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Wood Buffalo Environmental Association

JANUARY 2023

MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING February 28, 2023

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS01 BERTHA GANTER - FORT MCKAY JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort January 5, 2023 11:28 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 December 5, 2022 15:01	
		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 #:	JC1501301448	
Analyzer Range					
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998745	0.998187	Backgd or Offset:	19.0	19.1
Calibration intercept:	-0.313576	-0.293417	Coeff or Slope:	0.884	0.891
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)		<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.1	
as found span	4918	81.3	799.9	789.4	1.013
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4918	81.3	799.9	798.6	1.002
second point	4959	40.7	400.4	398.8	1.004
third point	4979	20.3	199.7	198.7	1.005
as left zero	5000	0.0	0.0	0.3	
as left span	4918	81.3	799.9	799.3	1.001
			Averag	ge Correction Factor	1.004
Baseline Corr As found:	789.30	Previous response	798.62	*% change	-1.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

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

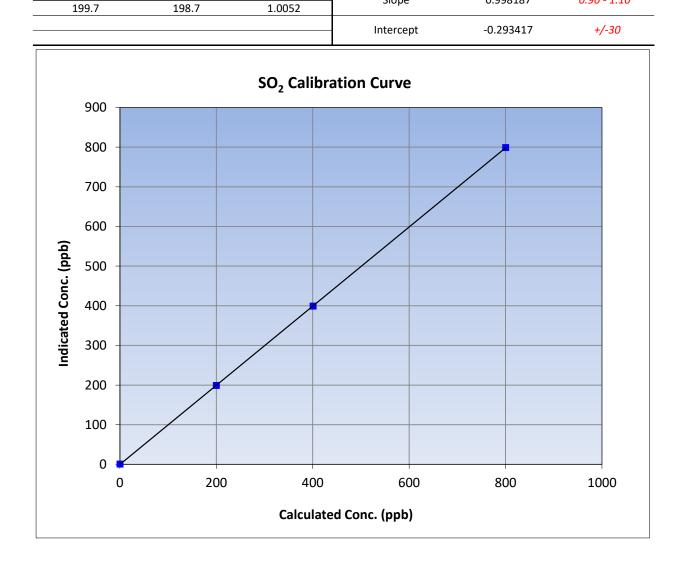
Calibration Performed By:

Rene Chamberland



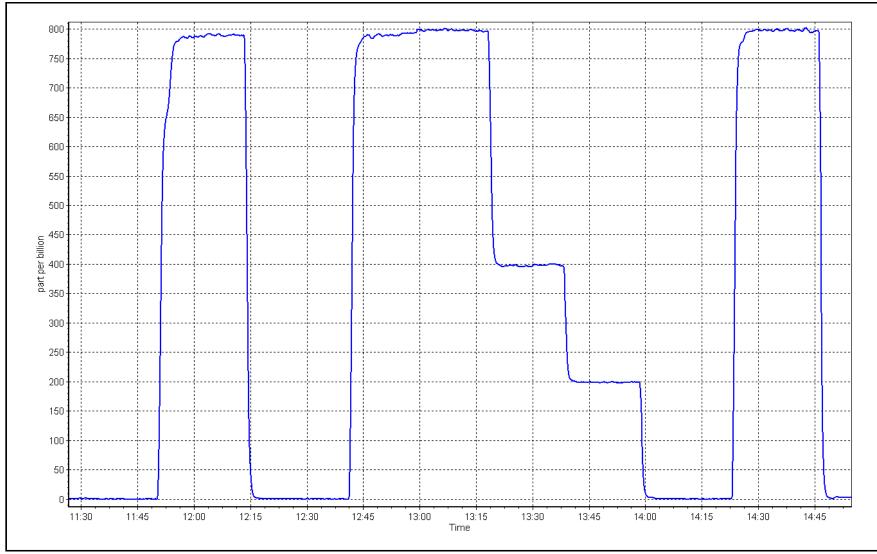
SO₂ Calibration Summary

WBEA					Version-01-202	
		Station	Information			
Calibration Date:	January S	5, 2023	Previous Calibration:	Decemb	er 5, 2022	
Station Name:	ation Name: Bertha Ganter-Fort McKay		Station Number:	AN	/S01	
Start Time (MST):	11:28		End Time (MST):	15	5:01	
Analyzer make:	nalvzer make: Thermo		Analyzer serial #:	JC1502)1301448	
		Calib	ration Data			
Calculated concentration Indicated concentration Correction fac (ppb) (Cc) (ppb) (Ic) (Cc/Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999997	N0 00E	
799.9	798.6	1.0017	Correlation Coefficient	0.555997	≥0.995	
400.4	398.8	1.0041	Slope	0.998187	0.90 - 1.10	
199 7	198 7	1 0052	Siope	0.558187	0.50 - 1.10	











TRS Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
itation Name: Calibration Date: Itart time (MST): Reason:	Bertha Ganter-Fort January 10, 2023 10:53 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 December 13, 2022 17:26	
		Calibration S	tandards		
Cal Gas Concentration:	5.10	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc:	<u>CC511749</u> 5.10	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	<u>N/A</u>		Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:	3565 5609	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CD Nova 0 - 100 ppb		Analyzer serial #: Converter serial #:	1218153461 470	
	<u>Start</u>	Finish		<u>Start</u>	Finish
Calibration slope:	0.999935	0.998364	Backgd or Offset:		2.29
Calibration intercept:	-0.019999	0.059997	Coeff or Slope:	0.908	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	78.8	1.016
as found 2nd point	4960	39.2	40.0	39.7	1.010
as found 3rd point	4980	19.6	20.0	19.9	1.010
new cylinder response		TRS Calibrat	ion Doto		
		TKS 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	4921	78.4	80.0	79.9	1.001
second point	4960	39.2	40.0	40.1	0.997
third point	4980	19.6	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.2	
as left span	4921	78.4	80.0	79.5	1.006
O2 Scrubber Check	4919	81.3	813.0	0.0	
ate of last scrubber cha	nge:	December 17, 2021	L	Ave Corr Factor	1.001
ate of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	78.7	Prev response:	79.97	*% change:	-1.6%
Baseline Corr 2nd AF pt:	39.6	AF Slope:		AF Intercept:	0.199998
per					
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999987		

Notes:

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

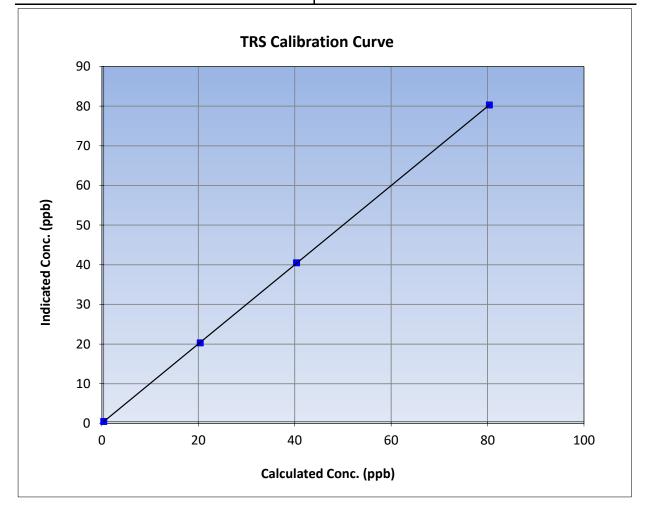


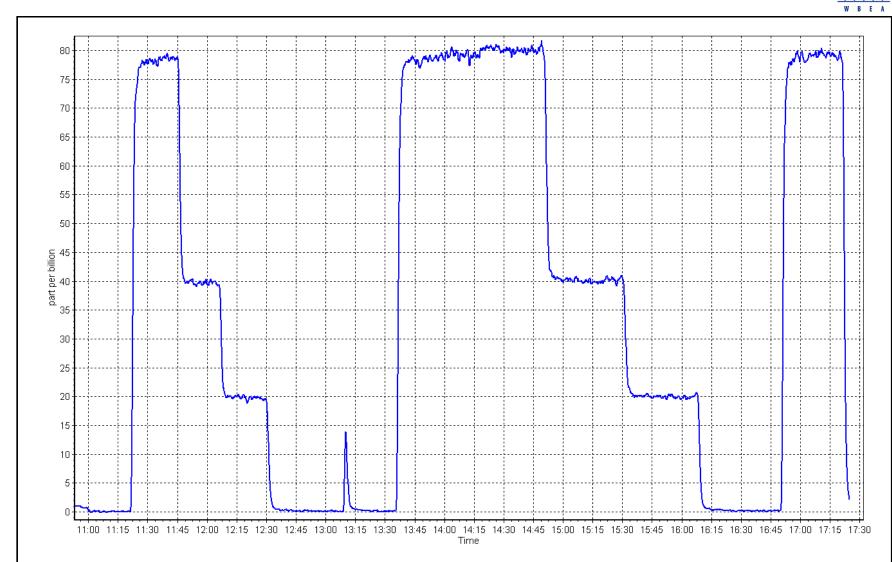
TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	January 10, 2023	Previous Calibration:	December 13, 2022				
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01				
Start Time (MST):	10:53	End Time (MST):	17:26				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153461				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999992	≥0.995
80.0	79.9	1.0012	correlation coefficient	0.999992	20.333
40.0	40.1	0.9975	Slope	0.998364	0.90 - 1.10
20.0	19.9	1.0049	Siope	0.998304	0.90 - 1.10
			Intercept	0.059997	+/-3





TRS Calibration Plot

Location: Bertha Ganter-Fort McKay





H₂S Calibration Report

W B E A					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort January 10, 2023 10:53 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 December 13, 2022 17:26	
		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:	Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:	3565 5609	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Thermo Converter 0 - 100 ppb		Analyzer serial #: Converter serial #:	1200326167 N/A	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997946	0.996946	Backgd or Offset:	1.94	1.94
Calibration intercept:	0.301610	0.161599	Coeff or Slope:	1.014	1.014
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4921	78.4	80.0	79.7	1.003
as found 2nd point	4960	39.2	40.0	40.7	0.983
as found 3rd point	4980	19.6	20.0	20.1	0.995
new cylinder response					
		H ₂ S Calibrat	ion Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
					(Cc/Ic)
Set Point	(sccm)	(sccm)	concentration (ppb)	concentration (ppb) (Ic)	
	(sccm)		(Cc)		
calibrator zero	(sccm) 5000	0.0	(Cc) 0.0	0.2	Limit = 0.95-1.05
calibrator zero high point	(sccm) 5000 4921	0.0 78.4	(Cc) 0.0 80.0	0.2 79.9	Limit = 0.95-1.05 1.001
calibrator zero high point second point	(sccm) 5000 4921 4961	0.0 78.4 39.2	(Cc) 0.0 80.0 40.0	0.2 79.9 40.1	Limit = 0.95-1.05 1.001 0.997
calibrator zero high point second point third point	(sccm) 5000 4921 4961 4980	0.0 78.4 39.2 19.6	(Cc) 0.0 80.0 40.0 20.0	0.2 79.9 40.1 20.0	Limit = 0.95-1.05 1.001
calibrator zero high point second point third point as left zero	(sccm) 5000 4921 4961 4980 5000	0.0 78.4 39.2 19.6 0.0	(Cc) 0.0 80.0 40.0 20.0 0.0	0.2 79.9 40.1 20.0 0.5	Limit = 0.95-1.05 1.001 0.997 1.000
calibrator zero high point second point third point as left zero as left span	(sccm) 5000 4921 4961 4980 5000 4921	0.0 78.4 39.2 19.6 0.0 78.4	(Cc) 0.0 80.0 40.0 20.0 0.0 80.0	0.2 79.9 40.1 20.0 0.5 78.9	Limit = 0.95-1.05 1.001 0.997 1.000
calibrator zero high point second point third point as left zero as left span 602 Scrubber Check	(sccm) 5000 4921 4961 4980 5000 4921 4921 4919	0.0 78.4 39.2 19.6 0.0 78.4 81.3	(Cc) 0.0 80.0 40.0 20.0 0.0	0.2 79.9 40.1 20.0 0.5 78.9 0.0	Limit = 0.95-1.05 1.001 0.997 1.000 1.014
calibrator zero high point second point third point as left zero	(sccm) 5000 4921 4961 4980 5000 4921 4919 ange:	0.0 78.4 39.2 19.6 0.0 78.4	(Cc) 0.0 80.0 40.0 20.0 0.0 80.0	0.2 79.9 40.1 20.0 0.5 78.9 0.0 Ave Corr Factor	Limit = 0.95-1.05 1.001 0.997 1.000 1.014
calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha Date of last converter ef	(sccm) 5000 4921 4961 4980 5000 4921 4919 ange: ficiency test:	0.0 78.4 39.2 19.6 0.0 78.4 81.3 March 21, 2022	(Cc) 0.0 80.0 40.0 20.0 0.0 80.0 813.0	0.2 79.9 40.1 20.0 0.5 78.9 0.0 Ave Corr Factor	Limit = 0.95-1.05 1.001 0.997 1.000 1.014 0.999 efficiency
calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found:	(sccm) 5000 4921 4961 4980 5000 4921 4919 ange: ficiency test: 79.7	0.0 78.4 39.2 19.6 0.0 78.4 81.3 March 21, 2022 Prev response:	(Cc) 0.0 80.0 40.0 20.0 0.0 80.0 813.0 80.11	0.2 79.9 40.1 20.0 0.5 78.9 0.0 Ave Corr Factor *% change:	Limit = 0.95-1.05 1.001 0.997 1.000 1.014 0.999 efficiency -0.5%
calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha Date of last converter ef	(sccm) 5000 4921 4961 4980 5000 4921 4919 ange: ficiency test:	0.0 78.4 39.2 19.6 0.0 78.4 81.3 March 21, 2022	(Cc) 0.0 80.0 40.0 20.0 0.0 80.0 813.0 80.11 0.996988	0.2 79.9 40.1 20.0 0.5 78.9 0.0 Ave Corr Factor	Limit = 0.95-1.05 1.001 0.997 1.000 1.014 0.999 efficiency

Notes:

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

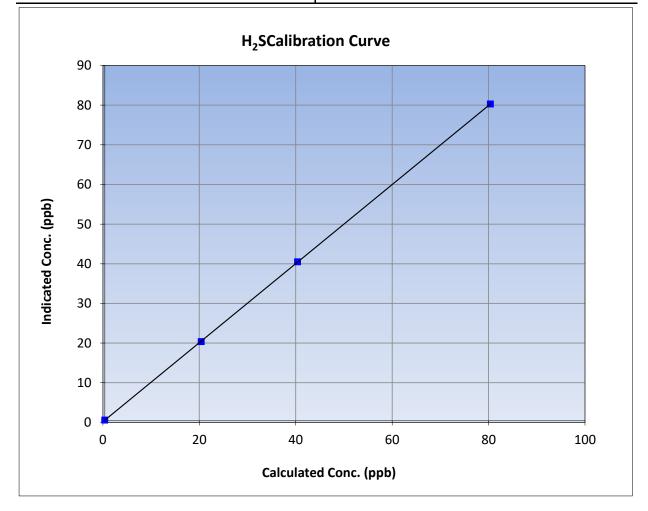


H₂S Calibration Summary

WBEA			Version-11-2021
	Station	n Information	
Calibration Date:	January 10, 2023	Previous Calibration:	December 13, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	10:53	End Time (MST):	17:26
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1200326167
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1200326167

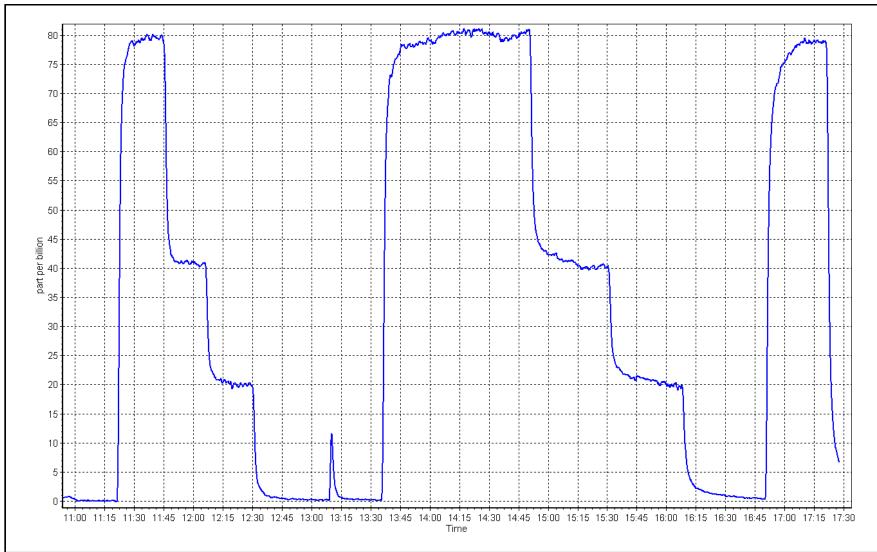
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999995	≥0.995
80.0	79.9	1.0012	correlation coefficient	0.999995	20.333
40.0	40.1	0.9973	Slope	0.996946	0.90 - 1.10
20.0	20.0	0.9999	Slope	0.990940	0.90 - 1.10
			- Intercept	0.161599	+/-3



H₂S Calibration Plot







THC / CH_4 / NMHC Calibration Report

		Station	n Information		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fo January 5, 2023 11:28 Routine	ort McKay	Station number: AMS01 Last Cal Date: December 5, 2022 End time (MST): 15:01		
		Calibrat	tion Standards		
Gas Cert Reference:	CC	486642	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	0	Serial Number: 35	65	
ZAG make/model:	Teledyne API T70)1	Serial Number: 56	509	
		Analyze	er Information		
Analyzer make: THC Range (ppm):			Analyzer serial #: 11	80320040	
NMHC Range (ppm):			CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.50E-04	2.52E-04	NMHC SP Ratio:	5.01E-05	5.11E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	183290	179678

		THC Calibra	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	17.29	17.13	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4918	81.3	17.29	17.33	0.998
second point	4959	40.7	8.65	8.62	1.004
third point	4979	20.3	4.32	4.33	0.996
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	17.29	17.40	0.994
			A	verage Correction Factor	0.999
Baseline Corr AF:	17.13	Prev response	17.27	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calib	ration Data			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
as found zero	5000	0	0.00	0.00		
as found span	4918	81.3	9.19	9.08	1.012	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0	0.00	0.00		
high point	4918	81.3	9.19	9.22	0.997	
second point	4959	40.7	4.60	4.61	0.999	
third point	4979	20.3	2.30	2.32	0.992	
as left zero	5000	0	0.00	0.00		
as left span	4918	81.3	9.19	9.27	0.992	
			ŀ	Average Correction Factor	0.996	
Baseline Corr AF:	9.08	Prev response	9.18	*% change	-1.1%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		<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	4918	81.3	8.09	8.04	1.006	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4918	81.3	8.09	8.11	0.999	
second point	4959	40.7	4.05	4.01	1.009	
third point	4979	20.3	2.02	2.02	1.002	
as left zero	5000	0.0	0.00	0.00		
as left span	4918	81.3	8.09	8.13	0.996	
			A	verage Correction Factor	1.003	
Baseline Corr AF:	8.04	Prev response	8.09	*% change	-0.6%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		
THC Cal Slope:		0.999531		1.001778		
THC Cal Offset:		-0.010042		-0.008039		
CH4 Cal Slope:		1.001390		1.001064		
CH4 Cal Offset:		-0.012722		-0.011320		
NMHC Cal Slope:		0.998342		1.002294		
NMHC Cal Offset:		0.002879		0.003480		

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

Calibration Performed By:

Rene Chamberland



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	5, 2023	Previous Calibration:	Decembe	r 5, 2022
tation Name:	Bertha Gante	Bertha Ganter-Fort McKay		AM	501
start Time (MST):	11	:28	End Time (MST):	15:	01
Analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20040
		Calibra	tion Data		
alculated concentratio (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999987	≥0.995
17.29	17.33	0.9978			
8.65 4.32	8.62 4.33	1.0037 0.9965	Slope	1.001778	0.90 - 1.10
4.52	4.55	0.9905	Intercept	-0.008039	+/-0.5
18.0 — 16.0 —				-	
14.0 -					
14.0					
ີ ແ 12.0 –					
لیہ 12.0 – طط 10.0 – کوں					
0.8 dt					
- 0.8 Indicated					
4.0					
2.0					
0.0	/	-			
0.0	5	.0		15.0	20.0
		Calculated	Conc. (ppm)		



CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	lanua	ary 5, 2023	Previous Calibration:	Decembe	r 5. 2022
Station Name:		nter-Fort McKay	Station Number:	AMS01	
Start Time (MST):		11:28	End Time (MST):	15:	
Analyzer make:		ermo 55i	Analyzer serial #:	11803	
analyzer maker			Analyzer Serial M	11000	
		Calibra	tion Data		
Calculated concentra (ppm) (Cc)	tion Indicated concentratic (ppm) (Ic)	on Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999964	≥0.995
8.09	8.11	0.9986			
4.05	4.01	1.0093 1.0020	Slope	1.001064	0.90 - 1.10
2.02	2.02	1.0020		0.044000	
			Intercept	-0.011320	+/-0.5
9.0 - 8.0 -				_	
7.0 -					
6.0 -					
(udd 5.0 -					
(bbul 5.0 - couc: 4.0 -					
ed					
ndicated -					
도 2.0 -					
1.0 -					
0.0					
	.0 2.0	4.0	6.0	8.0	10.0
			l Conc. (ppm)		

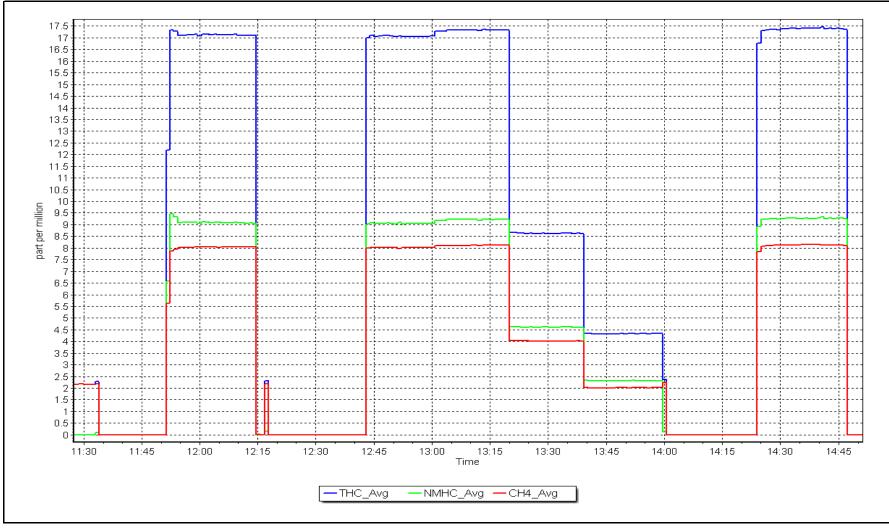


NMHC Calibration Summary

		Station I	nformation		
alibration Date:	January	5, 2023	Previous Calibration:	Decembe	r 5, 2022
tation Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	501
tart Time (MST):	11	:28	End Time (MST):	15:	01
nalyzer make:	Therr	no 55i	Analyzer serial #:	11803	20040
		Calibra	ition 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	0.999996	≥0.995
9.19 4.60	9.22 4.61	0.9971 0.9988			
2.30	2.32	0.9988	Slope	1.002294	0.90 - 1.10
			Intercept	0.003480	+/-0.5
8.0					
9.0					
7.0					
ud 6.0					
(md 6.0					
4.0					
= 2.0					
1.0					
0.0					
0.0 📮	2.0	4.0	6.0	8.0	10.0
0.0	2.0	4.0	0.0	0.0	10.0









THC / CH_4 / NMHC Calibration Report

		St	tion Information			
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-I January 23, 202 11:35 Cylinder Change	1:35 End time (MST): 14:43				
		Са	bration Standards			
Gas Cert Reference:	C	C486642	Cal Gas Expiry Date: F	ebruary 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			
Removed CH4 Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm	
Removed C3H8 Conc. Diff between cyl (CH ₄):	205.6	ppm	Diff between cyl (THC): Diff between cyl (NM):			
Calibrator Model:	Teledyne API T7	'00	Serial Number: 3	565		
ZAG make/model:	Teledyne API T7		Serial Number: 5	609		
		Ar	lyzer Information			
Analyzer make:	Thermo 55i		Analyzer serial #: 1	180320040		
THC Range (ppm):	0 - 20 ppm					
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm): C) - 10 ppm		
	<u>Start</u>	<u>Fini</u>	<u>!</u>	<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio	2.52E-04	2.52	04 NMHC SP Ratio:	5.11E-05	5.11E-05	
CH4 Retention time:	14.4	14	NMHC Peak Area:	179678	179678	

		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	4918	81.3	17.29	17.80	0.971
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.11	
as left span	4918	81.3	17.29	18.02	0.960
			Aver	age Correction Factor	
Baseline Corr AF:	17.80	Prev response	17.31	*% change	2.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change 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= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4918	81.3	9.19	9.50	0.968
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0	0.00	0.00	
as left span	4918	81.3	9.19	9.50	0.968
			Avera	ge Correction Factor	
Baseline Corr AF:	9.50	Prev response	9.22	*% change	2.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation

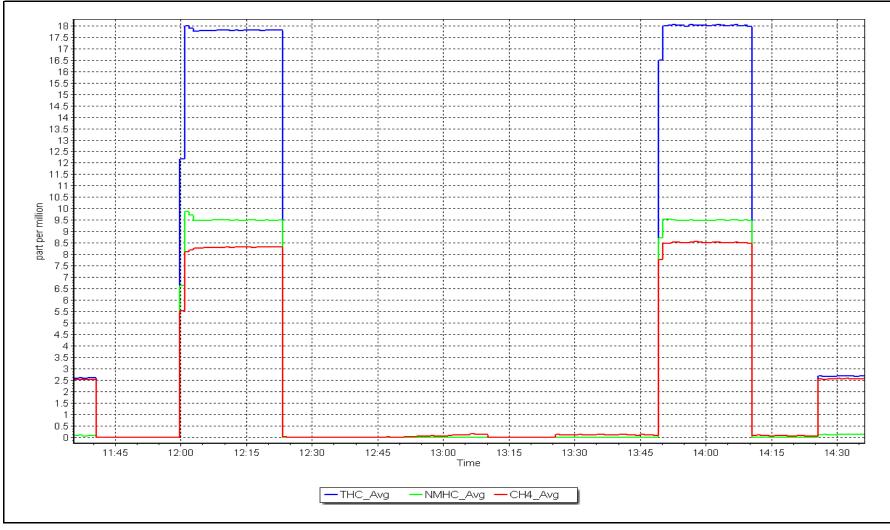
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	8.09	8.31	0.974
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.11	
as left span	4918	81.3	8.09	8.52	0.950
			Ave	rage Correction Factor	
Baseline Corr AF:	8.31	Prev response	8.09	*% change	2.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.001778			
THC Cal Offset:		-0.008039			
CH4 Cal Slope:		1.001064			
CH4 Cal Offset:		-0.011320			
NMHC Cal Slope:		1.002294			
NMHC Cal Offset:		0.003480			

Notes:

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

Calibration Performed By: **Rene Chamberland** NMHC Calibration Plot







THC / CH_4 / NMHC Calibration Report

Version-01-2020

			Station In	formation			
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-F January 24, 202 11:32 Cylinder Change	3	Station number: AMS01 Last Cal Date: January 5, 2023 End time (MST): 15:20				
			Calibration	Standards			
Gas Cert Reference:	C	C486642		Cal Gas Expiry Date: Fo	ebruary 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	A		
Removed CH4 Conc.	497.7	ppm		CH4 Equiv Conc.	1063.1	ppm	
Removed C3H8 Conc.	205.6	ppm		Diff between cyl (THC):			
Diff between cyl (CH ₄)	:			Diff between cyl (NM):			
Calibrator Model:	Teledyne API T7	'00		Serial Number: 3	565		
ZAG make/model:	Teledyne API T7	01		Serial Number: 5	609		
			Analyzer Ir	formation			
Analyzer make	: Thermo 55i			Analyzer serial #: 1	180320040		
THC Range (ppm)							
NMHC Range (ppm)	: 0 - 10 ppm			CH4 Range (ppm): 0	- 10 ppm		
	<u>Start</u>	<u> </u>	Finish		<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio	: 2.52E-04	2.	.54E-04	NMHC SP Ratio:	5.11E-05	5.11E-05	
CH4 Retention time	: 14.4		14.4	NMHC Peak Area:	179678	179761	

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	0.02	
high point	4918	81.3	17.29	17.30	1.000
second point	4959	40.7	8.65	8.63	1.003
third point	4980	20.3	4.32	4.32	0.999
as left zero	5000	0.0	0.00	0.01	
as left span	4918	81.3	17.29	17.29	1.000
			A	verage Correction Factor	1.001
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change 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) (C	c) Ind conc (ppm) (lc)	CF Limit= 0.95-1.0			
as found zero								
as found span								
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0	0.00	0.00				
high point	4918	81.3	9.19	9.20	1.000			
second point	4959	40.7	4.60	4.60	1.000			
third point	4980	20.3	2.30	2.31	0.995			
as left zero	5000	0	0.00	0.00				
as left span	4918	81.3	9.19	9.22	0.998			
			A	verage Correction Factor	0.998			
Baseline Corr AF:	NA	Prev response	NA	*% change	NA			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation			

CH4 Calibration Data

		CIT+ Culloru	cion Duta		
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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.02	
high point	4918	81.3	8.09	8.10	0.999
second point	4959	40.7	4.05	4.03	1.006
third point	4980	20.3	2.02	2.01	1.005
as left zero	5000	0.0	0.00	0.01	
as left span	4918	81.3	8.09	8.07	1.003
			A	verage Correction Factor	1.003
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		1.001778		0.999160	
THC Cal Offset:		-0.008039		0.008295	
CH4 Cal Slope:		1.001064		0.998842	
CH4 Cal Offset:		-0.011320		0.003433	
NMHC Cal Slope:		1.002294		0.999663	
NMHC Cal Offset:		0.003480		0.004462	

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

Calibration Performed By: Rene Chamberland

Notes:



THC Calibration Summary

		Station I	nformation		
Calibration Date:	lanuarv		Previous Calibration:	January	5, 2023
Station Name:	January 24, 2023 Bertha Ganter-Fort McKay		Station Number:	AM	
Start Time (MST):		:32	End Time (MST):	15:	
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 17.29	0.02 17.30	0.9996	Correlation Coefficient	0.999993	≥0.995
8.65	8.63	1.0030	Clana	0.000160	0.00 1.10
4.32	4.32	0.9993	Slope	0.999160	0.90 - 1.10
			Intercept	0.008295	+/-0.5
20.0		THC Calibration			
18.0 —					
16.0					
14.0					
E 12.0					
Line 12.0					
- 0.8 ted					
udica					
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		
alibration Date:	January	24, 2023	Previous Calibration:	January	5, 2023
tation Name:		er-Fort McKay	Station Number:	AM	
tart Time (MST):		:32	End Time (MST):	15:	20
nalyzer make:	Theri	mo 55i	Analyzer serial #:	11803	20040
		Calibra	tion Data		
(ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.02		Correlation Coefficient	0.999966	≥0.995
8.09 4.05	8.10 4.03	0.9990			
2.02	2.01	1.0048	Slope	0.998842	0.90 - 1.10
			Intercept	0.003433	+/-0.5
8.0					
b 4.0					
0.6 dicate					
2.0					
1.0 -					
0.0	20	10		8.0	10.0
0.0	2.0	4.0	6.0	8.0	10.0
		Calculated	l Conc. (ppm)		

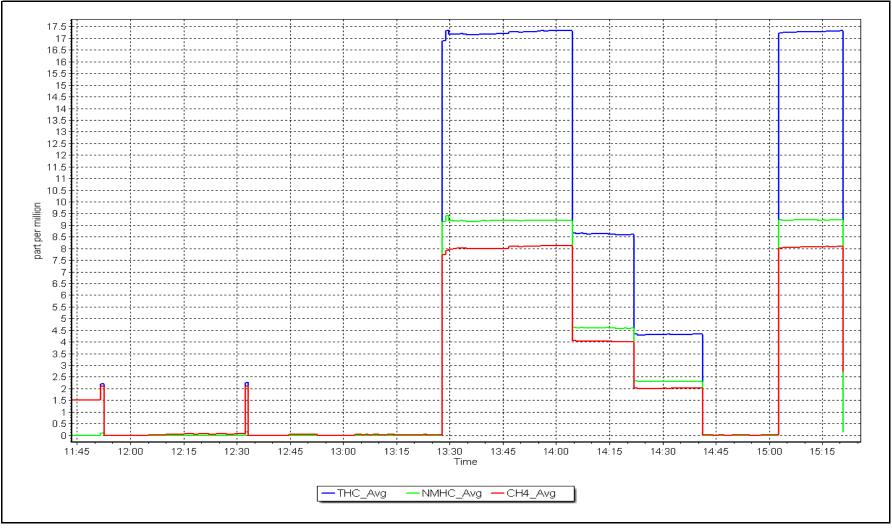


NMHC Calibration Summary

			Station I	nformation		
Calibration	n Date:	January	24, 2023	Previous Calibration:	January	5, 2023
Station Na	me:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01
Start Time	(MST):	11	:32	End Time (MST):	15:	20
Analyzer m	nake:	Therr	no 55i	Analyzer serial #:	11803	20040
			Calibra	tion Data		
Calculated co (ppm)		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eva	luation	<u>Limits</u>
0.0		0.00		Correlation Coefficient	0.999998	≥0.995
<u> </u>		9.20 4.60	0.9999			
2.3		2.31	0.9946	Slope	0.999663	0.90 - 1.10
				Intercept	0.004462	+/-0.5
	9.0 8.0 7.0					
	6.0					
Conc. (ppm)	5.0					
	4.0					
Indicated	3.0					
	2.0					
	1.0					
	0.0					10.0
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay
Calibration Date:	January 6, 2023
Start time (MST):	11:13
Reason:	Routine

Station number: AMS01 Last Cal Date: December 19, 2022 End time (MST): 16:15

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

NO Gas Cylinder #:		T2Y1P9L	Cal Gas Expiry Date: De	cember 11, 2	2023
NOX Cal Gas Conc:	50.84	ppm	NO Cal Gas Conc:	50.04	ppm
Removed Cylinder #:		NA	Removed Gas Exp Date:		NA
Removed Gas NOX Conc:	50.84	ppm	Removed Gas NO Conc:	50.04	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T	700	Serial Number:	3565	
ZAG make/model:	Teledyne API T	701	Serial Number:	5609	

Analy	vzer	Inform	ation
/			acion

Analyzer make: NOX Range (ppb):		,			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.432	1.453	NO bkgnd or offset:	6.7	6.9
NOX coeff or slope:	0.999	0.990	NOX bkgnd or offset:	6.9	7.0
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	195.4	195.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999185	0.999269
NO _x Cal Offset:	-0.340000	-0.220000
NO Cal Slope:	1.000128	1.000842
NO Cal Offset:	-1.100000	-0.900000
NO ₂ Cal Slope:	0.999271	0.996966
NO ₂ Cal Offset:	0.358702	-0.078101



$NO_X \setminus NO \setminus NO_2$ 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	0.1	-0.1		
as found span	4920	80.0	813.4	800.6	12.8	803.2	789.2	14.0	1.0127	1.0145
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.3	0.1		
high point	4920	80.0	813.4	800.6	12.8	812.9	800.8	12.3	1.0007	0.9998
second point	4960	40.0	406.7	400.3	6.4	406.0	399.8	6.2	1.0018	1.0013
third point	4980	20.0	203.4	200.2	3.2	202.3	197.8	4.5	1.0052	1.0119
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.4		
as left span	4920	80.0	813.4	400.3	413.1	810.3	389.8	420.6	1.0039	1.0270
							Average Co	orrection Factor	1.0026	1.0043
Corrected As fo	ound NO _x =	803.2 ppb	NO =	789.1 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-1.2%
Previous Respo	onse NO _x =	812.4 ppb	NO =	799.6 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 foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

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

Notes:

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

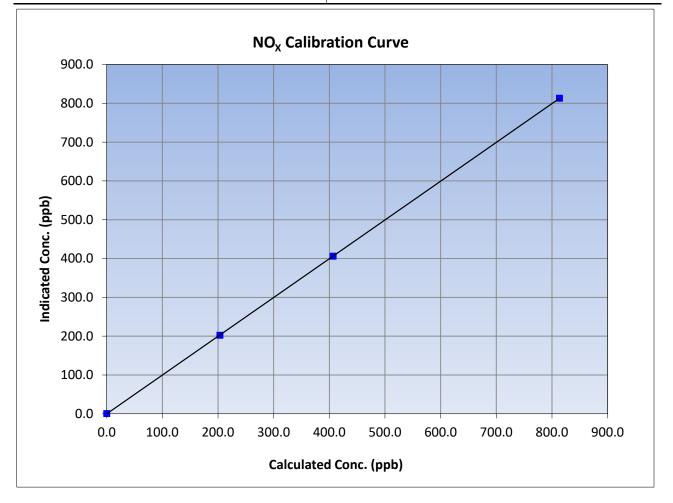
Calibration Performed By:

Rene Chamberland



NO_x Calibration Summary

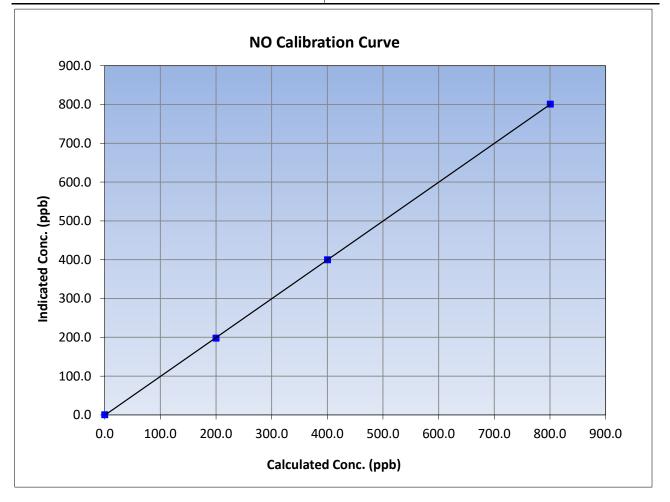
WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	6, 2023	Previous Calibration:	Decembe	r 19, 2022
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01
Start Time (MST):	11	:13	End Time (MST):	16	:15
Analyzer make:	Therr	no 42i	Analyzer serial #:	12181	53357
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999997	≥0.995
813.4	812.9	1.0007	correlation coefficient	0.555557	20.333
406.7	406.0	1.0018	Clana	0.999269	0.90 - 1.10
203.4	202.3	1.0052	Slope	0.999269	0.90 - 1.10
			Intercept	-0.220000	+/-20





NO Calibration Summary

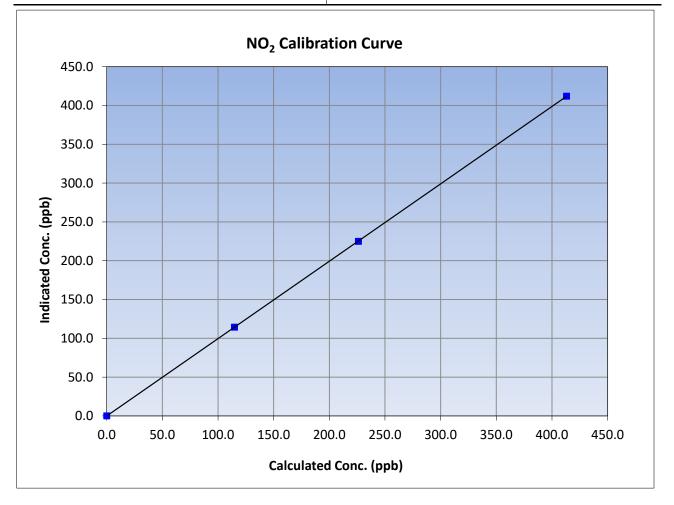
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January 6, 2023		Previous Calibration:	December 19, 2022	
Station Name:	Bertha Ganter-Fort McKay		Station Number:	AM	S01
Start Time (MST):	11:13		End Time (MST):	16:15	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1218153357	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999988	≥0.995
800.6	800.8	0.9998	correlation coernelent	0.555588	20.995
400.3	399.8	1.0013	Clana	1.000842 0.90	0.90 - 1.10
200.2	197.8	1.0119	Slope	1.000642 0.90-	0.90 - 1.10
			Intercept	-0.900000	+/-20

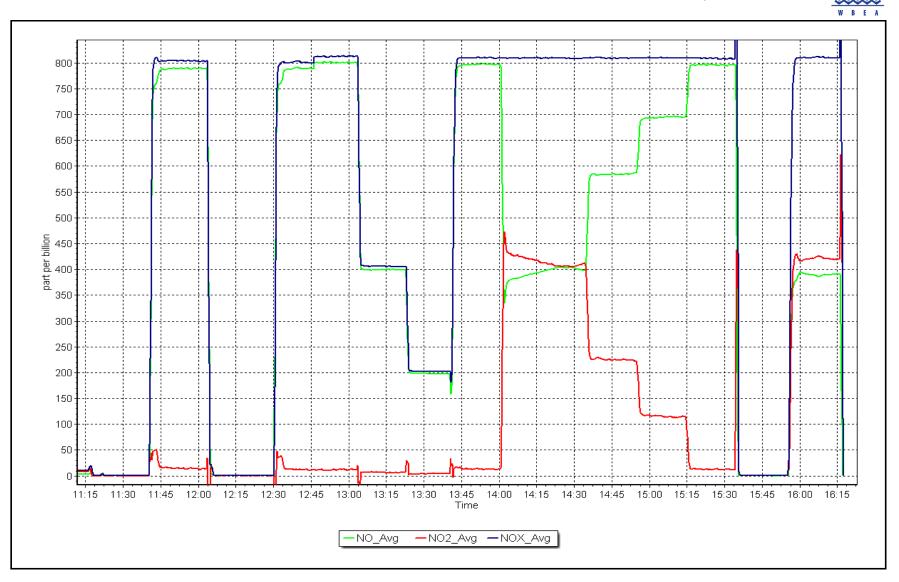




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	January 6, 2023		Previous Calibration:	December 19, 2022	
Station Name:	Bertha Ganter-Fort McKay		Station Number:	AM	S01
Start Time (MST):	11:13		End Time (MST):	16	:15
Analyzer make:	Therr	no 42i	Analyzer serial #:	1218153357	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999997	≥0.995
413.1	412.0	1.0027	correlation coefficient	0.555557	20.333
226.2	225.0	1.0053	Clara	0.996966 0.9	0.90 - 1.10
114.8	114.4	1.0035	Slope	0.996966	0.90 - 1.10
			Intercept	-0.078101	+/-20





Date: January 6, 2023

Location: Bertha Ganter-Fort McKay



O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort January 4, 2023 10:54 Routine	МсКау	Station number: Last Cal Date: End time (MST):	December 7, 2022	
		Calibration St	andards		
O3 generation mode:	Photometer			25.65	
Calibrator Make/Model:	Teledyne API T700		Serial Number:		
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609	
		Analyzer Info	rmation		
Analyzer make	: Teledyne API T400		Analyzer serial #:	1107	
Analyzer Range	e 0 - 500 ppb				
	Start	Finish		<u>Start</u>	Finish
Calibration slope:	0.997800	1.001400	Backgd or Offset:	2.0	2.9
Calibration intercept:	0.760000	0.480000	Coeff or Slope:	1.009	1.011
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	O ₃ Calibratic Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc/Ic Limit = 0.95-1.05
Set Point as found zero		Calibrator Lamp	Calculated		
	(sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	(sccm) 5000	Calibrator Lamp Voltage Drive 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.3	Limit = 0.95-1.05
as found zero as found span	(sccm) 5000	Calibrator Lamp Voltage Drive 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.3	Limit = 0.95-1.05
as found zero as found span as found 2nd point	(sccm) 5000	Calibrator Lamp Voltage Drive 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.3	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000 5000	Calibrator Lamp Voltage Drive 0.0 855.5	Calculated concentration (ppb) (Cc) 0.0 400.0	(ppm) (Ic) 0.3 401.2	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point	(sccm) 5000 5000 5000 5000 5000 5000	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5 738.6	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0	(ppm) (lc) 0.3 401.2 0.0 400.7 201.3	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	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0	(ppm) (Ic) 0.3 401.2 0.0 400.7 201.3 100.9	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	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5 738.6	Calculated concentration (ppb) (Cc) 0.0 400.0 	(ppm) (lc) 0.3 401.2 0.0 400.7 201.3	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	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5 738.6 649.2	Calculated concentration (ppb) (Cc) 0.0 400.0 	(ppm) (Ic) 0.3 401.2 0.0 400.7 201.3 100.9 0.2 401.8	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5 738.6 649.2 0.0	Calculated concentration (ppb) (Cc) 0.0 400.0 	(ppm) (Ic) 0.3 401.2 0.0 400.7 201.3 100.9 0.2	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	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5 738.6 649.2 0.0 855.5	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	(ppm) (Ic) 0.3 401.2 0.0 400.7 201.3 100.9 0.2 401.8 ge Correction Factor	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5 738.6 649.2 0.0 855.5 738.5 Previous response	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 400.0 Averag 399.9	(ppm) (Ic) 0.3 401.2 0.0 400.7 201.3 100.9 0.2 401.8 ge Correction Factor *% change	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive 0.0 855.5 0.0 855.5 738.6 649.2 0.0 855.5	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Average 399.9	(ppm) (Ic) 0.3 401.2 0.0 400.7 201.3 100.9 0.2 401.8 ge Correction Factor	Limit = 0.95-1.05

Notes:

Changed inlet filter after as founds. Adjusted zero only.

Calibration Performed By:

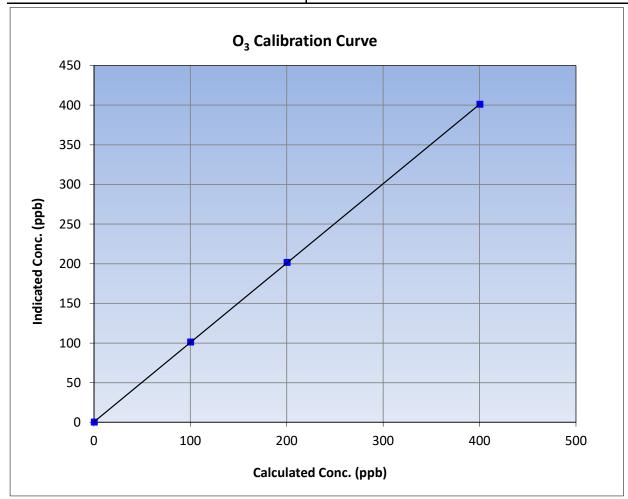
Rene Chamberland



O₃ Calibration Summary

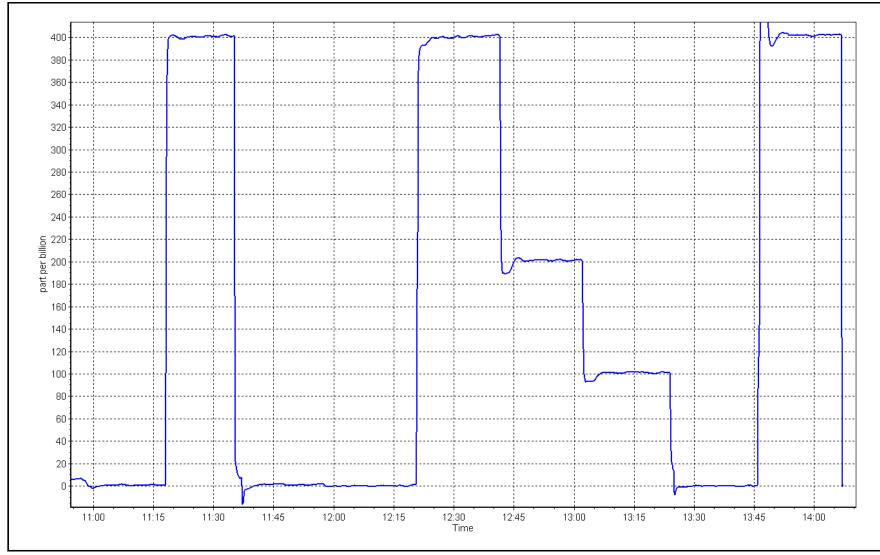
WBEA			Version-01-2020
	Station	Information	
Calibration Date:	January 4, 2023	Previous Calibration:	December 7, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	10:54	End Time (MST):	14:09
Analyzer make:	Teledyne API T400	Analyzer serial #:	1107
	Calib	ration Data	

Calculated concentration (ppb) (Cc)	n Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999992	≥0.995	
400.0	400.7	0.9983			20.333	
200.0	201.3	0.9935	Slope 1.001400		0.90 - 1.10	
100.0	100.9	0.9911	Slope	1.001400	0.90 - 1.10	
			Intercept	0.480000	+/- 5	











T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Informati	on		
Station Name: Calibration Date: Start time (MST):	Fort McKay - Bertha Ganter January 24, 2023 13:55		Station number: AMS 01 Last Cal Date: December 19, 2022 End time (MST): 14:58		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 306	5	
Flow Meter Make/Model: Temp/RH standard:				S/N: 1450 S/N: 1450	
Temp/Kh Stanuaru.	Delta Cal			50	
		Monthly Calibration			
Parameter	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-5.3	-5.4	-5.3		+/- 2 °C
P (mmHg)	733.8	733.7	733.8		+/- 10 mmHg
flow (LPM)	4.99	4.93	4.99		+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	January 24, 2023 6.3	Last Cal Date: <u>De</u> PM w/ HEPA:	ecember 19, 2022 0.0	
Inlet cleaning :	Inlet Head				
		Quarterly Calibratio	n Test		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test		NA			10.9 +/- 0.5
Date Optical Chamber Cleaned: Disposable Filter Changed:		December 19, 2022 December 19, 2022			
		Annual Maintena	nce		
Date Sample Tul	be Cleaned:	August 31	. 2022		
Date RH/T Sensor Cleaned:		December :			
Notes:		Flow, temperature and	pressure verified. Leak che	ck passed.	

Calibration by:

Rene Chamberland



CO Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort January 11, 2023 11:01 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 December 8, 2022 14:30	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	<u>3040</u> <u>ALM042207</u>	ppm	Cal Gas Exp Date:	December 1, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	<u>3040</u> <u>NA</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:	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> 1.000946 0.195852	<u>Finish</u> 0.999735 0.169836	Backgd or Offset: Coeff or Slope:	<u>Start</u> -0.012 0.989	<u>Finish</u> -0.012 0.989
		CO Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	4933	66.7	40.6	41.0	0.989
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4933	66.7	40.6	40.6	1.000
second point	4966	33.3	20.2	20.7	0.978
third point	4983	16.7	10.2	10.3	0.983
as left zero	5000	0.0	0.0	0.0	
as left span	2960	40.0	40.5	40.3	1.005
				ge Correction Factor	0.987
Baseline Corr As found:	40.86	Prev response:	40.79	*% change:	0.2%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA NA	AF Slope: AF Correlation:		AF Intercept:	

Notes:

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

Calibration Performed By:

Rene Chamberland

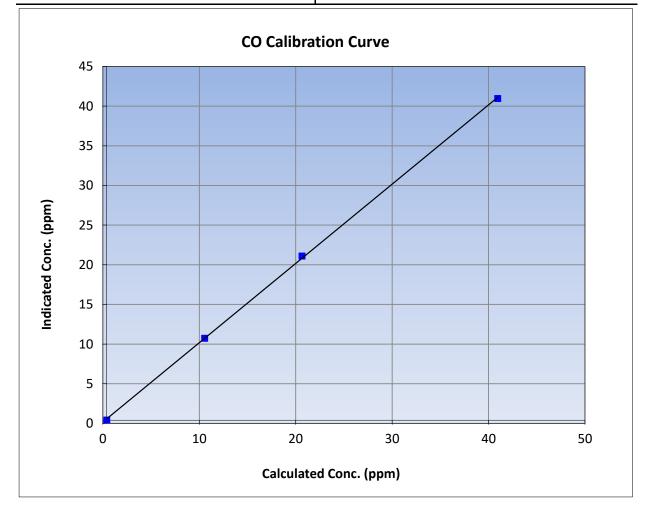


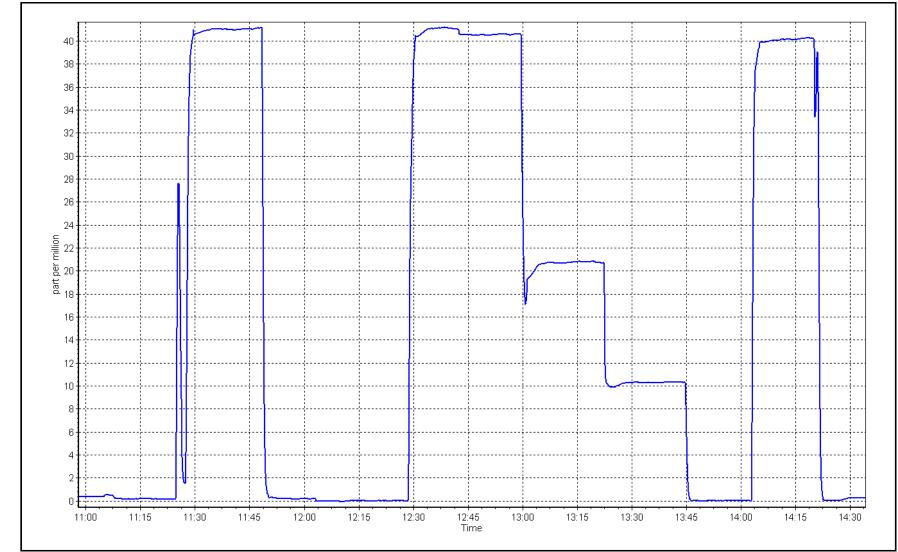
CO Calibration Summary

WBEA			Version-01-2020
	Station	Information	
Calibration Date:	January 11, 2023	Previous Calibration:	December 8, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:01	End Time (MST):	14:30
Analyzer make:	Teledyne API T300	Analyzer serial #:	3520

Calibration Data

Calculated concentration (ppm) (Cc)	Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (IC)		Statistical Evalua	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999860	≥0.995
40.6	40.6	0.9997	correlation coefficient	0.555800	20.333
20.2	20.7	0.9782	Slope	0.999735	0.90 - 1.10
10.2	10.3	0.9830	Slope	0.333733	0.30 - 1.10
			Intercept	0.169836	+/-1.5









CO₂ Calibration Report

Version-01-2020

					Version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort January 16, 2023 10:43 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 December 12, 2022 14:35	
		Calibration St	andards		
Cal Gas Concentration:	60,200	ppm	Cal Gas Exp Date:	December 1, 2028	
Cal Gas Cylinder #:	ALM042207				
Removed Cal Gas Conc:	<u>60,200</u>	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	<u>NA</u>		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		
Analvzer make:	: Teledyne API 360	-	Analyzer serial #:	442	
Analyzer Range			·		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.000615	1.002131	Backgd or Offset:		0.037
Calibration intercept:	-2.540000	-6.480000	Coeff or Slope:	0.879	0.883
		CO ₂ Calibratio	on Data		
			Calculated		
Set Point	Dilution air flow rate	Source gas flow rate	concentration (ppm)	Indicated concentration (
	(sccm)	(sccm)	(Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	3000	0.0	0.0	-0.4	
as found span	2920	80.0	1605.3	1573.6	1.020
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.1	
high point	2920	80.0	1605.3	1606.4	0.999
second point	2960	40.0	802.7	791.9	1.014
third point	2980	20.0	401.3	391.2	1.026
as left zero	3000	0.0	0.0	-0.2	
as left span	2960	40.0	802.7	776.0	1.034
			Averag	e Correction Factor	1.013
Baseline Corr As found:	1574.00	Prev response:	1603.78	*% change:	-1.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:		•	

Notes:

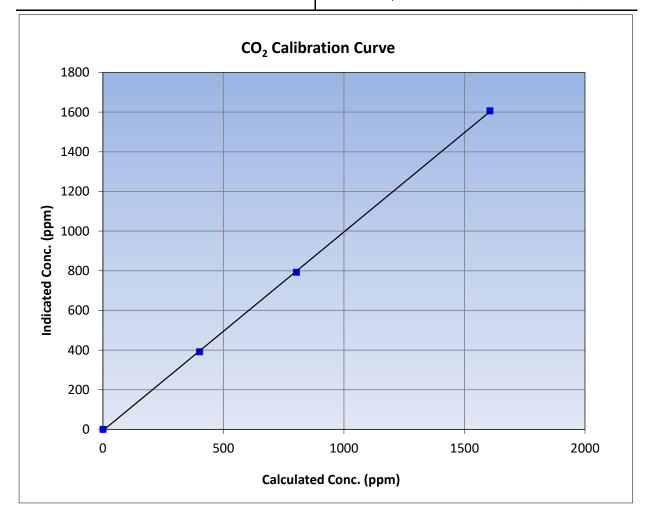
Changed the inlet filter after as founds. Adjusted span only.

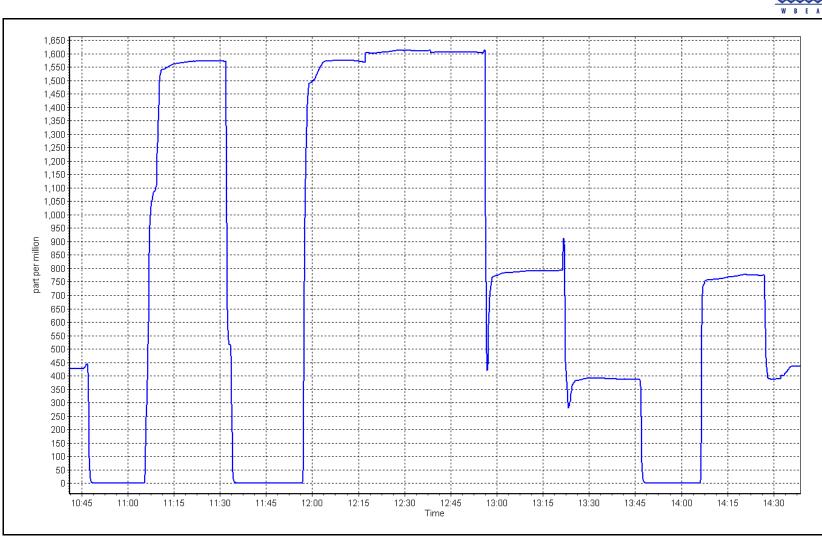
Calibration Performed By:



CO₂ Calibration Summary

		Station	Information		
Calibration Date	January 1	5, 2023	Previous Calibration	Decembe	er 12, 2022
Station Name	Bertha Ganter-Fort McKay		Station Number	AM	1501
Start Time (MST)	(MST) 10:43		End Time (MST)		:35
Analyzer make	Teledyne	API 360	Analyzer serial #	44	42
		Calib	ration Data		
alculated concentration In (ppm) (Cc)	dicated concentration (ppm) (Ic)	Calib Correction factor (Cc/Ic)	ration Data Statistical Evalua	ation	<u>Limits</u>
		Correction factor	Statistical Evalua		
	(ppm) (lc)	Correction factor (Cc/lc)		ation 0.999919	<u>Limits</u> ≥0.995
(ppm) (Cc) 0.0	(ppm) (Ic) -0.1	Correction factor (Cc/Ic)	Statistical Evalua	0.999919	≥0.995
(ppm) (Cc) 0.0 1605.3	(ppm) (Ic) -0.1 1606.4	Correction factor (Cc/Ic) 0.9993	Statistical Evalua		





Date: January 16, 2023

Location: Bertha Ganter-Fort McKay





TN - NO_X - NH₃ Calibration Report

Version-11-2021 Station Information Station Name: Bertha Ganter-Fort McKay Station number: AMS01 January 12, 2023 December 2, 2022 NOX Cal Date: Last Cal Date: Start time (MST): 11:29 End time (MST): 15:50 NH3 Cal Date: January 12, 2023 Last Cal Date: December 2, 2022 16:15 18:53 Start time (MST): End time (MST): Reason: As Found **Calibration Standards** T2Y1P9L NOX Cal Gas Conc: 50.84 NO Gas Cylinder #: ppm NO Cal Gas Conc: 50.04 NO Cal Gas Expiry: March 3, 2028 ppm Removed NOX Conc: 50.84 Removed Cylinder #: ppm NA 50.04 Removed NO Conc: ppm Removed cyl Expiry: NA NOX gas Diff: NO gas Diff: NH3 Cal Gas Conc: 74.00 NH3 Gas Cylinder #: LL119509 ppm NH3 Cal Gas Expiry: February 24, 2022 Removed Cylinder #: Removed NH3 Conc: 74.00 NA ppm NH3 gas Diff: Removed cyl Expiry: NA Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 5609 **Analyzer Information** Analyzer model: Teledyne API T201 Analyzer serial #: 475 Converter model: Teledyne API T501 Converter serial #: 484 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 6.00 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 527 Start Finish **Start** Finish NO coefficient: 1.009 1.001 TN coefficient: 1.009 1.000 NOX coefficient: 1.008 NO bkgrnd: 0.100 1.016 0.100 NO2 coefficient: 1.000 1.000 NOX bkgrnd: 0.600 0.600 NH3 coefficient: 0.933 0.933 TN bkgrnd: 2.300 2.300 **Calibration Statistics** Start Finish NO_x Cal Slope: 1.002501 1.000436 NO_x Cal Offset: -0.120000 -0.160000 NO Cal Slope: 1.001242 0.999472 NO Cal Offset: -1.540000-0.820000 NO₂ Cal Slope: 1.005272 0.994087 NO₂ Cal Offset: 0.622766 0.253701 NH3 Cal Slope: 1.000243 1.006531 NH3 Cal Offset: 3.207760 3.444505 TN Cal Slope: 1.002735 1.009328 TN Cal Offset: 3.501910 3.486553



TN - NOX - NH₃ Calibration Report

Version-11-2021

				Dilut	ion Calibration	Dala				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.0</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.9	-0.2	-0.7		
as found NO	4920	80.0	813.4	813.4		822.3	820.6	1.9	0.989	
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
high NO point	4920	80.0	813.4	813.4		812.7	813.1	-0.8	1.001	
NO/O3 point	4920	80.0	813.4	813.4		810.0	808.1	2.1	1.004	
as found NH3	2927	73.0	1800.7		1800.7	1815.7		1810.7	0.992	0.994
new NH3 cyl rp										
first NH3	2927	73.0	1800.7		1800.7	1815.7		1810.7	0.992	0.994
second NH3	2960	40.5	999.0		999.0	1022.0		1019.0	0.977	0.980
third NH3	2980	20.3	500.7		500.7	507.4		506.0	0.987	0.990
							Average C	orrection Factor	1.0026	0.9881
Corrected As fo	ound TN =	823.2 ppb	NO _x = 820.8	ppb NH3 =	1811.4 ppb			*Percent Chang	e TN =	0.5%
Previous Respo	onse TN =	819.2 ppb	NO _x = 815.4	ppb NH3 =	1804.3 ppb			*Percent Chang	e NO _x =	0.7%
NH3 Provious (Converter Efficie	ncy = 93.3%						*Percent Chang * = > +/-5% change		0.4%
	Jonventer Ennere	ncy =						s and showinge		

Dilution Calibration Data

NH3 Current Converter Efficiency = 93.3%



NO_X - NO - NO₂ Calibration Report

Difference of the sector of th

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	-0.2	-0.1	-0.9		
as found span	4920	80.0	813.4	800.6	813.4	820.6	802.0	822.3	0.9913	0.9983
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	0.0		
high point	4920	80.0	813.4	800.6	813.4	813.1	799.5	812.7	1.0004	1.0014
second point	4960	40.0	406.7	400.3	406.7	408.5	399.9	409.8	0.9956	1.0011
third point	4980	20.0	203.4	200.2	203.4	201.9	197.6	202.0	1.0072	1.0130
							Average C	orrection Factor	1.0011	1.0051
Baseline Corr As	s fnd TN =	823.2 ppb	NO _x = 820.8	ppb NO =	802.1 ppb			*Percent Chang	e TN =	0.5%
Previous Respo	nse TN =	819.2 ppb	NO _x = 815.4	ppb NO =	800.1 ppb			*Percent Change	e NO _x =	0.7%
								*Percent Change	e NO =	0.3%
								* = > +/-5% change i	nitiates investigati	on

		GF	'I Calibration Data				
O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%	
as found zero			0.0	0.0			
calibration zero			0.0	-0.1			
t GPT point (400 ppb O3)	798.4	387.9	423.3	420.1	1.0076	99.2%	
d GPT point (200 pph O3)	798 4	595 3	215 9	217 5	0 9926	100 7%	

CDT Calibration Data

--------99.2% 1st G 100.7% 2nd GPT point (200 ppb O3) 798.4 0.9926 595.3 215.9 217.5 798.4 686.9 124.3 122.5 1.0147 98.6% 3rd GPT point (100 ppb O3) 1.0050 99.5% Average Correction Factor

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

Calibration Performed By:

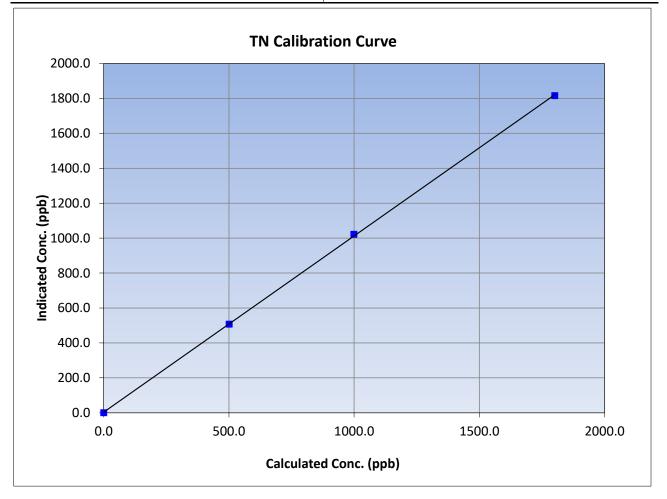
Notes:

Rene Chamberland



TN Calibration Summary

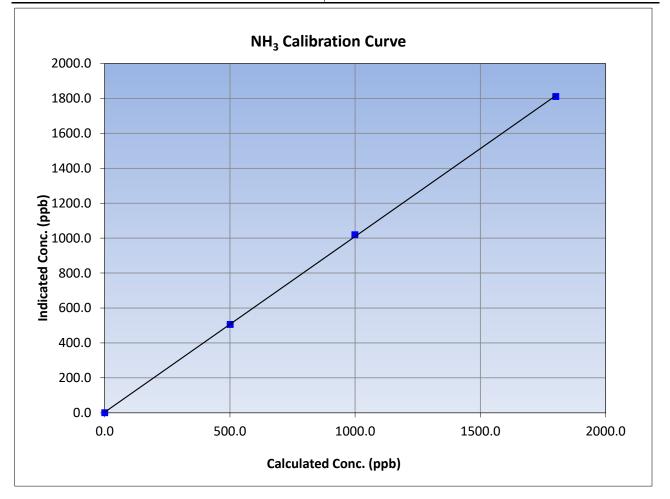
WBEA					Version-11-202	
		Station	Information			
Calibration Date:	January	12, 2023	Previous Calibration: De		ember 2, 2022	
Station Name:	Bertha Ganter-Fort McKay		Station Number:	А	MS01	
Start Time (MST):	11:29		End Time (MST):	1	15:50	
Analyzer make: Teledyne API T201			Analyzer serial #:			
		Calibra	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	0.999919	≥0.995	
1800.7	1815.7	0.9917	correlation coernelent	0.555515	20.333	
999.0	1022.0	0.9775	Slope	1.009328	0.90 - 1.10	
500.7	507.4	0.9868	Slope	1.009528	0.90 - 1.10	
			Intercept	3.486553	+/-20	





NH₃ Calibration Summary

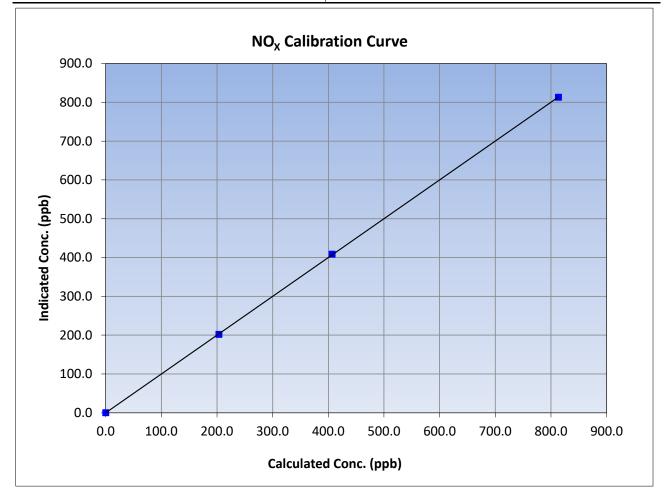
WBEA		Chattan	1. f		Version-11-202	
		Station	Information			
Calibration Date:	January	12, 2023	Previous Calibration: Dece		ember 2, 2022	
Station Name:	Bertha Ganter-Fort McKay		Station Number:	A	MS01	
Start Time (MST):	11:29		End Time (MST):		15:50	
Analyzer make:	Teledyne	API T201	Analyzer serial #:		475	
		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	0.999921	≥0.995	
1800.7	1810.7	0.9945	correlation coefficient	0.999921	20.333	
999.0	1019.0	0.9804	Clana	1.006531	0.90 - 1.10	
500.7	506.0	0.9895	Slope	1.006531	0.90 - 1.10	
			Intercept	3.444505	+/-20	





NO_x Calibration Summary

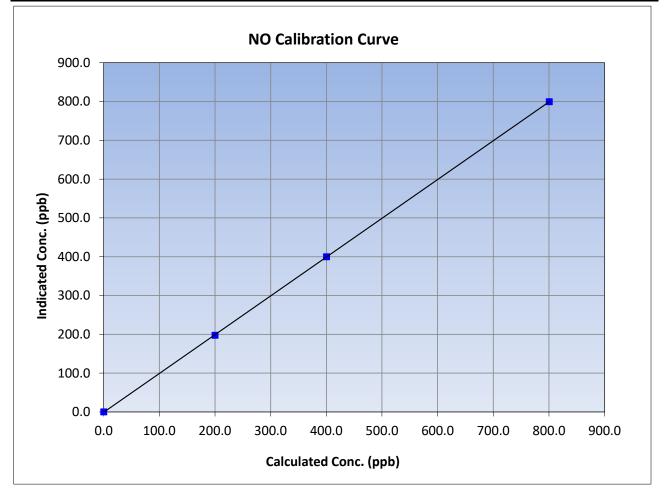
WBEA					Version-11-2	
		Station	Information			
Calibration Date:	January	12, 2023	Previous Calibration: Dece		ber 2, 2022	
Station Name:	Bertha Ganter-Fort McKay		Station Number:	Station Number: AI		
Start Time (MST):	11:29		End Time (MST):	15:50		
Analyzer make:	Teledyne	API T201	Analyzer serial #:	175		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999985	≥0.995	
813.4	813.1	1.0004	Correlation Coefficient	0.999985	20.995	
406.7	408.5	0.9956	Slope	1.000436	0.90 - 1.10	
203.4	201.9	1.0072	Slope	1.000430	0.30 - 1.10	
			Intercept	-0.160000	+/-20	





NO Calibration Summary

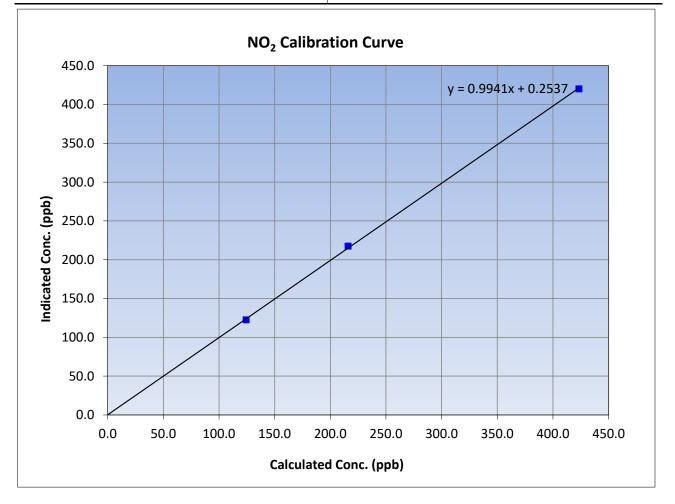
WBEA		Station	Information		Version-11-20
Calibration Date: Station Name: Start Time (MST): Analyzer make:	Bertha Gante 11	12, 2023 er-Fort McKay :29 API T201	Previous Calibration: Station Number: End Time (MST): Analyzer serial #:	AM 1	ber 2, 2022 MS01 5:50 475
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0 800.6	0.1 799.5	 1.0014	Correlation Coefficient	0.999989	≥0.995
400.3 200.2	399.9 197.6	1.0011 1.0130	Slope	0.999472	0.90 - 1.10
			Intercept	-0.820000	+/-20

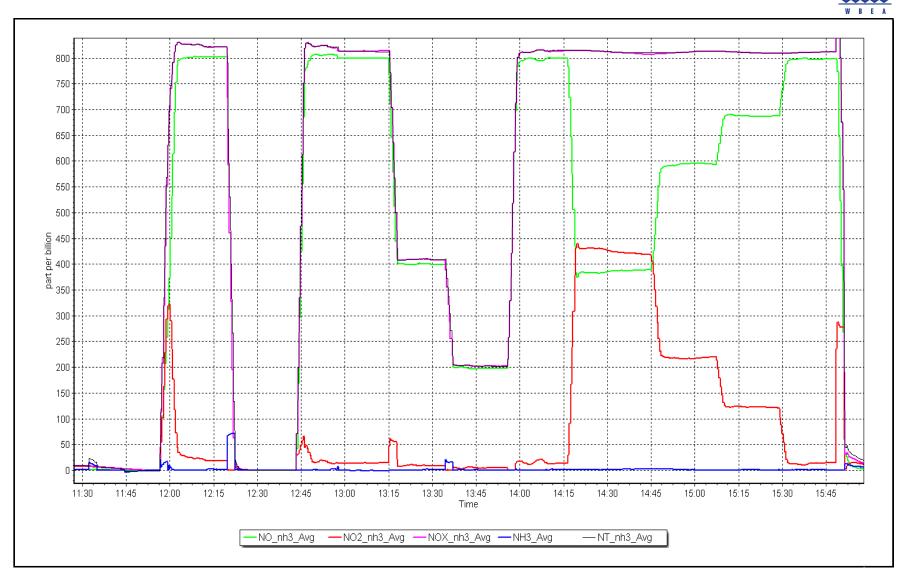




NO₂ Calibration Summary

WBEA		Station	Information		Version-11-2
Calibration Date: Station Name:		12, 2023 er-Fort McKay	Previous Calibration: Station Number:		oer 2, 2022 //S01
Start Time (MST):	11	:29	End Time (MST):	5:50	
Analyzer make:	Teledyne	API T201	Analyzer serial #:	2	475
		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	0.999898	≥0.995
423.3	420.1	1.0076	correlation coemcient	0.555050	20.000
215.9	217.5	0.9926	Slope	0.994087	0.90 - 1.10
124.3	122.5	1.0147	Slope	0.994087	0.90 - 1.10
			Intercept	0.253701	+/-20





NO_x Calibration Plot

Location: Bertha Ganter-Fort McKay











TN - NO_X - NH₃ Calibration Report

					Version-11-202
		Statio	n Information		-
Station Name: NOX Cal Date: Start time (MST): NH3 Cal Date: Start time (MST): Reason:	Bertha Ganter-For January 13, 2023 13:00 January 13, 2023 15:00 Maintenance	rt McKay	Station number: Last Cal Date: End time (MST): Last Cal Date: End time (MST):	AMS01 December 2, 2022 14:40 December 2, 2022 17:30	
		Calibra	ation Standards		
NOX Cal Gas Conc: NO Cal Gas Conc: Removed NOX Conc: Removed NO Conc:	50.84 50.04 50.84 50.04	ppm ppm ppm ppm	NO Gas Cylinder #: NO Cal Gas Expiry: Removed Cylinder #: Removed cyl Expiry:	T2Y1P9L March 3, 2028 NA NA	
NOX gas Diff: NH3 Cal Gas Conc:	72.93	ppm	NO gas Diff: NH3 Gas Cylinder #: NH3 Cal Gas Expiry:	CC281298 February 28, 2023	
Removed NH3 Conc: NH3 gas Diff: Calibrator Model: ZAG make/model:	-	ppm ne API T700 ne API T701	Removed Cylinder #: Removed cyl Expiry: Serial Number: Serial Number:	LL119509 February 24, 2022 3565 5609	
		Analyz	er Information		
-			Analyzer serial #: Converter serial #: Reaction cell Press: Sample Flow:	: 217 : 5.10	
NO coefficient		<u>Finish</u> 1.046	TN coefficient:	<u>Start</u> 1.000	<u>Finish</u>
NOX coefficient NO2 coefficient NH3 coefficient	: 1.000	1.050 1.000 0.933	NO bkgrnd: NOX bkgrnd: TN bkgrnd:	0.600	1.056 0.000 0.600 6.300
NO2 coefficient	: 1.000	1.000 0.933	NOX bkgrnd:	0.600	0.000 0.600
NO2 coefficient NH3 coefficient NO _x Cal Slope	: 1.000 : 0.933 :	1.000 0.933 Calibra <u>Start</u> 1.000436	NOX bkgrnd: TN bkgrnd: ation Statistics	E 0.600 2.300 E 0.998476	0.000 0.600
NO2 coefficient NH3 coefficient NO _x Cal Slope NO _x Cal Offset	: 1.000 : 0.933 :	1.000 0.933 Calibra <u>Start</u>	NOX bkgrnd: TN bkgrnd: ation Statistics	0.600 2.300	0.000 0.600
NO2 coefficient NH3 coefficient NO _x Cal Slope NO _x Cal Offset NO Cal Slope NO Cal Offset NO ₂ Cal Slope	: 1.000 : 0.933 : : : : :	1.000 0.933 Calibra 1.000436 -0.160000 0.999472 -0.820000 0.994087	NOX bkgrnd: TN bkgrnd: ation Statistics	E 0.600 2.300 Einish 0.998476 -0.200000	0.000 0.600
NO2 coefficient NH3 coefficient NO _x Cal Slope NO _x Cal Offset NO Cal Slope NO Cal Offset	: 1.000 : 0.933 : : : : : : : : : : :	1.000 0.933 Calibra <u>Start</u> 1.000436 -0.160000 0.999472 -0.820000	NOX bkgrnd: TN bkgrnd: ation Statistics	E 0.600 2.300 E 0.998476 -0.200000 1.000075	0.000 0.600



TN - NOX - NH₃ Calibration Report

Version-11-2021

			Diluti	on Calibration	Data				
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 Correctior factor (Cc/Ic) <i>Limit = 0.95-1.0</i>
5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1		
4920	80.0	813.4	813.4		813.4	812.0	1.3	1.000	
2926	74.1	1801.4		1801.4	1815.7		1810.7	0.992	0.995
2959	41.2	1001.6		1001.6	1014.2		1011.5	0.988	0.990
2979	20.6	500.8		500.8	512.8		511.1	0.977	0.980
						Average C	Correction Factor	1.0000	0.9883
und TN =	NA ppb	NO _x = NA	ppb NH3 =	NA ppb			*Percent Chang	e TN =	NA
nse TN =	NA ppb	NO _X = NA	ppb NH3 =	NA ppb			*Percent Change	e NO _x =	NA
							*Percent Change	e NH3 =	NA
onverter Efficie	ncy = 93.3%						* = > +/-5% change i	nitiates investigati	ion
	(sccm) 5000 4920 2926 2959 2979 und TN = nse TN =	(sccm) rate (sccm) 5000 0.0 4920 80.0 2926 74.1 2959 41.2 2979 20.6 und TN = NA ppb	Dilution flow rate (sccm) Source gas flow rate (sccm) concentration (ppb) (Cc) 5000 0.0 0.0 4920 80.0 813.4 2926 74.1 1801.4 2959 41.2 1001.6 2979 20.6 500.8 und TN = NA ppb NO _X = NA	Dilution flow rate (sccm)Source gas flow rate (sccm)Calculated TN concentration (ppb) (Cc)Calculated NOX concentration (ppb) (Cc) 5000 0.0 0.0 0.0 0.0 4920 80.0 813.4 813.4 2926 74.1 1801.4 $$ 2959 41.2 1001.6 $$ 2979 20.6 500.8 $$ undTN =NAppbNO _X =NANN ppbNO _X =NAppbNH3 =NN ppbNO _X =NAppbNH3 =	Dilution flow rate (sccm)Source gas flow rate (sccm)Calculated TN concentration (ppb) (Cc)Calculated NOX concentration (ppb) (Cc)Calculated NH3 concentration (ppb) (Cc)50000.00.00.00.0492080.0813.4813.4292674.11801.41801.4295941.21001.61001.6297920.6500.8500.8undTN =NAppbNOx =NAppbNAppbNOx =NAppbNH3 =NANAppbNOx =NAppbNH3 =NA	Dilution flow rate (sccm) Source gas flow rate (sccm) concentration (ppb) (Cc) concentration (ppb) (Cc) concentration (ppb) (Cc) concentration (ppb) (Cc) 5000 0.0 0.0 0.0 -0.3 4920 80.0 813.4 813.4 2926 74.1 1801.4 1801.4 2929 41.2 1001.6 1001.6 2979 20.6 500.8 500.8 512.8 und TN = NA ppb NG _X = NA ppb NH3 = NA ppb	Dilution flow rate (sccm)Source gas flow rate (sccm)Calculated TN concentration (ppb) (Cc)Calculated NOX concentration (ppb) (Cc)Calculated NH3 concentration (ppb) (Cc)Indicated TN concentration (ppb) (Ic)Indicated NOX concentration (ppb) (Ic)50000.00.00.00.0-0.3-0.2492080.0813.4813.4813.4812.0292674.11801.41801.41815.7295941.21001.61001.61014.2297920.6500.8500.8512.8Average CundTN =NAppbNOx =NAppbNH3 =NAppbNAppbNOx =NAppbNH3 =NAppb	Dilution flow rate (sccm)Source gas flow rate (sccm)Calculated TN concentration (ppb) (Cc)Calculated NOX concentration (ppb) (Cc)Calculated NH3 concentration (ppb) (Cc)Indicated NOX concentration (ppb) (Ic)Indicated NH3 concentration (ppb) (Ic) 5000 0.0 0.0 0.0 0.0 -0.3 -0.2 -0.1 4920 80.0 813.4 813.4 $$ 813.4 812.0 1.3 2926 74.1 1801.4 $$ 1801.4 1815.7 $$ 1810.7 2979 20.6 500.8 $$ 500.8 512.8 $$ 511.1 2979 20.6 500.8 $$ 500.8 512.8 $$ 511.1 $4verage Correction Factor4verage Correction Factor*Percent ChangeundTN = NAppbNO_x = NAppbNH3 = NAppb*Percent Change*Percent Change*Percent Change*Percent Change*Percent Change$	Dilution flow rate (scm)Source gas flow rate (sccm)Calculated TN concentration (ppb) (Cc)Calculated NOX concentration (ppb) (Cc)Calculated NH3

Dilution Calibration Data

NH3 Current Converter Efficiency = 93.3%



NO_x - NO - NO₂ Calibration Report

Version-11-2021

				Dilutio	on Calibration	Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero										
as found span										
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.3		
high point	4920	80.0	813.4	800.6	813.4	812.0	800.6	813.4	1.0018	1.0000
second point										
third point										
							Average C	orrection Factor	1.0018	1.0000
Baseline Corr As	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	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						
calibration zero			0.0	0.0		
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 were performed on January 12. Replaced the NH3 converter, pump, charcoal pack, and calibration gas. Adjusted both zero and span. NH3 calibration is still failing.

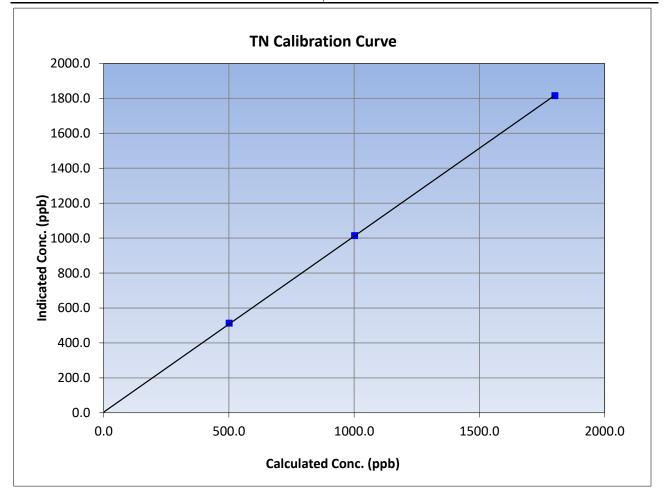
Calibration Performed By:

Rene Chamberland



TN Calibration Summary

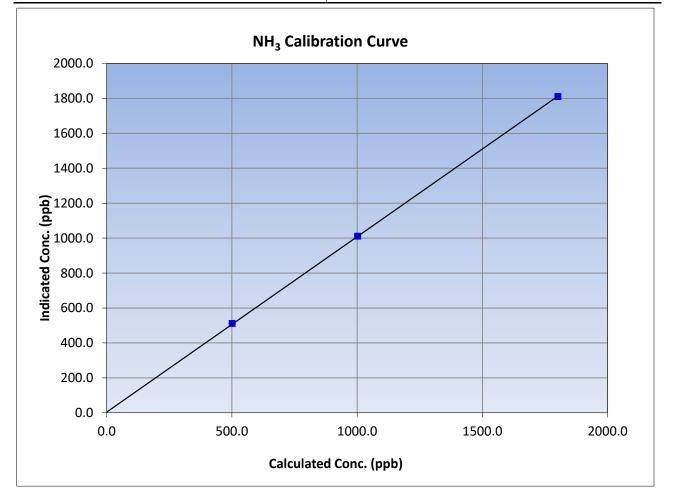
WBEA					Version-11-202	
		Station	Information			
Calibration Date:	January	13, 2023	Previous Calibration:	Decem	ber 2, 2022	
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	А	MS01	
Start Time (MST):	13	:00	End Time (MST):	End Time (MST): 14:40		
Analyzer make:	Teledyne	API T201	Analyzer serial #:		475	
		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	0.999974	≥0.995	
1801.4	1815.7	0.9921	correlation coernelent	0.999974	20.995	
1001.6	1014.2	0.9875	Slope	1.007082	0.90 - 1.10	
500.8	512.8	0.9766	Slope	1.007082	0.90 - 1.10	
			Intercept	3.818565	+/-20	

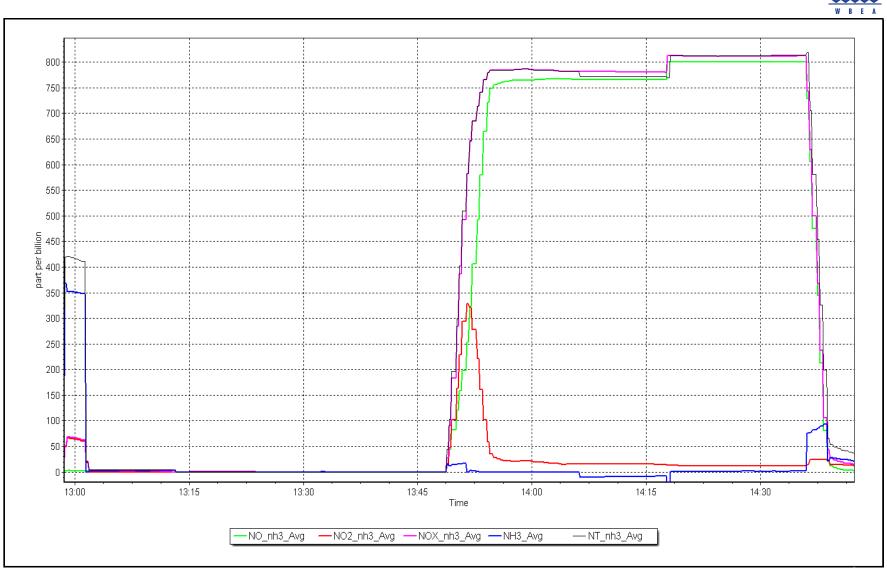




NH₃ Calibration Summary

WBEA					Version-11-202	
		Station	Information			
Calibration Date:	January	13, 2023	Previous Calibration:	Decem	ber 2, 2022	
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	A	MS01	
Start Time (MST):	13	:00	End Time (MST):	ime (MST): 14:40		
Analyzer make:	Teledyne	e API T201	Analyzer serial #:		475	
		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	0.999976	≥0.995	
1801.4	1810.7	0.9948	correlation coernicient	0.999970	20.995	
1001.6	1011.5	0.9902	Slope	1.004278	0.90 - 1.10	
500.8	511.1	0.9798	Slope	1.004278	0.90 - 1.10	
			Intercept	3.834562	+/-20	

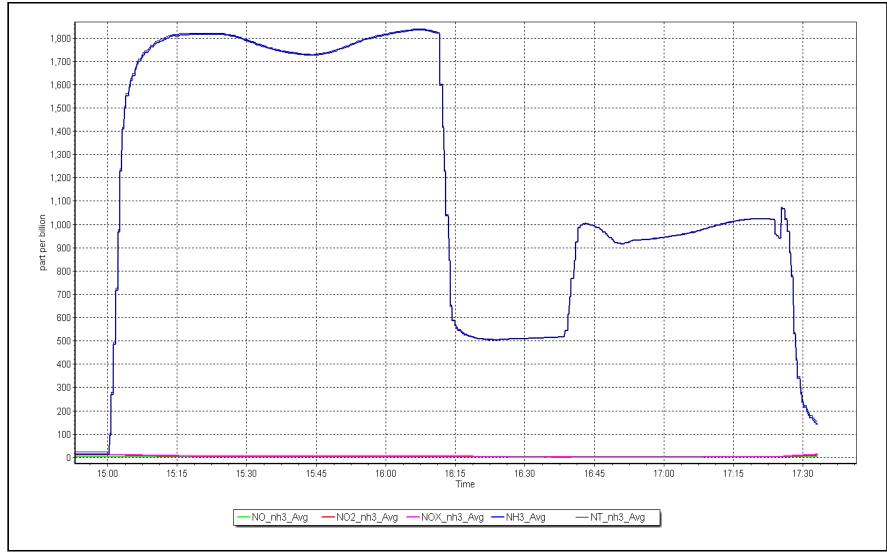




Location: Bertha Ganter-Fort McKay









TN - NO_X - NH_3 Calibration Report

WBEA					Version-11-2021
		Statio	on Information		
Station Name:	Bertha Ganter-Fort	. МсКау	Station number:	AMS01	
NOX Cal Date:	January 26, 2023		Last Cal Date:	N/A	
Start time (MST):	13:00		End time (MST):	15:00	
NH3 Cal Date:	January 26, 2023		Last Cal Date:	N/A	
Start time (MST):	15:00		End time (MST):	17:00	
Reason:	Install	Replaced the i	nstrument		
		Calibra	ation Chandonda		
	50.04		ation Standards	T2)/4 D01	
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: Removed NO Conc:	50.84 50.04	ppm	Removed Cylinder #:	NA NA	
NOX gas Diff:	50.04	ppm	Removed cyl Expiry: NO gas Diff:	NA	
NH3 Cal Gas Conc:	72.93	nnm	NH3 Gas Cylinder #:	CC281298	
	72.93	ppm	NH3 Cal Gas Expiry:	February 28, 2023	
Removed NH3 Conc:	72.93	ppm	Removed Cylinder #:	1 Col dal y 20, 2025	
NH3 gas Diff:	12.35	2211	Removed cyl Expiry:		
Calibrator Model:	Teledyne	e API T700	Serial Number:	3565	
ZAG make/model:		e API T701	Serial Number:	5609	
	-				
		Δnalv	zer Information		
Analyzor model	: Teledyne API T201		Analyzer serial #:	56	
	: Teledyne API T501	L	Converter serial #		
NH3 Range (ppb)	-		Reaction cell Press:		
NOX Range (ppb)			Sample Flow:		
100/(101/8c (pps)		Finish	Sample How		Finich
NO coefficient	: N/A	0.793	TN coefficient:	: N/A	<u>Finish</u> 0.806
NOX coefficient		0.804	NO bkgrnd:		-1.500
NO2 coefficient		1.000	NOX bkgrnd:		-0.400
NH3 coefficient		0.919	TN bkgrnd:		3.100
	,,,,	0.010			5.100
		Calibr	ation Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	N/A		1.001644	
NO _x Cal Offset	:	N/A		-0.440000	
NO Cal Slope	:	N/A		1.001856	
NO Cal Offset	:	N/A		-1.080000	
NO ₂ Cal Slope	:	N/A		0.999297	
NO ₂ Cal Offset	:	N/A		0.756159	
NH3 Cal Slope	:	N/A		0.988888	
NH3 Cal Offset	:	N/A		14.116543	
TN Cal Slope	:	N/A		0.996806	
TN Cal Offset	:	N/A		16.482567	



TN - NOX - NH₃ Calibration Report

Version-11-2021

				Diluti	on Calibration	Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero										
as found NO										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.3	0.2		
high NO point	4920	80.0	813.4	813.4		813.1	815.0	-2.0	1.000	
NO/O3 point										
as found NH3										
new NH3 cyl rp										
first NH3	3413	86.4	1800.6		1800.6	1794.1		1778.7	1.004	1.012
second NH3	3452	48.0	1000.2		1000.2	1042.4		1031.0	0.960	0.970
third NH3	3476	24.0	500.1		500.1	519.3		510.8	0.963	0.979
							Average C	Correction Factor	1.0004	0.9872
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 C	Converter Efficie	ncy = N/A						* = > +/-5% change i	nitiates investigati	ion

Dilution Calibration Data

NH3 Current Converter Efficiency = 91.9%



NO_x - NO - NO₂ Calibration Report

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Version-11-2021

				Dilutio	on 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										
as found span										
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.5		
high point	4920	80.0	813.4	800.6	813.4	815.0	801.9	813.1	0.9981	0.9984
second point	4960	40.0	406.7	400.3	406.7	405.7	398.8	405.9	1.0025	1.0038
third point	4980	20.0	203.4	200.2	203.4	203.1	198.4	200.9	1.0013	1.0089
							Average C	orrection Factor	1.0006	1.0037
Baseline Corr As	fnd TN =	NA ppb	NO _x = NA	ppb NO =	NA ppb			*Percent Change	e TN =	NA
Previous Respor	nse TN =	NA ppb	NO _x = NA	ppb NO =	NA ppb			*Percent Change	e NO _x =	NA
								*Percent Change	e NO =	NA
								* = > +/-5% change i	nitiates investigati	on

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

Notes:

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

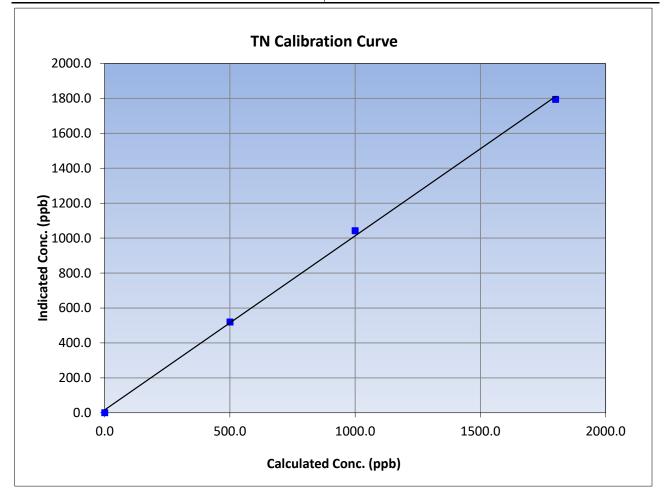
Calibration Performed By:

Max Farrell



TN Calibration Summary

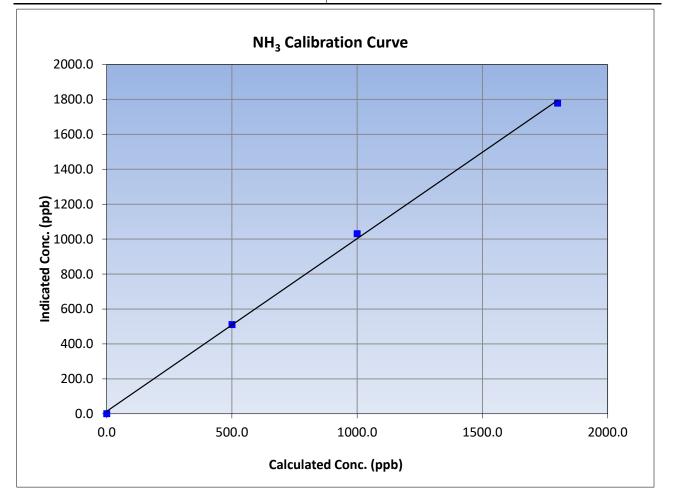
					Version-11-20
		Station	Information		
Calibration Date:	January	26, 2023	Previous Calibration:		N/A
Station Name:	Bertha Gante	er-Fort McKay	Station Number:		AMS01
Start Time (MST):	13	:00	End Time (MST):	15:00	
Analyzer make:	Teledyne	API T201E	Analyzer serial #:	56	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999199	≥0.995
1800.6	1794.1	1.0036	Correlation Coefficient	0.999199	20.995
1000.2	1042.4	0.9595	Slope	0.996806	0.90 - 1.10
500.1	519.3	0.9630	Slope	0.990800	0.90 - 1.10
			Intercept	16.482567	+/-20





NH₃ Calibration Summary

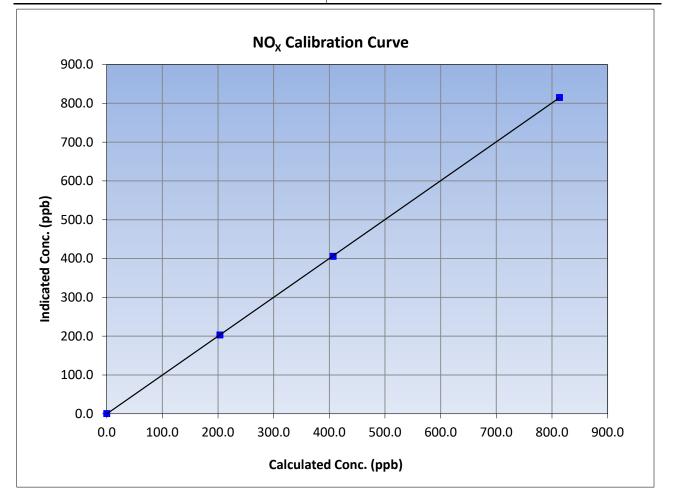
WBEA					Version-11-202
		Station	Information		
Calibration Date:	January 26, 2023		Previous Calibration:		N/A
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01
Start Time (MST):	13:00		End Time (MST):		15:00
Analyzer make:	nalyzer make: Teledyne API T201E				56
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibration factor (Cc/lc)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999290	≥0.995
1800.6	1778.7	1.0123	correlation coefficient	0.999290	20.335
1000.2	1031.0	0.9701	Slope	0.988888	0.90 - 1.10
500.1	510.8	0.9790		0.988888	0.50 1.10
			Intercept	14.116543	+/-20





NO_x Calibration Summary

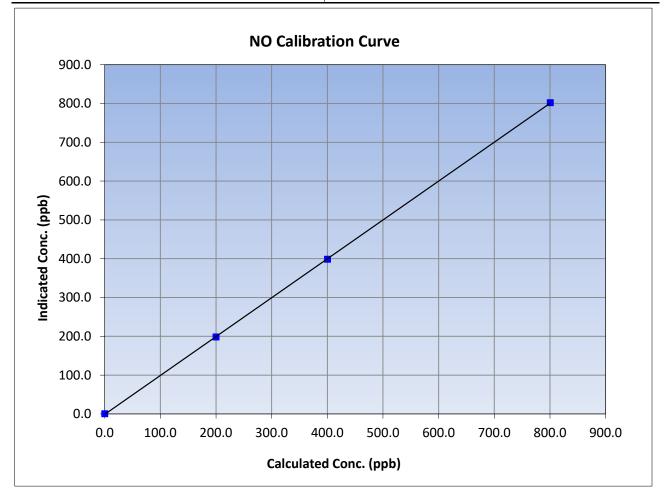
WBEA					Version-11-202	
		Station	Information			
Calibration Date:	January 26, 2023		Previous Calibration:		N/A	
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01	
Start Time (MST):	13:00		End Time (MST): 15:00		15:00	
Analyzer make: Teledyne API T201E			Analyzer serial #:		56	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Ic) Statistical Evaluation		<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999993	≥0.995	
813.4	815.0	0.9981	correlation coernelent	0.9999993	20.333	
406.7	405.7	1.0025	- Slope	1.001644	0.90 - 1.10	
203.4	203.1	1.0013		1.001044	0.90 - 1.10	
			Intercept	-0.440000	+/-20	





NO Calibration Summary

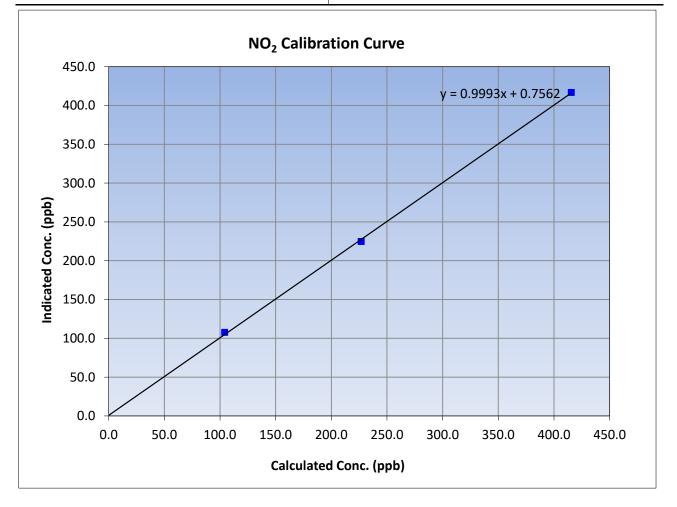
WBEA					Version-11-202	
		Station	Information			
Calibration Date:	January 26, 2023		Previous Calibration:		N/A	
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01	
Start Time (MST):	13:00		End Time (MST):	15:00		
Analyzer make: Teledyne API T201E			Analyzer serial #:		56	
		Calibra	ation 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	0.999985	≥0.995	
800.6	801.9	0.9984	correlation coefficient	0.999985	20.333	
400.3	398.8	1.0038	Clara	1.001856	0.90 - 1.10	
200.2	198.4	1.0089	Slope	1.001850	0.90 - 1.10	
			Intercept	-1.080000	+/-20	





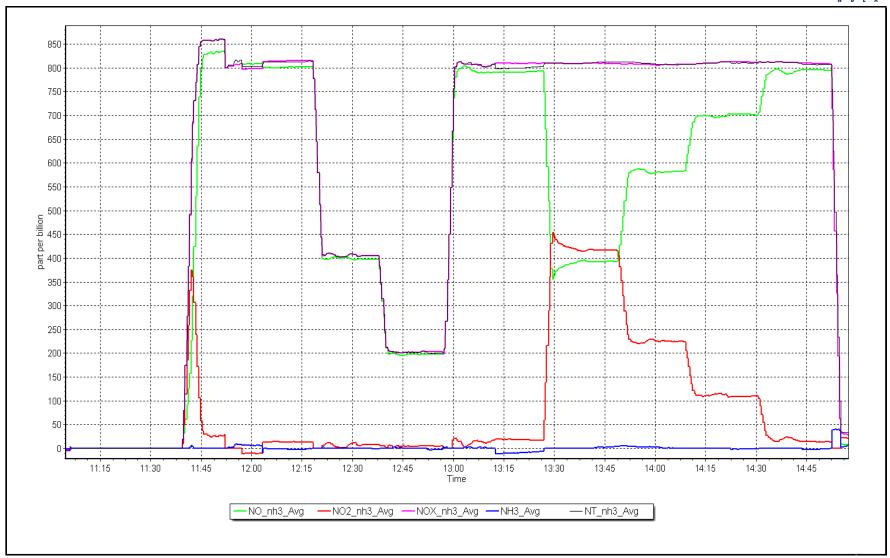
NO₂ Calibration Summary

WBEA					Version-11-202	
		Station	Information			
Calibration Date:	January 26, 2023		Previous Calibration:		N/A	
Station Name:	Bertha Ganter-Fort McKay		Station Number:		AMS01	
Start Time (MST):	13:00		End Time (MST):		15:00	
Analyzer make: Teledyne API T201E			Analyzer serial #:		56	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	c) Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999839	≥0.995	
415.6	416.8	0.9971	correlation coefficient	0.999839	20.995	
226.8	224.8	1.0089	Clana	0.999297	0.90 - 1.10	
104.2	107.6	0.9684	Slope	0.999297	0.90 - 1.10	
			Intercept	0.756159	+/-20	











Location: Bertha Ganter-Fort McKay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Mildred Lake January 3, 2023 11:03 Routine		Station number: Last Cal Date: End time (MST):	AMS02 December 5, 2022 13:53	
		Calibration Sta	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 #: Calibrator Make/Model:	NA API T700		Diff between cyl: Serial Number:	1185	
ZAG Make/Model:	API 1700 API 1701		Serial Number:	5608	
	,			5000	
		Analyzer Infor	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	JC1404901075	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997165	0.996082	Backgd or Offset:	17.6	17.8
Calibration intercept:	-0.305608	-0.526045	Coeff or Slope:	0.816	0.816
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.1	
as found span	4920	80.2	801.6	794.3	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	
high point	4920	80.2	801.6	798.6	1.004
second point	4960	40.1	400.8	397.9	1.007
third point	4980	20.0	199.9	197.8	1.011
as left zero	5000	0.0	0.0	0.2	
as left span	4920	80.2	801.6 Averag	789.6 se Correction Factor	1.015 1.007
Deceline Corr As faural	704.20				
Baseline Corr As found:	794.20	Previous response		*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	

Notes:

Changed inlet filter after as founds. No adjustments needed.

