WOOD BUFFALO ENVIRONMENTAL ASSOCIATION MONTHLY AMBIENT AIR QUALITY MONITORING REPORT MARCH 2022 REPORT HISTORY

Original report release data: April 29, 2023

Revised report release date: August 30, 2023

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

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



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Wood Buffalo Environmental Association

MARCH 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 MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|---|---|------------------------------|--|------------------------------------|--------------------------|
| Station Name: Calibration Date: Start time (MST): | Bertha Ganter-Fort March 13, 2023 15:30 | МсКау | Station number: Last Cal Date: End time (MST): | AMS01 February 1, 2023 18:20 | |
| Reason: | Routine | | | | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 49.19 CC486642 | ppm | Cal Gas Exp Date: | February 23, 2025 | |
| Removed Cal Gas Conc: | 49.19 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | | Diff between cyl: | | |
| Calibrator Make/Model: | Teledyne API T700 | | Serial Number: | 3565 | |
| ZAG Make/Model: | Teledyne API T701 | | Serial Number: | 5609 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Rang | e: Thermo 43i e 0 - 1000 ppb | - | Analyzer serial #: | JC1501301448 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.998801 | 1.000943 | Backgd or Offset: | 19.0 | 19.4 |
| Calibration intercept: | -0.333078 | -0.132808 | Coeff or Slope: | 0.891 | 0.897 |
| | | SO ₂ Calibratio | on Data | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration C | Correction factor (Cc/ |
| Set Point | (sccm) | (sccm) | concentration (ppb) (Cc) | (ppb) (Ic) | <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as found span | 4918 | 81.3 | 799.9 | 795.0 | 1.006 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.3 | |
| high point | 4918 | 81.3 | 799.9 | 801.2 | 0.998 |
| second point | 4959 | 40.7 | 400.4 | 399.2 | 1.003 |
| third point | 4979 | 20.3 | 199.7 | 200.2 | 0.998 |
| as left zero | 5000 | 0.0 | 0.0 | 0.3 | |
| as left span | 4918 | 81.3 | 799.9 | 800.3 | 1.000 |
| | | | Averag | e Correction Factor | 1.000 |
| | 704.00 | Previous response | 798.65 | *% change | -0.5% |
| Baseline Corr As found: | 794.80 | | | | |
| | 794.80 NA | | | AF Intercept: | |
| Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 794.80 NA NA | AF Slope: AF Correlation: | | AF Intercept: | |

Notes:

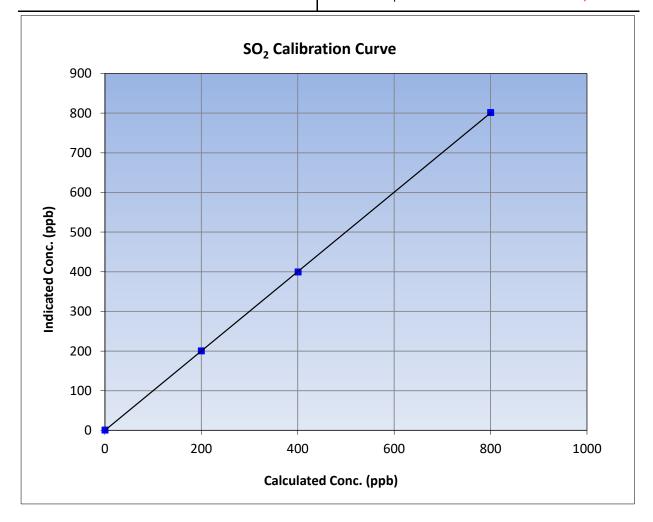
Changed the inlet filter after as founds. Adjusted span only.

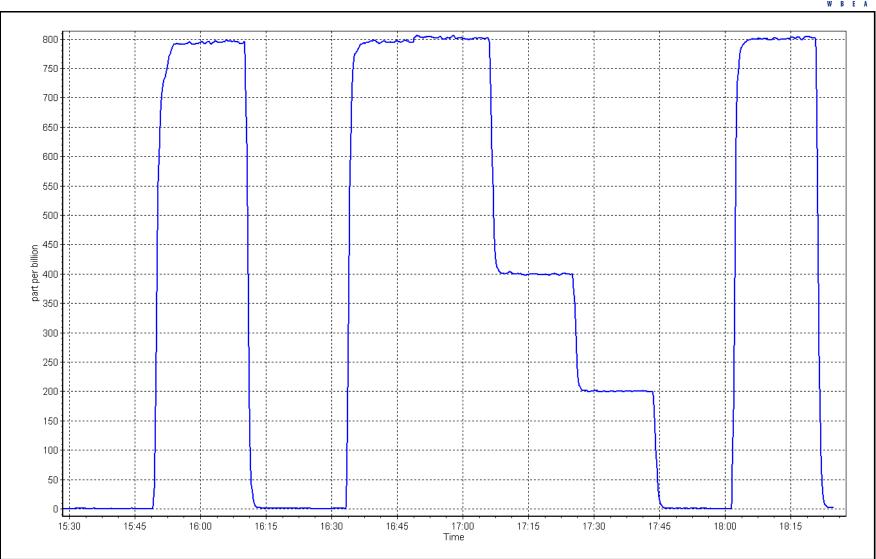
Calibration Performed By:



SO₂ Calibration Summary

| | | Station | Information | | |
|---|--------------------------------------|------------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March 13 | 3, 2023 | Previous Calibration: | Februar | y 1, 2023 |
| Station Name: | Bertha Ganter | -Fort McKay | Station Number: | AM | IS01 |
| Start Time (MST): | 15:3 | 80 | End Time (MST): | 18 | :20 |
| Analyzer make: | Therm | o 43i | Analyzer serial #: | JC1501 | .301448 |
| Calculated concentration In (ppb) (Cc) | ndicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
| 0.0 | 0.3 | | | | |
| 799.9 | 801.2 | 0.9984 | Correlation Coefficient | 0.999992 | ≥0.995 |
| 400.4 | 399.2 | 1.0031 | Slope | 1.000943 | 0.90 - 1.10 |
| 199.7 | 200.2 | 0.9977 | Siope | 1.000040 | 0.50 1.10 |
| | | | Intercept | -0.132808 | +/-30 |





SO2 Calibration Plot

Location: Bertha Ganter-Fort McKay





TRS Calibration Report

| WBEA | | - | | | Version-11-2 |
|--|---|--|--|--|--|
| | | Station Info | rmation | | |
| itation Name: Calibration Date: itart time (MST): Reason: | Bertha Ganter-Fort March 13, 2023 9:58 Routine | МсКау | Station number: Last Cal Date: End time (MST): | AMS01 February 13, 2023 15:33 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.10 | ppm | Cal Gas Exp Date: | September 16, 2024 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: | <u>CC511749</u> 5.10 <u>N/A</u> | ppm | Rem Gas Exp Date: Diff between cyl: | N/A | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API T700 Teledyne API T701 | | Serial Number: Serial Number: | 3565 5609 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i-TLE CD Nova 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1218153461 470 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.995507 | 1.000364 | Backgd or Offset: | 2.30 | 2.27 |
| Calibration intercept: | 0.059999 | 0.439997 | Coeff or Slope: | 0.919 | 0.919 |
| | | TRS As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjuster Correction facto (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as found span | 4921 | 78.4 | 80.0 | 79.0 | 1.013 |
| as found 2nd point | 4960 | 39.2 | 40.0 | 39.5 | 1.013 |
| as found 3rd point | 4980 | 19.6 | 20.0 | 19.9 | 1.005 |
| new cylinder response | | | | | |
| | | TRS Calibrati | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) | Indicated concentration (ppb) (Ic) | Correction facto (Cc/lc) |
| colibrotor zoro | F000 | 0.0 | (Cc) | 0.2 | Limit = 0.95-1.05 |
| calibrator zero | 5000 4921 | 0.0 | 0.0 80.0 | 80.3 | 0.996 |
| high point second point | 4921 4960 | 78.4 | 40.0 | 40.7 | 0.996 |
| | | | 20.0 | 20.6 | 0.983 |
| | 1020 | | 20.0 | 20.0 | 0.971 |
| third point | 4980 | 19.6 | 0.0 | 10 | |
| third point as left zero | 5000 | 0.0 | 0.0 | 1.0 | |
| third point as left zero as left span | 5000 4921 | 0.0 78.4 | 80.0 | 79.4 | 1.007 |
| third point as left zero as left span O2 Scrubber Check | 5000 4921 4919 | 0.0 78.4 81.3 | 80.0 813.0 | 79.4 0.0 | |
| third point as left zero as left span O2 Scrubber Check Date of last scrubber cha | 5000 4921 4919 ange: | 0.0 78.4 | 80.0 813.0 | 79.4 0.0 Ave Corr Factor | 0.983 |
| third point as left zero as left span 602 Scrubber Check Date of last scrubber cha Date of last converter ef | 5000 4921 4919 ange: ficiency test: | 0.0 78.4 81.3 December 17, 2021 | 80.0 813.0 | 79.4 0.0 Ave Corr Factor | 0.983 efficiency |
| third point as left zero as left span 602 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found: | 5000 4921 4919 ange: ficiency test: 79.0 | 0.0 78.4 81.3 December 17, 2021 Prev response: | 80.0 813.0 | 79.4 0.0 Ave Corr Factor *% change: | 0.983 efficiency -0.9% |
| third point as left zero as left span 602 Scrubber Check Date of last scrubber cha Date of last converter ef | 5000 4921 4919 ange: ficiency test: 79.0 | 0.0 78.4 81.3 December 17, 2021 | 80.0 813.0 | 79.4 0.0 Ave Corr Factor | 0.983 efficiency |

Notes:

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

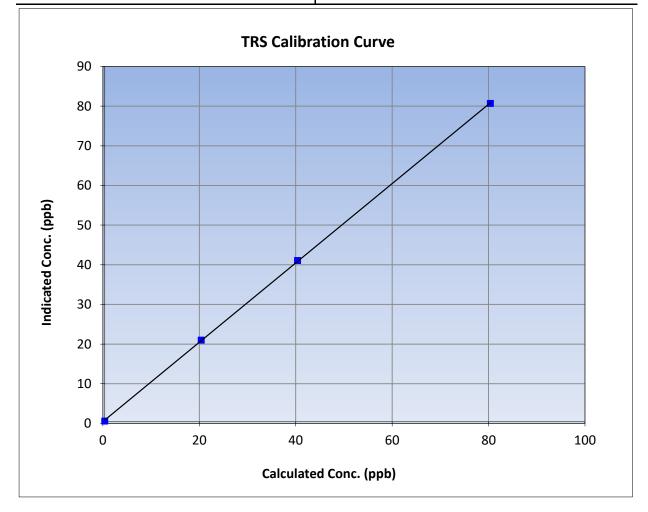


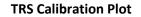
TRS Calibration Summary

| WBEA | | | Version-11-2021 |
|-------------------|--------------------------|-----------------------|-------------------|
| | Station | Information | |
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 13, 2023 |
| Station Name: | Bertha Ganter-Fort McKay | Station Number: | AMS01 |
| Start Time (MST): | 9:58 | End Time (MST): | 15:33 |
| Analyzer make: | Thermo 43i-TLE | Analyzer serial #: | 1218153461 |
| | | | |

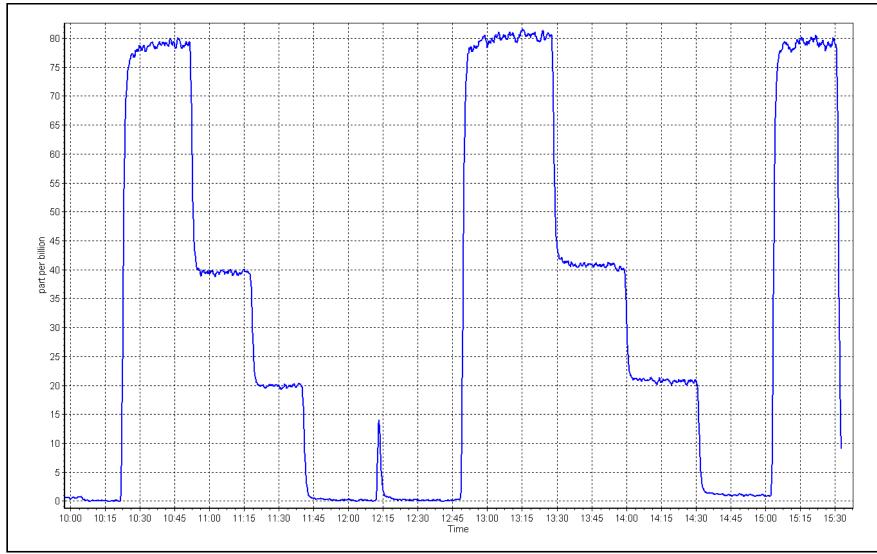
Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.2 | | Correlation Coefficient | 0.999952 | ≥0.995 |
| 80.0 | 80.3 | 0.9962 | correlation coefficient | 0.999932 | 20.333 |
| 40.0 | 40.7 | 0.9828 | Slope | 1.000364 | 0.90 - 1.10 |
| 20.0 | 20.6 | 0.9708 | Slope | 1.000304 | 0.90 - 1.10 |
| | | | Intercept | 0.439997 | +/-3 |











H₂S Calibration Report

| WBEA | | | | | Version-11-2 |
|--|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Bertha Ganter-Fort March 13, 2023 9:58 Routine | МсКау | Station number: Last Cal Date: End time (MST): | AMS01 February 13, 2023 15:33 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.10 | ppm | Cal Gas Exp Date: | September 16, 2024 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: | <u>CC511749</u> 5.10 <u>N/A</u> | ppm | Rem Gas Exp Date: Diff between cyl: | N/A | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API T700 Teledyne API T701 | | Serial Number: Serial Number: | 3565 5609 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQTL Thermo Converter 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1200326167 N/A | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.996946 | 0.996518 | Backgd or Offset: | 1.95 | 1.94 |
| Calibration intercept: | 0.361624 | 0.401597 | Coeff or Slope: | 1.014 | 1.014 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4921 | 78.4 | 80.0 | 79.7 | 1.005 |
| as found 2nd point | 4960 | 39.2 | 40.0 | 40.3 | 0.995 |
| as found 3rd point | 4980 | 19.6 | 20.0 | 20.3 | 0.990 |
| 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 | 78.4 | 80.0 | 80.1 | 0.999 |
| second point | 4961 | 39.2 | 40.0 | 40.3 | 0.992 |
| third point | 4980 | 19.6 | 20.0 | 20.3 | 0.985 |
| as left zero | 5000 | 0.0 | 0.0 | 0.6 | |
| as left span | 4921 | 78.4 | 80.0 | 79.1 | 1.011 |
| O2 Scrubber Check | 4919 | 81.3 | 813.0 | -0.2 | |
| ate of last scrubber cha | nge: | March 21, 2022 | | Ave Corr Factor | 0.992 |
| ate of last converter eff | iciency test: | | | | efficiency |
| Baseline Corr As found: | 79.6 | Prev response: | 80.09 | *% change: | -0.6% |
| Baseline Corr 2nd AF pt: | 40.2 | AF Slope: | | AF Intercept: | 0.299997 |
| Baseline Corr 3rd AF pt: | 20.2 | AF Correlation: | | | |
| Baseline Corr 3rd AF DC | | | | | |

Notes:

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

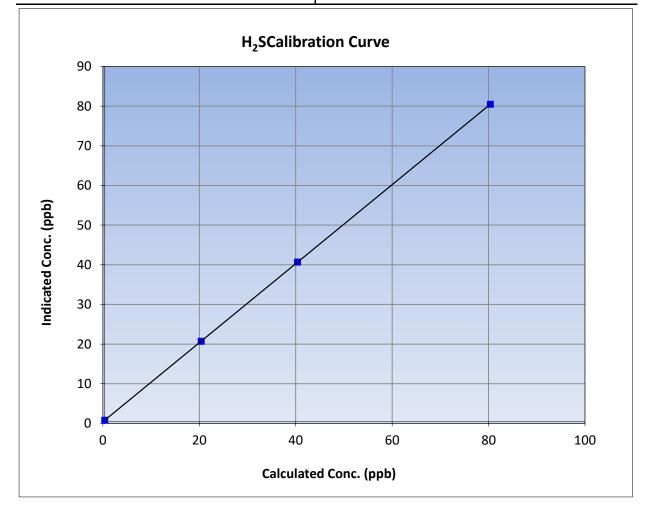


H₂S Calibration Summary

| WBEA | | | Version-11-2021 |
|-------------------|--------------------------|-----------------------|-------------------|
| | Station | Information | |
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 13, 2023 |
| Station Name: | Bertha Ganter-Fort McKay | Station Number: | AMS01 |
| Start Time (MST): | 9:58 | End Time (MST): | 15:33 |
| Analyzer make: | Thermo 43iQTL | Analyzer serial #: | 1200326167 |
| | | | |

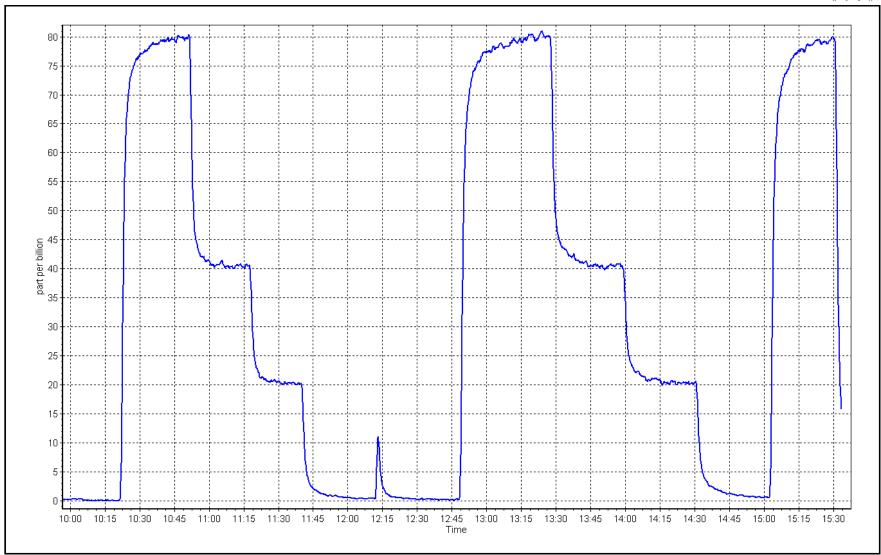
Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.4 | | Correlation Coefficient | 0.999999 | ≥0.995 |
| 80.0 | 80.1 | 0.9987 | correlation coefficient | 0.9999999 | 20.333 |
| 40.0 | 40.3 | 0.9923 | Slope | 0.996518 | 0.90 - 1.10 |
| 20.0 | 20.3 | 0.9851 | Slope | 0.990318 | 0.30 - 1.10 |
| | | | - Intercept | 0.401597 | +/-3 |











THC / CH_4 / NMHC Calibration Report

| | | Station | n Information | | |
|--|--|---------------|---|----------------|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Bertha Ganter-Fo March 13, 2023 15:30 Routine | ort McKay | Station number: Al Last Cal Date: Fe End time (MST): 18 | bruary 1, 2023 | |
| | | Calibrat | ion Standards | | |
| Gas Cert Reference: | CC | 2486642 | Cal Gas Expiry Date: Fe | bruary 23, 202 | 5 |
| CH4 Cal Gas Conc. | 497.7 | ppm | CH4 Equiv Conc. | 1063.1 | ppm |
| C3H8 Cal Gas Conc. | 205.6 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: N | 4 | |
| Removed CH4 Conc. | 497.7 | ppm | CH4 Equiv Conc. | 1063.1 | ppm |
| Removed C3H8 Conc. | 205.6 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | 1 | | Diff between cyl (NM): | | |
| Calibrator Model: | Teledyne API T70 | 00 | Serial Number: 35 | 65 | |
| ZAG make/model: | Teledyne API T70 |)1 | Serial Number: 56 | 509 | |
| | | Analyze | er Information | | |
| Analyzer make: THC Range (ppm): | | | Analyzer serial #: 11 | 80320040 | |
| NMHC Range (ppm): | | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio: | 2.52E-04 | 2.64E-04 | NMHC SP Ratio: | 5.06E-05 | 5.52E-05 |
| CH4 Retention time: | 14.4 | 14.4 | NMHC Peak Area: | 181561 | 166551 |

| | | THC Calibra | ation Data | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | c) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4918 | 81.3 | 17.29 | 16.20 | 1.067 |
| 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 | 17.32 | 0.998 |
| second point | 4959 | 40.7 | 8.65 | 8.62 | 1.004 |
| 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 | 17.35 | 0.997 |
| | | | А | verage Correction Factor | 1.000 |
| Baseline Corr AF: | 16.20 | Prev response | 17.19 | *% change | -6.2% |
| 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) (| 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 | 8.46 | 1.087 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0 | 0.00 | 0.00 | |
| high point | 4918 | 81.3 | 9.19 | 9.22 | 0.998 |
| second point | 4959 | 40.7 | 4.60 | 4.60 | 1.000 |
| third point | 4980 | 20.3 | 2.30 | 2.31 | 0.993 |
| as left zero | 5000 | 0 | 0.00 | 0.00 | |
| as left span | 4918 | 81.3 | 9.19 | 9.24 | 0.996 |
| | | | | Average Correction Factor | 0.997 |
| Baseline Corr AF: | 8.46 | Prev response | 9.14 | *% change | -8.0% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |

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

| | | CIT+ Culloru | 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 | 7.74 | 1.046 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| high point | 4918 | 81.3 | 8.09 | 8.11 | 0.998 | |
| second point | 4959 | 40.7 | 4.05 | 4.02 | 1.009 | |
| third point | 4980 | 20.3 | 2.02 | 2.01 | 1.004 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4918 | 81.3 | 8.09 | 8.11 | 0.998 | |
| | | | А | verage Correction Factor | 1.004 | |
| Baseline Corr AF: | 7.74 | Prev response | 8.05 | *% change | -4.1% | |
| 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: | | 0.995861 | | 1.001736 | | |
| THC Cal Offset: | | -0.022506 | | -0.010696 | | |
| CH4 Cal Slope: | 0.996625 | | | 1.001692 | | |
| CH4 Cal Offset: | | -0.014967 | | -0.013161 | | |
| NMHC Cal Slope: | | 0.994978 | | 1.001763 | | |
| NMHC Cal Offset: | | -0.007938 | | 0.002265 | | |

Notes:

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

Calibration Performed By:



THC Calibration Summary

| | | Station I | nformation | | |
|--|--|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March 1 | 13, 2023 | Previous Calibration: | February | 1, 2023 |
| Station Name: | | er-Fort McKay | Station Number: | AMS | |
| Start Time (MST): | | :30 | End Time (MST): | 18: | 20 |
| Analyzer make: | Thern | no 55i | Analyzer serial #: | 11803 | 20040 |
| | | | | | |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | on Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999988 | ≥0.995 |
| 17.29 | 17.32 | 0.9979 | | | |
| <u>8.65</u> 4.32 | 8.62 | 1.0039 0.9982 | Slope | 1.001736 | 0.90 - 1.10 |
| | 7.32 | 0.5502 | Intercept | -0.010696 | +/-0.5 |
| 18.0 | | | | | |
| 20.0 | | | | | |
| | | | | / | |
| 16.0 - | | | | | |
| 14.0 - | | | | | |
| E 12.0 - | | | | | |
| ີ ແ 12.0 - ເດີຍ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບິດຍິ ເບີດຍິ ເບີດຍິ ເບີດຍິ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດຍີ ເບີດ ເປີດ ເປີດ ເປີດ ເປີດ ເປີດ ເປີດ ເປີດ ເປ | | | | | |
| - 0.8 ted | | | | | |
| 0.8 - 0.8 - 0.0 - 0.0 - 0.0 | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 🖛 | | | | | |
| 0.0 |) 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



CH₄ Calibration Summary

| | | Station I | nformation | | |
|---------------------------------------|---------------------------------------|---------------------------|-------------------------|-----------|----------------|
| Calibration Date: | March | 13, 2023 | Previous Calibration: | February | 1 2023 |
| Station Name: | | er-Fort McKay | Station Number: | AM | |
| tart Time (MST): | | :30 | End Time (MST): | 18: | |
| nalyzer make: | | no 55i | Analyzer serial #: | 11803 | |
| analyzer make. | men | | Analyzer senar#. | 11003 | 20040 |
| | | Calibra | tion Data | | |
| alculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999968 | ≥0 <i>.995</i> |
| 8.09 4.05 | 8.11 4.02 | 0.9982 | | | |
| 2.02 | 2.01 | 1.0043 | Slope | 1.001692 | 0.90 - 1.10 |
| | | | Intercept | -0.013161 | +/-0.5 |
| 7.0 6.0 (mud 5.0 | | | | | |
| лс. (| | | | | |
| <u>ප</u> 4.0 – | | | | | |
| 0.8 undicated | | | | | |
| 2.0 | | | | | |
| 10 | | | | | |
| 1.0 | | | | | |
| | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |

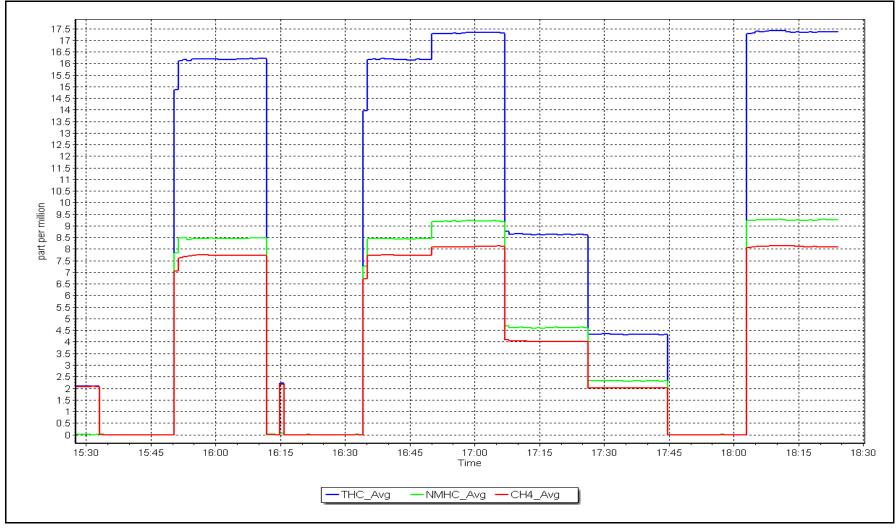


NMHC Calibration Summary

| | | | Station I | nformation | | |
|--------------------------------|--------|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| Calibration D | ate: | March | 13, 2023 | Previous Calibration: | February | 1, 2023 |
| Station Name | e: | Bertha Gante | er-Fort McKay | Station Number: | AM | 501 |
| Start Time (N | /IST): | 15 | :30 | End Time (MST): | 18: | 20 |
| Analyzer mał | ke: | Ther | mo 55i | Analyzer serial #: | 11803 | 20040 |
| | | | Calibra | tion Data | | |
| Calculated conc (ppm) (C | | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 9.19 | | 0.00 9.22 | 0.9977 | Correlation Coefficient | 0.999995 | ≥0.995 |
| 4.60 | | 4.60 | 1.0001 | | | |
| 2.30 | | 2.31 | 0.9929 | Slope | 1.001763 | 0.90 - 1.10 |
| | | | | Intercept | 0.002265 | +/-0.5 |
| 9. 8. 7. | | | | | | |
| 6. Conc. (ppm) 5. | | | | | | |
|) : 5. | .0 | | | | | |
| | .0 — | | | | | |
| Indicated 3. | .0 | | | | | |
| 2. | .0 | | | | | |
| 1. | .0 | | | | | |
| 0. | .0 | | | | | |
| | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | | l Conc. (ppm) | | |

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

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

Bertha Ganter-Fort McKay March 3, 2023 10:39 Routine

Last Cal Date: February 2, 2023 End time (MST): 15:36

Station number: AMS01

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

| NO Gas Cylinder #: | T2Y1P9L | | Cal Gas Expiry Date: Dec | Cal Gas Expiry Date: December 11, 2023 | | |
|-----------------------|-------------------|-----|--------------------------|--|-----|--|
| NOX Cal Gas Conc: | 50.84 | ppm | NO Cal Gas Conc: | 50.04 | ppm | |
| Removed Cylinder #: | | NA | Removed Gas Exp Date: | | NA | |
| Removed Gas NOX Conc: | 50.84 | ppm | Removed Gas NO Conc: | 50.04 | ppm | |
| NOX gas Diff: | | | NO gas Diff: | | | |
| Calibrator Model: | Teledyne API T700 | | Serial Number: | 3565 | | |
| ZAG make/model: | Teledyne API T7 | 701 | Serial Number: | 5609 | | |
| | | | | | | |

| Analy | vzer | Inform | ation |
|-------|------|--------|-------|
| / | | | acion |

| Analyzer make: T NOX Range (ppb): 0 | | | | | |
|--|--------------|---------------|----------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coeff or slope: | 1.440 | 1.458 | NO bkgnd or offset: | 6.8 | 6.9 |
| NOX coeff or slope: | 0.990 | 0.990 | NOX bkgnd or offset: | 6.9 | 7.0 |
| NO2 coeff or slope: | 1.000 | 1.000 | Reaction cell Press: | 194.8 | 196.0 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 0.997218 | 0.999171 |
| NO _x Cal Offset: | 0.060000 | -0.060000 |
| NO Cal Slope: | 0.998701 | 1.000071 |
| NO Cal Offset: | -0.400000 | -0.880000 |
| NO ₂ Cal Slope: | 0.997388 | 0.998181 |
| NO ₂ Cal Offset: | -0.442888 | -0.132907 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|--------------------------------|---|--|---|--|---|--|---|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.0 | | |
| as found span | 4920 | 80.0 | 813.4 | 800.6 | 12.8 | 803.7 | 788.4 | 15.5 | 1.0121 | 1.0155 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.3 | 0.1 | | |
| high point | 4920 | 80.0 | 813.4 | 800.6 | 12.8 | 812.8 | 800.3 | 12.5 | 1.0008 | 1.0004 |
| second point | 4960 | 40.0 | 406.7 | 400.3 | 6.4 | 406.5 | 399.2 | 7.3 | 1.0005 | 1.0028 |
| third point | 4980 | 20.0 | 203.4 | 200.2 | 3.2 | 202.4 | 197.9 | 4.4 | 1.0047 | 1.0114 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.2 | 0.2 | | |
| as left span | 4920 | 80.0 | 813.4 | 388.4 | 425.0 | 809.6 | 385.1 | 424.4 | 1.0047 | 1.0087 |
| | | | | | | | Average C | orrection Factor | 1.0020 | 1.0049 |
| Corrected As fo | ound NO _x = | 803.5 ppb | NO = | 788.2 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chang | ge NO _x = | -1.0% |
| Previous Respo | nse NO _x = | 811.2 ppb | NO = | 799.2 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 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) | 796.5 | 384.3 | 425.0 | 424.4 | 1.0014 | 99.9% |
| 2nd GPT point (200 ppb O3) | 796.5 | 594.2 | 215.1 | 213.9 | 1.0056 | 99.4% |
| 3rd GPT point (100 ppb O3) | 796.5 | 697.0 | 112.3 | 112.1 | 1.0018 | 99.8% |
| | | | / | Average Correction Factor | 1.0029 | 99.7% |

Notes:

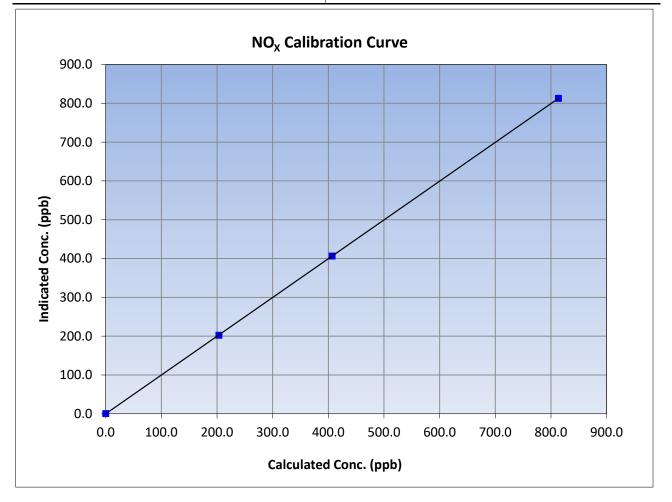
Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

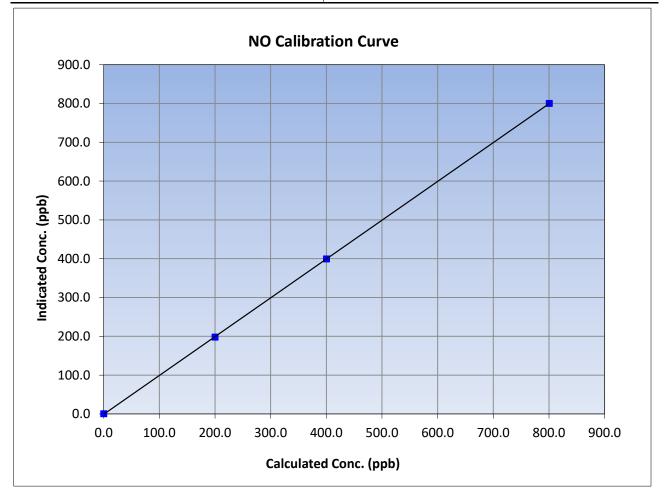
| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | February | , 2, 2023 | |
| Station Name: | Bertha Ganter-Fort McKay | | Station Number: | AM | S01 | |
| Start Time (MST): | 10:39 | | End Time (MST): | 15:36 | | |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 1218153357 | | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | 0.4 | | Correlation Coefficient | 0.999998 | ≥0.995 | |
| 813.4 | 812.8 | 1.0008 | correlation coefficient | 0.555556 | 20.333 | |
| 406.7 | 406.5 | 1.0005 | Clana | 0.999171 | 0.90 - 1.10 | |
| 203.4 | 202.4 | 1.0047 | Slope | 0.999171 | 0.90 - 1.10 | |
| | | | Intercept | -0.060000 | +/-20 | |





NO Calibration Summary

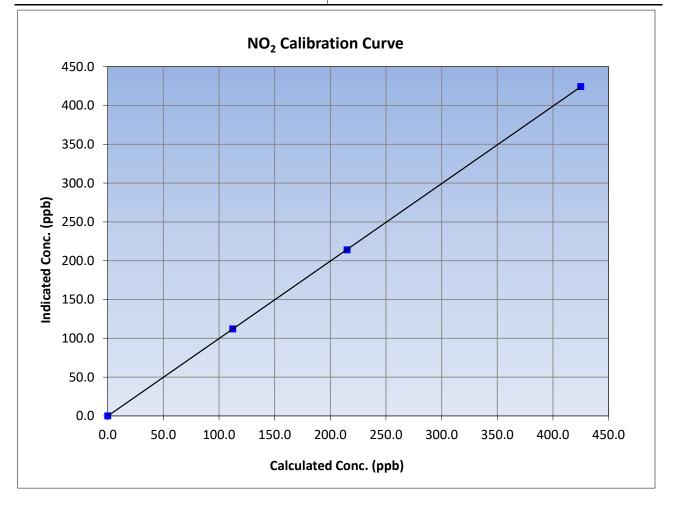
| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | February | y 2, 2023 | |
| Station Name: | Bertha Ganter-Fort McKay | | Station Number: | AM | S01 | |
| Start Time (MST): | 10:39 | | End Time (MST): | 15:36 | | |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 1218153357 | | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/lc) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | 0.3 | | Correlation Coefficient | 0.999990 | ≥0.995 | |
| 800.6 | 800.3 | 1.0004 | correlation coefficient | 0.5555550 | 20.995 | |
| 400.3 | 399.2 | 1.0028 | Slope | 1.000071 | 0.90 - 1.10 | |
| 200.2 | 197.9 | 1.0114 | Slope | 1.000071 | 0.90 - 1.10 | |
| | | | Intercept | -0.880000 | +/-20 | |

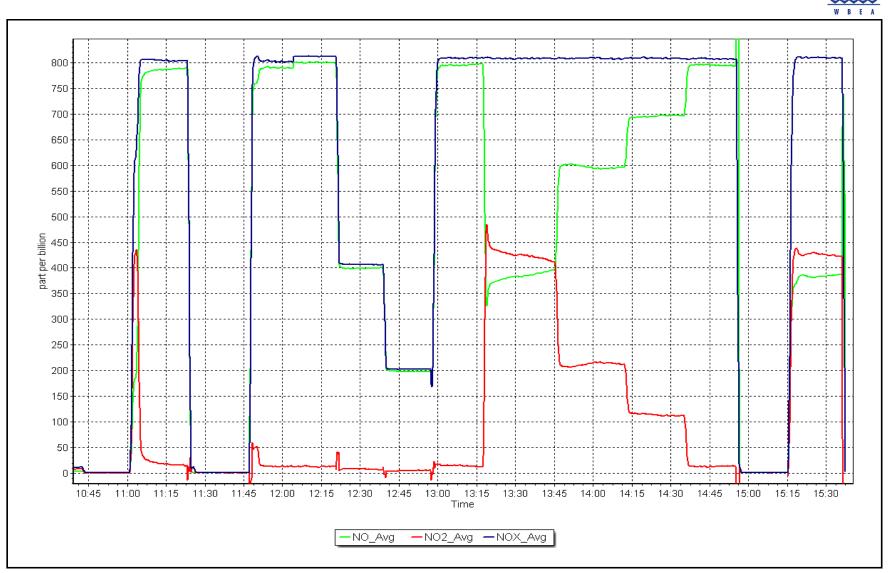




NO₂ Calibration Summary

| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | February | , 2, 2023 |
| Station Name: | Bertha Ganter-Fort McKay | | Station Number: | AM | S01 |
| Start Time (MST): | 10:39 | | End Time (MST): | 15 | :36 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 1218153357 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 425.0 | 424.4 | 1.0014 | correlation coefficient | 0.5555554 | 20.995 |
| 215.1 | 213.9 | 1.0056 | Slopp | 0.998181 | 0.90 - 1.10 |
| 112.3 | 112.1 | 1.0018 | Slope | 0.996161 | 0.90 - 1.10 |
| | | | Intercept | -0.132907 | +/-20 |





Location: Bertha Ganter-Fort McKay



O₃ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|---------------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Bertha Ganter-Fort March 1, 2023 11:28 Routine | МсКау | Station number: Last Cal Date: End time (MST): | February 8, 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 2 0 - 500 ppb | | Analyzer serial #: | 1107 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 1.000086 0.760000 | <u>Finish</u> 0.999829 0.780000 | Backgd or Offset: Coeff or Slope: | <u>Start</u> 2.4 1.016 | <u>Finish</u> 2.5 1.025 |
| | | 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 | 0.3 | |
| as found span | 5000 | 855.5 | 400.0 | 398.3 | 1.004 |
| as found 2nd point as found 3rd point | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.3 | |
| high point | 5000 | 855.5 | 400.0 | 400.3 | 0.999 |
| second point | 5000 | 738.6 | 200.0 | 201.5 | 0.993 |
| third point | 5000 | 649.2 | 100.0 | 100.9 | 0.991 |
| as left zero | 5000 | 0.0 | 0.0 | 0.3 | |
| as left span | 5000 | 855.5 | 400.0 | 401.0 | 0.998 |
| | | | Avera | ge Correction Factor | 0.994 |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | 398.0 NA | Previous response AF Slope: | | *% change AF Intercept: | -0.7% |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiate | es investigation |

Notes:

Changed inlet filter after as founds. Adjusted span only.

