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

Original report release date: May 31, 2023

Revised report release date: August 30, 2023

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

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



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

Wood Buffalo Environmental Association

APRIL 2023

MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING August 30, 2023 Revision 01

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS01 BERTHA GANTER - FORT MCKAY APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

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

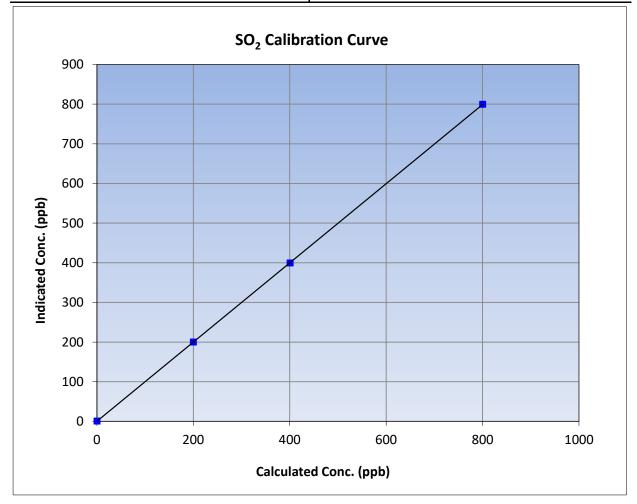
Calibration Performed By:

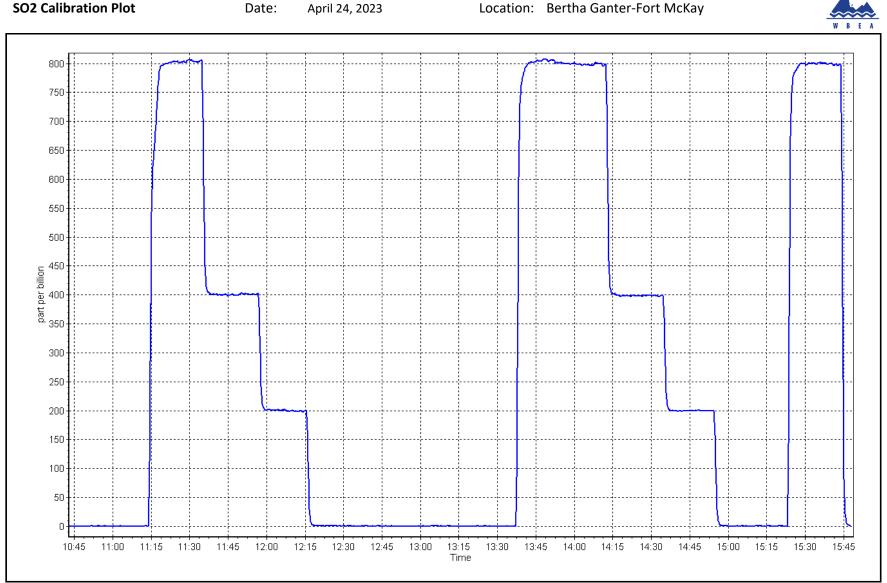
Rene Chamberland



SO₂ Calibration Summary

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





SO2 Calibration Plot

April 24, 2023

Location: Bertha Ganter-Fort McKay



TRS Calibration Report

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

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

Calibration Performed By:

Notes:

Rene Chamberland

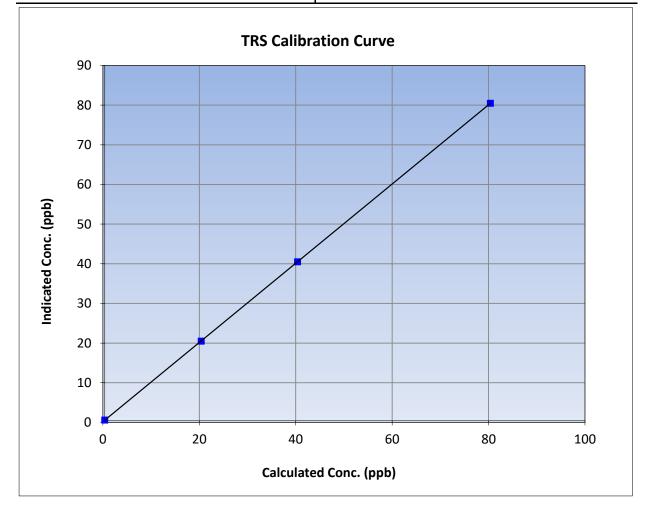


TRS Calibration Summary

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

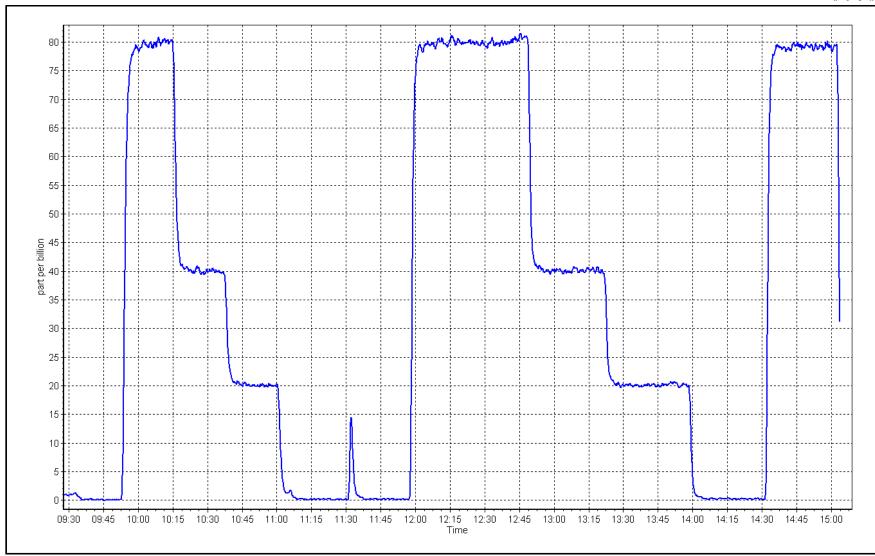
Calibration Data

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











H₂S Calibration Report

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

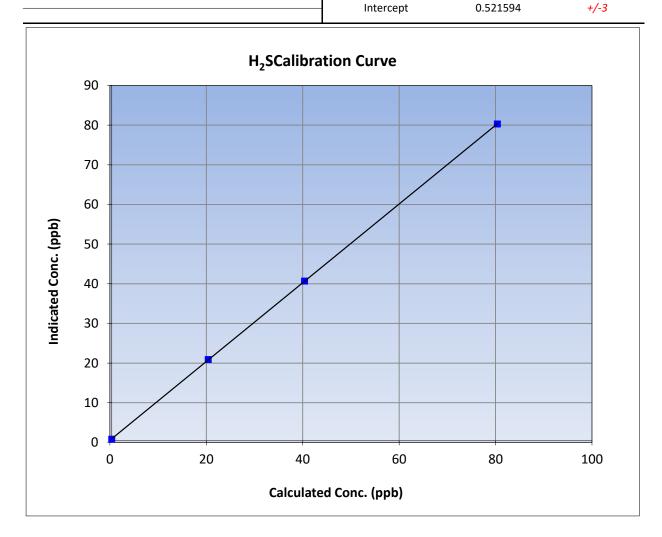
Notes:

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



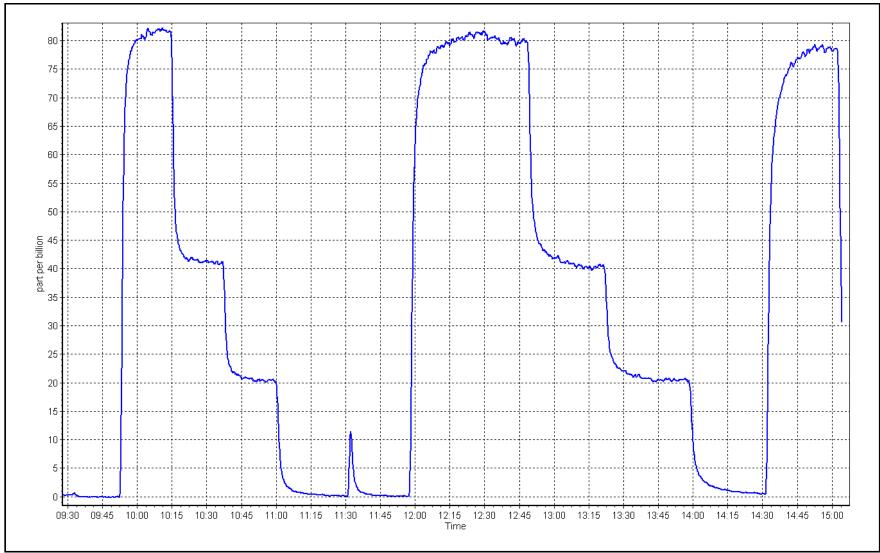
H₂S Calibration Summary

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











THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

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

Cal Gas Expiry Date: February 23, 2025

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

Calibration Standards

Station Information

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

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

THC Calibration Data

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

CH4 Calibration Data

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

Notes:

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

Calibration Performed By: Rene

Rene Chamberland



THC Calibration Summary

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



CH₄ Calibration Summary

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

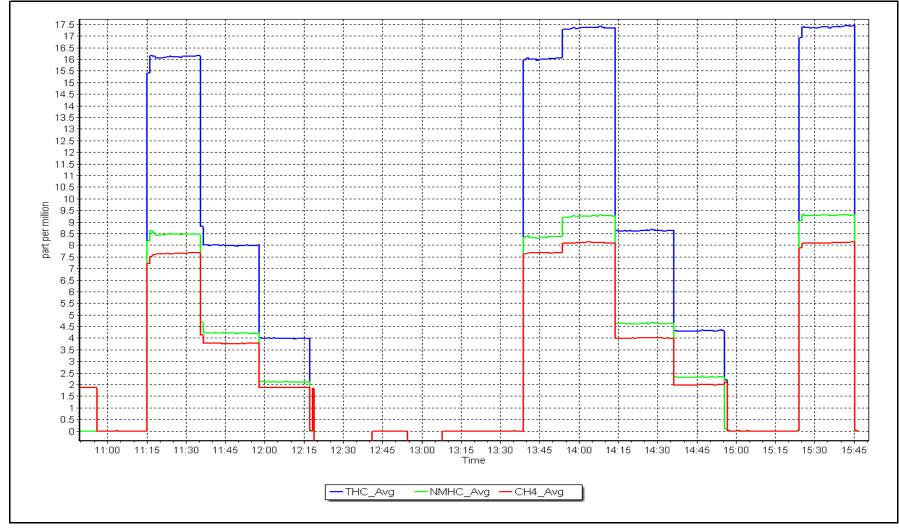


NMHC Calibration Summary

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

NMHC Calibration Plot







THC / CH_4 / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

| CH4 | Cal | ibration | Data |
|-----|-----|----------|------|
| | | | |

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

Notes:

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

Calibration Performed By: Aswin Sasi Kumar



THC Calibration Summary

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



CH₄ Calibration Summary

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



NMHC Calibration Summary

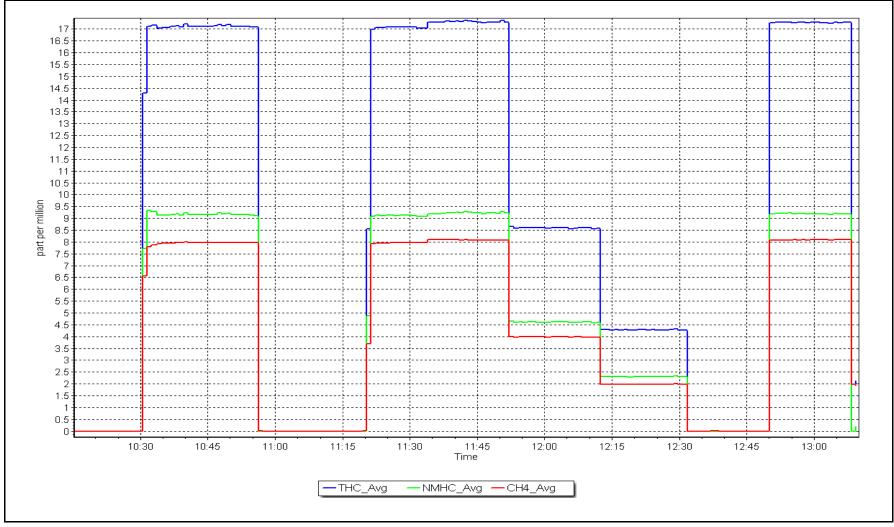
| | | Station I | nformation | | |
|------------------------------------|--|------------------------------|-------------------------|-----------|---------------|
| Calibration Date: | Apri | l 26, 2023 | Previous Calibration: | April 24 | l, 2023 |
| Station Name: | Bertha Ga | nter-Fort McKay | Station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

NMHC Calibration Plot

Date: April 26, 2023

Location: Bertha Ganter-Fort McKay





CALS_24



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

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

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

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

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

| Analy | /zer | Inform | ation |
|-------|------|--------|-------|
| | | | |

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

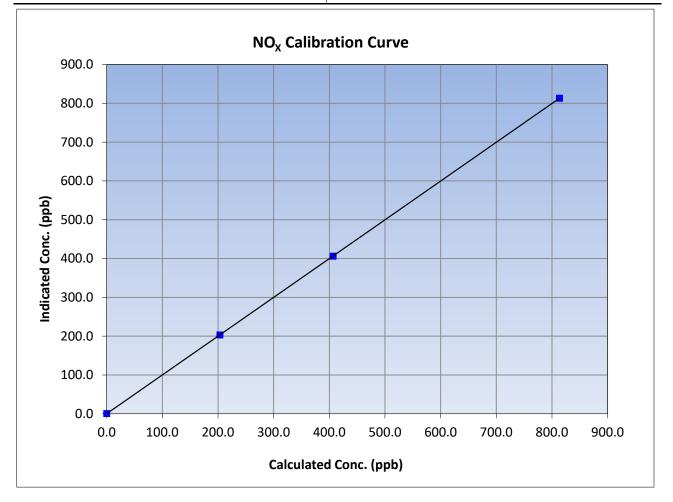
Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

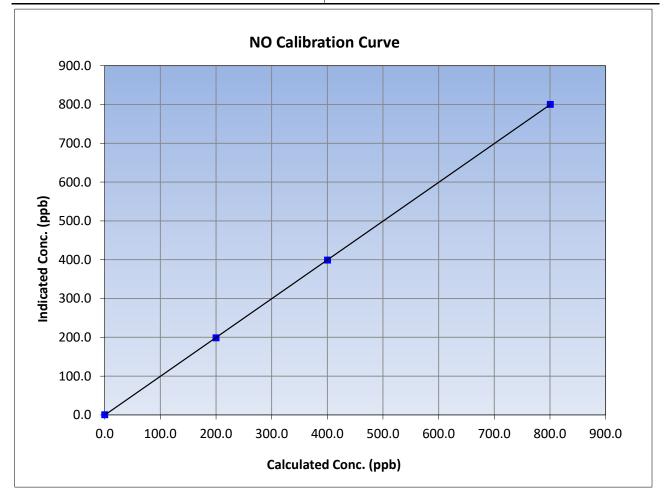
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|------------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 1 | 8, 2023 | Previous Calibration: | March | 3, 2023 |
| Station Name: | Bertha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





NO Calibration Summary

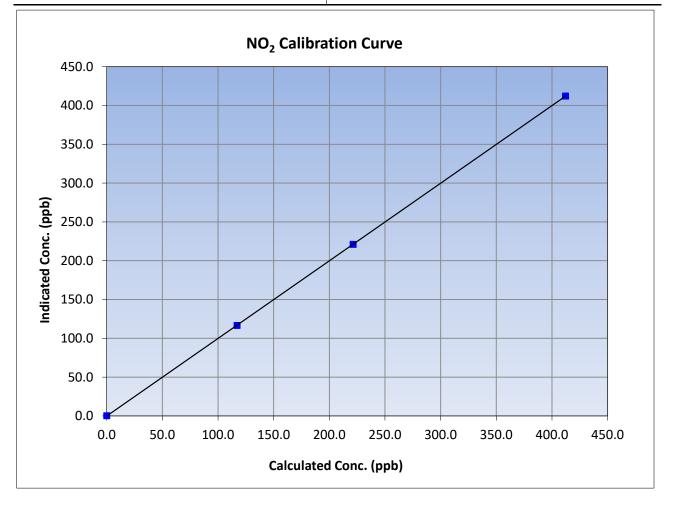
| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 1 | 8, 2023 | Previous Calibration: | March | 3, 2023 | |
| Station Name: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

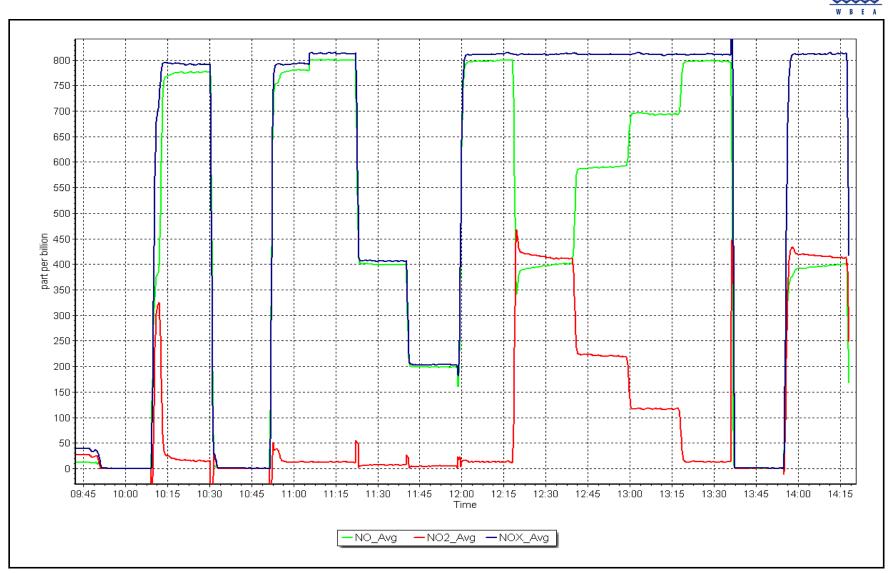




NO₂ Calibration Summary

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





April 18, 2023

Location: Bertha Ganter-Fort McKay



O₃ Calibration Report

Version-01-2020

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

Notes:

Changed inlet filter after as founds. Adjusted span only.

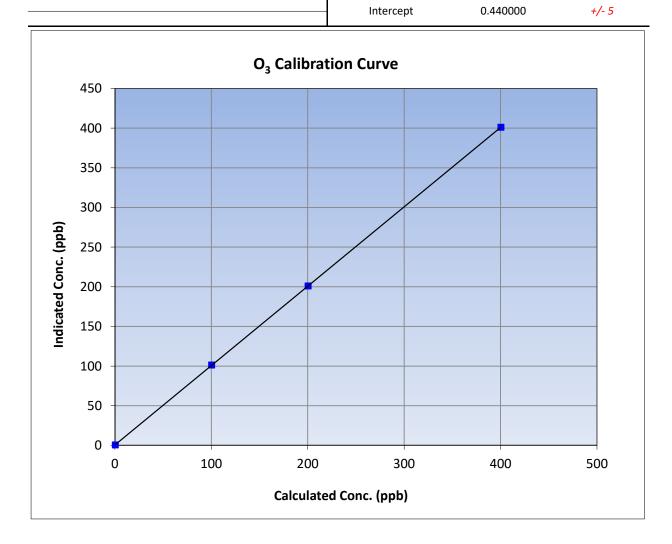
Calibration Performed By:

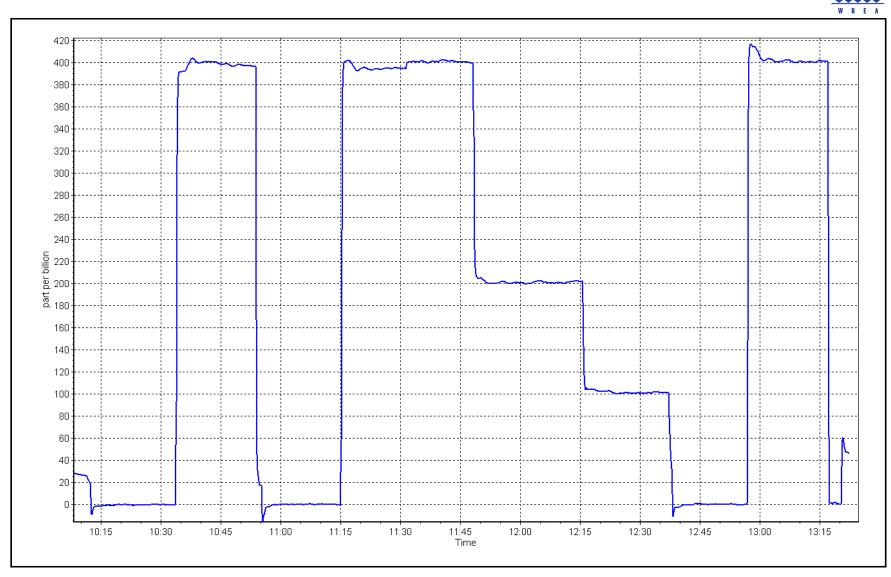
Rene Chamberland



O₃ Calibration Summary

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





Location: Bertha Ganter-Fort McKay



CALS_33



T640 PM_{2.5} CALIBRATION

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



TN - NO_X - NH_3 Calibration Report

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



TN - NOX - NH₃ Calibration Report

Version-11-2021

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

Dilution Calibration Data

NH3 Current Converter Efficiency = 93.7%



NO_x - NO - NO₂ Calibration Report

Version-11-2021

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

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

Notes:

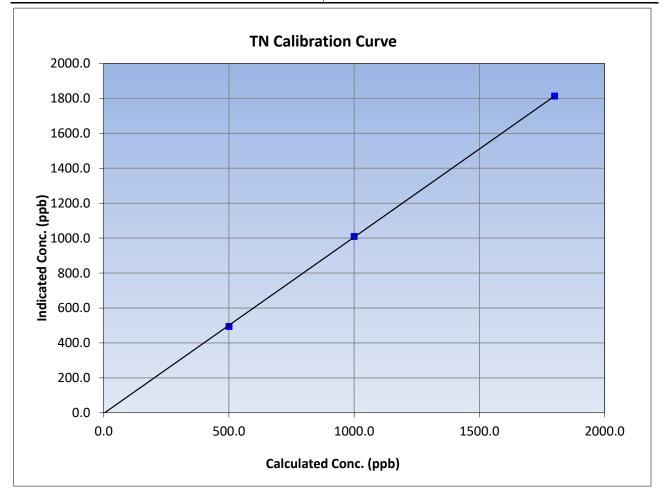
Changed the inlet filter. Adjusted both zero and span.

Calibration Performed By: Aswin Sasi Kumar & Rene Chamberland



TN Calibration Summary

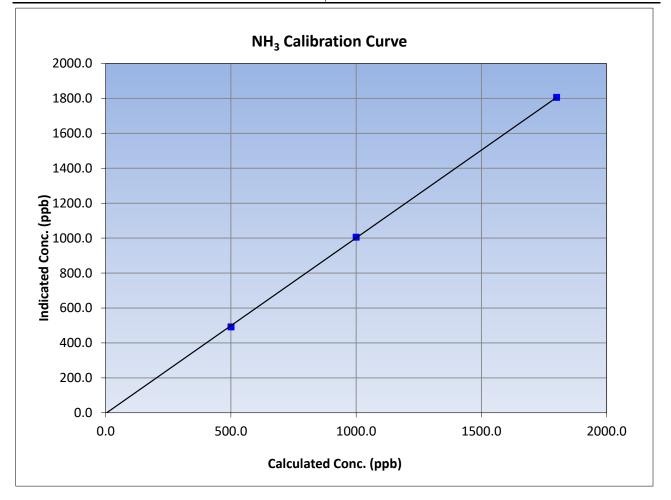
| WBEA | | t | | | Version-11-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 8, 2023 | Previous Calibration: | Marcl | n 30, 2023 |
| Station Name: |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





NH₃ Calibration Summary

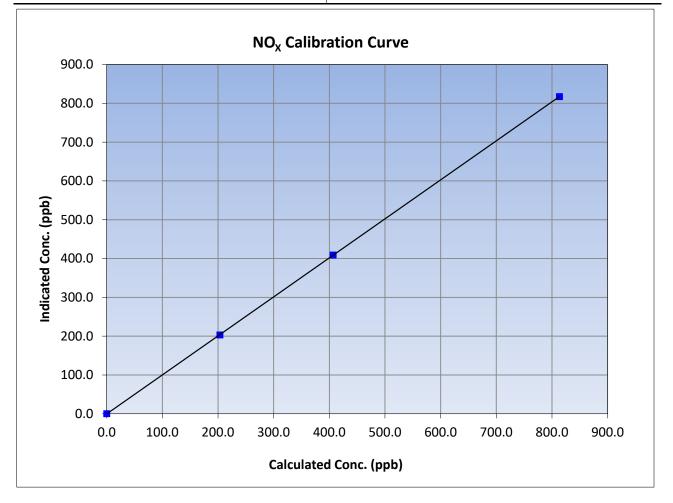
| WBEA | | | | | Version-11-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 8, 2023 | Previous Calibration: | March | n 30, 2023 |
| Station Name: | Bertha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





NO_x Calibration Summary

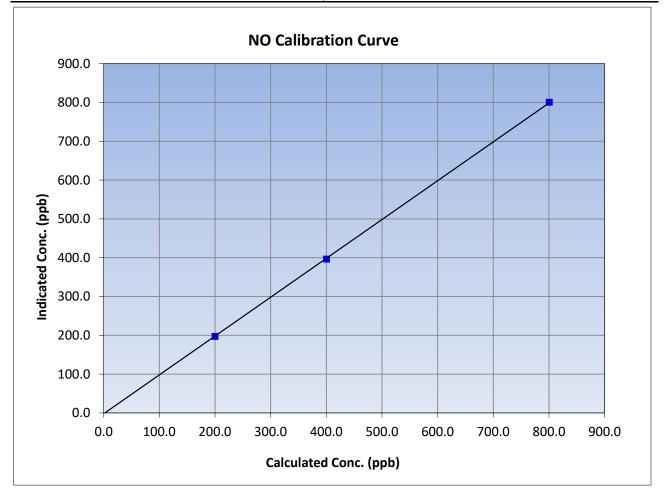
| WBEA | | | | | Version-11-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 7, 2023 | Previous Calibration: | March | 30, 2023 |
| Station Name: | Bertha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





NO Calibration Summary

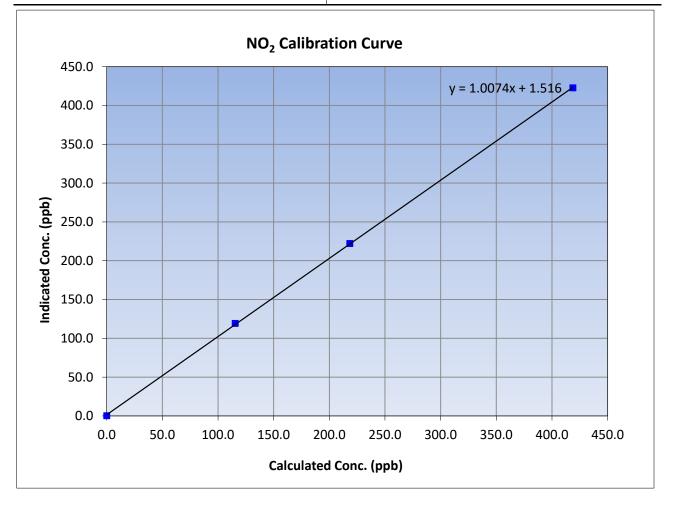
| | | Station | Information | | Version-11- |
|--|---------------------------------------|---------------------------|--|-----------|--------------------|
| Calibration Date: Station Name: | • | 7, 2023 ar-Eort McKay | Previous Calibration: Station Number: | | h 30, 2023 MS01 |
| Start Time (MST): |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

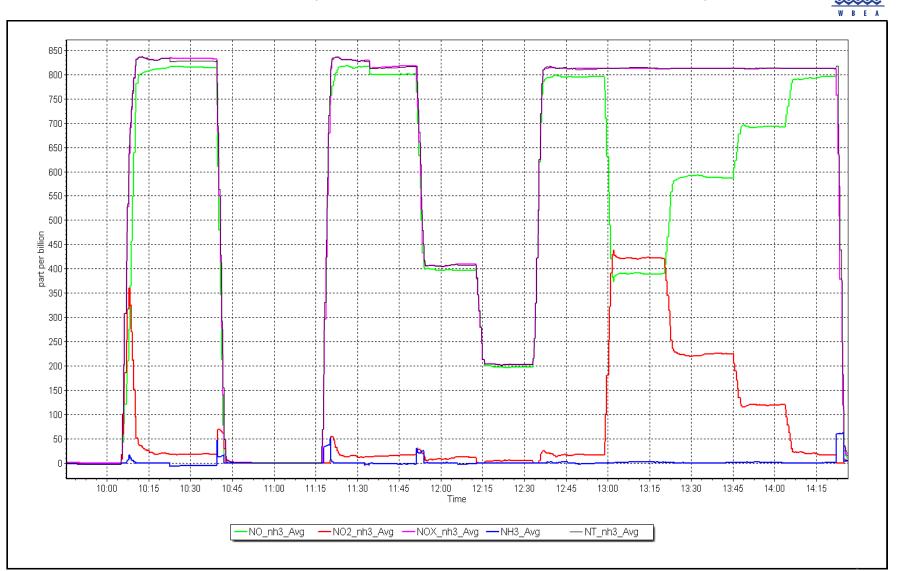




NO₂ Calibration Summary

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



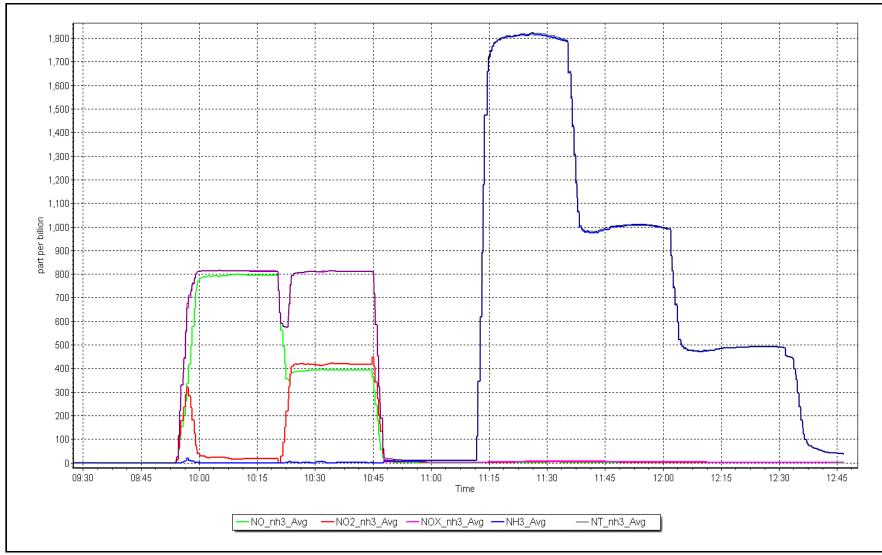


Location: Bertha Ganter-Fort McKay











CO Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

Rene Chamberland

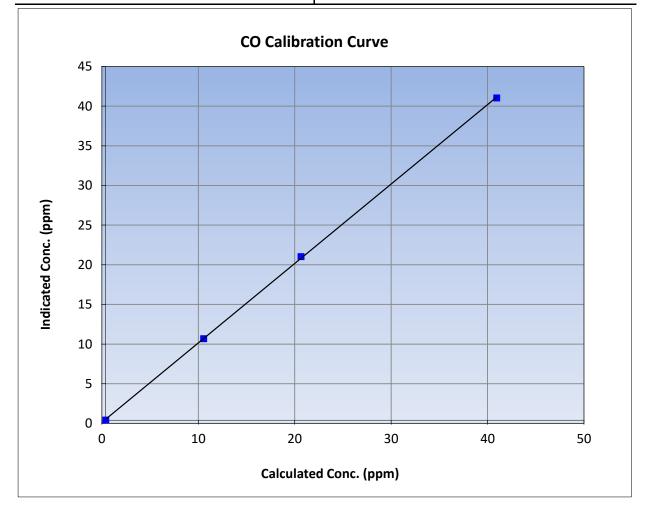


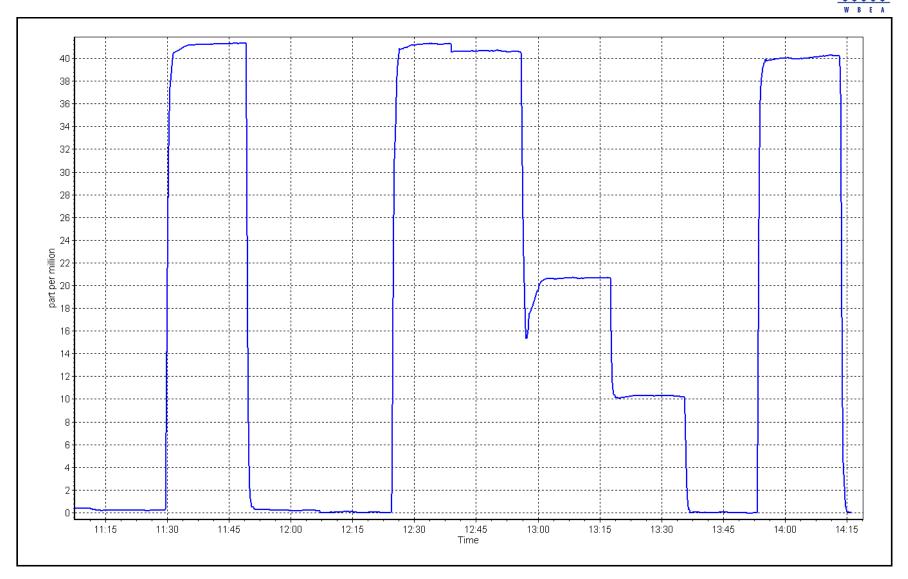
CO Calibration Summary

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

Calibration Data

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





Date: April 20, 2023

Location: Bertha Ganter-Fort McKay



CO₂ Calibration Report

Version-01-2020

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

Notes:

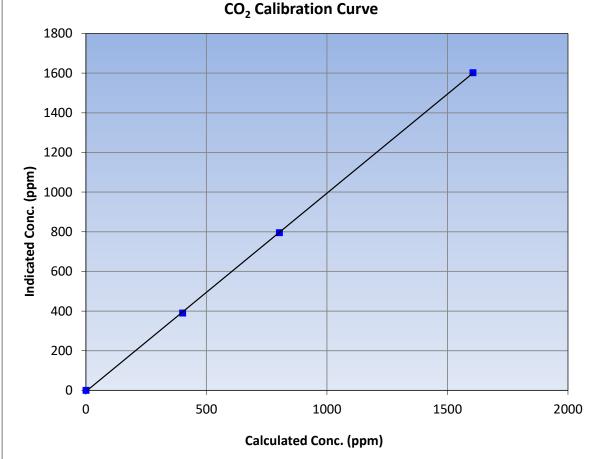
Changed the inlet filter after as founds. Cycled power to the analyzer. No adjustments made.

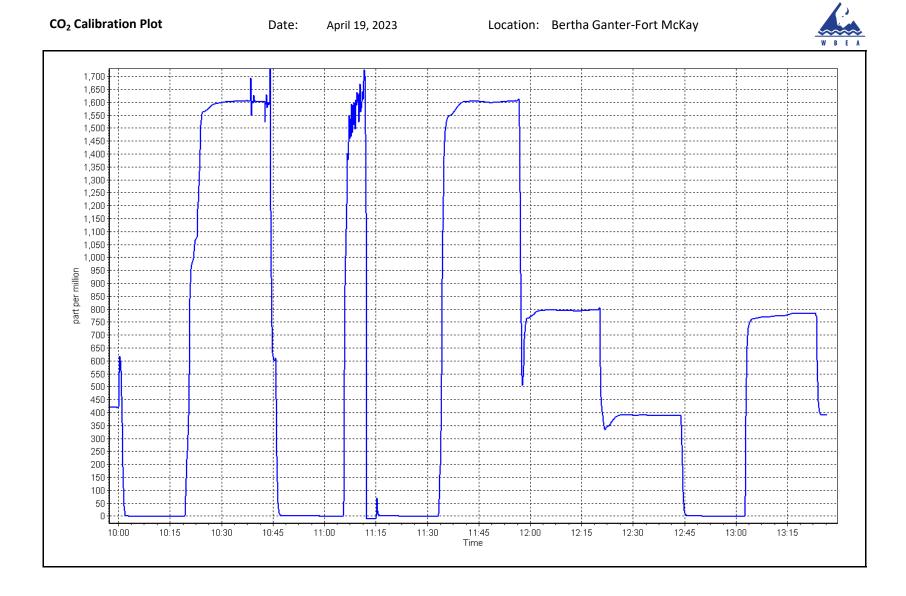
Calibration Performed By:



CO₂ Calibration Summary

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







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

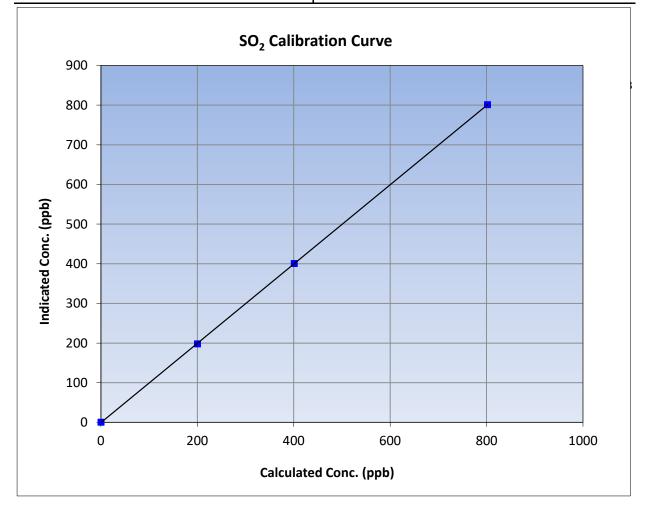


SO₂ Calibration Summary

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

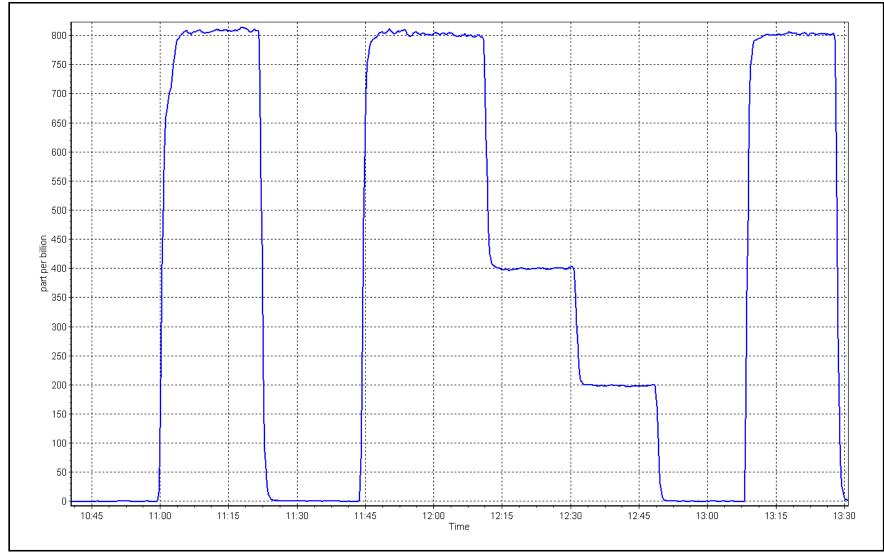
Calibration Data

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











H₂S Calibration Report

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

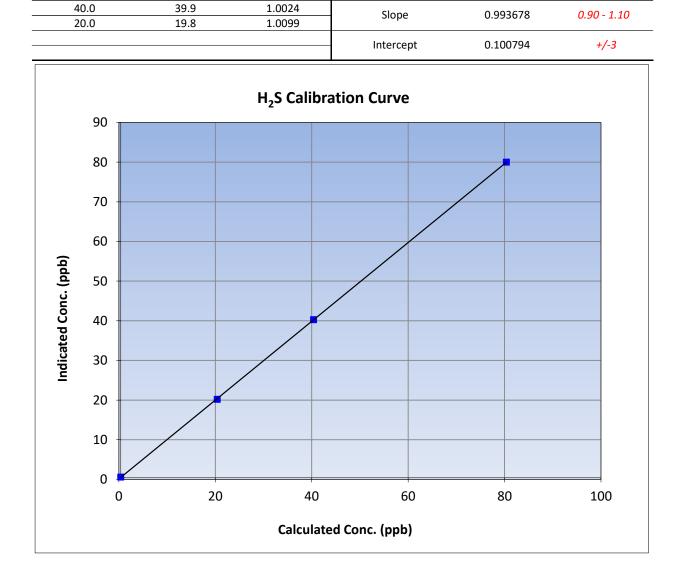
Notes:

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



H₂S Calibration Summary

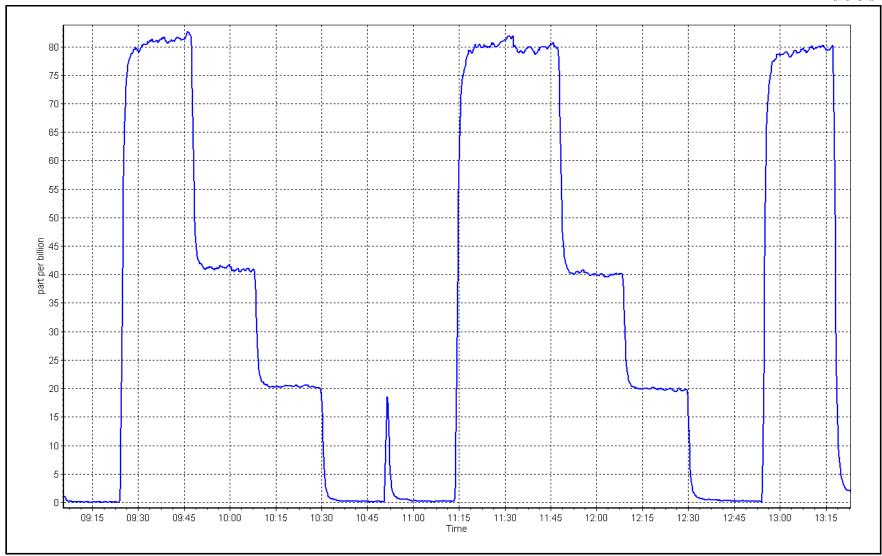
| WBEA | | | | | Version-11-202 |
|--|---------------------------------------|------------------------------|----------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 4, | 2023 | Previous Calibration: | March 16 | , 2023 |
| Station Name: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



H₂S Calibration Plot









H₂S Calibration Report

| WBEA | | | | | Version-11-2 |
|--|--|--|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| itation Name: Calibration Date: tart time (MST): Reason: | Mildred Lake April 5, 2023 8:55 Maintenance | will swap the pump | Station number: Last Cal Date: End time (MST): o (low flow) | AMS02 April 4, 2023 11:58 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.29 | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: | CC345191 5.29 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | | Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | API T700 API T701 | | Serial Number: Serial Number: | 1185 5608 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQTL Global G150 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 12113311966 2022-198 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.993678 | 1.015395 | Backgd or Offset: | 1.75 | 1.75 |
| Calibration intercept: | 0.100794 | -0.059190 | Coeff or Slope: | 0.823 | 0.823 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjuster Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4924 | 75.6 | 80.0 | 80.2 | 0.999 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | H ₂ S Calibrati | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4924 | 75.6 | 80.0 | 81.2 | 0.985 |
| second point | 4962 | 37.8 | 40.0 | 40.6 | 0.985 |
| third point | 4981 | 18.9 | 20.0 | 20.0 | 1.000 |
| as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as left span | 4924 | 75.6 | 80.0 | 80.8 | 0.990 |
| SO2 Scrubber Check | | 42.6 | | | |
| | inge: | 12-Sep-22 | | Ave Corr Factor | 0.990 efficiency |
| Date of last scrubber cha | - | | | | |
| Date of last scrubber cha Date of last converter eff | - | | | | enciency |
| Date of last scrubber cha Date of last converter eff Baseline Corr As found: | ficiency test: 80.1 | Prev response: | | *% change: | 0.6% |
| Date of last scrubber cha Date of last converter eff | ficiency test: | Prev response: AF Slope: AF Correlation: | NA | *% change: AF Intercept: | |

Notes:

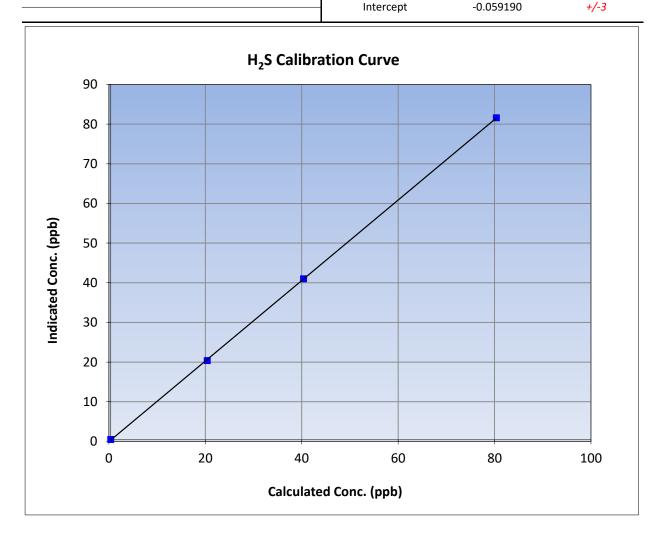
Pump changed after as founds. No adjustment made.

Calibration Performed By:



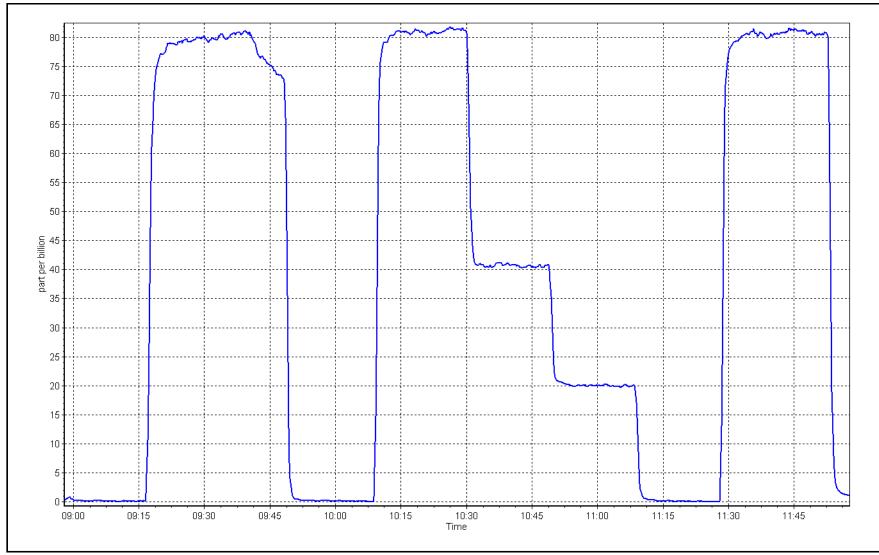
H₂S Calibration Summary

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











THC / CH_4 / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

Version-06-2022

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

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

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

Notes:

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

Sean Bala



THC Calibration Summary

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



CH₄ Calibration Summary

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



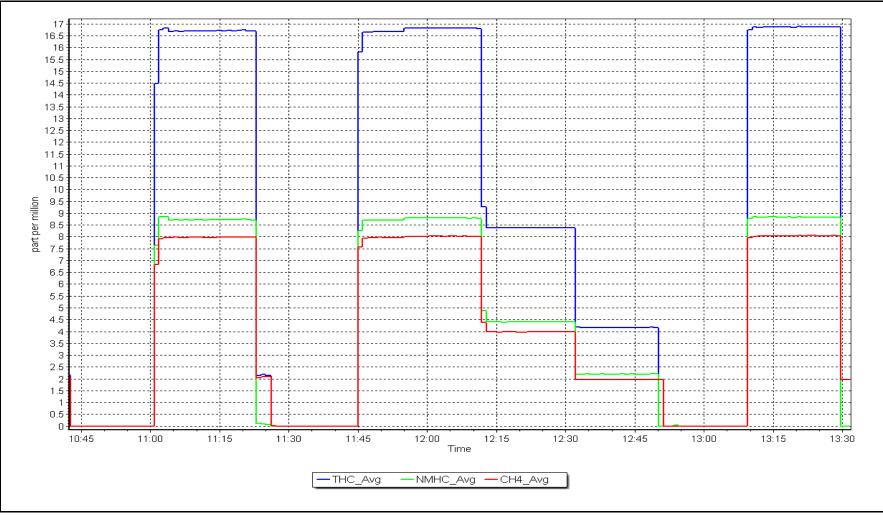
NMHC Calibration Summary

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

NMHC Calibration Plot

Location: Mildred Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT APRIL 2023

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

May 31, 2023







SO₂ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

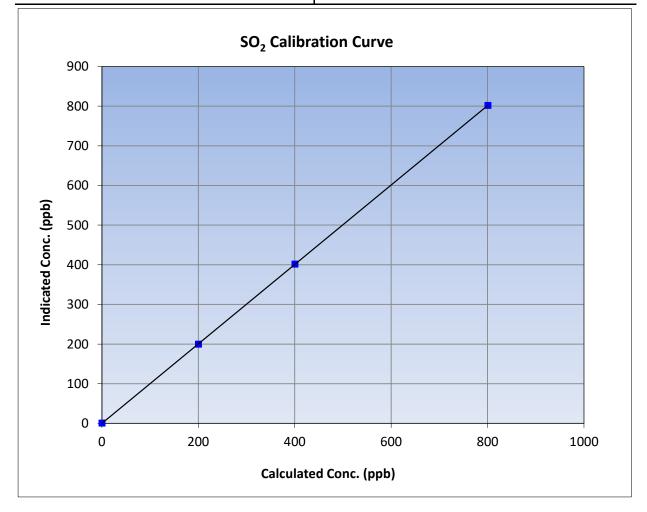


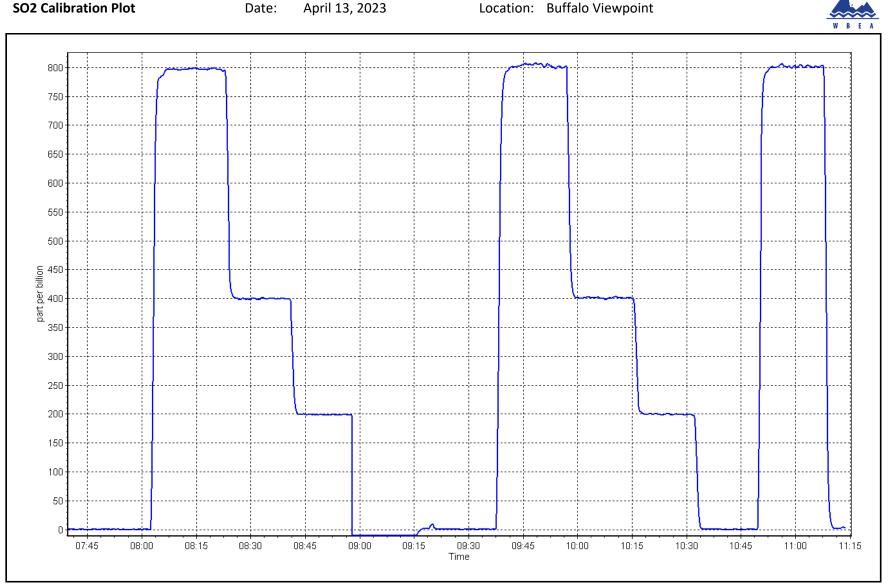
SO₂ Calibration Summary

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

Calibration Data

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





Location: Buffalo Viewpoint



H₂S Calibration Report

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

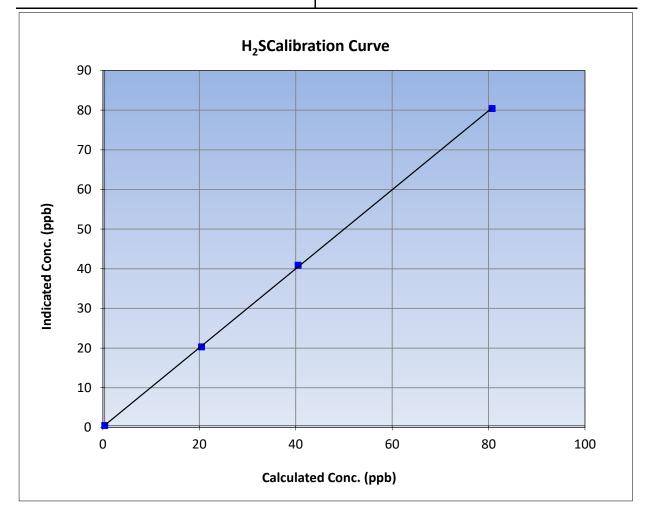
Notes:

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



H₂S Calibration Summary

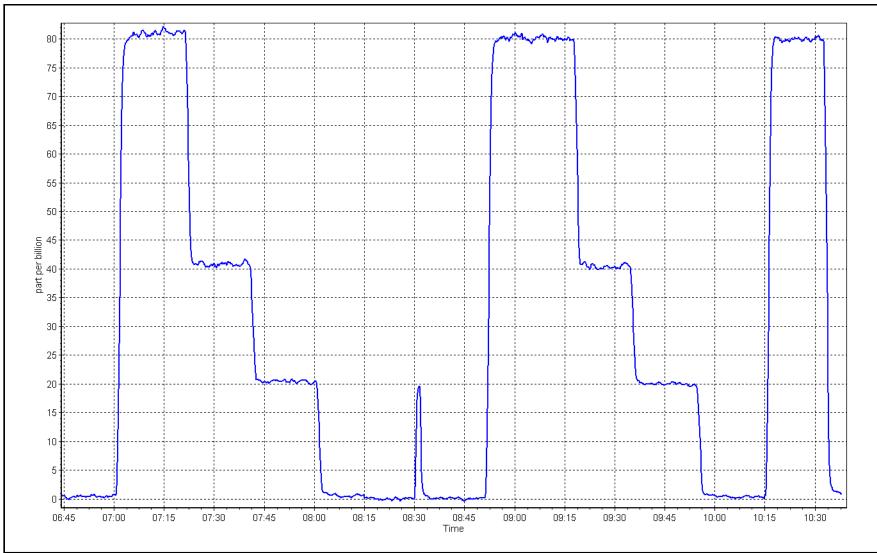
| WBEA | | | | | Version-11-2 |
|-------------------|-------------------------|-------------------|-------------------------|------------------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 27, | 2023 | Previous Calibration: | n: March 8, 2023 | |
| Station Name: | Buffalo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













THC / CH_4 / NMHC Calibration Report

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

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

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

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

Notes:

Span adjusted. No maintenance done.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

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



CH₄ Calibration Summary

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

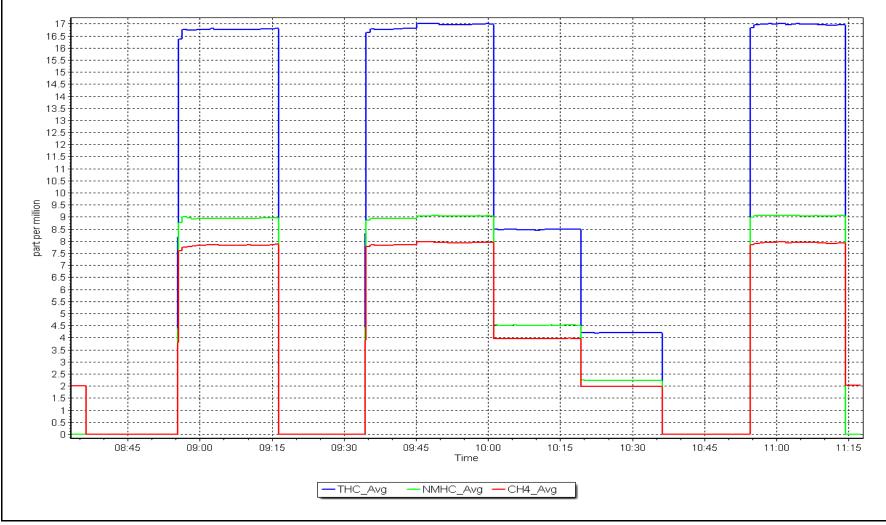


NMHC Calibration Summary

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

NMHC Calibration Plot







THC / CH₄ / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

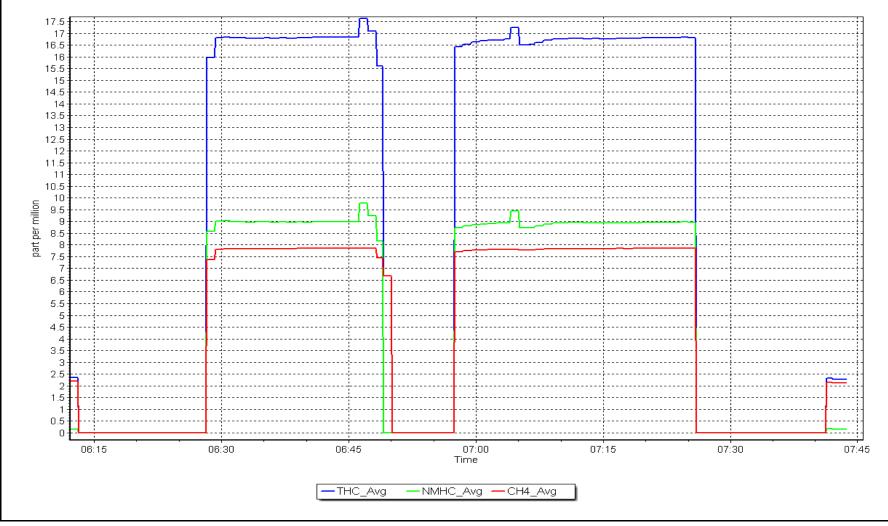
Hydrogen and Nitrogen cylinder change.