Calibration Performed By:

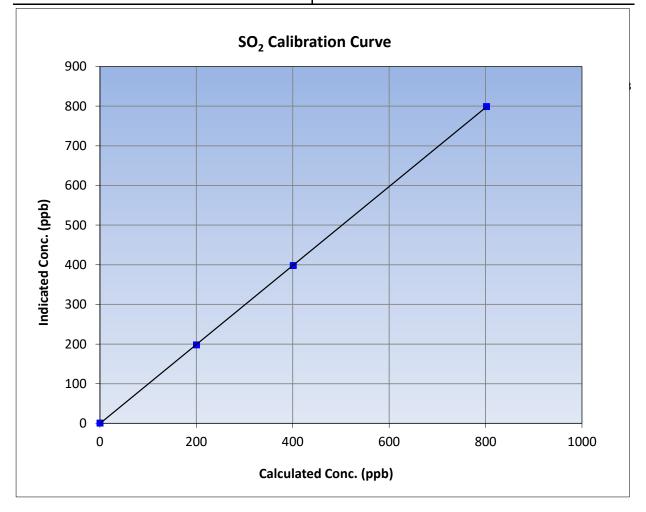


SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: January 3, 2023 **Previous Calibration:** December 5, 2022 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 11:03 End Time (MST): 13:53 Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

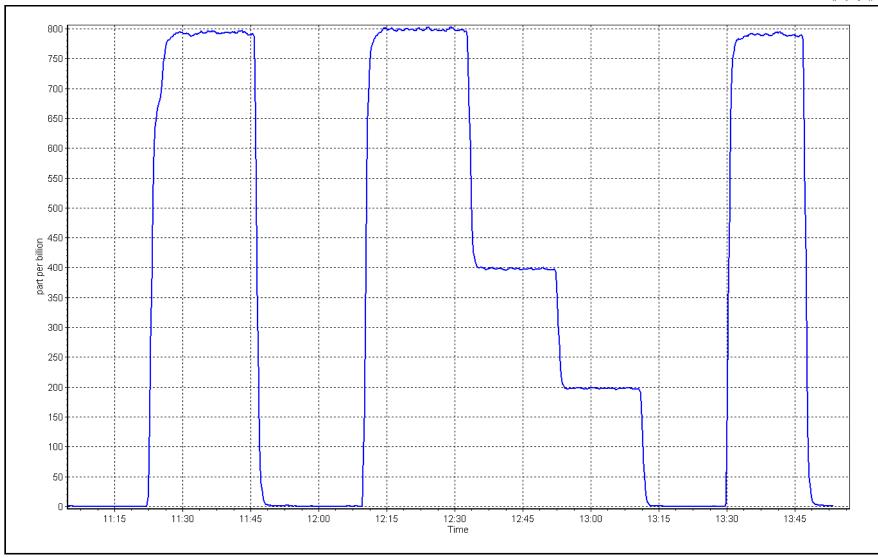
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.5		- Correlation Coefficient	0.999992	≥0.995
801.6	798.6	1.0038		0.999992	20.333
400.8	397.9	1.0074	- Slope	0.996082	0.90 - 1.10
199.9	197.8	1.0107			0.90 - 1.10
			- Intercept	-0.526045	+/-30











H₂S Calibration Report

WBEA					Version-11-2022
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Mildred Lake January 17, 2023 10:31 Routine		Station number: Last Cal Date: End time (MST):	AMS02 December 20, 2022 14:39	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.29 CC345191	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.29 NA	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701		Serial Number: Serial Number:	1185 5608	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	12113311966 2022-198	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.012680	1.010965	Backgd or Offset:	1.88	1.83
Calibration intercept:	-0.239192	-0.179192	Coeff or Slope:	0.887	0.844
		H 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	4924	75.6	80.0	84.7	0.942
as found 2nd point	4962	37.8	40.0	42.4	0.939
as found 3rd point	4981	18.9	20.0	20.7	0.957
new cylinder response					
		H ₂ S Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.1	
high point	4924	75.6	80.0	80.7	0.991
second point	4962	37.8	40.0	40.3	0.992
third point	4981	18.9	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.1	
as left span	4924	75.6	80.0	80.4	0.995
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber cha		12-Sep-22		Ave Corr Factor	0.996
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	84.9	Prev response:	80.77	*% change:	4.9%
Baseline Corr 2nd AF pt:	42.6	AF Slope:	1.062971	AF Intercept:	-0.299150
Baseline Corr 3rd AF pt:	20.9	AF Correlation:	0.999972		
				* = > +/-5% change initiate	es investigation

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

Max Farrell

Calibration Performed By:

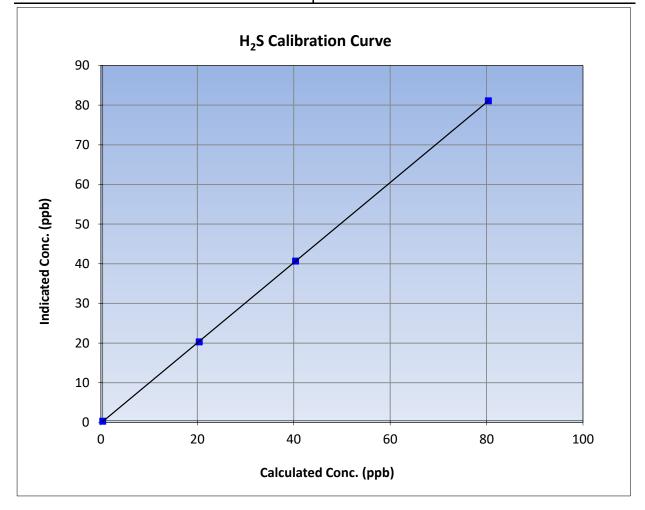


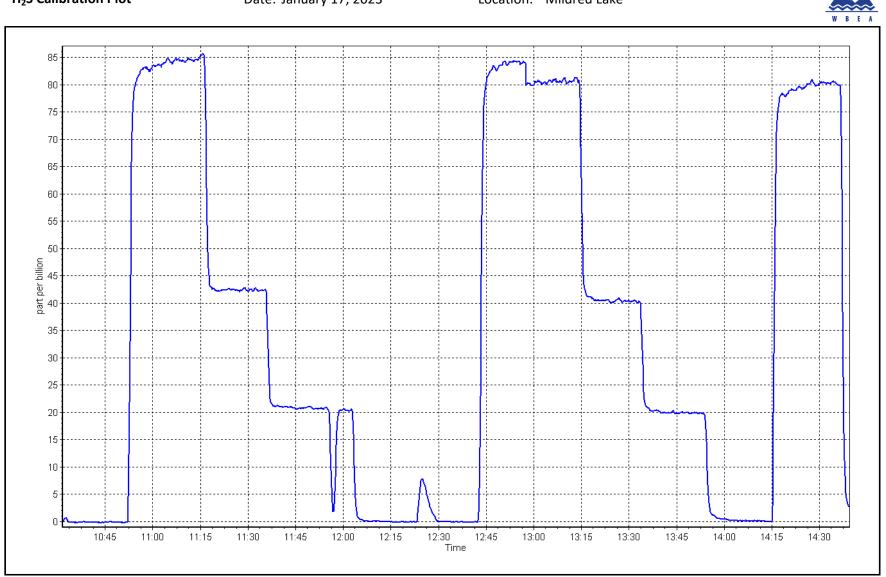
H₂S Calibration Summary

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

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999992	≥0.995
80.0	80.7	0.9912	correlation coefficient	0.999992	20.335
40.0	40.3	0.9924	Slope	1.010965	0.90 - 1.10
20.0	19.9	1.0049	Siope	1.010905	0.90 - 1.10
			Intercept	-0.179192	+/-3





H₂S Calibration Plot

Location: Mildred Lake



THC / CH_4 / NMHC Calibration Report

			Station Inf	ormation		
Station Name: Calibration Date: Start time (MST): Reason:	Mildred Lake January 3, 202 11:03 Routine	3		Station number: Last Cal Date: End time (MST):	December 5, 202	2
			Calibration	Standards		
Gas Cert Reference:		CC501209		Cal Gas Expiry Date:	August 12, 2024	
CH4 Cal Gas Conc.	500.2	ppm		CH4 Equiv Conc.	1048.6	ppm
C3H8 Cal Gas Conc.	199.4	ppm				
Removed Gas Cert:		NA		Removed Gas Expiry:		
Removed CH4 Conc.	500.2	ppm		CH4 Equiv Conc.	1048.6	ppm
Removed C3H8 Conc. Diff between cyl (CH ₄):	199.4	ppm		Diff between cyl (THC): Diff between cyl (NM):		
Calibrator Model:	Teledyne API	Г700		Serial Number:	1185	
ZAG make/model:	Teledyne API	701		Serial Number:	5608	
			Analyzer In	formation		
Analyzer make:	Thermo 55i			Analyzer serial #:	1180320038	
THC Range (ppm):	0 - 20 ppm					
NMHC Range (ppm):	0 - 10 ppm			CH4 Range (ppm):	0 - 10 ppm	
	<u>Start</u>	<u> </u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.87E-04	2.	.87E-04	NMHC SP Ratio:	4.52E-04	4.52E-04
CH4 Retention time:	14.6		14.6	NMHC Peak Area:	194883	194883
Zero Chromatogram:	ON		ON	Flat Baseline:	OFF	OFF

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



THC / CH_4 / NMHC Calibration Report

Version-06-2022

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

CH4 Calibration Data	CH4	Calibration	Data
----------------------	-----	-------------	------

		CIT+ Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.02	8.08	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	8.02	8.07	0.994
second point	4960	40.1	4.01	4.01	1.002
third point	4980	20.0	2.00	1.99	1.008
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.02	8.06	0.995
			A	verage Correction Factor	1.001
Baseline Corr AF:	8.08	Prev response	8.01	*% change	0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.999538		1.003029	
THC Cal Offset:		-0.018717		-0.014898	
CH4 Cal Slope:		1.000755		1.006623	
CH4 Cal Offset:		-0.017454		-0.017040	
NMHC Cal Slope:		0.998193		0.999387	
NMHC Cal Offset:		-0.000864		0.002541	

Notes:

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

Calibration Performed By:

Ryan Power



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	3, 2023	Previous Calibration:	Decembe	r 5, 2022
tation Name:	Mildre	ed Lake	Station Number:	AM	S02
start Time (MST):	11	:03	End Time (MST):	13:	49
analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20038
		Calibra	tion Data		
alculated concentrati (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	lation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
16.82	16.87	0.9972			
8.41 4.19	8.40	1.0009 1.0024	Slope	1.003029	0.90 - 1.10
4.15	4.10	1.0024	Intercept	-0.014898	+/-0.5
16.0 -					
18.0 –		THC Calibratio	n Curve		
16.0 -					
14.0 -					
2.110					
12.0 -					
ud 10.0 -					
<u>d</u> 10.0					
(bbm) 10.0 - 8.0 -					
ndicated – 0.9					
- 0.6 di					
4.0 -					
2.0 +					
0.0 🚽					
0.0) 5	.0	10.0	15.0	20.0
		Calculated	Conc. (ppm)		



CH₄ Calibration Summary

		Station	Information		
Calibration Date:	Janu	ıary 3, 2023	Previous Calibration:	Decembe	r 5, 2022
Station Name:		ldred Lake	Station Number:	AM	
Start Time (MST):		11:03	End Time (MST):	13:	
Analyzer make:		nermo 55i	Analyzer serial #:	11803	
,			,		
		Calibra	ation Data		
Calculated concentrat (ppm) (Cc)	ion Indicated concentrat (ppm) (Ic)	ion Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999977	≥0.995
8.02	8.07	0.9942			
4.01 2.00	4.01	<u> </u>	Slope	1.006623	0.90 - 1.10
2.00	1.55	1.0000	- Intercept	-0.017040	+/-0.5
8.0 - 7.0 -					
6.0 -					
(bbm) 5.0 - Conc: (bbm)					
оиоор 4.0-					
ndicated					
- 0.0 - 100					
2.0 -	0 2.0) 4.0	6.0	8.0	10.0

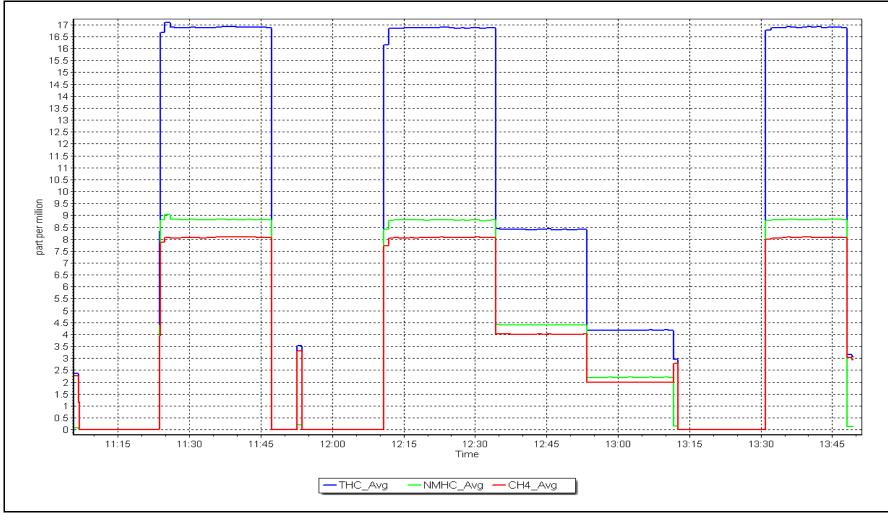


NMHC Calibration Summary

(ppm) (C	e: MST): ke:	Mildr 1	ry 3, 2023 red Lake 1:03 rmo 55i	Previous Calibration: Station Number: End Time (MST):	Decembe AMS 13:	502
tart Time (N nalyzer mal calculated conc (ppm) (C	MST): ke:	1	1:03	End Time (MST):		
nalyzer mal Calculated conc (ppm) (C	ke:				13:	10
alculated conc (ppm) (C	centration	Theı	rmo 55i	Analyzar carial #		49
(ppm) (C				Analyzer serial #:	11803	20038
(ppm) (C			Calibra	ntion Data		
	LC)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Ev	aluation	<u>Limits</u>
0.00		0.00		Correlation Coefficient	0.999999	≥0.995
8.80 4.40		8.79 4.40	<u>1.0004</u> 1.0004			
2.19		2.20	0.9975	Slope	0.999387	0.90 - 1.10
				Intercept	0.002541	+/-0.5
8. 7.	.0 .0 .0					
dd)	.0					
5 .	.0 —					
	.0					
4 Indicated	.0 —					
2.	.0 —					
1	.0 —					
0	.0 🖌					
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculator	d Conc. (ppm)		

NMHC Calibration Plot







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint January 12, 2023 10:40 Routine		Station number: Last Cal Date: End time (MST):	AMS04 December 13, 2022 13:09	
		Calibration St	andards		
Cal Gas Concentration:	50.02	ppm	Cal Gas Exp Date:	September 9, 2028	
Cal Gas Cylinder #:	CC470284				
Removed Cal Gas Conc:	50.02	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:	2445	
Calibrator Make/Model:	API T700		Serial Number:	2445	
ZAG Make/Model:	API T701		Serial Number:	5611	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	JC1327300932	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001942	0.998800	Backgd or Offset:	21.5	21.5
Calibration intercept:	0.880000	0.680000	Coeff or Slope:	0.869	0.869
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	Correction factor (Cc/I
		, and the second s		(ppb) (Ic)	
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)		<i>Limit = 0.95-1.05</i>
Set Point as found zero	(sccm) 5000	(sccm) 0.0	0.0	0.4	Limit = 0.95-1.05
		· · ·			
as found zero as found span as found 2nd point	5000	0.0	0.0	0.4	
as found zero as found span	5000	0.0	0.0	0.4	
as found zero as found span as found 2nd point as found 3rd point new cylinder response	5000 4920	0.0 80.0	0.0 800.3	0.4 800.3	
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4920 5000	0.0 80.0 0.0	0.0 800.3 0.0	0.4 800.3 0.5	 1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	5000 4920 5000 4920	0.0 80.0 0.0 80.0	0.0 800.3 0.0 800.3	0.4 800.3 0.5 800.0	 1.000 1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	5000 4920 5000 4920 4920 4960	0.0 80.0 0.0 80.0 40.0	0.0 800.3 0.0 800.3 400.2	0.4 800.3 0.5 800.0 400.3	 1.000 1.000 1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	5000 4920 5000 4920 4920 4960 4980	0.0 80.0 0.0 80.0 40.0 20.0	0.0 800.3 0.0 800.3 400.2 200.1	0.4 800.3 0.5 800.0 400.3 200.8	 1.000 1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	5000 4920 5000 4920 4920 4960 4980 5000	0.0 80.0 0.0 80.0 40.0 20.0 0.0	0.0 800.3 0.0 800.3 400.2 200.1 0.0	0.4 800.3 0.5 800.0 400.3 200.8 0.5	 1.000 1.000 1.000 0.996
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	5000 4920 5000 4920 4920 4960 4980	0.0 80.0 0.0 80.0 40.0 20.0	0.0 800.3 0.0 800.3 400.2 200.1 0.0 800.3	0.4 800.3 0.5 800.0 400.3 200.8 0.5 800.5	 1.000 1.000 1.000 0.996 1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	5000 4920 5000 4920 4920 4960 4980 5000	0.0 80.0 0.0 80.0 40.0 20.0 0.0	0.0 800.3 0.0 800.3 400.2 200.1 0.0 800.3	0.4 800.3 0.5 800.0 400.3 200.8 0.5	 1.000 1.000 1.000 0.996
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span	5000 4920 5000 4920 4920 4960 4980 5000	0.0 80.0 0.0 80.0 40.0 20.0 0.0 80.0	0.0 800.3 0.0 800.3 400.2 200.1 0.0 800.3 Average	0.4 800.3 0.5 800.0 400.3 200.8 0.5 800.5	 1.000 1.000 1.000 0.996 1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	5000 4920 5000 4920 4960 4960 4980 5000 4920	0.0 80.0 0.0 80.0 40.0 20.0 0.0	0.0 800.3 0.0 800.3 400.2 200.1 0.0 800.3 Averag 802.75	0.4 800.3 0.5 800.0 400.3 200.8 0.5 800.5 ge Correction Factor	 1.000 1.000 1.000 0.996 1.000 0.999

No Maintenance or adjustments done.

Calibration Performed By:

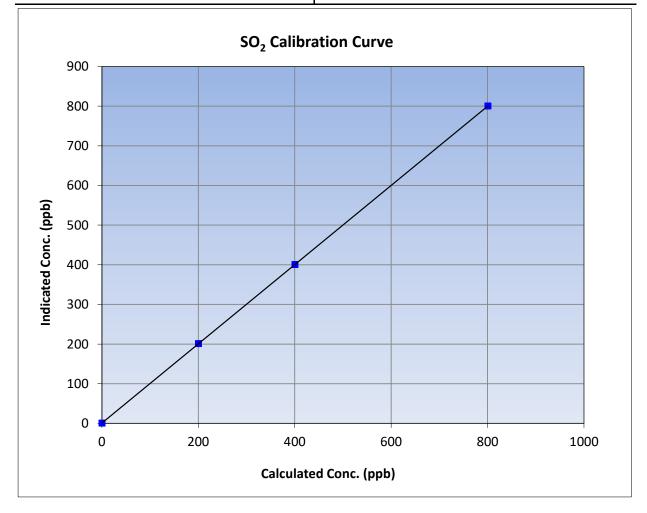


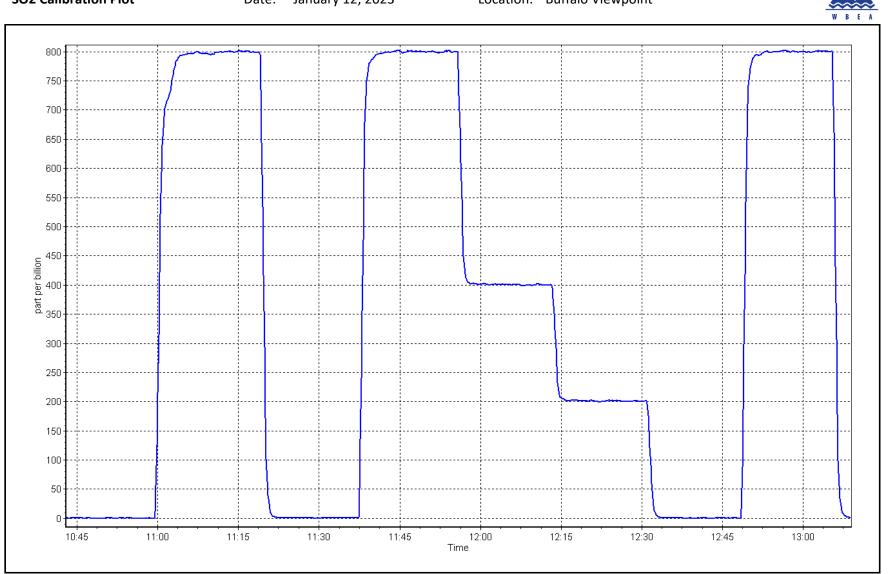
SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: January 12, 2023 **Previous Calibration:** December 13, 2022 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 7:45 End Time (MST): 13:09 Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5		Correlation Coefficient	1.000000	≥0.995
800.3	800.0	1.0004	correlation coefficient	1.000000	20.995
400.2	400.3	0.9997	Slope	0.998800	0.90 - 1.10
200.1	200.8	0.9964	Slope	0.998800	0.90 - 1.10
			Intercept	0.680000	+/-30





Location: Buffalo Viewpoint



H₂S Calibration Report

WBEA		-		•	Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint January 16, 2023 7:25 Routine		Station number: Last Cal Date: End time (MST):	AMS04 December 8, 2022 13:09	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.42 CC345266	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.42 CC345266	ppm	Rem Gas Exp Date: Diff between cyl:	January 4, 2025	
Calibrator Make/Model: ZAG Make/Model:			Serial Number: Serial Number:	3060 362	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450i NA 0 - 100 ppb		Analyzer serial #: Converter serial #:	1336160094 NA	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.003620	1.000770	Backgd or Offset:	17.9	20.1
Calibration intercept:	-0.197849	0.002271	Coeff or Slope:	1.074	1.119
		H 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	0.2	
as found span	4926	74.1	80.3	81.5	0.988
as found 2nd point	4963	37.0	40.1	40.6	0.993
as found 3rd point	4982	18.5	20.1	20.5	0.988
new cylinder response			-		
		H ₂ S Calibrat	ion Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction facto
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	concentration (ppb) (Ic)	(Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.1	
high point	4926	74.1	80.3	80.3	1.000
second point	4963	37.0	40.1	40.3	0.995
third point			.0.2		0.998
	4982		20.1	20.1	
	4982 5000	18.5	20.1	-0.2	
as left zero	5000	18.5 0.0	0.0	-0.2	
as left zero as left span		18.5			
as left zero as left span O2 Scrubber Check	5000 4926 4920	18.5 0.0 74.1	0.0 80.3	-0.2 80.5	 0.998
as left zero as left span 602 Scrubber Check Date of last scrubber cha	5000 4926 4920 inge:	18.5 0.0 74.1	0.0 80.3	-0.2 80.5 -0.2 Ave Corr Factor	 0.998
as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter eff	5000 4926 4920 Inge: ficiency test:	18.5 0.0 74.1 80.0	0.0 80.3 800.0	-0.2 80.5 -0.2 Ave Corr Factor	0.998 0.998 efficiency
as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter eff Baseline Corr As found:	5000 4926 4920 Inge: ficiency test: 81.3	18.5 0.0 74.1 80.0 Prev response:	0.0 80.3 800.0 80.42	-0.2 80.5 -0.2 Ave Corr Factor *% change:	0.998 0.998 efficiency 1.1%
as left zero	5000 4926 4920 Inge: ficiency test:	18.5 0.0 74.1 80.0	0.0 80.3 800.0 80.42 1.011872	-0.2 80.5 -0.2 Ave Corr Factor	0.998 0.998 efficiency

Notes:

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

Calibration Performed By:

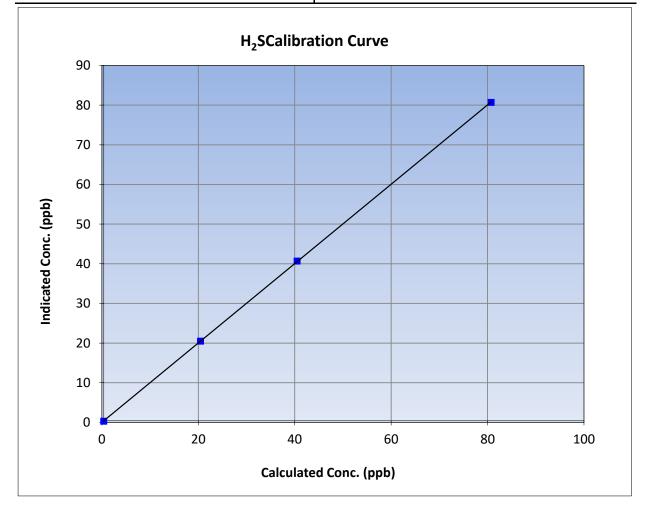


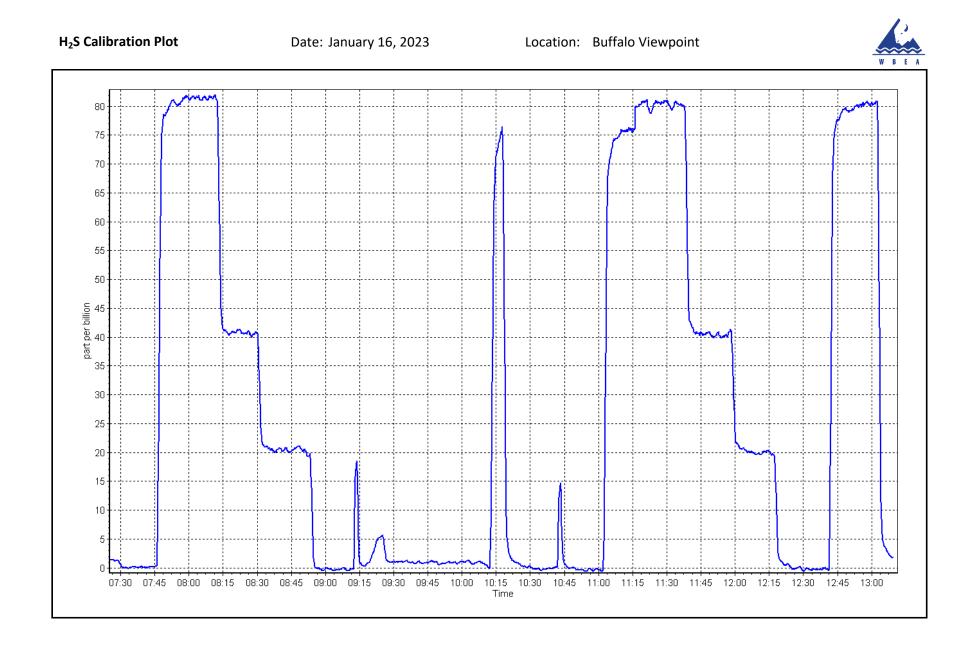
H₂S Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	January 16, 2023	Previous Calibration:	December 8, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	7:25	End Time (MST):	13:09
Analyzer make:	Thermo 450i	Analyzer serial #:	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999988	≥0.995
80.3	80.3	1.0003	correlation coefficient	0.999988	20.333
40.1	40.3	0.9952	Slopo	1.000770	0.90 - 1.10
20.1	20.1	0.9976	– Slope	1.000770	0.30 - 1.10
			Intercept	0.002271	+/-3







THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Station	Information		
Station Name:	Buffalo Viewpoi	nt	Station number: Al	MS04	
Calibration Date:	January 12, 202	3	Last Cal Date: Do	ecember 12, 20	22
Start time (MST):	10:40		End time (MST): 13	3:10	
Reason:	Routine				
		Calibrat	on Standards		
Gas Cert Reference:	C	C470284	Cal Gas Expiry Date: Se	eptember 9, 202	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	r Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 14	126262594	
, THC Range (ppm):			,		
NMHC Range (ppm)			CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 3.070E-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) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.0	17.01	17.21	0.988		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.0	17.01	17.09	0.995		
second point	4960	40.0	8.50	8.38	1.015		
third point	4980	20.0	4.25	4.18	1.017		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.0	17.01	17.04	0.998		
			A	Average Correction Factor	1.009		
Baseline Corr AF:	17.21	Prev response	17.03	*% change	1.0%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

CH4 Calibration Data

		CIT+ Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	7.96	8.08	0.986
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	7.96	8.04	0.991
second point	4960	40.0	3.98	3.89	1.024
third point	4980	20.0	1.99	1.92	1.037
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	7.96	8.02	0.993
			A	verage Correction Factor	1.017
Baseline Corr AF:	8.08	Prev response	7.99	*% change	1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.005447		1.005648	
THC Cal Offset:		-0.066000		-0.070000	
CH4 Cal Slope:		1.011020		1.011450	
CH4 Cal Offset:		-0.058000		-0.062000	
NMHC Cal Slope:		0.999400		1.001675	
NMHC Cal Offset:		-0.006000		-0.010000	

Notes:

No maintenance or adjustments done.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	12, 2023	Previous Calibration:	December	12, 2022
Station Name:		/iewpoint	Station Number:	AM	
Start Time (MST):		:40	End Time (MST):	13:	10
Analyzer make:	Thern	no 55i	Analyzer serial #:	14262	62594
-					
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	(ppm) (lc)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999881	≥0.995
17.01	17.09 8.38	0.9951			
8.50 4.25	4.18	1.0147 1.0172	Slope	1.005648	0.90 - 1.10
1.23	1.10	1.0172	Intercept	-0.070000	+/-0.5
18.0					
16.0					
14.0					
12.0					
u d 10.0					
0.01 (bbm)					
cated - 0.6					
ip u 4.0					
2.0					
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

			Station I	nformation		
Calibration	Date:	Januarv	12, 2023	Previous Calibration:	December	· 12, 2022
Station Na			viewpoint	Station Number:	AM	
Start Time):40	End Time (MST):	13:	
Analyzer m			mo 55i	Analyzer serial #:	14262	
			Calibra	tion Data		
Calculated co (ppm)		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.0		0.00 8.04	0.9906	Correlation Coefficient	0.999641	≥0.995
3.9		3.89	1.0238			
1.9		1.92	1.0371	Slope	1.011450	0.90 - 1.10
				Intercept	-0.062000	+/-0.5
	8.0 7.0 6.0					
c. (ppm	5.0					
d Cone	4.0					
Indicated Conc. (ppm)	3.0					
	2.0					
	1.0					
	0.0	2.0	4.0	6.0	8.0	10.0
	0.0	2.0	4.0		0.0	10.0
			Calculated	l Conc. (ppm)		

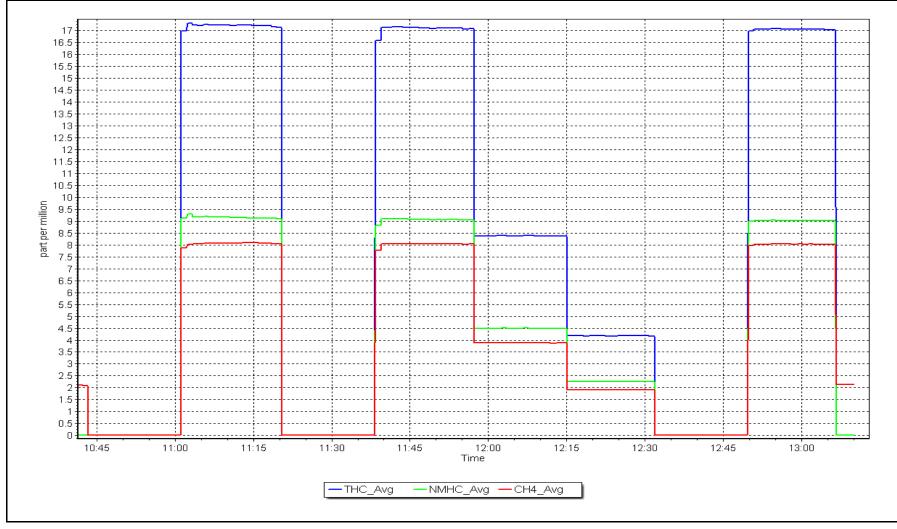


NMHC Calibration Summary

			Station I	nformation		
Calibratio	on Date:	January	12, 2023	Previous Calibration:	December	12, 2022
Station N	ame:	Buffalo \	/iewpoint	Station Number:	AMS	504
Start Time	e (MST):	10):40	End Time (MST):	13:	10
Analyzer	make:	Therr	mo 55i	Analyzer serial #:	14262	62594
			Calibra	ition Data		
	concentration n) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
	.00	0.00		Correlation Coefficient	0.999975	≥0.995
	.04 .52	9.06 4.49	0.9980			
		2.26	1.0003	Slope	1.001675	0.90 - 1.10
				Intercept	-0.010000	+/-0.5
(-	8.0 7.0 6.0					
Conc. (ppm)	5.0					
Cone	5.0					
	4.0					
Indicated	3.0					
	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0









$NO_X \setminus NO \setminus NO_2$ Calibration Report

			Station Information		
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint January 13, 2023 7:12 Routine		Station number: A Last Cal Date: D End time (MST): 1	December 1, 2022	
		C	Calibration Standards		
NO Gas Cylinder #:	T36RH1F		Cal Gas Expiry Date:	August 18, 2023	
NOX Cal Gas Conc:	51.16	ppm	NO Cal Gas Conc:	50.91	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	51.16	ppm	Removed Gas NO Conc:	50.91	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2445	
ZAG make/model:	API T701		Serial Number:	362	
Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> : 1.149 : 1.147	<u>F</u> 1 1	Analyzer Information Analyzer serial #: 7 Tinish 1.204 NO bkgnd or offset: 1.203 NOX bkgnd or offset: 1.000 Reaction cell Press:	223 <u>Start</u> -0.3 -0.1 6.8	<u>Finish</u> -0.3 -0.1 6.8
		(Calibration Statistics		
		<u>s</u>	<u>Start</u>	<u>Finish</u>	
NO _x Cal Slope			999214	1.000402	
NO _x Cal Offset		0.4	407361	0.466890	
NO Cal Slope			999207	1.001422	
NO Cal Offset			832949	-0.653871	
NO ₂ Cal Slope			995503	1.000220	
NO ₂ Cal Offset	:	1.6	527827	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/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.7	0.0	0.7		
as found span	4922	78.1	799.1	795.2	3.9	764.6	757.7	6.9	1.0451	1.0495
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.6	-0.2		
high point	4922	78.1	799.1	795.2	3.9	800.1	796.2	3.9	0.9988	0.9987
second point	4961	39.1	400.1	398.1	2.0	400.0	397.7	2.4	1.0002	1.0010
third point	4981	19.5	199.5	198.5	1.0	200.6	196.7	3.9	0.9945	1.0093
as left zero	5000	0.0	0.0	0.0	0.0	1.4	1.4	0.0		
as left span	4922	78.1	799.1	368.2	430.9	799.0	365.4	433.6	1.0001	1.0077
							Average C	orrection Factor	0.9978	1.0030
Corrected As fo	ound NO _x =	763.9 ppb	NO =	757.7 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	-4.6%
Previous Respo	onse NO _x =	798.9 ppb	NO =	793.7 ppb				*Percent Chang	ge NO =	-4.8%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

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

Notes:

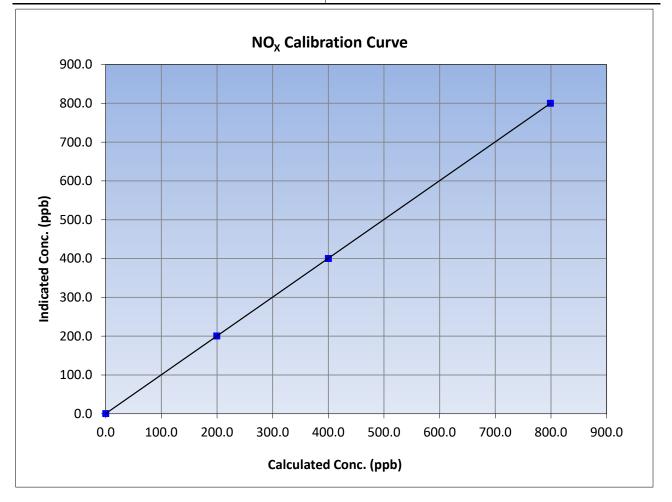
Pump and charcoal was changed recently. Diagnostics similar to last months. Span adjusted. No Maintenance done.

Calibration Performed By:



NO_x Calibration Summary

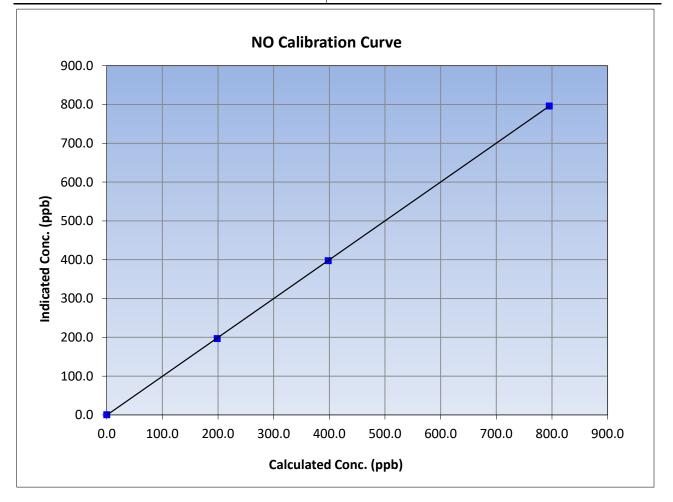
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	January	13, 2023	Previous Calibration: Dece		oer 1, 2022	
Station Name:	Buffalo Viewpoint		Station Number: AM		v1S04	
Start Time (MST):	7:12		End Time (MST):	1	2:19	
Analyzer make:	ake: API T200		Analyzer serial #:		723	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999998	≥0.995	
799.1	800.1	0.9988	correlation coernelent	0.555555	20.333	
400.1	400.0	1.0002	Slope	1.000402	0.90 - 1.10	
199.5	200.6	0.9945	Slope	1.000402	0.90 - 1.10	
			Intercept	0.466890	+/-20	





NO Calibration Summary

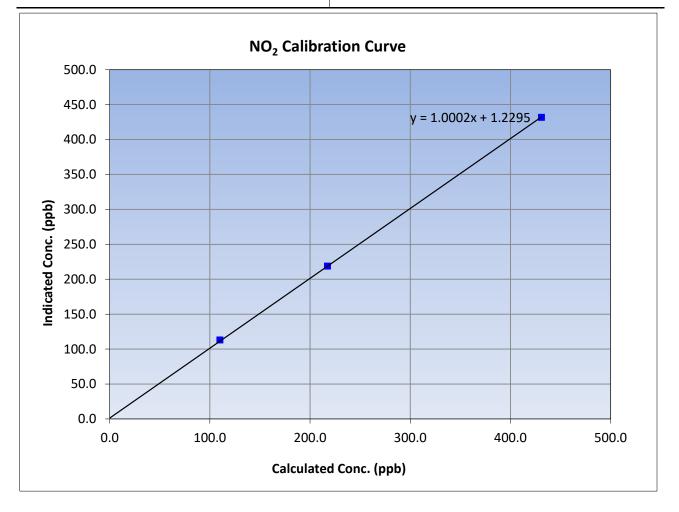
WBEA		Station	Information		Version-04-2	
Calibration Date: Station Name:	January 13, 2023 Buffalo Viewpoint		Previous Calibration: Station Number:		December 1, 2022 AMS04	
Start Time (MST):	7:12		End Time (MST):	1	2:19	
Analyzer make:	API T200		Analyzer serial #:		723	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.6		Correlation Coefficient	0.999988	≥0.995	
795.2	796.2	0.9987	correlation coefficient	0.999900	20.333	
398.1	397.7	1.0010	Slope	1.001422	0.90 - 1.10	
198.5	196.7	1.0093	Slope	1.001422	0.90 - 1.10	
			Intercept	-0.653871	+/-20	

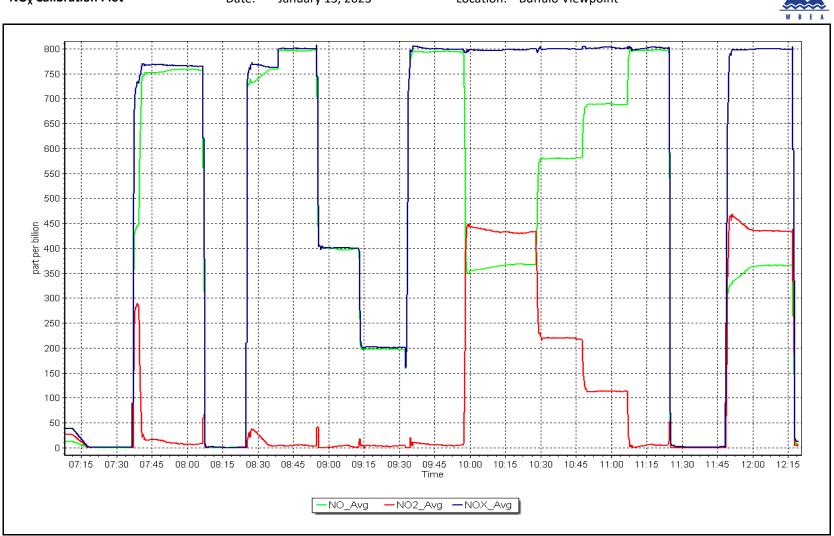




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	13, 2023	Previous Calibration:	Decemb	per 1, 2022
Station Name:	Buffalo Viewpoint		Station Number: A		VIS04
Start Time (MST):	7:12		End Time (MST): 12		2:19
Analyzer make:	nake: API T200		Analyzer serial #:		723
		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	0.999943	≥0.995
430.9	431.7	0.9982	correlation coefficient	0.555545	20.333
217.4	218.8	0.9936	Slope	1.000220	0.90 - 1.10
110.0	113.1	0.9726	Siope	1.000220	0.30 - 1.10
			Intercept	1.229528	+/-20





NO_x Calibration Plot

Date: January 13, 2023

Location: Buffalo Viewpoint



O₃ Calibration Report

Version-01-2020

					version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint January 12, 2023 8:07 Routine		Station number: Last Cal Date: End time (MST):	December 13, 2022	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer API T700 API T701		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	2961	
Calibration slope: Calibration intercept:	<u>Start</u> 0.993086 2.760000	<u>Finish</u> 0.992571 2.700000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> -3.3 1.065
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc, Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	5000	1158.7	400.0	394.3	1.014
as found 2nd point					
as found 3rd point calibrator zero	5000	0.0	0.0	0.9	
high point	5000	1160.3	400.0	399.0	1.003
second point	5000	919.0	200.0	201.6	0.992
third point	5000	787.5	100.0	104.1	0.961
as left zero	5000	0.0	0.0	0.5	
as left span	5000	1159.5	400.0	399.6	1.001
				ge Correction Factor	0.985
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	394.1 NA NA	Previous response AF Slope: AF Correlation:	400.0	*% change AF Intercept:	-1.5%
buschine con sid Ar pt.		A conclution.		* = > +/-5% change initiate	es investigation

Notes:

No maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay

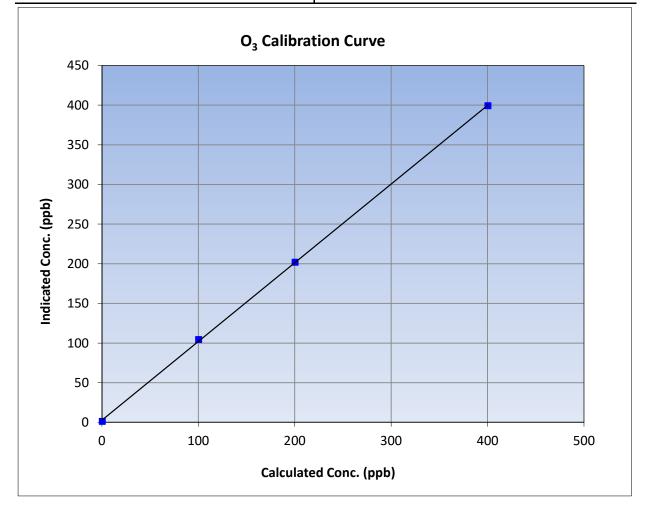


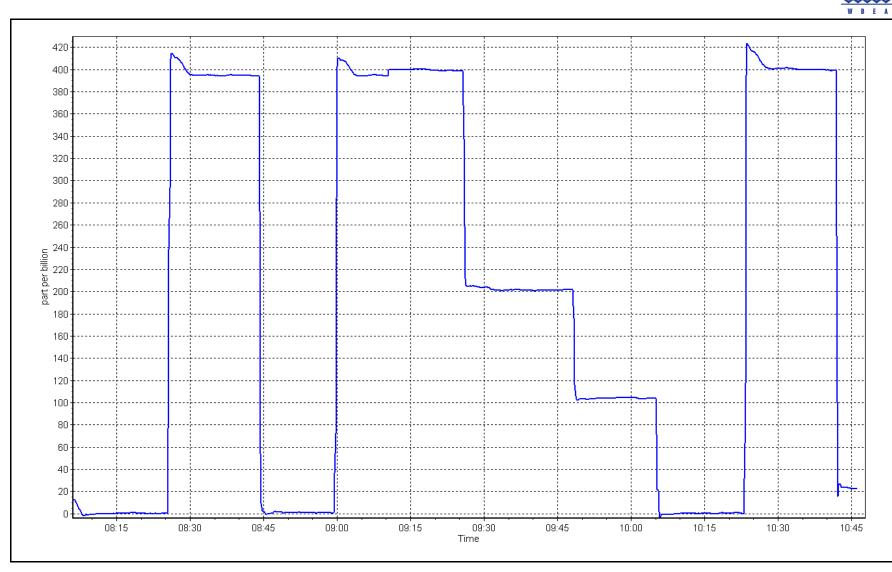
O₃ Calibration Summary

WDEA	Stati	on Information	Version-01-20
Calibration Date:	January 12, 2023	Previous Calibration:	December 13, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	8:07	End Time (MST):	10:46
Analyzer make:	API T400	Analyzer serial #:	2961

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.9		Correlation Coefficient	0.999901	≥0.995
400.0	399.0	1.0025	correlation coefficient	0.999901	20.995
200.0	201.6	0.9921	Slope	0.992571	0.90 - 1.10
100.0	104.1	0.9606	Slope	0.992371	0.30 - 1.10
			- Intercept	2.700000	+/- 5





Location: Buffalo Viewpoint



T640 PM_{2.5} CALIBRATION

W B E A					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Buffalo Viewpoint January 16, 2023 9:35		Station number: AMS (Last Cal Date: Decer End time (MST): 9:58		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 844		
Flow Meter Make/Model:	AliCat		S/N: 22808	35	
Temp/RH standard:	AliCat		S/N: 22808	35	
		Monthly Calibration	Test		
<u>Parameter</u> T (°C) P (mmHg)	<u>As found</u> -6.8 724.3	<u>Measured</u> -6.6 725.6	<u>As left</u> -6.8 724.3	Adjusted	<i>(Limits)</i> +/- 2 °C +/- 10 mmHg
flow (LPM)	5	4.60	5	\checkmark	+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	January 16, 2023 60	Last Cal Date: <u>Dece</u> PM w/ HEPA:	ember 13, 2022 0	
Inlet cleaning :	Inlet Head	 Image: A start of the start of			
		Quarterly Calibration	n 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 Disposable Filte		December 1 December 1			
		Annual Maintenar	nce		
Date Sample Tul	be Cleaned:	September 2	15, 2022		
Date RH/T Sense	or Cleaned:	September 2	15, 2022		
Notes:		Flow Adjust	ed. Inlet head cleaned.		
Calibration by:	Melissa Lemay				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Mannix January 20, 2023 10:09 Routine		Station number: Last Cal Date: End time (MST):	AMS05 December 2, 2022 14:55	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.02 XC026809B	ppm	Cal Gas Exp Date:	January 12, 2029	
Removed Cal Gas Conc: Removed Gas Cyl #:	50.02 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701H		Serial Number: Serial Number:	621 832	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1008841399	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.999415 -0.560000	0.996673 0.800000	Backgd or Offset: Coeff or Slope:	8.9 0.914	8.9 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 ((ppb) (Ic)	Correction factor (Cc/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.0	800.3	797.7	1.003
as found 2nd point as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.0	800.3	797.5	1.004
second point	4960	40.0	400.2	401.9	0.996
third point as left zero	4980 5000	20.0	200.1	199.5 0.2	1.003
as left span	4920	80.0	800.3	802.5	0.997
as ieit spaii	4 <i>3</i> 20	80.0		ge Correction Factor	1.001
Baseline Corr As found:	797.80	Previous response		*% change	-0.2%
	, , , , , , , , , , , , , , , , , , , ,			-	0.270
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

Notes:

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

Calibration Performed By:

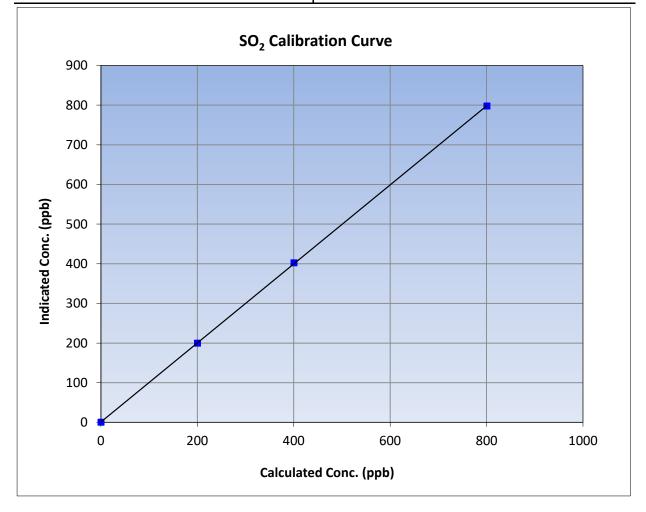


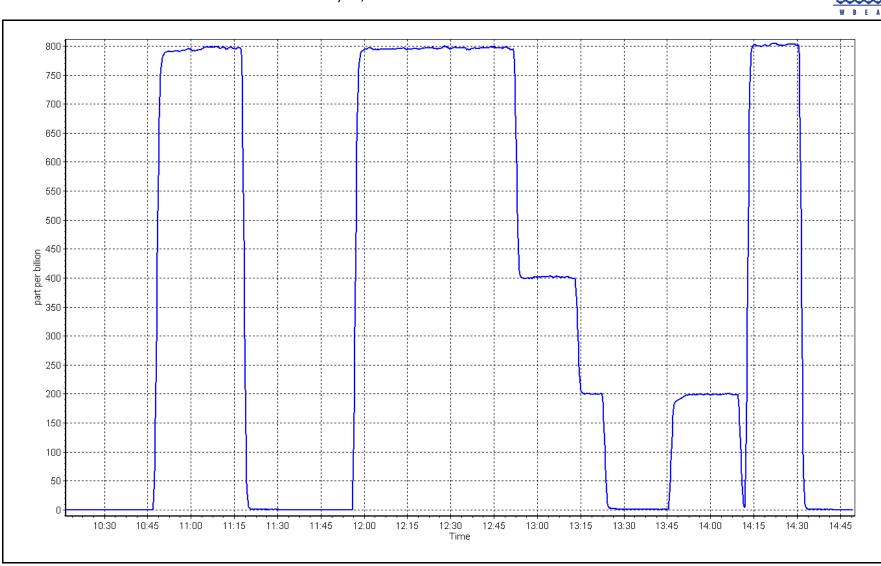
SO₂ Calibration Summary

	Stati	on Information	Version-01-202
Calibration Date:	January 20, 2023	Previous Calibration:	December 2, 2022
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:09	End Time (MST):	14:55
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841399

Calibration Data

Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999980	≥0.995
800.3	797.5	1.0035			
400.2	401.9	0.9957	Slope	0.996673	0.90 - 1.10
200.1	199.5	1.0029			
			- Intercept	0.800000	+/-30







H₂S Calibration Report

WDEA		2		•	
WBEA					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Mannix January 3, 2023 10:25 Routine		Station number: Last Cal Date: End time (MST):	AMS05 December 8, 2022 15:15	
		Calibration S	tandards		
Cal Gas Concentration:	4.92	ppm	Cal Gas Exp Date:	February 9, 2024	
Cal Gas Cylinder #:	EY0002433				
Removed Cal Gas Conc:	4.92	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	1845	
ZAG Make/Model:	API T701H		Serial Number:	832	
		Analyzer Info	ormation		
Analyzer make:	Thermo 43iQTL		Analyzer serial #:	1203169745	
, Converter make:	Global		Converter serial #:	2022-196	
Analyzer Range	0 - 100 ppb				
-	Ctart	Finish		Start	Finish
Calibration slope:	<u>Start</u> 0.996760	0.998045	Backgd or Offset:		2.09
Calibration intercept:	0.460517	0.340531	Coeff or Slope:	0.846	0.822
calibration intercept.	0.400317	0.340331	coen or slope.	0.840	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 Adjuste Correction facto (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.2	
as found span	4919	81.3	80.0	83.2	0.964
as found 2nd point	4960	40.7	40.0	42.1	0.956
as found 3rd point	4980	20.3	20.0	21.1	0.956
new cylinder response					
		H ₂ S Calibrat	ion Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction facto
Set Point	(sccm)	(sccm)	concentration (ppb)	concentration (ppb) (Ic)	(Cc/Ic)
		()	(Cc)		Limit = 0.95-1.0.
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	81.3	80.0	80.1	0.999
second point	4960	40.7	40.0	40.5	0.989
third point	4980	20.3	20.0	20.2	0.989
as left zero	5000	0.0	0.0	0.5	
			80.0	78.8	1.015
as left span	4919	81.3		-	
as left span 602 Scrubber Check	4920	81.3 80.0	800.0	0.1	
as left span O2 Scrubber Check Date of last scrubber cha	4920 inge:			0.1 Ave Corr Factor	0.992
as left span O2 Scrubber Check Date of last scrubber cha	4920 inge:				
as left span 602 Scrubber Check Date of last scrubber cha Date of last converter ef	4920 inge:	80.0	800.0		0.992 efficiency
as left span 602 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found:	4920 Inge: ficiency test:		800.0	Ave Corr Factor	0.992
	4920 inge: ficiency test: 83.0	80.0 Prev response:	800.0 80.20 1.037326	Ave Corr Factor *% change:	0.992 efficiency 3.4%

Notes:

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

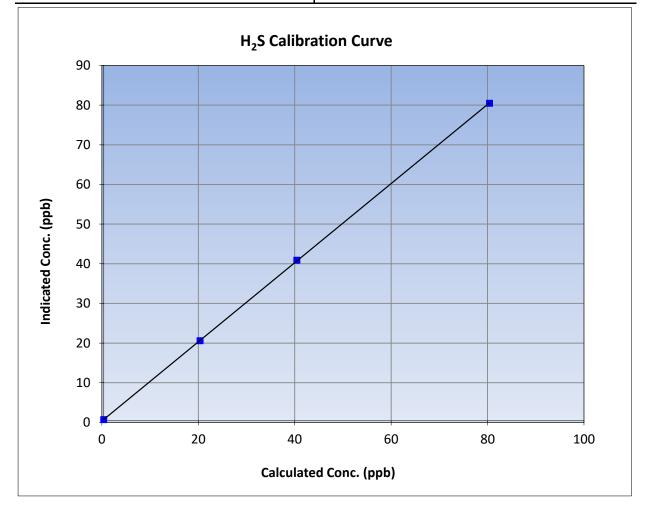


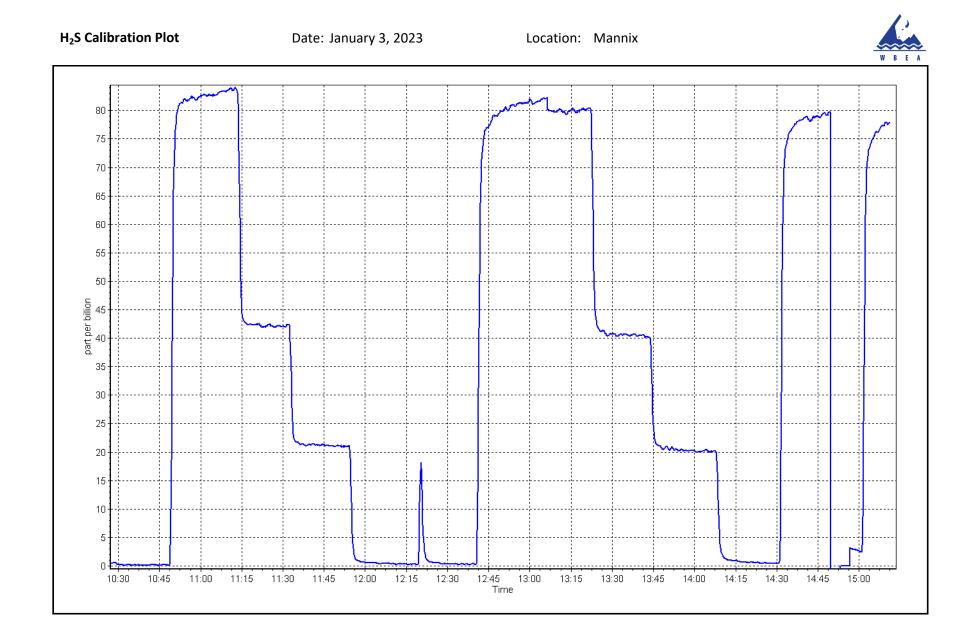
H₂S Calibration Summary

WBEA			Version-11-2021
	Stati	ion Information	
Calibration Date:	January 3, 2023	Previous Calibration:	December 8, 2022
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:25	End Time (MST):	15:15
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1203169745

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999985	≥0.995
80.0	80.1	0.9987	correlation coefficient	0.999985	20.335
40.0	40.5	0.9887	Slope	0.998045	0.90 - 1.10
20.0	20.2	0.9888	Siope		0.90 - 1.10
			- Intercept	0.340531	+/-3







THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Station	Information		
Station Name:	Mannix		Station number: AN	VIS05	
Calibration Date:	January 20, 202	3	Last Cal Date: De	ecember 2, 202	22
Start time (MST):	10:09		End time (MST): 14	1:55	
Reason:	Routine				
		Calibrat	ion Standards		
Gas Cert Reference:	хс	0268098	Cal Gas Expiry Date: Ja	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	21	
ZAG make/model:	API T701H		Serial Number: 83	32	
		Analyze	r Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 11	52430011	
THC Range (ppm):					
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.64E-04	2.57E-04	NMHC SP Ratio:	4.73E-05	4.41E-05
CH4 Retention time:	14.80	15.00	NMHC Peak Area:	193560	207495

THC Calibration Data						
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
as found zero	5000	0.0	0.00	0.00		
as found span	4920	80.0	17.23	18.04	0.955	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	80.0	17.23	17.32	0.995	
second point	4960	40.0	8.61	8.50	1.013	
third point	4980	20.0	4.31	4.31	1.000	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.0	17.23	17.27	0.997	
			A	Average Correction Factor	1.002	
Baseline Corr AF:	18.04	Prev response	17.22	*% change	4.6%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

CH4	Calibration	1 Data
	cumstation	Dutu

		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	8.08	8.27	0.977
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	8.08	8.13	0.993
second point	4960	40.0	4.04	3.97	1.016
third point	4980	20.0	2.02	2.01	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	8.08	8.10	0.997
			Aver	rage Correction Factor	1.004
Baseline Corr AF:	8.27	Prev response	8.08	*% change	2.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000481		1.004873	
THC Cal Offset:		-0.017000		-0.040600	
CH4 Cal Slope:		1.000509		1.006140	
CH4 Cal Offset:		-0.005600		-0.026000	
NMHC Cal Slope:		1.000444		1.003542	
NMHC Cal Offset:		-0.011600		-0.015000	
	Investigated h	nigh span; zero air gene	erator failed during c	alibraiton, and most lik	ely caused the
Notes:	-			ed station temperature	-
				omatogram, and adjust	
o 111					

Calibration Performed By: Karan Pandit



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	20, 2023	Previous Calibration:	Decembe	r 2, 2022
itation Name:	Ma	nnix	Station Number:	AM	S05
Start Time (MST):	10	:09	End Time (MST):	14:	55
Analyzer make:	Thern	no 55i	Analyzer serial #:	11524	30011
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00 17.23	0.00 17.32	 0.9946	Correlation Coefficient	0.999896	≥0.995
8.61	8.50	1.0129	ci.	4 00 4072	
4.31	4.31	0.9999	Slope	1.004873	0.90 - 1.10
			Intercept	-0.040600	+/-0.5
20.0		THC Calibratio	n Curve		
18.0					
16.0					
14.0					
<u> </u>					
ີພຸ 12.0 ອັນ 10.0					
0.8 Indicated					
4.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0
		Calaviatad	l Conc. (ppm)		



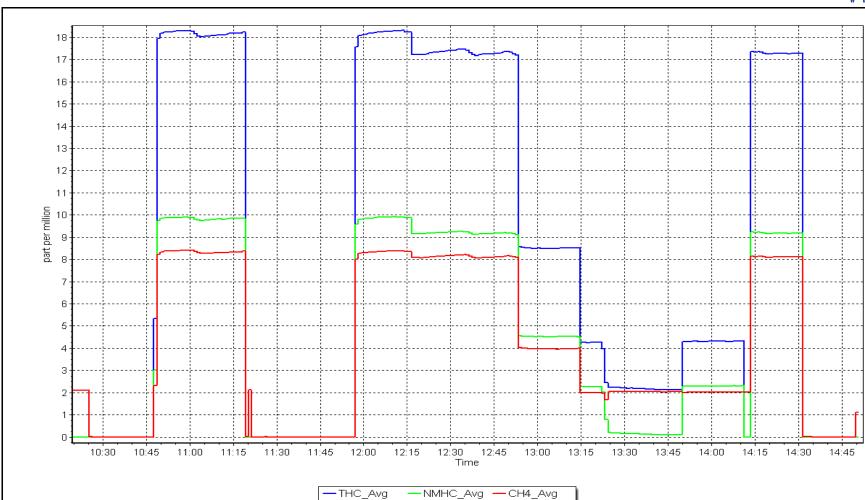
CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	Januar	January 20, 2023		Decembe	r 2, 2022
Station Name:	Μ	annix	Station Number:	AMS	505
Start Time (MST):	1	.0:09	End Time (MST):	14:	55
Analyzer make:	The	rmo 55i	Analyzer serial #:	115243	30011
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	ion Indicated concentration (ppm) (Ic)	۲ Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00 8.08	0.00 8.13	 0.9934	Correlation Coefficient	0.999841	≥0.995
4.04	3.97	1.0164	Slope	1.006140	0.90 - 1.10
2.02	2.01	1.0028	Jupe	1.000140	0.30 - 1.10
			Intercept	-0.026000	+/-0.5
8.0 - 7.0 - 6.0 -					
(ud 5.0 -					
Indicated Conc. (ppm)					
ndicate					
- 2.0 -	/				
1.0 -					
0.0	0 2.0	4.0	6.0	8.0	10.0
			l Conc. (ppm)		



NMHC Calibration Summary

			Station I	nformation		
Calibratior	n Date:	January	/ 20, 2023	Previous Calibration:	Decembe	r 2, 2022
Station Na	ime:	Ma	annix	Station Number:	AM	S05
Start Time	(MST):	1	0:09	End Time (MST):	14:	55
Analyzer n	nake:	Ther	mo 55i	Analyzer serial #:	11524	30011
			Calibra	ition Data		
Calculated co (ppm)		ion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eva	aluation	<u>Limits</u>
	00	0.00		Correlation Coefficient	0.999932	≥0.995
	15 57	9.19 4.53	0.9958			
	29	2.29	0.9978	Slope	1.003542	0.90 - 1.10
	-			Intercept	-0.015000	+/-0.5
	9.0 - 8.0 - 7.0 - 6.0 -					
Indicated Conc. (ppm)	5.0 -					
ited Co	4.0 -					
Indica	3.0 -					
	2.0 -					
	1.0 -					
	0.0	0 2.0	4.0	6.0	8.0	10.0
	0.	5 2.0	4.0	0.0	0.0	10.0
			Calculated	d Conc. (ppm)		



Date: January 20, 2023

Location: Mannix





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS06 PATRICIA MCINNES JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInnes January 9, 2023 10:14 Routine		Station number: Last Cal Date: End time (MST):	AMS06 December 2, 2022 13:09	
		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	PPIII	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	689	
ZAG Make/Model:	API T701		Serial Number:	3566	
	AITI/01		Senar Number.	3300	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1160290013	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.992599	0.992084	Backgd or Offset:	17.2	17.2
Calibration intercept:	1.461745	1.741680	Coeff or Slope:	0.907	0.907
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppb) (Ic)	Correction factor (Cc/I Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.3	
as found span	4920	80.3	799.5	792.2	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.3	799.5	794.1	1.007
second point	4960	40.2	400.2	399.4	1.002
third point	4980	20.1	200.1	202.2	0.990
as left zero	5000	0.0	0.0	-0.1	
as left span	4920	80.3	799.5	796.5	1.004
			Averag	ge Correction Factor	1.000
Baseline Corr As found:	792.50	Previous response	795.01	*% change	-0.3%
Baseline Corr As found: Baseline Corr 2nd AF pt:	792.50 NA	Previous response AF Slope:		*% change AF Intercept:	-0.3%

Notes:

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

Calibration Performed By:

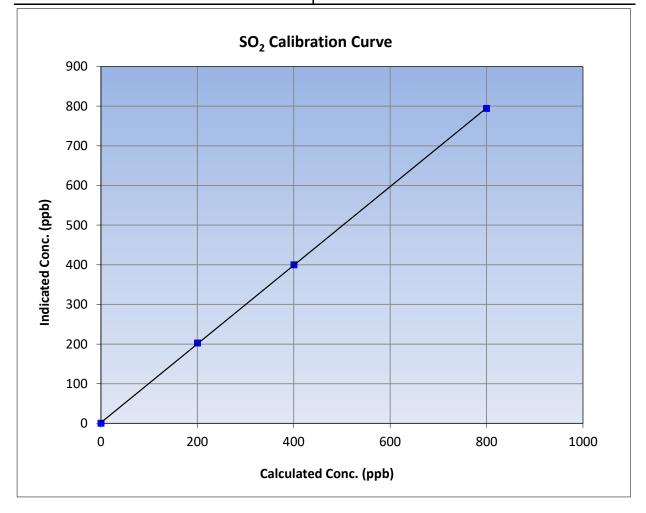


SO₂ Calibration Summary

W B E A			Version-01-2020
	Stati	on Information	
Calibration Date:	January 9, 2023	Previous Calibration:	December 2, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:14	End Time (MST):	13:09
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

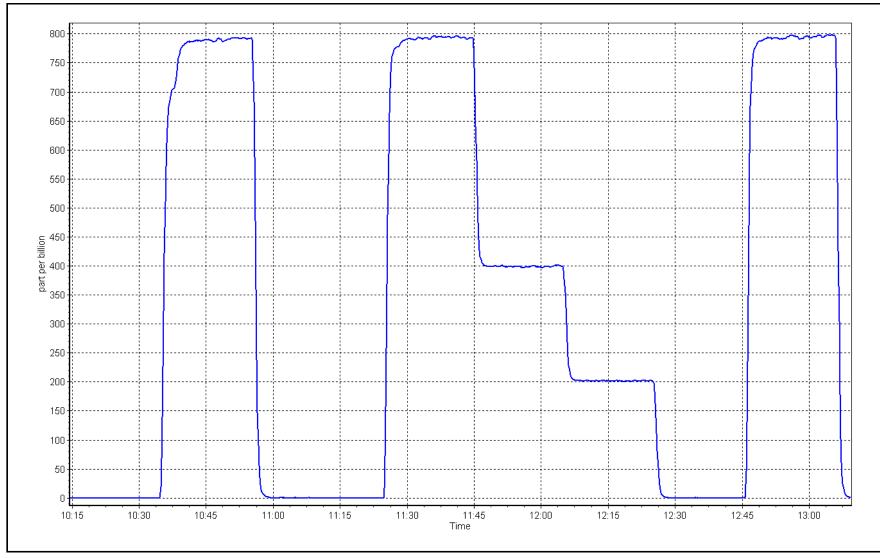
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999978	≥0.995
799.5	794.1	1.0068	correlation coefficient	0.999978	20.333
400.2	399.4	1.0021	Slope	0.992084	0.90 - 1.10
200.1	202.2	0.9897	Slope	0.992084	0.90 - 1.10
			- Intercept	1.741680	+/-30











TRS Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInnes January 3, 2023 12:00 Routine		Station number: Last Cal Date: End time (MST):	AMS 06 December 12, 2022 14:36	
		Calibration St	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.38 EY0000809	ppm	Cal Gas Exp Date:	March 2, 2023	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.38 N/A	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API 1700 API T701 H		Serial Number: Serial Number:	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:	0.992920	0.997488	Backgd or Offset:		2.38
Calibration intercept:	0.677080	0.117191	Coeff or Slope:	1.155	1.049
		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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
		TRS Calibrati	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	concentration (ppb) (Ic)	(Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4926	74.3	79.9	79.8	1.002
second point	4963	37.2	40.0	40.1	0.998
third point	4981	18.6	20.0	20.2	0.991
as left zero	5000	0.0	0.0	-0.1	
as left span	4926	74.3	79.9	79.2	1.009
O2 Scrubber Check	4920	80.3	803.0	0.1	
Date of last scrubber cha	nge:	December 20, 2021		Ave Corr Factor	0.997
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	NA	Prev response:	NA	*% change:	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:	NA	AF Intercept:	NA
Baseline Corr 3rd AF pt:	NA	AF Correlation:	NA		

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

Calibration Performed By:

Notes:

Max Farrell

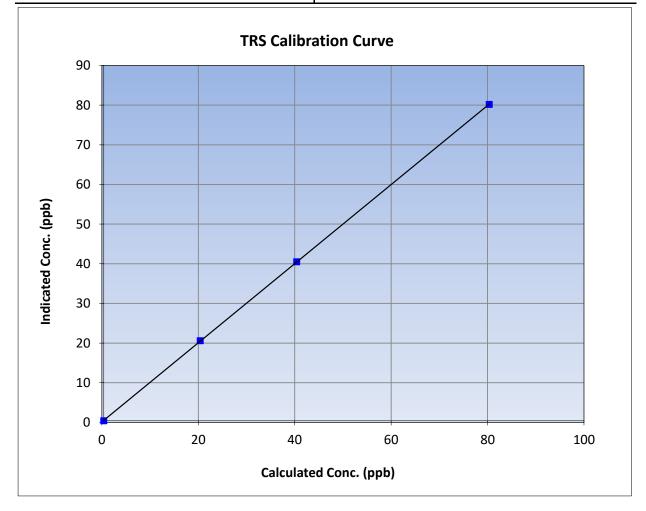


TRS Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	January 3, 2023	Previous Calibration:	December 12, 2022
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	12:00	End Time (MST):	14:36
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

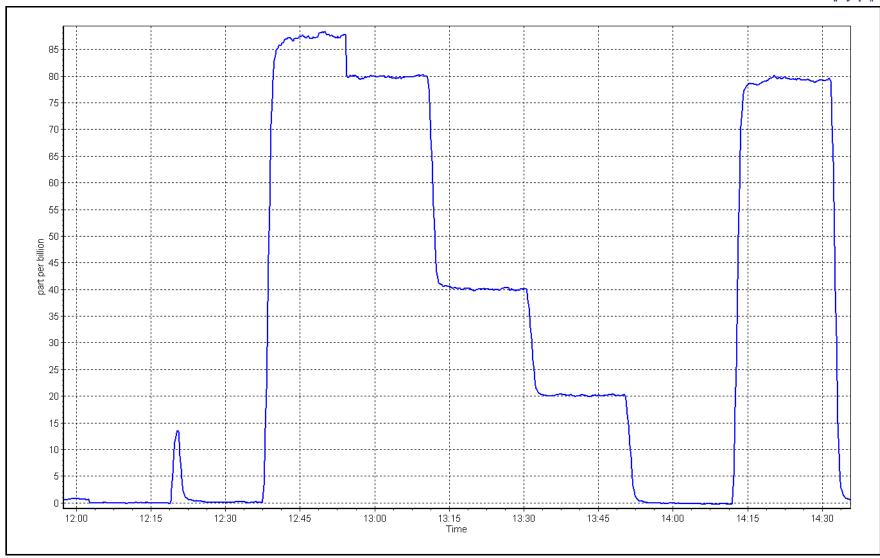
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999990	≥0.995
79.9	79.8	1.0018	correlation coefficient	0.999990	20.995
40.0	40.1	0.9981	Slope	0.997488	0.90 - 1.10
20.0	20.2	0.9909	Slope	0.997400	0.30 - 1.10
			Intercept	0.117191	+/-3











THC / CH₄ / NMHC Calibration Report

W B E A					Version-01-202
		Station Ir	oformation		
Station Name: Calibration Date:	Patricia McInnes January 9, 2023		Station number: Last Cal Date:	AMS06 December 2, 2022	
Start time (MST):	10:14		End time (MST):		
Reason:	Cylinder Change	N2 cylinder change	2		
		Calibratio	n Standards		
Gas Cert Reference:	AA	L070632	Cal Gas Expiry Date:	September 9, 2024	1
CH4 Cal Gas Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	ppm
C3H8 Cal Gas Conc.	205.3	ppm			
Removed Gas Ref.		N/A	Removed Gas Expiry:	N/A	
Removed CH4 Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	ppm
Removed C3H8 Conc.	205.3	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄):	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	689	
ZAG make/model:	API T701		Serial Number:	3566	
		Analyzer I	nformation		
Analyzer make:	: Thermo 55i		Analyzer serial #:	1180320037	
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:	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 Calib	ration 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	4920	80.3	17.12	17.04	1.005

as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	17.12	17.04	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	17.12	17.14	0.999
second point	4960	40.2	8.57	8.53	1.004
third point	4980	20.1	4.29	4.29	0.998
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.12	17.01	1.007
			А	verage Correction Factor	1.001
Baseline Corr AF:	17.04	Prev response	17.14	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates	investigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4920	80.3	9.07	9.01	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80.3	9.07	9.07	0.999
second point	4960	40.2	4.54	4.52	1.004
third point	4980	20.1	2.27	2.27	0.999
as left zero	5000	0	0.00	0.00	
as left span	4920	80.3	9.07	8.98	1.010
			A	verage Correction Factor	1.001
Baseline Corr AF:	9.01	Prev response	9.08	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation

CH4 Calibration Data

		CH4 Calibra	LION 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	4920	80.3	8.06	8.03	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	8.06	8.07	0.998
second point	4960	40.2	4.03	4.01	1.005
third point	4980	20.1	2.02	2.02	0.998
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.06	8.03	1.003
			A	verage Correction Factor	1.000
Baseline Corr AF:	8.03	Prev response	8.06	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000220		1.000499	

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

Notes:

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

Calibration Performed By: Max

Max Farrell



THC Calibration Summary

Calibration Date: Station Name:	January	0 2022			
Station Name:		9, 2023	Previous Calibration:	Decembe	r 2, 2022
	Patricia	McInnes	Station Number:	AM	506
Start Time (MST):	10	:14	End Time (MST):	13:	09
Analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20037
		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	0.999990	≥0.995
17.12	17.14	0.9991			
8.57 4.29	8.53 4.29	1.0045 0.9981	Slope	1.000499	0.90 - 1.10
4.25	4.29	0.9981	Intercept	-0.007453	+/-0.5
16.0					
18.0				_	
14.0					
14.0					
12.0					
ud 10.0					
(bbm) 10.0					
ouc					
9 8.0					
0.6 undicated					
0.6 gi		/			
4.0					
2.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0
		Calculated	l Conc. (ppm)		



CH₄ Calibration Summary

Calibration Date: tation Name:	lanua				
	Janua	ry 9, 2023	Previous Calibration:	Decembe	r 2, 2022
		a McInnes	Station Number:	AM	
tart Time (MST):		0:14	End Time (MST):	13:	
nalyzer make:		rmo 55i	Analyzer serial #:	11803	
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	tion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
8.06	8.07	0.9985			
4.03	4.01 2.02	1.0047 0.9977	Slope	1.001107	0.90 - 1.10
		•	Intercept	-0.004401	+/-0.5
8.0 - 7.0 - 6.0 -					
(udd) 5.0 - יסטס: 4.0 -					
b b b					
Indicated 0					
= 2.0 -					
1.0 -					
0.0	.0 2.0	4.0	6.0	8.0	10.0
0.			l Conc. (ppm)	5.0	

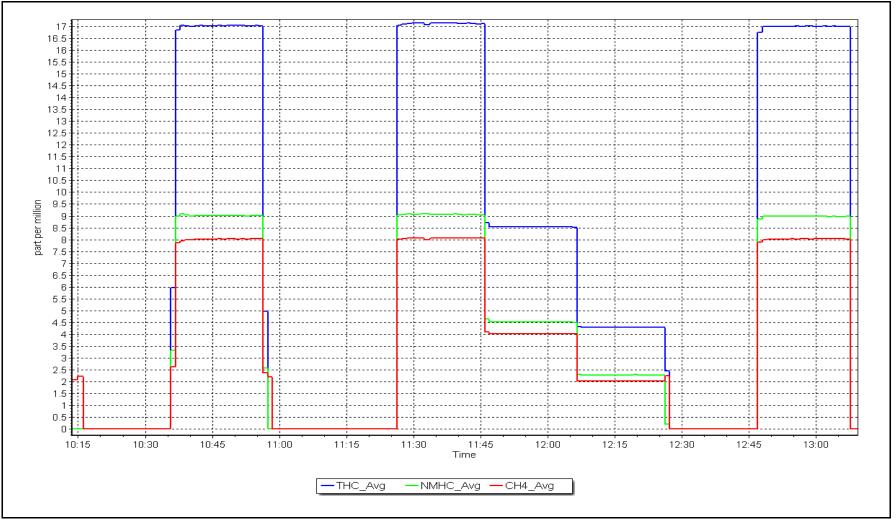


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	Januar	y 9, 2023	Previous Calibration: Decembe		r 2, 2022
Station Name:	Patricia	McInnes	Station Number: AMS		506
Start Time (MST):	10):14	End Time (MST): 13:09		09
Analyzer make:	Ther	mo 55i	Analyzer serial #:	Analyzer serial #: 1180320037	
		Calibra	ation Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical E	valuation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
9.07	9.07	0.9995		0.555551	
4.54	4.52	1.0045 0.9985	Slope	1.000174	0.90 - 1.10
2.27	2.27	0.3385	- Intercept	-0.003652	+/-0.5
10.0		NMHC Calibra	tion Curve		
9.0					
8.0					
7.0					
6.0					
5 .0					
Line 10.0 (bbm) 0.0 (bbm)					
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 Cal Slope:

NO Cal Offset:

NO₂ Cal Slope:

NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station I	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInnes January 5, 2023 10:11 Routine		Station number: Last Cal Date: End time (MST):	December 1, 2022	
		Calibratio	on Standards		
NO Gas Cylinder #: NOX Cal Gas Conc: Removed Cylinder #: Removed Gas NOX Conc: NOX gas Diff: Calibrator Model: ZAG make/model:	T26D9MR 52.51 N/A 52.51 Teledyne API T700 Teledyne API T701		Cal Gas Expiry Date: NO Cal Gas Conc: Removed Gas Exp Date: Removed Gas NO Conc: NO gas Diff: Serial Number: Serial Number:	August 18, 2023 51.98 N/A 51.98 3566 689	ppm ppm
		Analyzer	Information		
Analyzer make: NOX Range (ppb):			Analyzer serial #:	1172750022	
NO coeff or slope NOX coeff or slope NO2 coeff or slope	0.996	<u>Finish</u> 0.818 0.996 1.000	NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 3.2 3.8 156.3	Finish 3.2 3.8 154.2
		Calibrati	on Statistics		
NO _x Cal Slope NO _x Cal Offset		<u>Start</u> 000673 2.819985		<u>Finish</u> 1.000715 2.680164	

1.000413

1.780160

1.002852

0.310120

0.999284

1.700041

1.007019

0.124373



$NO_X \setminus NO \setminus NO_2$ 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	-0.2		
as found span	4923	76.9	807.6	799.5	8.2	812.0	799.6	12.4	0.9946	0.9998
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1		
high point	4923	76.9	807.6	799.5	8.2	809.7	799.9	9.9	0.9974	0.9994
second point	4962	38.5	404.3	400.2	4.1	408.3	402.3	6.0	0.9903	0.9949
third point	4981	19.2	201.6	199.6	2.0	207.1	202.6	4.5	0.9736	0.9852
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2		
as left span	4923	76.9	807.6	388.0	419.7	807.4	387.2	420.4	1.0003	1.0019
							Average C	orrection Factor	0.9871	0.9932
Corrected As fo	und NO _x =	811.9 ppb	NO =	799.4 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	0.1%
Previous Respo	nse NO _x =	811.0 ppb	NO =	801.6 ppb				*Percent Chang	ge NO =	-0.3%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (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)	797.7	386.2	419.7	422.6	0.9930	100.7%
2nd GPT point (200 ppb O3)	797.7	590.9	215.0	216.7	0.9919	100.8%
3rd GPT point (100 ppb O3)	797.7	692.7	113.2	114.3	0.9900	101.0%
				Average Correction Factor	0.9916	100.8%

Notes:

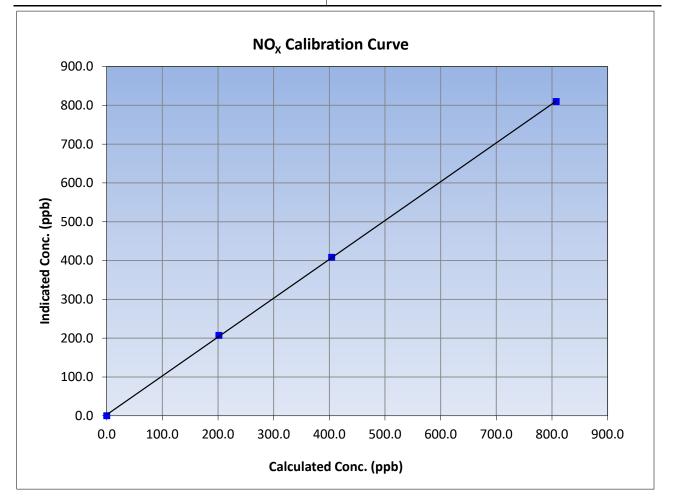
Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

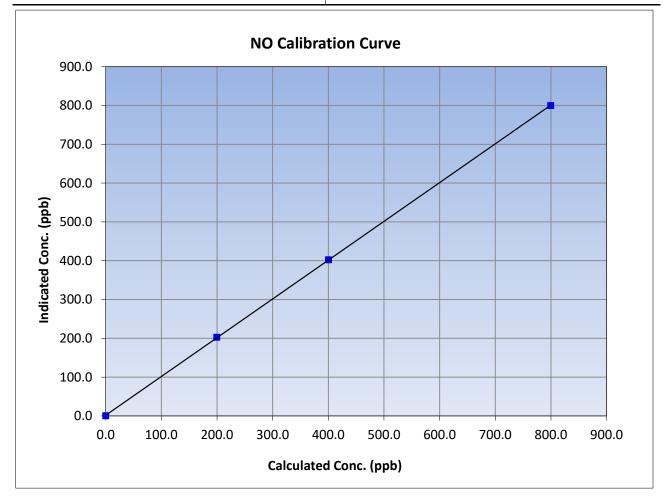
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	January	5, 2023	Previous Calibration:	Decembe	er 1, 2022	
Station Name:	Patricia McInnes		Station Number:	Station Number: AM		
Start Time (MST):	10:11		End Time (MST):	14	:44	
Analyzer make:	Thermo 42i		Analyzer serial #:	11727	1172750022	
		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	0.999957	≥0.995	
807.6	809.7	0.9974	correlation coefficient	0.555557	20.333	
404.3	408.3	0.9903	Clana	1.000715	0.90 - 1.10	
201.6	207.1	0.9736	Slope	1.000715	0.90 - 1.10	
			Intercept	2.680164	+/-20	





NO Calibration Summary

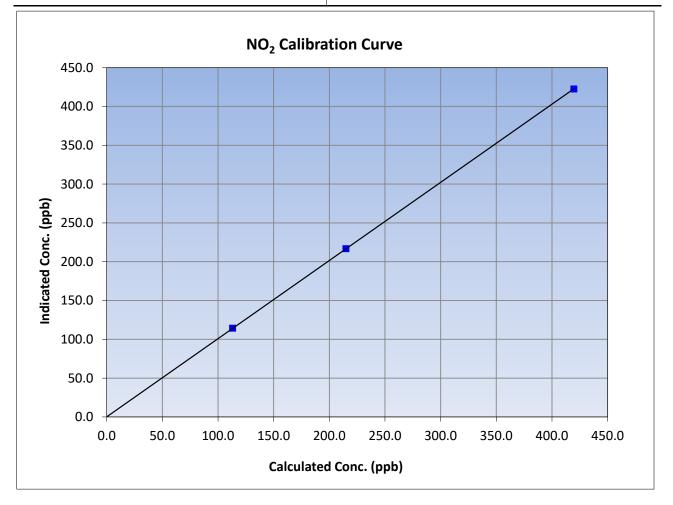
WBEA		Station	Information		Version-04-20	
		Station	information			
Calibration Date:	January	5, 2023	Previous Calibration:	Decembe	December 1, 2022	
Station Name:	Patricia McInnes		Station Number:	AM	S06	
Start Time (MST):	10:11		End Time (MST):	14	:44	
Analyzer make:	Thermo 42i		Analyzer serial #:	11727	50022	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999986	≥0.995	
799.5	799.9	0.9994	correlation coefficient	0.999960	20.995	
400.2	402.3	0.9949	Slope	0.999284	0.90 - 1.10	
199.6	202.6	0.9852	Siope	0.999264	0.90 - 1.10	
			Intercept	1.700041	+/-20	





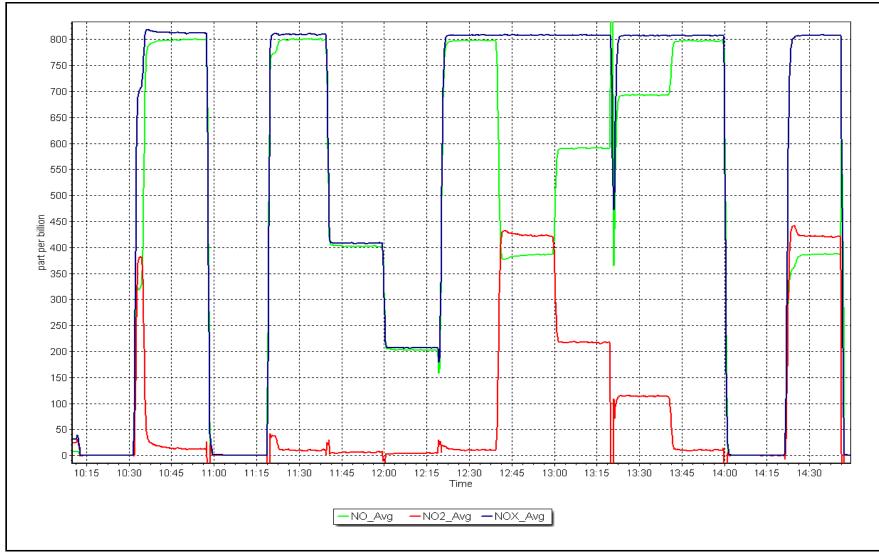
NO₂ Calibration Summary

WBEA					Version-04-20	
		Station	Information			
Calibration Date:	January	5, 2023	Previous Calibration:	Decembe	er 1, 2022	
Station Name:	Patricia McInnes		Station Number:	AM	S06	
Start Time (MST):	10:11		End Time (MST):	14	:44	
Analyzer make:	Therr	mo 42i	Analyzer serial #:	11727	1172750022	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999999	≥0.995	
419.7	422.6	0.9930	correlation coefficient	0.9999999	20.995	
215.0	216.7	0.9919	Clana	1.007019	0.90 - 1.10	
113.2	114.3	0.9900	Slope	1.007019	0.90 - 1.10	
			Intercept	0.124373	+/-20	











O₃ Calibration Report

Version-01-2020

		Charles I. C.			
		Station Infor	mation		
Station Name: Calibration Date:	Patricia McInnes January 12, 2023		Station number: Last Cal Date:	AMS06 December 2, 2022	
Start time (MST): Reason:	9:55 Routine		End time (MST):		
		Calibration St	andards		
O3 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	2 0 - 500 ppb				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.007000	1.004914	Backgd or Offset:	-1.2	-1.2
Calibration intercept:	1.200000	1.440000	Coeff or Slope:	1.019	1.019
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration C	Correction factor (Cc/
Set Point	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	800.0	0.0		
as found shap		000.0	0.0	0.6	
as iound span	5000	1303.0	400.0	<u> </u>	 0.994
as found span as found 2nd point	5000				
as found 2nd point as found 3rd point	5000				
as found 2nd point	5000				
as found 2nd point as found 3rd point		1303.0	400.0	402.6	0.994
as found 2nd point as found 3rd point calibrator zero	5000	1303.0 800.0	400.0 0.0	402.6 0.5	0.994
as found 2nd point as found 3rd point calibrator zero high point	5000 5000	1303.0 800.0 1303.0	400.0 0.0 400.0	402.6 0.5 402.9	0.994 0.993
as found 2nd point as found 3rd point calibrator zero high point second point	5000 5000 5000	1303.0 800.0 1303.0 966.5	400.0 0.0 400.0 200.0	402.6 0.5 402.9 203.0	0.994 0.993 0.985
as found 2nd point as found 3rd point calibrator zero high point second point third point	5000 5000 5000 5000	1303.0 800.0 1303.0 966.5 794.3	400.0 0.0 400.0 200.0 100.0	402.6 0.5 402.9 203.0 102.8	0.994 0.993 0.985 0.973
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	5000 5000 5000 5000 5000 5000	1303.0 800.0 1303.0 966.5 794.3 800.0	400.0 0.0 400.0 200.0 100.0 0.0 400.0	402.6 0.5 402.9 203.0 102.8 0.4	0.994 0.993 0.985 0.973
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span	5000 5000 5000 5000 5000 5000	1303.0 800.0 1303.0 966.5 794.3 800.0 1303.0	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Average	402.6 0.5 402.9 203.0 102.8 0.4 404.2 ge Correction Factor	0.994 0.993 0.985 0.973 0.990
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	5000 5000 5000 5000 5000 5000	1303.0 800.0 1303.0 966.5 794.3 800.0 1303.0 Previous response	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Average 404.0	402.6 0.5 402.9 203.0 102.8 0.4 404.2 ge Correction Factor *% change	0.994 0.993 0.985 0.973 0.990 0.984
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span	5000 5000 5000 5000 5000 5000 402.0	1303.0 800.0 1303.0 966.5 794.3 800.0 1303.0	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Average 404.0	402.6 0.5 402.9 203.0 102.8 0.4 404.2 ge Correction Factor	0.994 0.993 0.985 0.973 0.990 0.984

Notes:

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

Calibration Performed By:

Max Farrell

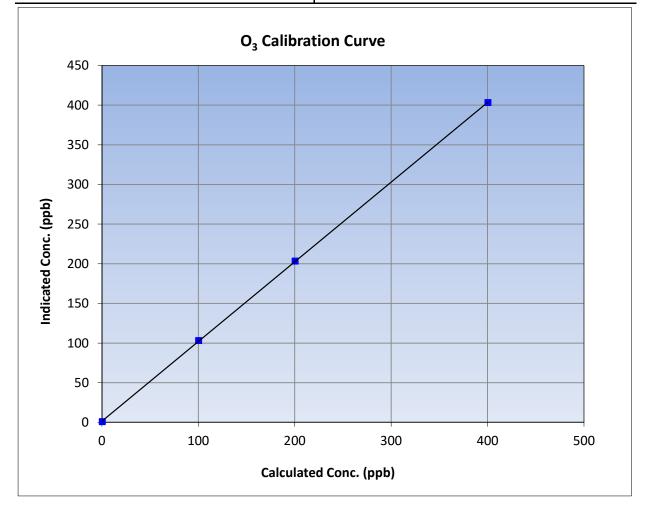


O₃ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 12, 2023	Previous Calibration:	December 2, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	9:55	End Time (MST):	13:23
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234

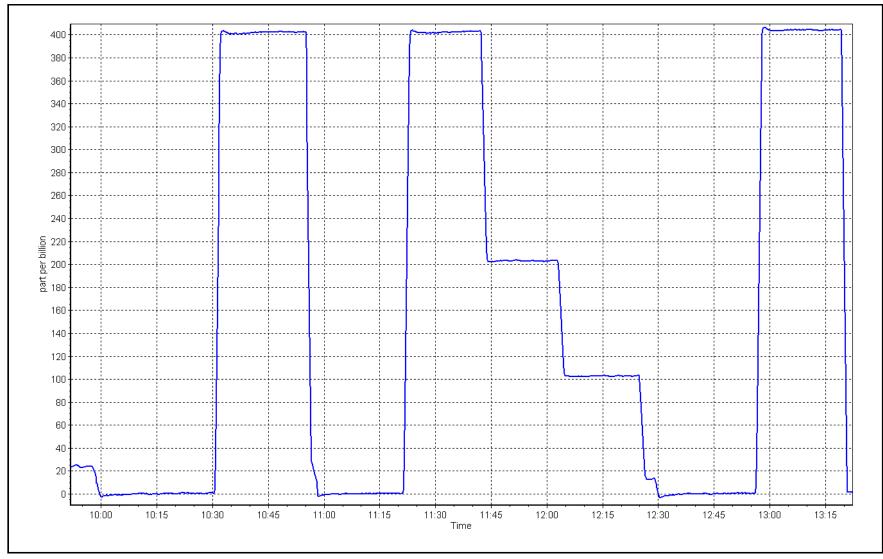
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.5		Correlation Coefficient	0.999975	≥0.995	
400.0	402.9	0.9928	correlation coefficient	0.999975	20.333	
200.0	203.0	0.9852	Slope	1.004914	0.90 - 1.10	
100.0	102.8	0.9728	Slope	1.004914	0.30 - 1.10	
			Intercept	1.440000	+/- 5	











T640 PM_{2.5} CALIBRATION

W B E A					Version-09-2020
		Station Informati	on		
Station Name: Calibration Date: Start time (MST):	Patricia McInnes January 9, 2023 14:07		Station number: A Last Cal Date: I End time (MST): 2	December 12, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 7	766	
Flow Meter Make/Model: Temp/RH standard:	Delta Cal Delta Cal		S/N: 6 S/N: 6		
		Monthly Calibration	Test		
Parameter T (°C) P (mmHg) flow (LPM) Leak Test: Inlet cleaning :	<u>As found</u> -8.6 720.4 4.98 Date of check: _ PM w/o HEPA: _ Inlet Head		PM w/ HEPA:	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM
		Quarterly Calibration	n Test		
<u>Parameter</u> PMT Peak Test	<u>As found</u> 10.9	Measured 10.9	<u>As left</u> 10.9	Adjusted	(Limits) 10.9 +/- 0.5
Date Optical Cham Disposable Filte		January 9 January 9			
		Annual Maintena	nce		
Date Sample Tul Date RH/T Sense		August 28 August 28			
Notes:	PMT	Peak test completed. Le	eak check passed. No	adjustments made.	

