlation coefficient	0.999998	20.335
400.2	399.3	1.0023	Slope	1.006172	0.90 - 1.10
200.1	196.3	1.0194	Slope		0.90 - 1.10
			- Intercept	-2.436019	+/-30







TRS Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Ells River February 13, 2023 10:37 Routine		Station number: Last Cal Date: End time (MST):	AMS30 January 5, 2023 14:43	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #: Removed Cal Gas Conc:	5.08 EY0002443	ppm	Cal Gas Exp Date:	February 9, 2024	
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: Calibration intercept:	1.029508 0.140267	0.999493 0.040843	Backgd or Offset: Coeff or Slope:		1.57 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)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4921	78.7	80.0	81.5	0.981
as found 2nd point	4961	39.4	40.0	40.6	0.986
as found 3rd point	4980	19.7	20.0	20.1	0.996
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	0.1	
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	0.1	
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	-	N/A		Ave Corr Factor	1.000
Date of last converter eff	ficiency test:	N/A		95.1%	efficiency
Baseline Corr As found:	81.5	Prev response:		*% change:	-1.2%
Baseline Corr 2nd AF pt:	40.6	AF Slope:		AF Intercept:	-0.159513
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999983	* = > +/-5% change initiat	es investigation

Notes:

Adjusted the span only.

Calibration Performed By:

Denny Ray Estador

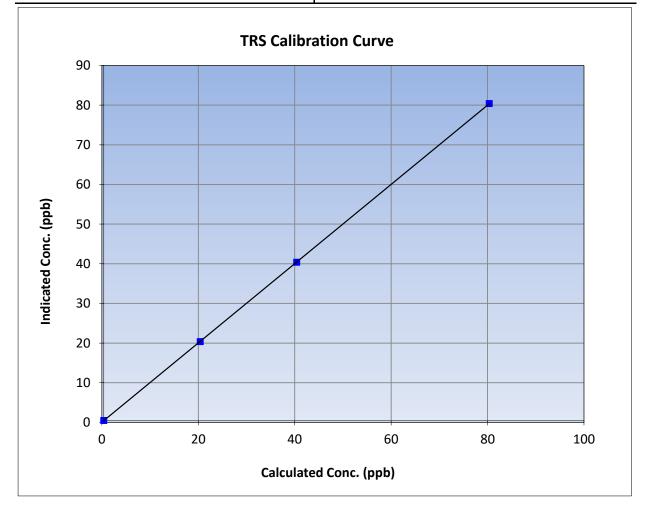


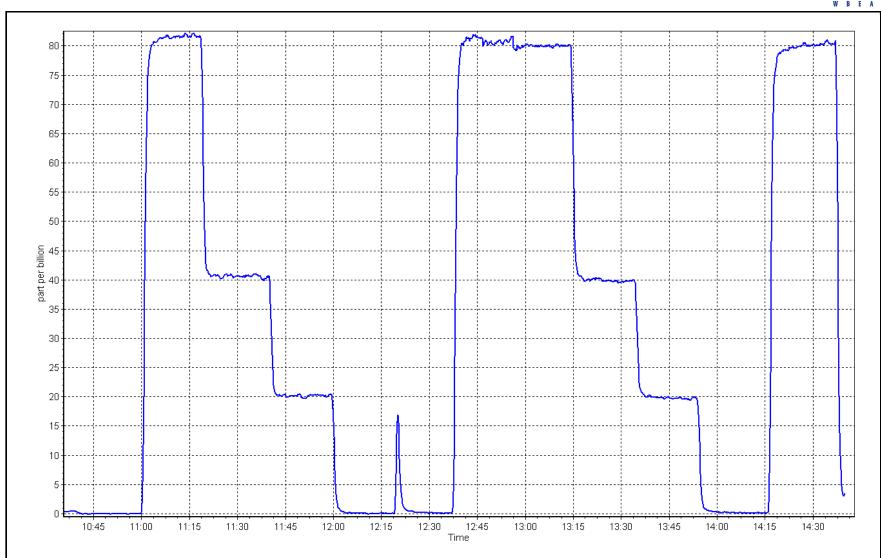
TRS Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	February 13, 2023	Previous Calibration:	January 5, 2023					
Station Name:	Ells River	Station Number:	AMS30					
Start Time (MST):	10:37	End Time (MST):	14:43					
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331					

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	0.999997	≥0.995
80.0	80.0	0.9995	correlation coefficient	0.999997	20.333
40.0	40.0	1.0007	Slope	0.999493	0.90 - 1.10
20.0	20.0	1.0008	Slope		0.90 - 1.10
			- Intercept	0.040843	+/-3





TRS Calibration Plot

Location: Ells River





THC / CH₄ / NMHC Calibration Report

W B E A					Version-01-202
		St	tation Information		
Station Name:	Ells River		Station number: A	AMS 30	
Calibration Date:	February 10, 2	023	Last Cal Date: J	anuary 2, 2023	
Start time (MST):	9:56		End time (MST): 1	13:06	
Reason:	Routine				
		Са	libration Standards		
Gas Cert Reference:		CC494126	Cal Gas Expiry Date: [December 29, 20	028
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: 3	3061	
ZAG make/model:	API T701H		Serial Number: 3	358	
		Ar	nalyzer Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 1	193585650	
THC Range (ppm)	: 0 - 20 ppm				
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): () - 10 ppm	
	<u>Start</u>	<u>Fini</u>	<u>sh</u>	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	0.000234	0.000	NMHC SP Ratio:	5.04E-05	4.96E-05
CH4 Retention time:	13.2	13	.6 NMHC Peak Area:	180847	183767
CH4 Retention time:	13.2	13	.6 NMHC Peak Area:	180847	183767

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	17.06	0.998		
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	17.02	1.000		
second point	4960	39.6	8.51	8.35	1.020		
third point	4980	19.8	4.26	4.13	1.030		
as left zero	5000	0.0	0.00	0.00			
as left span	4921	79.2	17.03	17.03	1.000		
			ŀ	Average Correction Factor	1.017		
Baseline Corr AF:	17.06	Prev response	17.05	*% change	0.1%		
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 Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0	0.00	0.00			
as found span	4921	79.2	9.11	9.25	0.985		
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	9.11	1.000		
second point	4960	39.6	4.56	4.51	1.011		
third point	4980	19.8	2.28	2.24	1.018		
as left zero	5000	0	0.00	0.00			
as left span	4921	79.2	9.11	9.10	1.002		
			ŀ	Average Correction Factor	1.010		
Baseline Corr AF:	9.25	Prev response	9.15	*% change	1.1%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>			

СН4	Cal	libra	tion	Data
CIII	Ca	i Di a	CIOIL	ναια

		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	4921	79.2	7.91	7.82	1.013
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	7.91	1.000
second point	4960	39.6	3.96	3.84	1.031
third point	4980	19.8	1.98	1.89	1.045
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	7.91	7.93	0.998
			A	verage Correction Factor	1.025
Baseline Corr AF:	7.82	Prev response	7.90	*% change	-1.1%
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:		1.006389		1.000952	
THC Cal Offset:		-0.085138		-0.082136	
CH4 Cal Slope:		1.004928	1.001462		
CH4 Cal Offset:		-0.050756		-0.056755	
NMHC Cal Slope:		1.007959		1.000622	
NMHC Cal Offset:		-0.034582		-0.025581	

Notes:

Adjusted the span.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

		Station	nformation		
Calibustics D. I					2 2022
Calibration Date:		/ 10, 2023	Previous Calibration:	January	
Station Name:		River	Station Number:	AM	
Start Time (MST)		:56	End Time (MST):	13:	
Analyzer make:	Theri	mo 55i	Analyzer serial #:	11935	85650
		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	0.999867	≥0.995
17.03	17.02	1.0004			
<u>8.51</u> 4.26	<u>8.35</u> 4.13	1.0201 1.0303	Slope	1.000952	0.90 - 1.10
4.20	4.15	1.0505	Intercept	-0.082136	+/-0.5
18.0 -					
16.0 -				/	
14.0 -					
12.0 -					
(mdd 10.0 - 300 -					
Conc. - 0.8					
ndicated (
드 4.0 -					
2.0 -					
0.0					
0.	.0 5	5.0		15.0	20.0
		Calculated	Conc. (ppm)		



CH₄ Calibration Summary

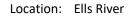
						Version-01-202
			Station I	nformation		
Calibration Da	ate:	February	10, 2023	Previous Calibration:	January	2, 2023
Station Name	2:	Ells	River	Station Number: A		5 30
Start Time (N	1ST):	9:56		End Time (MST):	13:	06
Analyzer mak	ke:	Therr	no 55i	Analyzer serial #:	11935	85650
			Calibra	tion Data		
			Cullora			
(ppm) (C		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00		0.00		Correlation Coefficient	0.999698	≥0.995
7.91 3.96		7.91 3.84	1.0005 1.0307			
1.98		1.89	1.0448	Slope	1.001462	0.90 - 1.10
				Intercept	-0.056755	+/-0.5
9. 8.						
7.	0 —					
6.	0 🕂					
Indicated Conc. (ppm)	0 -					
ouog 4.	0 -					
ndicate	0					
2.	0					
1.	0 -					
0.	0.0	2.0	4.0	6.0	8.0	10.0
			Calculater	l Conc. (ppm)		



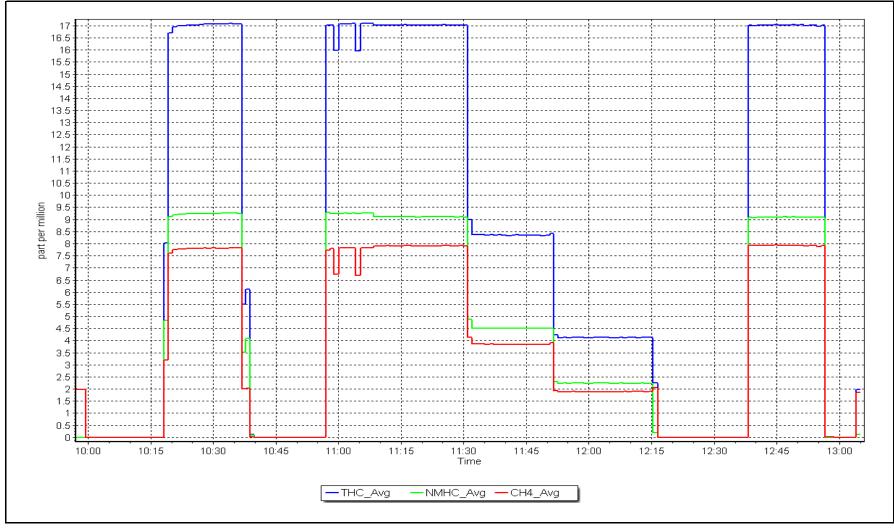
NMHC Calibration Summary

		Station I	nformation		
Calibration Date: February 10, 2		/ 10, 2023	Previous Calibration:	January	2, 2023
Station Name:	Ells	River	Station Number:	AMS 30	
Start Time (MST):	9:	56	End Time (MST):	13:	06
Analyzer make:	Therr	no 55i	Analyzer serial #: 1193		85650
		Calibra	ation Data		
alculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic)		Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999957	≥0.995
9.11 4.56	9.11 4.51	1.0003 1.0110			
2.28	2.24	1.0110	Slope	1.000622	0.90 - 1.10
			Intercept	-0.025581	+/-0.5
9.0 8.0 7.0					•
(u dd) 6.0					
6.0					
4.0					
2.0					
1.0					
0.0					10.0
0.0	2.0	4.0	6.0	8.0	10.0
		Calculated	d Conc. (ppm)		

NMHC Calibration Plot









THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2		
		St	ation Information				
Station Name:	Ells River		Station number: AMS 30				
Calibration Date:	February 12, 20	23	Last Cal Date: Fe	ebruary 10, 202	23		
Start time (MST):	10:00		End time (MST): 1	1:23			
Reason:	Removal						
		Cal	ibration 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: 3	061			
ZAG make/model:	API T701H		Serial Number: 3	58			
		An	alyzer Information				
Analyzer make:	: Thermo 55i		Analyzer serial #: 1	193585650			
THC Range (ppm):	: 0 - 20 ppm						
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm			
	<u>Start</u>	Finis	<u>h</u>	Start	Finish		
CH4 SP Ratio:	0.000236	NA	NMHC SP Ratio:	4.96E-05	NA		
CH4 Retention time:	: 13.6	NA	NMHC Peak Area:	183767	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= 0.95-1.05</i>		
as found zero	5000	0.0	0.00	0.00			
as found span	4921	79.2	17.03	16.90	1.007		
as found 2nd point	4960	39.6	8.51	8.29	1.027		
as found 3rd point	4980	19.8	4.26	4.15	1.027		
new cylinder response							
calibrator zero							
high point							
second point							
third point							
as left zero							
as left span							
			Aver	age Correction Factor			
Baseline Corr AF:	16.90	Prev response	16.96	*% change	-0.4%		
Baseline Corr 2nd AF:	8.3	AF Slope:	0.993223	AF Intercept:	-0.064347		
Baseline Corr 3rd AF:	4.1	AF Correlation:	0.999889	* = > +/-5% change initia	tes 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	0.00	0.00	
as found span	4921	79.2	9.11	9.11	1.000
as found 2nd point	4960	39.6	4.56	4.51	1.011
as found 3rd point	4980	19.8	2.28	2.24	1.020
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	
Baseline Corr AF:	9.11	Prev response	9.09	*% change	0.2%
Baseline Corr 2nd AF:	4.5	AF Slope:	1.000681	AF Intercept:	-0.027312
Baseline Corr 3rd AF:	2.2	AF Correlation:	0.999954	* = > +/-5% change initia	tes investigation
as found zero	5000	0.0	0.00	0.00	
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 span	4921	79.2	7.91	7.79	1.016
as found 2nd point	4960	39.6	3.96	3.78	1.048
as found 3rd point	4980	19.8	1.98	1.91	1.035
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
				age Correction Factor	
Baseline Corr AF:	7.79	Prev response	7.87	*% change	-1.0%
Baseline Corr 2nd AF:	3.78	AF Slope:	0.984307	AF Intercept:	-0.038378
Baseline Corr 3rd AF:	1.91	AF Correlation:	0.999713	* = > +/-5% change initia	tes investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		1.000952			
THC Cal Offset:		-0.082136			

Notes:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Removal calibration for instrument change out.