Calibration Performed By:

Melissa Lemay









$NO_X \setminus NO \setminus NO_2$ Calibration Report

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

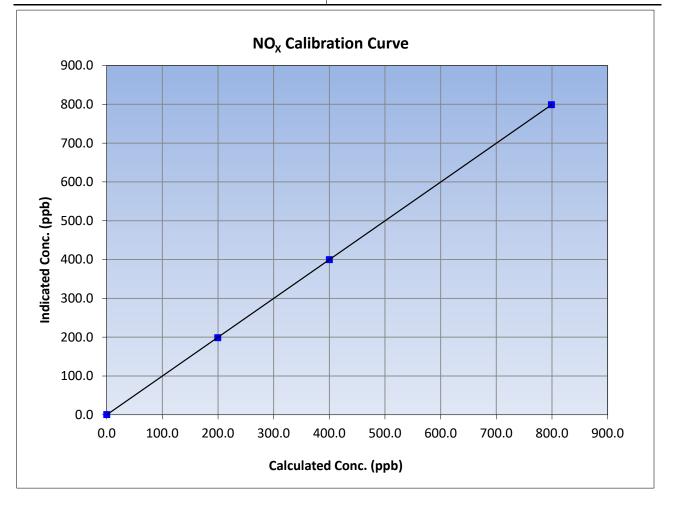
No maintenance done. Span adjusted. Due to drifting during the GPT the 2nd NO ref point used.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

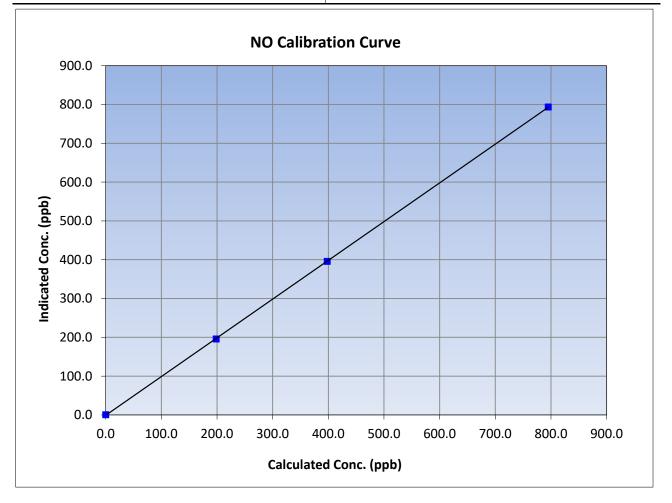
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|---------------------------|---------------------------|-----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 4 | l, 2023 | Previous Calibration: Mar | | n 3, 2023 | |
| Station Name: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





NO Calibration Summary

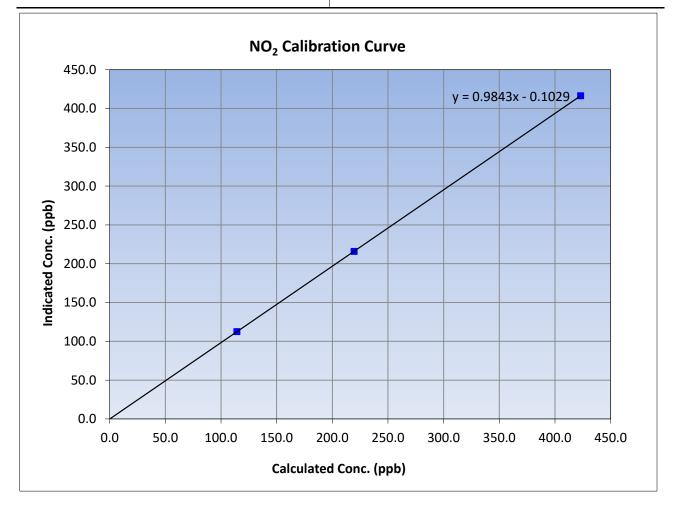
| WBEA | | Station | Information | | Version-04-20 |
|--|---------------------------------------|--------------------------------------|---------------------------------|--------------------|---------------|
| | | | Previous Calibration: | | |
| Calibration Date: | April 4 | April 4, 2023 | | Marc |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

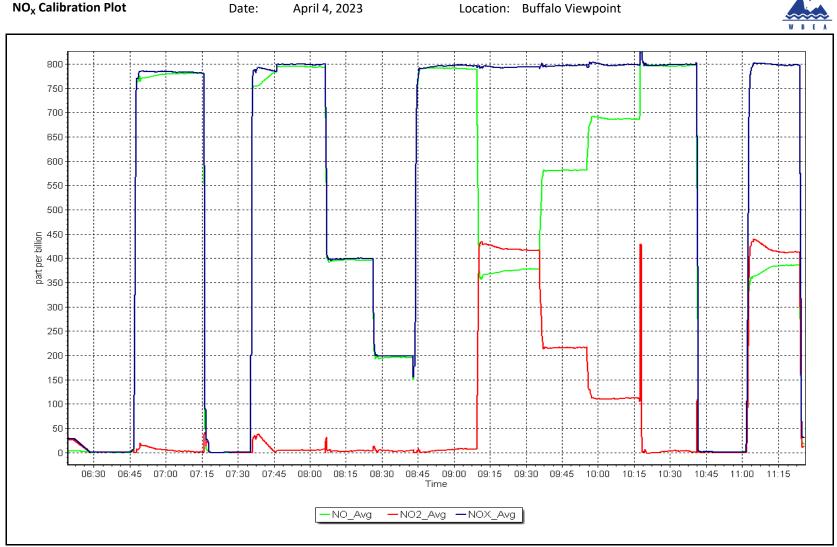




NO₂ Calibration Summary

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









O₃ Calibration Report

Version-01-2020

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

Notes:

O3 scrubber replaced. Zero and Span adjusted.

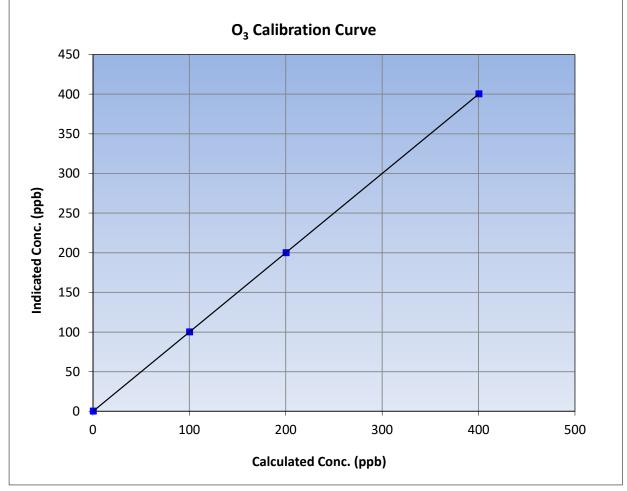
Calibration Performed By:

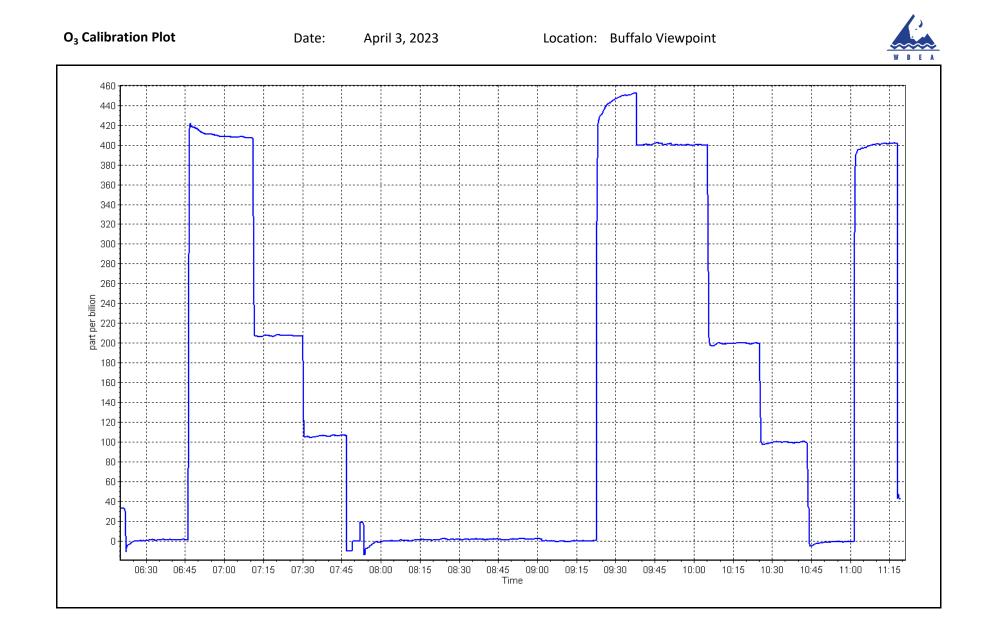
Melissa Lemay



O₃ Calibration Summary

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







T640 PM_{2.5} CALIBRATION

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

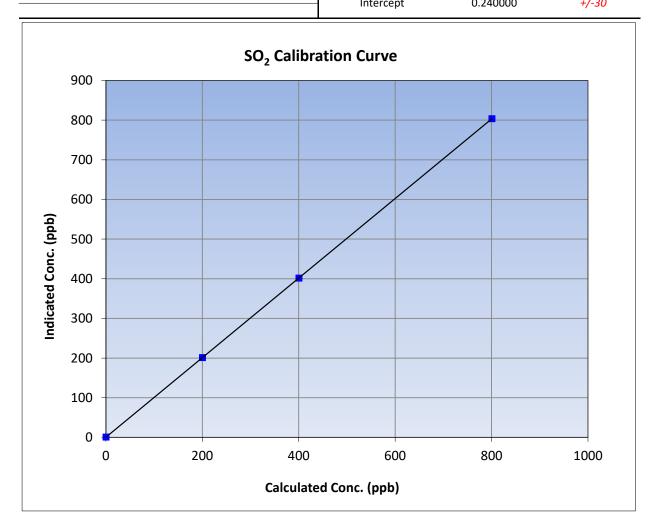
Sample inlet filter changed after as founds. No adjustments made.

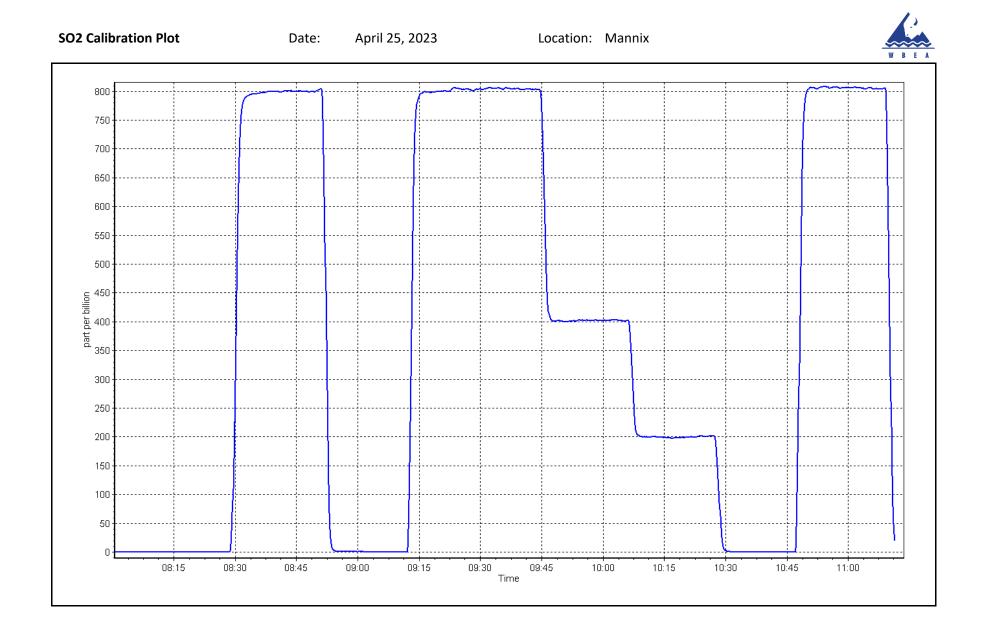
Calibration Performed By:



SO₂ Calibration Summary

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







H₂S Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|---|---------------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Mannix April 17, 2023 9:10 Routine | | Station number: Last Cal Date: End time (MST): | AMS05 March 15, 2023 13:55 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 4.92 EY0002433 | ppm | Cal Gas Exp Date: | February 9, 2024 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | 4.92 NA API T700 API T701H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 1845 832 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQTL Global 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1203169745 2022-196 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 0.988329 0.380632 | <u>Finish</u> 1.005327 0.060642 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> 2.17 0.849 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as found span | 4919 | 81.3 | 80.0 | 79.1 | 1.011 |
| as found 2nd point | 4960 | 40.7 | 40.0 | 39.6 | 1.011 |
| as found 3rd point | 4980 | 20.3 | 20.0 | 19.6 | 1.019 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4919 | 81.3 | 80.0 | 80.5 | 0.994 |
| second point | 4960 | 40.7 | 40.0 | 40.3 | 0.994 |
| third point | 4980 | 20.3 | 20.0 | 20.1 | 0.994 |
| as left zero | 5000 | 0.0 | 0.0 | 0.3 | |
| as left span | 4919 | 81.3 | 80.0 | 79.7 | 1.004 |
| SO2 Scrubber Check | 4920 | 80.0 | 800.0 | 0.2 | |
| Date of last scrubber cha Date of last converter eff | - | | | Ave Corr Factor | 0.994 efficiency |
| | • | 2 | 70 | *** | |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | 79.1 39.6 | Prev response: AF Slope: | 0.989473 | *% change: AF Intercept: | -0.4% -0.059409 |
| Baseline Corr 3rd AF pt: | 19.6 | AF Correlation: | 0.999995 | * = > +/-5% change initiate | es investigation |

Notes:

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

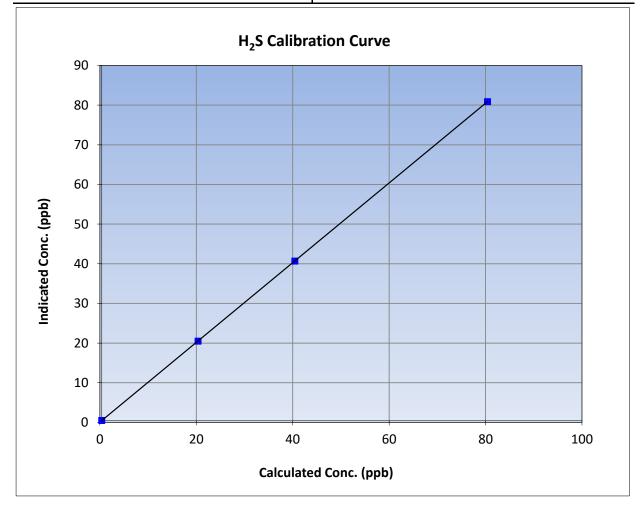
Calibration Performed By:

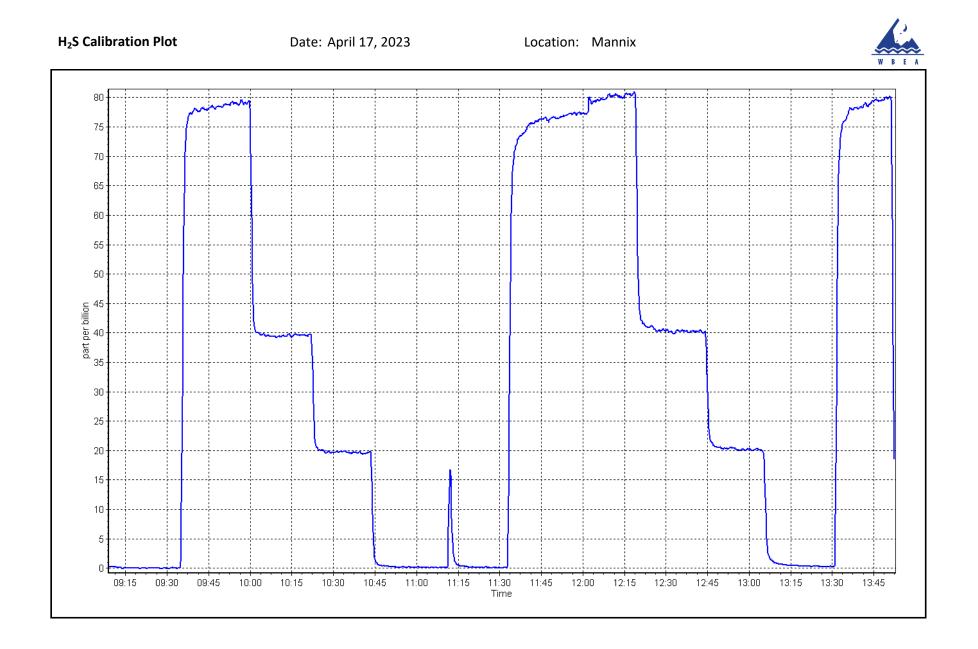


H₂S Calibration Summary

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

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







THC / CH_4 / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

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

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

Notes:

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

Calibration Performed By:

Karan Pandit



THC Calibration Summary

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



CH₄ Calibration Summary

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



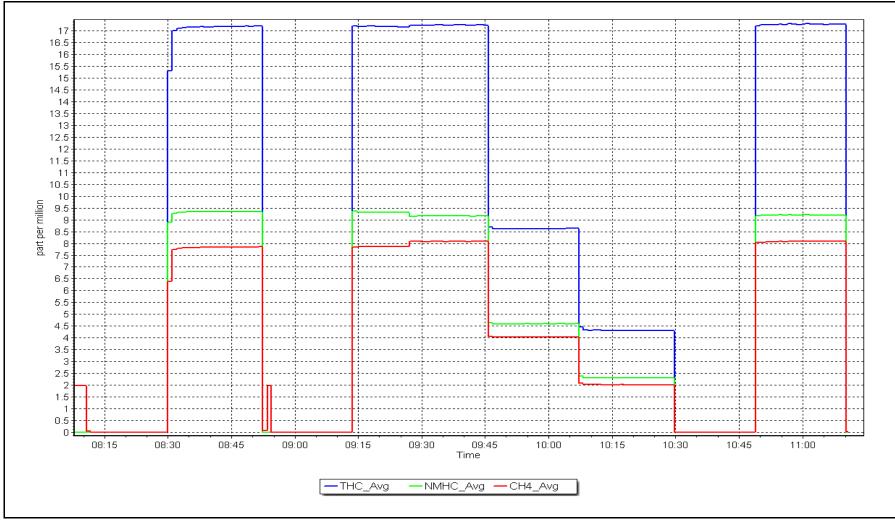
NMHC Calibration Summary

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

NMHC Calibration Plot

Location: Mannix







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS06 PATRICIA MCINNES APRIL 2023

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

August 30, 2023

Revision 01



SO₂ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

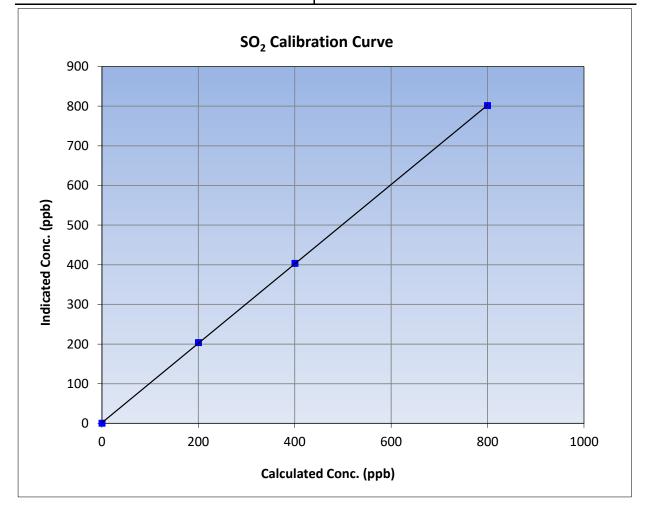


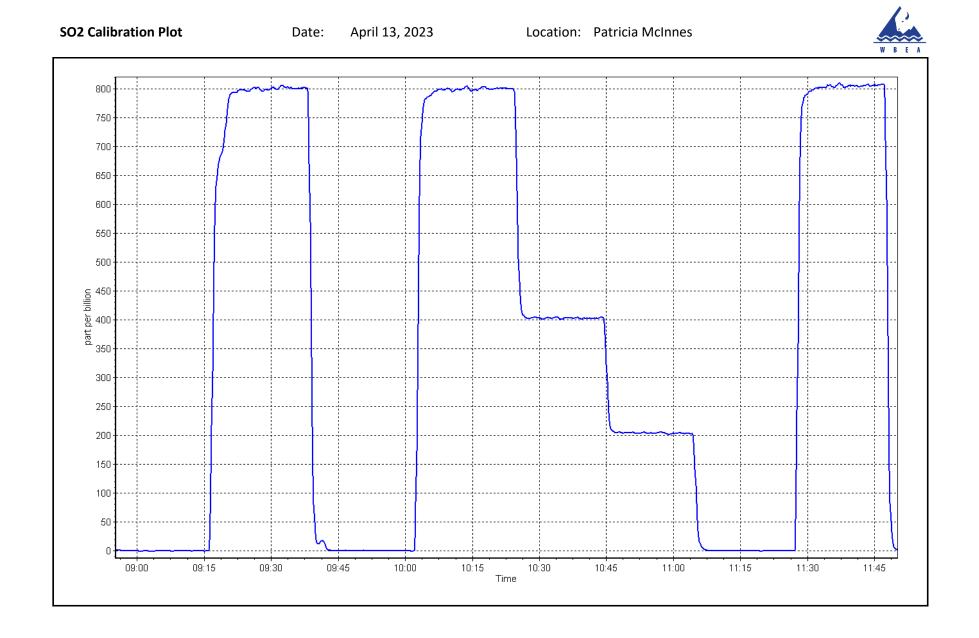
SO₂ Calibration Summary

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

Calibration Data

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







H2S Calibration Report

| | | | • | | |
|--|--|---|--|--|--|
| | | | | Version-11-202 | |
| | Station Info | rmation | | | |
| Patricia McInnes April 5, 2023 9:22 Routine | | Station number: Last Cal Date: End time (MST): | AMS 06 March 15, 2023 13:55 | | |
| | Calibration St | tandards | | | |
| 5.38 | ppm | Cal Gas Exp Date: | March 2, 2023 | | |
| EY0000809 5.38 N/A API T700 API T701 H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | N/A 3566 689 | | |
| | Analyzer Info | ormation | | | |
| Thermo 43i TLE Global G150 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1218153358 2022-195 | | |
| <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | |
| 0.997060 0.257193 | 0.992200 0.277270 | Backgd or Offset: Coeff or Slope: | 1.84 1.070 | 1.84 1.070 | |
| | H2S As Four | nd Data | | | |
| Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 | |
| 5000 | 0.0 | 0.0 | 0.0 | | |
| 4926 | 74.3 | 79.9 | 79.1 | 1.011 | |
| 4963 | 37.2 | 40.0 | 39.6 | 1.011 | |
| 4981 | 18.6 | 20.0 | 20.0 | 1.001 | |
| | | | | | |
| | H2S Calibrati | ion Data | | | |
| Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 | |
| 5000 | 0.0 | 0.0 | 0.1 | | |
| 4926 | 74.3 | 79.9 | 79.5 | 1.006 | |
| 4963 | 37.2 | 40.0 | 40.1 | 0.998 | |
| 4981 | 18.6 | 20.0 | 20.3 | 0.986 | |
| 5000 | 0.0 | 0.0 | 0.2 | | |
| 4926 | 74.3 | 79.9 | 79.9 | 1.001 | |
| 4920 | 80.3 | 803.0 | 0.0 | | |
| - | December 20, 2021 | L | Ave Corr Factor | 0.997 | |
| ficiency test: | | | | efficiency | |
| | | | | | |
| 79.1 | Prev response: | 79.96 | *% change: | -1.1% | |
| 79.1 39.6 20.0 | Prev response: AF Slope: AF Correlation: | 0.988623 | *% change: AF Intercept: | -1.1% 0.077446 | |
| | April 5, 2023 9:22 Routine 5.38 EY0000809 5.38 N/A API T700 API T701 H Thermo 43i TLE Global G150 0 - 100 ppb <u>Start</u> 0.997060 0.257193 Dilution air flow rate (sccm) 5000 4926 4963 4981 Dilution air flow rate (sccm) 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4920 nge: | Patricia McInnes April 5, 2023 9:22 Routine Calibration S 5.38 ppm EY0000809 ppm 5.38 ppm N/A ppm API T700 API T701 H API T701 H Analyzer Info Start Finish Global G150 0.997060 0.100 ppb Start Start Finish 0.997060 0.992200 0.257193 0.277270 Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Regioner (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source (sccm) Source gas flow rate (sccm) Source (sccm) | April 5, 2023 9:22 Routine Last Cal Date: End time (MST): End time (MST): 5.38 EY0000809 5.38 N/A ppm Cal Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Serial Number: Serial Number: API 7700 API 7701 H Serial Number: Serial Number: Serial Number: Thermo 43i TLE Global G150 0.997060 Analyzer Information Converter serial #: Converter serial #: Converter serial #: Converter serial #: Coeff or Slope: Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) </td <td>Patricia McInnes April 5, 2023 Station number: Last Cal Date: End time (MST): AMS 06 March 15, 2023 9:22 Routine End time (MST): 13:55 Station number: Station number: March 15, 2023 9:22 Routine ppm Cal Gas Exp Date: March 2, 2023 EY0000809 5.38 ppm Rem Gas Exp Date: N/A N/A Diff between cyl: Serial Number: 3566 API T701 H Serial Number: 689 Analyzer Information Thermo 43i TLE Global G150 Converter serial #: 1218153358 Start Analyzer Serial Number: Start O.997060 0.992200 Backgd or Offset: 1.84 O.277270 Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Source gas flow rate (sccm) <th colspa="</td"></th></td> | Patricia McInnes April 5, 2023 Station number: Last Cal Date: End time (MST): AMS 06 March 15, 2023 9:22 Routine End time (MST): 13:55 Station number: Station number: March 15, 2023 9:22 Routine ppm Cal Gas Exp Date: March 2, 2023 EY0000809 5.38 ppm Rem Gas Exp Date: N/A N/A Diff between cyl: Serial Number: 3566 API T701 H Serial Number: 689 Analyzer Information Thermo 43i TLE Global G150 Converter serial #: 1218153358 Start Analyzer Serial Number: Start O.997060 0.992200 Backgd or Offset: 1.84 O.277270 Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Source gas flow rate (sccm) <th colspa="</td"></th> | |

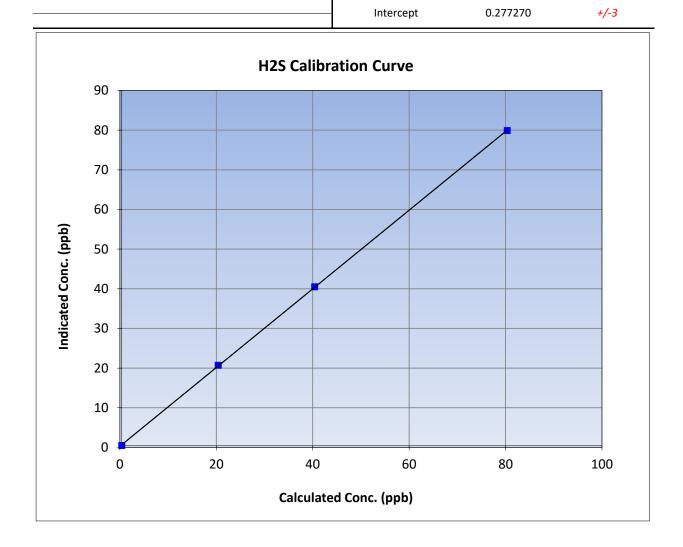
Notes:

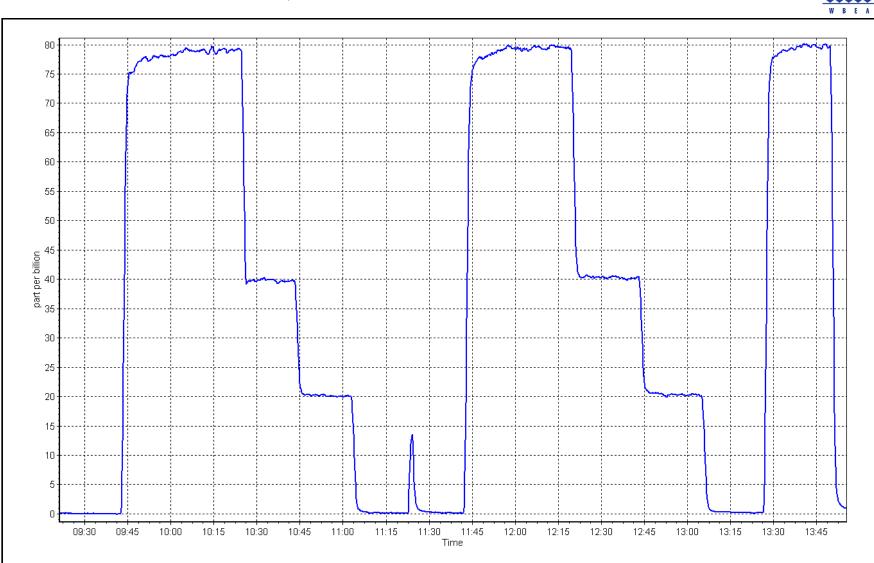
Changed the inlet filter after as founds. Ran a SO2 scrubber check after the calibrator zero. No adjustments made.



H2S Calibration Summary

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





Location: Patricia McInnes



THC / CH₄ / NMHC Calibration Report

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

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

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

CH4 Calibration Data

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

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

Notes:

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

Calibration Performed By:

Max Farrell



THC Calibration Summary

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



CH₄ Calibration Summary

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

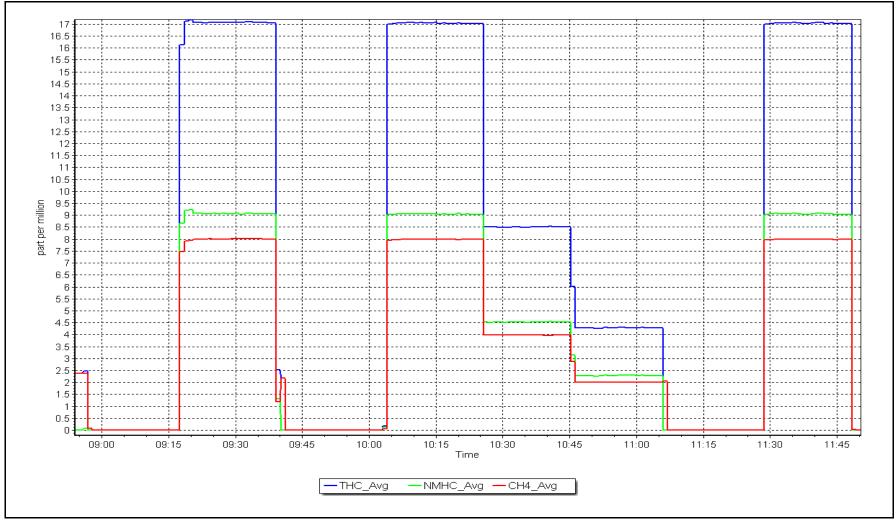


NMHC Calibration Summary

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

NMHC Calibration Plot







THC / CH₄ / NMHC Calibration Report

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

THC Calibration Data

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

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

CH4 Calibration Data

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

Calibration Statistics

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

Notes:

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

Calibration Performed By: Max Farrell



THC Calibration Summary

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



CH₄ Calibration Summary

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



NMHC Calibration Summary

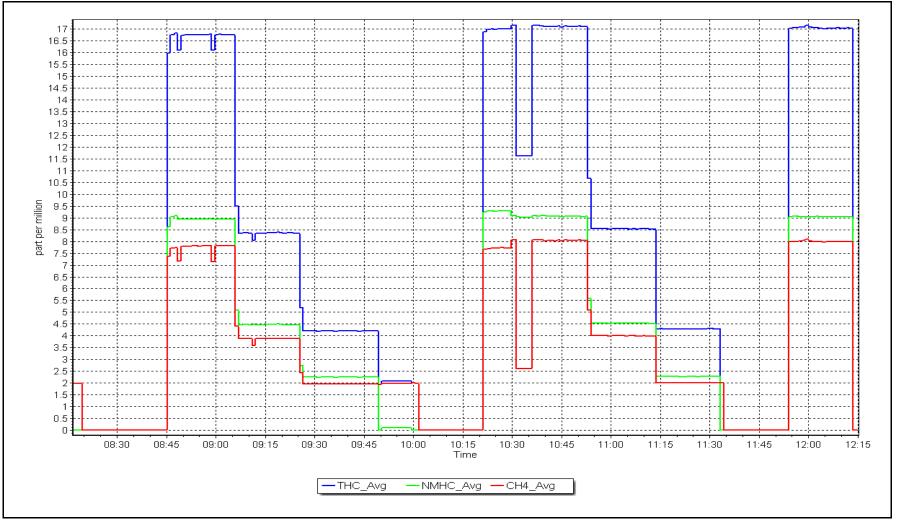
| | | | Station I | nformation | | |
|---------------------------------|-----|---------------------------------------|---------------------------|-----------------------|--------------|---------------|
| Calibration Da | te: | April 2 | 5, 2023 | Previous Calibratio | n: April 13 | 3, 2023 |
| Station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

NMHC Calibration Plot

Date: April 25, 2023

Location: Patricia McInnes







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

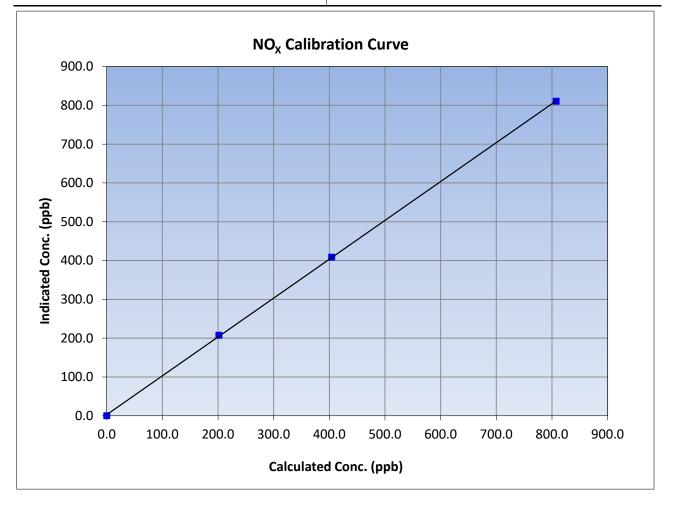
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

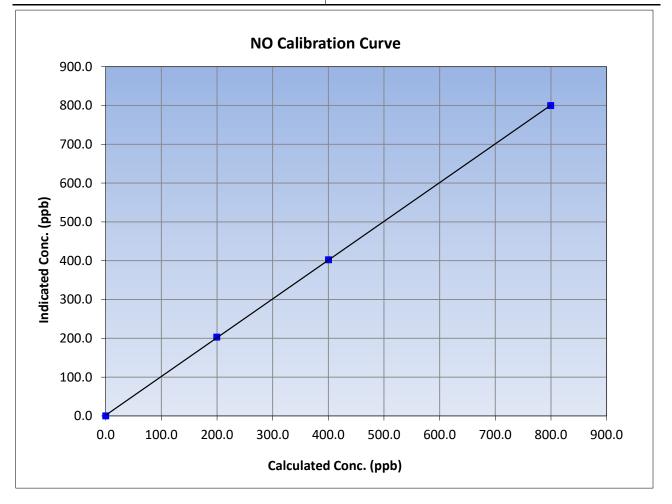
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 4 | l, 2023 | Previous Calibration: | March | 7, 2023 |
| Station Name: | Patricia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





NO Calibration Summary

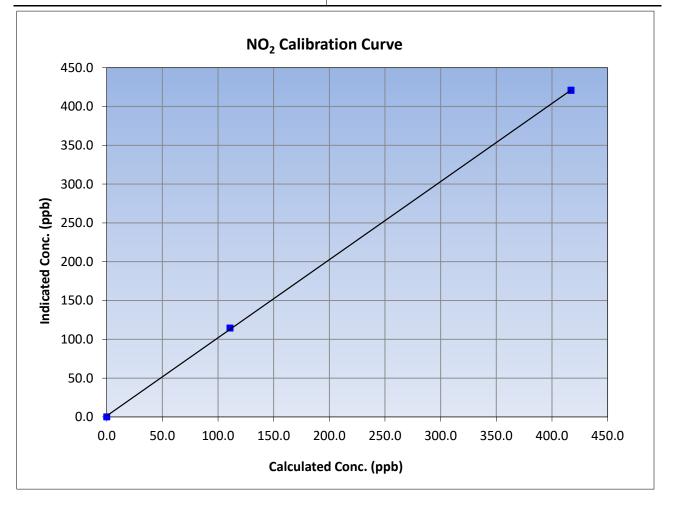
| WBEA | | | | | Version-04-20 | | |
|--|---------------------------------------|---------------------------|--------------------------|----------|---------------|--|--|
| | | Station | Information | | | | |
| Calibration Date: | April 4 | , 2023 | Previous Calibration: | March | 7, 2023 | | |
| Station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

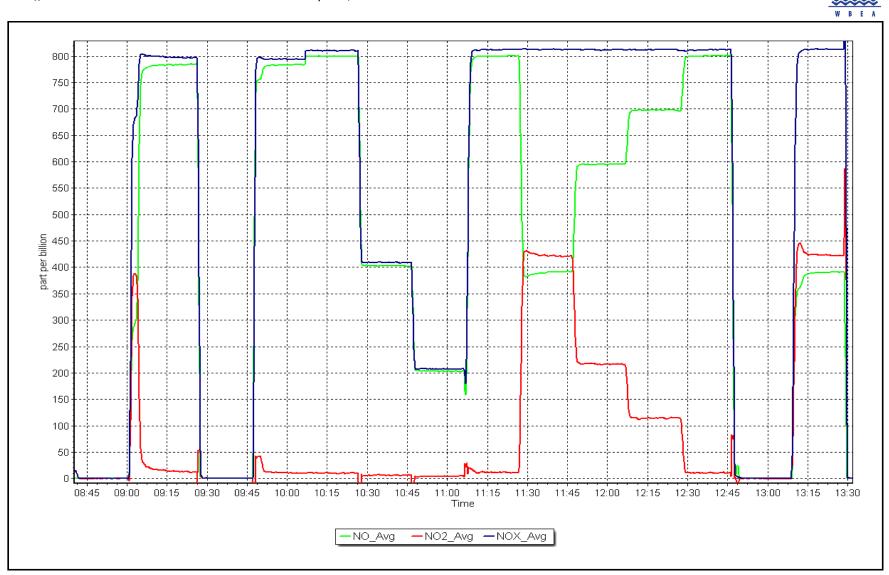




NO₂ Calibration Summary

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





Date: April 4, 2023

Location: Patricia McInnes





O₃ Calibration Report

Version-01-2020

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

Notes:

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

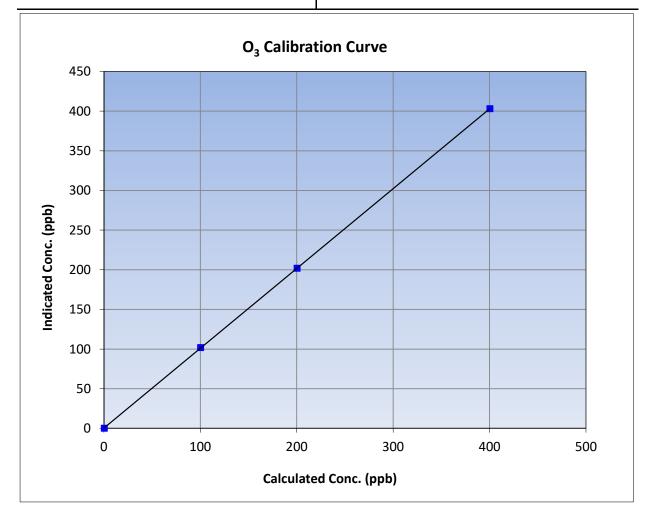
Calibration Performed By:

Max Farrell



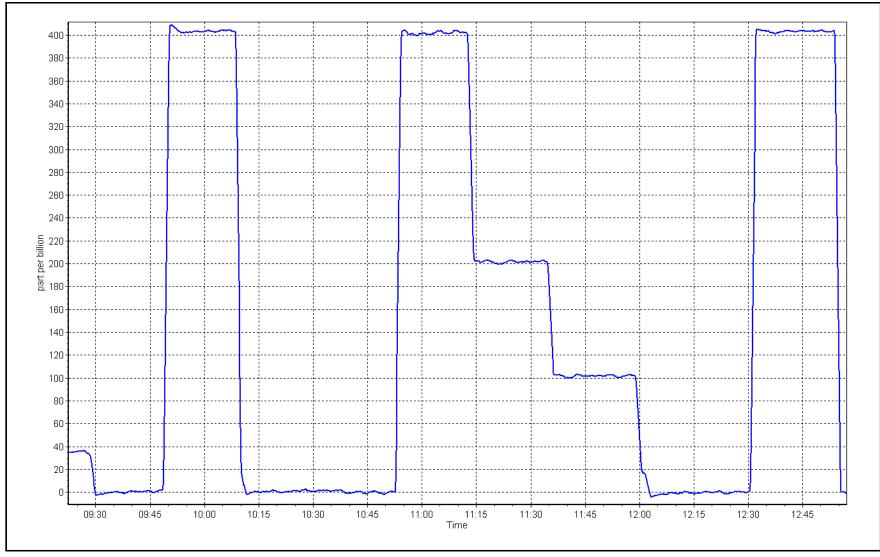
O₃ Calibration Summary

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











T640 PM_{2.5} CALIBRATION

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

Calibration by:

Max Farrell



TN - NO_X - NH_3 Calibration Report

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



TN - NOX - NH_3 Calibration Report

Version-11-2021

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

Dilution Calibration Data



NO_x - NO - NO₂ Calibration Report

Version-11-2021

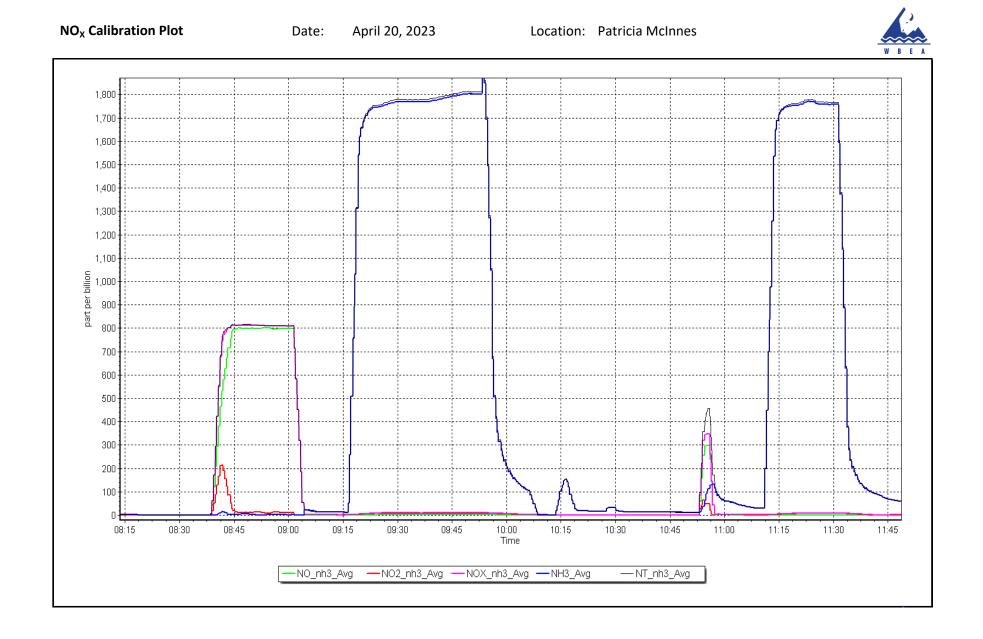
| | | | | Dilut | ion Calibration | n Data | | | | |
|------------------|------------------------------|--------------------------------|---|--|--|--|---|---|---|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration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

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

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

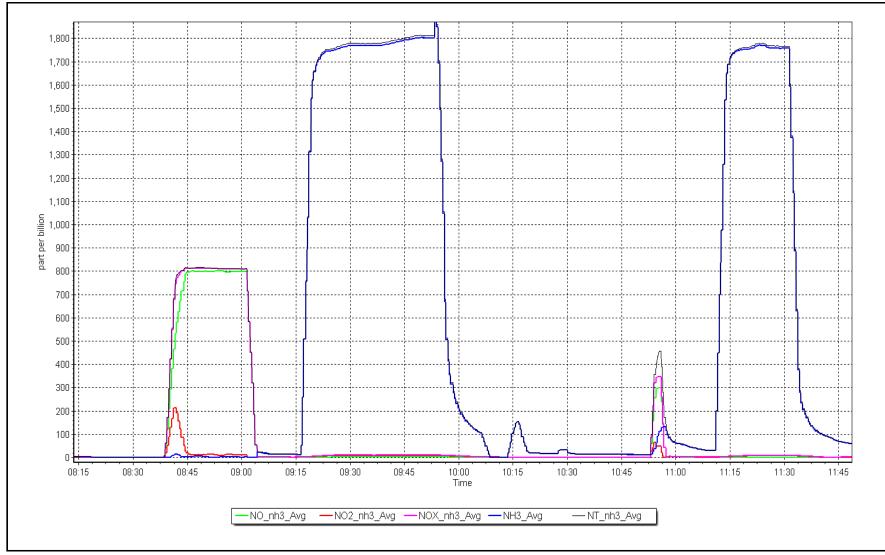
Calibration Performed By:

Max Farrell











TN - NO_X - NH_3 Calibration Report

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



TN - NOX - NH₃ Calibration Report

Version-11-2021

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

Dilution Calibration Data

NH3 Current Converter Efficiency = 95.1%



NO_x - NO - NO₂ Calibration Report

Version-11-2021

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

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

Notes:

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

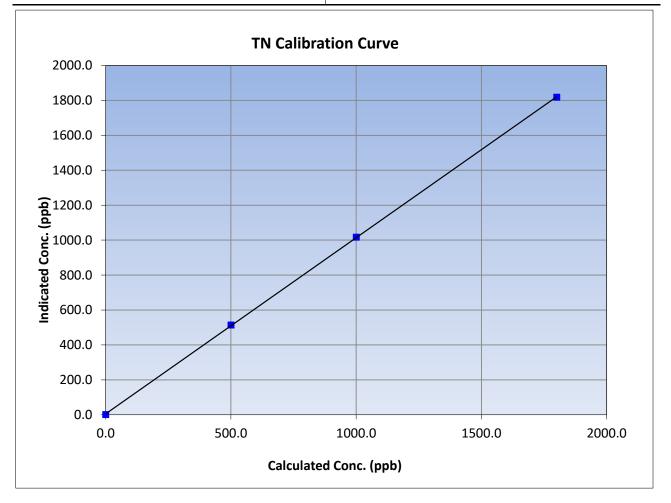
Calibration Performed By:

Max Farrell



TN Calibration Summary

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

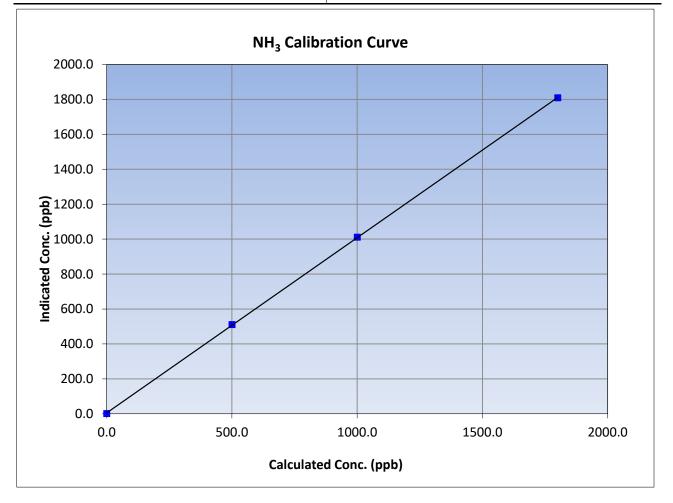


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NH₃ Calibration Summary

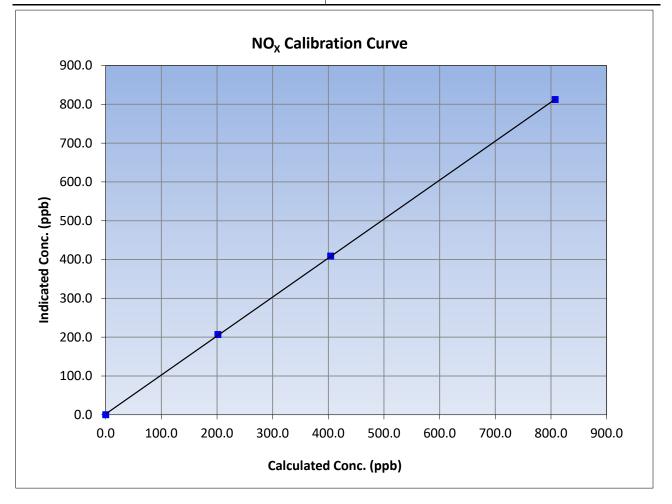
| WBEA | | Station | Information | | Version-11-2 |
|--|---------------------------------------|--------------------------------------|----------------------------------|----------|---------------|
| | | Station | mormation | | |
| Calibration Date: | April 2 | 7, 2023 | Previous Calibration: | March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





NO_x Calibration Summary

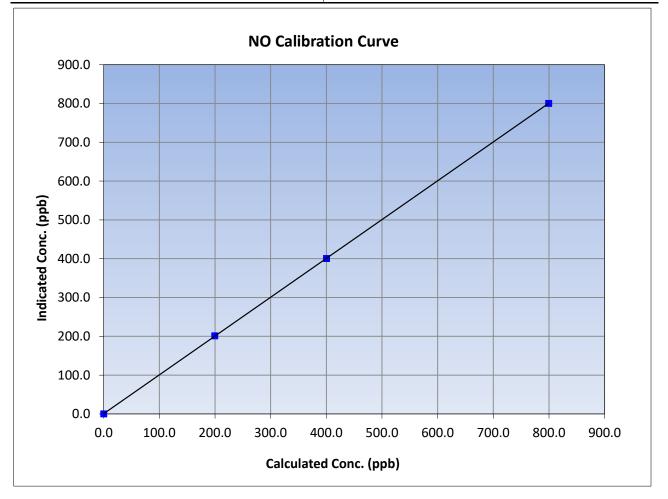
| WBEA | | Station | Information | | Version-11-2 | |
|--|---------------------------------------|---------------------------|---------------------------|----------|---------------|--|
| Calibration Date: | April 27, 2023 | | | | arch 8, 2023 | |
| Station Name: | Patricia | McInnes | Station Number: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





NO Calibration Summary

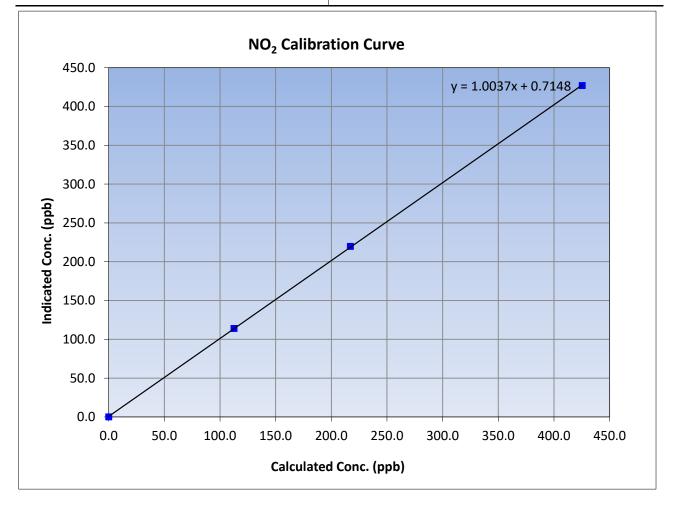
| WBEA | | | | | Version-11-20 |
|--|---------------------------------------|---------------------------|--------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 7, 2023 | Previous Calibration: | Marc | :h 8, 2023 |
| Station Name: | Patricia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

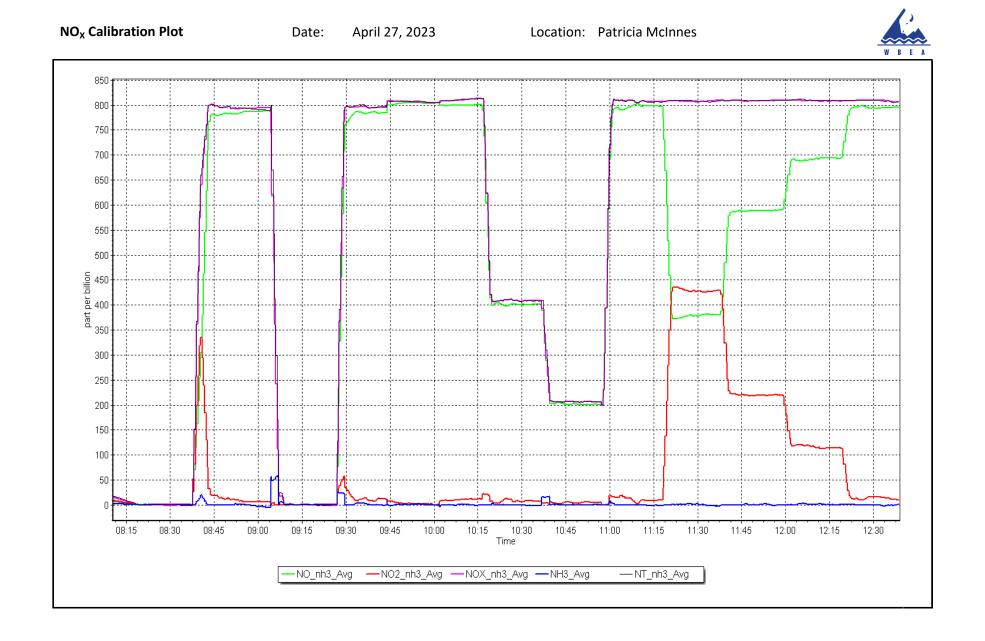




NO₂ Calibration Summary

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













WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

No adjustments or maintenance done.