Calibration by:

Max Farrell



TN - NO_X - NH_3 Calibration Report

WBEA					Version-11-202
		Stati	on Information		
Station Name: NOX Cal Date: Start time (MST): NH3 Cal Date:	Patricia McInnes January 11, 2023 9:30		Station number: Last Cal Date: End time (MST): Last Cal Date:	AMS 06 December 6, 2022 13:41	
Start time (MST): Reason:	January 11, 2023 13:41 Routine		End time (MST):	December 6, 2022 15:29	
		Calibr	ation 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: NOX gas Diff:	51.98	ppm	Removed cyl Expiry: NO gas Diff:	N/A	
NH3 Cal Gas Conc:	73.9	ppm	NH3 Gas Cylinder #: NH3 Cal Gas Expiry:	CC430800 January 7, 2023	
Removed NH3 Conc: NH3 gas Diff:	73.9	ppm	Removed Cylinder #: Removed cyl Expiry:		
Calibrator Model:	AP	I T700	Serial Number:	3566	
ZAG make/model:	AP	I T701	Serial Number:	689	
		Analy	zer Information		
Analyzer model:	: API T201		Analyzer serial #:	152	
Converter model			Converter serial #:		
NH3 Range (ppb)	: 0 - 2000 ppb		Reaction cell Press:	5.70	
NOX Range (ppb)			Sample Flow:	531	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	. 0.823	0.839	TN coefficient:	0.823	0.843
NOX coefficient	: 0.823	0.840	NO bkgrnd:	-0.1	-0.1
NO2 coefficient	: 1.000	1.000	NOX bkgrnd:		0.0
NH3 coefficient	: 0.951	0.951	TN bkgrnd:	0.0	0.0
		Calib	ration Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	0.994035	j	0.996497	
NO _x Cal Offset:	:	2.840711		1.220653	
NO Cal Slope	:	0.997954	Ļ	1.002531	
NO Cal Offset	:	1.640234	ŀ	-0.260924	
NO ₂ Cal Slope	:	0.996702	2	1.003819	
NO ₂ Cal Offset	:	-1.098676	5	1.157200	
NH3 Cal Slope	:	1.007009)	0.998364	
NH3 Cal Offset	:	8.369635		7.107284	
TN Cal Slope	:	1.011540)	1.003901	
TN Cal Offset	:	8.804361		5.611013	



TN - NOX - NH₃ Calibration Report

Version-11-2021

Dilution Calibration Data										
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-1.1	-1.5	0.4		
as found NO	4923	76.9	807.6	807.6		789.9	786.8	3.1	1.022	
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-1.6	1.4		
high NO point	4923	76.9	807.6	807.6		807.9	804.9	3.0	1.000	
NO/O3 point	4923	76.9	807.6	807.6		811.2	802.5	8.7	0.996	
as found NH3	3415	85.3	1801.0		1801.0	1810.5		1802.2	0.995	0.999
new NH3 cyl rp										
first NH3	3415	85.3	1801.0		1801.0	1810.5		1802.2	0.995	0.999
second NH3	3453	47.4	1000.8		1000.8	1012.8		1008.4	0.988	0.992
third NH3	3476	23.7	500.4		500.4	514.5		513.3	0.973	0.975
							Average C	orrection Factor	0.9976	0.9889
Corrected As fo	und TN =	791 ppb	NO _x = 788.3	ppb NH3 =	1801.8 ppb			*Percent Chang	e TN =	-4.4%
Previous Respo	nse TN =	825.7 ppb	NO _x = 805.6	ppb NH3 =	1822.0 ppb			*Percent Chang	e NO _x =	-2.2%
NH3 Previous Converter Efficiency = 95.1%							*Percent Chang * = > +/-5% change		-1.1% ion	

Dilution Calibration Data

NH3 Current Converter Efficiency = 95.1%



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) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-1.5	-1.7	-1.1		
as found span	4923	76.9	807.6	799.5	807.6	786.8	780.7	789.9	1.0264	1.0240
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.6	-1.2	-0.2		
high point	4923	76.9	807.6	799.5	807.6	804.9	800.3	807.9	1.0034	0.9989
second point	4962	38.5	404.3	400.2	404.3	404.6	402.8	406.5	0.9993	0.9937
third point	4981	19.2	201.6	199.6	201.6	205.6	199.9	206.3	0.9807	0.9985
							Average C	Correction Factor	0.9945	0.9970
Baseline Corr A	s fnd TN =	791 ppb	NO _x = 788.3	ppb NO =	782.4 ppb			*Percent Chang	e TN =	-4.4%
Previous Respo	onse TN =	825.7 ppb	NO _x = 805.6	ppb NO =	799.5 ppb			*Percent Chang	e NO _x =	-2.2%
								*Percent Chang	e NO =	-2.2%
								* = > +/-5% change	initiates investigati	on

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

Notes:

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

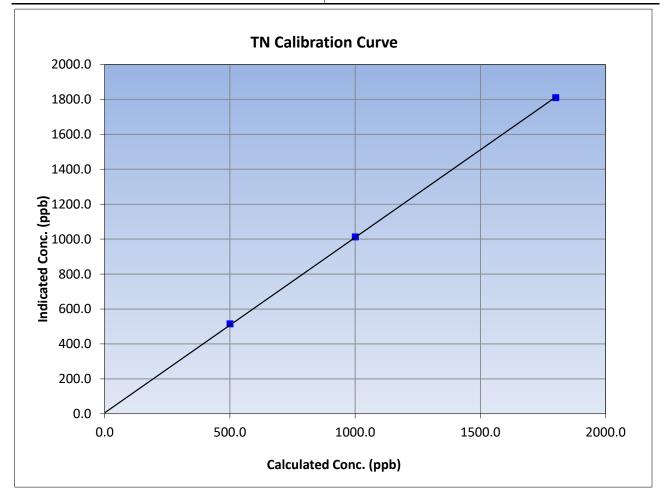
Calibration Performed By:

Max Farrell



TN Calibration Summary

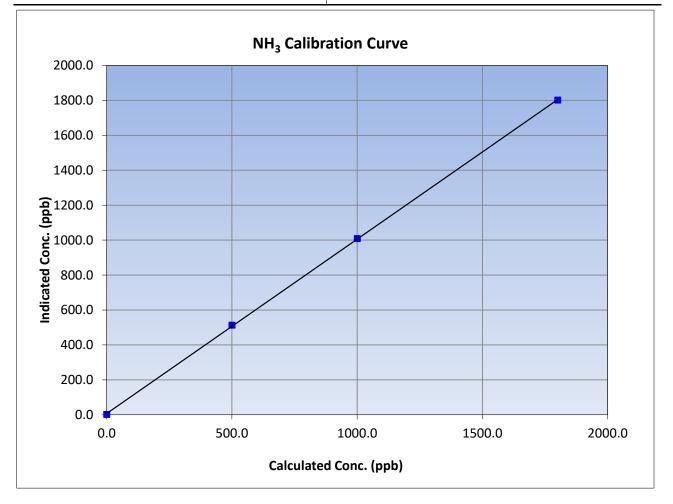
		Station	Information		
Calibration Date:	January 11, 2023		Previous Calibration:	Decembe	er 6, 2022
Station Name:	Patricia McInnes		Station Number:	AM	S 06
Start Time (MST):	9:30		End Time (MST):	13:41	
Analyzer make:	API T201		Analyzer serial #:	15	152
Cala. Jakad an an an an at a t		Calibra	ation Data		
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 Evalua	ation 0.999948	<u>Limits</u> ≥0.995
(ppb) (Cc) 0.0	(ppb) (Ic) -0.2		Correlation Coefficient	0.999948	≥0.995
(ppb) (Cc) 0.0 1801.0	(ppb) (Ic) -0.2 1810.5	0.9948			





NH₃ Calibration Summary

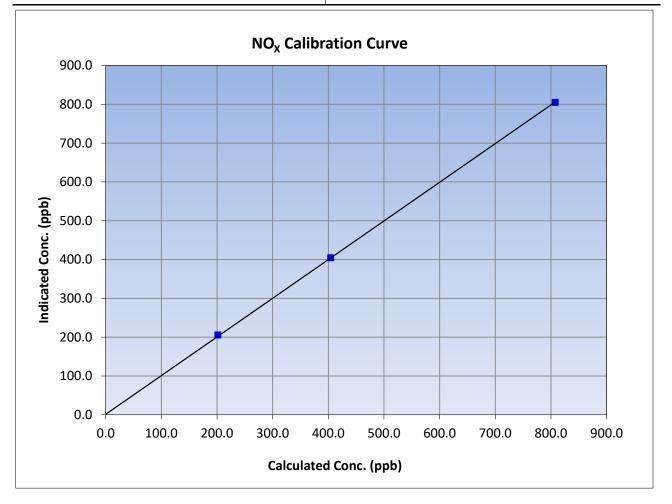
WBEA		Station	Information		Version-11-2
Calibration Date:	January 11, 2023		Previous Calibration:	Decemh	er 6, 2022
Station Name:	Patricia McInnes		Station Number:		1S 06
Start Time (MST):	9:30		End Time (MST):		3:41
Analyzer make:	API T201		Analyzer serial #:		152
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	/Ic) Statistical Evaluation [<u>Limits</u>
0.0	1.4		Correlation Coefficient	0.999949	≥0.995
1801.0	1802.2	0.9994	correlation coefficient	0.999949	20.995
1000.8	1008.4	0.9925	Clana	0.998364	0.90 - 1.10
500.4	513.3	0.9749	Slope	0.996504	0.90 - 1.10
			Intercept	7.107284	+/-20





NO_x Calibration Summary

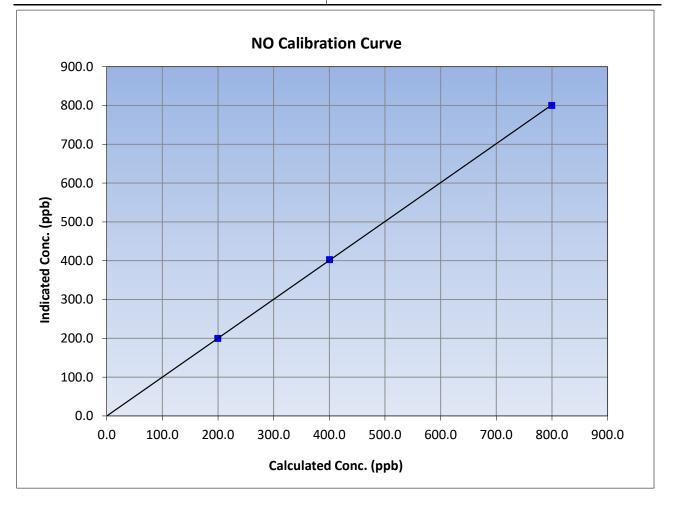
WBEA		Station	Information		Version-11-2
Calibration Date:	January 11, 2023		Previous Calibration:	Decemb	oer 6, 2022
Station Name:	Patricia McInnes		Station Number:	AN	/IS 06
Start Time (MST):	9:30		End Time (MST):	1	3:41
Analyzer make:	API T201		Analyzer serial #:	152	
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0	-1.6		Correlation Coefficient	0.999940	≥0.995
807.6	804.9	1.0034	correlation coernelent	0.555540	20.000
404.3	404.6	0.9993	Slope	0.996497	0.90 - 1.10
201.6	205.6	0.9807	Slope	0.990497	0.30 - 1.10
			Intercept	1.220653	+/-20





NO Calibration Summary

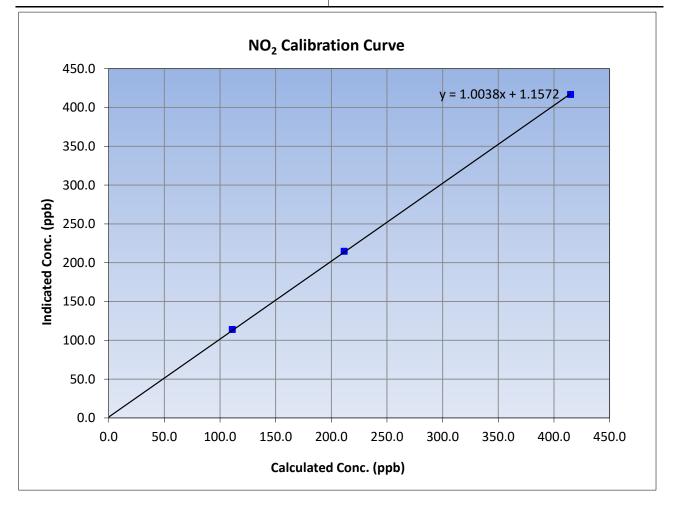
WBEA		Station	Information		Version-11-2
Calibration Date:	January 11, 2023		Previous Calibration:	Decemb	er 6, 2022
Station Name:	Patricia McInnes		Station Number:	AN	1S 06
Start Time (MST):	9:30		End Time (MST):	13	3:41
Analyzer make:	API T201		Analyzer serial #:	152	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	(Ic) Statistical Evaluation		<u>Limits</u>
0.0	-1.2		Correlation Coefficient	0.999986	≥0.995
799.5	800.3	0.9989	correlation coernelent	0.555580	20.995
400.2	402.8	0.9937	Slope	1.002531	0.90 - 1.10
199.6	199.9	0.9985	Slope	1.002551	0.90 - 1.10
			Intercept	-0.260924	+/-20

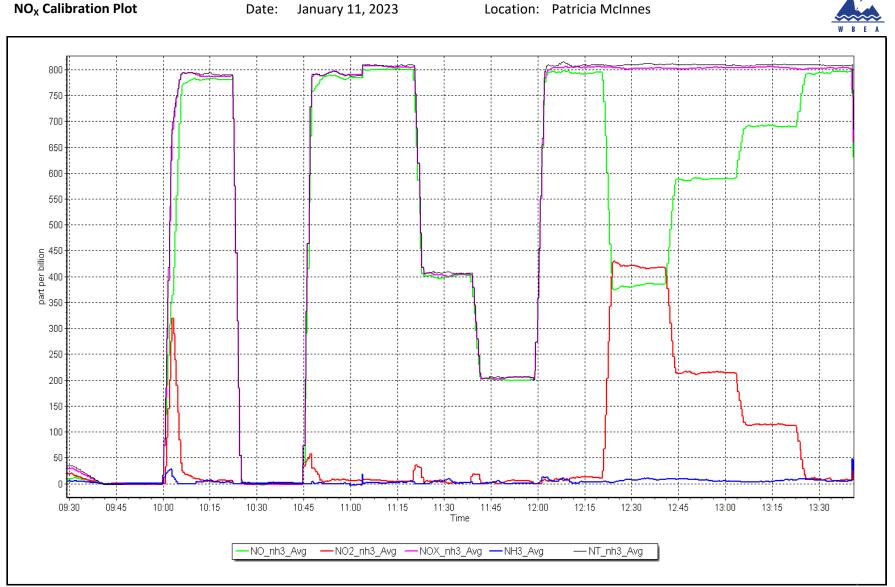




NO₂ Calibration Summary

WBEA		Chattan	1		Version-11-2	
		Station	Information			
Calibration Date:	January 11, 2023		Previous Calibration:	Decembe	December 6, 2022	
Station Name:	Patricia McInnes		Station Number:	AM	S 06	
Start Time (MST):	9:30		End Time (MST):	13	:41	
Analyzer make:	API T201		Analyzer serial #:		152	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	lc) Statistical Evaluation <u>L</u>		<u>Limits</u>	
0.0	-0.4		Correlation Coefficient	0.999929	>0.005	
415.0	416.7	0.9958	correlation coefficient	0.999929	≥0.995	
211.6	214.8	0.9849	Slope	1.003819	0.90 - 1.10	
111.1	113.9	0.9750	Slope	1.005819	0.90 - 1.10	
			Intercept	1.157200	+/-20	





Location: Patricia McInnes









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley January 16, 2023 11:20 Routine		Station number: Last Cal Date: End time (MST):	AMS07 December 5, 2022 14:05	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.52 CC282115	ppm	Cal Gas Exp Date:	December 29, 2028	
Removed Cal Gas Conc:	50.52	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA	ppin	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	3805	
ZAG Make/Model:	API 701H		Serial Number:	198	
		Analyzer Info	rmation		
	Thormo 42i LTE	, and year most		1507964692	
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:	0.996995	0.997038	Backgd or Offset:		2.71
Calibration intercept:	1.923766	1.683589	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/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.3	801.2	797.1	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.3	801.2	799.1	1.003
second point	4960	39.6	400.2	403.3	0.992
third point	4980	19.8	200.1	201.5	0.993
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.2	800.2 Averae	799.9 ge Correction Factor	1.000 0.996
	707.00	. .			
Baseline Corr As found:	797.20	Previous response		*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

No adjustments required.

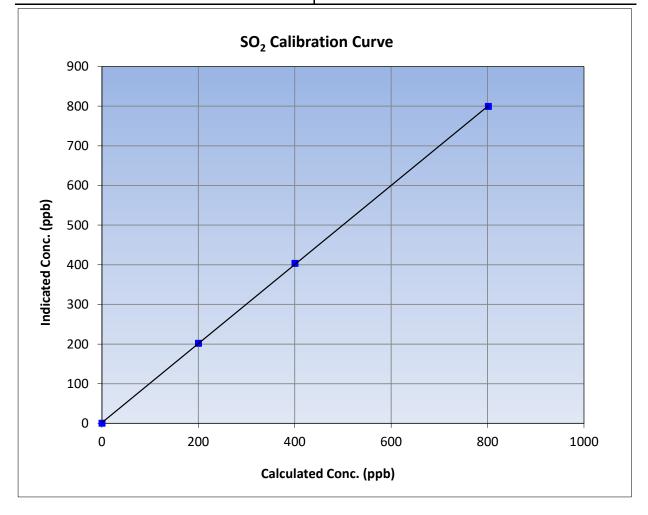


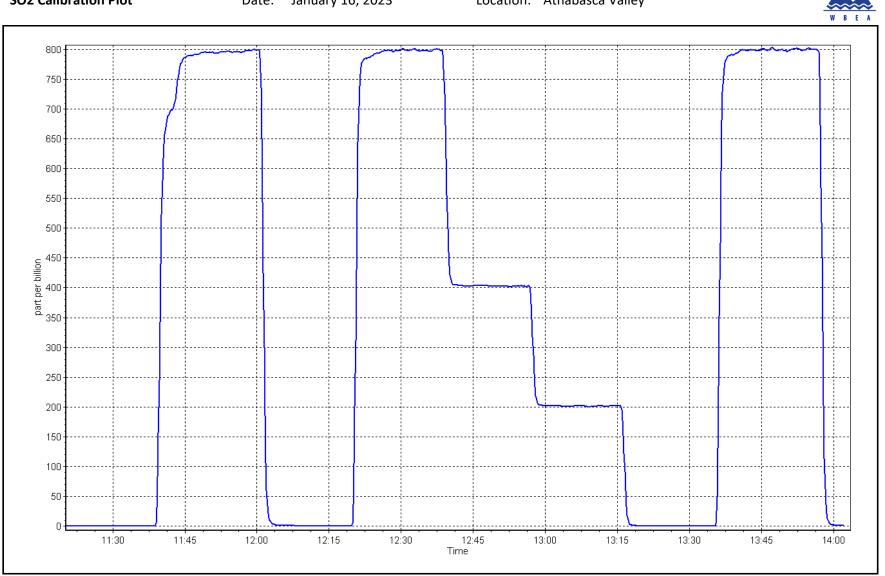
SO₂ Calibration Summary

W B E A			Version-01-2020				
Station Information							
Calibration Date:	January 16, 2023	Previous Calibration:	December 5, 2022				
Station Name:	Athabasca Valley	Station Number:	AMS07				
Start Time (MST):	11:20	End Time (MST):	14:05				
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1507864683				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999967	≥0.995
801.2	799.1	1.0026	Correlation Coefficient	0.555507	20.333
400.2	403.3	0.9922	Slope	0.997038	0.90 - 1.10
200.1	201.5	0.9929	Siope		0.90 - 1.10
			- Intercept	1.683589	+/-30





SO2 Calibration Plot

Location: Athabasca Valley



TRS Calibration Report

				-	
WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley January 17, 2023 7:00 Routine		Station number: Last Cal Date: End time (MST):	AMS07 December 13, 2022 10:57	
		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 API T700 API T701H	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: Calibration intercept:	0.993768 -0.078405	0.987815 0.181600	Backgd or Offset: Coeff or Slope:		2.18 0.834
		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	81.6	80.6	80.1	1.005
as found 2nd point	4959	40.8	40.3	40.1	1.003
as found 3rd point	4980	20.4	20.2	19.7	1.018
new cylinder response					
		TRS 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	4918	81.6	80.6	79.7	1.012
second point	4959	40.8	40.3	40.2	1.003
third point	4980	20.4	20.2	20.2	0.998
as left zero	5000	0.0	0.0	0.7	
as left span	4918	81.6	80.6	78.3	1.030
5O2 Scrubber Check	4921	79.2	800.2	0.3	
Date of last scrubber cha		25-Feb-22		Ave Corr Factor	1.004
Date of last converter ef	ficiency test:	April 22, 2022		98.5%	efficiency
Baseline Corr As found:	80.2	Prev response:		*% change:	0.2%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	40.2 19.8	AF Slope: AF Correlation:		AF Intercept:	-0.178398
				* = > +/-5% change initial	tes investigation

Notes:

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

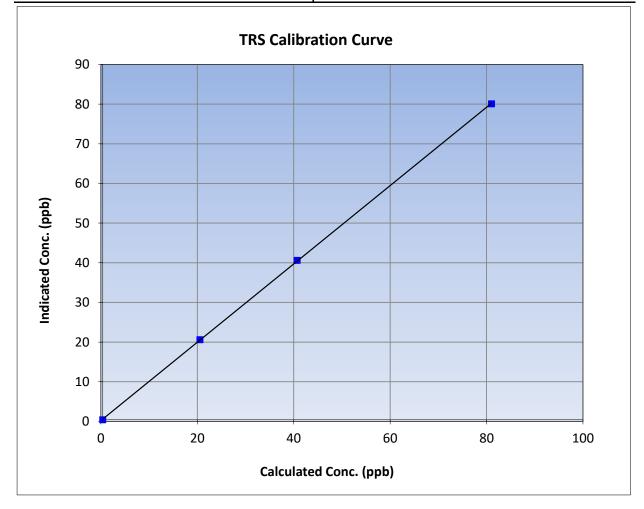


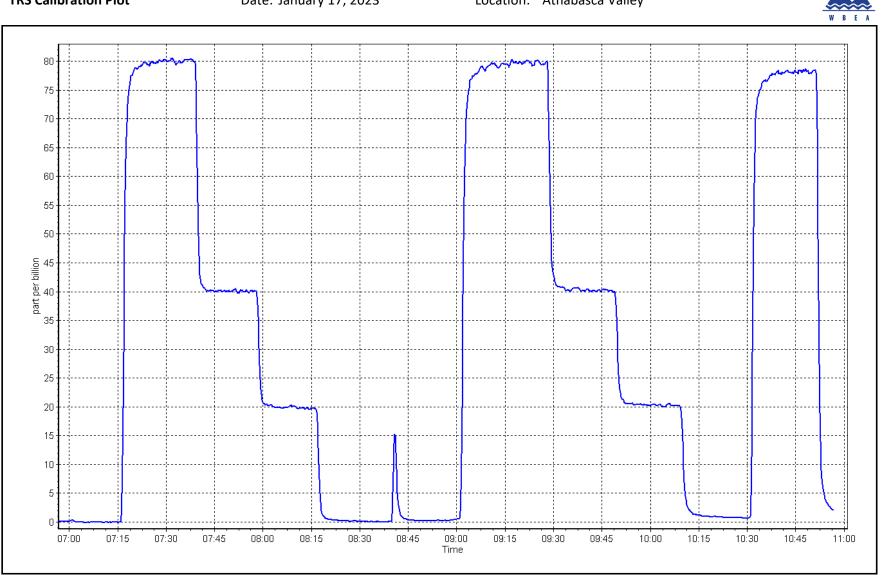
TRS Calibration Summary

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

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999971	≥0.995
80.6	79.7	1.0116	correlation coefficient	0.999971	20.995
40.3	40.2	1.0028	Slope	0.987815	0.90 - 1.10
20.2	20.2	0.9977	Siope		0.30 - 1.10
			Intercept	0.181600	+/-3





TRS Calibration Plot

Location: Athabasca Valley





THC / CH₄ / NMHC Calibration Report

		Stati	on Information		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valle January 16, 2023 11:20 Routine		Station number: AMS07 Last Cal Date: December 5, 2022 End time (MST): 14:05		
		Calibr	ration Standards		
Gas Cert Reference:	С	C282115	Cal Gas Expiry Date: De		028
CH4 Cal Gas Conc.	501.2	ppm	CH4 Equiv Conc.	1075.1	ppm
C3H8 Cal Gas Conc.	208.7	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry: NA	A	
Removed CH4 Conc.	501.2	ppm	CH4 Equiv Conc.	1075.1	ppm
Removed C3H8 Conc. Diff between cyl (CH ₄):	208.7	ppm	Diff between cyl (THC): Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 38	05	
ZAG make/model:	API 701H		Serial Number: 19	8	
		Analy	zer Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 13	17958219	
THC Range (ppm):	: 0 - 20 ppm				
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0 -	10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	. 0.000270	0.000270	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) (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	17.05	16.96	1.005		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4921	79.3	17.05	16.97	1.005		
second point	4960	39.6	8.52	8.48	1.004		
third point	4980	19.8	4.26	4.26	1.000		
as left zero	5000	0.0	0.00	0.00			
as left span	4921	79.2	17.03	16.97	1.003		
			А	verage Correction Factor	1.003		
Baseline Corr AF:	16.96	Prev response	17.04	*% change	-0.5%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calib	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4921	79.3	9.10	9.02	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	9.10	9.04	1.007
second point	4960	39.6	4.55	4.52	1.007
third point	4980	19.8	2.27	2.27	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	9.09	9.03	1.007
			ŀ	Average Correction Factor	1.005
Baseline Corr AF:	9.02	Prev response	9.10	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.3	7.95	7.94	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	7.95	7.94	1.002
second point	4960	39.6	3.97	3.97	1.001
third point	4980	19.8	1.98	1.99	0.999
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	7.94	7.95	0.999
			Av	verage Correction Factor	1.001
Baseline Corr AF:	7.94	Prev response	7.94	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.998506		0.994820	
THC Cal Offset:		0.011691		0.009674	
CH4 Cal Slope:		0.999047		0.998255	
CH4 Cal Offset:		0.000012		0.002012	
NMHC Cal Slope:		0.998021		0.992058	
NMHC Cal Offset:		0.012480		0.007463	

Notes:

No adjustments required.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	January	16, 2023	Previous Calibration:	Decembe	r 5, 2022
Station Name:	Athabas	Athabasca Valley		AM	S07
Start Time (MST):	11	:20	End Time (MST):	14:	05
Analyzer make:	Therr	no 55i	Analyzer serial #:	13179	58219
		Calibra	tion Data		
Calculated concentratio (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999998	≥0.995
17.05	16.97	1.0048			
8.52 4.26	<u>8.48</u> 4.26	1.0042 0.9997	Slope	0.994820	0.90 - 1.10
4.20	4.20	0.9997	Intercept	0.009674	+/-0.5
16.0 —				_	
				_	
14.0 —					
12.0					
12.0					
0.01 (bbm) 0.01 (bbm) 8.0					
0.6 udicated					
<u>=</u> 4.0 –					
2.0					
0.0	-	0	10.0	15.0	20.0
0.0	5	.0		15.0	20.0
		Calculated	l Conc. (ppm)		



CH₄ Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	lanuarv	16, 2023	Previous Calibration:	Decembe	er 5. 2022
Station Name:	Athabasca Valley		Station Number:	AM	
Start Time (MST):		:20	End Time (MST):	14	
Analyzer make:		no 55i	Analyzer serial #:	13179	
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
7.95	7.94	1.0016			
<u> </u>	3.97 1.99	1.0012 0.9994	Slope	0.998255	0.90 - 1.10
			Intercept	0.002012	+/-0.5
9.0					
7.0					
6.0					
b b b					
O 4.0					
Line (bbm) 5.0 (bbm) 4.0 (bbm) 3.0 (bbm)					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
		Calculated	l Conc. (ppm)		



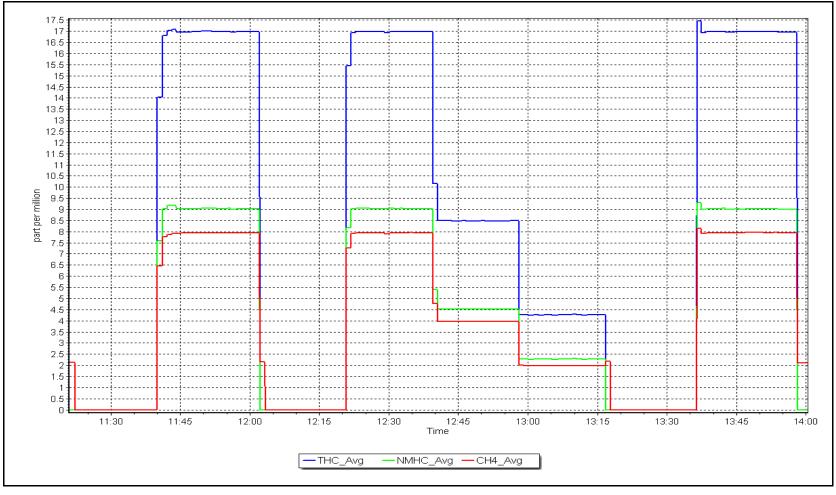
NMHC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	January	16, 2023	Previous Calibration:	Decembe	r 5, 2022
Station Name:	Athabas	ca Valley	Station Number:	AM	S07
Start Time (MST):	11:20 End Time (MST):			14:	05
Analyzer make:	Therr	no 55i	Analyzer serial #:	13179	58219
		Calibra	ition Data		
Calculated concentratio (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999996	≥0.995
9.10	9.04 4.52	1.0074			
4.55	<u>4.52</u> 2.27	1.0066 0.9999	Slope	0.992058	0.90 - 1.10
			Intercept	0.007463	+/-0.5
9.0 8.0 7.0					•
(m. 6.0 –					
— 6.0 - брии: - 5.0					
+ 0.4					
2.0					
1.0 -					
0.0					
0.0) 2.0	4.0	6.0	8.0	10.0
		Calculated	l Conc. (ppm)		









$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Statio	on Information		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley January 19, 2023 7:10 Routine		Station number: Al Last Cal Date: Do End time (MST): 11	ecember 12, 20	22
		Calibr	ation Standards		
NO Gas Cylinder #:	T2Y1KA4		Cal Gas Expiry Date: N	ovember 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	Analy <u>Finish</u> 1.048 0.995 1.000	zer Information Analyzer serial #: 11 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	160120024 <u>Start</u> 7.3 7.5 198.8	<u>Finish</u> 7.3 7.5 198.8
		Calibi	ration Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	1.00321	1	0.991445	
NO _x Cal Offset		1.15955	7	1.137226	
NO Cal Slope		1.00348	-	0.991156	
NO Cal Offset		0.77556		0.993235	
NO ₂ Cal Slope		1.00175		1.002806	
NO ₂ Cal Offset	:	0.28773	1	0.326300	



$NO_X \setminus NO \setminus NO_2$ 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/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	0.0	0.0	0.1		
as found span	4920	80.2	816.7	800.7	16.0	810.1	793.2	16.8	1.0082	1.0094
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.1		
high point	4920	80.2	816.7	800.7	16.0	810.0	793.8	16.2	1.0083	1.0087
second point	4960	40.1	408.4	400.4	8.0	407.6	399.3	8.3	1.0019	1.0026
third point	4980	20.0	203.7	199.7	4.0	203.4	199.1	4.4	1.0014	1.0029
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4920	80.2	816.7	401.2	415.5	816.5	394.8	421.6	1.0003	1.0162
							Average C	orrection Factor	1.0039	1.0047
Corrected As fo	ound NO _x =	810.1 ppb	NO =	793.2 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _X =	-1.3%
Previous Respo	onse NO _X =	820.5 ppb	NO =	804.3 ppb				*Percent Chan	ge NO =	-1.4%
Baseline Corr 2	2nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

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

Notes:

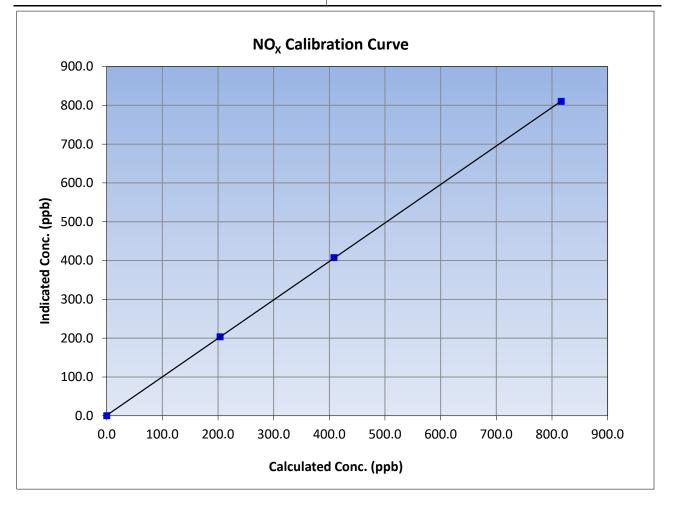
No maintenance or adjustments done.

Calibration Performed By:



NO_x Calibration Summary

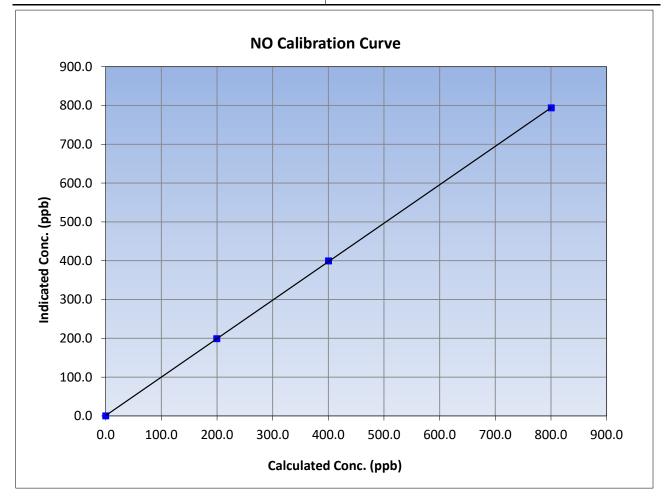
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	19, 2023	Previous Calibration:	Decembe	r 12, 2022
Station Name:	Athabas	ca Valley	Station Number:	AM	S07
Start Time (MST):	7:	10	End Time (MST):	11	:48
Analyzer make:	Thermo 42i		Analyzer serial #:	11601	20024
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999988	≥0.995
816.7	810.0	1.0083	correlation coefficient	0.555566	20.333
408.4	407.6	1.0019	Clana	0.001445	0.90 - 1.10
203.7	203.4	1.0014	Slope	0.991445	0.90 - 1.10
			Intercept	1.137226	+/-20





NO Calibration Summary

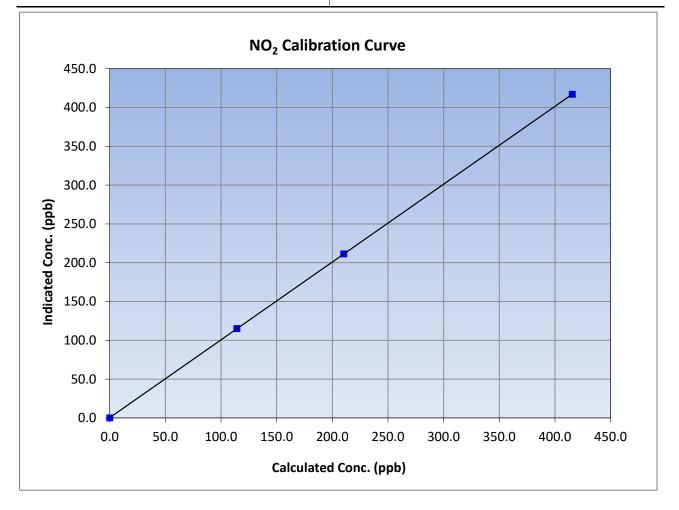
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	19, 2023	Previous Calibration:	Decembe	r 12, 2022
Station Name:	Athabas	ca Valley	Station Number:	AM	S07
Start Time (MST):	7:	10	End Time (MST):	11:	:48
Analyzer make:	Therr	no 42i	Analyzer serial #:	11601	20024
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999989	≥0.995
800.7	793.8	1.0087	correlation coernelent	0.555565	20.995
400.4	399.3	1.0026	Slope	0.991156	0.90 - 1.10
199.7	199.1	1.0029	Siope	0.991150	0.90 - 1.10
			Intercept	0.993235	+/-20

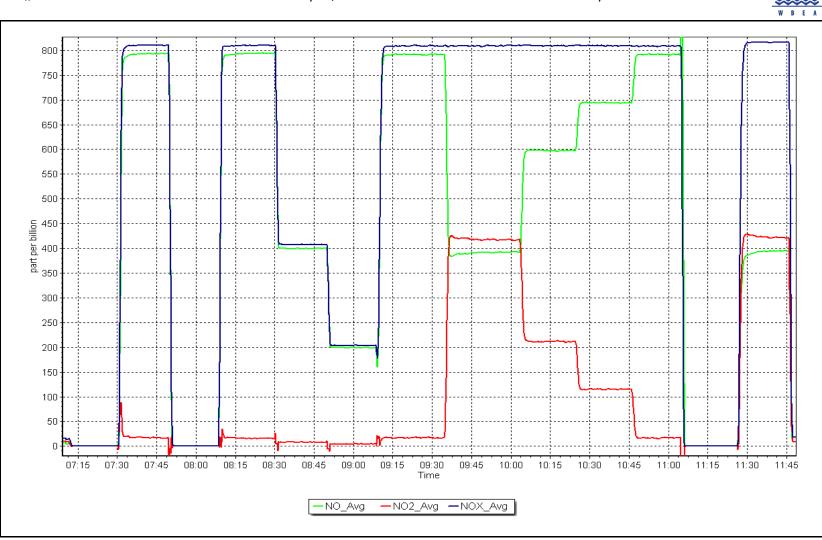




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	on Date: January 19, 2023		Previous Calibration:	Decembe	r 12, 2022
Station Name:	Athabasca Valley		Station Number:	AM	S07
Start Time (MST):	tart Time (MST): 7:10		End Time (MST):	11:48	
Analyzer make: Thermo 42i			Analyzer serial #: 116012		20024
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999999	≥0.995
415.5	416.9	0.9967	correlation coefficient	0.5555555	20.995
210.2	211.3	0.9950	Slope	1.002806	0.90 - 1.10
114.2	115.1	0.9925	Siope	1.002800	0.30 - 1.10
			Intercept	0.326300	+/-20









O₃ Calibration Report

Version-01-2020

					Version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley January 20, 2023 10:28 Routine		Station number: Last Cal Date: End time (MST):	December 6, 2022	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer T700 T701H		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1507964700	
Calibration slope: Calibration intercept:	<u>Start</u> 0.997143 1.100000	<u>Finish</u> 0.995429 1.500000	Backgd or Offset: Coeff or Slope:	<u>Start</u> -0.5 1.070	<u>Finish</u> -0.6 1.102
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc, Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	5000	1374.8	400.0	391.6	1.021
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.5	
high point	5000	1374.3	400.0	399.0	1.003
second point	5000	1017.7	200.0	201.6	0.992
third point	5000	840.4	100.0	101.7	0.983
as left zero	5000	0.0	0.0	0.0	
as left span	5000	1373.6	400.0	403.5	0.991
			Avera	ge Correction Factor	0.993
Baseline Corr As found: Baseline Corr 2nd AF pt:	391.7 NA	Previous response AF Slope:		*% change AF Intercept:	-2.1%
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

No Maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay

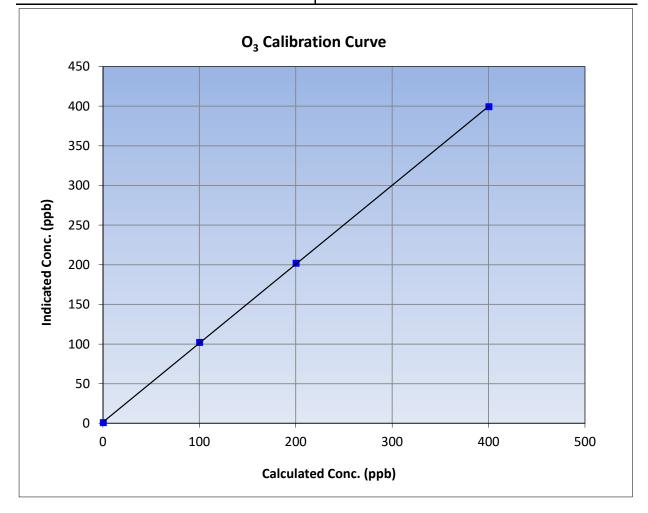


O₃ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 20, 2023	Previous Calibration:	December 6, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:28	End Time (MST):	13:37
Analyzer make:	Thermo 49i	Analyzer serial #:	1507964700

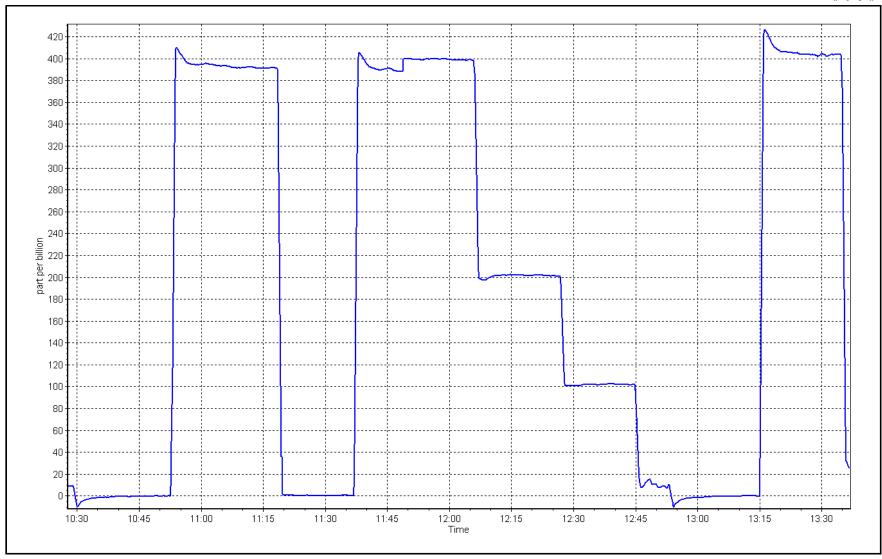
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999966	≥0.995
400.0	399.0	1.0025	correlation coefficient	0.999900	20.995
200.0	201.6	0.9921	Slope	0.995429	0.90 - 1.10
100.0	101.7	0.9833	Slope	0.993429	0.90 - 1.10
			- Intercept	1.500000	+/- 5











T640 PM_{2.5} CALIBRATION

W B E A					Version-09-2020
		Station Informat	ion		
Station Name: Calibration Date: Start time (MST):	Athabasca Valley January 19, 2023 11:51		Station number: AMS (Last Cal Date: Decer End time (MST): 12:29	nber 5, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 326		
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		S/N: 38875 S/N: 38875		
		Monthly Calibration	n Test		
<u>Parameter</u> T (°C) P (mmHg)	<u>As found</u> -6.0 733.1	<u>Measured</u> -6.1 735.2	<u>As left</u> -6.0 733.1	Adjusted	<i>(Limits)</i> +/- 2 °C +/- 10 mmHg
flow (LPM) Leak Test:	5.00 Date of check: J PM w/o HEPA:	5.08 anuary 19, 2023 11.2	5.00 Decer PM w/ HEPA:	nber 5, 2022 0	+/- 0.25 LPM
Inlet cleaning :	Inlet Head	\checkmark			
		Quarterly Calibratio	n 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 Disposable Filte		December December			
		Annual Maintena	nce		
Date Sample Tul Date RH/T Sense		December December			
Notes:		No adjustmen	ts done. Inlet Head cleaned		
Calibration by:	Melissa Lemay				



CO Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley January 20, 2023 7:05 Routine		Station number: Last Cal Date: End time (MST):	AMS07 December 14, 2022 9:52	
		Calibration St	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 Analyzer Range	: Thermo 48i-LTE : 0 - 50 ppm		Analyzer serial #:	1408761381	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.999858	0.999713	Backgd or Offset:	3.341	3.600
Calibration intercept:	0.074542	0.044565	Coeff or Slope:	1.079	1.079
		CO Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	
as found span	4933	66.7	40.0	40.4	0.991
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4933	66.7	40.0	40.0	1.001
second point	4967	33.3	20.0	20.1	0.992
third point	4983	16.7	10.0	10.0	0.998
as left zero	5000	0.0	0.0	0.0	
as left span	4933	66.7	40.0	40.0	1.001
			Avera	ge Correction Factor	0.997
Baseline Corr As found:	40.38	Prev response:	40.09	*% change:	0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
-	NA	AF Correlation:			
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:				AF Intercept: * = > +/-5% change initiate	es investiga

Notes:

No Maintenance done. Zero adjusted.

Calibration Performed By:

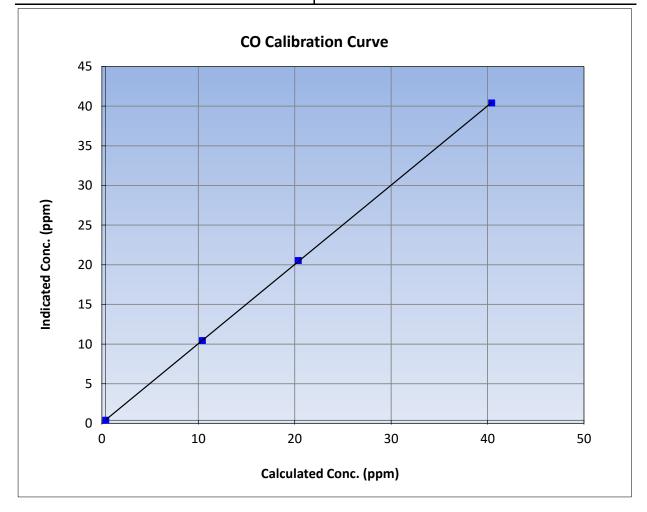


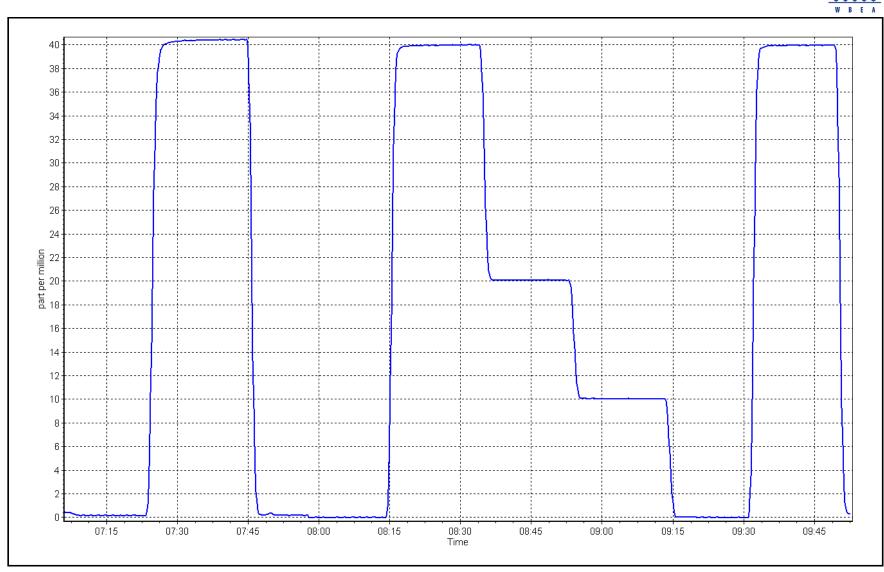
CO Calibration Summary

Version-01-2020 **Station Information** Calibration Date: January 20, 2023 **Previous Calibration:** December 14, 2022 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 7:05 End Time (MST): 9:52 Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999977	≥0.995
40.0	40.0	1.0006	correlation coefficient	0.999977	20.335
20.0	20.1	0.9920	Clana	0.999713	0.90 - 1.10
10.0	10.0	0.9981	Slope	0.999713	0.90 - 1.10
			Intercept	0.044565	+/-1.5





CO Calibration Plot

Location: Athabasca Valley





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

					Version-01-2020
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan January 11, 2023 12:19 Routine		Station number: Last Cal Date: End time (MST):	AMS08 December 6, 2022 3:08 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> 0.999374 0.136257	<u>Finish</u> 1.000787 0.415954	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	804.8	0.995
as found 2nd point as found 3rd point new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.3	800.4	801.7	0.998
second point	4960	40.2	400.7	400.4	1.001
third point	4980	20.1	200.4	201.9	0.992
as left zero	5000	0.0	0.0	0.3	
as left span	4920	80.3	800.4 Averas	806.4 ge Correction Factor	0.993 0.997
Baseline Corr As found:	804.70	Previous response		*% change * = > +/-5% change initiate	0.6%

Notes:

Sample inlet filter changed after as founds. no adjustments needed

Calibration Performed By:

Morgan Voyageur

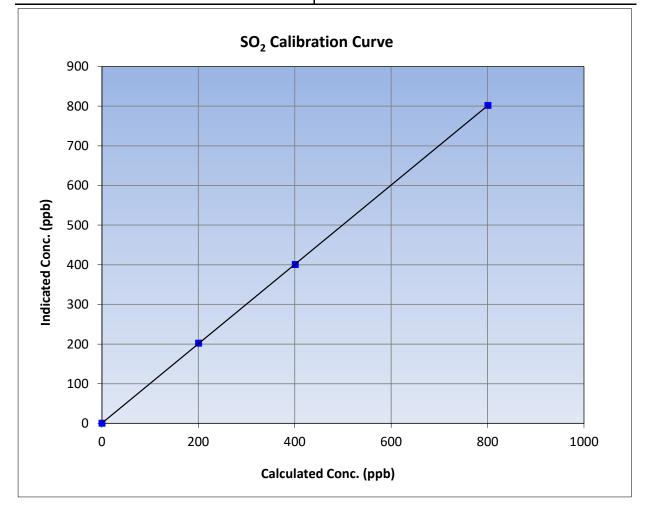


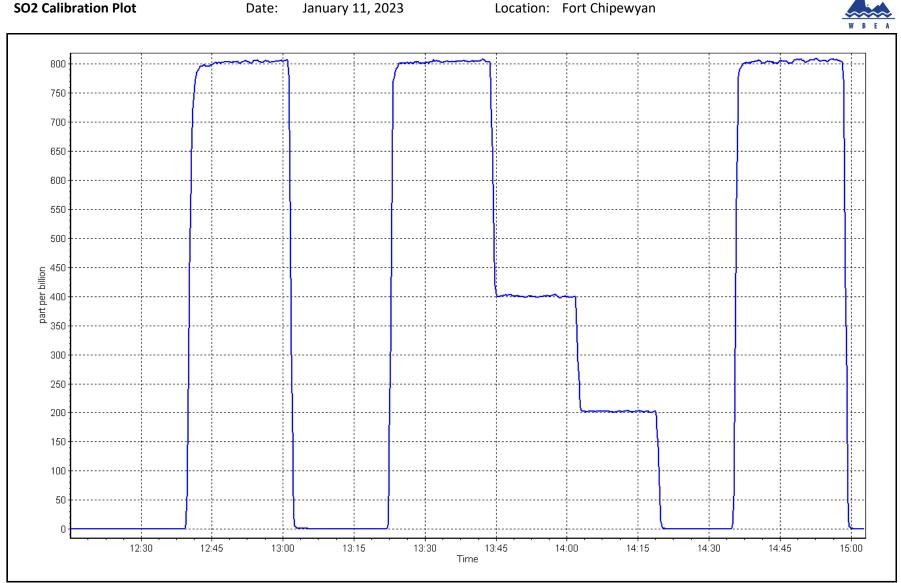
SO₂ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 11, 2023	Previous Calibration:	December 6, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	12:19	End Time (MST):	15:08
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999994	≥0.995
800.4	801.7	0.9984	correlation coefficient	0.999994	20.335
400.7	400.4	1.0007	Slope	1.000787	0.90 - 1.10
200.4	201.9	0.9923	Slope	1.000787	0.90 - 1.10
			Intercept	0.415954	+/-30





Location: Fort Chipewyan



TRS Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan January 11, 2023 8:20 Routine		Station number: Last Cal Date: End time (MST):	AMS08 December 5, 2022 12:05	
		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 #:	EY0002276 4.97 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: CAG Make/Model:	Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:	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:	1.001428 -0.261248	0.999140 0.018799	Backgd or Offset: Coeff or Slope:	1.42 0.743	1.42 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)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
		80.5	80.0	80.1	0.998
as found span	4920	80.5		39.9	
as found span as found 2nd point	4920 4960	40.2	40.0	55.5	0.999
			40.0 20.0	19.7	0.999
as found 2nd point as found 3rd point	4960	40.2 20.1	20.0		
as found 2nd point as found 3rd point	4960	40.2	20.0		
as found 2nd point as found 3rd point	4960	40.2 20.1	20.0		1.009 Correction factor (Cc/lc)
as found 2nd point as found 3rd point new cylinder response	4960 4980 Dilution air flow rate	40.2 20.1 TRS Calibrat	20.0 ion Data Calculated concentration (ppb)	19.7 Indicated	1.009 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point	4960 4980 Dilution air flow rate (sccm) 5000 4920	40.2 20.1 TRS Calibrat Source gas flow rate (sccm)	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0	Indicated concentration (ppb) (Ic) 0.0 79.9	1.009 Correction factor (Cc/Ic) Limit = 0.95-1.05 1.001
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960	40.2 20.1 TRS Calibrati Source gas flow rate (sccm) 0.0 80.5 40.2	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1	1.009 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4980	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9	1.009 Correction factor (Cc/lc) Limit = 0.95-1.05 1.001 0.996 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	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1 0.0	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9 0.1	1.009 Correction factor (Cc/lc) Limit = 0.95-1.05 1.001 0.996 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	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4920	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1 0.0 80.5	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 80.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9 0.1 80.1	1.009 Correction factor (Cc/lc) Limit = 0.95-1.05 1.001 0.996 1.004 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 as left span O2 Scrubber Check	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4920 4920 4920 4920	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1 0.0 80.5 80.5 80.3	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9 0.1 80.1 0.1	1.009 Correction factor (Cc/lc) Limit = 0.95-1.05 1.001 0.996 1.004 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 as left span O2 Scrubber Check Date of last scrubber cha	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4920 4920 4920 4920 4919.7 ange:	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1 0.0 80.5 80.3 March 7, 2022	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 80.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9 0.1 80.1 0.1 Ave Corr Factor	1.009 Correction factor (Cc/lc) Limit = 0.95-1.05 1.001 0.996 1.004 0.999 1.001
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 O2 Scrubber Check Date of last scrubber cha	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4920 4920 4920 4920 4919.7 ange:	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1 0.0 80.5 80.5 80.3	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 80.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9 0.1 80.1 0.1	1.009 Correction factor (Cc/lc) Limit = 0.95-1.05 1.001 0.996 1.004 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 as left span O2 Scrubber Check Date of last scrubber cha Date of last converter ef	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4920 4920 4920 4920 4919.7 ange:	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1 0.0 80.5 80.3 March 7, 2022	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 80.0 80.0	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9 0.1 80.1 0.1 Ave Corr Factor	1.009 Correction factor (Cc/Ic) Limit = 0.95-1.05 1.001 0.996 1.004 0.999 1.001
as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero	4960 4980 Dilution air flow rate (sccm) 5000 4920 4960 4960 4980 5000 4920 4919.7 ange: ficiency test:	40.2 20.1 TRS Calibrat Source gas flow rate (sccm) 0.0 80.5 40.2 20.1 0.0 80.5 80.3 March 7, 2022 March 15, 2022	20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 80.0 79.86	19.7 Indicated concentration (ppb) (Ic) 0.0 79.9 40.1 19.9 0.1 80.1 0.1 Ave Corr Factor 100.7%	1.009 Correction factor (Cc/lc) Limit = 0.95-1.05 1.001 0.996 1.004 0.999 1.001 efficiency

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

Calibration Performed By:

Notes:

Morgan Voyageur

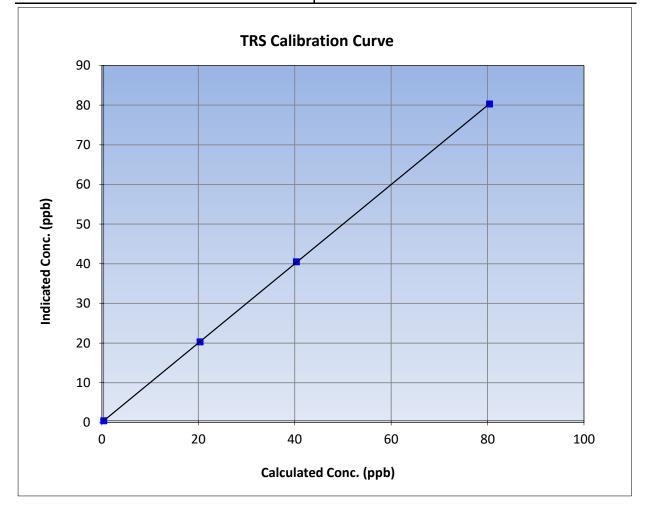


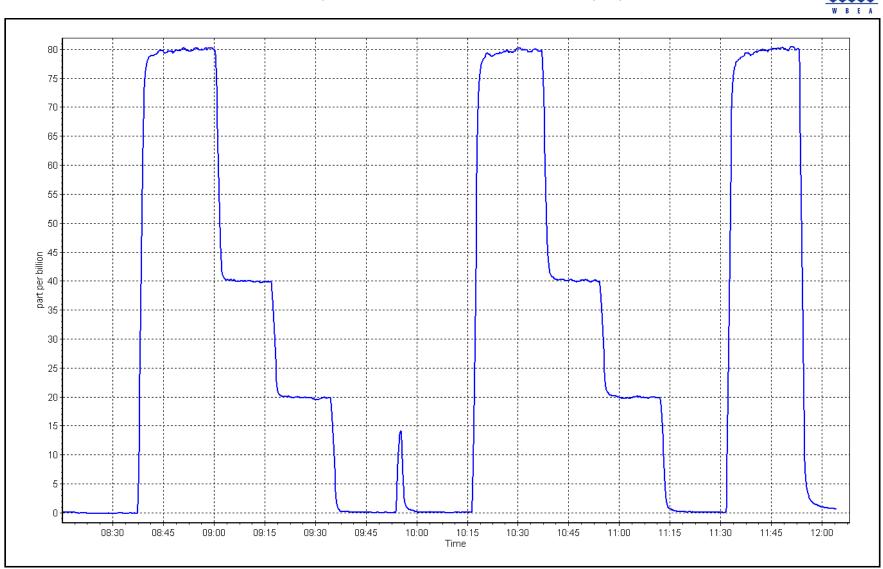
TRS Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	January 11, 2023	Previous Calibration:	December 5, 2022					
Station Name:	Fort Chipewyan	Station Number:	AMS08					
Start Time (MST):	8:20	End Time (MST):	12:05					
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999990	≥0.995
80.0	79.9	1.0014	correlation coefficient	0.555550	20.333
40.0	40.1	0.9964	Slope	0.999140	0.90 - 1.10
20.0	19.9	1.0040	Slope	0.999140	0.30 - 1.10
			Intercept	0.018799	+/-3





TRS Calibration Plot





Station Name:

Reason:

Calibration Date:

Start time (MST):

Fort Chipewyan

January 10, 2023

10:28

Routine

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS08 Last Cal Date: December 5, 2022 End time (MST): 15:41

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

Analyzer Information

Analyzer make: Th NOX Range (ppb): 0 -			Analyzer serial #: 14	26262592	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.819	1.844	NO bkgnd or offset:	6.8	6.9
NOX coeff or slope:	0.997	0.993	NOX bkgnd or offset:	6.8	6.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	252.6	252.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998229	0.995345
NO _x Cal Offset:	-1.120000	0.840000
NO Cal Slope:	1.000300	0.998815
NO Cal Offset:	-2.120000	-0.200000
NO ₂ Cal Slope:	1.005217	0.991767
NO ₂ Cal Offset:	-0.633827	-0.832054



$NO_X \setminus NO \setminus NO_2$ 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	0.9	0.7	0.1		
as found span	4918	82.0	800.3	800.3	0.0	794.0	787.9	6.8	1.0080	1.0158
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	1.0	0.9	0.1		
high point	4918	82.0	800.3	800.3	0.0	797.7	800.0	-2.2	1.0033	1.0004
second point	4959	41.0	400.2	400.2	0.0	398.5	398.1	0.4	1.0042	1.0052
third point	4980	20.5	200.1	200.1	0.0	200.2	199.1	1.1	0.9994	1.0049
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1		
as left span	4918	82.0	800.3	412.1	388.2	800.5	412.4	388.3	0.9998	0.9993
							Average C	orrection Factor	1.0023	1.0035
Corrected As fo	ound NO _x =	793.1 ppb	NO =	787.2 ppb	* = > +/-5%	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-0.6%
Previous Respo	onse NO _x =	797.8 ppb	NO =	798.4 ppb				*Percent Chan	ge NO =	-1.4%
Baseline Corr 2	2nd pt NO _x =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

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

Notes:

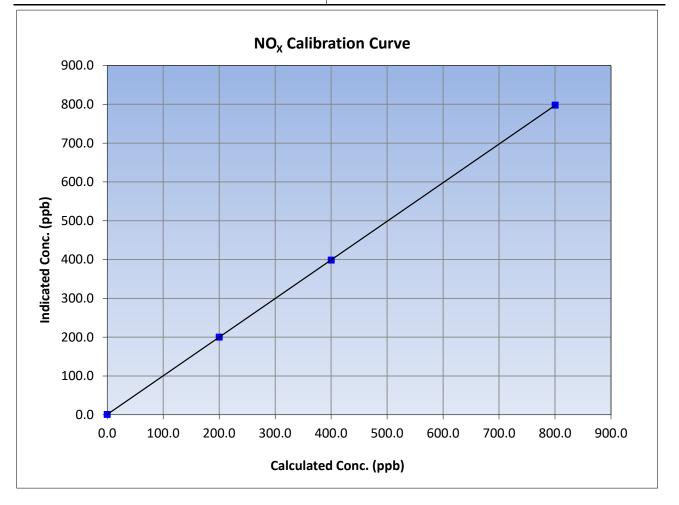
Sample inlet filter changed after as founds. Adjusted the zero and span.

Calibration Performed By:



NO_x Calibration Summary

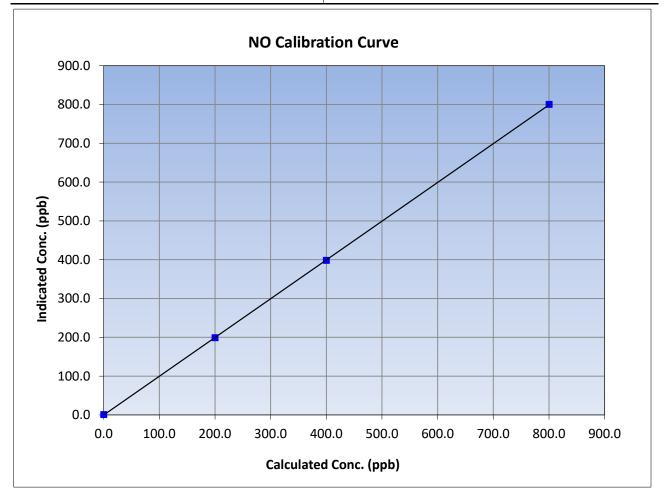
WBEA		Station	Information		Version-04-
		Station	Information		
Calibration Date:	January	10, 2023	Previous Calibration:	Decembe	er 5, 2022
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08
Start Time (MST):	10	:28	End Time (MST):	15:	41
Analyzer make:	Thern	no 42i	Analyzer serial #:	14262	62592
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	1.0		Completion Coofficient	0.000000	
800.3	797.7	1.0033	Correlation Coefficient	0.999998	≥0.995
400.2	398.5	1.0042	Claura.	0.995345	0.90 - 1.10
200.1	200.2	0.9994	Slope	0.335345	0.30 - 1.10
			Intercept	0.840000	+/-20





NO Calibration Summary

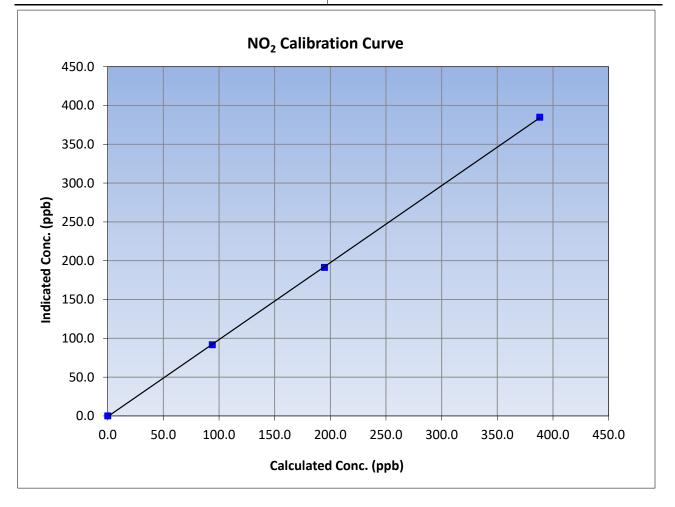
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	10, 2023	Previous Calibration:	Decembe	er 5, 2022
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08
Start Time (MST):	10	:28	End Time (MST):	15	:41
Analyzer make:	Thermo 42i		Analyzer serial #:	14262	62592
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.9		Correlation Coefficient	0.999988	≥0.995
800.3	800.0	1.0004	correlation coefficient	0.999900	20.333
400.2	398.1	1.0052	Slope	0.998815	0.90 - 1.10
200.1	199.1	1.0049	Siope	0.996615	0.90 - 1.10
			Intercept	-0.200000	+/-20





NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	10, 2023	Previous Calibration:	Decembe	er 5, 2022
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08
Start Time (MST):	10	:28	End Time (MST):	15	:41
Analyzer make:	Thern	no 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	0.999969	≥0.995
388.2	384.8	1.0088	correlation coefficient	0.555505	20.333
194.7	191.3	1.0178	Slope	0.991767	0.90 - 1.10
93.9	91.7	1.0240	Slope	0.991707	0.90 - 1.10
			Intercept	-0.832054	+/-20







O₃ Calibration Report

Version-01-2020

					Version-01-2020
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan January 10, 2023 7:47 Routine		Station number: Last Cal Date: End time (MST):	December 6, 2022	
		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 9 - 500 ppb		Analyzer serial #:	3872	
Calibration slope: Calibration intercept:	<u>Start</u> 1.009714 -0.900000	<u>Finish</u> 1.011486 -0.960000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> -2.0 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/Ic Limit = 0.95-1.05
as found zero	5000	NA	0.0	0.3	
as found span	5000	963.6	400.0	404.6	0.989
as found 2nd point					
as found 3rd point					
calibrator zero	5000	NA	0.0	0.5	
high point	5000	961.7	400.0	404.4	0.989
second point	5000	810.3	200.0	200.5	0.998
third point	5000	701.3	100.0	98.8	1.012
as left zero	5000	NA	0.0	0.1	
as left span	5000	963.3	400.0	405.2	0.987
			Avera	ge Correction Factor	1.000
Baseline Corr As found:	404.3	Previous response	403.0	*% change	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

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

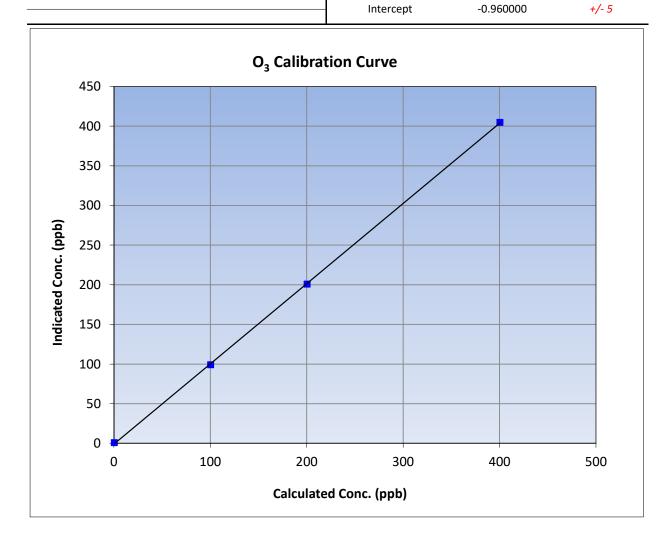
Calibration Performed By:

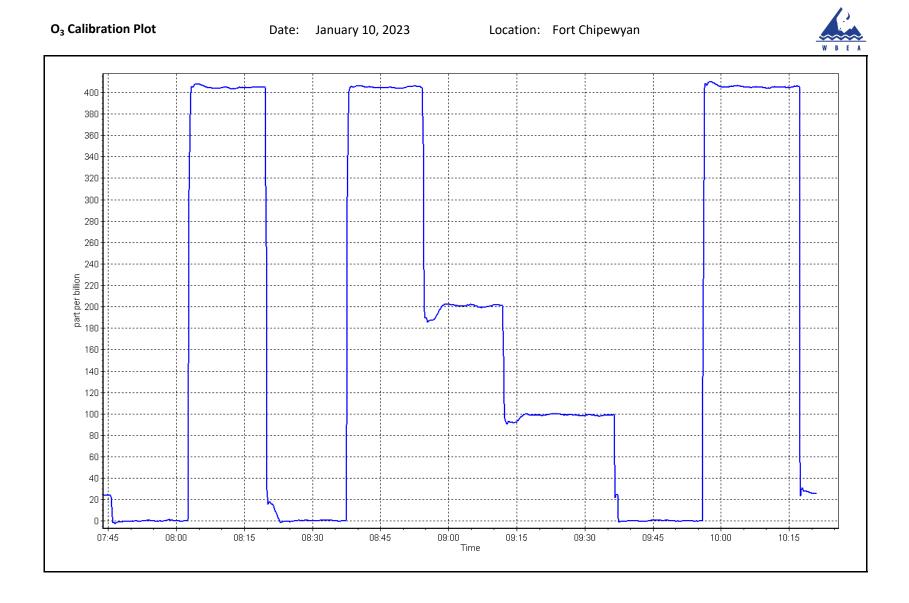
Morgan Voyageur



O₃ Calibration Summary

WBEA					Version-01-20
		Station	Information		
Calibration Date:	January 1	0, 2023	Previous Calibration:	Decembe	er 6, 2022
Station Name:	Fort Chip	ewyan	Station Number:	AM	IS08
Start Time (MST):	7:47		End Time (MST):	10	:23
Analyzer make: Teledyne		API T400	Analyzer serial #:	3872	
		Calibr	ration Data		
Calculated concentration I (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	tion	<u>Limits</u>
			1		
(ppb) (Cc)	(ppb) (lc)	(Cc/Ic)	Statistical Evalua	ntion 0.999940	<u>Limits</u> ≥0.995
(ppb) (Cc) 0.0	(ppb) (lc) 0.5	(Cc/Ic) 	1		





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T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Informat	ion		
Station Name: Calibration Date: Start time (MST):	Fort Chipewyan January 11, 2023 10:55		Station number: Last Cal Date: End time (MST): :	December 5, 2022	
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		S/N: 2	216	
Flow Meter Make/Model: Temp/RH standard:	Delta Cal Delta Cal		S/N: : S/N: :		
		Monthly Calibration	n Test		
<u>Parameter</u> T (°C) P (mmHg) flow (LPM)	<u>As found</u> -8.8 740.7 5.05	<u>Measured</u> -8.8 741.8 4.99	<u>As left</u> -8.8 740.7 5.05	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM
Leak Test:	Date of check: _ PM w/o HEPA: _	January 11, 2023 2.8		 December 5, 2022	17-0.25 EI W
Inlet cleaning :	Inlet Head				
		Quarterly Calibratio	n Test		
<u>Parameter</u> PMT Peak Test	<u>As found</u>	Measured	<u>As left</u>	Adjusted	(Limits) 11.1 +/- 0.5
Date Optical Chamber Cleaned: Disposable Filter Changed:		December 5, 2022 December 5, 2022			
		Annual Maintena	nce		
Date Sample Tube Cleaned: Date RH/T Sensor Cleaned:		July 14, July 14,			
Notes:		No a	adjustments made.		

Calibration by:

Morgan Voyageur



CO Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan January 13, 2023 10:03 Routine		Station number: Last Cal Date: End time (MST):	AMS08 December 6, 2022 13:07	
		Calibration Sta	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	3,030 ALM014846	ppm	Cal Gas Exp Date:	December 1, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	3,030 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	АРІ T700 АРІ T701Н		Serial Number: Serial Number:	5272 197	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range:			Analyzer serial #:	3505	
Calibration slope: Calibration intercept:	<u>Start</u> 0.997591 -0.041052	<u>Finish</u> 0.995217 0.070924	Backgd or Offset: Coeff or Slope:	<u>Start</u> -0.013 0.999	<u>Finish</u> -0.013 0.999
		CO Calibratio	n Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.05	
as found span	4933	66.7	40.4	40.3	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4934	66.7	40.4	40.3	1.004
second point	4967	33.3	20.2	20.2	0.998
third point	4983	16.7	10.1	10.1	1.002
as left zero	5000	0.0	0.0	0.1	
as left span	2960	40.0	40.4	40.2	1.005
Baseline Corr As found:	40.26	Prev response:	40.28	e Correction Factor *% change:	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	s investigation

Notes:

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

Calibration Performed By:

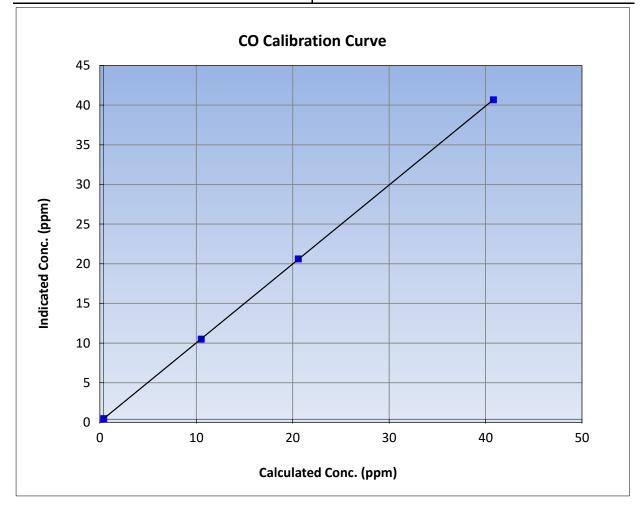
Matthew Courtoreille Morgan V

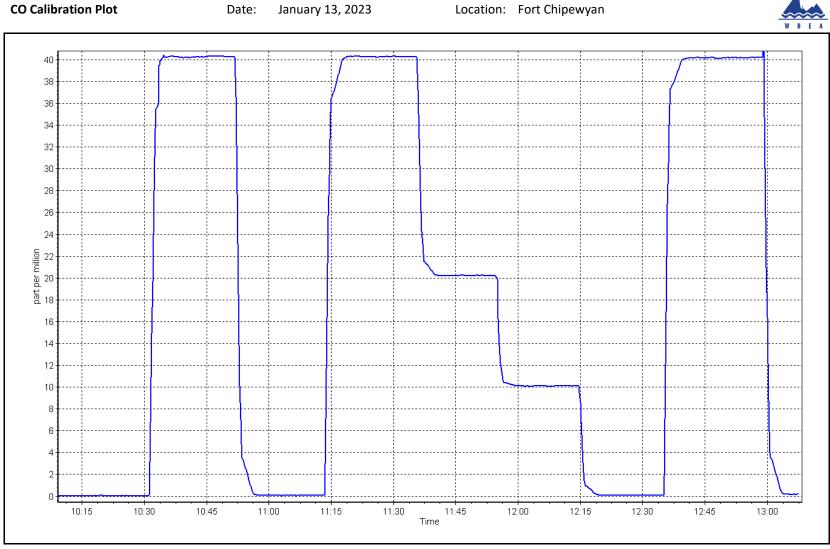


CO Calibration Summary

uary 13, 2023			
adiy 13, 2023	Previous Calibration:	December 6, 2022	
rt Chipewyan	Station Number:	AMS08	
10:03	End Time (MST):	13:07	
API T300	Analyzer serial #:	3505	
Cali	bration Data		
r	API T300	10:03 End Time (MST):	

 (ppm) (Cc)	(ppm) (Ic)	(Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999992	≥0.995
40.4	40.3	1.0036	correlation coefficient	0.999992	20.995
20.2	20.2	0.9980	Slope	0.995217	0.90 - 1.10
10.1	10.1	1.0020	Slope	0.555217	0.50 - 1.10
			Intercept	0.070924	+/-1.5







CO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Fort Chipewyan		Station number:	AMS08	
Calibration Date:	January 13, 2023		Last Cal Date:	December 6, 2022	
Start time (MST):	13:11		End time (MST):	16:56	
Reason:	Routine			20.00	
		Calibration Sta	andards		
Cal Gas Concentration:	60,220	ppm	Cal Gas Exp Date:	December 1, 2028	
Cal Gas Cylinder #:	ALM014846	r r		,	
Removed Cal Gas Conc:	60,220	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	ŇA		Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5272	
N2 Gen Make/Model:	NG 5000		Serial Number:	771048318	
	110 0000			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
		Analyzer Info	rmation		
Analyzer make:	: Teledyne API T360		Analyzer serial #:	289	
, Analyzer Range			,		
	Start	Finish		Start	Finich
Calibration slope:	<u>Start</u> 0.998681	0.998112	Packed or Officiate	<u>Start</u> 0.019	<u>Finish</u> 0.019
•			Backgd or Offset:		
Calibration intercept:	-5.440000	-5.540000	Coeff or Slope:	1.007	1.011
		CO ₂ Calibratio	on Data		
		с. (I	Calculated		
Set Point	Dilution air flow rate	Source gas flow rate	concentration (ppm)	Indicated concentration (
	(sccm)	(sccm)	(Cc)	(ppm) (lc)	<i>Limit = 0.95-1.05</i>
			()		
as found zero	3000	0.0	0.0	-0.2	
as found zero as found span	3000 2920	0.0 80.0		-0.2 1574.9	1.020
			0.0		1.020
as found span			0.0		1.020
as found span as found 2nd point			0.0		1.020
as found span as found 2nd point as found 3rd point			0.0		 1.020
as found span as found 2nd point as found 3rd point new cylinder response	2920	80.0	0.0 1605.9	1574.9	
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	2920 3000	0.0	0.0 1605.9 0.0	0.1	
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	2920 3000 2920	80.0 0.0 80.0	0.0 1605.9 0.0 1605.9	0.1 1604.1	 1.001
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	2920 3000 2920 2960	80.0 0.0 80.0 40.0	0.0 1605.9 0.0 1605.9 802.9	0.1 1604.1 781.1	 1.001 1.028
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	2920 3000 2920 2960 2980 3000	80.0 0.0 80.0 40.0 20.0 0.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0	0.1 0.1 1604.1 781.1 397.5 -0.3	1.001 1.028 1.010
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	2920 3000 2920 2960 2980	80.0 0.0 80.0 40.0 20.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 802.9	0.1 0.1 1604.1 781.1 397.5	1.001 1.028 1.010
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	2920 3000 2920 2960 2980 3000 2960	80.0 0.0 80.0 40.0 20.0 0.0 40.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 802.9 Average	0.1 0.1 1604.1 781.1 397.5 -0.3 778.5 re Correction Factor	 1.001 1.028 1.010 1.031 1.013
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:	2920 3000 2920 2960 2980 3000 2960 1575.10	80.0 0.0 80.0 40.0 20.0 0.0 40.0 Prev response:	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 802.9 Averag 1598.31	0.1 0.1 1604.1 781.1 397.5 -0.3 778.5 ce Correction Factor *% change:	 1.001 1.028 1.010 1.031
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	2920 3000 2920 2960 2980 3000 2960	80.0 0.0 80.0 40.0 20.0 0.0 40.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 802.9 Averag 1598.31	0.1 0.1 1604.1 781.1 397.5 -0.3 778.5 re Correction Factor	 1.001 1.028 1.010 1.031 1.013

Notes:

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

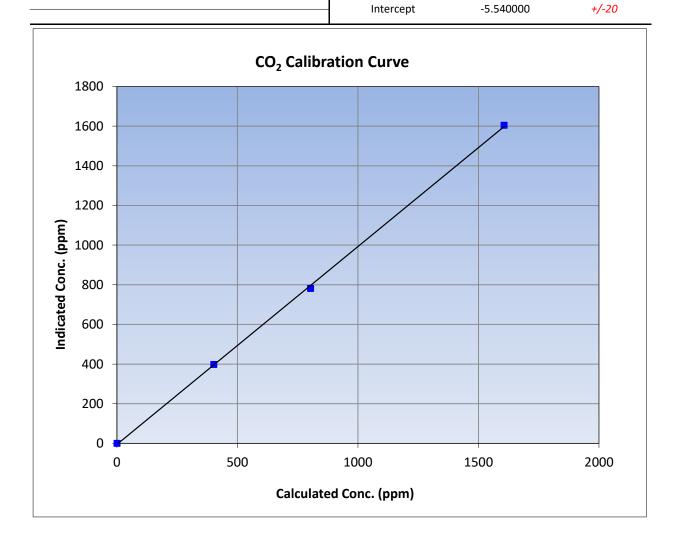
Calibration Performed By:

Matthew Courtoreille Morgan V



CO₂ Calibration Summary

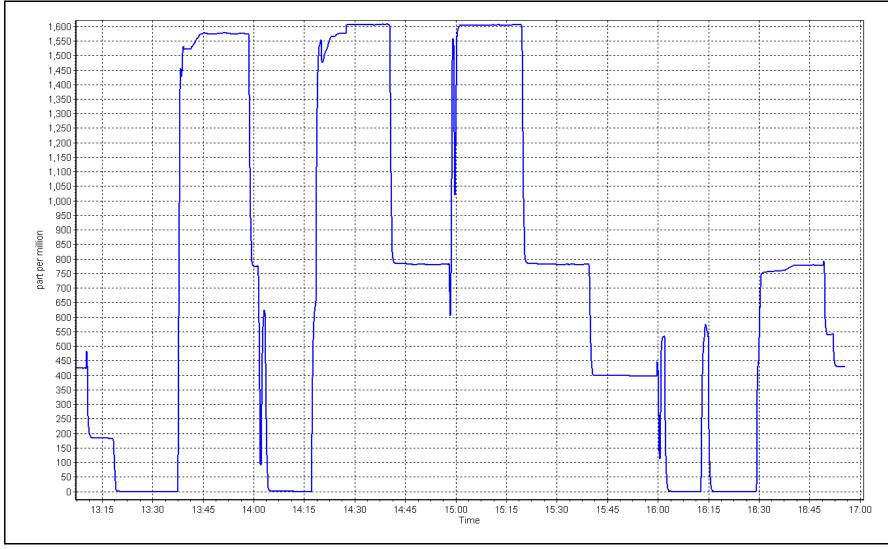
WBEA					Version-01-2020
		Station	Information		
Calibration Date	ration Date January 13, 2023		Previous Calibration	Decembe	er 6, 2022
Station Name	Fort Chip	ewyan	Station Number	AMS08	
Start Time (MST)	13:1	.1	End Time (MST)	16:56	
Analyzer make Teledyne		API T360 Analyzer serial #		2	89
		Calib	ration Data		
Calculated concentration I (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999785	>0.005
1605.9	1604.1	1.0011	Correlation Coefficient	0.999785	≥0.995
802.9	781.1	1.0280	Slope	0.998112	0.90 - 1.10
401.5	397.5	1.0100	Siope	0.338112	0.30 - 1.10





Location: Fort Chipewyan







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS09 BARGE LANDING JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing January 13, 2023 9:50 Routine		Station number: Last Cal Date: End time (MST):	AMS09 December 12, 2022 13:51	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	49.96 CC151285	ppm	Cal Gas Exp Date:	January 5, 2025	
Removed Cal Gas Conc:	49.96	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	3812	
ZAG Make/Model:	API T701		Serial Number:	4888	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1118148498	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997747	0.994624	Backgd or Offset:	9.6	9.8
Calibration intercept:	-0.329817	-0.310040	Coeff or Slope:	0.986	0.986
		SO ₂ 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	80.2	801.5	796.3	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	80.2	801.5	797.5	1.005
second point	4959	40.1	400.8	397.0	1.009
third point	4980	20.0	199.8	198.5	1.007
as left zero	5000	0.0	0.0	0.3	
as left span	4919	80.2	801.5	796.9	1.006
			Averag	ge Correction Factor	1.007
Baseline Corr As found:	796.00	Previous response	799.35	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Basenne con Enava pa					

Notes:

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

Calibration Performed By:

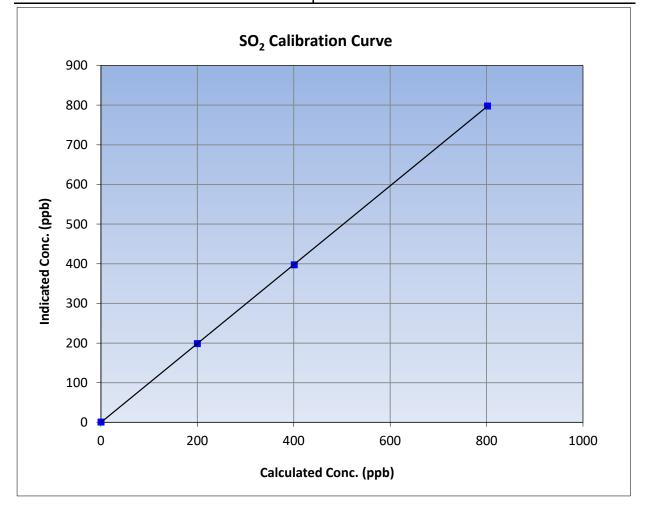


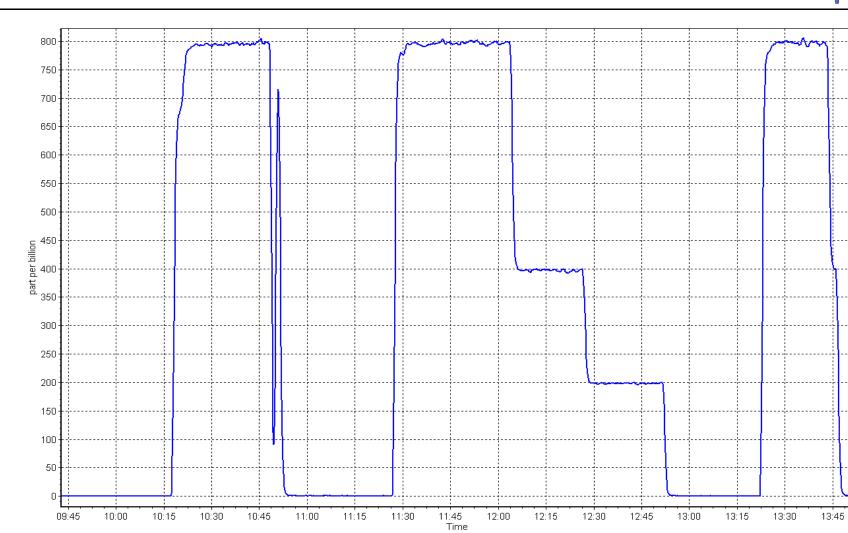
SO₂ Calibration Summary

		Version-01-2020					
Station Information							
January 13, 2023	Previous Calibration:	December 12, 2022					
Barge Landing	Station Number:	AMS09					
9:50	End Time (MST):	13:51					
Thermo 43i	Analyzer serial #:	1118148498					
	January 13, 2023 Barge Landing 9:50	January 13, 2023Previous Calibration:Barge LandingStation Number:9:50End Time (MST):					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999993	≥0.995
801.5	797.5	1.0050	Correlation Coefficient	0.9999995	20.995
400.8	397.0	1.0094	Slope	0.994624	0.90 - 1.10
199.8	198.5	1.0068	Slope	0.994024	0.90 - 1.10
			- Intercept	-0.310040	+/-30





Location: Barge Landing





TRS Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing January 23, 2023 11:31 Routine		Station number: Last Cal Date: End time (MST):	AMS09 December 20, 2022 16:01	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.87 EY0002346	ppm	Cal Gas Exp Date:	September 2, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #:	4.87 NA	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API 1700 API T701		Serial Number: Serial Number:	3812 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>	Finish
Calibration slope:	0.999432	1.003148	Backgd or Offset:	2.46	2.52
Calibration intercept:	0.079028	-0.000990	Coeff or Slope:	1.084	1.091
		TRS As 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	82.1	80.0	78.5	1.019
as found 2nd point	4959	41.1	40.0	39.4	1.016
as found 3rd point	4979	20.5	20.0	19.7	1.014
new cylinder response			_		
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4918	82.1	80.0	80.2	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				Ave Corr Factor	0.997
Date of last converter ef	ficiency test:				efficiency
Baseline Corr As found:	78.5	Prev response:	80.00	*% change:	-1.9%
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.981427	AF Intercept:	0.059042
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999997		
				* = > +/-5% change initiat	es investigation

Notes:

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

Calibration Performed By:

Braiden Boutilier

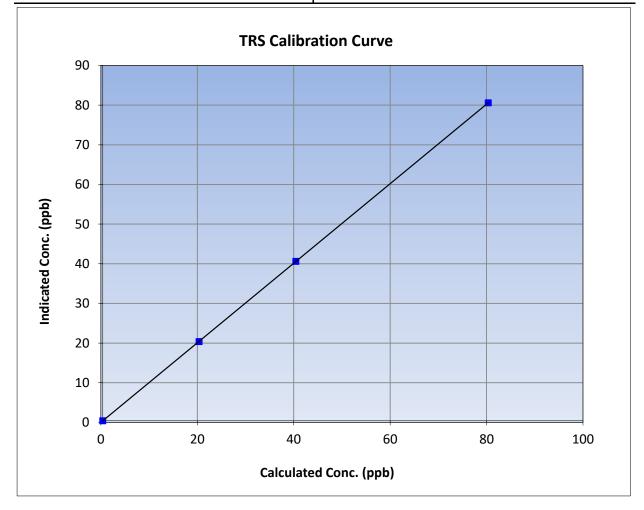


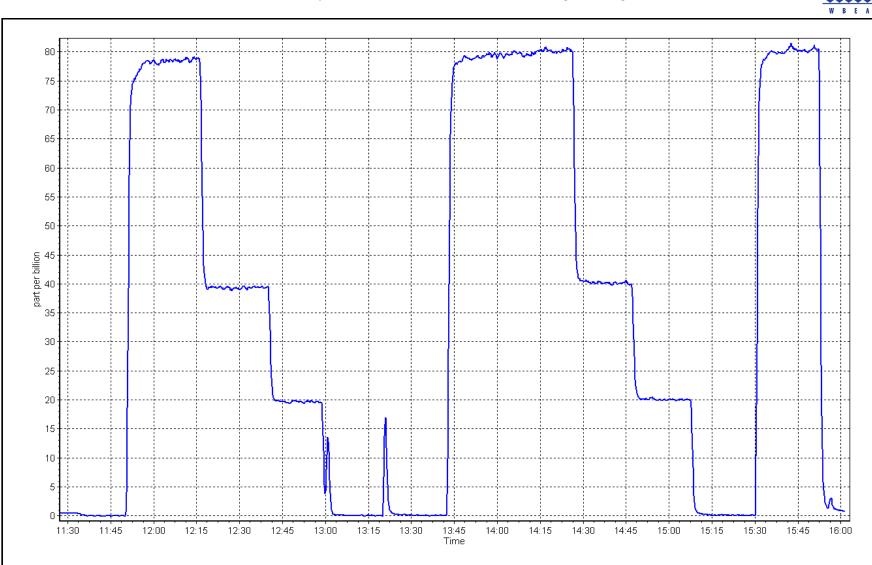
TRS Calibration Summary

Version-11-2021 **Station Information** Calibration Date: January 23, 2023 **Previous Calibration:** December 20, 2022 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 11:31 End Time (MST): 16:01 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	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	





TRS Calibration Plot

Location: Barge Landing



THC / CH_4 / NMHC Calibration Report

		Statio	n Information				
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing January 13, 202 9:50 Routine	3	Station number: AMS09 Last Cal Date: December 13, 2022 End time (MST): 13:51				
		Calibra	tion Standards				
Gas Cert Reference:	C	C151285	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				
ZAG make/model:	API T701		Serial Number: 48	388			
		Analyzo	er Information				
Analyzer make	: Thermo 55i		Analyzer serial #: 11	70050131			
THC Range (ppm)	: 0 - 100 ppm						
NMHC Range (ppm)	: 0 - 50 ppm		CH4 Range (ppm): 0	- 50 ppm			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>		
CH4 SP Ratio	: 1.96E-04	1.99E-04	NMHC SP Ratio:	4.31E-05	4.28E-05		
CH4 Retention time	: 12.00	12.2	NMHC Peak Area:	212118	213327		

THC Calibration Data									
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	4919	80.2	17.12	17.03	1.005				
as found 2nd point									
as found 3rd point									
new cylinder response									
calibrator zero	5000	0.0	0.00	0.00					
high point	4919	80.2	17.12	17.15	0.998				
second point	4960	40.1	8.56	8.45	1.013				
third point	4980	20.0	4.27	4.19	1.019				
as left zero	5000	0.0	0.00	0.00					
as left span	4919	80.2	17.12	17.05	1.004				
			Av	verage Correction Factor	1.010				
Baseline Corr AF:	17.03	Prev response	17.02	*% change	0.1%				
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:					
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation				



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

CH4 Calibration Data	CH4	Calibration	Data
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		CH4 Calibra			
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	7.98	7.81	1.022
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	7.98	7.98	1.000
second point	4960	40.1	3.99	3.91	1.021
third point	4980	20.0	1.99	1.94	1.025
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	7.98	7.92	1.008
			A	verage Correction Factor	1.016
Baseline Corr AF:	7.81	Prev response	7.86	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.995340		1.002709	
THC Cal Offset:		-0.022383		-0.059558	
CH4 Cal Slope:		0.985022		1.000454	
CH4 Cal Offset:		-0.004175		-0.035549	
NMHC Cal Slope:		1.004429		1.004517	
NMHC Cal Offset:		-0.018008		-0.024610	

Notes:

Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By:

Braiden Boutilier



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	13, 2023	Previous Calibration:	December	13, 2022
Station Name:	Barge I	anding	Station Number:	AM	509
Start Time (MST):	9:	50	End Time (MST):	13:	51
Analyzer make:	Therr	no 55i	Analyzer serial #: 1170050131		50131
		Calibra	tion Data		
Calculated concentratior (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999928	≥0.995
17.12 8.56	17.15 8.45	0.9982			
4.27	4.19	1.0128	Slope	1.002709	0.90 - 1.10
			Intercept	-0.059558	+/-0.5
20.0					
18.0				_	
14.0					
ົພ 12.0 –					
ີ ແມ່ 12.0 ອີນ ເມີຍອີນ ເມຍອີ ເມຍອີ ເມຍອີນ ເມຍອີນ ເມຍອີ ເມ ເມຍອີ ເມ ເມ ເມ ເມ ເມ ເມ ເມ ເມ ເມ ເມ ເມ ເມ ເມ					
0.8 ted					
0.8 Indicated					
4.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0
			l Conc. (ppm)		



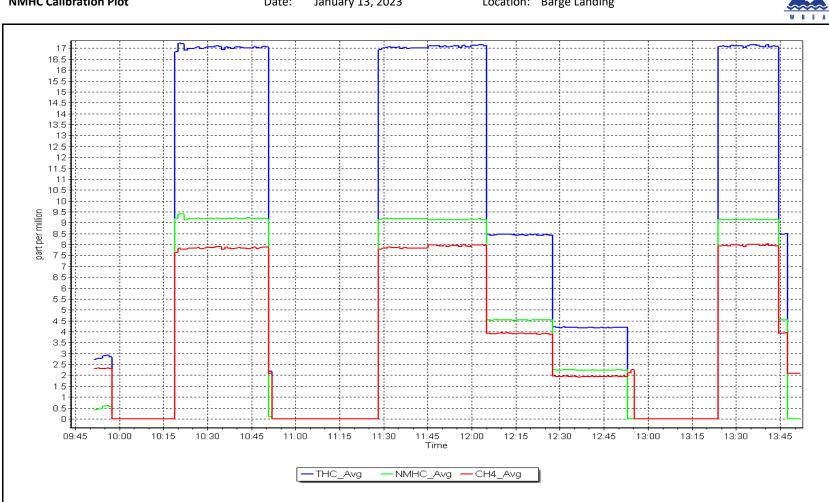
CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	Januarv	13, 2023	Previous Calibration:	December	13, 2022
Station Name:		anding	Station Number:	AM	
Start Time (MST):	-	50	End Time (MST):	13:	51
Analyzer make:	Therr	no 55i	Analyzer serial #:	11700	
		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	0.999866	≥0.995
7.98	7.98	1.0005	•	-	
3.99 1.99	<u>3.91</u> 1.94	1.0212 1.0255	Slope	1.000454	0.90 - 1.10
	2.57	1.0235	Intercept	-0.035549	+/-0.5
8.0 7.0 6.0					
(bbu) 5.0					
000 4.0					
ndicated .					
2.0					
1.0					
0.0 🖌					
0.0	2.0	4.0	6.0	8.0	10.0



NMHC Calibration Summary

			Station I	nformation		
Calibration	Date:	January	13, 2023	Previous Calibration:	December	13, 2022
Station Nar	me:	Barge	Landing	Station Number:	AMS	509
Start Time	(MST):	9	:50	End Time (MST):	13:	51
Analyzer m	nake:	Ther	mo 55i	Analyzer serial #:	11700	50131
			Calibra	tion Data		
Calculated co (ppm)		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eva	luation	<u>Limits</u>
0.0		0.00		Correlation Coefficient	0.999961	≥0.995
9.1 4.5		9.17 4.54	0.9964 1.0065			
4.5		2.25	1.0065	Slope	1.004517	0.90 - 1.10
	-			Intercept	-0.024610	+/-0.5
	9.0 8.0 7.0					
Conc. (ppm)	6.0					
onc.	5.0					
	4.0					
Indicated	3.0 -					
	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Statio	n Information					
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing January 20, 2023 10:52 Routine		Station number: AMS09 Last Cal Date: December 22, 2022 End time (MST): 15:46					
		Calibra	tion Standards					
NO Gas Cylinder #:	DT0036634		Cal Gas Expiry Date: Jan	uary 28, 2024				
NOX Cal Gas Conc: Removed Cylinder #:	50.00 NA	ppm	NO Cal Gas Conc: Removed Gas Exp Date: NA	49.70	ppm			
Removed Gas NOX Conc: NOX gas Diff:	50.00	ppm	Removed Gas NO Conc: NO gas Diff:	49.70	ppm			
Calibrator Model:	API T700		Serial Number:	3812				
ZAG make/model:	API T701		Serial Number:	4888				
		Apolyz	- Information					
		Allalyzo	er Information					
Analyzer make:	Thermo 42i	Anaryzo		26262593				
Analyzer make: NOX Range (ppb):		Analyzi	Analyzer serial #: 142	26262593				
		<u>Finish</u>		26262593 <u>Start</u>	<u>Finish</u>			
	0 - 1000 ppb <u>Start</u>				<u>Finish</u> 10.6			
NOX Range (ppb):	0 - 1000 ppb <u>Start</u> 1.164	<u>Finish</u>	Analyzer serial #: 142	<u>Start</u>				

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.020387	0.998369
NO _x Cal Offset:	0.452747	0.728922
NO Cal Slope:	1.019892	0.997899
NO Cal Offset:	-0.569015	-0.272767
NO ₂ Cal Slope:	1.003188	1.000917
NO ₂ Cal Offset:	-0.637715	0.473394



$NO_X \setminus NO \setminus NO_2$ 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/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4919	80.5	805.1	800.3	4.8	795.8	787.6	8.2	1.012	1.016
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
high point	4919	80.5	805.1	800.3	4.8	804.0	798.3	5.8	1.001	1.002
second point	4959	40.2	402.1	399.7	2.4	403.0	398.9	4.1	0.998	1.002
third point	4979	20.1	201.0	199.8	1.2	201.7	198.4	3.3	0.997	1.007
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.1		
as left span	4919	80.5	805.1	447.7	357.4	803.0	445.1	357.8	1.003	1.006
							Average C	orrection Factor	0.999	1.004
Corrected As fo	ound NO _x =	795.9 ppb	NO =	787.7 ppb	* = > +/-59	% change initiates i	investigation	*Percent Chang	ge NO _x =	-3.3%
Previous Respo	nse NO _x =	821.9 ppb	NO =	815.6 ppb				*Percent Chang	ge NO =	-3.5%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

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

Notes:

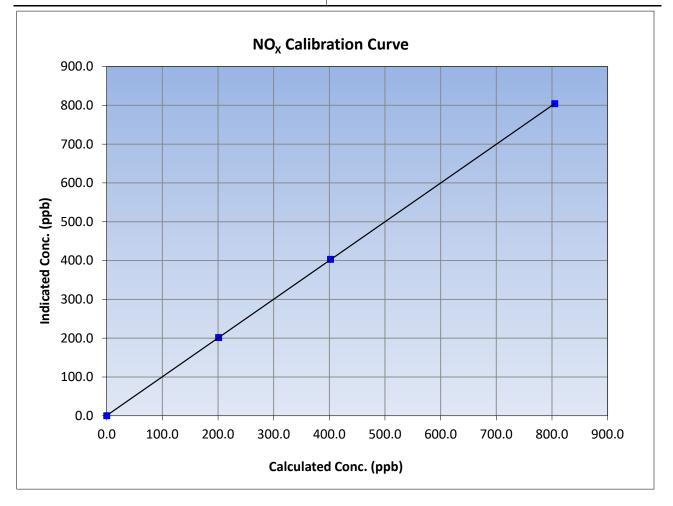
Sample inlet filter changed after as founds. Adjusted span.

Calibration Performed By:



NO_x Calibration Summary

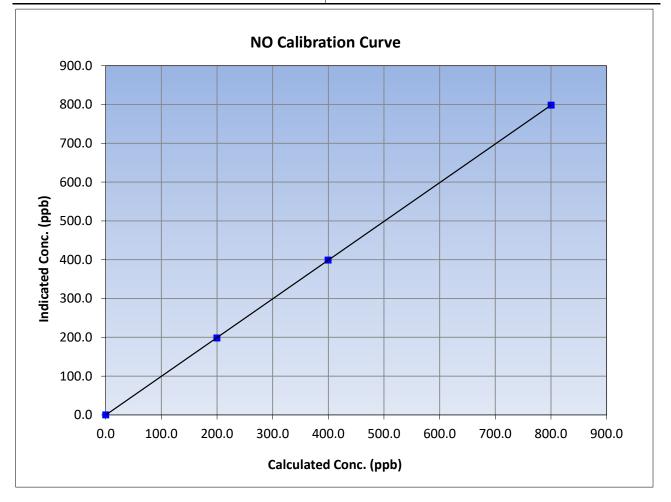
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	January 20, 2023		Previous Calibration:	December 22, 2022		
Station Name:	Barge Landing		Station Number:	AM	AMS09	
Start Time (MST):	10:52		End Time (MST):	15	:46	
Analyzer make:	Therr	no 42i	Analyzer serial #:	14262	62593	
		Calibr	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999996	≥0.995	
805.1	804.0	1.0013	correlation coefficient	0.9999990	≥0.995	
402.1	403.0	0.9977	Slope	0.998369	0.90 - 1.10	
201.0	201.7	0.9967	Siope		0.90 - 1.10	
			Intercept	0.728922	+/-20	





NO Calibration Summary

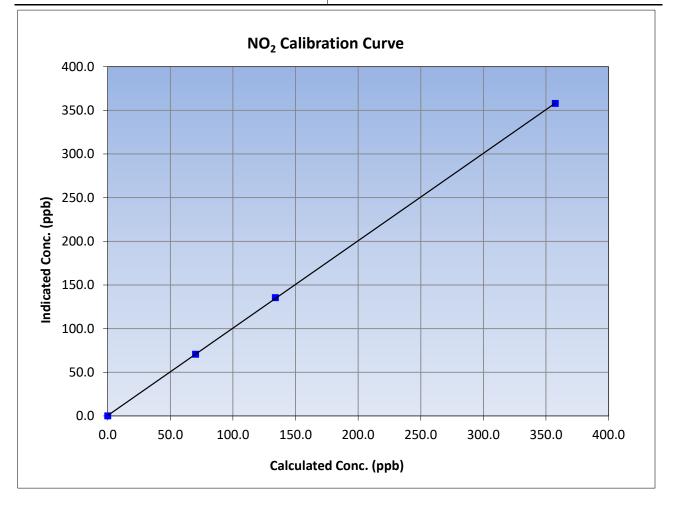
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	20, 2023	Previous Calibration:	Decembe	r 22, 2022
Station Name:	Barge	Landing	Station Number:	AM	S09
Start Time (MST):	10:52		End Time (MST):	15	:46
Analyzer make:	Thermo 42i		Analyzer serial #:	14262	62593
		Calibra	ation Data		
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
800.3	798.3	1.0024	correlation coernelent	0.555556	20.333
399.7	398.9	1.0019	Slope	0.997899	0.90 - 1.10
199.8	198.4	1.0072	Slope	0.997899	0.90 - 1.10
			Intercept	-0.272767	+/-20

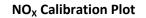




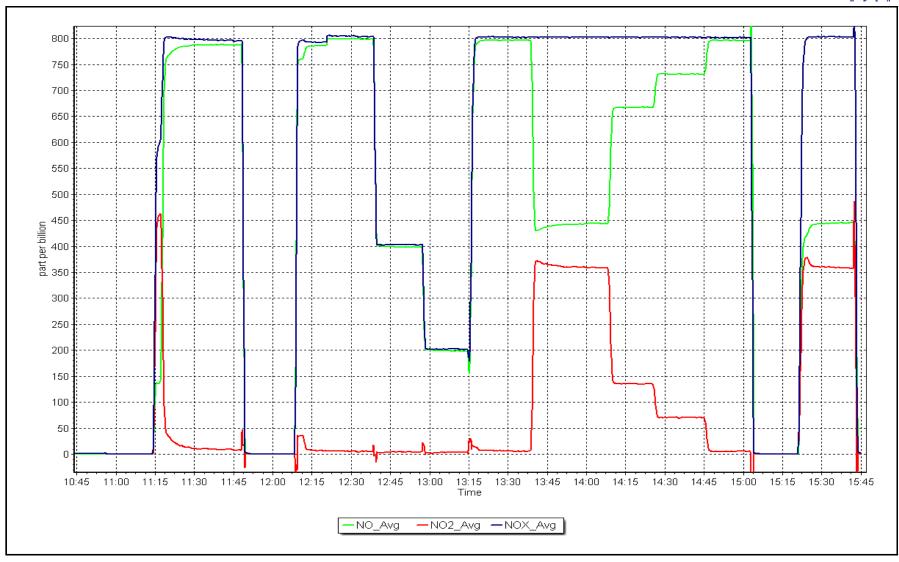
NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	January 20, 2023		Decembe	r 22, 2022
Station Name:	Barge I	Landing	Station Number:	AM	S09
Start Time (MST):	10:52		End Time (MST):	15	:46
Analyzer make:	Thermo 42i Analyzer serial #:		Analyzer serial #:	14262	62593
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0	0.0			0.000000	
357.4	357.9	0.9987	Correlation Coefficient	0.999982	≥0.995
133.9	135.5	0.9884	Slope	1.000917	0.90 - 1.10
70.2	70.6	0.9948	Siope	1.000917	0.50 - 1.10
			Intercept	0.473394	+/-20











T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Barge Landing January 27, 2023 13:59		Station number: AN Last Cal Date: De End time (MST): 14	cember 22, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 32	1	
Flow Meter Make/Model: Temp/RH standard:	Delta Cal Delta Cal		S/N: 11 S/N: 11		
		Monthly Calibration	Test		
<u>Parameter</u> T (°C) P (mmHg)	<u>As found</u> -16.7 743.1	<u>Measured</u> -16.6 742.4	<u>As left</u> -16.7 743.1	Adjusted	<i>(Limits)</i> +/- 2 °C +/- 10 mmHg
flow (LPM) Leak Test:	5.01 Date of check:	5.17 January 27, 2023	5.01 Last Cal Date: <u> </u>	December 22, 2022	+/- 0.25 LPM
Inlet cleaning :	Inlet Head				
<u>Parameter</u> PMT Peak Test	<u>As found</u>	Quarterly Calibration Measured	Test <u>As left</u>	Adjusted	(Limits) 10.9 +/- 0.5
Date Optical Chan Disposable Filte					
		Annual Maintenan	ce		
Date Sample Tul Date RH/T Sens		November 1 November 1			
Notes:		Monthly checks showing	g no issues. No adjustm	ents needed.	