Calibration Performed By: K

1.001462

-0.056755

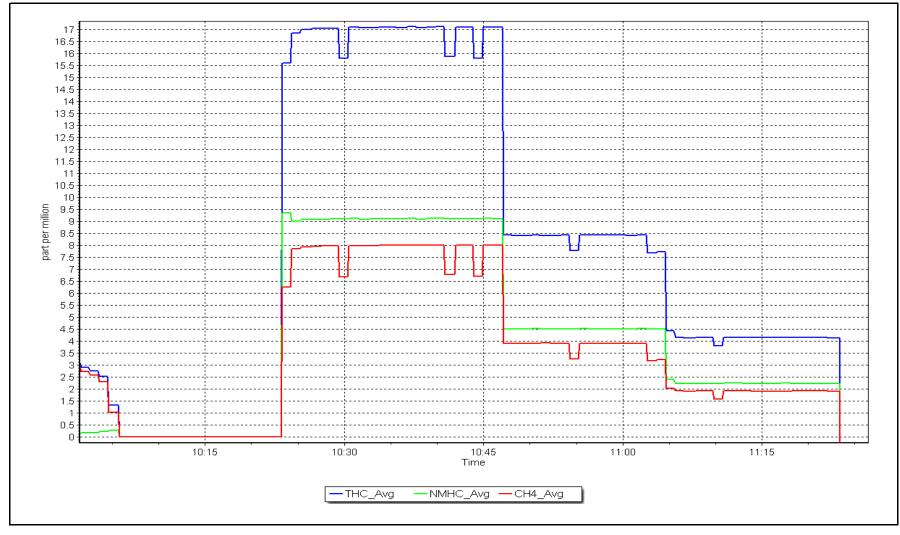
1.000622

-0.025581

NMHC Calibration Plot









THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020		
		St	ation Information				
Station Name:	Ells River		Station number: AMS 30				
Calibration Date: February 12, 2023			Last Cal Date: N	IA			
Start time (MST):	12:30		End time (MST): 1	4:50			
Reason:	Install						
		Cal	ibration Standards				
Gas Cert Reference:		CC494126	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: 3	061			
ZAG make/model:	API T701H		Serial Number: 3	58			
		An	alyzer Information				
Analyzer make	: Thermo 55i		Analyzer serial #: 1	181490018			
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	: NA	0.000	230 NMHC SP Ratio:	NA	4.00E-05		
CH4 Retention time	: NA	14.	D NMHC Peak Area:	NA	227486		

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							
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	4921	79.2	17.03	16.92	1.006		
second point	4960	39.6	8.51	8.36	1.018		
third point	4980	19.8	4.26	4.14	1.028		
as left zero	5000	0.0	0.00	0.00			
as left span	4921	79.2	17.03	16.73	1.018		
			A	verage Correction Factor	1.017		
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 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) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero								
as found span								
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0	0.00	0.00				
high point	4921	79.2	9.11	9.01	1.011			
second point	4960	39.6	4.56	4.47	1.020			
third point	4980	19.8	2.28	2.21	1.029			
as left zero	5000	0	0.00	0.00				
as left span	4921	79.2	9.11	8.91	1.023			
			A	verage Correction Factor	1.020			
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

		CIT+ Calibra	tion butu		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) 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	4921	79.2	7.91	7.91	1.001
second point	4960	39.6	3.96	3.90	1.016
third point	4980	19.8	1.98	1.93	1.026
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	7.91	7.82	1.012
			A	verage Correction Factor	1.014
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		0.994670	
THC Cal Offset:		NA		-0.054336	
CH4 Cal Slope:		NA		1.000380	
CH4 Cal Offset:		NA		-0.030757	
NMHC Cal Slope:		NA		0.989848	
NMHC Cal Offset:		NA		-0.023379	

Notes:

Install calibration for instrument change out. Adjusted the span only.

Calibration Performed By:

Karan Pandit



THC Calibration Summary

					Version-01-2020
		Station In	nformation		
Calibration Date:	February	12, 2023	Previous Calibration:	Ν	A
Station Name:	Ells	River	Station Number:	AMS	5 30
Start Time (MST):	12	:30	End Time (MST):	14:	50
Analyzer make:		no 55i	Analyzer serial #:	11814	
		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	0.999946	≥0.995
17.03 8.51	16.92 8.36	1.0065 1.0183			
4.26	4.14	1.0276	Slope	0.994670	0.90 - 1.10
			Intercept	-0.054336	+/-0.5
18.0 -				_	
16.0 -				_	
14.0 -					
12.0 -					
ЭÊ					
d 10.0 -					
JC.					
- 0.01 (ppm) - 0.8 conc. (ppm) - 0.9					
ted					
- 0.6 jic					
	/				
4.0 -					
2.0 -					
0.0					
0.	.0 5	.0	10.0	15.0	20.0
		Calculated	Conc. (ppm)		
1		calculated	Conc. (ppm)		



CH₄ Calibration Summary

			Station I	nformation		
Calibratio	on Date:	February	12, 2023	Previous Calibration:	Ν	A
Station Na	ame:	Ells	River	Station Number: A		5 30
Start Time	e (MST):	12	:30	End Time (MST):	14:	50
Analyzer ı	make:	Therr	no 55i	Analyzer serial #:	11814	90018
			Calibra	tion Data		
	concentration m) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eva	aluation	<u>Limits</u>
	.00	0.00		Correlation Coefficient	0.999919	≥0.995
	.91 .96	7.91 3.90	1.0009 1.0156			
	.90	1.93	1.0259	Slope	1.000380	0.90 - 1.10
				Intercept	-0.030757	+/-0.5
	8.0					
	7.0 —					
	6.0					
Indicated Conc. (ppm)	5.0 —					
Conc.	4.0					
ed C						
ndicat	3.0					
=	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		

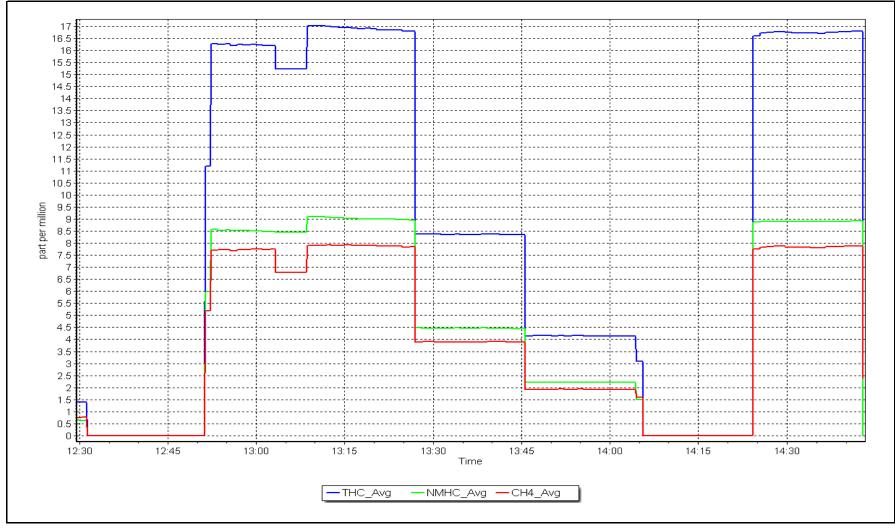


NMHC Calibration Summary

Calibration Date: Station Name: Start Time (MST): Analyzer make:	Ells 12	/ 12, 2023 River :30	Previous Calibration: Station Number:	N/ AMS	
Start Time (MST):	12		Station Number:	AMS	5 30
		:30			
Analyzer make:	Therr		End Time (MST): 1		50
		no 55i	Analyzer serial #:		90018
		Calibra	tion Data		
Calculated concentration In (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	Jation	<u>Limits</u>
0.00 9.11	0.00 9.01	1.0113	Correlation Coefficient	0.999967	≥0.995
4.56	4.47	1.0201 1.0290	Slope	0.989848	0.90 - 1.10
2.20		1.0250	Intercept	-0.023379	+/-0.5
9.0 8.0 7.0					
6.0 bbm) 5.0 couc					
5 .0					
0 4 .0					
4.0 Undicated					
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 February 1, 20 8:55 Routine	23	Station number: AMS 30 Last Cal Date: January 13, 2023 End time (MST): 13:15			3
			Calibrati	on Standards		
NO Gas Cylinder #:		T2Y1P2R		Cal Gas Expiry Date: De	cember 11, 20	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: 306		
ZAG make/model:	API T701H			Serial Number: 358	3	
			Analyze	r Information		
Analyzer make:	Thermo 42i			Analyzer serial #: 710)321429	
NOX Range (ppb):				······		
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	: 1.029		1.029	NO bkgnd or offset:	12.6	12.5
NOX coeff or slope:	. 0.992		0.992	NOX bkgnd or offset:	12.5	12.4
NO2 coeff or slope:	: 1.000		1.000	Reaction cell Press:	181.5	185.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998693	1.001096
NO _x Cal Offset:	-0.720000	-0.800000
NO Cal Slope:	0.997541	1.001429
NO Cal Offset:	-1.280000	-1.540000
NO ₂ Cal Slope:	1.000846	1.001609
NO ₂ Cal Offset:	0.511635	0.350570



$NO_X \setminus NO \setminus NO_2$ 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	0.0		
as found span	4920	80.0	813.3	799.5	13.8	817.9	802.1	15.8	0.9944	0.9968
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	4920	80.0	813.3	799.5	13.8	813.8	799.9	14.0	0.9994	0.9995
second point	4960	40.0	406.6	399.8	6.9	405.8	397.9	7.9	1.0021	1.0047
third point	4980	20.0	203.3	199.9	3.4	202.0	197.3	4.7	1.0065	1.0131
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4920	80.0	813.3	422.6	390.7	813.6	429.2	384.3	0.9996	0.9847
							Average C	orrection Factor	1.0027	1.0058
Corrected As fo	ound NO _x =	818.1 ppb	NO =	802.3 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _X =	0.8%
Previous Respo	nse NO _x =	811.5 ppb	NO =	796.3 ppb				*Percent Chang	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 foun	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)	797.4	420.5	390.7	391.2	0.9986	100.1%
2nd GPT point (200 ppb O3)	797.4	613.2	198.0	199.7	0.9913	100.9%
3rd GPT point (100 ppb O3)	797.4	704.9	106.3	106.4	0.9987	100.1%
				Average Correction Factor	0.9962	100.4%

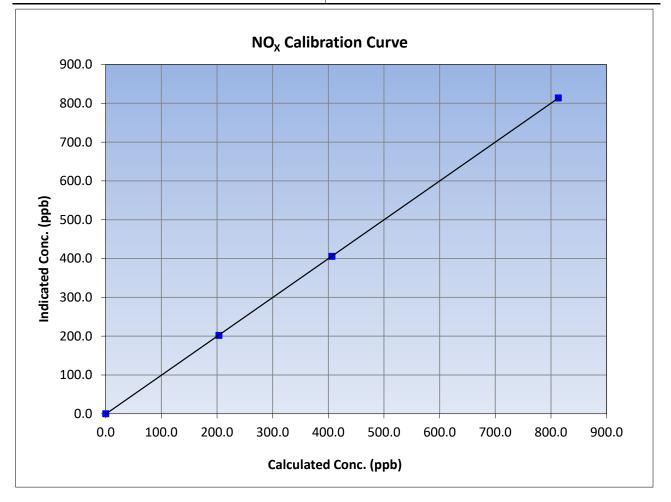
Notes:

No adjusments have been made.



NO_x Calibration Summary

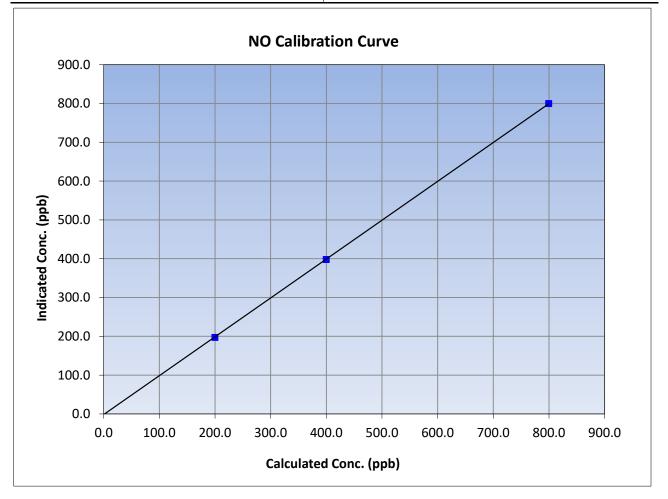
WBEA					Version-04-2
		Station	Information		
Calibration Date:	February 1, 2023		Previous Calibration:	January	13, 2023
Station Name:	Ells River		Station Number:	AM	S 30
Start Time (MST):	8:	55	End Time (MST):	13	:15
Analyzer make:	Therr	no 42i	Analyzer serial #: 710321429		
		Calibra	ation Data		
Calculated 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
813.3	813.8	0.9994	correlation coernelent	0.555550	20.333
406.6	405.8	1.0021	Slope	1.001096	0.90 - 1.10
203.3	202.0	1.0065	Slope	1.001096	0.90 - 1.10
			Intercept	-0.800000	+/-20