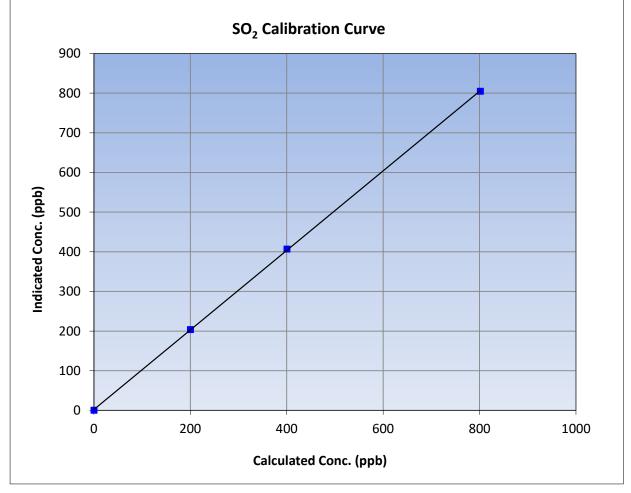
Calibration Performed By:

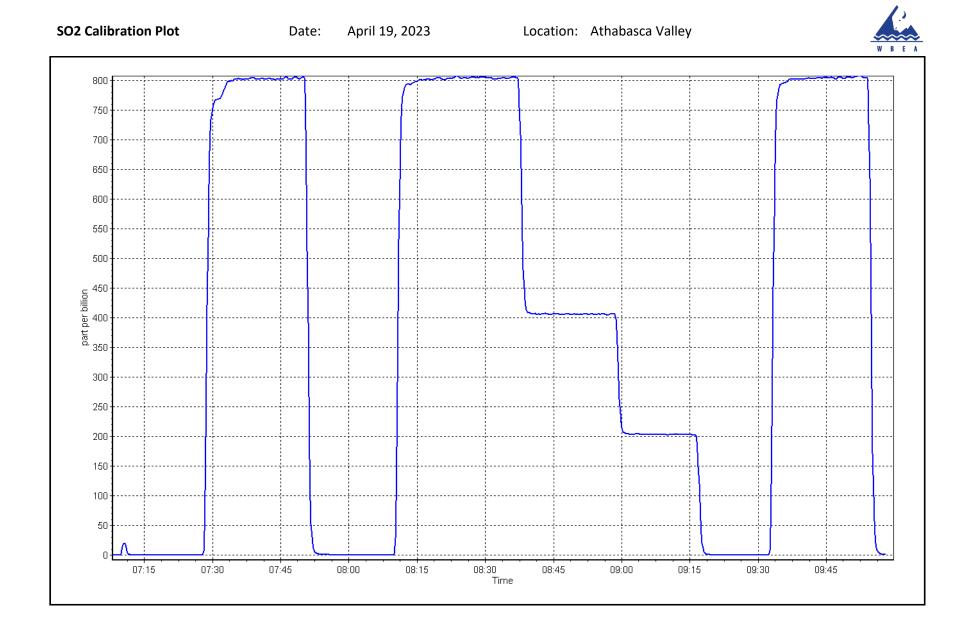


SO₂ Calibration Summary

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

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







TRS Calibration Report

| | | | • | |
|---|--|--|--|--|
| | | | | Version-11-202 |
| | Station Info | rmation | | |
| Athabasca Valley April 26, 2023 6:18 Routine | | Station number: Last Cal Date: End time (MST): | AMS07 March 13, 2023 10:29 | |
| | Calibration S | tandards | | |
| 4.94 | ppm | Cal Gas Exp Date: | February 9, 2024 | |
| EY0002277 4.94 NA API T700 API T701H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 3805 198 | |
| | Analyzer Info | ormation | | |
| Thermo 43i LTE CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1180540018 551 | |
| <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| 0.993485 | 0.993201 | Backgd or Offset: | 2.20 | 2.17 |
| 0.081597 | 0.141603 | Coeff or Slope: | 0.841 | 0.829 |
| | TRS As Four | nd Data | | |
| Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| 5000 | 0.0 | 0.0 | -0.1 | |
| 4918 | 81.6 | 80.6 | 81.2 | 0.992 |
| 4959 | 40.8 | 40.3 | 40.5 | 0.993 |
| 4980 | 20.4 | 20.2 | 20.0 | 1.003 |
| | | | | |
| | TRS Calibrat | ion Data | | |
| Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| 5000 | 0.0 | 0.0 | 0.1 | |
| 4918 | 81.6 | 80.6 | 80.2 | 1.005 |
| 4959 | 40.8 | 40.3 | 40.2 | 1.003 |
| 4980 | 20.4 | 20.2 | 20.2 | 0.998 |
| 5000 | 0.0 | 0.0 | 0.6 | |
| 4918 | 81.6 | 80.6 | 79.8 | 1.010 |
| 4921 | 79.2 | 800.2 | 0.0 | |
| | | | | 1.002 |
| iciency test: | April 22, 2022 | | 98.5% | efficiency |
| 81.3 | Prev response: | 80.18 | *% change: | 1.4% |
| 40.6 | | | AF Intercept: | -0.198377 |
| 20.1 | AF Correlation: | 0.999992 | | |
| | | | * = > +/-5% change initiat | es investigation |
| | April 26, 2023 6:18 Routine 4.94 EY0002277 4.94 NA API T700 API T701H Thermo 43i LTE CDN-101 0 - 100 ppb 5tart 0.993485 0.081597 Dilution air flow rate (sccm) 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 | Athabasca Valley April 26, 2023 6:18 Routine Calibration S 4.94 FY0002277 4.94 API T700 API T701H ppm AAPI T700 API T701H ppm Start 0.993485 0.993201 0.081597 Finish 0.993201 0.141603 Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) | April 26, 2023 Last Cal Date: 6:18 End time (MST): Routine Cal Gas Exp Date: 4.94 ppm Cal Gas Exp Date: EY0002277 4.94 ppm Rem Gas Exp Date: NA Diff between cyl: Serial Number: API T700 Serial Number: Serial Number: API T701H Serial Number: Serial Number: Diff between cyl: Serial Number: Serial Number: 0 - 100 ppb Start Analyzer serial #: Converter serial #: 0.993485 0.993201 Backgd or Offset: Oceff or Slope: Dilution air flow rate Source gas flow rate Calculated concentration (ppb) (cc) 5000 0.0 0.0 0.0 4980 20.4 20.2 Zol2 TRS Calibration Data Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (cc) (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (cc) Source gas flow rate (sccm) <t< td=""><td>Athabasca Valley April 26, 2023 6:18 RoutineStation number: Last Cal Date: End time (MST):AMS07 March 13, 2023 10:296:18 RoutineppmCal Gas Exp Date: Serial Number:February 9, 20244.94 EY0002277 4.94 API 7700 API T700 API T701HppmRem Gas Exp Date: Serial Number:NAMarch 13, 2023 Diff between cyl: API T701HSerial Number: Serial Number:3805Apit T701HSerial Number: Serial Number:1180540018 S000Stort O.993485 0.993201 0.081597Finish 0.141603Stort Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentr</td></t<> | Athabasca Valley April 26, 2023 6:18 RoutineStation number: Last Cal Date: End time (MST):AMS07 March 13, 2023 10:296:18 RoutineppmCal Gas Exp Date: Serial Number:February 9, 20244.94 EY0002277 4.94 API 7700 API T700 API T701HppmRem Gas Exp Date: Serial Number:NAMarch 13, 2023 Diff between cyl: API T701HSerial Number: Serial Number:3805Apit T701HSerial Number: Serial Number:1180540018 S000Stort O.993485 0.993201 0.081597Finish 0.141603Stort Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentr |

Notes:

Sox scrubber checked after calibrator zero. Span adjusted.

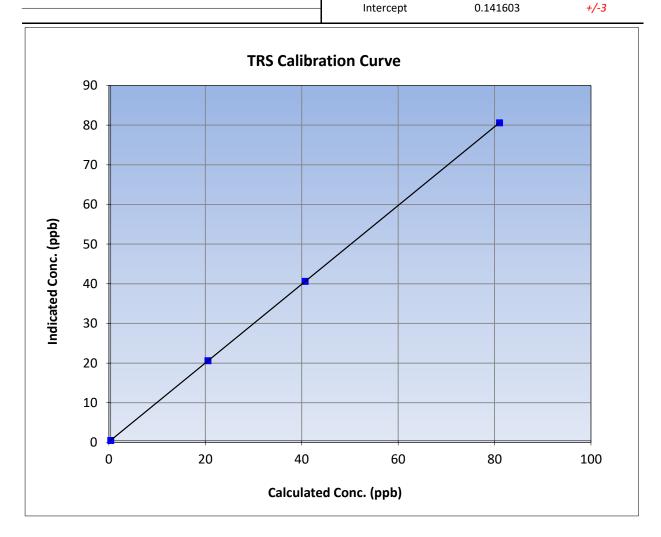
Calibration Performed By:

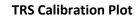
Melissa Lemay



TRS Calibration Summary

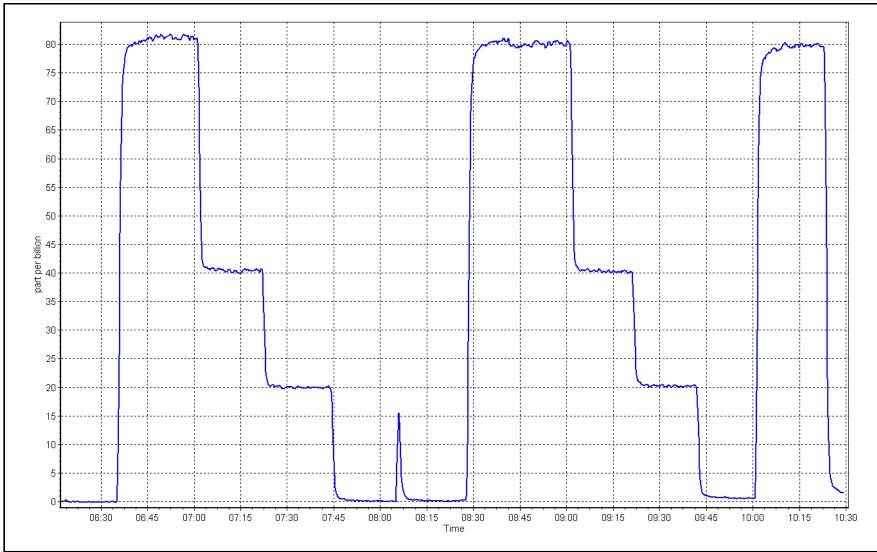
| WBEA | | | | | Version-11- |
|--|---------------------------------------|------------------------------|-------------------------|---------------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 26, | 2023 | Previous Calibration: | March | 13, 2023 |
| Station Name: |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













THC / CH₄ / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

| CH4 | Cal | ibration | Data |
|-----|-----|-----------|------|
| CIT | Cu | is a cion | Dutu |

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

Notes:

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

Calibration Performed By: Melissa Lemay



THC Calibration Summary

Version-01-2020

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



CH₄ Calibration Summary

Version-01-2020

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



NMHC Calibration Summary

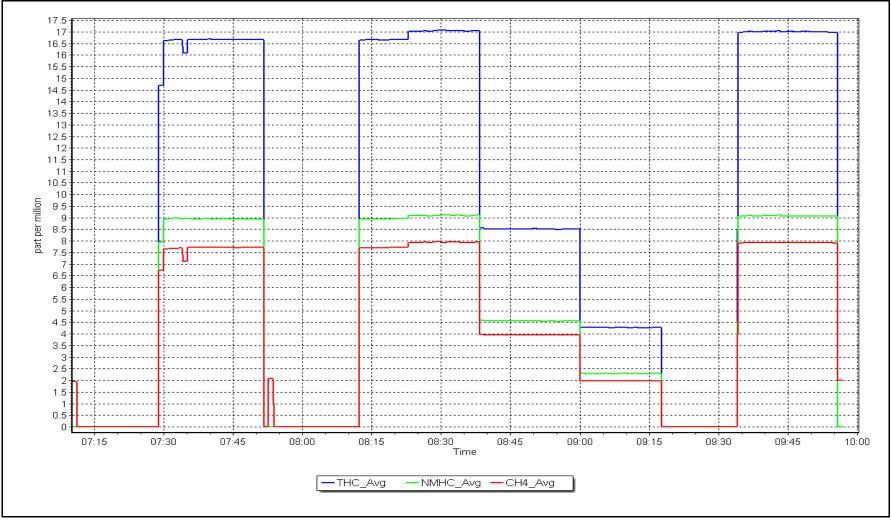
Version-01-2020

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

NMHC Calibration Plot

Location: Athabasca Valley







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

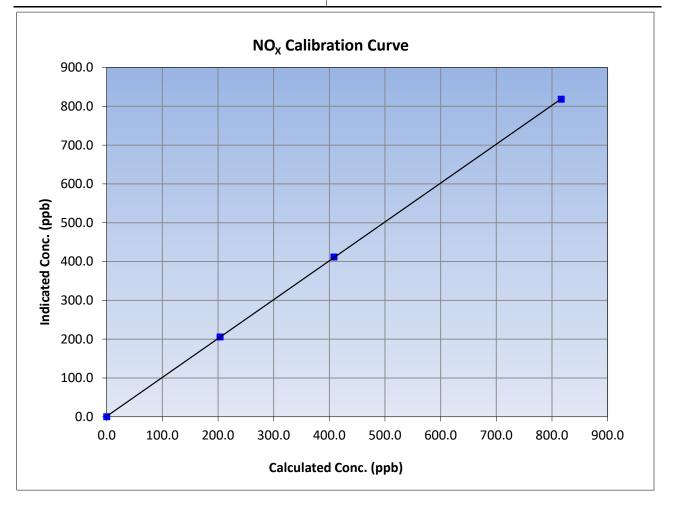
No maintenance or adjustments done.

Calibration Performed By:



NO_x Calibration Summary

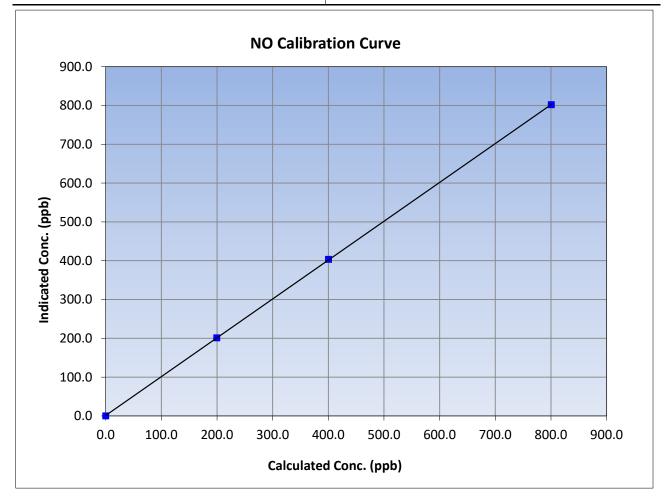
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|---------------------------|-------------------------|----------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 2 | 1, 2023 | Previous Calibration: | March 1 | 10, 2023 | |
| Station Name: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





NO Calibration Summary

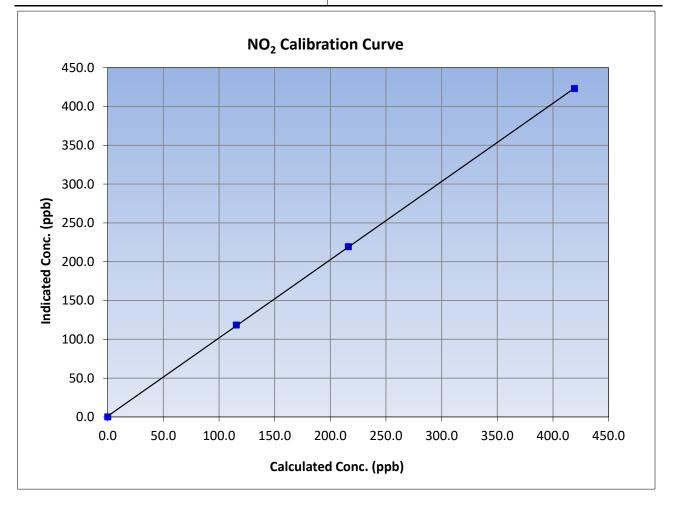
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|----------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 1, 2023 | Previous Calibration: | March 1 | 0, 2023 |
| Station Name: | Athabasca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

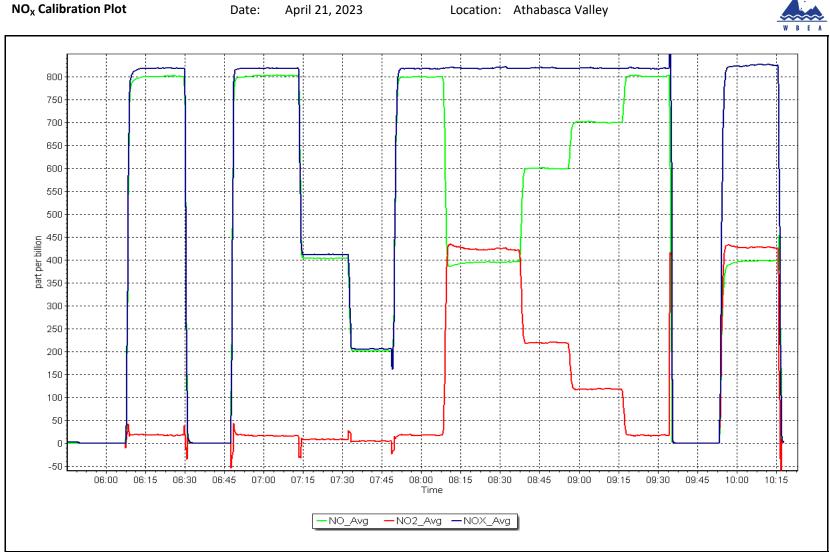




NO₂ Calibration Summary

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









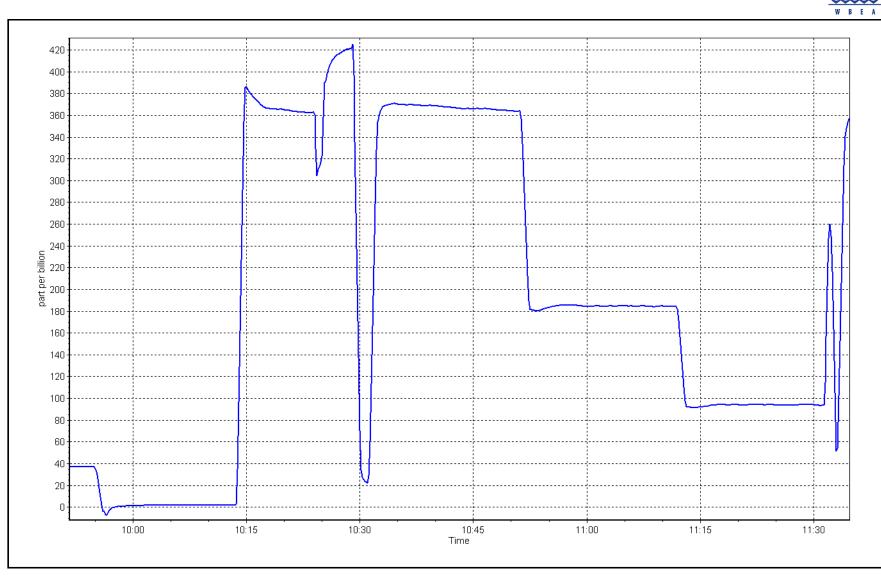
O₃ Calibration Report

Version-01-2020

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

Calibration Performed By:

Melissa Lemay



O₃ Calibration Plot

Location: Athabasca Valley





O₃ Calibration Report

Version-01-2020

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

Notes:

Install due to suspected leak in old O3 analyzer.

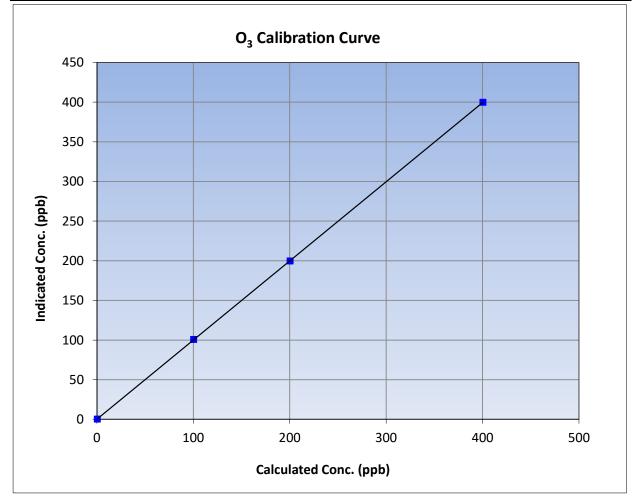
Calibration Performed By:

Melissa Lemay



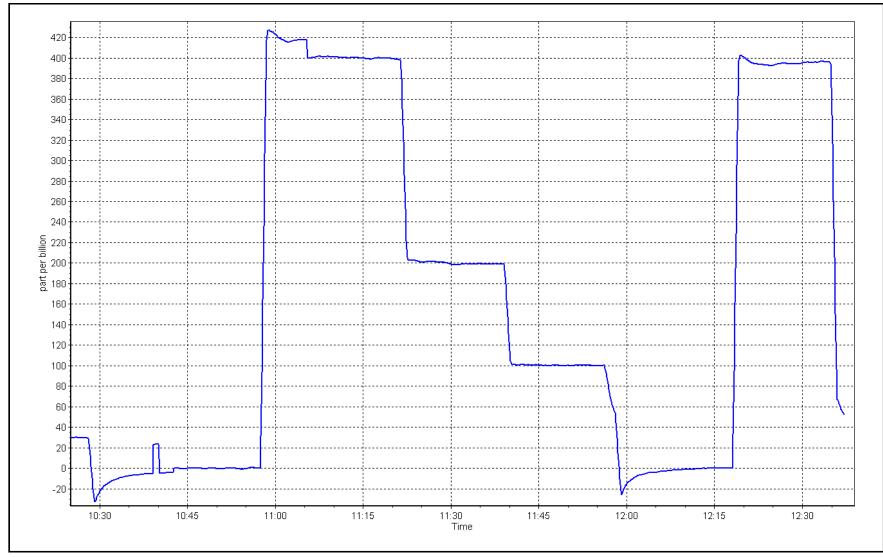
O₃ Calibration Summary

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











T640 PM_{2.5} CALIBRATION

| WBEA | | | | | | Version-01-2023 |
|-------------------------------|------------------|-----------------------|---------------------|----------------|--------|-----------------|
| | | Station Information | n | | | |
| Station Name: | Athabasca Valley | | Station number: | AMS 07 | | |
| Calibration Date: | April 26, 2023 | | Last Cal Date: | March 31, 2023 | i | |
| Start time (MST): | 10:32 | | End time (MST): | 11:04 | | |
| | | | - 4 - | | | |
| Analyzer Make: | API T640 | | S/N: | 645 | | |
| Particulate Fraction: | PM2.5 | | | | | |
| Flow Meter Make/Model: | Alicat FP-25BT | | S/N: | 388753 | | |
| Temp/RH standard: | Alicat FP-25BT | | S/N: | 388753 | | |
| | | Monthly Calibration T | est | | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | Ad | justed | (Limits) |
| T (°C) | 6.6 | 6.68 | 6.6 | | | +/- 2 °C |
| P (mmHg) | 735.8 | 734.7 | 735.8 | | | +/- 10 mmHg |
| flow (LPM) | 5 | 5.14 | 5 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | April 26, 2023 | Last Cal Date: | March 31, 2 | | , |
| Leak rest. | PM w/o HEPA: | 3.8 | PM w/ HEPA: | 0 | JZJ | <0.2 ug/m3 |
| Note: this leak check will be | | | | - | check | |
| Inlet cleaning : | Inlet Head | | · | | | |
| C C | | | | | | |
| | | | | | | |
| | | Quarterly Calibration | Test | | | |
| <u>Parameter</u> | <u>As found</u> | Post maintenance | <u>As left</u> | Ad | justed | (Limits) |
| PMT Peak Test | | | | | | 10.9 +/- 0.5 |
| | | | | | | |
| Post-maintenanc | | PM w/o HEPA: | | w/ HEPA: | | |
| Date Optical Chan | | February 1, | | | | <0.2 ug/m3 |
| Disposable Filte | er Changed: | February 1, | , 2023 | | | |
| | | | | | | |
| | | | | | | |
| | | Annual Maintenanc | e | | | |
| | | | | | | |
| Date Sample Tu | | December 5 | | | | |
| Date RH/T Sens | or Cleaned: | December 5 | 5, 2022 | | | |
| | | | | | | |
| Notoci | | No adjustmer | nts done. Head clea | ned | | |
| Notes: | | | | neu. | | |
| | | | | | | |
| Calibration by: | Melissa Lemay | | | | | |



CO Calibration Report

Version-01-2020

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

Notes:

No Maintenance done. Zero adjusted.

Calibration Performed By:

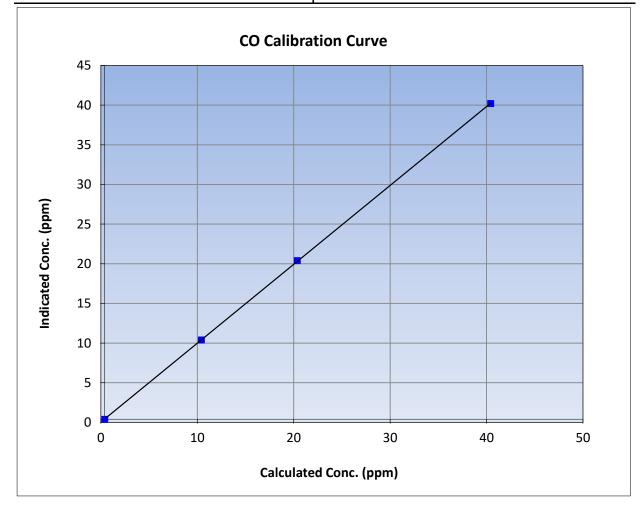


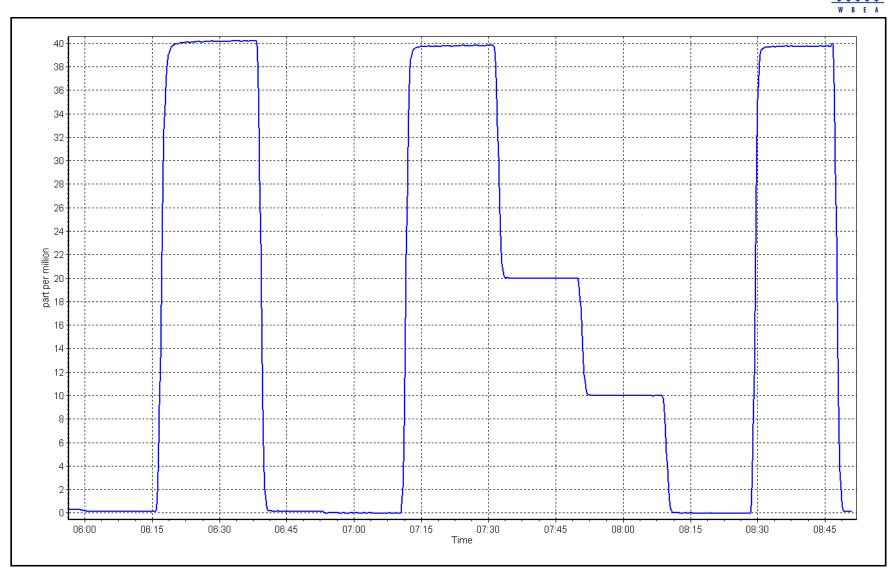
CO Calibration Summary

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

Calibration Data

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





Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

Morgan Voyageur

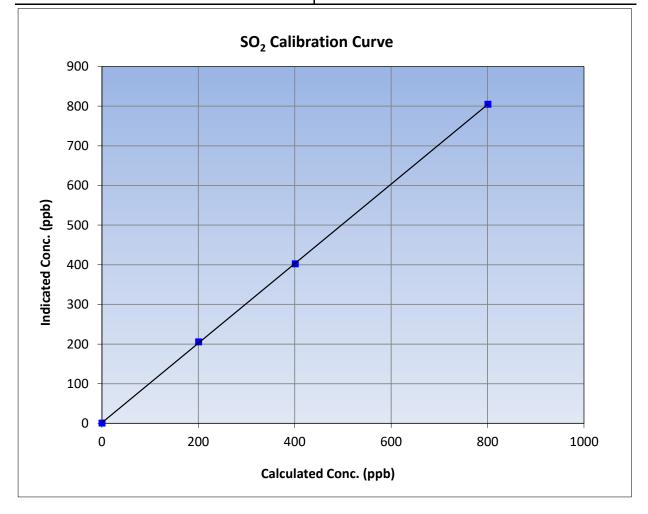


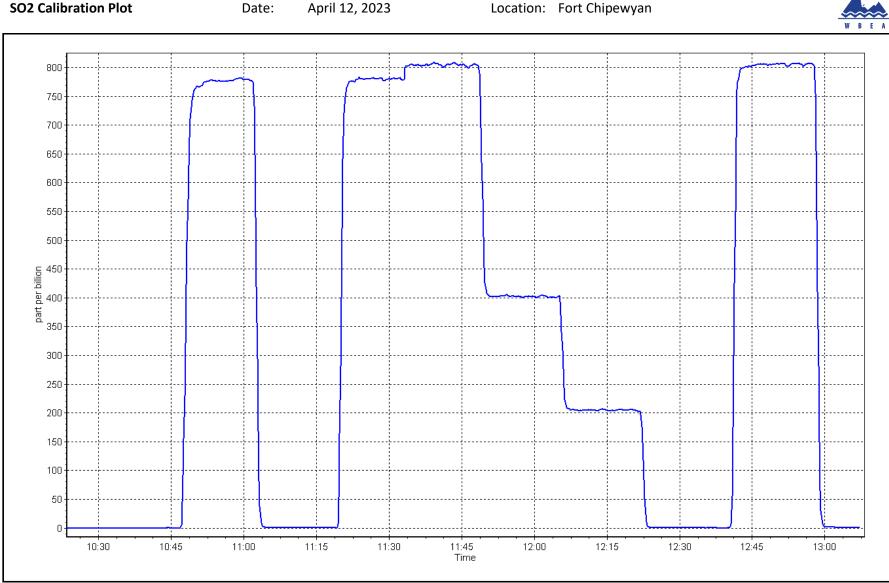
SO₂ Calibration Summary

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

Calibration Data

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





Location: Fort Chipewyan



TRS Calibration Report

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

Notes:

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

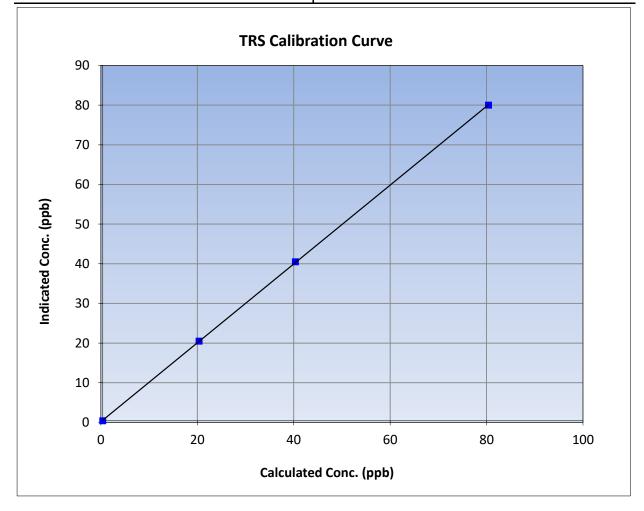


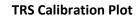
TRS Calibration Summary

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

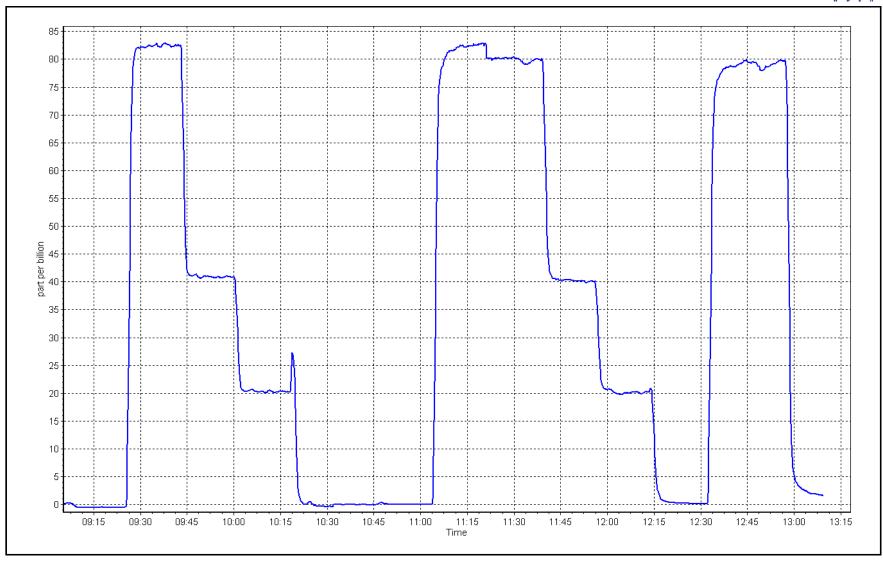
Calibration Data

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











Station Name:

Reason:

Calibration Date:

Start time (MST):

Fort Chipewyan

April 13, 2023

8:28

Routine

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

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

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

Analyzer Information

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

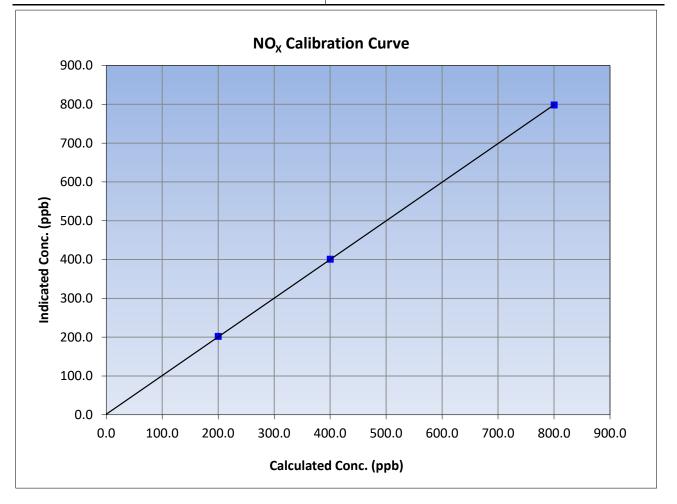
Notes:

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



NO_x Calibration Summary

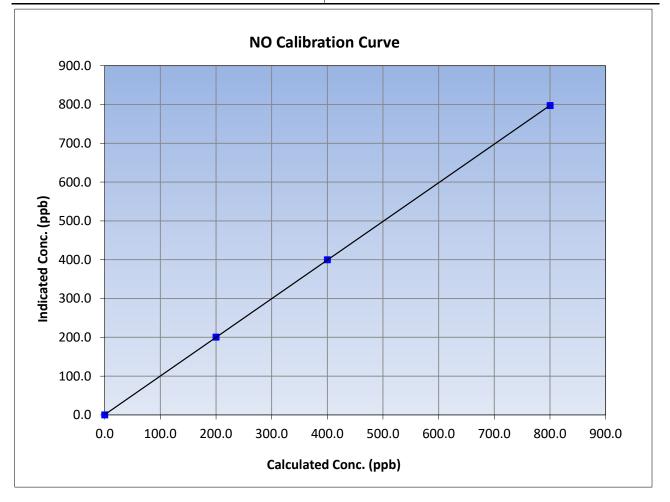
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|---------------------------|--------------------------|----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 1 | 3, 2023 | Previous Calibration: | March 1 | .3, 2023 | |
| Station Name: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





NO Calibration Summary

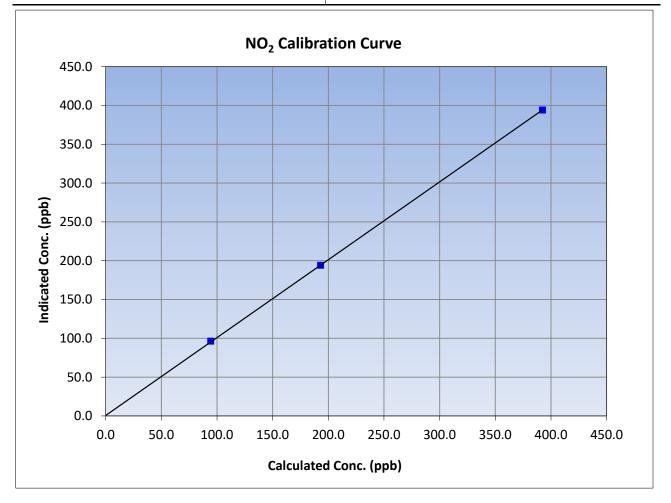
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------------------------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 1 | 3, 2023 | Previous Calibration: | March 1 | 13, 2023 |
| Station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

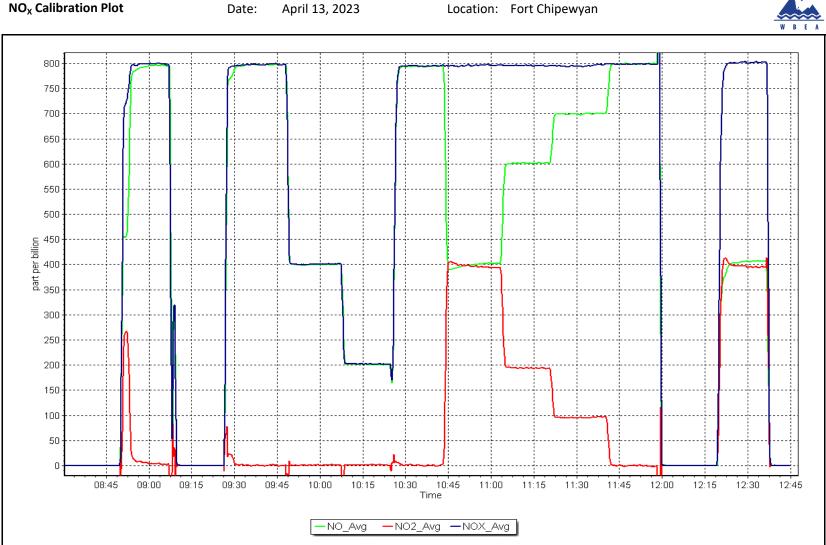




NO₂ Calibration Summary

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







O₃ Calibration Report

Version-01-2020

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

Notes:

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

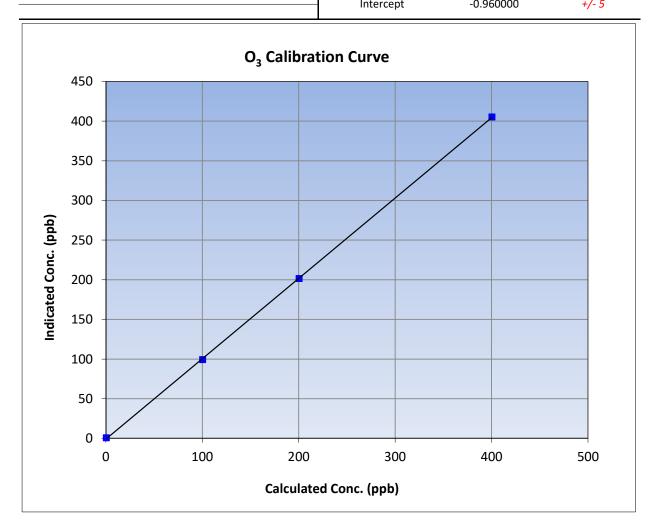
Calibration Performed By:

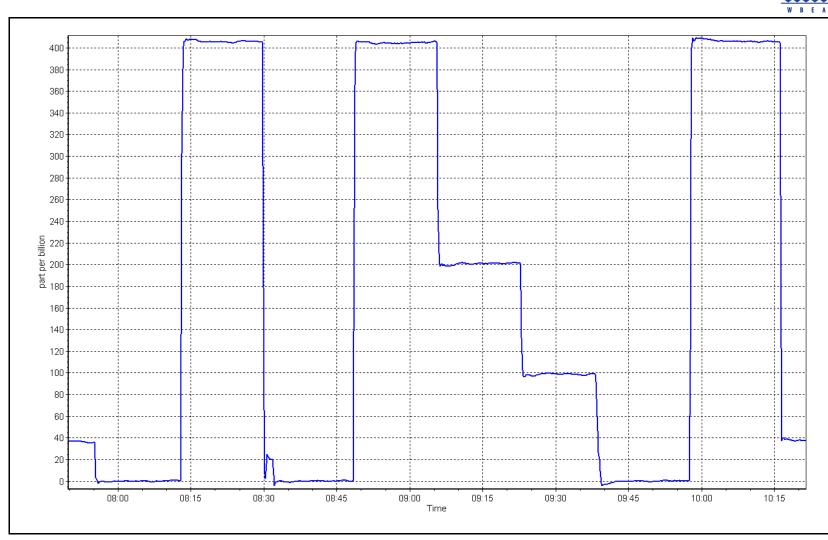
Morgan Voyageur



O₃ Calibration Summary

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





Location: Fort Chipewyan



T640 PM_{2.5} CALIBRATION

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



CO Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

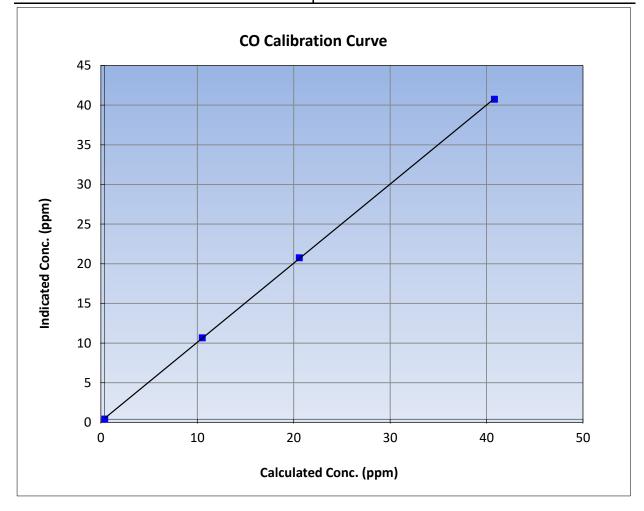


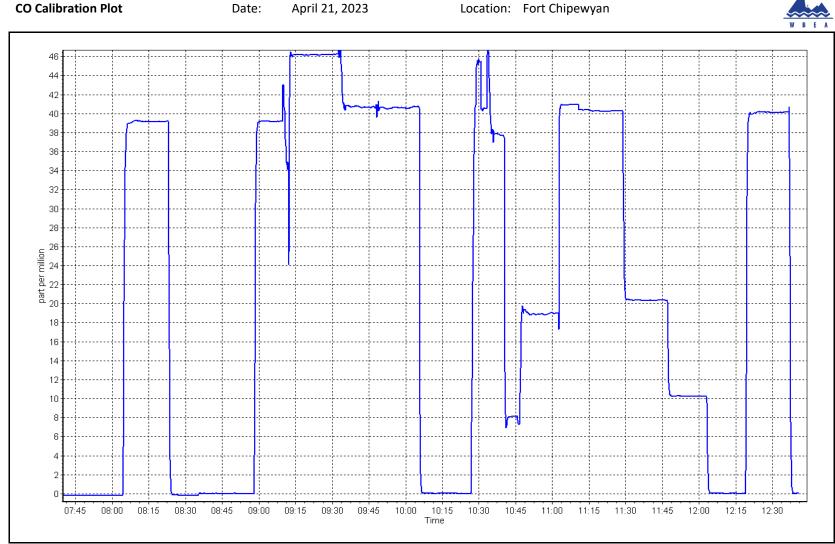
CO Calibration Summary

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

Calibration Data

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







CO₂ Calibration Report

Version-01-2020

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

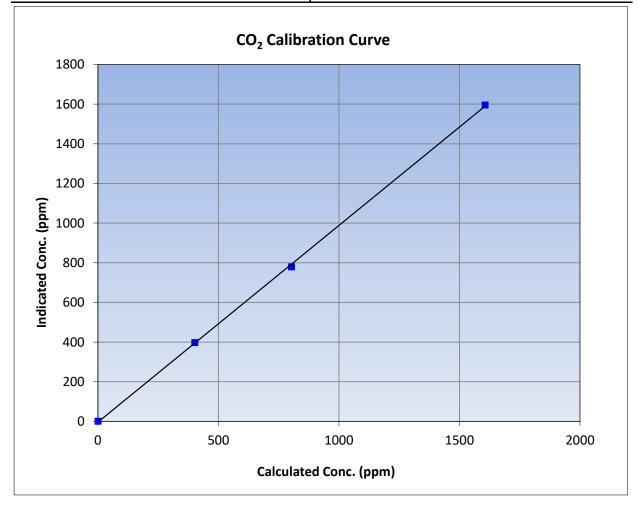
Sample inlet filter changed after as founds. no adjustments made

Calibration Performed By:



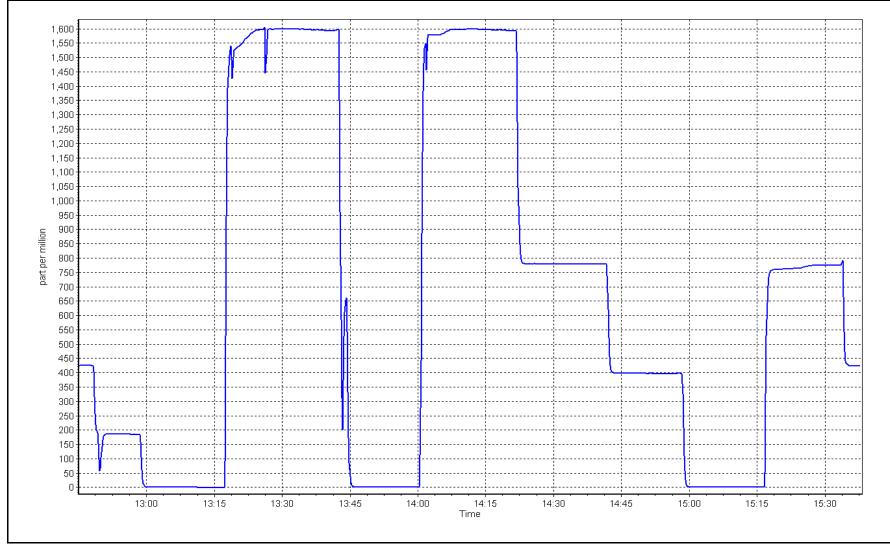
CO₂ Calibration Summary

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











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS09 BARGE LANDING APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:



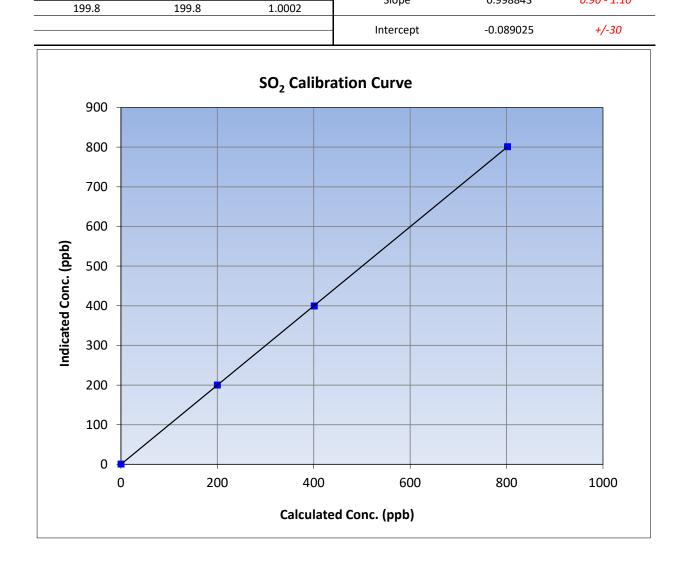
SO₂ Calibration Summary

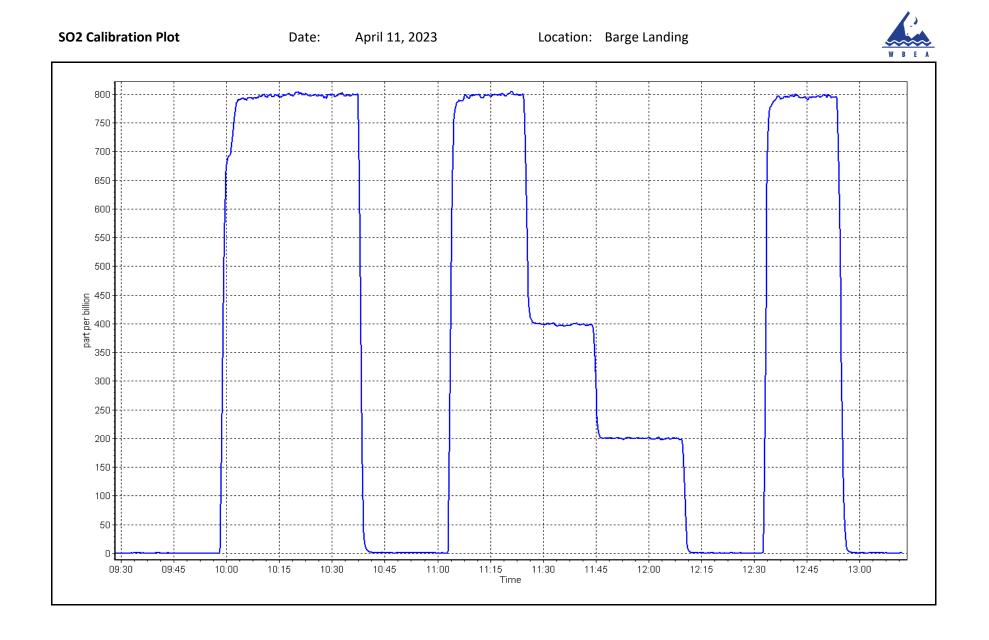
Slope

0.998843

0.90 - 1.10

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







TRS Calibration Report

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

Notes:

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

Calibration Performed By:

Braiden Boutilier

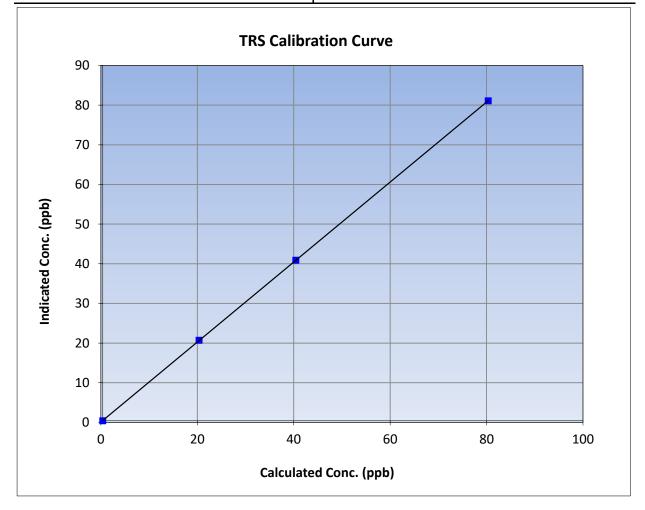


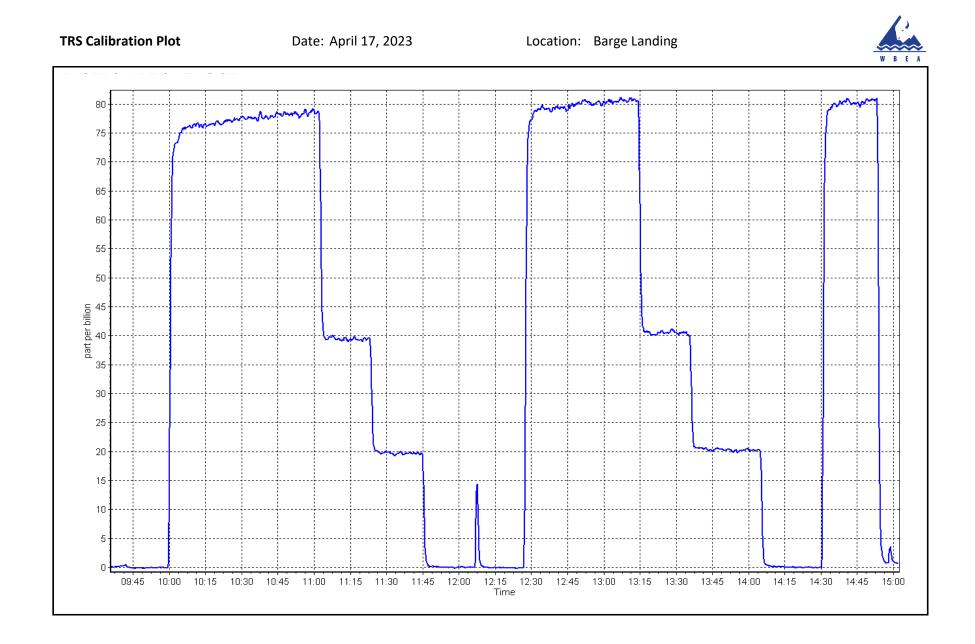
TRS Calibration Summary

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

Calibration Data

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







THC / CH_4 / NMHC Calibration Report

| W B E A | | | | | Version-01-2020 | | | |
|--------------------------------------|----------------|--|-------------------------|---------------|-----------------|--|--|--|
| | | St | ation Information | | | | | |
| Station Name: | Barge Landing | | Station number: AN | AS09 | | | | |
| Calibration Date: | April 11, 2023 | 11, 2023 Last Cal Date: March 28, 2023 | | | | | | |
| Start time (MST): | 9:28 | | End time (MST): 13 | :11 | | | | |
| Reason: | Routine | | | | | | | |
| | | Cal | ibration Standards | | | | | |
| Gas Cert Reference: | | CC151285 | Cal Gas Expiry Date: Ja | nuary 5, 2025 | | | | |
| CH4 Cal Gas Conc. | 497.6 | ppm | CH4 Equiv Conc. | 1067.1 | ppm | | | |
| C3H8 Cal Gas Conc. | 207.1 | ppm | | | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: NA | 4 | | | | |
| Removed CH4 Conc. | 497.6 | ppm | CH4 Equiv Conc. | 1067.1 | ppm | | | |
| Removed C3H8 Conc. | 207.1 | ppm | Diff between cyl (THC): | | | | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | | | | |
| Calibrator Model: | API T700 | | Serial Number: 38 | 12 | | | | |
| ZAG make/model: | API T701 | | Serial Number: 48 | 88 | | | | |
| | | An | alyzer Information | | | | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 11 | 93585649 | | | | |
| THC Range (ppm): | : 0 - 100 ppm | | | | | | | |
| NMHC Range (ppm): | : 0 - 50 ppm | | CH4 Range (ppm): 0 - | - 50 ppm | | | | |
| | <u>Start</u> | <u>Finis</u> | <u>sh</u> | <u>Start</u> | <u>Finish</u> | | | |
| CH4 SP Ratio: | 2.49E-04 | 2.49E | -04 NMHC SP Ratio: | 4.79E-05 | 4.79E-05 | | | |
| CH4 Retention time: | 15.2 | 15. | 2 NMHC Peak Area: | 190949 | 190949 | | | |
| | | | | | | | | |

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

| СН4 | Cal | ibration | Data |
|-----|-----|-----------|------|
| CH4 | Ca | INIALIOII | Dala |

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

Notes:

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

Calibration Performed By:



THC Calibration Summary

Version-01-2020

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



CH₄ Calibration Summary

Version-01-2020

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



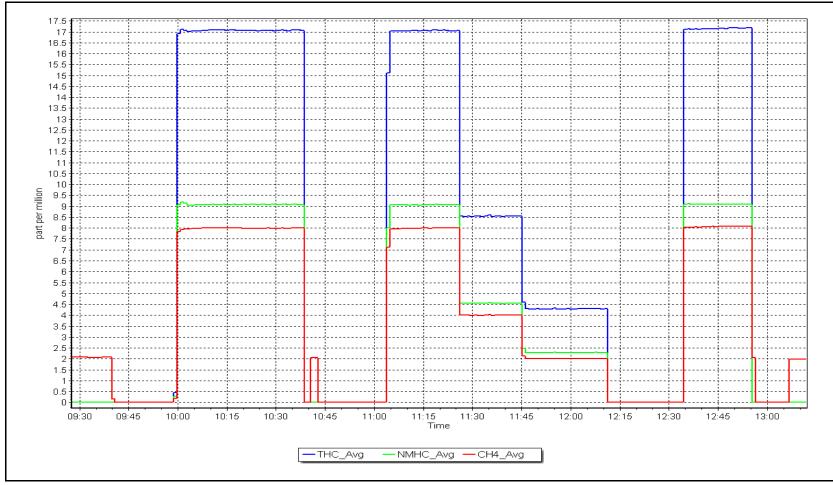
NMHC Calibration Summary

Version-01-2020

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









NO Cal Slope:

NO Cal Offset:

NO₂ Cal Slope:

NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

1.000056

-0.352413

1.001921

-0.892005

0.996586

-0.413290

1.003813

0.518213



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

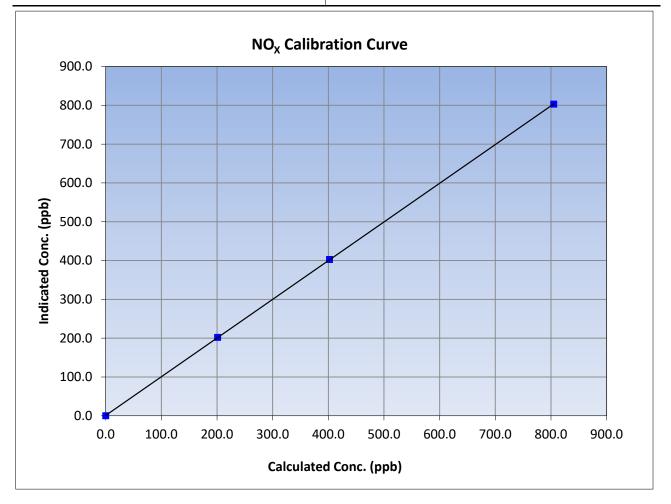
Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

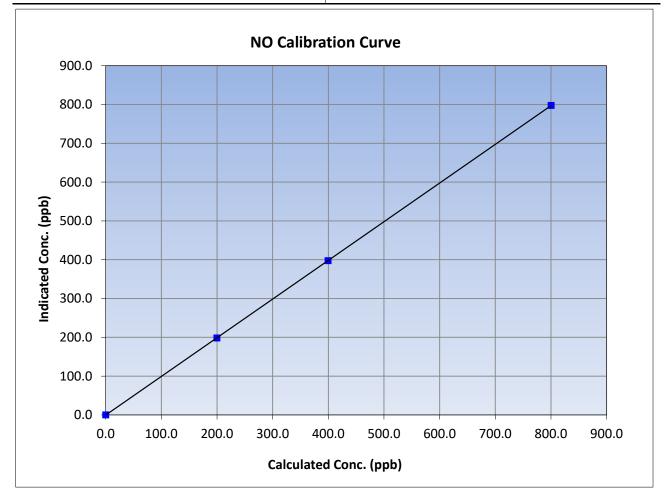
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 8, 2023 | Previous Calibration: | March 2 | 15, 2023 |
| Station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





NO Calibration Summary

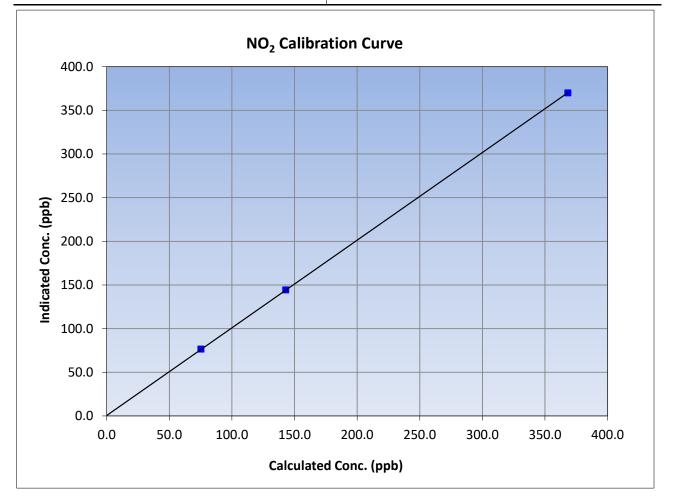
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|---------------------------|-------------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 8, 2023 | Previous Calibration: | March 1 | 5, 2023 |
| Station Name: |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