Calibration by: Ryan Power



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS11 LOWER CAMP JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Lower Camp January 20, 2023 10:58 Routine		Station number: Last Cal Date: End time (MST):	AMS11 December 7, 2022 14:05	
		Calibration St	andards		
Cal Gas Concentration:	49.25	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc:	CC2216		Dam Cas Fun Datas	NI A	
Removed Cal Gas Conc: Removed Gas Cyl #:	49.25 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3807	
ZAG Make/Model:	Teledyne API T701		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:	0.987356	0.996844	Backgd or Offset:		14.2
Calibration intercept:	-0.949290	-0.548951	Coeff or Slope:	1.039	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	0.3	
as found span	4919	81.3	800.8	787.1	1.017
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	81.3	800.8	798.4	1.003
second point	4959	40.7	400.9	397.8	1.008
third point	4980	20.3	199.9	198.5	1.007
as left zero	5000	0.0	0.0	0.1	
as left span	4919	81.3	800.8	797.9	1.004
			Averag	ge Correction Factor	1.006
Baseline Corr As found:	786.80	Previous response	789.68	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
baseline con zhu Ar pt.					

Notes:

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

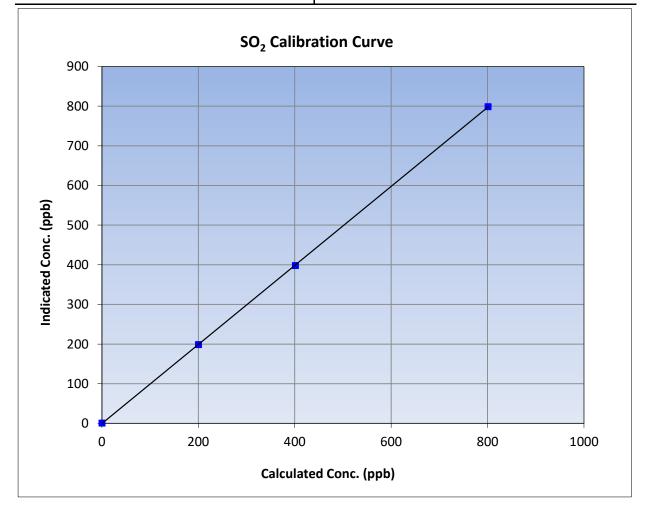
Calibration Performed By:

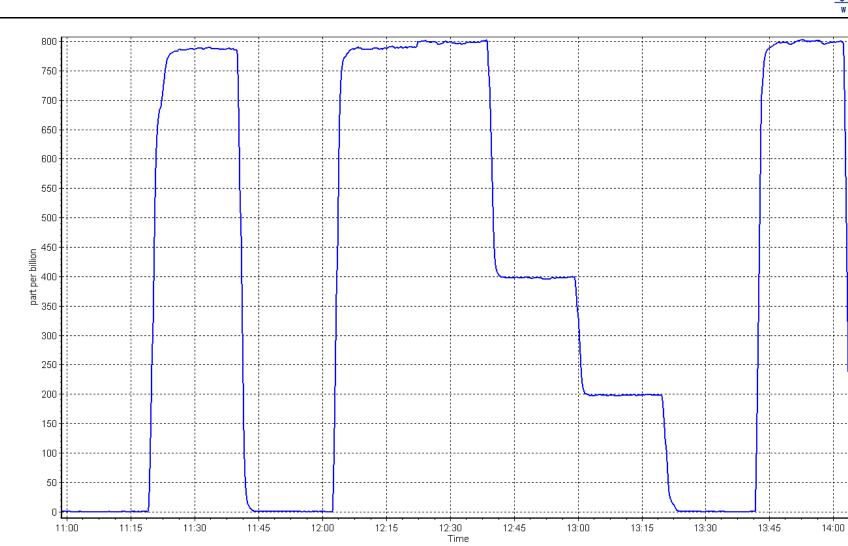


SO₂ Calibration Summary

WBEA				Version-01-2020
		Station I	Information	
Calibration Date:	January 2	0, 2023	Previous Calibration:	December 7, 2022
Station Name:	ion Name: Lower Camp		Station Number:	AMS11
Start Time (MST):	tart Time (MST): 10:58		End Time (MST):	14:05
Analyzer make: Thermo 43i		o 43i	Analyzer serial #:	100841398
		Calibra	ation Data	
Calculated concentration In	dicated concentration	Correction factor		11-11-
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	Statistical Evaluation	Limits

opb) (Cc) (aqq) (ic)	(Cc/IC)			
0.0	0.3		Correlation Coeffic	ient 0.999991	≥0.995
800.8	798.4	1.0030	Correlation Coeffic	ient 0.999991	20.333
400.9	397.8	1.0078	Slope	0.996844	0.90 - 1.10
199.9	198.5	1.0073	Siope	0.330844	0.30 - 1.10
			Intercept	-0.548951	+/-30
			intercept	0.548551	.7 50









H₂S Calibration Report

WBEA					
		Station Info	rmation		Version-11-2
Station Name: Calibration Date: Start time (MST):	Lower Camp January 19, 2023 10:52	Station info	Station number: Last Cal Date: End time (MST):	AMS11 December 12, 2022 14:35	
Reason:	Routine		End time (19131).	14.55	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.429 CC501097	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.429 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:			Serial Number:	3807	
ZAG Make/Model:	API T701H		Serial Number:	196	
		Analyzer Info	ormation		
Analyzer make:	Thermo 450iQ		Analyzer serial #:	CM20080003	
Converter make:	NA		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.988178	1.000040	Backgd or Offset:	13.9	13.9
Calibration intercept:	0.595542	0.055163	Coeff or Slope:	1.043	1.043
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb)	Indicated concentration (ppb) (Ic)	Baseline Adjuste Correction facto (Cc/(Ic-AFzero))
			(Cc)		<i>Limit = 0.90-1.10</i>
as found zero	5000	0.0	0.0	0.1	
as found span	4926	73.6	79.9	80.5	0.994
			40.0	40.1	
as found 2nd point	4963	36.8	40.0	40.1	0.999
as found 3rd point		36.8 18.6	20.2	20.1	0.999
	4963	18.6	20.2		
as found 3rd point	4963		20.2		1.010
as found 3rd point new cylinder response	4963	18.6	20.2		1.010 Correction factor
as found 3rd point	4963 4982	18.6 H ₂ S Calibrati	20.2 ion Data Calculated concentration (ppb)	20.1	1.010 Correction facto (Cc/Ic)
as found 3rd point new cylinder response Set Point	4963 4982 Dilution air flow rate (sccm)	18.6 H ₂ S Calibrati Source gas flow rate (sccm)	20.2 ion Data Calculated concentration (ppb) (Cc)	20.1 Indicated concentration (ppb) (Ic)	1.010 Correction facto (Cc/Ic)
as found 3rd point new cylinder response Set Point calibrator zero	4963 4982 Dilution air flow rate (sccm) 5000	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0	20.1 Indicated concentration (ppb) (Ic) 0.2	1.010 Correction facto (Cc/lc) Limit = 0.95-1.05
as found 3rd point new cylinder response Set Point calibrator zero high point	4963 4982 Dilution air flow rate (sccm) 5000 4926	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9	Indicated concentration (ppb) (Ic) 0.2 80.1	1.010 Correction facto (Cc/lc) Limit = 0.95-1.09 0.998
as found 3rd point new cylinder response Set Point calibrator zero high point second point	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0	Indicated concentration (ppb) (Ic) 0.2 80.1 39.8	1.010 Correction factor (Cc/lc) Limit = 0.95-1.02 0.998 1.004
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2	Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2	1.010 Correction facto (Cc/lc) Limit = 0.95-1.09 0.998
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982 5000	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6 0.0	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2 0.0	20.1 Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2 0.0	1.010 Correction factor (Cc/Ic) Limit = 0.95-1.00 0.998 1.004 1.000
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6 0.0 73.6	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2 0.0 79.9	20.1 Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2 0.0 79.8	1.010 Correction factor (Cc/Ic) Limit = 0.95-1.02 0.998 1.004 1.000
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4926 4919	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6 0.0	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2 0.0	20.1 Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2 0.0 79.8 0.0	1.010 Correction factor (Cc/Ic) Limit = 0.95-1.0 0.998 1.004 1.000 1.002
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	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4926 4919 ange:	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6 0.0 73.6	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2 0.0 79.9	20.1 Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2 0.0 79.8	1.010 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.998 1.004 1.000 1.002
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	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919 ange: ficiency test:	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6 0.0 73.6 81.1	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2 0.0 79.9 811.0	20.1 Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2 0.0 79.8 0.0 Ave Corr Factor	1.010 Correction factor (Cc/lc) Limit = 0.95-1.03 0.998 1.004 1.000 1.002 1.000 efficiency
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:	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919 ange: ficiency test: 80.4	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6 0.0 73.6 81.1 Prev response:	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2 0.0 79.9 811.0 79.57	20.1 Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2 0.0 79.8 0.0 Ave Corr Factor *% change:	1.010 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.998 1.004 1.000 1.000 efficiency 1.0%
as found 3rd point new cylinder response Set Point Calibrator zero high point second point third point as left zero	4963 4982 Dilution air flow rate (sccm) 5000 4926 4963 4982 5000 4926 4919 ange: ficiency test:	18.6 H ₂ S Calibrati Source gas flow rate (sccm) 0.0 73.6 36.8 18.6 0.0 73.6 81.1	20.2 ion Data Calculated concentration (ppb) (Cc) 0.0 79.9 40.0 20.2 0.0 79.9 811.0 79.57 1.007046	20.1 Indicated concentration (ppb) (Ic) 0.2 80.1 39.8 20.2 0.0 79.8 0.0 Ave Corr Factor	1.010 Correction facto (Cc/lc) Limit = 0.95-1.03 0.998 1.004 1.000 1.002 1.000 efficiency

Notes:

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

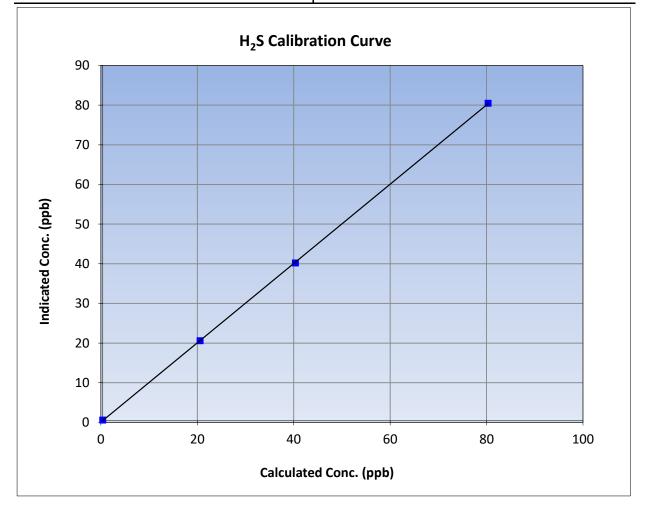


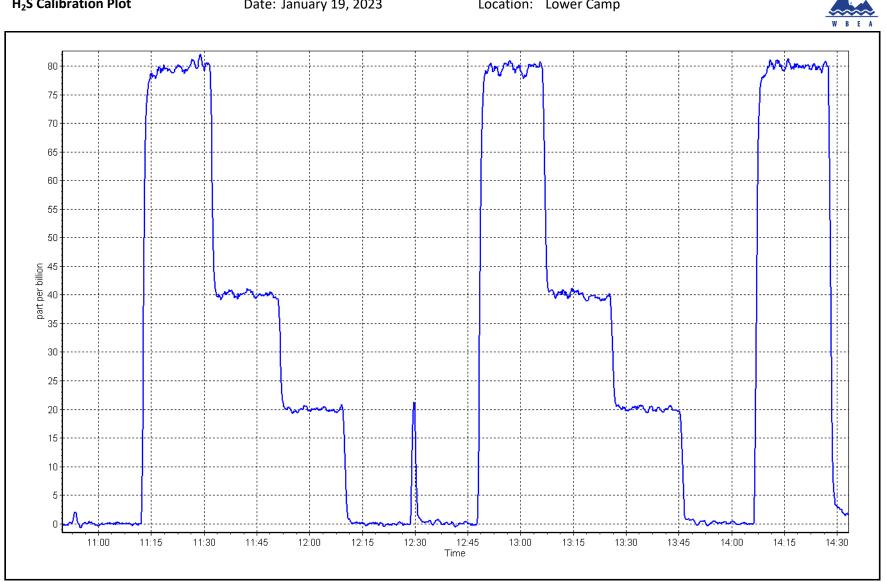
H₂S Calibration Summary

Version-11-2021 **Station Information** Calibration Date: January 19, 2023 **Previous Calibration:** December 12, 2022 Station Name: Lower Camp Station Number: AMS11 Start Time (MST): 10:52 End Time (MST): 14:35 Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999976	≥0.995
79.9	80.1	0.9978	correlation coefficient	0.999970	20.333
40.0	39.8	1.0040	Slope	1.000040	0.90 - 1.10
20.2	20.2	0.9997	Slope	1.000040	0.30 - 1.10
			Intercept	0.055163	+/-3





Location: Lower Camp



THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Stati	on Information		
Station Name: Calibration Date: Start time (MST): Reason:	Lower Camp January 20, 2023 10:58 Routine	3	Station number: Al Last Cal Date: De End time (MST): 14	ecember 7, 202	2
		Calibr	ation Standards		
Gas Cert Reference:	(CC2216	Cal Gas Expiry Date: Fe	bruary 23, 202	5
CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	502.0 205.5	ppm ppm	CH4 Equiv Conc.	1067.1	ppm
Removed Gas Cert:	20010	P.L	Removed Gas Expiry:		
Removed CH4 Conc.	502.0	ppm	CH4 Equiv Conc.	1067.1	ppm
Removed C3H8 Conc. Diff between cyl (CH₄):	205.5	ppm	Diff between cyl (THC): 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: THC Range (ppm):			Analyzer serial #: 15	505164381	
NMHC Range (ppm):			CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	3.09E-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	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	81.3	17.35	17.42	0.996	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4919	81.3	17.35	17.42	0.996	
second point	4959	40.7	8.69	8.66	1.003	
third point	4980	20.3	4.33	4.32	1.003	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	81.3	17.35	17.50	0.991	
			A	verage Correction Factor	1.001	
Baseline Corr AF:	17.42	Prev response	17.28	*% change	0.8%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		<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) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.3	9.19	9.21	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.3	9.19	9.20	0.999
second point	4959	40.7	4.60	4.58	1.004
third point	4980	20.3	2.29	2.29	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	9.19	9.26	0.993
			/	Average Correction Factor	1.002
Baseline Corr AF:	9.21	Prev response	9.12	*% change	1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

CH4	Cal	ibration	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	4919	81.3	8.16	8.21	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.3	8.16	8.22	0.993
second point	4959	40.7	4.09	4.08	1.003
third point	4980	20.3	2.04	2.03	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	8.16	8.25	0.990
			A	verage Correction Factor	0.999
Baseline Corr AF:	8.21	Prev response	8.16	*% change	0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.996778		1.004292	
THC Cal Offset:		-0.017186		-0.024989	
CH4 Cal Slope:		1.001133		1.007657	
CH4 Cal Offset:		-0.009686		-0.016486	
NMHC Cal Slope:		0.992847		1.001092	
NMHC Cal Offset:		-0.007499		-0.007903	

Notes:

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

Calibration Performed By:

Max Farrell



THC Calibration Summary

		Station I	nformation		
Calibration Date:	: January 20, 2023 Previous Calibration:		Decembe	r 7, 2022	
Station Name:	Lower	r Camp	Station Number:	AM	S11
Start Time (MST):	10	:58	End Time (MST):	14:	07
Analyzer make:	Therr	no 55i	Analyzer serial #:	15051	64381
		Calibra	tion Data		
Calculated concentrati (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	lation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999983	≥0.995
17.35	17.42	0.9959		0.333300	
8.69 4.33	8.66	1.0033 1.0028	Slope	1.004292	0.90 - 1.10
4.55	4.52	1.0028	Intercept	-0.024989	+/-0.5
20.0		THC Calibratio			
18.0 -					
16.0 -					
14.0 -					
ີ ພູ 12.0 -					
) 10.0 –					
Indicated Conc. (ppm) - 0.0 - 0.8 - 0.9 -					
ndic – 0.0 –					
4.0 -					
2.0 -					
0.0 # 0.0) 5	.0	10.0	15.0	20.0
	-		Conc. (ppm)		-



CH₄ Calibration Summary

		Station	nformation		
Calibration Date:	Janu	ary 20, 2023	Previous Calibration:	Decembe	r 7, 2022
station Name:	Lo	wer Camp	Station Number:	AM	511
start Time (MST):		10:58	End Time (MST):	14:	07
Analyzer make:	TI	nermo 55i	Analyzer serial #:	15051	64381
		Calibra	ation Data		
Calculated concentrat (ppm) (Cc)	tion Indicated concentrat (ppm) (Ic)	tion Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00 8.16	0.00 8.22	 0.9927	Correlation Coefficient	0.999969	≥0.995
4.09	4.08	1.0026	Clana	1 007657	0.00 1.10
2.04	2.03	1.0030	- Slope	1.007657	0.90 - 1.10
			Intercept	-0.016486	+/-0.5
9.0 - 8.0 - 7.0 - 6.0 - (ud 5.0 -					
Indicated Conc. (ppm) - 0.6 - 3.0 -					
- 0.6 ndicate					
2.0 -					
1.0 -					
0.0					
0.	.0 2.0		6.0	8.0	10.0
		Calculated	d Conc. (ppm)		

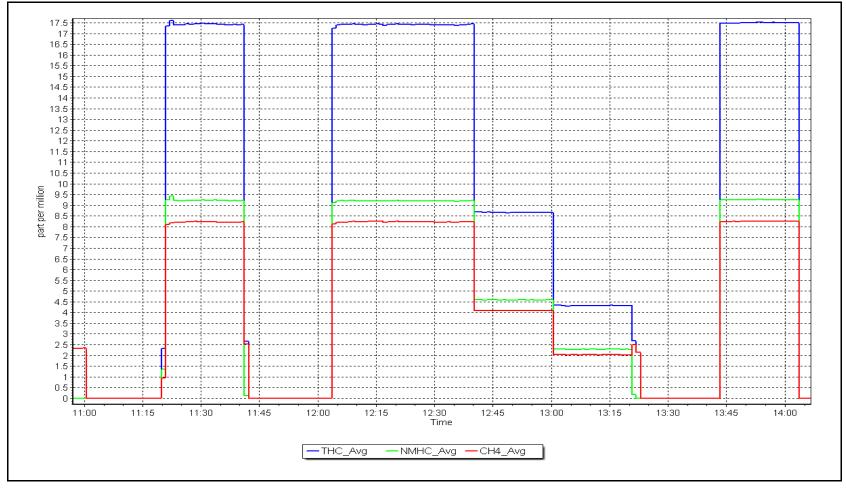


NMHC Calibration Summary

alibration Date ation Name: art Time (MS ⁻ nalyzer make: alculated concent (ppm) (Cc) 0.00 9.19 4.60 2.29	T):		Lower 10: Therm ntration	:58 no 55i	r (Cc/Ic)	End Tim Analyzer Ition Data	libration: Number: ne (MST): r serial #: Statistical Evalu	Decembe AM 14: 150510	S11 07
art Time (MS ⁻ nalyzer make: alculated concent (ppm) (Cc) 0.00 9.19 4.60	:	(ppm) (lc 0.00 9.20 4.58	10: Therm ntration	:58 no 55i Correction factor 0.9990 1.0038	r (Cc/Ic)	End Tim Analyzer I tion Data	ne (MST): r serial #:	14: 15051(07 64381
alculated concent (ppm) (Cc) 0.00 9.19 4.60	:	(ppm) (lc 0.00 9.20 4.58	Therm	no 55i Correction factor 0.9990 1.0038	r (Cc/Ic)	Analyzer	r serial #:	150510	64381
alculated concent (ppm) (Cc) 0.00 9.19 4.60		(ppm) (lc 0.00 9.20 4.58	ntration	Correction factor 0.9990 1.0038	r (Cc/Ic)	ition Data			
(ppm) (Cc) 0.00 9.19 4.60	tration	(ppm) (lc 0.00 9.20 4.58		Correction factor 0.9990 1.0038	r (Cc/Ic)	:	Statistical Evalu	ation	<u>Limits</u>
(ppm) (Cc) 0.00 9.19 4.60	tration	(ppm) (lc 0.00 9.20 4.58		Correction factor 0.9990 1.0038	r (Cc/Ic)	:	Statistical Evalu	ation	<u>Limits</u>
(ppm) (Cc) 0.00 9.19 4.60		(ppm) (lc 0.00 9.20 4.58		 0.9990 1.0038			Statistical Evalu	ation	<u>Limits</u>
9.19 4.60		9.20 4.58		0.9990 1.0038		Correlation Co			
4.60		4.58		1.0038			pefficient	0.999993	≥0.995
						Slope	2	1.001092	0.90 - 1.10
						Interce	pt	-0.007903	+/-0.5
8.0 7.0 2 6.0									
6.0 (bbm) 5.0									
Con									
				/					
4.0 3.0									
= 2.0									
1.0									
0.0									
	0.0		2.0	4	1.0	6.	0	8.0	10.0
				Calci					









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South January 16, 2023 10:30 Routine		Station number: Last Cal Date: End time (MST):	AMS13 December 2, 2022 13:37	
		Calibration St	andards		
Cal Gas Concentration:	50.55	ppm	Cal Gas Exp Date:	December 29, 2028	
Cal Gas Cylinder #:	CC260812		Dave Cas Eve Data	NI / A	
Removed Cal Gas Conc:	50.55	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	N/A		Diff between cyl:	2440	
Calibrator Make/Model: ZAG Make/Model:	API T700 API 701		Serial Number: Serial Number:	2448 1117	
ZAG Make/Model.	AFI701		Senai Number.	1117	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	599	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.006001	1.003886	Backgd or Offset:	77.0	79.7
Calibration intercept:	-3.218258	-3.178199	Coeff or Slope:	0.741	0.733
		SO ₂ 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	0.7	
as found span	4921	79.1	799.7	807.4	0.990
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.2	
high point	4921	79.1	799.7	801.0	0.998
second point	4961	39.5	399.3	396.5	1.007
third point	4980	19.8	200.2	194.6	1.029
as left zero	5000	0.0	0.0	-0.4	
as left span	4921	79.1	799.7	800.7	0.999
			Averag	ge Correction Factor	1.011
Baseline Corr As found:	806.70	Previous response	801.27	*% change	0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

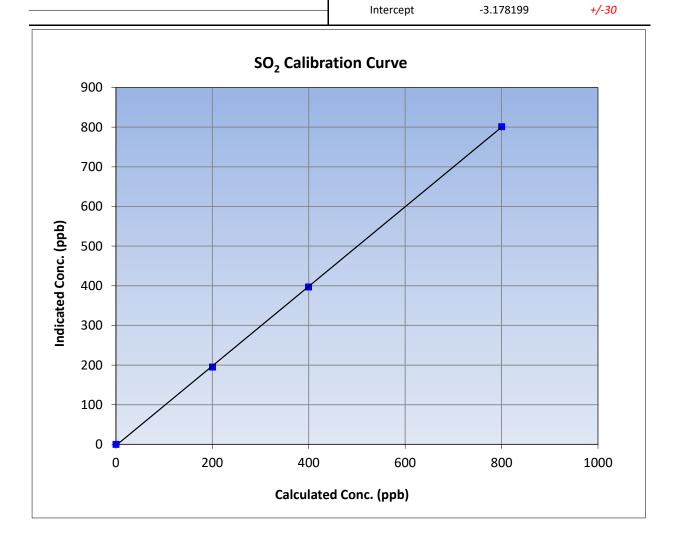
Changed the inlet filter after as founds. Adjusted zero and span.

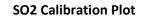
Calibration Performed By:



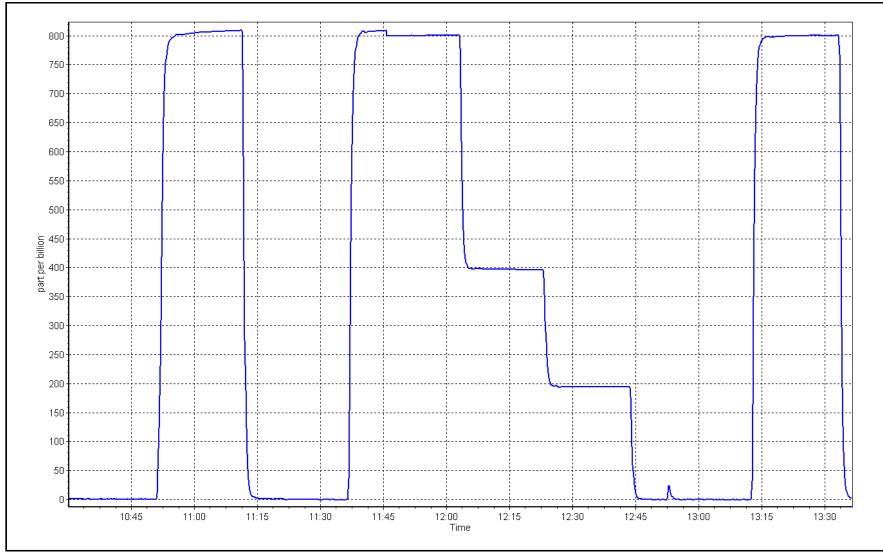
SO₂ Calibration Summary

WBEA					Version-01-2020
		Station	Information		
Calibration Date:	January 1	5, 2023	Previous Calibration:	Decemb	er 2, 2022
Station Name:	Fort McKa	y South	Station Number:	AN	1513
Start Time (MST):	10:3	0	End Time (MST):	13	3:37
Analyzer make: API T		.00 Analyzer serial #:		5	99
		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	0.999937	≥0.995
799.7	801.0	0.9984	correlation coefficient	0.333337	20.333
399.3	396.5	1.0071	Slope	1.003886	0.90 - 1.10











TRS Calibration Report

WBEA					Version-11-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South January 17, 2023 9:27 Routine		Station number: Last Cal Date: End time (MST):	AMS13 December 13, 2022 14:37	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.34 CC500241	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: CAG Make/Model:	5.32 EY0001990 Teledyne API T700 Teledyne API 701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	March 2, 2023 -4.1% 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	
Calibration slope: Calibration intercept:	<u>Start</u> 1.001418 -0.062130	<u>Finish</u> 0.999228 -0.042157	Backgd or Offset: Coeff or Slope:	<u>Start</u> 3.55 1.080	<u>Finish</u> 3.69 1.120
		TRS As Foun	d Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4925	75.5	80.3	80.2	1.003
as found 2nd point	4962	37.7	40.1	39.8	1.010
as found 3rd point	4981	18.9	20.1	19.6	1.031
new cylinder response	4925	75.5	80.6	77.3	1.043
		TRS Calibrati	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4925	75.5	80.6	80.6	1.000
second point	4962	37.7	40.3	40.2	1.002
third point	4981	18.9	20.2	19.8	1.019
as left zero	5000	0.0	0.0	0.3	
as left span	4925	75.5	80.6	80.4	1.003
O2 Scrubber Check	4921	79.1	791.0	0.0	
ate of last scrubber char	nge:	20-Mar-20		Ave Corr Factor	1.007
	iciency test:	NA			efficiency
Date of last converter eff					0.20/
Date of last converter effi Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	80.1 39.7 19.5	Prev response: AF Slope: AF Correlation:	0.999144	*% change: AF Intercept:	-0.3% -0.182203

Notes:

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

Calibration Performed By:

Sean Bala

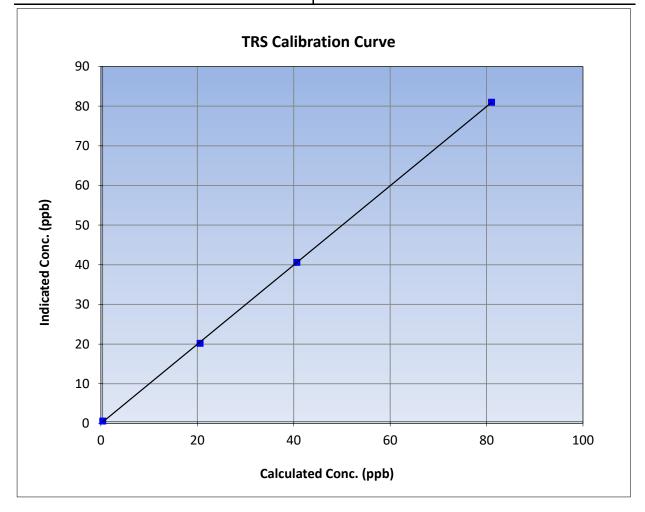


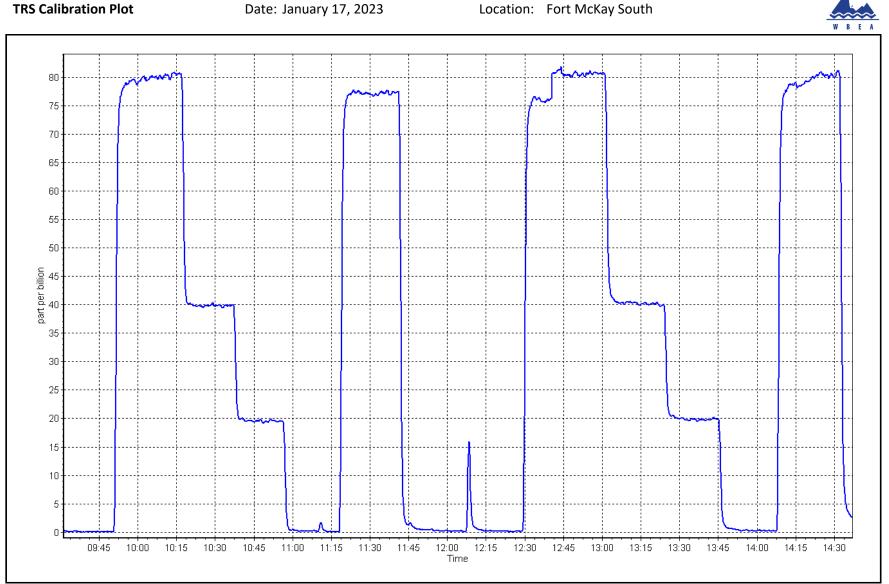
TRS Calibration Summary

Version-11-2021 **Station Information** Calibration Date: January 17, 2023 **Previous Calibration:** December 13, 2022 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 9:27 End Time (MST): 13:36 Analyzer make: Thermo 43i TLE Analyzer serial #: 1180540017

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999951	≥0.995
80.6	80.6	1.0003	Correlation Coefficient	0.999991	20.335
40.3	40.2	1.0016	Slope	0.999228	0.90 - 1.10
20.2	19.8	1.0195			0.30 - 1.10
			Intercept	-0.042157	+/-3







THC / CH₄ / NMHC Calibration Report

WBEA					Version-01-20
		Station	Information		
Station Name:	Fort McKay Sou	th	Station number: Al	MS13	
Calibration Date:	January 16, 202	3	Last Cal Date: De	ecember 2, 202	22
Start time (MST):	10:30		End time (MST): 13	3:37	
Reason:	Routine				
		Calibrat	ion 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	A	
Removed CH4 Conc.	503.6	ppm	CH4 Equiv Conc.	1077.5	ppm
Removed C3H8 Conc.	208.7	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄)	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 24	148	
ZAG make/model:	API 701		Serial Number: 11	117	
		Analyze	r Information		
Analyzer make	: Thermo 55i		Analyzer serial #: 11	152430012	
THC Range (ppm)					
NMHC Range (ppm)	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 2.38E-04	2.38E-04	NMHC SP Ratio:	4.69E-05	4.74E-05
CH4 Retention time	: 12.0	12.0	NMHC Peak Area:	193414	191456

THC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.00				
as found span	4921	79.1	17.05	16.99	1.003			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4921	79.1	17.05	17.06	0.999			
second point	4961	39.5	8.51	8.37	1.017			
third point	4980	19.8	4.27	4.24	1.007			
as left zero	5000	0.0	0.00	0.00				
as left span	4921	79.1	17.05	17.10	0.997			
			ŀ	Average Correction Factor	1.008			
Baseline Corr AF:	16.99	Prev response	16.99	*% change	0.0%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change 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	9.02	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4921	79.1	9.08	9.09	0.998
second point	4961	39.5	4.53	4.49	1.010
third point	4980	19.8	2.27	2.28	0.999
as left zero	5000	0	0.00	0.00	
as left span	4921	79.1	9.08	9.12	0.996
			1	Average Correction Factor	1.003
Baseline Corr AF:	9.02	Prev response	9.05	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation

СНЛ	Calibration Da	ata
CH4	Calibration Da	ıτa

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	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	7.97	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.1	7.97	7.97	1.000
second point	4961	39.5	3.98	3.89	1.024
third point	4980	19.8	1.99	1.96	1.016
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	7.97	7.99	0.998
			A	Average Correction Factor	1.013
Baseline Corr AF:	7.97	Prev response	7.94	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation
Baseline Corr 3rd AF:	NA	Calibration:	Statistics		tes investigation

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

Notes:

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

Calibration Performed By:

Sean Bala



THC Calibration Summary

		Station I	nformation		Version-01-20
Calibration Date:	January 16, 2023		Previous Calibration:	Decembe	r 2 2022
Station Name:		ay South	Station Number:	AM	-
Start Time (MST):		:30	End Time (MST):	13	
Analyzer make:		no 55i	Analyzer serial #:	11524	
analyzer make.	men		Analyzer serial #.	11524	50012
		Calibra	tion 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	0.999908	≥0.995
17.05	17.06	0.9990			
8.51 4.27	8.37	1.0166 1.0071	Slope	1.000765	0.90 - 1.10
4.27	4.24	1.0071	Intercept	-0.043424	+/-0.5
16.0 -					
18.0				_	
14.0 -					
12.0					
12.0 -					
E .					
(mdd) 10.0 - יייייייייייייייייייייייייייייייייייי					
uC.					
3 8.0 –					
ted					
ndicated -					
lnd	/				
4.0 +					
2.0 -					
	/				
00 =	/				
0.0 🖛) 5	0	10.0	15 0	20 0
0.0 🖛) 5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

			Station In	nformation		
Calibration	Date:	January	16, 2023	Previous Calibration:	Decembe	r 2, 2022
Station Nar	me:	Fort Mck		Station Number:	AM	513
Start Time	(MST):		:30	End Time (MST):	13:	37
Analyzer m	nake:	Thern	no 55i	Analyzer serial #:	11524	30012
			Calibra	tion Data		
Calculated co (ppm)		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.0		0.00		Correlation Coefficient	0.999833	≥0.995
7.9 3.9		7.97 3.89	0.9997 1.0237			
1.9		1.96	1.0165	Slope	1.000366	0.90 - 1.10
				Intercept	-0.031817	+/-0.5
	8.0 7.0 6.0					
c (ppm	5.0					
d Cone	4.0					
Indicated Conc. (ppm)	3.0					
	2.0					
:	1.0					
(0.0					
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		

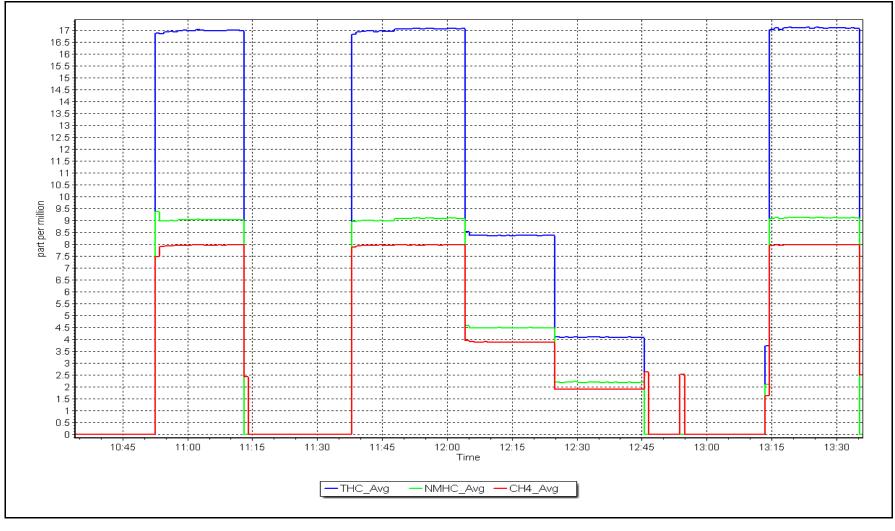


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	January	16, 2023	Previous Calibration:	Decembe	r 2, 2022
Station Name:	Fort McK	ay South	Station Number:	AMS	\$13
Start Time (MST):	10	:30	End Time (MST):	13:	37
Analyzer make:	Thern	no 55i	Analyzer serial #:	11524	30012
		Calibra	tion Data		
Calculated concentration Ir (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999955	≥0.995
9.08 4.53	9.09 4.49	0.9984			
2.27	2.28	0.9990	Slope	1.001015	0.90 - 1.10
			Intercept	-0.011206	+/-0.5
8.0 7.0 <u>(</u> 6.0					
(m 6.0 bbm) 5.0					
0.6 Indicated					
2.0					
1.0					
0.0	2.0	4.0		8.0	10.0
0.0	2.0	4.0	6.0	8.0	10.0









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 January 19, 2023 9:27 Routine		Station number: A Last Cal Date: D End time (MST): 13	ecember 6, 202	2
		Calibratio	on Standards		
NO Gas Cylinder #:	T2Y1P76		Cal Gas Expiry Date: D	ecember 11, 20	23
NOX Cal Gas Conc:	50.98	ppm	NO Cal Gas Conc:	49.32	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date: N	/A	
Removed Gas NOX Conc	: 50.98	ppm	Removed Gas NO Conc:	49.32	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2448	
ZAG make/model:	API T701		Serial Number:	1117	
Analyzer make:	Thermo 42i	Analyzer	Information Analyzer serial #: 14	410661329	
NOX Range (ppb):					
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope	e: 1.182	1.200	NO bkgnd or offset:	9.4	9.6
NOX coeff or slope	e: 0.991	0.992	NOX bkgnd or offset:	9.4	9.6
NO2 coeff or slope	2: 1.000	1.000	Reaction cell Press:	195.3	194.1
		Calibrati	on Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	2:	1.000035		0.999594	
NO _x Cal Offset	t:	-2.551182		-2.291272	
NO Cal Slope		1.003791		1.002005	
NO Cal Offset		-3.305357		-3.105090	
NO ₂ Cal Slope	2:	0.996580		1.006533	

-1.621259

-0.433464



$NO_X \setminus NO \setminus NO_2$ 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	0.1		
as found span	4919	81.1	826.9	800.0	26.9	815.1	787.2	28.0	1.0145	1.0162
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1		
high point	4919	81.1	826.9	800.0	26.9	825.3	799.9	25.2	1.0019	1.0001
second point	4960	40.6	413.9	400.4	13.5	410.5	396.8	13.7	1.0083	1.0091
third point	4980	20.3	207.0	200.2	6.7	202.3	194.4	8.0	1.0231	1.0300
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as left span	4919	81.1	826.9	386.3	440.6	834.0	389.4	444.6	0.9915	0.9919
							Average C	orrection Factor	1.0111	1.0131
Corrected As fo	ound NO _x =	815.3 ppb	NO =	787.4 ppb	* = > +/-59	6 change initiates i	investigation	*Percent Chan	ge NO _X =	-1.1%
Previous Respo	onse NO _x =	824.4 ppb	NO =	799.7 ppb				*Percent Chan	ge NO =	-1.6%
Baseline Corr 2	and 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 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)	792.8	379.1	440.6	443.2	0.9942	100.6%
2nd GPT point (200 ppb O3)	792.8	585.3	234.4	235.8	0.9942	100.6%
3rd GPT point (100 ppb O3)	792.8	689.6	130.1	129.6	1.0040	99.6%
				Average Correction Factor	0.9975	100.3%

Notes:

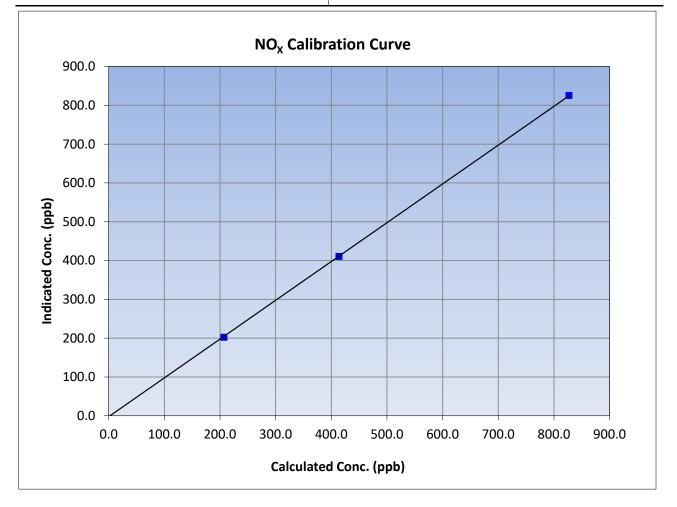
Changed the inlet filter after as founds. Used 2nd NO reference point due to drift. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

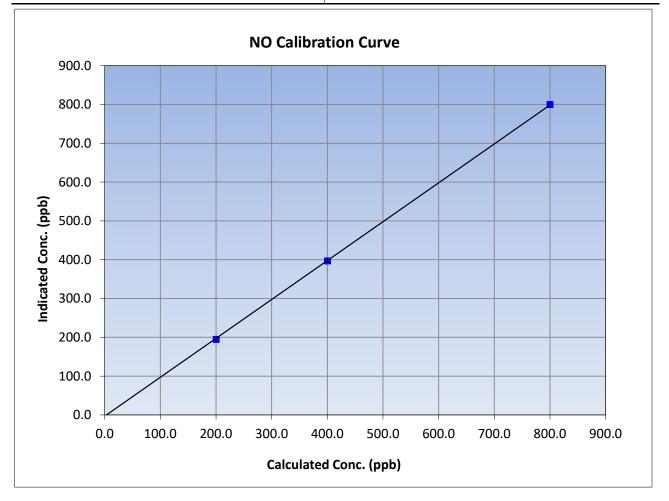
WBEA					Version-04-202	
		Station	Information			
Calibration Date:	January	19, 2023	Previous Calibration:	Decembe	er 6, 2022	
Station Name:	Fort Mck	(ay South	Station Number:	AM	S 13	
Start Time (MST):	9:27		End Time (MST):	13	:58	
Analyzer make:	Therr	no 42i	Analyzer serial #:	nalyzer serial #: 1410661329		
		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	0.999968	≥0.995	
826.9	825.3	1.0019	correlation coefficient	0.999908	20.995	
413.9	410.5	1.0083	Clana	0.999594	0.90 - 1.10	
207.0	202.3	1.0231	Slope	0.999594	0.90 - 1.10	
			Intercept	-2.291272	+/-20	





NO Calibration Summary

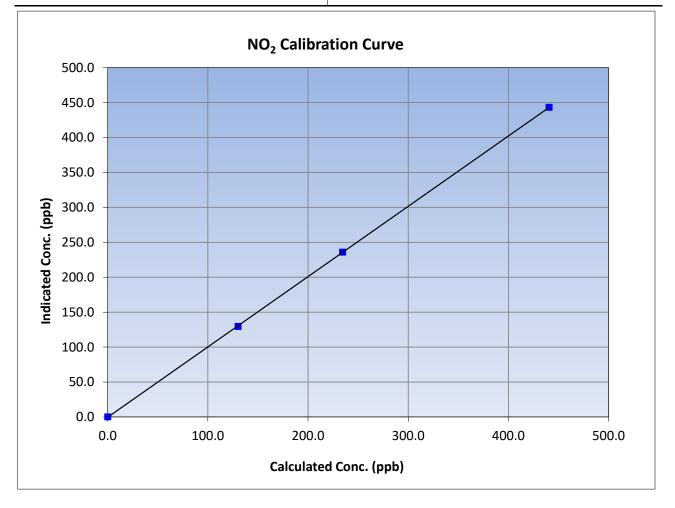
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	19, 2023	Previous Calibration:	Decembe	er 6, 2022
Station Name:	Fort Mck	(ay South	Station Number:	AM	S 13
Start Time (MST):	9:	27	End Time (MST):	13	:58
Analyzer make:	er make: Thermo 42i		Analyzer serial #: 1410		661329
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	c) Statistical Evaluation <u>Lim</u>		
0.0	-0.1		Correlation Coefficient	0.999936	≥0.995
800.0	799.9	1.0001	correlation coernelent	0.555550	20.333
400.4	396.8	1.0091	Slope	1.002005	0.90 - 1.10
200.2	194.4	1.0300	Slope	1.002005	0.90 - 1.10
			Intercept	-3.105090	+/-20

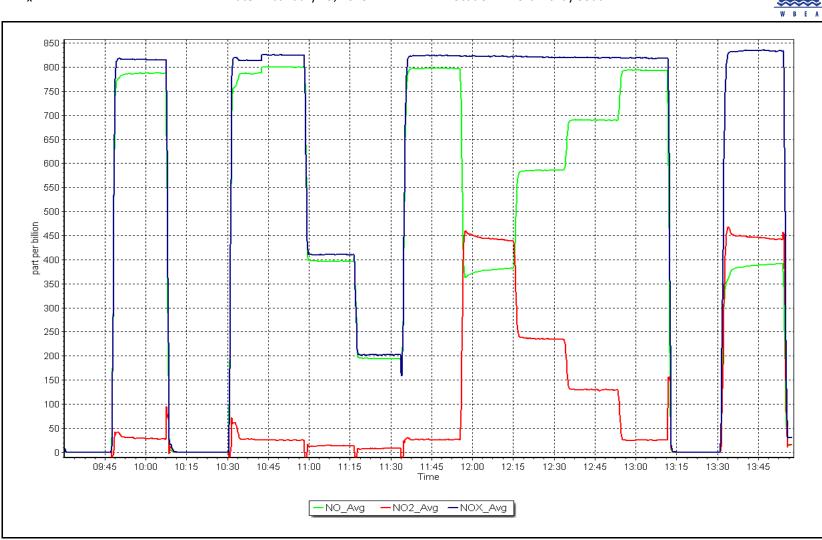




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	19, 2023	Previous Calibration:	Decembe	er 6, 2022
Station Name:	Fort Mck	(ay South	Station Number:	AM	S 13
Start Time (MST):	9:27		End Time (MST):	13	:58
Analyzer make:	Therr	Thermo 42i Analyzer serial #:		14106	61329
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)) Statistical Evaluation Lim		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999988	≥0.995
440.6	443.2	0.9942	correlation coefficient	0.999900	20.995
234.4	235.8	0.9942	Slope	1.006533	0.90 - 1.10
130.1	129.6	1.0040	Slope	1.000555	0.90 - 1.10
			Intercept	-0.433464	+/-20









O₃ Calibration Report

Version-01-2020

		o			Version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South January 18, 2023 9:14 Routine		Station number: Last Cal Date: End time (MST):	December 1, 2022	
		Calibration St	andards		
D3 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> 1.000486 0.640000	<u>Finish</u> 0.996143 1.300000	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	399.1	1.002
as found 2nd point as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	980.6	400.0	399.3	1.002
second point	5000	838.0	200.0	200.9	0.996
third point	5000	735.3	100.0	102.0	0.980
as left zero	5000	0.0	0.0	0.1	
as left span	5000	979.1	400.0	401.8	0.996
			Averag	ge Correction Factor	0.993
Baseline Corr As found: Baseline Corr 2nd AF pt:	399.2 NA	Previous response AF Slope:	400.8	*% change AF Intercept:	-0.4%
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:

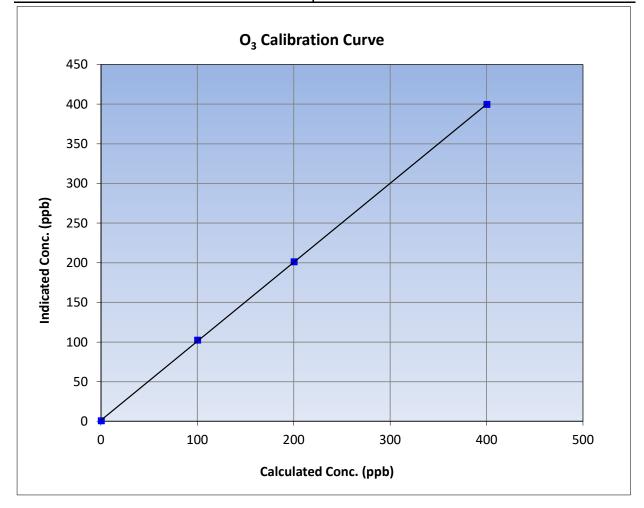
Sean Bala

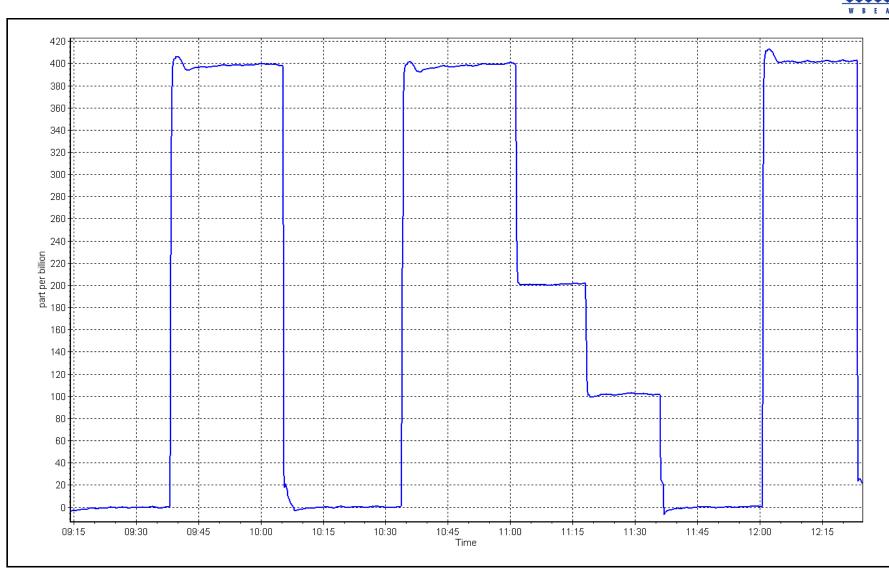


O₃ Calibration Summary

WBEA				Version-01-2020
		Station I	nformation	
Calibration Date:	January 1	8, 2023	Previous Calibration:	December 1, 2022
Station Name:	Fort McKa	ay South	Station Number:	AMS13
Start Time (MST):	9:1	4	End Time (MST):	12:25
Analyzer make: Teledyne		dyne API T400 Analyzer serial #:		3871
		Calibra	ation Data	
Calculated concentration Ind (ppb) (Cc)	icated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>

0.0 400.0	0.3 399.3	1.0018	Correlation Coefficient	0.999971	≥0.995
200.0	200.9	0.9955	Slope	0.996143	0.90 - 1.10
100.0	102.0	0.9804	Siope	0.990143	0.90 - 1.10
				1.300000	+/- 5





Location: Fort McKay South





T640 PM_{2.5} CALIBRATION

WDEA					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Fort McKay South January 19, 2023 10:49		Station number: Last Cal Date: End time (MST):	December 13, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	319	
Flow Meter Make/Model:				141229	
Temp/RH standard:	Delta Cal		S/N:	141229	
		Monthly Calibration	Test		
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
Т ([°] С)	-4.5	-4.7	-4.5		+/- 2 °C
P (mmHg)	731.2	731.5	731.2		+/- 10 mmHg
flow (LPM)	4.96	4.98	4.96		+/- 0.25 LPM
Leak Test:	Date of check:	January 19, 2023		December 13, 2022	
	PM w/o HEPA:	11.1	PM w/ HEPA:	0	
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	n Test		
<u>Parameter</u> PMT Peak Test	<u>As found</u>	Measured	<u>As left</u>	Adjusted	(Limits) 10.9 +/- 0.5
Date Optical Chan	nber Cleaned:	December 1	13, 2022		
Disposable Filte	r Changed:	December 1			
		Annual Maintena	nce		
Date Sample Tul	be Cleaned:	June 29,	2022		
Date RH/T Sense		June 29,			
Notes:		No adjustment	t made. Leak check pa	assed.	

Calibration by: Sean Bala



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS14 ANZAC JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac January 24, 2023 7:30 Routine		Station number: Last Cal Date: End time (MST):	AMS 14 December 6, 2022 10:29	
		Calibration St	andards		
Cal Gas Concentration:	49.95	ppm	Cal Gas Exp Date:	January 5, 2025	
Cal Gas Cylinder #:	CC279389				
Removed Cal Gas Conc: Removed Gas Cyl #:	49.95 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:	API T700		Serial Number:	5239	
ZAG Make/Model:	API T701H		Serial Number:	357	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	0710321322	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995082	0.998268	Backgd or Offset:	24.4	25.1
Calibration intercept:	-1.425034	-1.664595	Coeff or Slope:	0.784	0.795
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	Correction factor (Cc/
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.1	800.2	787.4	1.016
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.1	800.2	798.0	1.003
second point	4960	40.0	399.6	396.5	1.008
third point	4980	20.0	199.8	195.8	1.020
as left zero	5000	0.0	0.0	0.2	
as left span	4920	80.1	800.2	797.7	1.003
			Averag	ge Correction Factor	1.010
Baseline Corr As found:	787.50	Previous response	794.82	*% change	-0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

No maintenance done. Span adjusted.

Calibration Performed By:

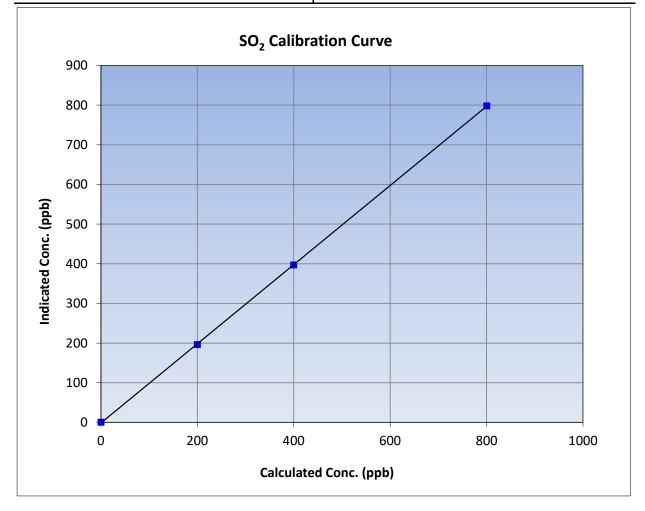


SO₂ Calibration Summary

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

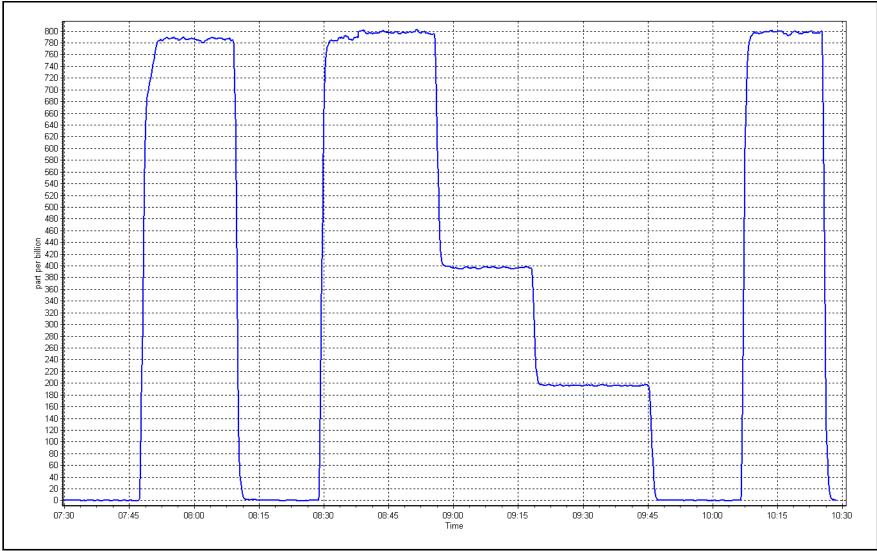
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999975	≥0.995
800.2	798.0	1.0027	correlation coefficient	0.999975	20.333
399.6	396.5	1.0078	Slope	0.998268	0.90 - 1.10
199.8	195.8	1.0204	Slope	0.998208	0.90 - 1.10
			Intercept	-1.664595	+/-30











TRS Calibration Report

				•	
WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac January 6, 2023 7:45 Routine		Station number: Last Cal Date: End time (MST):	AMS14 December 5, 2022 12:29	
		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	ррт	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 5252 357	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CD Nova CDN-101 0 - 100 ppb	·	Analyzer serial #: Converter serial #:	1180540019 503	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.002560 0.158711	1.003842 0.038815	Backgd or Offset: Coeff or Slope:	5.61 1.005	5.54 0.990
		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	4925	74.3	80.0	81.4	0.985
as found 2nd point	4962	37.2	40.0	40.8	0.986
as found 3rd point	4981	18.6	20.0	20.0	1.011
new cylinder response					
		TRS 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	0.3	
high point	4925	74.3	80.0	80.4	0.995
second point	4962	37.2	40.0	40.2	0.996
third point	4981	18.6	20.0	19.8	1.011
as left zero	5000	0.0	0.0	0.4	
as left span	4925	74.3	80.0	79.8	1.002
SO2 Scrubber Check	4920	80.0	800.0	0.0	
Date of last scrubber cha				Ave Corr Factor	1.000
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	81.2	Prev response:	80.32	*% change:	1.1%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	40.6 19.8	AF Slope: AF Correlation:		AF Intercept:	-0.021532
				* = > +/-5% change initiat	es investigation

Notes:

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

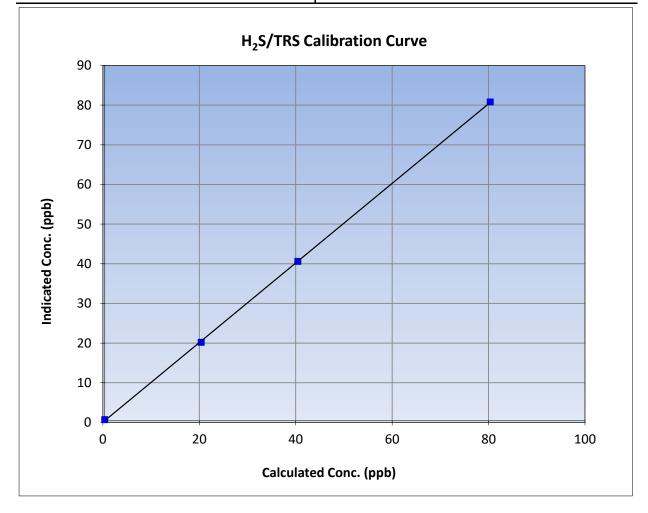


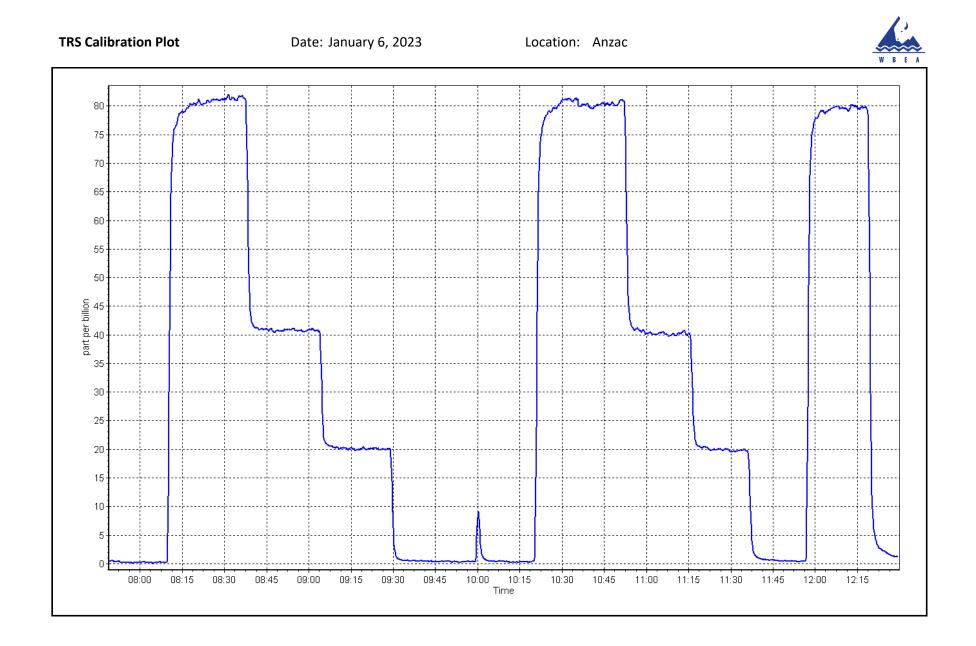
TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	January 6, 2023	Previous Calibration:	December 5, 2022				
Station Name:	Anzac	Station Number:	AMS14				
Start Time (MST):	7:45	End Time (MST):	12:29				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540019				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999947	≥0.995
80.0	80.4	0.9945	correlation coefficient	0.333347	20.995
40.0	40.2	0.9959	Slope	1.003842	0.90 - 1.10
20.0	19.8	1.0109	Slope	1.003642	0.30 - 1.10
			Intercept	0.038815	+/-3







THC / CH₄ / NMHC Calibration Report

W B E A						Version-01-202
		Statio	n Information			
Station Name:	Anzac		Station number: AN	VIS 14		
Calibration Date:	January 23, 202	3	Last Cal Date: De	ecember 14, 2	022	
Start time (MST):	12:05		End time (MST): 15	5:15		
Reason:	Routine					
		Calibra	ntion Standards			
Gas Cert Reference:	C	C279389	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		
		Analyz	er Information			
Analyzer make:	: Thermo 55i		Analyzer serial #: 11	18148494		
THC Range (ppm):	: 0 - 20 ppm					
NMHC Range (ppm)			CH4 Range (ppm): 0	- 10 ppm		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>		<u>Finish</u>
CH4 SP Ratio	: 3.85E-04	3.85E-04	NMHC SP Ratio:	4.46E-05	2	1.46E-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	17.17	0.997	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	80.1	17.12	17.13	1.000	
second point	4960	40.0	8.55	8.57	0.998	
third point	4980	20.0	4.28	4.25	1.007	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.1	17.12	17.17	0.997	
			A	Average Correction Factor	1.002	
Baseline Corr AF:	17.17	Prev response	17.10	*% change	0.4%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change 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	0.00	0.00					
as found span	4920	80.1	9.12	9.08	1.005				
as found 2nd point									
as found 3rd point									
new cylinder response									
calibrator zero	5000	0.0	0.00	0.00					
high point	4920	80.1	9.12	9.03	1.010				
second point	4960	40.0	4.56	4.51	1.010				
third point	4980	20.0	2.28	2.23	1.023				
as left zero	5000	0.0	0.00	0.00					
as left span	4920	80.1	9.12	9.07	1.006				
			ŀ	Average Correction Factor	1.014				
Baseline Corr AF:	9.08	Prev response	9.12	*% change	-0.5%				
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:					
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation				

CH4 Calibration Data

			lion 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	80.1	8.00	8.09	0.988		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.1	8.00	8.10	0.988		
second point	4960	40.0	3.99	4.06	0.985		
third point	4980	20.0	2.00	2.02	0.989		
as left zero	t zero 5000 0.0		0.00	0.00			
as left span	4920	80.1	8.00	8.10	0.987		
			A	verage Correction Factor	0.987		
Baseline Corr AF:	8.09	Prev response	7.98	*% change	1.4%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		
		Calibration	Statistics				
		<u>Start</u>		Finish			
-		0.998499		1.001116			
THC Cal Offset:		0.004201		-0.010387			
CH4 Cal Slope:		0.995993		1.012466			
CH4 Cal Offset:		0.013958		0.001594			
NMHC Cal Slope:		1.000697		0.991290			
NMHC Cal Offset:		-0.009757		-0.011980			

Notes:

N2 cylinder changed prior to calibration.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	January	23, 2023	Previous Calibration:	December	⁻ 14, 2022
tation Name:	An	zac	Station Number:	AMS	5 14
tart Time (MST):	12	:05	End Time (MST):	15:	15
nalyzer make:	Thern	no 55i	Analyzer serial #:	11181	48494
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00 17.12	0.00 17.13	0.9996	Correlation Coefficient	0.999994	≥0.995
8.55 4.28	8.57 4.25	0.9982 1.0071	Slope	1.001116	0.90 - 1.10
			Intercept	-0.010387	+/-0.5
18.0				_	
18.0				_	
16.0					
14.0					
12.0					
(mdd) 10.0					
0.01 (bbm) 0.02 (bbm)					
0.6 udicated					
4.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

Version-01-2020

		Station I	nformation		
alibration Date:	January	23, 2023	Previous Calibration:	December	[.] 14, 2022
tation Name:	An	zac	Station Number:	AMS	5 14
tart Time (MST):	12	:05	End Time (MST):	15:	15
nalyzer make:	Therr	no 55i	Analyzer serial #:	11181	48494
		Calibra	tion Data		
alculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00 8.00	0.00 8.10	0.9880	Correlation Coefficient	0.999996	≥0.995
3.99 2.00	4.06 2.02	0.9848 0.9892	Slope	1.012466	0.90 - 1.10
			Intercept	0.001594	+/-0.5
7.0 6.0					
udd 5.0					
OD 4.0					
Indicated Conc. (ppm) 0.4 0.7 0.7 0.7 0.7					
2.0					
1.0					
	2.0	4.0	6.0	8.0	10.0



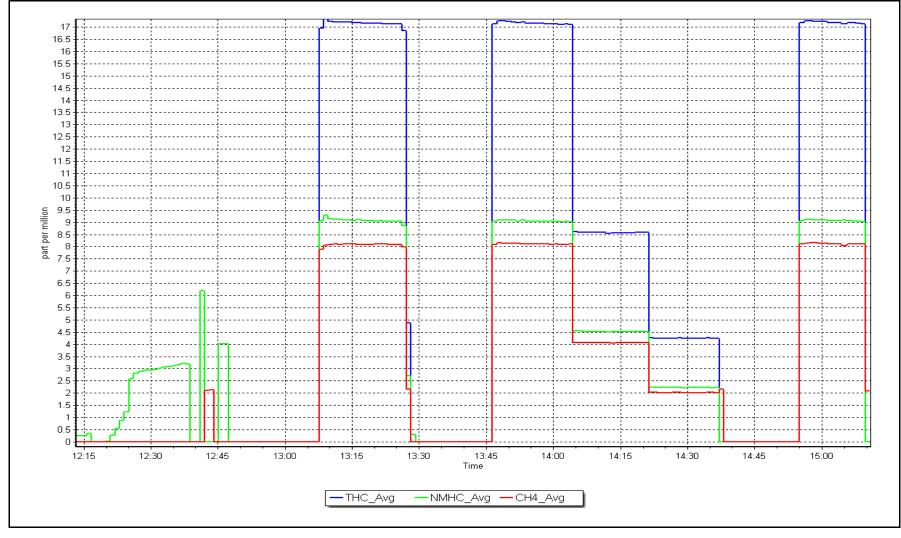
NMHC Calibration Summary

Version-01-2020

			Station I	nformation		
Calibratior	n Date:	January	23, 2023	Previous Calibration:	December	14, 2022
tation Na	me:	An	zac	Station Number:	AMS	5 14
tart Time	(MST):	12	:05	End Time (MST):	15:	15
nalyzer n	nake:	Therr	no 55i	Analyzer serial #:	11181	48494
			Calibra	tion Data		
alculated co (ppm)		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
	00	0.00		Correlation Coefficient	0.999987	≥0.995
9.:		9.03	1.0099			
4.	28	4.51 2.23	1.0100 1.0234	Slope	0.991290	0.90 - 1.10
	20	2.25	1.0234	Intercept	-0.011980	+/-0.5
	8.0 7.0 6.0					
Conc.	5.0					
ated (4.0					
Indic	3.0					
	2.0					
	1.0					
	0.0	2.0	4.0	6.0	8.0	10.0
	0.0	2.0	4.0	6.0	8.0	10.0

NMHC Calibration Plot







THC / CH_4 / NMHC Calibration Report

WBEA						Version-01-202
		Statio	n Information			
Station Name: Calibration Date: Start time (MST): Reason:	Anzac January 31, 202 7:37 Routine	3	Station number: Al Last Cal Date: Ja End time (MST): 8:	nuary 23, 202	3	
		Calibra	tion Standards			
Gas Cert Reference:	C	C279389	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				
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		
		Analyz	er Information			
Analyzer make:	: Thermo 55i		Analyzer serial #: 11	18148494		
, 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	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	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	80.1	17.12	17.09	1.002				
as found 2nd point									
as found 3rd point									
new cylinder response									
calibrator zero	5000	0.0	0.00	0.00					
high point	4920	80.1	17.12	17.02	1.006				
second point									
third point									
as left zero									
as left span									
			А	verage Correction Factor	1.006				
Baseline Corr AF:	17.09	Prev response	17.13	*% change	-0.2%				
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:					
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation				



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	9.12	9.06	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	9.12	9.04	1.009
second point					
third point					
as left zero					
as left span					
			Avera	age Correction Factor	1.009
Baseline Corr AF:	9.06	Prev response	9.03	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	8.00	8.03	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	8.00	7.98	1.002
second point					
third point					
as left zero					
as left span					
			Avera	age Correction Factor	1.002
Baseline Corr AF:	8.03	Prev response	8.10	*% change	-0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.001116		0.994029	
THC Cal Offset:		-0.010387		0.000000	
CH4 Cal Slope:		1.012466		0.997671	
CH4 Cal Offset:		0.001594		0.000000	
NMHC Cal Slope:		0.991290		0.990836	
NMHC Cal Offset:		-0.011980		0.000000	

Calibration Performed By: Melissa Lemay

CALS_271

NMHC Calibration Plot



17.5 -17 -16.5 16 -15.5 15 -14.5 14 13.5 13 -12.5 12 -11.5 11 10.5 10 -.**.**. 7 6.5 6. 5.5 5. 4.5 3.5 З-2.5 2 1.5 1 -0.5 -0 -07:45 08:00 08:15 08:30 08:45 Time -THC_Avg -NMHC_Avg -CH4_Avg



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station Information			
Station Name: Calibration Date: Start time (MST): Reason:	Anzac January 4, 2023 7:35 Routine	Station number: Last Cal Date: End time (MST):	December 2, 2022			
		(Calibration Standards			
NO Gas Cylinder #:	T2Y1P8D		Cal Gas Expiry Date:	December 11, 2023		
NOX Cal Gas Conc:	50.92	ppm	NO Cal Gas Conc:	50.05	ppm	
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA		
Removed Gas NOX Conc:	50.92	ppm	Removed Gas NO Conc:	50.05	ppm	
NOX gas Diff:			NO gas Diff:			
Calibrator Model:	Teledyne API T700		Serial Number:			
ZAG make/model:	Teledyne API 701H		Serial Number:	357		
			Analyzer Information			
Analyzer make:	Thermo 42i		Analyzer serial #:	1426262592		
NOX Range (ppb):						
	<u>Start</u>	Fi	inish	<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	4	.000 Reaction cell Press:	161.8		163.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002403	0.999876
NO _x Cal Offset:	-1.205267	-0.745750
NO Cal Slope:	1.003086	1.001401
NO Cal Offset:	-2.069261	-1.789671
NO ₂ Cal Slope:	1.000735	1.002246
NO ₂ Cal Offset:	0.178927	0.204305



$NO_X \setminus NO \setminus NO_2$ 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	-0.2	0.2		
as found span	4921	78.6	800.5	786.8	13.7	800.8	785.7	15.1	0.9997	1.0015
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1		
high point	4921	78.6	800.5	786.8	13.7	799.9	787.0	12.9	1.0008	0.9998
second point	4961	39.3	400.2	393.4	6.8	399.6	391.6	8.0	1.0015	1.0045
third point	4980	19.6	199.6	196.2	3.4	197.6	192.4	5.3	1.0102	1.0198
as left zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	0.2		
as left span	4921	78.6	800.5	392.6	407.9	797.7	388.4	409.3	1.0035	1.0109
							Average Co	orrection Factor	1.0042	1.0080
Corrected As fo	ound NO _x =	800.8 ppb	NO =	785.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-0.1%
Previous Respo	onse NO _x =	801.2 ppb	NO =	787.2 ppb				*Percent Chang	ge NO =	-0.2%
Baseline Corr 2	2nd pt NO _x =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/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)	781.8	387.6	407.9	408.9	0.9975	100.3%
2nd GPT point (200 ppb O3)	781.8	582.4	213.1	213.7	0.9971	100.3%
3rd GPT point (100 ppb O3)	781.8	681.5	114.0	114.9	0.9920	100.8%
				Average Correction Factor	0.9955	100.5%

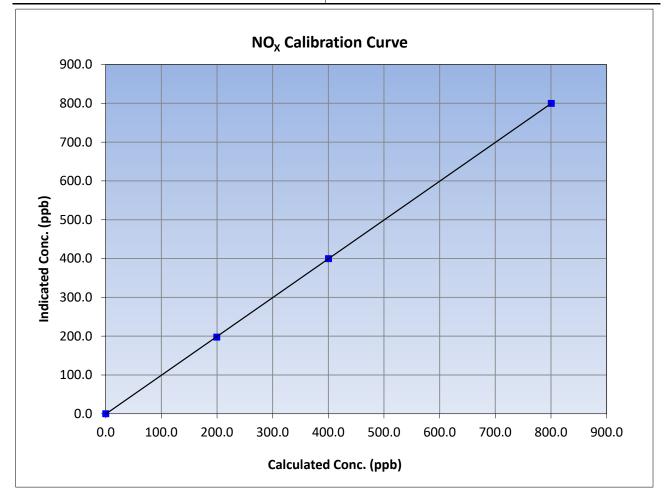
Notes:

No maintenance or adjustments done.



NO_x Calibration Summary

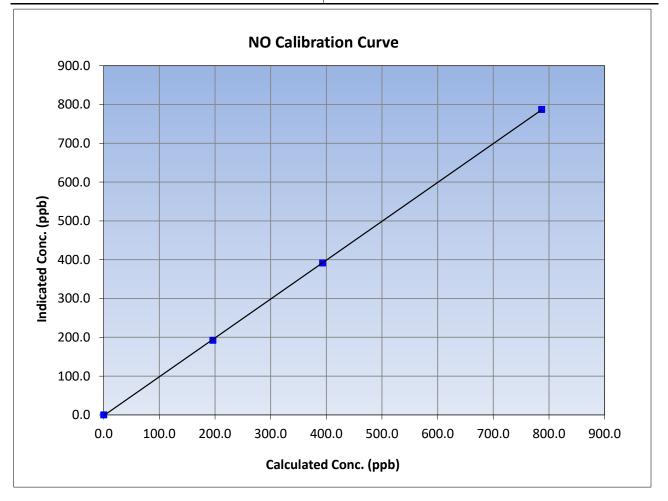
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	4, 2023	Previous Calibration:	Decembe	er 2, 2022
Station Name:	An	zac	Station Number:	AM	S 14
Start Time (MST):	7:	7:35		12	:31
Analyzer make: Thermo 42i			Analyzer serial #: 14262		62592
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999993	≥0.995
800.5	799.9	1.0008	correlation coefficient	0.5555555	20.333
400.2	399.6	1.0015	Clone	0.999876	0.90 - 1.10
199.6	197.6	1.0102	Slope	0.999870	0.90 - 1.10
			Intercept	-0.745750	+/-20





NO Calibration Summary

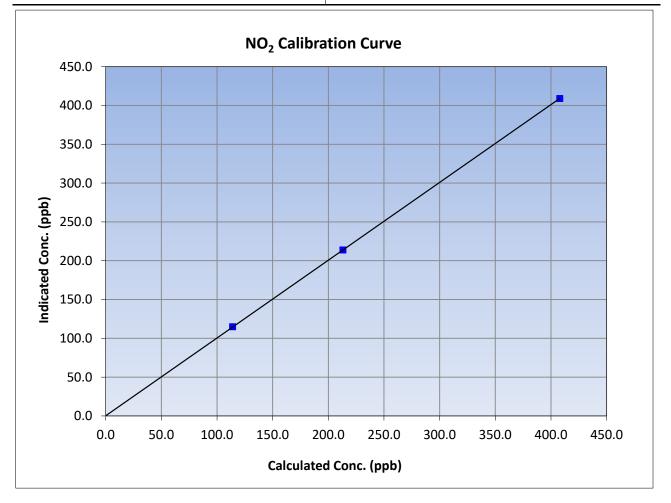
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	4, 2023	Previous Calibration:	Decembe	er 2, 2022
Station Name:	An	zac	Station Number:	AM	S 14
Start Time (MST):	7:	7:35		12	:31
analyzer make: Thermo 42i			Analyzer serial #:	1426262592	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999970	≥0.995
786.8	787.0	0.9998	correlation coefficient	0.555570	20.995
393.4	391.6	1.0045	Slope	1.001401	0.90 - 1.10
196.2	192.4	1.0198	Siope	1.001401	0.30 - 1.10
			Intercept	-1.789671	+/-20

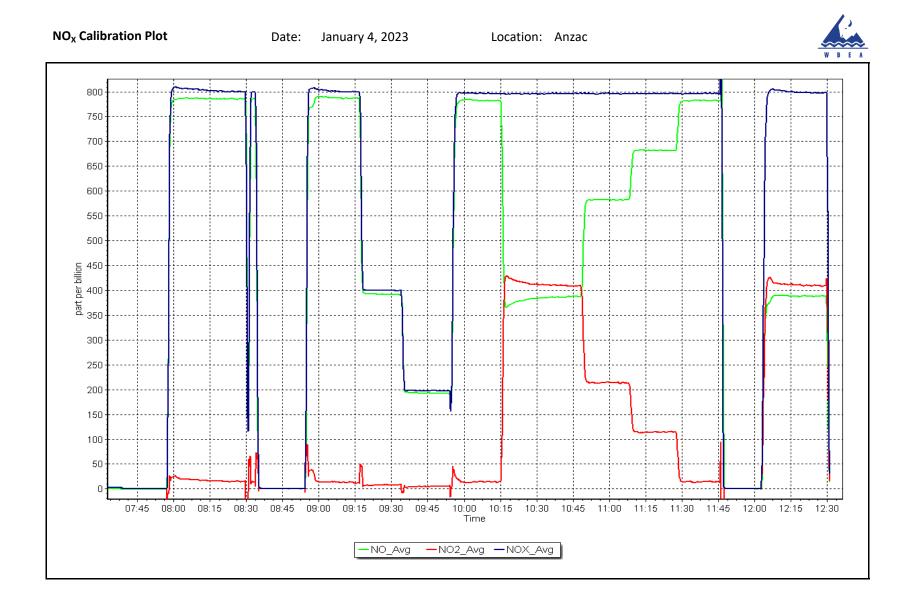




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	4, 2023	Previous Calibration:	Decembe	er 2, 2022
Station Name:	An	zac	Station Number:	AM	S 14
Start Time (MST):	7:35		End Time (MST):	12	:31
Analyzer make:	Thern	no 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	0.999996	≥0.995
407.9	408.9	0.9975	correlation coernelent	0.555550	20.995
213.1	213.7	0.9971	Slope	1.002246	0.90 - 1.10
114.0	114.9	0.9920	Slope	1.002240	0.90 - 1.10
			Intercept	0.204305	+/-20







O₃ Calibration Report

Version-01-2020

					Version-01-2020
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac January 24, 2023 10:29 Routine		Station number: Last Cal Date: End time (MST):	December 14, 2022	
		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> 0.993514 -1.440000	<u>Finish</u> 1.005686 -1.420000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 2.7 1.499
		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	0.0	0.0	-1.2	
as found span	5000	881.5	400.0	410.1	0.975
as found 2nd point as found 3rd point					
calibrator zero	5000	0.0	0.0	-1.8	
high point	5000	882.6	400.0	400.7	0.998
second point	5000	766.8	200.0	199.8	1.001
third point	5000	669.6	100.0	99.6	1.004
as left zero	5000	0.0	0.0	-2.1	
as left span	5000	924.8	400.0	400.4	0.999
			Avera	ge Correction Factor	1.001
Baseline Corr As found: Baseline Corr 2nd AF pt:	411.3 NA	Previous response AF Slope:		*% change AF Intercept:	3.7%
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

Notes:

No maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay

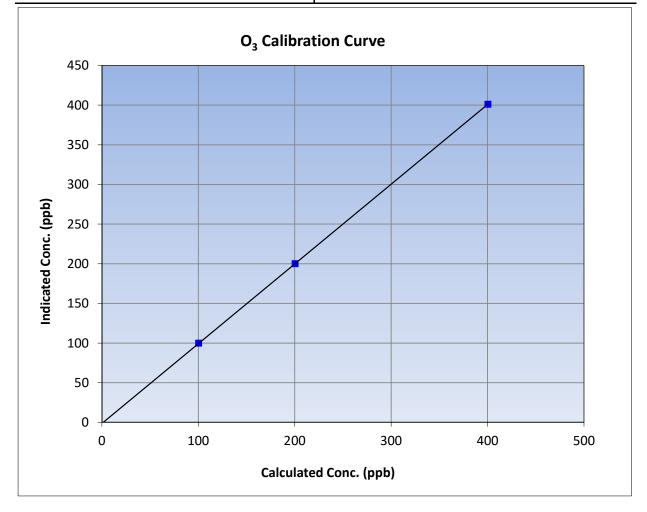


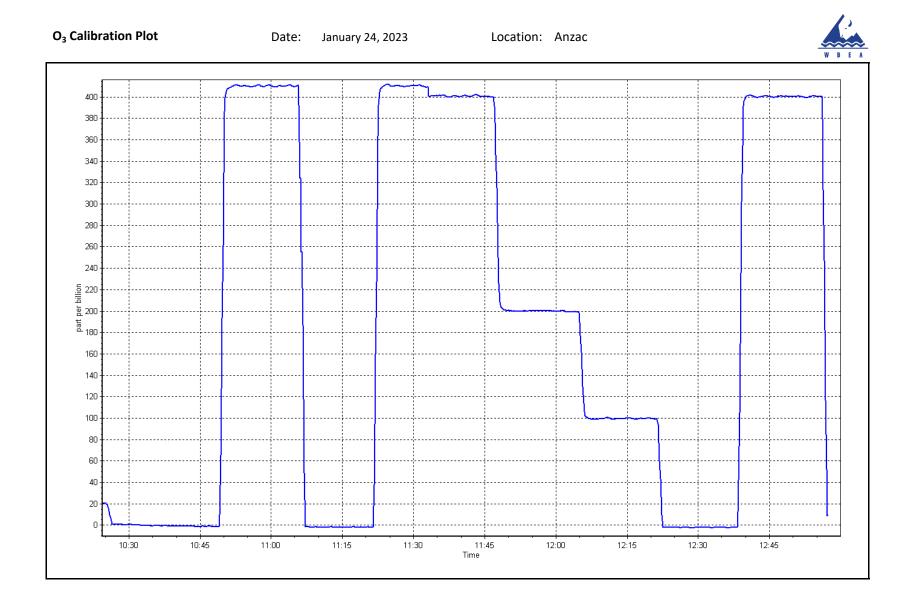
O₃ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 24, 2023	Previous Calibration:	December 14, 2022
Station Name:	Anzac	Station Number:	AMS14
Start Time (MST):	10:29	End Time (MST):	12:58
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-1.8		Correlation Coefficient	0.999996	≥0.995
400.0	400.7	0.9983	correlation coefficient	0.999990	20.333
200.0	199.8	1.0010	Slope	1.005686	0.90 - 1.10
100.0	99.6	1.0040	Siope		0.90 - 1.10
			Intercept	-1.420000	+/- 5







T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Informatio	'n		
Station Name: Calibration Date: Start time (MST):	Anzac January 24, 2023 11:37		Station number: Last Cal Date: End time (MST):	December 14, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	825	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25 Alicat FP-25			388753 388753	
		Monthly Calibration	Test		
Parameter T (°C) P (mmHg)	<u>As found</u> -4.6 713.8	<u>Measured</u> -4 714.8	<u>As left</u> -4.6 713.8	Adjusted	<i>(Limits)</i> +/- 2 °C +/- 10 mmHg
flow (LPM) Leak Test:	5.00 Date of check: _ PM w/o HEPA: _	5.1 January 24, 2023 4.2	5.00 Last Cal Date: PM w/ HEPA:	December 14, 2022 0	+/- 0.25 LPM
Inlet cleaning :	Inlet Head	∠.			
		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 Chamber Cleaned: Disposable Filter Changed:		December 14, 2022 December 14, 2022			
		Annual Maintenan	ce		
Date Sample Tub Date RH/T Senso	-	June 21, 2 June 21, 2			
Notes:		No adjustments	done. Inlet Head clea	aned.	