NO Calibration Summary

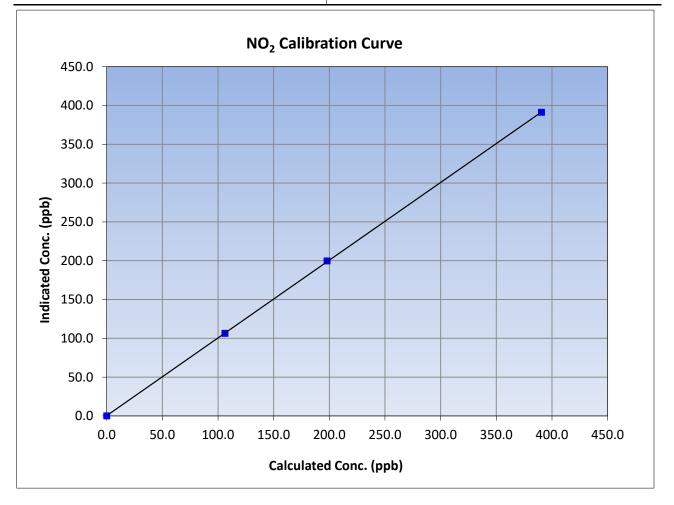
WBEA					Version-04-2
		Station	Information		
Calibration Date:	February 1, 2023		Previous Calibration:	January	13, 2023
Station Name:	Ells	River	Station Number:	AM	S 30
Start Time (MST):	8:	55	End Time (MST):	13	:15
Analyzer make:	Therr	no 42i	Analyzer serial #: 710321429		
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999985	≥0.995
799.5	799.9	0.9995	correlation coefficient	0.999965	20.333
399.8	397.9	1.0047	Slope	1.001429	0.90 - 1.10
199.9	197.3	1.0131	Slope	1.001429	0.90 - 1.10
			Intercept	-1.540000	+/-20





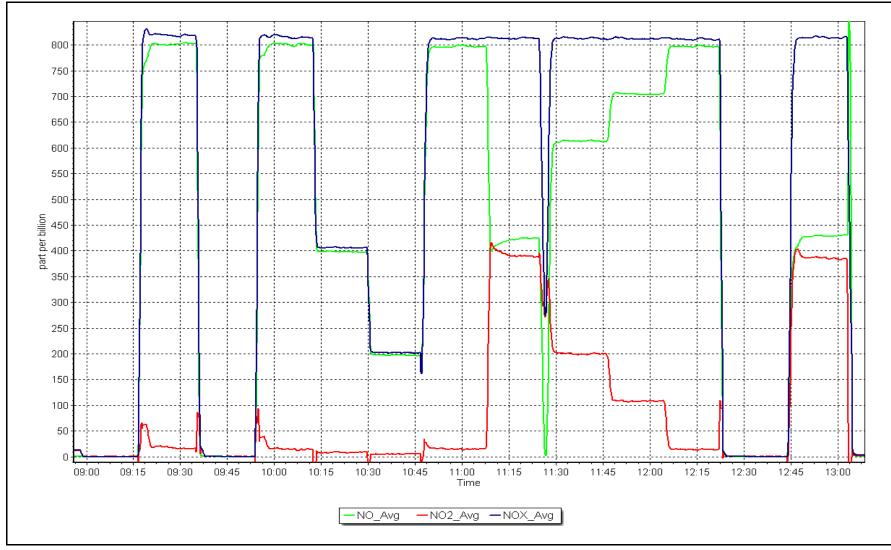
NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	February 1, 2023		Previous Calibration:	January	13, 2023
Station Name:	Ells	River	Station Number:	AM	S 30
Start Time (MST):	8:	55	End Time (MST):	13	:15
Analyzer make:	Therr	no 42i	Analyzer serial #: 710321429		
		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	0.999981	≥0.995
390.7	391.2	0.9986	correlation coernelent	0.555561	20.333
198.0	199.7	0.9913	Classe	1.001609	0.90 - 1.10
106.3	106.4	0.9987	Slope	1.001609	0.90 - 1.10
			Intercept	0.350570	+/-20











T640 PM_{2.5} CALIBRATION

WBEA						Version-01-2023
		Station Information	ı			
Station Name:	Ells River		Station number:	AMS 30		
Calibration Date:	February 17, 2023		Last Cal Date:	January 5, 202	3	
Start time (MST):	12:55		End time (MST):	13:08		
Analyzer Make:	API T640		S/N:	875		
Particulate Fraction:	PM2.5		5/14.	0/5		
Flow Meter Make/Model:	Delta Cal		S/N:	954		
Temp/RH standard:	Delta Cal		S/N:	954		
		Monthly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	A	<u>djusted</u>	(Limits)
T (°C)	-16.8	-17.1	-16.8			+/- 2 °C
P (mmHg)	730.4	726.5	730.4			+/- 10 mmHg
flow (LPM)	5.01	5.07	5.01			+/- 0.25 LPM
Leak Test:		February 17, 2023	Last Cal Date:	January 5,	2023	
	PM w/o HEPA:	3.1	PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be	e completed before the	quarterly work and will s	serve as the pre mai	intenance leak	check	
Inlet cleaning :	Inlet Head					
		Quarterly Calibration	Fest			
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>A</u>	djusted	(Limits)
PMT Peak Test						11.3 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham		December 1	9, 2022	,		<0.2 ug/m3
Disposable Filte		December 1				
		Annual Maintenanc	e			
Date Sample Tul	he Cleaned:	October 17	2022			
Date RH/T Sense	-	October 17				
			·			
		N 1				
Notes:		NO ADJU	istments required.			
Calibration by:	Donny Pay Estador					
Calibration by:	Denny Ray Estador					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS506 JACKFISH 1 FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

	Station Infor	mation		
Jackfish 1 February 14, 2023 11:36 Routine		Station number: Last Cal Date: End time (MST):	AMS 506 January 24, 2023 14:16	
	Calibration St	andards		
<u>50.52</u>	<u>2</u> ppm	Cal Gas Exp Date:	December 29, 2028	
<u>CC274266</u>				
	<u>2</u> ppm		NA	
			2659	
API 701		Serial Number:	4427	
	Analyzer Info	rmation		
Thermo 43i		Analyzer serial #:	1160290011	
0 - 1000 ppb				
Start	Finish		Start	<u>Finish</u>
1.006642	1.004300	Backgd or Offset:	19.0	18.9
-1.856099	-1.536060	Coeff or Slope:	0.960	0.960
	SO ₂ Calibratio	on Data		
Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/lc)
(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
5000	0.0	0.0	-0.7	
4921	79.2	800.2	800.4	1.000
				0.997
				1.012
				0.997
	, ,			1.003
801.10	Previous response			-0.3%
NA	AF Slope:		AF Intercept:	
	February 14, 2023 11:36 Routine 50.52 CC274266 50.52	February 14, 2023 11:36 Routine 50.52 ppm CC274266 50.52 ppm S0.52 ppm NA API T700 API 701 API 701 Kanalyzer Info Thermo 43i 1.004300 0 - 1000 ppb Finish Start Finish 1.006642 1.004300 -1.856099 -1.536060 Dilution air flow rate (sccm) Source gas flow rate (sccm) 5000 0.0 4921 79.2 4960 39.6 4980 19.8 5000 0.0 4921 79.2 4960 39.6 4980 19.8 5000 0.0 4921 79.2 4960 39.6 4980 19.8 5000 0.0 801.10 Previous response	February 14, 2023 Last Cal Date: 11:36 End time (MST): Routine 50.52 ppm Cal Gas Exp Date: CC274266 50.52 ppm Rem Gas Exp Date: MA Diff between cyl: API 7700 Serial Number: API 7701 Serial Number: Serial Number: Start Finish Analyzer serial #: 0 - 1000 ppb I.004300 Backgd or Offset: Start Finish Analyzer serial #: 1.006642 1.004300 Backgd or Offset: Start Source gas flow rate Calculated (sccm) 0.0 0.0 Story 79.2 800.2 Story 79.2 800.2 Story 79.2 800.2 4960 39.6 400.2 4980 19.8 200.1 Story 79.2 800.2 4980 19.8 200.1 Story 79.2 800.2 4980 19.8 200.1 Story 79.2 800.2 4980 1	February 14, 2023 Last Cal Date: January 24, 2023 11:36 End time (MST): 14:16 Source Source Source 50.52 ppm Cal Gas Exp Date: December 29, 2028 C2274266 50.52 ppm Rem Gas Exp Date: NA NA Diff between cyl: Serial Number: 2659 API 701 Serial Number: 4427 Start Finish 1.006642 1.004300 Backgd or Offset: 19.0 -1.856099 -1.536060 Coeff or Slope: 0.960 SO2 Calibration Data Dilution air flow rate (sccm) Source gas flow rate (sccm) concentration (ppb) (Cc) (ppb) (lc) 5000 0.0 0.0 -0.7 4921 79.2 800.2 800.4

Notes:

Changed inlet filter after as founds. Adjusted span only.

Calibration Performed By:

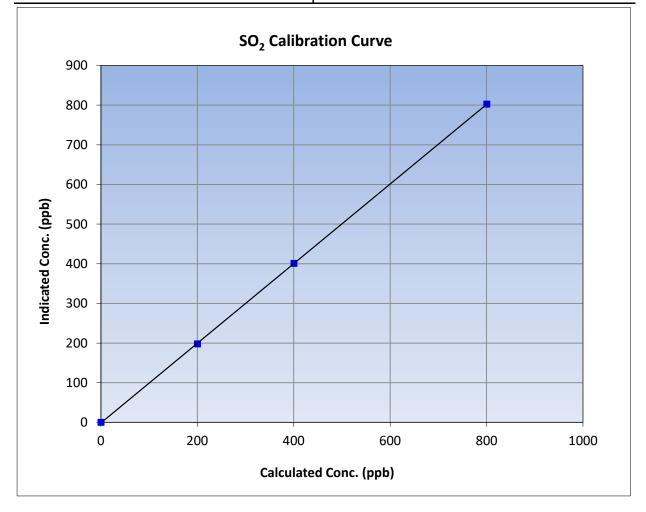


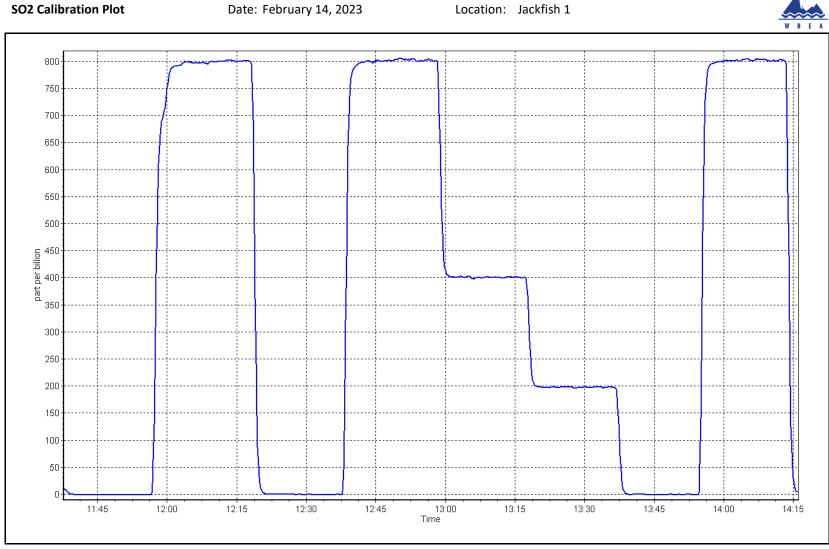
SO₂ Calibration Summary

WBEA			Version-01-2020
	Statio	on Information	
Calibration Date:	February 14, 2023	Previous Calibration:	January 24, 2023
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	11:36	End Time (MST):	14:16
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290011

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	-0.4		Correlation Coefficient	0.999988	≥0.995	
800.2	802.4	0.9973	correlation coefficient	0.999988	20.995	
400.2	400.6	0.9989	Slope	1.004300	0.90 - 1.10	
200.1	197.7	1.0120	Siope	1.004300	0.90 - 1.10	
			Intercept	-1.536060	+/-30	









H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 1 February 1, 2023 10:12 Routine		Station number: Last Cal Date: End time (MST):	AMS506 January 20, 2023 14:10	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.14 CC511843	ppm	Cal Gas Exp Date:	September 16, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.14 NA	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API 701		Serial Number: Serial Number:	2659 4427	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	12124313139 2022-200	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.008437	1.003151	Backgd or Offset:		1.04
Calibration intercept:	-0.098415	-0.038506	Coeff or Slope:	0.736	0.736
		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	0.2	
as found span	4922	77.8	80.0	74.6	1.075
as found 2nd point	4961	38.9	40.0	37.0	1.087
as found 3rd point new cylinder response	4981	19.4	19.9	17.8	1.133
new cynnaer 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	4922	77.8	80.0	80.4	0.995
second point	4961	38.9	40.0	39.9	1.002
third point	4981	19.4	19.9	19.5	1.023
as left zero	5000	0.0	0.0	0.6	
as left span	4922	77.8	80.0	80.9	0.989
SO2 Scrubber Check	4921	79.2	792.0	0.1	
Date of last scrubber cha				Ave Corr Factor	1.007
Date of last converter ef	ficiency test:	December 1, 2022			efficiency
Baseline Corr As found:	74.4	Prev response:	80.56	*% change:	-8.3%
Baseline Corr 2nd AF pt:	36.8	AF Slope:	0.933723	AF Intercept:	-0.260061
Baseline Corr 3rd AF pt:	17.6	AF Correlation:	0.999815	* = > +/-5% change initiate	es investigation
				- > +/->% unange initiate	is investigation

Noticed as found 3rd point is off the correction factor. Hydration might be required, inlet filter changed and hydrator filled after third As Found, scrubber check after calibrator zero. No adjustment made.