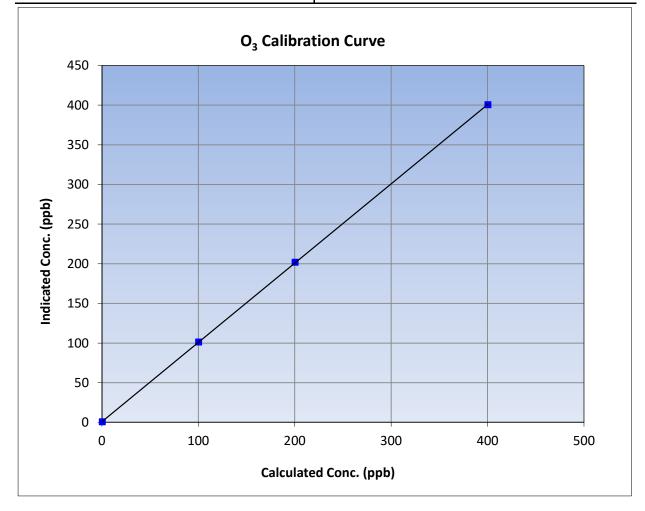
Calibration Performed By:

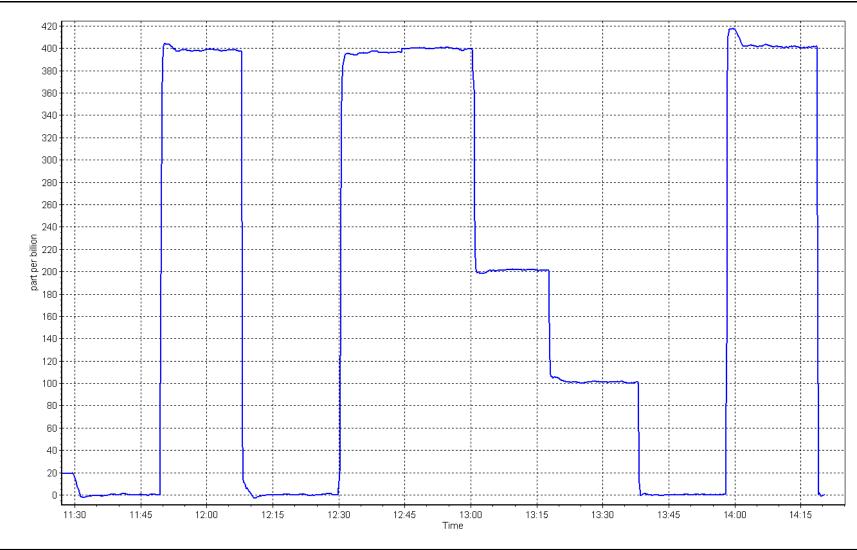


O₃ Calibration Summary

| WBEA | | | | Version-01-2020 |
|-----------------------------|------------------------|-------------------|------------------------|------------------|
| | | Station I | nformation | |
| Calibration Date: | March 1 | , 2023 | Previous Calibration: | February 8, 2023 |
| Station Name: | Bertha Ganter | -Fort McKay | Station Number: | AMS01 |
| Start Time (MST): | 11:2 | 28 | End Time (MST): | 14:20 |
| Analyzer make: | Teledyne A | API T400 | Analyzer serial #: | 1107 |
| | | Calibra | ation Data | |
| Calculated concentration Ir | ndicated concentration | Correction factor | Statistical Evaluation | limite |
| (nnh) (Cc) | (ppb) (lc) | (Cc/lc) | Statistical Evaluation | <u>Limits</u> |

| | (ppb) (Cc) | (ppb) (Ic) | (Cc/Ic) | | | LIIIILS |
|---|------------|------------|---------|-------------------------|----------|-------------|
| | 0.0 | 0.3 | | Correlation Coefficient | 0.999989 | ≥0.995 |
| | 400.0 | 400.3 | 0.9993 | correlation coernelent | 0.555565 | 20.335 |
| | 200.0 | 201.5 | 0.9926 | Slope | 0.999829 | 0.90 - 1.10 |
| | 100.0 | 100.9 | 0.9911 | 51066 | 0.555825 | 0.90 - 1.10 |
| _ | | | | – Intercept | 0.780000 | +/- 5 |





O₃ Calibration Plot

Location: Bertha Ganter-Fort McKay





T640 PM_{2.5} CALIBRATION

| W B E A | | | | | | Version-01-202 |
|---|--|--|--|--------------|-----------------|--|
| | | Station Information | ı | | | |
| Station Name: Calibration Date: Start time (MST): | Fort McKay - Bertha G March 30, 2023 11:13 | Santer | Station number: Last Cal Date: End time (MST): | February 1 | 6, 2023 | |
| Analyzer Make: Particulate Fraction: | API T640 PM2.5 | | S/N: | 306 | | |
| Flow Meter Make/Model: Temp/RH standard: | Delta Cal Delta Cal | | | 1450 1450 | | |
| | | Monthly Calibration T | est | | | |
| <u>Parameter</u> T (°C) P (mmHg) | <u>As found</u> -2.9 733.5 | <u>Measured</u> -2.4 734.1 | <u>As left</u> -2.9 733.5 | | Adjusted | <i>(Limits)</i> +/- 2 °C +/- 10 mmHg |
| flow (LPM) | 5.03 | 5.00 | 5.03 | | | +/- 0.25 LPM |
| Leak Test: Note: this leak check will be | Date of check: PM w/o HEPA: | March 30, 2023 13.2 | Last Cal Date: PM w/ HEPA: | , (|) | <0.2 ug/m3 |
| Inlet cleaning : | Inlet Head | | | | | |
| | | Quarterly Calibration | ſest | | | |
| <u>Parameter</u> | <u>As found</u> | Post maintenance | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| PMT Peak Test | 9.5 | 11 | 11 | | | 10.9 +/- 0.5 |
| Post-maintenance | | PM w/o HEPA: | 13 | w/ HEPA: | | 0 |
| Date Optical Cham Disposable Filter | - | March 30, March 30, | | | | <0.2 ug/m3 |
| | | Annual Maintenanc | e | | | |
| Date Sample Tub | - | August 31, | | | | |
| Date RH/T Senso | or Cleaned: | December 1 | 9, 2022 | | | |
| Notes: | | nd pressure verified. Leak ak test within limits post n | | | | |



CO Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|---------------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Bertha Ganter-Fort March 8, 2023 10:59 Routine | МсКау | Station number: Last Cal Date: End time (MST): | AMS01 February 15, 2023 14:22 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | <u>3040</u> ALM042207 | ppm | Cal Gas Exp Date: | December 1, 2028 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | <u>3040</u> <u>NA</u> | ppm | Rem Gas Exp Date: Diff between cyl: | NA | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API T700 Teledyne API T701 | | Serial Number: Serial Number: | 3565 5609 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | : Teledyne API T300 : 0 - 50 ppm | | Analyzer serial #: | 3520 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 1.001201 0.093816 | <u>Finish</u> 1.002977 0.109828 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> -0.012 0.996 |
| | | CO Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span as found 2nd point | 4933 | 66.7 | 40.6 | 40.9 | 0.993 |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4933 | 66.7 | 40.6 | 40.7 | 0.997 |
| second point | 4966 | 33.3 | 20.2 | 20.7 | 0.980 |
| third point | 4983 | 16.7 | 10.2 | 10.3 | 0.990 |
| as left zero | 5000 2960 | 0.0 40.0 | 0.0 40.5 | 0.0 40.2 | 1.010 |
| as left span | 2900 | 40.0 | | ge Correction Factor | 0.989 |
| | 40.70 | | | - · · · · · · · · · · · · · · · · · · · | |
| Baseline Corr As found: | 40.72 | Prev response: | | *% change: | 0.1% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | NA NA | AF Slope: AF Correlation: | | AF Intercept: | |

Notes:

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

Calibration Performed By:

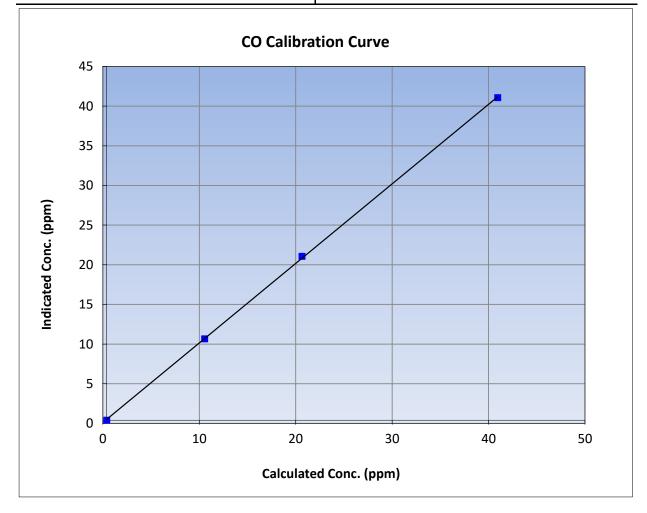


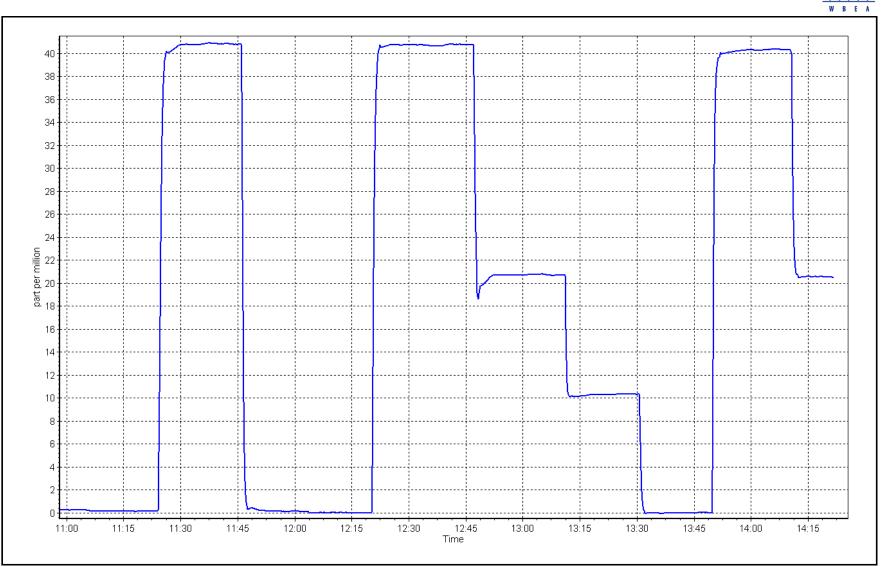
CO Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|--------------------------|-----------------------|-------------------|
| | Station | Information | |
| Calibration Date: | March 8, 2023 | Previous Calibration: | February 15, 2023 |
| Station Name: | Bertha Ganter-Fort McKay | Station Number: | AMS01 |
| Start Time (MST): | 10:59 | End Time (MST): | 14:22 |
| 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 | 0.999903 | ≥0.995 |
| 40.6 | 40.7 | 0.9972 | correlation coefficient | 0.999903 | 20.333 |
| 20.2 | 20.7 | 0.9796 | Slope | 1.002977 | 0.90 - 1.10 |
| 10.2 | 10.3 | 0.9897 | Slope | 1.002977 | 0.30 - 1.10 |
| | | | Intercept | 0.109828 | +/-1.5 |





CO Calibration Plot

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 March 7, 2023 10:47 Routine | МсКау | Station number: Last Cal Date: End time (MST): | AMS01 February 7, 2023 14:38 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 60,200 | ppm | Cal Gas Exp Date: | December 1, 2028 | |
| Cal Gas Cylinder #: | ALM042207 | | | | |
| Removed Cal Gas Conc: | <u>60,200</u> | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | <u>NA</u> | | Diff between cyl: | | |
| Calibrator Make/Model: | Teledyne API T700 | | Serial Number: | 3565 | |
| N2 Gen Make/Model: | Peak Sci NG5000 | | Serial Number: | 7220900034 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | : 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: | 0.999874 | 1.002067 | Backgd or Offset: | 0.037 | 0.037 |
| Calibration intercept: | -5.820000 | -4.460000 | Coeff or Slope: | 0.883 | 0.880 |
| | | CO ₂ Calibratio | on Data | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration | Correction factor (Cc/ |
| Set Point | (sccm) | (sccm) | concentration (ppm) (Cc) | (ppm) (Ic) | <i>Limit = 0.95-1.05</i> |
| as found zero | 3000 | 0.0 | 0.0 | -0.3 | |
| 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 | 1606.1 | 1.000 |
| second point | 2960 | 40.0 | 802.7 | 798.4 | 1.005 |
| third point | 2980 | 20.0 | 401.3 | 393.0 | 1.021 |
| as left zero | 3000 | 0.0 | 0.0 | -0.4 | |
| as left span | 2960 | 40.0 | 802.7 | 785.7 | 1.022 |
| | | | Averag | e Correction Factor | 1.009 |
| | | | | **** | 1 20/ |
| Baseline Corr As found: | 1618.20 | Prev response: | 1599.31 | *% change: | 1.2% |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | 1618.20 NA | Prev response: AF Slope: | | *% change: AF Intercept: | 1.2% |

Notes:

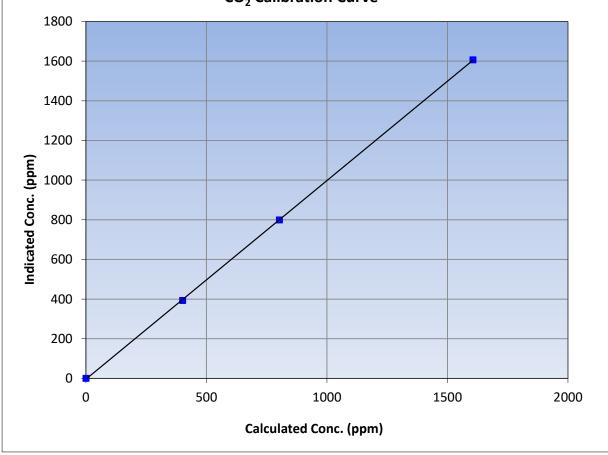
Changed the inlet filter after as founds. Adjusted span only.

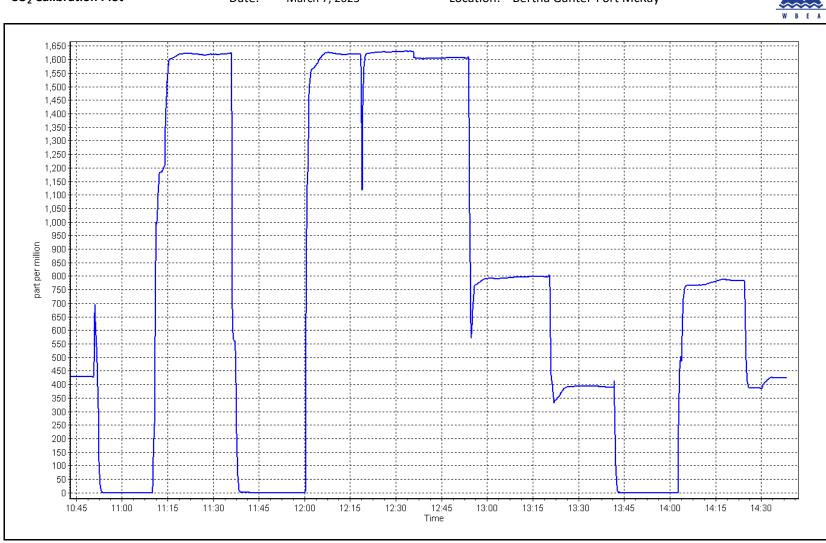
Calibration Performed By:



CO₂ Calibration Summary

| WBEA | | | | | Version-01-2 |
|---------------------------------------|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date | March 7 | , 2023 | Previous Calibration | Februar | y 7, 2023 |
| Station Name | Bertha Ganter | -Fort McKay | Station Number | AM | IS01 |
| Start Time (MST) | 10:4 | 47 | End Time (MST) | 14 | :38 |
| Analyzer make | Teledyne | API 360 | Analyzer serial # | 4 | 42 |
| | | Calibr | ration Data | | |
| alculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
| 0.0 | -0.2 | | Correlation Coefficient | 0.999967 | ≥0.995 |
| 1605.3 | 1606.1 | 0.9995 | | 0.00000 | _00000 |
| 802.7 | 798.4 | 1.0053 | Slope | 1.002067 | 0.90 - 1.10 |
| 401.3 | 393.0 | 1.0212 | | | |
| | | | Intercept | -4.460000 | +/-10 |





Date: March 7, 2023

Location: Bertha Ganter-Fort McKay





TN - NO_X - NH_3 Calibration Report

| W B E A | | | | • | Version-11-20 | | | |
|--|------------------------------------|---------------|-------------------------------------|----------------------------|---------------|--|--|--|
| | | Station | Information | | | | | |
| Station Name: NOX Cal Date: | Bertha Ganter-Fo March 30, 2023 | ort McKay | Station number: Last Cal Date: | AMS01 February 17, 2023 | | | | |
| Start time (MST): | 10:04 | | End time (MST): | 15:15 | | | | |
| NH3 Cal Date: | March 30, 2023 | | Last Cal Date: | February 17, 2023 | | | | |
| Start time (MST): | 15:35 Deutine | | End time (MST): | 20:02 | | | | |
| Reason: | Routine | | | | | | | |
| | | Calibrati | on 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: | Teledyne API T700 | | Serial Number: | 3565 | | | | |
| ZAG make/model: | leledy | ne API T701 | Serial Number: | 5609 | | | | |
| | | Analyze | r Information | | | | | |
| Analyzer model: Teledyne API T201 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: 468 | | | | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | | | |
| NO coefficient: | 0.833 | 0.828 | TN coefficient | : 0.828 | 0.828 | | | |
| NOX coefficient: | 0.834 | 0.829 | NO bkgrnd: | : -11.017 | -0.727 | | | |
| NO2 coefficient: | 1.000 | 1.000 | NOX bkgrnd | : -10.278 | 0.384 | | | |
| NH3 coefficient: | 0.854 | 0.911 | TN bkgrnd: | : -4.631 | 2.561 | | | |
| | | Calibrat | ion Statistics | | | | | |
| | | <u>Start</u> | | <u>Finish</u> | | | | |
| NO _x Cal Slope: | | 1.000885 | | 1.002051 | | | | |
| NO _x Cal Offset: | | 0.380000 | | -1.360000 | | | | |
| NO Cal Slope: | | 0.999215 | | 1.003626 | | | | |
| NO Cal Offset: | | -0.780000 | | -1.700000 | | | | |
| NO ₂ Cal Slope: | | 0.999881 | | 1.006842 | | | | |
| NO ₂ Cal Offset: | | 0.372129 | | -0.842838 | | | | |
| NH3 Cal Slope: | | 1.010718 | | 1.004604 | | | | |
| NH3 Cal Offset: | | -8.022555 | | -2.552362 | | | | |
| TN Cal Slope: | | 1.015098 | | 1.007959 | | | | |
| | | | | | | | | |
| TN Cal Offset: | | -7.787324 | | -2.846246 | | | | |



TN - NOX - NH₃ Calibration Report

Version-11-2021

| Dilution Calibration Data | | | | | | | | | | | | |
|--|------------------------------|--------------------------------|--|---|---|---|--|--|--|---|--|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated TN concentration (ppb) (Cc) | Calculated NOX concentration (ppb) (Cc) | Calculated NH3 concentration (ppb) (Cc) | Indicated TN concentration (ppb) (Ic) | Indicated NOX concentration (ppb) (Ic) | Indicated NH3 concentration (ppb) (Ic) | TN Correction factor (Cc/Ic) Limit = 0.95-1.05 | NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05 | | |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 3.8 | -2.2 | | | | |
| as found NO | 4920 | 80.0 | 813.4 | 813.4 | | 824.0 | 826.4 | -2.4 | 0.987 | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | | | | |
| high NO point | 4920 | 80.0 | 813.4 | 813.4 | | 814.8 | 815.0 | 0.0 | 0.998 | | | |
| NO/O3 point | 4920 | 80.0 | 813.4 | 813.4 | | 808.0 | 808.8 | -0.9 | 1.007 | | | |
| as found NH3 | 3413 | 86.4 | 1800.6 | | 1800.6 | 1819.1 | | 1813.1 | 0.990 | 0.993 | | |
| new NH3 cyl rp | | | | | | | | | | | | |
| first NH3 | 3413 | 86.4 | 1800.6 | | 1800.6 | 1819.1 | | 1813.1 | 0.990 | 0.993 | | |
| second NH3 | 3452 | 48.0 | 1000.2 | | 1000.2 | 989.9 | | 987.2 | 1.010 | 1.013 | | |
| third NH3 | 3476 | 24.0 | 500.1 | | 500.1 | 506.9 | | 505.7 | 0.987 | 0.989 | | |
| | | | | | | | Average C | orrection Factor | 1.0025 | 0.9984 | | |
| Corrected As fo | ound TN = | 822.4 ppb | NO _x = 822.6 | ppb NH3 = | 1815.3 ppb | | | *Percent Chang | e TN = | 0.5% | | |
| Previous Respo | onse TN = | 817.9 ppb | NO _x = 814.5 | ppb NH3 = | 1811.9 ppb | | | *Percent Chang | e NO _x = | 1.0% | | |
| *Percent Change NH3 = 0.2% NH3 Previous Converter Efficiency = 85.4% * = > +/-5% change initiates investigation | | | | | | | | | | | | |

NH3 Current Converter Efficiency = 91.1%



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 | 3.8 | 3.9 | 1.6 | | |
| as found span | 4920 | 80.0 | 813.4 | 800.6 | 813.4 | 826.4 | 810.3 | 824.0 | 0.9843 | 0.9881 |
| new NO cyl rp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | | |
| high point | 4920 | 80.0 | 813.4 | 800.6 | 813.4 | 815.0 | 802.4 | 814.8 | 0.9981 | 0.9978 |
| second point | 4960 | 40.0 | 406.7 | 400.3 | 406.7 | 403.8 | 400.0 | 404.6 | 1.0072 | 1.0008 |
| third point | 4980 | 20.0 | 203.4 | 200.2 | 203.4 | 202.2 | 197.1 | 202.8 | 1.0057 | 1.0155 |
| | | | | | | | Average C | Correction Factor | 1.0037 | 1.0047 |
| Baseline Corr A | s fnd TN = | 822.4 ppb | NO _x = 822.6 | ppb NO = | 806.4 ppb | | | *Percent Chang | e TN = | 0.5% |
| Previous Respo | nse TN = | 817.9 ppb | NO _x = 814.5 | ppb NO = | 799.2 ppb | | | *Percent Chang | e NO _x = | 1.0% |
| | | | | | | | | *Percent Chang | e NO = | 0.9% |
| | | | | | | | | * = > +/-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) (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 | | | 0.0 | 0.1 | | |
| 1st GPT point (400 ppb O3) | 793.7 | 387.7 | 418.8 | 421.2 | 0.9943 | 100.6% |
| 2nd GPT point (200 ppb O3) | 793.7 | 597.5 | 209.0 | 209.5 | 0.9976 | 100.2% |
| 3rd GPT point (100 ppb O3) | 793.7 | 693.1 | 113.4 | 112.1 | 1.0116 | 98.9% |
| | | | | Average Correction Factor | 1.0012 | 99.9% |

Notes:

Changed the inlet filter. Adjusted both zero and span. Adjusted the NH3 span.

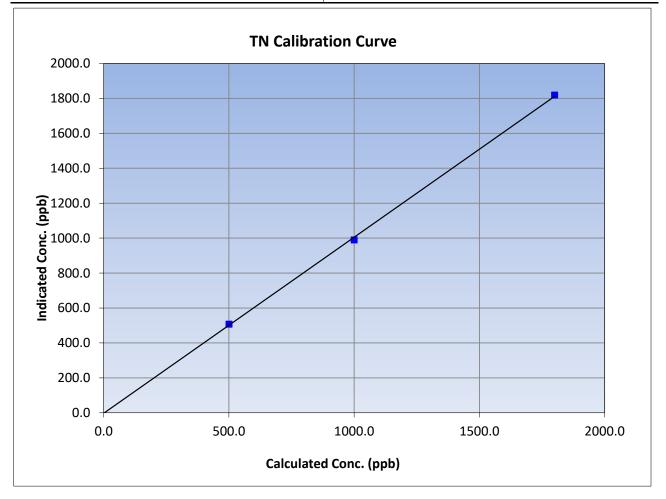
Calibration Performed By:

Rene Chamberland



TN Calibration Summary

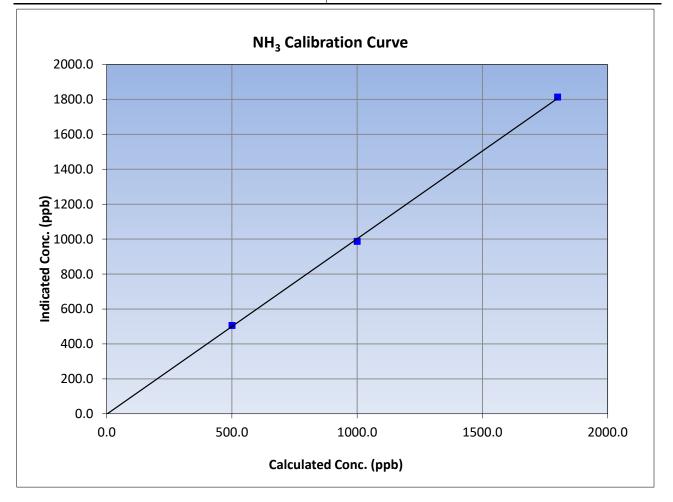
| WBEA | | | | | Version-11-2022 |
|--|---------------------------------------|---------------------------|-------------------------|------------------|-----------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | 30, 2023 | Previous Calibration: | Februar | ry 17, 2023 |
| Station Name: | Bertha Gante | er-Fort McKay | Station Number: | on Number: AMS01 | |
| Start Time (MST): | 10 | End Time (MST): | 1 | 5:15 | |
| Analyzer make: Teledyne API T201 | | | Analyzer serial #: | 808 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999819 | ≥0.995 |
| 1800.6 | 1819.1 | 0.9899 | correlation coemcient | 0.555015 | 20.000 |
| 1000.2 | 989.9 | 1.0104 | Clana | 1.007959 | 0.90 - 1.10 |
| 500.1 | 506.9 | 0.9866 | Slope | 1.007959 | 0.90 - 1.10 |
| | | | Intercept | -2.846246 | +/-20 |





NH₃ Calibration Summary

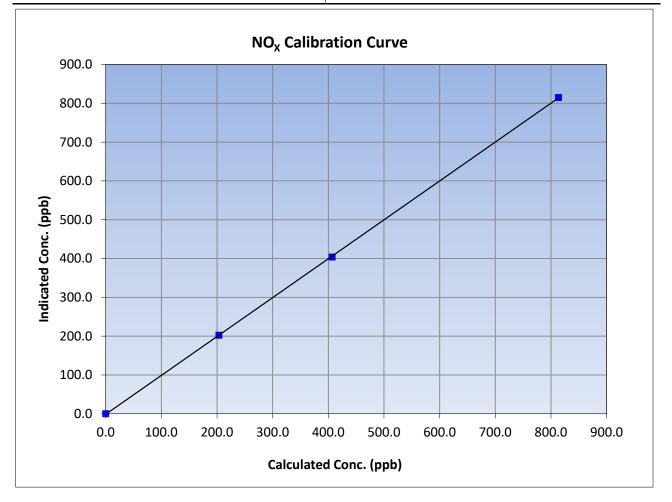
| WBEA | | Station | Information | | Version-11-20 |
|---|---------------------------------------|----------------------------------|---|-----------|------------------------------|
| Calibration Date: Station Name: Start Time (MST): | Bertha Gante | 30, 2023 er-Fort McKay :04 | Previous Calibration: Station Number: End Time (MST): | A | ry 17, 2023 MS01 15:15 |
| Analyzer make: | - | API T201 | Analyzer serial #: | 808 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999825 | ≥0.995 |
| 1800.6 | 1813.1 | 0.9931 | conclation coefficient | 0.555025 | 20.000 |
| 1000.2 | 987.2 | 1.0132 | Clana | 1.004604 | 0.90 - 1.10 |
| 500.1 | 505.7 | 0.9889 | Slope | 1.004604 | 0.90 - 1.10 |
| | | | Intercept | -2.552362 | +/-20 |





NO_x Calibration Summary

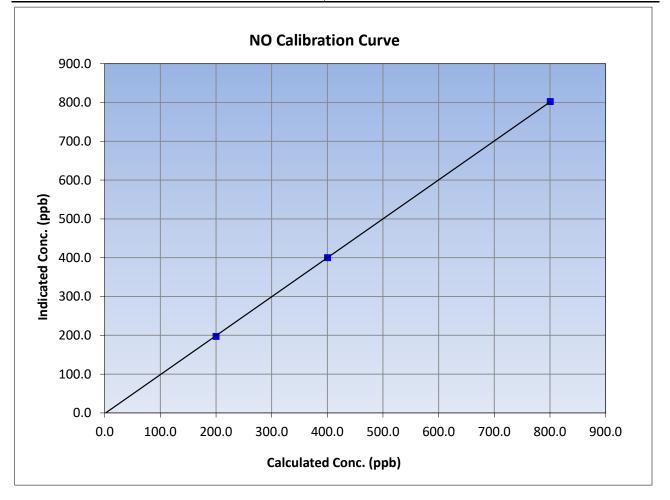
| WBEA | | | | | Version-11-20 | |
|--|---------------------------------------|---------------------------|----------------------------|-----------------------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 3 | 30, 2023 | Previous Calibration: Febr | | y 17, 2023 | |
| Station Name: | Bertha Gante | er-Fort McKay | Station Number: | AN | MS01 | |
| Start Time (MST): | 10 | End Time (MST): | 1 | 5:15 | | |
| Analyzer make: | Teledyne | API T201 | Analyzer serial #: | nalyzer serial #: 808 | | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999975 | ≥0.995 | |
| 813.4 | 815.0 | 0.9981 | correlation coefficient | 0.555575 | 20.333 | |
| 406.7 | 403.8 | 1.0072 | Slope | 1.002051 | 0.90 - 1.10 | |
| 203.4 | 202.2 | 1.0057 | Slope | 1.002051 | 0.90 - 1.10 | |
| | | | Intercept | -1.360000 | +/-20 | |





NO Calibration Summary

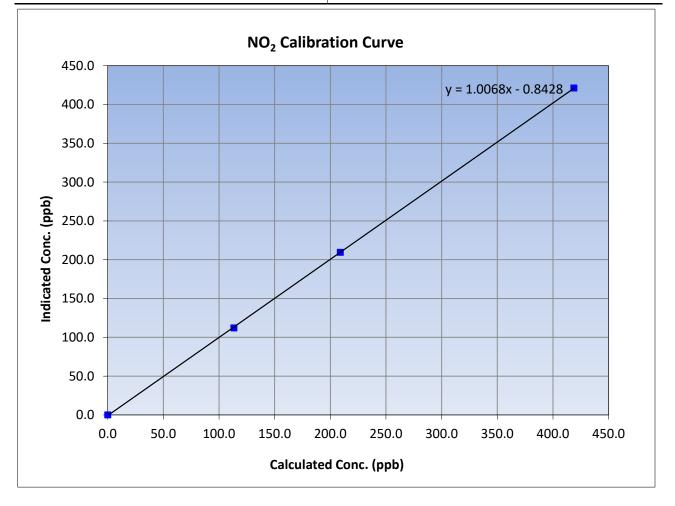
| WBEA | | Chattan | | | Version-11-2 | |
|--|---------------------------------------|--------------------------------------|---------------------------------|-----------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 3 | 30, 2023 | Previous Calibration: Fe | | ry 17, 2023 | |
| Station Name: | Bertha Gante | er-Fort McKay | Station Number: | A | MS01 | |
| Start Time (MST): | art Time (MST): 10:04 | | | 1 | 5:15 | |
| Analyzer make: | Teledyne | API T201 | Analyzer serial #: | 808 | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Calibra Correction factor (Cc/Ic) | ation Data Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999980 | >0.005 | |
| 800.6 | 802.4 | 0.9978 | correlation coefficient | 0.999980 | ≥0 <i>.995</i> | |
| 400.3 | 400.0 | 1.0008 | Slope | 1.003626 | 0.90 - 1.10 | |
| 200.2 | 197.1 | 1.0155 | Siope | 1.003020 | 0.90 - 1.10 | |
| | | | Intercept | -1.700000 | +/-20 | |

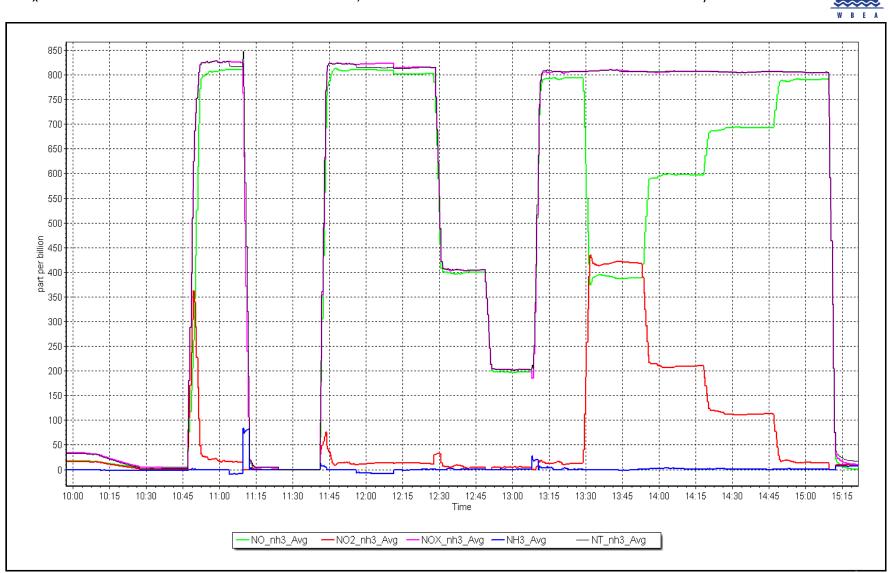




NO₂ Calibration Summary

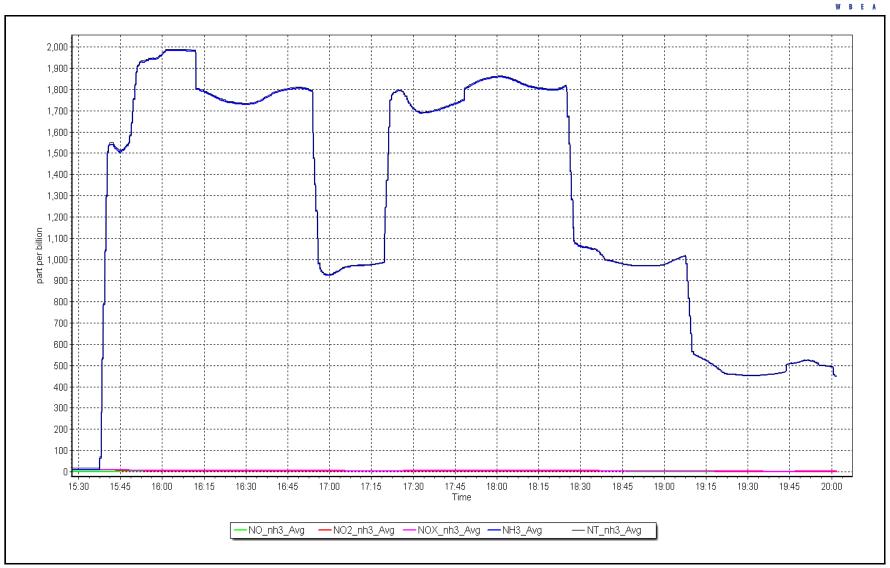
| WBEA | | Station | Information | | Version-11-2 | |
|--|---------------------------------------|---------------------------|--|-----------|---------------------|--|
| Calibration Date: Station Name: | | | Previous Calibration: Feb Station Number: | | ry 17, 2023 MS01 | |
| Start Time (MST): Analyzer make: | - | :04 API T201 | End Time (MST): Analyzer serial #: | | 15:15 808 | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/lc) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999973 | ≥0.995 | |
| 418.8 | 421.2 | 0.9943 | | 0.000070 | | |
| 209.0 | 209.5 | 0.9976 | Slope | 1.006842 | 0.90 - 1.10 | |
| 113.4 | 112.1 | 1.0116 | Jope | 1.000642 | 0.90 - 1.10 | |
| | | | Intercept | -0.842838 | +/-20 | |





NO_x Calibration Plot

Location: Bertha Ganter-Fort McKay



NH₃ Calibration Plot

Date: March 30, 2023

March 30, 2023 Location: Bertha Ganter-Fort McKay





TN - NO_X - NH_3 Calibration Report

| W B E A | | | × 5 | • | Version-11-20 |
|--|--|--------------|---|---|---------------|
| | | Station | Information | | Version II 20 |
| Station Name: NOX Cal Date: Start time (MST): NH3 Cal Date: Start time (MST): Reason: | Bertha Ganter-Fort McKay March 31, 2023 9:35 March 31, 2023 14:30 Maintenance | | Station number: Last Cal Date: End time (MST): Last Cal Date: End time (MST): | AMS01 February 17, 2023 14:10 February 17, 2023 17:00 | |
| | | Calibrati | 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 |)1 | 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 | : 466 | |
| | Start | Finish | | Start | Finish |
| NO coefficient: | 0.828 | 0.850 | TN coefficient | : 0.828 | 0.850 |
| NOX coefficient | 0.829 | 0.854 | NO bkgrnd | : -0.727 | -1.529 |
| NO2 coefficient | 1.000 | 1.000 | NOX bkgrnd | : 0.384 | -1.049 |
| NH3 coefficient | 0.911 | 0.937 | TN bkgrnd | : 2.561 | 3.877 |
| | | Calibrat | ion Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| NO _x Cal Slope: | : | 1.002051 | | 1.003400 | |
| NO _x Cal Offset | | -1.360000 | | -1.540000 | |
| NO Cal Slope | | 1.003626 | | 0.999800 | |
| NO Cal Sidpe | | | | | |
| | | -1.700000 | | -1.960000 | |
| NO ₂ Cal Slope | | 1.006842 | | 1.014549 | |
| NO ₂ Cal Offset | | -0.842838 | | 0.808984 | |
| NH3 Cal Slope | | 1.004604 | | 0.996086 | |
| NH3 Cal Offset | : | -2.552362 | | -1.322705 | |
| TN Cal Slope | : | 1.007959 | | 0.999769 | |
| TN Cal Offset | : | -2.846246 | | -1.287257 | |
| | | | | | |



TN - NOX - NH₃ Calibration Report

Version-11-2021

| | | | | Diluti | on Calibration | Data | | | | |
|------------------|------------------------------|-----------------------------|--|---|---|---|--|--|--|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated TN concentration (ppb) (Cc) | Calculated NOX concentration (ppb) (Cc) | Calculated NH3 concentration (ppb) (Cc) | Indicated TN concentration (ppb) (Ic) | Indicated NOX concentration (ppb) (Ic) | Indicated NH3 concentration (ppb) (Ic) | TN Correction factor (Cc/Ic) Limit = 0.95-1.05 | NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | | | | | | | | | | |
| as found NO | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | | |
| high NO point | 4920 | 80.0 | 813.4 | 813.4 | | 815.0 | 816.0 | -1.1 | 0.998 | |
| NO/O3 point | | | | | | | | | | |
| as found NH3 | | | | | | | | | | |
| new NH3 cyl rp | | | | | | | | | | |
| first NH3 | 3413 | 86.4 | 1800.6 | | 1800.6 | 1800.3 | | 1793.6 | 1.000 | 1.004 |
| second NH3 | 3452 | 48.0 | 1000.2 | | 1000.2 | 996.3 | | 992.7 | 1.004 | 1.008 |
| third NH3 | 3476 | 24.0 | 500.1 | | 500.1 | 498.5 | | 496.5 | 1.003 | 1.007 |
| | | | | | | | Average C | Correction Factor | 0.9981 | 1.0062 |
| Corrected As for | und TN = | NA ppb | NO _x = NA | ppb NH3 = | NA ppb | | | *Percent Change | e TN = | NA |
| Previous Respor | nse TN = | NA ppb | NO _x = NA | ppb NH3 = | NA ppb | | | *Percent Change | e NO _x = | NA |
| | | | | | | | | *Percent Change | e NH3 = | NA |
| NH3 Previous Co | onverter Efficie | ncy = 91.1% | | | | | | * = > +/-5% change i | nitiates investigati | on |

Dilution Calibration Data

NH3 Current Converter Efficiency = 93.7%



NO_x - NO - NO₂ Calibration Report

....