Calibration by:

Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu January 10, 2023 10:56 Routine		Station number: Last Cal Date: End time (MST):	AMS17 December 7, 2022 13:48	
		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 #:	<u>ALM066507</u> <u>50.38</u> <u>n/a</u>	ppm	Rem Gas Exp Date: Diff between cyl:	n/a	
Calibrator Make/Model: ZAG Make/Model:	API T700 API 701H		Serial Number: Serial Number:	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:	1.001410 -1.599411	0.999825 -1.319798	Backgd or Offset: Coeff or Slope:		12.0 1.099
calibration intercept.	-1.555411	-1.319798	coeff of slope.	1.099	1.055
		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	0.3	
as found span	4921	79.4	800.0	798.5	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.6	
high point	4921	79.4	800.0	799.8	1.000
second point third point	4960	39.7	400.0	396.7	1.008
•	4980	<u> 19.8</u> 0.0	<u> </u>	196.9	1.013
as left zero as left span	5000 4920	79.4	800.1	0.6 800.6	0.999
as ieit spaii	4320	/ 5.4		ge Correction Factor	1.007
Baseline Corr As found:	798.20	Previous response	799.50	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:			

Notes:

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

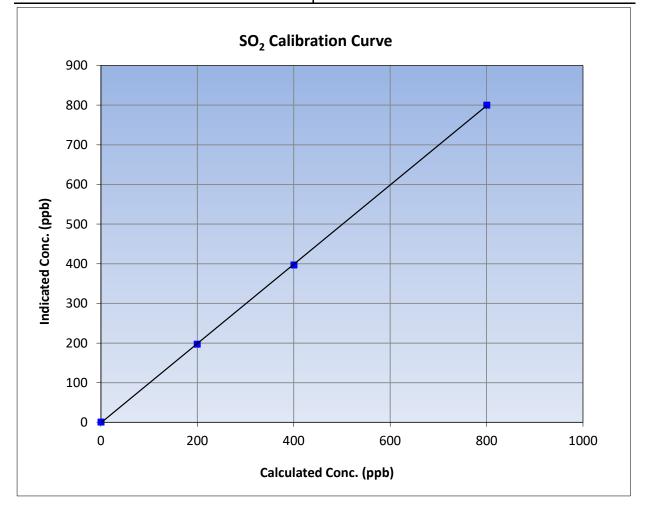
Calibration Performed By:

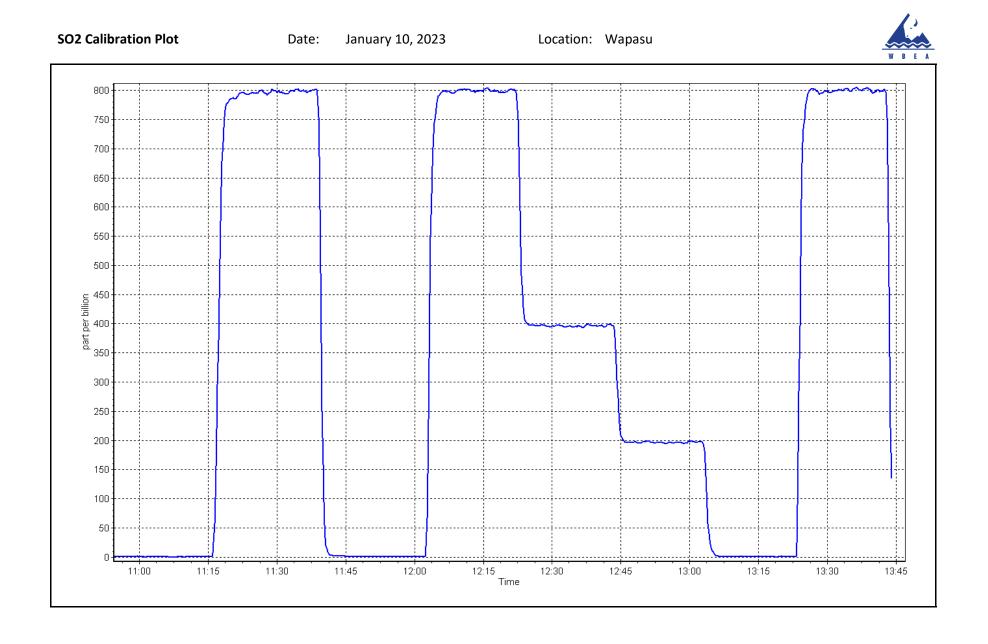


SO₂ Calibration Summary

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

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999969	≥0.995
800.0	799.8	1.0002	correlation coefficient	0.999909	20.333
400.0	396.7	1.0084	Slope	0.999825	0.90 - 1.10
199.5	196.9	1.0133	Slope	0.999825	0.90 - 1.10
			Intercept	-1.319798	+/-30







H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu January 5, 2023 10:23 Routine		Station number: Last Cal Date: End time (MST):	AMS17 December 14, 2022 14:35	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.076 CC511852	ppm	Cal Gas Exp Date:	September 16, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.076 n/a	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API 1700 API T701H		Serial Number: Serial Number:	2449 359	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450i n/a 0 - 100 ppb		Analyzer serial #: Converter serial #:	1218153583 n/a	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004139	1.002282	Backgd or Offset:	12.8	12.9
Calibration intercept:	0.280806	0.320801	Coeff or Slope:	1.085	1.085
		H 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	4921	78.8	80.0	80.1	1.001
as found 2nd point	4961	39.4	40.0	40.3	0.997
as found 3rd point	4980	19.7	20.0	20.1	1.005
new cylinder response					
		H ₂ S Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4921	78.8	80.0	80.5	0.994
second point	4961	39.4	40.0	40.4	0.990
third point	4980	19.7	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.7	
as left span	4921	78.8	80.0	80.6	0.993
SO2 Scrubber Check	4921	79.4	800.0	-0.1	
Date of last scrubber cha		n/a		Ave Corr Factor	0.988
Date of last converter eff	ficiency test:	n/a			efficiency
Baseline Corr As found:	79.9	Prev response:	80.61	*% change:	-0.9%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	0.999282	AF Intercept:	0.200806
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999992		
				* = > +/-5% change initiate	es investigation

Notes:

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

Calibration Performed By:

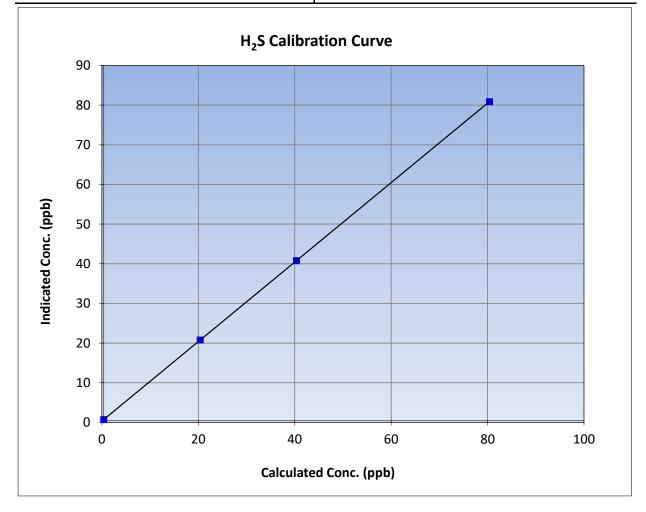


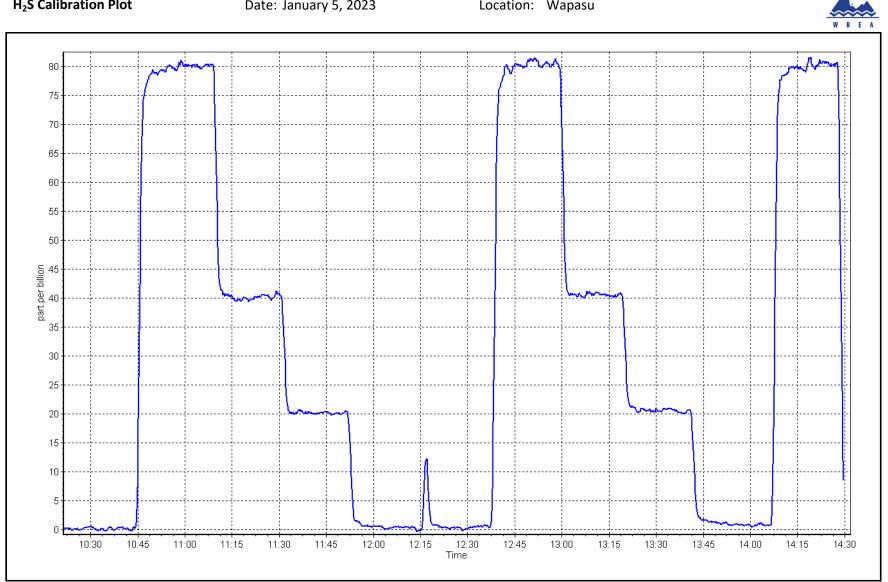
H₂S Calibration Summary

WBEA	Version-11-2021						
Station Information							
Calibration Date:	January 5, 2023	Previous Calibration:	December 14, 2022				
Station Name:	Wapasu	Station Number:	AMS17				
Start Time (MST):	10:23 End Time		14:35				
Analyzer make:	Thermo 450i	Analyzer serial #:	1218153583				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	1.000000	≥0.995
80.0	80.5	0.9938			
40.0	40.4	0.9900	Slope	1.002282	0.90 - 1.10
20.0	20.4	0.9804			
			Intercept	0.320801	+/-3





Date: January 5, 2023



THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu January 10, 2023 10:56 Routine		Station number: Last Cal Date: End time (MST):	AMS17 December 7, 2022 13:48	
		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:	n/a 1076.3 2449 359	ppm
		Analyzer Info	ormation		
Analyzer make: Analyzer Range:	: Thermo 51i-LT : 0 - 20 ppm	,,	Analyzer serial #:	1218153352	
Calibration slope: Calibration intercept:	<u>Start</u> 1.002399 -0.102337	<u>Finish</u> 1.003975 0.033881	Background: Coefficient:		<u>Finish</u> 2.950 4.292
		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	0.03	
as found span	4921	79.4	17.09	17.18	0.995
as found 2nd point as found 3rd point					
new cylinder response			0.00	0.07	
calibrator zero	5000	0.0	0.00	0.07	
high point	<u>4921</u> 4960	<u>79.4</u> 39.7	<u> </u>	<u> </u>	0.992
second point third point	4960	<u> </u>	4.26	4.31	<u> </u>
as left zero	5000	0.0	0.00	0.03	0.988
as left span	4920	79.4	17.09	17.24	0.992
	4520	, , , , , , , , , , , , , , , , , , , ,		ge Correction Factor	1
Baseline Corr As found:	17.14	Previous response	17.03	*% change	
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

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

Calibration Performed By:

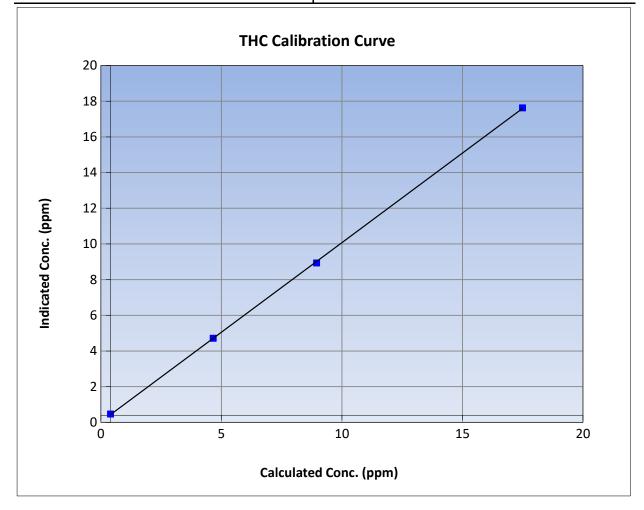


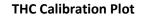
THC Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 10, 2023	Previous Calibration:	December 7, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:56	End Time (MST):	13:48
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352

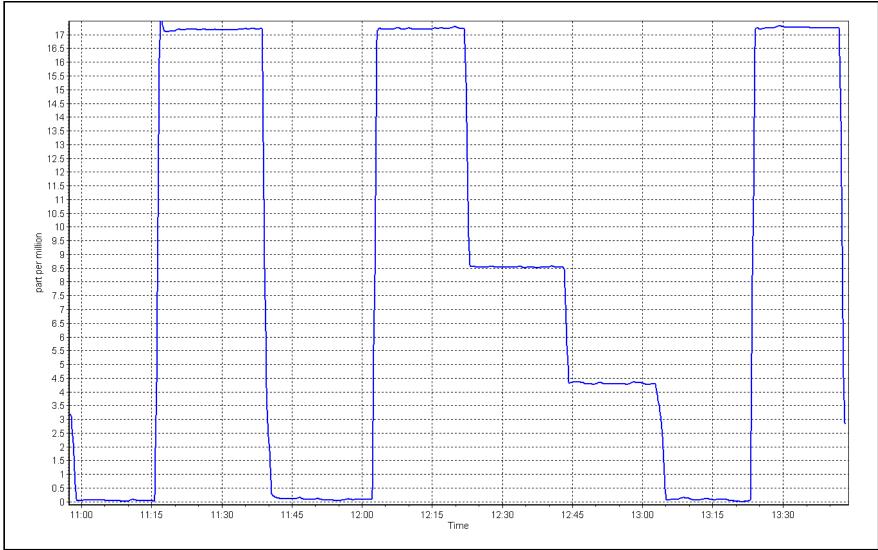
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.07		Correlation Coefficient	0.999947	≥0.995
17.09	17.23	0.9919	Correlation Coefficient	0.555547	20.333
8.55	8.54	1.0009	Slope	1.003975	0.90 - 1.10
4.26	4.31	0.9880	510pe	1.003975	0.90 - 1.10
			Intercept	0.033881	+/-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

		Stat	ion Information		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu January 19, 2023 10:33 Routine		Station number: AN Last Cal Date: De End time (MST): 15	ecember 8, 202	2
		Calib	oration Standards		
NO Gas Cylinder #:	Т37	75YK8	Cal Gas Expiry Date: Ap	oril 13, 2025	
NOX Cal Gas Conc: Removed Cylinder #:	<u>49.11</u>	ppm	NO Cal Gas Conc: Removed Gas Exp Date:	48.07	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:	API T700		Serial Number: 24		
ZAG make/model:	API T701H		Serial Number: 35	9	
		Anal	yzer Information		
Analyzer make: NOX Range (ppb):	Teledyne API T200 0 - 1000 ppb		yzer Information Analyzer serial #: 83	3	
·			Analyzer serial #: 83	3 <u>Start</u>	<u>Finish</u>
·	0 - 1000 ppb <u>Start</u>		Analyzer serial #: 83		<u>Finish</u> 0.1
NOX Range (ppb):	0 - 1000 ppb <u>Start</u> :: 0.820	<u>Finis</u> t	Analyzer serial #: 83	<u>Start</u>	
NOX Range (ppb): NO coeff or slope	0 - 1000 ppb <u>Start</u> :: 0.820 :: 0.812	<u>Finish</u> 0.820	Analyzer serial #: 83 NO bkgnd or offset: NOX bkgnd or offset:	<u>Start</u> 0.1	0.1
NOX Range (ppb): NO coeff or slope NOX coeff or slope	0 - 1000 ppb <u>Start</u> :: 0.820 :: 0.812	<i>Finish</i> 0.820 0.812 1.000	Analyzer serial #: 83 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 0.1 -0.4	0.1 -0.4
NOX Range (ppb): NO coeff or slope NOX coeff or slope	0 - 1000 ppb <u>Start</u> :: 0.820 :: 0.812	<i>Finish</i> 0.820 0.812 1.000	Analyzer serial #: 83 NO bkgnd or offset: NOX bkgnd or offset:	<u>Start</u> 0.1 -0.4	0.1 -0.4
NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> :: 0.820 :: 0.812 :: 1.000	<u>Finish</u> 0.820 0.812 1.000 Cali l	Analyzer serial #: 83 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 0.1 -0.4 4.3 <u>Finish</u>	0.1 -0.4
NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> :: 0.820 :: 0.812 :: 1.000	<i>Finish</i> 0.820 0.812 1.000 Cali	Analyzer serial #: 83 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 0.1 -0.4 4.3	0.1 -0.4
NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> :: 0.820 :: 0.812 :: 1.000	<u>Finish</u> 0.820 0.812 1.000 Cali l	Analyzer serial #: 83 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 0.1 -0.4 4.3 <u>Finish</u>	0.1 -0.4

-2.080000

0.992948

-0.933811

-2.440000

0.996862

-0.247483



$NO_X \setminus NO \setminus NO_2$ 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	0.3	-0.2	0.5		
as found span	4917	83.2	817.2	799.9	17.3	812.5	794.7	17.9	1.0058	1.0065
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3		
high point	4917	83.2	817.2	799.9	17.3	816.4	799.9	16.4	1.0010	1.0000
second point	4958	41.6	408.6	399.9	8.7	406.7	395.3	11.4	1.0047	1.0117
third point	4979	20.8	204.3	200.0	4.3	201.6	196.2	5.4	1.0134	1.0192
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3		
as left span	4917	83.2	817.2	408.0	409.2	807.5	402.3	405.3	1.0120	1.0141
							Average C	orrection Factor	1.0063	1.0103
Corrected As fo	ound NO _x =	812.2 ppb	NO =	794.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-0.4%
Previous Respo	onse NO _x =	815.7 ppb	NO =	798.0 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	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)	795.4	403.5	409.2	407.5	1.0042	99.6%
2nd GPT point (200 ppb O3)	795.4	595.6	217.1	217.3	0.9991	100.1%
3rd GPT point (100 ppb O3)	795.4	697.4	115.3	113.2	1.0186	98.2%
				Average Correction Factor	1.0073	99.3%

Notes:

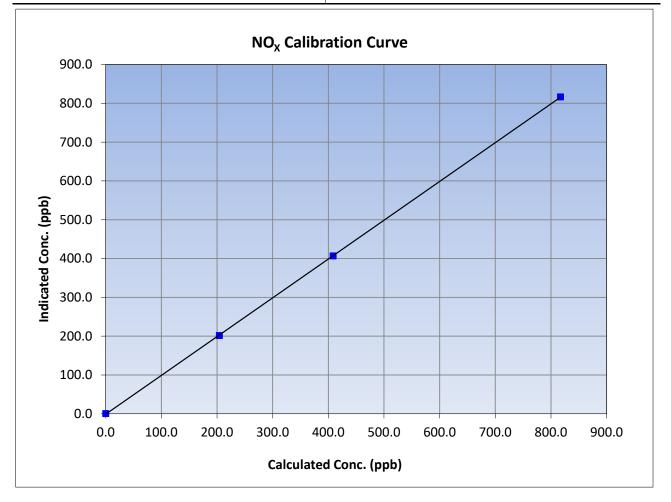
Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

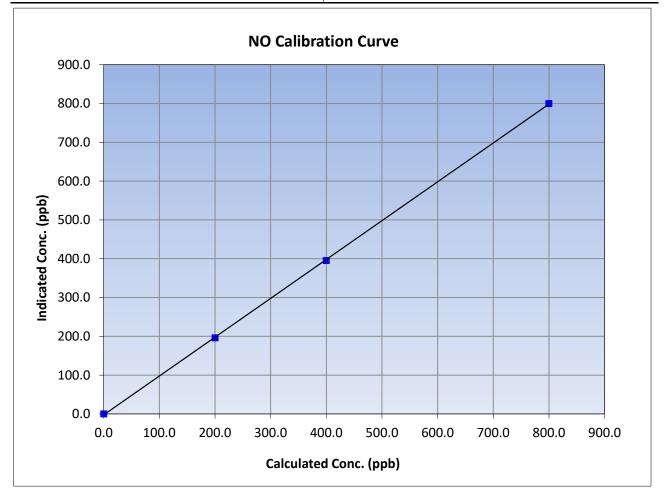
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	19, 2023	Previous Calibration:	Decemb	er 8, 2022
Station Name: Wapasu		Station Number:	AN	IS17	
Start Time (MST): 10:33			End Time (MST):	15	5:10
Analyzer make:	Teledyne	e API T200	Analyzer serial #:	8	333
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/lc)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Convolution Coofficient	0.000086	2.0.005
817.2	816.4	1.0010	Correlation Coefficient	0.999986	≥ <i>0.995</i>
408.6	406.7	1.0047	Slope	0.999578	0.90 - 1.10
204.3	201.6	1.0134	51000	0.555570	0.50 1.10
			Intercept	-1.120000	+/-20





NO Calibration Summary

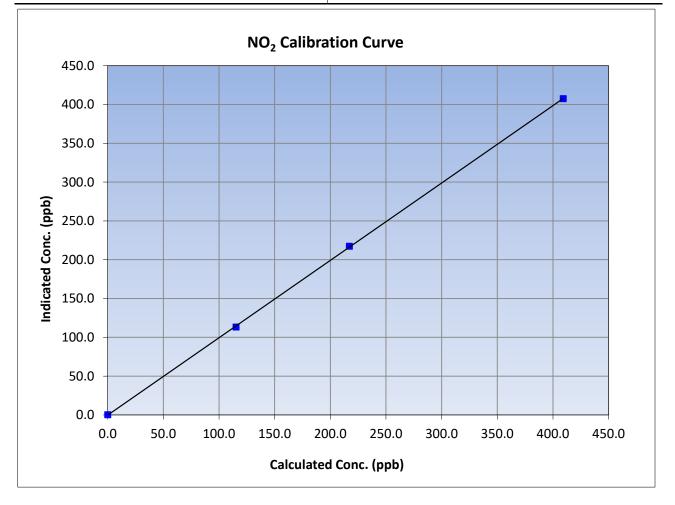
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	19, 2023	Previous Calibration:	Decem	oer 8, 2022
Station Name: Wapasu		Station Number:	A	MS17	
Start Time (MST): 10:33			End Time (MST):	1	5:10
Analyzer make:	Teledyne	e API T200	Analyzer serial #:	:	833
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999949	≥0.995
799.9	799.9	1.0000	correlation coefficient	0.555545	20.995
399.9	395.3	1.0117	Slope	1.000973	0.90 - 1.10
200.0	196.2	1.0192	Siope	1.000975	0.90 - 1.10
			Intercept	-2.440000	+/-20

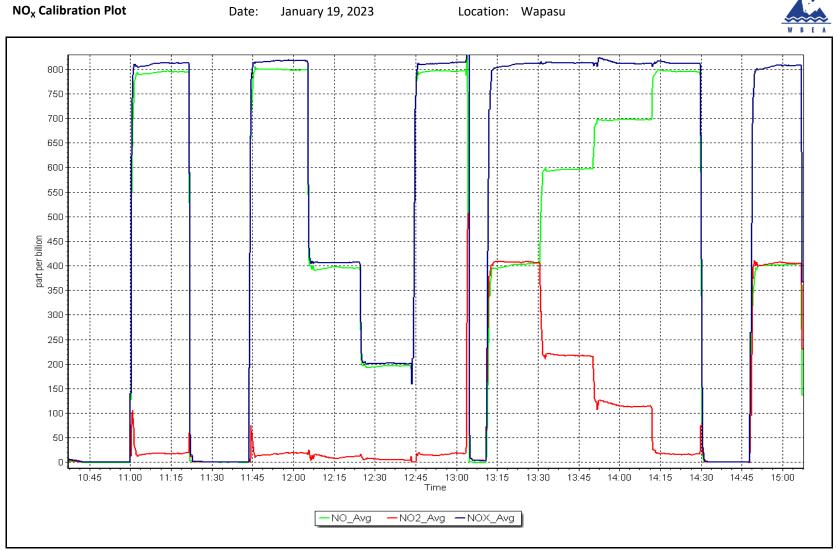




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	19, 2023	Previous Calibration:	Decem	per 8, 2022
Station Name: Wapasu		Station Number:	A	MS17	
Start Time (MST): 10:33			End Time (MST):	1	5:10
Analyzer make:	Teledyne	e API T200	Analyzer serial #:		833
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999957	≥0.995
409.2	407.5	1.0042	correlation coefficient	0.333337	20.333
217.1	217.3	0.9991	Slopp	0.996862	0.90 - 1.10
115.3	113.2	1.0186	Slope	0.990802	0.90 - 1.10
			Intercept	-0.247483	+/-20









O₃ Calibration Report

Version-01-2020

					Version-01-2020
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu January 4, 2023 10:15 Routine		Station number: Last Cal Date: End time (MST):	December 15, 2022	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer API T700 API T701H		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	3870	
Calibration slope: Calibration intercept:	<u>Start</u> 1.005114 -0.320000	<u>Finish</u> 1.005486 -0.360000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> -1.8 1.020
		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	0.0	0.0	-0.1	
as found span	5000	1077.3	400.0	402.7	0.993
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.2	
high point	5000	1077.3	400.0	402.2	0.995
second point	5000	900.3	200.0	200.2	0.999
third point	5000	789.5	100.0	99.8	1.002
as left zero	5000	0.0	0.0	0.3	
as left span	5000	1077.3	400.0	405.5	0.986
			Avera	ge Correction Factor	0.999
Baseline Corr As found: Baseline Corr 2nd AF pt:	402.8 NA	Previous response AF Slope:		*% change AF Intercept:	0.3%
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

Notes:

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

Calibration Performed By:

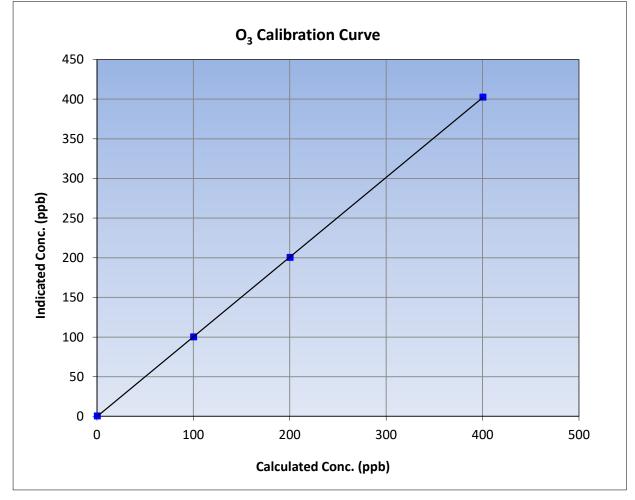
Karan Pandit

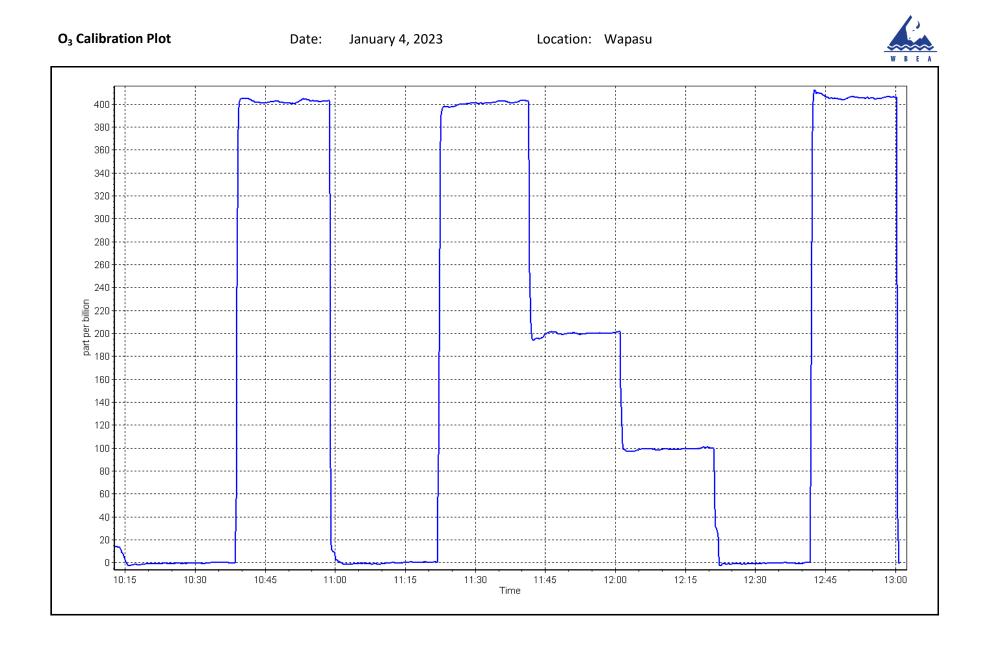


O₃ Calibration Summary

WBEA				Version-01-2020
		Station I	Information	
Calibration Date:	January 4	1, 2023	Previous Calibration:	December 15, 2022
Station Name:	Jame: Wapasu		Station Number:	AMS17
Start Time (MST):	t Time (MST): 10:15		End Time (MST):	13:05
Analyzer make:	API T	400	Analyzer serial #:	3870
		Calibra	ation Data	
Calculated concentration Inc (ppb) (Cc)	dicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	0.2			

0.0	0.2		Correlation Coefficient	0.999990	≥0.995
400.0	402.2	0.9945	correlation coefficient	0.555550	20.333
200.0	200.2	0.9990	Slope	1.005486	0.90 - 1.10
100.0	99.8	1.0020	51066	1.005480	0.90 - 1.10
			Intercept	-0.360000	+/- 5







T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Wapasu January 19, 2023 11:29		Station number: AMS 1 Last Cal Date: Decen End time (MST): 11:55		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 1183		
Flow Meter Make/Model:	Delta Cal		S/N: 1102		
Temp/RH standard:	Delta Cal		S/N: 1102		
		Monthly Calibration	Test		
<u>Parameter</u> T (°C) P (mmHg)	<u>As found</u> -4.8 709.9	<u>Measured</u> -4.7 711.0	<u>As left</u> -4.8 709.9	Adjusted	(Limits) +/- 2 °C
flow (LPM)	5.01	5.05	5.01		+/- 10 mmHg +/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	January 19, 2023 9.6	Last Cal Date: Dece PM w/ HEPA:		, , 0.25 E.M
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	n 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 Disposable Filte		December 1 December 1			
		Annual Maintenar	nce		
Date Sample Tul		November 2			
Date RH/T Sense	or Cleaned:	November 2	22, 2021		
Notes:		No adjustment:	s made. Leak check passed		
Calibration by:	Karan Pandit				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Stony Mountain		Station number:	AMS 18	
Calibration Date:	January 16, 2023		Last Cal Date:	December 15, 2022	
Start time (MST):	11:35		End time (MST):	14:42	
Reason:	Routine				
		Calibration St	andarda		
		Calibration St		E 1 00 000E	
Cal Gas Concentration:	49.40	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	CC463851		Dave Cas Eve Data	N1.4	
Removed Cal Gas Conc:	49.40	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA Talada a ADI T700		Diff between cyl:	2050	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658	
ZAG Make/Model:	Teledyne API 701H		Serial Number:	360	
		Analyzer Info	rmation		
Analyzor mako	· Thormo 12i	,,		101501201452	
Analyzer make Analyzer Range			Analyzer serial #:	JC1301301433	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.994979	1.003075	Backgd or Offset:	22.4	23.0
Calibration intercept:	-1.084581	-1.143339	Coeff or Slope:	0.807	0.817
		SO ₂ 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	5009	0.0	0.0	-0.5	
as found span	4919	81.0	800.3	788.7	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	
high point	4919	81.0	800.3	801.7	0.998
second point	4959	40.5	400.2	400.8	0.998
third point	4979	20.2	199.6	197.6	1.010
as left zero	5000	0.0	0.0	-0.3	
as left span	4919	81.0	800.3	800.9	0.999
			Avera	ge Correction Factor	1.002
Baseline Corr As found:	789.20	Previous response	795.18	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			
				* = > +/-5% change initiat	es investigation

Notes:

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

Calibration Performed By:

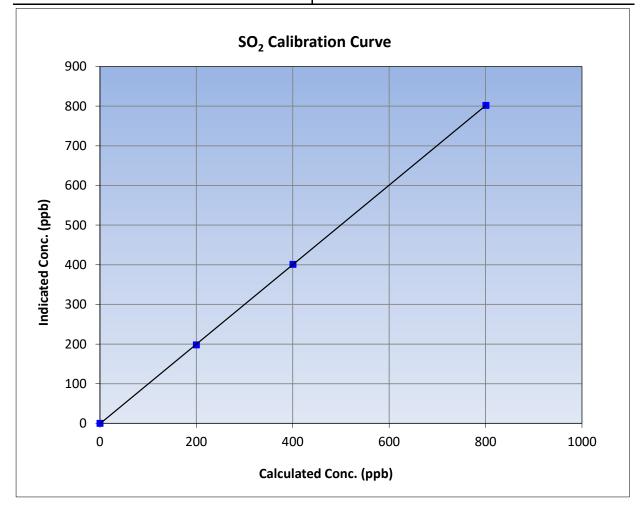


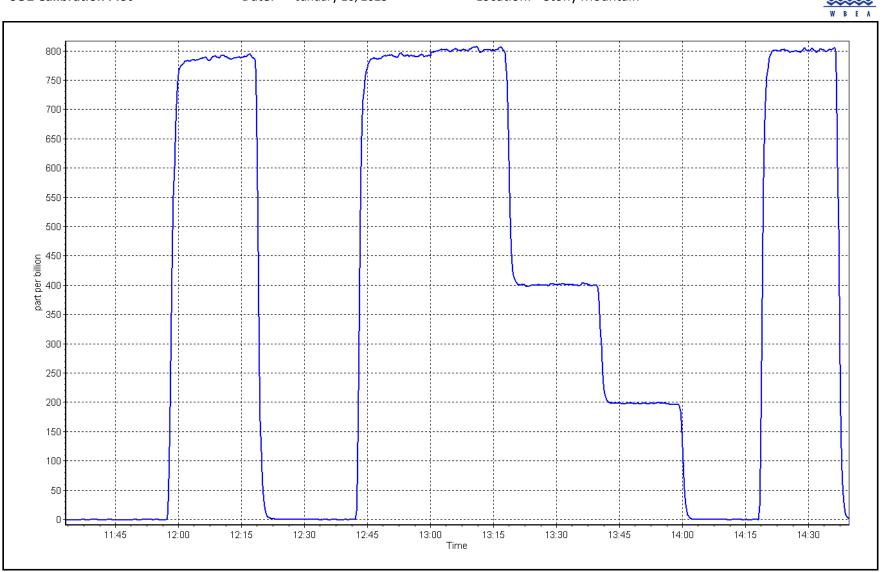
SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: January 16, 2023 **Previous Calibration:** December 15, 2022 Station Name: Stony Mountain Station Number: AMS 18 Start Time (MST): 11:35 End Time (MST): 14:42 Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999991	≥0.995
800.3	801.7	0.9982	correlation coefficient	0.999991	20.995
400.2	400.8	0.9985	Slope	1.003075	0.90 - 1.10
199.6	197.6	1.0102	Slope	1.003075	0.90 - 1.10
			Intercept	-1.143339	+/-30





SO2 Calibration Plot

Location: Stony Mountain



TRS Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
tation Name: Calibration Date: tart time (MST): Reason:	Stony Mountain January 18, 2023 10:24 Routine		Station number: Last Cal Date: End time (MST):	AMS18 December 14, 2022 14:43	
		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: AG Make/Model:			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:	0.994298	0.989724	Backgd or Offset:	2.53	2.55
Calibration intercept:	0.241122	0.201244	Coeff or Slope:	1.129	1.129
		TRS As 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	4927	73.0	80.0	78.4	1.022
as found 2nd point	4964	36.5	40.0	39.6	1.012
as found 3rd point	4983	18.3	20.0	19.7	1.023
new cylinder response					
		TRS 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	0.2	
high point	4927	73.0	80.0	79.3	1.009
second point	4964	36.5	40.0	40.0	1.000
third point	4983	18.3	20.0	19.9	1.007
as left zero	5000	0.0	0.0	0.2	
as left span	4927	73.0	80.0	79.2	1.010
O2 Scrubber Check	4923	77.1	771.0	0.0	
ate of last scrubber cha	-	17-Dec-21		Ave Corr Factor	1.005
ate of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	78.3	Prev response:	79.78	*% change:	-1.9%
Baseline Corr 2nd AF pt:	39.5	AF Slope:		AF Intercept:	0.161419
Baseline Corr 3rd AF pt:	19.6	AF Correlation:			
				* = > +/-5% change initiate	es investigation

Notes:

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

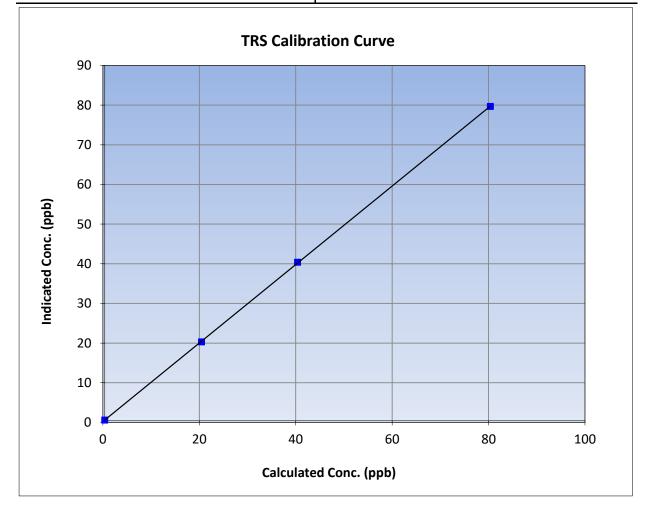


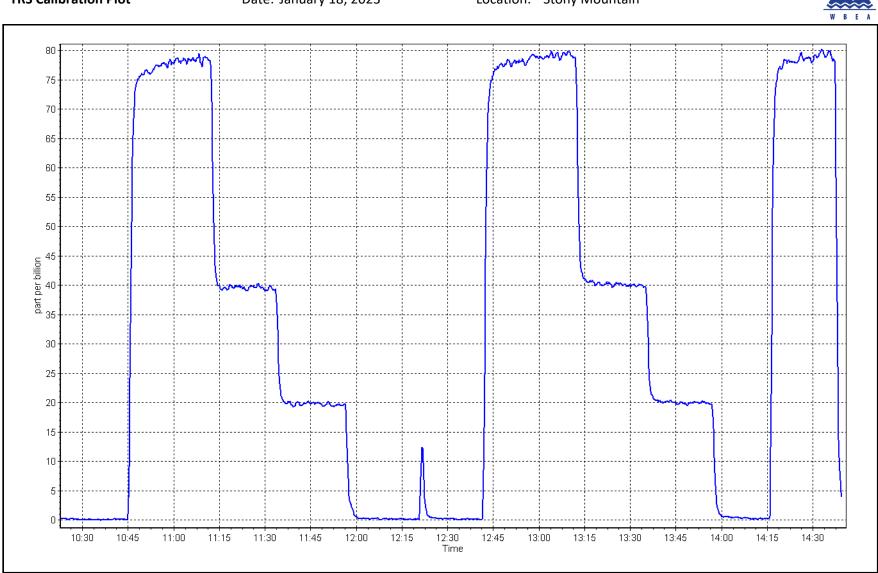
TRS Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	January 18, 2023	Previous Calibration:	December 14, 2022					
Station Name:	Stony Mountain	Station Number:	AMS18					
Start Time (MST):	10:24	End Time (MST):	14:43					
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999979	≥0.995
80.0	79.3	1.0087	correlation coefficient	0.999979	20.335
40.0	40.0	0.9998	Slopo	0.989724	0.90 - 1.10
20.0	19.9	1.0074	Slope	0.969724	0.90 - 1.10
			- Intercept	0.201244	+/-3





TRS Calibration Plot

Date: January 18, 2023

Location: Stony Mountain



THC / CH_4 / NMHC Calibration Report

			Station Information			
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain January 16, 202 11:35 Routine		Station number: AMS 18 Last Cal Date: December 15, 2022 End time (MST): 14:42			
		C	Calibration Standards			
Gas Cert Reference:	C	C463851	Cal Gas Expiry Date:	February 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:	NA		
Removed CH4 Conc.	500.8	ppm	CH4 Equiv Conc.	1066.8	ppm	
Removed C3H8 Conc.	205.8	ppm	Diff between cyl (THC):			
Diff between cyl (CH ₄)			Diff between cyl (NM):			
Calibrator Model:	Teledyne API T7		Serial Number:			
ZAG make/model:	Teledyne API T7	01H	Serial Number:	360		
		A	Analyzer Information			
Analyzer make	: Thermo 55i		Analyzer serial #:	1180320039		
THC Range (ppm)	: 0 - 20 ppm					
NMHC Range (ppm)	: 0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm		
	<u>Start</u>	<u>Fii</u>	<u>nish</u>	<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio	: 3.03E-04	3.0	6E-04 NMHC SP Ratio:	5.53E-05	5.66E-05	
CH4 Retention time	: 14.60	14	4.60 NMHC Peak Area:	165923	162130	

THC Calibration 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	4919	81.0	17.28	16.99	1.017		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4919	81.0	17.28	17.25	1.002		
second point	4959	40.5	8.64	8.61	1.004		
third point	4979	20.2	4.31	4.29	1.005		
as left zero	5000	0.0	0.00	0.00			
as left span	4919	81.0	17.28	17.35	0.996		
			A	verage Correction Factor	1.004		
Baseline Corr AF:	16.99	Prev response	17.31	*% change	-1.9%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		<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) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4919	81.0	9.17	8.94	1.026
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4919	81.0	9.17	9.14	1.003
second point	4959	40.5	4.58	4.58	1.002
third point	4979	20.2	2.29	2.29	0.999
as left zero	5000	0	0.00	0.00	
as left span	4919	81	9.17	9.21	0.996
			ŀ	Average Correction Factor	1.001
Baseline Corr AF:	8.94	Prev response	9.17	*% change	-2.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

СН4	Cal	ibration	Data
CH4	Ca	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	4919	81.0	8.11	8.06	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.0	8.11	8.11	1.001
second point	4959	40.5	4.06	4.03	1.006
third point	4979	20.2	2.02	2.00	1.012
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	8.11	8.14	0.996
			A	verage Correction Factor	1.006
Baseline Corr AF:	8.06	Prev response	8.14	*% change	-1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.001927		0.998211	
THC Cal Offset:		-0.008379		-0.008790	
CH4 Cal Slope:		1.005440		0.999750	
CH4 Cal Offset:		-0.017403		-0.013212	
NMHC Cal Slope:		0.998694		0.996638	
NMHC Cal Offset:		0.009024		0.005021	

Notes:

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

Calibration Performed By:

Karan Pandit



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	16, 2023	Previous Calibration:	December	⁻ 15, 2022
Station Name:	Stony N	Iountain	Station Number:	AMS	5 18
Start Time (MST):	11	:35	End Time (MST):	14:	42
Analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20039
		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		Correlation Coefficient	0.999998	≥0.995
17.28	17.25	1.0019		0.555550	
8.64	8.61	1.0040	Slope	0.998211	0.90 - 1.10
4.31	4.29	1.0050	lutereet	0.000700	. / 0.5
			Intercept	-0.008790	+/-0.5
20.0					
18.0 -					
16.0					
14.0					
(md 12.0 + 					
טיי 10.0					
0.8 udicated					
bip 6.0					
4.0					
2.0					
0.0 🖊	-	.0	10.0	15.0	20.0
				1511	71111
0.0	5		Conc. (ppm)	15.0	20.0



CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	January 16, 2023		Previous Calibration:	December 15, 2022	
station Name:	Stony N	Iountain	Station Number:	AMS	5 18
start Time (MST):	11	:35	End Time (MST):	14:	42
Analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20039
		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	0.999987	≥0.995
8.11 4.06	8.11 4.03	1.0009 1.0064			
2.02	2.00	1.0118	Slope	0.999750	0.90 - 1.10
			Intercept	-0.013212	+/-0.5
8.0 7.0 6.0 (mag) 5.0					
Indicated Conc. (ppm)					
0.6 udicate					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
0.0					

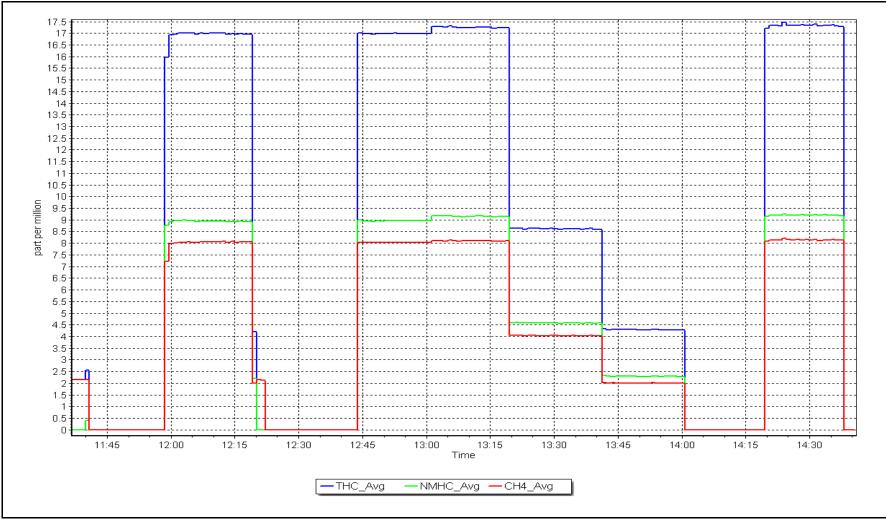


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	January 16, 2023		Previous Calibration:	December	15, 2022
Station Name:	Stony N	Iountain	Station Number:	AMS	5 18
Start Time (MST):	11	:35	End Time (MST):	14:	42
Analyzer make:	Ther	no 55i	Analyzer serial #:	118032	20039
		Calibra	tion Data		
Calculated concentration Ir (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999999	≥0.995
9.17	9.14	1.0031			
4.58 2.29	4.58 2.29	1.0017 0.9990	Slope	0.996638	0.90 - 1.10
			Intercept	0.005021	+/-0.5
10.0 9.0 8.0 7.0					•
0.0 bbm 0.0 conc. (bbm) 0.0 conc. (bbm)					
5.0					
4.0					
1.0 1.0					
2.0					
1.0					
0.0					
0.0	2.0	4.0 Calculated	6.0 I Conc. (ppm)	8.0	10.0









Station Name:

Reason:

Calibration Date:

Start time (MST):

Stony Mountain

January 24, 2023

Cylinder Change

10:19

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS 18 Last Cal Date: December 21, 2022 End time (MST): 15:58

NO Gas Cylinder #:	T2XX7ME		Cal Gas Expiry Date:	January 14, 2024	
NOX Cal Gas Conc:	50.48	ppm	NO Cal Gas Conc:	49.22	ppm
Removed Cylinder #:	T2Y1P5K		Removed Gas Exp Date:	December 11, 2023	
Removed Gas NOX Conc:	51.06	ppm	Removed Gas NO Conc:	50.35	ppm
NOX gas Diff:	-0.5%		NO gas Diff:	-0.6%	
Calibrator Model:	Teledyne API T700		Serial Number:	2658	
ZAG make/model:	Teledyne API 701H		Serial Number:	360	

Analy	vzer	Inform	nation
7 11101	201		

Analyzer make:	Thermo 42i		Analyzer serial #: 13	336160088	
NOX Range (ppb):	0 - 1000 ppb				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.026	1.043	NO bkgnd or offset:	2.9	2.9
NOX coeff or slope:	0.990	0.987	NOX bkgnd or offset:	2.9	2.9
NO2 coeff or slope:	0.999	0.999	Reaction cell Press:	225.3	218.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000898	1.000554
NO _x Cal Offset:	-0.096867	0.069933
NO Cal Slope:	1.001322	1.001394
NO Cal Offset:	-1.059867	-0.829546
NO ₂ Cal Slope:	0.997471	1.001873
NO ₂ Cal Offset:	0.297014	0.315702



$NO_X \setminus NO \setminus NO_2$ 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	-0.1	-0.1	0.0		
as found span	4921	79.4	810.8	799.5	11.3	804.0	790.1	13.9	1.0084	1.0119
as found 2nd										
as found 3rd										
new cyl resp	4919	81.3	820.8	800.3	20.5	809.7	786.2	23.4	1.0137	1.0179
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4919	81.3	820.8	800.3	20.5	821.2	801.0	20.2	0.9995	0.9991
second point	4959	40.7	410.9	400.7	10.3	411.5	399.9	11.6	0.9986	1.0019
third point	4980	20.3	204.9	199.8	5.1	204.9	198.5	6.4	1.0002	1.0067
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as left span	4919	81.3	820.8	390.0	430.8	824.1	387.7	436.5	0.9959	1.0059
							Average C	orrection Factor	0.9994	1.0026
Corrected As fo	ound NO _x =	804.1 ppb	NO =	790.2 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO _x =	-0.9%
Previous Respo	onse NO _x =	811.4 ppb	NO =	799.5 ppb				*Percent Chan	ge NO =	-1.2%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As foun	d $NO_{\chi} r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (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)	799.5	389.2	430.8	431.8	0.9977	100.2%
2nd GPT point (200 ppb O3)	799.5	585.7	234.3	235.1	0.9965	100.3%
3rd GPT point (100 ppb O3)	799.5	695.7	124.3	125.1	0.9935	100.7%
				Average Correction Factor	0.9959	100.4%

Notes:

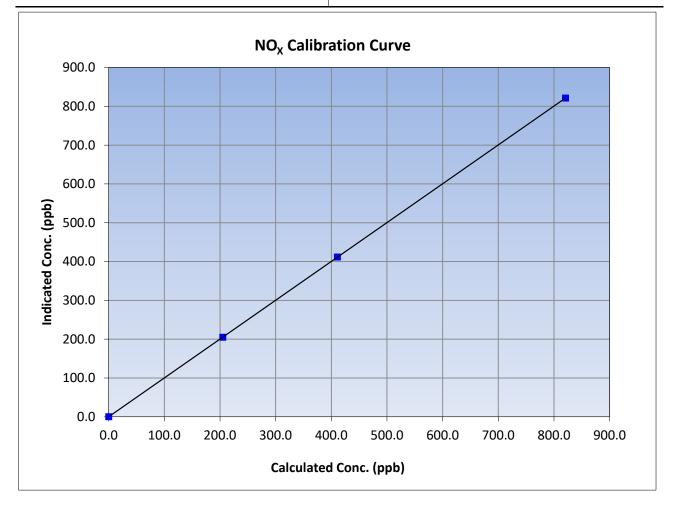
Changed calibration gas cylinder after as founds. Sample inlet filter changed after new cylinder response. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

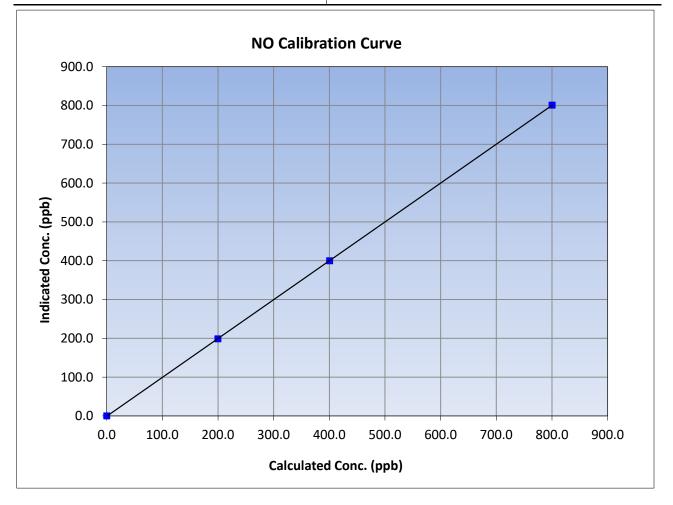
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	r 21, 2022
Station Name:	Stony N	lountain	Station Number:	AM	S 18
Start Time (MST):	10	:19	End Time (MST):	15	:58
Analyzer make:	e: Thermo 42i		Analyzer serial #:	13361	.60088
		Coliby	ation Data		
		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	1.000000	≥0.995
820.8	821.2	0.9995	Correlation Coefficient	1.000000	20.995
410.9	411.5	0.9986	Slope	1.000554	0.90 - 1.10
204.9	204.9	1.0002	Siope	1.000554	0.00 - 1.10
			Intercept	0.069933	+/-20





NO Calibration Summary

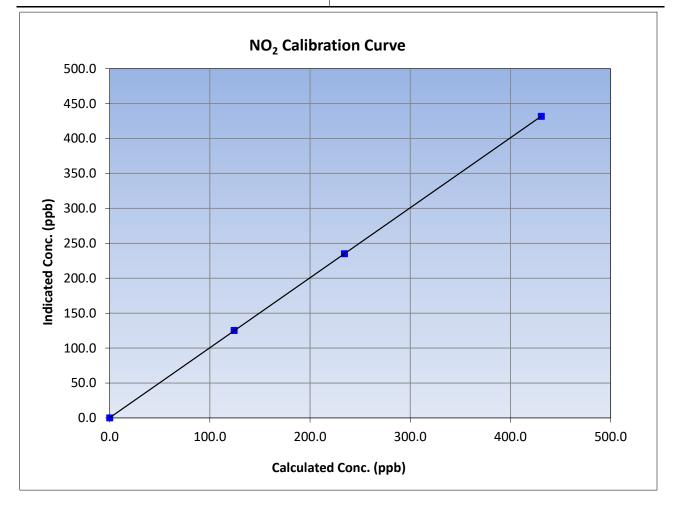
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	r 21, 2022
Station Name:	Stony N	Iountain	Station Number:	AM	S 18
Start Time (MST):	10	:19	End Time (MST):	15	:58
Analyzer make:	Therr	no 42i	Analyzer serial #:	Analyzer serial #: 1336160	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	c) Statistical Evaluation <u>Lin</u>		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999995	≥0.995
800.3	801.0	0.9991	correlation coefficient	0.999995	20.333
400.7	399.9	1.0019	Slope	1.001394	0.90 - 1.10
199.8	198.5	1.0067	Siohe	1.001394	0.90 - 1.10
			Intercept	-0.829546	+/-20

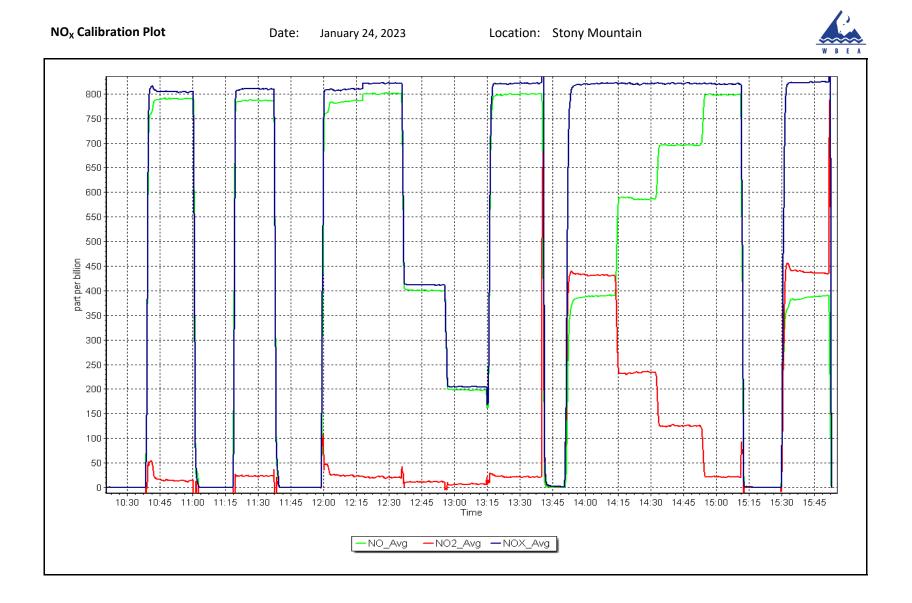




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	r 21, 2022
Station Name:	Stony N	Iountain	Station Number:	AM	S 18
Start Time (MST):	10:19		End Time (MST):	15	:58
Analyzer make:	Thermo 42i		Analyzer serial #:	13361	.60088
		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	0.999999	≥0.995
430.8	431.8	0.9977	Correlation Coefficient	0.9999999	20.995
234.3	235.1	0.9965	Slope	1.001873	0.90 - 1.10
124.3	125.1	0.9935	Slope	1.001875	0.30 - 1.10
			Intercept	0.315702	+/-20







O₃ Calibration Report

Version-01-2020

					Version-01-2020
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain January 9, 2023 11:20 Routine	Station number: AMS18 Last Cal Date: December 1, 2022 End time (MST): 14:20			
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer Teledyne API T700 Teledyne API T701H	Serial Number: 2658 Serial Number: 360			
		Analyzer Info	rmation		
Analyzer make: API T400 Analyzer Range 0 - 500 ppb			Analyzer serial #:	825	
Calibration slope: Calibration intercept:	<u>Start</u> 0.997743 -0.380000	<u>Finish</u> 0.993114 -0.320000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 1.000 0.976
		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	-0.4	
as found span	4888	1096.9	400.0	398.2	1.005
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	-0.2	
high point	4888	1101.7	400.0	396.8	1.008
second point	4888	863.9	200.0	198.8	1.006
third point	4888	741.4	100.0	98.5	1.015
as left zero	5000	800.0	0.0	0.2	
as left span	4812	1097.9	400.0	397.8 ge Correction Factor	1.006
			AVEIA		1.010
Baseline Corr As found:	398.6	Previous response		*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

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

Calibration Performed By:

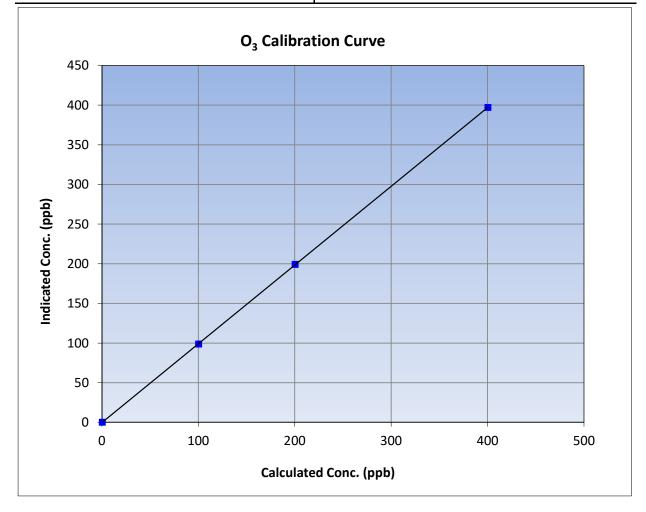
Karan Pandit



O₃ Calibration Summary

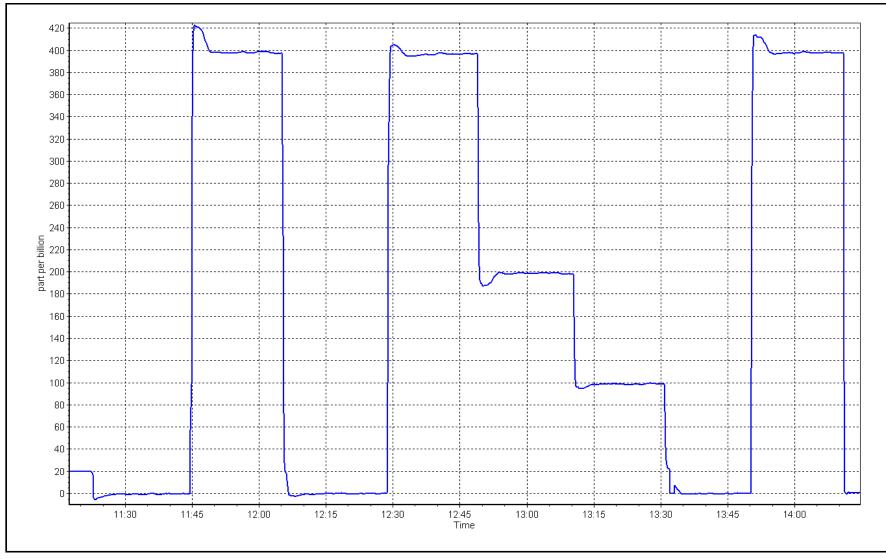
WBEA				Version-01-2020	
		Station I	Information		
Calibration Date: Janua		9, 2023	Previous Calibration:	December 1, 2022	
Station Name: Stony Mo		ountain	Station Number:	AMS18	
Start Time (MST): 11:20		20 End Time (MST):		14:20	
Analyzer make: API T		100	Analyzer serial #:	825	
		Calibra	ation Data		
Calculated concentration Inc (ppb) (Cc)	licated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	

(hhn) (cc)	(ppp) (ic)	(CC/IC)			
0.0	-0.2			+ 0.000004 >0.005	
400.0	396.8	1.0081		0.555554	20.995
 200.0	198.8	1.0060	Slope	0 00311/	0.90 - 1.10
100.0	98.5	1.0152		0.993114	0.90 - 1.10
			Intercept	-0.320000	+/- 5
				0.020000	., .











T640 PM_{2.5} CALIBRATION

W B E A					Version-09-2020
		Station Informat	ion		
Station Name: Calibration Date: Start time (MST):	Stony Mountain January 24, 2023 12:20		Station number: A Last Cal Date: I End time (MST): 1	December 14, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 1	335	
Flow Meter Make/Model: Temp/RH standard:	DeltaCal DeltaCal		S/N: 1 S/N: 1		
		Monthly Calibration	n Test		
Parameter T (°C) P (mmHg) flow (LPM) Leak Test: Inlet cleaning : <u>Parameter</u>	<u>As found</u> -2.4 696.4 5.01 Date of check: PM w/o HEPA: Inlet Head	Measured -2.1 698.6 4.95 January 24, 2023 3.2 Quarterly Calibration Measured	<u>As left</u> -2.4 696.4 5.01 Last Cal Date: _ PM w/ HEPA: _	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM
PMT Peak Test Date Optical Chan Disposable Filte	-	November 1 November 1	,		10.9 +/- 0.5
Date Sample Tul Date RH/T Sens	-	Annual Maintena August 30, August 30,	. 2022		
Notes:	No	adjustments made to temp	perature, pressure or flo	ow. Leak check passed.	

Calibration by:

Karan Pandit



CO Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain January 6, 2023 10:46 Routine		Station number: Last Cal Date: End time (MST):	AMS 18 December 12, 2022 13:37	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	3,050 ALM063503	ppm	Cal Gas Exp Date:	December 1, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	3,050 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	rmation		
Analyzer make: Analyzer Range:			Analyzer serial #:	3504	
Calibration slope: Calibration intercept:	<u>Start</u> 1.009187 0.095767	<u>Finish</u> 1.018233 0.009764	Backgd or Offset: Coeff or Slope:	<u>Start</u> -0.009 0.910	<u>Finish</u> -0.009 0.916
		CO Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate (sccm)	Calculated concentration (ppm)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc)
Set Point	(sccm)	(30011)	(Cc)		<i>Limit = 0.95-1.05</i>
Set Point as found zero	(sccm) 5000	0.0	(Cc) 0.0	0.1	Limit = 0.95-1.05
				0.1 41.4	
as found zero as found span as found 2nd point	5000	0.0	0.0	-	
as found zero as found span as found 2nd point as found 3rd point	5000	0.0	0.0	-	
as found zero as found span as found 2nd point as found 3rd point new cylinder response	5000 4933	0.0 66.7	0.0 40.7	41.4	
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4933 5000	0.0 66.7 0.0	0.0 40.7	0.0	
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	5000 4933 5000 4933	0.0 66.7 0.0 66.7	0.0 40.7 0.0 40.7	41.4 0.0 41.4	 0.982 0.983
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	5000 4933 5000 4933 4966	0.0 66.7 0.0 66.7 33.3	0.0 40.7 0.0 40.7 20.3	41.4 0.0 41.4 20.8	 0.982 0.983 0.975
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	5000 4933 5000 4933 4966 4983	0.0 66.7 0.0 66.7 33.3 16.7	0.0 40.7 0.0 40.7 20.3 10.2	41.4 0.0 41.4 20.8 10.3	 0.982 0.983
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 4933 5000 4933 4933 4966 4983 3000	0.0 66.7 0.0 66.7 33.3 16.7 0.0	0.0 40.7 0.0 40.7 20.3 10.2 0.0	41.4 0.0 41.4 20.8 10.3 0.0	0.982 0.982 0.983 0.975 0.987
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	5000 4933 5000 4933 4966 4983	0.0 66.7 0.0 66.7 33.3 16.7	0.0 40.7 0.0 40.7 20.3 10.2 0.0 40.7	41.4 0.0 41.4 20.8 10.3 0.0 41.6	0.982 0.982 0.983 0.975 0.987 0.979
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 4933 5000 4933 4933 4966 4983 3000	0.0 66.7 0.0 66.7 33.3 16.7 0.0	0.0 40.7 0.0 40.7 20.3 10.2 0.0 40.7	41.4 0.0 41.4 20.8 10.3 0.0	0.982 0.982 0.983 0.975 0.987
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:	5000 4933 5000 4933 4966 4983 3000 2960 41.29	0.0 66.7 0.0 66.7 33.3 16.7 0.0 40.0 Prev response:	0.0 40.7 0.0 40.7 20.3 10.2 0.0 40.7 Averag 41.16	41.4 0.0 41.4 20.8 10.3 0.0 41.6 ge Correction Factor *% change:	0.982 0.982 0.983 0.975 0.987 0.979
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 4933 5000 4933 4966 4983 3000 2960	0.0 66.7 0.0 66.7 33.3 16.7 0.0 40.0	0.0 40.7 0.0 40.7 20.3 10.2 0.0 40.7 Averag 41.16	41.4 0.0 41.4 20.8 10.3 0.0 41.6 ge Correction Factor	 0.982 0.983 0.975 0.987 0.979 0.982

Notes:

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

Calibration Performed By:

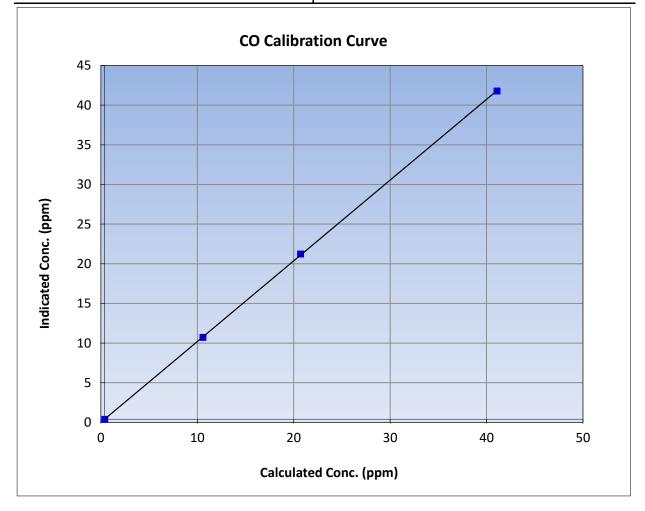


CO Calibration Summary

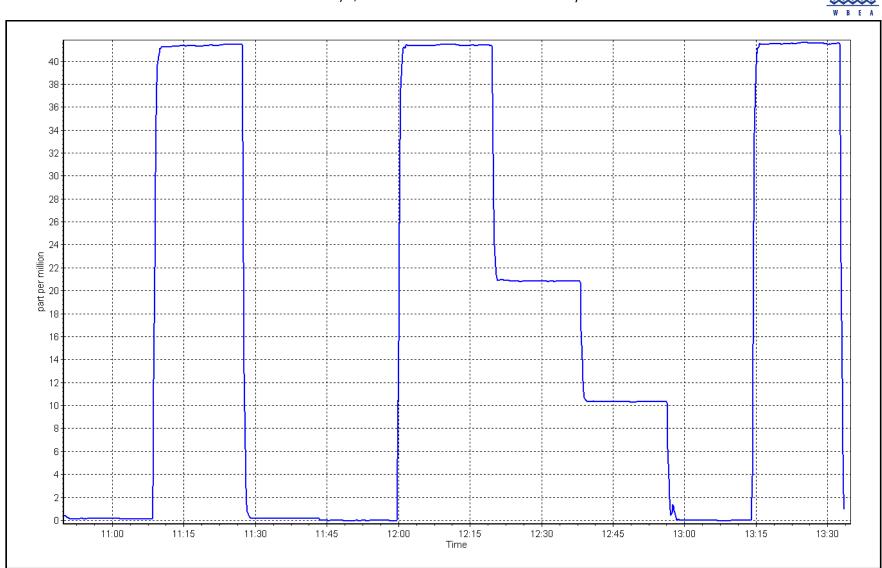
Station Information						
Calibration Date:	January 6, 2023	Previous Calibration:	December 12, 2022			
Station Name:	Stony Mountain	Station Number:	AMS 18			
Start Time (MST):	10:46	End Time (MST):	13:37			
Analyzer make:	API T300	Analyzer serial #:	3504			

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999973	≥0.995
40.7	41.4	0.9831	correlation coefficient	0.555575	20.335
20.3	20.8	0.9753	Slope	1.018233	0.90 - 1.10
10.2	10.3	0.9872	Slope	1.018233	0.90 - 1.10
			- Intercept	0.009764	+/-1.5



Version-01-2020



Location: Stony Mountain



CO₂ Calibration Report

Version-01-2020

				Version-01-202
	Station Infor	mation		
Stony Mountain January 12, 2023 10:50 Routine		Station number: Last Cal Date: End time (MST):	AMS 18 December 13, 2022 13:52	
	Calibration St	andards		
60,220 ALM063503	ppm	Cal Gas Exp Date:	December 1, 2026	
60,220 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Teledyne API T700 Peak Scientific		Serial Number: Serial Number:	2658 771048317	
	Analyzer Info	rmation		
API T360 0 - 2,000 ppm		Analyzer serial #:	283	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
1.000503 2.940000	1.000425 5.520000	-		-0.045 1.051
	CO ₂ Calibratio	on Data		
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
3000	0.0	0.0	0.6	
2930	80.0	1600.5	1602.5	0.999
3000	0.0	0.0	0.8	
2930	80.0	1600.5	1601.9	0.999
2970	40.0	800.3	815.9	0.981
2990	20.0	400.1	405.6	0.987
3000	0.0	0.0	0.7	
2930	80.0	1600.5	1606.2	0.996
		Averag	e Correction Factor	0.989
1601.90 NA	•	1604.28	*% change: AF Intercept:	-0.1%
NA	AF Correlation:			
	January 12, 2023 10:50 Routine 60,220 ALM063503 60,220 NA Teledyne API T700 Peak Scientific API T360 0 - 2,000 ppm <u>Start</u> 1.000503 2.940000 Dilution air flow rate (sccm) Dilution air flow rate (sccm) 3000 2930 2930 2930 2970 2990 3000 2930 2970 2990 3000 2930	Stony Mountain January 12, 2023 January 12, 2023 10:50 Routine Calibration State 60,220 ppm ALM063503 60,220 60,220 ppm NA Teledyne API T700 Peak Scientific Analyzer Infor API T360 0 - 2,000 ppm 0 - 2,000 ppm 1.000425 Start Finish 1.000503 1.000425 2.940000 5.520000 CO2 Calibratic Dilution air flow rate (sccm) Source gas flow rate (sccm) 3000 0.0 2930 80.0 3000 0.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0 2930 80.0	January 12, 2023 10:50 RoutineLast Cal Date: End time (MST): End time (MST):Calibration Standards60,220 $60,220ppmCal Gas Exp Date:Date:NAALM06350360,220ppmRem Gas Exp Date:Serial Number:ALM06350360,220ppmRem Gas Exp Date:Serial Number:Teledyne API T700Peak ScientificSerial Number:Serial Number:Peak ScientificFinish1.0005031.0004252.940000Analyzer InformationCoeff or Slope:Start1.0005032.940000Finish1.0004255.520000Backgd or Offset:Coeff or Slope:Dilution air flow rate(sccm)Source gas flow rate(sccm)Calculatedconcentration (ppm)(Cc)Dilution air flow rate(sccm)Source gas flow rate(sccm)Calculatedconcentration (ppm)(Cc)30000.00.00.0293080.01600.5297040.0800.3299020.0400.130000.00.0293080.01600.5297040.0800.3299020.0400.130000.00.0293080.01600.5297040.0800.3299020.0400.130000.00.0293080.01601.5293080.01602.5203080.01602.5203080.01602.5203080.01602.5$	Stony Mountain January 12, 2023 10:50 RoutineStation number: Last Cal Date: End time (MST):AMS 18 December 13, 2022 13:52Calibration Standards 60,220ppmCal Gas Exp Date: Serial Number:December 1, 2026 2658ALM063503 60,220ppmRem Gas Exp Date: Serial Number:December 1, 2026 2658Peak ScientificSerial Number: Serial Number:2658 2658Peak ScientificSerial Number: Serial Number:71048317Cologo ppmCologo ppmStart 1.000503 2.940000Serial Number: Source gas flow rate (sccm)Start (cc)Indicated concentration (ppm) (cc)Calculated concentration (ppm) (cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated (concentration (ppm) (cc)Mathematical Source gas flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppm) (cc)Mathematical Source gas flow rate (sccm)Calculated concentration (ppm) (cc)Indicated concentration (ppm) (cc)Mathematical Source gas flow rate (sccm)Calculated concentration (ppm) (cc)Indicated concentration (ppm) (cc)Mathematical Source (sccm)Source gas flow rate (sccm)Calculated concentration (ppm) (cc)Indicated concentration (ppm) (cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppm) (cc)Indicated concentration (ppm) (ppm) (cc)Mathematical S

Notes:

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

Calibration Performed By:

Karan Pandit and Karina Fenwick



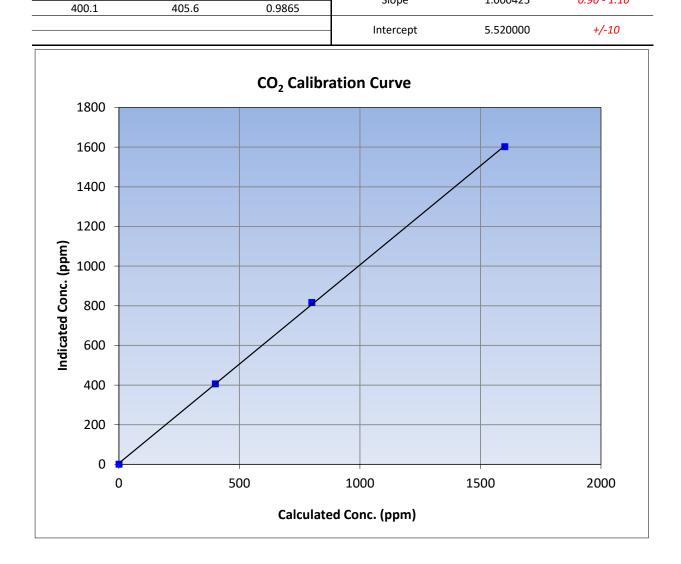
CO₂ Calibration Summary

Slope

1.000425

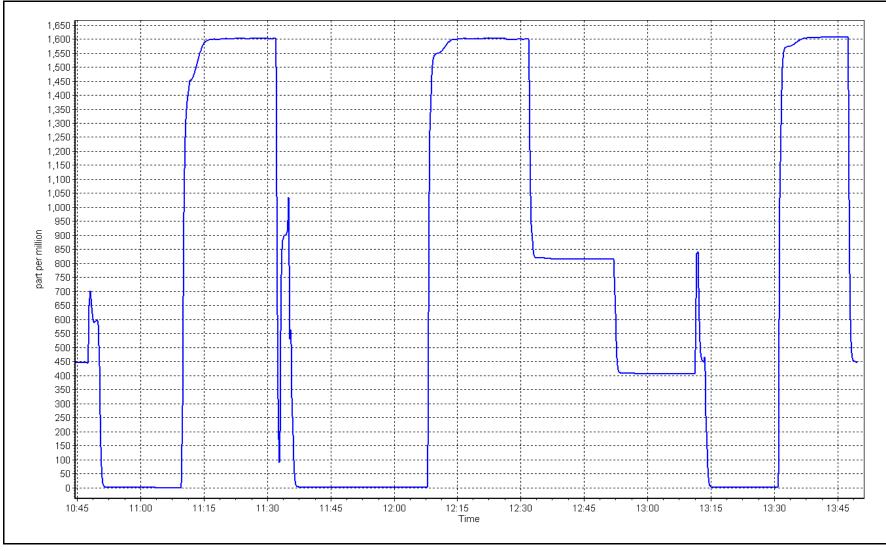
0.90 - 1.10

WBEA					Version-01-2020	
		Station	Information			
Calibration Date	January 1	2, 2023	Previous Calibration	Decemb	er 13, 2022	
Station Name	Stony Mo	ountain	Station Number		/IS 18	
Start Time (MST)	10:5	50	End Time (MST)		3:52	
Analyzer make	API T360		Analyzer serial #		283	
		Calibi	ration Data			
Calculated concentration I (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.8		Correlation Coefficient	0.999899	≥0.995	
1600.5	1601.9	0.9991	correlation coefficient	0.333033	20.995	
800.3	815.9	0.9808	Slone	1 000425	0 90 - 1 10	











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS19 FIREBAG JANUARY 2023

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

February 28, 2023







SO₂ Calibration Report

Version-01-2020

	Station Infor	mation		
Firebag January 26, 2023 11:22 Routine		Station number: Last Cal Date: End time (MST):	AMS 19 December 5, 2022 15:36	
	Calibration St	andards		
49.29	ppm	Cal Gas Exp Date:	February 23, 2025	
		_		
49.29	ppm			
API T701		Serial Number:	1118	
	Analyzer Info	rmation		
Thermo 43i	-		1410661308	
0 - 1000 ppb		,, 201 001101		
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
1.002165	0.997774	Backgd or Offset:	10.1	10.2
-0.042557	-0.381080	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)		Correction factor (Cc/Ic) Limit = 0.95-1.05
4999	0.0	0.0	-0.5	
4919	81.1	799.5	797.1	1.003
4959	40.6	400.3	399.3	1.002
4980	20.3	200.1	200.5	0.998
4999	0.0	0.0	-0.2	
4919	81.1	799.5	797.7	1.002
4959	40.6	400.3	398.0	1.006
4980				1.002
4999	0.0	0.0	-0.3	
4919	81.1	799.5	802.0	0.997
		Avera	ge Correction Factor	1.003
797.60	Previous response	801.16	*% change	-0.4%
399.80	AF Slope:	0.997147	AF Intercept:	0.138400
201.00	AF Correlation:			
	January 26, 2023 11:22 Routine 49.29 CC716618 49.29 API T700 API T700 API T701 Thermo 43i 0 - 1000 ppb Start 1.002165 -0.042557 Dilution air flow rate (sccm) Dilution air flow rate (sccm) 4999 4919 4959 4959 4959 4959 4959 4959	Firebag January 26, 2023 11:22 Routine Calibration St 49.29 ppm 49.29 ppm 2000 ppm API T700 API T701 API T700 API T700 API T701 API T701 Start Finish 0.997774 1.002165 0.997774 0.042557 0.997774 0.042557 0.381080 Dilution air flow rate (sccm) Source gas flow rate (sccm) 4999 0.0 <t< td=""><td>January 26, 2023 Last Cal Date: 11:22 End time (MST): Routine Finish 49.29 ppm CC716618 49.29 49.29 ppm CC716618 Ppm API T700 Serial Number: API T701 Serial Number: Start Finish 1.002165 0.997774 0.1000 ppb Analyzer serial #: Start Finish 1.002165 0.997774 Backgd or Offset: -0.381080 Ceff or Slope: Source gas flow rate Calculated (sccm) Calculated concentration (ppb) (Cc) 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 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 4999 0.0 <t< td=""><td>Firebag January 26, 2023 11:22 Station number: AMS 19 Last Cal Date: December 5, 2022 Routine Calibration Standards 15:36 49.29 ppm Cal Gas Exp Date: February 23, 2025 CC716618 49.29 ppm Rem Gas Exp Date: February 23, 2025 API 7700 Serial Number: 1607 API T700 Serial Number: 1118 Analyzer Information Thermo 43i Analyzer Information 1.002165 0.997774 Backgd or Offset: 10.1 1.002165 0.997774 Backgd or Offset: 10.1 1.002165 0.997774 Backgd or Offset: 10.1 0.00 0.0 -0.5 4919 9.1 20ilution air flow rate (sccm) Source gas flow rate (sccm) Calculated (sccm) Indicated concentration of (ppb) (lc) 4959 0.0 0.0 -0.5 4919 81.1 799.5 797.1 4959 40.6 400.3 398.0 4980 20.3 200.1 200.5 </td></t<></td></t<>	January 26, 2023 Last Cal Date: 11:22 End time (MST): Routine Finish 49.29 ppm CC716618 49.29 49.29 ppm CC716618 Ppm API T700 Serial Number: API T701 Serial Number: Start Finish 1.002165 0.997774 0.1000 ppb Analyzer serial #: Start Finish 1.002165 0.997774 Backgd or Offset: -0.381080 Ceff or Slope: Source gas flow rate Calculated (sccm) Calculated concentration (ppb) (Cc) 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 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 4999 0.0 <t< td=""><td>Firebag January 26, 2023 11:22 Station number: AMS 19 Last Cal Date: December 5, 2022 Routine Calibration Standards 15:36 49.29 ppm Cal Gas Exp Date: February 23, 2025 CC716618 49.29 ppm Rem Gas Exp Date: February 23, 2025 API 7700 Serial Number: 1607 API T700 Serial Number: 1118 Analyzer Information Thermo 43i Analyzer Information 1.002165 0.997774 Backgd or Offset: 10.1 1.002165 0.997774 Backgd or Offset: 10.1 1.002165 0.997774 Backgd or Offset: 10.1 0.00 0.0 -0.5 4919 9.1 20ilution air flow rate (sccm) Source gas flow rate (sccm) Calculated (sccm) Indicated concentration of (ppb) (lc) 4959 0.0 0.0 -0.5 4919 81.1 799.5 797.1 4959 40.6 400.3 398.0 4980 20.3 200.1 200.5 </td></t<>	Firebag January 26, 2023 11:22 Station number: AMS 19 Last Cal Date: December 5, 2022 Routine Calibration Standards 15:36 49.29 ppm Cal Gas Exp Date: February 23, 2025 CC716618 49.29 ppm Rem Gas Exp Date: February 23, 2025 API 7700 Serial Number: 1607 API T700 Serial Number: 1118 Analyzer Information Thermo 43i Analyzer Information 1.002165 0.997774 Backgd or Offset: 10.1 1.002165 0.997774 Backgd or Offset: 10.1 1.002165 0.997774 Backgd or Offset: 10.1 0.00 0.0 -0.5 4919 9.1 20ilution air flow rate (sccm) Source gas flow rate (sccm) Calculated (sccm) Indicated concentration of (ppb) (lc) 4959 0.0 0.0 -0.5 4919 81.1 799.5 797.1 4959 40.6 400.3 398.0 4980 20.3 200.1 200.5

Calibration Performed By:

Braiden Boutilier

No adjustments made. Swapped THC valve after MPAF's. Changed sample inlet filter after as

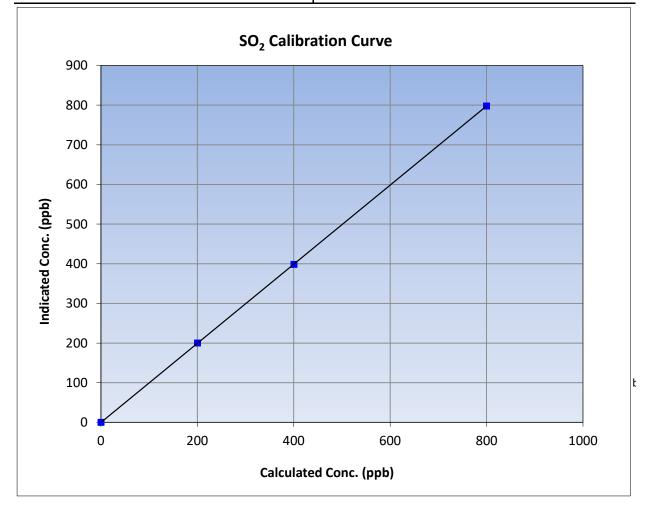
founds.

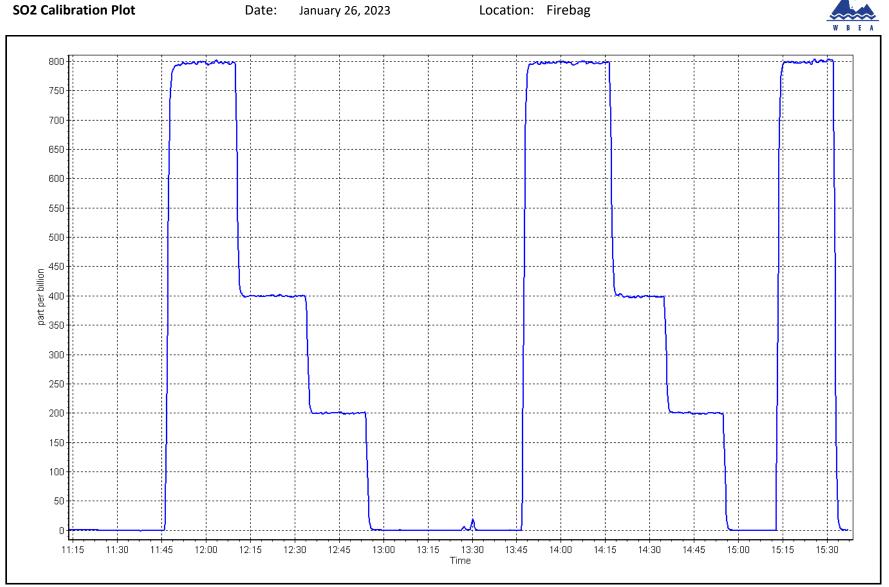


SO₂ Calibration Summary

	Stati	on Information	
Calibration Date:	January 26, 2023	Previous Calibration:	December 5, 2022
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:22	End Time (MST):	15:36
Analyzer make:	Thermo 43i	Analyzer serial #:	1410661308

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
799.5	797.7	1.0022	correlation coefficient	0.555550	20.995
400.3	398.0	1.0057	Slope	0.997774	0.90 - 1.10
200.1	199.7	1.0020	Slope	0.997774	0.90 - 1.10
			Intercept	-0.381080	+/-30







H₂S Calibration Report

				Version-11-2021
	Station Info	rmation		
Firebag January 17, 2023 10:31 Removal		Station number: Last Cal Date: End time (MST):	AMS19 December 1, 2022 12:42	
	Calibration S	tandards		
5.114 CC517427	ppm	Cal Gas Exp Date:	February 5, 2024 ,	
n/a	ppm	Diff between cyl:		
Teledyne API T701		Serial Number:	1118	
	Analyzer Info	ormation		
Thermo 450i n/a 0 - 100 ppb		Analyzer serial #: Converter serial #:	CM18360223 n/a	
<u>Start</u> 0.991477 -0.081394	<u>Finish</u>	Backgd or Offset: Coeff or Slope:	<u>Start</u> 22.3 0.980	<u>Finish</u> 22.3 0.980
	H ₂ S As Four	nd Data		
Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
5000	0.0	0.0	1.4	
4922	78.2	80.0	82.2	0.990
				1.000
4980	19.6	20.0	21.3	1.007
	H S Calibrati	ion Data		
	H ₂ 5 Calibrati			
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
inge:	December 9. 2021		Ave Corr Factor	
ficiency test:	n/a			efficiency
80 S	Prev resnance.	79 22	*% change	2.0%
80.8 40.0	Prev response: AF Slope:		*% change: AF Intercept:	2.0% 1.178264
	January 17, 2023 10:31 Removal 5.114 CC517427 5.114 n/a Teledyne API T700 Teledyne API T700 Teledyne API T701 Thermo 450i n/a 0 - 100 ppb <u>Start</u> 0.991477 -0.081394 Dilution air flow rate (sccm) 5000 4922 4961 4980 Dilution air flow rate (sccm)	Firebag January 17, 2023 10:31 Removal Calibration S 5.114 ppm CC517427 ppm 5.114 ppm n/a ppm Teledyne API T700 Teledyne API T701 Teledyne API T701 Finish 0 - 100 ppb Finish Start Finish 0.991477 -0.081394 Dilution air flow rate (sccm) Source gas flow rate (sccm) 5000 0.0 4980 19.6 H2S Calibrati Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) mge: December 9, 2021	January 17, 2023 10:31 Removal Last Cal Date: End time (MST): End time (MST): 10:31 Removal ppm Cal Gas Exp Date: Cal Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Serial Number: 5.114 CC517427 5.114 n/a ppm Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Teledyne API T700 Teledyne API T701 Serial Number: Serial Number: Thermo 450i n/a 0.991477 -0.081394 Analyzer Information Converter serial #: Coeff or Slope: Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc)	Firebag January 17, 2023 10:31 RemovalStation number: Last Cal Date: End time (MST):AMS19 December 1, 2022 L3:4210:31 Removalcalibration Standards Cal Gas Exp Date:February 5, 20245.114 n/a n/appmCal Gas Exp Date: Serial Number:February 5, 20245.114 n/a Teledyne API T700pmRem Gas Exp Date: Serial Number:n/aMalyzer InformationThermo 450i n/a 0 - 100 ppbAnalyzer InformationThermo 450i n/a 0 - 100 ppbStart Finish (Calculated concentration (ppb)Start (Calculated concentration (ppb) (Cc)Indicated concentration (ppb)H2S As Found DataDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)H2S Calibration DataDilution air flow rate (sccm)Calculated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (ccc)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilu

Notes:

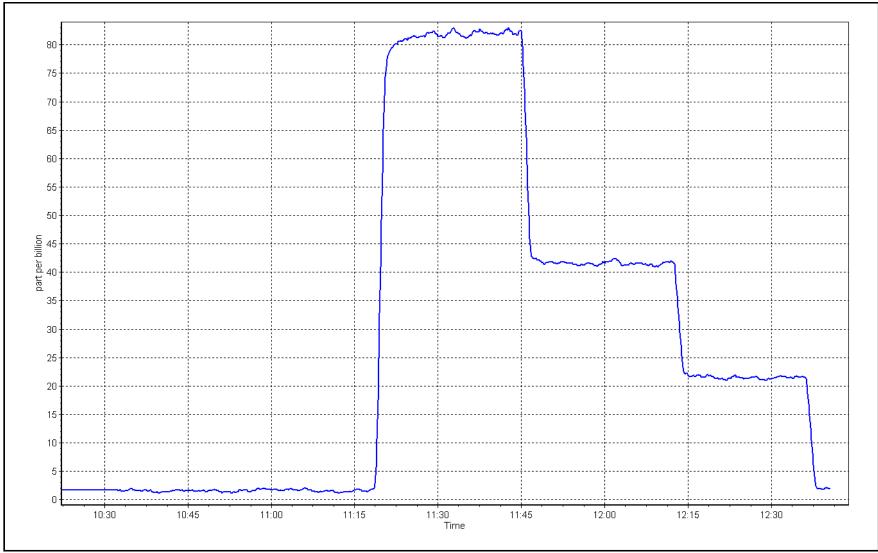
Removed 450i, replacing with a 43iTLE and external converter.

Calibration Performed By:

Braiden Boutilier









H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag January 18, 2023 11:07 Install		Station number: Last Cal Date: End time (MST):	AMS19 December 1, 2022 14:56	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.114 CC517427	ppm	Cal Gas Exp Date:	February 5, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	5.114 n/a Teledyne API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	n/a 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	
Calibration slope: Calibration intercept:	<u>Start</u>	<u>Finish</u> 0.998910 0.058437	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 2.88 0.955
		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		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4922	78.2	80.0	79.9	1.001
second point	4961	39.1	40.0	40.1	0.997
third point	4980	19.6	20.0	20.1	0.997
as left zero	5000	0.0	0.0	0.1	
as left span	4922	78.2	80.0	80.3	0.996
SO2 Scrubber Check	4922	78.3	800.2		
Date of last scrubber cha		December 9, 2021		Ave Corr Factor	0.999
Date of last converter ef	ficiency test:	n/a			efficiency
Baseline Corr As found:	NA	Prev response:	NA	*% change:	NA
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA NA	AF Slope: AF Correlation:	NA NA	AF Intercept:	NA
				* = > +/-5% change initiat	es investigation

Notes:

Installed 43i-TLE. Adjusted the zero and span.

Calibration Performed By:

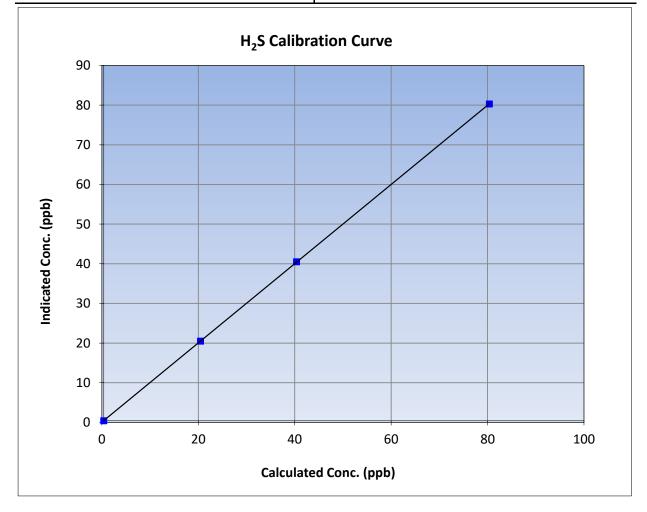
Braiden Boutilier



H₂S Calibration Summary

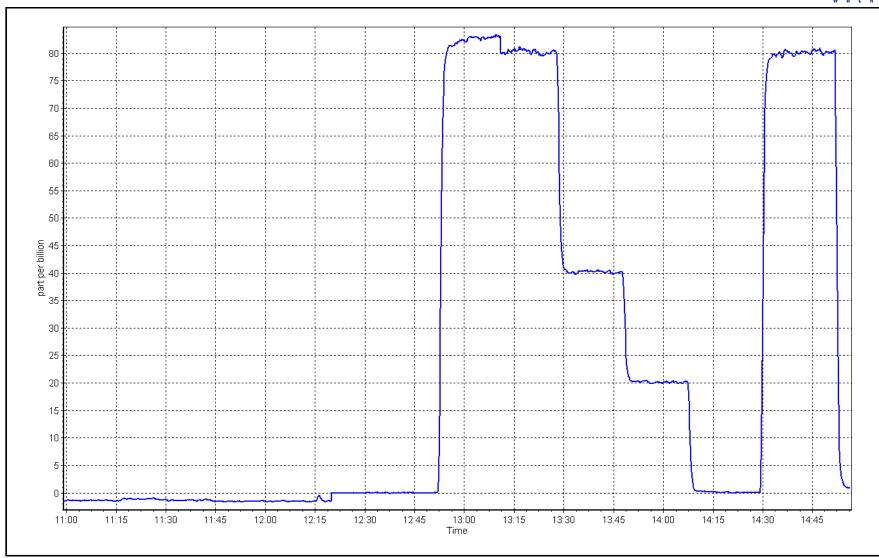
WBEA			Version-11-2021				
Station Information							
Calibration Date:	January 18, 2023	Previous Calibration:	December 1, 2022				
Station Name:	Firebag	Station Number:	AMS19				
Start Time (MST):	11:07	End Time (MST):	14:56				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1336160090				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
80.0	79.9	1.0010	correlation coefficient	0.9999990	20.995
40.0	40.1	0.9973	Slope	0.998910	0.90 - 1.10
20.0	20.1	0.9974	Slope	0.998910	0.30 - 1.10
			Intercept	0.058437	+/-3











THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag January 26, 2023 11:22 Routine		Station number: Last Cal Date: End time (MST):	AMS 19 December 21, 2022 15:36	
		Calibration S	tandards		
Gas Cert Reference:	CC7	16618	Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	500.7	ppm	CH4 Equiv Conc.	1066.9	ppm
C3H8 Cal Gas Conc.	205.9	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	500.7	ppm	CH4 Equiv Conc.	1066.9	ppm
Removed C3H8 Conc.	205.9	ppm	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	1607	
ZAG Make/Model:	API T701		Serial Number:	1118	
		Analyzer Info	ormation		
Analyzer make	e: Thermo 51i-LT		Analyzer serial #:	1336160089	
Analyzer Range			maryzer seriar #.	1000100000	
Allalyzer Kallge	20 ppm				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998886	1.001270	Background:		2.25
Calibration intercept:	-0.003747	-0.051562	Coefficient:	3.754	3.774
		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	-0.06	
as found span	4919	81.1	17.31	17.18	1.007
as found 2nd point	4959	40.6	8.66	8.49	1.021
as found 3rd point	4980	20.3	4.33	4.14	1.048
new cylinder response					
calibrator zero	4999	0.0	0.00	-0.03	
high point	4919	81.1	17.31	17.29	1.001
second point	4959	40.6	8.66	8.60	1.007
third point	4980	20.3	4.33	4.28	1.013
as left zero	5000	0.0	0.00	-0.06	
as left span	4919	81.1	17.31	17.31	1.000
				ge Correction Factor	1.007
Baseline Corr As found:	17.24	Previous response	17.28	*% change	-0.2%
Deceline Corr 2nd AF nt.	8.55	AF Slope:	0.998210	AF Intercept:	-0.126132
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	4.20	AF Correlation:	0.999939		

Notes:

Adjusted span. Changed zero/span valve after MPAF's. Changed sample inlet filter after as founds.

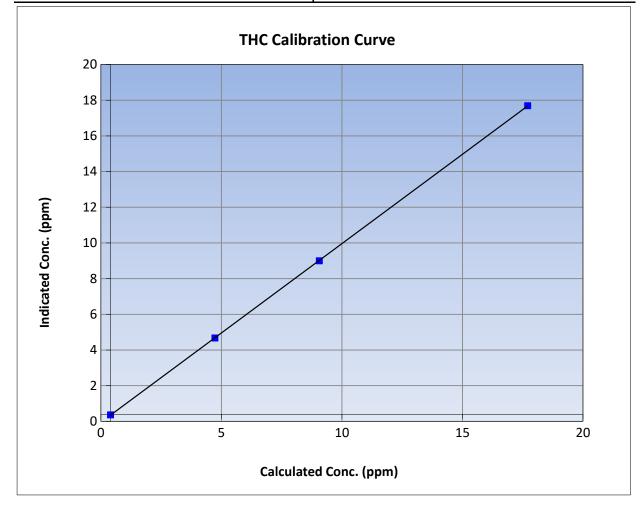
Calibration Performed By:

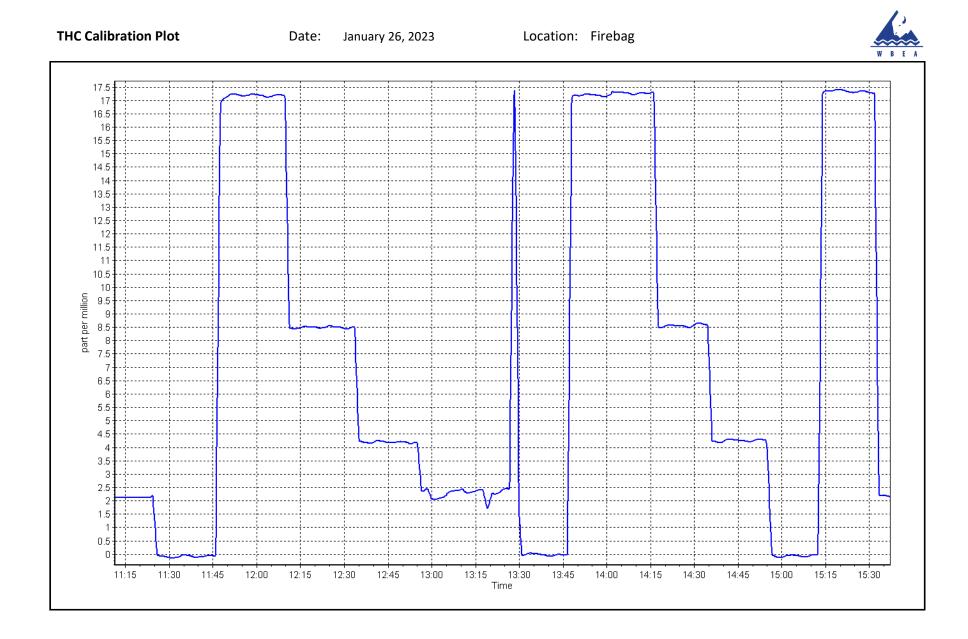


THC Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 26, 2023	Previous Calibration:	December 21, 2022
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:22	End Time (MST):	15:36
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	-0.03		Correlation Coefficient	0.999992	≥0.995
17.31	17.29	1.0009	correlation coefficient	0.555552	20.333
8.66	8.60	1.0075	Slope	1.001270	0.90 - 1.10
4.33	4.28	1.0132	510pe	1.001270	0.30 - 1.10
			Intercept	-0.051562	+/-1.5







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

		Sta	tion Information			
Station Name: Calibration Date: Start time (MST): Reason:	Firebag January 19, 2023 10:45 Routine		Station number: Last Cal Date: End time (MST):	December 1, 2022		
		Calil	oration Standards			
NO Gas Cylinder #:	T2Y1K63		Cal Gas Expiry Date:	November 30, 2023		
NOX Cal Gas Conc:	51.12	ppm	NO Cal Gas Conc:	49.40	ppm	
Removed Cylinder #:	n/a		Removed Gas Exp Date:	n/a		
Removed Gas NOX Conc:	51.12	ppm	Removed Gas NO Conc:	49.40	ppm	
NOX gas Diff:			NO gas Diff:			
Calibrator Model:	Teledyne API T700		Serial Number:			
ZAG make/model:	Teledyne API T701		Serial Number:	1118		
		Ana	lyzer Information			
Analyzer make:	Thermo 42i		Analyzer serial #:	1410661309		
NOX Range (ppb):				0 0 0 1 0 0 0		
				e		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finis</u>	_
NO coeff or slope:		1.041			7.2	
NOX coeff or slope:		0.996		7.3	7.3	
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	209.4	207.8	3
		Cali	bration Statistics			
		Start		Finish		
NO _x Cal Slope:		0.99740)9	0.990896		
A I						

0.215620

0.999812

-0.371292

0.999908

-0.728179

0.574492

0.991188

0.047030

1.003489

-1.311603



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Diit	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	4999	0.0	0.0	0.0	0.0	0.0	-0.2	0.2		
as found span	4919	81.0	828.1	800.3	27.9	824.0	791.2	32.5	1.0050	1.0115
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
high point	4919	81.0	828.1	800.3	27.9	821.0	793.2	27.8	1.0087	1.0089
second point	4960	40.5	414.0	400.1	13.9	410.8	396.7	14.1	1.0079	1.0086
third point	4980	20.2	206.5	199.6	6.9	206.0	198.0	8.0	1.0025	1.0079
as left zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4919	81.0	828.1	363.9	464.3	815.0	350.6	464.5	1.0161	1.0379
							Average C	orrection Factor	1.0064	1.0085
Corrected As for	und NO _x =	824.0 ppb	NO =	791.4 ppb	* = > +/-59	6 change initiates i	nvestigation	*Percent Chan	ge NO _x =	-0.3%
Previous Respor	nse NO _X =	826.2 ppb	NO =	799.8 ppb				*Percent Chan	ge NO =	-1.1%
Baseline Corr 2n	nd pt NO _x =	NA ppb	NO =	NA ppb	As found	$1 NO_{\rm X} r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3r	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	NO r^2 :		NO SI:	NO Int:	
					As found	$NO_2 r^2$:		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)	788.8	352.4	464.3	465.1	0.9982	100.2%
2nd GPT point (200 ppb O3)	788.8	571.1	245.6	245.3	1.0011	99.9%
3rd GPT point (100 ppb O3)	788.8	679.6	137.1	134.1	1.0221	97.8%
			ŀ	Average Correction Factor	1.0071	99.3%

Notes:

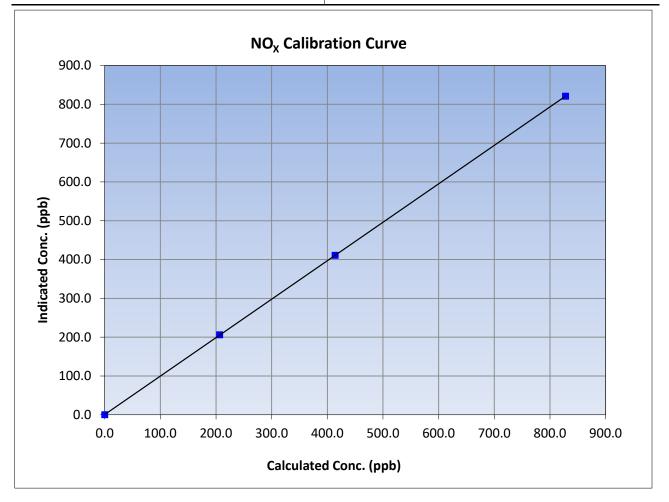
No adjustments made. Changed sample inlet filter after as founds.

Calibration Performed By:



NO_x Calibration Summary

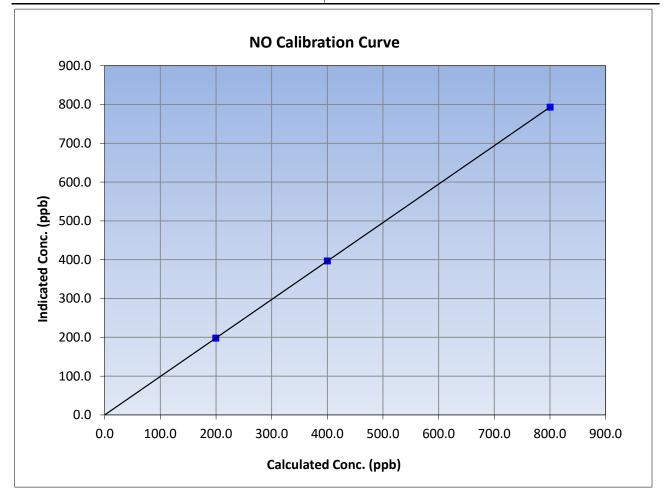
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January 19, 2023		Previous Calibration:	Decembe	er 1, 2022
Station Name:	Fire	ebag	Station Number:	AM	S 19
Start Time (MST):	Time (MST): 10:45		End Time (MST):	15	:05
Analyzer make: Thermo 42i			Analyzer serial #:	14106	61309
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999997	≥0.995
828.1	821.0	1.0087	correlation coefficient	0.555557	20.995
414.0	410.8	1.0079	Clana	0.990896	0.90 - 1.10
206.5	206.0	1.0025	Slope	0.990890	0.90 - 1.10
			Intercept	0.574492	+/-20





NO Calibration Summary

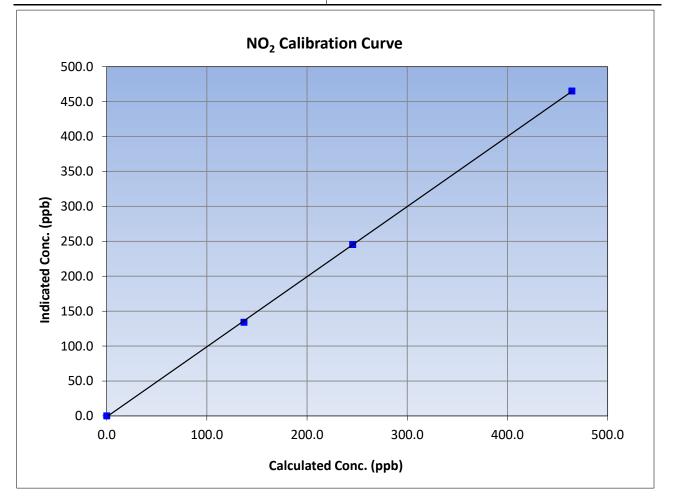
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January 19, 2023		Previous Calibration:	Decembe	er 1, 2022
Station Name:	Fire	ebag	Station Number:	AM	S 19
Start Time (MST):	art Time (MST): 10:45		End Time (MST):	15	:05
Analyzer make: Thermo 42i		Analyzer serial #: 1		410661309	
		Calibra	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	1.000000	≥0.995
800.3	793.2	1.0089	correlation coernicient	1.000000	20.333
400.1	396.7	1.0086	<u>Classe</u>	0.991188	0.90 - 1.10
199.6	198.0	1.0079	Slope	0.991188	0.90 - 1.10
			Intercept	0.047030	+/-20

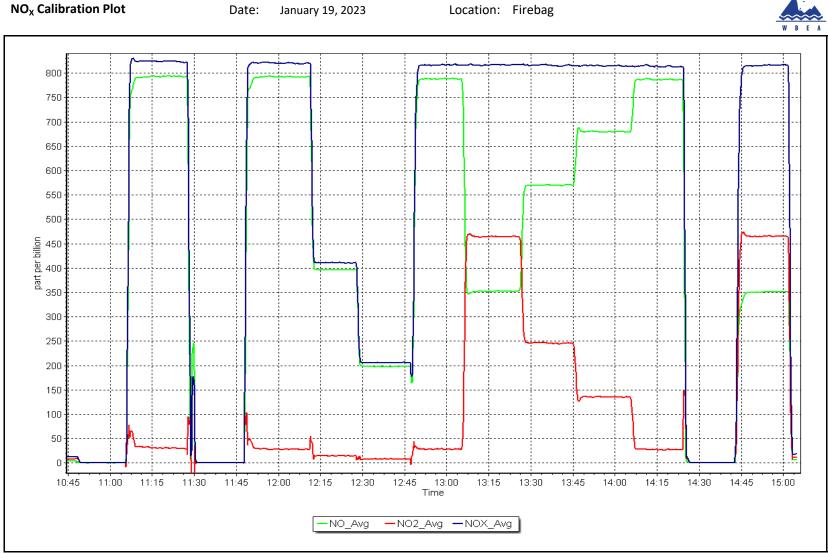




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January 19, 2023		Previous Calibration:	Decembe	er 1, 2022
Station Name:	Fire	ebag	Station Number:	AM	S 19
Start Time (MST):	art Time (MST): 10:45		End Time (MST):	15	:05
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	0.999941	≥0.995
464.3	465.1	0.9982	correlation coefficient	0.555541	20.995
245.6	245.3	1.0011	Clana	1.003489	0.90 - 1.10
137.1	134.1	1.0221	Slope	1.005469	0.90 - 1.10
			Intercept	-1.311603	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS20 MACKAY RIVER JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River January 17, 2023 10:55 Routine		Station number: Last Cal Date: End time (MST):	AMS20 December 2, 2022 14:15	
		Calibration St	andards		
Cal Gas Concentration:	<u>49.22</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	<u>CC306868</u> <u>49.22</u> <u>NA</u> Teledyne API T700 Teledyne API 701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 1220 4522	
		Analyzer Info	rmation		
Analyzer make	· Thermo 12i		Analyzer serial #:	1501301/150	
Analyzer Range			Allalyzer Serial #.	1301301430	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.988213	0.993569	Backgd or Offset:	18.6	18.6
Calibration intercept:	1.411526	3.910928	Coeff or Slope:	0.959	0.974
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/Ic)
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.1	
as found span	4919	81.3	800.3	788.4	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4919	81.3	800.3	797.4	1.004
second point	4959	40.7	400.7	403.1	0.994
third point	4980	20.3	199.8	206.8	0.966
as left zero	5000	0.0	0.0	0.1	
as left span	4919	81.3	800.3 Averag	800.5 ge Correction Factor	1.000 0.988
			•		
Baseline Corr As found:	788.50	Previous response		*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope: AF Correlation:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA				

Notes:

Sample inlet filter changed after as founds. Span adjusted.

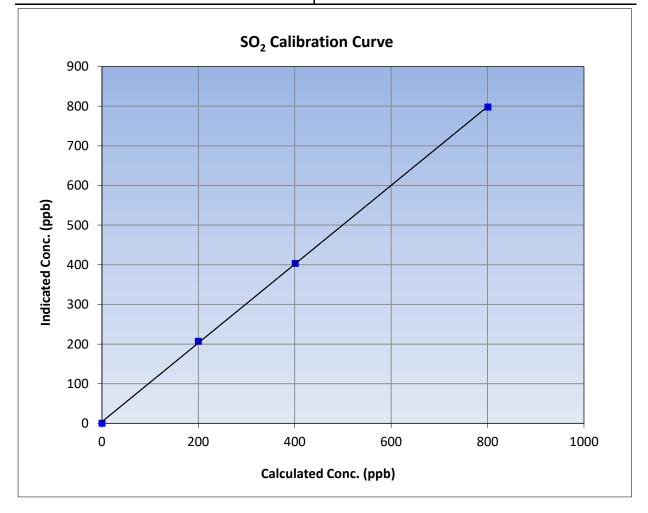
Calibration Performed By:

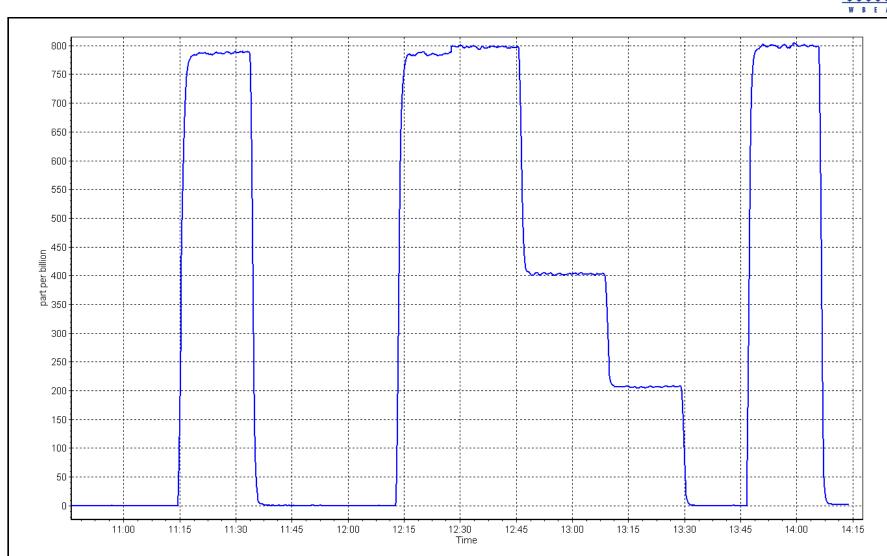


SO₂ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 17, 2023	Previous Calibration:	December 2, 2022
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	10:55	End Time (MST):	14:15
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999892	≥0.995
800.3	797.4	1.0036	correlation coefficient	0.999892	20.333
400.7	403.1	0.9940	- Slope	0.993569	0.90 - 1.10
199.8	206.8	0.9663			0.30 - 1.10
			Intercept	3.910928	+/-30





Location: MacKay River



H₂S Calibration Report

WBEA					Version-11-2021
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River January 23, 2023 11:31 Routine		Station number: Last Cal Date: End time (MST):	AMS20 December 6, 2022 15:44	
		Calibration St	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.87 EY0001922		Cal Gas Exp Date:	May 5, 2023	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	4.87 NA Teledyne API T700 Teledyne API 701		Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 1220 4522	
		Analyzer Info	rmation		
Analyzer make: Converter make: Analyzer Range	Teledyne API T101 Internal 0 - 100 ppb		Analyzer serial #: Converter serial #:	196 NA	
Calibration slope: Calibration intercept:	<u>Start</u> 1.004863 -0.061013	<u>Finish</u> 0.999429 0.379115	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 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	0.0	
as found span	4918	82.1	80.0	84.9	0.942
as found 2nd point	4959	41.1	40.0	43.0	0.931
as found 3rd point	4979	20.5	20.0	22.0	0.908
new cylinder response					
		H ₂ S Calibrati	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4918	82.1	80.0	80.2	0.997
second point	4959	41.1	40.0	40.4	0.991
third point	4979	20.5	20.0	20.7	0.965
as left zero	5000	0.0	0.0	0.2	
as left span	4918	82.1	80.0	79.9	1.001
SO2 Scrubber Check	4919	80.0	800.2	0.0	
Date of last scrubber cha		December 15, 2020		Ave Corr Factor	0.984
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 2nd AF pt:	84.9 43.0	Prev response: AF Slope:	80.29 1.059020	*% change: AF Intercept:	5.4% 0.418989
Baseline Corr 3rd AF pt:	22.0	AF Correlation:	0.999888	* = > +/-5% change initiate	es investigation

Notes:

Changed inlet filter after multi point as founds. Scrubber test after calibrator zero.Adjusted span

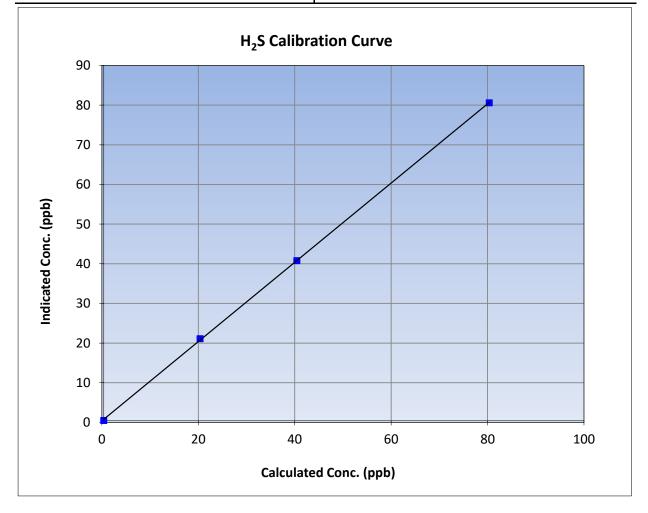
only.