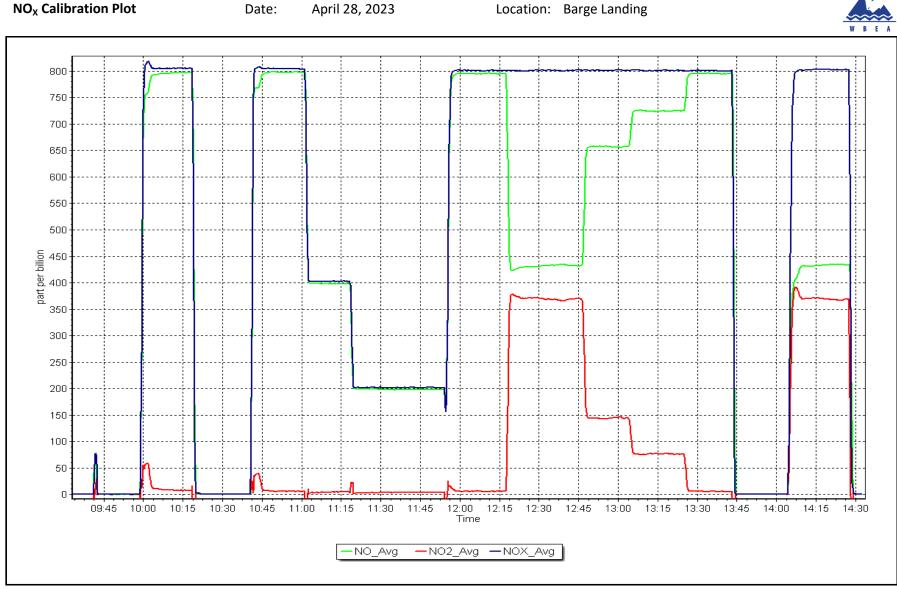




NO₂ Calibration Summary

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





April 28, 2023

Location: Barge Landing



T640 PM_{2.5} CALIBRATION

| WBEA | | | | | Version-01-2023 |
|-------------------------------|----------------------|---------------------------|---------------------|----------------------|-----------------|
| | | Station Information | | | |
| Station Name: | Barge Landing | | Station number: | AMS 09 | |
| Calibration Date: | April 28, 2023 | | Last Cal Date: | March 23, 2023 | |
| Start time (MST): | 11:18 | | End time (MST): | 11:48 | |
| Analyzer Make: | API T640 | | S/N: | 321 | |
| Particulate Fraction: | PM2.5 | | | | |
| Flow Meter Make/Model: | Alicat FP-25BT | | S/N: | 388750 | |
| Temp/RH standard: | Alicat FP-25BT | | S/N: | 388750 | |
| | | Monthly Calibration Te | est | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | <u>Adjusted</u> | (Limits) |
| Т ([°] С) | 14.3 | 15.60 | 14.3 | | +/- 2 °C |
| P (mmHg) | 733.8 | 735.67 | 733.8 | | +/- 10 mmHg |
| flow (LPM) | 5.00 | 4.901 | 5.00 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | April 28, 2023 | Last Cal Date: | March 23, 2023 | |
| | PM w/o HEPA: | 1.8 | PM w/ HEPA: | 0.0 | <0.2 ug/m3 |
| Note: this leak check will be | completed before the | quarterly work and will s | erve as the pre ma | intenance leak check | |
| Inlet cleaning : | Inlet Head | \checkmark | | | |
| | | | | | |
| | | | | | |
| | | Quarterly Calibration T | est | | |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | <u>Adjusted</u> | (Limits) |
| PMT Peak Test | - | - | - | | 11.3 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | | w/ HEPA: | _ |
| Date Optical Cham | | February 28, | 2023 | wy ner A. | <0.2 ug/m3 |
| Disposable Filte | | February 28, | | | 1012 06/110 |
| | | | | | |
| | | | | | |
| | | Annual Maintenance | 2 | | |
| Date Sample Tul | be Cleaned: | November 15 | <i>,</i> 2022 | | |
| Date RH/T Sense | or Cleaned: | November 15 | 5, 2022 | | |
| | | | | | |
| | N | o adjustments made. Cle | aned inlet head. Le | eak check passed. | |
| Notes: | | - | | - | |
| Calibration by: | Braiden Boutilier | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS11 LOWER CAMP APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

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

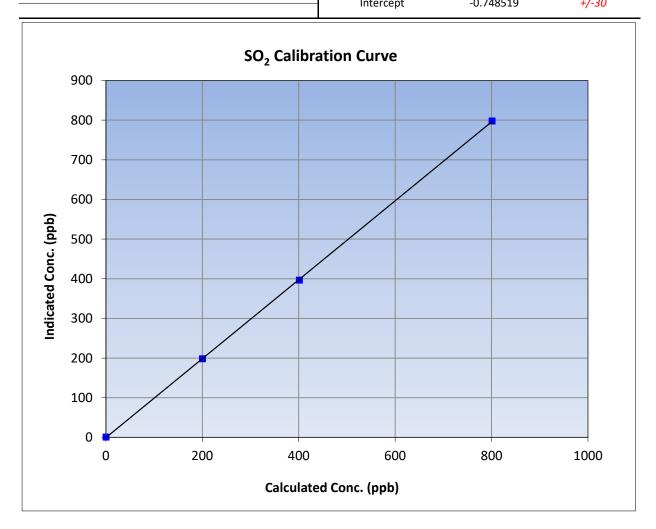
Calibration Performed By:

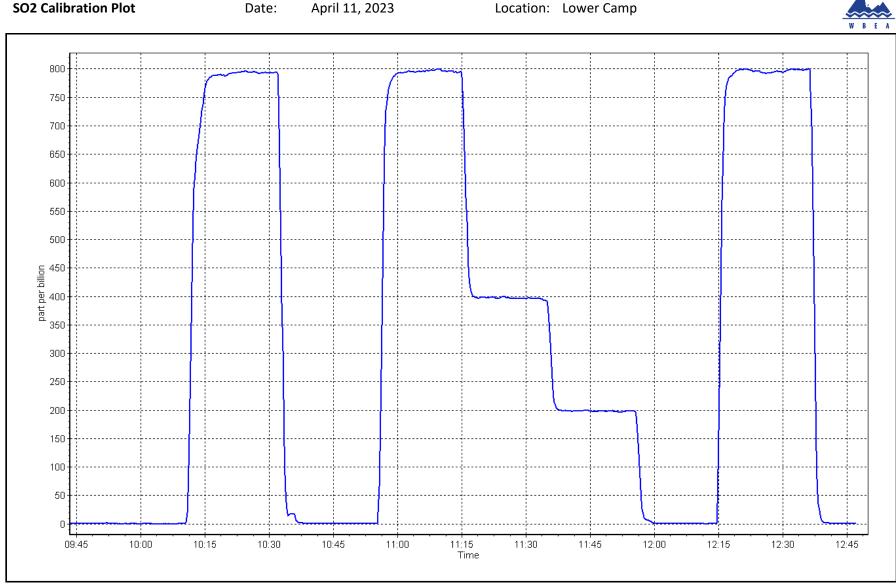
Mohammed Kashif



SO₂ Calibration Summary

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





SO2 Calibration Plot

Location: Lower Camp



H₂S Calibration Report

| WBEA | | - | | | Version-11-2 |
|---|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | VC13I011-11-2 |
| Station Name: Calibration Date: Start time (MST): Reason: | Lower Camp April 13, 2023 8:42 Routine | | Station number: Last Cal Date: End time (MST): | AMS11 March 28, 2023 12:19 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.429 | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | CC501097 5.429 NA API T700 API T701H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 3807 196 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 450iQ NA 0 - 100 ppb | | Analyzer serial #: Converter serial #: | CM20080003 NA | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 1.026375 0.532956 | 1.015352 0.293967 | Backgd or Offset: Coeff or Slope: | | 14.0 1.043 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.3 | |
| as found span | 4926 | 73.6 | 79.9 | 80.8 | 0.993 |
| as found 2nd point | 4963 | 36.8 | 40.0 | 40.4 | 0.996 |
| as found 3rd point | 4982 | 18.6 | 20.2 | 20.3 | 1.010 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrati | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction facto (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.4 | |
| high point | 4926 | 73.6 | 79.9 | 81.5 | 0.981 |
| second point | 4963 | 36.8 | 40.0 | 40.8 | 0.979 |
| third point | 4982 | 18.6 | 20.2 | 20.7 | 0.976 |
| as left zero | 5000 | 0.0 | 0.0 | 0.5 | |
| as left span | 4926 | 73.6 | 79.9 | 81.4 | 0.982 |
| O2 Scrubber Check | 4919 | 81.1 | 811.0 | 0.0 | |
| Date of last scrubber cha | - | | | Ave Corr Factor | 0.979 |
| Date of last converter eff | iciency test: | | | | efficiency |
| Baseline Corr As found: | 80.5 | Prev response: | 82.56 | *% change: | -2.6% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 40.1 20.0 | AF Slope: AF Correlation: | 1.008475 | AF Intercept: | 0.134769 |
| basenne con siù Ar pl: | 20.0 | AF COITEIdtiON: | 0.333300 | * = > +/-5% change initiate | es investigation |

Notes:

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

Calibration Performed By:

Mohammed Kashif

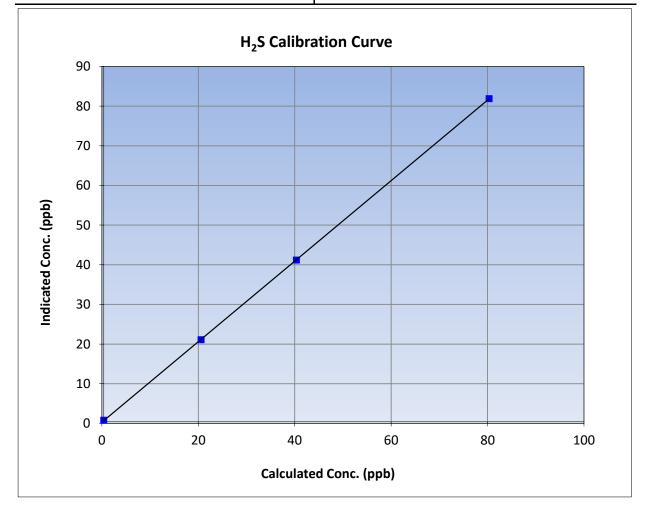


H₂S Calibration Summary

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

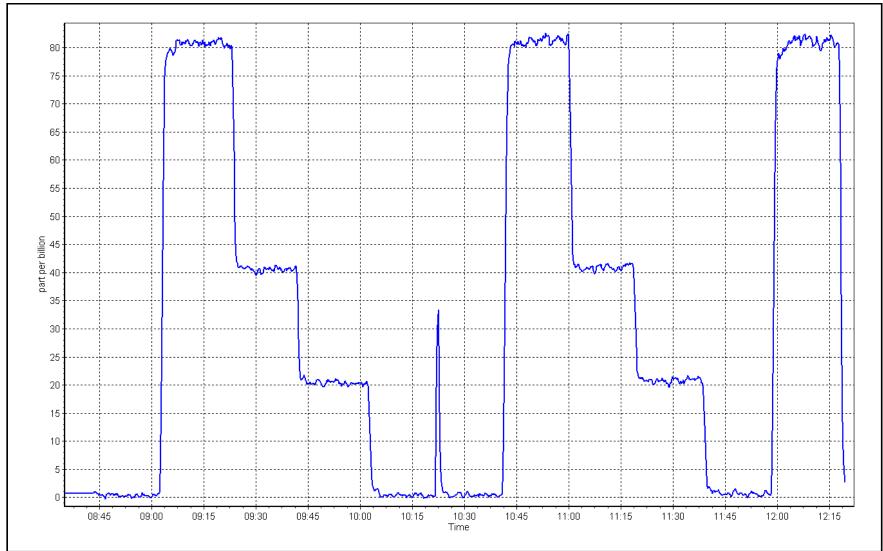
Calibration Data

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











THC / CH_4 / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

| CH4 | Cal | ibration | Data |
|-----|-----|-----------|------|
| CIT | Cu | is a cion | Dutu |

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

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

Calibration Performed By:

Mohammed Kashif



THC Calibration Summary

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



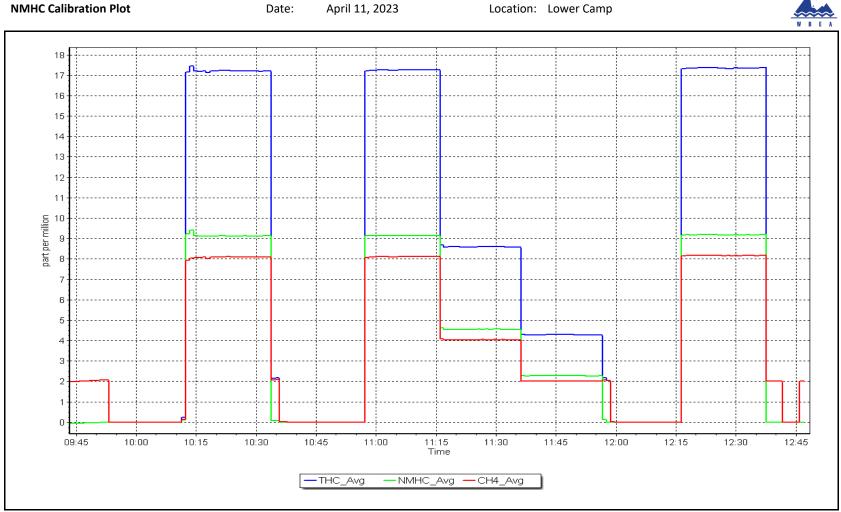
CH₄ Calibration Summary

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



NMHC Calibration Summary

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







third point as left zero

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

| W B E A | | | | | Version-01-20 |
|--|---|---------------------|---|---------------------|---------------------|
| | | Station | Information | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Lower Camp April 27, 2023 9:21 Cylinder Change | | Station number: Last Cal Date: End time (MST): | April 11, 2023 | |
| | | Calibrat | ion Standards | | |
| Gas Cert Reference: | C | C2216 | Cal Gas Expiry Date: | February 23 2025 | |
| CH4 Cal Gas Conc. | 502.0 | ppm | CH4 Equiv Conc. | 1067.1 | ppm |
| C3H8 Cal Gas Conc. | 205.5 | ppm | ente Equiv conc. | 1007.1 | PPIII |
| Removed Gas Cert: | 205.5 | PPIII | Removed Gas Expiry: | | |
| Removed CH4 Conc. | 502.0 | ppm | CH4 Equiv Conc. | 1067.1 | ppm |
| Removed C3H8 Conc. | 205.5 | ppm | Diff between cyl (THC): | | FF |
| Diff between cyl (CH_4): | | r r | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: | 3807 | |
| ZAG make/model: | API T701 | | Serial Number: | 196 | |
| | | Analyze | r Information | | |
| Analyzer make: THC Range (ppm): | | | Analyzer serial #: | 1505164381 | |
| NMHC Range (ppm): | | | CH4 Range (ppm): | 0 - 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio: | 3.02E-04 | 3.02E-04 | NMHC SP Ratio: | 5.86E-05 | 5.86E-05 |
| CH4 Retention time: | 13.8 | 13.8 | NMHC Peak Area: | 156599 | 156599 |
| | | THC Cal | ibration Data | | |
| Set Point | Dil air flow rate | Source gas flow rat | e Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4919 | 81.3 | 17.35 | 17.34 | 1.001 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| nigh point | 4919 | 81.3 | 17.35 | 17.31 | 1.002 |
| second point | | | | | |

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



THC / CH_4 / NMHC Calibration Report

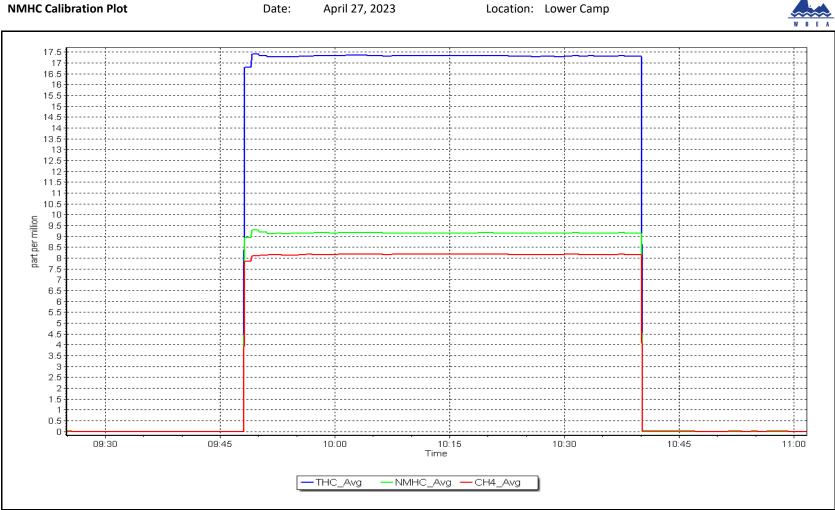
Version-01-2020

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

Notes:

Changed N2 cylinder after as founds.

Calibration Performed By: Sean Bala



Location: Lower Camp



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

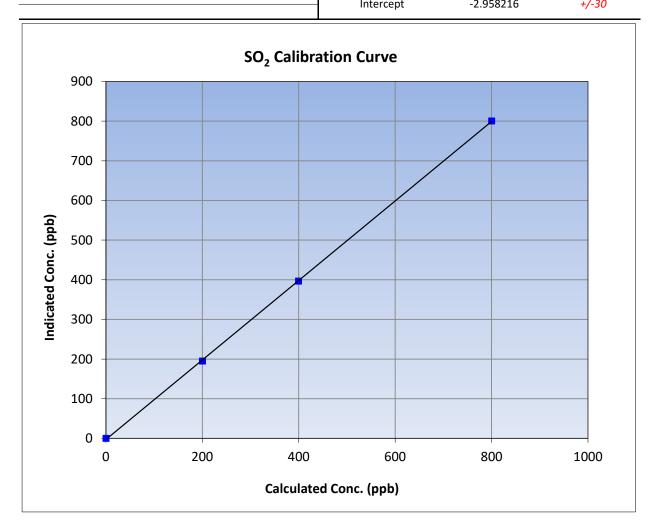
Changed the inlet filter after as founds. Adjusted span only.

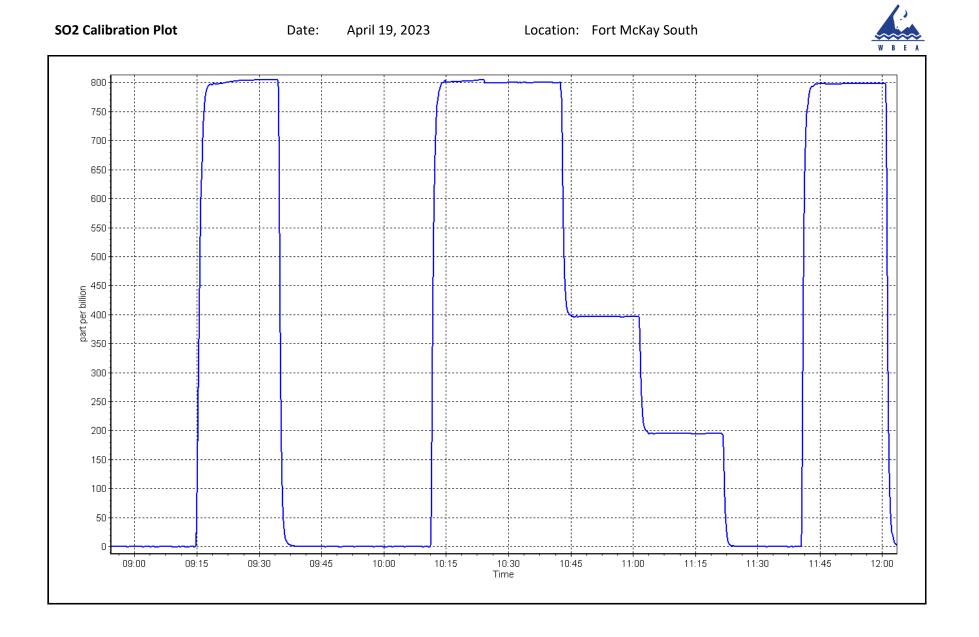
Calibration Performed By:



SO₂ Calibration Summary

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







TRS Calibration Report

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

Notes:

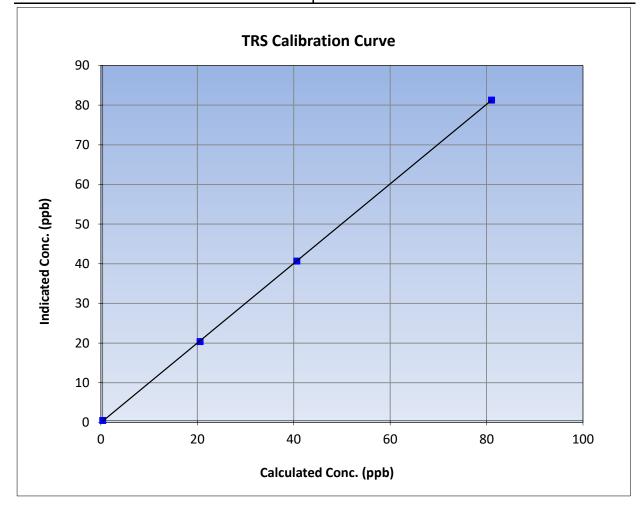
Changed the inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero. No adjustment made.

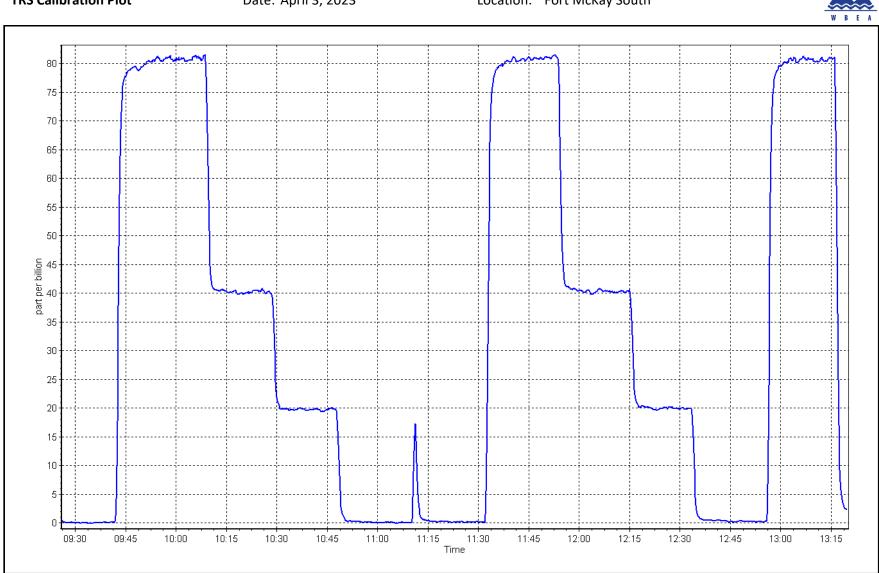


TRS Calibration Summary

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

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





TRS Calibration Plot

Location: Fort McKay South



THC / CH₄ / NMHC Calibration Report

| W B E A | | | | | Version-01-2020 |
|-------------------------------------|----------------|---------------|-------------------------|----------------|-----------------|
| | | Statio | n Information | | |
| Station Name: | Fort McKay Sou | ith | Station number: Al | | |
| Calibration Date: | April 19, 2023 | | Last Cal Date: M | arch 3, 2023 | |
| Start time (MST): | 8:54 | | End time (MST): 12 | 2:04 | |
| Reason: | Install | | | | |
| | | Calibra | tion Standards | | |
| Gas Cert Reference: | C | CC260812 | Cal Gas Expiry Date: De | ecember 29, 20 | 028 |
| CH4 Cal Gas Conc. | 503.6 | ppm | CH4 Equiv Conc. | 1077.5 | ppm |
| C3H8 Cal Gas Conc. | 208.7 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: N | Ą | |
| Removed CH4 Conc. | 503.6 | ppm | CH4 Equiv Conc. | 1077.5 | ppm |
| Removed C3H8 Conc. | 208.7 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄) | : | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 24 | 148 | |
| ZAG make/model: | API 701 | | Serial Number: 11 | 117 | |
| | | Analyz | er Information | | |
| Analyzer make | : Thermo 55i | | Analyzer serial #: 11 | 170050130 | |
| THC Range (ppm) | : 0 - 20 ppm | | | | |
| NMHC Range (ppm) | : 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : 2.16E-04 | 2.19E-04 | NMHC SP Ratio: | 5.11E-04 | 5.04E-04 |
| CH4 Retention time | : 12.8 | 12.8 | NMHC Peak Area: | 177635 | 179990 |

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

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

| | | | _ |
|-----|-------|---------|------|
| СНЛ | Calib | oration | Data |
| C14 | Calli | παιισπ | ναια |

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

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

Notes:

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

Sean Bala



THC Calibration Summary

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



CH₄ Calibration Summary

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

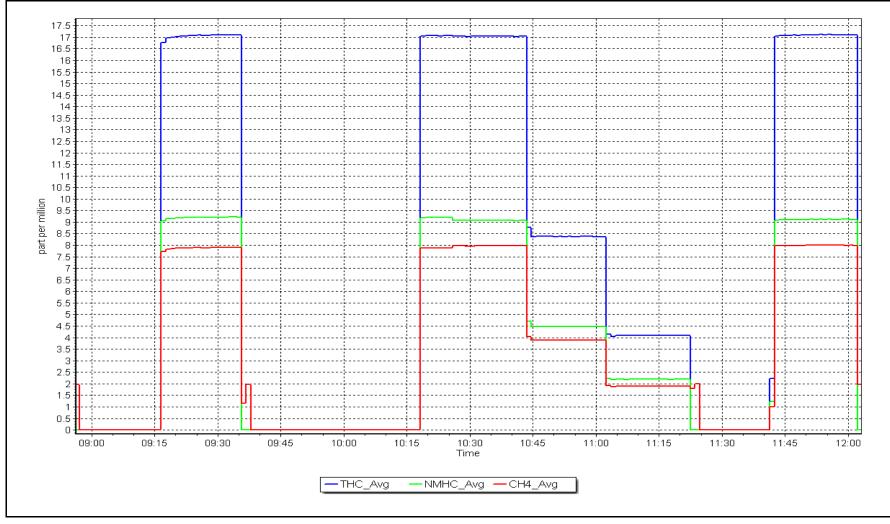


NMHC Calibration Summary

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

NMHC Calibration Plot







NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

-0.332208

-0.712517



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

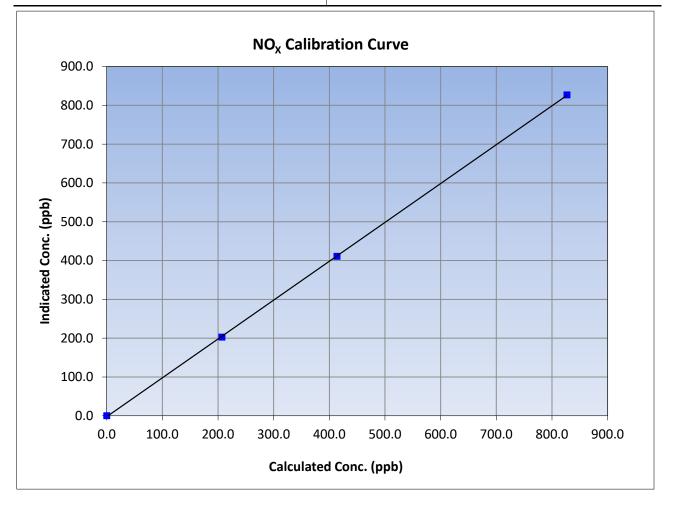
Changed the inlet filter after as founds. No adjustment made.

Calibration Performed By:



NO_x Calibration Summary

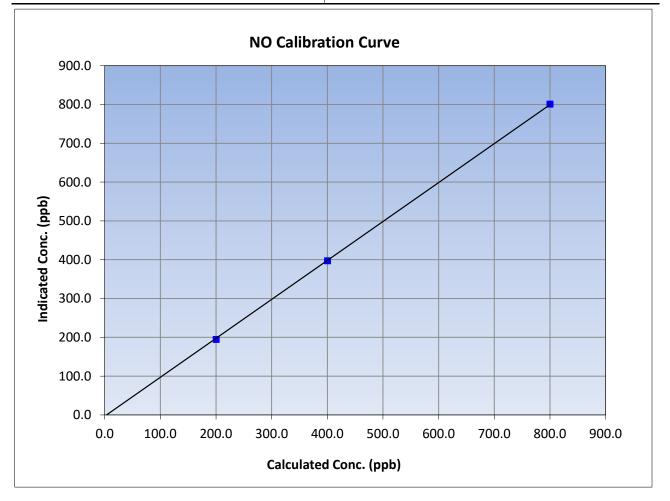
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-----------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 12, 2023 | | Previous Calibration: March | | 23, 2023 |
| Station Name: |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





NO Calibration Summary

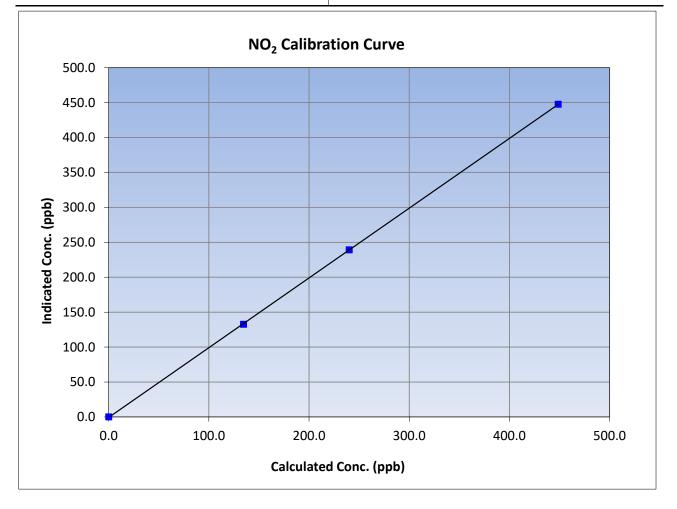
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 12, 2023 | | Previous Calibration: | March 2 | 23, 2023 |
| Station Name: | Fort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

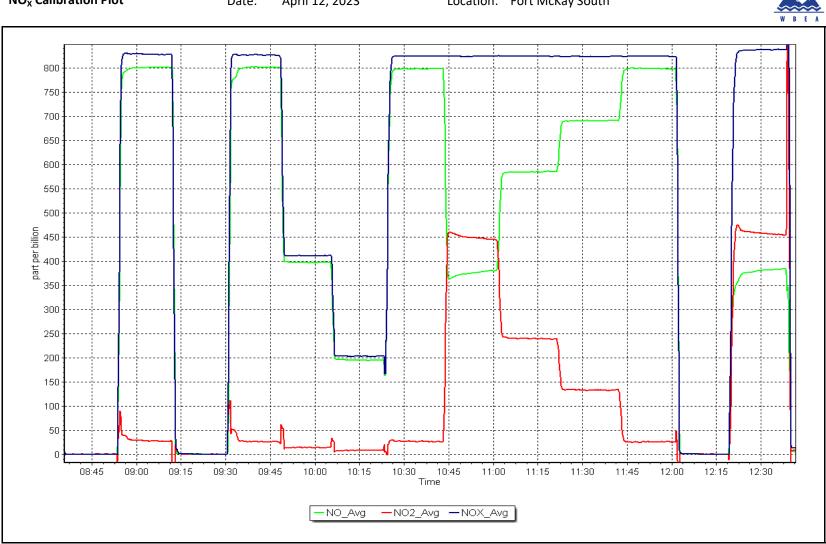




NO₂ Calibration Summary

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









O₃ Calibration Report

Version-01-2020

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

Notes:

Changed inlet filter after as founds. Zero adjusted.

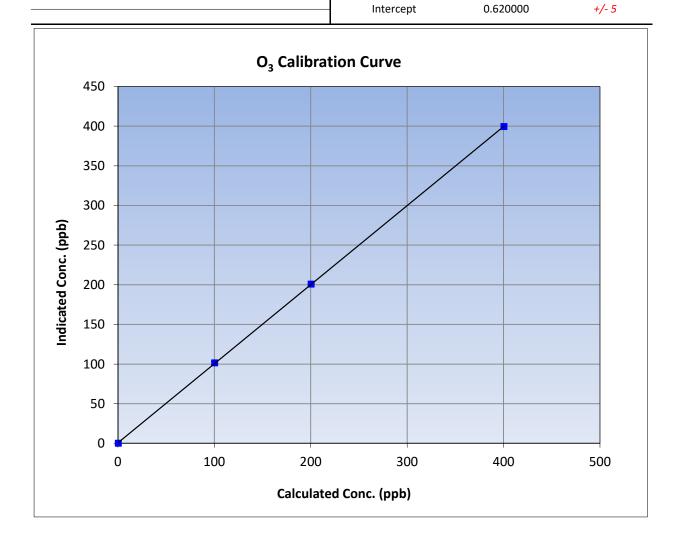
Calibration Performed By:

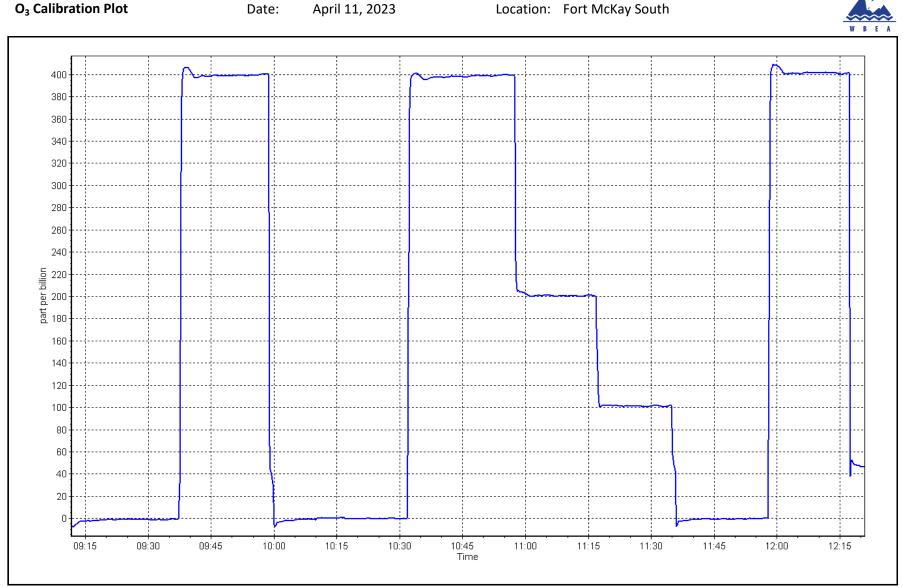
Sean Bala



O₃ Calibration Summary

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





Location: Fort McKay South



T640 PM_{2.5} CALIBRATION

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS14 ANZAC APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|--|----------------------------|--|-----------------------------------|--------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac April 18, 2023 7:55 Routine | | Station number: Last Cal Date: End time (MST): | AMS 14 March 17, 2023 10:21 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.95 | ppm | Cal Gas Exp Date: | January 5, 2025 | |
| Cal Gas Cylinder #: | CC279389 | | | | |
| Removed Cal Gas Conc: | 49.95 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: Calibrator Make/Model: | NA API T700 | | Diff between cyl: Serial Number: | 5239 | |
| ZAG Make/Model: | API 1700 API T701H | | Serial Number: | 357 | |
| | | | | | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 0710321322 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.997012 | 0.997195 | Backgd or Offset: | 25.1 | 25.2 |
| Calibration intercept: | -1.625104 | -0.864371 | Coeff or Slope: | 0.795 | 0.798 |
| | | SO ₂ Calibratio | on Data | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration C | orrection factor (Cc/ |
| Set Point | (sccm) | (sccm) | concentration (ppb) (Cc) | (ppb) (Ic) | <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as found span | 4920 | 80.1 | 800.2 | 794.6 | 1.007 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.6 | |
| high point | 4920 | 80.1 | 800.2 | 797.5 | 1.003 |
| second point | 4960 | 40.0 | 399.6 | 397.8 | 1.005 |
| third point | 4980 | 20.0 | 199.8 | 196.3 | 1.018 |
| as left zero as left span | 5000 4920 | 0.0 | 0.0 800.2 | 0.3 799.9 | |
| as ieit spall | 4920 | 80.1 | | ge Correction Factor | 1.000 |
| Baseline Corr As found: | 794.40 | Previous response | 796.17 | *% change | -0.2% |
| | | | | AF Intercept: | |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | | |

Notes:

No Maintenance done. Span adjusted.

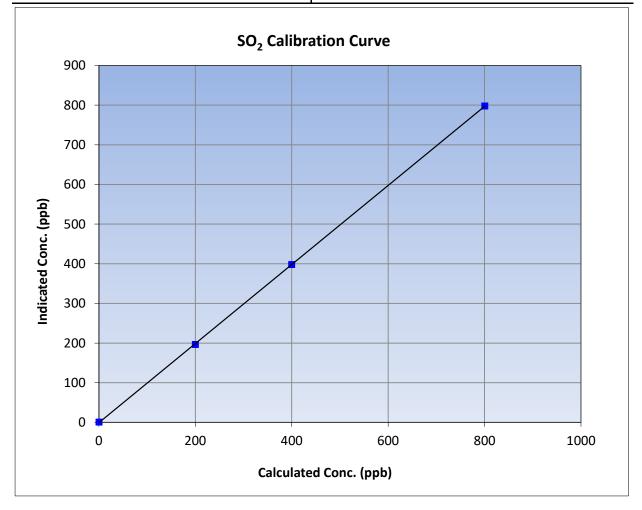
Calibration Performed By:

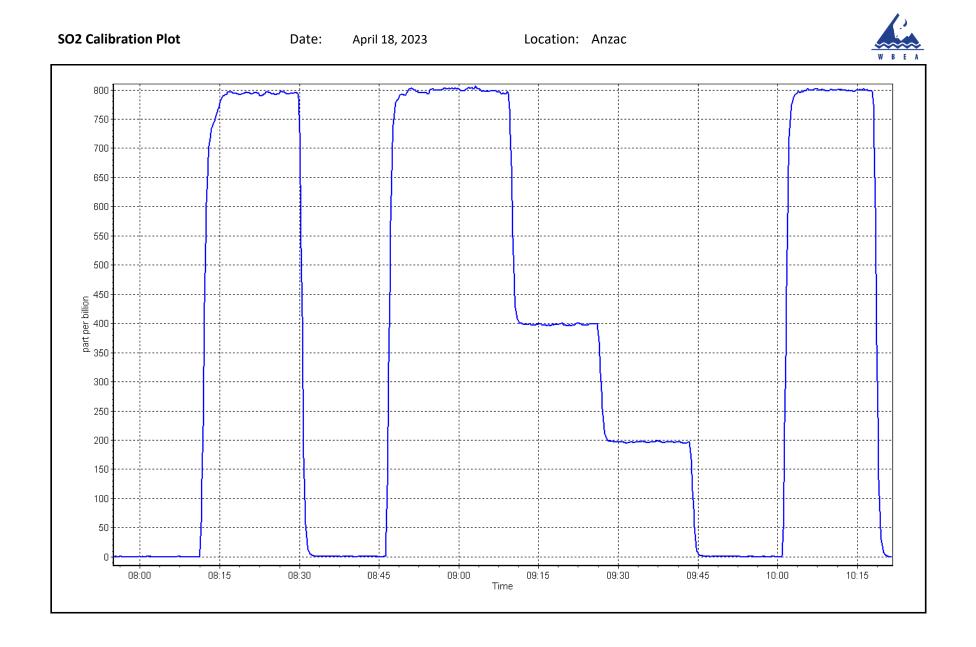


SO₂ Calibration Summary

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

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







TRS Calibration Report

| WBEA | | | | | Version-11-202 |
|---|--|--|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac April 5, 2023 7:43 Routine | | Station number: Last Cal Date: End time (MST): | AMS14 March 1, 2023 11:50 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.38 | ppm | Cal Gas Exp Date: | February 3, 2023 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | EY0000859 5.38 NA API T700 API 701H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 5252 357 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i-TLE CD Nova CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1180540019 503 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 1.004840 0.178882 | 1.002553 -0.041067 | Backgd or Offset: Coeff or Slope: | | 5.51 0.993 |
| | | TRS As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.3 | |
| as found span | 4925 | 74.3 | 80.0 | 83.9 | 0.956 |
| as found 2nd point | 4962 | 37.2 | 40.0 | 41.8 | 0.965 |
| as found 3rd point | 4981 | 18.6 | 20.0 | 20.6 | 0.986 |
| new cylinder response | | | | | |
| | | TRS Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.3 | |
| high point | 4925 | 74.3 | 80.0 | 80.3 | 0.996 |
| second point | 4962 | 37.2 | 40.0 | 39.9 | 1.003 |
| third point | 4981 | 18.6 | 20.0 | 19.7 | 1.016 |
| as left zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as left span | 4925 | 74.3 | 80.0 | 79.5 | 1.006 |
| SO2 Scrubber Check | 4920 | 80.0 | 800.0 | 0.1 | |
| Date of last scrubber cha | | | | Ave Corr Factor | 1.005 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 83.6 41.5 20.3 | Prev response: AF Slope: AF Correlation: | 1.047722 | *% change: AF Intercept: | 3.7% -0.022058 |
| | 20.0 | | 0.000002 | * = > +/-5% change initiat | es investigation |

Notes:

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

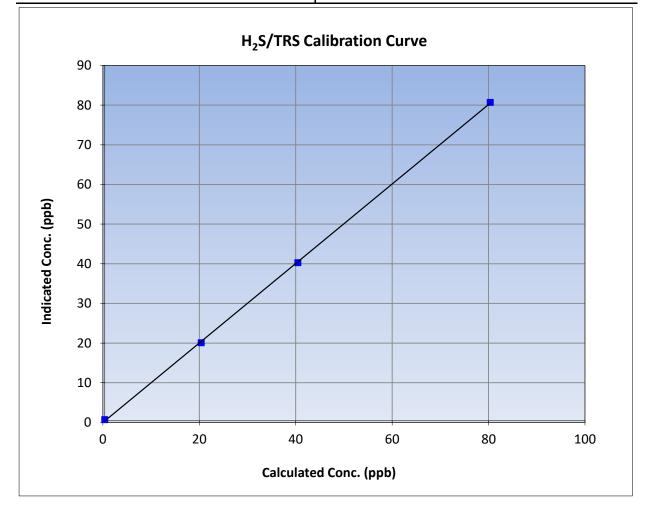


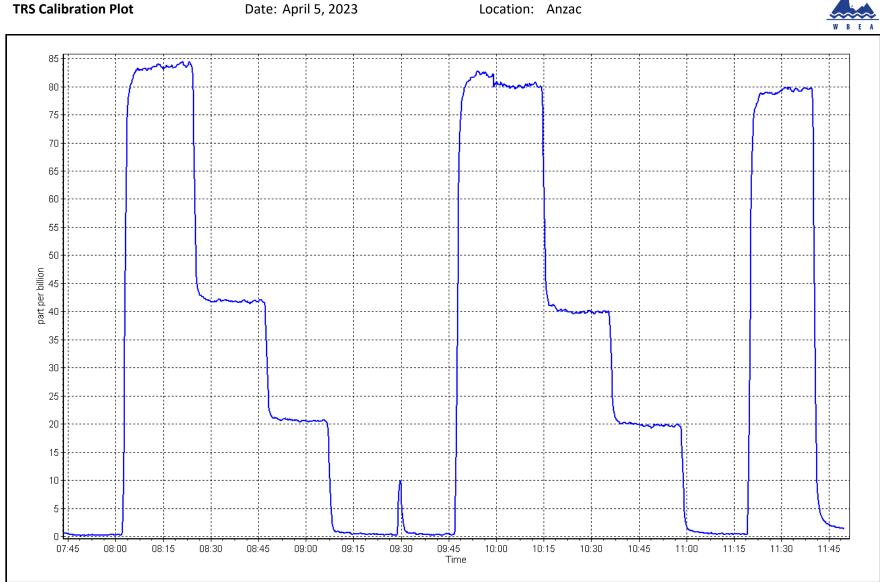
TRS Calibration Summary

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

Calibration Data

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







as left zero

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

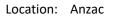
Version-01-2020

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

Calibration Performed By:

Melissa Lemay







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



THC / CH_4 / NMHC Calibration Report

| WDEA | | | | | | Version-01-202 |
|--|--|--------------|--|----------------|-----|----------------|
| | | St | ation Information | | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac April 18, 2023 7:55 Routine | | Station number: A Last Cal Date: N End time (MST): 1 | March 17, 2023 | | |
| | | Cal | ibration Standards | | | |
| Gas Cert Reference: | (| C279389 | Cal Gas Expiry Date: J | anuary 5, 2025 | | |
| CH4 Cal Gas Conc. | 499.3 | ppm | CH4 Equiv Conc. | 1068.8 | ppm | |
| C3H8 Cal Gas Conc. | 207.1 | ppm | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: | | NA | |
| Removed CH4 Conc. | 499.3 | ppm | CH4 Equiv Conc. | 1068.8 | ppm | |
| Removed C3H8 Conc. | 207.1 | ppm | Diff between cyl (THC): | | | |
| Diff between cyl (CH ₄) | : | | Diff between cyl (NM): | | | |
| Calibrator Model: | API T700 | | Serial Number: 5 | 5252 | | |
| ZAG make/model: | API 701H | | Serial Number: 3 | 357 | | |
| | | An | alyzer Information | | | |
| Analyzer make | : Thermo 55i | | Analyzer serial #: 1 | 118148494 | | |
| , THC Range (ppm) | | | , | | | |
| NMHC Range (ppm) | | | CH4 Range (ppm): C |) - 10 ppm | | |
| | <u>Start</u> | <u>Finis</u> | <u>h</u> | <u>Start</u> | | <u>Finish</u> |
| CH4 SP Ratio | : 3.85E-04 | 3.90E | -04 NMHC SP Ratio: | 4.46E-05 | | 4.53E-05 |
| CH4 Retention time | :: 12.00 | 12.2 | 0 NMHC Peak Area: | 204554 | | 201206 |

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

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

Notes:

No Maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

Version-01-2020

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



CH₄ Calibration Summary

Version-01-2020

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

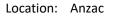


NMHC Calibration Summary

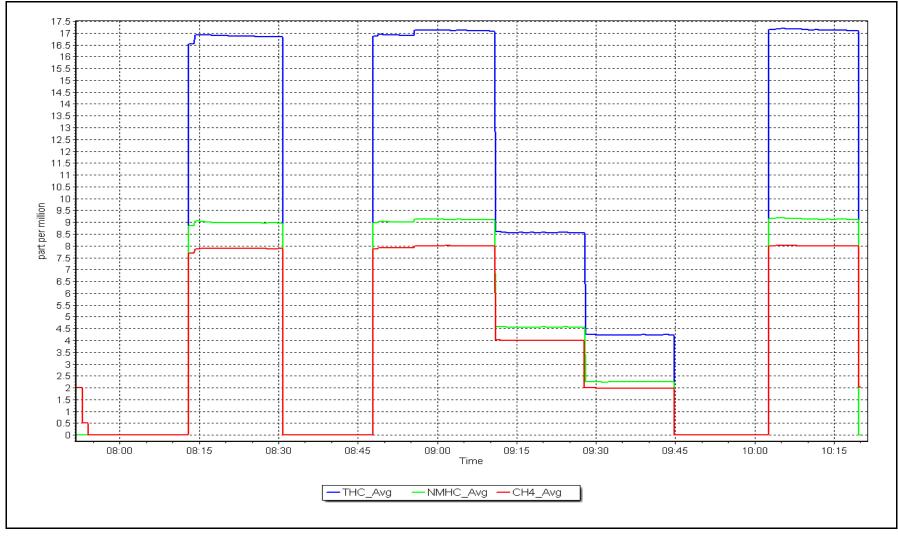
Version-01-2020

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

NMHC Calibration Plot









$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

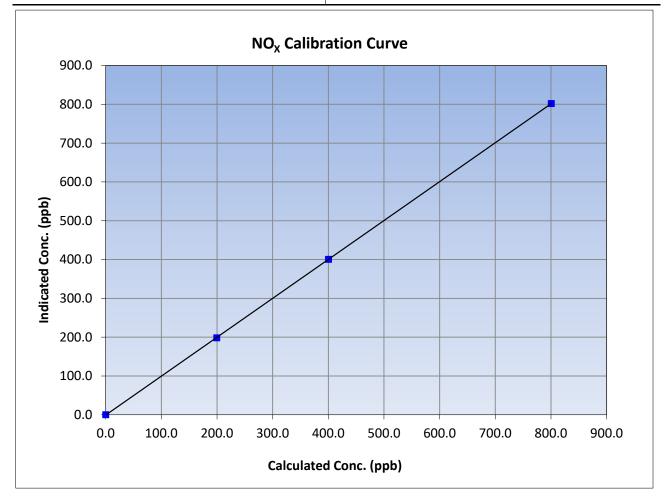
Notes:

No maintenance or adjustments done.



NO_x Calibration Summary

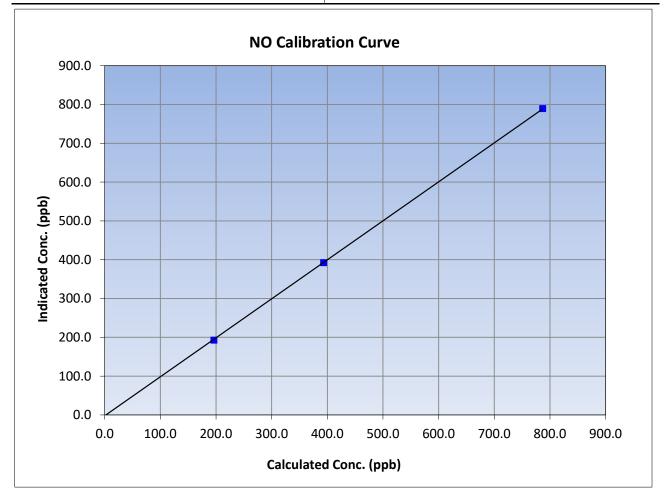
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 1 | 4, 2023 | Previous Calibration: | March | 2, 2023 | |
| Station Name: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





NO Calibration Summary

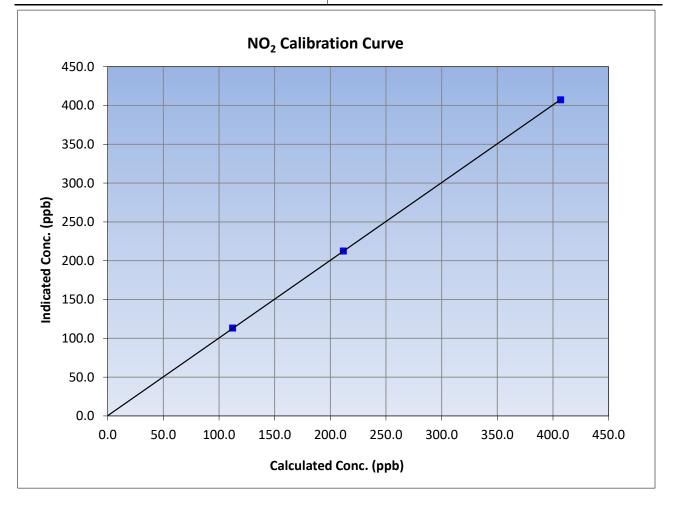
| WBEA | | Station | Information | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | mormation | | |
| Calibration Date: | April 1 | 4, 2023 | Previous Calibration: | March | 2, 2023 |
| Station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

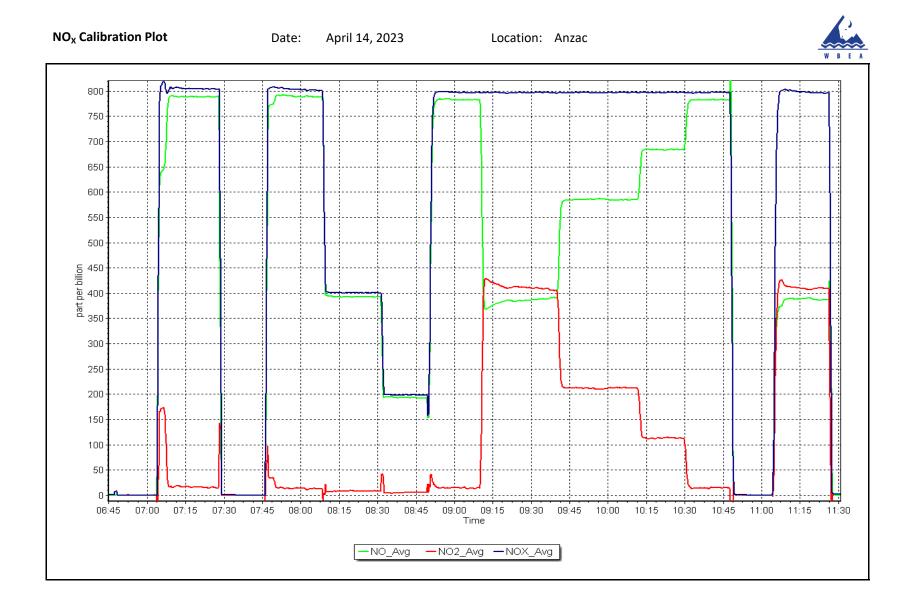




NO₂ Calibration Summary

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







O₃ Calibration Report

Version-01-2020

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

Notes:

Ozone Scrubber Replaced. Zero adjusted.

Calibration Performed By:

Melissa Lemay

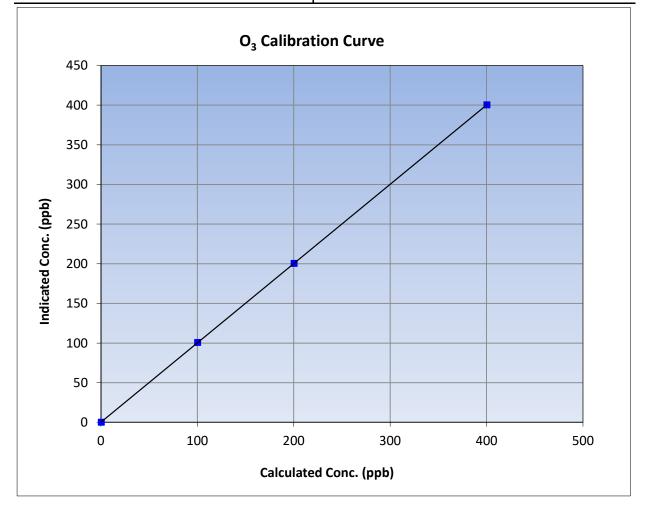


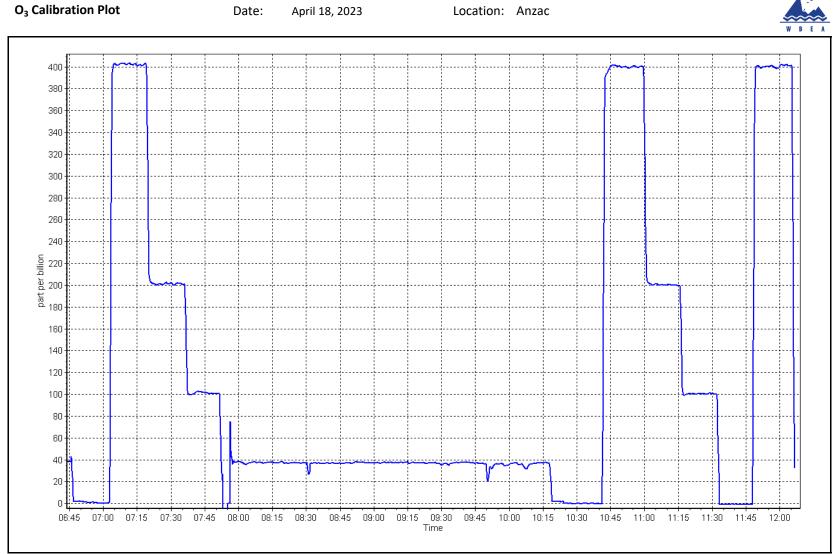
O₃ Calibration Summary

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

Calibration Data

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









T640 PM_{2.5} CALIBRATION

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

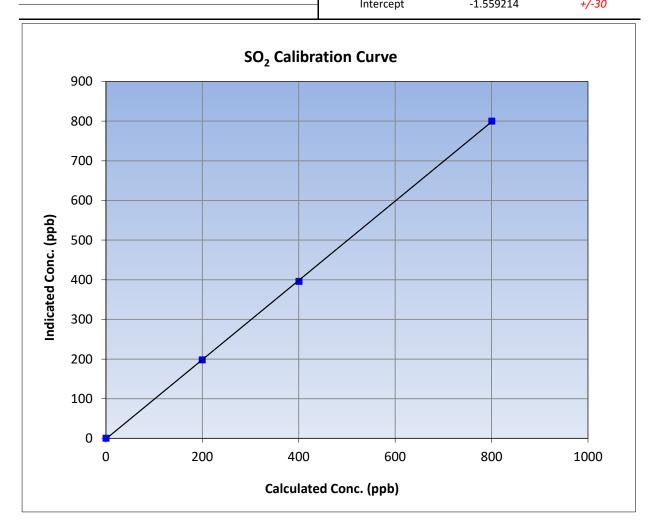
Sample inlet filter changed after as founds. No adjustments made.