Version-11-2021

| | | | | Dilutio | on Calibration | Data | | | | |
|------------------|------------------------------|--------------------------------|---|--|--|--|---|---|---|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated TN concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated TN concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | | | | | | | | | | |
| as found span | | | | | | | | | | |
| new NO cyl rp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | | |
| high point | 4920 | 80.0 | 813.4 | 800.6 | 813.4 | 816.0 | 799.9 | 815.0 | 0.9969 | 1.0009 |
| second point | 4960 | 40.0 | 406.7 | 400.3 | 406.7 | 404.1 | 396.1 | 404.1 | 1.0065 | 1.0107 |
| third point | 4980 | 20.0 | 203.4 | 200.2 | 203.4 | 202.1 | 197.0 | 202.1 | 1.0062 | 1.0160 |
| | | | | | | | Average C | orrection Factor | 1.0032 | 1.0092 |
| Baseline Corr As | fnd TN = | NA ppb | NO _x = NA | ppb NO = | NA ppb | | | *Percent Chang | e TN = | NA |
| Previous Respor | nse TN = | NA ppb | NO _x = NA | ppb NO = | NA ppb | | | *Percent Change | e NO _x = | NA |
| | | | | | | | | *Percent Change | e NO = | NA |
| | | | | | | | | * = > +/-5% change i | nitiates investigati | on |

| | | GF | PT Calibration Data | | | |
|----------------------------|--|---------------------------------------|--|---|---|---|
| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Cc) | Indicated NO2 concentration (ppb) (Ic) | NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
| as found zero | | | | | | |
| calibration zero | | | 0.0 | 0.0 | | |
| 1st GPT point (400 ppb O3) | 788.1 | 394.5 | 406.4 | 413.2 | 0.9835 | 101.7% |
| 2nd GPT point (200 ppb O3) | 788.1 | 589.7 | 211.2 | 214.0 | 0.9869 | 101.3% |
| 3rd GPT point (100 ppb O3) | 788.1 | 692.4 | 108.5 | 112.7 | 0.9627 | 103.9% |
| | | | А | verage Correction Factor | 0.9777 | 102.3% |

Notes: As founds were skipped because they were done yesterday. Changed out the pump and scrubber pack. Changed out the vent line. Adjusted both zero and span. Adjusted the NH3 span. Used the 2nd GPT reference point.

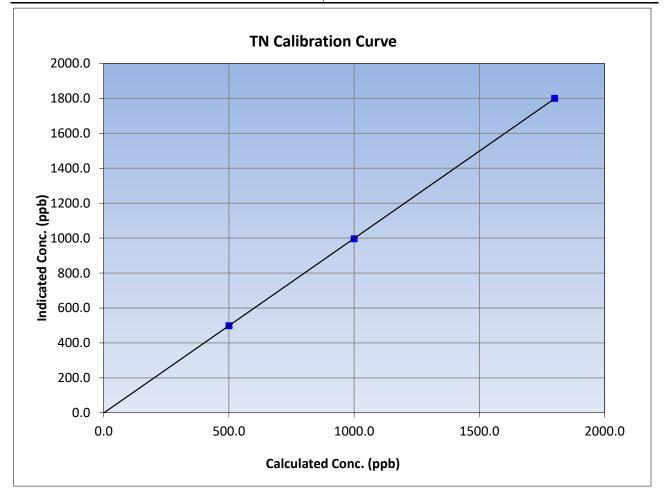
Calibration Performed By:

Rene Chamberland



TN Calibration Summary

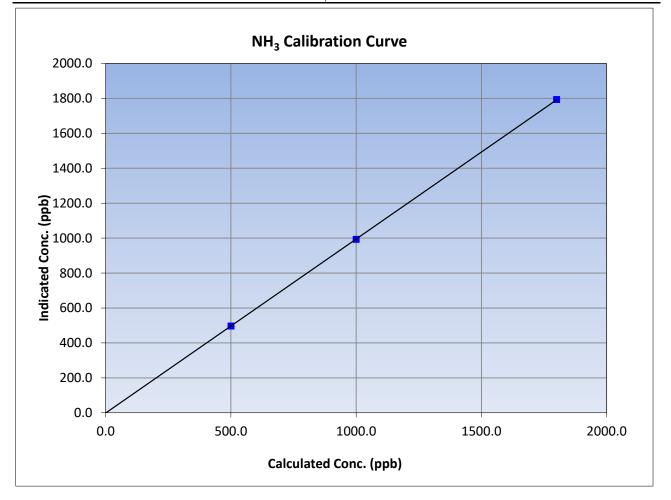
| WBEA | | | | | Version-11-202 |
|--|---------------------------------------|---------------------------|--------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | March | 31, 2023 | Previous Calibration: Fe | | ry 17, 2023 |
| Station Name: | Bertha Ganter-Fort McKay | | Station Number: | А | MS01 |
| Start Time (MST): | MST): 9:35 | | End Time (MST): | 1 | L4:10 |
| 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 | -0.1 | | Correlation Coefficient | 0.999995 | ≥0.995 |
| 1800.6 | 1800.3 | 1.0002 | correlation coernelent | 0.999999 | 20.333 |
| 1000.2 | 996.3 | 1.0039 | Slope | 0.999769 | 0.90 - 1.10 |
| 500.1 | 498.5 | 1.0032 | Slope | 0.999709 | 0.90 - 1.10 |
| | | | Intercept | -1.287257 | +/-20 |





NH₃ Calibration Summary

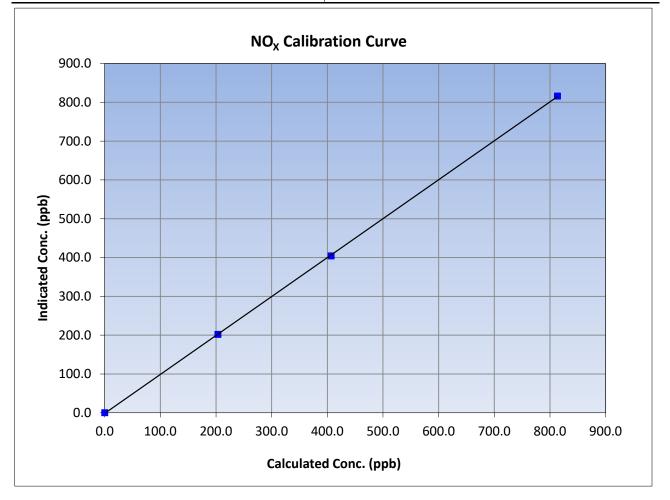
| WBEA | | | | | Version-11-2 |
|--|---------------------------------------|---------------------------|------------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 31, 2023 | Previous Calibration: | Februa | ry 17, 2023 |
| Station Name: | Bertha Gante | er-Fort McKay | Station Number: | A | MS01 |
| Start Time (MST): | 9:35 | | End Time (MST): | 14:10 | |
| Analyzer make: | e: Teledyne API T201 | | Analyzer serial #: | | 808 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | c/lc) Statistical Evaluation | | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999995 | ≥0.995 |
| 1800.6 | 1793.6 | 1.0039 | correlation coernelent | 0.999999 | 20.333 |
| 1000.2 | 992.7 | 1.0075 | Slope | 0.996086 | 0.90 - 1.10 |
| 500.1 | 496.5 | 1.0072 | Slope | 0.990080 | 0.30 - 1.10 |
| | | | Intercept | -1.322705 | +/-20 |





NO_x Calibration Summary

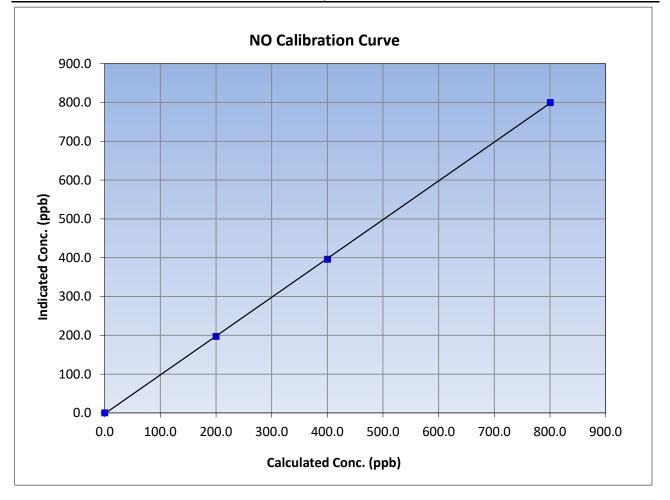
| WBEA | | | | | Version-11-2 |
|--|---------------------------------------|---------------------------|-------------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | 31, 2023 | Previous Calibration: | Februar | ry 17, 2023 |
| Station Name: | Bertha Gante | er-Fort McKay | Station Number: | A | MS01 |
| Start Time (MST): | 9:35 | | End Time (MST): | 14:10 | |
| Analyzer make: | ke: Teledyne API T201 | | Analyzer serial #: | 808 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Cc/Ic) Statistical Evaluation | | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999971 | ≥0.995 |
| 813.4 | 816.0 | 0.9969 | correlation coefficient | 0.999971 | 20.333 |
| 406.7 | 404.1 | 1.0065 | Slope | 1.003400 | 0.90 - 1.10 |
| 203.4 | 202.1 | 1.0062 | Slope | 1.003400 | 0.30 - 1.10 |
| | | | Intercept | -1.540000 | +/-20 |





NO Calibration Summary

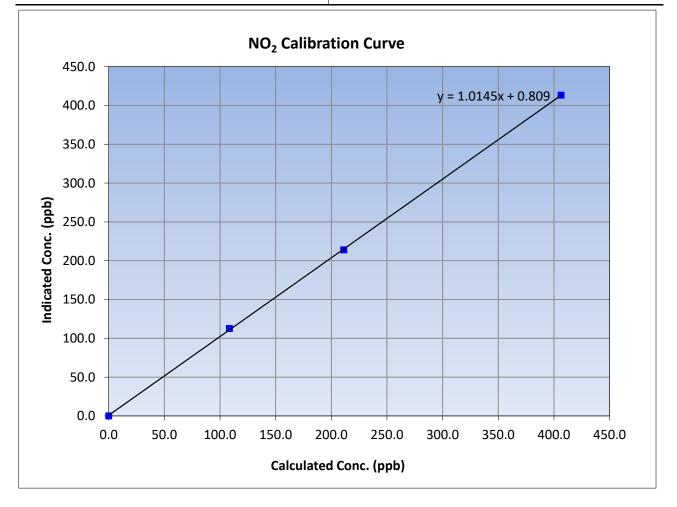
| WBEA | | | | | Version-11-2 |
|--|---------------------------------------|---------------------------|------------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | 31, 2023 | Previous Calibration: | Februar | ry 17, 2023 |
| Station Name: | Bertha Gante | er-Fort McKay | Station Number: | A | MS01 |
| Start Time (MST): | 9:35 | | End Time (MST): | 14:10 | |
| Analyzer make: | nake: Teledyne API T201 | | Analyzer serial #: | 808 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | c/lc) Statistical Evaluation | | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999966 | ≥0.995 |
| 800.6 | 799.9 | 1.0009 | correlation coernelent | 0.999900 | 20.333 |
| 400.3 | 396.1 | 1.0107 | Slope | 0.999800 | 0.90 - 1.10 |
| 200.2 | 197.0 | 1.0160 | Siope | 0.555800 | 0.90 - 1.10 |
| | | | Intercept | -1.960000 | +/-20 |





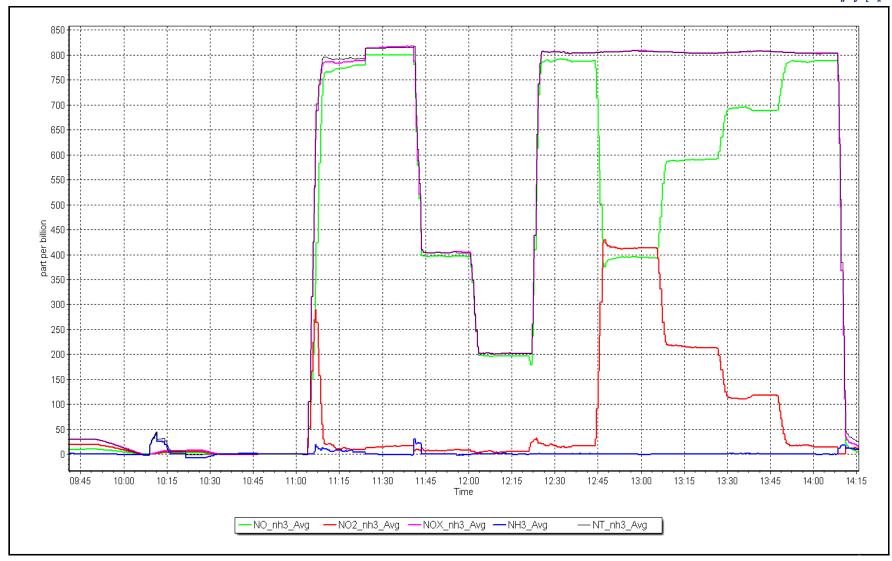
NO₂ Calibration Summary

| WBEA | | Chatian | | | Version-11-20 |
|--|---------------------------------------|---------------------------|--------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | 31, 2023 | Previous Calibration: | Februai | ry 17, 2023 |
| Station Name: | Bertha Gante | er-Fort McKay | Station Number: | A | VIS01 |
| Start Time (MST): | 9:35 | | End Time (MST): | 1 | 4:10 |
| Analyzer make: | Teledyne API T201 | | Analyzer serial #: | | 808 |
| | | 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 | 0.999945 | ≥0.995 |
| 406.4 | 413.2 | 0.9835 | correlation coefficient | 0.999945 | 20.995 |
| 211.2 | 214.0 | 0.9869 | Slope | 1.014549 | 0.90 - 1.10 |
| 108.5 | 112.7 | 0.9627 | Slope | 1.014549 | 0.90 - 1.10 |
| | | | Intercept | 0.808984 | +/-20 |

















WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|----------------------------|--|------------------------------------|--------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Mildred Lake March 8, 2023 9:53 AM Routine | | Station number: Last Cal Date: End time (MST): | AMS02 February 8, 2023 12:58 | |
| | | 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: | 1.002695 | 1.002096 | Backgd or Offset: | 17.9 | 18.0 |
| Calibration intercept: | -0.144667 | -0.984595 | Coeff or Slope: | 0.827 | 0.811 |
| | | SO ₂ Calibratio | on Data | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration (| Correction factor (Cc/I |
| Set Point | (sccm) | (sccm) | concentration (ppb) (Cc) | | <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as found span | 4920 | 80.2 | 801.6 | 817.9 | 0.980 |
| 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 | 803.1 | 0.998 |
| second point | 4960 | 40.1 | 400.8 | 399.3 | 1.004 |
| third point | 4980 | 20.0 | 199.9 | 199.1 | 1.004 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4920 | 80.2 | 801.6 | 802.9 | 0.998 |
| | | | Averag | ge Correction Factor | 1.002 |
| Baseline Corr As found: | 817.50 | Previous response | 803.66 | *% change | 1.7% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

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

Calibration Performed By:

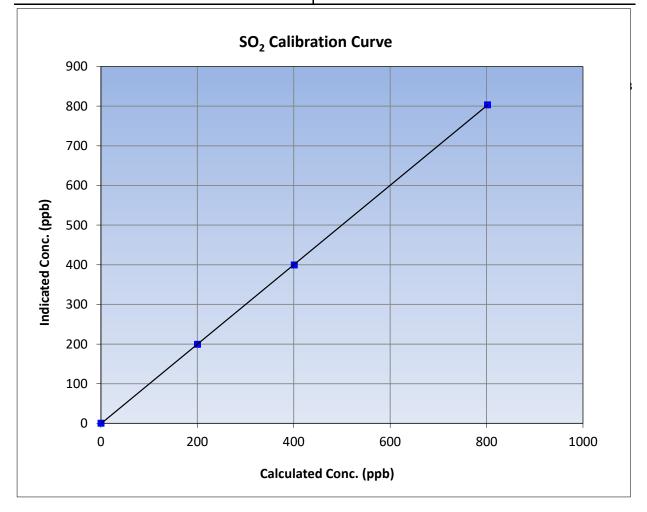


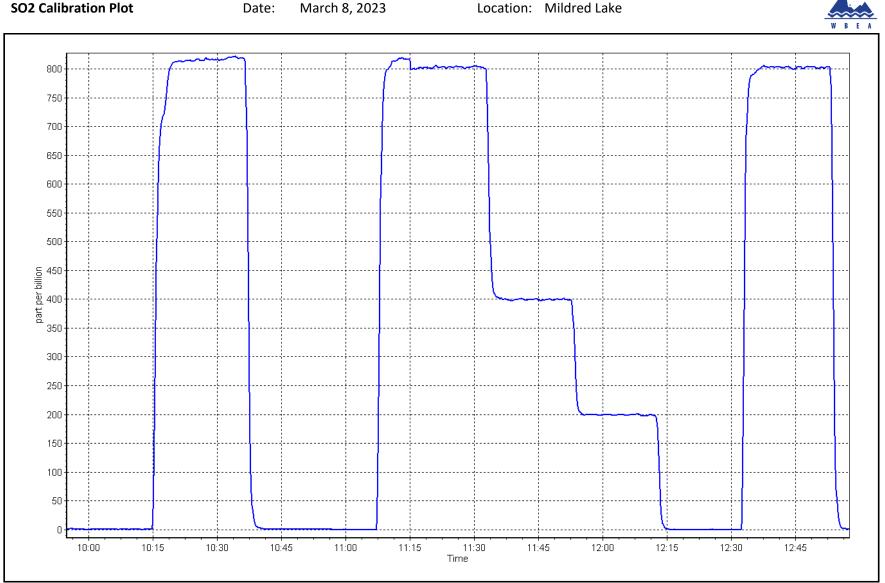
SO₂ Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|---------------|-----------------------|------------------|
| | Stat | ion Information | |
| Calibration Date: | March 8, 2023 | Previous Calibration: | February 8, 2023 |
| Station Name: | Mildred Lake | Station Number: | AMS02 |
| Start Time (MST): | 9:53 | End Time (MST): | 12:58 |
| Analyzer make: | Thermo 43i | Analyzer serial #: | JC1404901075 |

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 | 0.999991 | ≥0.995 |
| 801.6 | 803.1 | 0.9982 | correlation coefficient | 0.555551 | 20.333 |
| 400.8 | 399.3 | 1.0038 | Slope | 1.002096 | 0.90 - 1.10 |
| 199.9 | 199.1 | 1.0041 | Slope | 1.002090 | 0.90 - 1.10 |
| | | | Intercept | -0.984595 | +/-30 |





Location: Mildred Lake



H₂S Calibration Report

| | | | | | Version-11-2 |
|--|---|----------------------------------|--|---------------------------------------|--|
| | | Station Info | rmation | | Version-11-2 |
| Station Name: Calibration Date: Start time (MST): Reason: | Mildred Lake March 16, 2023 9:45 Routine | | Station number: Last Cal Date: End time (MST): | AMS02 February 6, 2023 12:45 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.29 | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | CC345191 5.29 NA API T700 API T701 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 1185 5608 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQTL Global G150 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 12113311966 2022-198 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.993964 -0.059204 | 1.007251 0.000807 | Backgd or Offset: Coeff or Slope: | 1.83 0.844 | 1.83 0.844 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjuster Correction facto (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 | 81.4 | 0.981 |
| as found 2nd point | 4962 | 37.8 | 40.0 | 40.8 | 0.978 |
| as found 3rd point | 4981 | 18.9 | 20.0 | 20.1 | 0.990 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction facto (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4924 | 75.6 | 80.0 | 80.5 | 0.994 |
| second point | 4962 | 37.8 | 40.0 | 40.5 | 0.988 |
| | 4981 | 18.9 | 20.0 | 20.0 | 1.000 |
| third point | | | | | |
| third point as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| third point as left zero as left span | 5000 4924 | 0.0 75.6 | 80.0 | 81.6 | 0.980 |
| third point as left zero as left span 602 Scrubber Check | 5000 4924 4920 | 0.0 75.6 80.2 | | 81.6 0.0 | 0.980 |
| third point as left zero as left span 602 Scrubber Check Date of last scrubber cha | 5000 4924 4920 nge: | 0.0 75.6 | 80.0 | 81.6 | 0.980 0.994 |
| third point as left zero as left span 502 Scrubber Check Date of last scrubber cha | 5000 4924 4920 nge: | 0.0 75.6 80.2 | 80.0 | 81.6 0.0 | 0.980 |
| third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter eff | 5000 4924 4920 nge: | 0.0 75.6 80.2 | 80.0 802.0 | 81.6 0.0 | 0.980 0.994 |
| third point as left zero | 5000 4924 4920 nge: ficiency test: | 0.0 75.6 80.2 12-Sep-22 | 80.0 802.0 79.45 | 81.6 0.0 Ave Corr Factor | 0.980 0.994 efficiency |

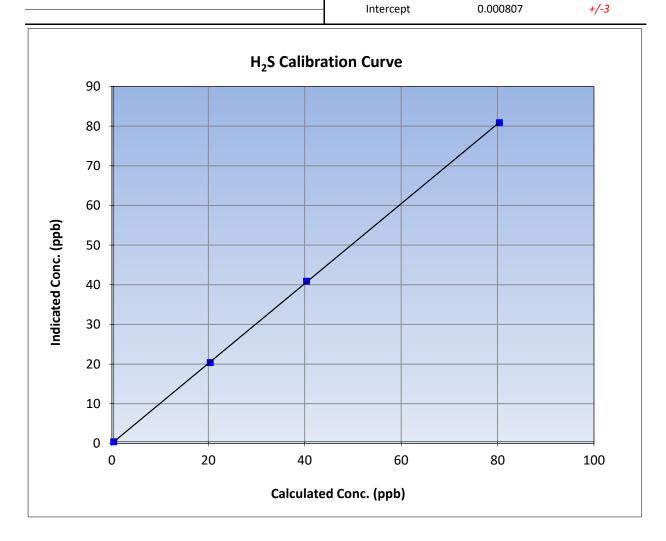
Notes:

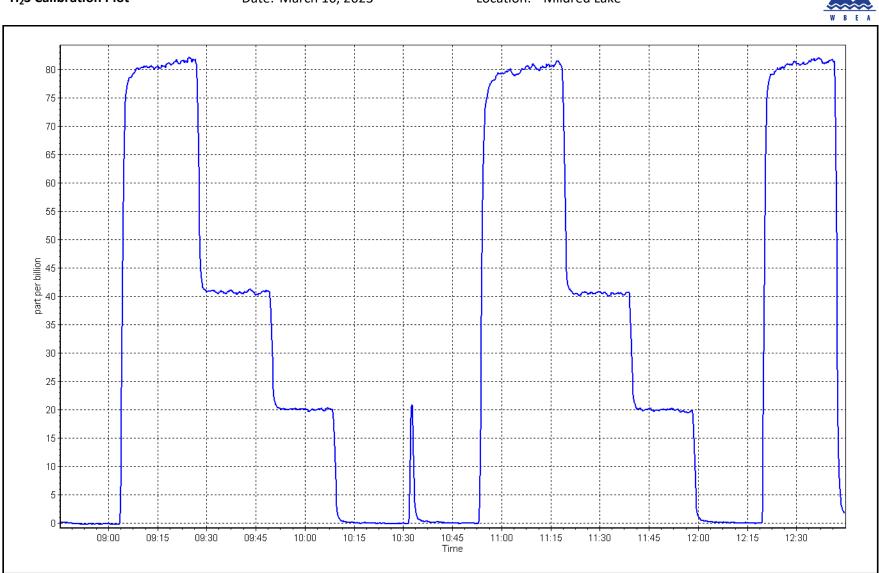
Changed the inlet filter after as founds. Ran a SO2 scrubber check after calibrator zero. No adjustment made.



H₂S Calibration Summary

| WBFA | | | | | Version-11-2 |
|---|--------------------------------------|------------------------------|-------------------------|----------|--------------------|
| | | Station | Information | | |
| Calibration Date: | March 16 | , 2023 | Previous Calibration: | Februa | ry 6 <i>,</i> 2023 |
| Station Name: | Mildred | Lake | Station Number: | AN | /IS02 |
| Start Time (MST): | 9:45 | | End Time (MST): | 1 | 2:45 |
| Analyzer make: API T | | 700 | Analyzer serial #: | 1 | 185 |
| | | Calib | ration Data | | |
| Calculated concentration Ir (ppb) (Cc) | ndicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ition | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999980 | ≥0.995 |
| 80.0 | 80.5 | 0.9937 | correlation coefficient | 0.555500 | 20.555 |
| 40.0 | 40.5 | 0.9875 | Slope | 1.007251 | 0.90 - 1.10 |
| 20.0 | 20.0 | 0.9998 | 51000 | 1.007251 | 0.00 1.10 |
| | | | | | |





H_2S Calibration Plot

Location: Mildred Lake



THC / CH_4 / NMHC Calibration Report

| | | Stati | on Information | | |
|-------------------------------------|-----------------|---------------|-------------------------|----------------|---------------|
| Station Name: | Mildred Lake | | Station number: AN | VIS02 | |
| Calibration Date: | March 8, 2023 | | Last Cal Date: Fe | bruary 8, 2023 | |
| Start time (MST): | 9:53 | | End time (MST): 12 | :58 | |
| Reason: | Routine | | | | |
| | | Calibr | ation Standards | | |
| Gas Cert Reference: | С | C501209 | Cal Gas Expiry Date: Au | ıgust 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 | 608 | |
| | | Analy | zer 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 | : 2.80E-04 | 2.84E-04 | NMHC SP Ratio: | 4.43E-04 | 4.45E-04 |
| CH4 Retention time | : 14.4 | 14.6 | NMHC Peak Area: | 198634 | 197833 |
| Zero Chromatogram | : ON | ON | Flat Baseline: | OFF | OFF |

| THC Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|-------------------|----------------------------|----------------------------|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as found span | 4920 | 80.2 | 16.82 | 16.79 | 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 | 80.2 | 16.82 | 16.82 | 1.000 | | |
| second point | 4960 | 40.1 | 8.41 | 8.37 | 1.005 | | |
| third point | 4980 | 20.0 | 4.19 | 4.15 | 1.010 | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4920 | 80.2 | 16.82 | 16.87 | 0.997 | | |
| | | | / | Average Correction Factor | 1.005 | | |
| Baseline Corr AF: | 16.79 | Prev response | 16.79 | *% change | 0.0% | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | tes investigation | | |



THC / CH_4 / NMHC Calibration Report

Version-06-2022

| | | NMHC Calib | ration Data | | |
|-----------------------|-------------------|----------------------|-------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.2 | 8.80 | 8.83 | 0.996 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.2 | 8.80 | 8.79 | 1.000 |
| second point | 4960 | 40.1 | 4.40 | 4.39 | 1.001 |
| third point | 4980 | 20.0 | 2.19 | 2.19 | 1.002 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.2 | 8.80 | 8.83 | 0.996 |
| | | | / | Average Correction Factor | 1.001 |
| Baseline Corr AF: | 8.83 | Prev response | 8.79 | *% change | 0.4% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |

| CH4 Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|----------------------------|--|--|
| 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 | 7.96 | 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 | 8.02 | 8.02 | 1.000 | | |
| second point | 4960 | 40.1 | 4.01 | 3.97 | 1.010 | | |
| third point | 4980 | 20.0 | 2.00 | 1.96 | 1.019 | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4920 | 80.2 | 8.02 | 8.04 | 0.998 | | |
| | | | A | verage Correction Factor | 1.010 | | |
| Baseline Corr AF: | 7.96 | Prev response | 8.00 | *% 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> | | <u>Finish</u> | | | |
| THC Cal Slope: | | 0.999735 | | 1.000469 | | | |
| THC Cal Offset: | | | | | | | |
| CH4 Cal Slope: | | 0.999431 | 1.001069 | | | | |
| CH4 Cal Offset: | | -0.023056 | -0.023053 | | | | |
| NMHC Cal Slope: | | 1.000064 | | 0.999791 | | | |
| NMHC Cal Offset: | | -0.001060 | -0.002261 | | | | |

Notes:

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

Calibration Performed By:

Sean Bala



THC Calibration Summary

| | | Ctation I | -formation | | |
|------------------------------------|---|---------------------------|-------------------------|-----------|---------------|
| | | | nformation | | |
| Calibration Date: | | 8, 2023 | Previous Calibration: | February | |
| Station Name: | | ed Lake | Station Number: | | S02 |
| Start Time (MST) | : 9 | :53 | End Time (MST): | 12 | :58 |
| Analyzer make: | Ther | mo 55i | Analyzer serial #: | 11803 | 20038 |
| | | 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 | 0.999989 | ≥0.995 |
| 16.82 | 16.82 | 1.0001 | correlation coefficient | 0.555585 | 20.000 |
| 8.41 | 8.37 | 1.0050 | Slope | 1.000469 | 0.90 - 1.10 |
| 4.19 | 4.15 | 1.0104 | | | |
| | | | Intercept | -0.025314 | +/-0.5 |
| 18.0 - | | THC Calibration | n Curve | | |
| 16.0 - | | | | | |
| 14.0 - | | | | | |
| 12.0 | | | | | |
| (udd) 10.0 - | | | | | |
| Ouc 0.8 - | | | | | |
| ndicated 0 | | | | | |
| 4.0 | | | | | |
| 2.0 - | | | | | |
| 0.0 | .0 5 | 5.0 | 10.0 | 15.0 | 20.0 |
| | .0 : | | 10.0 | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



CH₄ Calibration Summary

| | | | | | | Version-06-20 |
|---------------------------|------------|---------------------------------------|---------------------------|------------------------|-------------|---------------|
| | | | | nformation | | |
| Calibration [| | March 8, 2023 | | Previous Calibration | | |
| Station Nam | | | ed Lake | Station Numbe | | |
| Start Time (I | MST): | 9 | 53 | End Time (MST | r): 12: | :58 |
| Analyzer ma | ake: | Ther | no 55i | Analyzer serial | #: 11803 | 20038 |
| | | | Calibra | tion Data | | |
| Calculated con (ppm) (| | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistica | Evaluation | <u>Limits</u> |
| 0.00 | | 0.00 8.02 | 1.0000 | Correlation Coefficier | nt 0.999959 | ≥0.995 |
| 4.01 | | 3.97 1.96 | 1.0100 1.0193 | Slope | 1.001069 | 0.90 - 1.10 |
| | | | | Intercept | -0.023053 | +/-0.5 |
| | 9.0 3.0 | | | | _ | |
| | 7.0 - | | | | | |
| 6 | 5.0 - | | | | | |
| (udd) 5 | 5.0 - | | | | | |
| Indicated Conc. (ppm) | 1.0 | | | | | |
| ndicate | 3.0 | | | | | |
| | 2.0 | | | | | |
| 1 | L.0 | | | | | |
| 0 | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | 5.0 | 2.0 | | l Conc. (ppm) | 5.0 | _0.0 |
| | | | Calculated | | | |

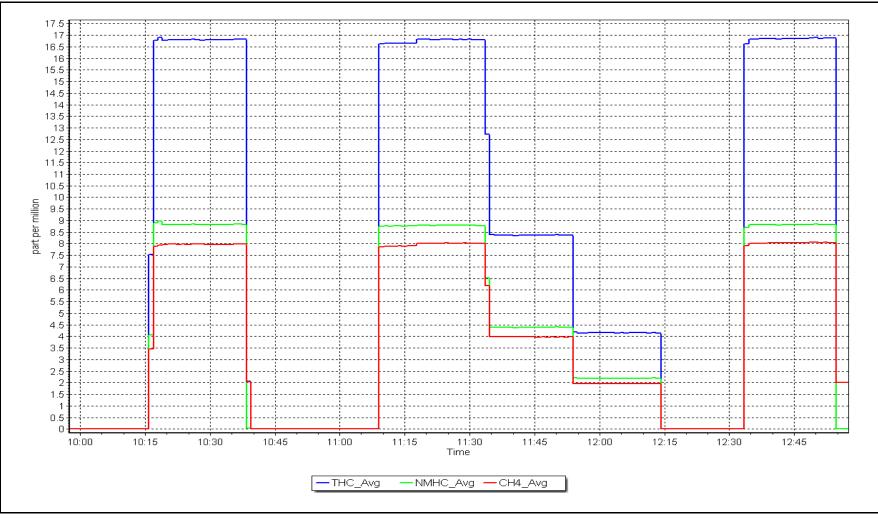


NMHC Calibration Summary

| | | | Station I | nformation | | |
|-------------|---|---------------------|------------------------|-------------------------|---------------|-------------|
| Calibratio | on Date: | March 8, 2023 | | Previous Calibration: | February | 8, 2023 |
| Station Na | ame: | Mildre | ed Lake | Station Number: | AMS | 502 |
| Start Time | e (MST): | 9: | :53 | End Time (MST): | 12: | 58 |
| Analyzer r | make: | Therr | no 55i | Analyzer serial #: | 118032 | 20038 |
| | | | Calibra | tion Data | | |
| | lculated concentration Indicated concentration (ppm) (Cc) (ppm) (lc) Correction factor (Cc/Ic) | | Statistical Evaluation | | <u>Limits</u> | |
| | .00 | 0.00 | | Correlation Coefficient | 1.000000 | ≥0.995 |
| | .80 | <u>8.79</u> 4.39 | 1.0004 1.0008 | | | |
| | .40 .19 | 2.19 | 1.0008 | Slope | 0.999791 | 0.90 - 1.10 |
| | | - | | Intercept | -0.002261 | +/-0.5 |
| (| 8.0 | | | | | |
| Conc. (ppm) | 6.0 5.0 | | | | | |
| Conc | 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







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT MARCH 2023

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

April 29, 2023







SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|--|----------------------------|--|------------------------------------|------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Buffalo Viewpoint March 28, 2023 6:30 Routine | | Station number: Last Cal Date: End time (MST): | AMS04 February 10, 2023 9:25 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 50.02 | ppm | Cal Gas Exp Date: | September 9, 2028 | |
| Cal Gas Cylinder #: | CC470284 | | Dave Cas Eve Data | NA | |
| Removed Cal Gas Conc: | 50.02 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA API T700 | | Diff between cyl: Serial Number: | 3808 | |
| Calibrator Make/Model: ZAG Make/Model: | API 1700 API T701 | | Serial Number: | 5611 | |
| LAG Make/ Model. | AFTTOI | | Senai Number. | 5011 | |
| | | Analyzer Info | rmation | | |
| Analyzer make: Analyzer Range | | | Analyzer serial #: | JC1327300932 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.998701 | 0.996516 | Backgd or Offset: | 21.5 | 22.1 |
| Calibration intercept: | 1.140000 | -0.920000 | Coeff or Slope: | 0.869 | 0.869 |
| | | SO ₂ Calibratio | on Data | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration C | orrection factor (Cc/I |
| Set Point | (sccm) | (sccm) | concentration (ppb) (Cc) | | Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as found span | 4920 | 80.0 | 800.3 | 794.6 | 1.007 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.3 | |
| high point | 4920 | 80.0 | 800.3 | 796.7 | 1.005 |
| second point | 4960 | 40.0 | 400.2 | 398.2 | 1.005 |
| third point | 4980 | 20.0 | 200.1 | 197.4 | 1.014 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4920 | 80.0 | 800.3 | 797.8 | 1.003 |
| | | | Averag | ge Correction Factor | 1.008 |
| | 794.20 | Previous response | 800.42 | *% change | -0.8% |
| Baseline Corr As found: | | | | | |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |

No Maintenance done. Zero Adjusted.