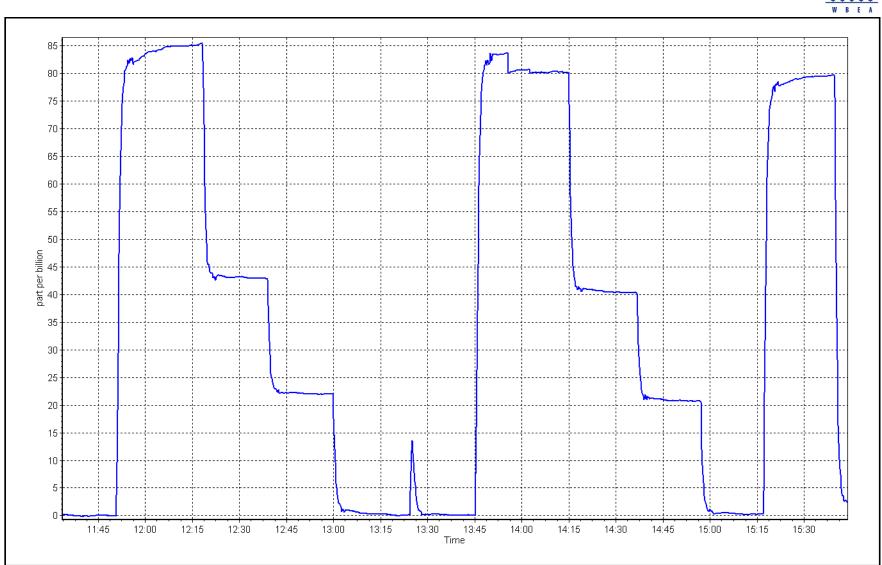


H₂S Calibration Summary

	Statio	on Information		
Calibration Date:	January 23, 2023	Previous Calibration:	December 6, 2022	
Station Name:	MacKay River	Station Number:	AMS20	
Start Time (MST):	11:31	End Time (MST):	15:44	
Analyzer make:	Teledyne API T101	Analyzer serial #:	196	

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999937	≥0.995
80.0	80.2	0.9971			
40.0	40.4	0.9909	- Slope	0.999429	0.90 - 1.10
20.0	20.7	0.9647			
			- Intercept	0.379115	+/-3





H₂S Calibration Plot

Location: MacKay River







THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River January 17, 2023 10:55 Routine		Station number: Last Cal Date: End time (MST):	AMS20 December 2, 2022 14:15	
		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:	N <u>499.40</u> <u>206.20</u> Teledyne API T700 Teledyne API 701	A ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	NA 1066.45 1220 4522	ppm
		Analyzer Info	ormation		
Analyzer make: Analyzer Range:	: Thermo 51i-LT : 0 - 20 ppm	,	Analyzer serial #:	1501663727	
Calibration slope: Calibration intercept:	<u>Start</u> 0.975440 0.264006	<u>Finish</u> 0.986110 0.143798	Background Coefficient		<u>Finish</u> 3.180 5.471
		THC Calibrat	tion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.05	
as found span	4919	81.3	17.34	17.15	1.011
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.06	
high point	4919	81.3	17.34	17.20	1.008
second point	4959	40.7	8.68	8.74	0.993
third point	4980	20.3	4.33	4.50	0.961
as left zero	5000	0.0	0.00	0.07	
as left span	4919	81.3	17.34	17.58	0.986
	4- 10			rage Correction Factor	
Baseline Corr As found:	17.10	Previous response	17.18	*% change	
				A E Intorconti	
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA NA	AF Slope: AF Correlation:		AF Intercept:	

Notes:

Sample inlet filter changed after as founds. H2 changed after as founds. Zero and span adjusted

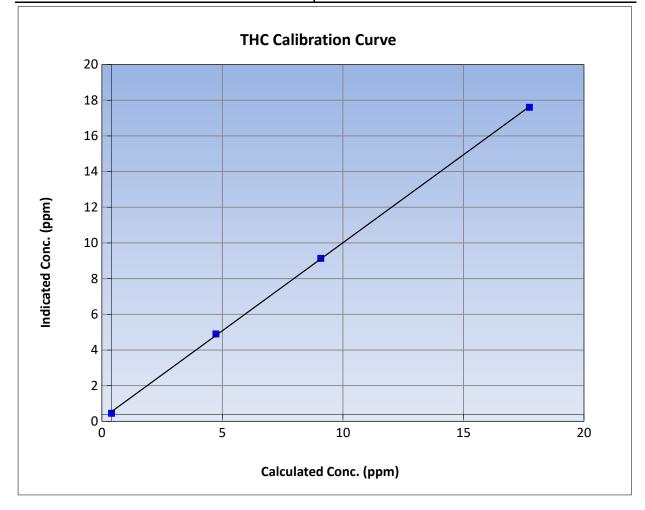
Calibration Performed By:



THC Calibration Summary

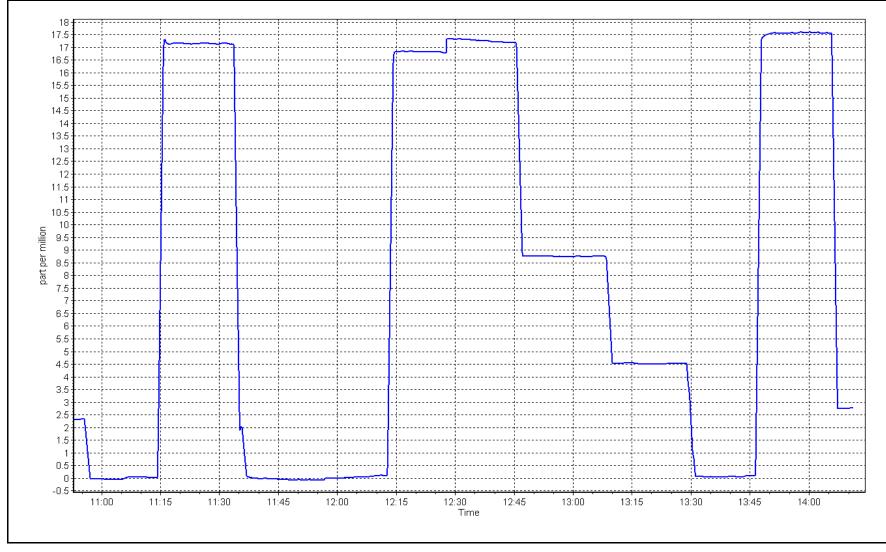
W B E A			Version-01-2020			
Station Information						
Calibration Date:	January 17, 2023	Previous Calibration:	December 2, 2022			
Station Name:	MacKay River	Station Number:	AMS20			
Start Time (MST):	10:55	End Time (MST):	14:15			
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727			

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.06		Correlation Coefficient	0.999884	≥0.995
17.34	17.20	1.0080	correlation coefficient	0.555004	20.333
8.68	8.74	0.9933	Slope	0.986110	0.90 - 1.10
4.33	4.50	0.9613			
			Intercept	0.143798	+/-1.5











Station Name:

Reason:

Calibration Date:

Start time (MST):

MacKay River

9:43

Routine

January 24, 2023

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station number: AMS20 Last Cal Date: December 8, 2022 End time (MST): 13:48

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:	49.19	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: T NOX Range (ppb): 0			Analyzer serial #: 15	05164379	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.379	1.409	NO bkgnd or offset:	3.8	3.9
NOX coeff or slope:	0.995	0.995	NOX bkgnd or offset:	3.8	3.9
NO2 coeff or slope:	0.995	0.995	Reaction cell Press:	172.3	175.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.995546	0.996925
NO _x Cal Offset:	1.090368	2.570800
NO Cal Slope:	0.995349	0.998231
NO Cal Offset:	-0.168545	1.372065
NO ₂ Cal Slope:	1.008585	1.007507
NO ₂ Cal Offset:	-0.287241	-1.673176



$NO_X \setminus NO \setminus NO_2$ 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/lc) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1		
as found span	4917	83.3	819.5	800.3	19.2	815.9	789.1	26.8	1.0044	1.0142
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4917	83.3	819.5	800.3	19.2	819.0	800.3	18.6	1.0006	1.0000
second point	4956	41.7	410.4	400.8	9.6	410.8	400.0	10.8	0.9991	1.0021
third point	4979	20.8	204.6	199.9	4.8	210.5	203.7	6.8	0.9722	0.9811
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4917	83.3	819.5	466.6	352.9	814.1	453.9	360.1	1.0066	1.0280
							Average C	orrection Factor	0.9906	0.9944
Corrected As fo	ound NO _x =	816.0 ppb	NO =	789.2 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chan	ge NO _x =	-0.1%
Previous Respo	onse NO _x =	816.9 ppb	NO =	796.4 ppb				*Percent Chan	ge NO =	-0.9%
Baseline Corr 2	2nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	NO r^2 :		NO SI:	NO Int:	
					As found	$NO_2 r^2$:		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)	785.7	452.0	352.9	355.4	0.9928	100.7%
2nd GPT point (200 ppb O3)	785.7	611.5	193.4	190.9	1.0129	98.7%
3rd GPT point (100 ppb O3)	785.7	695.8	109.1	107.1	1.0183	98.2%
			ŀ	Average Correction Factor	1.0080	99.2%

Notes:

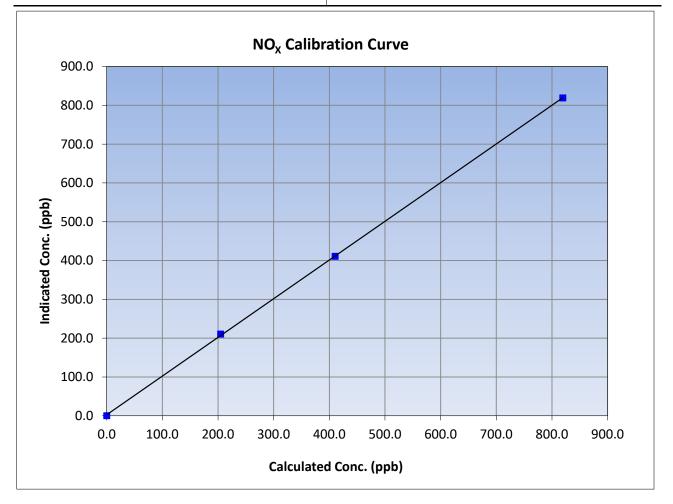
Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

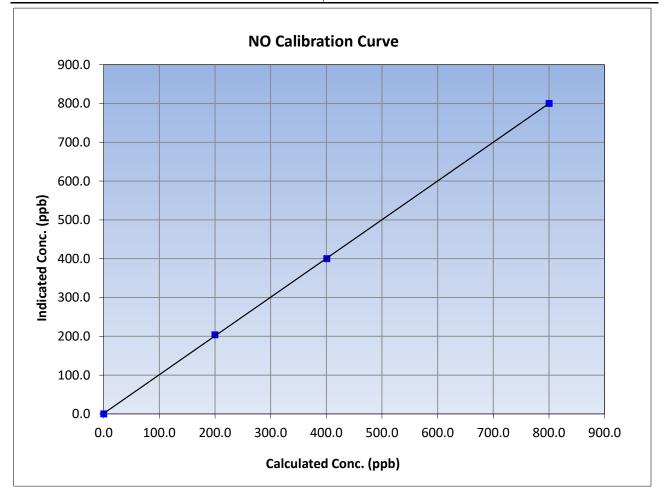
WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	er 8, 2022
Station Name:	MacKa	ıy River	Station Number:	AM	IS20
Start Time (MST):	9:43		End Time (MST):	13	:48
Analyzer make:	Thermo 42i		Analyzer serial #:	rial #: 1505164379	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999938	≥0.995
819.5	819.0	1.0006	correlation coefficient	0.555558	20.333
410.4	410.8	0.9991	Clana	0.996925	0.90 - 1.10
204.6	210.5	0.9722	Slope	0.996925	0.90 - 1.10
			Intercept	2.570800	+/-20





NO Calibration Summary

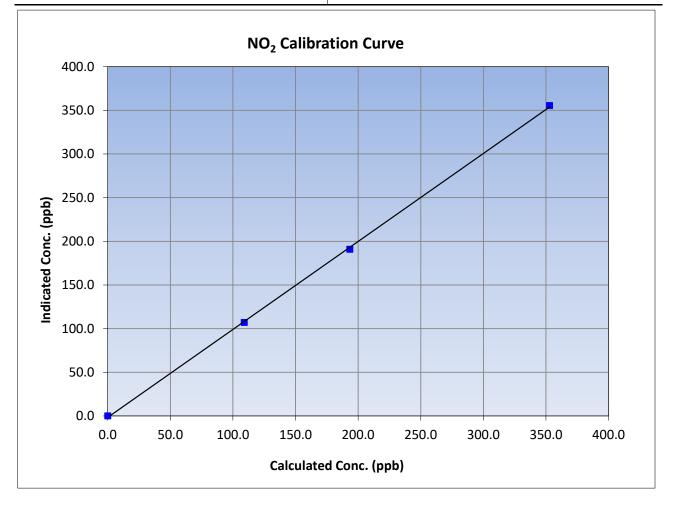
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	er 8, 2022
Station Name:	MacKa	ny River	Station Number:	AM	IS20
Start Time (MST):	9:43		End Time (MST):	13	:48
Analyzer make:	Thermo 42i		Analyzer serial #:	15051	.64379
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999965	≥0.995
800.3	800.3	1.0000	correlation coefficient	0.555505	20.995
400.8	400.0	1.0021	Clana	0.998231	0.90 - 1.10
199.9	203.7	0.9811	Slope	0.998231	0.90 - 1.10
			Intercept	1.372065	+/-20

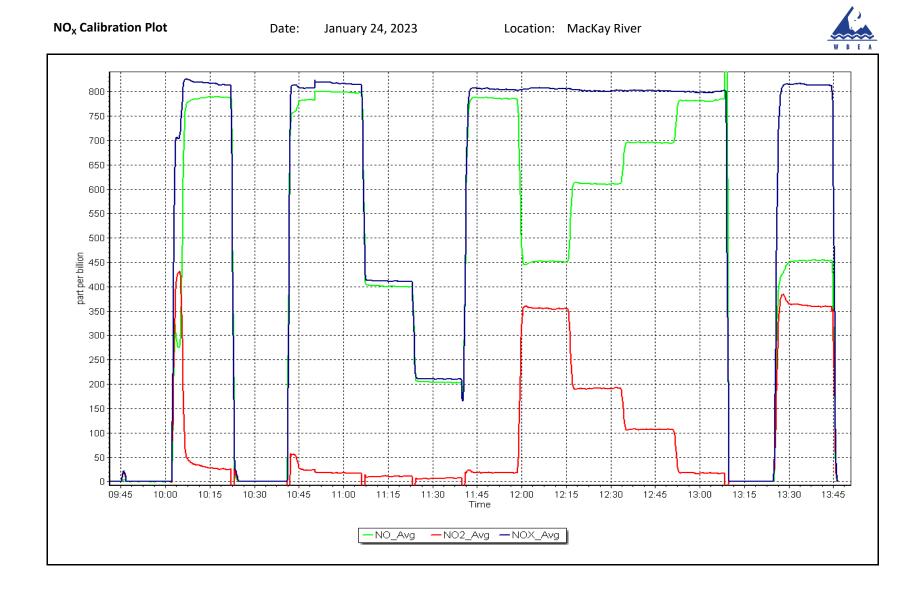




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	er 8, 2022
Station Name:	MacKa	ny River	Station Number:	AM	S20
Start Time (MST):	9:	43	End Time (MST):	13	:48
Analyzer make:	Therr	no 42i	Analyzer serial #:	15051	64379
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999825	≥0.995
352.9	355.4	0.9928	correlation coefficient	0.555625	20.335
193.4	190.9	1.0129	Clana	1.007507	0.90 - 1.10
109.1	107.1	1.0183	Slope	1.007507	0.90 - 1.10
			Intercept	-1.673176	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS21 CONKLIN JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation				
Station Name: Calibration Date: Start time (MST): Reason:	Conklin January 3, 2023 11:33 Routine		Station number: Last Cal Date: End time (MST):	AMS21 December 13, 2022 14:50			
		Calibration St	andards				
Cal Gas Concentration:	49.93	ppm	Cal Gas Exp Date:	January 5, 2025			
Cal Gas Cylinder #:	<u>CC259455</u>		_				
Removed Cal Gas Conc:	49.93	ppm	Rem Gas Exp Date:	NA			
Removed Gas Cyl #: Calibrator Make/Model:	Teledyne API T700		Diff between cyl: Serial Number:	3810			
ZAG Make/Model:	Teledyne API 701		Serial Number:	262			
			Schul Humber.	202			
		Analyzer Info	rmation				
Analyzer make Analyzer Range			Analyzer serial #:	1428701363			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>		
Calibration slope:	0.997976	1.003298	Backgd or Offset:	27.0	27.9		
Calibration intercept:	1.435794	0.595998	Coeff or Slope:	0.914	0.914		
SO ₂ Calibration Data							
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	Correction factor (Cc/lc Limit = 0.95-1.05		
as found zero	5005	0.0	0.0	0.5			
as found span	4920	80.2	800.8	801.0	1.000		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5005	0.0	0.0	0.1			
high point	4920	80.2	800.8	804.1	0.996		
second point	4960	40.1	400.4	401.8	0.997		
third point	4980	20.0	200.1	202.4	0.989		
as left zero	5005	0.0	0.0	0.2			
as left span	4920	80.2	800.8 Averag	802.0 ge Correction Factor	0.999 0.994		
Baseline Corr As found:	800.50	Previous response	800.66	*% change	0.0%		
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF pt:	NA	AF Correlation:					

Notes:

Adjusted the zero only.

Calibration Performed By:

Denny Ray Estador

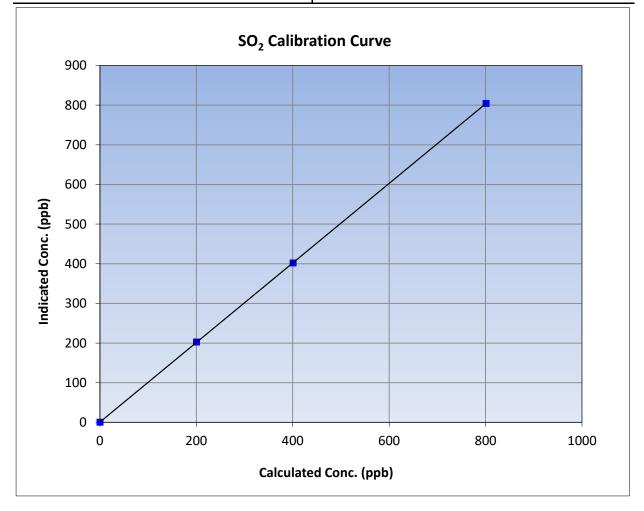


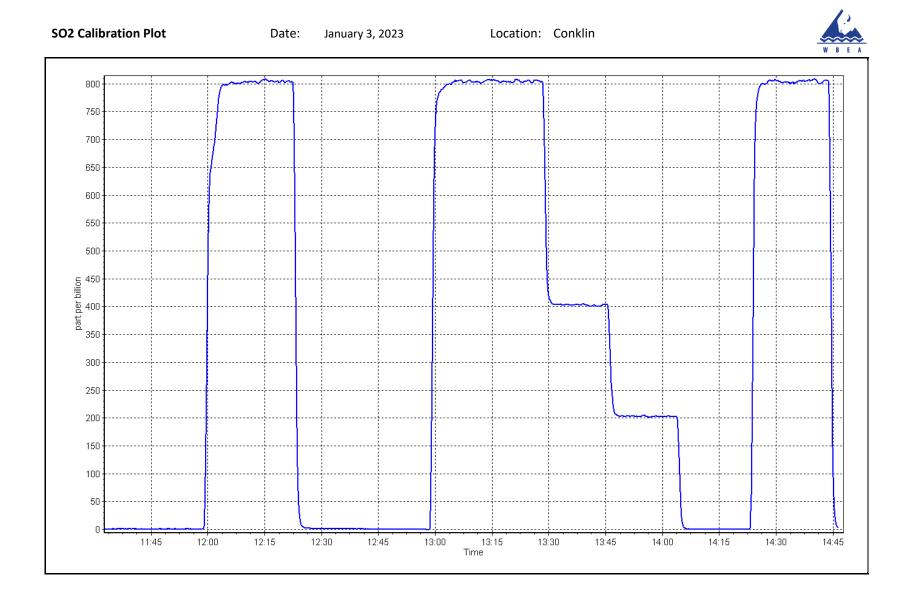
SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: January 3, 2023 **Previous Calibration:** December 13, 2022 Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:33 End Time (MST): 14:50 Analyzer make: Thermo 43i Analyzer serial #: 1428701363

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999995	≥0.995
800.8	804.1	0.9960	correlation coefficient	0.999995	20.333
400.4	401.8	0.9966	Slope	1.003298	0.90 - 1.10
200.1	202.4	0.9887	Slope	1.003298	0.30 - 1.10
			Intercept	0.595998	+/-30





CALS_370



TRS Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Conklin January 9, 2023 9:05 Routine		Station number: Last Cal Date: End time (MST):	AMS21 December 22, 2022 12:51	
		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:	0.999155 0.597263	1.005143 -0.162334	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	89.1	0.894
as found 2nd point	4960	39.8	40.0	44.6	0.890
as found 3rd point	4980	19.9	20.0	22.3	0.882
new cylinder response					
		TRS 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	79.5	80.0	80.2	0.997
second point	4960	39.8	40.0	40.1	0.999
third point	4980	19.9	20.0	20.0	1.001
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.5	80.0	79.4	1.007
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber cha	-			Ave Corr Factor	0.999
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	89.5	Prev response:	80.50	*% change:	10.1%
Baseline Corr 2nd AF pt:	45.0	AF Slope:	1.118193	AF Intercept:	-0.244908
Baseline Corr 3rd AF pt:	22.7	AF Correlation:	0.999986		
				* = > +/-5% change initiat	es investigation

Notes:

Adjusted both zero and span.

Calibration Performed By:

Melissa Lemay

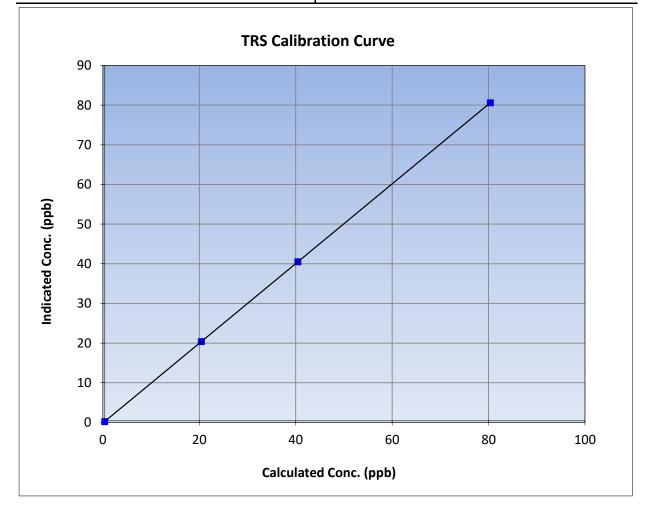


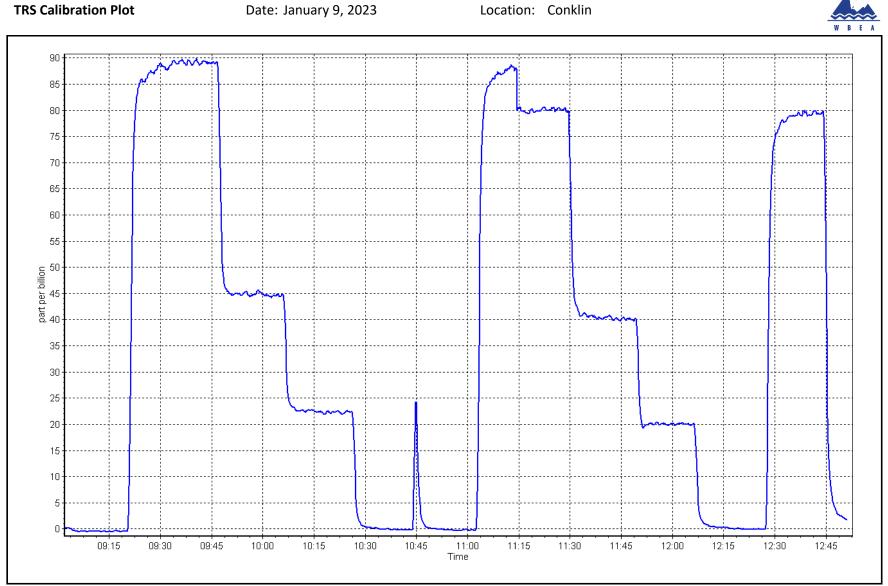
TRS Calibration Summary

WBEA			Version-11-2021						
Station Information									
Calibration Date:	January 9, 2023	Previous Calibration:	December 22, 2022						
Station Name:	Conklin	Station Number:	AMS21						
Start Time (MST):	9:05	End Time (MST):	12:51						
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1236656116						

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999999	≥0.995
80.0	80.2	0.9971	correlation coefficient	0.999999	20.333
40.0	40.1	0.9985	Slope	1.005143	0.90 - 1.10
20.0	20.0	1.0010	Siope	1.005145	0.90 - 1.10
			Intercept	-0.162334	+/-3







THC / CH_4 / NMHC Calibration Report

WBEA						Version-01-202
			Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Conklin January 3, 2023 11:33 Routine		Station number: AMS21 Last Cal Date: December 13, 2022 End time (MST): 14:50			
			Calibrati	on Standards		
Gas Cert Reference:	C	C259455		Cal Gas Expiry Date: Ja	nuary 5, 2025	
CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	497.9 207.2	ppm ppm		CH4 Equiv Conc.	1067.7	ppm
Removed Gas Cert:		NA		Removed Gas Expiry: NA	4	
Removed CH4 Conc.	497.9	ppm		CH4 Equiv Conc.	1067.7	ppm
Removed C3H8 Conc. Diff between cyl (CH ₄)	207.2	ppm		Diff between cyl (THC): Diff between cyl (NM):		
Calibrator Model:	Teledyne API T7	00		Serial Number: 38	10	
ZAG make/model:	Teledyne API 70	1		Serial Number: 26	2	
			Analyze	r Information		
Analyzer make	: Thermo 55i			Analyzer serial #: 11	18148495	
THC Range (ppm)						
NMHC Range (ppm)	••			CH4 Range (ppm): 0 -	· 10 ppm	
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 1.81E-04	1	.85E-04	NMHC SP Ratio:	4.48E-05	4.66E-05
CH4 Retention time	: 12.4		12.2	NMHC Peak Area:	203812	196117

THC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.00				
as found span	4920	80.2	17.13	13.17	1.301			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.2	17.13	17.13	1.000			
second point	4960	40.1	8.56	8.55	1.001			
third point	4980	20.0	4.27	4.31	0.991			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.2	17.13	17.03	1.006			
			A	Average Correction Factor	0.997			
Baseline Corr AF:	13.17	Prev response	16.89	*% change	-28.3%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	es investigation			



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0	0.00	0.00				
as found span	4920	80.2	9.14	6.78	1.347			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0	0.00	0.00				
high point	4920	80.2	9.14	9.13	1.001			
second point	4960	40.1	4.57	4.58	0.999			
third point	4980	20	2.28	2.31	0.989			
as left zero	5000	0	0.00	0.00				
as left span	4920	80.2	9.14	9.05	1.010			
			A	Average Correction Factor	0.996			
Baseline Corr AF:	6.78	Prev response	8.99	*% change	-32.6%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation			

СН4	Cal	ibration	Data
CH4	Ca	INIALIOII	Dala

			lion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	7.99	6.38	1.252
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	7.99	8.00	0.999
second point	4960	40.1	3.99	3.98	1.004
third point	4980	20.0	1.99	2.01	0.993
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	7.97	1.002
			A	verage Correction Factor	0.998
Baseline Corr AF:	6.38	Prev response	7.89	*% change	-23.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.986853		0.999155	
THC Cal Offset:		-0.014487		0.013380	
CH4 Cal Slope:		0.989953		1.000338	
CH4 Cal Offset:		-0.012077		0.001151	
NMHC Cal Slope:		0.984570		0.998171	
NMHC Cal Offset:		-0.003608		0.013029	

Notes:

Adjusted the span only. N2 and H2 cylinders changed.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	January	3, 2023	Previous Calibration:	December	13, 2022
station Name:	Cor	nklin	Station Number:	AM	S21
itart Time (MST):	11	:33	End Time (MST):	14:	50
nalyzer make:	Therr	no 55i	Analyzer serial #:	11814	18495
		Calibra	tion Data		
alculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
17.13	17.13	1.0000			
8.56 4.27	8.55 4.31	1.0015 0.9907	Slope	0.999155	0.90 - 1.10
4.27	4.51	0.5907	Intercept	0.013380	+/-0.5
16.0 -					
18.0		THC Calibratio			
16.0					
14.0					
12.0 —					
ک					
(bbm) 10.0					
0.6 ulicated					
Indi					
4.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0
			Conc. (ppm)		



CH₄ Calibration Summary

Version-01-2020

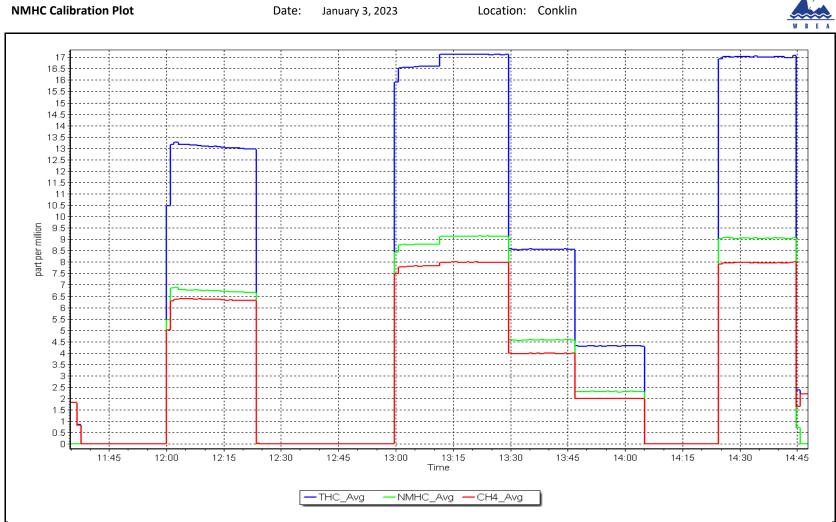
		Station	nformation		Version-01-20
alibration Date:	1000		Previous Calibration:	Docomba	12 2022
tation Name:		iary 3, 2023 Conklin	Station Number:	December AM	
tation Name: tart Time (MST):		11:33	End Time (MST):	AM 14:	
	т				
nalyzer make:		nermo 55i	Analyzer serial #:	11814	18495
		Calibra	ation Data		
alculated concentration (ppm) (Cc)	on Indicated concentrat (ppm) (Ic)	ion Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 7.99	0.00 8.00	0.9989	Correlation Coefficient	0.999987	≥0.995
3.99 1.99	3.98 2.01	1.0035 0.9928	Slope	1.000338	0.90 - 1.10
1.55	2.01	0.5520	Intercept	0.001151	+/-0.5
8.0 7.0 6.0 (mudi 5.0					
ວບ ບັບ ບັບ ບັບ					
Indicated Conc. (ppm)					
2.0 +					
1.0					
0.0					10.0
0.0) 2.(6.0	8.0	10.0
		Calculate	d Conc. (ppm)		



NMHC Calibration Summary

Version-01-2020

			Station I	nformation		
Calibration	Date:	January	3, 2023	Previous Calibration:	December	13, 2022
Station Nar	me:	Сог	nklin	Station Number:	AMS	521
Start Time ((MST):	11	:33	End Time (MST):	14:	50
Analyzer m	nake:	Therr	no 55i	Analyzer serial #:	11814	8495
			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	1.0009	Correlation Coefficient	0.999990	≥0.995
4.5		4.58	0.9988	ci.	0.000474	
2.2		2.31	0.9888	Slope	0.998171	0.90 - 1.10
				Intercept	0.013029	+/-0.5
:	9.0					•
Conc. (ppm)	6.0					
ידר (ידר (5.0					
	4.0					
Indicated	3.0					
	2.0					
	1.0					
1	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0
				l Conc. (ppm)		







THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-20		
		Stati	ion Information				
Station Name:	Conklin	Station number: AMS21					
Calibration Date:	January 4, 2023			January 3, 2023			
Start time (MST):	9:40		End time (MST):	13:40			
Reason:	Other:	As Lefts					
		Calibi	ration Standards				
Gas Cert Reference:	C	259455	Cal Gas Expiry Date:	January 5, 2025			
CH4 Cal Gas Conc.	497.9	ppm	CH4 Equiv Conc.	1067.7	ppm		
C3H8 Cal Gas Conc.	207.2	ppm					
Removed Gas Cert:		NA	Removed Gas Expiry:	NA			
Removed CH4 Conc.	497.9	ppm	CH4 Equiv Conc.	1067.7	ppm		
Removed C3H8 Conc.	207.2	ppm	Diff between cyl (THC):				
Diff between cyl (CH ₄)	:		Diff between cyl (NM):				
Calibrator Model:	librator Model: Teledyne API T700			Serial Number: 3810			
ZAG make/model:	Teledyne API 702	1	Serial Number:	262			
		Analy	zer Information				
Analyzer make	: Thermo 55i		Analyzer serial #:	118148495			
THC Range (ppm)			· ····· / · · · · · · · · · ·				
NMHC Range (ppm)			CH4 Range (ppm):	0 - 10 ppm			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	Finish		
CH4 SP Ratio	: 1.81E-04	1.85E-04	1 NMHC SP Ratio:	4.48E-05	4.66E-05		
CH4 Retention time	: 12.4	12.2	NMHC Peak Area:	203812	196117		
		THC	Calibration Data				
Set Point	Dil air flow rate	Source gas flow	v rate Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.03	1.006
			Ave	rage Correction Factor	
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change 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= 0.95-1.05
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0	0.00	0.00	
as left span	4920	80.2	9.14	9.10	1.004
			Avera	ge Correction Factor	
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	CH4 Calibra Source gas flow rate	tion Data Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	Dirai now rate	Source gas now rate			Ci Linit- 0.55 1.65
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	7.93	1.007
•			Avera	ge Correction Factor	
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.986853		<u></u>	
THC Cal Offset:		-0.014487			
CH4 Cal Slope:		0.989953			
CH4 Cal Offset:		-0.012077			
NMHC Cal Slope:		0.984570			
Nume carsiope.		0.004070			

Notes:

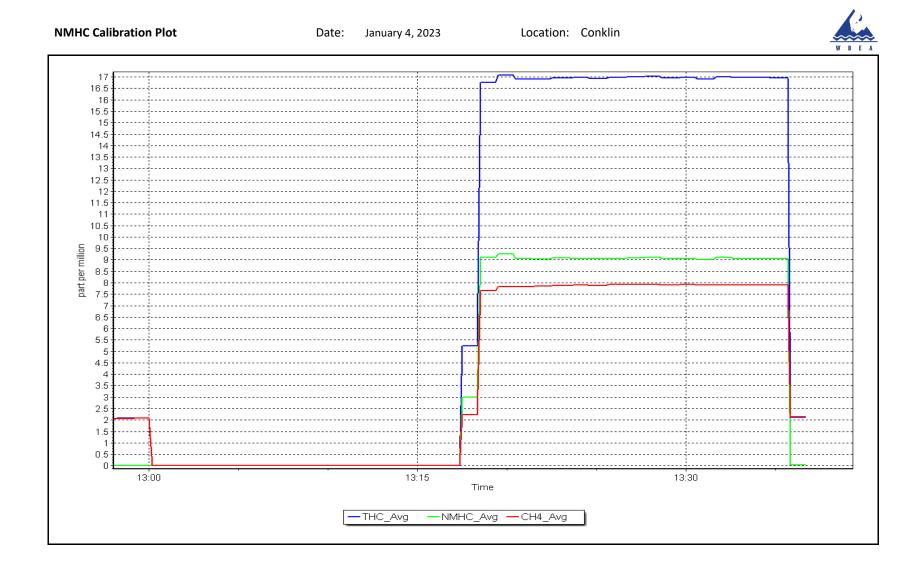
NMHC Cal Offset:

H2 leak at cylinder disrupted analyzer operation; leak fixed; as lefts points completed to verify analyzer operation.

-0.003608

Calibration Performed By: Denny Ray Estador

CALS_381





Station Name:

Reason:

Calibration Date:

Start time (MST):

Conklin

Routine

9:28

January 17, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS21 Last Cal Date: December 7, 2022 End time (MST): 13:30

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

NO Gas Cylinder #:	T2Y1P1H Cal Gas Expiry Date: December 11, 2023				023
NOX Cal Gas Conc:	51.09	ppm	NO Cal Gas Conc:	50.39	ppm
Removed Cylinder #:	n/a		Removed Gas Exp Date: n/a		
Removed Gas NOX Conc:	51.09	ppm	Removed Gas NO Conc:	50.39	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T75	0	Serial Number:	282	
ZAG make/model:	Teledyne API T70	1	Serial Number:	361	

Analy	vzer	Inforr	nation

Analyzer make: NOX Range (ppb):			Analyzer serial #: 15		
	<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	11.7
NOX coeff or slope:	1.001	1.001	NOX bkgnd or offset:	11.9	11.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	231.2	226.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998786	1.001997
NO _x Cal Offset:	1.643904	1.704503
NO Cal Slope:	0.998353	0.998723
NO Cal Offset:	1.000893	1.321276
NO ₂ Cal Slope:	0.997669	0.999769
NO ₂ Cal Offset:	-1.114017	-0.317822



$NO_X \setminus NO \setminus NO_2$ 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) <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	4921	79.4	811.2	800.1	11.1	812.0	799.0	13.5	0.9991	1.0014
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
high point	4921	79.4	811.2	800.1	11.1	813.8	799.9	13.9	0.9969	1.0003
second point	4960	39.7	405.7	400.1	5.6	408.8	401.2	7.6	0.9924	0.9973
third point	4980	19.8	202.3	199.6	2.8	206.3	202.2	4.1	0.9807	0.9869
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4921	79.4	811.2	390.7	420.5	812.0	392.2	419.8	0.9991	0.9962
							Average C	orrection Factor	0.9900	0.9948
Corrected As fo	ound NO _x =	812.2 ppb	NO =	799.2 ppb	* = > +/-5	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	0.0%
Previous Respo	onse NO _x =	811.9 ppb	NO =	799.8 ppb				*Percent Chan	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 foun	d $NO_2 r^2$:		NO2 SI: ;	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.8	389.4	420.5	420.2	1.0007	99.9%
2nd GPT point (200 ppb O3)	798.8	589.6	220.3	220.0	1.0014	99.9%
3rd GPT point (100 ppb O3)	798.8	695.9	114.0	113.2	1.0072	99.3%
				Average Correction Factor	1.0031	99.7%

Notes:

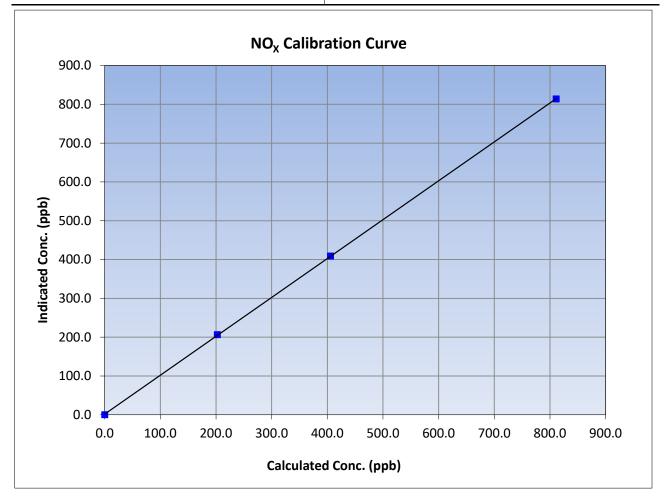
No adjustments required.

Calibration Performed By:



NO_x Calibration Summary

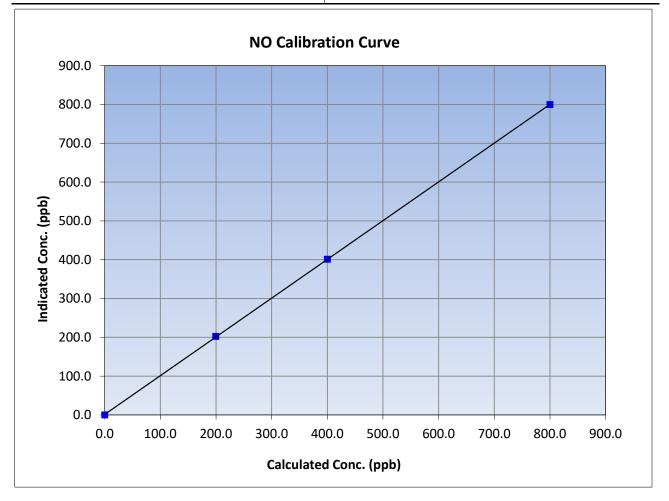
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	17, 2023	Previous Calibration:	Decembe	er 7, 2022
Station Name:	Cor	nklin	Station Number:	AM	S21
Start Time (MST):	9:	28	End Time (MST):	13	:30
Analyzer make:	Therr	mo 42i	Analyzer serial #:	15016	63731
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999980	≥0.995
811.2	813.8	0.9969	correlation coefficient	0.999980	20.995
405.7	408.8	0.9924	Classe	1.001997	0.90 - 1.10
202.3	206.3	0.9807	Slope	1.001997	0.90 - 1.10
			Intercept	1.704503	+/-20





NO Calibration Summary

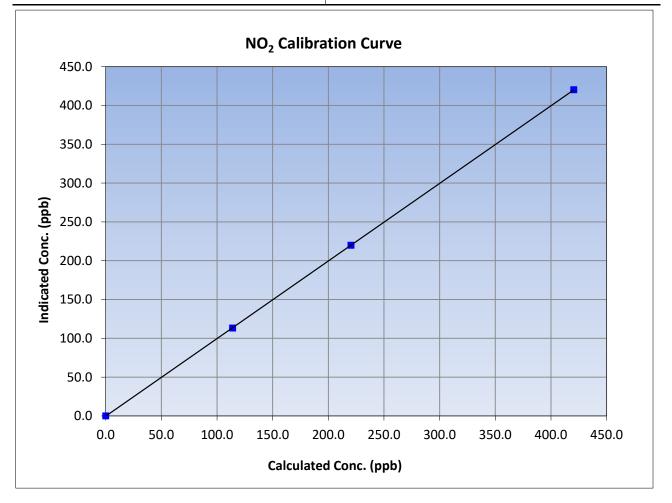
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	17, 2023	Previous Calibration:	Decembe	er 7, 2022
Station Name:	Cor	nklin	Station Number:	AM	S21
Start Time (MST):	9:	28	End Time (MST):	13	:30
Analyzer make:	Thermo 42i		Analyzer serial #:	alyzer serial #: 150166	
		Calibra	ation 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	0.999987	≥0.995
800.1	799.9	1.0003	correlation coefficient	0.999907	20.995
400.1	401.2	0.9973	Slope	0.998723	0.90 - 1.10
199.6	202.2	0.9869	Slope	0.998725	0.90 - 1.10
			Intercept	1.321276	+/-20

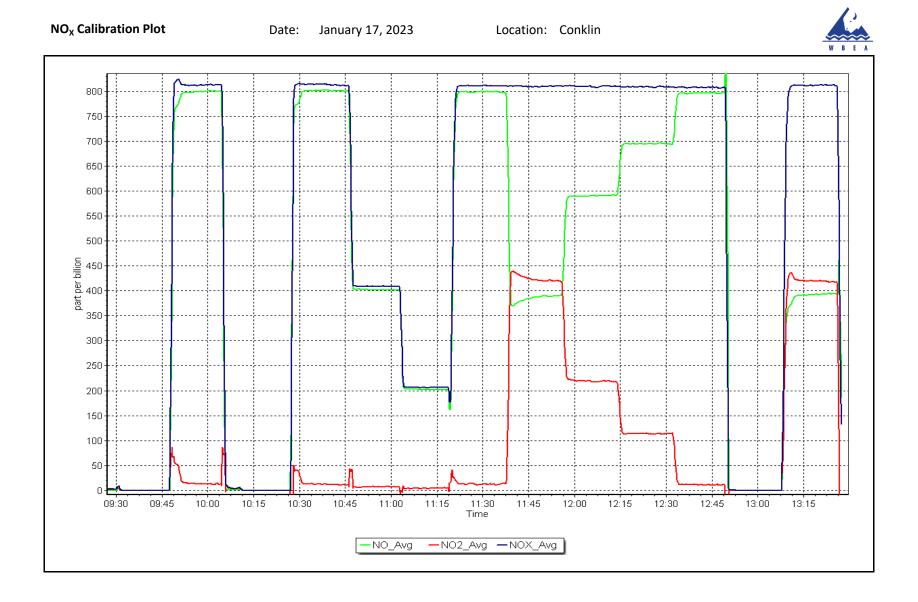




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	17, 2023	Previous Calibration:	Decembe	er 7, 2022
Station Name:	Cor	nklin	Station Number:	AM	S21
Start Time (MST):	9:	28	End Time (MST):	13	:30
Analyzer make:	Therr	no 42i	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	0.999996	≥0.995
420.5	420.2	1.0007	correlation coefficient	0.555550	20.333
220.3	220.0	1.0014	Slopp	0.999769	0.90 - 1.10
114.0	113.2	1.0072	Slope	0.999769	0.90 - 1.10
			Intercept	-0.317822	+/-20







O₃ Calibration Report

Version-01-2020

					Version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Conklin January 20, 2023 9:32 Routine		Station number: Last Cal Date: End time (MST):	December 6, 2022	
		Calibration St	andarda		
02	Dhata wata a	Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer Teledyne API T700 Teledyne API 701		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1501663734	
	<u>Start</u>	Finish		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.009514	0.997857	Backgd or Offset:	-0.3	-0.3
Calibration intercept:	0.660000	0.200000	Coeff or Slope:	1.011	1.011
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc/ Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.7	
as found span	5000	935.6	400.0	400.0	1.000
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.3	
high point	5000	933.0	400.0	399.0	1.003
second point	5000	799.4	200.0	200.3	0.999
third point	5000	701.9	100.0	100.3	0.997
as left zero	5000	0.0	0.0	-0.3	
as left span	5000	936.0	400.0	404.0	0.990
			Avera	ge Correction Factor	0.999
Baseline Corr As found:	400.7	Previous response	404.5	*% change	-0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		-1	
•				* = > +/-5% change initiate	es investigation

Notes:

No adjustments have been made.

Calibration Performed By:

Denny Ray Estador

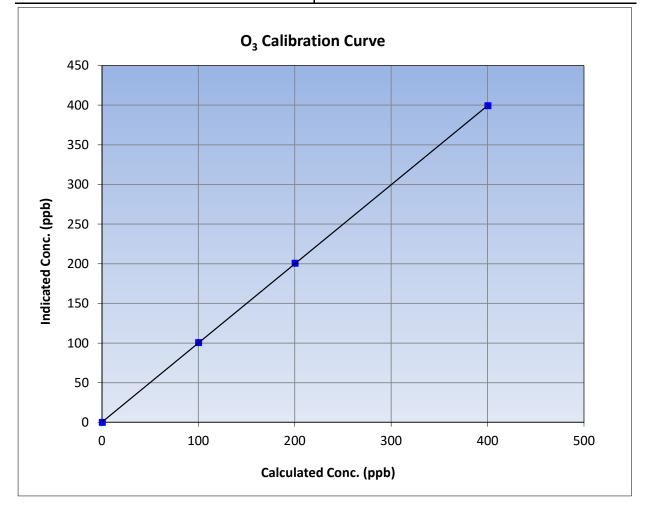


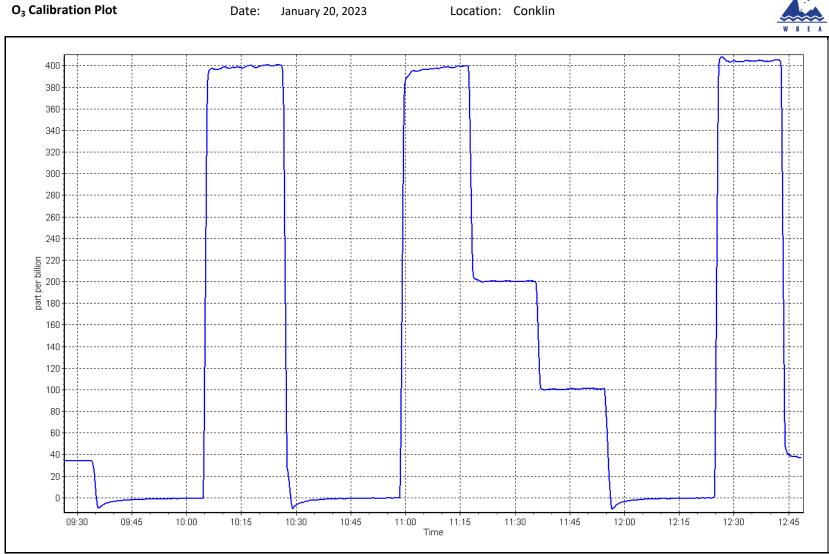
O₃ Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	January 20, 2023	Previous Calibration:	December 6, 2022					
Station Name:	Conklin	Station Number:	AMS21					
Start Time (MST):	9:32	End Time (MST):	12:50					
Analyzer make:	Thermo 49i	Analyzer serial #:	1501663734					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999991	≥0.995
400.0	399.0	1.0025	correlation coefficient	0.999991	20.333
200.0	200.3	0.9985	Slope	0.997857	0.90 - 1.10
100.0	100.3	0.9970	Slope	0.997837	0.90 - 1.10
			Intercept	0.200000	+/- 5





Location: Conklin



T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Conklin January 4, 2023 11:15		Station number: AMS Last Cal Date: Dec End time (MST): 11:5	ember 22, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 154	7	
Flow Meter Make/Model: Temp/RH standard:	DeltaCal DeltaCal		S/N: 954 S/N: 954		
		Monthly Calibration	Test		
Parameter T (°C) P (mmHg) flow (LPM) Leak Test: Inlet cleaning :	<u>As found</u> -8 709.4 5.02 Date of Check: _ PM w/o HEPA: _ Inlet Head	<u>Measured</u> -7.6 703.9 5.13 January 4, 2023 7.3	<u>As left</u> -8 709.4 5.02 Last Cal Date: <u>De</u> PM w/ HEPA:	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM
		Quarterly Calibratior	Test		
Parameter	<u>As found</u>	Measured	As left	Adjusted	(Limits)
PMT Peak Test	<u>no round</u>				10.9 +/- 0.5
Date Optical Chamber Cleaned: Disposable Filter Changed:		N/A N/A			
		Annual Maintenar	nce		
Date Sample Tube Cleaned: Date RH/T Sensor Cleaned:		N/A N/A			
Notes:	Re	cently installed last Dece	mber 2022, first monthly ca	libration test.	

Calibration by:

Denny Ray Estador



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS22 JANVIER JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

Station Name: Janvier January 17, 2023 Calibration Date: January 17, 2023 Start time (MST): 12:10 Reason: Routine Calibration Standards Cal Gas Concentration: 50.11 ppm Cal Gas Exp Date: January 18, 2029 Cal Gas Concentration: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Conc: 50.11 ppm Rem Gas Exp Date: 10.0 Calibration Make/Model: Teledyne API T700 Serial Number: 4890 ZAG Make/Model: Teledyne API T701 Serial Number: 4890 Calibration intercept: 0.1000 ppb Start Einish Calibration intercept: 0.10007 SO2 Calibration Data Set Point Dilution air flow rate (sccm) concentration (ppb) (c) (ppb) (k) (Lmt = 0.35-1.0 (ppb) (k)			Station Infor	mation		
Cal Gas Concentration: 50.11 ppm Cal Gas Exp Date: January 18, 2029 Removed Cal Gas Conc: S0.11 ppm Rem Gas Exp Date: NA Removed Cas Cyl #: NA Cal Gas Conc: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Calibrator Make/Model: Teledyne API T701 Calibration Serial Number: 3806 Calibration slope: 1.0000 ppb Calibration slope: 1.000878 Calibration slope: 0.164277 Calibration air flow rate Soc Calibration Data Set Point Set Point Dilution air flow rate (sccm) Calibration Concentration (ppb) (c) as found 2nd point Ageo 200 Concentration (ppb) (c) Concentration (ppb) (Calibration Date: Start time (MST):	January 17, 2023 12:10		Last Cal Date:	December 6, 2022	
Cal Gas Cylinder #:CC281519 PpmPpm Rem Gas Exp Date: NA Removed Gas Cyl #:NA NA Diff between cyl: Calibrator Make/Model:Teledyne API T700 Teledyne API T701Serial Number: Serial Number:3806 S806 Serial Number:4890Analyzer Information Analyzer Range 0 - 1000 ppbCalibrator Make/Model:Teledyne API T701Serial Number: Serial Number:4890Calibrator Make/Model:Teledyne API T701Serial Number: Serial Number:4890Calibration slope: Calibration slope:1.000878 1.000878Analyzer serial #: 1.0003351152430006 Backgd or Offset: 1.9.319.2 1.9.3Calibration slope: Calibration intercept:0.1642770.604356 0.604356Coeff or Slope: Coeff or Slope:1.0161.007Set PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration Correction factor (C (ppb) (k)Limit = 0.95 + 0.0as found zero50000.00.00.1 as found 3 dpoint498020.0200.4202.80.988new cylinder response calibrator zero50000.00.00.2 high point498020.0200.4201.00.997Average Correction Factor0.997Average Correction Factor0.997Average Correction Factor0.997Average Correction Factor <td></td> <td></td> <td>Calibration St</td> <td>andards</td> <td></td> <td></td>			Calibration St	andards		
Removed Cal Gas Conc:50.11ppmRem Gas Exp Date:NARemoved Gas Cyl #:NADiff between cyl:3806Calibrator Make/Model:Teledyne API T700Serial Number:3806ZAG Make/Model:Teledyne API T701Serial Number:4890ZAG Make/Model:Teledyne API T701Serial Number:4890Analyzer InformationAnalyzer serial #:1152430006Analyzer Range0 - 1000 ppbAnalyzer serial #:1152430006Calibration slope:1.0008781.000335Backgd or Offset:19.3Calibration intercept:0.1642770.604356Coeff or Slope:1.0161.007Source gas flow rate (sccm)Calculated concentration (ppb) (IC)Imicated concentration Correction factor (I (ppb) (IC)Imicated concentration Cor	Cal Gas Concentration:	50.11	ppm	Cal Gas Exp Date:	January 18, 2029	
Removed Gas Cyl #: NA Diff between cyl: Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701 Serial Number: 3806 ZAG Make/Model: Teledyne API T701 Serial Number: 4890 Analyzer make: Thermo 43i Analyzer serial #: 1152430006 Analyzer make: Thermo 43i Analyzer serial #: 1152430006 Calibration slope: 1.000878 1.000335 Backgd or Offset: 19.3 Calibration intercept: 0.164277 0.604356 Coeff or Slope: 1.016 1.007 Set Point Dilution air flow rate (sccm) Calculated indicated concentration Correction factor (concentration (ppb) (Cc) Limit = 0.95-1.0 as found zero 5000 0.0 0.1 as found span 4920 79.8 799.8 806.7 0.989 as found 3rd point 4980 20.0 200.4 202.8 0.989 as found 3rd point 4980 20.0 200.4 20	Cal Gas Cylinder #:	CC281519		·		
Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Serial Number: 3806 Serial Number: 4890 Analyzer make: Thermo 43i Analyzer Range 0 - 1000 ppb Start Finish Analyzer serial #: 1152430006 Analyzer serial #: 1152430006 Calibration slope: 1.000878 1.000878 1.000878 1.000335 Backgd or Offset: 19.3 19.2 Calibration intercept: 0.164277 0.664356 Coeff or Slope: 1.016 1.007 SO ₂ Calibration Data Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Calculated (sccm) Colculated (sccm) Colculated (sccm) Colculated	Removed Cal Gas Conc:	50.11	ppm	Rem Gas Exp Date:	NA	
Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Serial Number: 3806 Serial Number: 4890 Analyzer Make/Model: Teledyne API T701 Analyzer Information Analyzer Range 0 - 1000 ppb Start Finish Analyzer serial #: 1152430006 Analyzer Range 0 - 1000 ppb Start Finish 1.000335 Calibration slope: 1.000878 1.000878 1.000878 1.000335 Backgd or Offset: 19.3 1.016 1.007 SO ₂ Calibration Data Set Point Dilution air flow rate (sccm) SO ₂ Calibration Data Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Sourc	Removed Gas Cyl #:	NA		Diff between cyl:		
ZAG Make/Model: Teledyne API T701 Serial Number: 4890 Analyzer Information Analyzer make: Thermo 43i Analyzer Range 0 - 1000 ppb Analyzer serial #: 1152430006 Calibration slope: 1.000878 1.000335 Backgd or Offset: 19.3 19.2 Calibration slope: 0.164277 0.604356 Coeff or Slope: 1.016 1.007 Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Indicated concentration Correction factor (0 (ppb) (lc) Limit = 0.95-10.0 as found zero 5000 0.0 0.1 0.991 as found span 4920 79.8 799.8 806.7 0.991 as found 3rd point 4980 20.0 200.4 202.8 0.9889 as found 3rd point 4980 20.0 200.4 202.8 0.9991 as found 3rd point 4980 20.0 200.4 202.8 0.9999 second point 4960 39.9 399.9 401.6 0.9997 as found 2nd point 4920 79.8 799.8 800.2<	-	Teledyne API T700		-	3806	
Analyzer make: Thermo 43i Analyzer Range 0 - 1000 ppbAnalyzer serial #: 1152430006Calibration slope: Calibration intercept:Start 0.064277Finish 1.000335 0.664356Start Backgd or Offset:19.3 19.2 1.01619.7Calibration intercept:0.1642770.604356Coeff or Slope:1.0161.007SOze Calibration DataSet PointDilution air flow rate (sccm)Source gas flow rate concentration (ppb) (Cc)Indicated concentration factor (C (ppb) (lc)as found zero50000.00.00.1as found zero50000.00.00.1as found span492079.879.8806.70.991as found 3rd point496039.9399.9404.50.988new cylinder responsecalibrator zero50000.00.00.2high point492079.8799.8800.20.999second point496039.9399.9401.60.996third point492079.8799.8802.40.997as left zero50000.00.00.4Average Correction Factor0.997as left span492079.8799.8802.40.997Average Correction Factor0.997Baseline Corr As found:806.60Previous response A 799.8800.65*% change 0.7% <td< td=""><td></td><td></td><td></td><td>Serial Number:</td><td>4890</td><td></td></td<>				Serial Number:	4890	
Analyzer make: Thermo 43i Analyzer Range 0 - 1000 ppbAnalyzer serial #: 1152430006Calibration slope: Calibration intercept:Start 1.000878Finish 1.000335Start Backgd or Offset:Finish 19.3Calibration intercept:0.1642770.604356Coeff or Slope:1.0161.007Soze Calibration DataSet PointDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (lc)Indicated concentration factor (0 (ppb) (lc)as found zero50000.00.00.1as found span492079.879.8806.70.991as found 3rd point496039.9399.9404.50.988new cylinder responsecalibrator zero50000.00.00.2high point492079.8799.8800.20.999second point496039.9399.9401.60.996third point492079.8799.8802.40.997as left zero50000.00.00.4as left span492079.8799.8802.40.997as left span492079.8799.8802.40.997as left span492079.8799.8802.40.997Average Correction Factor0.997Baseline Corr As found:806.60Previous response Raseline Corr 2nd AF pt:0.7%			Analyzer Info	rmation		
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Start Calibration slope: Calibration intercept: Start 1.000878 0.604356 Finish Backgd or Offset: Dilution air flow rate (sccm) Start 0.604356 Finish Coeff or Slope: Finish 19.3 Set Point Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Ic) Indicated concentration Correction factor (0 (ppb) (Ic) as found zero 5000 0.0 0.1 as found zero 5000 0.0 0.0 0.1 as found 2nd point 4980 20.0 200.4 202.8 0.988 new cylinder response high point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.996 third point 4920 79.8 799.8 802.4 0.997 as l	•			/ analyzer seriar in:	1102 100000	
Calibration slope: 1.000878 1.000335 Backgd or Offset: 19.3 19.2 Calibration intercept: 0.164277 0.604356 Coeff or Slope: 1.016 1.007 SO2 Calibration Data Set Point Dilution air flow rate (sccm) Calculated indicated concentration Correction factor (Concentration (ppb) (Cc) as found zero 5000 0.0 0.1 as found span 4920 79.8 799.8 806.7 0.991 as found 2nd point 4960 39.9 399.9 404.5 0.988 new cylinder response Calibrator zero 5000 0.0 0.0 0.2 high point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.999 second point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.997 as left zero 5000	/ maryzer hang	c 0 1000 pp5				
Calibration intercept: 0.164277 0.604356 Coeff or Slope: 1.016 1.007 SO2 Calibration Data Set Point Dilution air flow rate (sccm) Source gas flow rate concentration (ppb) (Cc) Indicated concentration Correction factor (C (ppb) (Ic) Limit = 0.95-1.0 as found zero 5000 0.0 0.0 0.1 as found span 4920 79.8 799.8 806.7 0.991 as found 2nd point 4960 39.9 399.9 404.5 0.989 as found 3rd point 4980 20.0 200.4 202.8 0.988 new cylinder response high point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.9997 high point 4920 79.8 799.8 800.2 0.997 as left zero 5000 0.0 0.0 0.4 as left zero 5000 0.0 0.0 0.4 </td <td></td> <td><u>Start</u></td> <td><u>Finish</u></td> <td></td> <td><u>Start</u></td> <td><u>Finish</u></td>		<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
SO2 Calibration DataSet PointDilution air flow rate (sccm)Source gas flow rate concentration (ppb) (Cc)Indicated concentration (ppb) (Ic)Correction factor (C (ppb) (Ic))as found zero50000.00.00.1as found span492079.8799.8806.70.991as found 2nd point496039.9399.9404.50.989as found 3rd point498020.0200.4202.80.988new cylinder responsecalibrator zero50000.00.00.2high point492079.8799.8800.20.999second point496039.9399.9401.60.996third point492079.8799.8800.20.997as left zero50000.00.00.4as left zero50000.00.00.4as left span492079.8799.8802.40.997Average Correction Factor0.997Average Correction Factor0.997as left span492079.8799.8802.40.997Average Correction Factor0.997Average Correction Factor0.997Average Correction Factor0.997Average Correction Factor0.997Average Correction Factor0.997Average Correction Fac	Calibration slope:	1.000878	1.000335	Backgd or Offset:	19.3	19.2
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Set Point (sccm) concentration (ppb) (Cc) (ppb) (lc) Limit = 0.95-1.0 as found zero 5000 0.0 0.0 0.1 as found span 4920 79.8 799.8 806.7 0.991 as found 2nd point 4960 39.9 399.9 404.5 0.989 as found 3rd point 4980 20.0 200.4 202.8 0.988 new cylinder response high point 4920 79.8 799.8 800.2 0.999 second point 4920 79.8 799.8 800.2 0.999 second point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.996 third point 4980 20.0 200.4 201.0 0.997 as left zero 5000 0.0 0.0 0.4 as left span 4920 79.			SO ₂ Calibrati	on Data		
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as found 2nd point496039.9399.9404.50.989as found 3rd point498020.0200.4202.80.988new cylinder response0.00.00.2calibrator zero50000.00.00.2high point492079.8799.8800.20.999second point496039.9399.9401.60.996third point498020.0200.4201.00.997as left zero50000.00.00.4as left span492079.8799.8802.40.997Average Correction Factor0.997Average Correction Factor0.997Baseline Corr As found:806.60Previous response800.65*% change0.7%Baseline Corr 3rd AF pt:202.70AF Correlation:0.999980.999980.99998						0.991
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new cylinder response calibrator zero 5000 0.0 0.0 0.2 high point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.996 third point 4980 20.0 200.4 201.0 0.997 as left zero 5000 0.0 0.0 0.4 as left span 4920 79.8 799.8 802.4 0.997 Average Correction Factor 0.997 Average Correction Factor 0.997 Baseline Corr As found: 806.60 Previous response 800.65 *% change 0.7% Baseline Corr 2nd AF pt: 404.40 AF Slope: 1.008439 AF Intercept: 0.542651 Baseline Corr 3rd AF pt: 202.70 AF Correlation: 0.999998 0.542651						
calibrator zero 5000 0.0 0.0 0.2 high point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.996 third point 4980 20.0 200.4 201.0 0.997 as left zero 5000 0.0 0.0 0.4 as left span 4920 79.8 799.8 802.4 0.997 Average Correction Factor 0.997 Average Correction Factor 0.997 Baseline Corr As found: 806.60 Previous response 800.65 *% change 0.7% Baseline Corr 2nd AF pt: 404.40 AF Slope: 1.008439 AF Intercept: 0.542651 Baseline Corr 3rd AF pt: 202.70 AF Correlation: 0.9999988 0.542651						
high point 4920 79.8 799.8 800.2 0.999 second point 4960 39.9 399.9 401.6 0.996 third point 4980 20.0 200.4 201.0 0.997 as left zero 5000 0.0 0.0 0.4 as left span 4920 79.8 799.8 802.4 0.997 Average Correction Factor 0.997 Average Correction Factor 0.997 Baseline Corr As found: 806.60 Previous response 800.65 *% change 0.7% Baseline Corr 2nd AF pt: 404.40 AF Slope: 1.008439 AF Intercept: 0.542651 Baseline Corr 3rd AF pt: 202.70 AF Correlation: 0.999998 0.542651		5000	0.0	0.0	0.2	
second point 4960 39.9 399.9 401.6 0.996 third point 4980 20.0 200.4 201.0 0.997 as left zero 5000 0.0 0.0 0.4 as left span 4920 79.8 799.8 802.4 0.997 Average Correction Factor 0.997 Average Correction Factor 0.997 Baseline Corr As found: 806.60 Previous response 800.65 *% change 0.7% Baseline Corr 2nd AF pt: 404.40 AF Slope: 1.008439 AF Intercept: 0.542651 Baseline Corr 3rd AF pt: 202.70 AF Correlation: 0.999998 0.542651						0.999
third point 4980 20.0 200.4 201.0 0.997 as left zero 5000 0.0 0.0 0.4 as left span 4920 79.8 799.8 802.4 0.997 Average Correction Factor 0.997 Baseline Corr As found: 806.60 Previous response 800.65 *% change 0.7% Baseline Corr 2nd AF pt: 404.40 AF Slope: 1.008439 AF Intercept: 0.542651 Baseline Corr 3rd AF pt: 202.70 AF Correlation: 0.999998 0.542651						
as left zero 5000 0.0 0.0 0.4 as left span 4920 79.8 799.8 802.4 0.997 Average Correction Factor 0.997 Baseline Corr As found: 806.60 Previous response 800.65 *% change 0.7% Baseline Corr 2nd AF pt: 404.40 AF Slope: 1.008439 AF Intercept: 0.542651 Baseline Corr 3rd AF pt: 202.70 AF Correlation: 0.999998 0.542651						
as left span 4920 79.8 799.8 802.4 0.997 Average Correction Factor 0.997 Baseline Corr As found: 806.60 Previous response 800.65 *% change 0.7% Baseline Corr 2nd AF pt: 404.40 AF Slope: 1.008439 AF Intercept: 0.542651 Baseline Corr 3rd AF pt: 202.70 AF Correlation: 0.999998 0.542651						
Average Correction Factor0.997Baseline Corr As found:806.60Previous response800.65*% change0.7%Baseline Corr 2nd AF pt:404.40AF Slope:1.008439AF Intercept:0.542651Baseline Corr 3rd AF pt:202.70AF Correlation:0.999998						0.997
Baseline Corr As found:806.60Previous response800.65*% change0.7%Baseline Corr 2nd AF pt:404.40AF Slope:1.008439AF Intercept:0.542651Baseline Corr 3rd AF pt:202.70AF Correlation:0.999998						
Baseline Corr 2nd AF pt:404.40AF Slope:1.008439AF Intercept:0.542651Baseline Corr 3rd AF pt:202.70AF Correlation:0.999998	Baseline Corr As found	806.60	Previous response			
Baseline Corr 3rd AF pt:202.70AF Correlation:0.999998					-	
					A mercept.	0.072001
					* = > +/-5% change initiat	es investigation

Inlet filter changed after as founds. Adjusted span only.

Calibration Performed By:

Rene Chamberland

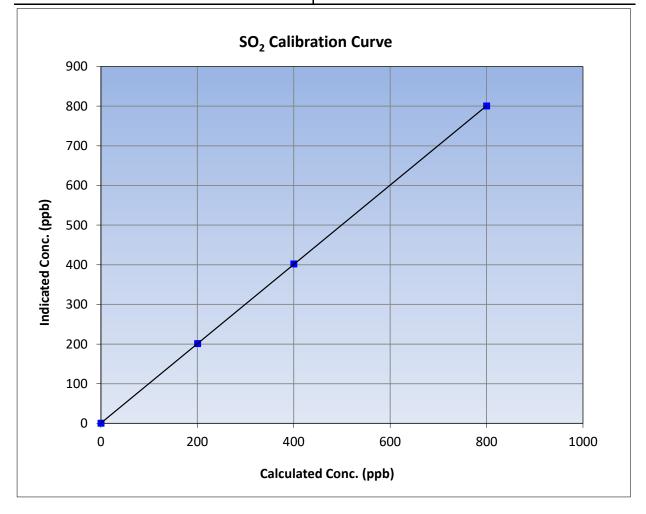


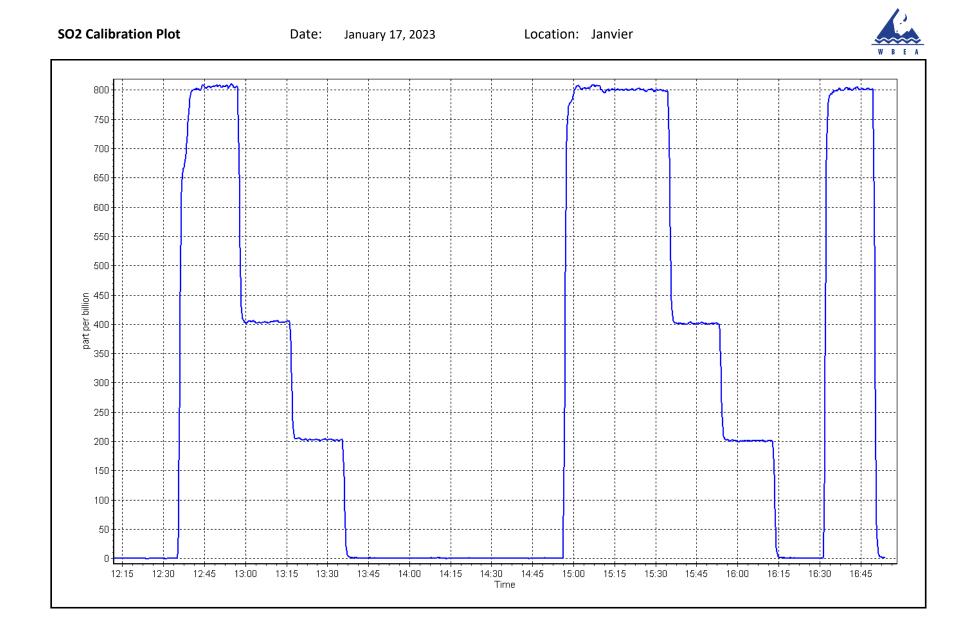
SO₂ Calibration Summary

W B E A			Version-01-2020		
Station Information					
Calibration Date:	January 17, 2023	Previous Calibration:	December 6, 2022		
Station Name:	Janvier	Station Number:	AMS 22		
Start Time (MST):	12:10	End Time (MST):	16:51		
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006		

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999996	≥0.995	
799.8	800.2	0.9995	correlation coefficient	0.999990	20.995	
399.9	401.6	0.9957	Slope	1.000335	0.90 - 1.10	
200.4	201.0	0.9972	Slope	1.000335	0.90 - 1.10	
			- Intercept	0.604356	+/-30	







TRS Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Janvier January 20, 2023 10:30 Maintenance		Station number: Last Cal Date: End time (MST):	AMS22 December 15, 2022 15:45	
		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:		
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:	0.999078	1.005365	Backgd or Offset:	3.39	3.42
Calibration intercept:	0.320986	0.000881	Coeff or Slope:	1.223	1.239
		TRS As 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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	TRS Calibrat Source gas flow rate (sccm)	ion Data Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction facto (Cc/Ic) <i>Limit = 0.95-1.05</i>
Set Point calibrator zero		Source gas flow rate	Calculated concentration (ppb)		(Cc/Ic)
	(sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	concentration (ppb) (Ic)	(Cc/Ic)
calibrator zero	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated concentration (ppb) (Cc) 0.0	concentration (ppb) (Ic) 0.2	(Cc/lc) <i>Limit = 0.95-1.05</i>
calibrator zero high point second point third point	(sccm) 5000 4920 4960 4980	Source gas flow rate (sccm) 0.0 79.5 39.8 19.9	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0	concentration (ppb) (Ic) 0.2 80.4	(Cc/lc) Limit = 0.95-1.05 0.995
calibrator zero high point second point	(sccm) 5000 4920 4960	Source gas flow rate (sccm) 0.0 79.5 39.8	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0	concentration (ppb) (Ic) 0.2 80.4 40.5	(Cc/lc) <i>Limit = 0.95-1.05</i> 0.995 0.989
calibrator zero high point second point third point	(sccm) 5000 4920 4960 4980	Source gas flow rate (sccm) 0.0 79.5 39.8 19.9	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0	concentration (ppb) (Ic) 0.2 80.4 40.5 19.7 0.2 79.9	(Cc/lc) Limit = 0.95-1.05 0.995 0.989 1.016
calibrator zero high point second point third point as left zero as left span O2 Scrubber Check	(sccm) 5000 4920 4960 4980 5000 4920 4920	Source gas flow rate (sccm) 0.0 79.5 39.8 19.9 0.0	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0	concentration (ppb) (Ic) 0.2 80.4 40.5 19.7 0.2	(Cc/lc) Limit = 0.95-1.03 0.995 0.989 1.016
calibrator zero high point second point third point as left zero as left span O2 Scrubber Check Date of last scrubber cha	(sccm) 5000 4920 4960 4980 5000 4920 4920 4920 ange:	Source gas flow rate (sccm) 0.0 79.5 39.8 19.9 0.0 79.5	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0	concentration (ppb) (Ic) 0.2 80.4 40.5 19.7 0.2 79.9	(Cc/lc) Limit = 0.95-1.02 0.995 0.995 1.016 1.001 1.000
calibrator zero high point second point third point as left zero as left span O2 Scrubber Check Date of last scrubber cha	(sccm) 5000 4920 4960 4980 5000 4920 4920 4920 ange:	Source gas flow rate (sccm) 0.0 79.5 39.8 19.9 0.0 79.5	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0	concentration (ppb) (Ic) 0.2 80.4 40.5 19.7 0.2 79.9 0.1	(Cc/lc) Limit = 0.95-1.02 0.995 0.995 0.989 1.016 1.001
calibrator zero high point second point third point as left zero	(sccm) 5000 4920 4960 4980 5000 4920 4920 4920 ange:	Source gas flow rate (sccm) 0.0 79.5 39.8 19.9 0.0 79.5	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 798.0	concentration (ppb) (Ic) 0.2 80.4 40.5 19.7 0.2 79.9 0.1	(Cc/lc) Limit = 0.95-1.02 0.995 0.995 1.016 1.001 1.000
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	(sccm) 5000 4920 4960 4980 5000 4920 4920 4920 ange: ficiency test:	Source gas flow rate (sccm) 0.0 79.5 39.8 19.9 0.0 79.5 79.8	Calculated concentration (ppb) (Cc) 0.0 80.0 20.0 0.0 80.0 798.0 NA	concentration (ppb) (Ic) 0.2 80.4 40.5 19.7 0.2 79.9 0.1 Ave Corr Factor	(Cc/lc) Limit = 0.95-1.05 0.995 0.989 1.016 1.001 1.000 efficiency

No as founds completed because of a converter failure. Replaced the TRS converter. Changed outNotes:the inlet filter. Scrubber check passed. Increased the converter temperature to 840C. Adjusted

span only.

Calibration Performed By:

Rene Chamberland

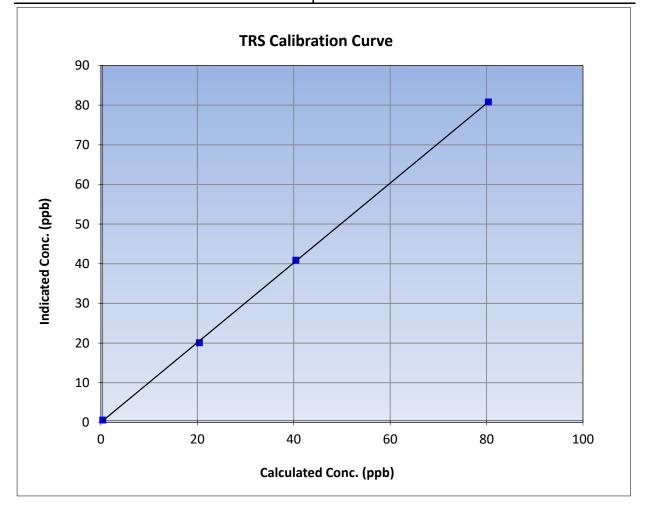


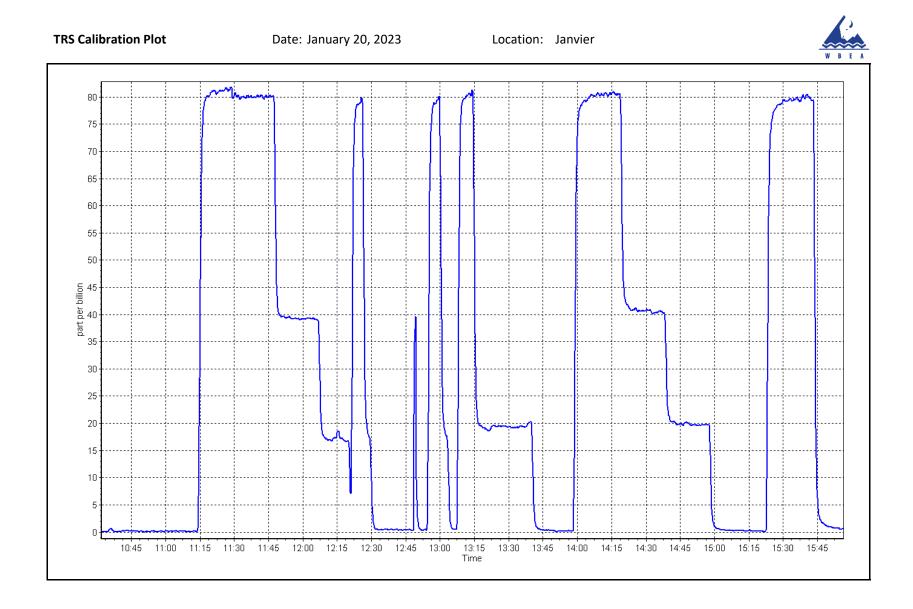
TRS Calibration Summary

Version-11-2021 **Station Information** Calibration Date: January 20, 2023 **Previous Calibration:** December 15, 2022 Station Name: Station Number: AMS22 Janvier Start Time (MST): 10:30 End Time (MST): 15:45 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680031

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999920	≥0.995	
80.0	80.4	0.9948	correlation coefficient	0.999920	20.333	
40.0	40.5	0.9887	Slope	1.005365	0.90 - 1.10	
20.0	19.7	1.0162	Slope	1.005505	0.90 - 1.10	
			Intercept	0.000881	+/-3	







THC / CH_4 / NMHC Calibration Report

W B E A					Version-01-20	
		Statio	on Information			
Station Name:	Janvier		Station number: AN			
Calibration Date:	January 17, 202	3	Last Cal Date: December 6, 2022			
Start time (MST):	12:10		End time (MST): 16	5:51		
Reason:	Routine					
		Calibra	ation Standards			
Gas Cert Reference:	C	C281519	Cal Gas Expiry Date: Ja	nuary 18, 2029)	
CH4 Cal Gas Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm	
C3H8 Cal Gas Conc.	208.4	ppm				
Removed Gas Cert:		N/A	Removed Gas Expiry: N/	/Α		
Removed CH4 Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm	
Removed C3H8 Conc.	208.4	ppm	Diff between cyl (THC):			
Diff between cyl (CH ₄):	:		Diff between cyl (NM):			
Calibrator Model:	Teledyne API 70	0	Serial Number: 38	306		
ZAG make/model:	Teledyne API 70	01	Serial Number: 48	390		
		Analyz	er Information			
Analyzer make:	Thermo 55i		Analyzer serial #: 1172750023			
THC Range (ppm):	0 - 20 ppm					
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio:	2.180E-04	2.180E-04	NMHC SP Ratio:	4.62E-05	4.69E-05	
CH4 Retention time:	12.80	13.00	NMHC Peak Area:	198163	195272	

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	17.17	17.34	0.990
as found 2nd point	4960	39.9	8.59	8.63	0.995
as found 3rd point	4980	20.0	4.30	4.32	0.996
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	17.17	17.14	1.002
second point	4960	39.9	8.59	8.52	1.008
third point	4980	20.0	4.30	4.22	1.020
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	17.17	17.11	1.004
			Aver	rage Correction Factor	1.010
Baseline Corr AF:	17.34	Prev response	17.16	*% change	1.0%
Baseline Corr 2nd AF:	8.6	AF Slope:	1.009988	AF Intercept:	-0.017439
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999993	* = > +/-5% change 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	79.8	9.15	9.17	0.997		
as found 2nd point	4960	39.9	4.57	4.59	0.997		
as found 3rd point	4980	20	2.29	2.28	1.005		
new cylinder response							
calibrator zero	5000	0	0.00	0.00			
high point	4920	79.8	9.15	9.11	1.004		
second point	4960	39.9	4.57	4.53	1.010		
third point	4980	20.0	2.29	2.25	1.021		
as left zero	5000	0	0.00	0.00			
as left span	4920	79.8	9.15	9.10	1.006		
			Aver	age Correction Factor	1.011		
Baseline Corr AF:	9.17	Prev response	9.16	*% change	0.1%		
Baseline Corr 2nd AF:	4.6	AF Slope:	1.003390	AF Intercept:	-0.006039		
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999995	* = > +/-5% change initiat	es investigation		

CH4 Calibration Data

		lion Data			
Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
5000	0.0	0.00	0.00		
4920	79.8	8.03	8.16	0.984	
4960	39.9	4.01	4.04	0.994	
4980	20.0	2.01	2.04	0.986	
5000	0.0	0.00	0.00		
4920	79.8	8.03	8.03	1.000	
4960	39.9	4.01	3.99	1.005	
4980	20.0	2.01	1.97	1.020	
5000	0.0	0.00	0.00		
4920	79.8	8.03	8.01	1.001	
		Aver	age Correction Factor	1.008	
8.16	Prev response	8.00	*% change	2.0%	
4.04	AF Slope:	1.016305	AF Intercept:	-0.010190	
2.04	AF Correlation:	0.999967	* = > +/-5% change initiat	es investigation	
	Calibration	Statistics			
	<u>Start</u>		<u>Finish</u>		
	0.999736		0.999594		
	-0.008390		-0.041578		
	0.997864	1.001935			
	-0.011155		-0.020955		
	1.001366		0.997466		
	0.002565		-0.020822		
	5000 4920 4960 4980 5000 4920 4960 4980 5000 4920 4920 8.16 4.04	Dil air flow rate Source gas flow rate 5000 0.0 4920 79.8 4960 39.9 4980 20.0 5000 0.0 4980 20.0 5000 0.0 4980 20.0 5000 0.0 4920 79.8 4960 39.9 4980 20.0 5000 0.0 4920 79.8 4960 39.9 4980 20.0 5000 0.0 4920 79.8 4920 79.8 204 AF Slope: 2.04 AF Correlation: Calibration Start 0.999736 -0.008390 0.997864 -0.011155 1.001366 1.001366	Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) 5000 0.0 0.00 4920 79.8 8.03 4960 39.9 4.01 4980 20.0 2.01 5000 0.0 0.00 4980 20.0 2.01 5000 0.0 0.00 4920 79.8 8.03 4960 39.9 4.01 4980 20.0 2.01 5000 0.0 0.00 4920 79.8 8.03 4960 39.9 4.01 4980 20.0 2.01 5000 0.0 0.00 4920 79.8 8.03 4920 79.8 8.03 Aver 8.16 Prev response 8.16 Prev response 8.00 4.04 AF Slope: 1.016305 2.04 AF Correlation: 0.9999967 -0.008390 0.997864	Dil air flow rateSource gas flow rateCalc conc (ppm) (Cc)Ind conc (ppm) (lc) 5000 0.0 0.00 0.00 4920 79.8 8.03 8.16 4960 39.9 4.01 4.04 4980 20.0 2.01 2.04	

Changed the inlet filter after as founds. Changed out the N2 and H2 cylinders. Adjusted span only.

Calibration Performed By:

Notes:

Rene Chamberland



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	17, 2023	Previous Calibration:	Decembe	r 6, 2022
Station Name:	Jan	vier	Station Number:	AMS	5 22
Start Time (MST):	12	:10	End Time (MST):	16:	51
Analyzer make:	Thern	าด 55i	Analyzer serial #:	11727	50023
		Calibra	ition Data		
Calculated concentra (ppm) (Cc)	tion Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999973	≥0.995
17.17	17.14	1.0016			
8.59 4.30	<u>8.52</u> 4.22	1.0076 1.0203	Slope	0.999594	0.90 - 1.10
		1.0205	Intercept	-0.041578	+/-0.5
20.0		THC Calibratio	n Curve		
18.0 -					
16.0 -					
14.0 -					
- 12.0 - bbu: - 10.0 - OD					
- 0.01 - Conc O					
- 0.8 g					
- 0.8 q - 0.6 udicated					
4.0 -					
2.0 -					
0.0		-			
0.	0 5	.0		15.0	20.0
		Calculated	l Conc. (ppm)		



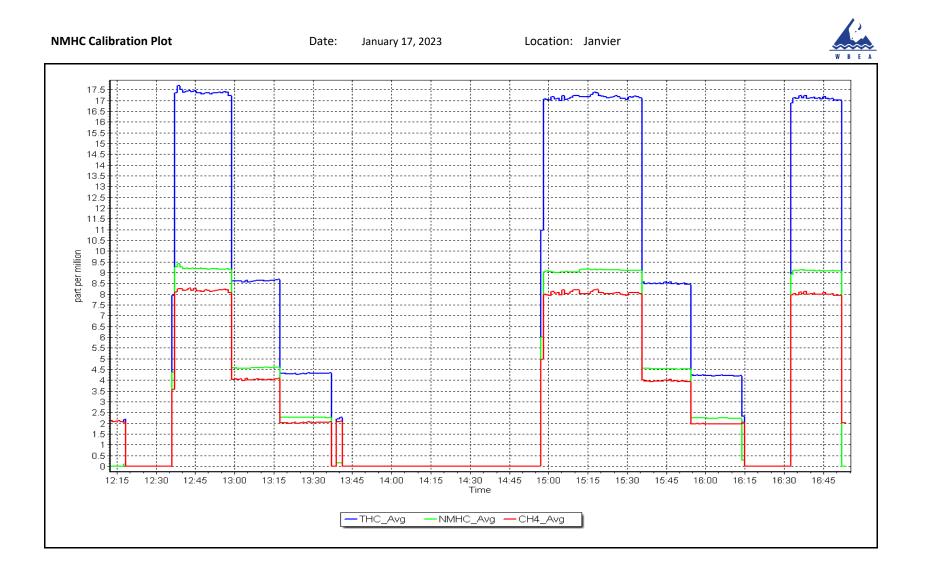
CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	January	17, 2023	Previous Calibration:	Decembe	r 6, 2022
Station Name:	Jan	ivier			5 22
Start Time (MST):	12	::10	End Time (MST):	16:	51
Analyzer make:	Thern	no 55i	Analyzer serial #:	11727	50023
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00 8.03	0.00 8.03	0.9995	Correlation Coefficient	0.999968	≥0.995
4.01 2.01	3.99 1.97	1.0051 1.0204	Slope	1.001935	0.90 - 1.10
			Intercept	-0.020955	+/-0.5
8.0 7.0 6.0					
10 10 10 10 10 10 10 10					
OD 4.0					
0.6 udicate					
2.0					
1.0 -					
0.0	2.0	4.0	6.0	8.0	10.0



NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	January 17, 2023		Previous Calibration:	Decembe	r 6, 2022
Station Name:	Janvier		Station Number: AMS 22		5 22
Start Time (MST):	12	:10	End Time (MST):	16:	51
Analyzer make:	Thern	no 55i	Analyzer serial #:	11727	50023
		Calibra	tion Data		
Calculated concentration Ir (ppm) (Cc)	ration Indicated concentration (ppm) (Ic) Correction factor (Cc/Ic)		Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999976	≥0.995
9.15	9.11	1.0036		0.555570	
4.57	4.53 2.25	1.0098 1.0207	Slope	0.997466	0.90 - 1.10
	2.25	1.0207	Intercept	-0.020822	+/-0.5
			tion Course		
10.0		NMHC Calibra	tion Curve		
10.0					
9.0					•
8.0					
7.0					
E 6.0					
0.0 bbm 0.0 c 0.0 c 0.0 d 0.0 d					
Co					
0.4 de					
. 3.0					
2.0					
1.0					
0.0					
0.0	2.0	4.0	6.0	8.0	10.0
		Calculated	l Conc. (ppm)		





Station Name:

Calibration Date:

Start time (MST):

Janvier

12:16

January 26, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station number: AMS 22 Last Cal Date: December 1, 2022 End time (MST): 17:52

		Calib	ration Standards		
NO Gas Cylinder #:	CC424183		Cal Gas Expiry Date:	April 16, 2023	
NOX Cal Gas Conc:	48.60	ppm	NO Cal Gas Conc:	48.60	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	48.60	ppm	Removed Gas NO Conc:	48.60	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3806	
ZAG make/model:	Teledyne API T701		Serial Number:	4890	

Analyzer make: NOX Range (ppb):	Teledyne API T200 0 - 1000 ppb		Analyzer serial #: 71		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.018	1.015	NO bkgnd or offset:	0.0	-0.3
NOX coeff or slope:	1.007	1.004	NOX bkgnd or offset:	0.3	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	5.0	5.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.003274	1.004514
NO _x Cal Offset:	0.187776	-0.271695
NO Cal Slope:	1.003586	1.003357
NO Cal Offset:	-0.871493	-0.891348
NO ₂ Cal Slope:	1.001086	0.999938
NO ₂ Cal Offset:	0.486335	0.560426



$NO_X \setminus NO \setminus NO_2$ 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	0.9	-0.2	1.0		
as found span	4918	82.3	799.9	799.9	0.0	795.6	791.7	4.0	1.0054	1.0104
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high point	4918	82.3	799.9	799.9	0.0	803.6	802.2	1.5	0.9954	0.9971
second point	4959	41.2	400.4	400.4	0.0	401.1	400.3	0.9	0.9984	1.0004
third point	4980	20.6	200.2	200.2	0.0	201.2	199.2	2.0	0.9951	1.0051
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2		
as left span	4918	82.3	799.9	411.7	388.2	796.0	409.1	386.9	1.0049	1.0064
							Average C	orrection Factor	0.9963	1.0009
Corrected As fo	ound NO _x =	794.7 ppb	NO =	791.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-1.0%
Previous Respo	onse NO _x =	802.7 ppb	NO =	801.9 ppb				*Percent Chan	ge NO =	-1.3%
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	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO_2 Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	797.7	409.5	388.2	388.5	0.9992	100.1%
2nd GPT point (200 ppb O3)	797.7	605.4	192.3	192.9	0.9969	100.3%
3rd GPT point (100 ppb O3)	797.7	700.8	96.9	98.3	0.9858	101.4%
				Average Correction Factor	0.9940	100.6%

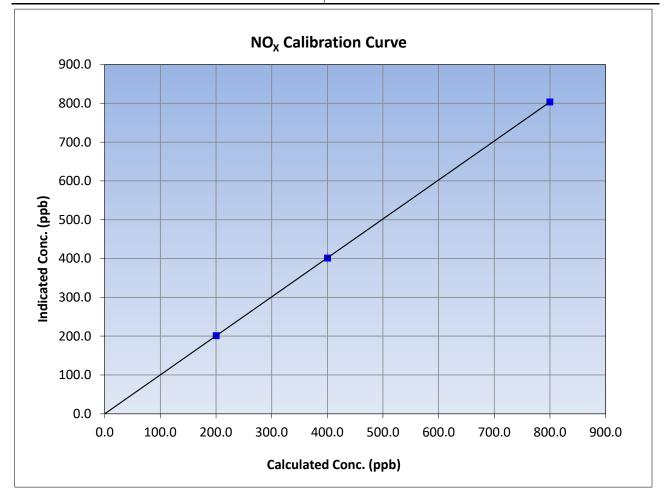
Notes: Changed the inlet filter after as founds. Changed out the Purafil and charcoal scrubber canisters on the ZAG. Adjusted both zero and span.