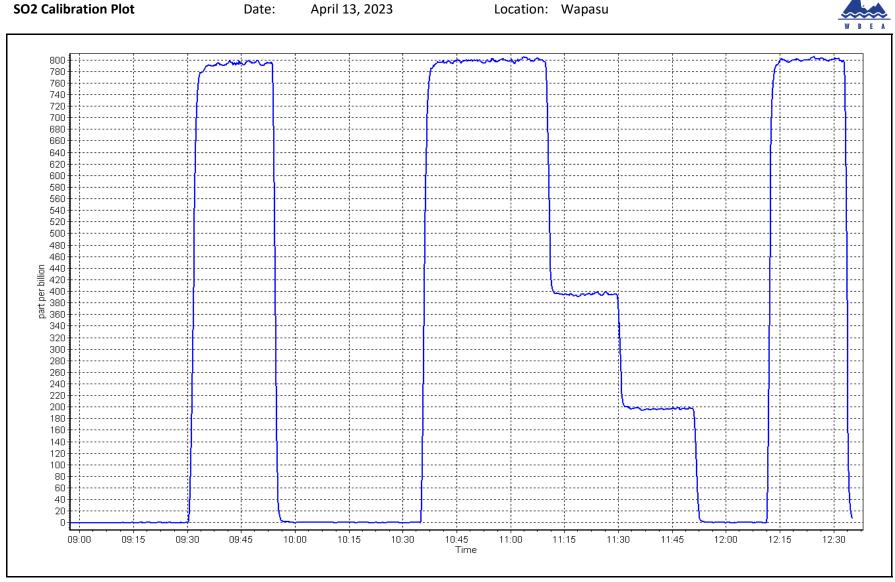
Calibration Performed By:



SO₂ Calibration Summary

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







H₂S Calibration Report

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

Notes:

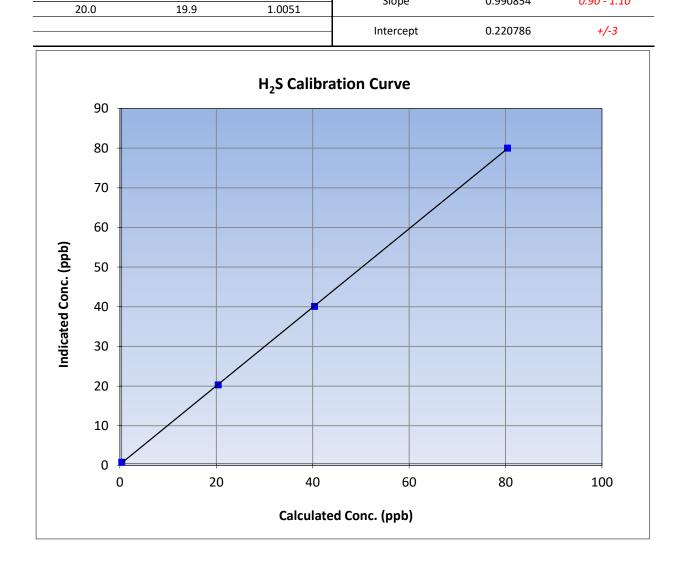
Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

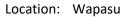


H₂S Calibration Summary

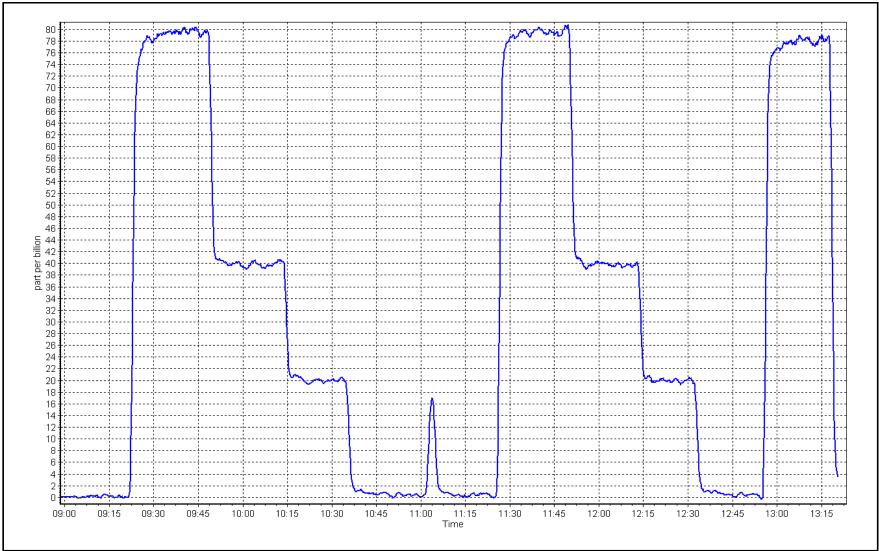
| WBEA | | | | | Version-11-20 |
|---|--------------------------------------|------------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 21 | 2023 | Previous Calibration: | March | 8, 2023 |
| Station Name: | Wapa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



H₂S Calibration Plot









THC Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

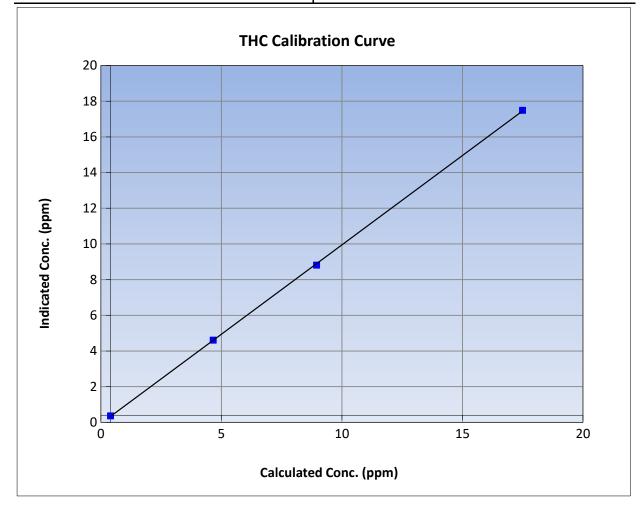


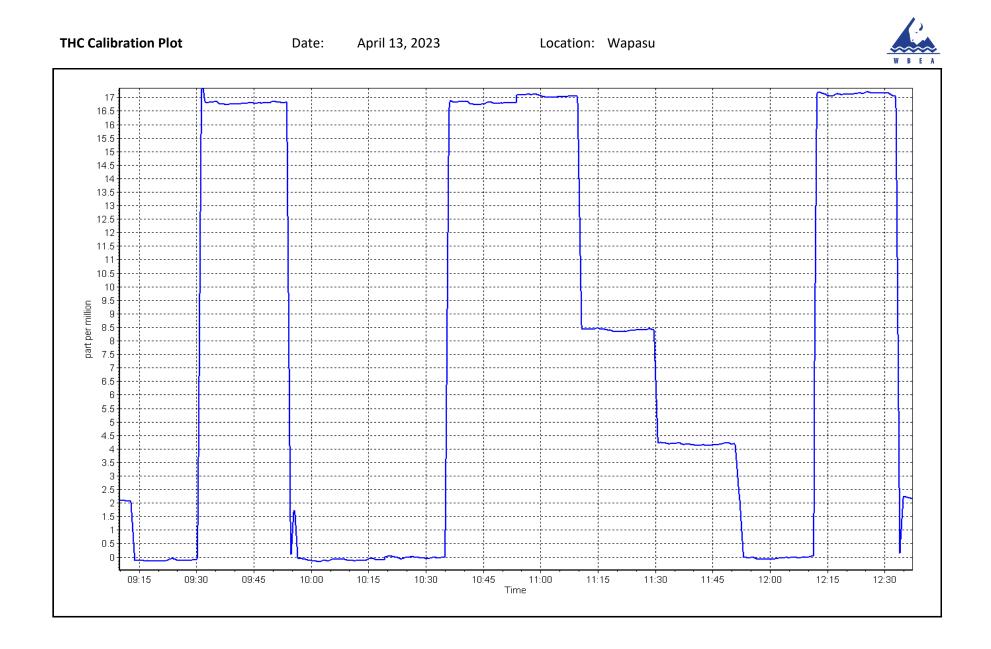
THC Calibration Summary

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

Calibration Data

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







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

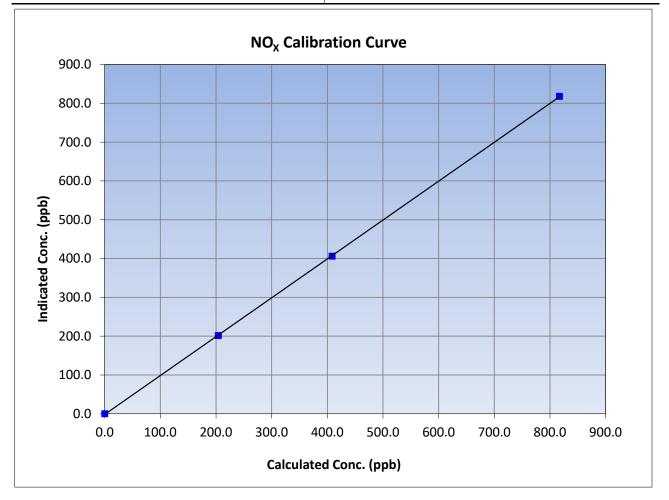
Sample inlet filter changed after as founds. Span adjusted.

Calibration Performed By:



NO_x Calibration Summary

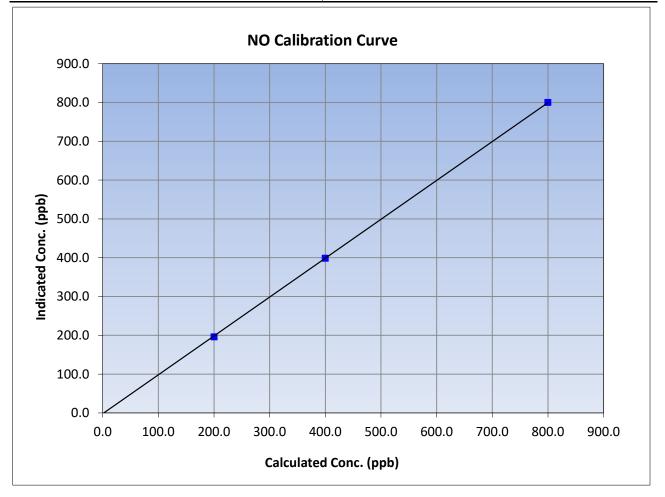
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 5, 2023 | Previous Calibration: | March | 23, 2023 |
| Station Name: | Wa |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





NO Calibration Summary

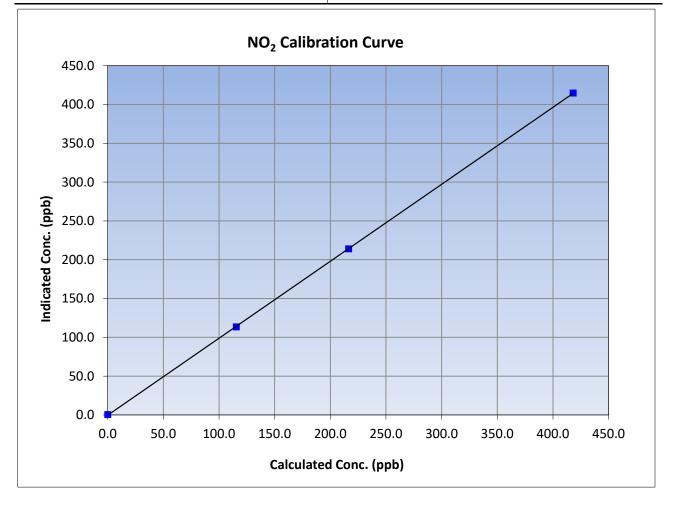
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|--------------------------------------|---------------------------------|-----------|--------------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 2 | 5, 2023 | Previous Calibration: | March | 1 23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

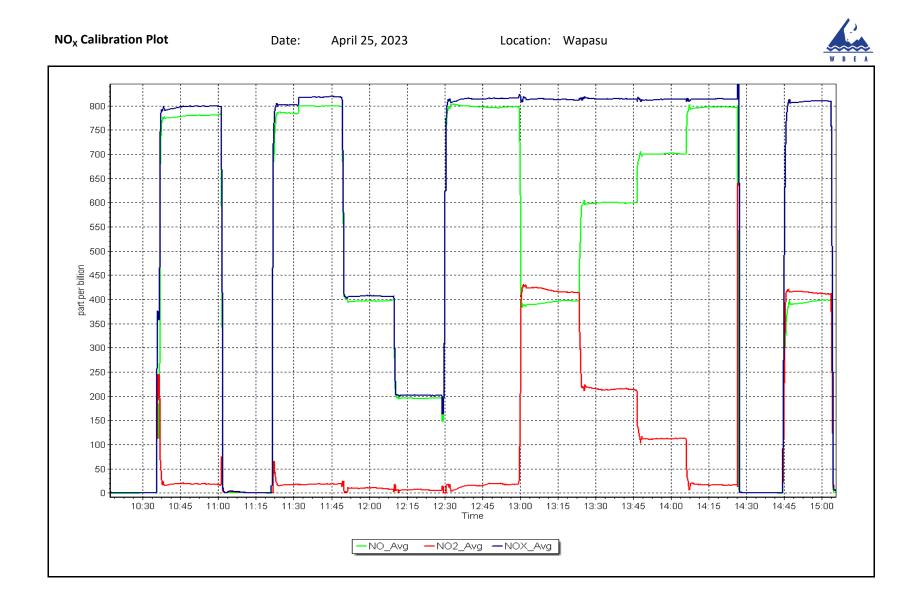




NO₂ Calibration Summary

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







O₃ Calibration Report

Version-01-2020

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

Notes:

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

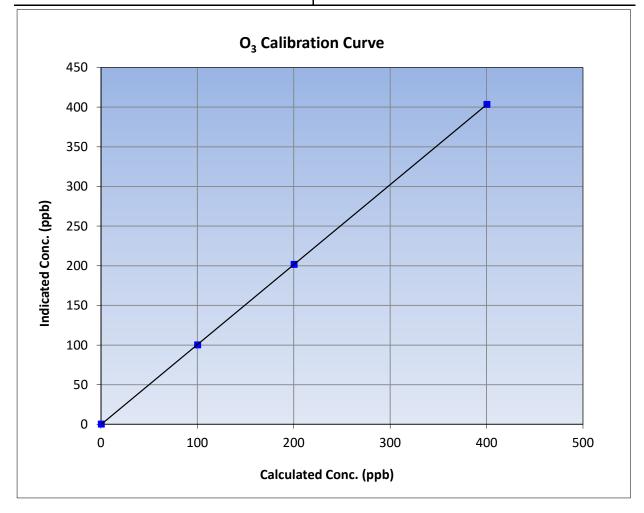
Calibration Performed By:

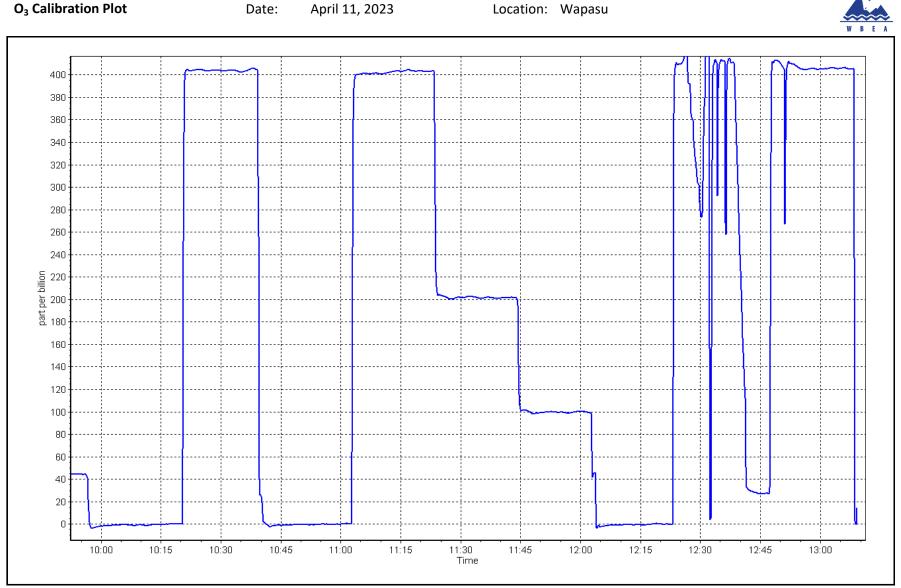
Karan Pandit



O₃ Calibration Summary

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







T640 PM_{2.5} CALIBRATION

| WBEA | | | | | | Version-01-2023 |
|-------------------------------|------------------|--------------------------|---------------------|---------------|-----------------|-----------------|
| | | Station Information | 1 | | | |
| Station Name: | Wapasu | | Station number: | AMS 17 | | |
| Calibration Date: | April 25, 2023 | | Last Cal Date: | March 23, 20 | 23 | |
| Start time (MST): | 13:15 | | End time (MST): | 14:34 | | |
| Analyzer Make: | API T640 | | S/N: | 1183 | | |
| Particulate Fraction: | PM2.5 | | | | | |
| Flow Meter Make/Model: | Alicat FP-25BT | | S/N: | 388754 | | |
| Temp/RH standard: | Alicat FP-25BT | | S/N: | 388754 | | |
| | | Monthly Calibration To | est | | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | <u>/</u> | <u>Adjusted</u> | (Limits) |
| T (°C) | 4.60 | 4.06 | 4.60 | | | +/- 2 °C |
| P (mmHg) | 710.00 | 712.43 | 710.00 | | | +/- 10 mmHg |
| flow (LPM) | 5.00 | 5.05 | 5.00 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | April 25, 2023 | Last Cal Date: | March 23, | 2023 | |
| | PM w/o HEPA: | 6.9 | PM w/ HEPA: | 0.0 | | <0.2 ug/m3 |
| Note: this leak check will be | | | erve as the pre mai | intenance lea | k check | |
| Inlet cleaning : | Inlet Head | \checkmark | | | | |
| | | | | | | |
| | | Quarterly Calibration T | est | | | |
| Parameter | <u>As found</u> | Post maintenance | As left | | Adjusted | (Limits) |
| PMT Peak Test | <u>As tound</u> | <u>r ost maintenance</u> | <u>As left</u> | <u>'</u> | | 10.9 +/- 0.5 |
| TWITT Cak TCSt | | | | | | 10.5 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | | w/ HEPA: | | |
| Date Optical Cham | ber Cleaned: | March 23, | 2023 | | | <0.2 ug/m3 |
| Disposable Filte | r Changed: | March 23, | 2023 | | | |
| | | | | | | |
| | | Annual Maintenance | 2 | | | |
| | | | - | | | |
| Date Sample Tub | pe Cleaned: | | | | | |
| Date RH/T Sense | or Cleaned: | | | | | |
| | | | | | | |
| Notes: | | No adjustments | made. Leak check p | bassed. | | |
| | | | | | | |
| Calibration by: | Aswin Sasi Kumar | | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

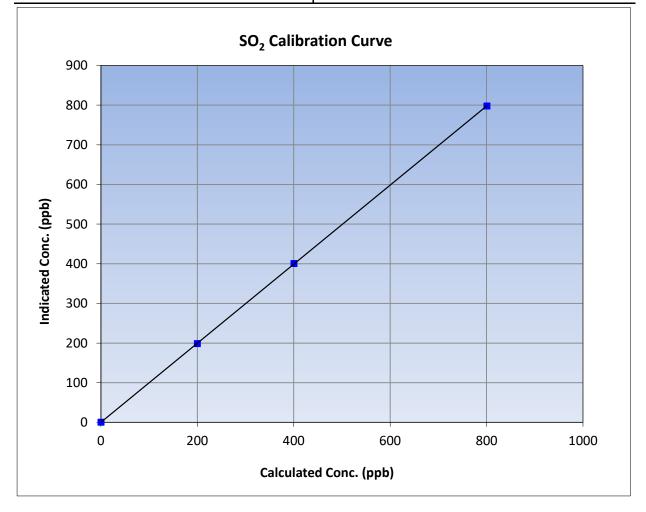


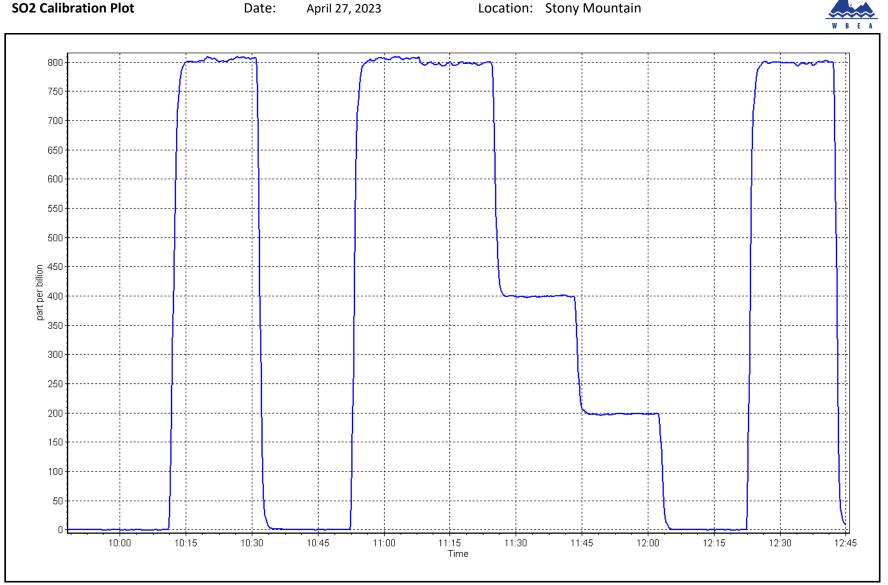
SO₂ Calibration Summary

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

Calibration Data

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





April 27, 2023

Location: Stony Mountain





TRS Calibration Report

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

Notes:

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

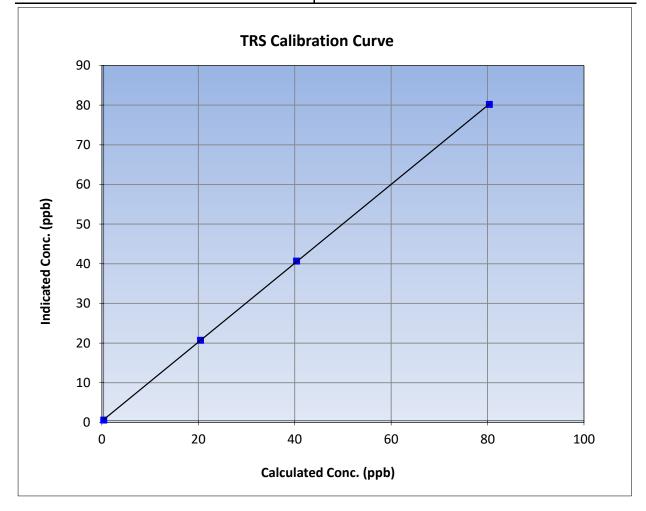


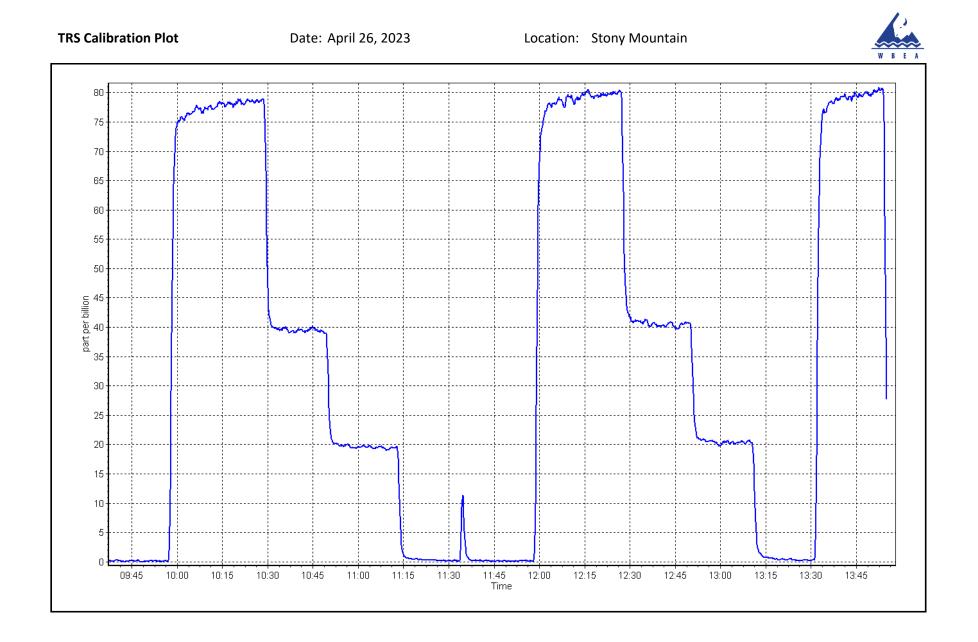
TRS Calibration Summary

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

Calibration Data

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







THC / CH₄ / NMHC Calibration Report

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

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

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

| СН4 | Cal | ibration | Data |
|-----|-----|-----------|------|
| CH4 | Ca | INIALIOII | Dala |

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

Notes:

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

Calibration Performed By:

Karan Pandit



THC Calibration Summary

Version-01-2020

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



CH₄ Calibration Summary

Version-01-2020

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



NMHC Calibration Summary

Version-01-2020

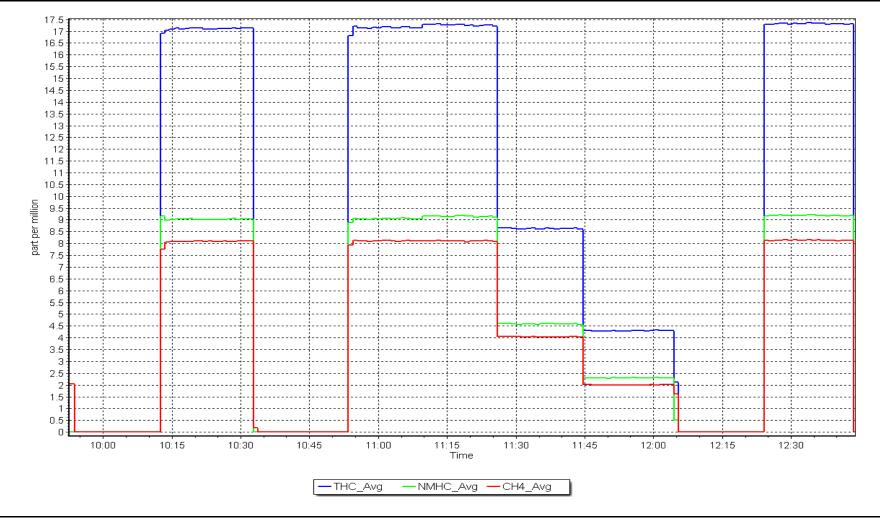
| | | | Station I | nformation | | |
|-------------------------------|-------|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| Calibration Da | ate: | April 2 | 7, 2023 | Previous Calibration: | March 3 | 0, 2023 |
| Station Name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

NMHC Calibration Plot

Date: April 27, 2023

Location: Stony Mountain







Station Name:

Reason:

Calibration Date:

Start time (MST):

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

ppm

ppm

Station Information

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

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

Stony Mountain

April 20, 2023

9:18

Routine

Analyzer Information

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

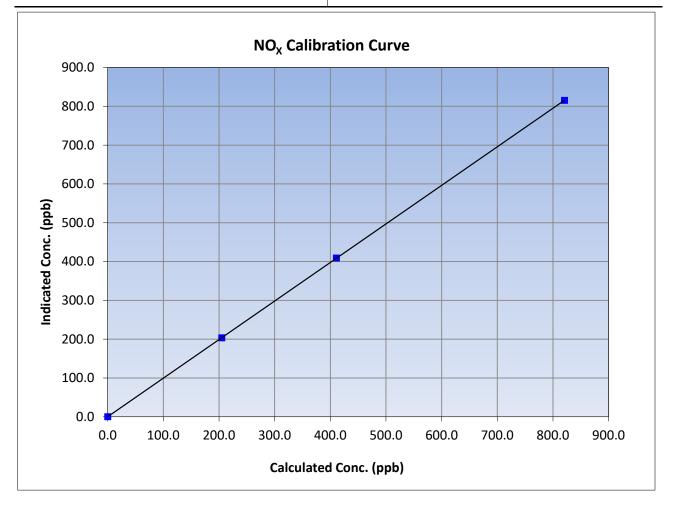
Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

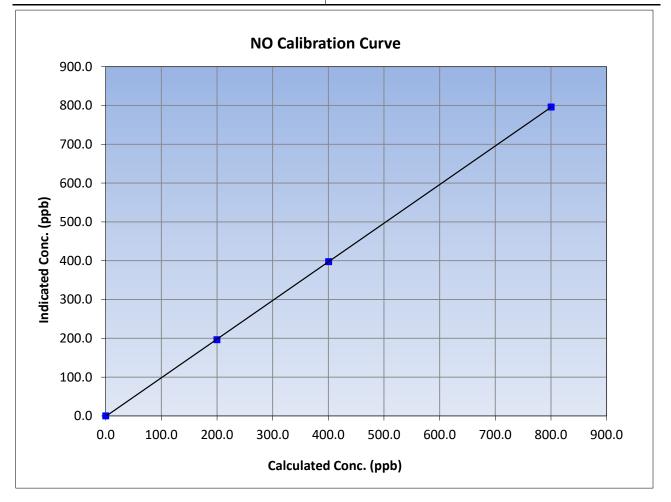
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 0, 2023 | Previous Calibration: | March 2 | 22, 2023 |
| Station Name: | Stony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





NO Calibration Summary

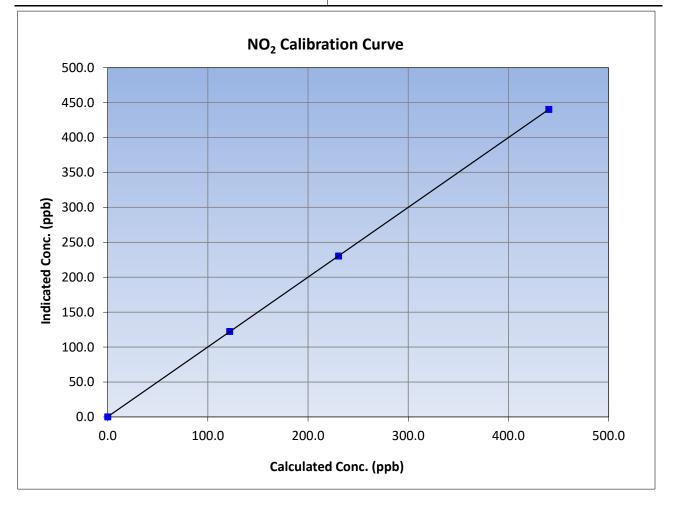
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|---------------------------|-------------------------|---------------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 20, 2023 | | Previous Calibration: | March 2 | March 22, 2023 | |
|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

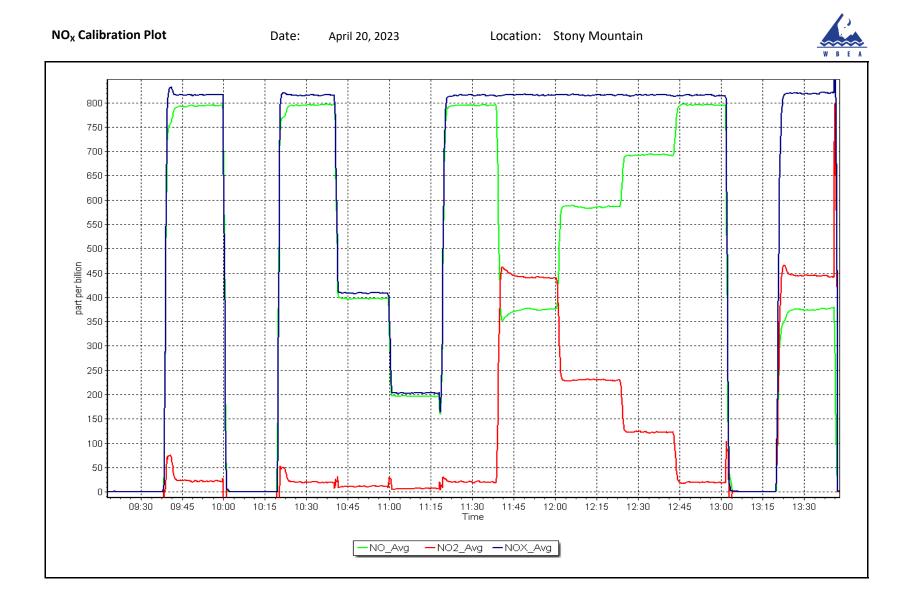




NO₂ Calibration Summary

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







O₃ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

Karan Pandit

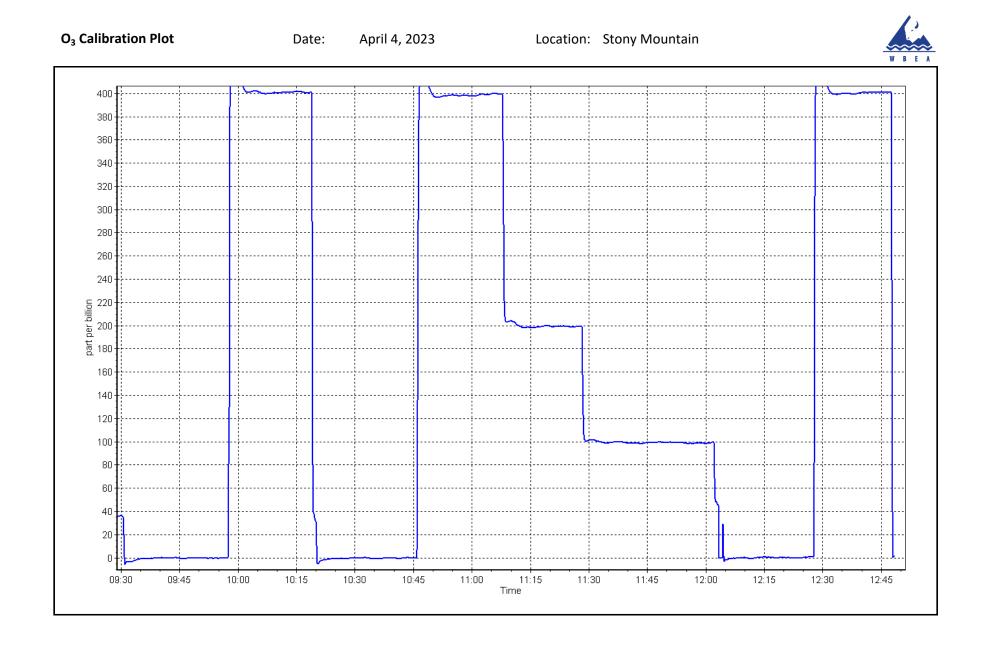


Calculated Conc. (ppb)

Wood Buffalo Environmental Association

O₃ Calibration Summary

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





T640 PM_{2.5} CALIBRATION

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



T640 PM_{2.5} CALIBRATION

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

Karan Pandit



CO Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

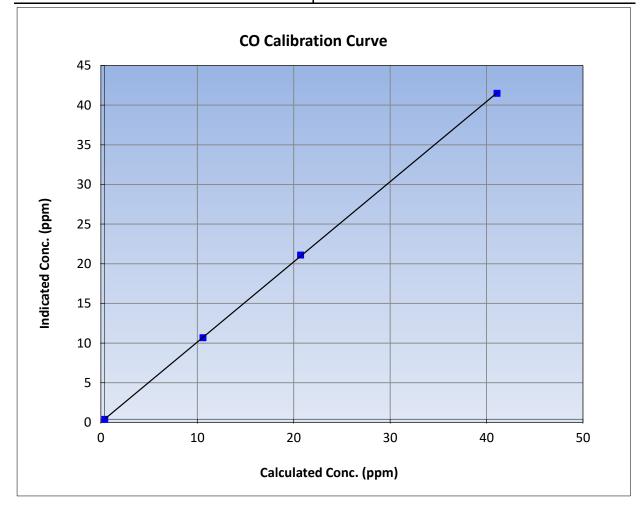


CO Calibration Summary

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

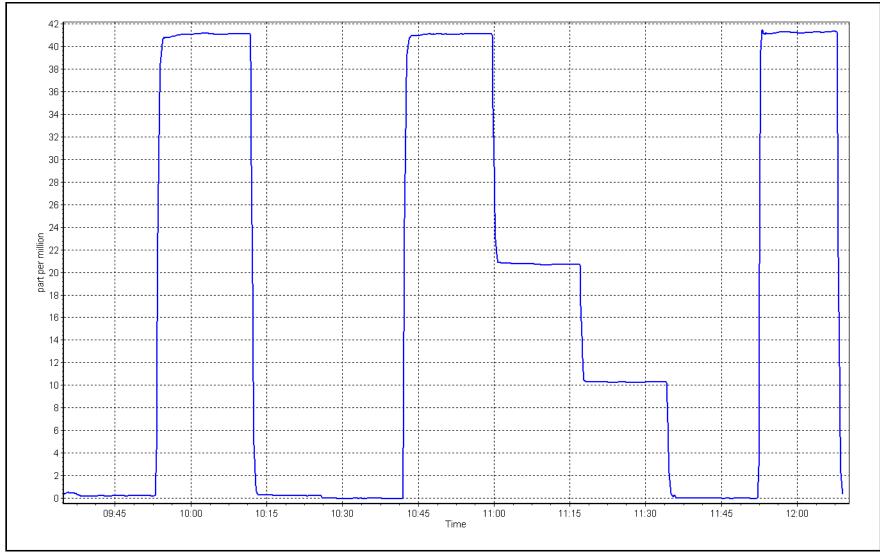
Calibration Data

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











CO₂ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:



401.5

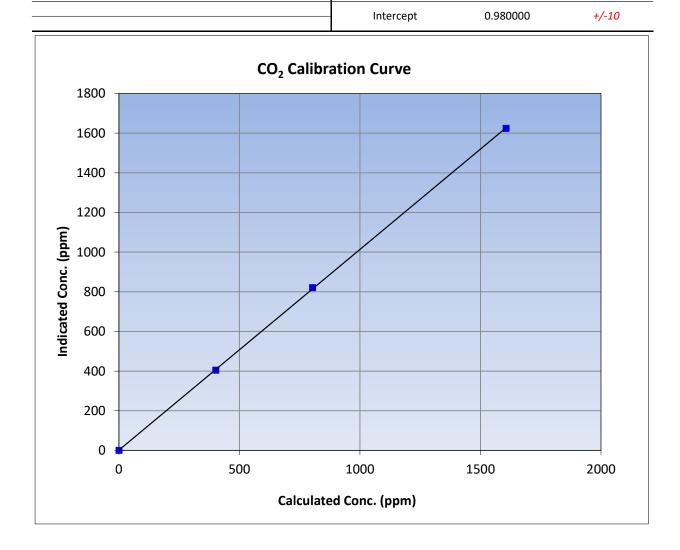
404.4

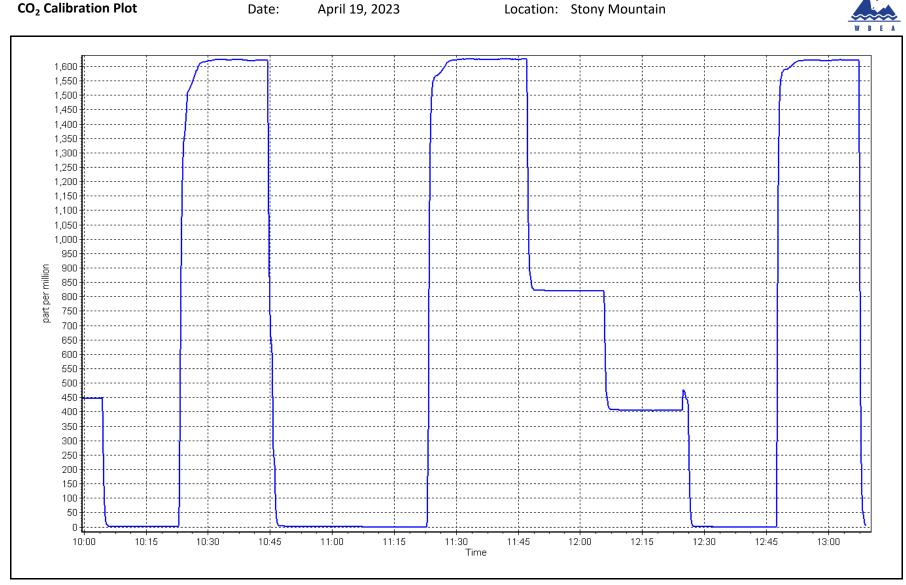
Wood Buffalo Environmental Association

CO₂ Calibration Summary

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

0.9927





Location: Stony Mountain



5



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS19 FIREBAG APRIL 2023

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

May 31, 2023







SO₂ Calibration Report

Version-01-2020

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

Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By:



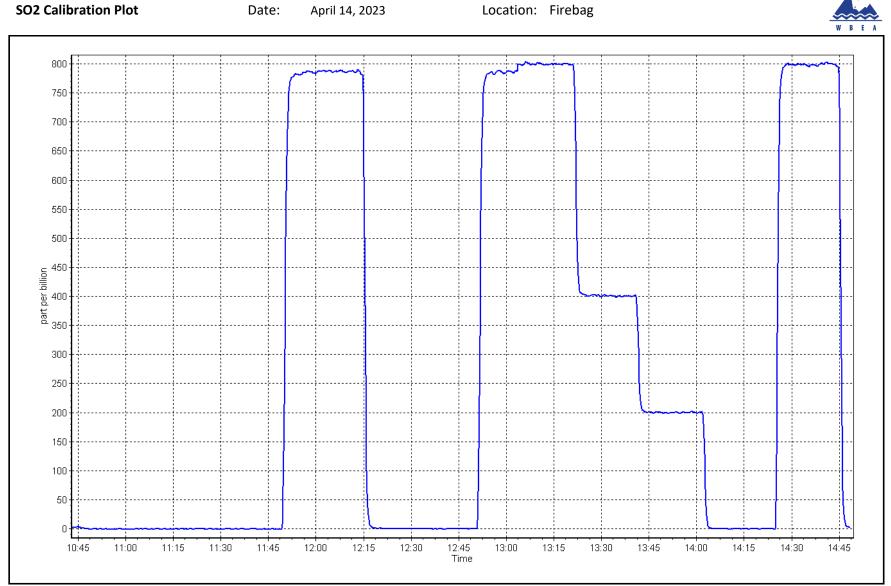
Calculated Conc. (ppb)

Wood Buffalo Environmental Association

SO₂ Calibration Summary

| | | Station | Information | | | |
|--|----------------|------------------------------|-------------------------|-----------|---------------|--|
| Calibration Date: | April 14, 2023 | | Previous Calibration: | March | 7, 2023 | |
| Station Name: | | Firebag Station Number: | | AMS 19 | | |
| Start Time (MST): | 10: | | End Time (MST): | 14 | 14:48 | |
| Analyzer make: | Therm | io 43i | Analyzer serial #: | 14106 | 561308 | |
| | | Caliby | ration Data | | | |
| | | | | | | |
| Calculated concentration I (ppb) (Cc) | (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | |
| 0.0 799.5 | -0.2 799.5 | 1.0000 | Correlation Coefficient | 1.000000 | ≥0.995 | |
| 400.3 | 399.8 | 1.0012 | Slope | 1.000391 | 0.90 - 1.10 | |
| 200.1 | 199.6 | 1.0025 | Intercept | -0.421893 | +/-30 | |
| 900 | | | | | | |
| | | | | | | |
| 800 | | | | | | |
| | | | | | | |
| 700 | | | / | | | |
| | | | | | | |
| 600 | | | | | | |
| (qdc _00 | | | | | | |
| <u>9</u> 500 | | | | | | |
| 5 400 - | | | | | | |
| 100 500 (bbb) 300 300 300 (bbb) | | | | | | |
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| <u> ۲</u> | | | | | | |
| 200 | / | | | | | |
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H₂S Calibration Report

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

Notes:

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

Calibration Performed By:

Braiden Boutilier

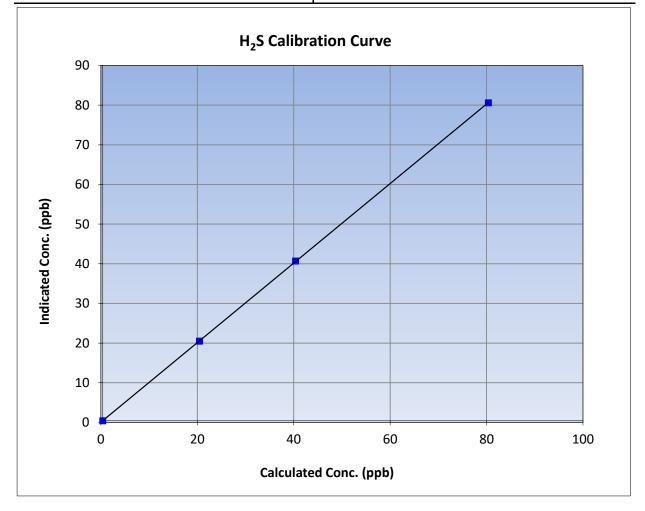


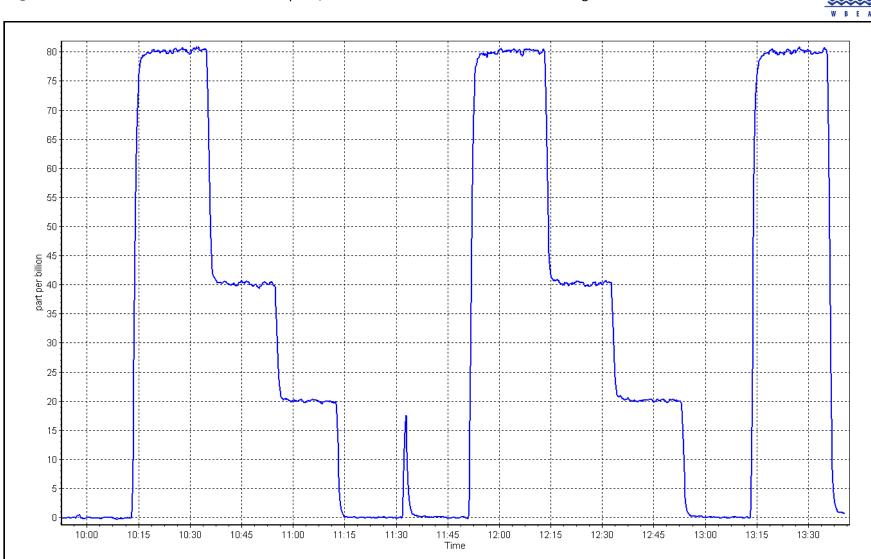
H₂S Calibration Summary

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

Calibration Data

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







THC Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

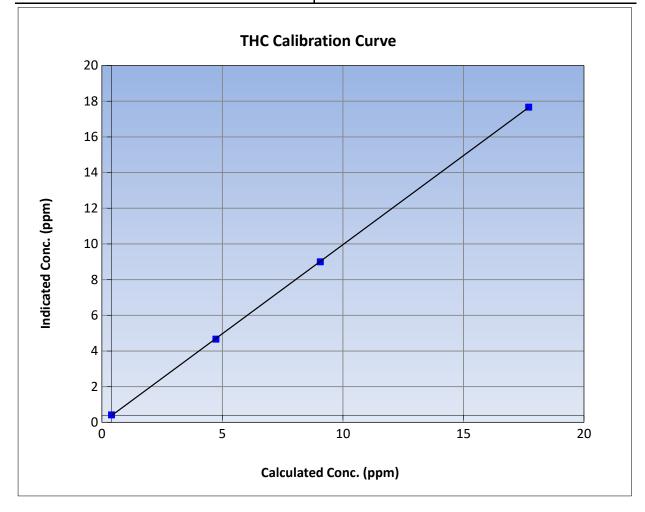


THC Calibration Summary

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

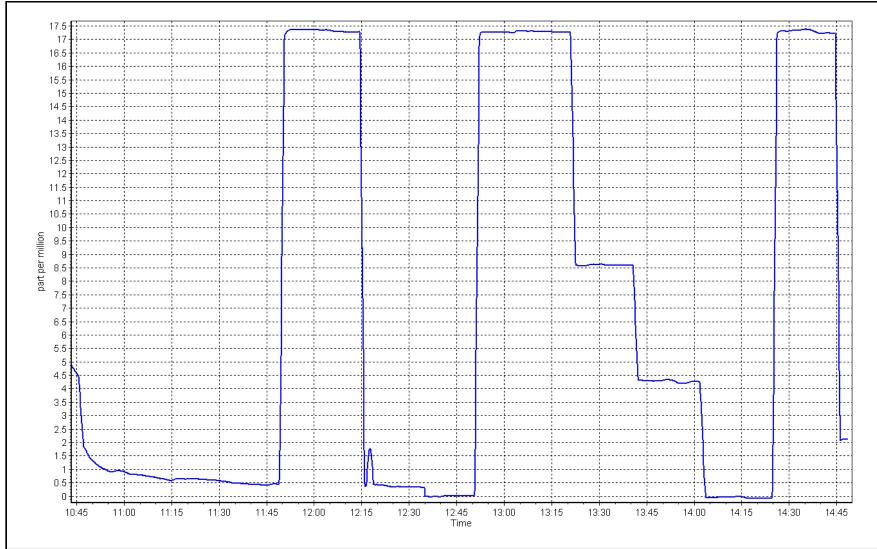
Calibration Data

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











$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

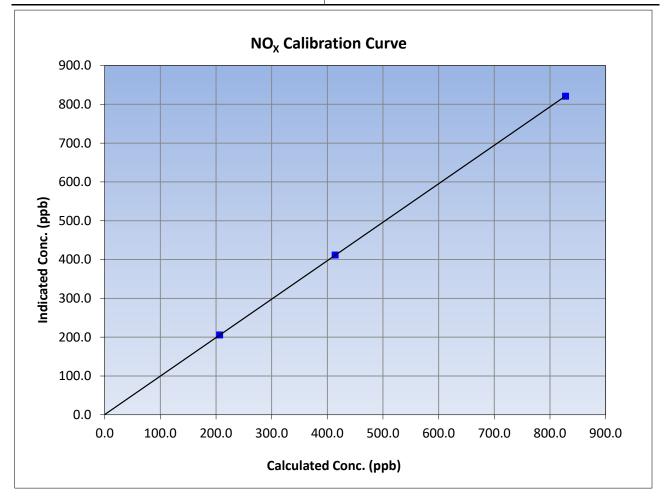
No adjustments made. Changed sample inlet filter after as founds.

Calibration Performed By:



NO_x Calibration Summary

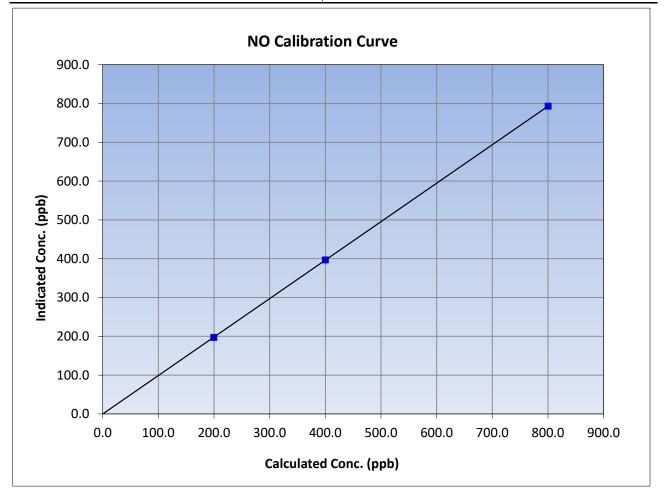
| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|---------------------------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 4 | 1, 2023 | Previous Calibration: | Calibration: March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





NO Calibration Summary

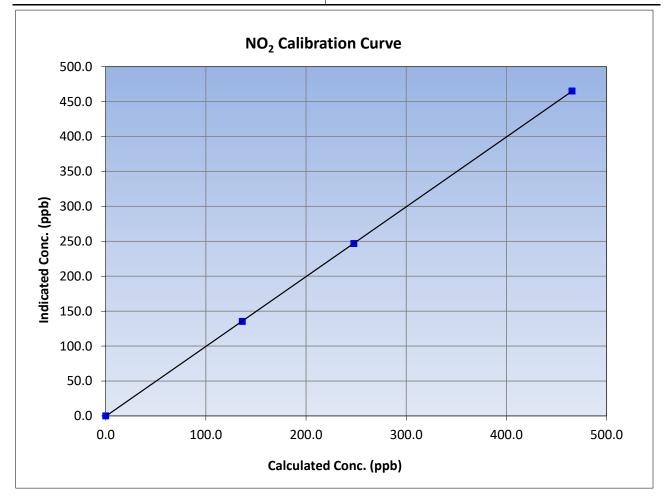
| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 4 | 1, 2023 | Previous Calibration: | March | 3, 2023 | |
| Station Name: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

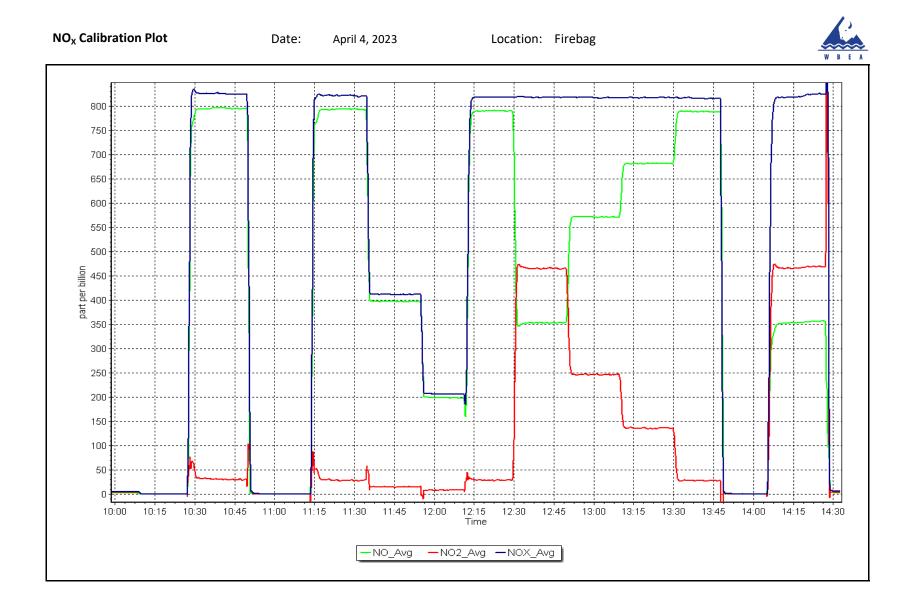




NO₂ Calibration Summary

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







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS20 MACKAY RIVER APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

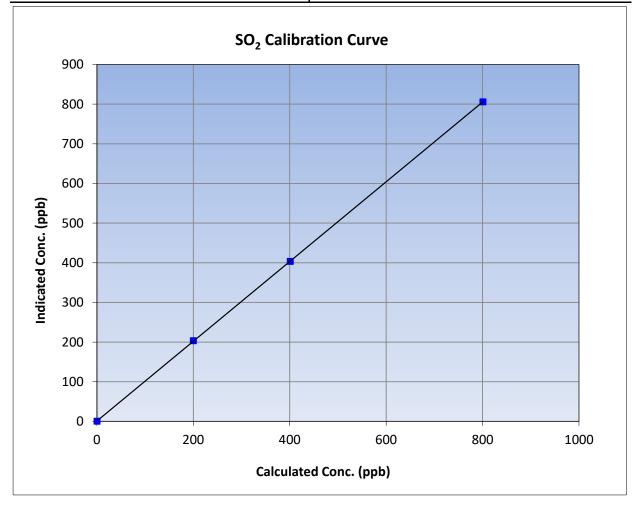
| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | MacKay River April 3, 2023 10:04 Routine | | Station number: Last Cal Date: End time (MST): | AMS20 March 1, 2023 13:02 | |
| | | Calibration St | andards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

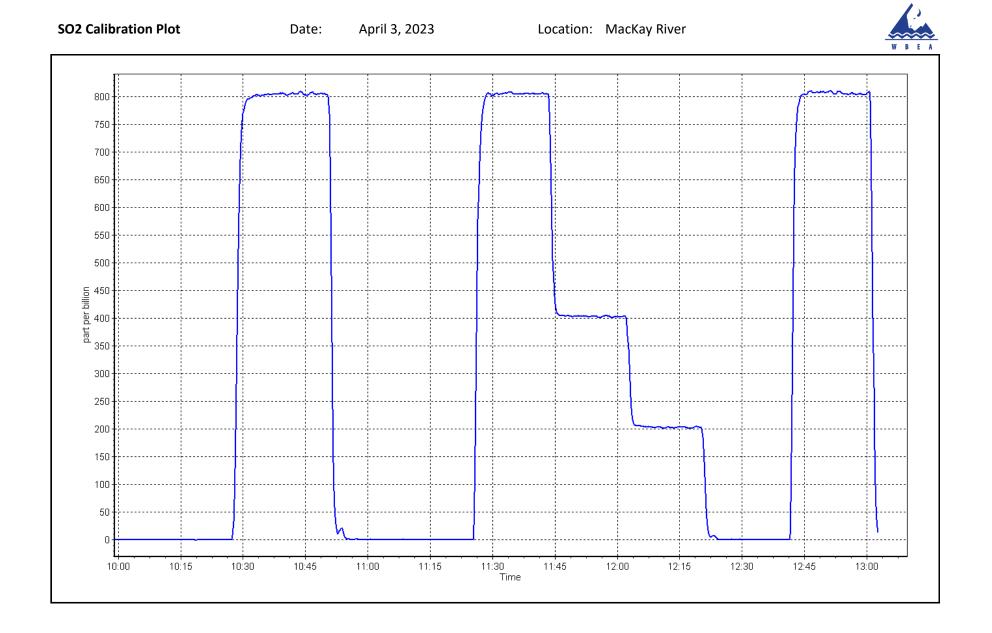
Sample inlet filter changed after as founds. No adjustments requried.