Calibration Performed By:

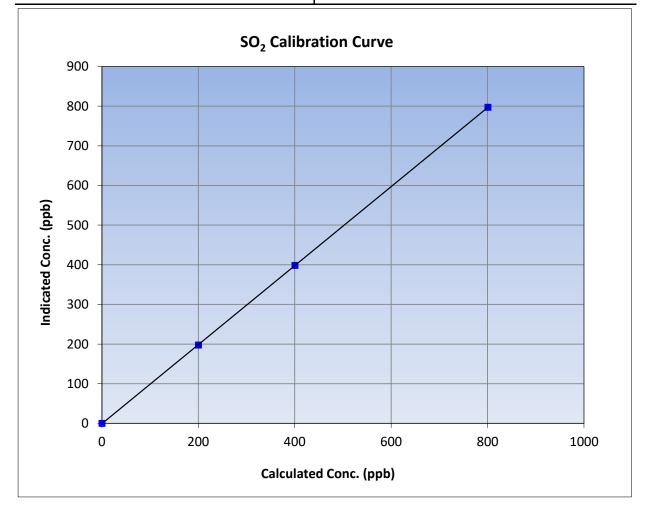


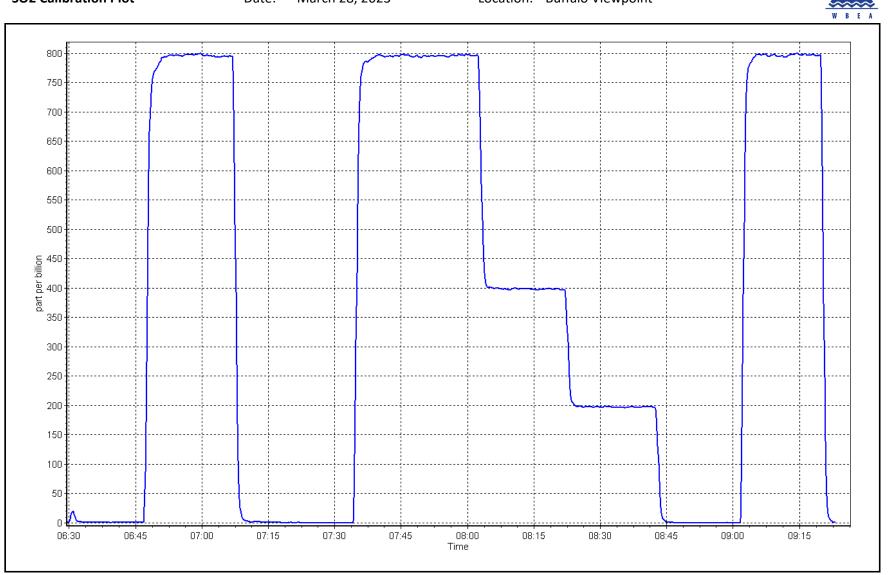
SO₂ Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|-------------------|-----------------------|-------------------|
| | Stati | on Information | |
| Calibration Date: | March 28, 2023 | Previous Calibration: | February 10, 2023 |
| Station Name: | Buffalo Viewpoint | Station Number: | AMS04 |
| Start Time (MST): | 6:30 | End Time (MST): | 9:25 |
| Analyzer make: | Thermo 43i | Analyzer serial #: | JC1327300932 |
| | | | |

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 | 0.999995 | ≥0.995 |
| 800.3 | 796.7 | 1.0045 | correlation coefficient | 0.999999 | 20.990 |
| 400.2 | 398.2 | 1.0049 | Slope | 0.996516 | 0.90 - 1.10 |
| 200.1 | 197.4 | 1.0136 | Slope | 0.990310 | 0.30 - 1.10 |
| | | | - Intercept | -0.920000 | +/-30 |





Location: Buffalo Viewpoint



H₂S Calibration Report

| WBEA | | - | | - | |
|---|---|--------------------------------|--|---------------------------------------|---|
| WBEA | | | | | Version-11-20 |
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Buffalo Viewpoint March 8, 2023 8:50 Routine | | Station number: Last Cal Date: End time (MST): | AMS04 February 15, 2023 12:30 | |
| | | 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 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | | |
| | | 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: | 1.001200 0.162167 | 0.995796 0.201944 | Backgd or Offset: Coeff or Slope: | 18.7 1.080 | 18.7 1.080 |
| | | 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 | 80.3 | 80.6 | 1.000 |
| as found 2nd point | 4963 | 37.0 | 40.1 | 40.7 | 0.993 |
| as found 3rd point | 4982 | 18.5 | 20.1 | 20.0 | 1.018 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrati | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.4 | |
| high point | 4926 | 74.1 | 80.3 | 80.3 | 1.000 |
| second point | 4963 | 37.0 | 40.1 | 40.0 | 1.003 |
| third point | 4982 | 18.5 | 20.1 | 20.0 | 1.003 |
| as left zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as left span | 4926 | 74.1 | 80.3 | 81.0 | 0.992 |
| SO2 Scrubber Check | 4920 | 80.0 | 800.0 | -0.2 | |
| Date of last scrubber cha | - | | | Ave Corr Factor | 1.002 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 80.3 | Prev response: | 80.58 | *% change: | -0.4% |
| Baseline Corr 2nd AF pt: | 40.4 | AF Slope: | 1.001624 | AF Intercept: | 0.222271 |
| Baseline Corr 3rd AF pt: | 19.7 | AF Correlation: | 0.999944 | | |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

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

Calibration Performed By:

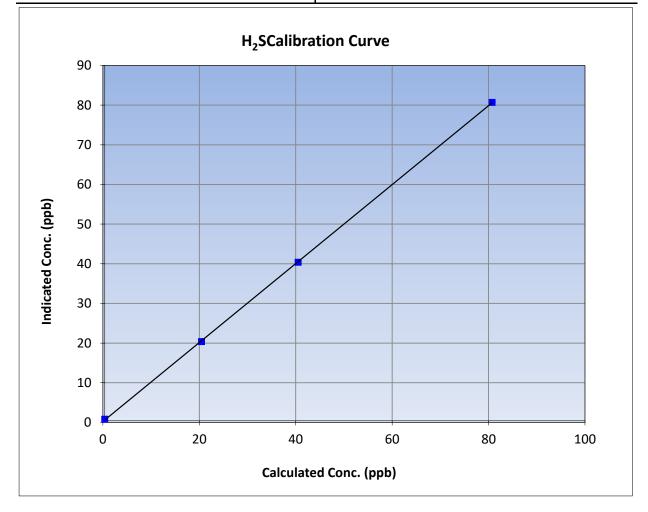


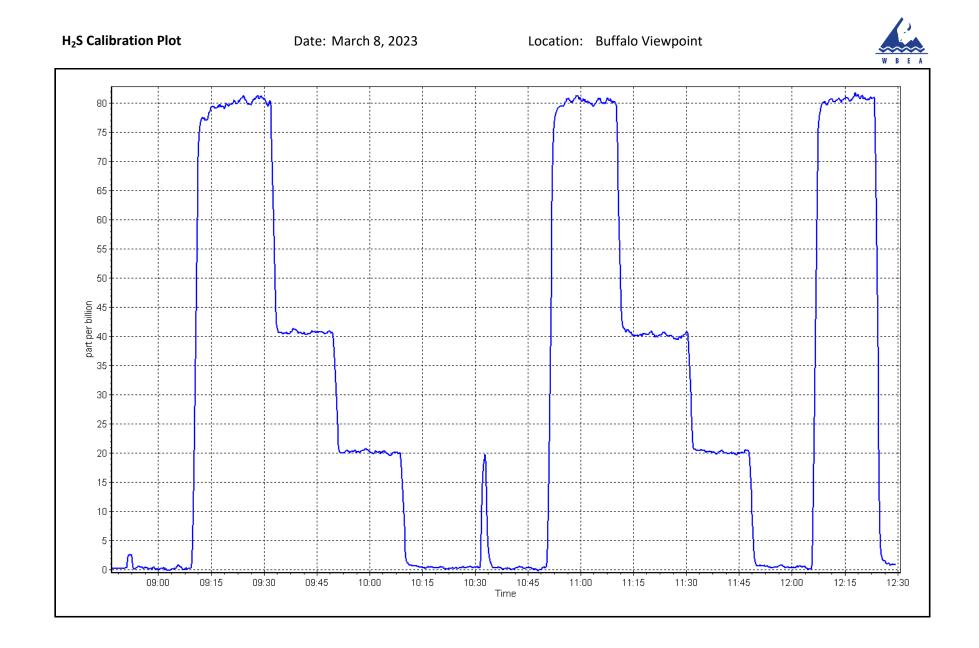
H₂S Calibration Summary

| | Stati | on Information | |
|-------------------|-------------------|-----------------------|-------------------|
| Calibration Date: | March 8, 2023 | Previous Calibration: | February 15, 2023 |
| Station Name: | Buffalo Viewpoint | Station Number: | AMS04 |
| Start Time (MST): | 8:50 | End Time (MST): | 12:30 |
| Analyzer make: | Thermo 450i | Analyzer serial #: | 1336160094 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.4 | | Correlation Coefficient | 0.999971 | ≥0.995 |
| 80.3 | 80.3 | 1.0003 | correlation coefficient | 0.999971 | 20.333 |
| 40.1 | 40.0 | 1.0027 | Slope | 0.995796 | 0.90 - 1.10 |
| 20.1 | 20.0 | 1.0026 | Slope | 0.993790 | 0.90 - 1.10 |
| | | | Intercept | 0.201944 | +/-3 |







THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-202 |
|--------------------------------------|---------------|------------|-------------------------|-----------------|----------------|
| | | : | Station Information | | |
| Station Name: | Buffalo Viewp | oint | Station number: A | MS04 | |
| Calibration Date: | March 28, 202 | 23 | Last Cal Date: Fo | ebruary 10, 202 | 23 |
| Start time (MST): | 6:30 | | End time (MST): 8 | :45 | |
| Reason: | Removal | | | | |
| | | С | alibration Standards | | |
| Gas Cert Reference: | | CC470284 | Cal Gas Expiry Date: S | 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: 3 | 808 | |
| ZAG make/model: | API T701 | | Serial Number: 3 | 62 | |
| | | ۵ | nalyzer Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 1 | 426262594 | |
| THC Range (ppm) | : 0 - 20 ppm | | - - | | |
| NMHC Range (ppm): | : 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Fir</u> | <u>nish</u> | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : 3.070E-0 | 4 3.19 | 0E-04 NMHC SP Ratio: | 6.120E-05 | 6.400E-05 |
| CH4 Retention time: | : 13.6 | 1 | 3.6 NMHC Peak Area: | 147690 | 141169 |

| | | THC Calibra | ation Data | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|----------------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.0 | 17.01 | 16.75 | 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 | 17.02 | 0.999 |
| second point | 4960 | 40.0 | 8.50 | 8.33 | 1.021 |
| third point | 4980 | 20.0 | 4.25 | 4.10 | 1.037 |
| as left zero | | | | | |
| as left span | | | | | |
| | | | A | Average Correction Factor | 1.019 |
| Baseline Corr AF: | 16.75 | Prev response | 17.01 | *% change | -1.5% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| | | NMHC 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 | 80.0 | 9.04 | 8.85 | 1.022 |
| 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 | 9.00 | 1.005 |
| second point | 4960 | 40.0 | 4.52 | 4.46 | 1.014 |
| third point | 4980 | 20.0 | 2.26 | 2.21 | 1.023 |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Ave | rage Correction Factor | 1.014 |
| Baseline Corr AF: | 8.85 | Prev response | 9.03 | *% change | -2.0% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| Set Point | Dil air flow rate | 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 | 7.90 | 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 | 7.96 | 8.02 | 0.993 |
| second point | 4960 | 40.0 | 3.98 | 3.87 | 1.029 |
| third point | 4980 | 20.0 | 1.99 | 1.88 | 1.059 |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Ave | rage Correction Factor | 1.027 |
| Baseline Corr AF: | 7.90 | Prev response | 7.99 | *% change | -1.1% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| | | | | | |

| NMHC Cal Offset: | -0.006000 | -0.024000 |
|------------------|--|--|
| | | |
| Notes: | Removal Due to third point being 6% low. | Span was adjusted, before finding out third point was low. |

1.004640

-0.080000

1.011594

-0.070000

0.999400

Calibration Performed By: Melissa Lemay

THC Cal Slope:

THC Cal Offset:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

1.002691

-0.098000

1.010302

-0.078000

0.996366



THC Calibration Summary

| | | Station I | nformation | | |
|--|--|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March 2 | March 28, 2023 | | February | 10, 2023 |
| Station Name: | | /iewpoint | Station Number: | AM | |
| Start Time (MST): | | 30 | End Time (MST): | 8:4 | 45 |
| Analyzer make: | | no 55i | Analyzer serial #: | 14262 | 62594 |
| · | | | | | |
| | | Calibra | tion Data | | |
| Calculated concentratio (ppm) (Cc) | on Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999825 | ≥0.995 |
| 17.01 | 17.02 | 0.9992 | | | |
| 8.50 4.25 | 8.33 4.10 | 1.0208 1.0370 | Slope | 1.002691 | 0.90 - 1.10 |
| 4.25 | 10 | 1.0370 | Intercept | -0.098000 | +/-0.5 |
| 18.0 | | | | | |
| 16.0 — | | | | | |
| 14.0 - | | | | | |
| 12.0 — | | | | | |
| u d 10.0 – | | | | | |
| Conc. | | | | | |
| Indicated Conc. (ppm) 0.8 – 0.0 – 0.0 – 0.0 – | | | | | |
| <u>e</u> 4.0 – | | | | | |
| 2.0 - | | | | | |
| 0.0 | | 2 | 10.0 | 45.0 | |
| 0.0 | J 5 | .0 | | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



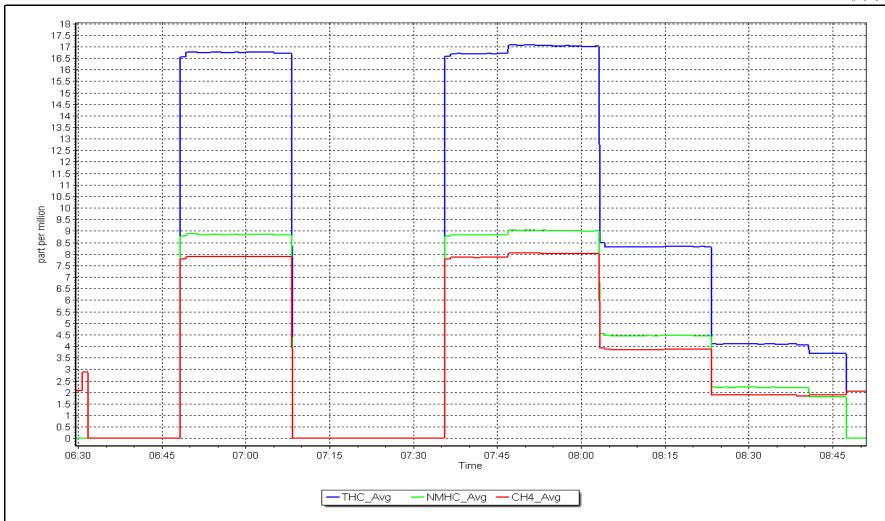
CH₄ Calibration Summary

| | | Sta | tion Informat | ion | | |
|-------------------------------------|---------------------------------------|-----------------------------|----------------|------------------|-----------|---------------|
| Caliburati D i | | | | | | 10, 2022 |
| Calibration Date | | March 28, 2023 | | us Calibration: | February | |
| Station Name: | | ffalo Viewpoint | | ation Number: | AMS | |
| Start Time (MST | | 6:30 | | nd Time (MST): | 8:4 | |
| Analyzer make: | | Thermo 55i | Ar | alyzer serial #: | 14262 | 52594 |
| | | Ca | alibration Dat | a | | |
| Calculated concentr (ppm) (Cc) | ation Indicated concent (ppm) (Ic) | ration Correction factor | (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 7.96 | 0.00 8.02 | 0.9931 | Correlat | ion Coefficient | 0.999512 | ≥0.995 |
| 3.98 | 3.87 | 1.0290 | | Slope | 1.010302 | 0.90 - 1.10 |
| 1.99 | 1.88 | 1.0591 | | Siepe | 11010302 | 0.000 1.100 |
| | | | Ir | itercept | -0.078000 | +/-0.5 |
| 9.0 8.0 7.0 | | | | | | |
| | | | | | | |
| 6.0 | | | | | | |
| Indicated Conc. (ppm) 3.0 | | | | | | |
| u oj 4.0 | | | | | | |
| 0.6 dicate | | | | | | |
| = 2.0 | | | | | | |
| 1.0 | | | | | | |
| 0.0 | | | | | | |
| | | 2.0 4. | .0 | 6.0 | 8.0 | 10.0 |
| (|).0 2 | 0 | .0 | 0.0 | 0.0 | 10.0 |



NMHC Calibration Summary

| | | Station I | nformation | | |
|--|---|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 28, 2023 | Previous Calibration: | February | 10, 2023 |
| Station Name: | Buffalo | Buffalo Viewpoint | | AM. | S04 |
| Start Time (MST): | 6 | :30 | End Time (MST): | 8:4 | 45 |
| Analyzer make: | Ther | mo 55i | Analyzer serial #: | 14262 | 62594 |
| | | | | | |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | n Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical E | valuation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999965 | ≥0.995 |
| 9.04 | 9.00 | 1.0047 | | | |
| 4.52 | 4.46 | 1.0137 1.0229 | Slope | 0.996366 | 0.90 - 1.10 |
| 2.20 | 2.21 | 1.0225 | Intercept | -0.024000 | +/-0.5 |
| 9.0 | | | | | |
| 8.0 | | | | | |
| 7.0 | | | | | |
| u 6.0 | | | | | |
| Located Conc. (ppm) | | | | | |
| 0.4 d | | | | | |
| u 3.0 | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 + | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculated | l Conc. (ppm) | | |



NMHC Calibration Plot

Date: March 28, 2023

Location: Buffalo Viewpoint





THC / CH₄ / NMHC Calibration Report

| | | Stati | ion Information | | Version-01-2 |
|--------------------------------------|----------------|---------------|-------------------------|--|---------------|
| Station Name: | Buffalo Viewpo | | Station number: AN | 1504 | |
| Calibration Date: | March 29, 2023 | | Last Cal Date: | 1504 | |
| Start time (MST): | 8:24 | | End time (MST): 10 | :37 | |
| Reason: | Install | | | | |
| | | Calib | ration Standards | | |
| Gas Cert Reference: | | CC470284 | Cal Gas Expiry Date: Se | ptember 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 | N Contraction of the second se | |
| 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 | 08 | |
| ZAG make/model: | API T701 | | Serial Number: 36 | 2 | |
| | | Analy | vzer Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 12 | 22762077 | |
| 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: | : | 1.860E-0 | 4 NMHC SP Ratio: | | 3.820E-05 |
| CH4 Retention time: | : | 12.0 | NMHC Peak Area: | | 236627 |

THC Calibration Data

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (0 | Cc) Ind conc (ppm) (Ic) | CF <i>Limit=</i> 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 | 80.0 | 17.01 | 17.00 | 1.000 |
| second point | 4960 | 40.0 | 8.50 | 8.50 | 1.000 |
| third point | 4980 | 20.0 | 4.25 | 4.22 | 1.008 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.0 | 17.01 | 17.07 | 0.996 |
| | | | ŀ | Average Correction Factor | 1.003 |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | tes investigation |
| | | | | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| NMHC Calibration Data | | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (0 | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | | |
| as found zero | | | | | | | | |
| as found span | | | | | | | | |
| as found 2nd point | | | | | | | | |
| as found 3rd point | | | | | | | | |
| new cylinder response | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 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 | | | |
| | | | A | verage Correction Factor | 1.004 | | | |
| 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) (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 | 80.0 | 7.96 | 7.97 | 0.999 |
| second point | 4960 | 40.0 | 3.98 | 3.99 | 0.998 |
| third point | 4980 | 20.0 | 1.99 | 1.99 | 1.001 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.0 | 7.96 | 8.02 | 0.993 |
| | | | Av | erage Correction Factor | 0.999 |
| 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: | | | | 1.000205 | |
| THC Cal Offset: | | | | -0.012000 | |
| CH4 Cal Slope: | | | | 1.000832 | |
| CH4 Cal Offset: | | | | 0.000000 | |
| NMHC Cal Slope: | | | | 1.000411 | |
| NMHC Cal Offset: | | | | -0.010000 | |

Notes:

Removed 55i not linear. Install calibration. Use zero chromatogram to NO. Span adjusted.

Calibration Performed By: Melissa Lemay



THC Calibration Summary

| | | Chation I | aformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | | nformation | | |
| Calibration Date: | | | AMS04 | | |
| Station Name: | | /iewpoint | Station Number: | | |
| Start Time (MST): | | 24 | End Time (MST): | 10: | |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 12227 | 62077 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999996 | ≥0.995 |
| 17.01 | 17.00 | 1.0004 | | | |
| 8.50 4.25 | 8.50 4.22 | 1.0004 1.0075 | Slope | 1.000205 | 0.90 - 1.10 |
| 4.25 | 4.22 | 1.0075 | Intercept | -0.012000 | +/-0.5 |
| 18.0 | | THC Calibratio | n Curve | | |
| 18.0 | | | | | |
| 16.0 | | | | | |
| 14.0 | | | | | |
| 12.0 | | | | | |
| (mdd 10.0 | | | | | |
| 10.0 (bbm) 0.8 0.0 | | | | | |
| - 0.6 cated | | | | | |
| | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | | | | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



CH₄ Calibration Summary

| | | Station I | nformation | | |
|-----------------------|---|---------------------------|-------------------------|----------|---------------|
| Calibration Date: | March | 29, 2023 | Previous Calibration: | | |
| Station Name: | Buffalo \ | Buffalo Viewpoint | | AM | 504 |
| Start Time (MST): | 8 | :24 | End Time (MST): | 10: | 37 |
| Analyzer make: | Ther | mo 55i | Analyzer serial #: | 12227 | 62077 |
| | | Calibra | tion Data | | |
| | | | | | |
| (ppm) (Cc) | n Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999999 | ≥0.995 |
| 7.96 | 7.97 3.99 | 0.9993 0.9981 | | | |
| 1.99 | 1.99 | 1.0006 | Slope | 1.000832 | 0.90 - 1.10 |
| | | | Intercept | 0.000000 | +/-0.5 |
| 9.0 - | | | | | |
| 7.0 | | | | | |
| 6.0 - | | | | | |
| (mdd 5.0 - | | | | | |
| OUC 4.0 | | | | | |
| Indicated Conc. (ppm) | | | | | |
| 2.0 | | | | | |
| 1.0 — | | | | | |
| 0.0 🚅 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | l Conc. (ppm) | | |

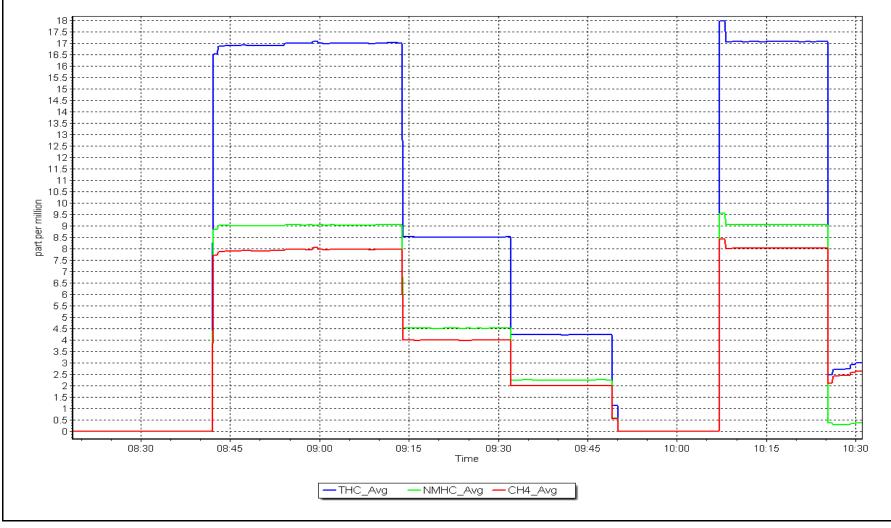


NMHC Calibration Summary

| | | Station I | nformation | | |
|---|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 29, 2023 | Previous Calibration: | | |
| Station Name: | Buffalo \ | /iewpoint | Station Number: | AM | 504 |
| Start Time (MST): | 8: | 24 | End Time (MST): | 10: | 37 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 12227 | 62077 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 9.04 4.52 | 9.04 4.51 | 1.0002 1.0024 | | | |
| 2.26 | 2.24 | 1.0092 | Slope | 1.000411 | 0.90 - 1.10 |
| | | | Intercept | -0.010000 | +/-0.5 |
| 10.0 9.0 8.0 7.0 6.0 5.0 | | | | | |
| <u>ب</u> 5.0 – | | | | | |
| 0.4 teg | | | | | |
| 0.4 Undicated | | | | | |
| 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

| | | Stat | ion Information | | | | | | | |
|---|---|---|--|--|--------------------------------------|--|--|--|--|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Buffalo Viewpoint March 3, 2023 8:07 Routine | | Station number: Last Cal Date: End time (MST): | February 14, 2023 | | | | | | |
| | | Calib | ration Standards | | | | | | | |
| NO Gas Cylinder #: | T36RH1F | | Cal Gas Expiry Date: | August 18, 2023 | | | | | | |
| NOX Cal Gas Conc: | 51.16 | ppm | NO Cal Gas Conc: | 50.91 | ppm | | | | | |
| Removed Cylinder #: | NA | | Removed Gas Exp Date: | NA | | | | | | |
| Removed Gas NOX Conc: | 51.16 | ppm | Removed Gas NO Conc: | 50.91 | ppm | | | | | |
| NOX gas Diff: | | | NO gas Diff: | | | | | | | |
| Calibrator Model: | API T700 | | Serial Number: | 2445 | | | | | | |
| ZAG make/model: | API T701 | | Serial Number: | 362 | | | | | | |
| Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope | 0 - 1000 ppb <u>Start</u> : 0.998 : 0.992 | Anal <u>Finish</u> 0.998 0.992 1.000 | NO bkgnd or offset: NOX bkgnd or offset: | 723 <u>Start</u> -9.0 -9.0 7.3 | <u>Finish</u> -2.1 -1.7 7.6 | | | | | |
| Calibration Statistics | | | | | | | | | | |
| | | <u>Start</u> | | <u>Finish</u> | | | | | | |
| NO _x Cal Slope | | 1.0007 | | 0.998743 | | | | | | |
| NO _x Cal Offset | | 0.9668 | | 0.546857 | | | | | | |
| NO Cal Slope | | 1.0041 | | 1.004711 | | | | | | |
| NO Cal Offset | | -0.0531 | | -0.973240 | | | | | | |
| NO ₂ Cal Slope | | 0.9944 | | 0.992216 | | | | | | |
| NO ₂ Cal Offset | : | -0.6129 | 33 | 0.603575 | | | | | | |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|--|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/lc) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 3.4 | 1.2 | | |
| as found span | 4922 | 78.1 | 799.1 | 795.2 | 3.9 | 799.2 | 797.1 | 2.1 | 0.9999 | 0.9976 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | -0.2 | | |
| high point | 4922 | 78.1 | 799.1 | 795.2 | 3.9 | 798.6 | 798.8 | -0.2 | 1.0006 | 0.9955 |
| second point | 4961 | 39.1 | 400.1 | 398.1 | 2.0 | 399.7 | 397.8 | 2.0 | 1.0009 | 1.0008 |
| third point | 4981 | 19.5 | 199.5 | 198.5 | 1.0 | 200.8 | 197.6 | 3.1 | 0.9935 | 1.0047 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| as left span | 4922 | 78.1 | 799.1 | 366.2 | 432.9 | 799.2 | 363.5 | 435.8 | 0.9999 | 1.0074 |
| | | | | | | | Average C | orrection Factor | 0.9984 | 1.0003 |
| Corrected As fo | ound NO _x = | 794.7 ppb | NO = | 793.7 ppb | * = > +/-5% | % change initiates i | nvestigation | *Percent Chan | ge NO _x = | -0.8% |
| Previous Respo | onse NO _x = | 800.7 ppb | NO = | 798.4 ppb | | | | *Percent Chan | ge NO = | -0.6% |
| Baseline Corr 2 | nd pt NO _X = | NA ppb | NO = | NA ppb | As found | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | rd pt NO _x = | NA ppb | NO = | NA ppb | As found | d NO r^2 : | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |
| | | | | | | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 concentration (ppb) (Ic) | NO2 Correction factor (Cc/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) | 796.4 | 367.4 | 432.9 | 429.6 | 1.0077 | 99.2% |
| 2nd GPT point (200 ppb O3) | 796.4 | 582.3 | 218.0 | 217.7 | 1.0014 | 99.9% |
| 3rd GPT point (100 ppb O3) | 796.4 | 689.5 | 110.8 | 111.1 | 0.9973 | 100.3% |
| | | | ŀ | Average Correction Factor | 1.0021 | 99.8% |

Notes:

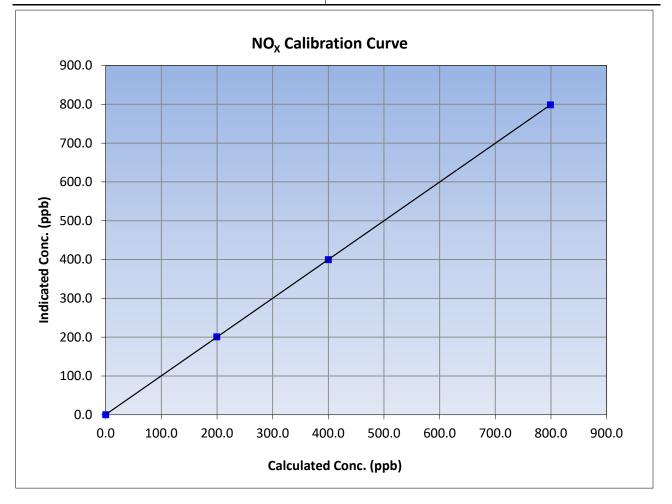
No maintenance done. Zero adjusted.

Calibration Performed By:



NO_x Calibration Summary

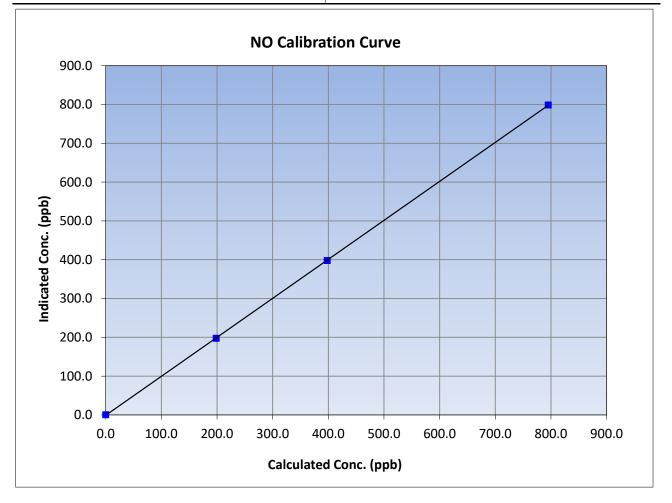
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | February | / 14, 2023 |
| Station Name: | Buffalo V | /iewpoint | Station Number: | AM | 1SO4 |
| Start Time (MST): | 8: | .07 | End Time (MST): | 12 | 2:49 |
| Analyzer make: | API | Т200 | Analyzer serial #: | 7 | 23 |
| | | 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 |
| 799.1 | 798.6 | 1.0006 | correlation coefficient | 0.5555550 | 20.333 |
| 400.1 | 399.7 | 1.0009 | Slope | 0.998743 | 0.90 - 1.10 |
| 199.5 | 200.8 | 0.9935 | Slope | 0.998745 | 0.90 - 1.10 |
| | | | Intercept | 0.546857 | +/-20 |





NO Calibration Summary

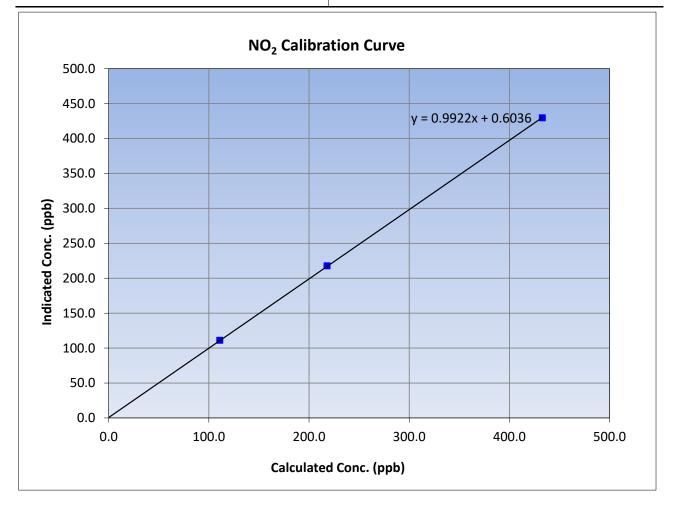
| WBEA | | Station | Information | | Version-04-20 | |
|--|---------------------------------------|---------------------------|--|-----------|---------------------|--|
| Calibration Date: Station Name: | | 3, 2023 /iewpoint | Previous Calibration: Station Number: | | y 14, 2023 //SO4 | |
| Start Time (MST): Analyzer make: | 8:07 API T200 | | End Time (MST): Analyzer serial #: | | | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 795.2 | 0.3 798.8 | 0.9955 | Correlation Coefficient | 0.999987 | ≥0 <i>.995</i> | |
| 398.1 198.5 | 397.8 197.6 | 1.0008 1.0047 | Slope | 1.004711 | 0.90 - 1.10 | |
| | | | Intercept | -0.973240 | +/-20 | |

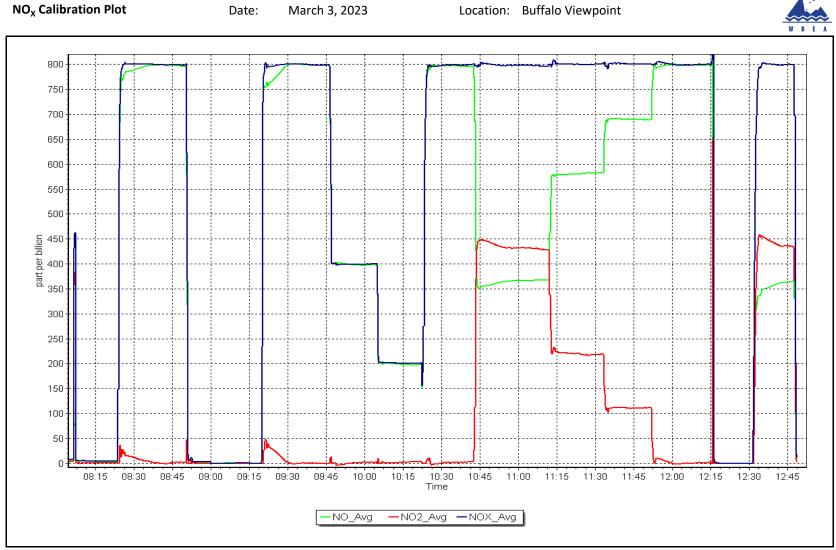




NO₂ Calibration Summary

| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | Februa | ry 14, 2023 |
| Station Name: | Buffalo V | /iewpoint | Station Number: | A | MS04 |
| Start Time (MST): | 8: | 8:07 | | End Time (MST): 12:49 | |
| Analyzer make: | API | T200 | Analyzer serial #: | 723 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | ation | <u>Limits</u> |
| 0.0 | -0.2 | | Correlation Coefficient | 0.999981 | ≥0.995 |
| 432.9 | 429.6 | 1.0077 | correlation coernelent | 0.333381 | 20.333 |
| 218.0 | 217.7 | 1.0014 | Slope | 0.992216 | 0.90 - 1.10 |
| 110.8 | 111.1 | 0.9973 | Slope | 0.992210 | 0.30 - 1.10 |
| | | | Intercept | 0.603575 | +/-20 |







O₃ Calibration Report

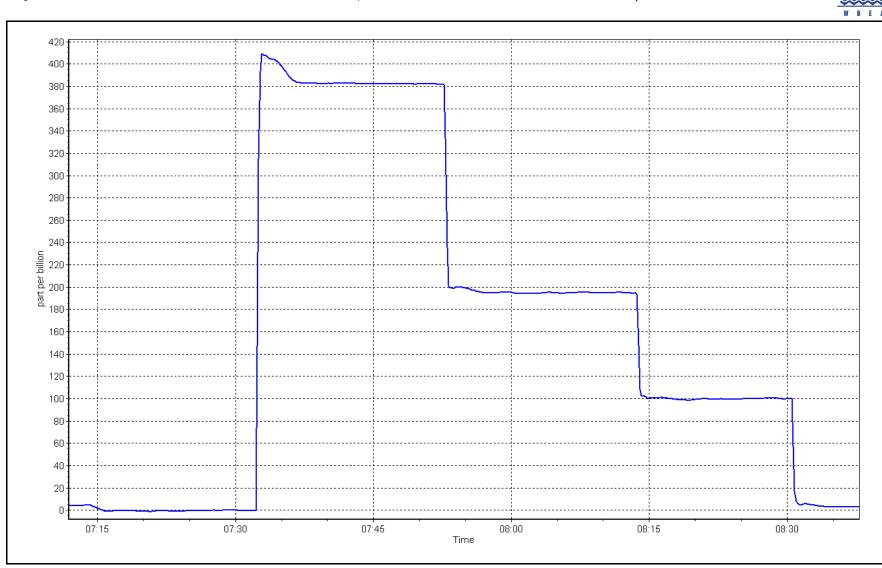
Version-01-2020

| | | Station Infor | mation | | |
|---|---------------------|--------------------------------|-------------------------------|--|--------------------------|
| Station Name: | Buffalo Viewpoint | | Station number: A | AMS04 | |
| Calibration Date: | March 6, 2023 | | Last Cal Date: F | ebruary 10, 2023 | |
| Start time (MST): | 7:14 | | End time (MST): 8 | • | |
| Reason: | As Found | | | | |
| | | | | | |
| | | Calibration St | andards | | |
| O3 generation mode: | Photometer | | | | |
| Calibrator Make/Model: | API T700 | | Serial Number: 2 | 2445 | |
| ZAG Make/Model: | API T701 | | Serial Number: 3 | 362 | |
| | | Analyzer Info | rmation | | |
| Analyzer make | 2: API T400 | | Analyzer serial #: 2 | 961 | |
| Analyzer Rang | | | | | |
| | Start | Finish | | Start | Finish |
| Calibration slope: | 0.988657 | <u>i 11/15/1</u> | Backgd or Offset: | -3.3 | -3.3 |
| Calibration intercept: | 3.560000 | | Coeff or Slope: | 1.065 | 1.065 |
| canoration intercept. | 3.300000 | | coen of slope. | 1.005 | 1.005 |
| | | O ₃ Calibratio | on Data | | |
| Set Point | Total air flow rate | Calibrator Lamp | Calculated I | ndicated concentration Co | prrection factor (Co |
| Set Point | (sccm) | Voltage Drive | concentration (ppb) (Cc) | (ppm) (Ic) | <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | -0.2 | |
| as found span | 5000 | 1158.5 | 400.0 | 382.2 | 1.047 |
| as found 2nd point | 5000 | 915.0 | 200.0 | 194.9 | 1.026 |
| as found 3rd point | 5000 | 784.5 | 100.0 | 99.9 | 1.001 |
| calibrator zero | | | | | |
| high point | | | | | |
| second point | | | | | |
| | | | | | |
| third point | | | | | |
| third point as left zero | | | | | |
| - | | | | | |
| as left zero | | | Average | Correction Factor | |
| as left zero as left span Baseline Corr As found: | 382.4 | Previous response | | Correction Factor | -4.3% |
| as left zero as left span Baseline Corr As found: | 382.4 -187.3 | Previous response AF Slope: | 399.0 | | -4.3% 2.380000 |
| as left zero as left span | | - | 399.0 0.953257 0.999784 | *% change AF Intercept: | 2.380000 |
| as left zero as left span Baseline Corr As found: Baseline Corr 2nd AF pt: | -187.3 | AF Slope: | 399.0 0.953257 0.999784 | *% change | 2.380000 |
| as left zero as left span Baseline Corr As found: Baseline Corr 2nd AF pt: | -187.3 -95.0 | AF Slope: AF Correlation: | 399.0 0.953257 0.999784 | *% change AF Intercept: = > +/-5% change initiates | 2.380000 |

maintenance- Lamp changed, Leak check passed.

Calibration Performed By:

Melissa Lemay



Location: Buffalo Viewpoint



O₃ Calibration Report

Version-01-2020

| | | Station Infor | mation | | | |
|---|--|--|--|---|---|--|
| Station Name: | Buffalo Viewpoint | | Station number: | | | |
| Calibration Date: | March 7, 2023 | | Last Cal Date: March 6, 2023 | | | |
| Start time (MST): | 9:20 | | End time (MST): | | | |
| | | | End time (wist). | 11.59 | | |
| 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 | | | | | | |
| | <u>Start</u> | Finish | | <u>Start</u> | <u>Finish</u> | |
| Calibration slope: | 0.988657 | 0.996114 | Backgd or Offset: | -3.3 | -5.3 | |
| Calibration intercept: | 3.560000 | 1.880000 | Coeff or Slope: | 1.065 | 1.178 | |
| | | 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) | orrection factor (Cc/I 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 | 0.3 | | |
| • | 5000 5000 | 0.0 970.8 | 0.0 400.0 | 0.3 399.6 | 1.001 | |
| calibrator zero | | | | | | |
| calibrator zero high point | 5000 | 970.8 | 400.0 | 399.6 | 1.001 | |
| calibrator zero high point second point third point as left zero | 5000 5000 | 970.8 806.0 | 400.0 200.0 | 399.6 201.7 103.2 1.2 | 1.001 0.992 | |
| calibrator zero high point second point third point | 5000 5000 5000 | 970.8 806.0 697.0 | 400.0 200.0 100.0 | 399.6 201.7 103.2 | 1.001 0.992 0.969 | |
| calibrator zero high point second point third point as left zero | 5000 5000 5000 5000 | 970.8 806.0 697.0 0.0 | 400.0 200.0 100.0 0.0 400.0 | 399.6 201.7 103.2 1.2 | 1.001 0.992 0.969 | |
| calibrator zero high point second point third point as left zero | 5000 5000 5000 5000 | 970.8 806.0 697.0 0.0 | 400.0 200.0 100.0 0.0 400.0 | 399.6 201.7 103.2 1.2 399.2 | 1.001 0.992 0.969 1.002 | |
| calibrator zero high point second point third point as left zero as left span | 5000 5000 5000 5000 5000 | 970.8 806.0 697.0 0.0 971.2 | 400.0 200.0 100.0 0.0 400.0 Average | 399.6 201.7 103.2 1.2 399.2 e Correction Factor | 1.001 0.992 0.969 1.002 0.987 | |
| calibrator zero high point second point third point as left zero as left span Baseline Corr As found: | 5000 5000 5000 5000 5000 NA | 970.8 806.0 697.0 0.0 971.2 Previous response | 400.0 200.0 100.0 0.0 400.0 Average | 399.6 201.7 103.2 1.2 399.2 e Correction Factor *% change | 1.001 0.992 0.969 1.002 0.987 | |

Notes: Station calibrator was replaced. Analyzer maintenance- Lamp changed, Leak check passed. Span adjusted.