Calibration Performed By:



NO_x Calibration Summary

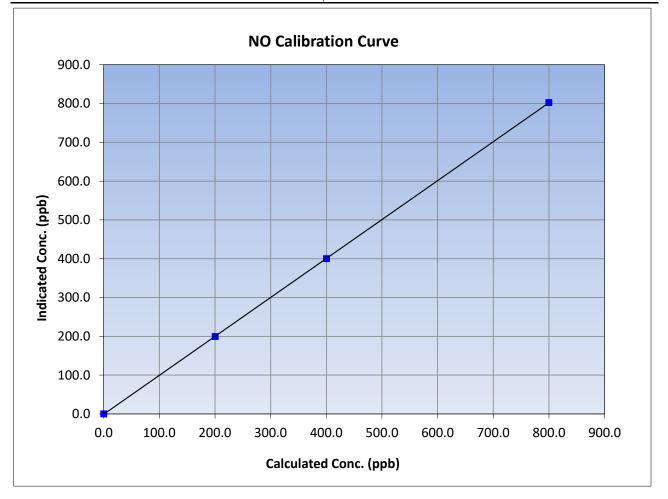
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	January 26, 2023		Previous Calibration: Dece		er 1, 2022	
Station Name:	Janvier		Station Number:	AN	1S 22	
Start Time (MST):	12:16		End Time (MST):	17	7:52	
Analyzer make:	Teledyne API T200		Analyzer serial #: 71		117	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999997	≥0.995	
799.9	803.6	0.9954	correlation coernelent	0.555557	20.333	
400.4	401.1	0.9984	Slope	1.004514	0.90 - 1.10	
200.2	201.2	0.9951	Slope	1.004514	0.90 - 1.10	
			Intercept	-0.271695	+/-20	





NO Calibration Summary

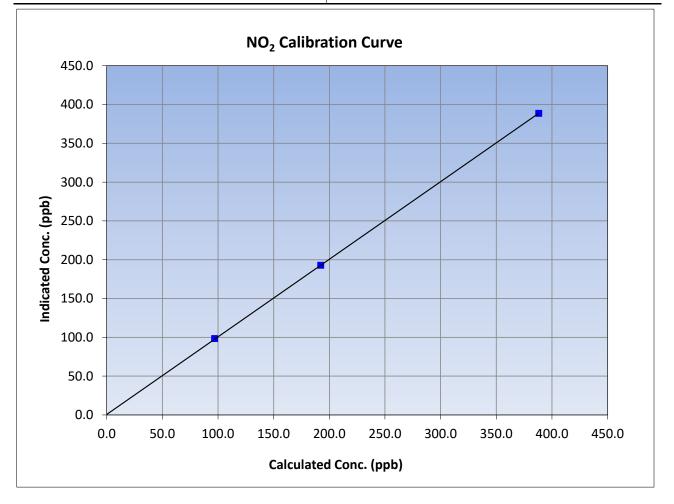
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	January	January 26, 2023		Decemb	oer 1, 2022	
Station Name:	Janvier		Station Number:	AN	VIS 22	
Start Time (MST):	12:16		End Time (MST):	1	7:52	
Analyzer make:	Teledyne API T200		Analyzer serial #: 71:		117	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999994	≥0.995	
799.9	802.2	0.9971	correlation coefficient	0.5555554	20.333	
400.4	400.3	1.0004	Slope	1.003357	0.90 - 1.10	
200.2	199.2	1.0051	Slope	1.003357	0.90 - 1.10	
			Intercept	-0.891348	+/-20	

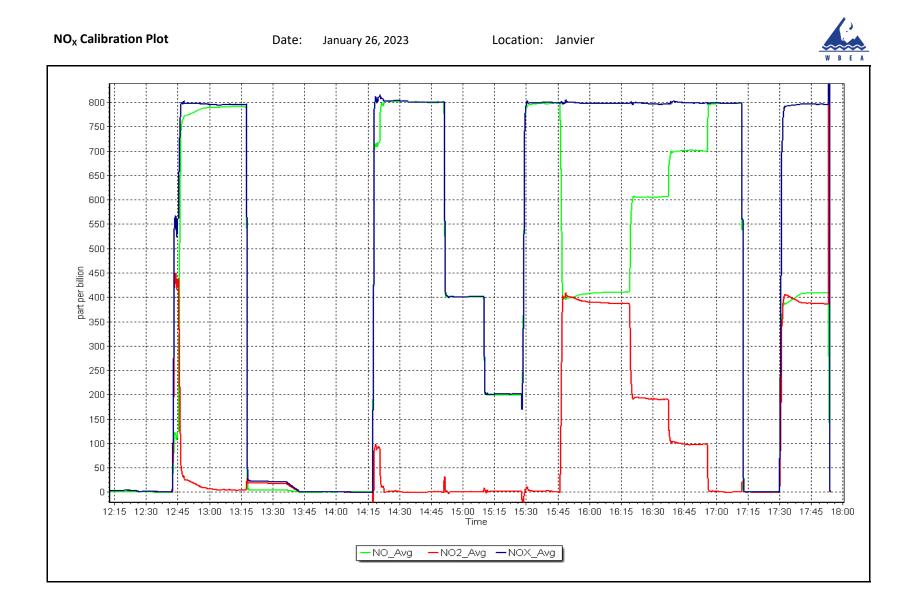




NO₂ Calibration Summary

WBEA					Version-04-202	
		Station	Information			
Calibration Date:	January 26, 2023		Previous Calibration:	Decem	ber 1, 2022	
Station Name:	Janvier		Station Number:	AN	VIS 22	
Start Time (MST):	12:16		End Time (MST):	1	7:52	
Analyzer make:	Teledyne API T200		Analyzer serial #: 71		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	0.999985	≥0.995	
388.2	388.5	0.9992	correlation coernelent	0.555505	20.000	
192.3	192.9	0.9969	Slope	0.999938	0.90 - 1.10	
96.9	98.3	0.9858	Slope	0.999958	0.90 - 1.10	
			Intercept	0.560426	+/-20	







O₃ Calibration Report

Version-01-2020

					Version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Janvier January 25, 2023 11:15 Routine		Station number: Last Cal Date: End time (MST):	December 16, 2022	
		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 9 - 500 ppb		Analyzer serial #:	3869	
Calibration slope: Calibration intercept:	<u>Start</u> 0.998686 0.480000	<u>Finish</u> 0.998486 0.240000	Backgd or Offset: Coeff or Slope:	<u>Start</u> -2.0 1.011	<u>Finish</u> -2.0 1.011
		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/Id Limit = 0.95-1.05
as found zero	5000	800.0	0.0	0.0	
as found span	4893	892.5	400.0	398.4	1.004
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.1	
high point	4893	892.5	400.0	399.6	1.001
second point	4893	747.3	200.0	199.9	1.001
third point	4893	648.9	100.0	100.3	0.997
as left zero	5000	800.0	0.0	0.4	
as left span	4816	892.5	400.0	401.0	0.998
			Averag	ge Correction Factor	1.000
Baseline Corr As found:	398.4	Previous response	400.0	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By:

Rene Chamberland

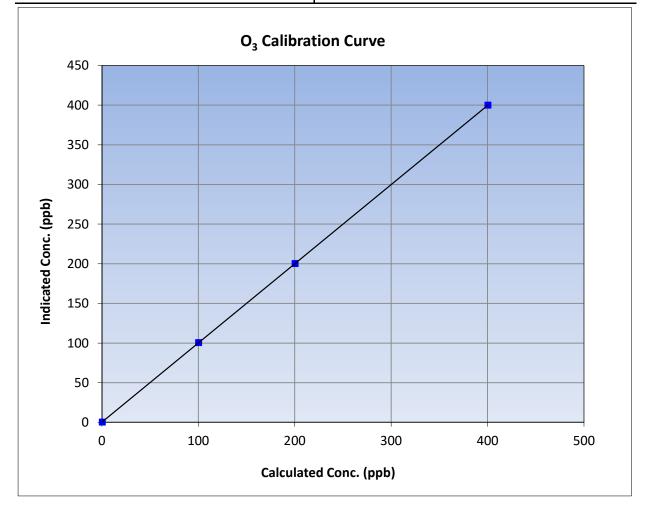


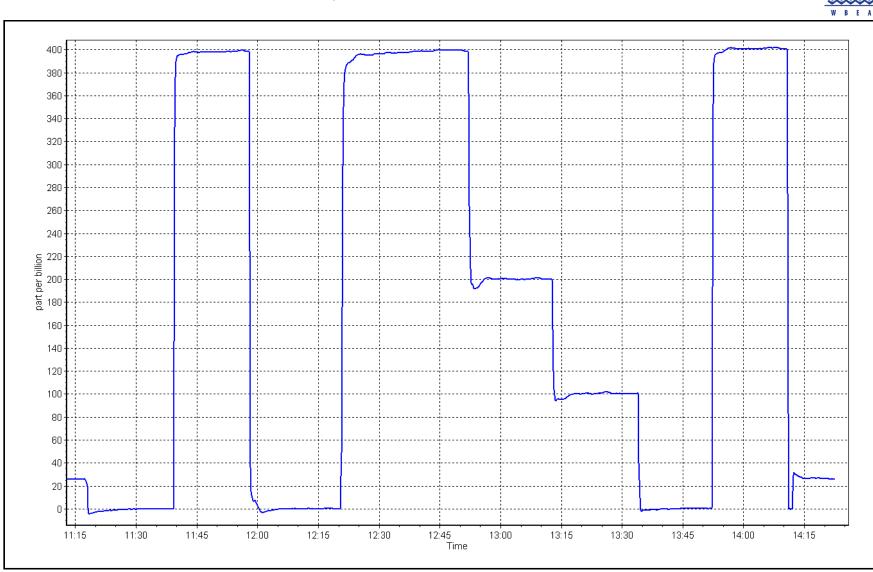
O₃ Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	January 25, 2023	Previous Calibration:	December 16, 2022					
Station Name:	Janvier	Station Number:	AMS 22					
Start Time (MST):	11:15	End Time (MST):	14:12					
Analyzer make:	Teledyne API T400	Analyzer serial #:	3869					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999999	≥0.995
400.0	399.6	1.0010	correlation coefficient	0.9999999	20.995
200.0	199.9	1.0005	Slope	0.998486	0.90 - 1.10
100.0	100.3	0.9970	Slope	0.998480	0.30 - 1.10
			Intercept	0.240000	+/- 5





Location: Janvier





T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Janvier January 26, 2023 14:47		Station number: AMS Last Cal Date: Dec End time (MST): 16:2	ember 16, 2022	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 325		
Flow Meter Make/Model: Temp/RH standard:	Delta Cal Delta Cal		S/N: 145 S/N: 145		
		Monthly Calibration	Test		
Parameter T (°C) P (mmHg)	<u>As found</u> -3.4 715.1	<u>Measured</u> -2.7 713.2	<u>As left</u> -3.4 715.1	Adjusted	<i>(Limits)</i> +/- 2 °C +/- 10 mmHg
flow (LPM) Leak Test:	5.01 Date of check: _ PM w/o HEPA: _	5.06 January 26, 2023 2.8	5.01 PM w/ HEPA:	cember 16, 2022 0.0	+/- 0.25 LPM
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	n Test		
<u>Parameter</u> PMT Peak Test	As found 10.1	Measured	<u>As left</u> 11.0	<u>Adjusted</u> ☑	(Limits) 10.9 +/- 0.5
Date Optical Cham Disposable Filte		January 26 January 26			
		Annual Maintena	nce		
Date Sample Tul	be Cleaned:	October 6	, 2022		
Date RH/T Sense	or Cleaned:	October 6	, 2022		
Notes:	Verified flow, tempera		: passed. PMT peak voltage adj d and disposable filter changec		85V. Optical
Calibration by:	Rene Chamberland				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS23 FORT HILLS JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills January 4, 2023 10:43 Routine		Station number: Last Cal Date: End time (MST):	AMS23 December 5, 2022 13:50	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	49.76 CC281425	ppm	Cal Gas Exp Date:	January 5, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #:	49.76 N/A	ppm	Rem Gas Exp Date: Diff between cyl:	N/A	
Calibrator Make/Model:	API T700		Serial Number:	451	
ZAG Make/Model:	API T701		Serial Number:	5611	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1160290012	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.992999	0.999236	Backgd or Offset:		18.1
Calibration intercept:	-0.521973	-0.603450	Coeff or Slope:	1.036	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 C (ppb) (Ic)	Correction factor (Cc/le Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.4	
as found span	4920	80.3	799.1	788.2	1.014
as found 2nd point					
as found 3rd point					
new cylinder response	5000				
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	80.3	799.1	798.1	1.001
second point	4960	40.2	400.1	399.2	1.002
third point as left zero	4980	20.1	200.0	<u>198.3</u> 0.0	1.009
as left span	5000 4920	80.3	799.1	801.3	0.997
as ieit spall	4920	00.5		ge Correction Factor	1.004
Baseline Corr As found:	787.80	Previous response	792.98	*% change	-0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	-
	NA	AF Correlation:			

Notes:

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

Calibration Performed By:

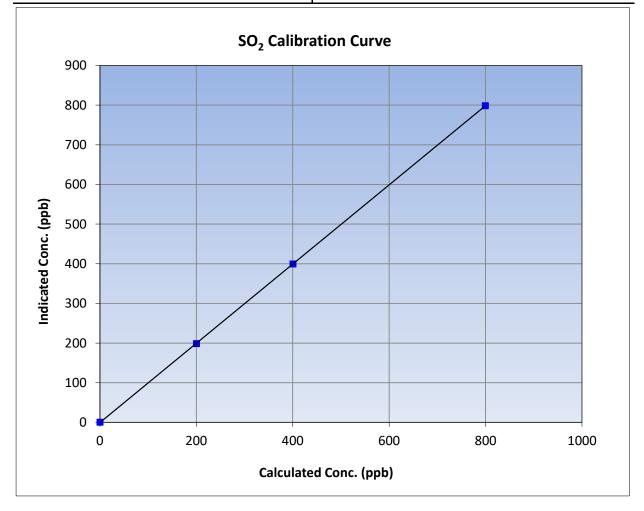


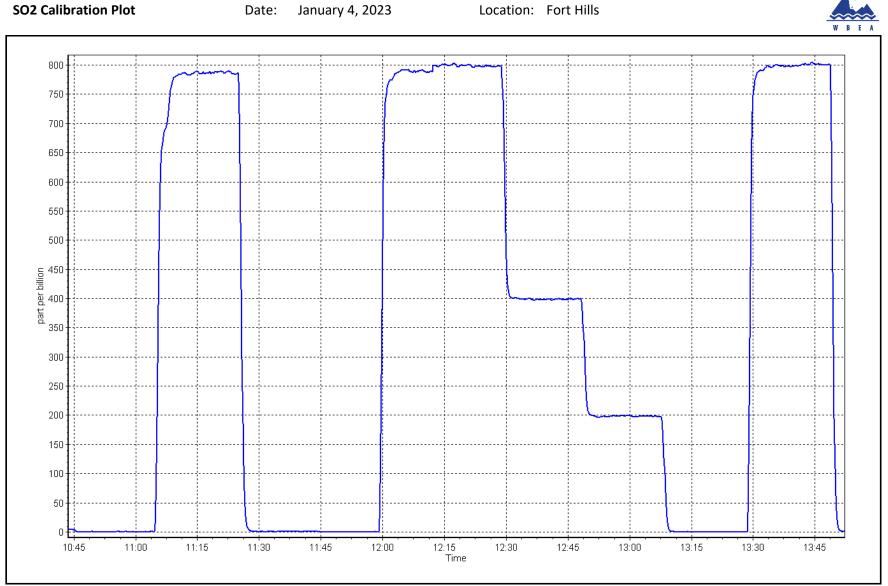
SO₂ Calibration Summary

Station Information							
Calibration Date:	January 4, 2023	Previous Calibration:	December 5, 2022				
Station Name:	Fort Hills	Station Number:	AMS23				
Start Time (MST):	10:43	End Time (MST):	13:50				
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290012				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999996	≥0.995
799.1	798.1	1.0013	correlation coefficient	0.999990	20.335
400.1	399.2	1.0021	Slope	0.999236	0.90 - 1.10
200.0	198.3	1.0087	Slope	0.999230	0.30 - 1.10
			Intercept	-0.603450	+/-30







TRS Calibration Report

					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills January 10, 2023 11:01 Routine		Station number: Last Cal Date: End time (MST):	AMS23 December 8, 2022 14:52	
		Calibration S	tandards		
Cal Gas Concentration:	5.20	ppm	Cal Gas Exp Date:	February 5, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc:	CC517372 5.20	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	N/A		Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701		Serial Number: Serial Number:	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	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.000594	0.988739	Backgd or Offset:	0.96	0.96
Calibration intercept:	0.442079	0.581876	Coeff or Slope:	0.714	0.714
		H ₂ S/TRS As Fo	ound 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	79.1	1.013
as found 2nd point	4962	38.5	40.0	39.4	1.018
as found 3rd point	4981	19.2	19.9	19.6	1.023
new cylinder response					
new cylinder response			ation Data		
		H ₂ S/TRS Calibr			
Set Point	Dilution air flow rate (sccm)	H ₂ S/TRS Calibr Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	(Cc/Ic)
		Source gas flow rate	Calculated concentration (ppb)		(Cc/Ic)
Set Point	(sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	concentration (ppb) (Ic)	(Cc/Ic) Limit = 0.95-1.05
Set Point calibrator zero	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated concentration (ppb) (Cc) 0.0	concentration (ppb) (Ic) 0.1	(Cc/Ic) Limit = 0.95-1.05
Set Point calibrator zero high point	(sccm) 5000 4923	Source gas flow rate (sccm) 0.0 77.0	Calculated concentration (ppb) (Cc) 0.0 80.0	concentration (ppb) (Ic) 0.1 79.4	(Cc/Ic) Limit = 0.95-1.05 1.008
Set Point calibrator zero high point second point	(sccm) 5000 4923 4962	Source gas flow rate (sccm) 0.0 77.0 38.5	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0	concentration (ppb) (Ic) 0.1 79.4 40.5	(Cc/lc) Limit = 0.95-1.05 1.008 0.988
Set Point calibrator zero high point second point third point as left zero as left span	(sccm) 5000 4923 4962 4981 5000 4923	Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0	concentration (ppb) (IC) 0.1 79.4 40.5 20.7 1.4 80.9	(Cc/lc) Limit = 0.95-1.05 1.008 0.988 0.964
Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check	(sccm) 5000 4923 4962 4981 5000 4923 4922	Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0	concentration (ppb) (Ic) 0.1 79.4 40.5 20.7 1.4 80.9 0.1	(Cc/lc) Limit = 0.95-1.05 1.008 0.988 0.964
Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check vate of last scrubber cha	(sccm) 5000 4923 4962 4981 5000 4923 4922 ange:	Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0	concentration (ppb) (IC) 0.1 79.4 40.5 20.7 1.4 80.9	(Cc/lc) Limit = 0.95-1.05 1.008 0.988 0.964 0.989 0.986
Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check Date of last scrubber cha	(sccm) 5000 4923 4962 4981 5000 4923 4922 ange:	Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0	concentration (ppb) (Ic) 0.1 79.4 40.5 20.7 1.4 80.9 0.1	Limit = 0.95-1.05
Set Point calibrator zero high point second point third point as left zero	(sccm) 5000 4923 4962 4981 5000 4923 4922 ange:	Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0 783.0	concentration (ppb) (Ic) 0.1 79.4 40.5 20.7 1.4 80.9 0.1	(Cc/lc) Limit = 0.95-1.05 1.008 0.988 0.964 0.989 0.986
Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check Date of last scrubber cha Date of last converter ef	(sccm) 5000 4923 4962 4981 5000 4923 4922 ange: ficiency test:	Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0 78.3	Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0 783.0 80.49	concentration (ppb) (Ic) 0.1 79.4 40.5 20.7 1.4 80.9 0.1 Ave Corr Factor	(Cc/lc) Limit = 0.95-1.05 1.008 0.988 0.964 0.989 0.986 efficiency

Notes:

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

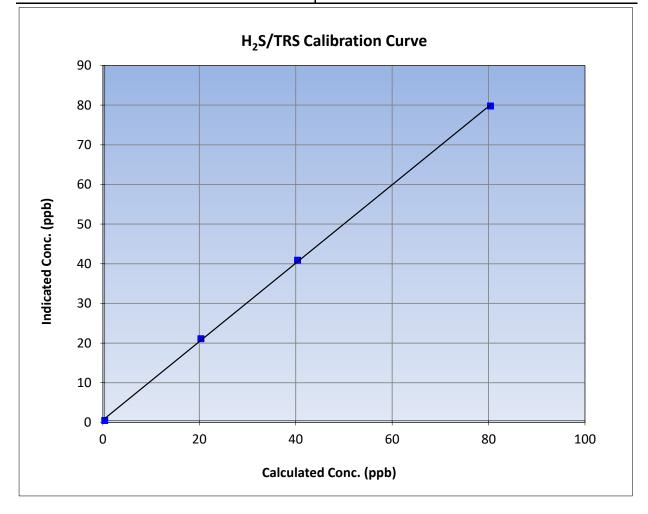


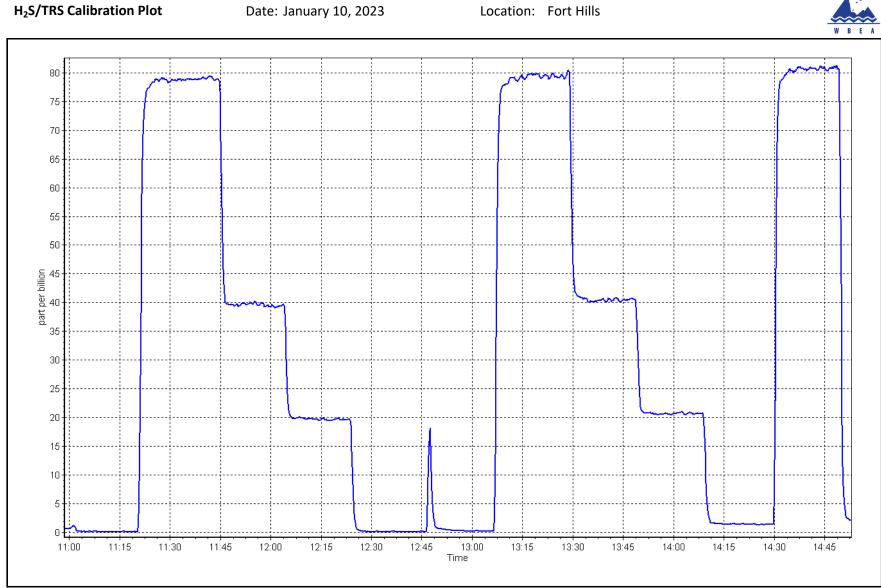
H₂S/TRS Calibration Summary

WBEA			Version-11-2021						
Station Information									
Calibration Date:	January 10, 2023	Previous Calibration:	December 8, 2022						
Station Name:	Fort Hills	Station Number:	AMS23						
Start Time (MST):	11:01	End Time (MST):	14:52						
Analyzer make:	Thermo 43iQ TLE	Analyzer serial #:	12113311965						

Calibration Data

Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999823	≥0.995
80.0	79.4	1.0076	correlation coefficient	0.999823	20.333
40.0	40.5	0.9876	Slope	0.988739	0.90 - 1.10
19.9	20.7	0.9637	Slope	0.988739	0.90 - 1.10
			Intercept	0.581876	+/-3





Location: Fort Hills



THC / CH_4 / NMHC Calibration Report

W B E A					Version-01-2020
		Sta	tion Information		
Station Name:	Fort Hills		Station number: AN	VIS23	
Calibration Date:	January 4, 202	3	Last Cal Date: De	ecember 5, 202	2
Start time (MST):	10:43		End time (MST): 13	:50	
Reason:	Routine				
		Calil	oration Standards		
Gas Cert Reference:		CC281425	Cal Gas Expiry Date: Ja	nuary 5, 2025	
CH4 Cal Gas Conc.	500.2	ppm	CH4 Equiv Conc.	1070.6	ppm
C3H8 Cal Gas Conc.	207.4	ppm			
Removed Gas Cert:		N/A	Removed Gas Expiry: N/	Ά	
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	
		Ana	lyzer Information		
Analyzer make:	Thermo 55i		Analyzer serial #: 11	93585648	
THC Range (ppm):					
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0 -	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.28E-04	2.33E-0	NMHC SP Ratio:	5.04E-05	5.01E-05
CH4 Retention time:	13.0	13.0	NMHC Peak Area:	182523	180258

THC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	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	4920	80.3	17.19	17.03	1.010			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.3	17.19	17.38	0.989			
second point	4960	40.2	8.61	8.65	0.995			
third point	4980	20.1	4.30	4.33	0.994			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.3	17.19	17.35	0.991			
			А	verage Correction Factor	0.993			
Baseline Corr AF:	17.03	Prev response	17.22	*% change	-1.1%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation				



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.00				
as found span	4920	80.3	9.16	9.09	1.008			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.3	9.16	9.21	0.995			
second point	4960	40.2	4.59	4.64	0.988			
third point	4980	20.1	2.29	2.34	0.981			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.3	9.16	9.19	0.996			
			A	Average Correction Factor	0.988			
Baseline Corr AF:	9.09	Prev response	9.18	*% change	-1.0%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>				

СН4	Cal	ibration	Data
CH4	Ca	INIALIOII	Dala

CH4 Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.00				
as found span	4920	80.3	8.03	7.94	1.011			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.3	8.03	8.17	0.984			
second point	4960	40.2	4.02	4.01	1.003			
third point	4980	20.1	2.01	2.00	1.008			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.3	8.03	8.16	0.985			
			А	verage Correction Factor	0.998			
Baseline Corr AF:	7.94	Prev response	8.04	*% change	-1.3%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation			
		Calibration	Statistics					
		<u>Start</u>		<u>Finish</u>				
THC Cal Slope:		1.002403		1.010672				
THC Cal Offset:		-0.010188		-0.017415				
CH4 Cal Slope:		1.004851		1.017425				
CH4 Cal Offset:		-0.027043		-0.035257				
NMHC Cal Slope:		1.000606		1.004438				
NMHC Cal Offset:		0.016455		0.018841				

Notes:

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

Calibration Performed By:

Max Farrell



THC Calibration Summary

		Station I	nformation		
Calibration Date:	January	January 4, 2023		Decembe	r 5, 2022
Station Name:	Fort	: Hills	Station Number:	AM	S23
Start Time (MST):	10	:43	End Time (MST):	13:	50
Analyzer make:	Therr	mo 55i	Analyzer serial #:	11935	85648
		Calibra	ition Data		
Calculated concentrat (ppm) (Cc)	ated concentration Indicated concentration				<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999990	≥0.995
17.19	17.38	0.9895			
8.61 4.30	<u>8.65</u> 4.33	0.9952	Slope	1.010672	0.90 - 1.10
		0.5557	Intercept	-0.017415	+/-0.5
20.0 - 18.0 -		THC Calibratio			
16.0					
14.0 -					
ີ ແມ່ 12.0 - ເມັນ 10.0 - ເບັນ 10.0 -					
– 0.8 – 0.6 –					
- 4.0 -					
2.0 -					
0.0					
0.	0 5	.0		15.0	20.0
		Calculated	l Conc. (ppm)		



CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	January	4, 2023	Previous Calibration:	Decembe	r 5, 2022
tation Name:		Hills	Station Number:	AM	
itart Time (MST):	10	:43	End Time (MST):	13:	50
Analyzer make:		no 55i	Analyzer serial #:	11935	
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	(ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999877	≥0.995
8.03	8.17 4.01	0.9838			
2.01	2.00	1.0031	Slope	1.017425	0.90 - 1.10
		1.0075	Intercept	-0.035257	+/-0.5
7.0 6.0 (mag 5.0					
Conc.					
0.6 Indicated					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0

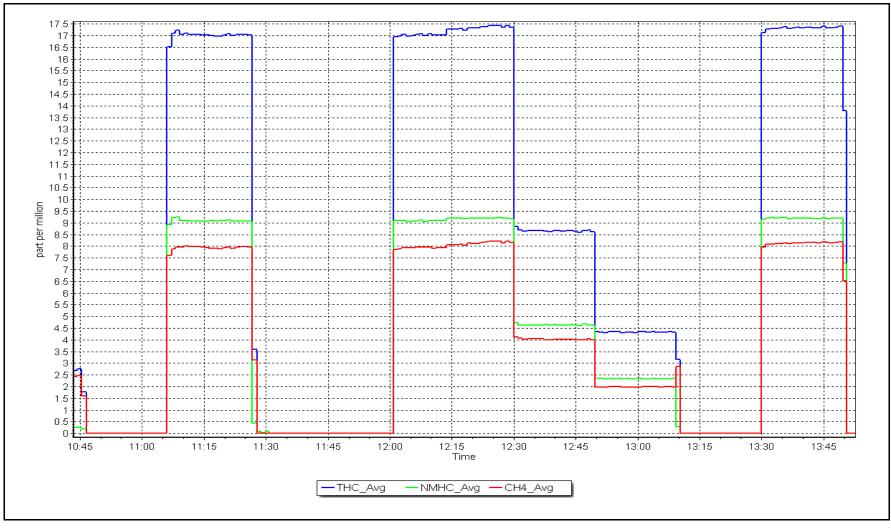


NMHC Calibration Summary

			Station	Information			
Calibration D	ate:	ate: January 4, 2023 Pro			libration:	Decembe	r 5, 2022
Station Name	e:	Fo	ort Hills	Station Number:		AMS	523
Start Time (N	/IST):		10:43	End Tim	ne (MST):	13:	50
Analyzer mak	ke:	The	ermo 55i	Analyze	r serial #:	11935	85648
			Calibra	ation Data			
Calculated conce (ppm) (C		on Indicated concentratic (ppm) (Ic)	on Correction factor (Cc/Ic)		Statistical Evalu	ation	<u>Limits</u>
0.00		0.00		Correlation Co	oefficient	0.999979	≥0.995
9.16		9.21	0.9948		Jenneient	0.555575	
4.59		4.64	0.9880	Slope	9	1.004438	0.90 - 1.10
		2.34	0.5815	– Interce	pt	0.018841	+/-0.5
			NMHC Calibra	ition Curve	9		
10.	0						
9.	0 -						
8.	0 -						
7.	0 -				/		
(udd 6.	0 -						
-) : 5.	0 -						
Indicated Conc. (ppm) .5 .5 .5 .5	0 +						
1 udi 3.	0 +						
2.	0 +						
1.	0 +						
0.	0	0 2.0	4.0	6.	0	8.0	10.0
	0.	. 2.0		d Conc. (ppm		0.0	10.0









THC / CH_4 / NMHC Calibration Report

WBEA						Version-01-202	
			Station	Information			
Station Name:	Fort Hills			Station number: AN			
Calibration Date:	January 18, 20	023		Last Cal Date: Ja	nuary 4, 2023		
Start time (MST):	10:24			End time (MST): 14	:24		
Reason:	Maintenance						
			Calibrati	on Standards			
Gas Cert Reference:		CC281425		Cal Gas Expiry Date: Ja	nuary 5, 2025		
CH4 Cal Gas Conc.	500.2	ppm		CH4 Equiv Conc.	1070.6	ppm	
C3H8 Cal Gas Conc.	207.4	ppm					
Removed Gas Cert:		N/A		Removed Gas Expiry: N/	Ά		
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	1		
ZAG make/model:	API T701			Serial Number: 56	11		
			Analyze	r Information			
Analyzer make	: Thermo 55i			Analyzer serial #: 11	93585648		
THC Range (ppm)	: 0 - 20 ppm						
NMHC Range (ppm)	: 0 - 10 ppm			CH4 Range (ppm): 0	· 10 ppm		
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio	: 2.33E-04	2	.33E-04	NMHC SP Ratio:	5.01E-05	5.01E-05	
CH4 Retention time	: 13.0		13.0	NMHC Peak Area:	180258	180258	

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	17.19	14.50	1.185
as found 2nd point	4960	40.2	8.61	7.15	1.203
as found 3rd point	4980	20.1	4.30	3.65	1.180
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	17.19	17.17	1.001
second point	4960	40.2	8.61	8.61	1.000
third point	4980	20.1	4.30	4.31	0.999
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.19	17.28	0.995
			Aver	rage Correction Factor	1.000
Baseline Corr AF:	14.50	Prev response	17.36	*% change	-19.7%
Baseline Corr 2nd AF:	7.2	AF Slope:	0.842506	AF Intercept:	-0.014862
Baseline Corr 3rd AF:	3.6	AF Correlation:	0.999919	* = > +/-5% change 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	0.00	0.00		
as found span	4920	80.3	9.16	7.54	1.214	
as found 2nd point	4960	40.2	4.59	3.74	1.225	
as found 3rd point	4980	20.1	2.29	1.93	1.186	
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	80.3	9.16	9.13	1.003	
second point	4960	40.2	4.59	4.60	0.996	
third point	4980	20.1	2.29	2.33	0.985	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.3	9.16	9.17	0.999	
			Aver	age Correction Factor	0.995	
Baseline Corr AF:	7.54	Prev response	9.22	*% change	-22.2%	
Baseline Corr 2nd AF:	3.7	AF Slope:	0.821429	AF Intercept:	0.011089	
Baseline Corr 3rd AF:	1.9	AF Correlation:	0.999905	* = > +/-5% change initiat	es investigation	

CH4 Calibration Data

		CH4 Calibra	lion Dala		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	8.03	6.96	1.154
as found 2nd point	4960	40.2	4.02	3.41	1.179
as found 3rd point	4980	20.1	2.01	1.71	1.174
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	8.03	8.04	0.999
second point	4960	40.2	4.02	4.01	1.004
third point	4980	20.1	2.01	1.98	1.015
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.03	8.12	0.990
			Aver	age Correction Factor	1.006
Baseline Corr AF:	6.96	Prev response	8.14	*% change	-16.9%
Baseline Corr 2nd AF:	3.41	AF Slope:	0.866538	AF Intercept:	-0.025951
Baseline Corr 3rd AF:	1.71	AF Correlation:	0.999869	* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		1.010672		0.998822	
THC Cal Offset:		-0.017415		0.006016	
CH4 Cal Slope: 1.0		1.017425	1.001922		
CH4 Cal Offset: -0.03525		-0.035257		-0.016245	
NMHC Cal Slope:		1.004438		0.996115	
NMHC Cal Offset:		0.018841		0.022460	

Notes:

Due to pump failure low as founds. Swapped out the pump and the inlet filter after multipoint as founds. No adjustments needed.

Calibration Performed By:



THC Calibration Summary

		Station I	nformation		
Calibration Date:		January 18, 2023		January	
Station Name:	me: Fort Hills		Station Number:	AM	
Start Time (MST):		:24	End Time (MST):	14:	
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 17.19	0.00 17.17	1.0010	Correlation Coefficient	0.999999	≥0.995
8.61 4.30	8.61 4.31	0.9999	Slope	0.998822	0.90 - 1.10
4.50	4.31	0.3387	Intercept	0.006016	+/-0.5
20.0					
18.0 -					
16.0 -				_	
10.0					
14.0 -					
E 12.0 -					
ີ ແມ່ 12.0 - ອີນ ເບິ່ງ ອີນ 10.0 -					
Cor - 0.8 gd					
– 0.8 – - 0.6 –					
4.0 -					
2.0 -					
2.0 - 0.0 -		.0			



CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	Januar	y 18, 2023	Previous Calibration:	January	4, 2023
station Name:	Fo	Fort Hills		AM	S23
Start Time (MST):	1	.0:24	End Time (MST):	14:	24
Analyzer make:	The	rmo 55i	Analyzer serial #:	11935	85648
		Calibra	tion Data		
Calculated concentratic (ppm) (Cc)	on Indicated concentratior (ppm) (Ic)	n Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999981	≥0.995
8.03	8.04	0.9991 1.0041			
2.01	1.98	1.0145	Slope	1.001922 <i>0.90 - 1.1</i>	
			Intercept	-0.016245	+/-0.5
8.0 7.0 6.0					
(bbm) 5.0 5.0 4.0					
ndicated 0.6					
– 2.0 –					
1.0 -					
0.0) 2.0	4.0	6.0	8.0	10.0



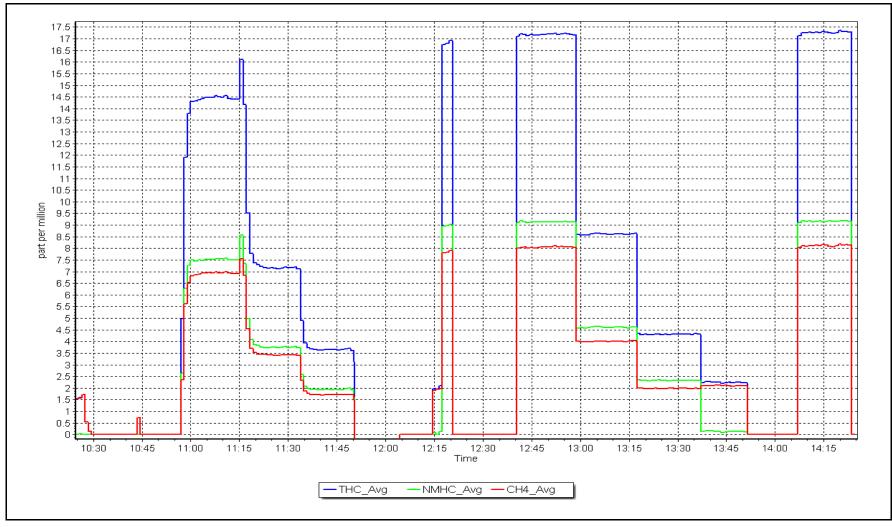
NMHC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	January	18, 2023	Previous Calibration:	January	4, 2023
Station Name:	For	: Hills	Station Number:	AMS	S23
Start Time (MST):	rt Time (MST): 10:24		End Time (MST):	14:	24
Analyzer make:	Ther	mo 55i	Analyzer serial #:		85648
		Calibra	tion Data		
Calculated concentration Ir (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999972	≥0.995
9.16 4.59	9.13 4.60	1.0028 0.9960			
2.29	2.33	0.9853	Slope	0.996115	0.90 - 1.10
			Intercept	0.022460	+/-0.5
9.0 8.0 7.0					•
Indicated Conc. (bbm) 0.0 0.0 0.0 0.0 0.0 0.0					
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	d Conc. (ppm)		

NMHC Calibration Plot







Station Name:

Calibration Date:

Start time (MST):

Fort Hills

10:04

January 24, 2023

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station number: AMS23 Last Cal Date: December 7, 2022 End time (MST): 15:17

		Calib	ration Standards		
NO Gas Cylinder #:	CC332703		Cal Gas Expiry Date: Jan	uary 28, 2024	4
NOX Cal Gas Conc:	49.7	ppm	NO Cal Gas Conc:	49.7	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date: N/	4	
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 T751F	ł	Serial Number:	307	

		,			
Analyzer make: T NOX Range (ppb): 0			Analyzer serial #:	1152430007	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.501	1.527	NO bkgnd or offset:	4.2	4.3
NOX coeff or slope:	0.995	0.997	NOX bkgnd or offset:	4.6	4.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	221.4	225.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.994625	0.999637
NO _x Cal Offset:	-0.277404	0.644160
NO Cal Slope:	0.996641	0.999282
NO Cal Offset:	-1.157676	-0.256715
NO ₂ Cal Slope:	0.992164	1.001046
NO ₂ Cal Offset:	-0.103647	0.284247



$NO_X \setminus NO \setminus NO_2$ 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	0.1	-0.2		
as found span	4920	80.5	800.2	800.2	0.0	787.7	786.0	1.7	1.016	1.018
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.2		
high point	4920	80.5	800.2	800.2	0.0	799.9	799.5	0.4	1.000	1.001
second point	4960	40.2	399.6	399.6	0.0	401.2	399.0	2.2	0.996	1.001
third point	4980	20.1	199.8	199.8	0.0	200.6	198.8	1.8	0.996	1.005
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.3		
as left span	4920	80.5	800.2	436.5	363.7	802.5	435.9	366.6	0.997	1.001
							Average C	orrection Factor	0.997	1.002
Corrected As fo	ound NO _x =	787.9 ppb	NO =	785.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-1.0%
Previous Respo	onse NO _X =	795.6 ppb	NO =	796.3 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/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	432.3	363.7	364.0	0.999	100.1%
2nd GPT point (200 ppb O3)	796.0	617.2	178.8	179.9	0.994	100.6%
3rd GPT point (100 ppb O3)	796.0	704.4	91.6	92.2	0.993	100.7%
			ŀ	Average Correction Factor	0.996	100.5%

Notes:

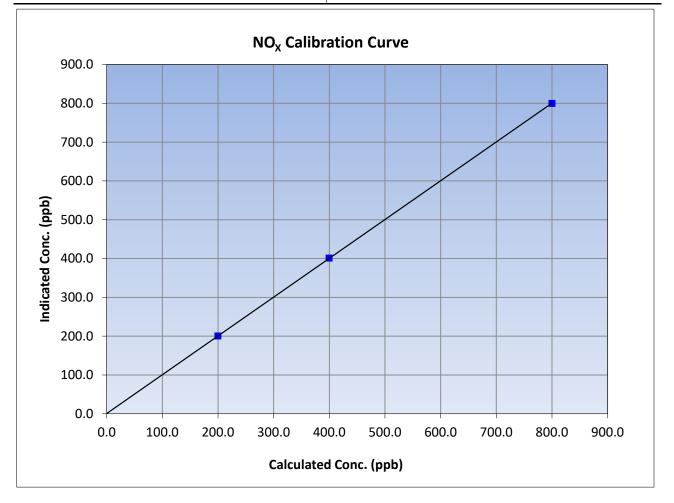
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

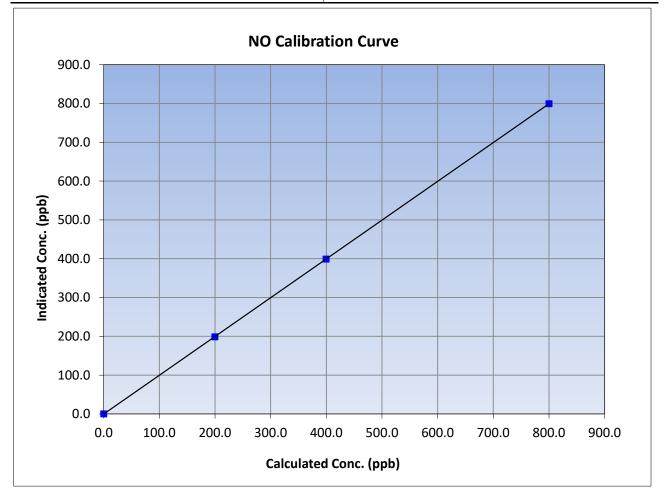
WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	er 7, 2022
Station Name:	ion Name: Fort Hills		Station Number:	AM	S23
Start Time (MST):	rt Time (MST): 10:04		End Time (MST):	15	:17
Analyzer make:	Therr	no 42i	Analyzer serial #:		30007
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999994	≥0.995
800.2	799.9	1.0003	correlation coernelent	0.5555554	20.333
399.6	401.2	0.9959	Slope	0.999637	0.90 - 1.10
199.8	200.6	0.9960	Slope	0.999057	0.90 - 1.10
			Intercept	0.644160	+/-20





NO Calibration Summary

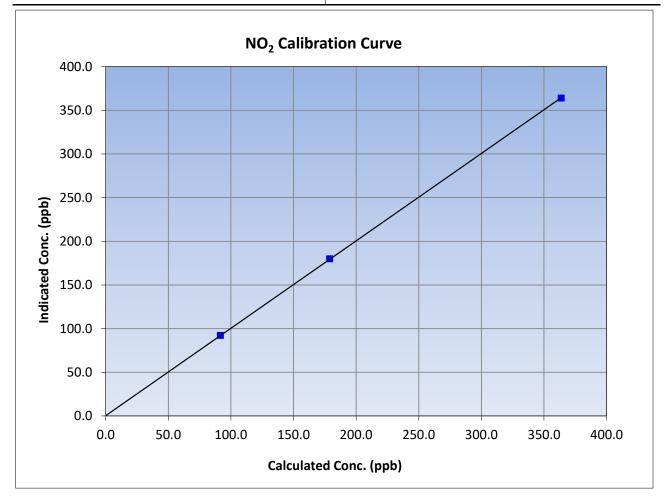
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	er 7, 2022
Station Name:	ation Name: Fort Hills		Station Number:	AM	S23
Start Time (MST):	t Time (MST): 10:04		End Time (MST):	15	:17
Analyzer make:	Therr	Thermo 42i Analyzer serial #: 1		11524	30007
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999998	≥0.995
800.2	799.5	1.0008	correlation coefficient	0.9999998	20.999
399.6	399.0	1.0014	Slope	0.999282	0.90 - 1.10
199.8	198.8	1.0050	Slope	0.999282	0.90 - 1.10
			Intercept	-0.256715	+/-20

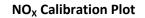




NO₂ Calibration Summary

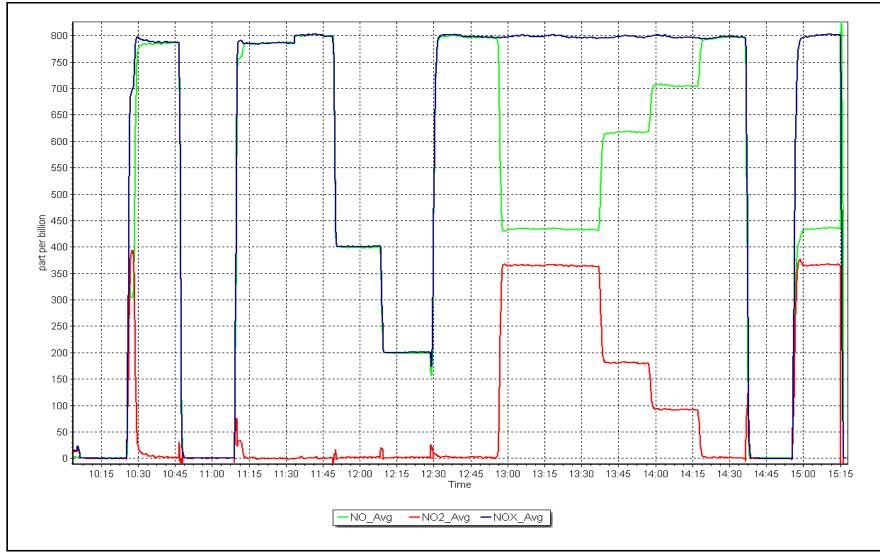
WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	24, 2023	Previous Calibration:	Decembe	er 7, 2022
Station Name:	ation Name: Fort Hills		Station Number:	AM	S23
Start Time (MST):	Time (MST): 10:04 End T		End Time (MST):	d Time (MST): 15	
Analyzer make:	Therr	no 42i	Analyzer serial #:	Analyzer serial #: 115243000	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999989	≥0.995
363.7	364.0	0.9992	correlation coernelent	0.555565	20.333
178.8	179.9	0.9939	Clana	1.001046	0.90 - 1.10
91.6	92.2	0.9935	Slope	1.001046	0.90 - 1.10
			Intercept	0.284247	+/-20













WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Waskow ohci Pimat January 3, 2023 10:15 Routine	tisiwin	Station number: Last Cal Date: End time (MST):	AMS25 December 16, 2022 13:10	
		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 #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	747	
ZAG Make/Model:	API T701		Serial Number:	261	
		Analyzer Info	rmation		
Analyzer make	: Thermo 43i	-	Analyzer serial #:	1118148497	
Analyzer Range			,		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.003529	0.999783	Backgd or Offset:	9.9	11.0
Calibration intercept:	0.624937	-0.314119	Coeff or Slope:	1.212	1.212
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	orrection factor (Cc/
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.9	
as found span	4924	76.3	799.6	798.9	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4924	76.3	799.6	799.3	1.000
second point	4962	38.2	400.3	399.6	1.002
third point	4981	19.1	200.2	199.6	1.003
as left zero	5000	0.0	0.0	-0.2	
as left span	4924	76.3	799.6	797.6	1.002
			Averag	ge Correction Factor	1.002
Baseline Corr As found:	798.00	Previous response	803.02	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline con Enava pe.					

Zero adjusted. No maintenance done.

Calibration Performed By:

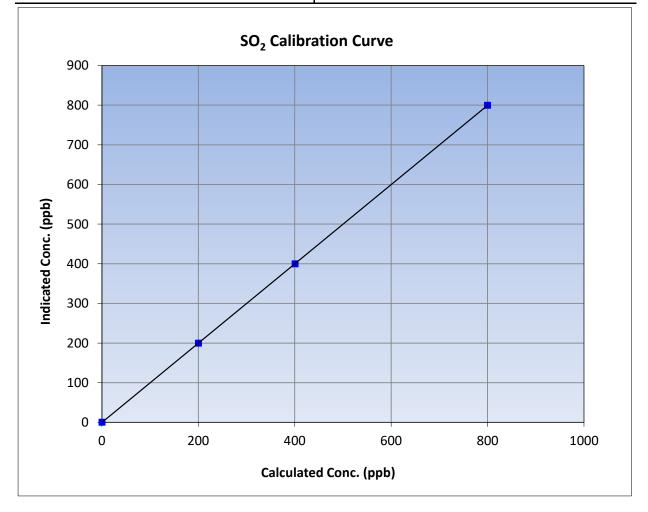


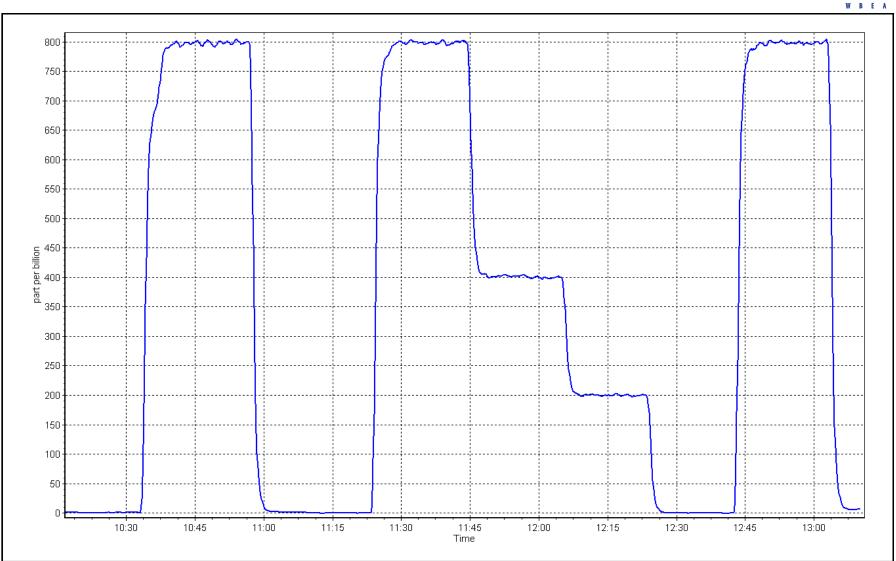
SO₂ Calibration Summary

	Station	n Information	
Calibration Date:	January 3, 2023	Previous Calibration:	December 16, 2022
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS25
Start Time (MST):	10:15	End Time (MST):	13:10
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148497

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999999	≥0.995
799.6	799.3	1.0003	correlation coefficient	0.9999999	20.995
400.3	399.6	1.0018	Slope	0.999783	0.90 - 1.10
200.2	199.6	1.0028	Slope	0.999783	0.90 - 1.10
			Intercept	-0.314119	+/-30









H₂S Calibration Report

					Version-11-2
		Station Info	rmation		
itation Name: Calibration Date: itart time (MST): Reason:	Waskow ohci Pima January 11, 2023 8:20 Routine	isiwin	Station number: Last Cal Date: End time (MST):	AMS25 December 7, 2022 12:44	
		Calibration S	tandards		
Cal Gas Concentration:	4.90	ppm	Cal Gas Exp Date:	May 5, 2023	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	LL119538 4.90 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:			Serial Number:	747	
AG Make/Model:	API T701		Serial Number:	261	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-LTE Thermo 43C 0 - 100 ppb		Analyzer serial #: Converter serial #:	1170050146 328702539	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002595	1.002738	Backgd or Offset:	3.3	3.3
Calibration intercept:	0.421608	0.341605	Coeff or Slope:	1.085	1.085
		H 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	4918	81.6	80.0	80.7	0.993
as found 2nd point	4959	40.8	40.0	40.5	0.992
as found 3rd point			20.0	20.3	
as found shu point	4980	20.4	20.0	20.5	0.995
new cylinder response	4980			20.3	0.995
	4980	20.4 H ₂ S Calibrati		20.3	0.995
	4980 Dilution air flow rate (sccm)			Indicated concentration (ppb) (Ic)	0.995 Correction facto (Cc/Ic) Limit = 0.95-1.05
new cylinder response	Dilution air flow rate	H ₂ S Calibrati	ion Data Calculated concentration (ppb)	Indicated	Correction facto (Cc/Ic)
new cylinder response Set Point calibrator zero high point	Dilution air flow rate (sccm) 5000 4918	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0	Indicated concentration (ppb) (Ic)	Correction facto (Cc/Ic) Limit = 0.95-1.05 0.993
new cylinder response Set Point calibrator zero high point second point	Dilution air flow rate (sccm) 5000	H ₂ S Calibrati Source gas flow rate (sccm) 0.0	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0	Indicated concentration (ppb) (Ic) 0.3	Correction facto (Cc/Ic) Limit = 0.95-1.05
Set Point Calibrator zero high point second point third point	Dilution air flow rate (sccm) 5000 4918 4959 4980	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4	Correction facto (Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980
Set Point Calibrator zero high point second point third point as left zero	Dilution air flow rate (sccm) 5000 4918 4959 4980 5000	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4 0.0	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4 0.2	Correction facto (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980
Set Point Calibrator zero high point second point third point as left zero as left span	Dilution air flow rate (sccm) 5000 4918 4959 4980 5000 4912	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4 0.0 88.3	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4 0.2 801.2	Correction facto (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.999
Set Point 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 4918 4959 4980 5000 4912 4924	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4 0.2 801.2 0.1	Correction facto (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.999
Set Point Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check vate of last scrubber cha	Dilution air flow rate (sccm) 5000 4918 4959 4980 5000 4912 4924 ange:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4 0.0 88.3	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4 0.2 801.2	Correction facto (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.999 0.999
new cylinder response Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check Date of last scrubber cha	Dilution air flow rate (sccm) 5000 4918 4959 4980 5000 4912 4924 ange:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4 0.2 801.2 0.1	Correction facto (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.999
new cylinder response Set Point calibrator zero high point second point third point as left zero	Dilution air flow rate (sccm) 5000 4918 4959 4980 5000 4912 4924 ange:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0 800.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4 0.2 801.2 0.1	Correction facto (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.999 0.999
new cylinder response Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check Date of last scrubber cha Date of last converter ef	Dilution air flow rate (sccm) 5000 4918 4959 4980 5000 4912 4924 ange: ficiency test:	H ₂ S Calibrati Source gas flow rate (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 19-Jul-10	ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0 800.0 800.0 800.0	Indicated concentration (ppb) (Ic) 0.3 80.5 40.5 20.4 0.2 801.2 0.1 Ave Corr Factor	Correction facto (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.999 0.987 efficiency

Notes:

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

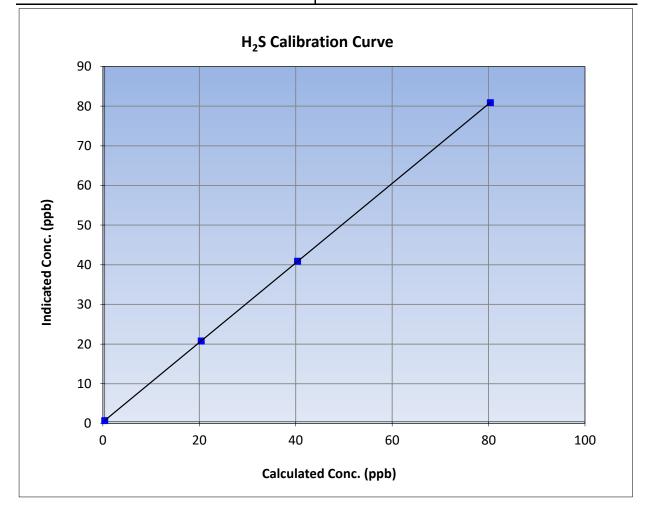


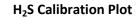
H₂S Calibration Summary

WBEA			Version-11-2021						
Station Information									
Calibration Date:	January 11, 2023	Previous Calibration:	December 7, 2022						
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS25						
Start Time (MST):	8:20	End Time (MST):	12:44						
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1170050146						

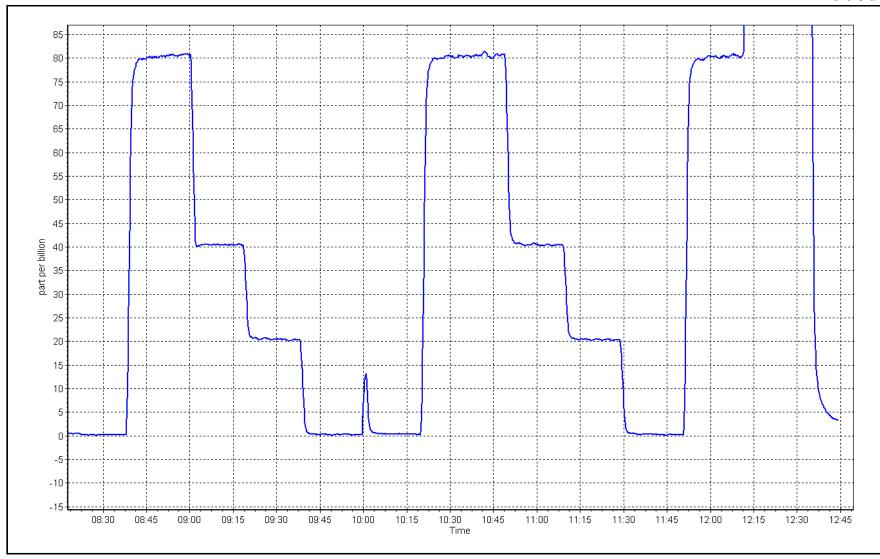
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999998	≥0.995
80.0	80.5	0.9935	correlation coefficient	0.999996	20.995
40.0	40.5	0.9873	Slope	1.002738	0.90 - 1.10
20.0	20.4	0.9799	Slope	1.002758	0.30 - 1.10
			Intercept	0.341605	+/-3











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake January 25, 2023 8:40 Routine		Station number: Last Cal Date: End time (MST):	AMS 26 December 15, 2022 12:54	
		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 #:			Diff between cyl:	2447	
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:	1.004842	1.000779	Backgd or Offset:	15.9	16.4
Calibration intercept:	-2.096815	-2.876133	Coeff or Slope:	0.943	0.929
		SO ₂ 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	0.7	
as found span	4919	80.6	799.0	812.0	0.984
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.1	
high point	4919	80.6	799.0	797.9	1.001
second point	4960	40.3	399.4	396.1	1.008
third point	4980	20.2	200.2	194.3	1.030
as left zero	5000	0.0	0.0	0.1	
as left span	4919	80.6	799.0	802.0	0.996
			Averag	ge Correction Factor	1.013
		- ·	800.74	*% change	1.3%
Baseline Corr As found:	811.30	Previous response	800.74	70 chunge	1.370
Baseline Corr As found: Baseline Corr 2nd AF pt:	811.30 NA	Previous response AF Slope:		AF Intercept:	1.570

Notes:

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

Calibration Performed By:

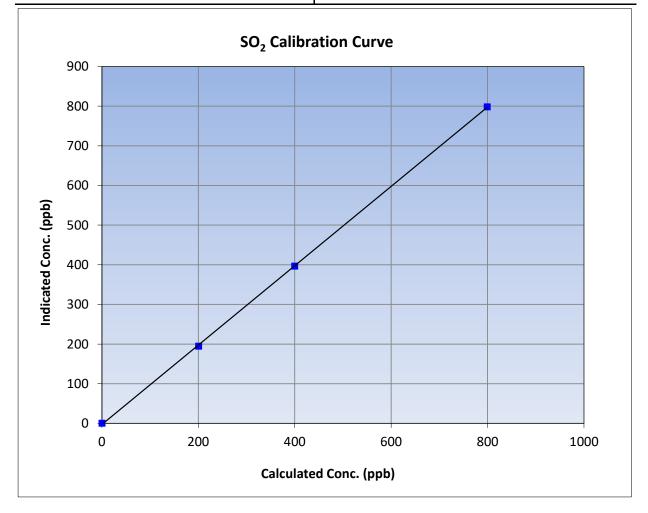


SO₂ Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	January 25, 2023	Previous Calibration:	December 15, 2022					
Station Name:	Christina Lake	Station Number:	AMS 26					
Start Time (MST):	8:40	End Time (MST):	12:54					
Analyzer make:	Thermo 43i	Analyzer serial #:	1173410001					

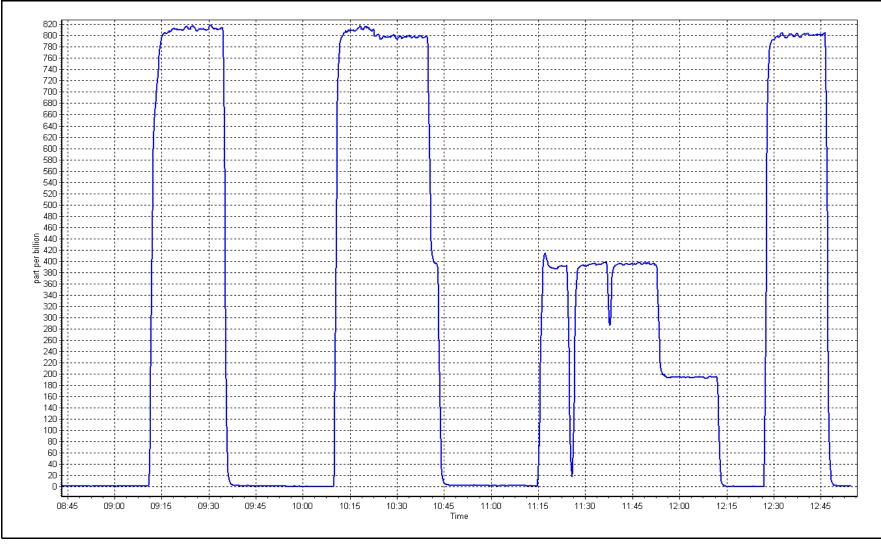
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999943	≥0.995
799.0	797.9	1.0013	correlation coefficient	0.555545	20.995
399.4	396.1	1.0084	Slope	1.000779	0.90 - 1.10
200.2	194.3	1.0304	Slope	1.000779	0.90 - 1.10
			Intercept	-2.876133	+/-30











H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake January 25, 2023 8:40 Routine		Station number: Last Cal Date: End time (MST):	AMS26 December 13, 2022 13:36	
		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:	API T750 API 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:	0.993615	1.010037	Backgd or Offset:	33.3	33.3
Calibration intercept:	-0.141127	0.159267	Coeff or Slope:	1.113	1.113
		H 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	4918	81.8	80.0	80.8	0.988
as found 2nd point	4959	40.9	40.0	40.3	0.988
as found 3rd point	4979	20.4	20.0	20.0	0.988
new cylinder response					
		H 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	4918	81.8	80.0	81.0	0.988
second point	4959	40.9	40.0	40.5	0.988
third point	4979	20.4	20.0	20.3	0.983
as left zero	5000	0.0	0.0	0.2	
as left span	4918	81.8	80.0	80.2	0.998
SO2 Scrubber Check	4919	80.6	806.1	0.0	
Date of last scrubber cha		27-Feb-19		Ave Corr Factor	0.986
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	81.0	Prev response:		*% change:	2.0%
Baseline Corr 2nd AF pt:	40.5	AF Slope:		AF Intercept:	-0.200681
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	1.000000	* = > +/-5% change initiate	es investigation

Notes:

Ran scrubber check after calibrator zero. No adjustments made.

Calibration Performed By:

Braiden Boutilier

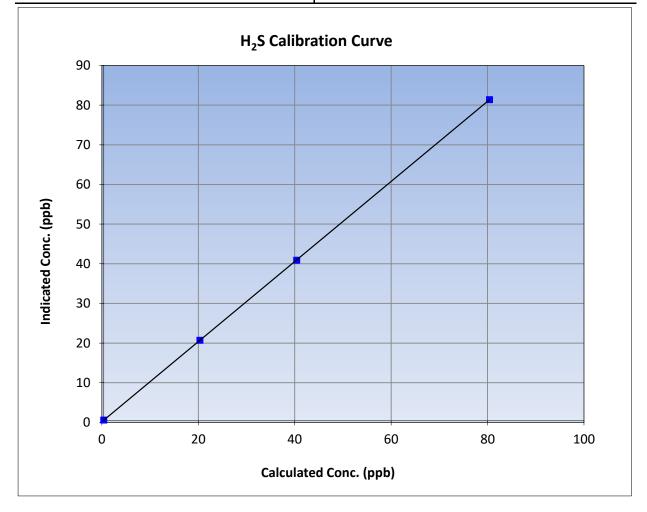


H₂S Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	January 25, 2023	Previous Calibration:	December 13, 2022					
Station Name:	Christina Lake	Station Number:	AMS26					
Start Time (MST):	8:40	End Time (MST):	13:36					
Analyzer make:	Thermo 450i	Analyzer serial #:	1180030032					

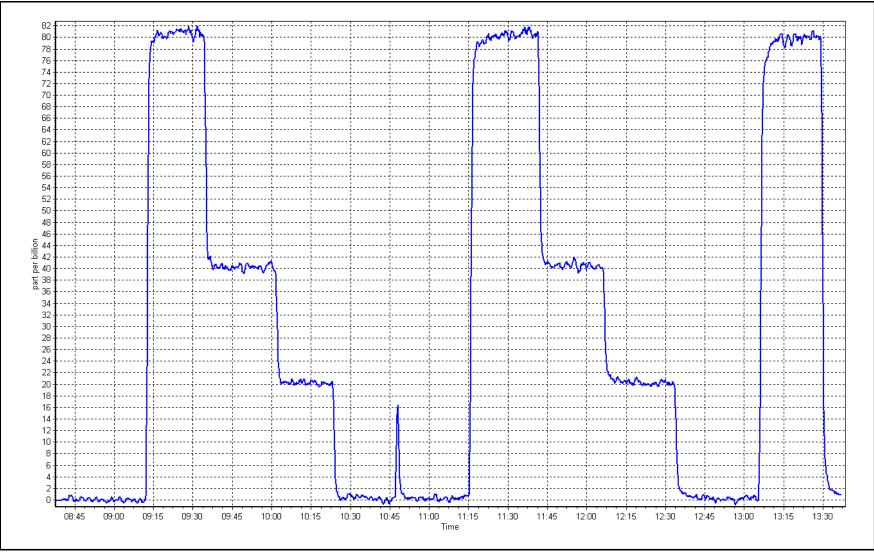
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999998	≥0.995
80.0	81.0	0.9877	correlation coefficient	0.999998	20.333
40.0	40.5	0.9877	Slope	1.010037	0.90 - 1.10
20.0	20.3	0.9829	Slope	1.010037	0.90 - 1.10
			Intercept	0.159267	+/-3



H₂S Calibration Plot







NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station I	Information			
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake January 24, 2023 11:33 Routine	Station number: AMS 26 Last Cal Date: December 14, 2022 End time (MST): 16:36				
		Calibratio	on Standards			
NO Gas Cylinder #:	T2Y1P4C		Cal Gas Expiry Date: Nov	/ember 12, 20)23	
NOX Cal Gas Conc:	50.82	ppm	NO Cal Gas Conc:	50.02	ppm	
Removed Cylinder #:	NA		Removed Gas Exp Date: NA			
Removed Gas NOX Conc:	50.82	ppm	Removed Gas NO Conc:	50.02	ppm	
NOX gas Diff:			NO gas Diff:			
Calibrator Model:	API T700		Serial Number:	2447		
ZAG make/model:	API T701		Serial Number:	953		
Analyzer make: NOX Range (ppb):		Analyzer	Information Analyzer serial #: 117	3480006		
		Tinich		Charact	Tinich	
NO sooff or slove	<u>Start</u>	<u>Finish</u>	NO blend or offect	<u>Start</u>	<u>Finish</u>	
NO coeff or slope NOX coeff or slope		1.647 0.996	NO bkgnd or offset: NOX bkgnd or offset:	2.7 2.8	2.7 2.8	
NO2 coeff or slope		1.000	Reaction cell Press:	2.8 189.8	2.8 190.1	
		Calibrati	on Statistics			
				Finich		
NO. Cal Slana		<u>Start</u> 0.998735		<u>Finish</u> 1.000028		
NO _x Cal Slope						
NO _x Cal Offset		-1.240000		-2.400000		
NO Cal Slope NO Cal Offset		1.000657 -2.620000		1.000828 -3.180000		
NO ₂ Cal Slope		0.999507		0.997345		
		0.999507		0.55/545		

0.641309

-0.231843



$NO_X \setminus NO \setminus NO_2$ 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	4920	80.0	813.1	800.3	12.8	805.0	791.5	13.2	1.0101	1.0111
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.0		
high point	4920	80.0	813.1	800.3	12.8	812.0	799.6	12.1	1.0014	1.0009
second point	4960	40.0	406.6	400.2	6.4	402.9	395.1	7.8	1.0091	1.0128
third point	4980	20.0	203.3	200.1	3.2	198.4	194.3	4.1	1.0246	1.0297
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4920	80.0	813.1	392.5	420.6	812.0	387.4	424.2	1.0014	1.0132
							Average C	orrection Factor	1.0117	1.0145
Corrected As fo	ound NO _x =	805.0 ppb	NO =	791.5 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-0.7%
Previous Respo	onse NO _x =	810.9 ppb	NO =	798.2 ppb				*Percent Chan	ge NO =	-0.8%
Baseline Corr 2	nd pt NO _x =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	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) (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)	795.9	388.1	420.6	419.5	1.0026	99.7%
2nd GPT point (200 ppb O3)	795.9	596.1	212.6	211.3	1.0062	99.4%
3rd GPT point (100 ppb O3)	795.9	698.9	109.8	109.3	1.0046	99.5%
				Average Correction Factor	1.0044	99.6%

Notes:

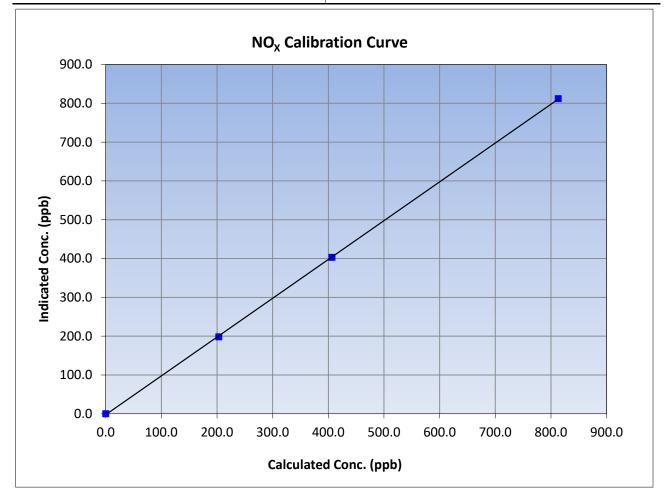
Changed sample inlet filter after as founds. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

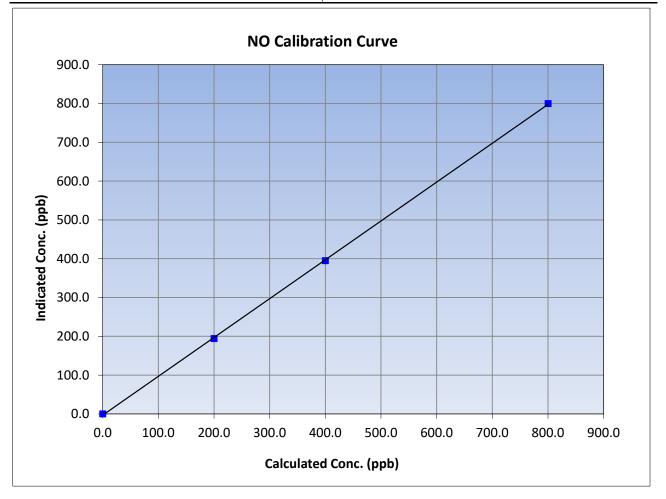
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January 24, 2023		Previous Calibration:	Decembe	er 14, 2022
Station Name:	Christina Lake		Station Number:	AN	1S 26
Start Time (MST):	11:33		End Time (MST):	16:36	
Analyzer make:	Therr	no 42i	Analyzer serial #: 14:00		4:00
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999957	≥0.995
813.1	812.0	1.0014	correlation coernelent	0.555557	20.995
406.6	402.9	1.0091	Classe	1.000028	0.90 - 1.10
203.3	198.4	1.0246	Slope	1.000028	0.30 - 1.10
			Intercept	-2.400000	+/-20





NO Calibration Summary

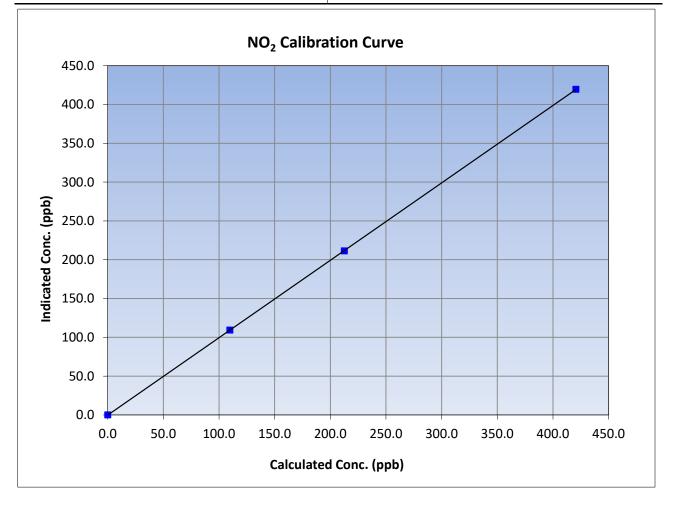
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January 24, 2023		Previous Calibration:	Decemb	er 14, 2022
Station Name:	Christi	na Lake	Station Number:	AN	/IS 26
Start Time (MST):	11	:33	End Time (MST):	16:36	
Analyzer make:	Thermo 42i		Analyzer serial #:	: 14:00	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999926	≥0.995
800.3	799.6	1.0009	correlation coefficient	0.555520	20.333
400.2	395.1	1.0128	Clana	1.000828	0.90 - 1.10
200.1	194.3	1.0297	Slope	1.000828	0.90 - 1.10
			Intercept	-3.180000	+/-20





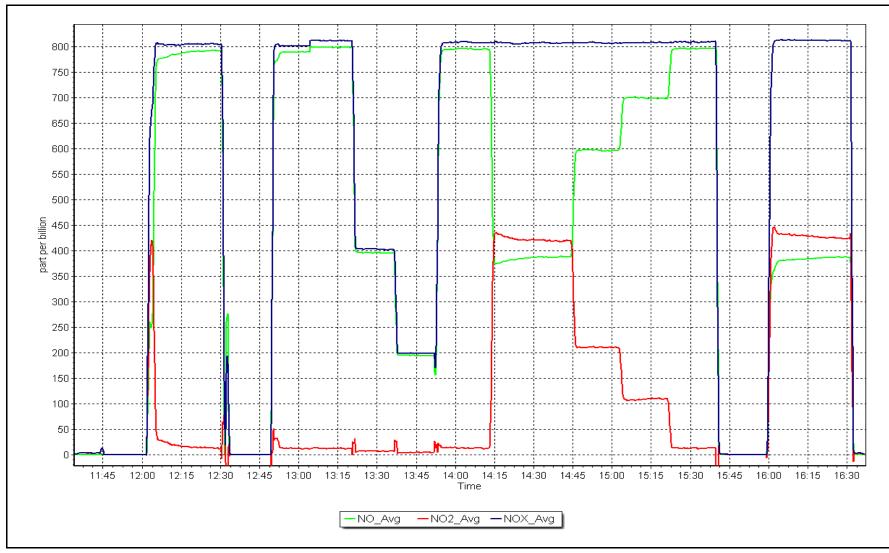
NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	January 24, 2023		Previous Calibration:	Decembe	er 14, 2022
Station Name:	Christina Lake		Station Number:	AN	IS 26
Start Time (MST):	11:33		End Time (MST):	16:36	
Analyzer make:	Therr	no 42i	Analyzer serial #:	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	0.0		Correlation Coefficient	0.999996	≥0.995
420.6	419.5	1.0026	correlation coernelent	0.999990	20.995
212.6	211.3	1.0062	Slope	0.997345	0.90 - 1.10
109.8	109.3	1.0046	Slope	0.997545	0.90 - 1.10
			Intercept	-0.231843	+/-20











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS27 JACKFISH 2/3 JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Inforn	nation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 January 19, 2023 10:10 Routine		Station number: Last Cal Date: End time (MST):	AMS 27 December 8, 2022 12:45	
		Calibration Sta	ndards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.58 <u>SG9133974BAL</u>	ppm	Cal Gas Exp Date:	December 29, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	50.58 <u>NA</u>	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API 701		Serial Number: Serial Number:	3811 364	
		Analyzer Infor	mation		
Analyzer make Analyzer Range			Analyzer serial #:	12124313138	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.001034 -1.838597	1.001858 -1.876897	Backgd or Offset: Coeff or Slope:	7.6 1.002	7.4 0.979
		SO ₂ Calibratio	n 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	0.0	
as found span	4921	79.1	800.2	815.0	0.982
as found 2nd point					
as found 3rd point					
new cylinder response	5000				
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	79.1	800.2	800.1	1.000
second point	4961 4980	39.5 19.8	399.5 200.3	<u> </u>	1.000
third point as left zero	5000	0.0	0.0	0.2	
as left span	4921	79.1	800.2	800.2	1.000
us icit spair	7721	7.5.1		ge Correction Factor	1.000
Baseline Corr As found:	815.00	Previous response	799.15	*% change	1.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	

Adjusted the span only.

Calibration Performed By:

Denny Ray Estador



399.5

399.5

Wood Buffalo Environmental Association

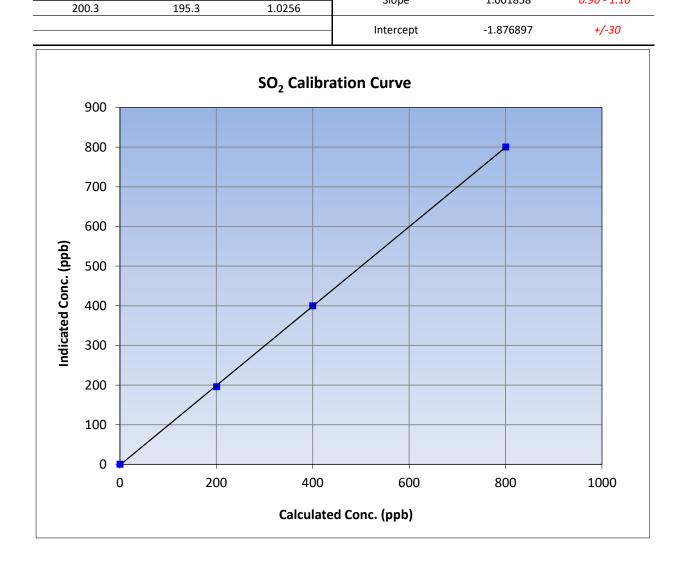
SO₂ Calibration Summary

Slope

1.001858

					Version-01-202	
		Station	Information			
Calibration Date:	January 1	9, 2023	Previous Calibration:	Decembe	er 8, 2022	
Station Name:	Jackfisł	n 2/3	Station Number:	AMS 27		
Start Time (MST):	10:1	.0	End Time (MST):	12:	:45	
Analyzer make:	nalyzer make: Thero 4		Analyzer serial #:		12124313138	
		Calib	ration Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evaluation	on	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999949	≥0.995	
800.2	800.1	1.0001	correlation coefficient	0.999949	20.333	

1.0001

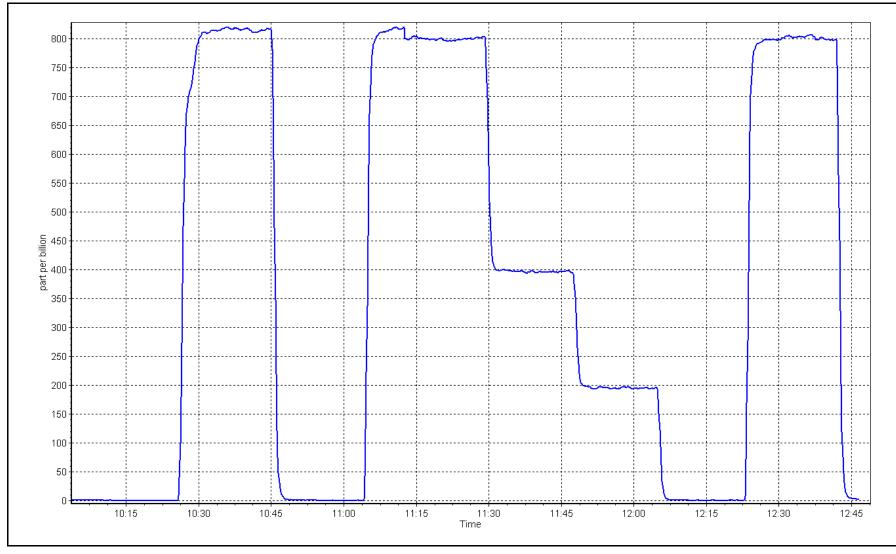


Version-01-2020

0.90 - 1.10









H₂S Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 January 11, 2023 10:13 Routine		Station number: Last Cal Date: End time (MST):	AMS27 December 14, 2022 13:40	
		Calibration S	tandards		
Cal Gas Concentration:	5.41	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	CC345023 5.41 NA API T700 API 701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3811 364	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	API T101 0 - 100 ppb		Analyzer serial #: Converter serial #:	621	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.003337 -0.197871	0.997920 0.042016	Backgd or Offset: Coeff or Slope:	24.3 0.965	24.3 0.965
		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	4926	74.1	80.2	81.0	0.992
as found 2nd point	4963	37.0	40.0	40.2	1.001
as found 3rd point	4982	18.5	20.0	19.9	1.016
new cylinder response					
		H ₂ S Calibrati	ion Data		
Set Point	Dilution air flow rate (sccm)	H ₂ S Calibrati	ion Data Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
Set Point calibrator zero		Source gas flow rate	Calculated concentration (ppb)		(Cc/Ic)
calibrator zero high point	(sccm) 5000 4926	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	concentration (ppb) (Ic) 0.2 80.1	(Cc/lc) Limit = 0.95-1.05 1.001
calibrator zero high point second point	(sccm) 5000 4926 4963	Source gas flow rate (sccm) 0.0 74.1 37.0	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0	concentration (ppb) (Ic) 0.2 80.1 40.0	(Cc/lc) <i>Limit = 0.95-1.05</i> 1.001 1.001
calibrator zero high point second point third point	(sccm) 5000 4926 4963 4982	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8	(Cc/lc) Limit = 0.95-1.05 1.001 1.001 1.011
calibrator zero high point second point third point as left zero	(sccm) 5000 4926 4963 4982 5000	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5 0.0	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0 0.0	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8 0.3	(Cc/lc) Limit = 0.95-1.05 1.001 1.001 1.011
calibrator zero high point second point third point as left zero as left span	(sccm) 5000 4926 4963 4982 5000 4926	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5 0.0 74.1	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0 0.0 80.2	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8 0.3 80.0	(Cc/lc) Limit = 0.95-1.05 1.001 1.001 1.011 1.002
calibrator zero high point second point third point as left zero as left span 502 Scrubber Check	(sccm) 5000 4926 4963 4982 5000 4926 4921	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5 0.0	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0 0.0	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8 0.3 80.0 0.1	(Cc/lc) Limit = 0.95-1.05 1.001 1.001 1.011 1.002
calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha	(sccm) 5000 4926 4963 4982 5000 4926 4921 ange:	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5 0.0 74.1	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0 0.0 80.2	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8 0.3 80.0	(Cc/lc) Limit = 0.95-1.05 1.001 1.001 1.011 1.002 1.004
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	(sccm) 5000 4926 4963 4982 5000 4926 4921 ange: ficiency test:	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5 0.0 74.1 79.1	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0 0.0 80.2 791.0	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8 0.3 80.0 0.1 Ave Corr Factor	(Cc/lc) Limit = 0.95-1.05 1.001 1.011 1.002 1.004 efficiency
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:	(sccm) 5000 4926 4963 4982 5000 4926 4921 ange: ficiency test: 80.8	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5 0.0 74.1 79.1 Prev response:	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0 0.0 80.2 791.0 80.24	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8 0.3 80.0 0.1 Ave Corr Factor *% change:	(Cc/lc) Limit = 0.95-1.05 1.001 1.011 1.002 1.004 efficiency 0.7%
calibrator zero high point second point third point as left zero	(sccm) 5000 4926 4963 4982 5000 4926 4921 ange: ficiency test: 80.8	Source gas flow rate (sccm) 0.0 74.1 37.0 18.5 0.0 74.1 79.1	Calculated concentration (ppb) (Cc) 0.0 80.2 40.0 20.0 0.0 80.2 791.0 80.24 1.009326	concentration (ppb) (Ic) 0.2 80.1 40.0 19.8 0.3 80.0 0.1 Ave Corr Factor	Limit = 0.95-1.05 1.001 1.001 1.011 1.002 1.004 efficiency

Notes:

No adjustments have been made.

Calibration Performed By:

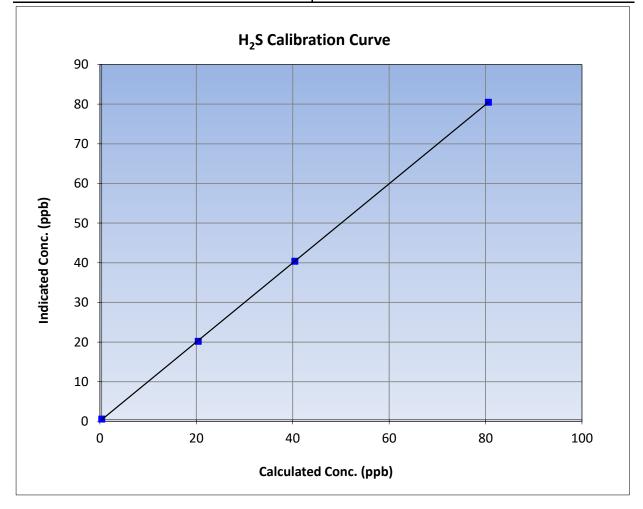
Denny Ray Estador

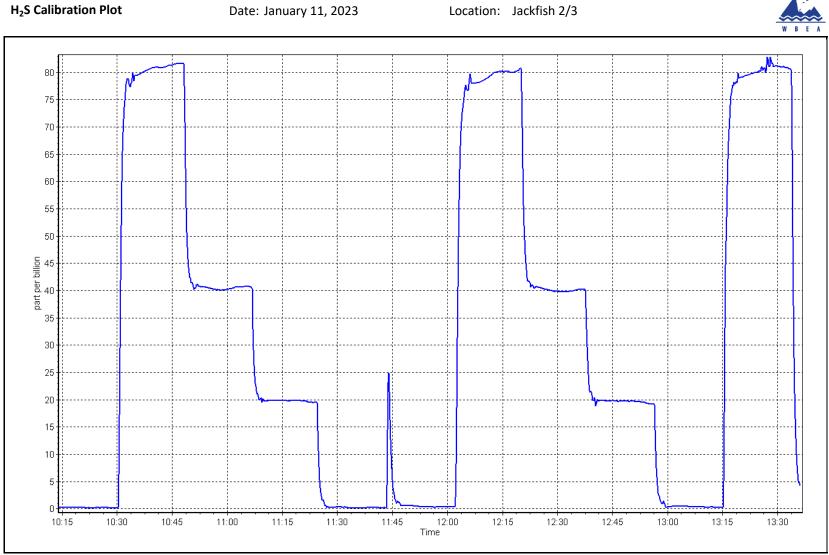


H₂S Calibration Summary

WBEA	Stati	on Information	Version-11-202
Calibration Date:	January 11, 2023	Previous Calibration:	December 14, 2022
Station Name:	Jackfish 2/3	Station Number:	AMS27
Start Time (MST):	10:13	End Time (MST):	13:40
Analyzer make:	API T101	Analyzer serial #:	621
	(c)	ibration Data	

Calculated concentratior (ppb) (Cc)	n Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999979	≥0.995
80.2	80.1	1.0009	correlation coefficient	0.555575	20.335
40.0	40.0	1.0009	Slope	0.997920	0.90 - 1.10
20.0	19.8	1.0109	Siope	0.997920	0.90 - 1.10
			Intercept	0.042016	+/-3









$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 January 18, 2023 9:08 Routine	Station number: AMS27 023 Last Cal Date: December 20, 2022 End time (MST): 13:30			
		Calibrati	on Standards		
NO Gas Cylinder #:	T2Y1P35		Cal Gas Expiry Date: Dec	ember 11, 20	23
NOX Cal Gas Conc:	51.44	ppm	NO Cal Gas Conc:	50.40	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date: NA		
Removed Gas NOX Conc:	51.44	ppm	Removed Gas NO Conc:	50.40	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T750		Serial Number:	282	
ZAG make/model:	API 751H		Serial Number:	321	
Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> : 1.256 : 1.252	Analyzer <u>Finish</u> 1.241 1.228 1.000	r Information Analyzer serial #: 446 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	50 <u>Start</u> 1.9 7.8 4.4	<u>Finish</u> 0.9 0.9 4.3
		Calibrat	ion Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	1.001524		1.001608	
NO _x Cal Offset	:	-3.737174		-3.416967	
NO Cal Slope	:	1.009612		1.005444	
NO Cal Offset		-3.559292		-4.300508	
NO ₂ Cal Slope	:	0.999877		0.998544	
NO ₂ Cal Offset	:	0.211880		0.230642	



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-4.6	-1.2	-3.4		
as found span	4921	79.4	816.8	800.3	16.5	829.2	804.5	24.5	0.9850	0.9948
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1		
high point	4921	79.4	816.8	800.3	16.5	816.0	802.0	13.7	1.0010	0.9979
second point	4960	39.7	408.5	400.2	8.3	405.0	397.2	7.7	1.0085	1.0076
third point	4980	19.8	203.7	199.6	4.1	196.8	191.5	5.4	1.0351	1.0423
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.4	0.0		
as left span	4921	79.4	816.8	395.6	423.2	813.2	391.9	421.2	1.0044	1.0094
							Average C	orrection Factor	1.0149	1.0159
Corrected As fo	ound NO _x =	833.8 ppb	NO =	805.7 ppb	* = > +/-5	% change initiates i	investigation	*Percent Chang	ge NO _x =	2.3%
Previous Respo	nse NO _x =	814.3 ppb	NO =	804.4 ppb				*Percent Chang	ge NO =	0.2%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	800.4	393.7	423.2	422.8	1.0010	99.9%
2nd GPT point (200 ppb O3)	800.4	615.1	201.8	201.7	1.0006	99.9%
3rd GPT point (100 ppb O3)	800.4	711.2	105.7	106.0	0.9973	100.3%
				Average Correction Factor	0.9996	100.0%

Notes:

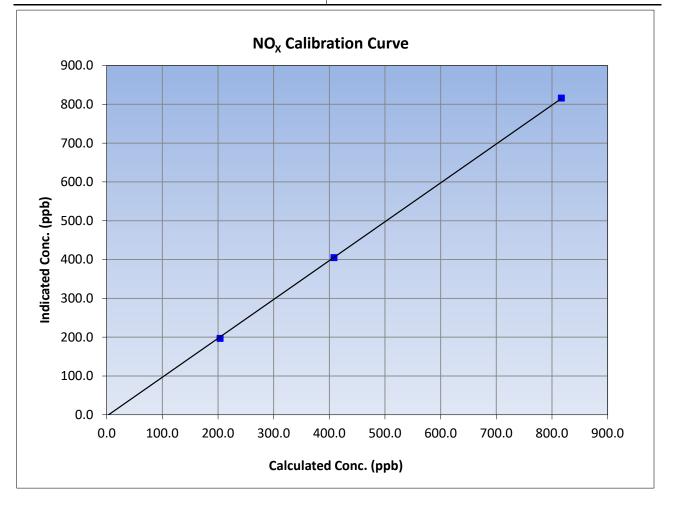
Adjusted both zero and span.

Calibration Performed By:



NO_x Calibration Summary

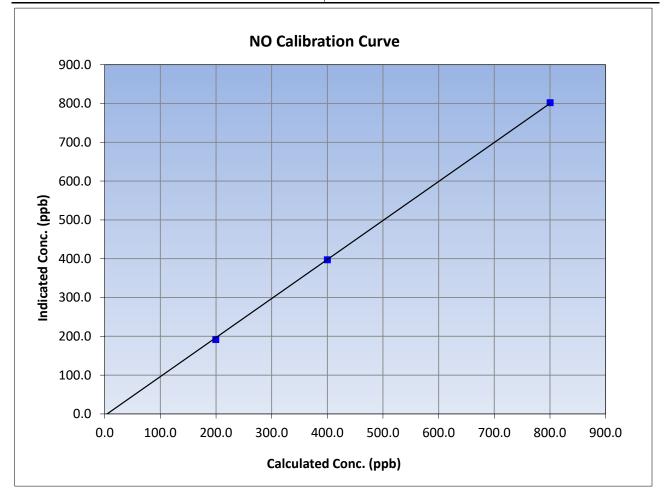
WBEA		Station	Information		Version-04-20
		Station	mormation		
Calibration Date:	January 18, 2023		Previous Calibration:	Decembe	er 20, 2022
Station Name:	Jackfi	sh 2/3	Station Number:	AN	/IS27
Start Time (MST):	9:	08	End Time (MST):	13	3:30
Analyzer make:	API	T200	Analyzer serial #:	4	460
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999926	≥0.995
816.8	816.0	1.0010	correlation coefficient	0.999920	20.333
408.5	405.0	1.0085	Clana	1.001608	0.90 - 1.10
203.7	196.8	1.0351	Slope	1.001008	0.90 - 1.10
			Intercept	-3.416967	+/-20





NO Calibration Summary

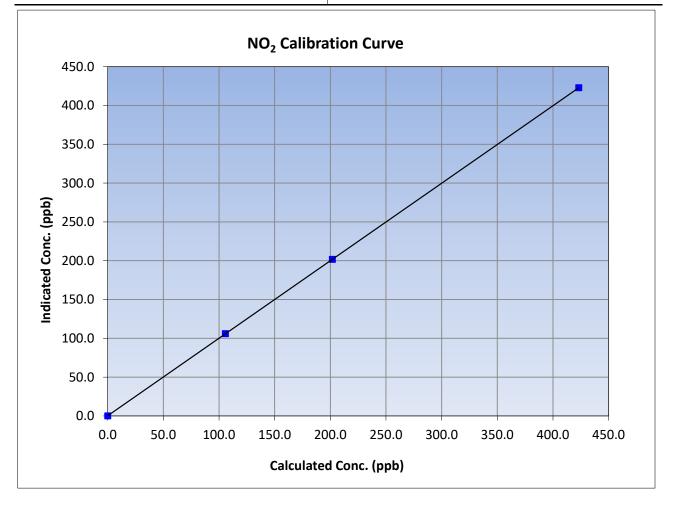
WBEA					Version-04-20		
		Station	Information				
Calibration Date:	January	January 18, 2023		January 18, 2023 Previous Calibration:		Decemb	oer 20, 2022
Station Name:	Jackfi	sh 2/3	Station Number:	А	MS27		
Start Time (MST):	9:	08	End Time (MST):	1	13:30		
Analyzer make:	API	T200	Analyzer serial #:	4	4460		
		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	0.999875	≥0.995		
800.3	802.0	0.9979	correlation coefficient	0.999075	20.333		
400.2	397.2	1.0076	Slope	1.005444	0.90 - 1.10		
199.6	191.5	1.0423	Slope	1.005444	0.90 - 1.10		
			Intercept	-4.300508	+/-20		

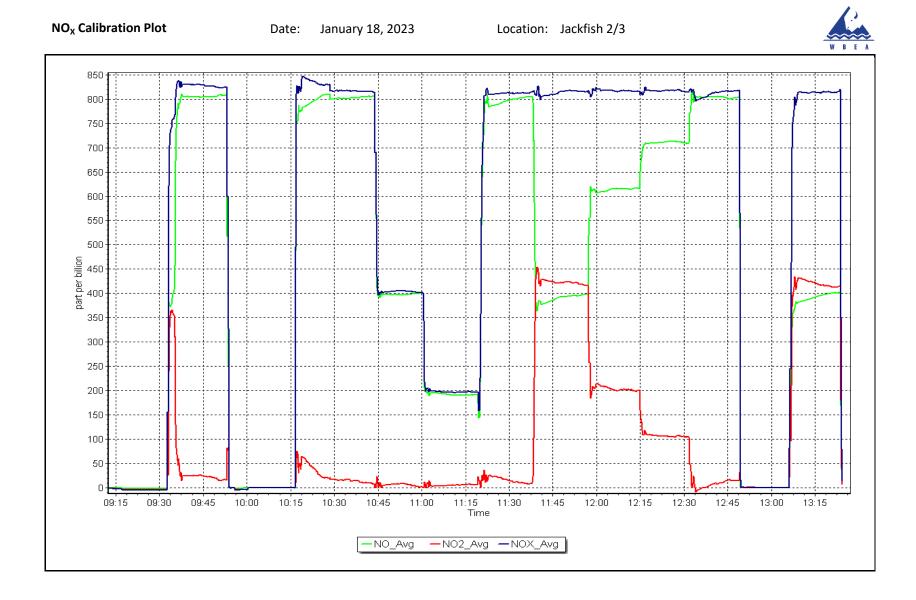




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	January 18, 2023		Decembe	er 20, 2022
Station Name:	Jackfi	sh 2/3	Station Number:	AN	1S27
Start Time (MST):	9:	08	End Time (MST):	13	3:30
Analyzer make:	API	Т200	Analyzer serial #:	44	460
		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	0.999999	≥0.995
423.2	422.8	1.0010	correlation coernicient	0.555555	20.995
201.8	201.7	1.0006	Slope	0.998544	0.90 - 1.10
105.7	106.0	0.9973	Slope	0.998544	0.30 - 1.10
			Intercept	0.230642	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS29 SURMONT 2 JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 January 3, 2023 11:24 Routine		Station number: Last Cal Date: End time (MST):	AMS29 December 15, 2022 15:04	
		Calibration St	andards		
Cal Gas Concentration:	<u>49.21</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	<u>CC356008</u>				
Removed Cal Gas Conc:	<u>49.21</u>	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA Taladuna ADI T700		Diff between cyl:	2000	
Calibrator Make/Model: ZAG Make/Model:	Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:	3808 4297	
	Teledylle AFT 1701		Senar Number.	4237	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1170050150	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998931	0.997244	Backgd or Offset:	12.3	12.4
Calibration intercept:	-0.505941	-0.565207	Coeff or Slope:	0.966	0.966
		SO ₂ 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	800.1	796.3	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	81.3	800.1	797.9	1.003
second point	4959	40.7	400.6	398.1	1.006
third point	4979	20.3	199.8	198.1	1.009
as left zero	5000	0.0	0.0	0.2	
as left span	4919	81.3	800.1	799.4	1.001
			Averag	ge Correction Factor	1.006
		. .	798.75	*% change	-0.3%
Baseline Corr As found:	796.20	Previous response	196.15	70 change	0.070
Baseline Corr As found: Baseline Corr 2nd AF pt:	796.20 NA	AF Slope:		AF Intercept:	0.070

Notes:

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

Calibration Performed By:

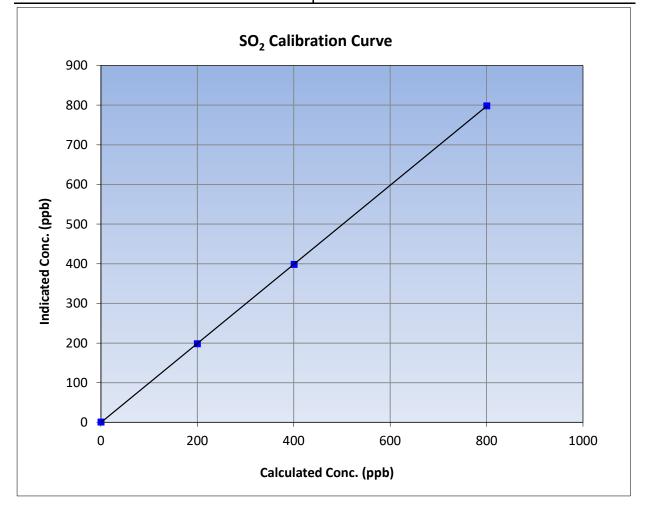


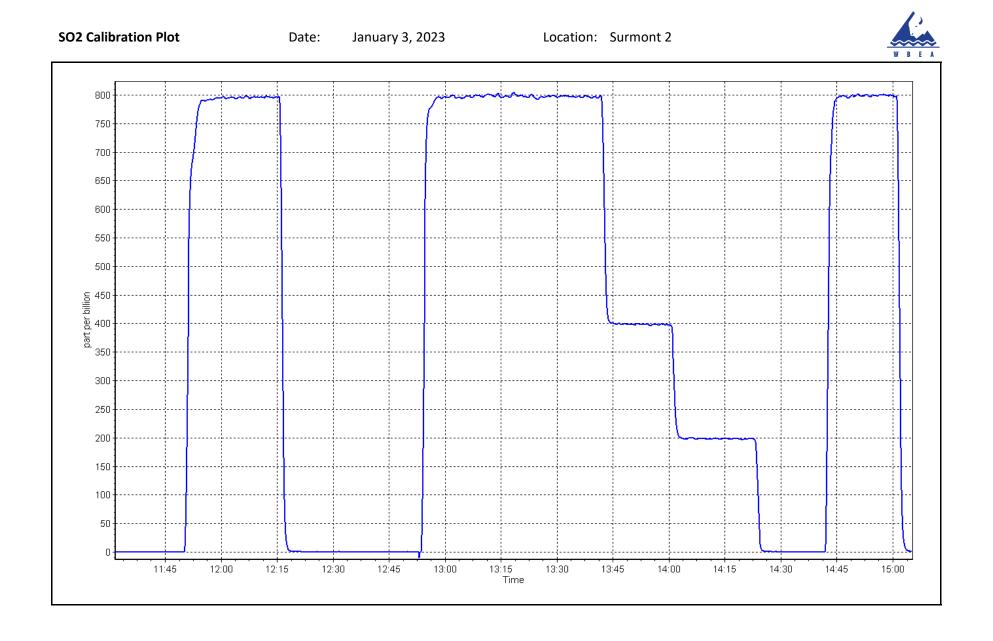
SO₂ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 3, 2023	Previous Calibration:	December 15, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	11:24	End Time (MST):	15:04
Analyzer make:	Thermo 43i	Analyzer serial #:	1170050150

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999994	≥0.995
800.1	797.9	1.0028	correlation coefficient	0.999994	20.995
400.6	398.1	1.0063	Slope	0.997244	0.90 - 1.10
199.8	198.1	1.0087	Slope	0.997244	0.90 - 1.10
			Intercept	-0.565207	+/-30







H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 January 9, 2023 11:00 Routine		Station number: Last Cal Date: End time (MST):	AMS29 December 14, 2022 15:19	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	<u>5.391</u> <u>CC508338</u>	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	<u>5.391</u> <u>CC508338</u> Teledyne API T700 Teledyne API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3808 4297	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450i Internal 0 - 100 ppb	-	Analyzer serial #: Converter serial #:	1170050142 NA	
Calibration slope: Calibration intercept:	<u>Start</u> 0.996190 -0.082676	<u>Finish</u> 0.996612 0.177532	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 16.0 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 Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4926	74.2	80.0	81.5	0.982
as found 2nd point	4963	37.2	40.1	40.9	0.981
as found 3rd point	4982	18.6	20.1	19.8	1.013
new cylinder response					
		H 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	4926	74.2	80.0	80.0	1.000
second point	4963	37.2	40.1	40.1	1.000
third point	4982	18.6	20.1	19.9	1.008
as left zero	5000	0.0	0.0	0.3	
as left span	4926	74.2	80.0	80.1	0.999
SO2 Scrubber Check	4919	81.3	813.0	-0.1	
Date of last scrubber cha	-	15-Apr-21		Ave Corr Factor	1.003
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	81.5 40.9 19.8	Prev response: AF Slope: AF Correlation:	1.021474	*% change: AF Intercept:	2.3% -0.243677
F -		-		* = > +/-5% change initiate	es investigation

Notes:

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

Calibration Performed By:

Braiden Boutilier

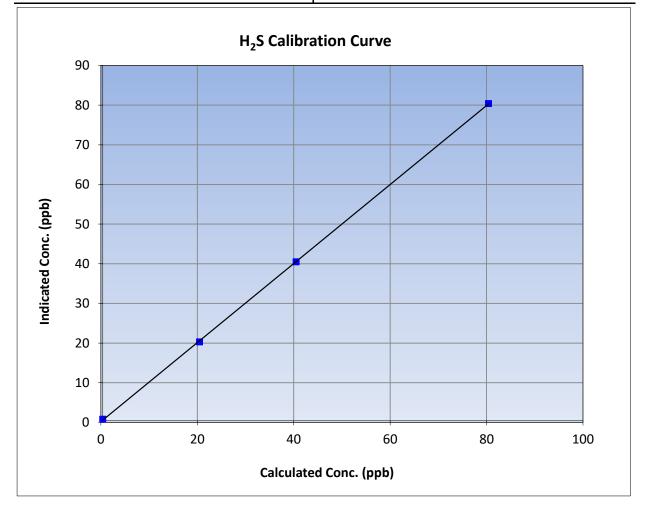


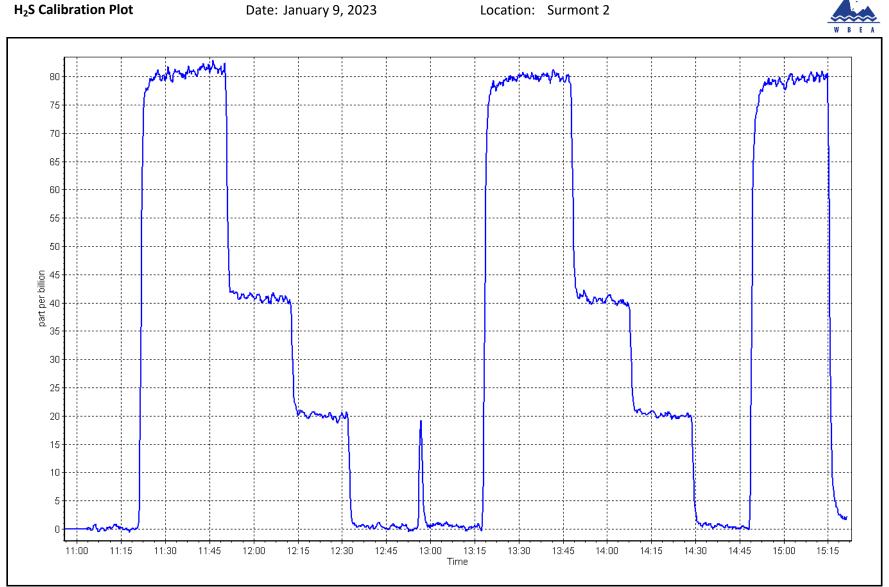
H₂S Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	January 9, 2023	Previous Calibration:	December 14, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	11:00	End Time (MST):	15:19
Analyzer make:	Thermo 450i	Analyzer serial #:	1170050142

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999963	≥0.995	
80.0	80.0	1.0000	correlation coefficient	0.999903	20.333	
40.1	40.1	1.0002	Slope	0.996612	0.90 - 1.10	
20.1	19.9	1.0077	Slope	0.990012	0.90 - 1.10	
			Intercept	0.177532	+/-3	









THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 January 3, 2023 11:24 Routine		Station number: Last Cal Date: End time (MST):	AMS29 December 15, 2022 15:04	2
		Calibration S	tandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC3 <u>499.0</u> 205.7	56008 ppm ppm	Cal Gas Expiry Date: CH4 Equiv Conc.	February 23, 2025 1064.7	ppm
Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model:	4 <u>99.0</u> 205.7 Teledyne API T700 Teledyne API T701	NA ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	NA 1064.7 3808 4297	ppm
		Analyzer Info	ormation		
Analyzer make Analyzer Range	: Thermo 51i-LT : 0 - 20 ppm		Analyzer serial #:	1170050149	
Calibration slope: Calibration intercept:	<u>Start</u> 1.000353 0.055778	<u>Finish</u> 0.999326 -0.002444	Background: Coefficient:	<u>Start</u> 4.240 5.163	<u>Finish</u> 4.510 5.288
		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	0.10	
as found span	4918	81.3	17.31	17.07	1.014
as found 2nd point as found 3rd point new cylinder response					
calibrator zero	5000	0.0	0.00	0.02	
high point	4918	81.3	17.31	17.32	1.000
second point	4959	40.7	8.67	8.62	1.005
third point	4979	20.3	4.32	4.32	1.002
as left zero	5000	0.0	0.00	-0.09	
as left span	4918	81.3	17.31	17.47	0.991
Baseline Corr As found: Baseline Corr 2nd AF pt:	16.97 NA	Previous response AF Slope:	17.38	<u>se Correction Factor</u> *% change AF Intercept:	-2.4%
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

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

Calibration Performed By:

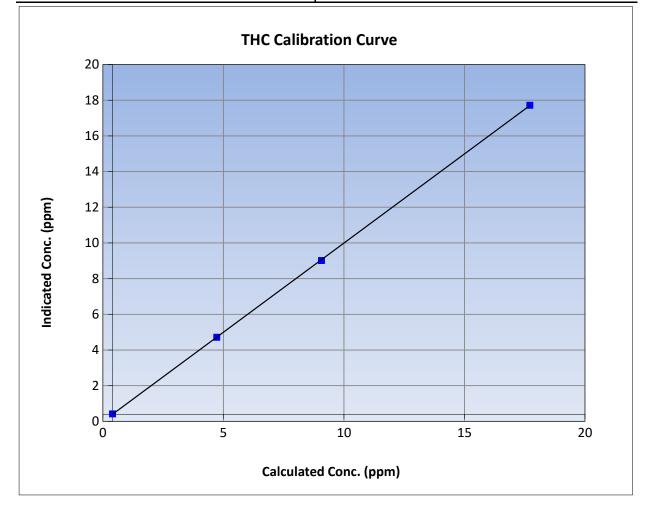


THC Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	January 3, 2023	Previous Calibration:	December 15, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	11:24	End Time (MST):	15:04
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149

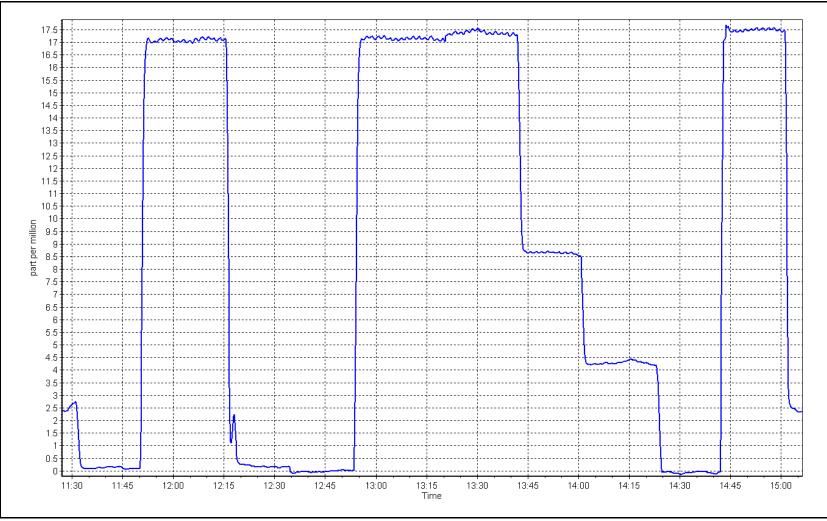
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.02		Correlation Coefficient	0.999986	≥0.995
17.31	17.32	0.9997	correlation coefficient	0.999980	20.333
8.67	8.62	1.0054	Slope	0.999326	0.90 - 1.10
4.32	4.32	1.0019	510pe	0.999320	0.30 - 1.10
			Intercept	-0.002444	+/-1.5











Station Name:

Reason:

Calibration Date:

Start time (MST):

Surmont 2

12:58

Routine

January 1, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS29 Last Cal Date: December 6, 2022 End time (MST): 17:05

			Callburghia			
			Calibratio	on Standards		
NO Gas Cylinder #:		T12YYFE		Cal Gas Expiry Date: O	ctober 30, 202	4
NOX Cal Gas Conc:	47.46	ppm		NO Cal Gas Conc:	47.46	ppm
Removed Cylinder #:		NA		Removed Gas Exp Date: N	A	
Removed Gas NOX Conc:	47.46	ppm		Removed Gas NO Conc:	47.46	ppm
NOX gas Diff:				NO gas Diff:		
Calibrator Model:	Teledyne API T	700		Serial Number: 3	808	
ZAG make/model:	Teledyne API T	701		Serial Number: 4	297	
			Analyzer	Information		
Analyzer make: NOX Range (ppb):				Analyzer serial #: 1	170050148	
	<u>Start</u>		Finish		<u>Start</u>	<u>Finish</u>

	Start	FINISN		Start	FINISN
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
NOZ COEIT OF SIOPE:	1.000	1.000	Reaction cell Fless.	100.4	100

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004874	0.998337
NO _x Cal Offset:	0.426008	0.787346
NO Cal Slope:	1.006946	1.000325
NO Cal Offset:	-0.773758	-0.232760
NO ₂ Cal Slope:	1.000565	0.997537
NO ₂ Cal Offset:	0.708204	-0.620843



$NO_X \setminus NO \setminus NO_2$ 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/lc) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as found span	4916	84.2	799.2	799.2	0.0	813.1	812.8	0.2	0.9829	0.9833
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	0.0	0.6		
high point	4916	84.2	799.2	799.2	0.0	798.4	799.1	-0.6	1.0010	1.0001
second point	4958	42.1	399.6	399.6	0.0	400.3	400.1	0.2	0.9983	0.9988
third point	4979	21.1	200.3	200.3	0.0	200.6	199.4	1.1	0.9984	1.0044
as left zero	5000	0.0	0.0	0.0	0.0					
as left span	4916	84.2	799.2	256.7	542.5					-
							Average C	orrection Factor	0.9992	1.0011
Corrected As fo	ound NO _x =	812.9 ppb	NO =	812.8 ppb	* = > +/-59	% change initiates	investigation	*Percent Chan	ge NO _x =	1.2%
Previous Respo	onse NO _x =	803.5 ppb	NO =	804.0 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) (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)	798.3	255.8	542.5	541.0	1.0028	99.7%
2nd GPT point (200 ppb O3)	798.3	588.8	209.5	207.7	1.0087	99.1%
3rd GPT point (100 ppb O3)	798.3	690.9	107.4	105.5	1.0180	98.2%
				Average Correction Factor	1.0098	99.0%

Notes:

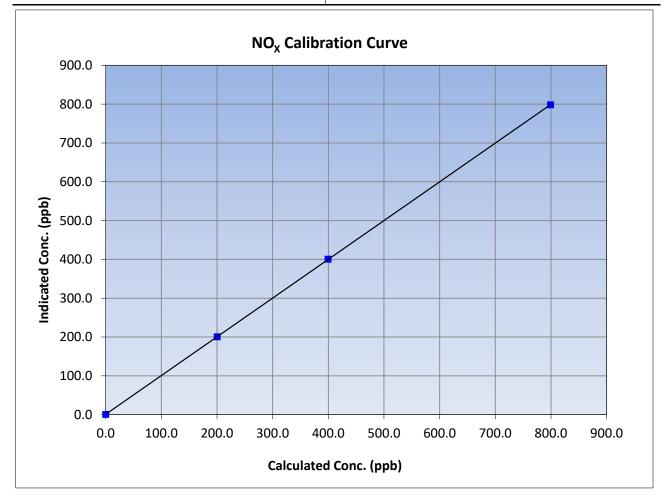
Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

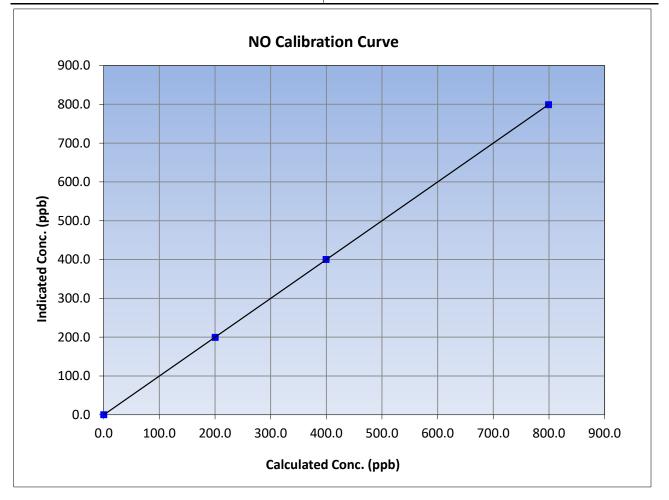
WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	1, 2023	Previous Calibration:	Decembe	er 6, 2022
Station Name:	Surmont 2		Station Number:	AM	S29
Start Time (MST):	12:58		End Time (MST):	17	:05
Analyzer make:	Therr	no 42i	Analyzer serial #:	1170050148	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999999	≥0.995
799.2	798.4	1.0010	correlation coefficient	0.5555555	20.333
399.6	400.3	0.9983	Clana	0.998337	0.90 - 1.10
200.3	200.6	0.9984	Slope	0.998337	0.90 - 1.10
			Intercept	0.787346	+/-20





NO Calibration Summary

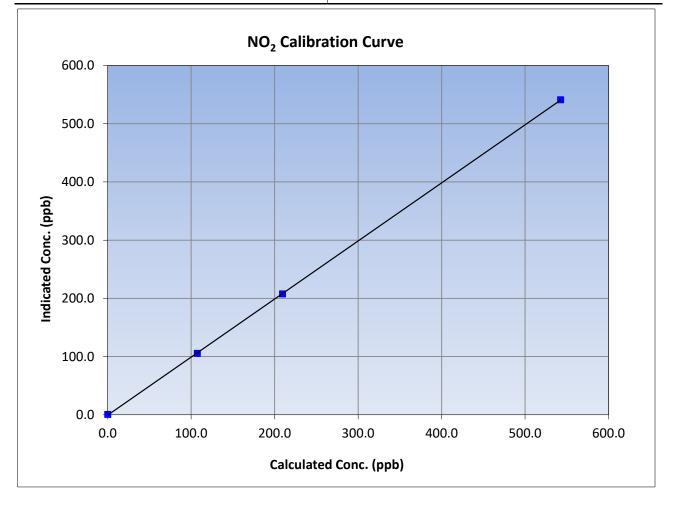
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	1, 2023	Previous Calibration:	Decembe	er 6, 2022
Station Name:	me: Surmont 2		Station Number:	AM	S29
Start Time (MST):	art Time (MST): 12:58		End Time (MST):	17:05	
Analyzer make:	Therr	Thermo 42iAnalyzer serial #:117005014		50148	
		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	0.999997	≥0.995
799.2	799.1	1.0001	correlation coefficient	0.555557	20.995
399.6	400.1	0.9988	Clana	1.000325	0.90 - 1.10
200.3	199.4	1.0044	Slope	1.000325	0.90 - 1.10
			Intercept	-0.232760	+/-20

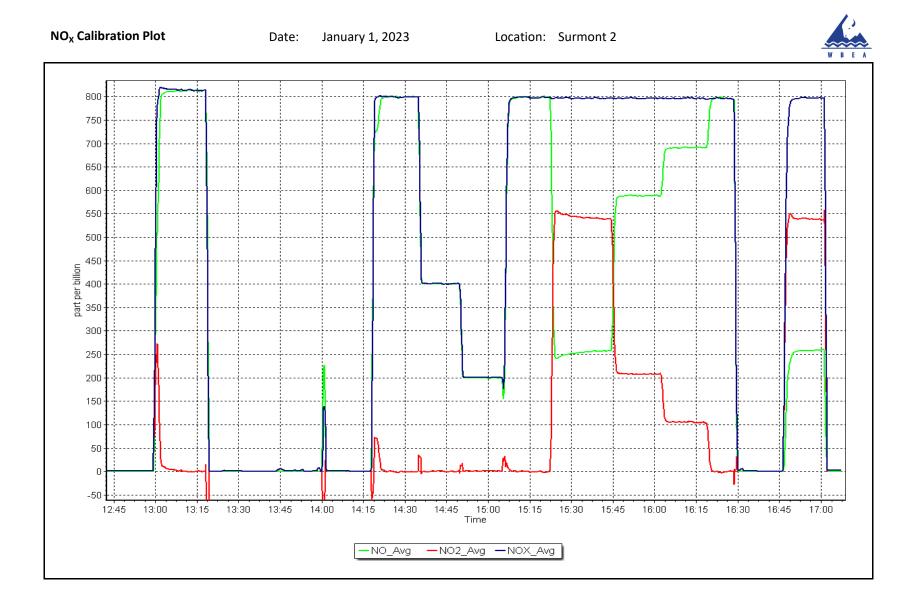




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	1, 2023	Previous Calibration:	Decembe	er 6, 2022
Station Name:	: Surmont 2		Station Number:	AM	S29
Start Time (MST):	12:58		End Time (MST):	17:05	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1170050148	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999981	≥0.995
542.5	541.0	1.0028	correlation coefficient	0.999901	20.333
209.5	207.7	1.0087	Slope	0.997537	0.90 - 1.10
107.4	105.5	1.0180	Slope	0.997557	0.90 - 1.10
			Intercept	-0.620843	+/-20







T640 PM_{2.5} CALIBRATION

WBEA					Version-09-2020
		Station Information	on		
Station Name: Calibration Date: Start time (MST):	Surmont 2 January 12, 2023 14:24		Station number: AMS 2 Last Cal Date: Decem End time (MST): 14:46		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 253		
Flow Meter Make/Model: Temp/RH standard:	Delta Cal Delta Cal		S/N: 1018 S/N: 1018		
		Monthly Calibration	Test		
<u>Parameter</u> T (°C) P (mmHg)	<u>As found</u> -8.4 710.4	<u>Measured</u> -7.8 707.4	<u>As left</u> -8.4 710.4	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg
flow (LPM)	4.99	4.98	4.99		+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	January 12, 2023 9.5	Last Cal Date: <u>Dece</u> PM w/ HEPA:	mber 15, 2022 0	
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	n Test		
<u>Parameter</u> PMT Peak Test	<u>As found</u>	Measured	<u>As left</u>	Adjusted	(Limits) 11.3 +/- 0.5
Date Optical Cham	nber Cleaned:				
Disposable Filte	r Changed:	September	30, 2022		
		Annual Maintenar	nce		
Date Sample Tul	be Cleaned:	September 3	30, 2022		
Date RH/T Sense	or Cleaned:	October 6			
Notes:		No ac	djustments made.		
Calibration by:	Braiden Boutilier				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS30 ELLS RIVER JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Ells River January 10, 2023 10:08 Routine		Station number: Last Cal Date: End time (MST):	AMS 30 December 2, 2022 13:15	
		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:	API T700 API T701H		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:	1.005272 -2.195981	1.003501 -2.675936	Backgd or Offset: Coeff or Slope:	9.1 0.978	9.3 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/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.5	
as found span	4921	79.2	800.4	790.7	1.012
as found 2nd point as found 3rd point					
new cylinder response	5000				
calibrator zero	5000	0.0	0.0	-0.1	
high point	4921	79.2	800.4	802.0	0.998
second point third point	4960 4980	39.6 19.8	400.2 200.1	<u> </u>	1.008
•		0.0	0.0	-0.3	1.021
as left zero as left span	5000 4921	79.2	800.4	803.1	0.997
as ieit spail	4721	13.2		ge Correction Factor	1.009
Baseline Corr As found:	791.20	Previous response		*% change	-1.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiat	

Adjusted the span only.