SO₂ Calibration Summary

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







H₂S Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|---|--|--|---------------------------------------|---|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | MacKay River April 4, 2023 9:59 Routine | | Station number: Last Cal Date: End time (MST): | AMS20 March 8, 2023 14:52 | |
| | | Calibration St | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 4.87 EY0001922 | | Cal Gas Exp Date: | May 5, 2023 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | 4.87 NA Teledyne API T700 Teledyne API 701 | •• | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 1220 4522 | |
| | | Analyzer Info | rmation | | |
| Analyzer make: Converter make: Analyzer Range | Teledyne API T101 Internal 0 - 100 ppb | - | Analyzer serial #: Converter serial #: | 196 NA | |
| Calibration slope: Calibration intercept: | <u>Start</u> 0.999432 0.479018 | <u>Finish</u> 1.003004 0.079047 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> 46.3 0.987 |
| | | H ₂ S As Foun | id Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.6 | |
| as found span | 4918 | 82.1 | 80.0 | 83.1 | 0.969 |
| as found 2nd point | 4959 | 41.1 | 40.0 | 42.1 | 0.965 |
| as found 3rd point | 4979 | 20.5 | 20.0 | 21.4 | 0.960 |
| new cylinder response | | | _ | | |
| | | H ₂ S Calibrati | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.1 | |
| high point | 4918 | 82.1 | 80.0 | 80.2 | 0.997 |
| second point | 4959 | 41.1 | 40.0 | 40.3 | 0.993 |
| third point | 4979 | 20.5 | 20.0 | 20.3 | 0.984 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4918 | 82.1 | 80.0 | 79.5 | 1.006 |
| SO2 Scrubber Check | 4919 | 80.0 | 800.2 | 0.1 | |
| Date of last scrubber cha Date of last converter eff | - | December 15, 2020 | | Ave Corr Factor | 0.991 efficiency |
| | | | | | • |
| Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 82.5 41.5 20.8 | Prev response: AF Slope: AF Correlation: | 80.40 1.031156 0.999990 | *% change: AF Intercept: | 2.5% 0.718981 |
| | 20.0 | | 0.00000 | * = > +/-5% change initiate | es investigation |

Notes:

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

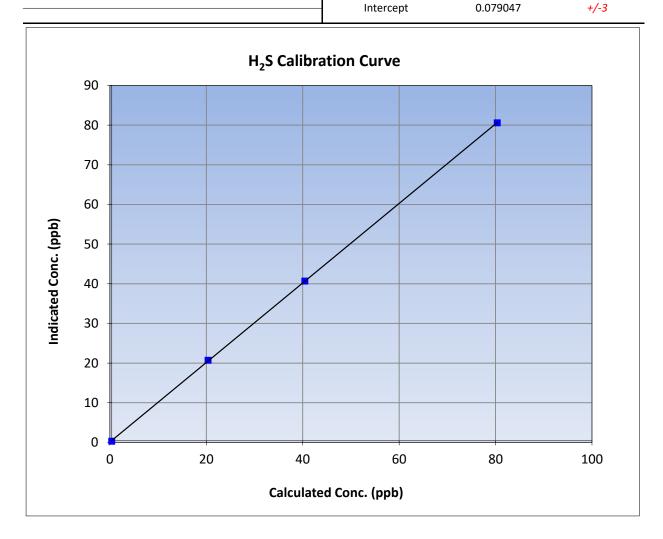
Calibration Performed By:

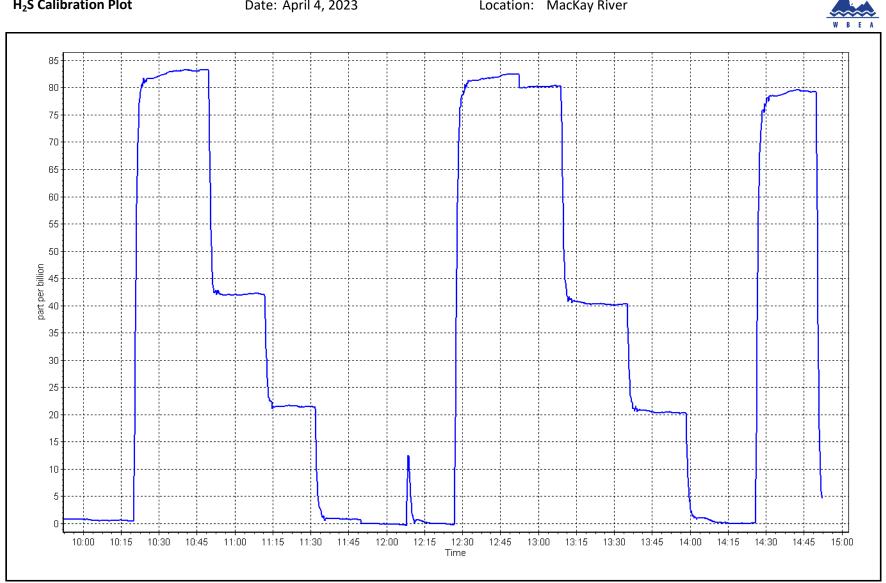
Mohammed Kashif



H₂S Calibration Summary

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





H₂S Calibration Plot

Date: April 4, 2023



THC Calibration Report

Version-01-2020

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

Notes:

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

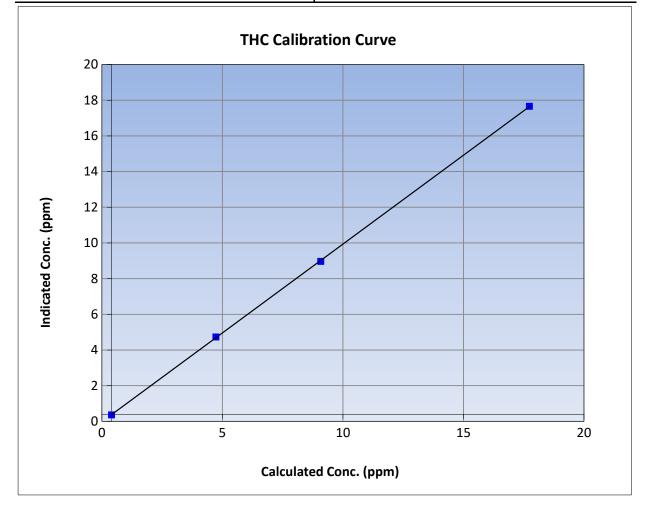
Calibration Performed By:

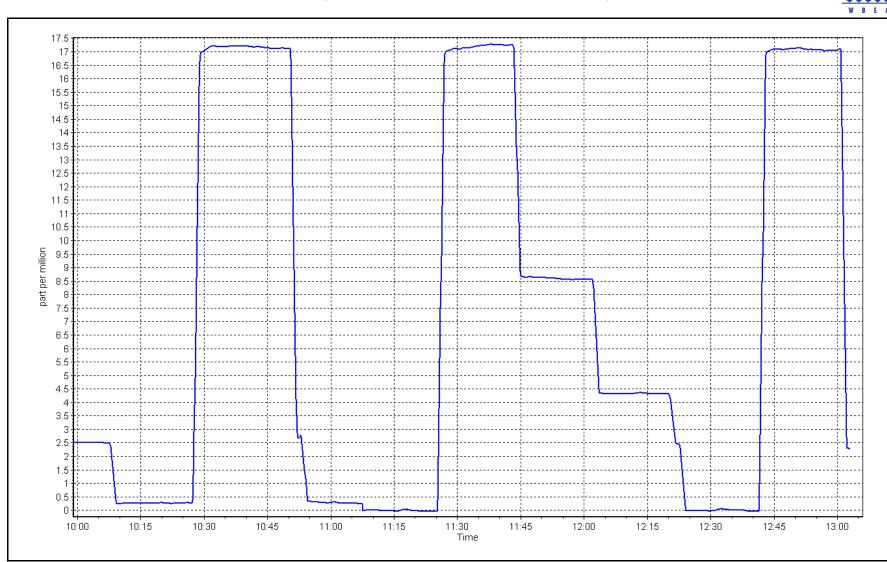


THC Calibration Summary

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

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





April 3, 2023

Date:

Location: MacKay River



Station Name:

Reason:

Calibration Date:

Start time (MST):

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

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

ppm

ppm

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

MacKay River

April 19, 2023

9:47

Routine

Analyzer Information

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

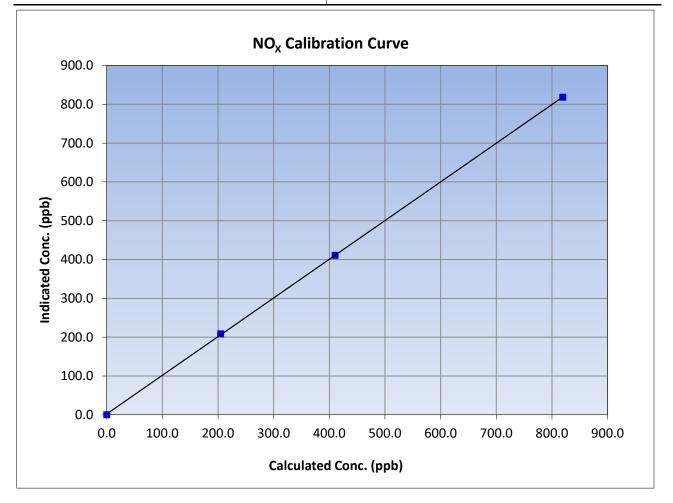
Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

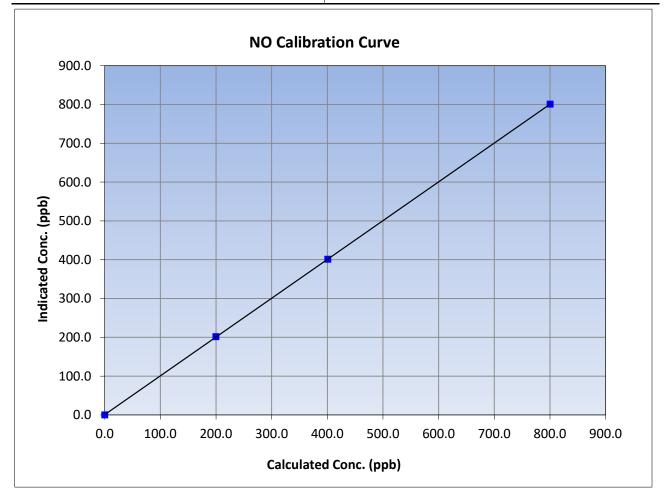
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 1 | 9, 2023 | Previous Calibration: | March | 9, 2023 |
| Station Name: | MacKa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





NO Calibration Summary

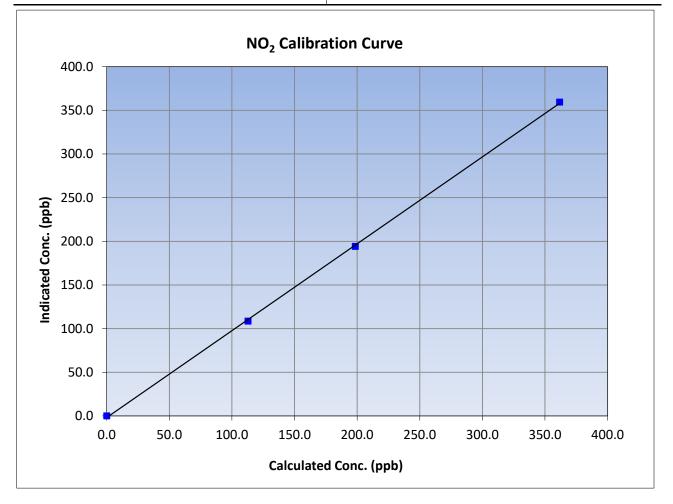
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 1 | 9, 2023 | Previous Calibration: | March | 9, 2023 |
| Station Name: | MacKa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





NO₂ Calibration Summary

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





April 19, 2023



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS21 CONKLIN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

No adjustments made.

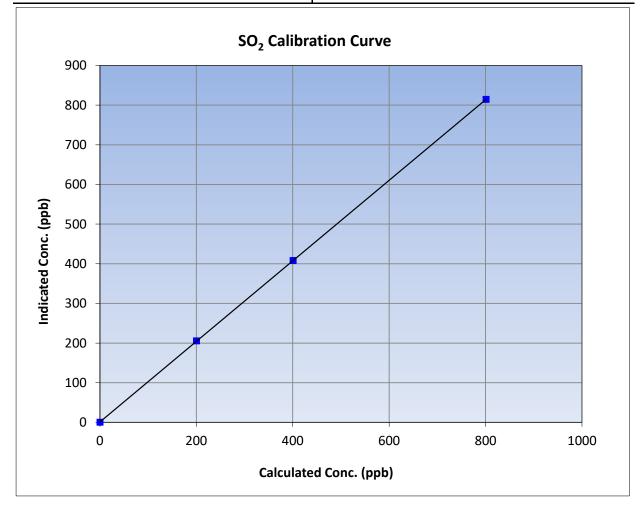
Calibration Performed By:

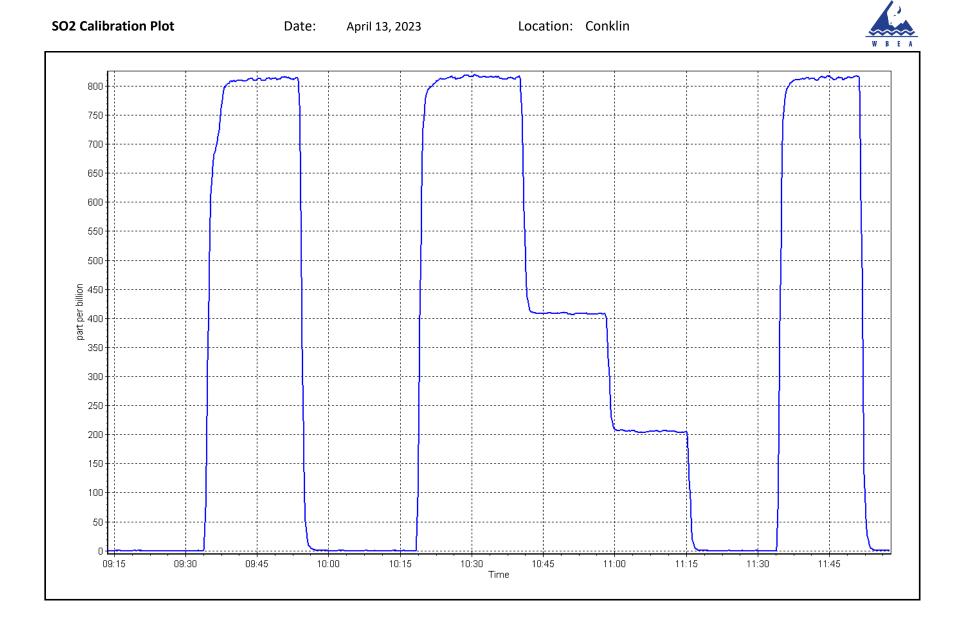


SO₂ Calibration Summary

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

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







TRS Calibration Report

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

Notes:

Adjusted the span only.

Calibration Performed By:

Denny Ray Estador

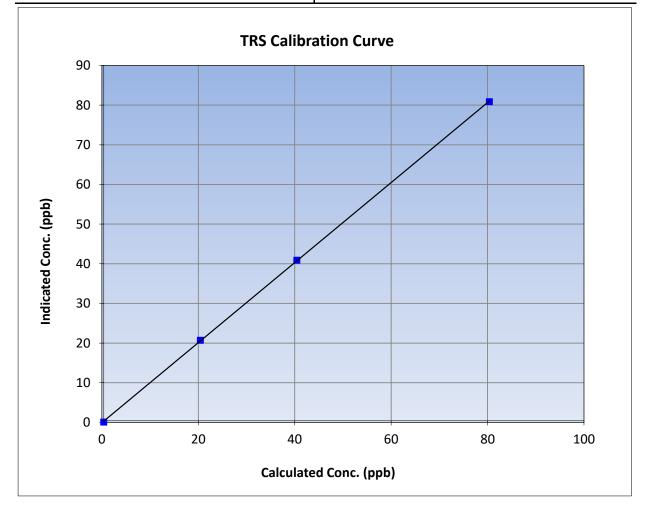


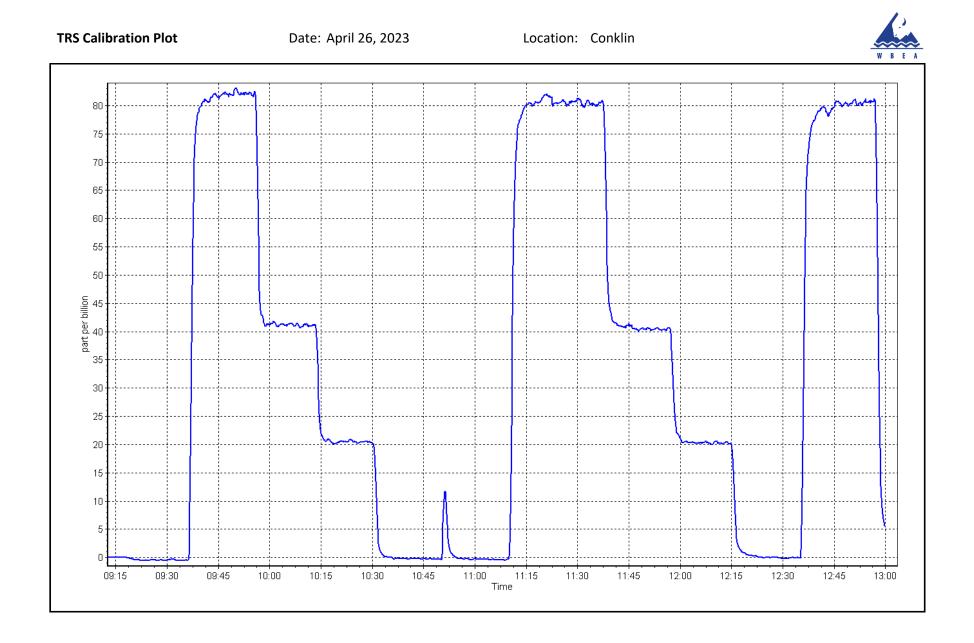
TRS Calibration Summary

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

Calibration Data

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







THC / CH_4 / NMHC Calibration Report

| | | Stat | ion Information | | |
|--------------------------------------|-----------------|---------------|--------------------------|---------------|---------------|
| Station Name: | Conklin | | Station number: AN | /IS21 | |
| Calibration Date: | April 13, 2023 | | Last Cal Date: Ma | arch 3, 2023 | |
| Start time (MST): | 9:14 | | End time (MST): 12 | :00 | |
| Reason: | Routine | | | | |
| | | Calib | oration Standards | | |
| Gas Cert Reference: | (| C259455 | Cal Gas Expiry Date: Jar | nuary 5, 2025 | |
| CH4 Cal Gas Conc. | 497.9 | ppm | CH4 Equiv Conc. | 1067.7 | ppm |
| C3H8 Cal Gas Conc. | 207.2 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: NA | 4 | |
| Removed CH4 Conc. | 497.9 | ppm | CH4 Equiv Conc. | 1067.7 | ppm |
| Removed C3H8 Conc. | 207.2 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | |
| Calibrator Model: | Teledyne API T | 700 | Serial Number: 38 | 10 | |
| ZAG make/model: | Teledyne API 70 | 01 | Serial Number: 69 | 1 | |
| | | Anal | yzer Information | | |
| Analyzer make: | Thermo 55i | | Analyzer serial #: 11 | 8148495 | |
| THC Range (ppm): | : 0 - 20 ppm | | | | |
| NMHC Range (ppm): | : 0 - 10 ppm | | CH4 Range (ppm): 0 - | - 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio: | 1.86E-04 | 1.86E-0 | 4 NMHC SP Ratio: | 4.56E-05 | 4.56E-05 |
| CH4 Retention time: | 12.60 | 12.60 | NMHC Peak Area: | 200658 | 200658 |

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

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



THC / CH₄ / NMHC Calibration Report

Version-06-2022

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

CH4 Calibration Data

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

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

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



CH₄ Calibration Summary

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



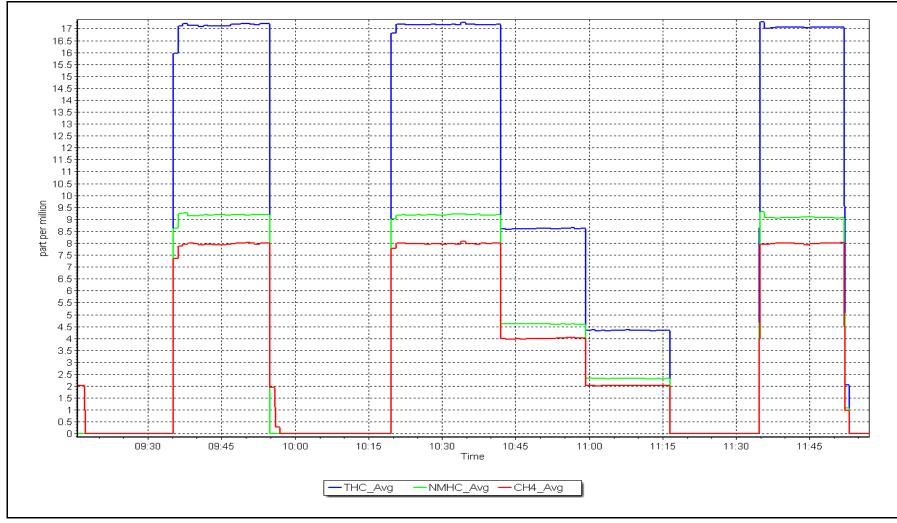
NMHC Calibration Summary

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

NMHC Calibration Plot

Location: Conklin







THC / CH_4 / NMHC Calibration Report

| | | Stat | tion Information | | | |
|--|---|---------------|-------------------------|---------------|---------------|--|
| Station Name: Calibration Date: Start time (MST): Reason: | ConklinStation number: AMS21April 16, 2023Last Cal Date: April 13, 202310:14End time (MST): 12:50MaintenanceMaintenance | | | | | |
| | Wantenance | Calik | pration Standards | | | |
| Gas Cert Reference: | C | C259455 | Cal Gas Expiry Date: Ja | nuary 5, 2025 | | |
| CH4 Cal Gas Conc. | 497.9 | ppm | CH4 Equiv Conc. | 1067.7 | ppm | |
| C3H8 Cal Gas Conc. | 207.2 | ppm | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: N/ | 4 | | |
| Removed CH4 Conc. | 497.9 | ppm | CH4 Equiv Conc. | 1067.7 | ppm | |
| Removed C3H8 Conc. | 207.2 | ppm | Diff between cyl (THC): | | | |
| Diff between cyl (CH ₄): | | | Diff between cyl (NM): | | | |
| Calibrator Model: | Teledyne API T7 | 00 | Serial Number: 3810 | | | |
| ZAG make/model: | Teledyne API 70 | 1 | Serial Number: 691 | | | |
| | | Anal | yzer Information | | | |
| Analyzer make: | Thermo 55i | | Analyzer serial #: 11 | 18148495 | | |
| THC Range (ppm): | 0 - 20 ppm | | | | | |
| NMHC Range (ppm): | 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | |
| CH4 SP Ratio: | 1.86E-04 | 1.82E-0 | NMHC SP Ratio: | 4.56E-05 | 4.58E-05 | |
| CH4 Retention time: | 12.60 | 12.20 | NMHC Peak Area: | 200658 | 199772 | |

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

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



THC / CH_4 / NMHC Calibration Report

Version-06-2022

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

| CH4 | Cal | ibration | Data |
|-----|-----|-----------|------|
| CIT | Cu | is a cion | Dutu |

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

Notes:

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

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

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



CH₄ Calibration Summary

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

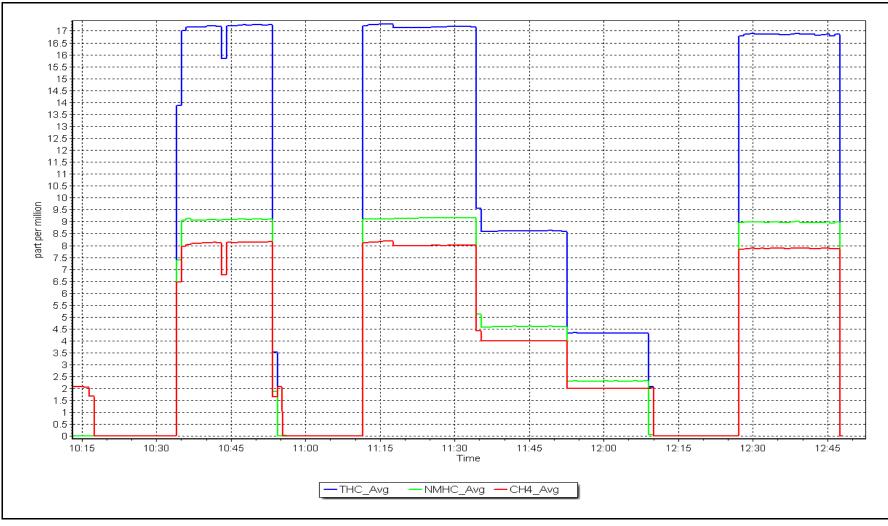


NMHC Calibration Summary

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









THC / CH_4 / NMHC Calibration Report

| | | | Station | Information | | | |
|--|---|---------|---------------------|---|-----------------------|---------------|--|
| Station Name: Calibration Date: Start time (MST): Reason: | ConklinStation number: AMS21April 18, 2023Last Cal Date: April 16, 20239:50End time (MST): 11:10RemovalFind time (MST): 11:10 | | | | | | |
| | | | Calibrat | ion Standards | | | |
| Gas Cert Reference: | C | C259455 | | Cal Gas Expiry Date: Ja | nuary 5 <i>,</i> 2025 | | |
| CH4 Cal Gas Conc. | 497.9 | ppm | | CH4 Equiv Conc. | 1067.7 | ppm | |
| C3H8 Cal Gas Conc. | 207.2 | ppm | | | | | |
| Removed Gas Cert: | | NA | | Removed Gas Expiry: NA | | | |
| Removed CH4 Conc. | 497.9 | ppm | | CH4 Equiv Conc. | 1067.7 | ppm | |
| Removed C3H8 Conc. Diff between cyl (CH ₄): | 207.2 | ppm | | Diff between cyl (THC): Diff between cyl (NM): | | | |
| Calibrator Model: | Teledyne API T7 | 700 | Serial Number: 3810 | | | | |
| ZAG make/model: | Teledyne API 70 | 01 | Serial Number: 691 | | | | |
| | | | Analyze | r Information | | | |
| Analyzer make: | Thermo 55i | | | Analyzer serial #: 11 | L8148495 | | |
| THC Range (ppm): | : 0 - 20 ppm | | | | | | |
| NMHC Range (ppm): | : 0 - 10 ppm | | | CH4 Range (ppm): 0 - | - 10 ppm | | |
| | <u>Start</u> | | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | |
| CH4 SP Ratio: | 1.82E-04 | | NA | NMHC SP Ratio: | 4.58E-05 | NA | |
| CH4 Retention time: | 12.20 | | NA | NMHC Peak Area: | 199772 | NA | |

THC Calibration Data

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



THC / CH_4 / NMHC Calibration Report

Version-06-2022

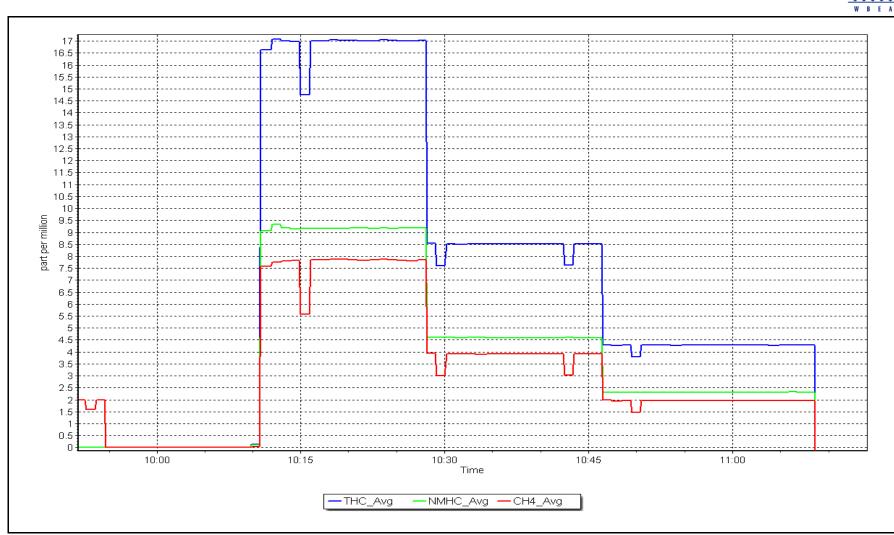
| | | NMHC Calibr | ation Data | | |
|-----------------------|-------------------|----------------------|----------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05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

Notes:

Removal calibration for instrument change out.

Calibration Performed By: Ka

Karan Pandit



Location: Conklin

5



THC / CH_4 / NMHC Calibration Report

| | | | | | version-00-20 | |
|--|---|-----------------------|---|---------------------|----------------------------|--|
| | | Station | Information | | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Conklin April 18, 2023 11:55 Install | Station number: AMS21 | | | | |
| | | Calibratio | on Standards | | | |
| Gas Cert Reference: | CC | 259455 | Cal Gas Expiry Date: | January 5, 2025 | | |
| CH4 Cal Gas Conc. | 497.9 | ppm | CH4 Equiv Conc. | 1067.7 | ppm | |
| C3H8 Cal Gas Conc. | 207.2 | ppm | | | P.F | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: | NA | | |
| Removed CH4 Conc. | 497.9 | ppm | CH4 Equiv Conc. | 1067.7 | ppm | |
| Removed C3H8 Conc. Diff between cyl (CH ₄): | 207.2 | ppm | Diff between cyl (THC): Diff between cyl (NM): | | | |
| Calibrator Model: | Teledyne API T700 |) | Serial Number: | 3810 | | |
| ZAG make/model: | Teledyne API 701 | | Serial Number: | 691 | | |
| | | Analyzer | Information | | | |
| Analyzer make: | Thermo 55i | | Analyzer serial #: | 118148495 | | |
| THC Range (ppm): | 0 - 20 ppm | | · | | | |
| NMHC Range (ppm): | | | CH4 Range (ppm): | 0 - 10 ppm | | |
| | Start | Finish | | Start | Finish | |
| CH4 SP Ratio: | | 2.16E-04 | NMHC SP Ratio: | NA | 4.66E-05 | |
| CH4 Retention time: | | 12.00 | NMHC Peak Area: | NA | 196084 | |
| | | THE Colli | hustion Data | | | |
| Set Point | Dil air flow rate | Source gas flow rate | calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> | |
| as found zero | Dir dir now rate | | | | Ci Linne 0.00-1.00 | |
| as found span | | | | | | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| high point | 4920 | 80.2 | 17.13 | 17.14 | 0.999 | |
| second point | 4960 | 40.1 | 8.56 | 8.63 | 0.992 | |
| third point | 4980 | 20.0 | 4.27 | 4.36 | 0.979 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |



THC / CH_4 / NMHC Calibration Report

Version-06-2022

| NMHC Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | |
| as found zero | | | | | | | |
| as found span | | | | | | | |
| as found 2nd point | | | | | | | |
| as found 3rd point | | | | | | | |
| new cylinder response | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| high point | 4920 | 80.2 | 9.14 | 9.15 | 0.999 | | |
| second point | 4960 | 40.1 | 4.57 | 4.61 | 0.991 | | |
| third point | 4980 | 20.0 | 2.28 | 2.33 | 0.979 | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4920 | 80.2 | 9.14 | 9.18 | 0.996 | | |
| | | | А | verage Correction Factor | 0.990 | | |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation | | |

CH4 Calibration Data

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Co | :) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
|-----------------------|-------------------|----------------------|---------------------|----------------------------|---------------------|
| as found zero | | | | | |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.2 | 7.99 | 8.00 | 0.999 |
| second point | 4960 | 40.1 | 3.99 | 4.02 | 0.993 |
| third point | 4980 | 20.0 | 1.99 | 2.03 | 0.980 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.2 | 7.99 | 8.00 | 0.998 |
| | | | Av | verage Correction Factor | 0.991 |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| THC Cal Slope: | | NA | | 0.999574 | |
| THC Cal Offset: | | NA | | 0.045989 | |
| CH4 Cal Slope: | | NA | | 0.999808 | |
| CH4 Cal Offset: | | NA | | 0.019754 | |
| NMHC Cal Slope: | | NA | | 0.999495 | |
| NMHC Cal Offset: | | NA | | 0.026235 | |

Notes:

Install calibration.

Calibration Performed By:

Karan Pandit



THC Calibration Summary

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



CH₄ Calibration Summary

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



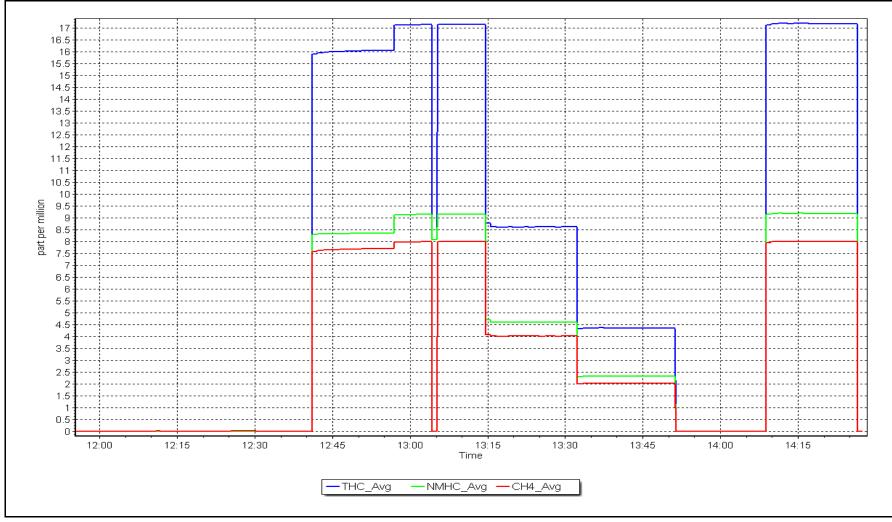
NMHC Calibration Summary

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

NMHC Calibration Plot

Location: Conklin







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

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

| Calibration | Standards |
|-------------|-----------|
|-------------|-----------|

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

| Analy | vzer | Inform | ation |
|-------|------|--------|-------|
| | , | | |

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

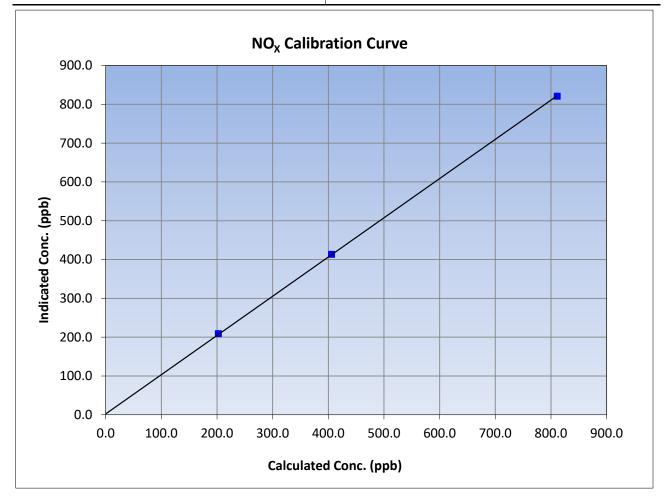
No adjustments required.

Calibration Performed By:



NO_x Calibration Summary

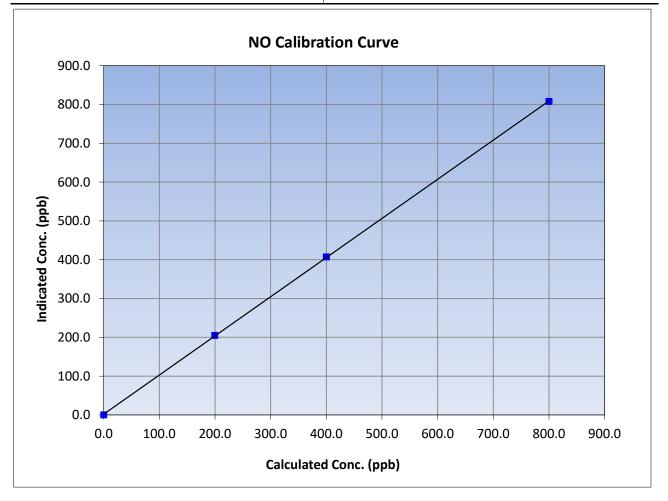
| WBEA | | | | | Version-04-2 |
|--------------------------|--------------------|--------------------------------------|---------------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 8, 2023 | Previous Calibration: | March 2 | 29, 2023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





NO Calibration Summary

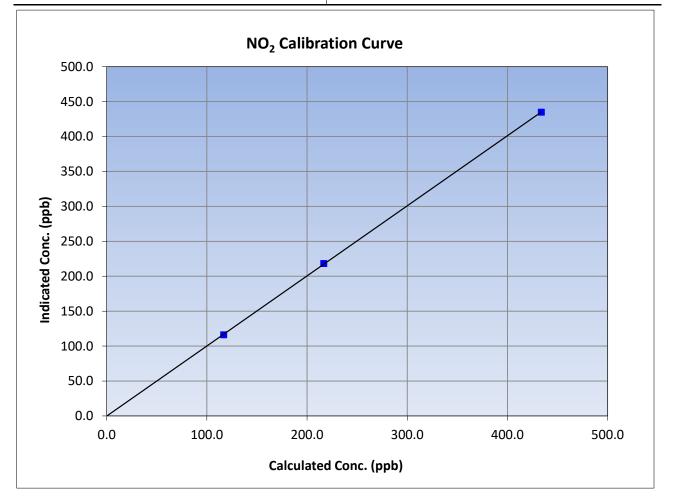
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|--------------------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 8, 2023 | Previous Calibration: | March 2 | 29, 2023 |
| Station Name: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

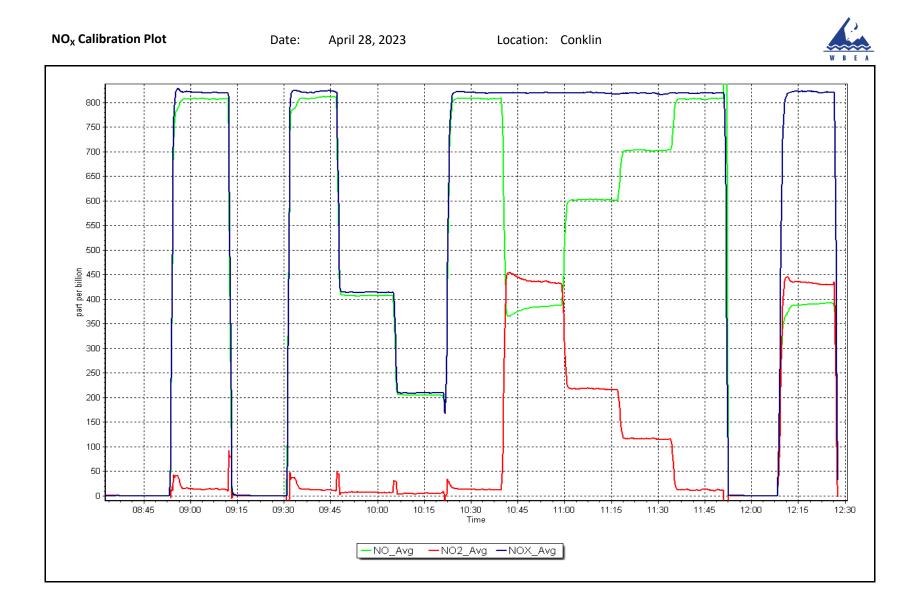




NO₂ Calibration Summary

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









O₃ Calibration Report

Version-01-2020

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

Notes:

Adjusted the zero.

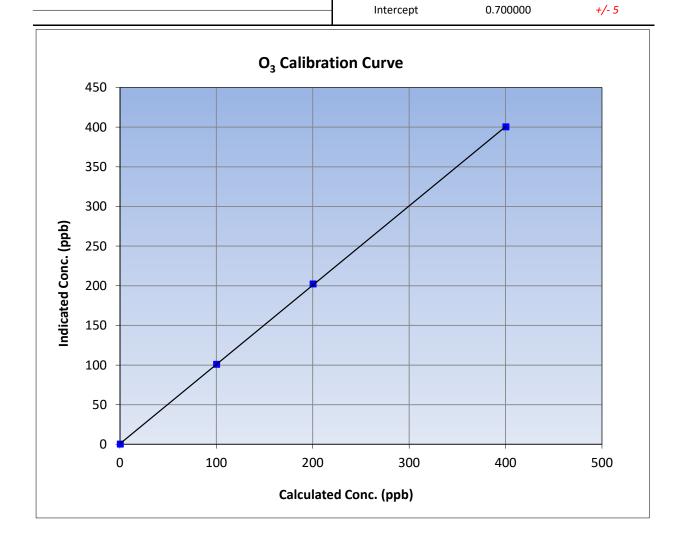
Calibration Performed By:

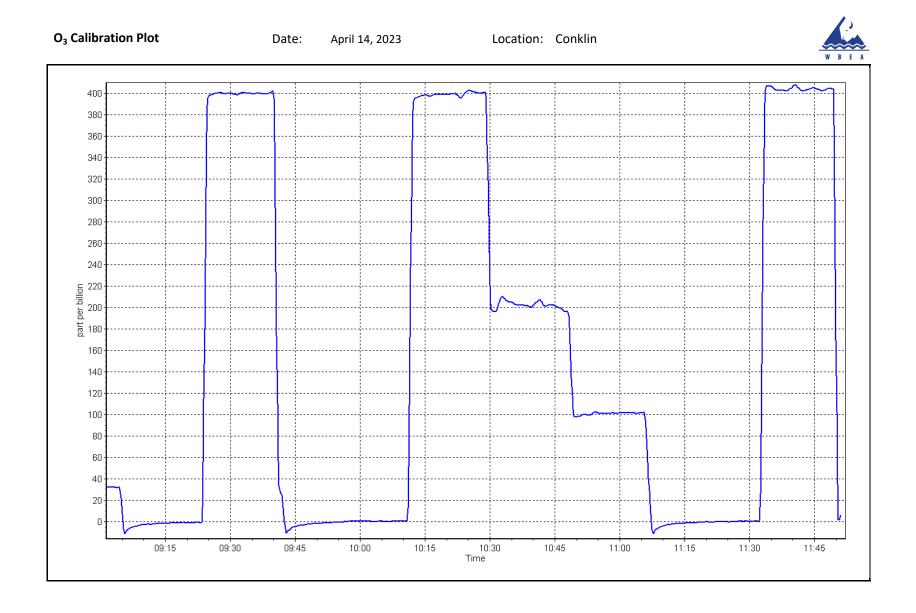
Denny Ray Estador



O₃ Calibration Summary

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







T640 PM_{2.5} CALIBRATION

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS22 JANVIER APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

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

Calibration Performed By:

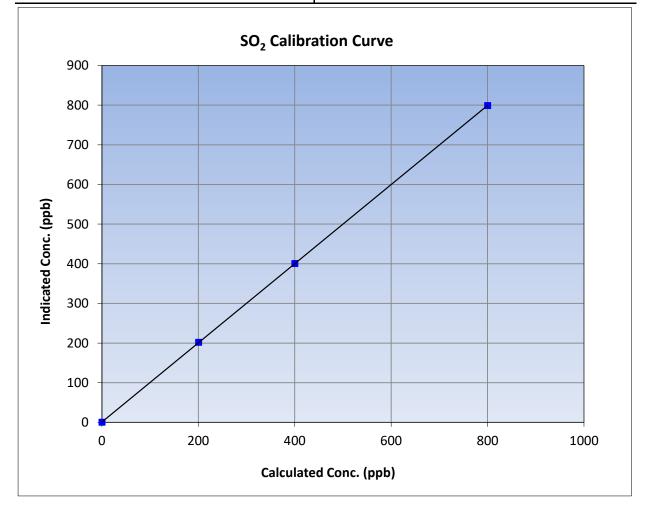


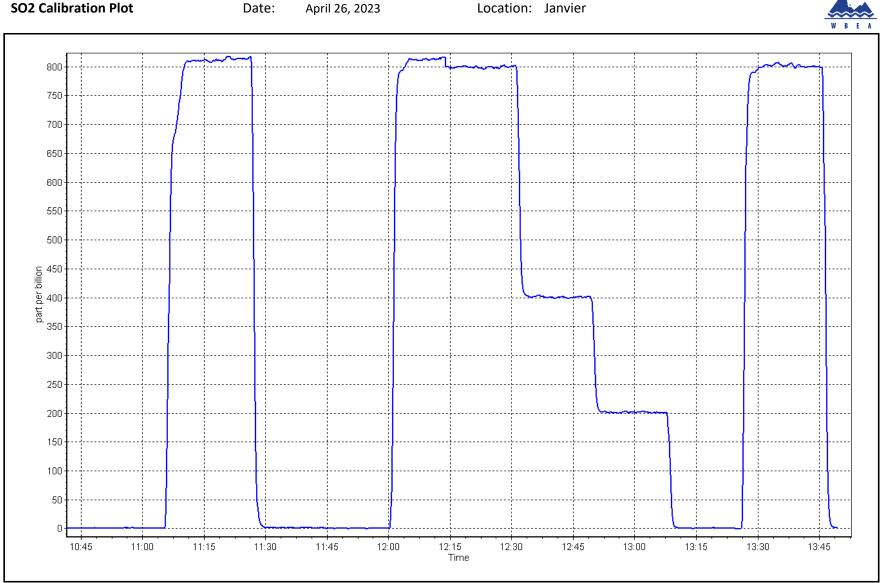
SO₂ Calibration Summary

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

Calibration Data

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





Location: Janvier



TRS Calibration Report

| WBEA | | | | | Version-11-202 |
|---|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Janvier April 25, 2023 10:33 Routine | | Station number: Last Cal Date: End time (MST): | AMS22 March 29, 2023 16:35 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.03 | ppm | Cal Gas Exp Date: | April 16, 2022 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | DT0018680 5.03 NA Teledyne API T700 Teledyne API T701 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 3806 4890 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i-TLE CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1151680031 587 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.999222 | 0.999363 | Backgd or Offset: | 3.50 | 5.95 |
| Calibration intercept: | 0.140953 | -0.038984 | Coeff or Slope: | 1.220 | 1.071 |
| | | TRS As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.9 | |
| as found span | 4920 | 79.5 | 80.0 | 87.6 | 0.923 |
| as found 2nd point | 4960 | 39.8 | 40.0 | 45.0 | 0.908 |
| as found 3rd point | 4980 | 19.9 | 20.0 | 23.0 | 0.906 |
| new cylinder response | | | | | |
| | | TRS Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4920 | 79.5 | 80.0 | 79.9 | 1.001 |
| second point | 4960 | 39.8 | 40.0 | 40.0 | 1.001 |
| third point | 4980 | 19.9 | 20.0 | 19.9 | 1.006 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4920 | 79.5 | 80.0 | 79.4 | 1.007 |
| SO2 Scrubber Check | 4920 | 79.8 | 798.0 | 0.0 | |
| Date of last scrubber cha | - | | | Ave Corr Factor | 1.003 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 86.7 | Prev response: | 80.06 | *% change: | 7.7% |
| Baseline Corr 2nd AF pt: | 44.1 | AF Slope: | 1.083245 | AF Intercept: | 1.199186 |
| Baseline Corr 3rd AF pt: | 22.1 | AF Correlation: | 0.999916 | | |
| | | | | * = > +/-5% change initiat | es investigation |

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

Calibration Performed By:

Notes:

Rene Chamberland

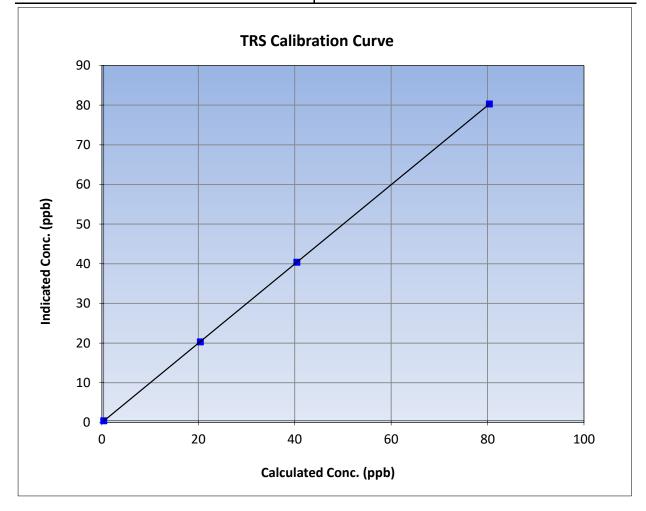


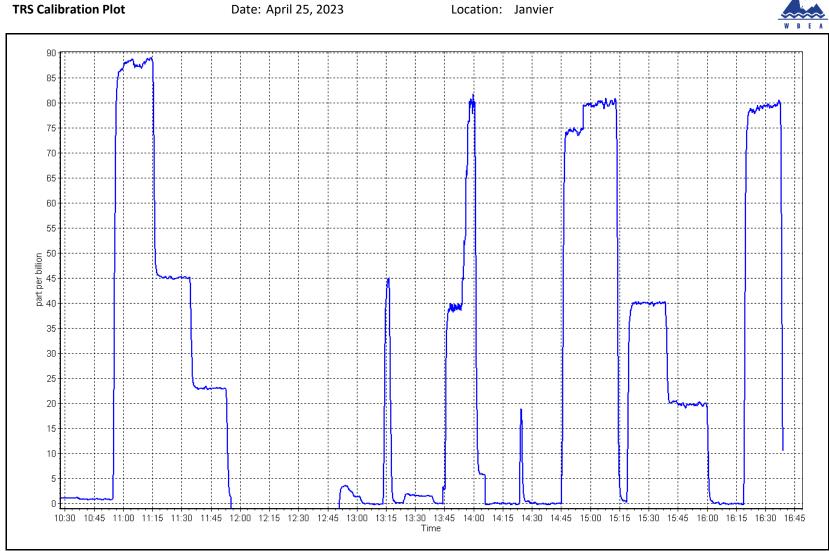
TRS Calibration Summary

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

Calibration Data

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









THC / CH₄ / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|--------------------------------------|-----------------|--------------|-------------------------|----------------|-----------------|
| | | Sta | ation Information | | |
| Station Name: | Janvier | | Station number: AN | VIS 22 | |
| Calibration Date: | April 26, 2023 | | Last Cal Date: M | arch 15, 2023 | |
| Start time (MST): | 10:44 | | End time (MST): 13 | 3:45 | |
| Reason: | Routine | | | | |
| | | Cal | bration Standards | | |
| Gas Cert Reference: | C | C281519 | Cal Gas Expiry Date: Ja | nuary 18, 2029 | |
| CH4 Cal Gas Conc. | 502.8 | ppm | CH4 Equiv Conc. | 1075.9 | ppm |
| C3H8 Cal Gas Conc. | 208.4 | ppm | | | |
| Removed Gas Cert: | | N/A | Removed Gas Expiry: N/ | /Α | |
| Removed CH4 Conc. | 502.8 | ppm | CH4 Equiv Conc. | 1075.9 | ppm |
| Removed C3H8 Conc. | 208.4 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | |
| Calibrator Model: | Teledyne API 70 | C | Serial Number: 38 | 306 | |
| ZAG make/model: | Teledyne API 70 | 1 | Serial Number: 48 | 390 | |
| | | Ana | alyzer Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 11 | 72750023 | |
| THC Range (ppm): | : 0 - 20 ppm | | | | |
| NMHC Range (ppm): | : 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Finis</u> | <u>h</u> | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio: | : 2.150E-04 | 2.150E | -04 NMHC SP Ratio: | 4.51E-05 | 4.45E-05 |
| CH4 Retention time: | : 13.20 | 13.2 | 0 NMHC Peak Area: | 202703 | 205602 |

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

CH4 Calibration Data

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

Notes:

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

Calibration Performed By:

Rene Chamberland



THC Calibration Summary

Version-01-2020

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



CH₄ Calibration Summary

Version-01-2020

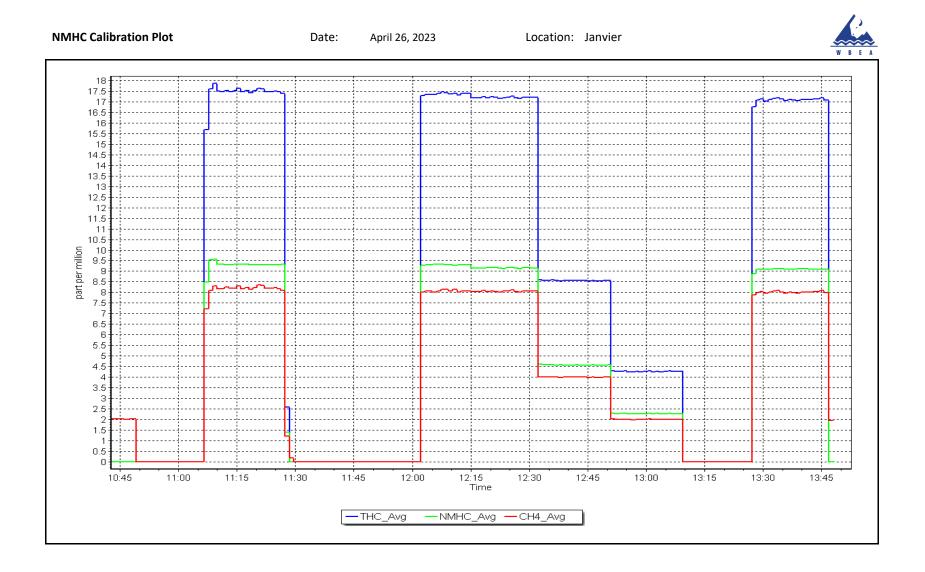
| | | | Station I | nformation | | | | |
|---------------------------|-------------------------------|---------------------------------------|---------------------------|-------------------------|-----------|---------------|--|--|
| Calibration [| ibration Date: April 26, 2023 | | | Previous Calibration: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



NMHC Calibration Summary

Version-01-2020

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





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

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

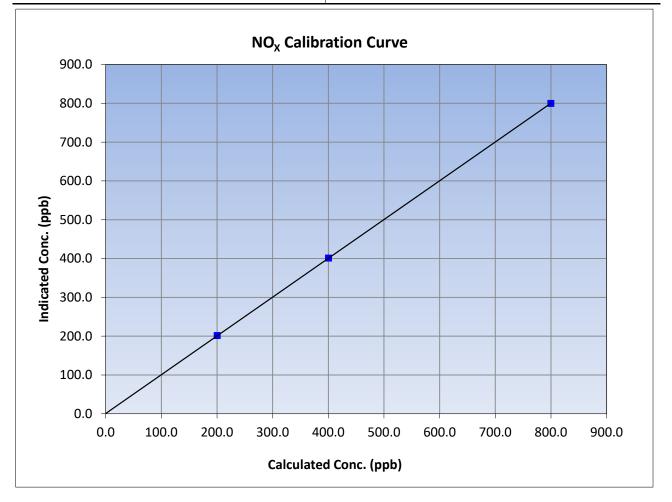
Calibration Performed By:

Rene Chamberland



$NO_{\rm X}$ Calibration Summary

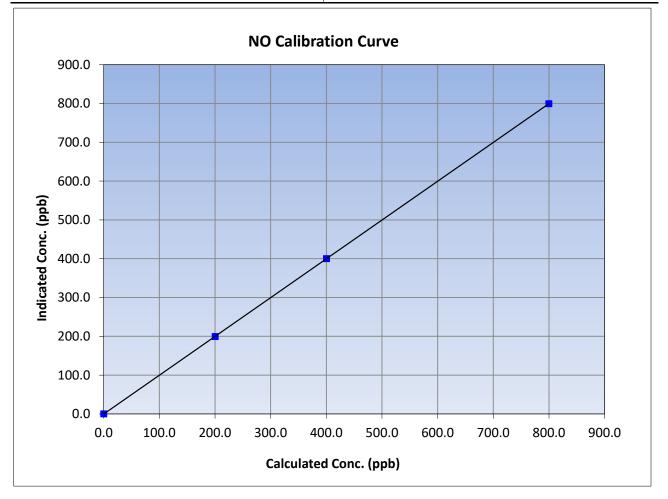
| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 2 | 7, 2023 | Previous Calibration: | March | 9, 2023 | |
| Station Name: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





NO Calibration Summary

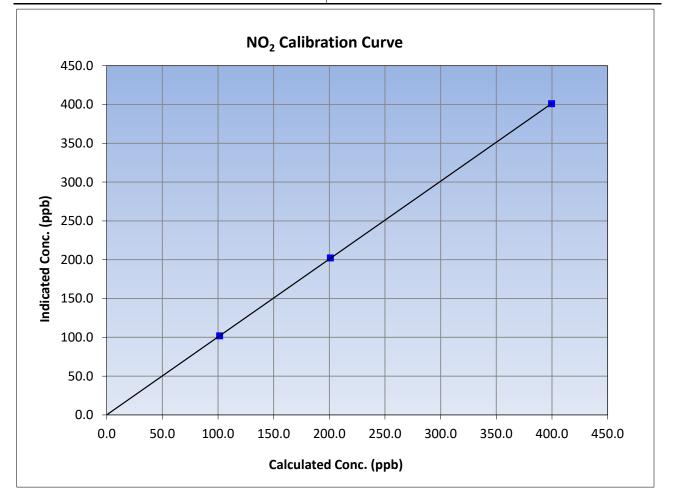
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 7, 2023 | Previous Calibration: | Marc | h 9, 2023 |
| Station Name: | Jan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

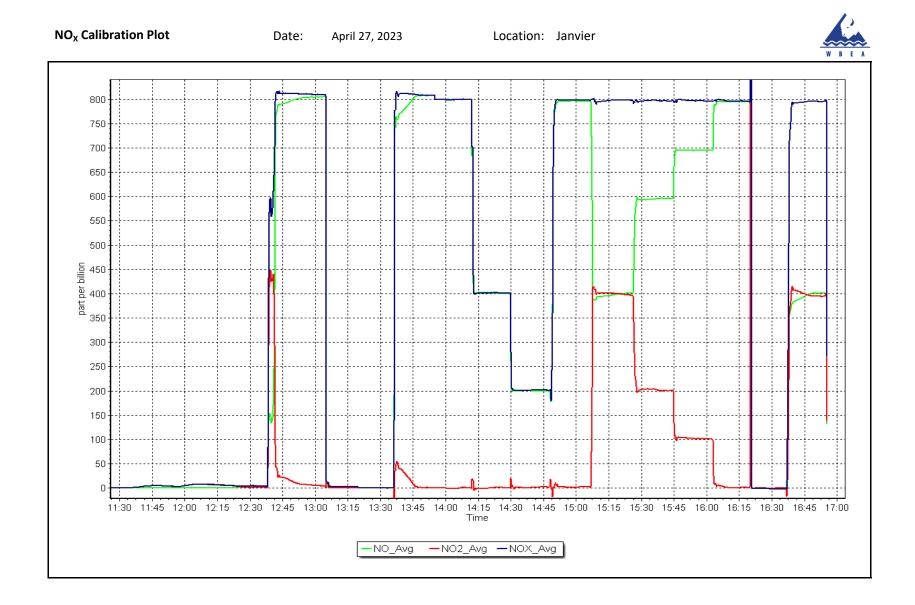




NO₂ Calibration Summary

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







O₃ Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

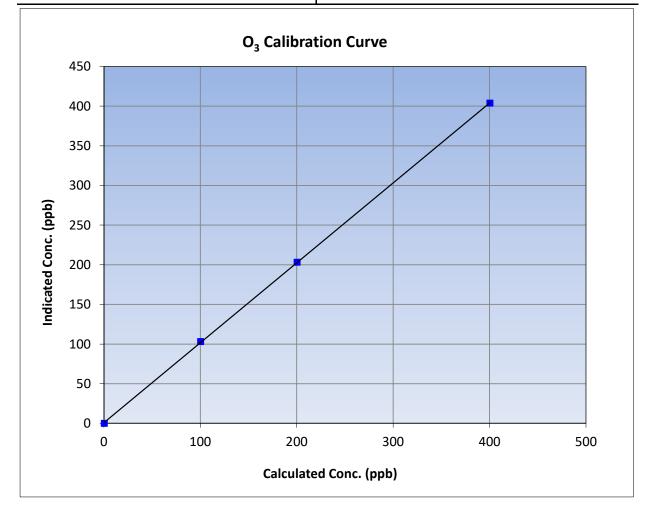
Rene Chamberland



O₃ Calibration Summary

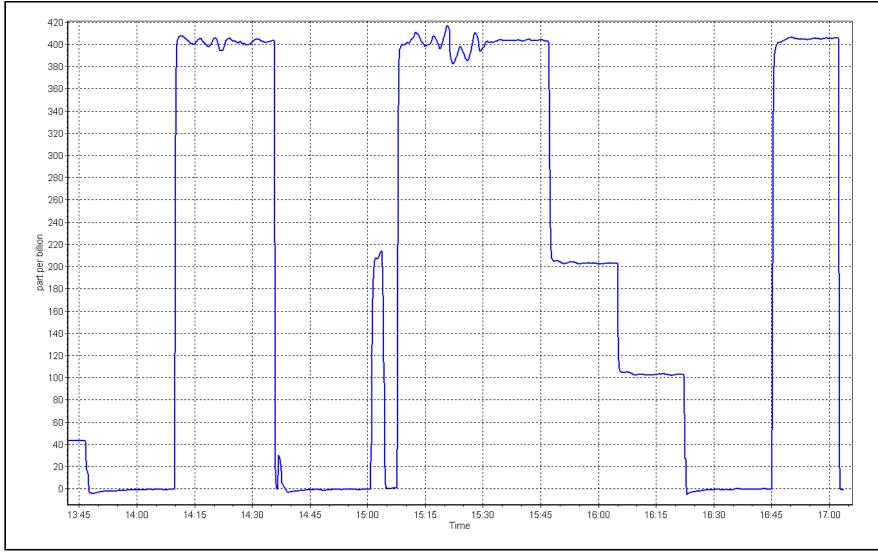
| | Statio | on Information | |
|-------------------|-------------------|-----------------------|----------------|
| Calibration Date: | April 26, 2023 | Previous Calibration: | March 28, 2023 |
| Station Name: | Janvier | Station Number: | AMS 22 |
| Start Time (MST): | 13:45 | End Time (MST): | 17:04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

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











T640 PM_{2.5} CALIBRATION

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS23 FORT HILLS APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

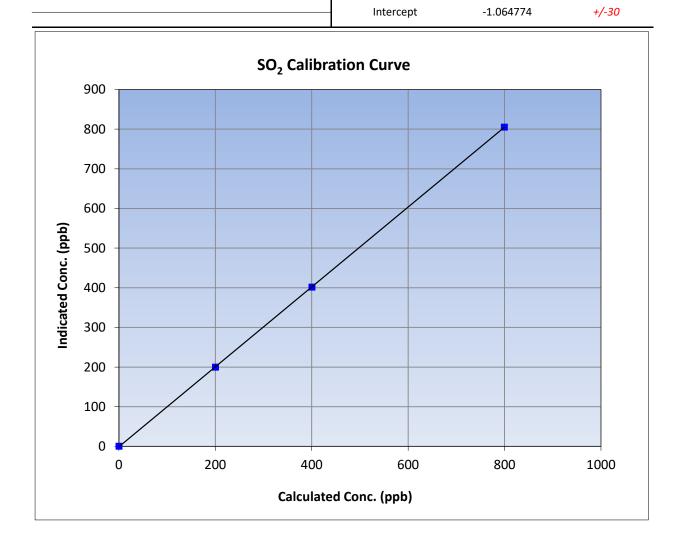
Changed the inlet filter after as founds. No adjustments made.