Calibration Performed By:

Notes:

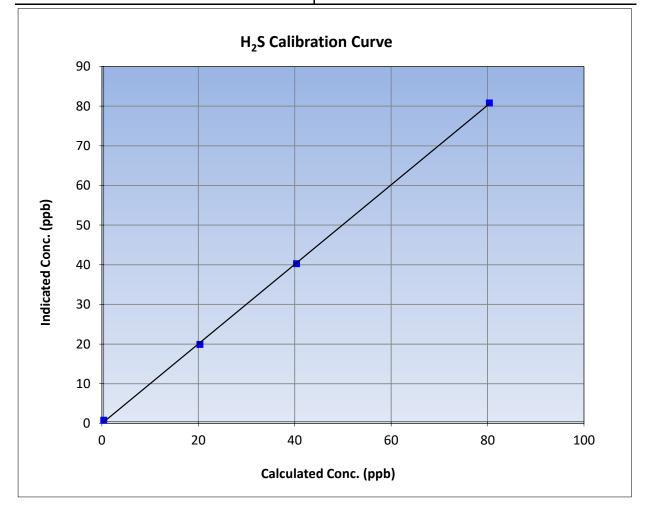


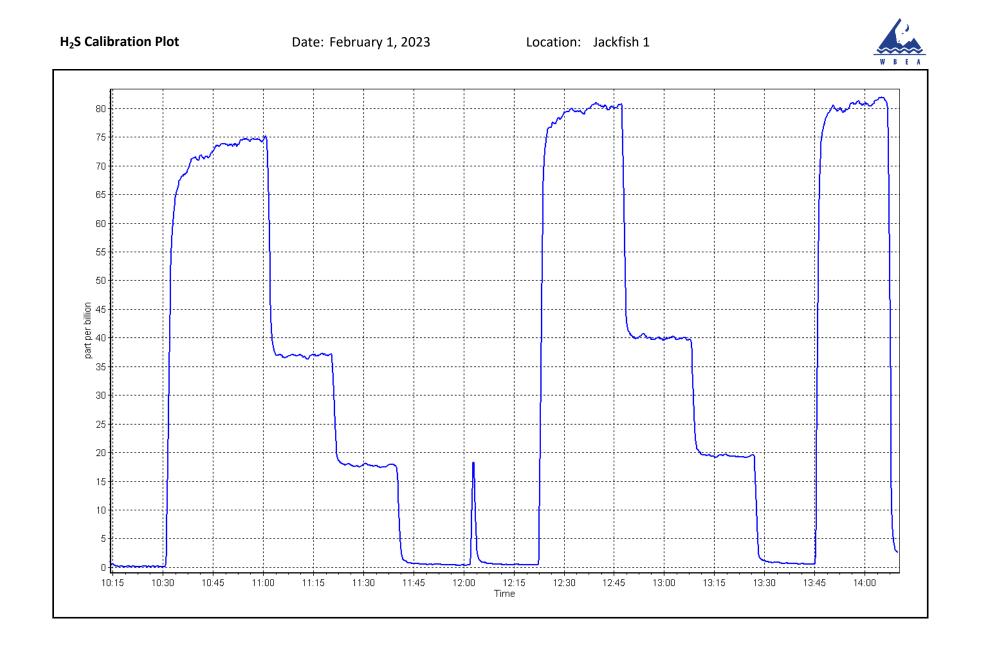
H₂S Calibration Summary

WBEA			Version-11-2021						
Station Information									
Calibration Date:	February 1, 2023	Previous Calibration:	January 20, 2023						
Station Name:	Jackfish 1	Station Number:	AMS506						
Start Time (MST):	10:12	End Time (MST):	14:10						
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12124313139						

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999863	≥0.995
80.0	80.4	0.9948	correlation coefficient	0.555605	20.995
40.0	39.9	1.0023	Slope	1.003151	0.90 - 1.10
19.9	19.5	1.0226	Slope	1.003131	0.90 - 1.10
			- Intercept	-0.038506	+/-3







H₂S Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
tation Name: Calibration Date: tart time (MST): Ceason:	Jackfish 1 February 13, 2023 10:00 Maintenance	H2S low spans	Station number: Last Cal Date: End time (MST):	AMS506 February 1, 2023 14:06	
		Calibration S	tandards		
Cal Gas Concentration:	5.14	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	CC511843 5.14 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:			Serial Number: Serial Number:	2659 4427	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	12124313139 2022-200	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.008437	1.002721	Backgd or Offset:	1.04	1.04
Calibration intercept:	-0.098415	0.101523	Coeff or Slope:	0.736	0.720
		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	77.8	80.0	67.8	1.181
as found 2nd point	4961	38.9	40.0	33.0	1.216
as found 3rd point	4981	19.4	19.9	16.2	1.239
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	4922	77.8	80.0	80.4	0.995
second point	4961	38.9	40.0	40.2	0.995
third point	4981	19.4	19.9	19.7	1.012
as left zero	5000	0.0	0.0	0.6	
as left span	4922	77.8	80.0	81.0	0.987
O2 Scrubber Check	4921	79.2	792.0	0.0	
Date of last scrubber cha				Ave Corr Factor	1.001
Date of last converter ef	0	December 1, 2022			efficiency
Baseline Corr As found:	67.7	Prev response:	80.56	*% change:	-19.0%
Baseline Corr 2nd AF pt:	32.9	AF Slope:		AF Intercept:	-0.401783
Baseline Corr 3rd AF pt:	16.1	AF Correlation:			001,05

Notes:

Here to address H2S low spans. Inlet filter changed and hydrator filled after third As Found, scrubber check after calibrator zero. Adjusted span.

Calibration Performed By:

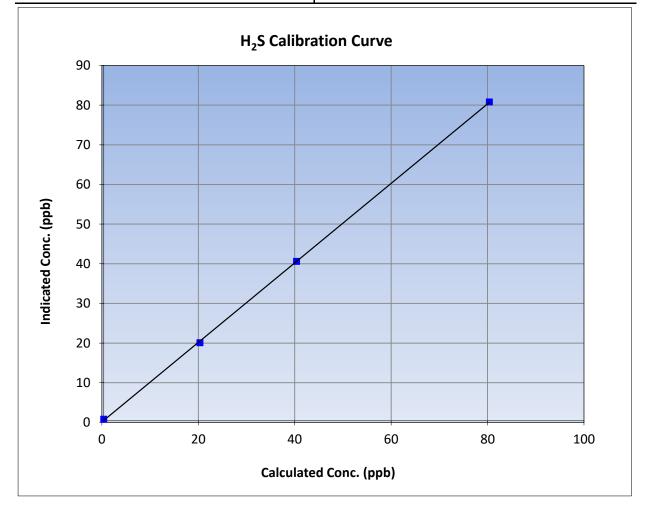
Sean Bala

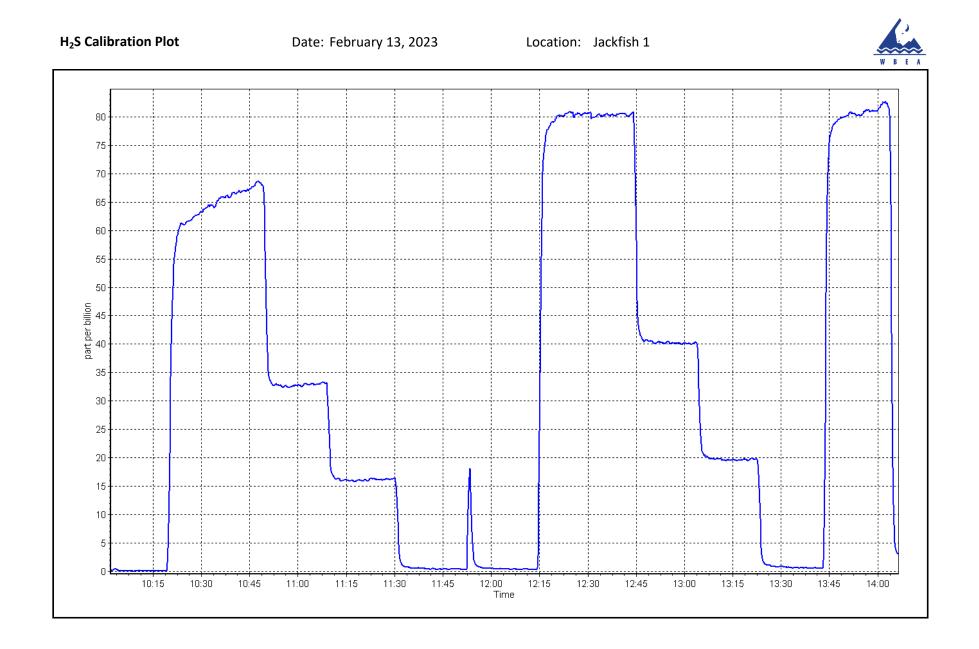


H₂S Calibration Summary

Station Information								
Calibration Date:	February 13, 2023	Previous Calibration:	February 1, 2023					
Station Name:	Jackfish 1	Station Number:	AMS506					
Start Time (MST):	10:00	End Time (MST):	14:06					
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12124313139					

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999927	≥0.995
80.0	80.4	0.9948	correlation coefficient	0.999927	20.995
40.0	40.2	0.9948	Slope	1.002721	0.90 - 1.10
19.9	19.7	1.0123	Slope	1.002721	0.30 - 1.10
			- Intercept	0.101523	+/-3







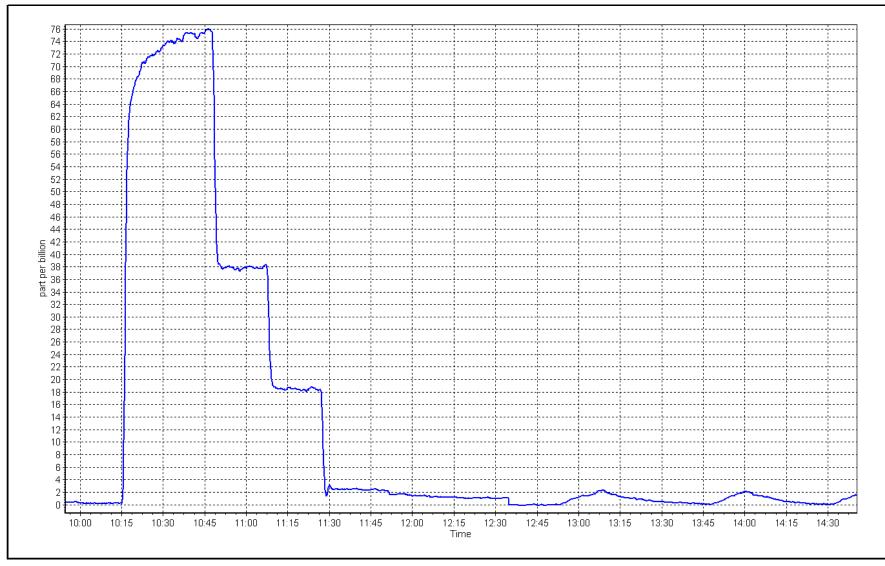
H₂S Calibration Report

WBEA		Station Info	rmation		Version-11-20
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 1 February 22, 2023 9:57 Maintenance	Station mo	Station number: Last Cal Date: End time (MST):	AMS506 February 13, 2023 14:49	
		Calibration S	tandards		
Cal Gas Concentration:	5.14	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	CC511843 5.14 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:			Serial Number: Serial Number:	2659 4427	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQ Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	12124313139 2022-200	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.002721 0.101523		Backgd or Offset: Coeff or Slope:	1.04 0.720	1.04 0.720
		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)	•
	(sccm)	- Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	(ppb) (Ic)	Correction factor (Cc, AFzero)) Limit = 0.90-1.10
as found zero	(sccm) 5000	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc) 0.0	(ppb) (Ic) 0.2	Correction factor (Cc, AFzero)) Limit = 0.90-1.10
as found zero as found span	(sccm) 5000 4922	Source gas flow rate (sccm) 0.0 77.8	Calculated concentration (ppb) (Cc) 0.0 80.0	(ppb) (Ic) 0.2 75.1	Correction factor (Cc, AFzero)) <i>Limit = 0.90-1.10</i> 1.068
as found zero as found span as found 2nd point	(sccm) 5000 4922 4961	Source gas flow rate (sccm) 0.0 77.8 38.9	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0	(ppb) (Ic) 0.2 75.1 37.9	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000 4922	Source gas flow rate (sccm) 0.0 77.8	Calculated concentration (ppb) (Cc) 0.0 80.0	(ppb) (Ic) 0.2 75.1	AFzero)) <i>Limit = 0.90-1.10</i> 1.068
as found zero as found span as found 2nd point	(sccm) 5000 4922 4961	Source gas flow rate (sccm) 0.0 77.8 38.9	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9	(ppb) (Ic) 0.2 75.1 37.9	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000 4922 4961	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9	(ppb) (Ic) 0.2 75.1 37.9	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096
as found zero as found span as found 2nd point as found 3rd point new cylinder response	(sccm) 5000 4922 4961 4981 Dilution air flow rate	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point	(sccm) 5000 4922 4961 4981 Dilution air flow rate	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point	(sccm) 5000 4922 4961 4981 Dilution air flow rate	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point	(sccm) 5000 4922 4961 4981 Dilution air flow rate	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero	(sccm) 5000 4922 4961 4981 Dilution air flow rate	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span	(sccm) 5000 4922 4961 4981 Dilution air flow rate	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span GO2 Scrubber Check	(sccm) 5000 4922 4961 4981 Dilution air flow rate (sccm)	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration (ppb) (Ic)	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point 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	(sccm) 5000 4922 4961 4981 Dilution air flow rate (sccm)	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati Source gas flow rate (sccm) 22-Feb-23	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc, Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha	(sccm) 5000 4922 4961 4981 Dilution air flow rate (sccm)	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 ion Data Calculated	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration (ppb) (Ic) Ave Corr Factor	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc,
as found zero as found span as found 2nd point 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 eff Baseline Corr As found:	(sccm) 5000 4922 4961 4981 Dilution air flow rate (sccm) ange: ficiency test: 74.9	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati Source gas flow rate (sccm) 22-Feb-23 December 1, 2022 Prev response:	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 Con Data Calculated concentration (ppb) (Cc)	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration (ppb) (Ic) Ave Corr Factor *% change:	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc, Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point Calibrator zero high point second point third point as left zero	(sccm) 5000 4922 4961 4981 Dilution air flow rate (sccm) ange: ficiency test:	Source gas flow rate (sccm) 0.0 77.8 38.9 19.4 H ₂ S Calibrati Source gas flow rate (sccm) 22-Feb-23 December 1, 2022	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 Con Data Calculated concentration (ppb) (Cc)	(ppb) (Ic) 0.2 75.1 37.9 18.4 Indicated concentration (ppb) (Ic) Ave Corr Factor	Correction factor (Cc, AFzero)) Limit = 0.90-1.10 1.068 1.061 1.096 Correction factor (Cc, Limit = 0.95-1.05

Notes: Changed inlet filter and SO2 scrubber beads after multi-point as founds. Multiple attempts to remedy SO2 scrubber failure. Discussed with the lead and decided to leave it hydrated overnight.