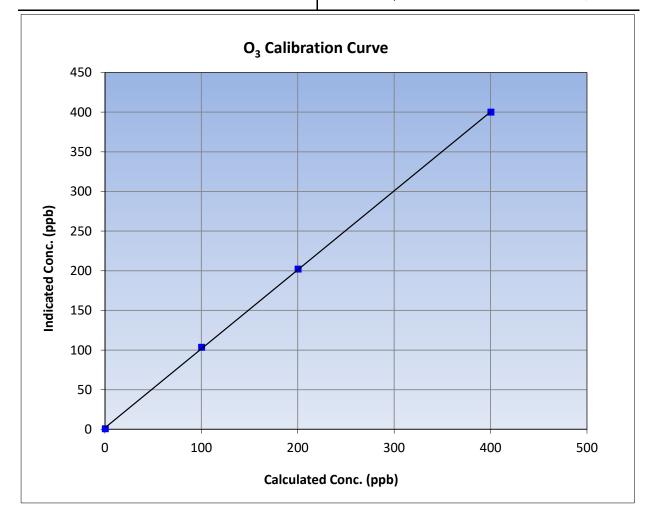
Calibration Performed By:

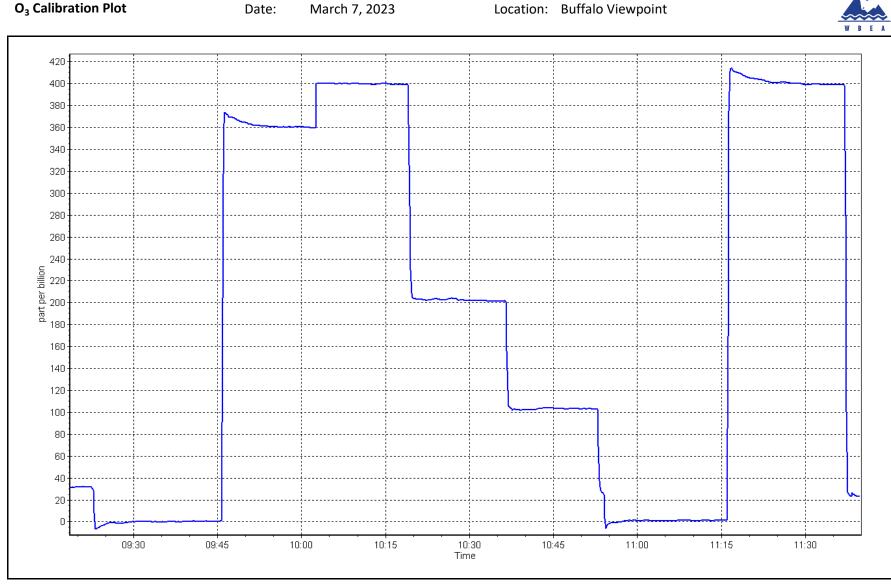
Melissa Lemay



O₃ Calibration Summary

| WBEA | | | | | Version-01-20 | |
|--------------------------|-------------------------|-----------------------------|-------------------------|----------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 7 | , 2023 | Previous Calibration: | Marc | h 6, 2023 | |
| Station Name: | Buffalo Vie | ewpoint | Station Number: | A | MS04 | |
| Start Time (MST): | 9:20 | 0 | End Time (MST): | 1 | 1:39 | |
| Analyzer make: | API T4 | 100 | Analyzer serial #: | 2 | 2961 | |
| Calculated concentration | Indicated concentration | Calibr Correction factor | ration Data | tion | Limits | |
| (ppb) (Cc) | (ppb) (Ic) | (Cc/Ic) | | nion | <u>Linnits</u> | |
| 0.0 | 0.3 | | Correlation Coefficient | 0.999927 | ≥0.995 | |
| 400.0 | 399.6 | 1.0010 | | 0.000027 | | |
| 200.0 | 201.7 | 0.9916 | Slope | 0.996114 | 0.90 - 1.10 | |
| 100.0 | 103.2 | 0.9690 | 51000 | 0.550114 | 0.50 - 1.10 | |
| | | | Intercept | 1.880000 | +/- 5 | |





Location: Buffalo Viewpoint



T640 PM_{2.5} CALIBRATION

| W D E A | | | | | Version-01-2023 |
|-------------------------------|--------------------|---|-----------------|---------------------------|-----------------|
| | | Station Information | 1 | | |
| Station Name: | Buffalo Viewpoint | | Station number: | AMS 04 | |
| Calibration Date: | March 28, 2023 | | Last Cal Date: | February 15, 2023 | |
| Start time (MST): | 9:26 | | End time (MST): | 10:33 | |
| | | | - (h) | | |
| Analyzer Make: | API T640 | | S/N: | 844 | |
| 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) |
| т (°С) | -11.4 | -11.5 | -11.4 | | +/- 2 °C |
| P (mmHg) | 736.3 | 738.1 | 736.1 | | +/- 10 mmHg |
| flow (LPM) | 5 | 4.8 | 5 | | +/- 0.25 LPM |
| | | - | - | | +/- 0.25 LPIVI |
| Leak Test: | Date of check: | March 28, 2023 | Last Cal Date: | February 15, 2023 | |
| Note: this leak check will be | PM w/o HEPA: | 5 quarterly work and will s | PM w/ HEPA: | 0 intenance leak check | <0.2 ug/m3 |
| | Inlet Head | | | | |
| Inlet cleaning : | iniet Head | | | | |
| | | | | | |
| | | Quarterly Calibration | Tost | | |
| Parameter | As found | Post maintenance | As left | Adjusted | (Limits) |
| | 10.5 | <u>FOST Maintenance</u> | 10.5 | Aujusteu | |
| PMT Peak Test | 10.5 | | 10.5 | | 10.9 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | | w/ HEPA: | |
| Date Optical Cham | nber Cleaned: | March 28, 2023 | | | <0.2 ug/m3 |
| Disposable Filte | er Changed: | March 28, | 2023 | | |
| | | | | | |
| | | | | | |
| | | Annual Maintenanc | 0 | | |
| | | Annual Maintenanc | c | | |
| Date Sample Tul | be Cleaned: | September 1 | 5, 2022 | | |
| Date RH/T Sense | - | September 1 | 5, 2022 | | |
| | | | | | |
| | | | | | |
| | | eadings once in a while bef | | | |
| Notes: | was showing no rea | adings before cleaning, aft cleaning. Pump at 80 | - | | tailed after |
| Calibration by: | Melissa Lemay | cicaning. Fump dt ou | | | |
| , | / | | | | |



T640 PM_{2.5} CALIBRATION

| WBEA | | | | | Version-01-2023 |
|---|-------------------|-----------------------|--------------------|----------|-----------------|
| | | Station Informatio | n | | |
| Station Name: | Buffalo Viewpoint | | Station number: | AMS 04 | |
| Calibration Date: | March 29, 2023 | | Last Cal Date: | | |
| Start time (MST): | 6:29 | | End time (MST): | 7:09 | |
| | | | . (1) | | |
| Analyzer Make: Particulate Fraction: | 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 1 | ſest | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | Adjusted | (Limits) |
| T (°C) | -4 | -3.85 | -4 | | +/- 2 °C |
| P (mmHg) | 728.6 | 729.9 | 728.6 | | +/- 10 mmHg |
| flow (LPM) | 5 | 4.95 | 5 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 29, 2023 | Last Cal Date: | | , |
| Leak Test. | PM w/o HEPA: | 5.9 | PM w/ HEPA: | 0 | <0.2 ug/m3 |
| Note: this leak check will be | | | | - | N.2 06/113 |
| Inlet cleaning : | Inlet Head | | | | |
| 57777 8 | | | | | |
| | | | | | |
| | | Quarterly Calibration | Test | | |
| Parameter_ | <u>As found</u> | Post maintenance | As left | Adjusted | (Limits) |
| PMT Peak Test | 10.4 | | 10.4 | | 10.9 +/- 0.5 |
| | 2011 | | 10.1 | | 1013 ., 013 |
| Post-maintenance | e leak check: | PM w/o HEPA: | | w/ HEPA: | |
| Date Optical Chan | nber Cleaned: | March 28, 2023 | | | <0.2 ug/m3 |
| Disposable Filte | r Changed: | March 28, | , 2023 | | |
| | | | | | |
| | | | | | |
| | | Annual Maintenan | ce | | |
| | | | | | |
| Date Sample Tul | be Cleaned: | September 1 | 15, 2022 | | |
| Date RH/T Sense | or Cleaned: | September 1 | 15, 2022 | | |
| | | | | | |
| | | | | | |
| Notes: | | Ins | stall Calibration. | | |
| NOLES. | | | | | |
| Calibration by: | Melissa Lemay | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Mannix March 2, 2023 10:34 Routine | | Station number: Last Cal Date: End time (MST): | AMS05 February 21, 2023 14:43 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 50.02 XC026809B | ppm | Cal Gas Exp Date: | January 12, 2029 | |
| Removed Cal Gas Conc: | 50.02 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | | Diff between cyl: | | |
| Calibrator Make/Model: | API T700 | | , Serial Number: | 621 | |
| ZAG Make/Model: | API T701H | | Serial Number: | 832 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1008841399 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.996758 | 0.999400 | Backgd or Offset: | | 9.1 |
| Calibration intercept: | -0.080000 | -0.280000 | Coeff or Slope: | 0.914 | 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/Ic Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | -0.1 | |
| as found span | 4920 | 80.0 | 800.3 | 792.2 | 1.010 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4920 | 80.0 | 800.3 | 799.4 | 1.001 |
| second point | 4960 | 40.0 | 400.2 | 400.5 | 0.999 |
| third point | 4980 | 20.0 | 200.1 | 198.6 | 1.007 |
| as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as left span | 4920 | 80.0 | 800.3 Averas | 803.8 ge Correction Factor | 0.996 |
| | | | | | |
| Baseline Corr As found: | 792.30 | Previous response | | *% change | -0.7% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

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

Calibration Performed By:

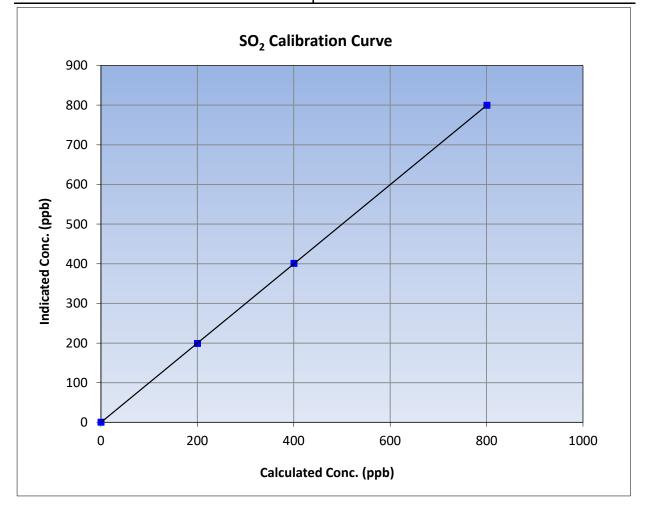


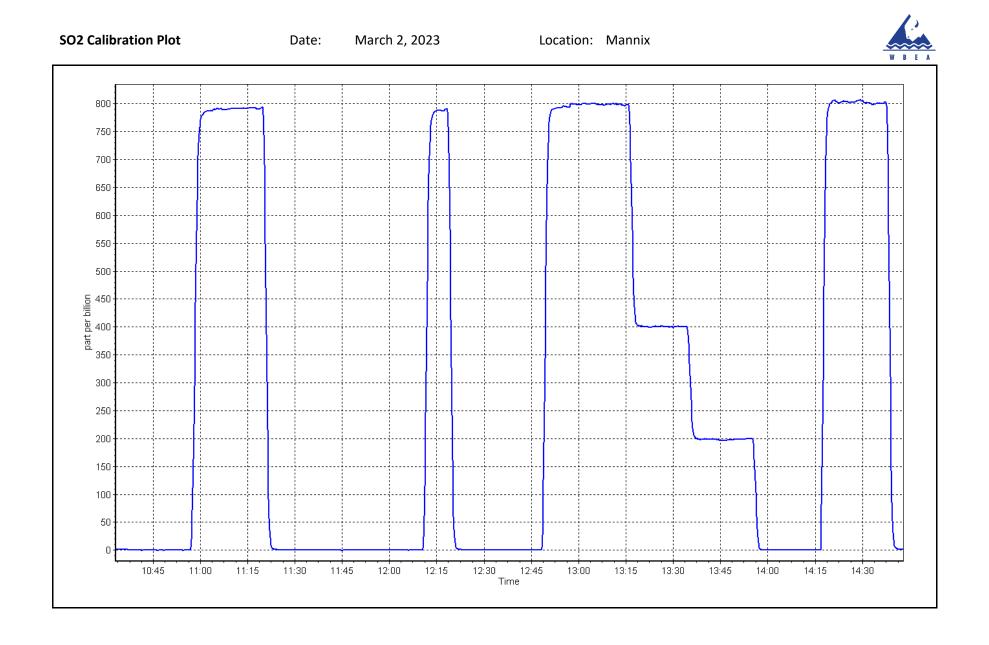
SO₂ Calibration Summary

| WBEA | | | Version-01-20 |
|-------------------|---------------|-----------------------|-------------------|
| | Stat | ion Information | |
| Calibration Date: | March 2, 2023 | Previous Calibration: | February 21, 2023 |
| Station Name: | Mannix | Station Number: | AMS05 |
| Start Time (MST): | 10:34 | End Time (MST): | 14:43 |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1008841399 |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1008841399 |
| | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 800.3 | 799.4 | 1.0012 | correlation coefficient | 0.999994 | 20.333 |
| 400.2 | 400.5 | 0.9992 | Slope | 0.999400 | 0.90 - 1.10 |
| 200.1 | 198.6 | 1.0075 | Slope | | 0.90 - 1.10 |
| | | | Intercept | -0.280000 | +/-30 |







H₂S Calibration Report

| WBEA | | | | | Version-11-2022 |
|--|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Mannix March 15, 2023 8:52 Routine | | Station number: Last Cal Date: End time (MST): | AMS05 February 15, 2023 13:37 | |
| | | 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 | |
| ZAG Make/ Model. | APITIOIN | | Senai Number. | 852 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQTL Global 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1203169745 2022-196 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.998613 0.220652 | 0.988329 0.380632 | Backgd or Offset: Coeff or Slope: | | 2.07 0.822 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as found span | 4919 | 81.3 | 80.0 | 79.0 | 1.015 |
| as found 2nd point | 4960 | 40.7 | 40.0 | 40.1 | 1.004 |
| as found 3rd point | 4980 | 20.3 | 20.0 | 20.2 | 0.999 |
| new cylinder response | | | an Data | | |
| | | 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 | 0.3 | |
| high point | 4919 | 81.3 | 80.0 | 79.4 | 1.007 |
| second point | 4960 | 40.7 | 40.0 | 40.0 | 1.001 |
| third point | 4980 | 20.3 | 20.0 | 20.2 | 0.989 |
| as left zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as left span | 4919 | 81.3 | 80.0 | 80.0 | 1.000 |
| SO2 Scrubber Check | 4920 | 80.0 | 800.0 | 0.0 | |
| Date of last scrubber cha | - | | | Ave Corr Factor | 0.999 |
| Date of last converter ef | ficiency test: | | | | efficiency |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | 78.8 39.9 | Prev response: AF Slope: | 0.984332 | *% change: AF Intercept: | -1.7% 0.420538 |
| Baseline Corr 3rd AF pt: | 20.0 | AF Correlation: | 0.999953 | * = > +/-5% change initiate | es investigation |

Notes:

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

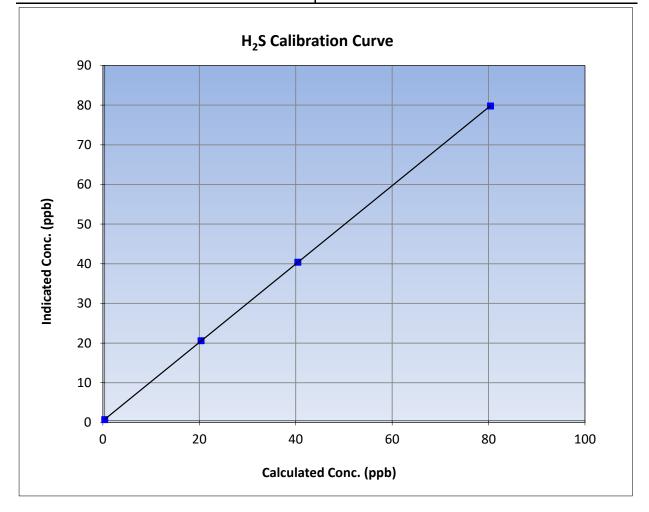


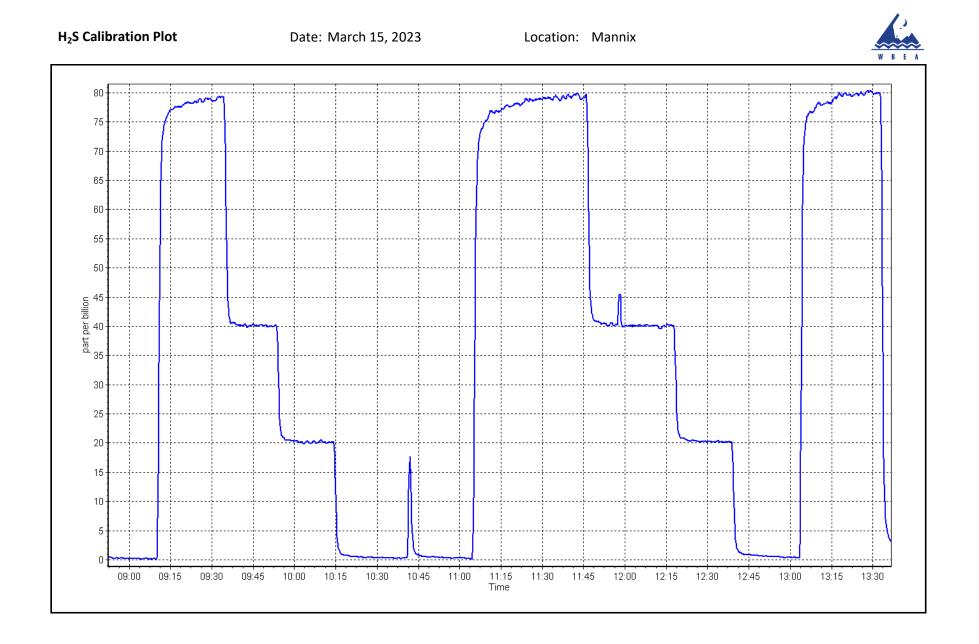
H₂S Calibration Summary

| WBEA | | | Version-11-2021 |
|-------------------|----------------|-----------------------|-------------------|
| | Stati | on Information | |
| Calibration Date: | March 15, 2023 | Previous Calibration: | February 15, 2023 |
| Station Name: | Mannix | Station Number: | AMS05 |
| Start Time (MST): | 8:52 | End Time (MST): | 13:37 |
| Analyzer make: | Thermo 43iQTL | Analyzer serial #: | 1203169745 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.3 | | Correlation Coefficient | 0.999995 | ≥0.995 |
| 80.0 | 79.4 | 1.0075 | correlation coefficient | 0.999995 | 20.333 |
| 40.0 | 40.0 | 1.0011 | Slope | 0.988329 | 0.90 - 1.10 |
| 20.0 | 20.2 | 0.9888 | Siope | | 0.30 - 1.10 |
| | | | Intercept | 0.380632 | +/-3 |







THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|-------------------------------------|---------------|---------------|-------------------------|----------------|-----------------|
| | | Station | Information | | |
| Station Name: | Mannix | | Station number: AN | VIS05 | |
| Calibration Date: | March 2, 2023 | | Last Cal Date: Fe | bruary 21, 202 | .3 |
| Start time (MST): | 10:34 | | End time (MST): 14 | :43 | |
| Reason: | Routine | | | | |
| | | Calibrat | ion Standards | | |
| Gas Cert Reference: | XC | 0268098 | Cal Gas Expiry Date: Ja | nuary 12, 2029 |) |
| CH4 Cal Gas Conc. | 504.9 | ppm | CH4 Equiv Conc. | 1076.6 | ppm |
| C3H8 Cal Gas Conc. | 207.9 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: | | |
| Removed CH4 Conc. | 504.9 | ppm | CH4 Equiv Conc. | 1076.6 | ppm |
| Removed C3H8 Conc. | 207.9 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄) | : | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 62 | 21 | |
| ZAG make/model: | API T701H | | Serial Number: 83 | 32 | |
| | | Analyze | r Information | | |
| Analyzer make | : Thermo 55i | | Analyzer serial #: 11 | .52430011 | |
| THC Range (ppm) | | | , | | |
| NMHC Range (ppm) | : 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : 2.56E-04 | 2.58E-04 | NMHC SP Ratio: | 4.36E-05 | 4.50E-05 |
| CH4 Retention time | : 15.00 | 15.00 | NMHC Peak Area: | 209913 | 203233 |

| THC Calibration Data | | | | | | |
|-----------------------|-------------------|----------------------|---------------------|--|---------------------|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Co | c) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4920 | 80.0 | 17.23 | 17.06 | 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 | 80.0 | 17.23 | 17.23 | 1.000 | |
| second point | 4960 | 40.0 | 8.61 | 8.61 | 1.000 | |
| third point | 4980 | 20.0 | 4.31 | 4.29 | 1.003 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4920 | 80.0 | 17.23 | 17.29 | 0.996 | |
| | | | Av | verage Correction Factor | 1.001 | |
| Baseline Corr AF: | 17.06 | Prev response | 17.17 | *% change | -0.6% | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates investigation</pre> | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| | | NMHC Calib | ration Data | | |
|-----------------------|-------------------|----------------------|-------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0 | 0.00 | 0.00 | |
| as found span | 4920 | 80 | 9.15 | 9.01 | 1.015 |
| 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 | 9.15 | 0.999 |
| second point | 4960 | 40 | 4.57 | 4.59 | 0.996 |
| third point | 4980 | 20 | 2.29 | 2.30 | 0.996 |
| as left zero | 5000 | 0 | 0.00 | 0.00 | |
| as left span | 4920 | 80 | 9.15 | 9.22 | 0.992 |
| | | | / | Average Correction Factor | 0.997 |
| Baseline Corr AF: | 9.01 | Prev response | 9.12 | *% change | -1.3% |
| 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 | Calibration | Data |
|----------------------|-----|-------------|------|
|----------------------|-----|-------------|------|

| | | lion Dala | | |
|-------------------|--|--|--|--|
| 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 | |
| 4920 | 80.0 | 8.08 | 8.05 | 1.004 |
| | | | | |
| | | | | |
| | | | | |
| 5000 | 0.0 | 0.00 | 0.00 | |
| 4920 | 80.0 | 8.08 | 8.07 | 1.001 |
| 4960 | 40.0 | 4.04 | 4.02 | 1.005 |
| 4980 | 20.0 | 2.02 | 2.00 | 1.012 |
| 5000 | 0.0 | 0.00 | 0.00 | |
| 4920 | 80.0 | 8.08 | 8.07 | 1.001 |
| | | A | verage Correction Factor | 1.006 |
| 8.05 | Prev response | 8.05 | *% change | 0.0% |
| NA | AF Slope: | | AF Intercept: | |
| NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | Calibration | Statistics | | |
| | <u>Start</u> | | Finish | |
| | 0.997356 | | 1.000262 | |
| | -0.010200 | | -0.006600 | |
| | 0.997864 | 0.999646 | | |
| | -0.012000 | | -0.011800 | |
| | 0.997020 | | 1.000469 | |
| | 0.000600 | | 0.005800 | |
| | 5000 4920 5000 4920 4920 4960 4980 5000 4920 8.05 NA | Dil air flow rate Source gas flow rate 5000 0.0 4920 80.0 5000 0.0 4920 80.0 5000 0.0 4920 80.0 4960 40.0 4980 20.0 5000 0.0 4920 80.0 4920 80.0 8.05 Prev response NA AF Slope: NA AF Correlation: Calibration Start 0.997356 -0.010200 0.997864 -0.012000 0.997020 | 5000 0.0 0.00 4920 80.0 8.08 5000 0.0 0.00 4920 80.0 8.08 4960 40.0 4.04 4980 20.0 2.02 5000 0.0 0.00 4920 80.0 8.08 4960 40.0 4.04 4980 20.0 2.02 5000 0.0 0.00 4920 80.0 8.08 Ar 8.05 Prev response 8.05 NA AF Slope: Ar NA AF Correlation: Ar Calibration Statistics Start 0.997356 -0.010200 0.997864 -0.012000 0.997020 | Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) Ind conc (ppm) (lc) 5000 0.0 0.00 0.00 4920 80.0 8.08 8.05 |

Notes:

Sample inlet filter changed after as founds. Zero chromatogram was used. Span was adjusted.

Calibration Performed By: Sean Bala



THC Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 2, 2023 | Previous Calibration: | February | 21, 2023 |
| Station Name: | Ma | nnix | Station Number: | AMS05 | |
| Start Time (MST): | 10 | :34 | End Time (MST): | 14: | 43 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11524 | 30011 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 17.23 | 0.00 17.23 | 1.0000 | Correlation Coefficient | 0.999999 | ≥0.995 |
| 8.61 4.31 | 8.61 4.29 | 1.0005 1.0034 | Slope | 1.000262 | 0.90 - 1.10 |
| | | | Intercept | -0.006600 | +/-0.5 |
| 20.0 | | THC Calibratio | n Curve | | |
| 18.0 | | | | | |
| 16.0 | | | | | |
| 14.0 | | | | | |
| u 12.0 | | | | | |
| | | | | | |
| 12.0 | | | | | |
| Indic 0.0 | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | ς | .0 | 10.0 | 15.0 | 20.0 |
| 0.0 | J | | Conc. (ppm) | 13.0 | 20.0 |



CH₄ Calibration Summary

| | | | Station I | nformation | | |
|------------------------|---------|---|---------------------------|-------------------------|-----------|---------------|
| Calibration | n Date: | March | 1 2 <i>,</i> 2023 | Previous Calibration: | February | 21, 2023 |
| Station Na | | | annix | Station Number: | AM | |
| Start Time | | | 0:34 | End Time (MST): | 14: | |
| Analyzer m | | | mo 55i | Analyzer serial #: | 11524 | |
| | | | | , | | |
| | | | Calibra | tion Data | | |
| Calculated co (ppm) | | n Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.0 | | 0.00 | | Correlation Coefficient | 0.999990 | ≥0.995 |
| <u> </u> | | 8.07 | 1.0010 | | | |
| 2.0 | | 2.00 | 1.0050 1.0118 | Slope | 0.999646 | 0.90 - 1.10 |
| | | | | Intercept | -0.011800 | +/-0.5 |
| | 8.0 — | | | | | |
| | | | | | | |
| | 7.0 | | | | | |
| | 6.0 | | | | | |
| Conc. (ppm) | 5.0 | | | | | |
| d Con | 4.0 | | | | | |
| Indicated (| 3.0 | | | | | |
| | 2.0 | | | | | |
| | 1.0 | | | | | |
| | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | 0.0 | 2.0 | | | 0.0 | 10.0 |
| | | | Calculated | l Conc. (ppm) | | |

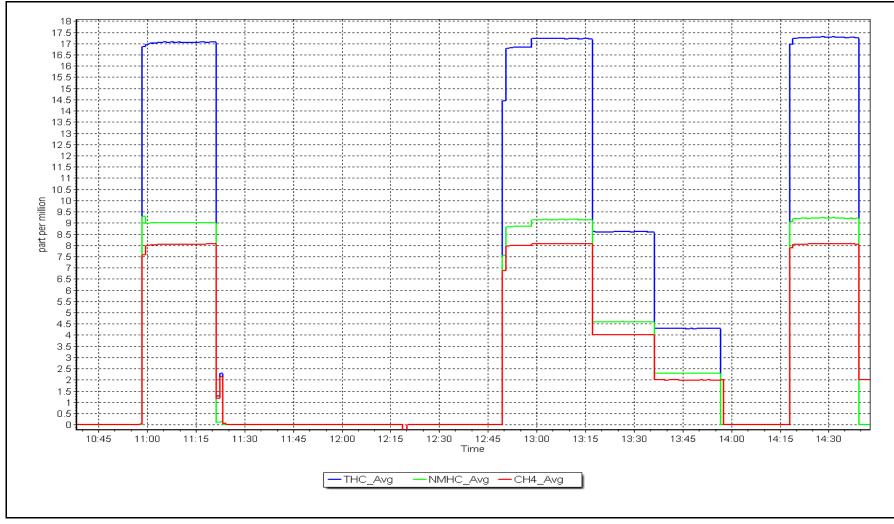


NMHC Calibration Summary

| | | Station I | nformation | | |
|--|--|---------------------------|-------------------------|-------------------|---------------|
| Calibration Date: | March | 2, 2023 | Previous Calibration: | February 21, 2023 | |
| Station Name: | Ma | Mannix | | AM | S05 |
| Start Time (MST): | 10 | :34 | End Time (MST): | 14: | 43 |
| Analyzer make: | Ther | mo 55i | Analyzer serial #: | 11524 | 30011 |
| | | Calibra | tion Data | | |
| | | Calibra | Ition Data | | |
| Calculated concentratio (ppm) (Cc) | on Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999997 | ≥0.995 |
| 9.15 | 9.15 | 0.9994 | | | |
| 4.57 | 4.59 | 0.9965 | Slope | 1.000469 | 0.90 - 1.10 |
| 2.25 | 2.30 | 0.9900 | Intercept | 0.005800 | +/-0.5 |
| 10.0 9.0 | | | | | • |
| 9.0 - | | | | | |
| 0.0 | | | | | |
| 7.0 - | | | | | |
| u 6.0 | | | | | |
| 0.6 bbm 0.6 bbm 0.6 bbm | | | | | |
| 4.0 + | | | | | |
| udica 3.0 – | | | | | |
| 2.0 | | | | | |
| 1.0 - | | | | | |
| 0.0 🖛 | | | | | |
| 0.0 |) 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculated | l Conc. (ppm) | | |









THC / CH₄ / NMHC Calibration Report

| | | Statio | on Information | | |
|--|--|---------------|---|----------------|---------------|
| Station Name: Calibration Date: Start time (MST): | MannixStation number: AMSMarch 10, 2023Last Cal Date: March9:30End time (MST): 10:56 | | | arch 2, 2023 | |
| Reason: | Maintenance | | | | |
| | | Calibra | ation Standards | | |
| Gas Cert Reference: | Х | CO268098 | Cal Gas Expiry Date: Ja | nuary 12, 2029 | |
| CH4 Cal Gas Conc. | 504.9 | ppm | CH4 Equiv Conc. | 1076.6 | ppm |
| C3H8 Cal Gas Conc. | 207.9 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: | | |
| Removed CH4 Conc. | 504.9 | ppm | CH4 Equiv Conc. | 1076.6 | ppm |
| Removed C3H8 Conc. Diff between cyl (CH ₄): | 207.9 | ppm | Diff between cyl (THC): Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 62 | 21 | |
| ZAG make/model: | API T701H | | Serial Number: 83 | 32 | |
| | | Analyz | er Information | | |
| Analyzer make: THC Range (ppm): | | | Analyzer serial #: 11 | 52430011 | |
| 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 | NA | NMHC SP Ratio: | 4.50E-05 | NA |
| CH4 Retention time: | 15.00 | NA | NMHC Peak Area: | 203233 | NA |

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

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Co | c) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
|-----------------------|-------------------|----------------------|---------------------|----------------------------|---------------------|
| as found zero | | | | | |
| 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 | 80.0 | 17.23 | 17.42 | 0.989 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | A | verage Correction Factor | 0.989 |
| 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 |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

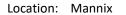
| WBEA | | | | | Version-01-2 |
|-----------------------|-------------------|-------------------------------------|----------------------|----------------------------|---------------------------|
| | | NMHC Calibr | ation Data | | |
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.0</i> |
| is found zero | | 0 | | | |
| is found span | | | | | |
| s found 2nd point | | | | | |
| is found 3rd point | | | | | |
| new cylinder response | | | | | |
| alibrator zero | 5000 | 0 | 0.00 | 0.00 | |
| nigh point | 4920 | 80 | 9.15 | 9.39 | 0.974 |
| second point | | | | | |
| hird point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Ave | erage Correction Factor | 0.974 |
| 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 |
| | | | tion Data | | |
| Set Point | Dil air flow rate | CH4 Calibra Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.0</i> |
| as found zero | | | | | 0. 1 |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| nigh point | 4920 | 80.0 | 8.08 | 8.03 | 1.006 |
| second point | | | | | |
| hird point: | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Ave | erage Correction Factor | 1.006 |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | Finish | |
| THC Cal Slope: | | 1.000262 | | 1.011204 | |
| THC Cal Offset: | | -0.006600 | | 0.000000 | |
| CH4 Cal Slope: | | 0.999646 | | 0.993637 | |
| CH4 Cal Offset: | | -0.011800 | | 0.000000 | |
| NMHC Cal Slope: | | 1.000469 | | 1.026827 | |
| NMHC Cal Offset: | | 0.005800 | | 0.000000 | |

Notes: Low dilution pressure caused insufficient air supply which affected the instrument baseline and zerospan sequence. Was not able to generate as founds due this issue. Replaced the Zero Air Generator.

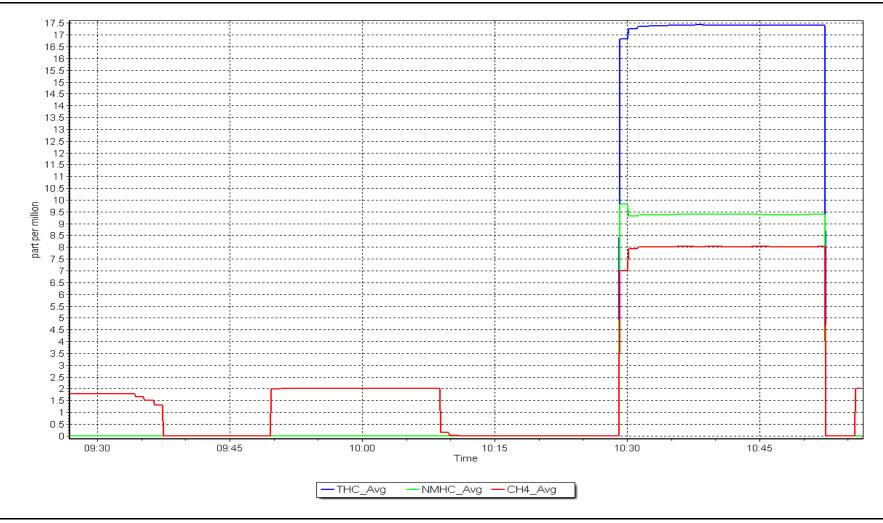
Calibration Performed By: Karan Pandit

CALS_114











THC / CH_4 / NMHC Calibration Report

| | | C 11 | and the factor of the second | | |
|--------------------------------------|-----------------|---------------|--|----------------|---------------|
| | | Stati | on Information | | |
| Station Name: | Mannix | | Station number: AN | | |
| Calibration Date: | March 16, 2023 | | Last Cal Date: M | | |
| Start time (MST): | 9:33 | | End time (MST): 11 | .:15 | |
| Reason: | Cylinder Change | | | | |
| | | Calibi | ration Standards | | |
| Gas Cert Reference: | хс | 0268098 | Cal Gas Expiry Date: Ja | nuary 12, 2029 | |
| CH4 Cal Gas Conc. | 504.9 | ppm | CH4 Equiv Conc. | 1076.6 | ppm |
| C3H8 Cal Gas Conc. | 207.9 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: | | |
| Removed CH4 Conc. | 504.9 | ppm | CH4 Equiv Conc. | 1076.6 | ppm |
| Removed C3H8 Conc. | 207.9 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 62 | 21 | |
| ZAG make/model: | API T701H | | Serial Number: 83 | 32 | |
| | | Analy | zer 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 | NA | NMHC SP Ratio: | 4.50E-05 | NA |
| CH4 Retention time: | 15.00 | NA | NMHC Peak Area: | 203233 | NA |

| | | THC Calibra | ation Data | | |
|-----------------------|-------------------|----------------------|-------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.0 | 17.23 | 17.45 | 0.987 |
| 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 | 17.44 | 0.988 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | | Average Correction Factor | 0.988 |
| Baseline Corr AF: | 17.45 | Prev response | 17.22 | *% change | 1.3% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| | | NMHC Calibr | | | |
|-----------------------|-------------------|----------------------|----------------------|-----------------------------|----------------------------|
| 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 | 80.0 | 9.15 | 9.41 | 0.972 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0 | 0.00 | 0.00 | |
| high point | 4920 | 80.0 | 9.15 | 9.40 | 0.973 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Avera | ge Correction Factor | 0.973 |
| Baseline Corr AF: | 9.41 | Prev response | 9.16 | *% change | 2.7% |
| 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 | 4920 | 80.0 | 8.08 | 8.03 | 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 | 80.0 | 8.08 | 8.04 | 1.005 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| • | | | Avera | ge Correction Factor | 1.005 |
| Baseline Corr AF: | 8.03 | Prev response | 8.06 | *% change | -0.4% |
| 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> | | <u>Finish</u> | |
| THC Cal Slope: | | 1.000262 | | 1.012133 | |
| THC Cal Offset: | | -0.006600 | | 0.000000 | |
| CH4 Cal Slope: | | 0.999646 | | 0.994875 | |
| CH4 Cal Offset: | | -0.011800 | | 0.000000 | |
| NMHC Cal Slope: | | 1.000469 | | 1.027373 | |
| NMHC Cal Offset: | | 0.005800 | | 0.000000 | |
| | | 0.003000 | | 0.000000 | |

Notes:

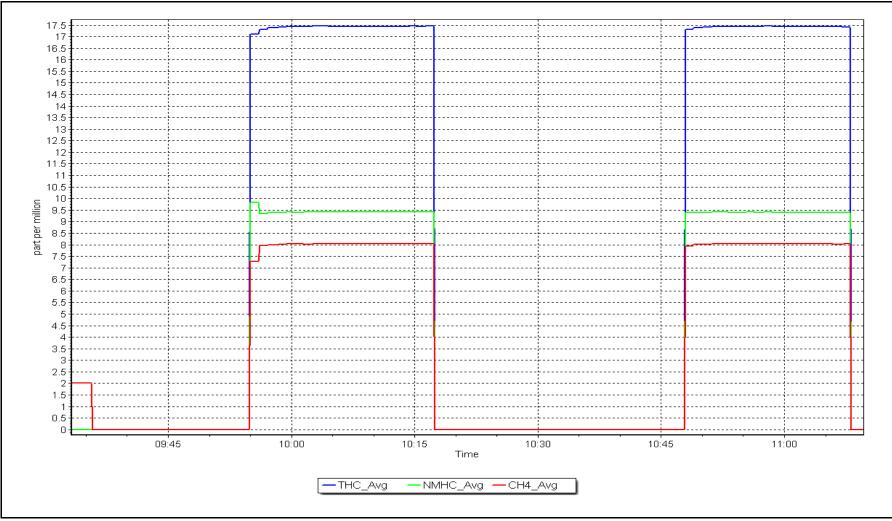
Calibration Performed By:

Karan Pandit



Location: Mannix







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS06 PATRICIA MCINNES MARCH 2023

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

August 30, 2023

Revision 01



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Patricia McInnes March 13, 2023 9:37 Routine | | Station number: Last Cal Date: End time (MST): | AMS06 February 16, 2023 13:59 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.78 | ppm | Cal Gas Exp Date: | September 9, 2024 | |
| Cal Gas Cylinder #: | AAL070632 | | | | |
| Removed Cal Gas Conc: | 49.78 | ppm | Rem Gas Exp Date: | 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 | e: Thermo 43i | - | Analyzer serial #: | 1160290013 | |
| Analyzer Rang | | | , | | |
| | Start | Finish | | Start | Finish |
| Calibration slope: | 0.993085 | 0.991070 | Backgd or Offset: | | 17.2 |
| Calibration intercept: | 1.541481 | 1.621614 | Coeff or Slope: | | 0.907 |
| | | SO ₂ Calibration | 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 | 789.8 | 1.012 |
| as found 2nd point | 4960 | 40.2 | 400.2 | 397.5 | 1.007 |
| as found 3rd point | 4980 | 20.1 | 200.1 | 201.2 | 0.995 |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.1 | |
| high point | 4920 | 80.3 | 799.5 | 792.9 | 1.008 |
| second point | 4960 | 40.2 | 400.2 | 399.7 | 1.001 |
| third point | 4980 | 20.1 | 200.1 | 201.3 | 0.994 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4920 | 80.3 | 799.5 | 793.0 | 1.008 |
| | | | Avera | ge Correction Factor | 1.001 |
| Baseline Corr As found: | 789.70 | Previous response | 795.48 | *% change | -0.7% |
| Baseline Corr 2nd AF pt: | 397.40 | AF Slope: | 0.986609 | AF Intercept: | 1.882706 |
| Baseline Corr 3rd AF pt: | 201.10 | AF Correlation: | 0.999977 | * = > +/-5% change initiat | es investigation |

Notes:

Completed multipoint as founds to complete maintenance for the NMHC. Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By:

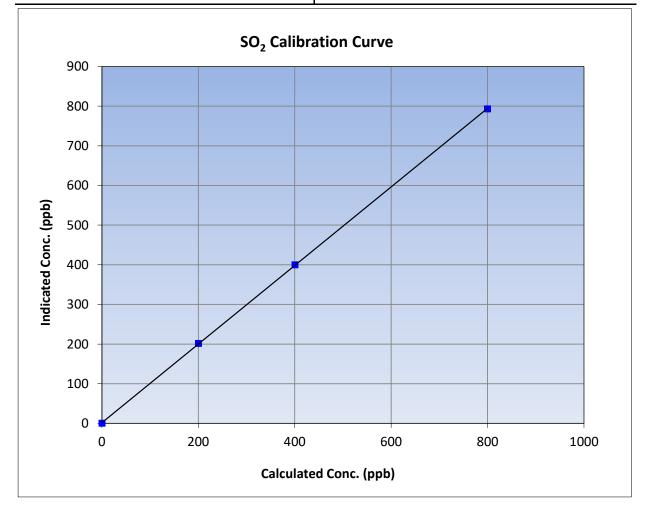


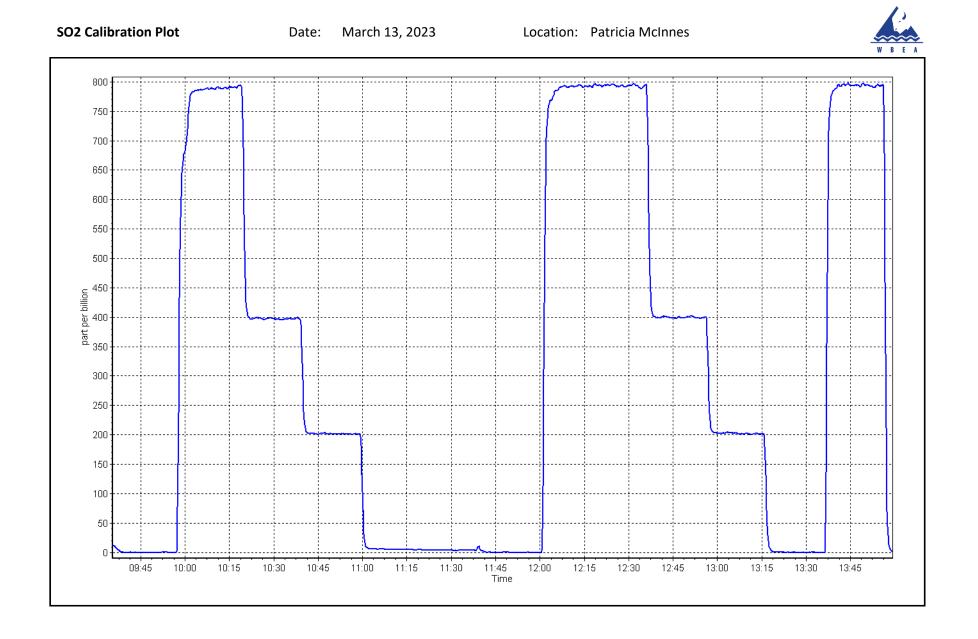
SO₂ Calibration Summary

| W B E A | | | Version-01-2020 | | | | |
|---------------------|------------------|-----------------------|-------------------|--|--|--|--|
| Station Information | | | | | | | |
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 16, 2023 | | | | |
| Station Name: | Patricia McInnes | Station Number: | AMS06 | | | | |
| Start Time (MST): | 9:37 | End Time (MST): | 13:59 | | | | |
| 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 | -0.1 | | Correlation Coefficient | 0.999977 | ≥0.995 |
| 799.5 | 792.9 | 1.0083 | Correlation Coefficient | 0.333377 | 20.995 |
| 400.2 | 399.7 | 1.0013 | - Slope | 0.991070 | 0.90 - 1.10 |
| 200.1 | 201.3 | 0.9941 | | | 0.30 - 1.10 |
| | | | Intercept | 1.621614 | +/-30 |







H2S Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|---|--|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Patricia McInnes March 15, 2023 8:55 Routine | | Station number: Last Cal Date: End time (MST): | AMS 06 February 6, 2023 13:18 | |
| | | Calibration St | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.38 EY0000809 | ppm | Cal Gas Exp Date: | March 2, 2023 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | 5.38 N/A API T700 API T701 H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | N/A 3566 689 | |
| | | | | | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i TLE Global G150 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1218153358 2022-195 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.990341 0.217319 | 0.997060 0.257193 | Backgd or Offset: Coeff or Slope: | | 1.84 1.070 |
| | | H2S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as found span | 4926 | 74.3 | 79.9 | 77.6 | 1.030 |
| as found 2nd point | 4963 | 37.2 | 40.0 | 39.2 | 1.021 |
| as found 3rd point | 4981 | 18.6 | 20.0 | 20.0 | 1.001 |
| new cylinder response | | | | | |
| | | H2S 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/lc) <i>Limit = 0.95-1.05</i> |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4926 | 74.3 | 79.9 | 79.9 | 1.001 |
| second point | 4963 | 37.2 | 40.0 | 40.2 | 0.996 |
| third point | 4981 | 18.6 | 20.0 | 20.4 | 0.981 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as left span | 4926 | 74.3 | 79.9 | 79.8 | 1.002 |
| SO2 Scrubber Check | 4920 | 80.3 | 803.0 | 0.0 | |
| Date of last scrubber cha | | December 20, 2021 | | Ave Corr Factor | 0.992 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: Baseline Corr 2nd AF pt: Paseline Corr 2rd AF pt: | 77.6 39.2 20.0 | Prev response: AF Slope: AF Correlation: | 79.39 0.968755 0.999932 | *% change: AF Intercept: | -2.3% 0.297750 |
| Baseline Corr 3rd AF pt: | 20.0 | A Correlation: | 0.333332 | * = > +/-5% change initiate | es investigation |

Notes:

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

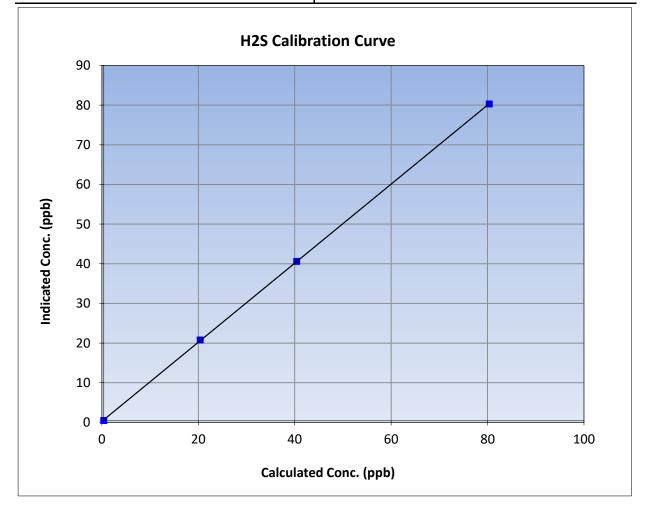


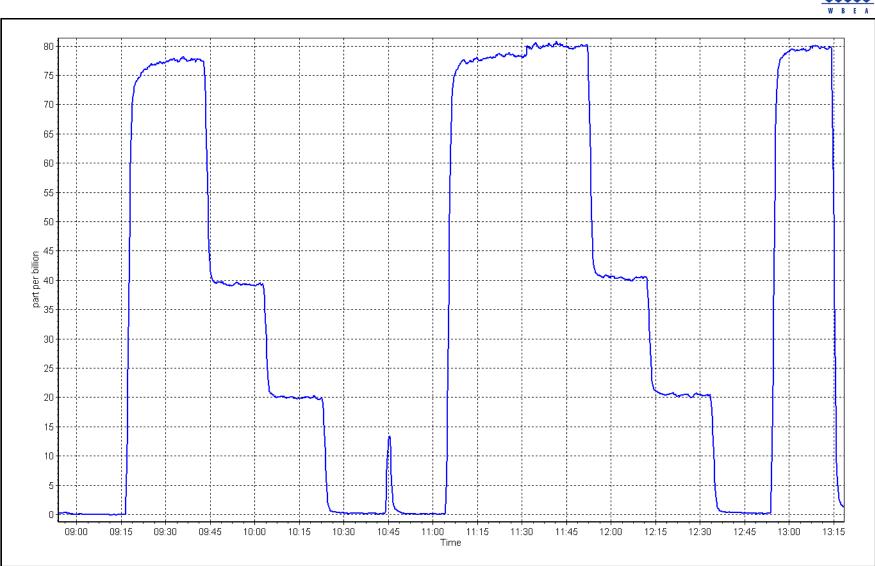
H2S Calibration Summary

| WBEA | | | Version-11-2021 | | | | |
|---------------------|------------------|-----------------------|------------------|--|--|--|--|
| Station Information | | | | | | | |
| Calibration Date: | March 15, 2023 | Previous Calibration: | February 6, 2023 | | | | |
| Station Name: | Patricia McInnes | Station Number: | AMS 06 | | | | |
| Start Time (MST): | 8:55 | End Time (MST): | 13:18 | | | | |
| Analyzer make: | Thermo 43i TLE | Analyzer serial #: | 1218153358 | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999981 | ≥0.995 |
| 79.9 | 79.9 | 1.0005 | Correlation Coefficient | 0.999981 | 20.995 |
| 40.0 | 40.2 | 0.9957 | – Slope | 0.997060 | 0.90 - 1.10 |
| 20.0 | 20.4 | 0.9811 | | | 0.90 - 1.10 |
| | | | - Intercept | 0.257193 | +/-3 |





H2S Calibration Plot

Location: Patricia McInnes





THC / CH₄ / NMHC Calibration Report

| W B E A | | | | _ | Version-01-20 |
|--|--|---------------|---|----------------|---------------|
| | | Stati | ion Information | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Patricia McInne March 13, 2023 9:37 Routine | - | Station number: AN Last Cal Date: Fe End time (MST): 13 | bruary 25, 202 | 23 |
| | | Calib | ration Standards | | |
| Gas Cert Reference: | А | AL070632 | Cal Gas Expiry Date: Se | ptember 9, 20 | 24 |
| CH4 Cal Gas Conc. | 501.6 | ppm | CH4 Equiv Conc. | 1066.2 | ppm |
| C3H8 Cal Gas Conc. | 205.3 | ppm | | | |
| Removed Gas Ref. | | N/A | Removed Gas Expiry: N/ | '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): | 1 | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 35 | 66 | |
| ZAG make/model: | API T701 | | Serial Number: 26 | 1 | |
| | | Analy | vzer Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 11 | .80320037 | |
| 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 | 3.26E-04 | 3.33E-04 | 4 NMHC SP Ratio: | 5.79E-05 | 5.86E-05 |
| CH4 Retention time: | : 14 | 14.0 | NMHC Peak Area: | 156880 | 154840 |

THC Calibration Data

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> |
|-----------------------|-------------------|----------------------|----------------------|---------------------------|----------------------------|
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.3 | 17.12 | 16.91 | 1.013 |
| as found 2nd point | 4960 | 40.2 | 8.57 | 8.45 | 1.015 |
| as found 3rd point | 4980 | 20.1 | 4.29 | 4.26 | 1.007 |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.3 | 17.12 | 17.15 | 0.998 |
| second point | 4960 | 40.2 | 8.57 | 8.57 | 1.000 |
| third point | 4980 | 20.1 | 4.29 | 4.32 | 0.992 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.3 | 17.12 | 17.16 | 0.998 |
| | | | Aver | age Correction Factor | 0.997 |
| Baseline Corr AF: | 16.91 | Prev response | 17.13 | *% change | -1.3% |
| Baseline Corr 2nd AF: | 8.4 | AF Slope: | 0.986971 | AF Intercept: | 0.006195 |
| Baseline Corr 3rd AF: | 4.3 | AF Correlation: | 0.999995 | * = > +/-5% change initia | 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 <i>Limit= 0.95-1.05</i> |
|-----------------------|-------------------|----------------------|----------------------|----------------------------|----------------------------|
| as found zero | 5000 | 0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.3 | 9.07 | 8.99 | 1.008 |
| as found 2nd point | 4960 | 40.2 | 4.54 | 4.51 | 1.007 |
| as found 3rd point | 4980 | 20.1 | 2.27 | 2.27 | 1.002 |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0 | 0.00 | 0.00 | |
| high point | 4920 | 80.3 | 9.07 | 9.08 | 0.999 |
| second point | 4960 | 40.2 | 4.54 | 4.55 | 0.997 |
| third point | 4980 | 20.1 | 2.27 | 2.29 | 0.990 |
| as left zero | 5000 | 0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.3 | 9.07 | 9.08 | 0.998 |
| | | | Ave | rage Correction Factor | 0.996 |
| Baseline Corr AF: | 8.99 | Prev response | 9.08 | *% change | -0.9% |
| Baseline Corr 2nd AF: | 4.5 | AF Slope: | 0.991315 | AF Intercept: | 0.006759 |
| 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 | 7.92 | 1.017 |
| as found 2nd point | 4960 | 40.2 | 4.03 | 3.94 | 1.023 |
| as found 3rd point | 4980 | 20.1 | 2.02 | 1.99 | 1.013 |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.3 | 8.06 | 8.07 | 0.998 |
| second point | 4960 | 40.2 | 4.03 | 4.02 | 1.003 |
| third point | 4980 | 20.1 | 2.02 | 2.03 | 0.994 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.3 | 8.06 | 8.07 | 0.998 |
| | | | Aver | age Correction Factor | 0.998 |
| Baseline Corr AF: | 7.92 | Prev response | 8.05 | *% change | -1.7% |
| Baseline Corr 2nd AF: | 3.94 | AF Slope: | 0.982351 | AF Intercept: | -0.000765 |
| Baseline Corr 3rd AF: | 1.99 | AF Correlation: | 0.999986 | * = > +/-5% change initiates investigation | |
| | | | | | |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> | |
|------------------|--------------|---------------|--|
| THC Cal Slope: | 1.000813 | 1.000848 | |
| THC Cal Offset: | -0.008055 | 0.007935 | |
| CH4 Cal Slope: | 1.000524 | 1.001093 | |
| CH4 Cal Offset: | -0.008597 | -0.000603 | |
| NMHC Cal Slope: | 1.001070 | 1.000428 | |
| NMHC Cal Offset: | 0.000542 | 0.009337 | |

Notes:

Completed multipoint as founds due to H2 generator requiring routine maintenance. Adjusted the span only.

Calibration Performed By: Max Farrell



THC Calibration Summary

| | | Station I | nformation | | | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|--|
| Calibration Date: | March | 13, 2023 | Previous Calibration: | February | 25, 2023 | |
| Station Name: | Patricia | McInnes | Station Number: | AM | AMS06 | |
| Start Time (MST): | 9: | 37 | End Time (MST): | 13: | 59 | |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11803 | 20037 | |
| | | Calibra | tion Data | | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.00 17.12 | 0.00 17.15 | 0.9985 | Correlation Coefficient | 0.999994 | ≥0.995 | |
| 8.57 4.29 | 8.57 4.32 | 1.0005 0.9919 | Slope | 1.000848 | 0.90 - 1.10 | |
| | | | Intercept | 0.007935 | +/-0.5 | |
| 20.0 | | | | | | |
| 18.0 | | | | | | |
| 16.0 - | | | | | | |
| | | | | | | |
| 14.0 | | | | | | |
| ີ ແລ້ 12.0 – | | | | | | |
| ل ت 10.0 | | | | | | |
| 0.8 eq | | | | | | |
| 12.0 | | | | | | |
| 4.0 | | | | | | |
| 2.0 | | | | | | |
| | | | | | | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 | |
| | | | | | | |



CH₄ Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 13, 2023 | Previous Calibration: | February | 25, 2023 |
| Station Name: | Patricia | McInnes | Station Number: | AMS06 | |
| Start Time (MST): | 9: | 37 | End Time (MST): | 13: | 59 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11803 | 20037 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 8.06 | 0.00 8.07 | 0.9982 | Correlation Coefficient | 0.999987 | ≥0.995 |
| 4.03 2.02 | 4.02 2.03 | 1.0034 0.9938 | Slope | 1.001093 | 0.90 - 1.10 |
| | | | Intercept | -0.000603 | +/-0.5 |
| 8.0 7.0 6.0 | | | | | |
| 0.5 (bbm) | | | | | |
| 00 4.0 | | | | | |
| 0.6 udicat | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculated | l Conc. (ppm) | | |

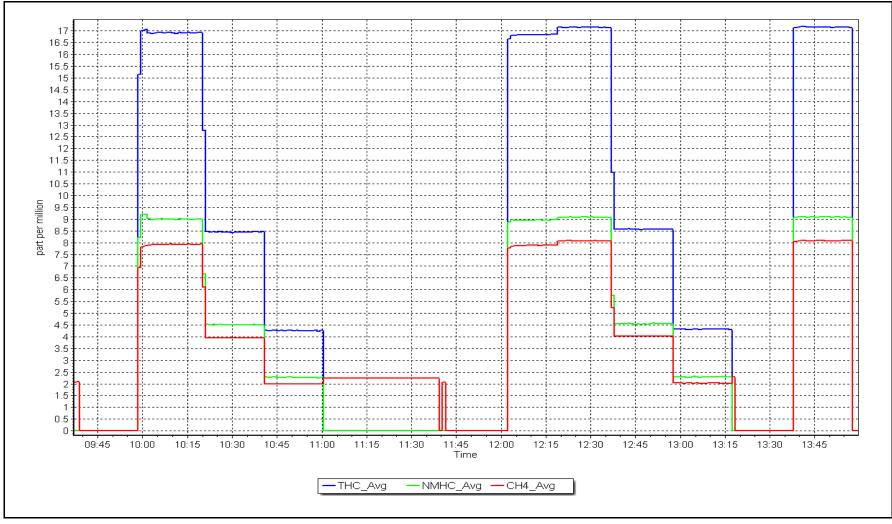


NMHC Calibration Summary

| | | Station I | nformation | | |
|---------------------------------------|---------------------------------------|---------------------------|-------------------------------|----------|---------------|
| alibration Date: | March | 13, 2023 | Previous Calibration: | February | 25, 2023 |
| tation Name: | Patricia | McInnes | Station Number: | AMS06 | |
| tart Time (MST): | 9 | :37 | End Time (MST): | 13: | 59 |
| nalyzer make: | Ther | mo 55i | Analyzer serial #: | 11803 | 20037 |
| | | Calibra | tion Data | | |
| alculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Cc/Ic) Statistical Evaluation | | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999995 | ≥0.995 |
| 9.07 4.54 | 9.08 4.55 | 0.9989 0.9974 | | | |
| 2.27 | 2.29 | 0.9902 | Slope | 1.000428 | 0.90 - 1.10 |
| | | | Intercept | 0.009337 | +/-0.5 |
| 8.0 | | | | | |
| 6.0 (bbm) 5.0 | | | | | |
| 5 .0 | | | | | |
| | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | | | |

NMHC Calibration Plot







as left zero

Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

| W B E A | | | | | Version-01-20 |
|--|---|----------------|--|---------------------|----------------------------|
| | | Sta | tion Information | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Patricia McInnes March 24, 2023 8:53 Cylinder Change | | Station number: Last Cal Date: End time (MST): | March 13, 2023 | |
| | | Calib | pration Standards | | |
| Gas Cert Reference: | AAL | 070632 | Cal Gas Expiry Date: | September 9, 2024 | Ļ |
| 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: | 3566 | |
| ZAG make/model: | API T701 | | Serial Number: | 261 | |
| | | Ana | lyzer Information | | |
| Analyzer make: | Thermo 55i | | Analyzer serial #: | 1180320037 | |
| 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-0 | 04 NMHC SP Ratio: | 5.86E-05 | 5.86E-05 |
| CH4 Retention time: | 14 | 14.0 | NMHC Peak Area: | 154840 | 154840 |
| | | тнс | Calibration Data | | |
| Set Point | Dil air flow rate | Source gas flo | ow rate Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.3 | 17.12 | 17.15 | 0.998 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.3 | 17.12 | 17.13 | 1.000 |
| second point | | | | | |
| third point | | | | | |

| as left span | | | | | |
|-----------------------|-------|-----------------|-------|--|--------------|
| | | | A | Average Correction Factor | 1.000 |
| Baseline Corr AF: | 17.15 | Prev response | 17.15 | *% change | 0.1% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates i</pre> | nvestigation |



THC / CH₄ / NMHC Calibration Report

Version-01-2020

| | | NMHC Calibr | ation Data | | |
|-------------------------------------|-------------------|----------------------|----------------------|---------------------------|----------------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.3 | 9.07 | 9.13 | 0.993 |
| 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 | 9.11 | 0.995 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| 1 | | | Avera | ge Correction Factor | 0.995 |
| Baseline Corr AF: | 9.13 | Prev response | 9.08 | *% change | 0.6% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initia | tes investigation |
| | | | | | <u> </u> |
| | | 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= 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.3 | 8.06 | 8.02 | 1.004 |
| as found 2nd point | 4920 | 80.5 | 8.00 | 8.02 | 1.004 |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| | | 0.0 | 0.00 | 8.02 | 1.004 |
| high point | 4920 | 80.3 | 8.06 | 8.02 | 1.004 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | 0.00 | | | ige Correction Factor | 1.004 |
| Baseline Corr AF: | 8.02 | Prev response | 8.06 | *% change | -0.5% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initia | tes investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | Finish | |
| THC Cal Slope: | | 1.000848 | | 1.000481 | |
| THC Cal Offset: | | 0.007935 | | 0.000000 | |
| CH4 Cal Slope: | | 1.001093 | | 0.995569 | |
| CH4 Cal Offset: | | -0.000603 | | 0.000000 | |
| | | 1.000428 | | 1.005175 | |
| NIMUC Cal Clanas | | | | | |
| NMHC Cal Slope: NMHC Cal Offset: | | 0.009337 | | 0.000000 | |

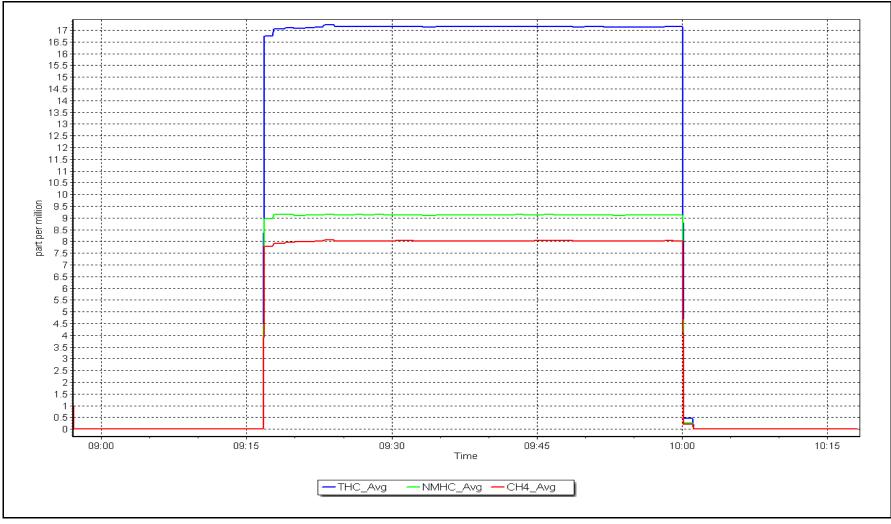
Notes:

Cylinder change.

Calibration Performed By: Sean Bala









$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | Station In | formation | | | |
|--|---|-----|---------------|-----------------------|-----------------|-----|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Date:March 7, 2023Last Cal Date: February 2, 2023 | | | | | | |
| | | | Calibratior | ı Standards | | | |
| NO Gas Cylinder #: | T26D9MR | | | Cal Gas Expiry Date: | August 18, 2023 | | |
| NOX Cal Gas Conc: | 52.51 | ppm | | NO Cal Gas Conc: | 51.98 | ppm | |
| Removed Cylinder #: | N/A | | | Removed Gas Exp Date: | N/A | | |
| Removed Gas NOX Conc: | 52.51 | ppm | | Removed Gas NO Conc: | 51.98 | ppm | |
| NOX gas Diff: | | | | NO gas Diff: | | | |
| Calibrator Model: | Teledyne API T700 | | | Serial Number: | 3566 | | |
| ZAG make/model: | Teledyne API T701 | | | Serial Number: | 689 | | |
| | | | Analyzer lı | nformation | | | |
| Analyzer make: | Thermo 42i | | | Analyzer serial #: | 1172750022 | | |
| | 0 - 1000 ppb | | | | | | |
| | <u>Start</u> | | <u>Finish</u> | | <u>Start</u> | | <u>Finish</u> |
| NO coeff or slope: | 0.818 | | 0.818 | NO bkgnd or offset: | 3.2 | | 3.2 |
| · · · · | 0.000 | | 0.996 | NOX bkgnd or offset: | 3.8 | | 3.8 |
| NOX coeff or slope: | 0.996 | | 0.000 | | | | |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.004307 | 0.993329 |
| NO _x Cal Offset: | 2.260596 | 2.240132 |
| NO Cal Slope: | 1.003971 | 0.991966 |
| NO Cal Offset: | 1.260503 | 1.559980 |
| NO ₂ Cal Slope: | 1.009891 | 1.003238 |
| NO ₂ Cal Offset: | 0.497022 | 1.111866 |



$NO_X \setminus NO \setminus NO_2$ 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 | -0.4 | 0.0 | -0.5 | | |
| as found span | 4923 | 76.9 | 807.6 | 799.5 | 8.2 | 805.4 | 792.5 | 12.9 | 1.0027 | 1.0088 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | -0.1 | | |
| high point | 4923 | 76.9 | 807.6 | 799.5 | 8.2 | 803.4 | 793.9 | 9.6 | 1.0052 | 1.0070 |
| second point | 4962 | 38.5 | 404.3 | 400.2 | 4.1 | 404.8 | 399.3 | 5.6 | 0.9988 | 1.0024 |
| third point | 4981 | 19.2 | 201.6 | 199.6 | 2.0 | 204.9 | 200.9 | 4.0 | 0.9841 | 0.9935 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | -0.3 | | |
| as left span | 4923 | 76.9 | 807.6 | 389.9 | 417.8 | 801.2 | 384.2 | 417.1 | 1.0080 | 1.0147 |
| | | | | | | | Average C | orrection Factor | 0.9960 | 1.0010 |
| Corrected As fo | ound NO _x = | 805.8 ppb | NO = | 792.5 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chan | ge NO _x = | -0.9% |
| Previous Respo | onse NO _x = | 813.3 ppb | NO = | 803.9 ppb | | | | *Percent Chan | 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 | ard pt NO _x = | NA ppb | NO = | NA ppb | As found | d NO r^2 : | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |
| | | | | | | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (C | Indicated NO2 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|--|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 791.9 | 382.3 | 417.8 | 419.6 | 0.9956 | 100.4% |
| 2nd GPT point (200 ppb O3) | 791.9 | 587.1 | 213.0 | 215.3 | 0.9891 | 101.1% |
| 3rd GPT point (100 ppb O3) | 791.9 | 690.1 | 110.0 | 112.7 | 0.9756 | 102.5% |
| | | | | Average Correction Factor | 0.9868 | 101.3% |

Notes:

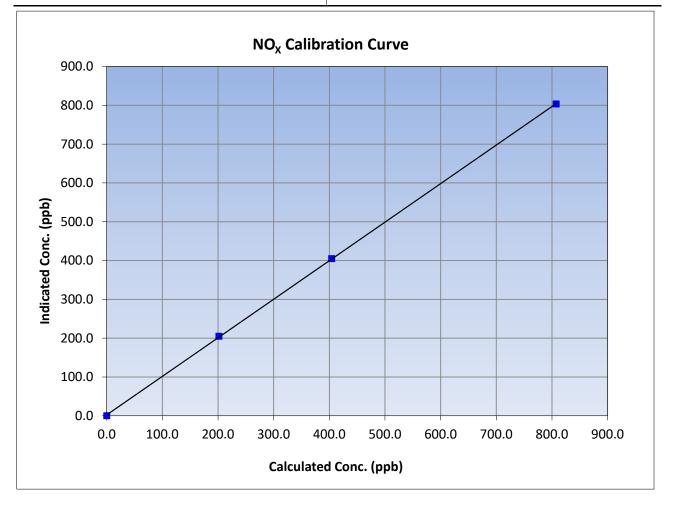
Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

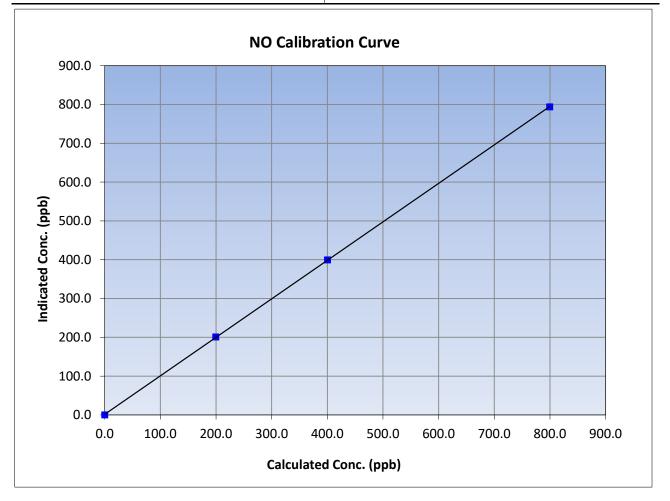
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|--------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 7, 2023 | Previous Calibration: | February | , 2, 2023 |
| Station Name: | Patricia | McInnes | Station Number: | AM | S06 |
| Start Time (MST): | 9: | 33 | End Time (MST): | 14 | :21 |
| 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 | 0.0 | | Correlation Coefficient | 0.999964 | ≥0.995 |
| 807.6 | 803.4 | 1.0052 | correlation coefficient | 0.555504 | 20.995 |
| 404.3 | 404.8 | 0.9988 | Clana | 0.002220 | 0.90 - 1.10 |
| 201.6 | 204.9 | 0.9841 | Slope | 0.993329 | 0.90 - 1.10 |
| | | | Intercept | 2.240132 | +/-20 |





NO Calibration Summary

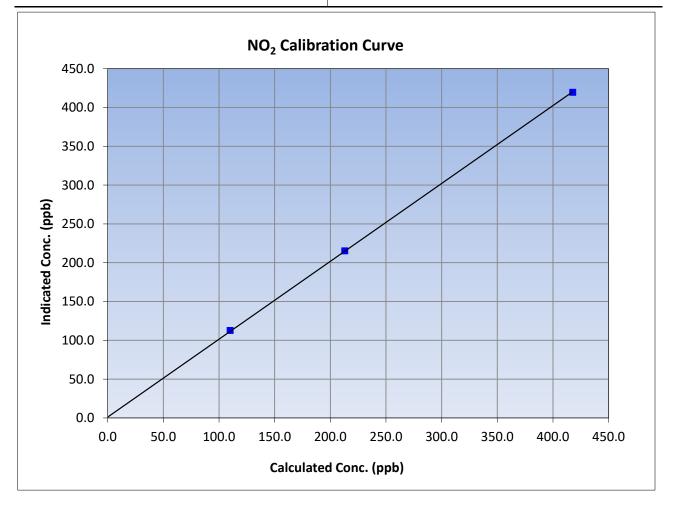
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-----------------------------|-------------|----------------|
| | | Station | Information | | |
| Calibration Date: | March | 7, 2023 | Previous Calibration: | February | y 2, 2023 |
| Station Name: | Patricia | McInnes | Station Number: | AM | S06 |
| Start Time (MST): | 9: | 33 | End Time (MST): | 14:21 | |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 11727500 | | 50022 |
| | | 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 | 0.999987 | ≥0.995 |
| 799.5 | 793.9 | 1.0070 | correlation coernicient | 0.555567 | 20.995 |
| 400.2 | 2 399.3 1.0024 Class 0.00 | | 0.991966 | 0.90 - 1.10 | |
| 199.6 | 200.9 | 0.9935 | Slope | 0.991900 | 0.90 - 1.10 |
| | | | Intercept | 1.559980 | +/-20 |





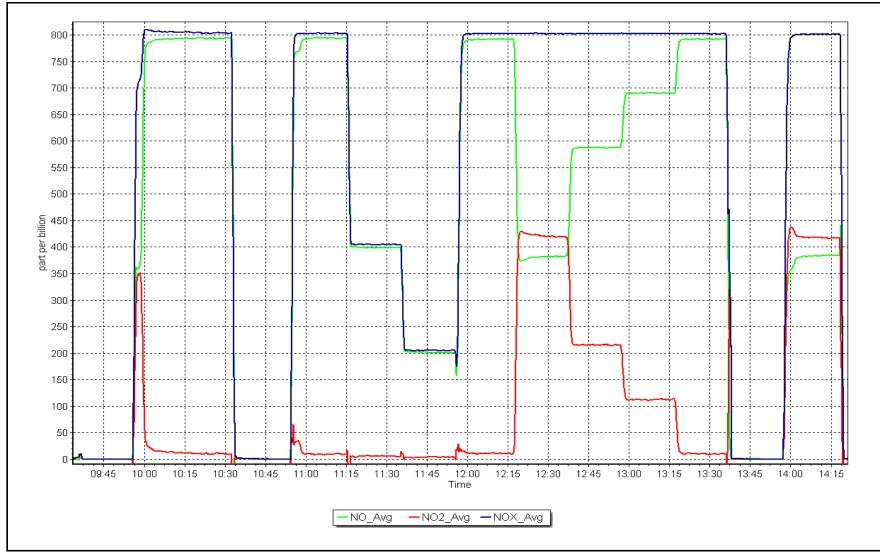
NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-----------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | March 7, 2023 | | Previous Calibration: | February | y 2, 2023 |
| Station Name: | Patricia | Station Number: | AM | AMS06 | |
| Start Time (MST): | art Time (MST): 9:33 | | End Time (MST): 14 | | 1:21 |
| 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 Evaluation Li | | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999960 | >0.005 |
| 417.8 | 419.6 | 0.9956 | Correlation Coefficient | 0.999900 | ≥0 <i>.995</i> |
| 213.0 | 215.3 | 0.9891 | Slope | 1.003238 | 0.90 - 1.10 |
| 110.0 | 112.7 | 0.9756 | | 1.005258 | 0.50 - 1.10 |
| | | | Intercept | 1.111866 | +/-20 |











O₃ Calibration Report

Version-01-2020

| | | | | | Version-01-20 | |
|--------------------------|--|----------------------------------|--|---|-------------------|--|
| | | Station Infor | mation | | | |
| Station Name: | Patricia McInnes Station number: AMS06 | | | | | |
| Calibration Date: | March 9, 2023 | | Last Cal Date: | February 8, 2023 | | |
| Start time (MST): | 11:10 | | End time (MST): 14:11 | | | |
| Reason: | Routine | | | | | |
| | | Calibration St | andards | | | |
| O3 generation mode: | Photometer | | | | | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 3566 | | |
| ZAG Make/Model: | API T701H | | Serial Number: | | | |
| EAG Makey Model. | | | Schar Walliber. | | | |
| | | Analyzer Info | rmation | | | |
| Analyzer make | : Thermo 49i | | Analyzer serial #: | 1300156234 | | |
| Analyzer Range | e 0 - 500 ppb | | | | | |
| | <u>Start</u> | Finish | | <u>Start</u> | Finish | |
| Calibration slope: | 1.005057 | 1.005771 | Backgd or Offset: | -1.2 | -1.2 | |
| Calibration intercept: | 1.240000 | 0.940000 | Coeff or Slope: | | 1.019 | |
| | | O ₃ Calibratio | on Data | | | |
| | Tabala's Gaussia | | | | | |
| Set Point | Total air flow rate (sccm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration C (ppm) (Ic) | Limit = 0.95-1.05 | |
| | · · · | Voltage Drive | |) (ppiii) (ic) | 2000 - 0.00 1.00 | |
| as found zero | 5000 | 800.0 | 0.0 | 0.2 | | |
| as found span | 5000 | 1303.0 | 400.0 | 402.5 | 0.994 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| calibrator zero | 5000 | 800.0 | 0.0 | 0.2 | | |
| high point | 5000 | 1303.0 | 400.0 | 402.8 | 0.993 | |
| second point | 5000 | 966.5 | 200.0 | 202.7 | 0.987 | |
| third point | 5000 | 794.3 | 100.0 | 102.1 | 0.979 | |
| as left zero | 5000 | 800.0 | 0.0 | 0.4 | | |
| as left span | 5000 | 1303.0 | 400.0 | 404.6 | 0.989 | |
| | | | Avera | ge Correction Factor | 0.986 | |
| Baseline Corr As found: | 402.3 | Previous response | 403.3 | *% change | -0.2% | |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | • | | |
| | | | | * = > +/-5% change initiate | es investigation | |
| | | | | | | |

Notes:

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

Calibration Performed By:

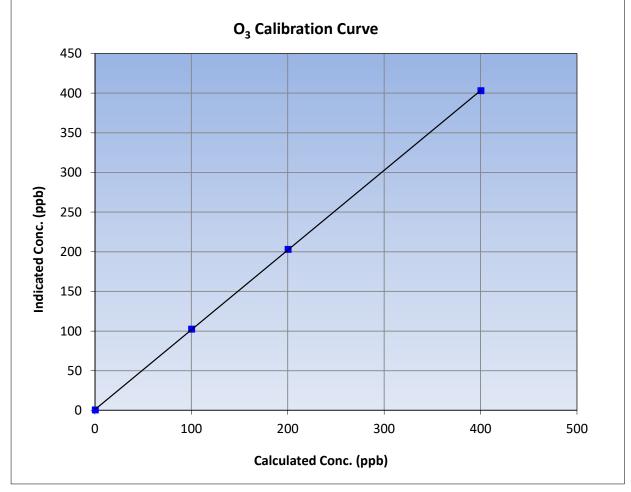
Max Farrell



O₃ Calibration Summary

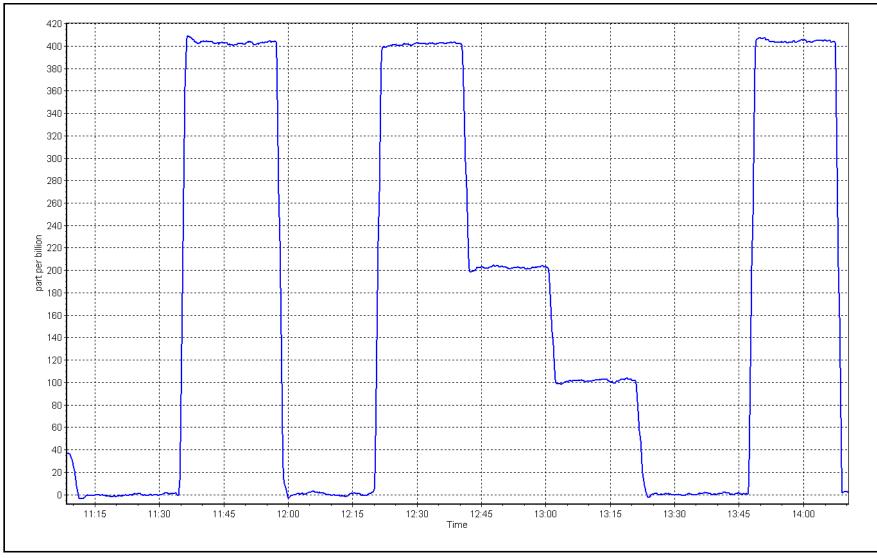
| WBEA | | | | Version-01-2020 | |
|---|------------------------------------|------------------------------|-------------------------|------------------|--|
| | | Station | Information | | |
| Calibration Date: | March 9 | , 2023 | Previous Calibration: | February 8, 2023 | |
| ation Name: Patricia McInnes | | 1cInnes | Station Number: | AMS06 | |
| Start Time (MST): | Time (MST): 11:10 | | End Time (MST): | 14:11 | |
| Analyzer make: Therm | | mo 49i Analyzer serial #: | | 1300156234 | |
| | | | | | |
| | | Calibi | ration Data | | |
| Calculated concentration Indi (ppb) (Cc) | icated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> | |
| 0.0 | 0.2 | | Correlation Coefficient | | |

| | 0.0 | 0.2 | | Correlation Coefficient | 0.999984 | ≥0.995 |
|---|-------|-------|--------|-------------------------|----------|-------------|
| | 400.0 | 402.8 | 0.9930 | correlation coefficient | 0.999904 | 20.995 |
| | 200.0 | 202.7 | 0.9867 | Slope | 1.005771 | 0.90 - 1.10 |
| | 100.0 | 102.1 | 0.9794 | | 1.005771 | |
| _ | | | | Intercept | 0.940000 | +/- 5 |
| Г | | | | | | |