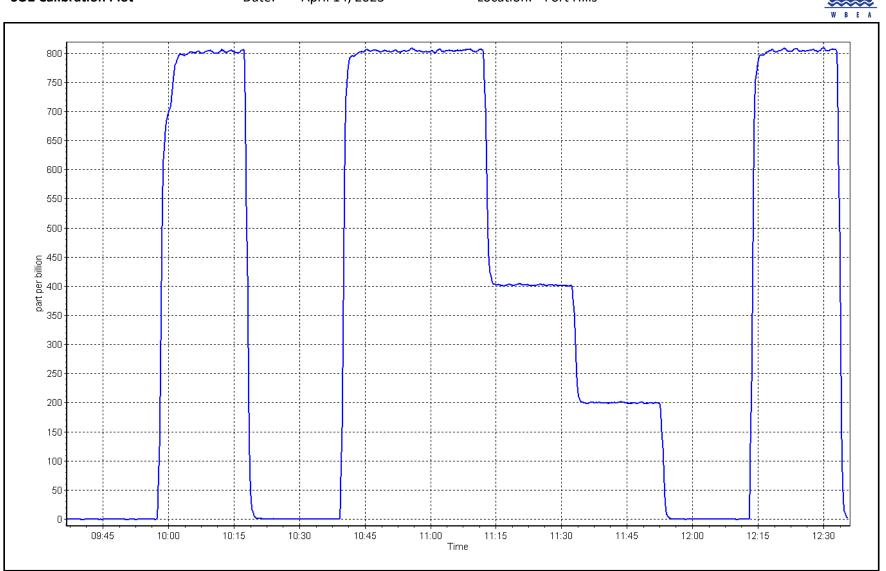
Calibration Performed By:



SO₂ Calibration Summary

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





Location: Fort Hills





TRS Calibration Report

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

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

Calibration Performed By:

Notes:

Braiden Boutilier

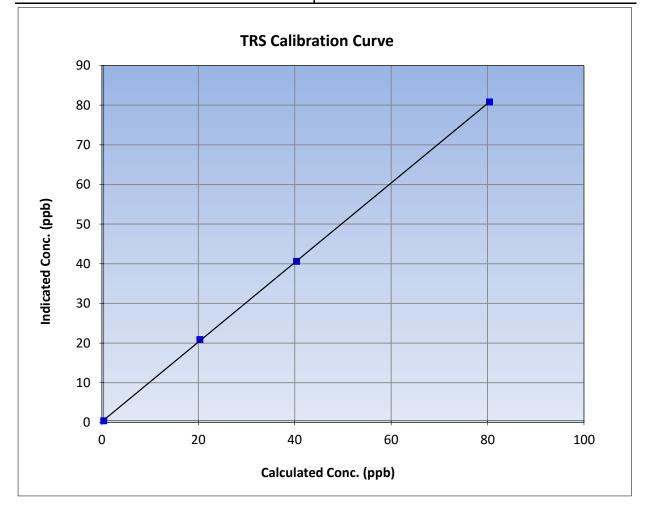


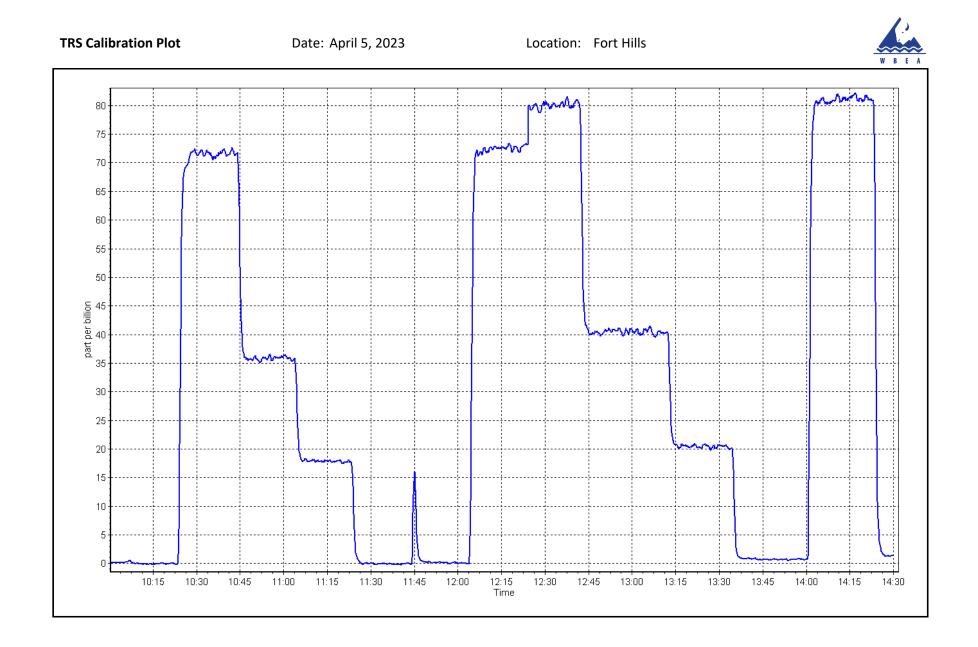
TRS Calibration Summary

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

Calibration Data

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







THC / CH_4 / NMHC Calibration Report

| | ort Hills | Sta | tion Information | | |
|--------------------------------------|--|--------------|-------------------------|---------------|---------------|
| | ort Hills | | | | |
| Start time (MST): 9 | Fort HillsStation number: AMS23May 10, 2023Last Cal Date: April 14, 20239:24End time (MST): 12:35RoutineFourtime | | | | |
| | | Cali | bration Standards | | |
| Gas Cert Reference: | (| C281425 | Cal Gas Expiry Date: Ja | nuary 5, 2025 | |
| CH4 Cal Gas Conc. | 500.2 | ppm | CH4 Equiv Conc. | 1070.6 | ppm |
| C3H8 Cal Gas Conc. | 207.4 | ppm | | | |
| Removed Gas Cert: | | N/A | Removed Gas Expiry: N/ | /Α | |
| Removed CH4 Conc. | 500.2 | ppm | CH4 Equiv Conc. | 1070.6 | ppm |
| Removed C3H8 Conc. | 207.4 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | | | Diff between cyl (NM): | | |
| Calibrator Model: A | API T700 | | Serial Number: 45 | 51 | |
| ZAG make/model: A | API T701 | | Serial Number: 56 | 511 | |
| | | Ana | lyzer Information | | |
| Analyzer make: T | Thermo 55i | | Analyzer serial #: 11 | 93585648 | |
| THC Range (ppm): 0 |) - 20 ppm | | | | |
| NMHC Range (ppm): 0 |) - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Finis</u> | <u>h</u> | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio: | 2.32E-04 | 2.32E- | 04 NMHC SP Ratio: | 5.06E-05 | 5.06E-05 |
| CH4 Retention time: | 13.0 | 13.0 | NMHC Peak Area: | 181940 | 181940 |

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

| СН4 | Cal | ibration | Data |
|-----|-----|-----------|------|
| CH4 | Ca | INIALIOII | Dala |

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

Notes:

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

Calibration Performed By: Max Farrell



THC Calibration Summary

Version-01-2020

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



CH₄ Calibration Summary

Version-01-2020

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



NMHC Calibration Summary

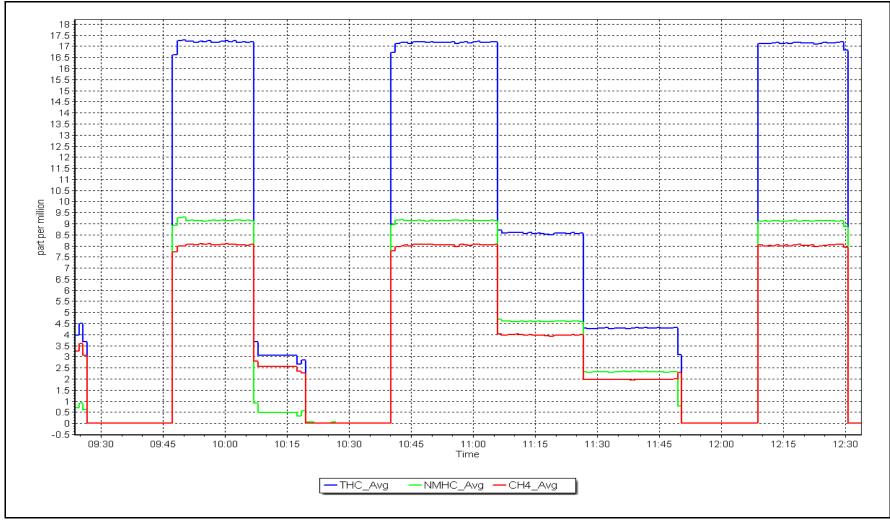
Version-01-2020

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

NMHC Calibration Plot

Location: Fort Hills







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

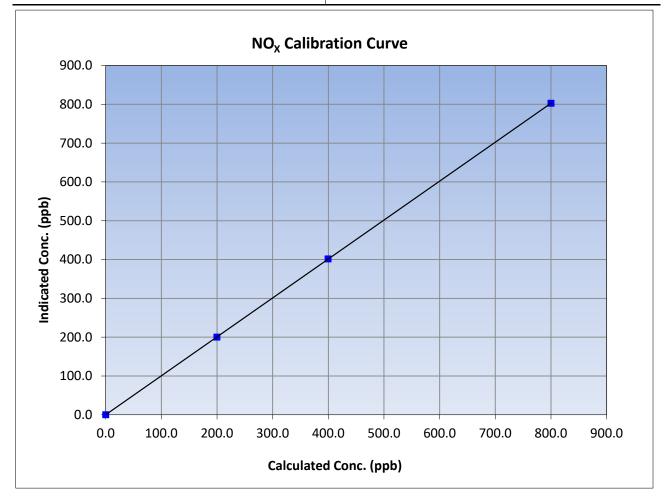
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

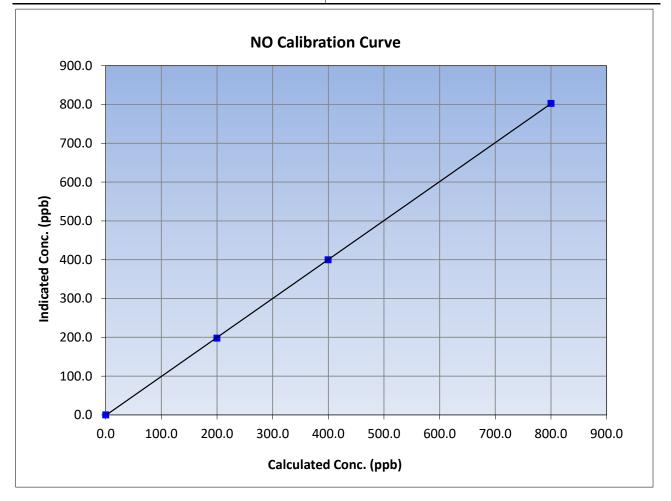
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 1, 2023 | Previous Calibration: | March | 1, 2023 |
| Station Name: | Fort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





NO Calibration Summary

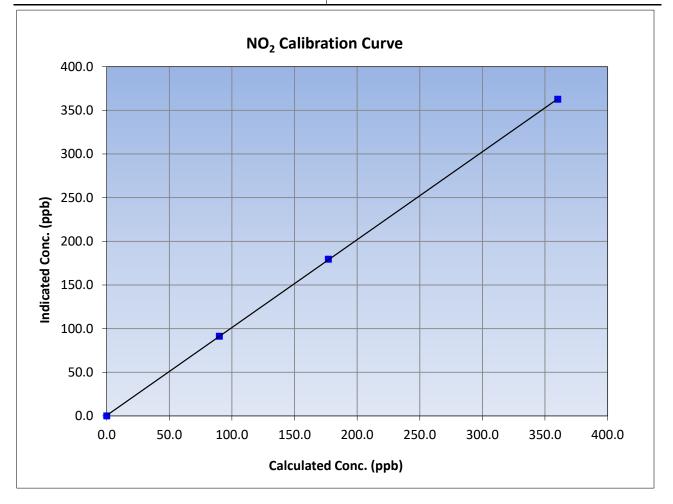
| WBEA | | | | | Version-04-2 |
|--|--|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 1, 2023 | Previous Calibration: | March | 1, 2023 |
| Station Name: | Fort Hills | | Station Number: AM | | S23 |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





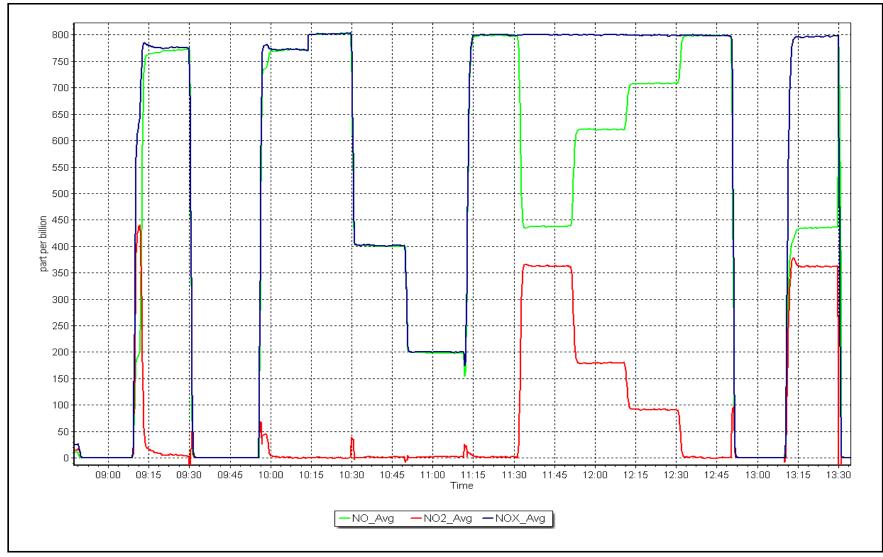
NO₂ Calibration Summary

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











T640 PM_{2.5} CALIBRATION

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

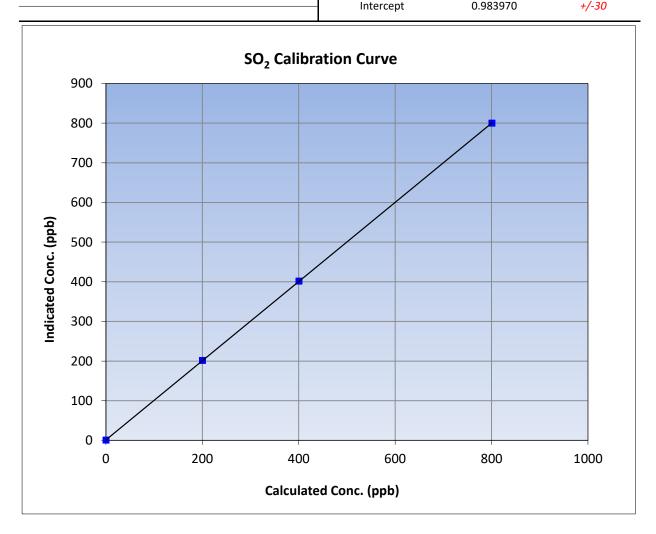
Calibration Gas Changed. Span adjusted.

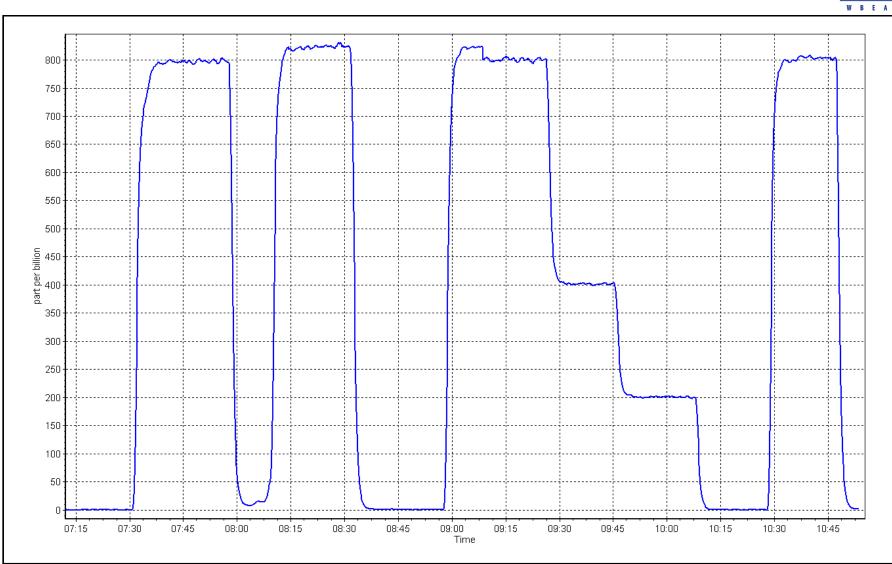
Calibration Performed By:



SO₂ Calibration Summary

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





April 11, 2023

Date:

SO2 Calibration Plot

Location: Waskow ohci Pimatisiwin



H₂S Calibration Report

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

Notes:

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

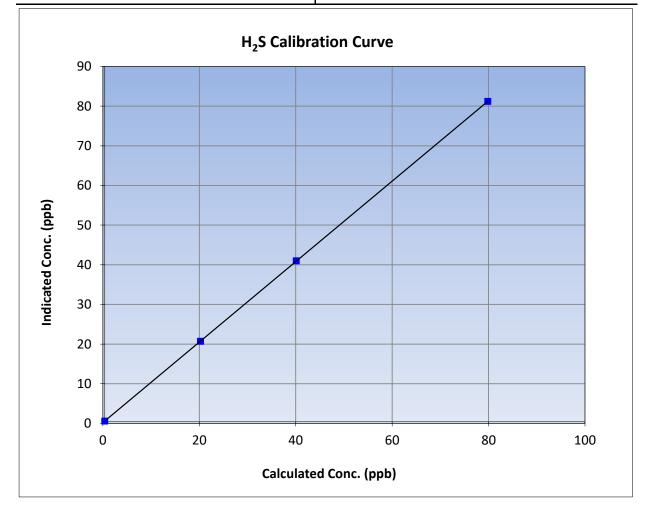


H₂S Calibration Summary

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

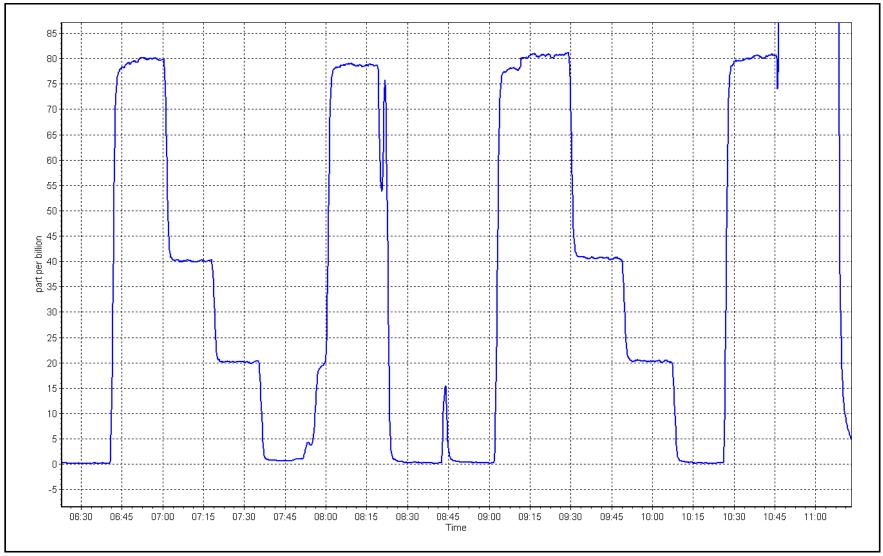
Calibration Data

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











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

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

Calibration Performed By:

Mohammed Kashif

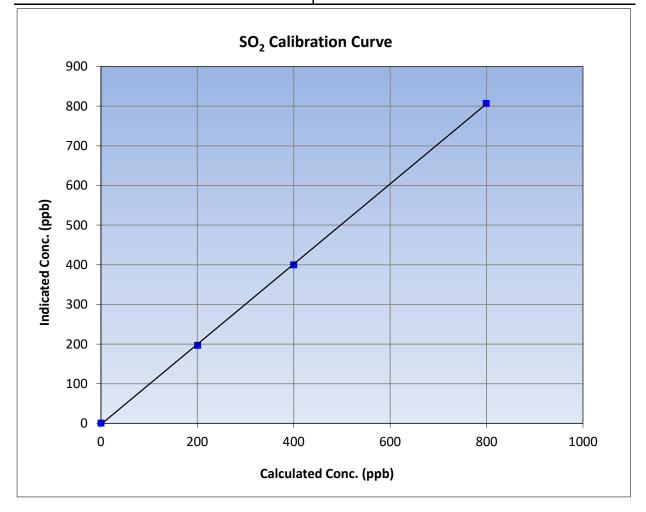


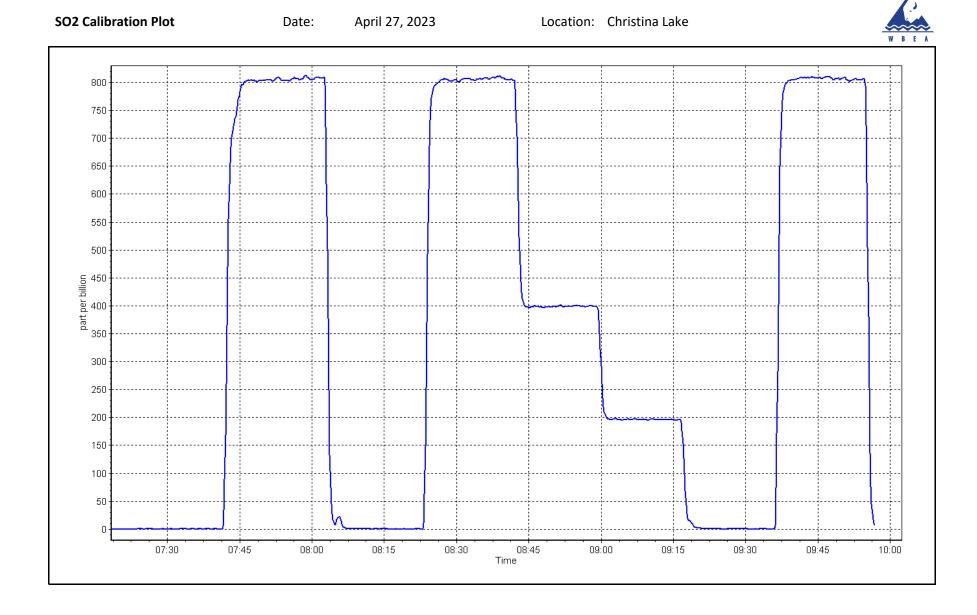
SO₂ Calibration Summary

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

Calibration Data

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







H₂S Calibration Report

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

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

Calibration Performed By:

Notes:

Mohammed Kashif

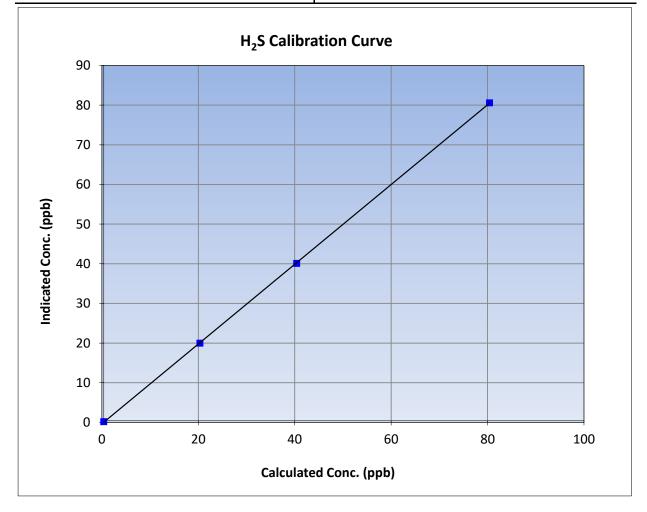


H₂S Calibration Summary

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

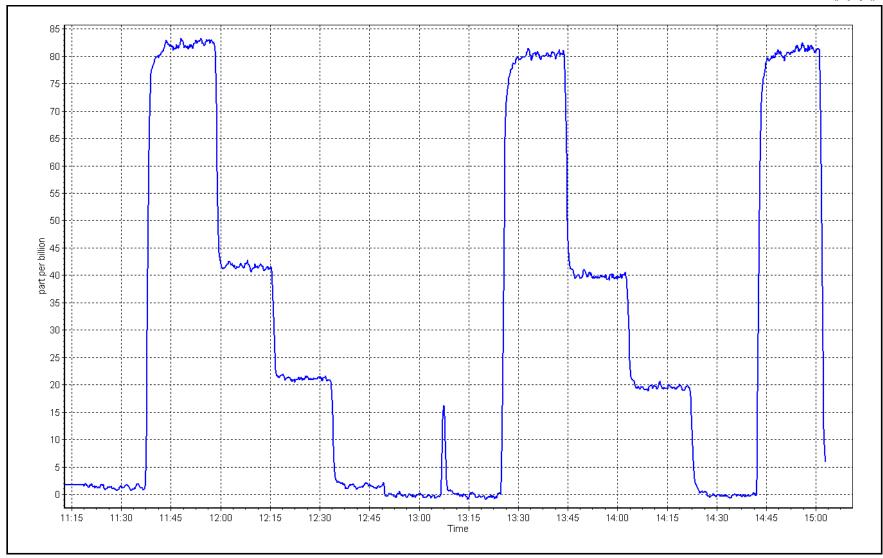
Calibration Data

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











$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

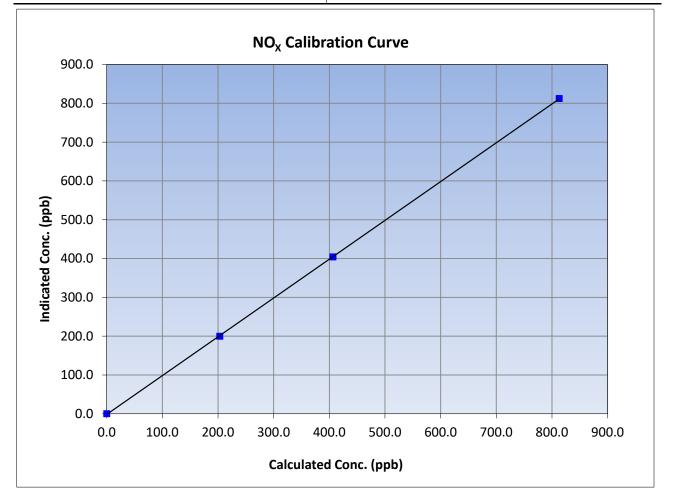
Changed sample inlet filter after as founds. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

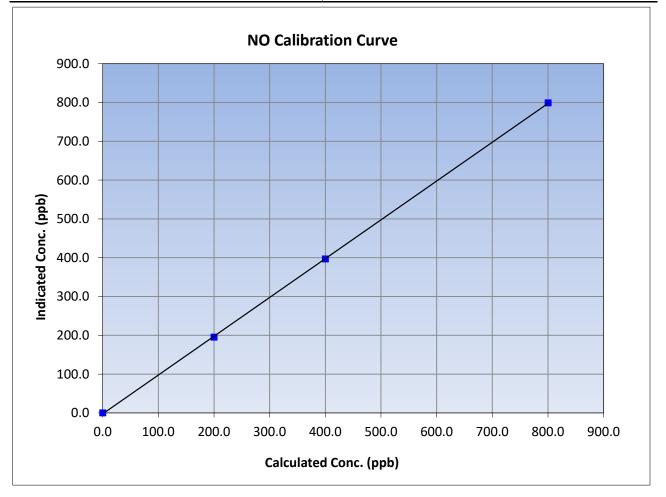
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 26, 2023 | | Previous Calibration: | March | 29, 2023 |
| Station Name: | Christina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





NO Calibration Summary

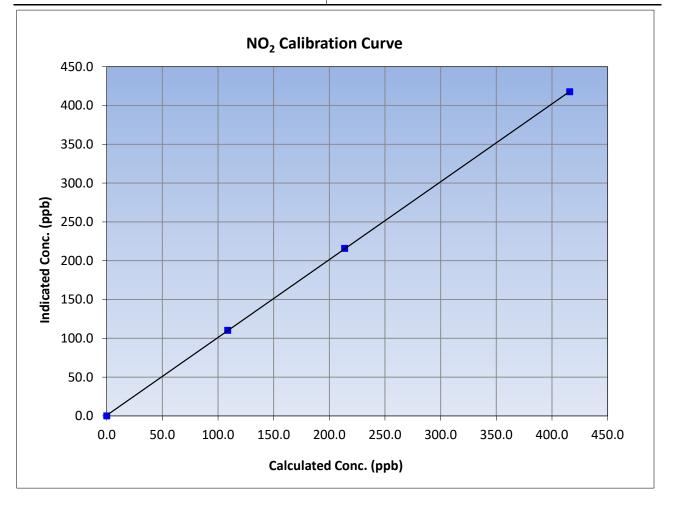
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | April 26, 2023 | | March | 29, 2023 |
| Station Name: | Christi | na Lake |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





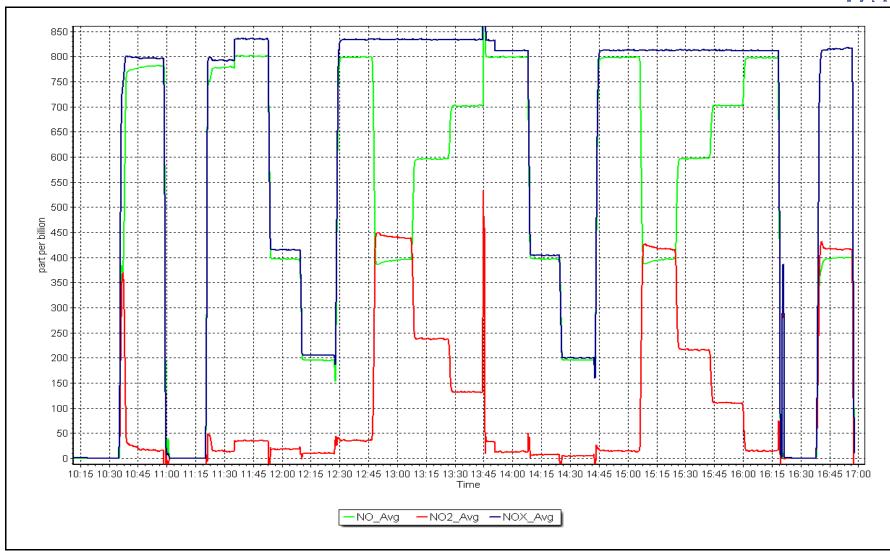
NO₂ Calibration Summary

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











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS27 JACKFISH 2/3 APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador

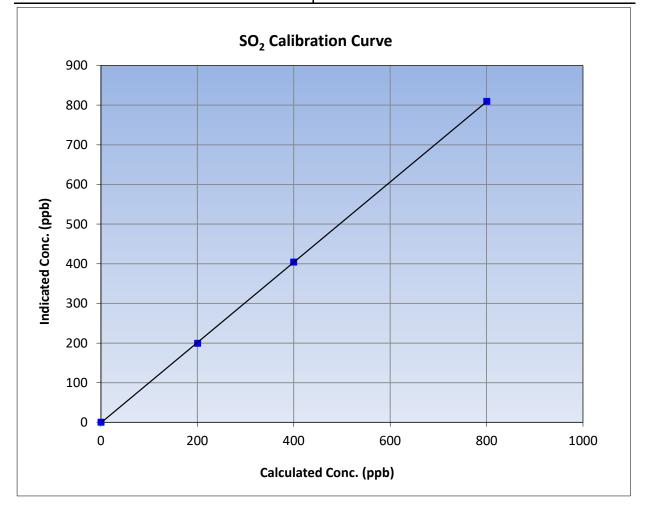


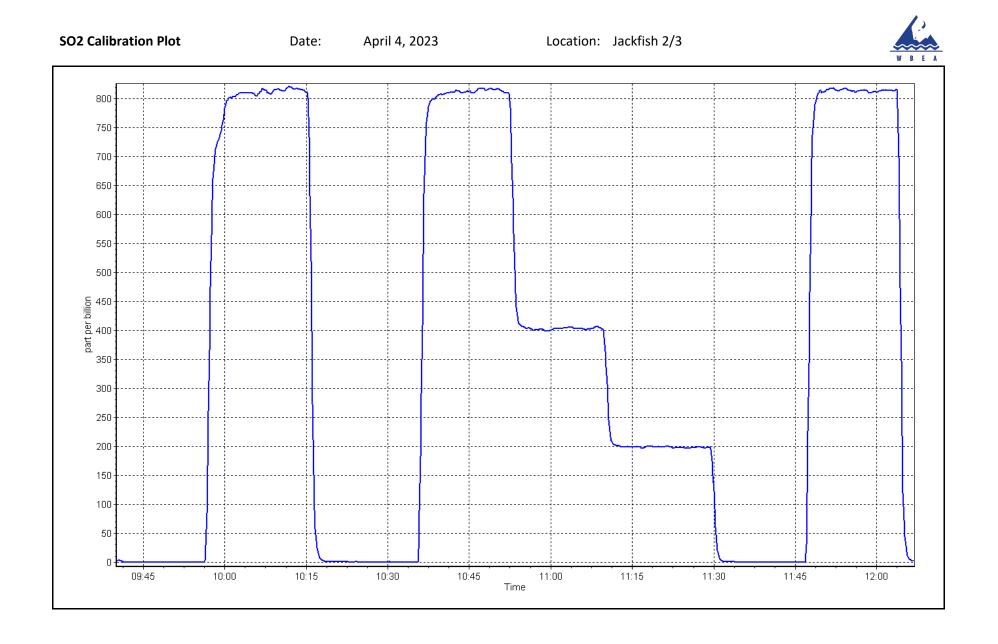
SO₂ Calibration Summary

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

Calibration Data

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







H₂S Calibration Report

| WBEA | | | | | Version-11-2021 |
|---|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Jackfish 2/3 April 27, 2023 9:18 Routine | | Station number: Last Cal Date: End time (MST): | AMS27 March 23, 2023 13:12 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.41 CC345023 | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: | 5.41 NA API T700 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | NA 3811 | |
| ZAG Make/Model: | API 701 | | Serial Number: | 135 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | API T101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 621 | |
| | Start | Finish | | <u>Start</u> | Finish |
| Calibration slope: | 0.983812 | 1.000342 | Backgd or Offset: | | 25.7 |
| Calibration intercept: | -0.138417 | -0.217897 | Coeff or Slope: | | 0.970 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.3 | |
| as found span | 4926 | 74.1 | 80.2 | 79.7 | 1.010 |
| as found 2nd point | 4963 | 37.0 | 40.0 | 39.8 | 1.014 |
| as found 3rd point | 4982 | 18.5 | 20.0 | 19.5 | 1.042 |
| new cylinder response | | H & Calibrati | ion Data | | |
| | | H ₂ S Calibrat | Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4926 | 74.1 | 80.2 | 80.0 | 1.002 |
| second point | 4963 | 37.0 | 40.0 | 40.0 | 1.001 |
| third point | 4982 | 18.5 | 20.0 | 19.4 | 1.032 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4926 | 74.1 | 80.2 | 79.9 | 1.003 |
| SO2 Scrubber Check | 4921 | 79.1 | 791.0 | 0.1 | |
| Date of last scrubber cha | inge: | | | Ave Corr Factor | 1.012 |
| Date of last converter ef | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 79.4 | Prev response: | 78.74 | *% change: | 0.8% |
| Baseline Corr 2nd AF pt: | 39.5 | AF Slope: | 0.992790 | AF Intercept: | 0.021866 |
| Baseline Corr 3rd AF pt: | 19.2 | AF Correlation: | 0.999931 | * / 50/ | |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

Adjusted the zero and span.

Calibration Performed By:

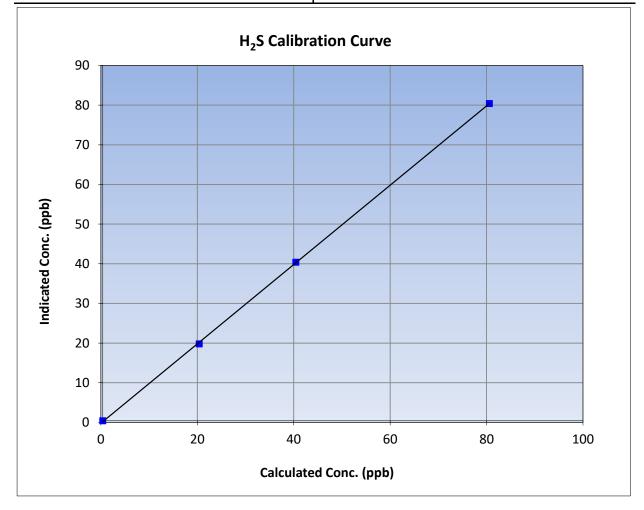
Denny Ray Estador



H₂S Calibration Summary

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

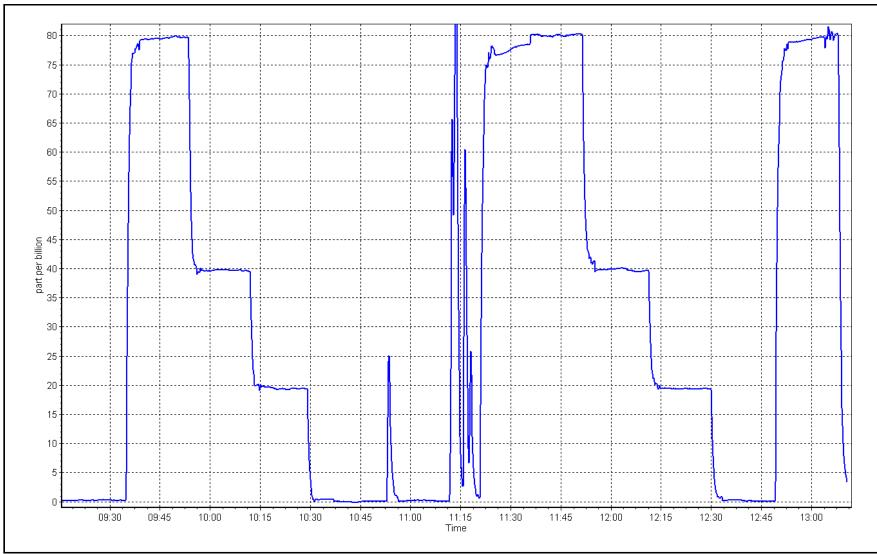
| Calculated concentratio (ppb) (Cc) | n Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | <u>Limits</u> | |
|---------------------------------------|---|------------------------------|-------------------------|---------------|-------------|
| 0.0 | 0.0 | | Correlation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













NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

-0.727241

N/A



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

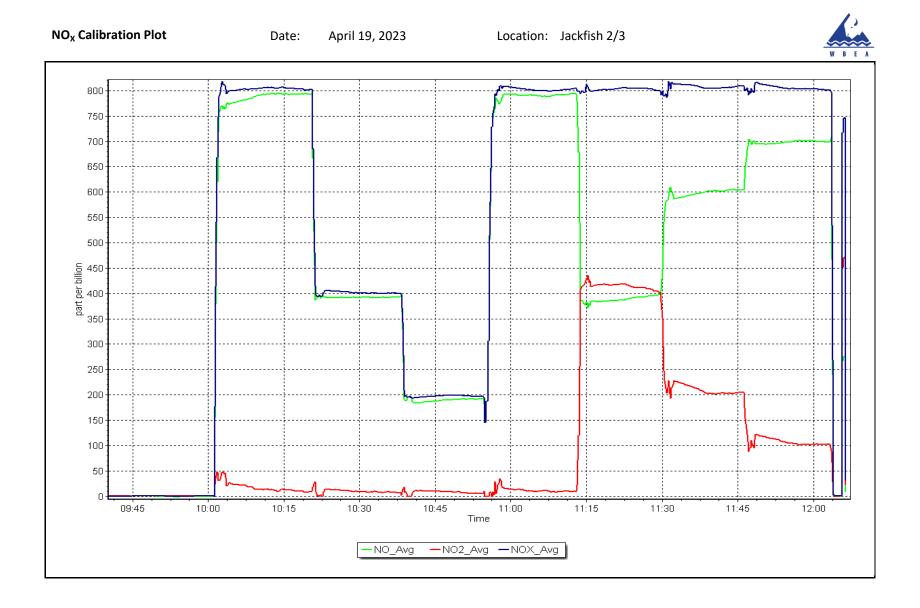
GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NO2 concentration (ppb) (Ic) | NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% | |
|----------------------------------|---|---------------------------------------|--|---|--|---|--|
| as found GPT zero | | | 0.0 | 0.9 | | | |
| as found GPT point (400 ppb NO2) | 790.9 | 392.7 | 414.7 | 411.4 | 1.0081 | 99.2% | |
| as found GPT point (200 ppb NO2) | 790.9 | 600.5 | 206.9 205.1 1.0088 | | 1.0088 | 99.1% | |
| as found GPT point (100 ppb NO2) | 790.9 | 700.6 | 106.8 | 102.8 | 1.0390 | 96.2% | |
| 1st GPT point (400 ppb O3) | | | | | | | |
| 2nd GPT point (200 ppb O3) | | | | | | | |
| 3rd GPT point (100 ppb O3) | N/A | | | | | | |
| | | | Av | erage Correction Factor | | | |

Notes:

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

Calibration Performed By:





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

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

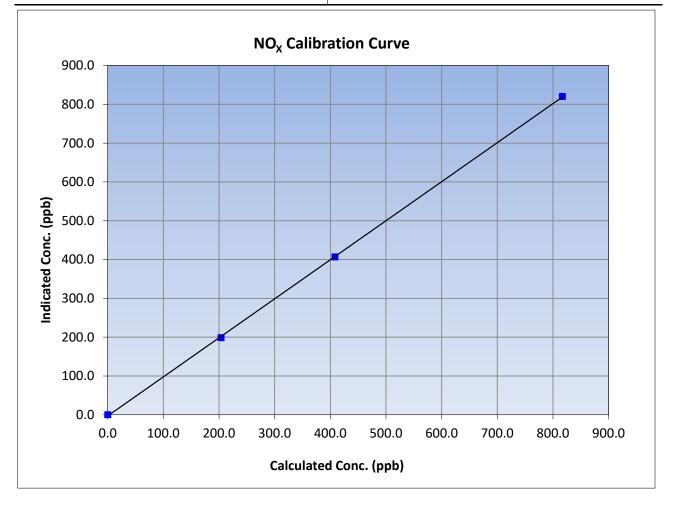
Calibration Performed By:

Denny Ray Estador



NO_x Calibration Summary

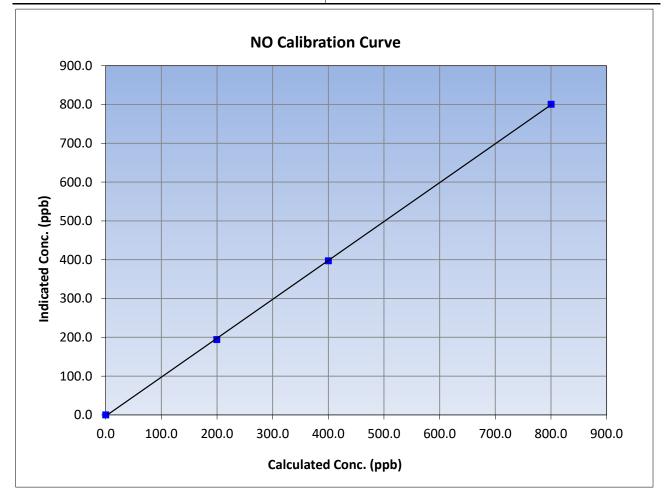
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 20, 2023 | | Previous Calibration: | April : | 19, 2023 |
| Station Name: | Jackfi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





NO Calibration Summary

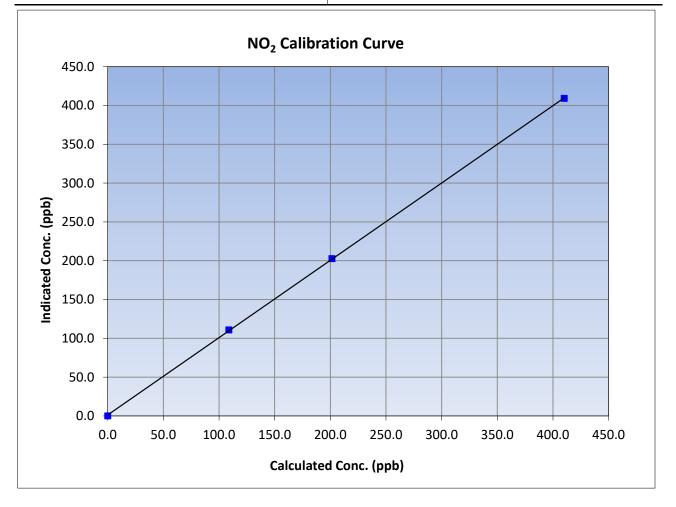
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 0, 2023 | Previous Calibration: | April | 19, 2023 |
| Station Name: | Jackfi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

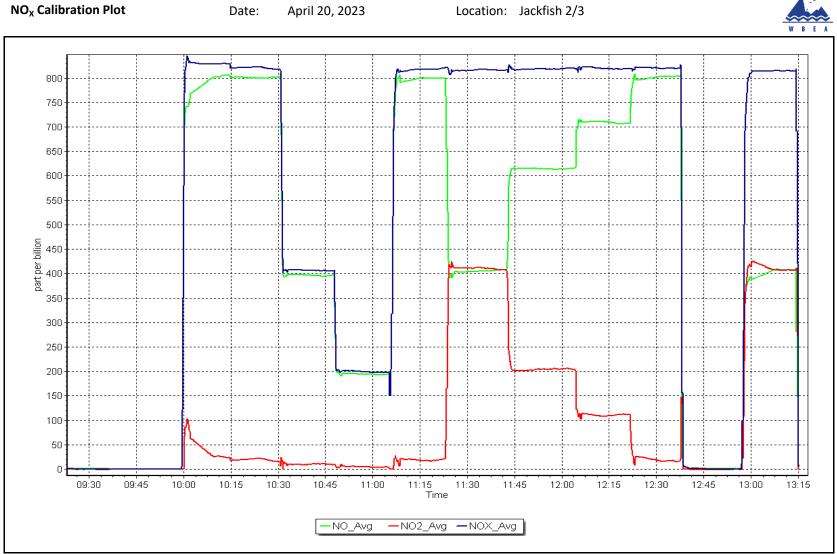




NO₂ Calibration Summary

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









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS29 SURMONT 2 APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

Changed sample inlet filter after as founds. Adjusted span.