H₂S Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name:	Jackfish 1		Station number:	AMS506	
alibration Date:	February 24, 2023		Last Cal Date:	February 22, 2023	
tart time (MST):	9:32		End time (MST):	13:05	
leason:	Maintenance	Installing a new H2	S setup		
		Calibration S			
Cal Gas Concentration:	5.14	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #:	CC511843				
emoved Cal Gas Conc:	5.14	ppm	Rem Gas Exp Date:	NA	
emoved Gas Cyl #:	NA		Diff between cyl:		
alibrator Make/Model:			Serial Number:	2659	
AG Make/Model:	API 701		Serial Number:	4427	
		Analyzer Info	ormation		
nalyzer make:	Thermo 43i-TLE		Analyzer serial #:	1180540020	
Converter make:	Global G150		Converter serial #:	2022-218	
Analyzer Range	0 - 100 ppb				
	0 100 pps				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	NA	0.995862	Backgd or Offset:	NA	1.04
alibration intercept:	NA	0.041428	Coeff or Slope:	NA	0.720
		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/ 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 Calibrat	ion Data		
Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/
Serrome	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.2	
high point	4922	77.8	80.0	79.7	1.004
second point	4961	38.9	40.0	40.0	1.000
third point	4981	19.4	19.9	19.6	1.017
as left zero	5000	0.0	0.0	0.1	
as left span	4922	77.8	80.0	80.0	1.000
O2 Scrubber Check	4921	79.2	792.0	-0.1	
	nge:	24-Feb-23		Ave Corr Factor	1.007
ate of last scrubber cha					officionau
		December 1, 2022			efficiency
Date of last converter eff	ficiency test:		NΔ	*% change:	
Date of last converter eff Baseline Corr As found:	ficiency test: NA	Prev response:		*% change:	NA
Date of last scrubber cha Date of last converter eff Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	ficiency test:		NA	*% change: AF Intercept:	

Started maintenance on 2023-02-22. Inlet filter changed and multi-point as found was already done. H2S setup need to be change because it was not responding. Adjusted span.

Notes:

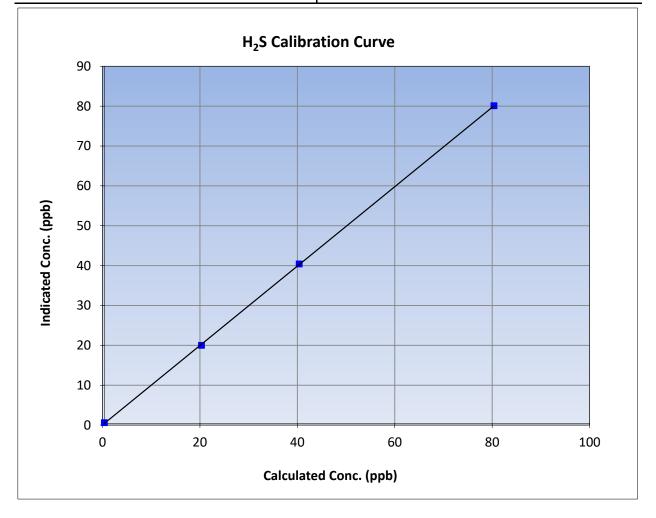
Sean Bala

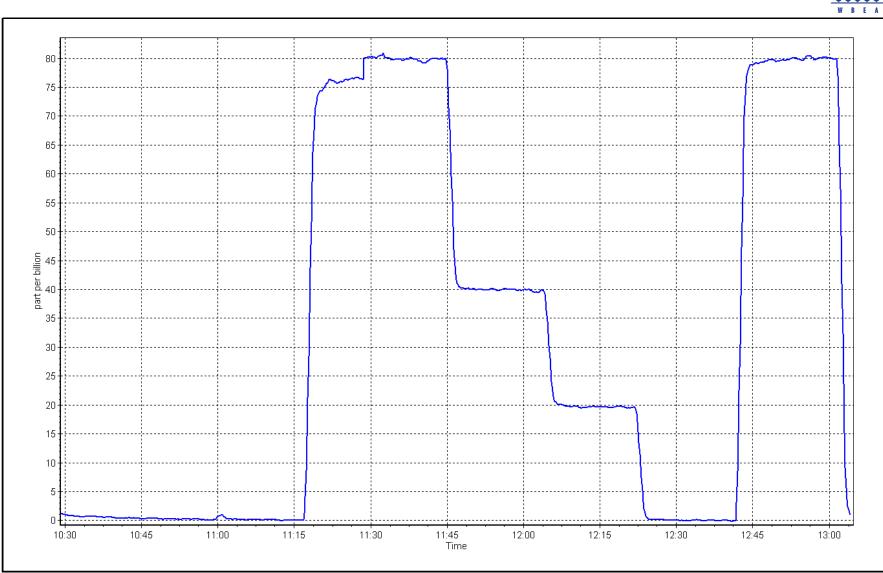


H₂S Calibration Summary

WBEA			Version-11-2021
	Statio	on Information	
Calibration Date:	February 24, 2023	Previous Calibration:	February 22, 2023
Station Name:	Jackfish 1	Station Number:	AMS506
Start Time (MST):	9:32	End Time (MST):	13:05
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540020

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999962	≥0.995
80.0	79.7	1.0035	Correlation Coefficient	0.999902	20.995
40.0	40.0	0.9997	Slope	0.995862	0.90 - 1.10
19.9	19.6	1.0174	Slope	0.993802	0.90 - 1.10
			Intercept	0.041428	+/-3





Location: Jackfish 1





Station Name:

Reason:

Calibration Date:

Start time (MST):

Jackfish 1

10:21

Routine

February 15, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS506 Last Cal Date: January 25, 2023 End time (MST): 14:36

NO Gas Cylinder #:T26811MCal Gas Expiry Date:NOX Cal Gas Conc:47.46ppmNO Cal Gas Conc:Removed Cylinder #:NARemoved Gas Exp Date:	47.39	ober 30, 2024
Removed Cylinder #: NA Removed Gas Exp Date:	47.35	ppm
Removed Cymatel II. Removed Gus Exp Date:		NA
Removed Gas NOX Conc: <u>47.46</u> ppm Removed Gas NO Conc:	47.39	ppm
NOX gas Diff: NO gas Diff:		
Calibrator Model: API T700 Serial Number: 20	659	
ZAG make/model: API 701 Serial Number: 44	427	

Analyzer make: NOX Range (ppb):			Analyzer serial #: 12	18153356	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.151	1.144	NO bkgnd or offset:	3.3	3.3
NOX coeff or slope:	0.991	0.992	NOX bkgnd or offset:	3.4	3.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	174.0	173.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999577	0.999791
NO _x Cal Offset:	-0.847995	-1.047992
NO Cal Slope:	1.001211	1.001240
NO Cal Offset:	-2.027974	-2.087973
NO ₂ Cal Slope:	1.000608	0.999204
NO ₂ Cal Offset:	0.007440	-0.347850



$NO_X \setminus NO \setminus NO_2$ 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	4916	84.4	801.1	799.9	1.2	806.9	804.8	2.1	0.9928	0.9939
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1		
high point	4916	84.4	801.1	799.9	1.2	800.1	799.5	0.6	1.0012	1.0005
second point	4958	42.2	400.5	400.0	0.6	400.0	398.5	1.5	1.0014	1.0037
third point	4979	21.1	200.3	200.0	0.3	197.0	195.0	2.0	1.0166	1.0255
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1		
as left span	4916	84.4	801.1	415.9	385.2	793.9	411.3	382.6	1.0090	1.0111
							Average C	orrection Factor	1.0064	1.0099
Corrected As fo	ound NO _x =	806.8 ppb	NO =	804.7 ppb	* = > +/-5%	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	0.9%
Previous Respo	onse NO _x =	799.9 ppb	NO =	798.8 ppb				*Percent Chan	ge NO =	0.7%
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	ord 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)	792.8	408.8	385.2	385.0	1.0005	100.0%
2nd GPT point (200 ppb O3)	792.8	591.0	203.0	201.6	1.0069	99.3%
3rd GPT point (100 ppb O3)	792.8	687.5	106.5	106.0	1.0045	99.5%
				Average Correction Factor	1.0040	99.6%

Notes:

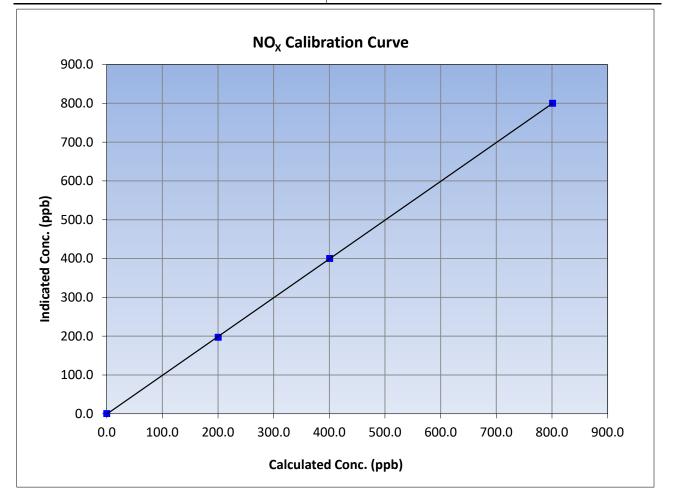
Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

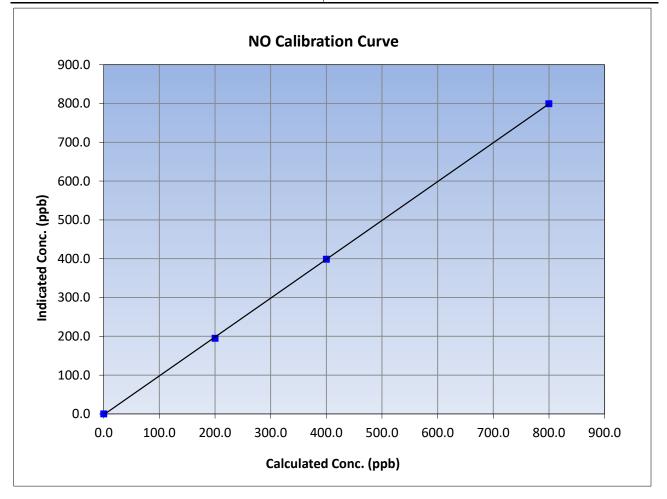
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February	15, 2023	Previous Calibration:	January	25, 2023
Station Name:	Jackt	fish 1	Station Number:	AMS	506
Start Time (MST):	10	:21	End Time (MST):	14	:36
Analyzer make:	Therr	no 42i	Analyzer serial #:	12181	53356
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999980	≥0.995
801.1	800.1	1.0012	correlation coefficient	0.555560	20.333
400.5	400.0	1.0014	Clana	0.999791	0.90 - 1.10
200.3	197.0	1.0166	Slope	0.999791	0.90 - 1.10
			Intercept	-1.047992	+/-20





NO Calibration Summary

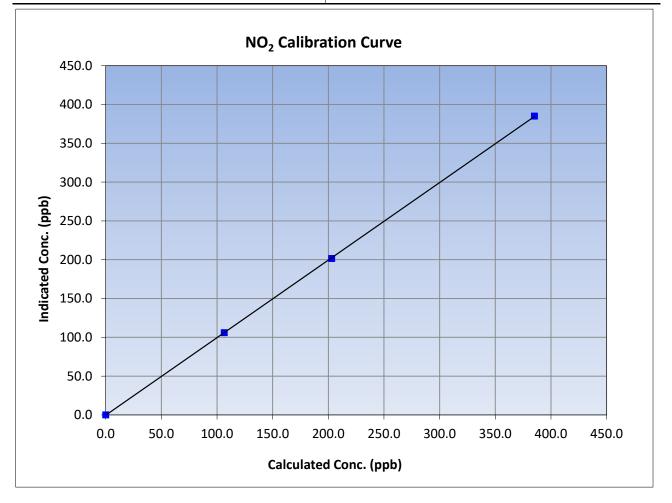
WBEA					Version-04-20
		Station	Information		
Calibration Date:	February 15, 2023		Previous Calibration:	January	25, 2023
Station Name:	Jackt	fish 1	Station Number:	AMS	\$506
Start Time (MST):	10:21		End Time (MST):	14	:36
Analyzer make:	Thermo 42i		Analyzer serial #:	12181	.53356
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999955	≥0.995
799.9	799.5	1.0005	correlation coernelent	0.999955	20.333
400.0	398.5	1.0037	Slope	1.001240	0.90 - 1.10
200.0	195.0	1.0255	Slope	1.001240	0.90 - 1.10
			Intercept	-2.087973	+/-20





NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	February 15, 2023		Previous Calibration:	January	25, 2023
Station Name:	Jackf	ish 1	Station Number:	AMS	506
Start Time (MST):	10:21		End Time (MST):	14	:36
Analyzer make:	Therr	no 42i	Analyzer serial #:	Analyzer serial #: 1218153356	
		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	0.999985	≥0.995
385.2	385.0	1.0005	correlation coefficient	0.999965	20.995
203.0	201.6	1.0069	Slope	0.999204	0.90 - 1.10
106.5	106.0	1.0045	Slope	0.999204	0.90 - 1.10
			Intercept	-0.347850	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS508 KIRBY NORTH FEBRUARY 2023