Calibration Performed By:

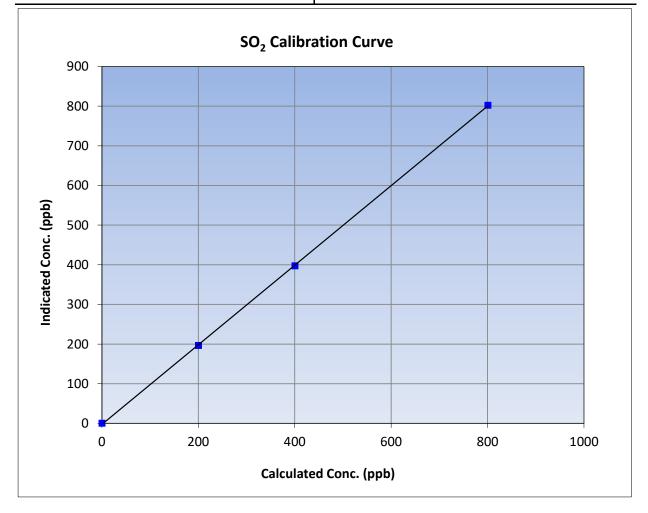


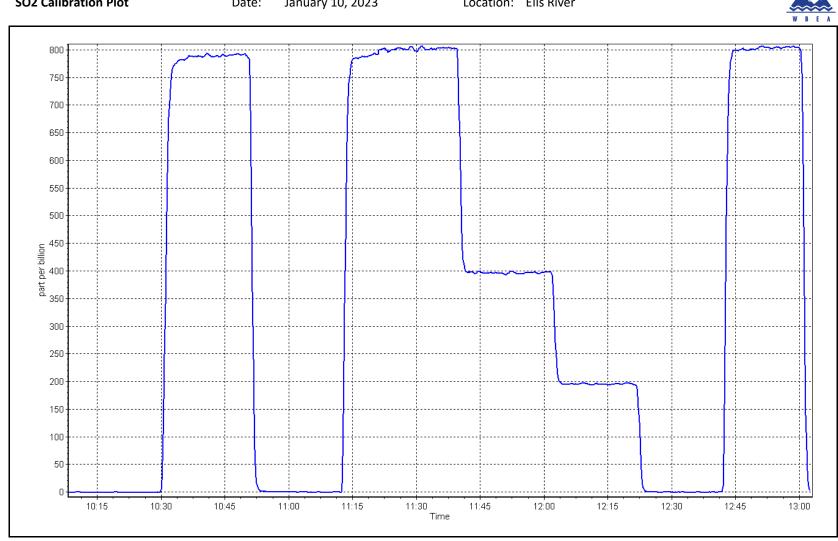
SO₂ Calibration Summary

W B E A			Version-01-2020				
Station Information							
Calibration Date:	January 10, 2023	Previous Calibration:	December 2, 2022				
Station Name:	Ells River	Station Number:	AMS 30				
Start Time (MST):	10:08	End Time (MST):	13:15				
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841397				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999951	≥0.995
800.4	802.0	0.9980	correlation coefficient	0.9999951	20.995
400.2	397.0	1.0081	Slope	1.003501	0.90 - 1.10
200.1	196.0	1.0210	Slope	1.003501	0.90 - 1.10
			Intercept	-2.675936	+/-30





Date: January 10, 2023 Location: Ells River





TRS Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Ells River January 5, 2023 8:33 Routine		Station number: Last Cal Date: End time (MST):	AMS30 December 5, 2022 12:20	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.08 EY0002443	ppm	Cal Gas Exp Date:	February 9, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.08	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701H		Serial Number: Serial Number:	3061 358	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i TLE CDN - 101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1410661331 555	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.027511	1.029508	Backgd or Offset:	1.58	1.59
Calibration intercept:	0.160157	0.140267	Coeff or Slope:	1.123	1.123
		TRS As 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	82.2	0.973
as found 2nd point	4961	39.4	40.0	40.7	0.983
as found 3rd point	4980	19.7	20.0	20.3	0.986
new cylinder response					
		TRS 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	78.7	80.0	82.5	0.969
second point	4961	39.4	40.0	41.3	0.969
third point	4980	19.7	20.0	20.7	0.967
as left zero	5000	0.0	0.0	0.4	
as left span	4921	78.7	80.0	82.3	0.972
SO2 Scrubber Check	4921	79.2	800.4	-0.1	
Date of last scrubber cha	inge:	N/A		Ave Corr Factor	0.968
Date of last converter ef	ficiency test:	N/A		95.1%	efficiency
Baseline Corr As found:	82.2	Prev response:	82.32	*% change:	-0.2%
Baseline Corr 2nd AF pt:	40.7	AF Slope:	1.028504	AF Intercept:	-0.199604
Baseline Corr 3rd AF pt:	20.3	AF Correlation:			
				* = > +/-5% change initia	tes investigation

Notes:

No adjustments required.

Calibration Performed By:

Denny Ray Estador

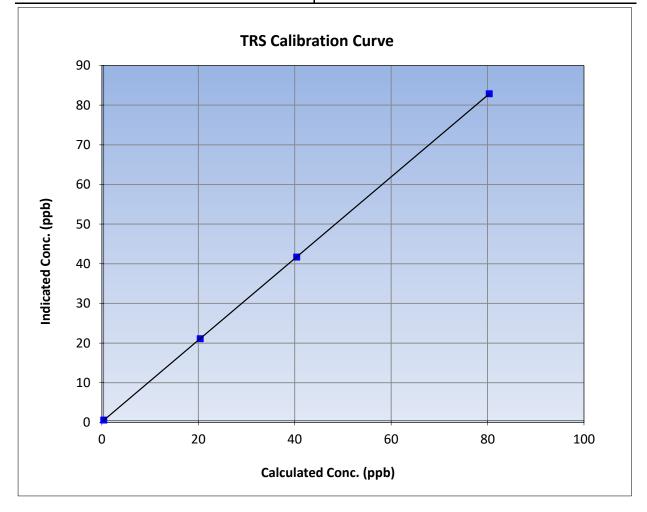


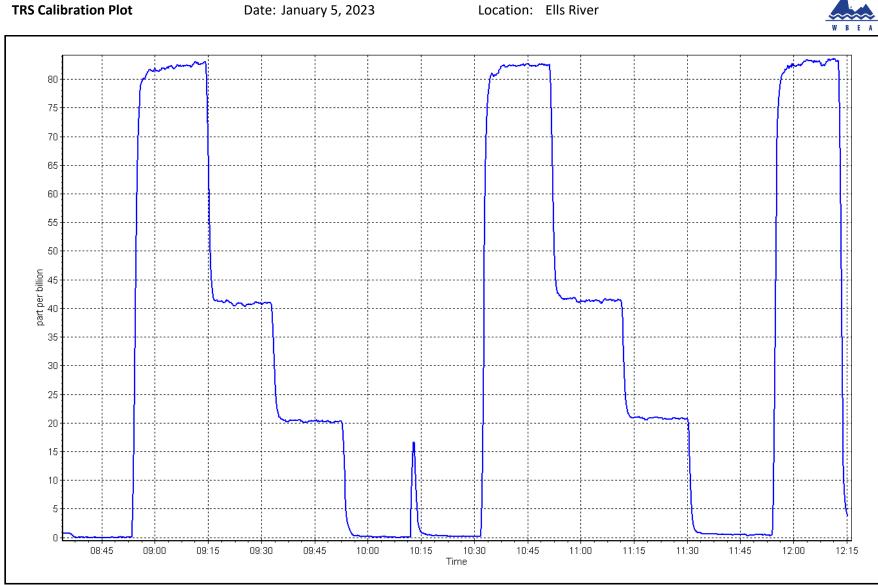
TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	January 5, 2023	Previous Calibration:	December 5, 2022				
Station Name:	Ells River	Station Number:	AMS30				
Start Time (MST):	8:33	End Time (MST):	12:20				
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999997	≥0.995
80.0	82.5	0.9693	correlation coefficient	0.999997	20.333
40.0	41.3	0.9692	Slope	1.029508	0.90 - 1.10
20.0	20.7	0.9670	Siope		0.30 - 1.10
			- Intercept	0.140267	+/-3









THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Sta	tion Information		
Station Name:	Ells River		Station number: A	MS 30	
Calibration Date:	January 1, 2023		Last Cal Date: D	ecember 2, 202	2
Start time (MST):	13:30		End time (MST): 17	7:40	
Reason:	Routine				
		Calib	oration Standards		
Gas Cert Reference:	CC	2494126	Cal Gas Expiry Date: D	ecember 29, 20	28
CH4 Cal Gas Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm
C3H8 Cal Gas Conc.	209.2	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm
Removed C3H8 Conc.	209.2	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄):	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 30	061	
ZAG make/model:	API T701H		Serial Number: 3	58	
		Ana	lyzer Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 12	193585650	
THC Range (ppm):					
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	Finish		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	0.000236	0.0002	56 NMHC SP Ratio:	5.05E-05	5.68E-05
CH4 Retention time:	13.2	13.2	NMHC Peak Area:	182329	177985

THC Calibration Data						
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (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	4921	79.2	17.03	16.94	1.005	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4921	79.2	17.03	16.96	1.004	
second point	4960	39.6	8.51	8.37	1.017	
third point	4980	19.8	4.26	4.16	1.024	
as left zero	5000	0.0	0.00	0.00		
as left span	4921	79.2	17.03	18.76	0.908	
			Av	verage Correction Factor	1.015	
Baseline Corr AF:	16.94	Prev response	16.94	*% change	0.0%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change 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	4921	79.2	9.11	9.05	1.007		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0	0.00	0.00			
high point	4921	79.2	9.11	9.10	1.001		
second point	4960	39.6	4.56	4.52	1.008		
third point	4980	19.8	2.28	2.26	1.009		
as left zero	5000	0	0.00	0.00			
as left span	4921	79.2	9.11	10.19	0.894		
			A	Average Correction Factor	1.006		
Baseline Corr AF:	9.05	Prev response	9.07	*% change	-0.2%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		

CH4	Cal	ibration	Data
CIT	Cu	is a cion	Dutu

		CH4 Calibra	tion 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	79.2	7.91	7.89	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.2	7.91	7.86	1.007
second point	4960	39.6	3.96	3.85	1.027
third point	4980	19.8	1.98	1.90	1.042
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	7.91	8.57	0.924
			A	verage Correction Factor	1.025
Baseline Corr AF:	7.89	Prev response	7.87	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		1.000865		0.997012	
THC Cal Offset:		-0.098736		-0.054536	
CH4 Cal Slope:		1.001593		0.994373	
CH4 Cal Offset:		-0.052956		-0.040955	
NMHC Cal Slope:		0.999982		0.998992	
NMHC Cal Offset:		-0.044780		-0.012581	

N2 cylinder changed at 14:07 MST. No change in response to span. Noticed ambient readings were

below global background, turned on "use zero chromatogram" and calibrated

Notes:

Calibration Performed By:

Ryan Power



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	January	1, 2023	Previous Calibration:	Decembe	r 2, 2022
Station Name:	Ells	River	Station Number:	AMS	5 30
Start Time (MST):	13	:30	End Time (MST):	17:	40
Analyzer make:	Therr	no 55i	Analyzer serial #:	11935	85650
		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	0.999940	≥0.995
17.03	16.96	1.0039			
8.51 4.26	8.37 4.16	1.0170 1.0236	Slope	0.997012	0.90 - 1.10
1.20	4.10	1.0230	Intercept	-0.054536	+/-0.5
18.0				_	
16.0					
14.0					
12.0					
10.0 (bbm) 10.0					
0.6 ulicated					
<u>د</u> 4.0					
2.0					
0.0	-	2	10.0	15.0	20.0
0.0				1511	71111
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

Version-01-2020

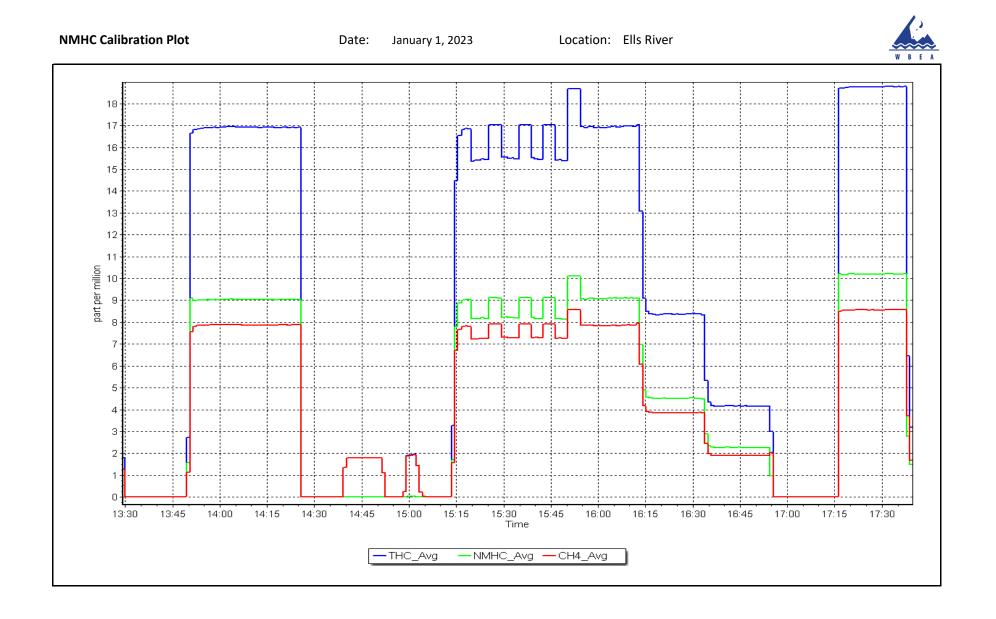
		Station I	nformation		
Calibration Date:	Janua	ary 1, 2023	Previous Calibration:	Decembe	r 2, 2022
Station Name:		ls River	Station Number:	AMS	
Start Time (MST)	:	13:30	End Time (MST):	17:	40
Analyzer make:	The	ermo 55i	Analyzer serial #:	11935	85650
		Calibra	tion Data		
Calculated concentra (ppm) (Cc)	tion Indicated concentratio (ppm) (Ic)	On Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 7.91	0.00 7.86	1.0074	Correlation Coefficient	0.999856	≥0.995
3.96	3.85	1.0272	Slope	0.004272	0.00 1.10
1.98	1.90	1.0415	Slope	0.994373	0.90 - 1.10
			Intercept	-0.040955	+/-0.5
9.0 - 8.0 - 7.0 - 6.0 - E					
dd 5.0 - ວເ					
og 4.0-					
Indicated Conc. (ppm) - 0.6					
- 2.0 -					
1.0 -					
0.0					10.0
0	.0 2.0		6.0	8.0	10.0
		Calculated	l Conc. (ppm)		



NMHC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	January 1, 2023		Previous Calibration:	December 2, 2022	
Station Name:	Ells River		Station Number:	AMS	5 30
Start Time (MST):	rt Time (MST): 13:30		End Time (MST): 1		40
Analyzer make:	nalyzer make: Thermo 55i		Analyzer serial #: 1193		85650
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
9.11	9.10	1.0013		0.333300	
4.56	4.52	1.0079 1.0085	Slope	0.998992	0.90 - 1.10
2.20	2.20	1.0005	– Intercept -0.01258		+/-0.5
9.0					
8.0					
(6.0					
0.6 bbm 0.7 bbm 0.7 bbm 0.7 bbm					
4.0					
ip 3.0					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
		Calculated	l Conc. (ppm)		





THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020	
		Stati	on Information			
Station Name:	Ells River		Station number: Al			
Calibration Date:	January 2, 2023		Last Cal Date: January 1, 2023			
Start time (MST):	10:20					
Reason:	Routine					
		Calibr	ration Standards			
Gas Cert Reference:	C	C494126	Cal Gas Expiry Date: De	ecember 29, 20)28	
CH4 Cal Gas Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm	
C3H8 Cal Gas Conc.	209.2	ppm				
Removed Gas Cert:			Removed Gas Expiry:			
Removed CH4 Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm	
Removed C3H8 Conc.	209.2	ppm	Diff between cyl (THC):			
Diff between cyl (CH ₄):	:		Diff between cyl (NM):			
Calibrator Model:	API T700		Serial Number: 30	061		
ZAG make/model:	API T701H		Serial Number: 35	58		
		Analy	zer Information			
Analyzer make: Thermo 55i			Analyzer serial #: 11	193585650		
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:	0.000256	0.000234	NMHC SP Ratio:	5.68E-05	5.04E-05	
CH4 Retention time:	13.2	13.2	NMHC Peak Area:	177985	180847	

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <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	18.22	0.934
as found 2nd point	4960	39.6	8.51	8.89	0.958
as found 3rd point	4980	19.8	4.26	4.38	0.973
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.2	17.03	17.10	0.996
second point	4960	39.6	8.51	8.41	1.012
third point	4980	19.8	4.26	4.14	1.030
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	17.03	17.12	0.995
			Aver	rage Correction Factor	1.013
Baseline Corr AF:	18.22	Prev response	16.92	*% change	7.1%
Baseline Corr 2nd AF:	8.9	AF Slope:	1.072185	AF Intercept:	-0.116558
Baseline Corr 3rd AF:	4.4	AF Correlation:	0.999774	* = > +/-5% change initiates investigation	



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	79.2	9.11	9.88	0.922			
as found 2nd point	4960	39.6	4.56	4.84	0.941			
as found 3rd point	4980	19.8	2.28	2.40	0.951			
new cylinder response								
calibrator zero	5000	0	0.00	0.00				
high point	4921	79.2	9.11	9.17	0.994			
second point	4960	39.6	4.56	4.53	1.006			
third point	4980	19.8	2.28	2.24	1.019			
as left zero	5000	0	0.00	0.00				
as left span	4921	79.2	9.11	9.18	0.993			
			Aver	age Correction Factor	1.006			
Baseline Corr AF:	9.88	Prev response	9.09	*% change	8.0%			
Baseline Corr 2nd AF:	4.8	AF Slope:	1.085893	AF Intercept:	-0.049795			
Baseline Corr 3rd AF:	2.4	AF Correlation:	0.999854	* = > +/-5% change initiat	es investigation			

CH4 Calibration Data

		CH4 Calibra	lion Data				
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4921	79.2	7.91	8.34	0.949		
as found 2nd point	4960	39.6	3.96	4.05	0.978		
as found 3rd point	4980	19.8	1.98	1.98	0.999		
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4921	79.2	7.91	7.94	0.997		
second point	4960	39.6	3.96	3.88	1.020		
third point	4980	19.8	1.98	1.90	1.042		
as left zero	5000	0.0	0.00	0.00			
as left span	4921	79.2	7.91	7.94	0.997		
			Aver	age Correction Factor	1.020		
Baseline Corr AF:	8.34	Prev response	7.83	*% change	6.1%		
Baseline Corr 2nd AF:	4.05	AF Slope:	1.056173	AF Intercept:	-0.065963		
Baseline Corr 3rd AF:	1.98	AF Correlation:	0.999667	* = > +/-5% change initiat	es investigation		
		Calibration	Statistics				
		<u>Start</u>		<u>Finish</u>			
THC Cal Slope:		0.997012		1.006389			
THC Cal Offset:		-0.054536		-0.085138			
CH4 Cal Slope:		0.994373	1.004928				
CH4 Cal Offset:		-0.040955		-0.050756			
NMHC Cal Slope:		0.998992		1.007959			
NMHC Cal Offset:		-0.012581		-0.034582			

Notes:

Troubleshooting after yesterdays failed As Lefts and todays high daily span. Pump changed after As Founds. Tested options for data processing, "use zero chrome" turned on

Calibration Performed By:

Ryan Power



THC Calibration Summary

Version-01-2020

		Station I	nformation			
Calibration Date:	January	2, 2023	Previous Calibration:	January	1, 2023	
Station Name:	Ells	River	Station Number:	AMS	5 30	
Start Time (MST):	10	:20	End Time (MST):	: 14:51		
Analyzer make:	Thern	no 55i	Analyzer serial #:	Analyzer serial #: 1193585650		
		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	0.999878	≥0.995	
17.03 8.51	17.10 8.41	0.9955				
4.26	4.14	1.0295	Slope	1.006389	0.90 - 1.10	
			Intercept	-0.085138	+/-0.5	
18.0				_		
16.0						
14.0						
12.0						
0.0 (bbm) 0.0 couc 8.0						
0.6 udicated						
드 4.0						
2.0						
0.0						
0.0	5	.0	10.0	15.0	20.0	
			l Conc. (ppm)			



CH₄ Calibration Summary

Version-01-2020

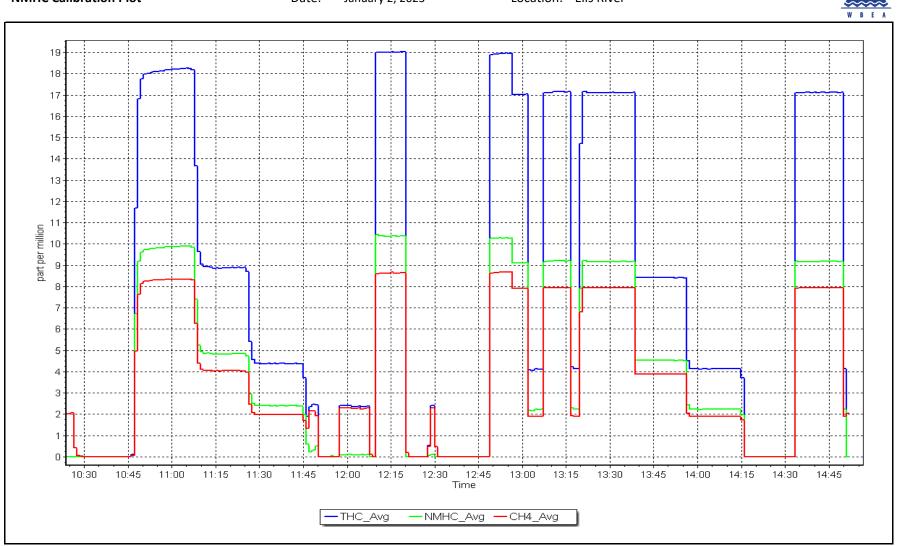
							Version-01-202
			Station	Information			
Calibration Date	:	January	2, 2023	Previous C	alibration:	January	1, 2023
Station Name:		Ells R	liver	Statio	n Number:	AMS	30
Start Time (MST):	10:	20	End T	End Time (MST): 14:51		51
Analyzer make:		Therm	no 55i	Analyz	er serial #:	119358	35650
			Calib	ration Data			
Calculated concentr (ppm) (Cc)	ration Indicated co (ppm		Correction factor (Cc/l	:)	Statistical Eval	uation	<u>Limits</u>
0.00	0.0			- Correlation	Coefficient	0.999797	≥0.995
7.91	7.9		0.9975				
3.96 1.98	3.8		1.0196 1.0415	– Slop	be	1.004928	0.90 - 1.10
			1.0 110	Interc	cept	-0.050756	+/-0.5
8.0 7.0 6.0							
Indicated Conc. (ppm) 3.0							
u o b i							
0.6 dicate							
– 2.0							
1.0							
0.0	0.0	2.0	4.0	(5.0	8.0	10.0
			Calculat	ed Conc. (pp	m)		



NMHC Calibration Summary

Version-01-2020

			Station I	nformation			
Calibratio	on Date:	Janua	ry 2, 2023	Previous Calibr	ration:	January	1, 2023
tation Na	ame:	El	s River	Station Nu	ımber:	AMS 30	
tart Time	e (MST):	:	10:20	End Time	(MST):	14:	51
Analyzer r	make:	The	ermo 55i	Analyzer se	erial #:	119358	85650
			Calibra	ation Data			
	concentrationn) (Cc)	tion Indicated concentration (ppm) (Ic) Correction factor (Cc/Id		Stat	tistical Evalua	tion	<u>Limits</u>
	.00	0.00		Correlation Coef	ficient	0.999929	≥0.995
	.11	9.17 4.53	0.9935				
	.28	2.24	1.0189	- Slope		1.007959	0.90 - 1.10
				Intercept		-0.034582	+/-0.5
	9.0						•
:	10.0						
	8.0						
	7.0				/		
(mq	6.0			/			
Conc. (ppm)	5.0						
	4.0 -						
ate							
Indicated	3.0						
-	2.0 -						
	1.0 -						
	0.0 🚅 0.0) 2.0	4.0	6.0		8.0	10.0
				d Conc. (ppm)			
			Calculated	a conc. (ppin)			



Date: January 2, 2023

Location: Ells River

3



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station	Information				
Station Name: Calibration Date: Start time (MST): Reason:	Ells River January 13, 20 9:13 Routine)23	Station number: AMS 30 Last Cal Date: December 12, 2022 End time (MST): 13:30					
			Calibrati	on Standards				
NO Gas Cylinder #:		T2Y1P2R		Cal Gas Expiry Date: De	cember 11, 20	023		
NOX Cal Gas Conc: Removed Cylinder #:	50.83	ppm		NO Cal Gas Conc: Removed Gas Exp Date:	49.97	ppm		
Removed Gas NOX Conc: NOX gas Diff:	50.83	ppm		Removed Gas NO Conc: NO gas Diff:	49.97	ppm		
Calibrator Model: ZAG make/model:	API T700 API T701H			Serial Number: 30 Serial Number: 35				
			Analyzei	Information				
Analyzer make: NOX Range (ppb):				Analyzer serial #: 71	0321429			
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>		
NO coeff or slope:	1.017		1.029	NO bkgnd or offset:	12.4	12.6		
NOX coeff or slope:	0.995		0.992	NOX bkgnd or offset:	12.3	12.5		
NO2 coeff or slope:	1.000		1.000	Reaction cell Press:	182.1	181.5		

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000562	0.998693
NO _x Cal Offset:	-1.060000	-0.720000
NO Cal Slope:	0.996669	0.997541
NO Cal Offset:	-1.600000	-1.280000
NO ₂ Cal Slope:	1.009494	1.000846
NO ₂ Cal Offset:	0.761787	0.511635



$NO_X \setminus NO \setminus NO_2$ 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	-0.3	0.4		
as found span	4920	80.0	813.3	799.5	13.8	808.1	789.2	18.9	1.0064	1.0131
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3		
high point	4920	80.0	813.3	799.5	13.8	812.0	797.1	14.6	1.0016	1.0030
second point	4960	40.0	406.6	399.8	6.9	404.9	396.3	8.6	1.0043	1.0087
third point	4980	20.0	203.3	199.9	3.4	201.3	197.2	4.1	1.0100	1.0136
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as left span	4920	80.0	813.3	433.3	380.0	813.5	430.9	382.6	0.9997	1.0056
							Average C	orrection Factor	1.0053	1.0085
Corrected As fo	ound NO _X =	808.1 ppb	NO =	789.5 ppb	* = > +/-59	% change initiates i	investigation	*Percent Chan	ge NO _x =	-0.6%
Previous Respo	nse NO _x =	812.7 ppb	NO =	795.3 ppb				*Percent Chan	ge NO =	-0.7%
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)	793.7	427.5	380.0	380.5	0.9986	100.1%
2nd GPT point (200 ppb O3)	793.7	614.7	192.8	194.1	0.9931	100.7%
3rd GPT point (100 ppb O3)	793.7	702.2	105.3	105.7	0.9958	100.4%
				Average Correction Factor	0.9958	100.4%

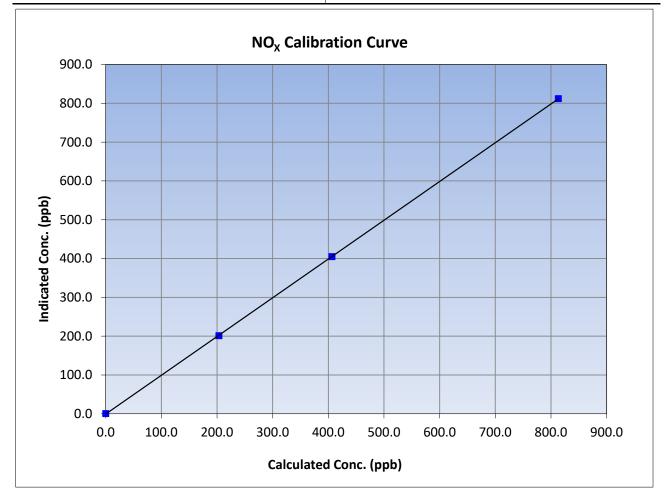
Notes:

Adjusted the span only.



NO_x Calibration Summary

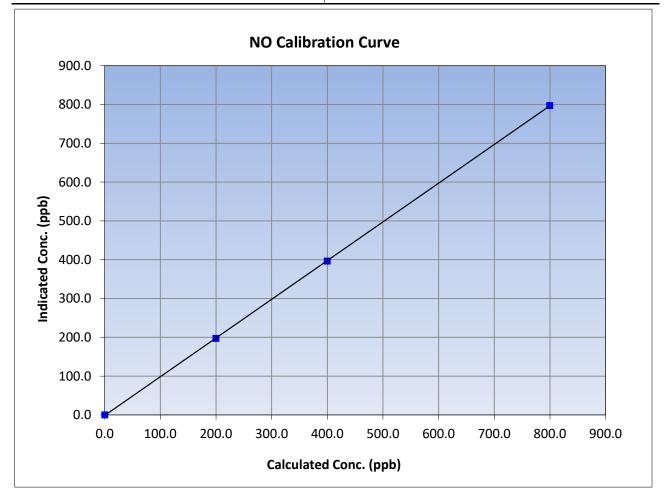
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	13, 2023	Previous Calibration:	Decembe	r 12, 2022
Station Name:	Ells	River	Station Number:	AM	S 30
Start Time (MST):	9:13		End Time (MST):	13	:30
Analyzer make: Thermo 42i			Analyzer serial #:	71032	21429
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999993	≥0.995
813.3	812.0	1.0016	correlation coernelent	0.5555555	20.995
406.6	404.9	1.0043	Claura,	0.998693	0.90 - 1.10
203.3	201.3	1.0100	Slope	0.998095	0.90 - 1.10
			Intercept	-0.720000	+/-20





NO Calibration Summary

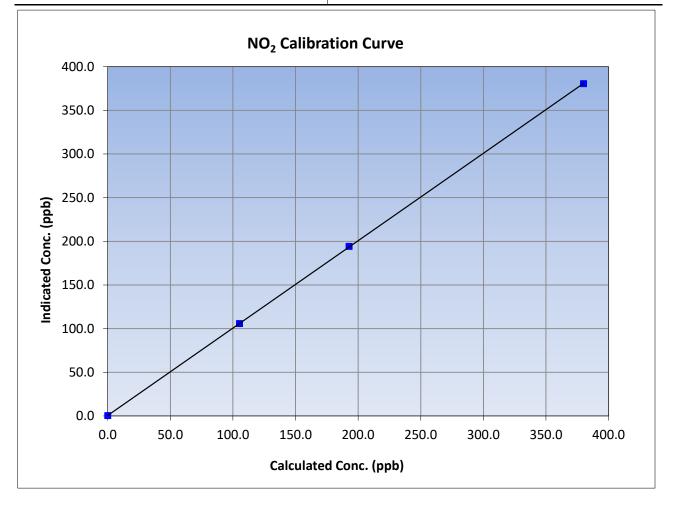
WBEA					Version-04-20
		Station	Information		
Calibration Date:	January	13, 2023	Previous Calibration:	Decembe	r 12, 2022
Station Name:	Ells River		Station Number:	AM	S 30
Start Time (MST):	9:13		End Time (MST):	13	:30
Analyzer make:				71032	21429
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999987	≥0.995
799.5	797.1	1.0030	correlation coefficient	0.999907	20.995
399.8	396.3	1.0087	Clana	0.997541	0.90 - 1.10
199.9	197.2	1.0136	Slope	0.997541	0.90 - 1.10
			Intercept	-1.280000	+/-20

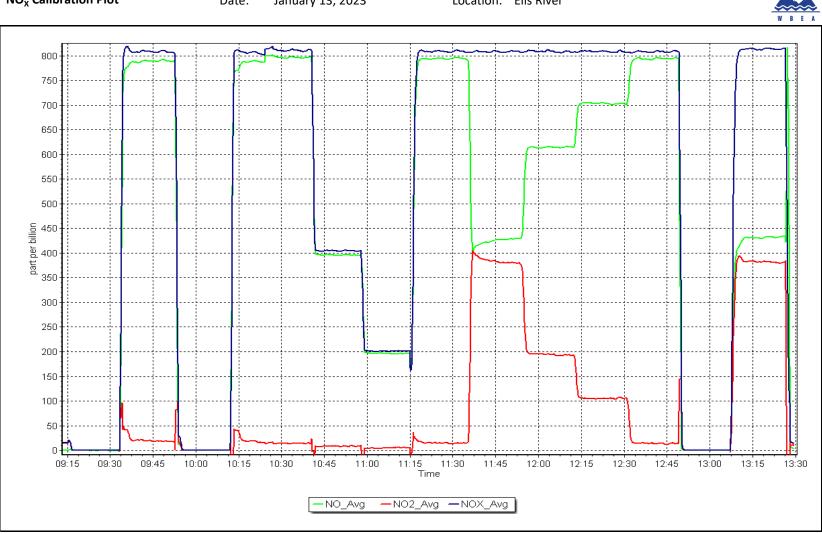




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	January	13, 2023	Previous Calibration:	Decembe	r 12, 2022	
Station Name:	Ells River		Station Number:	AM	S 30	
Start Time (MST):	9:13		End Time (MST):	13	:30	
Analyzer make: Thermo 42i			Analyzer serial #:	71032	710321429	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999992	≥0.995	
380.0	380.5	0.9986	correlation coefficient	0.999992	20.995	
192.8	194.1	0.9931	Slope	1.000846	0.90 - 1.10	
105.3	105.7	0.9958	Slope	1.000840	0.90 - 1.10	
			Intercept	0.511635	+/-20	









T640 PM_{2.5} CALIBRATION

W B E A					Version-09-2020
		Station Informati	on		
Station Name: Calibration Date: Start time (MST):	Ells River January 5, 2023 11:42		Station number: AMS 3 Last Cal Date: Decer End time (MST): 12:00		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 875		
Flow Meter Make/Model: Temp/RH standard:	Delta Cal Delta Cal		S/N: 954 S/N: 954		
		Monthly Calibration	Test		
<u>Parameter</u> T ([°] C) P (mmHg) flow (LPM)	<u>As found</u> -12.5 731.6 5.02	<u>Measured</u> -11.9 730.5 5.19	<u>As left</u> -12.5 731.6 5.02	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	January 5, 2023 12.4	Last Cal Date: PM w/ HEPA:	ember 19, 2022 0.0	,
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	n Test		
<u>Parameter</u> PMT Peak Test	<u>As found</u>	Measured	<u>As left</u>	Adjusted	(Limits) 10.9 +/- 0.5
Date Optical Chan Disposable Filte		December 1 December 1			
		Annual Maintena	nce		
Date Sample Tul Date RH/T Sens		October 17 October 17	,		
Notes:		No adjustments requi	ired. Inspect inlet head; stil	l clean.	
Calibration by:	Denny Ra	y Estador			



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS506 JACKFISH 1 JANUARY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 1 January 24, 2023 10:05 Routine		Station number: Last Cal Date: End time (MST):	AMS 506 December 16, 2022 12:49	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	<u>50.52</u> CC274266	ppm	Cal Gas Exp Date:	December 29, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	<u>50.52</u> NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	API T700 API 701		Serial Number: Serial Number:	2659 4427	
		Analyzer Info	rmation		
Analyzer make Analyzer Range		-	Analyzer serial #:	1160290011	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.004057 -1.476056	1.006642 -1.856099	Backgd or Offset: Coeff or Slope:		19.0 0.960
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	orrection factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.6	
as found span	4921	79.2	800.2	803.6	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	
high point	4921	79.2	800.2	804.0	0.995
second point	4960	39.6	400.2	401.5	0.997
third point	4980	19.8	200.1	197.1	1.015
as left zero	5000	0.0	0.0	-0.3	
as left span	4921	79.2	800.2 Averag	804.3 ge Correction Factor	0.995
Baseline Corr As found:	804.20	Previous response		*% change	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	0.070
	NA	AF Correlation:			

Notes:

Changed inlet filter after as founds. No adjustment made.

Calibration Performed By:

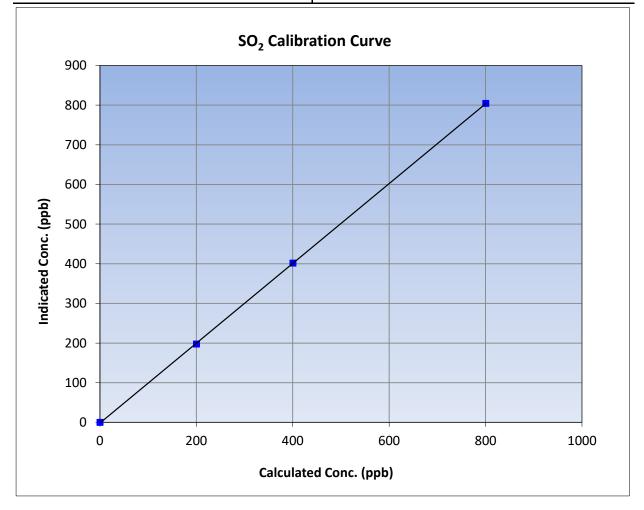


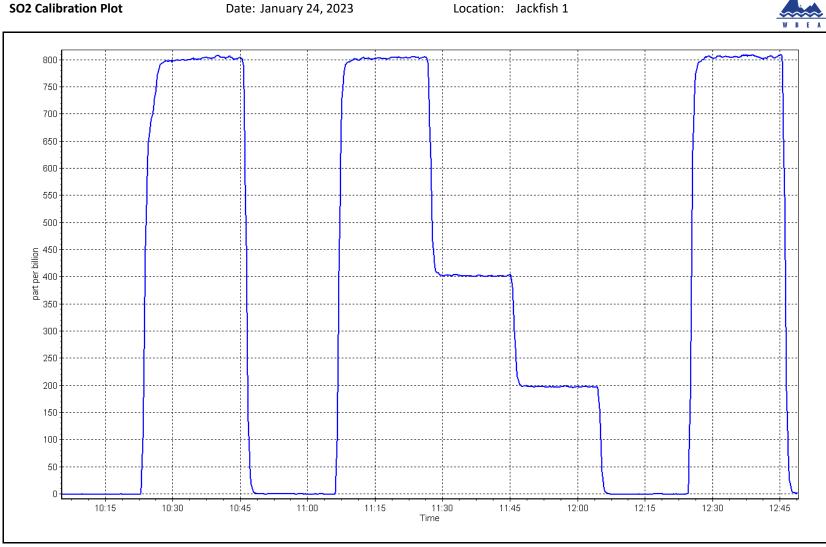
SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: January 24, 2023 **Previous Calibration:** December 16, 2022 Station Name: Jackfish 1 Station Number: AMS 506 Start Time (MST): 10:05 End Time (MST): 12:49 Analyzer make: Thermo 43i Analyzer serial #: 1160290011

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	ation	<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999975	≥0.995
800.2	804.0	0.9953	correlation coefficient	0.999975	20.995
400.2	401.5	0.9966	Slope	1.006642	0.90 - 1.10
200.1	197.1	1.0151	Slope	1.000042	0.90 - 1.10
			- Intercept	-1.856099	+/-30





Location: Jackfish 1





H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 1 January 4, 2023 11:55 Routine		Station number: Last Cal Date: End time (MST):	AMS506 December 20, 2022 16:48	
		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 #: Calibrator Make/Model:	5.14 NA	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 2659	
ZAG Make/Model:	API 700 API 701		Serial Number:	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:	1.005293	0.999436	Backgd or Offset:		1.04
Calibration intercept:	ntercept: -0.338428 -0.058588 Coeff or Slope: 0.774		0.774	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	0.1	
as found span	4922	77.8	80.0	77.0	1.040
as found 2nd point	4961	38.9	40.0	37.3	1.075
as found 3rd point	4981	19.4	19.9	17.5	1.146
new cylinder response					
		H 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	0.3	
high point	4922	77.8	80.0	80.0	1.000
second point	4961	38.9	40.0	39.9	1.002
third point	4981	19.4	19.9	19.4	1.028
as left zero	5000	0.0	0.0	0.6	
as left span	4922	77.8	80.0	79.6	1.005
SO2 Scrubber Check	4921	79.2	792.0	0.1	
Date of last scrubber cha	inge:			Ave Corr Factor	1.010
Date of last converter ef	ficiency test:	December 1, 2022			efficiency
Baseline Corr As found:	76.9	Prev response:	80.07	*% change:	-4.1%
Baseline Corr 2nd AF pt:	37.2	AF Slope:	0.967301	AF Intercept:	-0.859535
Baseline Corr 3rd AF pt:	17.4	AF Correlation:	0.999297	* = > +/-5% change initiate	es investigation
				- × 17 570 change mittate	.5 mycougacion

Arrived to station to investigate low spans, (12.5% low). Hydrator almost empty, inlet filter changed and hydrator filled after third As Found, scrubber check after calibrator zero. Span

adjusted

Calibration Performed By:

Notes:

Ryan Power

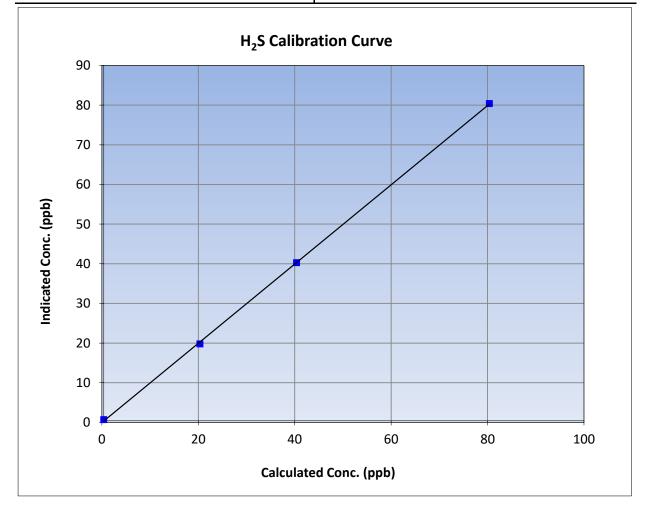


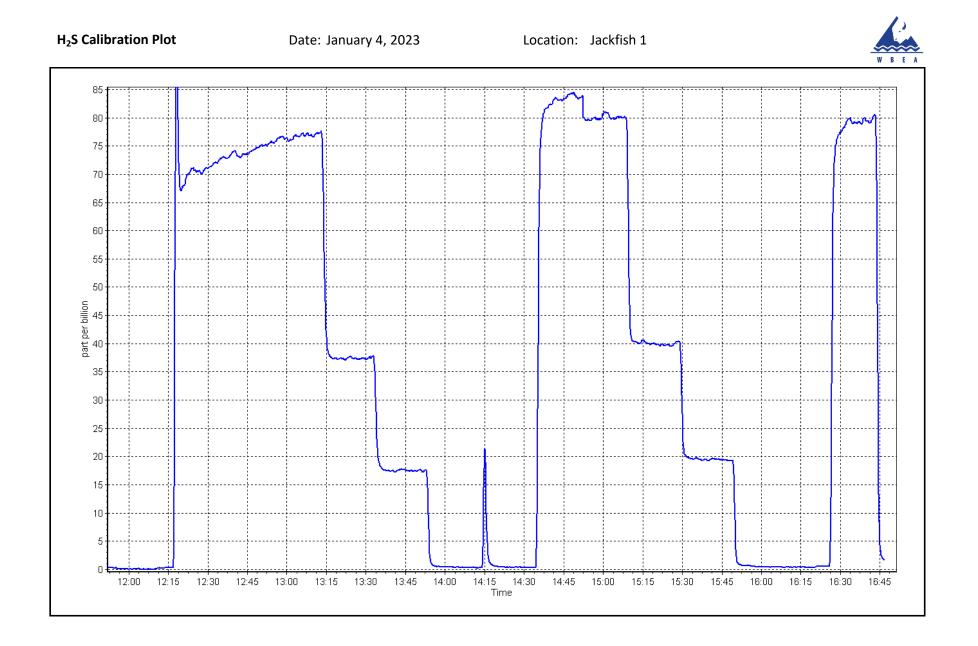
H₂S Calibration Summary

WBEA			Version-11-2021						
Station Information									
Calibration Date:	January 4, 2023	Previous Calibration:	December 20, 2022						
Station Name:	Jackfish 1	Station Number:	AMS506						
Start Time (MST):	11:55	End Time (MST):	16:48						
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12124313139						

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	ation	<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999895	≥0.995	
80.0	80.0	0.9998	correlation coefficient	0.999095	20.333	
40.0	39.9	1.0023	Slope	0.999436	0.90 - 1.10	
19.9	19.4	1.0279	Slope	0.999430	0.90 - 1.10	
			Intercept	-0.058588	+/-3	







H₂S Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
tation Name: Calibration Date: tart time (MST): Reason:	Jackfish 1 January 20, 2023 9:52 Maintenance	H2S low spans.	Station number: Last Cal Date: End time (MST):	AMS506 January 4, 2023 13:56	
		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 #: Calibrator Make/Model: ZAG Make/Model:	CC511843 5.14 NA API T700 API 701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 2659 4427	
	AFI701		Senai Number.	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: Calibration intercept:	0.999436 -0.058588	1.008437 -0.098415	Backgd or Offset: Coeff or Slope:	1.04 0.736	1.04 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 Adjuster Correction facto (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4922	77.8	80.0	72.7	1.102
as found 2nd point	4961	38.9	40.0	35.8	1.120
as found 3rd point	4981	19.4	19.9	17.1	1.173
new cylinder response					
		H 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	0.3	
high point	4922	77.8	80.0	80.7	0.991
second point	4961	38.9	40.0	40.2	0.995
third point	4981	19.4	19.9	19.5	1.023
as left zero	5000	0.0	0.0	0.5	
as left span	4922	77.8	80.0	81.1	0.986
O2 Scrubber Check	4921	79.2	792.0	0.0	
Date of last scrubber cha				Ave Corr Factor	1.003
Date of last converter eff	ticiency test:	December 1, 2022			efficiency
Baseline Corr As found:	72.6	Prev response:		*% change:	-10.0%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	35.7 17.0	AF Slope: AF Correlation:		AF Intercept:	-0.460573

Hydrator is quarter to empty, inlet filter changed and hydrator filled after third As Found, scrubber check after calibrator zero. No adjustment made.

Calibration Performed By:

Notes:

Sean Bala

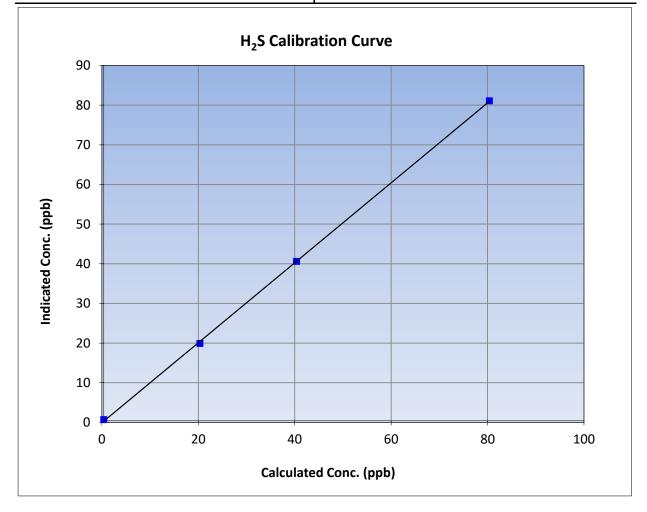


H₂S Calibration Summary

W B E A Version-11-2021 Station Information								
Calibration Date:	January 20, 2023	Previous Calibration:	January 4, 2023					
Station Name:	Jackfish 1	Station Number:	AMS506					
Start Time (MST):	9:52	End Time (MST):	13:56					
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12124313139					

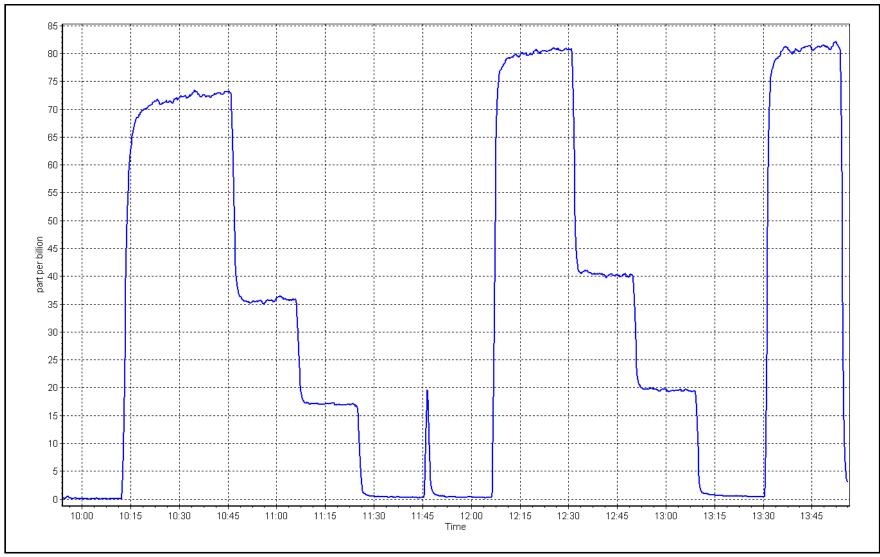
Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999876	≥0.995
80.0	80.7	0.9911	correlation coefficient	0.999870	20.995
40.0	40.2	0.9948	Slope	1.008437	0.90 - 1.10
19.9	19.5	1.0226	Siope	1.008437	0.90 - 1.10
			Intercept	-0.098415	+/-3











$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station	Information		
Station Name:Jackfish 1Station number: AMS506Calibration Date:January 25, 2023Last Cal Date: December 15, 20Start time (MST):9:51End time (MST): 14:18Reason:Routine						2022
			Calibrati	on Standards		
NO Gas Cylinder #:		T26811M		Cal Gas Expiry Date:	Octo	ober 30, 2024
NOX Cal Gas Conc:	<u>47.46</u>	ppm		NO Cal Gas Conc:	<u>47.39</u>	ppm
Removed Cylinder #:		NA		Removed Gas Exp Date:		NA
Removed Gas NOX Conc:	<u>47.46</u>	ppm		Removed Gas NO Conc:	<u>47.39</u>	ppm
NOX gas Diff:				NO gas Diff:		
Calibrator Model:	API T700			Serial Number: 26		
ZAG make/model:	API 701			Serial Number: 44	27	
			Analyze	r Information		
Analyzer make:	Thermo 42i			Analyzer serial #: 12:	18153356	
NOX Range (ppb):	0 - 1000 ppb					
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.146		1.151	NO bkgnd or offset:	3.3	3.3
NOX coeff or slope:			0.991	NOX bkgnd or offset:	3.4	3.4
NO2 coeff or slope:			1.000	Reaction cell Press:	174.3	174.0
			Calibrat	ion Statistics		
			Start		Finish	

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001375	0.999577
NO _x Cal Offset:	-1.128010	-0.847995
NO Cal Slope:	1.003326	1.001211
NO Cal Offset:	-1.767998	-2.027974
NO ₂ Cal Slope:	0.999583	1.000608
NO ₂ Cal Offset:	0.238295	0.007440



$NO_X \setminus NO \setminus NO_2$ 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	799.4	796.5	3.0	1.0021	1.0042
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1		
high point	4916	84.4	801.1	799.9	1.2	800.0	799.5	0.6	1.0013	1.0005
second point	4958	42.2	400.5	400.0	0.6	400.3	398.6	1.6	1.0006	1.0034
third point	4979	21.1	200.3	200.0	0.3	197.3	195.1	2.3	1.0151	1.0250
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0		
as left span	4916	84.4	801.1	416.2	384.9	795.9	411.4	384.4	1.0065	1.0116
							Average C	orrection Factor	1.0057	1.0096
Corrected As fo	und NO _x =	799.3 ppb	NO =	796.4 ppb	* = > +/-5	% change initiates i	investigation	*Percent Chang	ge NO _x =	-0.2%
Previous Respo	nse NO _x =	801.0 ppb	NO =	800.8 ppb				*Percent Chang	ge NO =	-0.5%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (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)	794.2	410.5	384.9	385.2	0.9992	100.1%
2nd GPT point (200 ppb O3)	794.2	588.8	206.6	206.6	0.9999	100.0%
3rd GPT point (100 ppb O3)	794.2	686.7	108.7	108.7	0.9998	100.0%
				Average Correction Factor	0.9996	100.0%

Notes:

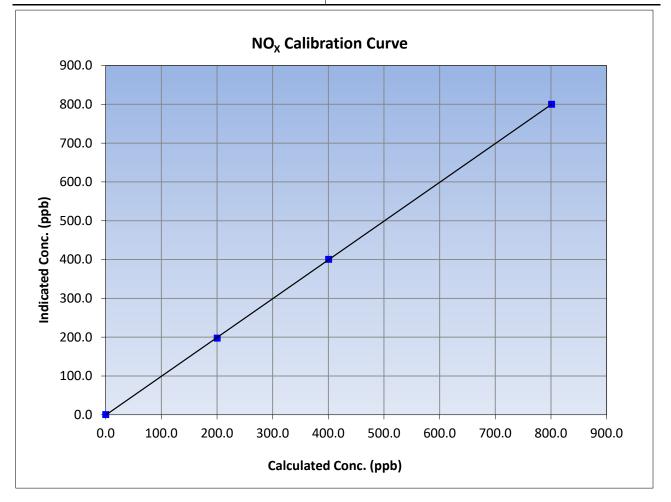
Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

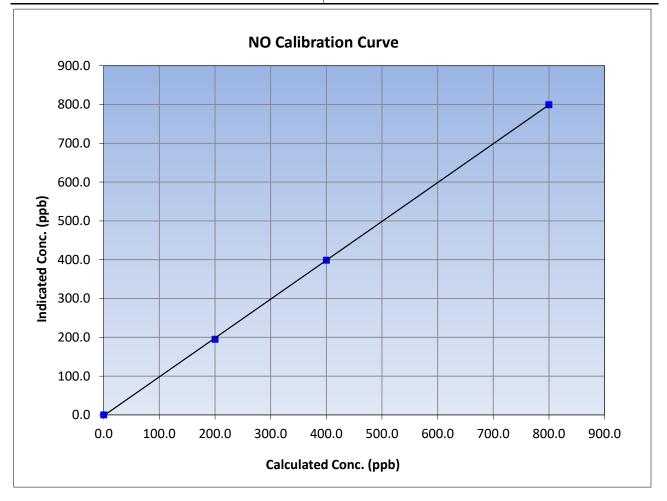
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	25, 2023	Previous Calibration:	Decembe	r 15, 2022
Station Name:	Jackfish 1		Station Number:	AMS	506
Start Time (MST):	9:51		End Time (MST):	14	:18
Analyzer make: Thermo 42i			Analyzer serial #: 121815		53356
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999983	≥0.995
801.1	800.0	1.0013	correlation coefficient	0.555565	20.333
400.5	400.3	1.0006	Slope	0.999577	0.90 - 1.10
200.3	197.3	1.0151	Slope	0.333577	0.90 - 1.10
			Intercept	-0.847995	+/-20





NO Calibration Summary

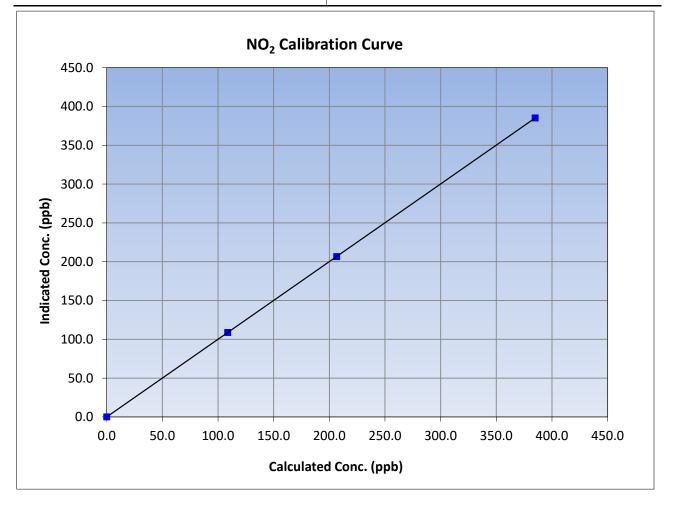
WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	25, 2023	Previous Calibration:	Decembe	r 15, 2022
Station Name:	Jackt	fish 1	Station Number:	AMS	506
Start Time (MST):	9:	51	End Time (MST):	14	:18
Analyzer make: Thermo 42i			Analyzer serial #: 121815		53356
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999957	≥0.995
799.9	799.5	1.0005	correlation coernicient	0.555557	20.995
400.0	398.6	1.0034	Slope	1.001211	0.90 - 1.10
200.0	195.1	1.0250	Siope	1.001211	0.90 - 1.10
			Intercept	-2.027974	+/-20

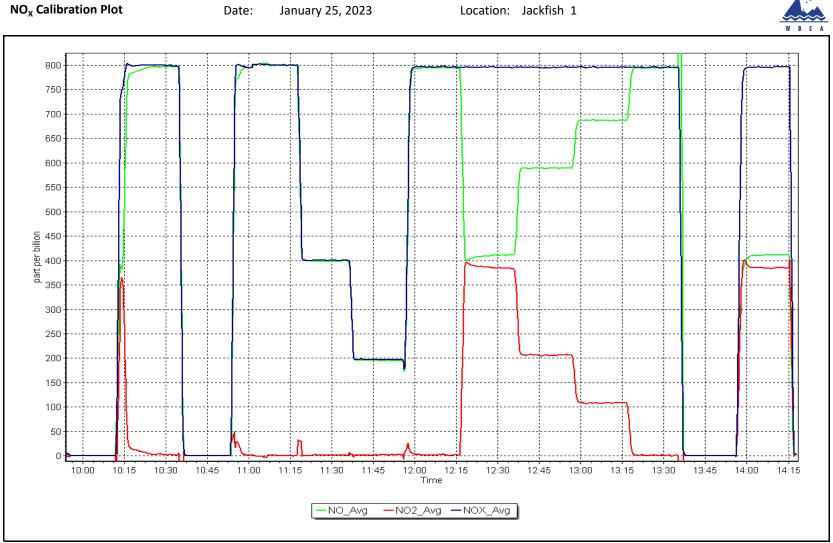




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	January	25, 2023	Previous Calibration:	Decembe	r 15, 2022
Station Name:	Jackfish 1		Station Number:	AMS	506
Start Time (MST):	9:51		End Time (MST):	14	:18
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	0.1		Correlation Coefficient	1.000000	≥0.995
384.9	385.2	0.9992	correlation coefficient	1.000000	20.333
206.6	206.6	0.9999	Class	1.000608	0.90 - 1.10
108.7	108.7	0.9998	Slope	1.000008	0.90 - 1.10
			Intercept	0.007440	+/-20







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS508 KIRBY NORTH JANAURY 2023

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

February 28, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North January 11, 2023 9:07 Routine		Station number: Last Cal Date: End time (MST):	AMS508 December 7, 2022 15:03	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	49.18 <u>CC303554</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	49.18 <u>NA</u> API T700 API T701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3804 880	
		Analyzer Info	rmation		
Analyzer make Analyzer Rang	e: Thermo 43iQ e 0 - 1000 ppb		Analyzer serial #:	1182340007	
Calibration slope: Calibration intercept:	<u>Start</u> 0.999463 0.231120	<u>Finish</u> 1.001350 -0.328940	Backgd or Offset: Coeff or Slope:	<u>Start</u> 19.6 1.167	<u>Finish</u> 19.2 1.151
		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	0.2	
as found span	4919	81.3	799.6	820.7	0.974
as found 2nd point	4959	40.7	400.3	408.1	0.981
as found 3rd point	4980	20.3	199.7	204.3	0.977
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	81.3	799.6	801.0	0.998
second point	4959	40.7	400.3	399.3	1.003
third point as left zero	4980 5000	20.3	<u> </u>	<u> 199.6</u> 0.2	1.000
as left span	4919	81.3	799.6	801.0	0.998
	7717	01.5		ge Correction Factor	1.000
Baseline Corr As found:	820.50	Previous response	799.42	*% change	2.6%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	407.90 204.10	AF Slope: AF Correlation:		AF Intercept:	-0.688756
				* = > +/-5% change initiate	es investigation

Notes:

Changed sample inlet filter after as founds. Swapped out weak external pump. Adjusted span.

Calibration Performed By:

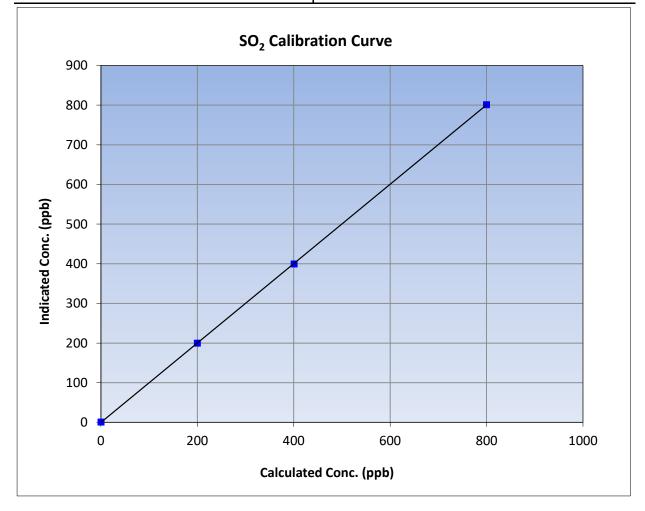


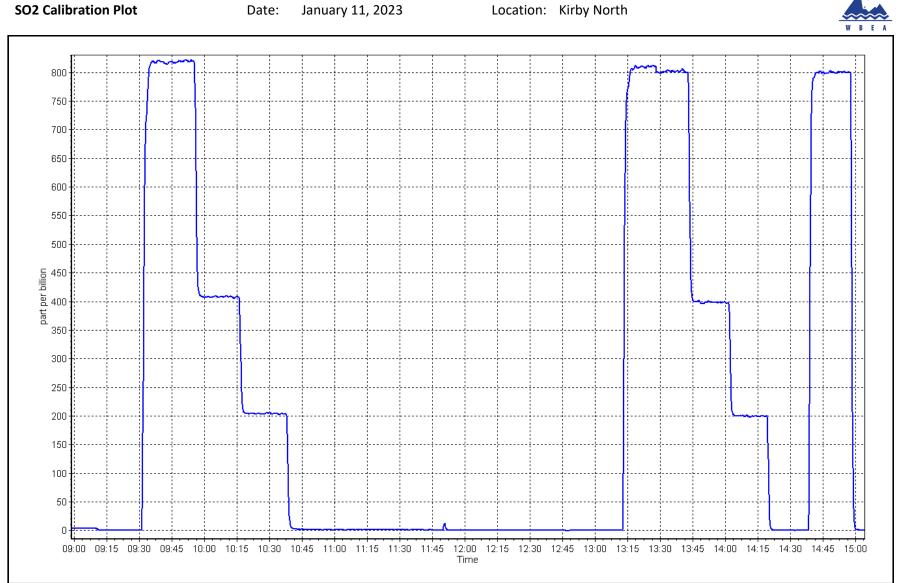
SO₂ Calibration Summary

WBEA			Version-01-2020				
Station Information							
Calibration Date:	January 11, 2023	Previous Calibration:	December 7, 2022				
Station Name:	Kirby North	Station Number:	AMS508				
Start Time (MST):	9:07	End Time (MST):	15:03				
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1182340007				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999993	≥0.995
799.6	801.0	0.9983	correlation coefficient	0.999993	20.995
400.3	399.3	1.0026	Slope	1.001350	0.90 - 1.10
199.7	199.6	1.0003		1.001350	0.90 - 1.10
			Intercept	-0.328940	+/-30







H₂S Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North January 12, 2023 8:05 Routine		Station number: Last Cal Date: End time (MST):	AMS508 December 8, 2022 12:36	
		Calibration S	tandards		
Cal Gas Concentration:	5.167	ppm	Cal Gas Exp Date:	February 5, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	<u>CC517378</u> 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	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.000172 -0.160960	1.007171 -0.280963	Backgd or Offset: Coeff or Slope:		1.76 1.058
		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	4923	77.4	80.0	82.3	0.969
as found 2nd point	4961	38.8	40.1	40.8	0.978
as found 3rd point	4981	19.3	19.9	20.1	0.982
new cylinder response					
		H ₂ S Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	-0.1	
high point	4923	77.4	80.0	80.4	0.995
second point	4961	38.8	40.1	39.9	1.005
third point	4981	19.3	19.9	19.7	1.012
as left zero	5000	0.0	0.0	0.1	
as left span	4923	77.4	80.0	80.3	0.996
O2 Scrubber Check	4920	79.8	798.0	0.0	
Date of last scrubber cha	-	27-Nov-19		Ave Corr Factor	1.004
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	82.5	Prev response:	79.83	*% change:	3.2%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	41.0 20.3	AF Slope: AF Correlation:		AF Intercept:	-0.380988
				* = > +/-5% change initiate	es investigation

Changed sample inlet filter after as founds. First scrubber check failed. After rehydrating using DI water in a hydrator second test passed. No adjustments made.

Calibration Performed By:

Notes:

Braiden Boutilier

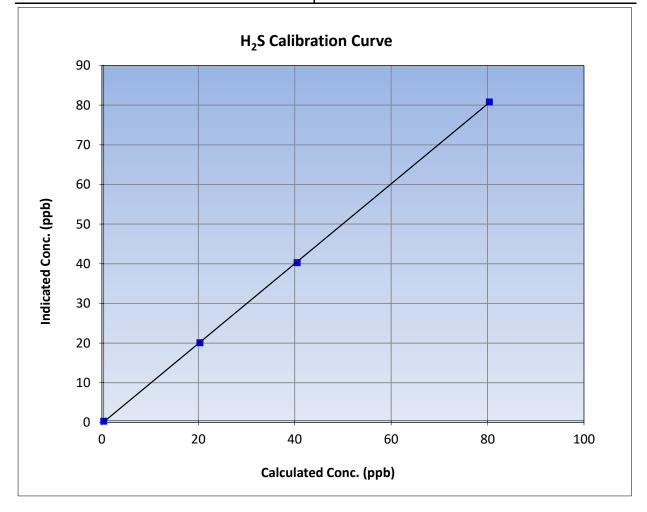


H₂S Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	January 12, 2023	Previous Calibration:	December 8, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	8:05	End Time (MST):	12:36
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012

Calibration Data

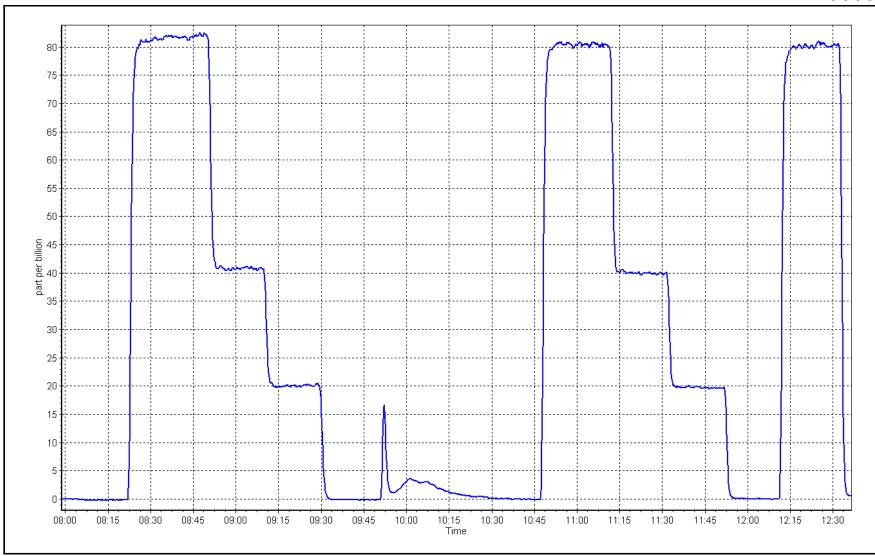
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999971	≥0.995
80.0	80.4	0.9948	Correlation Coefficient	0.999971	20.995
40.1	39.9	1.0050	Slope	1.007171 0.9	0.90 - 1.10
19.9	19.7	1.0124	Siope		0.90 - 1.10
			Intercept	-0.280963	+/-3













THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North January 11, 2023 9:07 Routine		Station number: Last Cal Date: End time (MST):	AMS508 December 7, 2022 15:03	
		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:	496.6 205.5 API T700 API T701H	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> 0.996667 0.016195	<u>Finish</u> 0.999219 -0.026583	Background: Coefficient:	<u>Start</u> 4.750 5.494	<u>Finish</u> 2.820 3.789
		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	-0.91	
as found span	4919	81.3	17.26	16.61	1.039
as found 2nd point	4959	40.7	8.64	7.75	1.116
as found 3rd point	4980	20.3	4.31	3.37	1.279
new cylinder response					
calibrator zero	5000	0.0	0.00	0.01	
high point	4919	81.3	17.26	17.25	1.001
second point	4959	40.7	8.64	8.56	1.010
third point	4980	20.3	4.31	4.27	1.009
as left zero	5000	0.0	0.00	-0.04	
as left span	4919	81.3	17.26	17.31	0.997
Baseline Corr As found:	17.52	Previous response	Averaş	ge Correction Factor *% change	1.007 1.7%
Baseline Corr As round: Baseline Corr 2nd AF pt:	8.66	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	4.28	AF Correlation:	0.999937	* = > +/-5% change initia	

Notes: Changed sample inlet filter after as founds. Changed internal pump on the 51i after MPAF's. Zero and span adjusted.

Calibration Performed By:

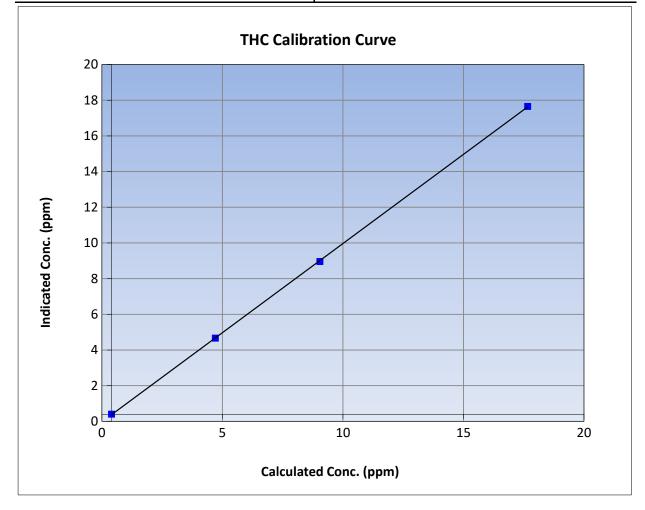


THC Calibration Summary

W B E A			Version-01-2020
	Stati	on Information	
Calibration Date:	January 11, 2023	Previous Calibration:	December 7, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	9:07	End Time (MST):	15:03
Analyzer make:	Thermo 51i	Analyzer serial #:	1182340005

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>	
0.00	0.01		Correlation Coefficient	0.999973	≥0.995
17.26	17.25	1.0007	correlation coefficient	0.555575	20.333
8.64	8.56	1.0097	Slope	0.999219	0.90 - 1.10
4.31	4.27	1.0094	Siope	0.999219	0.90 - 1.10
			- Intercept	-0.026583	+/-1.5











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 January 10, 2023 11:48 Routine		Station number: Last Cal Date: End time (MST):	AMS508 December 7, 2022 17:00	
		Calibratio	on Standards		
NO Gas Cylinder #: NOX Cal Gas Conc: Removed Cylinder #: Removed Gas NOX Conc: NOX gas Diff: Calibrator Model: ZAG make/model:	NA	GL om om	Cal Gas Expiry Date: NO Cal Gas Conc: Removed Gas Exp Date: Removed Gas NO Conc: NO gas Diff: Serial Number: Serial Number:	49.02 NA 49.02 3804	ppm ppm
		Analyzer	Information		
Analyzer make: NOX Range (ppb):			Analyzer serial #:	7029	
NO coeff or slope: NOX coeff or slope: NO2 coeff or slope:	0.972	<i>Finish</i> 0.977 0.972 1.000	NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:		<i>Finish</i> 0.1 0.3 3.8
	1.000			5.0	5.0
		Calibratio	on Statistics		
NO _x Cal Slope: NO _x Cal Offset: NO Cal Slope: NO Cal Offset:		<u>Start</u> 1.005786 -0.790665 1.006745 -1.712399		<u>Finish</u> 0.999259 -0.331803 1.000587 -1.673511	

1.000928

0.299748

0.999811

1.112079



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.3		
as found span	4919	81.0	800.1	794.1	6.0	796.5	788.0	8.5	1.0045	1.0078
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
high point	4919	81.0	800.1	794.1	6.0	799.1	793.7	5.4	1.0013	1.0005
second point	4960	40.5	400.0	397.0	3.0	400.0	394.8	5.2	1.0000	1.0056
third point	4980	20.2	199.5	198.0	1.5	198.2	194.9	3.3	1.0067	1.0161
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.2	0.2		
as left span	4919	81.0	800.1	412.3	387.8	794.1	406.8	387.3	1.0076	1.0136
							Average C	orrection Factor	1.0027	1.0074
Corrected As for	und NO _x =	796.4 ppb	NO =	788.2 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	-0.9%
Previous Respor	nse NO _x =	804.0 ppb	NO =	797.8 ppb				*Percent Chang	ge NO =	-1.2%
Baseline Corr 2r	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3r	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	789.8	408.0	387.8	388.4	0.9984	100.2%
2nd GPT point (200 ppb O3)	789.8	593.6	202.2	203.5	0.9936	100.6%
3rd GPT point (100 ppb O3)	789.8	696.1	99.7	102.0	0.9774	102.3%
			ŀ	Average Correction Factor	0.9898	101.0%

Notes:

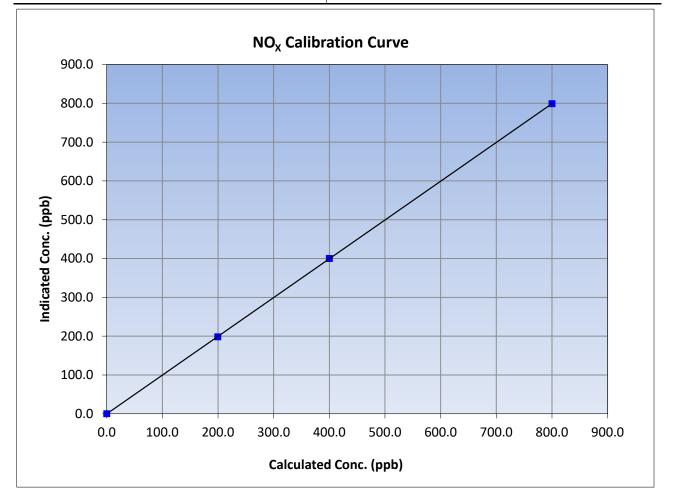
Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

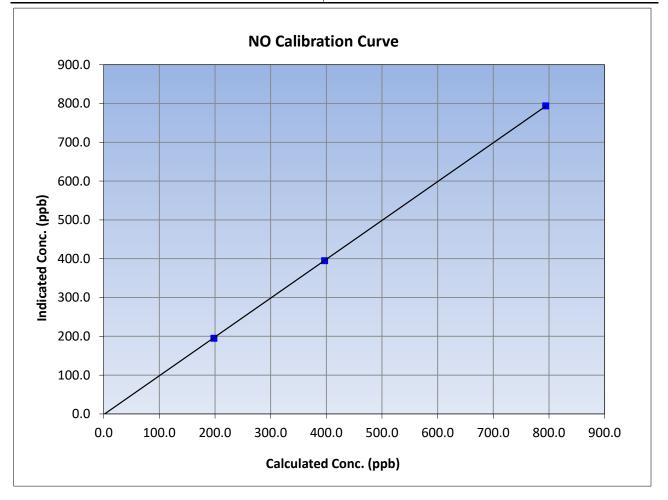
WBEA		Station	Information		Version-04-20	
		Station	Information			
Calibration Date:	January	10, 2023	Previous Calibration: De		er 7, 2022	
Station Name:	Kirby	North	Station Number:	AM	\$508	
Start Time (MST):	11	:48	End Time (MST):	17	7:00	
Analyzer make:	halyzer make: API T200			Analyzer serial #: 7029		
		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	
800.1	799.1	1.0013	correlation coefficient	0.555557	20.333	
400.0	400.0	1.0000	Slopp	0.999259	0.90 - 1.10	
199.5	198.2	1.0067	Slope	0.999259	0.90 - 1.10	
			Intercept	-0.331803	+/-20	





NO Calibration Summary

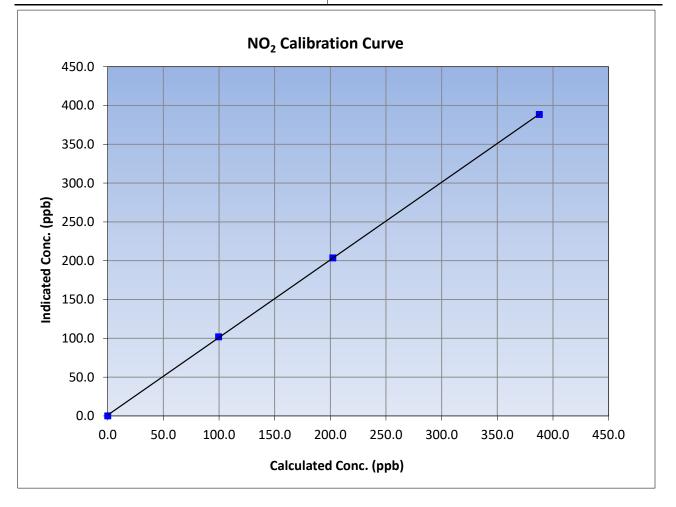
WBEA					Version-04-202
		Station	Information		
Calibration Date:	January	10, 2023	Previous Calibration: Dec		ber 7, 2022
Station Name:	Kirby	North	Station Number:	AN	AS508
Start Time (MST):	11	:48	End Time (MST):	1	.7:00
Analyzer make:	alyzer make: API T200			7	7029
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999982	≥0.995
794.1	793.7	1.0005	correlation coernelent	0.999902	20.999
397.0	394.8	1.0056	Slope	1.000587	0.90 - 1.10
198.0	194.9	1.0161	Slope	1.000387	0.90 - 1.10
			Intercept	-1.673511	+/-20

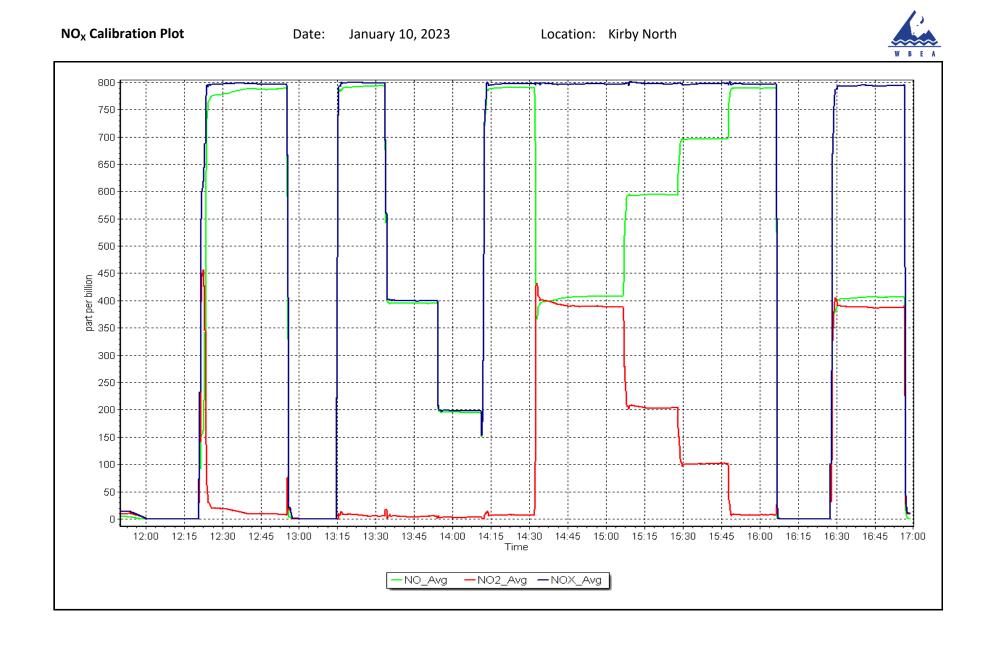




NO₂ Calibration Summary

WBEA		Station	Information		Version-04-20	
		Station	Information			
Calibration Date:	January	10, 2023	Previous Calibration:	Decemb	December 7, 2022	
Station Name:	Kirby	North	Station Number:	AM	\$508	
Start Time (MST):	T): 11:48		End Time (MST):	17	2:00	
nalyzer make: API T200			Analyzer serial #:	7029		
		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	0.999967	≥0.995	
387.8	388.4	0.9984	correlation coefficient	0.555507	20.333	
202.2	203.5	0.9936	Slope	0.999811	0.90 - 1.10	
99.7	102.0	0.9774	Slope	0.999811	0.90 - 1.10	
			Intercept	1.112079	+/-20	







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North January 22, 20 11:22 Maintenance	23		Station number: Last Cal Date: End time (MST):	AMS508 January 10, 2023 16:54	
			Calibrati	on Standards		
NO Gas Cylinder #:		T34ULGL		Cal Gas Expiry Date:	March 8, 2025	
NOX Cal Gas Conc: Removed Cylinder #:	49.39	ppm NA		NO Cal Gas Conc: Removed Gas Exp Date:	49.02	ppm
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:	3804	
ZAG make/model:	API 701H			Serial Number:	880	
			Analyzer	Information		
Analyzer make: NOX Range (ppb):				Analyzer serial #:	7029	
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.977		1.037	NO bkgnd or offset:	0.1	0.1
NOX coeff or slope:	0.972		1.032	NOX bkgnd or offset:	0.3	0.3
NO2 coeff or slope:	1.000		1.000	Reaction cell Press:	3.8	4.8
			Calibrati	on Statistics		
			<u>Start</u>		<u>Finish</u>	

	Start	FINISN
NO _x Cal Slope:	0.999259	1.001403
NO _x Cal Offset:	-0.331803	-2.032210
NO Cal Slope:	1.000587	1.002948
NO Cal Offset:	-1.673511	-3.293659
NO ₂ Cal Slope:	0.999811	0.998706
NO ₂ Cal Offset:	1.112079	0.927800



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.3		
as found span	4919	81.0	800.1	794.1	6.0	733.2	726.9	6.3	1.0913	1.0925
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
high point	4919	81.0	800.1	794.1	6.0	800.0	795.0	5.4	1.0001	0.9989
second point	4960	40.5	400.0	397.0	3.0	398.2	392.6	5.6	1.0046	1.0113
third point	4980	20.2	199.5	198.0	1.5	195.3	192.6	2.8	1.0216	1.0282
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4919	81.0	800.1	411.7	388.4	794.0	406.1	387.8	1.0077	1.0138
							Average C	orrection Factor	1.0088	1.0128
Corrected As fo	ound NO _x =	733.1 ppb	NO =	727.1 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-9.0%
Previous Respo	onse NO _x =	799.2 ppb	NO =	792.9 ppb				*Percent Chang	ge NO =	-9.1%
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	$1 NO r^2$:		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) (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)	790.3	407.9	388.4	388.2	1.0005	100.0%
2nd GPT point (200 ppb O3)	790.3	594.3	202.0	203.6	0.9921	100.8%
3rd GPT point (100 ppb O3)	790.3	696.3	100.0	101.3	0.9871	101.3%
				Average Correction Factor	0.9932	100.7%

Notes:

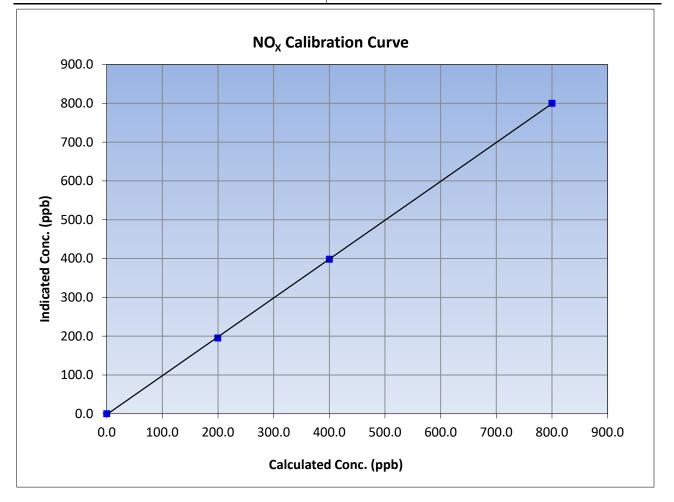
Changed out external pump. Adjusted span. Large adjustment made, over 6%.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

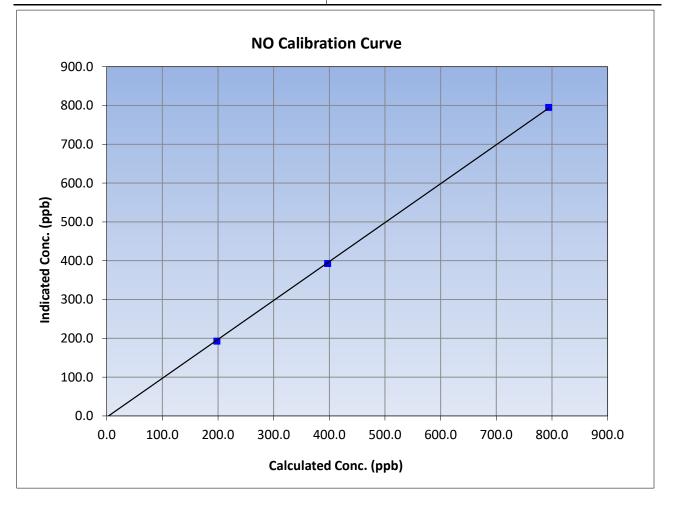
WBEA		Station	Information		Version-04-2	
Calibration Date: Station Name:	January 22, 2023 Kirby North				nry 10, 2023 MS508	
Start Time (MST):	11:22		End Time (MST):	16:54		
Analyzer make:	API T200		Analyzer serial #:	7029		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999969	≥0.995	
800.1	800.0	1.0001		0.999909	20.333	
400.0	398.2	1.0046	Slope	1.001403	0.90 - 1.10	
199.5	195.3	1.0216		1.001405	0.90 - 1.10	
			Intercept	-2.032210	+/-20	





NO Calibration Summary

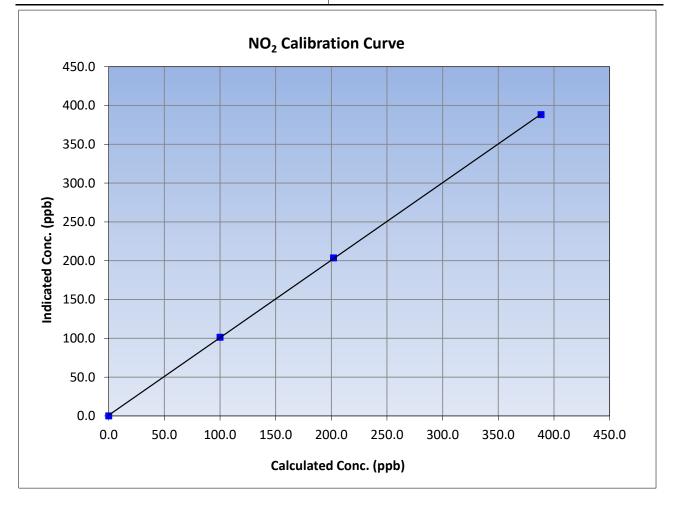
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	January 22, 2023		Previous Calibration:	January	10, 2023	
Station Name:	Kirby North		Station Number:	AM	AMS508	
Start Time (MST):	11:22		End Time (MST):	16:54		
Analyzer make:	API T200		Analyzer serial #:	7029		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999924	≥0.995	
794.1	795.0	0.9989		0.999924	20.993	
397.0	392.6	1.0113	Slope	1 002049	0.90 - 1.10	
198.0	192.6	1.0282		1.002948	0.90 - 1.10	
			Intercept	-3.293659	+/-20	

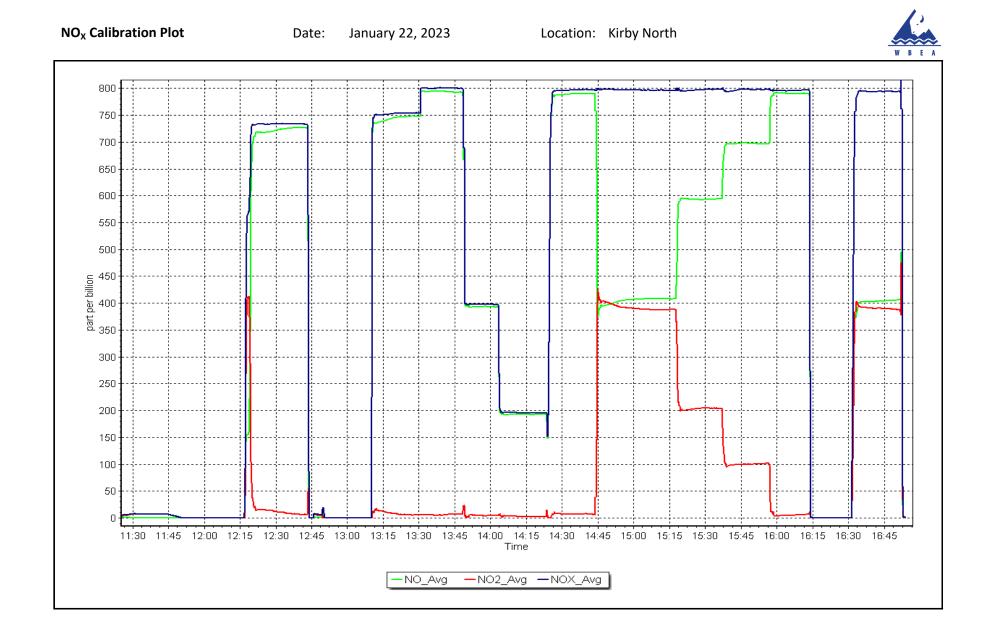




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	January 22, 2023		Previous Calibration:	January	/ 10, 2023
Station Name:	Kirby North		Station Number:	AN	1S508
Start Time (MST):	11:22		End Time (MST):	1	6:54
Analyzer make:	API T200		Analyzer serial #:	7029	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999973	≥0.995
388.4	388.2	1.0005		0.999975	20.995
202.0	203.6	0.9921	Slope	0.009706	0.90 - 1.10
100.0	101.3	0.9871		0.998706	0.90 - 1.10
			Intercept	0.927800	+/-20







End of Report