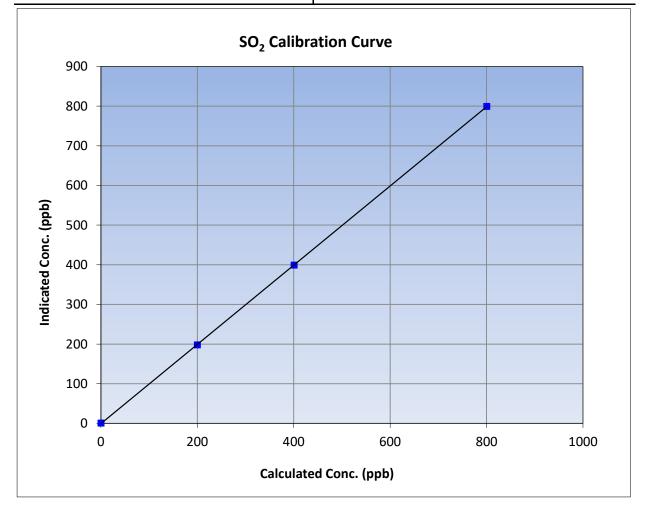
Calibration Performed By:

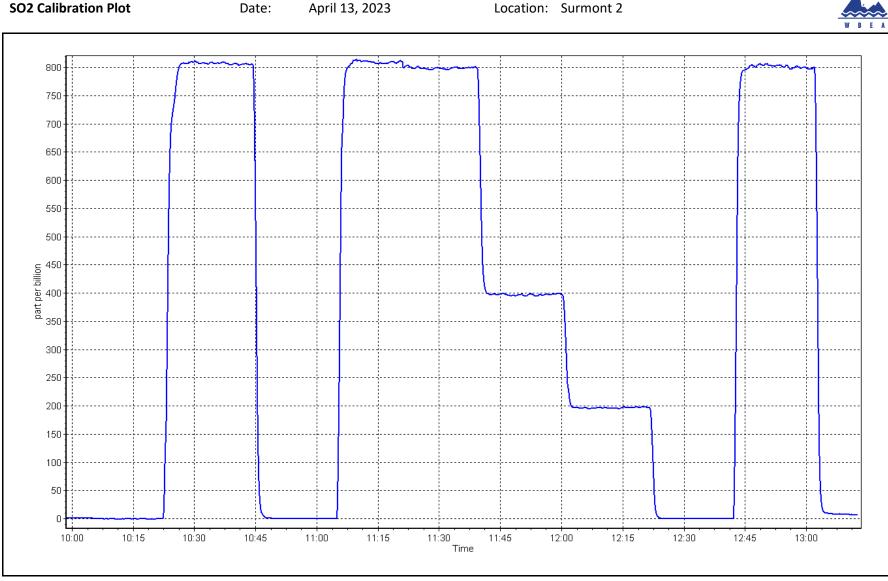


SO₂ Calibration Summary

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

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





Location: Surmont 2



H₂S Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Surmont 2 April 12, 2023 9:31 Routine | | Station number: Last Cal Date: End time (MST): | AMS29 March 30, 2023 14:54 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | <u>5.391</u> <u>CC508338</u> | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | <u>5.391</u> <u>CC508338</u> Taladara ADI T700 | ppm | Rem Gas Exp Date: Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API 1700 Teledyne API 1701 | | Serial Number: Serial Number: | 5258 4297 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQ-TLE Global 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1200326170 2022-223 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.002040 | 0.999326 | Backgd or Offset: | 1.22 | 0.82 |
| Calibration intercept: | -0.162687 | -0.142577 | Coeff or Slope: | 1.043 | 1.043 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | -0.5 | |
| as found span | 4926 | 74.2 | 80.0 | 78.9 | 1.008 |
| as found 2nd point | 4963 | 37.2 | 40.1 | 39.0 | 1.015 |
| as found 3rd point | 4982 | 18.6 | 20.1 | 19.0 | 1.028 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrati | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4926 | 74.2 | 80.0 | 79.9 | 1.001 |
| second point | 4963 | 37.2 | 40.1 | 39.8 | 1.008 |
| third point | 4982 | 18.6 | 20.1 | 19.8 | 1.013 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4926 | 74.2 | 80.0 | 80.3 | 0.996 |
| SO2 Scrubber Check | 4919 | 81.3 | 813.0 | 0.1 | |
| Date of last scrubber cha | nge: | | | Ave Corr Factor | 1.007 |
| Date of last converter eff | - | | | | efficiency |
| Baseline Corr As found: | 79.4 | Prev response: | 80.00 | *% change: | -0.8% |
| Baseline Corr 2nd AF pt: | 39.5 | AF Slope: | | AF Intercept: | -0.722284 |
| Baseline Corr 3rd AF pt: | 19.5 | AF Correlation: | | • | |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

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

Braiden Boutilier

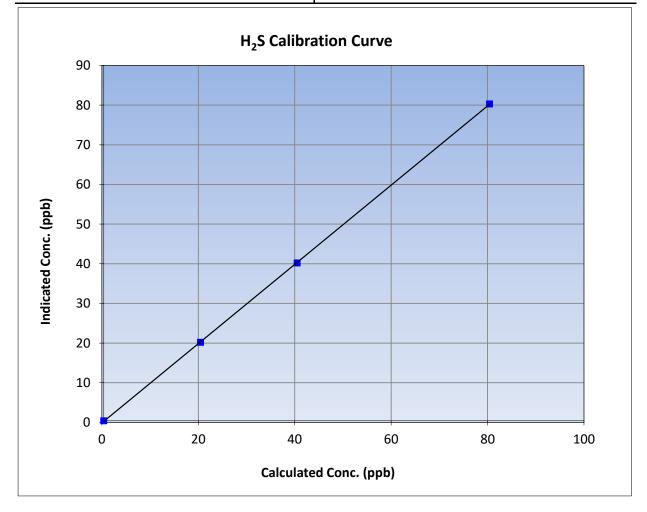


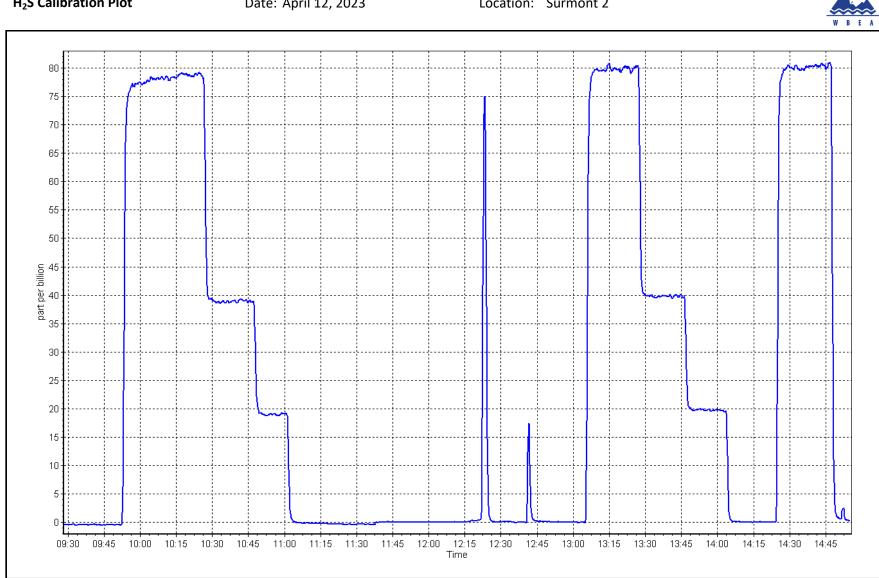
H₂S Calibration Summary

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

Calibration Data

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





Location: Surmont 2



THC Calibration Report

Version-01-2020

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

Notes:

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

Calibration Performed By:

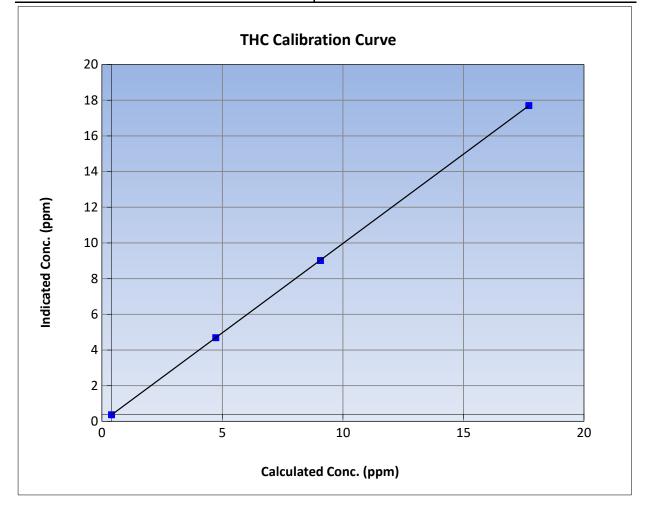


THC Calibration Summary

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

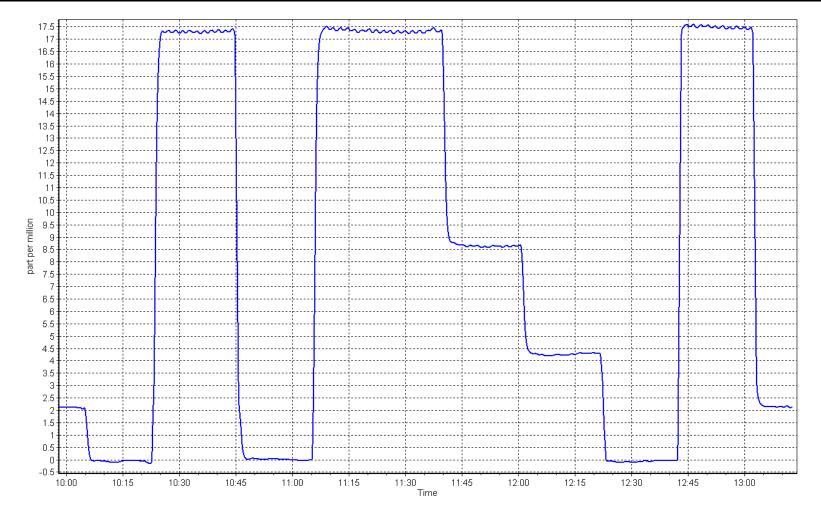
Calibration Data

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











Station Name:

Reason:

Calibration Date:

Start time (MST):

Surmont 2

10:00

Routine

April 26, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

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

| | | c | Calibration Standards | |
|-----------------------|-----------------|---------|---------------------------------------|---|
| NO Gas Cylinder #: | - | T12YYFE | Cal Gas Expiry Date: October 30, 2024 | |
| NOX Cal Gas Conc: | 47.46 | ppm | NO Cal Gas Conc: 47.46 pp | m |
| Removed Cylinder #: | | NA | Removed Gas Exp Date: NA | |
| Removed Gas NOX Conc: | 47.46 | ppm | Removed Gas NO Conc: 47.46 pp | m |
| NOX gas Diff: | | | NO gas Diff: | |
| Calibrator Model: | Teledyne API T7 | 00 | Serial Number: 5258 | |
| ZAG make/model: | Teledyne API T7 | 01 | Serial Number: 4297 | |
| | | 1 | Analyzer Information | |
| | The way a 42: | | Analyzan april 4, 1170050148 | |

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

Calibration Statistics

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

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

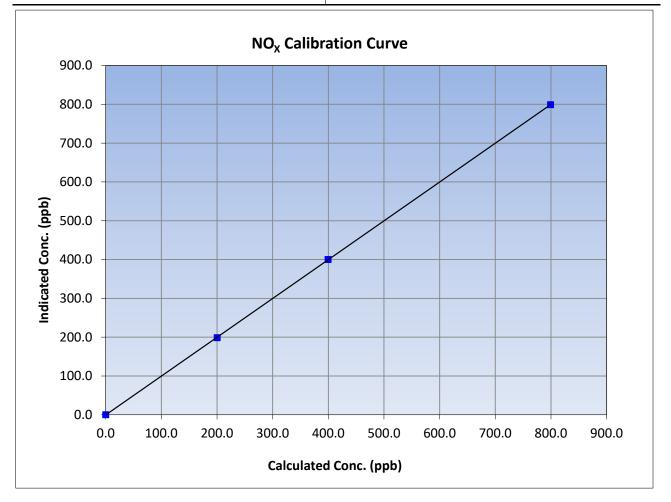
Calibration Performed By:

Notes:



NO_x Calibration Summary

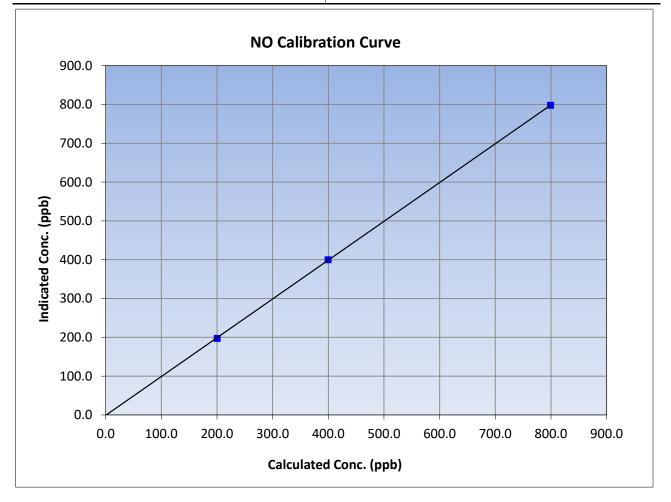
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 6, 2023 | Previous Calibration: | March 1 | 16, 2023 |
| Station Name: | Surm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





NO Calibration Summary

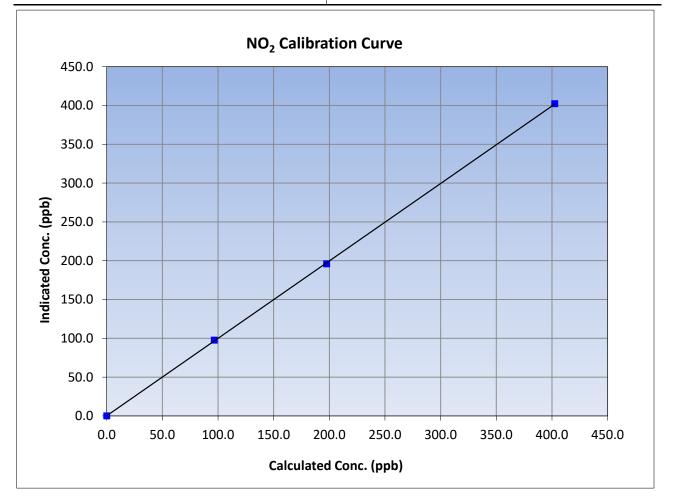
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|---------------------------|-----------------------------|-----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | April 2 | 6, 2023 | Previous Calibration: | March 1 | 16, 2023 | |
| Station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

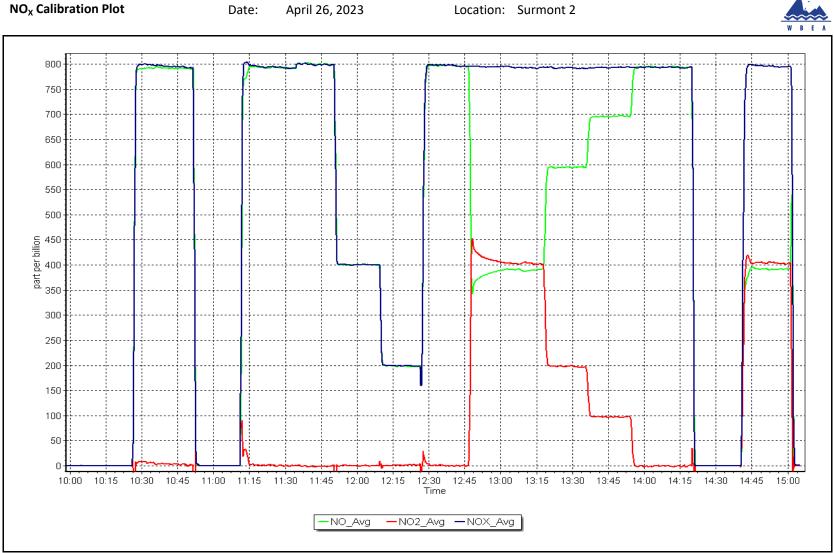




NO₂ Calibration Summary

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









T640 PM_{2.5} CALIBRATION

| WBEA | | | | | Version-01-2023 |
|--|-------------------|-------------------------|---------------------|----------------------|-----------------|
| | | Station Information | 1 | | |
| Station Name: | Surmont 2 | | Station number: | AMS 29 | |
| Calibration Date: | April 26, 2023 | | Last Cal Date: | March 13, 2023 | |
| Start time (MST): | 11:38 | | End time (MST): | 12:38 | |
| Analyzer Make: | API T640 | | S/N: | 253 | |
| Particulate Fraction: | PM2.5 | | | | |
| Flow Meter Make/Model: | Alicat FP-25BT | | S/N: | 388750 | |
| Temp/RH standard: | Alicat FP-25BT | | S/N: | 388750 | |
| | | Monthly Calibration T | est | | |
| Parameter | <u>As found</u> | Measured | <u>As left</u> | <u>Adjusted</u> | (Limits) |
| T (°C) | 6.5 | 5.76 | 6.5 | | +/- 2 °C |
| P (mmHg) | 706.8 | 707.79 | 706.8 | | +/- 10 mmHg |
| flow (LPM) | 4.99 | 5.068 | 4.99 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | April 26, 2023 | Last Cal Date: | March 13, 2023 | _ |
| | PM w/o HEPA: | 1.5 | PM w/ HEPA: | 0 | <0.2 ug/m3 |
| Note: this leak check will be | | | erve as the pre mai | intenance leak check | |
| Inlet cleaning : | Inlet Head | | | | |
| | | | | | |
| | | Quarterly Calibration 1 | est | | |
| Parameter | <u>As found</u> | Post maintenance | As left | Adjusted | (Limits) |
| PMT Peak Test | | | | | 11.3 +/- 0.5 |
| | | | | | |
| Post-maintenance | | PM w/o HEPA: | | w/ HEPA: | |
| Date Optical Cham | | February 17 | | | <0.2 ug/m3 |
| Disposable Filte | r Changed: | February 17 | , 2023 | | |
| | | | | | |
| | | Annual Maintenanc | e | | |
| | | | | | |
| Date Sample Tube Cleaned: Date RH/T Sensor Cleaned: | | September 3 | | | |
| Date RH/T Sense | or Cleaned: | October 6, | 2022 | | |
| | | | | | |
| Notes: | | No adjustments | made, Leak check p | Dassed. | |
| Calibration by: | Braiden Boutilier | | | | |
| | | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS30 ELLS RIVER APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

No adjustments made.

Calibration Performed By:



400.2

398.0

Wood Buffalo Environmental Association

SO₂ Calibration Summary

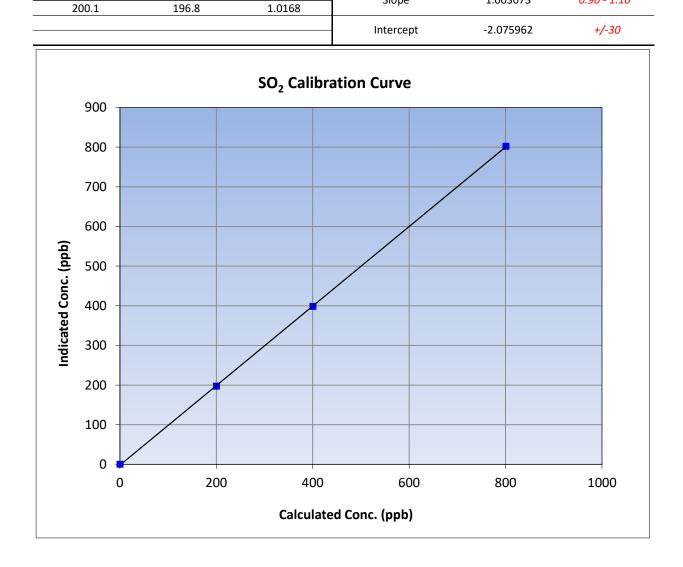
Slope

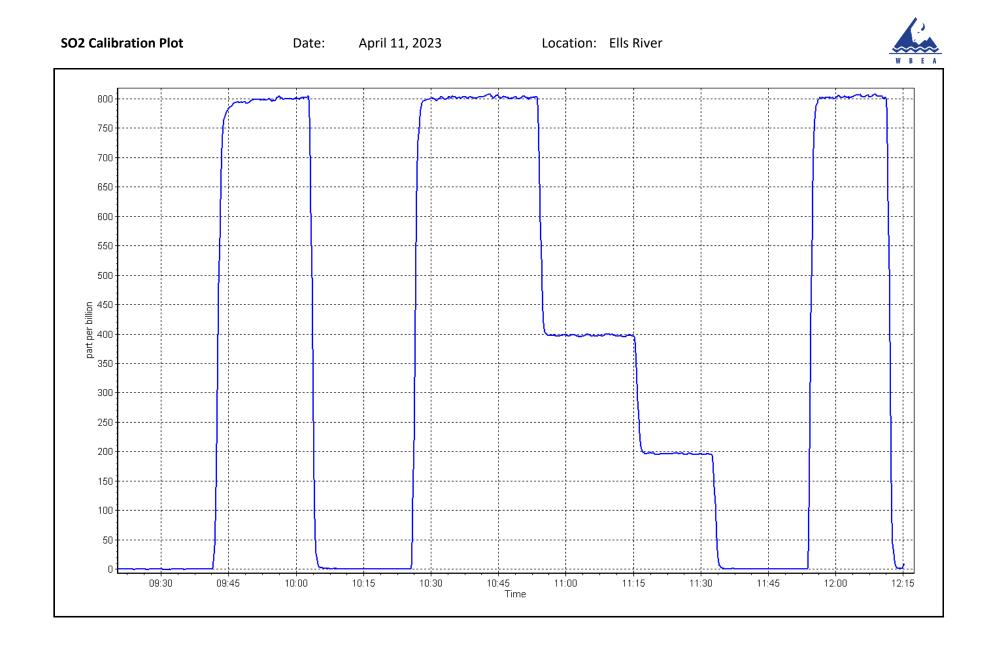
1.003073

0.90 - 1.10

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

1.0056







TRS Calibration Report

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

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador

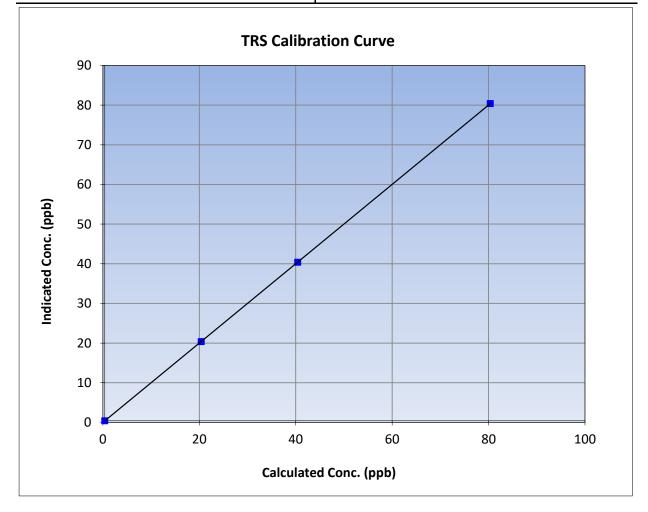


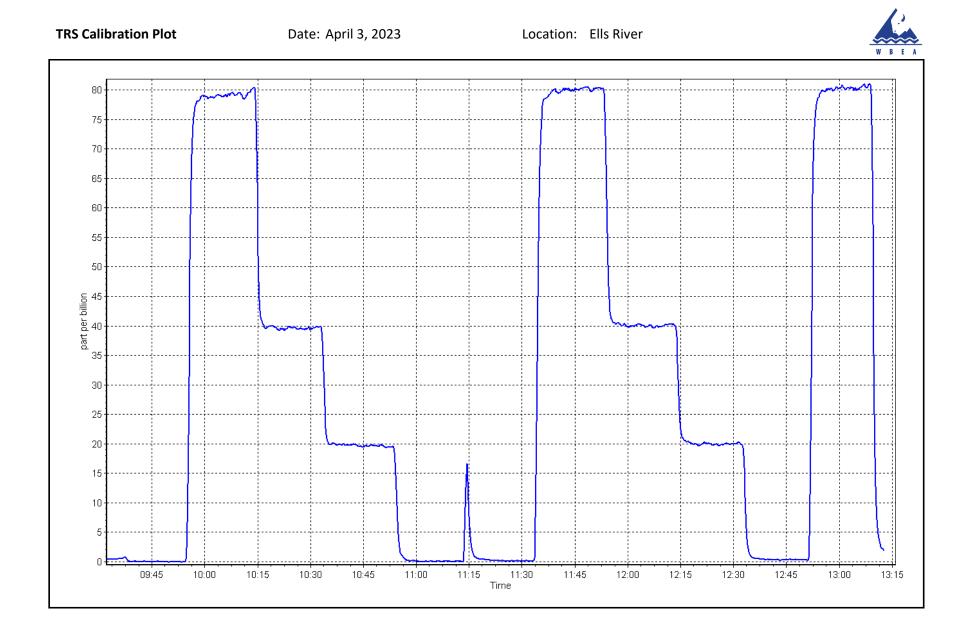
TRS Calibration Summary

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

Calibration Data

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







THC / CH_4 / NMHC Calibration Report

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

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

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

CH4 Calibration Data

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

Notes:

Adjusted the span.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

Version-01-2020

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



CH₄ Calibration Summary

Version-01-2020

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



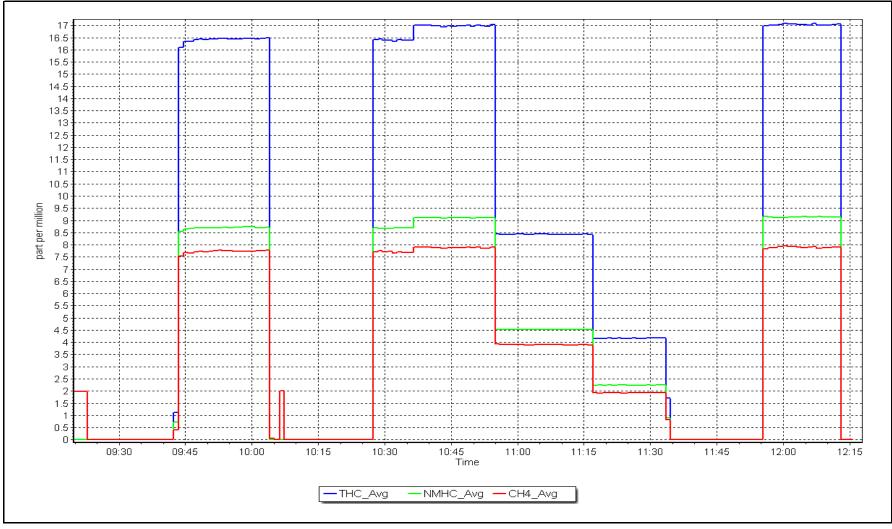
NMHC Calibration Summary

Version-01-2020

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

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

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



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

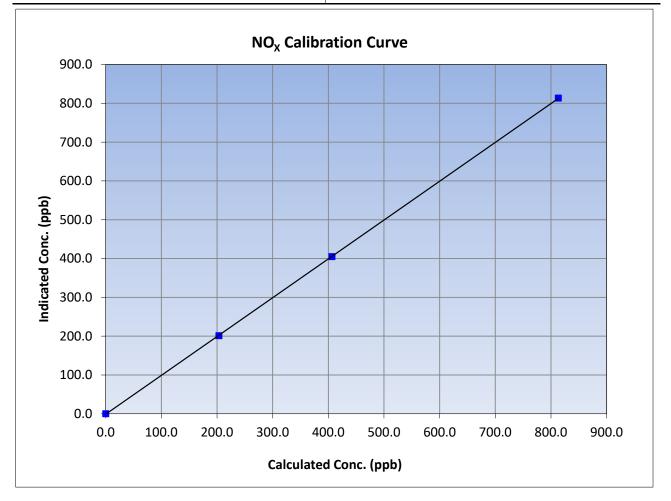
Notes:

No adjusments have been made.



NO_x Calibration Summary

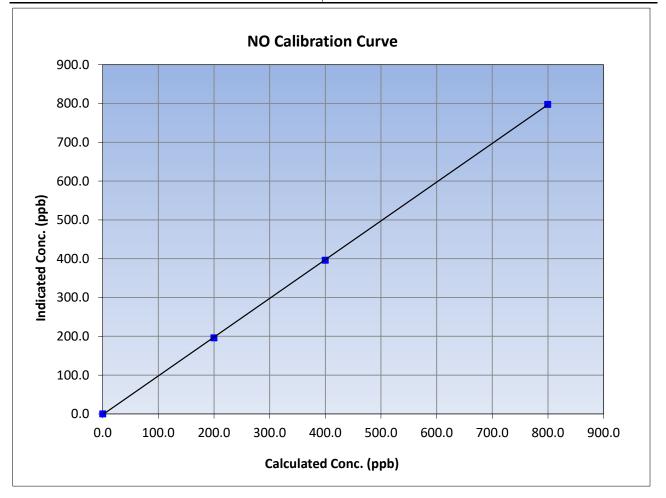
| WBEA | | Station | Information | | Version-04-2 | |
|--|---------------------------------------|---------------------------|-------------------------|---------------------|----------------|--|
| | | Station | intornation | | | |
| Calibration Date: | April 5 | 5, 2023 | Previous Calibration: | March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





NO Calibration Summary

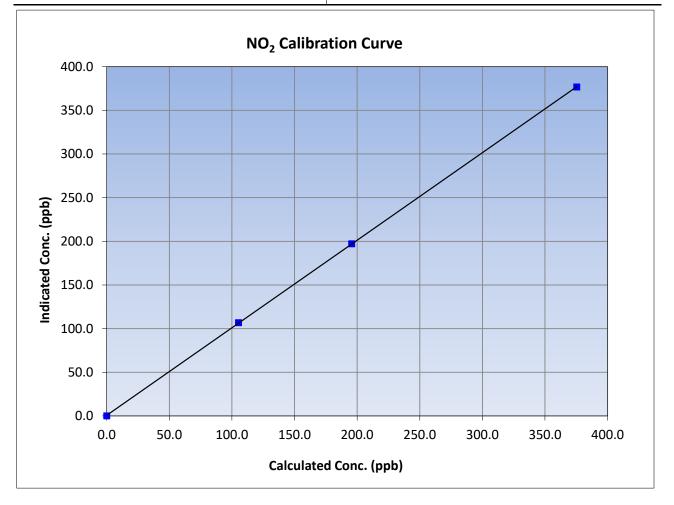
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 5 | 5, 2023 | Previous Calibration: | March 2 | 15, 2023 |
| Station Name: |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

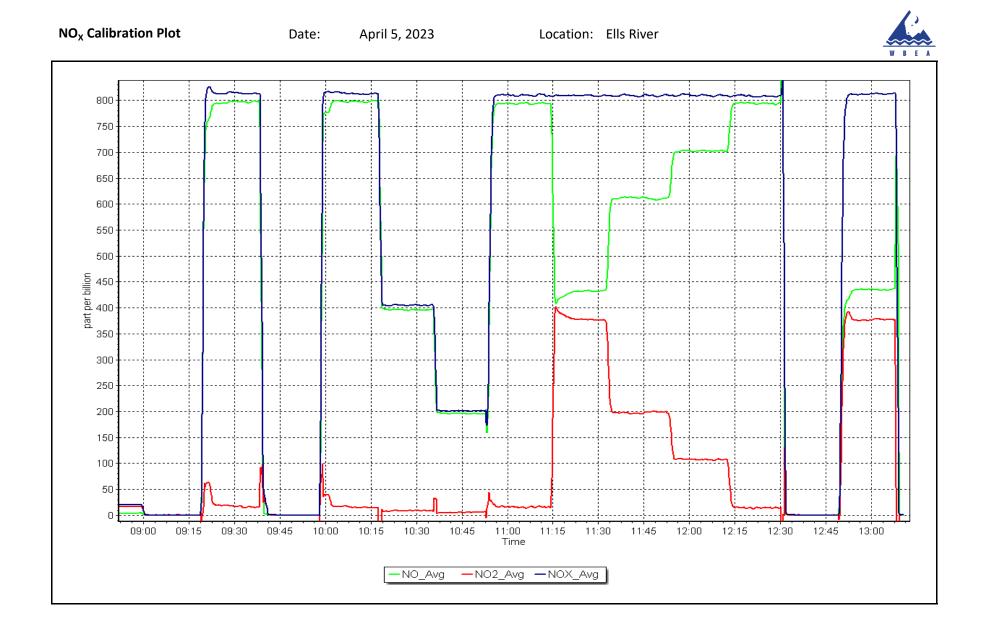




NO₂ Calibration Summary

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







T640 PM_{2.5} CALIBRATION

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS506 JACKFISH 1 APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

Changed inlet filter after as founds. Adjusted span only.

Calibration Performed By:

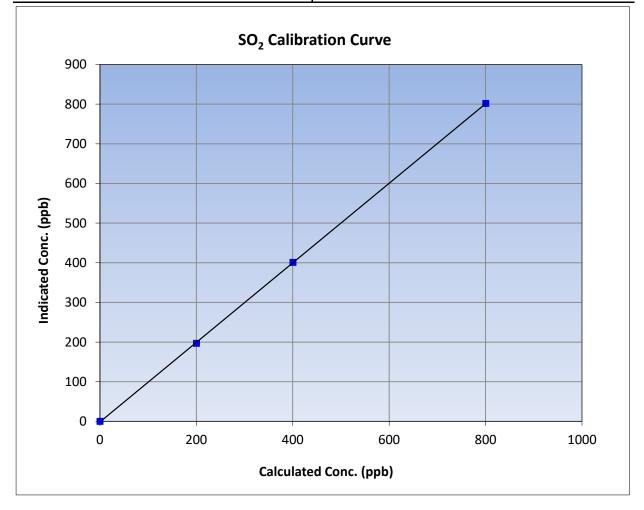


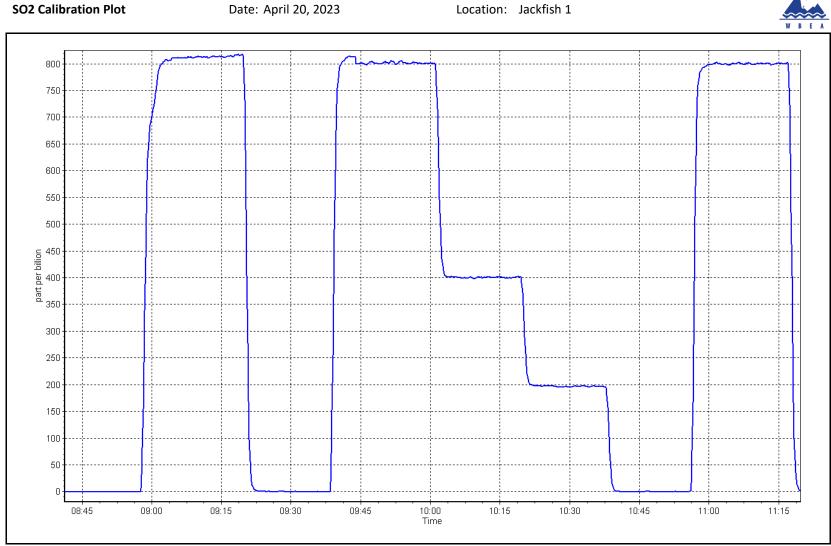
SO₂ Calibration Summary

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

Calibration Data

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









H₂S Calibration Report

| | | | | Version-11-202 |
|---|---|---|---|---|
| | Station Info | rmation | | |
| Jackfish 1 April 25, 2023 9:04 Routine | | Station number: Last Cal Date: End time (MST): | AMS506 March 29, 2023 12:54 | |
| | Calibration S | tandards | | |
| 5.14 CC511843 | ppm | Cal Gas Exp Date: | September 16, 2024 | |
| 5.14 NA API T700 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | NA 2659 | |
| API 701 | | Serial Number: | 4427 | |
| | Analyzer Info | ormation | | |
| Thermo 43i-TLE Global G150 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1180540020 2022-218 | |
| <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| 1.005003 | 0.999860 | Backgd or Offset: | 3.42 | 3.37 |
| -0.178301 | -0.298400 | Coeff or Slope: | 1.090 | 1.066 |
| | H ₂ S As Four | nd Data | | |
| Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| 5000 | 0.0 | 0.0 | -0.2 | |
| 4922 | 77.8 | 80.0 | 80.8 | 0.987 |
| 4961 | 38.9 | 40.0 | 40.1 | 0.992 |
| 4981 | 19.4 | 19.9 | 19.7 | 1.002 |
| | | | | |
| | H ₂ S Calibrati | ion Data | | |
| Dilution air flow rate | Source gas flow rate | Calculated | Indicated | Correction factor |
| (sccm) | (sccm) | concentration (ppb) (Cc) | concentration (ppb) (Ic) | (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| 5000 | 0.0 | 0.0 | -0.2 | |
| 4922 | 77.8 | 80.0 | 79.7 | 1.004 |
| 4961 | 38.9 | 40.0 | 39.7 | 1.007 |
| 4981 | 19.4 | 19.9 | 19.5 | 1.023 |
| 5000 | 0.0 | 0.0 | -0.2 | |
| 4000 | 77.8 | 80.0 | 79.9 | 1.001 |
| 4922 | | 702.0 | 0.0 | |
| 4921 | 79.2 | 792.0 | | |
| 4921 ange: | 79.2 24-Feb-23 | 792.0 | Ave Corr Factor | 1.011 |
| 4921 | | 792.0 | Ave Corr Factor | 1.011 efficiency |
| 4921 ange: | 24-Feb-23 | | Ave Corr Factor | |
| 4921 ange: ficiency test: | 24-Feb-23 December 1, 2022 | 80.20 1.013717 | Ave Corr Factor | efficiency |
| | April 25, 2023 9:04 Routine 5.14 CC511843 5.14 NA API 7700 API 701 Thermo 43i-TLE Global G150 0 - 100 ppb <u>Start</u> 1.005003 -0.178301 Dilution air flow rate (sccm) Dilution air flow rate (sccm) Dilution air flow rate (sccm) 5000 4922 4961 4981 | Jackfish 1 April 25, 2023 9:04 Routine Soutine Calibration S 5.14 ppm CC511843 ppm 5.14 ppm NA API 7700 API 7701 Analyzer Info Thermo 43i-TLE Finish Global G150 0.999860 0 - 100 ppb Finish Start Finish 1.005003 0.999860 -0.178301 -0.298400 Dilution air flow rate Source gas flow rate (sccm) 0.0 4961 38.9 4981 19.4 Dilution air flow rate Source gas flow rate (sccm) 0.0 4961 38.9 4981 19.4 | April 25, 2023 9:04 Routine Last Cal Date: End time (MST): End time (MST): Source as flow rate (CC511843) 5.14 ppm Cal Gas Exp Date: Diff between cyl: S.14 CC511843 5.14 ppm Rem Gas Exp Date: Diff between cyl: API 7700 API 701 Serial Number: API 7700 API 701 Serial Number: Converter serial #: Global G150 0 - 100 ppb Analyzer serial #: Converter serial #: Converte | Jackfish 1 April 25, 2023 9:04 Routine AMS506 March 29, 2023 12:54 9:04 Routine Last Cal Date: End time (MST): March 29, 2023 12:54 5.14 CC511843 5.14 ppm Cal Gas Exp Date: Diff between cyl: Serial Number: September 16, 2024 API T700 API 701 Serial Number: Serial Number: 2659 2659 API 701 Serial Number: Serial Number: 2659 2022-218 Thermo 43i-TLE Global G150 0 - 100 ppb Analyzer serial #: 2022-218 1180540020 2022-218 Start 1.005003 Finish 0.999860 0.999860 Start Backgd or Offset: 3.42 Coeff or Slope: Start 3.42 Dilution air flow rate (sccm) Source gas flow rate (sccm) (sccm) Calculated concentration (ppb) (cc) Indicated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilu |

Notes:

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

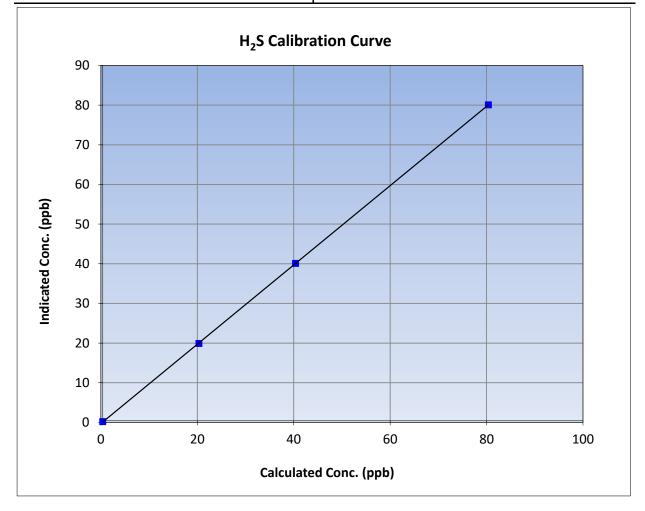


H₂S Calibration Summary

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

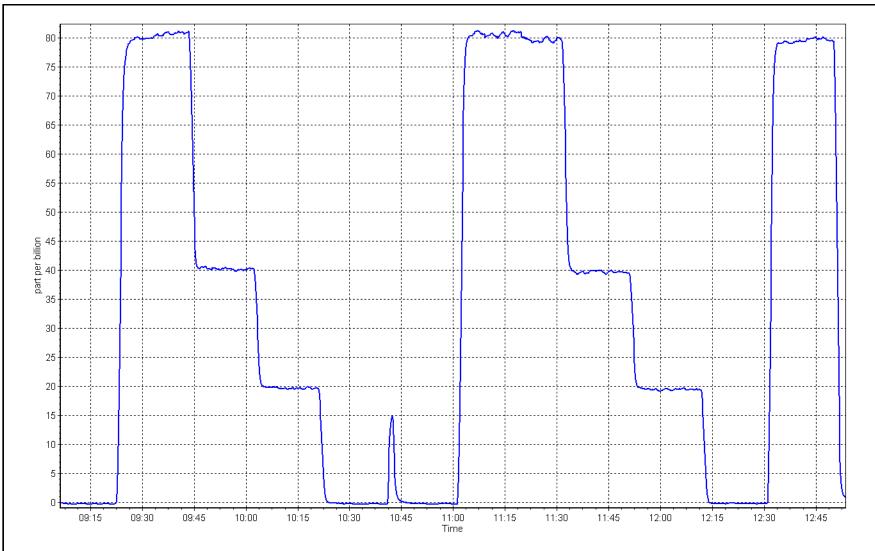
Calibration Data

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











NO Cal Slope:

NO Cal Offset:

NO₂ Cal Slope:

NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

1.002854

-1.627998

1.003399

0.523900

0.999625

-1.447978

1.006063

0.960980



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

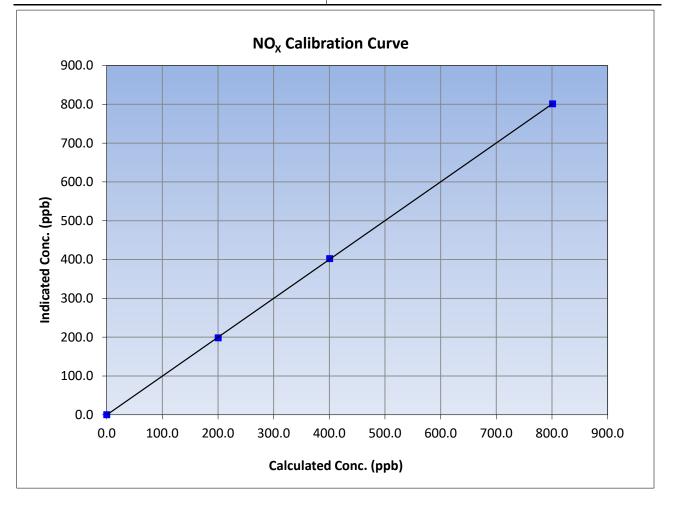
Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

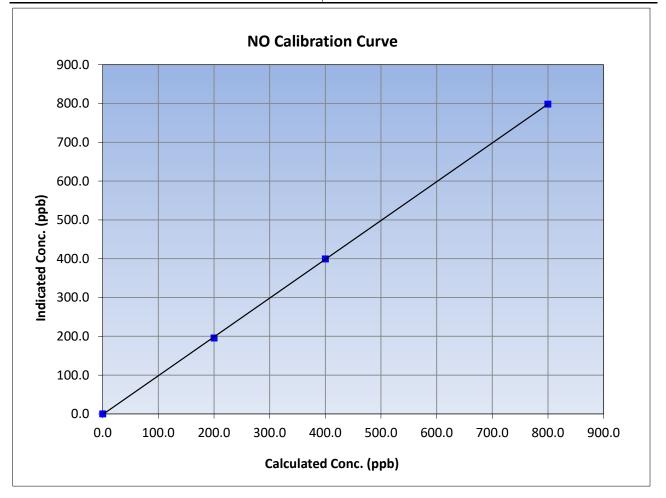
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | alibration Date: April 26, 2023 | | Previous Calibration: | March 3 | 80, 2023 |
|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





NO Calibration Summary

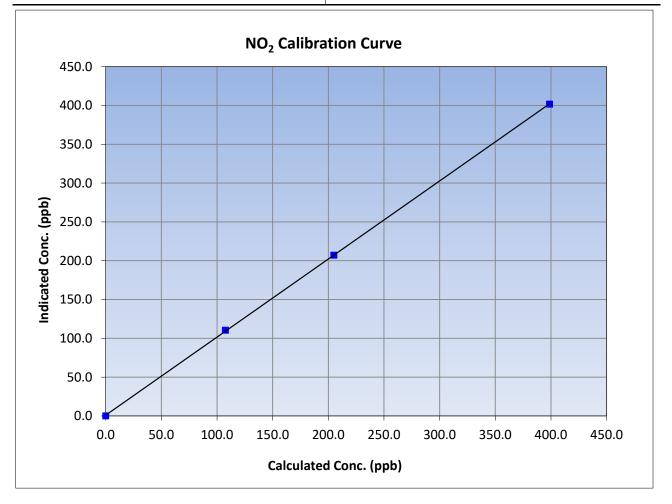
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | April 2 | 6, 2023 | Previous Calibration: | March | 30, 2023 |
| Station Name: | Jack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

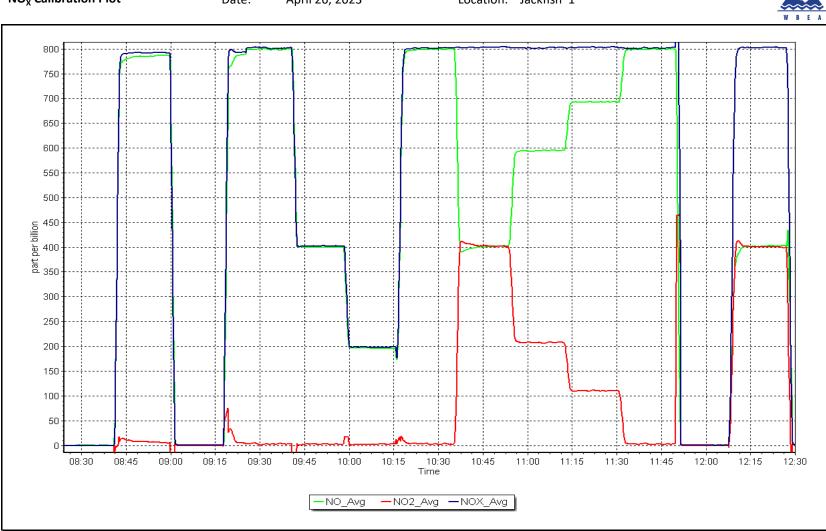




NO₂ Calibration Summary

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









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS508 KIRBY NORTH APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

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

Notes:

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

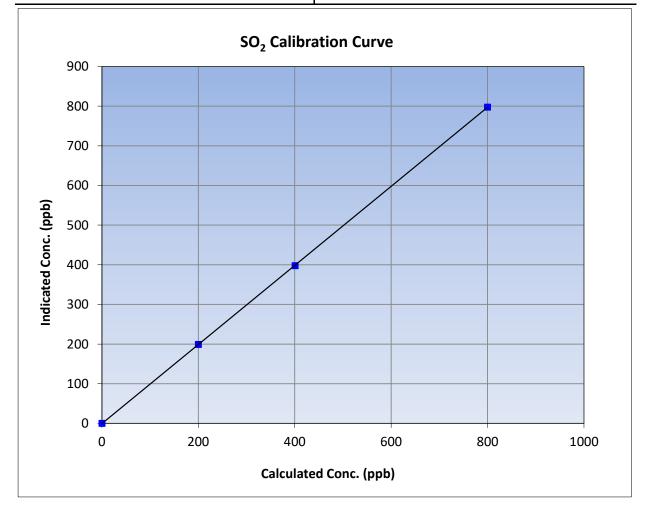
Calibration Performed By:

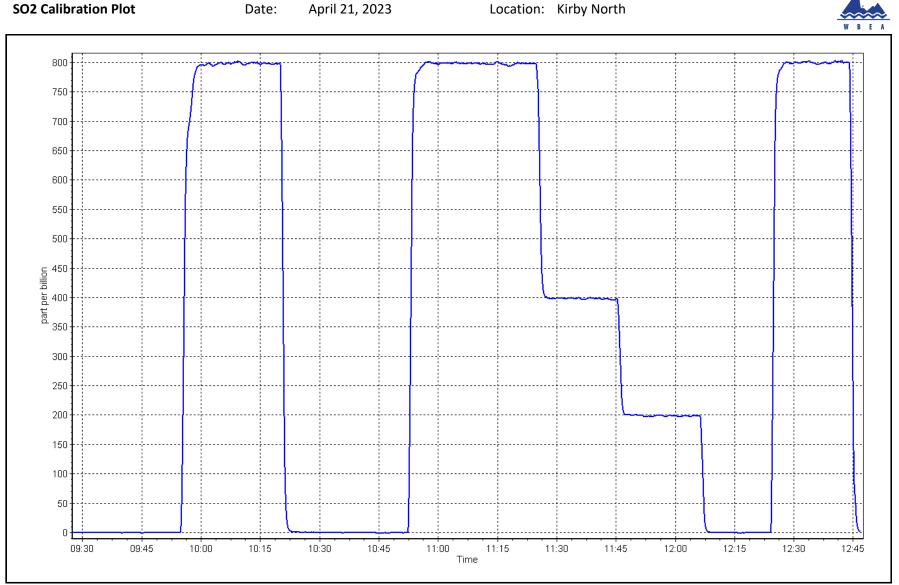


SO₂ Calibration Summary

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

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







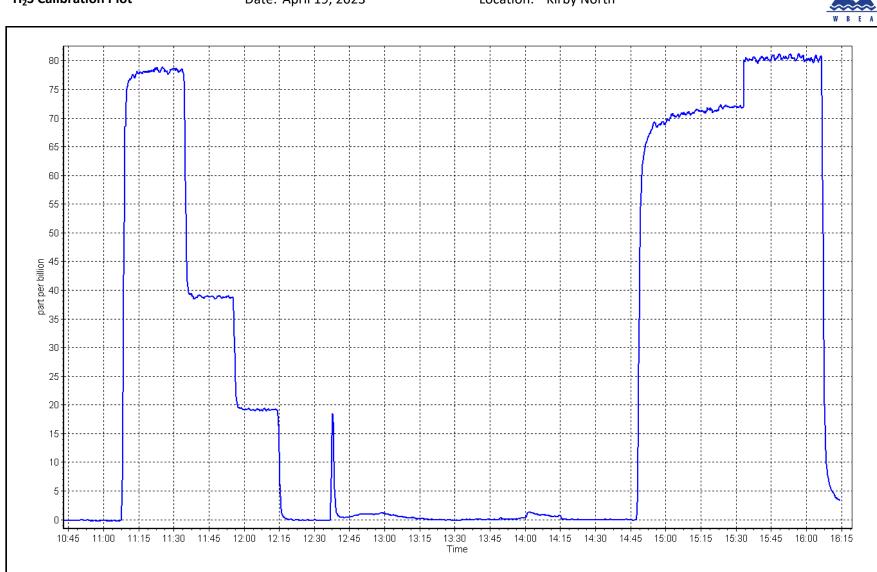
H₂S Calibration Report

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

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

Notes:

Braiden Boutilier



Location: Kirby North



H₂S Calibration Report

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

Notes:

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

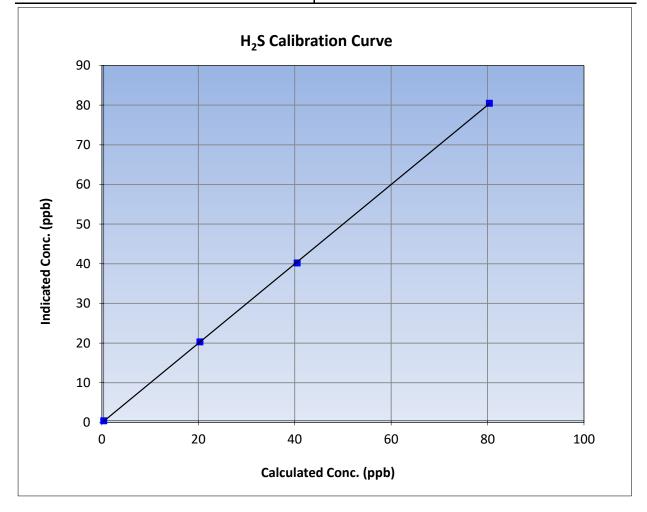


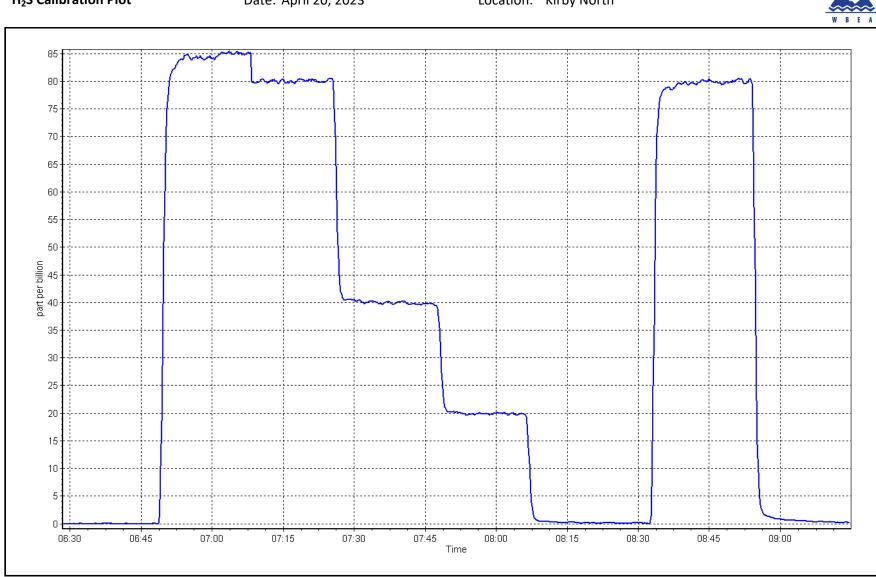
H₂S Calibration Summary

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

Calibration Data

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





Location: Kirby North



THC Calibration Report

Version-01-2020

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

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

Calibration Performed By:

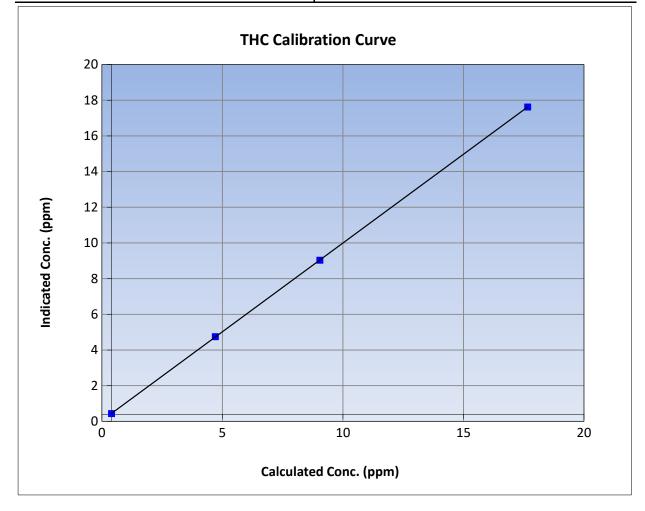


THC Calibration Summary

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

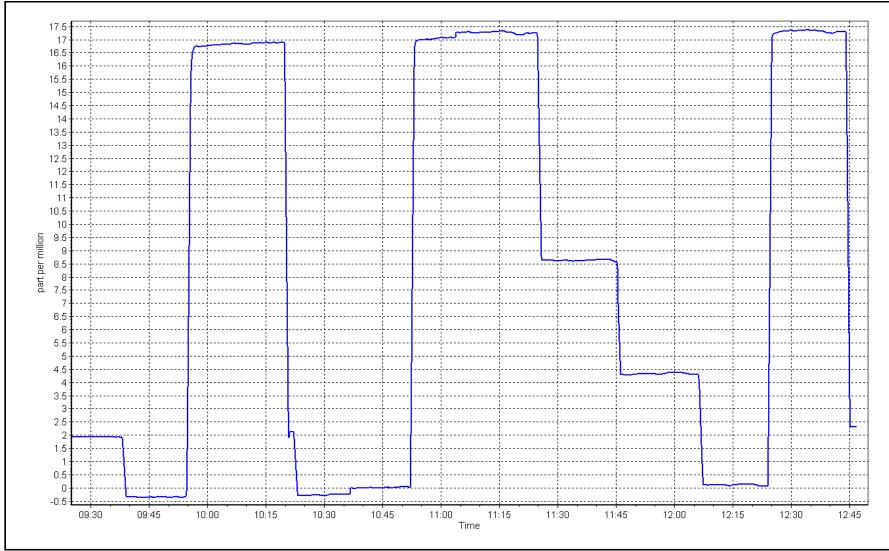
Calibration Data

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











NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

0.638504

1.001988



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

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

GPT Calibration Data

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

Notes:

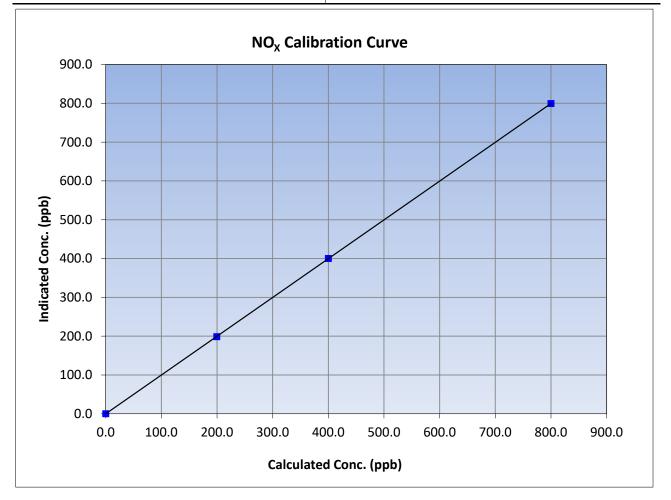
Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

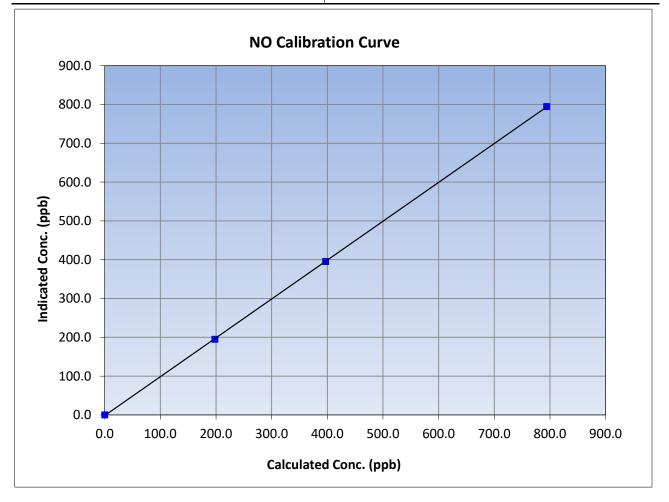
| WBEA | | Station | Information | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | information | | |
| Calibration Date: | April 2 | 0, 2023 | Previous Calibration: | March | n 8, 2023 |
|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





NO Calibration Summary

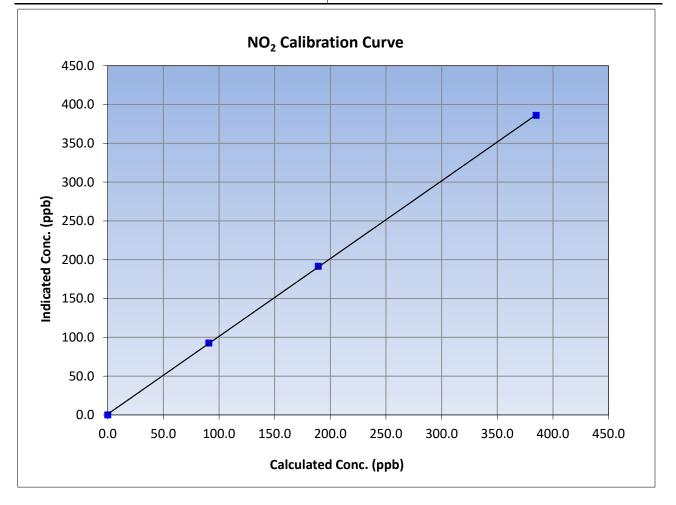
| | | Station | Information | | |
|--|---------------------------------------|---|-----------------------|-------------------|-------------------------|
| Calibration Date: | April 2 | 0, 2023 | Previous Calibration: | March | n 8, 2023 |
| Station Name: | Kirby | North | Station Number: | AN | 1S508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





NO₂ Calibration Summary

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







End of Report