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

March 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Kirby North		Station number:	AMS508	
Calibration Date:	February 2, 2023		Last Cal Date:	January 11, 2023	
Start time (MST):	8:41		End time (MST):	14:52	
Reason:	Routine				
		Calibration St	andards		
Cal Gas Concentration:	49.18	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	CC303554	r r		, ,	
, Removed Cal Gas Conc:	49.18	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	3804	
ZAG Make/Model:	API T701H		Serial Number:	880	
			Schulttunisen		
		Analyzer Info	rmation		
Analyzer make:	Thermo 43iO	-	Analyzer serial #:	1182340007	
Analyzer Range			/ maryzer seriar #	11010 10007	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001350	1.001676	Backgd or Offset:	19.2	19.2
Calibration intercept:	-0.328940	-1.468267	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/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.3	
as found span	4919	81.3	799.6	796.6	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	81.3	799.6	801.0	0.998
second point	4959	40.7	400.3	396.8	1.009
third point	4980	20.3	199.7	198.0	1.008
as left zero	5000	0.0	0.0	0.7	
as left span	4919	81.3	799.6	800.0	1.000
·				ge Correction Factor	1.005
Baseline Corr As found:	796.30	Previous response	800.37	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:			

Notes:

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

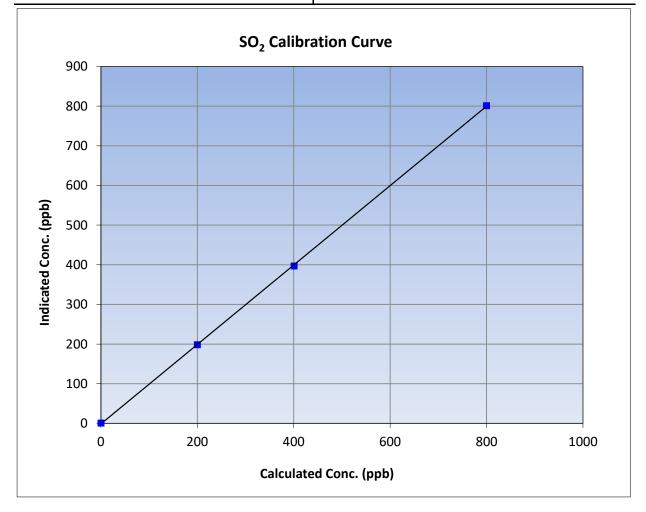
Calibration Performed By:

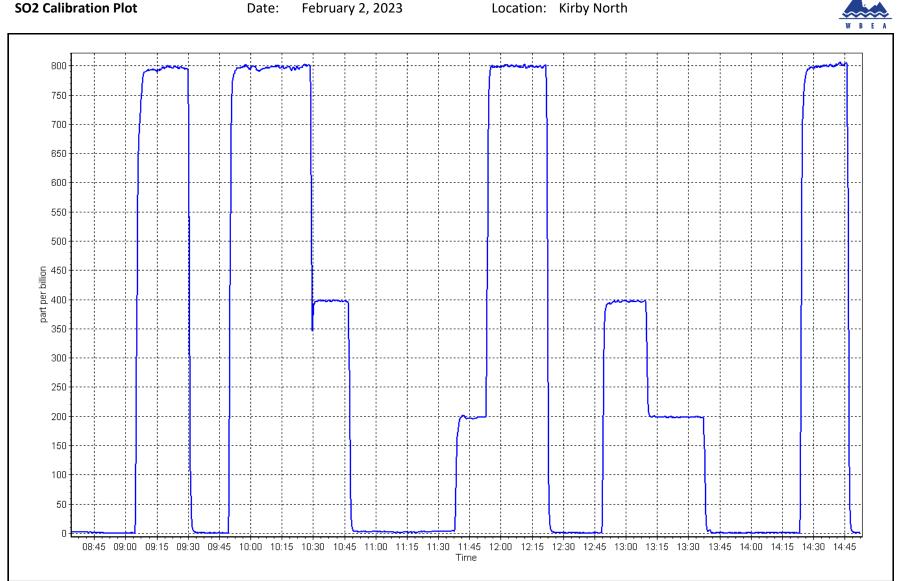


SO₂ Calibration Summary

WBEA			Version-01-2020				
Station Information							
Calibration Date:	February 2, 2023	Previous Calibration:	January 11, 2023				
Station Name:	Kirby North	Station Number:	AMS508				
Start Time (MST):	8:41	End Time (MST):	14:52				
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1182340007				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999962	≥0.995
799.6	801.0	0.9983	correlation coefficient	0.999902	20.333
400.3	396.8	1.0089	Slope	1.001676	0.90 - 1.10
199.7	198.0	1.0084			0.90 - 1.10
			Intercept	-1.468267	+/-30





Location: Kirby North



H₂S Calibration Report

WBEA					
WDLA		Chatlen Info			Version-11-202
		Station Info			
Station Name:	Kirby North		Station number:	AMS508	
Calibration Date:	February 2, 2023		Last Cal Date:	January 12, 2023	
Start time (MST):	8:41		End time (MST):	14:34	
Reason:	Routine				
		Calibration St	tandards		
Cal Gas Concentration:	5.167	ppm	Cal Gas Exp Date:	February 5, 2024	
Cal Gas Cylinder #:	CC517378	PPIII	cui cus Exp Dute.		
Removed Cal Gas Conc:	5.167	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA	PP	Diff between cyl:		
Calibrator Make/Model:			Serial Number:	3804	
ZAG Make/Model:	API 701H		Serial Number:	880	
ZAG Make/ Model.			Schur Number.	000	
		Analyzer Info	ormation		
Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1150840012	
Converter make:	Global		Converter serial #:	2022-197	
Analyzer Range	0 - 100 ppb				
	Ctout	Einich		Start	Einich
Calibration closes	<u>Start</u> 1.007171	<u>Finish</u> 1.005874	Backad or Officate	<u>Start</u> 1.76	<u>Finish</u> 1.77
Calibration slope:			Backgd or Offset:		
Calibration intercept:	-0.280963	-0.260560	Coeff or Slope:	1.058	1.069
		H ₂ S As Four	nd Data		
					Baseline Adjusted
Set Point	Dilution air flow rate	Source gas flow rate	Calculated concentration (ppb)	Indicated	Correction factor
SetFolit	(sccm)	(sccm)	(Cc)	concentration (ppb) (Ic)	(Cc/(Ic-AFzero))
					<i>Limit = 0.90-1.10</i>
as found zero	5000	0.0	0.0	-0.2	
as found span	4923	77.4	80.0	81.8	0.975
as found 2nd point	4961	38.8	40.1	41.0	0 0 7 2
as found 3rd point					0.973
	4981	19.3	19.9	20.4	0.975
new cylinder response	4981			20.4	
	4981	19.3 H ₂ S Calibrati		20.4	
new cylinder response		H ₂ S Calibrati	on Data Calculated		0.968 Correction factor
	4981 Dilution air flow rate (sccm)		on Data Calculated concentration (ppb)	Indicated	0.968 Correction factor (Cc/Ic)
new cylinder response	Dilution air flow rate (sccm)	H ₂ S Calibrati Source gas flow rate (sccm)	On Data Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	0.968 Correction factor
new cylinder response Set Point calibrator zero	Dilution air flow rate (sccm) 5000	H ₂ S Calibrati Source gas flow rate (sccm) 0.0	Calculated concentration (ppb) (Cc) 0.0	Indicated concentration (ppb) (Ic) 0.1	0.968 Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
new cylinder response Set Point calibrator zero high point	Dilution air flow rate (sccm) 5000 4923	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4	Calculated concentration (ppb) (Cc) 0.0 80.0	Indicated concentration (ppb) (Ic) 0.1 80.5	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994
new cylinder response Set Point calibrator zero high point second point	Dilution air flow rate (sccm) 5000 4923 4961	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8	Calculated concentration (ppb) (Cc) 0.0 80.0 40.1	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994 1.015
new cylinder response Set Point calibrator zero high point second point third point	Dilution air flow rate (sccm) 5000 4923 4961 4981	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3	Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994 1.015 1.012
new cylinder response Set Point calibrator zero high point second point third point as left zero	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0	Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0	0.968 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.994 1.015 1.012
new cylinder response Set Point calibrator zero high point second point third point as left zero as left span	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000 4923	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0 77.4	Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0 80.0	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0 78.3	0.968 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.994 1.015 1.012 1.021
new cylinder response Set Point calibrator zero high point second point third point as left zero as left zero as left span SO2 Scrubber Check	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000 4923 4920	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0 77.4 79.8	Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0 78.3 0.1	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994 1.015 1.012 1.021
new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000 4923 4923 4920 ange:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0 77.4	Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0 80.0	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0 78.3	0.968 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.994 1.015 1.012 1.021 1.007
new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000 4923 4923 4920 ange:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0 77.4 79.8	Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0 80.0	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0 78.3 0.1	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994 1.015 1.012 1.021
new cylinder response Set Point calibrator zero high point second point third point as left zero	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000 4923 4920 ange: ficiency test:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0 77.4 79.8 27-Nov-19	on Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0 80.0 798.0	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0 78.3 0.1 Ave Corr Factor	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994 1.015 1.012 1.021 1.007 efficiency
new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found:	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000 4923 4920 ange: ficiency test: 82.0	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0 77.4 79.8 27-Nov-19 Prev response:	on Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0 80.0 798.0 80.27	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0 78.3 0.1 Ave Corr Factor *% change:	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994 1.015 1.012 1.021 1.007 efficiency 2.1%
new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter ef	Dilution air flow rate (sccm) 5000 4923 4961 4981 5000 4923 4920 ange: ficiency test:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 77.4 38.8 19.3 0.0 77.4 79.8 27-Nov-19	on Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.1 19.9 0.0 80.0 798.0 80.27	Indicated concentration (ppb) (Ic) 0.1 80.5 39.5 19.7 0.0 78.3 0.1 Ave Corr Factor	0.968 Correction factor (Cc/lc) Limit = 0.95-1.05 0.994 1.015 1.012 1.021 1.007 efficiency

Changed sample inlet filter after as founds. First scrubber check failed. Used DI water in a hydrator to hydrate the scrubber beads. Second test passed. Adjusted span.

Calibration Performed By:

Notes:

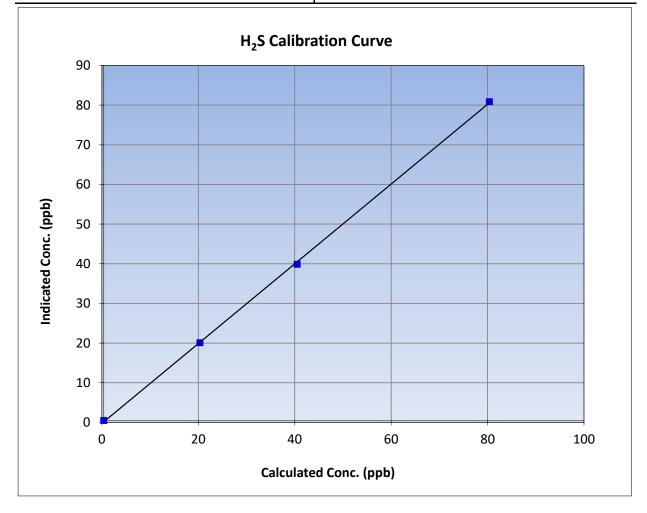
Braiden Boutilier

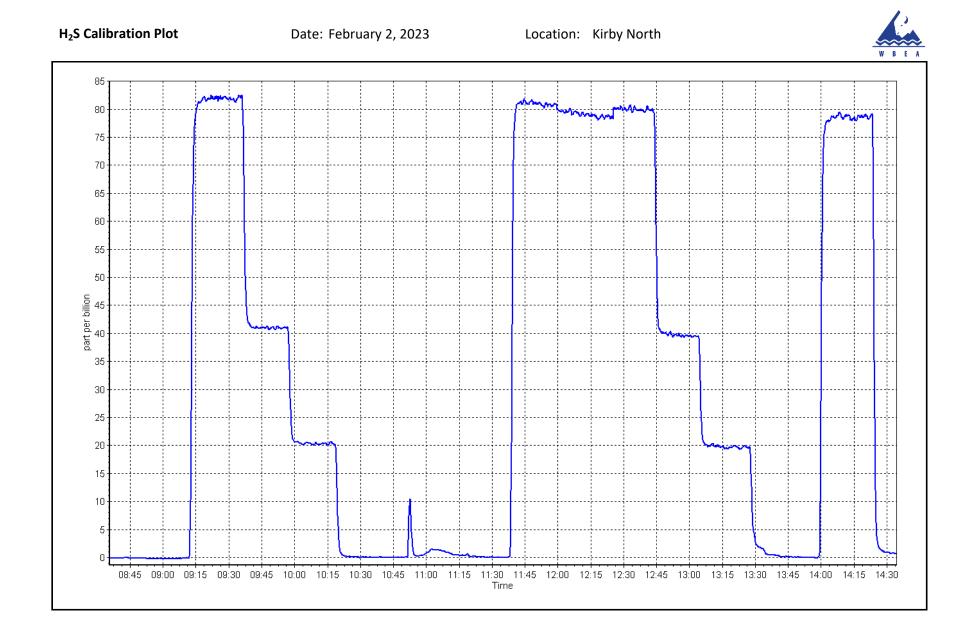


H₂S Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 2, 2023	Previous Calibration:	January 12, 2023				
Station Name:	Kirby North	Station Number:	AMS508				
Start Time (MST):	8:41	End Time (MST):	14:34				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999840	≥0.995
80.0	80.5	0.9935			20.333
40.1	39.5	1.0151	Slope	1.005874	0.90 - 1.10
19.9	19.7	1.0124			0.30 - 1.10
			Intercept	-0.260560	+/-3







H₂S Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North February 14, 2023 12:51 As Found		Station number: Last Cal Date: End time (MST):	AMS508 February 2, 2023 16:45	
		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: CAG Make/Model:	5.167 <u>NA</u> API T700 API 701H	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> 1.007171 -0.280963	<u>Finish</u>	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 1.77 1.069
		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	4923	77.4	80.0	78.2	1.021
as found 2nd point	4961	38.8	40.1	38.5	1.039
as found 3rd point	4981	19.3	19.9	19.1	1.039
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					
high point					
second point					
third point					
as left zero					
as left span					
O2 Scrubber Check		27.11.42			
Date of last scrubber cha	-	27-Nov-19		Ave Corr Factor	officionar
Date of last converter ef	inciency test:				efficiency
Baseline Corr As found:	78.3	Prev response:	80.27	*% change:	-2.5%
Baseline Corr 2nd AF pt:	38.6	AF Slope:	0.979453	AF Intercept:	-0.360689
Baseline Corr 3rd AF pt:	19.2	AF Correlation:	0.999912		

As founds done after a low nightly span. Hydrator ran dry and likely changed the conditions of the scrubber.

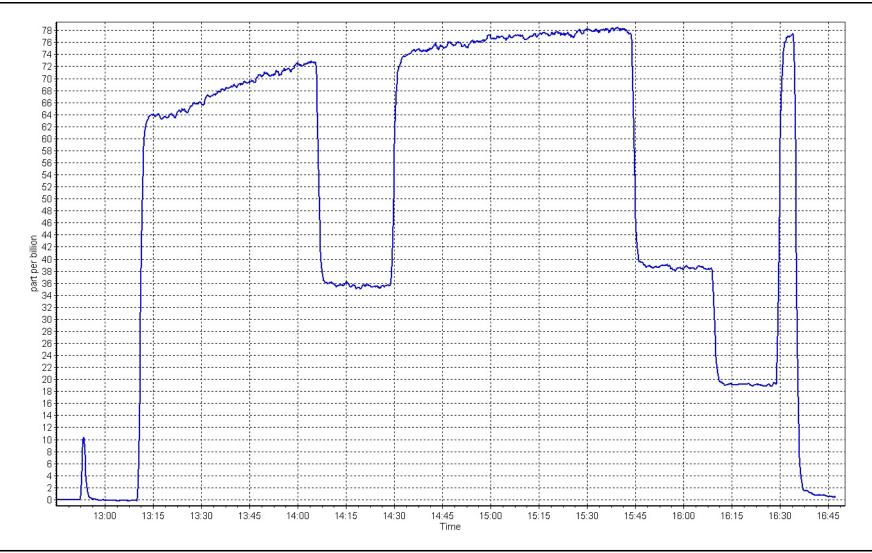
Calibration Performed By:

Notes:

Braiden Boutilier









H₂S Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North February 15, 2023 11:48 Maintenance		Station number: Last Cal Date: End time (MST):	AMS508 February 14, 2023 17:04	
		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 701H	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> 1.005874 -0.260560	<u>Finish</u> 0.995603 -0.101015	Backgd or Offset: Coeff or Slope:	<u>Start</u> 1.77 1.069	<u>Finish</u> 1.70 1.022
		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/lc) <i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.0	
high point	4923	77.4	80.0	79.6	1.005
second point	4961	38.8	40.1	39.7	1.010
third point	4981	19.3	19.9	19.7	1.012
as left zero	5000	0.0	0.0	0.0	
as left span	4923	77.4	80.0	79.4	1.007
O2 Scrubber Check	4920	79.8	798.0	0.0	
Date of last scrubber cha		21-Sep-22		Ave Corr Factor	1.009
Date of last converter eff	iciency test:				efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt:	NA NA	Prev response: AF Slope:	NA	*% change: AF Intercept:	<mark>NA</mark> NA
Baseline Corr 3rd AF pt:	NA	AF Correlation:	NA	* = > +/-5% change initiate	es investigation

Notes:

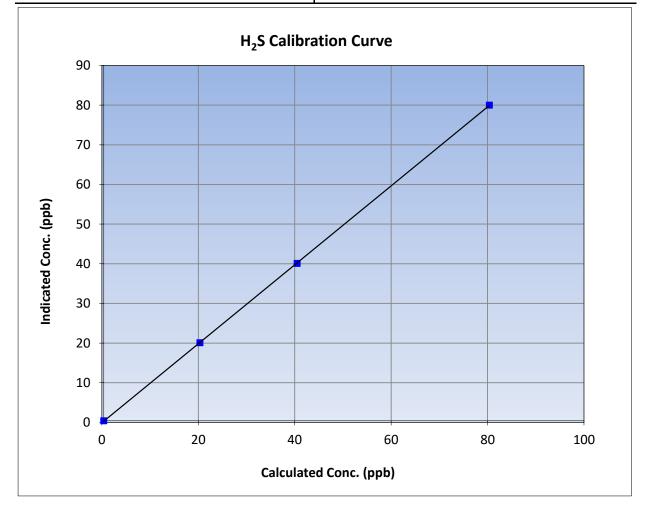
Followup calibration after as founds from February 14. Adjusted zero and span. Second SOx scrubber check passed.

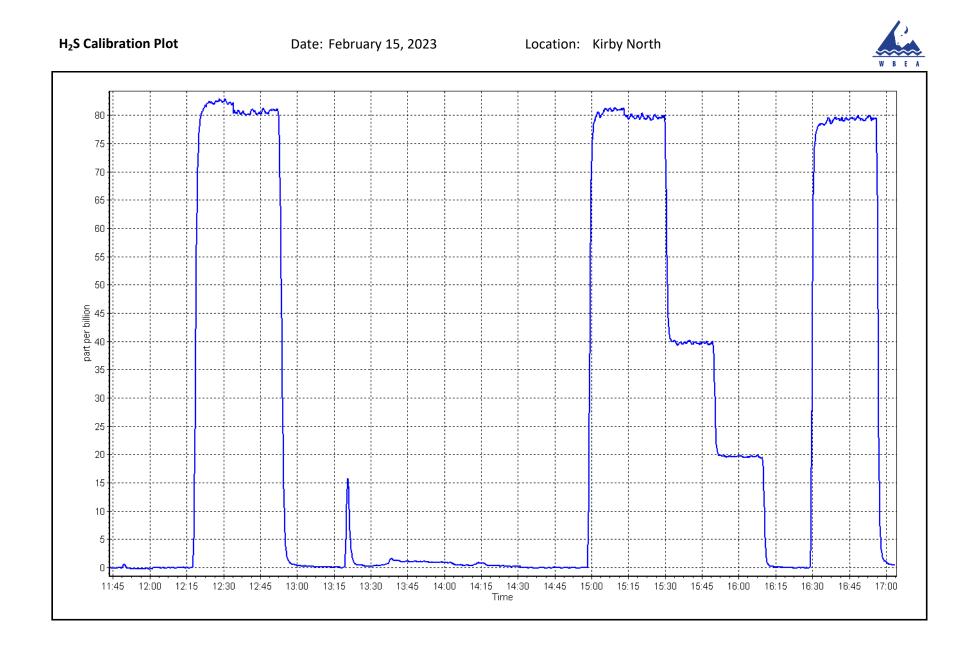


H₂S Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	February 15, 2023	Previous Calibration:	February 14, 2023				
Station Name:	Kirby North	Station Number:	AMS508				
Start Time (MST):	11:48	End Time (MST):	17:04				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999990	≥0.995
80.0	79.6	1.0048			20.333
40.1	39.7	1.0100	Slope	0.995603	0.90 - 1.10
19.9	19.7	1.0124			0.30 - 1.10
			Intercept	-0.101015	+/-3







THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North February 2, 2023 8:41 Routine		Station number: Last Cal Date: End time (MST):	AMS508 January 11, 2023 14:52	
		Calibration S	tandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC30 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> 0.999219 -0.026583	<u>Finish</u> 0.998377 0.036779	Background: Coefficient:	<u>Start</u> 2.820 3.789	<u>Finish</u> 3.37 3.750
		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	-0.03	
as found zero as found span	5000 4919	0.0 81.3	0.00 17.26	-0.03 17.32	0.997
as found span as found 2nd point					
as found span as found 2nd point as found 3rd point					
as found span as found 2nd point as found 3rd point new cylinder response	4919	81.3	17.26	17.32	0.997
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	4919 5000	0.0	0.00	0.03	0.997
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	4919 5000 4919	81.3 0.0 81.3	17.26 0.00 17.26	17.32 0.03 17.26	0.997 1.000
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	4919 5000 4919 4959	81.3 0.0 81.3 40.7	17.26 0.00 17.26 8.64	17.32 0.03 17.26 8.69	0.997 1.000 0.995
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	4919 5000 4919 4959 4980	81.3 0.0 81.3 40.7 20.3	17.26 0.00 17.26 8.64 4.31	17.32 0.03 17.26 8.69 4.34	0.997 1.000
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	4919 5000 4919 4959	81.3 0.0 81.3 40.7 20.3 0.0	17.26 0.00 17.26 8.64 4.31 0.00	17.32 0.03 17.26 8.69 4.34 -0.11	0.997 1.000 0.995 0.994
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	4919 5000 4919 4959 4980 5000	81.3 0.0 81.3 40.7 20.3	17.26 0.00 17.26 8.64 4.31 0.00 17.26	17.32 0.03 17.26 8.69 4.34 -0.11 17.29	0.997 1.000 0.995 0.994 0.998
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	4919 5000 4919 4959 4980 5000	81.3 0.0 81.3 40.7 20.3 0.0	17.26 0.00 17.26 8.64 4.31 0.00 17.26 Averag 17.22	17.32 0.03 17.26 8.69 4.34 -0.11	0.997 1.000 0.995 0.994 0.998 0.996 0.7%

Changed sample inlet filter after as founds. Span and zero adjusted.

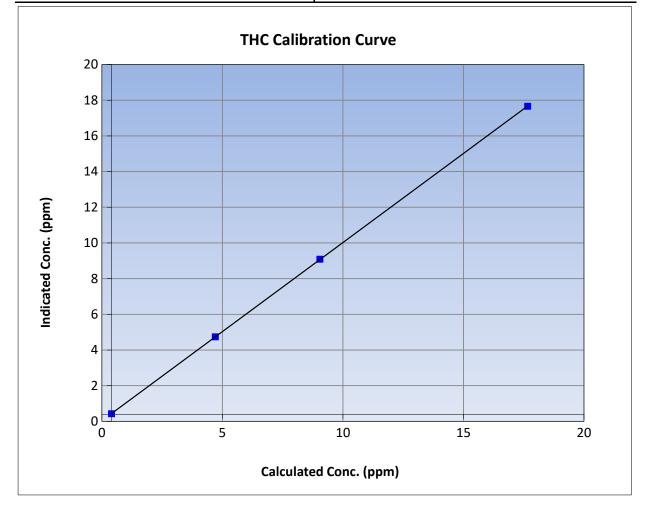
Calibration Performed By:

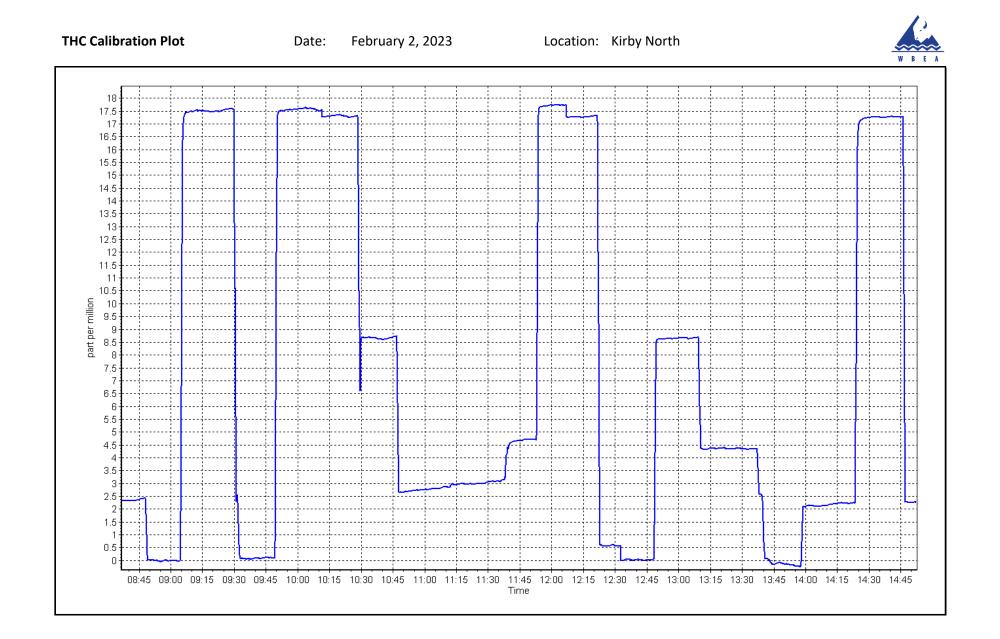


THC Calibration Summary

W B E A			Version-01-2020
	Stati	on Information	
Calibration Date:	February 2, 2023	Previous Calibration:	January 11, 2023
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	8:41	End Time (MST):	14:52
Analyzer make:	Thermo 51i	Analyzer serial #:	1182340005

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>	
0.00	0.03		Correlation Coefficient	0.999995	≥0.995
17.26	17.26	1.0002	correlation coefficient	0.999995	20.333
8.64	8.69	0.9946	Slope	0.998377	0.90 - 1.10
4.31	4.34	0.9939	Slope	0.998377	0.90 - 1.10
			- Intercept	0.036779	+/-1.5







THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North February 4, 2023 10:50 Maintenance		Station number: Last Cal Date: End time (MST):	AMS508 February 2, 2023 14:29	
		Calibration S	tandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC3 496.6 205.5	03554 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:	и 496.6 205.5 АРІ Т700 АРІ Т701Н	VA 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> 0.998377 0.036779	<u>Finish</u> 1.002675 -0.018187	Background: Coefficient:	<u>Start</u> 3.37 3.750	<u>Finish</u> 2.70 3.796
		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/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	-0.66	
as found span	4919	81.3	17.26	16.45	1.049
as found 2nd point	4959	40.7	8.64	7.86	1.100
as found 3rd point	4980	20.3	4.31	3.58	1.204
new cylinder response					
calibrator zero	5000	0.0	0.00	0.02	
high point	4919	81.3	17.26	17.32	0.997
second point	4959	40.7	8.64	8.60	1.005
third point	4980	20.3	4.31	4.28	1.007
as left zero	5000	0.0	0.00	0.08	
as left span	4919	81.3	17.26	17.35	0.995
Decoling Corr As found	17 11	Drovious responses		ge Correction Factor	1.003
Baseline Corr As found:	17.11	Previous response	17.27	*% change	-1.0%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	8.51 4.24	AF Slope: AF Correlation:	0.991324 0.999987	AF Intercept:	-0.681192

Notes:

Linearity test from last calibration. Adjusted zero and span. Readings were shifted down from the

calibration on February 2.

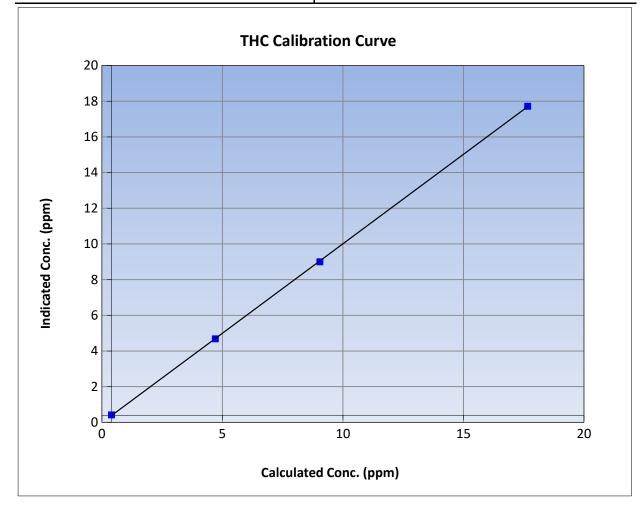
Calibration Performed By:

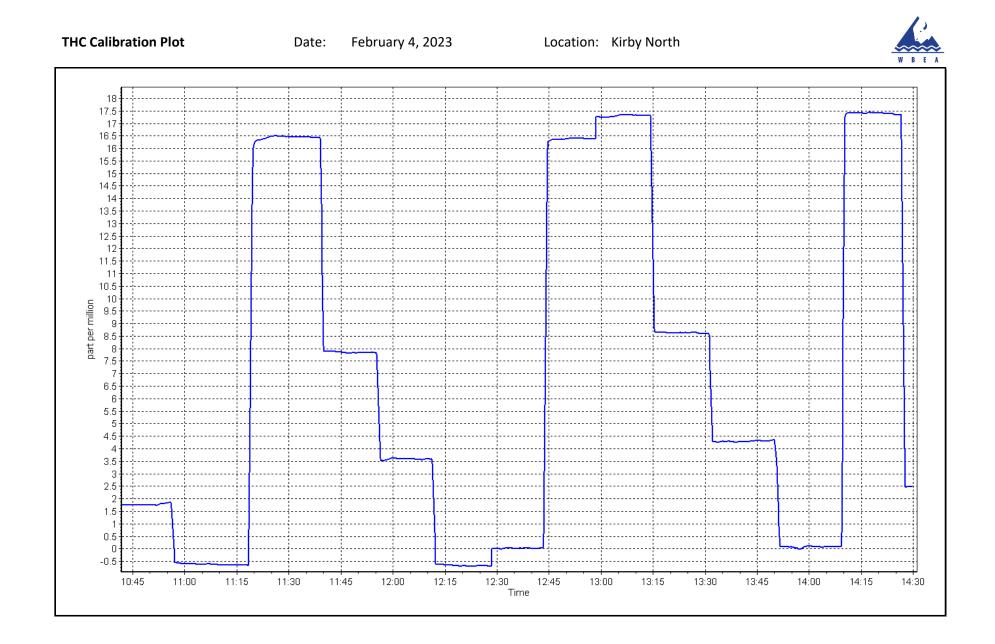


THC Calibration Summary

W B E A			Version-01-2020
	Stati	on Information	
Calibration Date:	February 4, 2023	Previous Calibration:	February 2, 2023
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	10:50	End Time (MST):	14:29
Analyzer make:	Thermo 51i	Analyzer serial #:	1182340005

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>	
0.00	0.02		Correlation Coefficient	0.999968	≥0.995
17.26	17.32	0.9967	correlation coefficient	0.999908	20.333
8.64	8.60	1.0050	Slope	1.002675	0.90 - 1.10
4.31	4.28	1.0066	510pe	1.002075	0.90 - 1.10
			Intercept	-0.018187	+/-1.5







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:	Kirby North February 1, 2023 11:39 Routine		Station number: Last Cal Date: End time (MST):	AMS508 January 22, 2023 17:28	
		Calibratio	on Standards		
NO Gas Cylinder #:	та	4ULGL	Cal Gas Expiry Date:	March 8 2025	
NOX Cal Gas Conc:	49.39	ppm	NO Cal Gas Conc		ppm
Removed Cylinder #:	13103	NA	Removed Gas Exp Date:		PP
Removed Gas NOX Conc: NOX gas Diff:	49.39	ppm	Removed Gas NO Conc: NO gas Diff:	49.02	ppm
Calibrator Model:	API T700		Serial Number:		
ZAG make/model:	API 701H		Serial Number:	: 880	
		Analyzer	Information		
Analyzer make: NOX Range (ppb):			Analyzer serial #:	7029	
	Start	<u>Finish</u>		Start	Finish
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:	4.8	4.8
		Calibratio	on Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	1.001403		1.002073	
NO _x Cal Offset	:	-2.032210		-1.391610	
NO Cal Slope	:	1.002948		1.001077	

-3.293659

0.998706

0.927800

-2.093883

0.998942

-0.787844



$NO_X \setminus NO \setminus NO_2$ 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	-0.3	-0.2	-0.1		
as found span	4919	81.0	800.1	794.1	6.0	791.3	784.3	7.0	1.0111	1.0125
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	801.0	793.7	7.1	0.9989	1.0005
second point	4960	40.5	400.0	397.0	3.0	399.0	395.0	4.0	1.0026	1.0051
third point	4980	20.2	199.5	198.0	1.5	197.0	193.6	3.4	1.0128	1.0229
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4919	81.0	800.1	413.2	386.9	799.5	420.8	378.7	1.0008	0.9820
							Average C	orrection Factor	1.0048	1.0095
Corrected As fo	ound NO _x =	791.6 ppb	NO =	784.5 ppb	* = > +/-59	% change initiates i	investigation	*Percent Chan	ge NO _x =	-1.0%
Previous Respo	nse NO _x =	799.2 ppb	NO =	793.2 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 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	793.5	412.6	386.9	385.4	1.0039	99.6%
2nd GPT point (200 ppb O3)	793.5	599.0	200.5	201.2	0.9965	100.4%
3rd GPT point (100 ppb O3)	793.5	696.1	103.4	100.3	1.0308	97.0%
				Average Correction Factor	1.0104	99.0%

Notes:

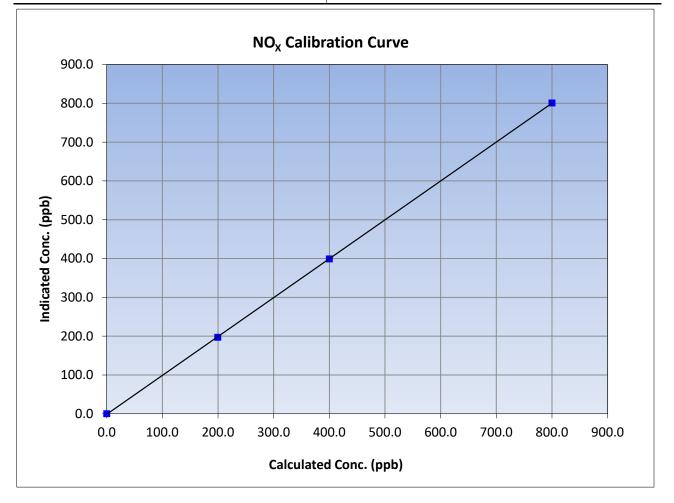
Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By:



NO_x Calibration Summary

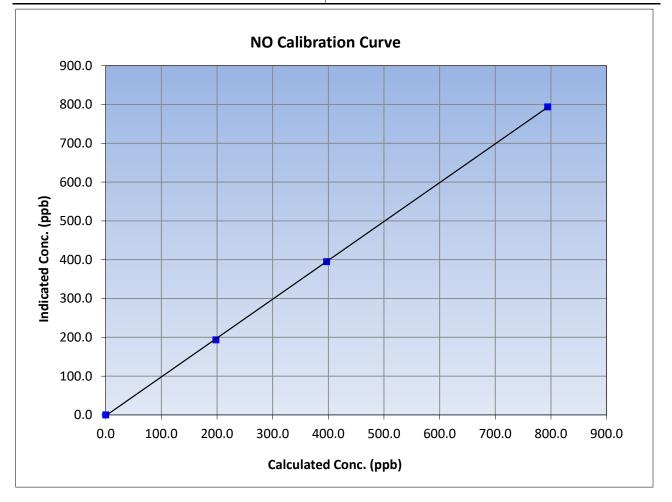
WBEA		Station	Information		Version-04-20
		Station	information		
Calibration Date:	Februar	y 1, 2023	Previous Calibration:	January	22, 2023
Station Name:	Kirby	North	Station Number:	AN	15508
Start Time (MST):	11	:39	End Time (MST):	1	7:28
Analyzer make:	API	T200	Analyzer serial #:	7	029
		Calibra	ation 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	0.999986	≥0.995
800.1	801.0	0.9989	correlation coefficient	0.555560	20.333
400.0	399.0	1.0026	Slope	1.002073	0.90 - 1.10
199.5	197.0	1.0128	Slope	1.002075	0.90 - 1.10
			Intercept	-1.391610	+/-20





NO Calibration Summary

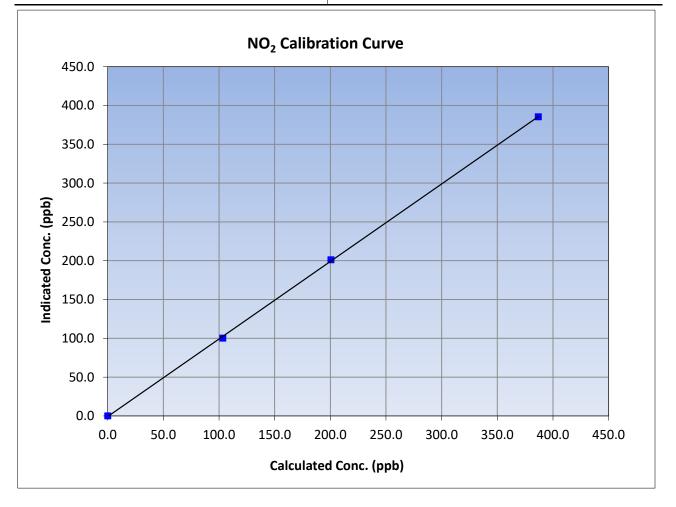
WBEA		Station	Information		Version-04-20
		Station	information		
Calibration Date:	Februar	y 1, 2023	Previous Calibration:	January	22, 2023
Station Name:	Kirby	North	Station Number:	AN	15508
Start Time (MST):	11	:39	End Time (MST):	17	7:28
Analyzer make:	API	T200	Analyzer serial #:	7	029
		Calibra	ation 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	0.999966	≥0.995
794.1	793.7	1.0005	correlation coefficient	0.999900	20.333
397.0	395.0	1.0051	Slope	1.001077	0.90 - 1.10
198.0	193.6	1.0229	Slope	1.001077	0.90 - 1.10
			Intercept	-2.093883	+/-20

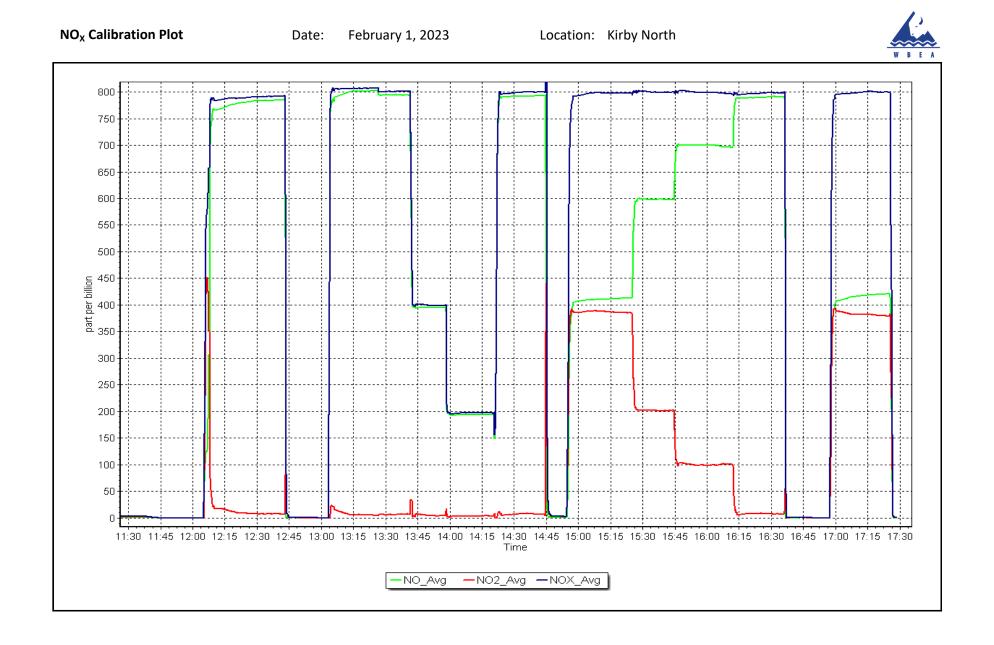




NO₂ Calibration Summary

WBEA		Station	Information		Version-04-20
		Station	information		
Calibration Date:	February	y 1, 2023	Previous Calibration:	January	22, 2023
Station Name:	Kirby	North	Station Number:	AM	S508
Start Time (MST):	11	:39	End Time (MST):	17	:28
Analyzer make: API T200			Analyzer serial #:	70)29
		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	0.999896	≥0.995
386.9	385.4	1.0039	correlation coefficient	0.999890	20.995
200.5	201.2	0.9965	Slope	0.998942	0.90 - 1.10
103.4	100.3	1.0308	Slope	0.996942	0.90 - 1.10
			Intercept	-0.787844	+/-20







End of Report