T640 PM_{2.5} CALIBRATION

| WDEA | | | | | | Version-01-2023 |
|-------------------------------|------------------|--------------------------|---------------------|-------------|-----------------|--|
| | | Station Information | 1 | | | |
| Station Name: | Patricia McInnes | | Station number: | AMS 06 | | |
| Calibration Date: | March 15, 2023 | | Last Cal Date: | February 1 | 6, 2023 | |
| Start time (MST): | 13:50 | | End time (MST): | 14:17 | | |
| Analyzer Make: | API T640 | | S/N: | 766 | | |
| Particulate Fraction: | PM2.5 | | | | | |
| Flow Meter Make/Model: | Delta Cal | | S/N: | 628 | | |
| Temp/RH standard: | Delta Cal | | S/N: | 628 | | |
| | | Monthly Calibration To | est | | | |
| <u>Parameter</u> | <u>As found</u> | <u>Measured</u> | <u>As left</u> | | Adjusted | (Limits) |
| T (°C) | -8.4 | -7.5 | -8.4 | | | +/- 2 °C |
| P (mmHg) | 727.8 | 725.5 | 727.8 | | | +/- 10 mmHg |
| flow (LPM) | 5 | 5.14 | 5 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 15, 2023 | Last Cal Date: | February | 16, 2023 | |
| | PM w/o HEPA: | 9.4 | PM w/ HEPA: | | 0 | <0.2 ug/m3 |
| Note: this leak check will be | | | erve as the pre ma | intenance l | eak check | |
| Inlet cleaning : | Inlet Head | \checkmark | | | | |
| | | | | | | |
| | | Oversterk, Calibration 7 | | | | |
| D | | Quarterly Calibration 1 | | | | <i>(</i> , , , , , , , , , , , , , , , , , , , |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| PMT Peak Test | | | | | | 11.3 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | | w/ HEPA: | | |
| Date Optical Chan | nber Cleaned: | January 9, | 2023 | | | <0.2 ug/m3 |
| Disposable Filte | r Changed: | January 9, | 2023 | | | |
| | | | | | | |
| | | | | | | |
| | | Annual Maintenanc | e | | | |
| Date Sample Tul | be Cleaned: | August 28, | 2020 | | | |
| Date RH/T Sense | or Cleaned: | August 28, | 2020 | | | |
| | | | | | | |
| Notes: | PMT Peak | test completed in Januar | y. Leak check passe | ed. No adju | stments mad | de. |
| | | - | | - | | |
| Colibration by | May Farrall | | | | | |

Max Farrell



TN - NO_X - NH_3 Calibration Report

| W B E A | | | | | Version-11-202 |
|---|-----------------------------------|--------------------|---------------------------------------|----------------------------|----------------|
| | | Stati | ion Information | | |
| Station Name: NOX Cal Date: | Patricia McInnes March 8, 2023 | | Station number: Last Cal Date: | AMS 06 February 7, 2023 | |
| Start time (MST): | 9:25 | | End time (MST): Last Cal Date: | 14:00 | |
| NH3 Cal Date: Start time (MST): | March 8, 2023 14:30 | | End time (MST): | February 7, 2023 16:05 | |
| Reason: | Routine | | Lifu time (WST). | 10.05 | |
| | | | | | |
| | | Calib | 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: | | | NO gas Diff: | 66420000 | |
| NH3 Cal Gas Conc: | 73.9 | ppm | NH3 Gas Cylinder #: | CC430800 | |
| Demonstrad NU12 Comes | 72.0 | | NH3 Cal Gas Expiry: | January 7, 2023 | |
| Removed NH3 Conc: | 73.9 | ppm | Removed Cylinder #: | | |
| NH3 gas Diff: Calibrator Model: | • | PI T700 | Removed cyl Expiry: Serial Number: | 3566 | |
| ZAG make/model: | | PI T700 PI T701 | Serial Number: | 689 | |
| | | 11701 | Schur Number. | 005 | |
| | | Analy | zer Information | | |
| Analyzer model | : API T201 | | Analyzer serial # | : 152 | |
| Converter model: API T501 Converter serial #: 147 | | | | | |
| NH3 Range (ppb) | : 0 - 2000 ppb | | Reaction cell Press | : 5.70 | |
| NOX Range (ppb) | | | Sample Flow | : 531 | |
| | Start | Finish | | Start | Finish |
| NO coefficient | : 0.853 | 0.823 | TN coefficient | . 0.851 | 0.822 |
| NOX coefficient | : 0.855 | 0.824 | 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 |
| | | Calib | oration Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| NO _x Cal Slope | : | 0.994899 | 9 | 0.999337 | |
| NO _x Cal Offset | | 2.96028 | | 1.041887 | |
| NO Cal Slope | | 0.99493 | | 0.997013 | |
| NO Cal Offset | | 1.31996 | | 2.119639 | |
| NO ₂ Cal Slope | | 0.99343 | | 0.993721 | |
| NO ₂ Cal Offset | | 1.20548 | | -1.386593 | |
| NH3 Cal Slope | | 0.99891 | | 1.005985 | |
| NH3 Cal Offset | | 8.37570 | | 7.240605 | |
| TN Cal Slope | | 1.00445 | | 1.011422 | |
| TN Cal Offset | | 8.831802 | | 7.102178 | |
| in caronset | • | 0.00100 | - | , | |



NH3 Current Converter Efficiency =

95.1%

Wood Buffalo Environmental Association

TN - NOX - NH₃ Calibration Report

Version-11-2021

| | | | | Dilut | ion Calibration | Data | | | | |
|-----------------|------------------------------|--------------------------------|--|---|---|---|--|--|--|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated TN concentration (ppb) (Cc) | Calculated NOX concentration (ppb) (Cc) | Calculated NH3 concentration (ppb) (Cc) | Indicated TN concentration (ppb) (Ic) | Indicated NOX concentration (ppb) (Ic) | Indicated NH3 concentration (ppb) (Ic) | TN Correction factor (Cc/Ic) Limit = 0.95-1.05 | NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | -0.1 | 0.9 | | |
| as found NO | 4923 | 76.9 | 807.6 | 807.6 | | 838.4 | 835.4 | 3.1 | 0.963 | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | -0.4 | 1.1 | | |
| high NO point | 4923 | 76.9 | 807.6 | 807.6 | | 809.4 | 808.3 | 1.2 | 0.998 | |
| NO/O3 point | 4923 | 76.9 | 807.6 | 807.6 | | 804.1 | 803.3 | 1.0 | 1.004 | |
| as found NH3 | 3415 | 85.3 | 1801.0 | | 1801.0 | 1824.2 | | 1814.8 | 0.987 | 0.992 |
| new NH3 cyl rp | | | | | | | | | | |
| first NH3 | 3415 | 85.3 | 1801.0 | | 1801.0 | 1824.2 | | 1814.8 | 0.987 | 0.992 |
| second NH3 | 3453 | 47.4 | 1000.8 | | 1000.8 | 1024.7 | | 1019.0 | 0.977 | 0.982 |
| third NH3 | 3476 | 23.7 | 500.4 | | 500.4 | 518.8 | | 516.1 | 0.965 | 0.970 |
| | | | | | | | Average C | Correction Factor | 1.0011 | 0.9814 |
| Corrected As fo | und TN = | 837.6 ppb | NO _x = 835.5 | ppb NH3 = | 1813.9 ppb | | | *Percent Chang | e TN= | 2.1% |
| Previous Respo | nse TN = | 820 ppb | NO _x = 806.4 | ppb NH3 = | 1807.5 ppb | | | *Percent Chang | e NO _x = | 3.5% |
| | | | | | | | | *Percent Chang | | 0.4% |
| NH3 Previous C | onverter Efficie | ncy = 95.1% | | | | | | * = > +/-5% change | initiates investigat | ion |

Dilution Calibration Data



NO_x - NO - NO₂ Calibration Report

Version-11-2021

| | Dilution Calibration Data | | | | | | | | | |
|-----------------|------------------------------|-----------------------------|---|--|--|--|---|---|---|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated TN concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated TN concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.4 | 0.8 | | |
| as found span | 4923 | 76.9 | 807.6 | 799.5 | 807.6 | 835.4 | 824.9 | 838.4 | 0.9667 | 0.9692 |
| new NO cyl rp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.4 | 0.1 | 0.7 | | |
| high point | 4923 | 76.9 | 807.6 | 799.5 | 807.6 | 808.3 | 798.0 | 809.4 | 0.9991 | 1.0018 |
| second point | 4962 | 38.5 | 404.3 | 400.2 | 404.3 | 403.1 | 402.7 | 408.0 | 1.0030 | 0.9939 |
| third point | 4981 | 19.2 | 201.6 | 199.6 | 201.6 | 205.8 | 202.8 | 208.7 | 0.9798 | 0.9842 |
| | | | | | | | Average C | orrection Factor | 0.9940 | 0.9933 |
| Baseline Corr A | s fnd TN = | 837.6 ppb | NO _x = 835.5 | ppb NO = | 824.5 ppb | | | *Percent Chang | e TN = | 2.1% |
| Previous Respo | nse TN = | 820 ppb | NO _x = 806.4 | ppb NO = | 796.7 ppb | | | *Percent Chang | e NO _x = | 3.5% |
| | | | | | | | | *Percent Chang | e NO = | 3.4% |
| | | | | | | | | * = > +/-5% change | initiates investigati | on |

| GPT Calibration Data | | | | | | | |
|----------------------------|---|---------------------------------------|---|---|---|---|--|
| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Cc | Indicated NO2 concentration (ppb) (Ic) | NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% | |
| as found zero | | | 0.0 | -0.5 | | | |
| calibration zero | | | 0.0 | -0.5 | | | |
| 1st GPT point (400 ppb O3) | 798.2 | 378.1 | 428.3 | 425.0 | 1.0077 | 99.2% | |
| 2nd GPT point (200 ppb O3) | 798.2 | 586.4 | 220.0 | 215.7 | 1.0197 | 98.1% | |
| 3rd GPT point (100 ppb O3) | 798.2 | 688.9 | 117.5 | 115.1 | 1.0204 | 98.0% | |
| | | | | Average Correction Factor | 1.0159 | 98.4% | |

Notes:

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

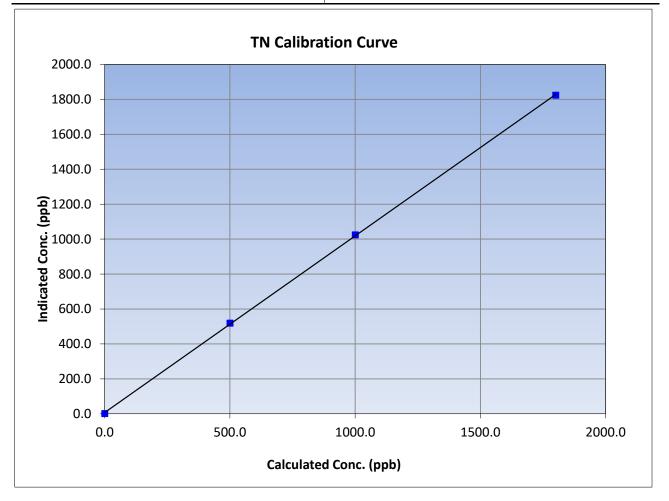
Calibration Performed By:

Max Farrell



TN Calibration Summary

| | | Station | Information | | |
|--|---------------------------------------|---------------------------|-------------------------|-------------------|-------------------------|
| Calibration Date: | March | 8, 2023 | Previous Calibration: | Februar | ry 7, 2023 |
| Station Name: | Patricia McInnes | | Station Number: | | 1S 06 |
| Start Time (MST): | 9:25 | | End Time (MST): | 14 | 1:00 |
| Analyzer make: | halyzer make: API T201 | | | 1 | 152 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
| | | Correction factor (Cc/Ic) | | | |
| (ppb) (Cc) | (ppb) (Ic) | | Statistical Evaluation | ation 0.999933 | <u>Limits</u> ≥0.995 |
| (ppb) (Cc) 0.0 | (ppb) (Ic) 0.7 | | Correlation Coefficient | 0.999933 | ≥0.995 |
| (ppb) (Cc) 0.0 1801.0 | (ppb) (Ic) 0.7 1824.2 | 0.9873 | | | |

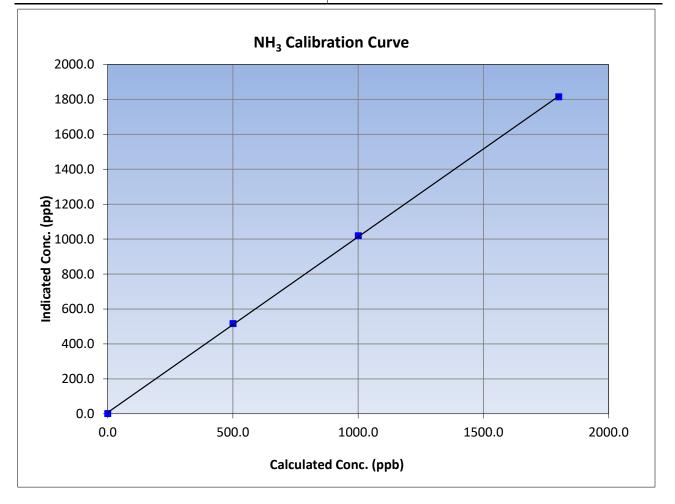


....



NH₃ Calibration Summary

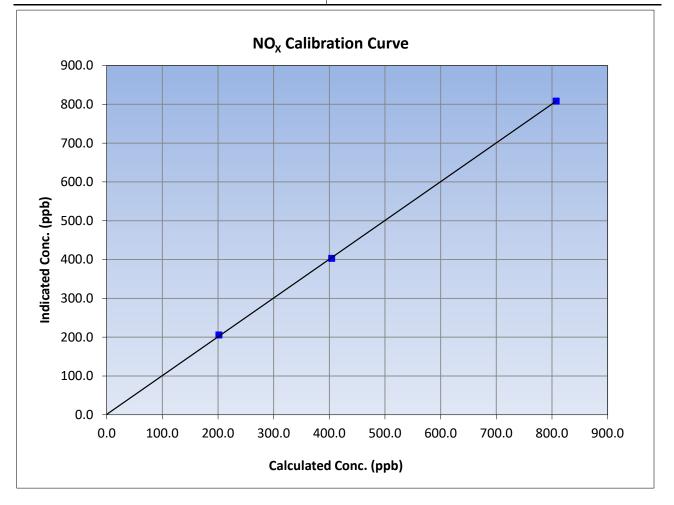
| WBEA | | Station | Information | | Version-11-2 | |
|--|---------------------------------------|---------------------------|------------------------------------|----------|------------------|--|
| Calibration Date: | March 8, 2023 | | Previous Calibration: | | February 7, 2023 | |
| Station Name: Start Time (MST): | Patricia McInnes 9:25 | | Station Number: End Time (MST): | | лs 06 4:00 | |
| Analyzer make: | API | T201 | Analyzer serial #: 152 | | 152 | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | 1.1 | | Correlation Coefficient | 0.999938 | ≥0.995 | |
| 1801.0 | 1814.8 | 0.9924 | correlation coernelent | 0.555550 | 20.000 | |
| 1000.8 | 1019.0 | 0.9822 | Slope | 1.005985 | 0.90 - 1.10 | |
| 500.4 | 516.1 | 0.9696 | Siope | 1.003985 | 0.90 - 1.10 | |
| | | | Intercept | 7.240605 | +/-20 | |





NO_x Calibration Summary

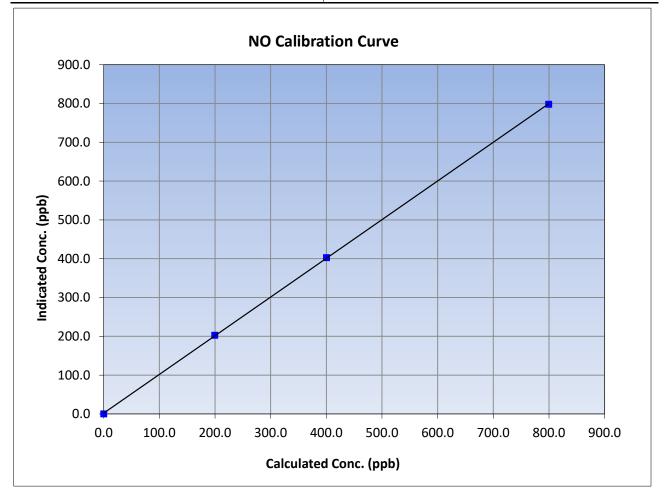
| WBEA | | Station | Information | | Version-11-20 | |
|--|---------------------------------------|---------------------------|-------------------------|----------|------------------|--|
| Calibration Date: | tion Date: March 8, 2023 | | Previous Calibration: | Februar | February 7, 2023 | |
| Station Name: | Patricia McInnes | | Station Number: | AM | 1S 06 | |
| Start Time (MST): | 9:25 | | End Time (MST): | 14 | 4:00 | |
| Analyzer make: | API T201 | | Analyzer serial #: 1 | | .52 | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> | |
| 0.0 | -0.4 | | Correlation Coefficient | 0.999953 | ≥0.995 | |
| 807.6 | 808.3 | 0.9991 | correlation coernicient | 0.555555 | 20.333 | |
| 404.3 | 403.1 | 1.0030 | Slope | 0.999337 | 0.90 - 1.10 | |
| 201.6 | 205.8 | 0.9798 | Slope | 0.999557 | 0.90 - 1.10 | |
| | | | Intercept | 1.041887 | +/-20 | |





NO Calibration Summary

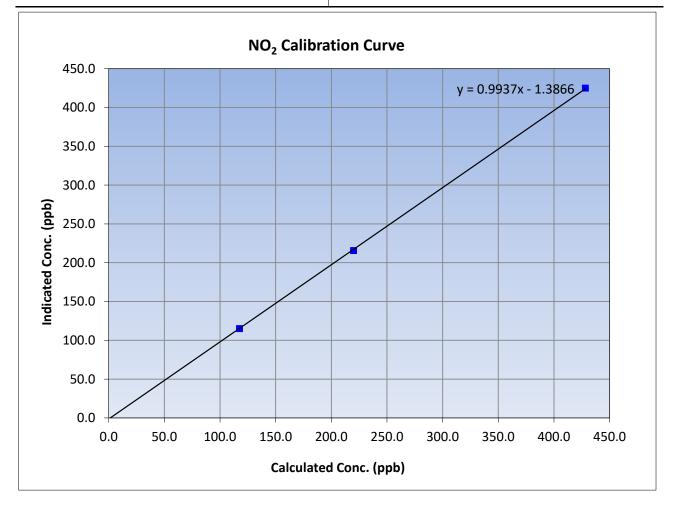
| WBEA | | Station | Information | | Version-11-20 |
|--|---------------------------------------|---------------------------|-----------------------------|------------------------|---------------|
| | | Station | mormation | | |
| Calibration Date: | March 8, 2023 | | Previous Calibration: Febru | | ary 7, 2023 |
| Station Name: | Patricia McInnes | | Station Number: | A | MS 06 |
| Start Time (MST): | 9:25 | | End Time (MST): | 1 | 14:00 |
| Analyzer make: | make: API T201 | | Analyzer serial #: | Analyzer serial #: 152 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999969 | ≥0.995 |
| 799.5 | 798.0 | 1.0018 | correlation coernelent | 0.999909 | 20.333 |
| 400.2 | 402.7 | 0.9939 | Slope | 0.997013 | 0.90 - 1.10 |
| 199.6 | 202.8 | 0.9842 | Siope | 0.337015 | 0.90 - 1.10 |
| | | | Intercept | 2.119639 | +/-20 |

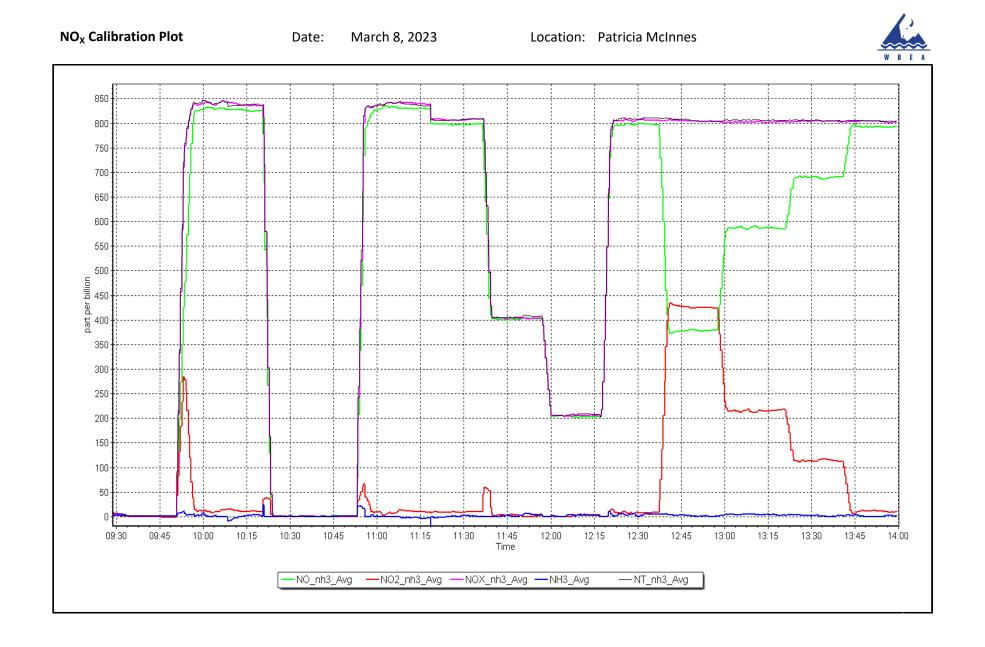




NO₂ Calibration Summary

| WBEA | | Chattan | 1. f | | Version-11-2 | |
|--|---------------------------------------|---------------------------|-------------------------|---------------------|------------------|--|
| | | Station | Information | | | |
| Calibration Date: | March | 8, 2023 | Previous Calibration: | Februa | February 7, 2023 | |
| Station Name: | Patricia McInnes | | Station Number: A | | AS 06 | |
| Start Time (MST): |): 9:25 | | End Time (MST): | End Time (MST): 14: | | |
| Analyzer make: | vzer make: API T201 | | Analyzer serial #: | | 152 | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | -0.5 | | Correlation Coefficient | 0.999962 | ≥0.995 | |
| 428.3 | 425.0 | 1.0077 | Correlation Coefficient | 0.999902 | 20.995 | |
| 220.0 | 215.7 | 1.0197 | Slope | 0.993721 | 0.90 - 1.10 | |
| 117.5 | 115.1 | 1.0204 | Slope | 0.995721 | 0.30 - 1.10 | |
| | | | Intercept | -1.386593 | +/-20 | |







Location: Patricia McInnes



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Athabasca Valley March 9, 2023 10:56 Routine | | Station number: Last Cal Date: End time (MST): | AMS07 February 1, 2023 13:35 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 50.52 | ppm | Cal Gas Exp Date: | December 29, 2028 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: | CC282115 50.52 | | Rom Cas Evp Data: | NA | |
| Removed Gas Cyl #: | 50.52 NA | ppm | Rem Gas Exp Date: Diff between cyl: | NA | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 3805 | |
| ZAG Make/Model: | API 701H | | Serial Number: | 198 | |
| | | | | | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | : Thermo 43i-LTE e 0 - 1000 ppb | | Analyzer serial #: | 1507864683 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.998179 | 0.995896 | Backgd or Offset: | 2.70 | 2.70 |
| Calibration intercept: | 1.983813 | 2.083550 | 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) | Correction factor (Cc/lc Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | -0.1 | |
| as found span | 4921 | 79.3 | 801.2 | 797.2 | 1.005 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4921 | 79.3 | 801.2 | 798.4 | 1.004 |
| second point | 4960 | 39.6 | 400.2 | 403.4 | 0.992 |
| third point | 4980 | 19.8 | 200.1 | 202.1 | 0.990 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4921 | 79.2 | 800.2 Averag | 800.7 ge Correction Factor | 0.999 0.995 |
| Deceline Cour As farmed | 707 20 | Drouious | | | |
| Baseline Corr As found: | 797.30 | Previous response | | *% change | -0.6% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | NA NA | AF Slope: AF Correlation: | | AF Intercept: | |
| pti | | | | * = > +/-5% change initiate | |

Notes:

No adjustments or maintenance done.

Calibration Performed By:

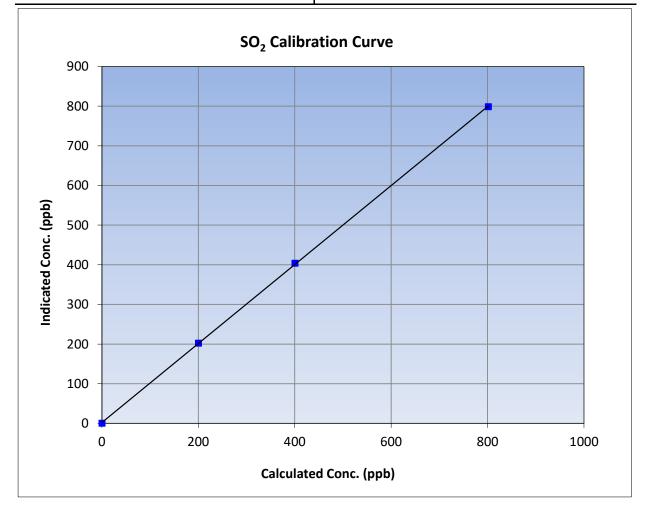


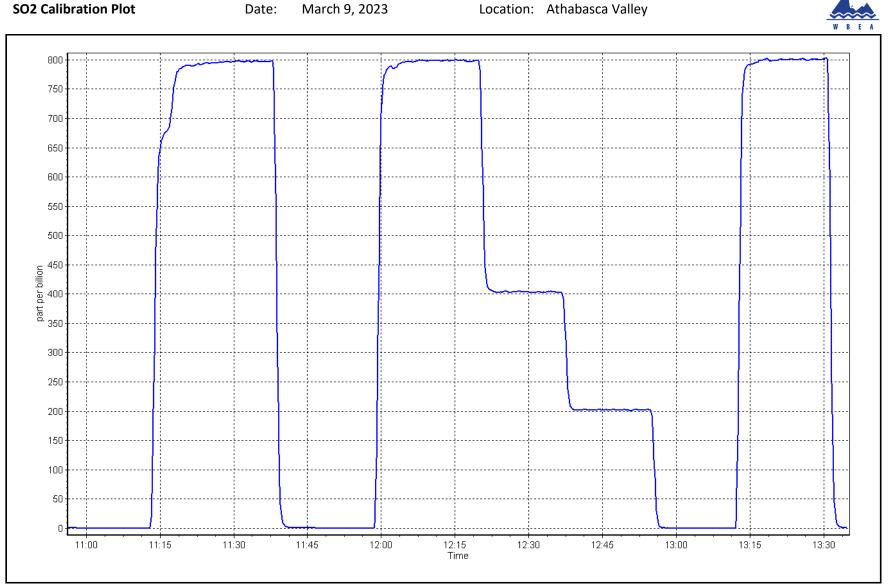
SO₂ Calibration Summary

| WBEA | | | Version-01-2020 | | | | | |
|---------------------|------------------|-----------------------|------------------|--|--|--|--|--|
| Station Information | | | | | | | | |
| Calibration Date: | March 9, 2023 | Previous Calibration: | February 1, 2023 | | | | | |
| Station Name: | Athabasca Valley | Station Number: | AMS07 | | | | | |
| Start Time (MST): | 10:56 | End Time (MST): | 13:35 | | | | | |
| Analyzer make: | Thermo 43i-LTE | Analyzer serial #: | 1507864683 | | | | | |
| | | | | | | | | |

Calibration Data

| Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) | | Correction factor Statistical Evalu (Cc/Ic) | | ation | <u>Limits</u> | |
|---|-------|--|-------------------------|----------|---------------|--|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999957 | ≥0.995 | |
| 801.2 | 798.4 | 1.0035 | correlation coefficient | 0.999937 | 20.333 | |
| 400.2 | 403.4 | 0.9919 | Slope | 0.995896 | 0.90 - 1.10 | |
| 200.1 | 202.1 | 0.9899 | Slope | 0.993690 | 0.90 - 1.10 | |
| | | | Intercept | 2.083550 | +/-30 | |





Location: Athabasca Valley



TRS Calibration Report

| | | | | - | |
|---|---|--------------------------------|--|---------------------------------------|---|
| WBEA | | | | | Version-11-202 |
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Athabasca Valley March 13, 2023 7:52 Routine | | Station number: Last Cal Date: End time (MST): | AMS07 February 6, 2023 11:54 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 4.94 | ppm | Cal Gas Exp Date: | February 9, 2024 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | EY0002277 4.94 NA API T700 API T701H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | • | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i LTE CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1180540018 551 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.988807 | 0.993485 | Backgd or Offset: | 2.33 | 2.20 |
| Calibration intercept: | 0.421592 | 0.081597 | Coeff or Slope: | 0.886 | 0.841 |
| | | TRS As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as found span | 4918 | 81.6 | 80.6 | 84.5 | 0.954 |
| as found 2nd point | 4959 | 40.8 | 40.3 | 42.2 | 0.955 |
| as found 3rd point | 4980 | 20.4 | 20.2 | 20.9 | 0.964 |
| 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 | 4918 | 81.6 | 80.6 | 80.2 | 1.005 |
| second point | 4959 | 40.8 | 40.3 | 40.2 | 1.003 |
| third point | 4980 | 20.4 | 20.2 | 19.9 | 1.013 |
| as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as left span | 4918 | 81.6 | 80.6 | 79.6 | 1.013 |
| SO2 Scrubber Check | 4921 | 79.2 | 800.2 | -0.1 | |
| Date of last scrubber cha | | 25-Feb-22 | | Ave Corr Factor | 1.007 |
| Date of last converter eff | iciency test: | April 22, 2022 | | 98.5% | efficiency |
| Baseline Corr As found: | 84.5 | Prev response: | 80.15 | *% change: | 5.2% |
| Baseline Corr 2nd AF pt: | 42.2 | AF Slope: | | AF Intercept: | -0.098313 |
| Baseline Corr 3rd AF pt: | 20.9 | AF Correlation: | | | |
| | | | | * = > +/-5% change initiat | es investigation |

Notes:

Sox scrubber checked after calibrator zero. Span adjusted.

Calibration Performed By:

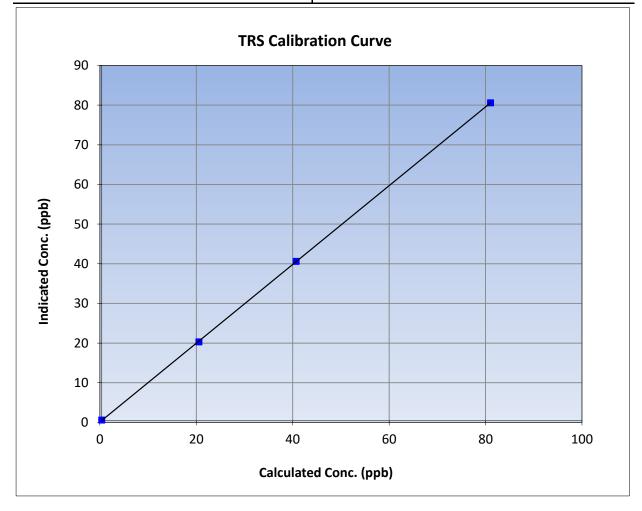
Melissa Lemay

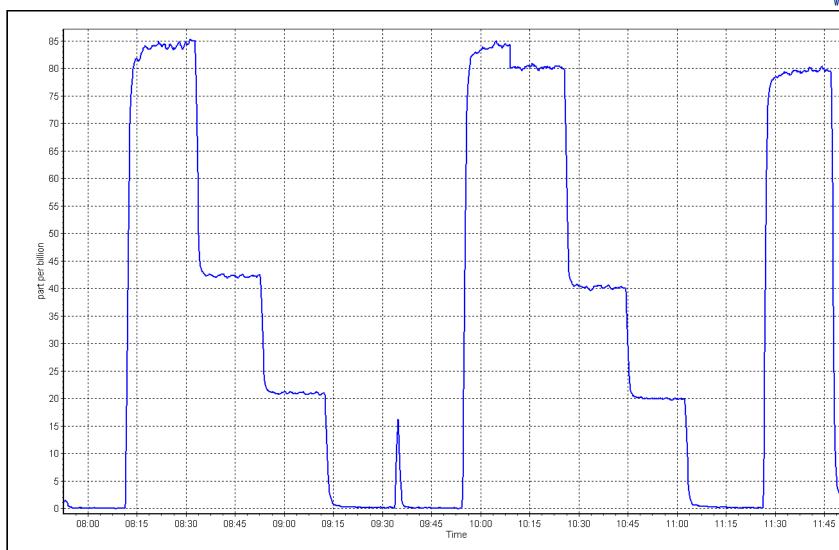


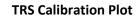
TRS Calibration Summary

| | Stati | on Information | |
|-------------------|------------------|-----------------------|------------------|
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 6, 2023 |
| Station Name: | Athabasca Valley | Station Number: | AMS07 |
| Start Time (MST): | 7:52 | End Time (MST): | 11:54 |
| Analyzer make: | CDN-101 | Analyzer serial #: | 551 |
| | | | |
| | Ca | libration Data | |

| can | (ppb) (Cc) | (ppb) (Ic) | (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | |
|-----|------------|------------|---------|-------------------------|----------|---------------|--|
| | 0.0 | 0.2 | | Correlation Coefficient | 0.999983 | ≥0.995 | |
| | 80.6 | 80.2 | 1.0053 | correlation coefficient | 0.999905 | 20.335 | |
| | 40.3 | 40.2 | 1.0028 | Slope | 0.993485 | 0.90 - 1.10 | |
| | 20.2 | 19.9 | 1.0127 | Slope | 0.993485 | 0.90 - 1.10 | |
| | | | | Intercept | 0.081597 | +/-3 | |
| | | | | 1 | | | |







Location: Athabasca Valley





THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | | Version-01-202 |
|-------------------------------------|---------------|----------|---------------|-------------------------|-----------------|----------------|
| | | | Station | Information | | |
| Station Name: | Athabasca Val | ley | | Station number: Al | MS07 | |
| Calibration Date: | March 9, 2023 | } | | Last Cal Date: Fe | ebruary 1, 2023 | 3 |
| Start time (MST): | 10:57 | | | End time (MST): 13 | 3:34 | |
| Reason: | Routine | | | | | |
| | | | Calibrat | ion Standards | | |
| Gas Cert Reference: | | CC282115 | | Cal Gas Expiry Date: D | ecember 29, 20 | 028 |
| CH4 Cal Gas Conc. | 501.2 | ppm | | CH4 Equiv Conc. | 1075.1 | ppm |
| C3H8 Cal Gas Conc. | 208.7 | ppm | | | | |
| Removed Gas Cert: | | NA | | Removed Gas Expiry: N | A | |
| Removed CH4 Conc. | 501.2 | ppm | | CH4 Equiv Conc. | 1075.1 | ppm |
| Removed C3H8 Conc. | 208.7 | ppm | | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄) | : | | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | | Serial Number: 38 | 305 | |
| ZAG make/model: | API 701H | | | Serial Number: 19 | 98 | |
| | | | Analyze | r Information | | |
| Analyzer make | : Thermo 55i | | | Analyzer serial #: 13 | 317958219 | |
| THC Range (ppm) | : 0 - 20 ppm | | | | | |
| NMHC Range (ppm) | : 0 - 10 ppm | | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | | <u>Finish</u> | | <u>Start</u> | Finish |
| CH4 SP Ratio | : 0.000270 |) (| 0.000270 | NMHC SP Ratio: | 4.42E-05 | 4.42E-05 |
| CH4 Retention time | : 13.4 | | 13.4 | NMHC Peak Area: | 205840 | 205840 |

| THC Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|--|---------------------|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as found span | 4921 | 79.3 | 17.05 | 17.01 | 1.002 | | |
| as found 2nd point | | | | | | | |
| as found 3rd point | | | | | | | |
| new cylinder response | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| high point | 4921 | 79.3 | 17.05 | 16.97 | 1.005 | | |
| second point | 4960 | 39.6 | 8.52 | 8.48 | 1.004 | | |
| third point | 4980 | 19.8 | 4.26 | 4.27 | 0.997 | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4921 | 79.2 | 17.03 | 16.98 | 1.003 | | |
| | | | A | Average Correction Factor | 1.002 | | |
| Baseline Corr AF: | 17.01 | Prev response | 17.16 | *% change | -0.9% | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiates investigation | | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| NMHC Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|--|---------------------|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (0 | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | |
| as found zero | 5000 | 0 | 0.00 | 0.00 | | | |
| as found span | 4921 | 79.3 | 9.10 | 9.14 | 0.996 | | |
| as found 2nd point | | | | | | | |
| as found 3rd point | | | | | | | |
| new cylinder response | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| high point | 4921 | 79.3 | 9.10 | 9.12 | 0.998 | | |
| second point | 4960 | 39.6 | 4.55 | 4.57 | 0.995 | | |
| third point | 4980 | 19.8 | 2.27 | 2.30 | 0.988 | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4921 | 79.2 | 9.09 | 9.12 | 0.997 | | |
| | | | A | Average Correction Factor | 0.994 | | |
| Baseline Corr AF: | 9.14 | Prev response | 9.16 | *% change | -0.2% | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates investigation</pre> | | | |

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

| | | | lion 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 | 4921 | 79.3 | 7.95 | 7.87 | 1.010 |
| 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 | 7.86 | 1.011 |
| second point | 4960 | 39.6 | 3.97 | 3.91 | 1.015 |
| third point | 4980 | 19.8 | 1.98 | 1.97 | 1.008 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4921 | 79.2 | 7.94 | 7.86 | 1.010 |
| | | | A | verage Correction Factor | 1.011 |
| Baseline Corr AF: | 7.87 | Prev response | 8.00 | *% 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> | | <u>Finish</u> | |
| THC Cal Slope: | | 1.004980 | | 0.994780 | |
| THC Cal Offset: | | 0.021918 | | 0.013474 | |
| CH4 Cal Slope: | CH4 Cal Slope: 1.006293 | | | 0.988322 | |
| CH4 Cal Offset: | | -0.000176 | | -0.000211 | |
| NMHC Cal Slope: | | 1.004211 | | 1.001323 | |
| NMHC Cal Offset: | | 0.018094 | | 0.012086 | |

Notes:

No Maintenance or adjustments done.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| Calibration Date: | March | 9, 2023 | Previous Calibration: | February | 1, 2023 |
| tation Name: | Athabas | ca Valley | Station Number: | AM | S07 |
| tart Time (MST): | 10 | :57 | End Time (MST): | 13: | 34 |
| nalyzer make: | Therr | no 55i | Analyzer serial #: | 13179 | 58219 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 17.05 | 0.00 16.97 | 1.0046 | Correlation Coefficient | 0.999996 | ≥0.995 |
| 8.52 4.26 | 8.48 4.27 | 1.0042 0.9971 | Slope | 0.994780 | 0.90 - 1.10 |
| | | | Intercept | 0.013474 | +/-0.5 |
| 18.0 | | | | _ | |
| 16.0 - | | | | _ | |
| | | | | | |
| 14.0 | | | | | |
| 12.0 | | | | | |
| ud 10.0 - | | | | | |
| Conc. | | | | | |
| Indicated Conc. (ppm) | | | | | |
| <u>8</u> 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | | | | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | | | | |



CH₄ Calibration Summary

Version-01-2020

| | | | Station I | nformation | | |
|--|--------|---------------------------------------|-----------------------------|-----------------------|--------------|---------------|
| Calibration Date | e: | March | 9, 2023 | Previous Calibratio | n: February | 1, 2023 |
| Station Name: | | Athabas | ca Valley | Station Numbe | er: AM | S07 |
| Start Time (MST | Г): | 10 | :57 | End Time (MST | -): 13 | 34 |
| Analyzer make: | | Therr | no 55i | Analyzer serial | #: 13179 | 58219 |
| | | | Calibra | tion Data | | |
| Calculated concent (ppm) (Cc) | ration | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistica | l Evaluation | <u>Limits</u> |
| 0.00 7.95 | | 0.00 7.86 | 1.0113 | Correlation Coefficie | nt 0.999992 | ≥0.995 |
| 3.97 1.98 | | 3.91 1.97 | 1.0153 1.0075 | Slope | 0.988322 | 0.90 - 1.10 |
| | | | | Intercept | -0.000211 | +/-0.5 |
| 9.0 8.0 | | | CH ₄ Calibration | | | |
| 7.0 | | | | | | |
| 6.0 | | | | | | |
| (bbm) 5.0 Conc. (bbm) 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 | 2.0 | | | 5.0 | 10.0 |
| | | | Calculated | l Conc. (ppm) | | |



NMHC Calibration Summary

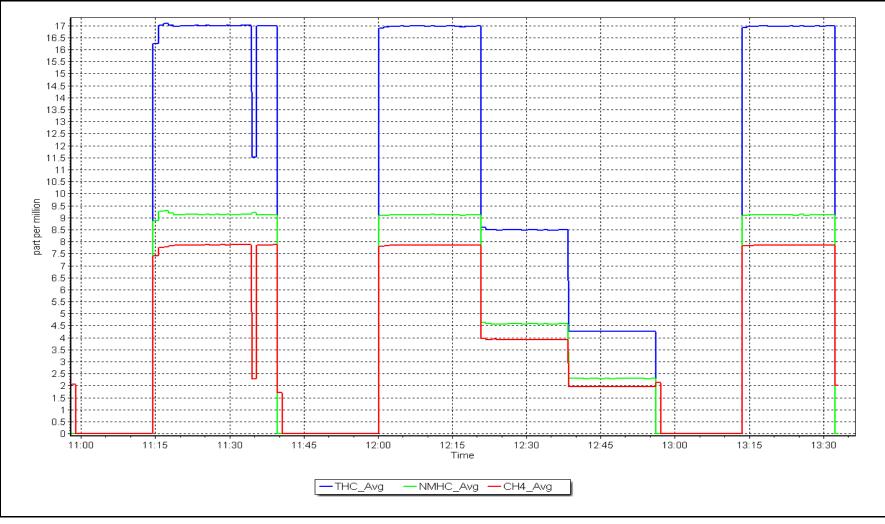
Version-01-2020

| | | Station | Information | | |
|------------------------------------|---|---------------------------|---------------------------|------------|---------------|
| Calibration Date: | bration Date: March 9, 2023 | | Previous Calibration | : February | 1, 2023 |
| Station Name: | Athaba | sca Valley | Station Number | : AM: | S07 |
| Start Time (MST) | : 1 | 0:57 | End Time (MST) | : 13: | 34 |
| Analyzer make: | The | rmo 55i | Analyzer serial # | : 13179 | 58219 |
| | | Colibra | ation Data | | |
| | | | ation Data | | |
| Calculated concentra (ppm) (Cc) | ation Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical I | Evaluation | <u>Limits</u> |
| 0.00 | 0.00 | | - Correlation Coefficient | t 0.999992 | ≥0.995 |
| <u>9.10</u> 4.55 | <u>9.12</u> 4.57 | 0.9980 | | | |
| 2.27 | 2.30 | 0.9882 | Slope | 1.001323 | 0.90 - 1.10 |
| | | | Intercept | 0.012086 | +/-0.5 |
| 10.0 | | NMHC Calibra | tion Curve | | |
| 8.0 | | | | | |
| 7.0 | | | | | |
| u 6.0 | | | | | |
| (mdd) 5.0 - | | | | | |
| | | | | | |
| - 0.6 Indicated | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | .0 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculated | d Conc. (ppm) | | |

NMHC Calibration Plot

Location: Athabasca Valley







Baseline Corr 2nd AF:

Baseline Corr 3rd AF:

NA

NA

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-20 |
|--|-------------------|----------------------|-------------------------|---------------------|---------------------------|
| | | Station In | formation | | |
| Station Name: | Athabasca Valley | | Station number: A | AMS07 | |
| Calibration Date: | March 31, 2023 | | Last Cal Date: | March 9, 2023 | |
| Start time (MST): | 8:45 | | End time (MST): 9 | 9:58 | |
| Reason: | Cylinder Change | Hydrogen cylinder o | change | | |
| | | Calibration | Chandanda | | |
| | | Calibration | | | |
| Gas Cert Reference: | | 282115 | Cal Gas Expiry Date: [| | |
| CH4 Cal Gas Conc. | 501.2 | ppm | CH4 Equiv Conc. | 1075.1 | ppm |
| C3H8 Cal Gas Conc. | 208.7 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: N | | |
| Removed CH4 Conc. | 501.2 | ppm | CH4 Equiv Conc. | 1075.1 | ppm |
| Removed C3H8 Conc. | 208.7 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 3 | 3805 | |
| ZAG make/model: | API 701H | | Serial Number: 1 | 198 | |
| | | Analyzer Ir | nformation | | |
| Analyzer make: | Thermo 55i | · ·····, | Analyzer serial #: 1 | 1317958219 | |
| THC Range (ppm): | | | | 1317330213 | |
| NMHC Range (ppm): | | | CH4 Range (ppm): (|) - 10 nnm | |
| initia in the second of the second se | 0 10 ppm | | chi i nunge (ppin). e | 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio: | 0.000270 | 0.000270 | NMHC SP Ratio: | 4.42E-05 | 4.42E-05 |
| CH4 Retention time: | 13.4 | 13.4 | NMHC Peak Area: | 205840 | 205840 |
| | | | | | |
| | | THC Calibr | | | |
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF <i>Limit=</i> 0.95-1.0 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4921 | 79.3 | 17.05 | 16.74 | 1.019 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4921 | 79.3 | 17.05 | 16.73 | 1.019 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | 0.00 | | |
| as left span | | | | | |
| | | | Average | Correction Factor | 1.019 |
| Baseline Corr AF: | 16.74 | Prev response | 16.97 | *% change | -1.4% |
| | | | | | |

AF Slope:

AF Correlation:

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



THC / CH_4 / NMHC Calibration Report

Version-01-2020

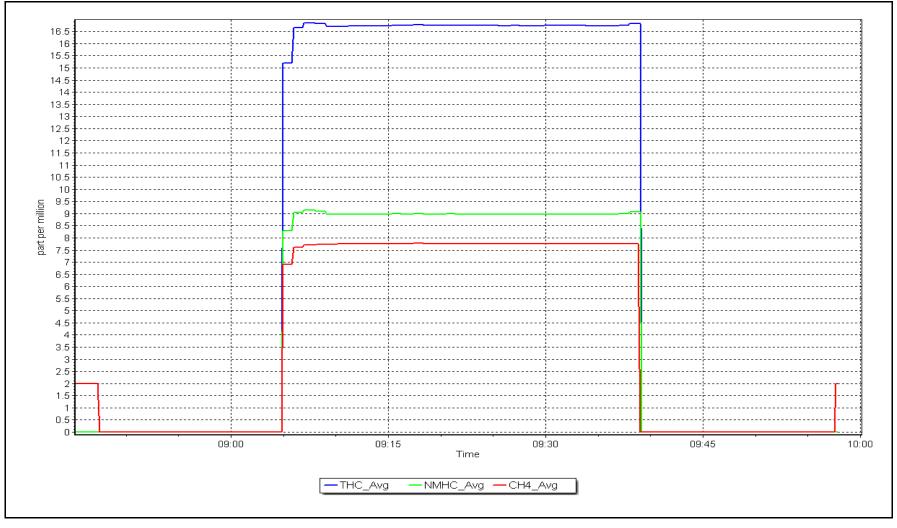
| Cat Da St | Dilaiaf | NMHC Calibr | | | |
|-------------------------------------|-------------------|----------------------|---|----------------------------|----------------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF <i>Limit=</i> 0.95-1.05 |
| as found zero | 5000 | 0 | 0.00 | 0.00 | |
| as found span | 4921 | 79.3 | 9.10 | 8.98 | 1.014 |
| 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 | 8.97 | 1.015 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Avera | ge Correction Factor | 1.015 |
| Baseline Corr AF: | 8.98 | Prev response | 9.13 | *% change | -1.6% |
| 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 <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 | 7.76 | 1.024 |
| 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 | 7.76 | 1.024 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Avera | ge Correction Factor | 1.024 |
| Baseline Corr AF: | 7.76 | Prev response | 7.86 | *% change | -1.2% |
| Baseline Corr 2nd AF: | NA | AF Slope: | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | AF Intercept: | 112/0 |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| baseline con Siu Al. | 114 | Calibration | Statistics | , | |
| | | | Statistics | Et a ta b | |
| | | <u>Start</u> | | <u>Finish</u> | |
| THC Cal Slope: | | 0.994780 | | 0.981205 | |
| THC Cal Offset: | | 0.013474 | | 0.000000 | |
| CH4 Cal Slope: | | 0.988322 | | 0.976278 | |
| CH4 Cal Offset: | | -0.000211 | | 0.000000 | |
| | | 1.001323 | | 0.985508 | |
| NMHC Cal Slope: NMHC Cal Offset: | | 0.012086 | | 0.000000 | |

Calibration Performed By: N

Melissa Lemay









$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | Stati | on Information | | | |
|---|---|---|--|---|--------------------------------------|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Athabasca Valley March 10, 2023 7:40 Routine | Station number: AMS07 Last Cal Date: February 7, 2023 End time (MST): 12:10 | | | | |
| | | Calibr | ation Standards | | | |
| NO Gas Cylinder #: | T2Y1KA4 | | Cal Gas Expiry Date: N | lovember 30, 20 | 023 | |
| NOX Cal Gas Conc: | 50.92 | ppm | NO Cal Gas Conc: | 49.92 | ppm | |
| Removed Cylinder #: | NA | | Removed Gas Exp Date: | NA | | |
| Removed Gas NOX Conc: | 50.92 | ppm | Removed Gas NO Conc: | 49.92 | ppm | |
| NOX gas Diff: | | | NO gas Diff: | | | |
| Calibrator Model: | API T700 | | Serial Number: | 3805 | | |
| ZAG make/model: | API T701H | | Serial Number: | 198 | | |
| Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope | 0 - 1000 ppb <u>Start</u> : 1.048 : 0.995 | Analy <u>Finish</u> 1.048 0.995 1.000 | zer Information Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press: | .160120024 <u>Start</u> 7.3 7.5 201.9 | <u>Finish</u> 7.3 7.5 197.9 | |
| | | Calib | ration Statistics | | | |
| | | <u>Start</u> | | <u>Finish</u> | | |
| NO _x Cal Slope | : | 0.99103 | 9 | 0.997475 | | |
| NO _x Cal Offset | | 1.15717 | | 1.358498 | | |
| NO Cal Slope | | 0.99104 | | 0.997406 | | |
| NO Cal Offset | | 0.93320 | | 1.054447 | | |
| NO ₂ Cal Slope | | 1.00074 | 2 | 1.001683 | | |
| NO ₂ Cal Offset | : | 0.45763 | 6 | 0.681681 | | |



$NO_X \setminus NO \setminus NO_2$ 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 | 0.0 | | |
| as found span | 4920 | 80.2 | 816.7 | 800.7 | 16.0 | 817.5 | 799.6 | 17.9 | 0.9991 | 1.0014 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | | |
| high point | 4920 | 80.2 | 816.7 | 800.7 | 16.0 | 815.1 | 798.8 | 16.3 | 1.0020 | 1.0024 |
| second point | 4960 | 40.1 | 408.4 | 400.4 | 8.0 | 410.3 | 402.0 | 8.3 | 0.9953 | 0.9959 |
| third point | 4980 | 20.0 | 203.7 | 199.7 | 4.0 | 205.0 | 200.4 | 4.6 | 0.9936 | 0.9964 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | -0.1 | | |
| as left span | 4920 | 80.2 | 816.7 | 398.9 | 417.8 | 820.6 | 397.4 | 423.3 | 0.9953 | 1.0037 |
| | | | | | | | Average C | orrection Factor | 0.9970 | 0.9982 |
| Corrected As fo | ound NO _x = | 817.6 ppb | NO = | 799.7 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chang | ge NO _X = | 0.9% |
| Previous Respo | nse NO _x = | 810.6 ppb | NO = | 794.4 ppb | | | | *Percent Chang | ge NO = | 0.7% |
| Baseline Corr 2 | nd pt NO _X = | NA ppb | NO = | NA ppb | As found | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | rd pt NO _x = | NA ppb | NO = | NA ppb | As found | d NO r^2 : | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (C | Indicated NO2 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|--|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 797.1 | 395.3 | 417.8 | 419.0 | 0.9972 | 100.3% |
| 2nd GPT point (200 ppb O3) | 797.1 | 599.1 | 214.0 | 215.1 | 0.9951 | 100.5% |
| 3rd GPT point (100 ppb O3) | 797.1 | 699.2 | 113.9 | 115.6 | 0.9856 | 101.5% |
| | | | | Average Correction Factor | 0.9926 | 100.7% |

Notes:

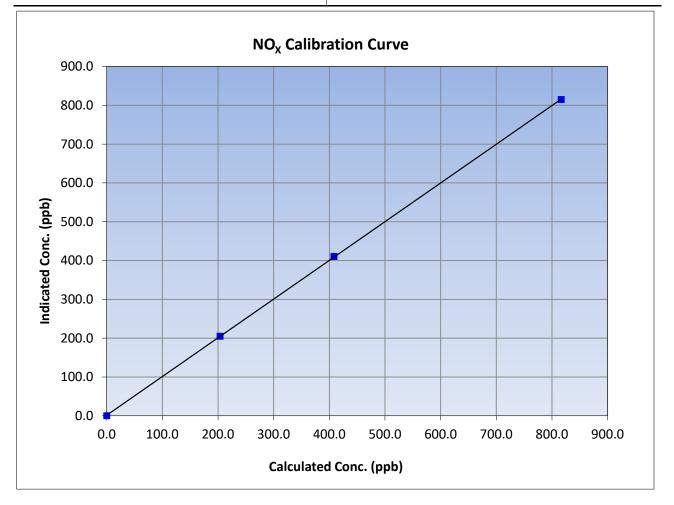
No maintenance or adjustments done.

Calibration Performed By:



NO_x Calibration Summary

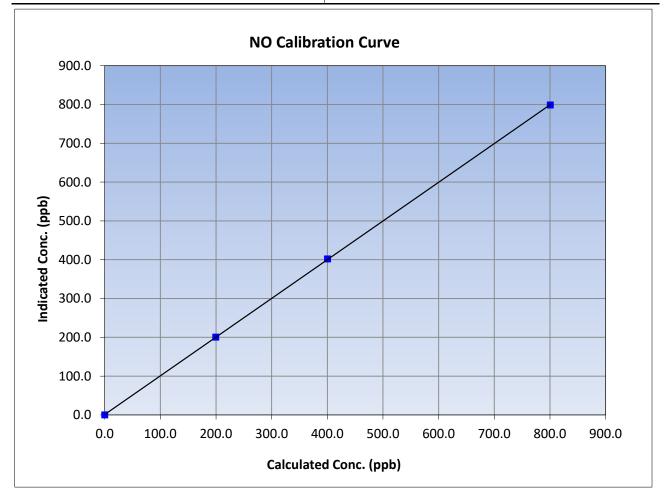
| WBEA | | | | | Version-04-202 | |
|--|---------------------------------------|---------------------------|-------------------------|------------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | March : | 10, 2023 | Previous Calibration: | February | 7, 2023 | |
| Station Name: | Athabas | ca Valley | Station Number: | AM | S07 | |
| Start Time (MST): | 7:40 | | End Time (MST): | 12 | :10 | |
| Analyzer make: | Therr | mo 42i | Analyzer serial #: | 1160120024 | | |
| | | 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 | 0.999986 | ≥0.995 | |
| 816.7 | 815.1 | 1.0020 | correlation coefficient | 0.555560 | 20.333 | |
| 408.4 | 410.3 | 0.9953 | Slope | 0.997475 | 0.90 - 1.10 | |
| 203.7 | 205.0 | 0.9936 | Slope | 0.997475 | 0.90 - 1.10 | |
| | | | Intercept | 1.358498 | +/-20 | |





NO Calibration Summary

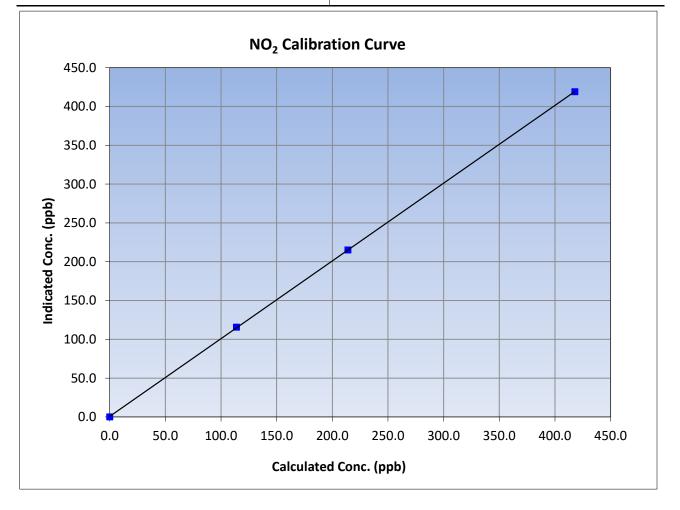
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------------------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 10, 2023 | Previous Calibration: | February | 7, 2023 |
| Station Name: | Athabas | ca Valley | Station Number: | AM | S07 |
| Start Time (MST): | 7:40 | | End Time (MST): | 12 | :10 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | Analyzer serial #: 11601200 | |
| | | 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 | 0.999988 | ≥0.995 |
| 800.7 | 798.8 | 1.0024 | correlation coernicient | 0.555588 | 20.333 |
| 400.4 | 402.0 | 0.9959 | Slope | 0.997406 | 0.90 - 1.10 |
| 199.7 | 200.4 | 0.9964 | Slope | 0.997400 | 0.90 - 1.10 |
| | | | Intercept | 1.054447 | +/-20 |

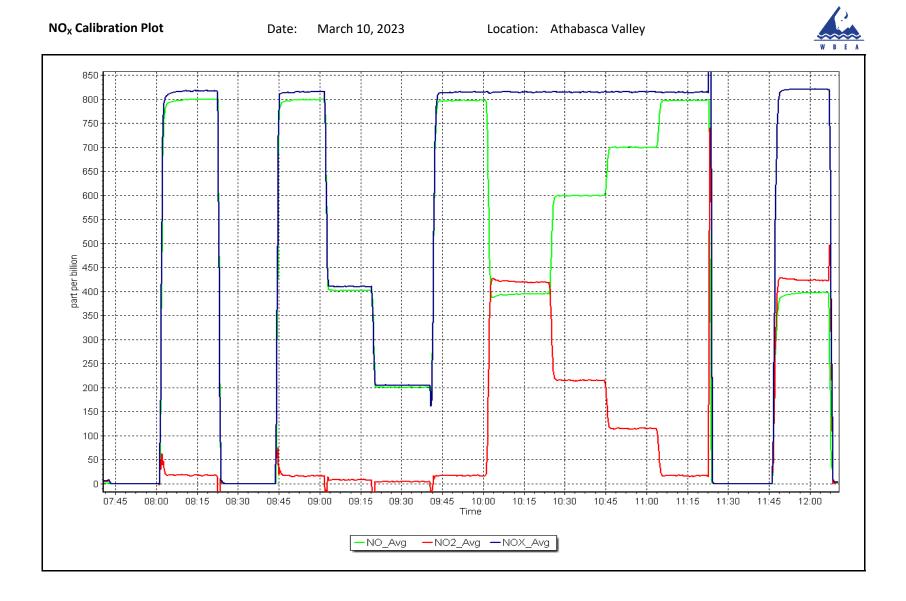




NO₂ Calibration Summary

| WBEA | | | | | Version-04-202 | |
|--|---------------------------------------|---------------------------|-------------------------|---------------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | March : | 10, 2023 | Previous Calibration: | Februar | y 7, 2023 | |
| Station Name: | Athabas | ca Valley | Station Number: | AM | S07 | |
| Start Time (MST): | 7:40 | | End Time (MST): | 12 | :10 | |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | #: 1160120024 | | |
| | | 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 | |
| 417.8 | 419.0 | 0.9972 | correlation coefficient | 0.555565 | 20.333 | |
| 214.0 | 215.1 | 0.9951 | Slope | 1.001683 | 0.90 - 1.10 | |
| 113.9 | 115.6 | 0.9856 | Slope | 1.001085 | 0.90 - 1.10 | |
| | | | Intercept | 0.681681 | +/-20 | |







O₃ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|---|--|---|--|---|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Athabasca Valley March 9, 2023 7:22 Routine | | Station number: Last Cal Date: End time (MST): | February 8, 2023 | |
| | | Calibration St | andards | | |
| O3 generation mode: | Photometer | | | | |
| Calibrator Make/Model: | T700 | | Serial Number: | 3805 | |
| ZAG Make/Model: | T701H | | Serial Number: | | |
| | | Analyzer Info | rmation | | |
| Analyzer make | | | Analyzer serial #: | 1507964700 | |
| Analyzer Range | e 0 - 500 ppb | | | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.995429 | 0.994371 | Backgd or Offset: | -0.6 | -0.6 |
| Calibration intercept: | 1.600000 | 2.260000 | Coeff or Slope: | 1.119 | 1.170 |
| | | O ₃ Calibratio | on Data | | |
| Set Point | Total air flow rate (sccm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration C (ppm) (Ic) | Correction factor (Cc/ Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 5000 | 1383.2 | 400.0 | 388.9 | 1.029 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.5 | |
| high point | 5000 | 1383.7 | 400.0 | 398.9 | 1.003 |
| second point | 5000 | 1022.2 | 200.0 | 202.7 | 0.987 |
| third point | 5000 | 843.8 | 100.0 | 103.0 | 0.971 |
| as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as left span | 5000 | 1380.2 | 400.0 | 396.8 | 1.008 |
| | | | Averag | ge Correction Factor | 0.987 |
| | | | | | |
| Baseline Corr As found: | 388.8 | Previous response | 399.8 | *% change | -2.8% |
| | 388.8 NA | Previous response AF Slope: | 399.8 | *% change AF Intercept: | -2.8% |
| Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | | Previous response AF Slope: AF Correlation: | 399.8 | *% change AF Intercept: | -2.8% |

Notes:

No Maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay

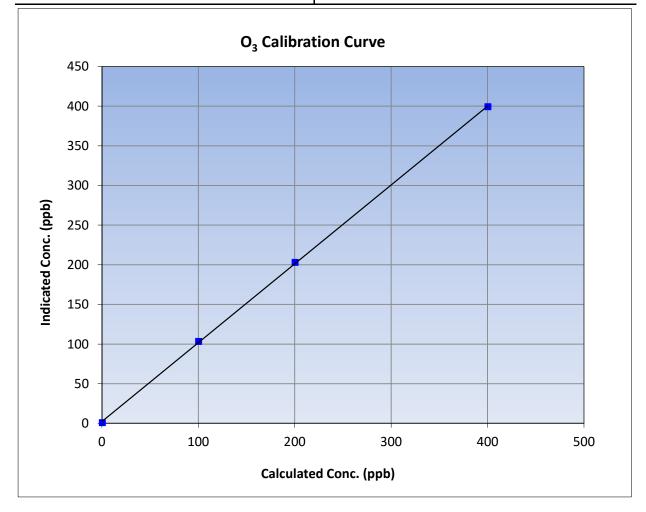


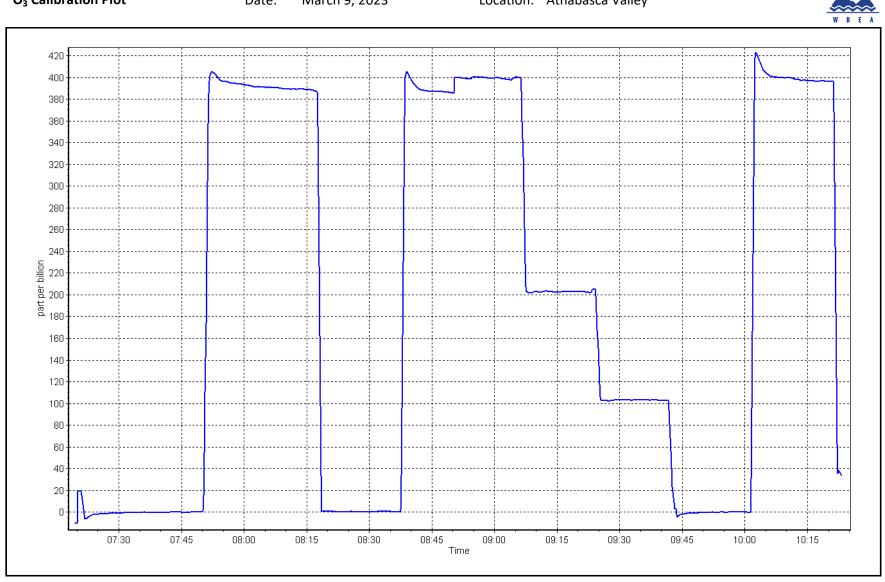
O₃ Calibration Summary

| WBEA | | | Version-01-2020 | | | | | | |
|---------------------|------------------|-----------------------|------------------|--|--|--|--|--|--|
| Station Information | | | | | | | | | |
| Calibration Date: | March 9, 2023 | Previous Calibration: | February 8, 2023 | | | | | | |
| Station Name: | Athabasca Valley | Station Number: | AMS07 | | | | | | |
| Start Time (MST): | 7:22 | End Time (MST): | 10:23 | | | | | | |
| Analyzer make: | Thermo 49i | Analyzer serial #: | 1507964700 | | | | | | |
| | | | | | | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.5 | | Correlation Coefficient | 0.999902 | ≥0.995 |
| 400.0 | 398.9 | 1.0028 | correlation coefficient | 0.333302 | 20.333 |
| 200.0 | 202.7 | 0.9867 | Slope | 0.994371 | 0.90 - 1.10 |
| 100.0 | 103.0 | 0.9709 | Siope | | 0.30 - 1.10 |
| | | | Intercept | 2.260000 | +/- 5 |





Location: Athabasca Valley



T640 PM_{2.5} CALIBRATION

| WBEA | | | | | Version-01-2023 |
|---|------------------|-------------------------|---------------------|------------------|-----------------|
| | | Station Information | 1 | | |
| Station Name: | Athabasca Valley | | Station number: | AMS 07 | |
| Calibration Date: | March 31, 2023 | | Last Cal Date: | February 1, 2023 | |
| Start time (MST): | 8:21 | | End time (MST): | 8:43 | |
| Applyzor Makor | API T640 | | S/N: | CAE | |
| Analyzer Make: Particulate Fraction: | PM2.5 | | 5/IN: | 045 | |
| | 1112.5 | | | | |
| Flow Meter Make/Model: | Alicat FP-25BT | | S/N: | 388753 | |
| Temp/RH standard: | Alicat FP-25BT | | S/N: | 388753 | |
| | | Monthly Calibration To | est | | |
| Parameter | <u>As found</u> | Measured | <u>As left</u> | Adjuste | ed (Limits) |
| T (°C) | -3.9 | -3 | -3.9 | | +/- 2 °C |
| P (mmHg) | 733.9 | 732.6 | 733.9 | | +/- 10 mmHg |
| flow (LPM) | 5 | 5.17 | 5 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 31, 2023 | Last Cal Date: | | |
| Leak Test. | PM w/o HEPA: | 7.7 | PM w/ HEPA: | 0 | <0.2 ug/m3 |
| Note: this leak check will be | - | | - | - | |
| Inlet cleaning : | Inlet Head | | | | |
| C C | | | | | |
| | | | | | |
| | | Quarterly Calibration T | est | | |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | Adjuste | ed (Limits) |
| PMT Peak Test | | | | | 10.9 +/- 0.5 |
| | | | | | |
| Post-maintenanc | | PM w/o HEPA: | | w/ HEPA: | |
| Date Optical Chan | - | February 1, 2023 | | | <0.2 ug/m3 |
| Disposable Filte | er Changed: | February 1, | 2023 | | |
| | | | | | |
| | | | | | |
| | | Annual Maintenance | е | | |
| | | | | | |
| Date Sample Tu | - | December 5 | | | |
| Date RH/T Sens | or Cleaned: | December 5 | , 2022 | | |
| | | | | | |
| Notes: | | No adjustmen | its done. Head clea | uned | |
| NOLES. | | | | | |
| | | | | | |
| Calibration by: | Melissa Lemay | | | | |



CO Calibration Report

Version-01-2020

| | | | | | Version of 2 |
|-------------------------|------------------------|----------------------|---------------------|-------------------------|--------------------------|
| | | Station Infor | mation | | |
| Station Name: | Athabasca Valley | | Station number: | AMS07 | |
| Calibration Date: | March 14, 2023 | | Last Cal Date: | February 8, 2023 | |
| Start time (MST): | 8:44 | | End time (MST): | 11:48 | |
| Reason: | Routine | | | | |
| | | | | | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 3,000 | ppm | Cal Gas Exp Date: | December 12, 2026 | |
| Cal Gas Cylinder #: | LL66942 | | · | | |
| Removed Cal Gas Conc: | 3,000 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | | Diff between cyl: | | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 3805 | |
| ZAG Make/Model: | API 700H | | Serial Number: | 198 | |
| | | | Senarransen | | |
| | | Analyzer Info | rmation | | |
| Analyzer make | : Thermo 48i-LTE | | Analyzer serial #: | 1408761381 | |
| Analyzer Range | | | - | | |
| | | | | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.997345 | 0.998030 | Backgd or Offset: | 3.651 | 3.773 |
| Calibration intercept: | 0.018531 | 0.026535 | Coeff or Slope: | 1.079 | 1.079 |
| | | CO Calibratio | n Data | | |
| | | | | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration | Correction factor |
| Set Point | (sccm) | (sccm) | concentration (ppm) | (ppm) (lc) | (Cc/Ic) |
| <u> </u> | | | (Cc) | | <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4933 | 66.7 | 40.0 | 40.2 | 0.997 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4933 | 66.7 | 40.0 | 39.9 | 1.002 |
| second point | 4967 | 33.3 | 20.0 | 20.1 | 0.996 |
| third point | 4983 | 16.7 | 10.0 | 10.0 | 1.000 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| | | 66.7 | 40.0 | 39.9 | 1.003 |
| as left span | 4933 | | ··- | | |
| as left span | 4933 | 00.7 | Avera | ge Correction Factor | 1.000 |
| · | | | | ge Correction Factor | |
| Baseline Corr As found: | 40.08 | Prev response: | 39.93 | *% change: | 1.000 0.4% |
| · | | | 39.93 | | |

Notes:

No Maintenance done. Zero adjusted.

Calibration Performed By:

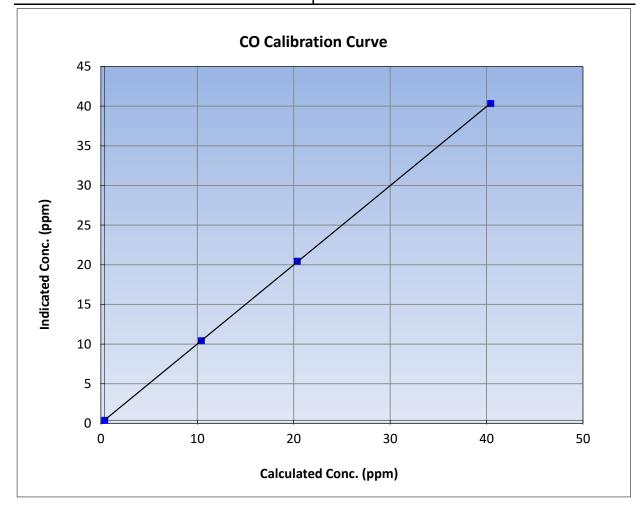


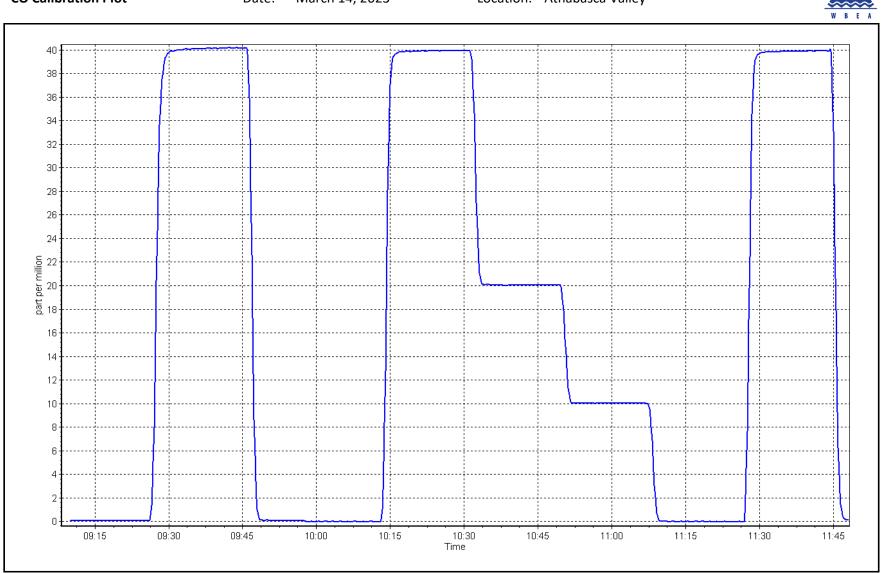
CO Calibration Summary

Version-01-2020 **Station Information** Calibration Date: March 14, 2023 **Previous Calibration:** February 8, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:44 End Time (MST): 11:48 Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.0 | | Correlation Coefficient | 0.999988 | ≥0.995 |
| 40.0 | 39.9 | 1.0023 | correlation coefficient | 0.999900 | 20.335 |
| 20.0 | 20.1 | 0.9964 | Slope | 0.998030 | 0.90 - 1.10 |
| 10.0 | 10.0 | 1.0001 | Siope | 0.998030 | 0.90 - 1.10 |
| | | | Intercept | 0.026535 | +/-1.5 |





Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | | | | Version-01-2020 |
|---|--|---------------------------------------|---|---|---|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Chipewyan March 13, 2023 10:22 Routine | | Station number: Last Cal Date: End time (MST): | AMS08 February 10, 2023 13:08 | |
| | | 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> 0.998816 0.356495 | Backgd or Offset: Coeff or Slope: | <u>Start</u> 1.32 1.006 | <u>Finish</u> 1.27 0.981 |
| | | SO ₂ Calibrati | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration ((ppb) (Ic) | Correction factor (Cc/Ic Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4920 | 80.3 | 800.4 | 815.6 | 0.981 |
| 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 | 800.2 | 1.000 |
| second point | 4960 | 40.2 | 400.7 | 399.3 | 1.004 |
| third point | 4980 | 20.1 | 200.4 | 201.4 | 0.995 |
| as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as left span | 4920 | 80.3 | 800.4 | 782.3 | 1.023 |
| | | | Averag | ge Correction Factor | 1.000 |
| Baseline Corr As found: | 815.50 | Previous response | e 799.05 | *% change * = > +/-5% change initiat | 2.0% es investigation |

Notes:

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

Calibration Performed By:

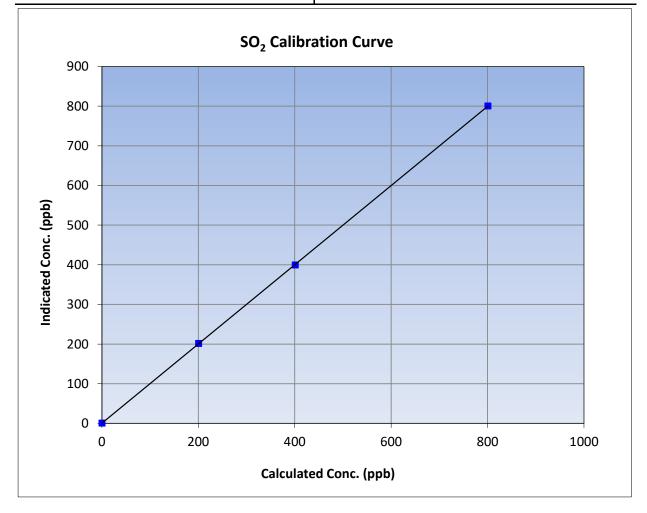


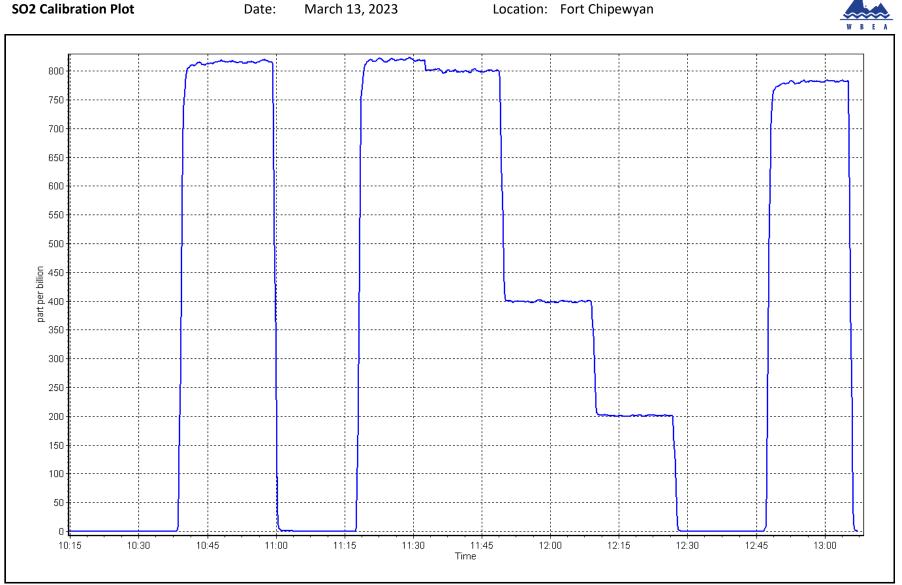
SO₂ Calibration Summary

| WBEA | | | Version-01-2020 | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|
| Station Information | | | | | | | |
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 10, 2023 | | | | |
| Station Name: | Fort Chipewyan | Station Number: | AMS08 | | | | |
| Start Time (MST): | 10:22 | End Time (MST): | 13:08 | | | | |
| Analyzer make: | Thermo 43i-TLE | Analyzer serial #: | 1136451241 | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.3 | | Correlation Coefficient | 0.999992 | ≥0.995 |
| 800.4 | 800.2 | 1.0002 | correlation coefficient | 0.333332 | 20.333 |
| 400.7 | 399.3 | 1.0035 | Slope | 0.998816 | 0.90 - 1.10 |
| 200.4 | 201.4 | 0.9948 | Slope | 0.998810 | 0.90 - 1.10 |
| | | | - Intercept | 0.356495 | +/-30 |









TRS Calibration Report

| WBEA | | | | | Version-11-202 |
|---|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Chipewyan March 12, 2023 11:41 Routine | | Station number: Last Cal Date: End time (MST): | AMS08 February 10, 2023 16:35 | |
| | | 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: | • | |
| | | 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: | 1.000139 | 0.995571 | Backgd or Offset: | 1.43 | 1.37 |
| Calibration intercept: | 0.058837 | 0.018651 | Coeff or Slope: | 0.743 | 0.717 |
| | | TRS As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as found span | 4920 | 80.5 | 80.0 | 81.6 | 0.981 |
| as found 2nd point | 4960 | 40.2 | 40.0 | 41.1 | 0.972 |
| as found 3rd point | 4980 | 20.1 | 20.0 | 20.4 | 0.979 |
| new cylinder response | | | | | |
| | | TRS Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4920 | 80.5 | 80.0 | 79.7 | 1.004 |
| second point | 4960 | 40.2 | 40.0 | 39.8 | 1.004 |
| third point | 4980 | 20.1 | 20.0 | 19.8 | 1.009 |
| as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as left span | 4920 | 80.5 | 80.0 | 77.6 | 1.031 |
| SO2 Scrubber Check | 4919.7 | 80.3 | 803.0 | 0.0 | |
| Date of last scrubber cha | - | March 7, 2022 | | Ave Corr Factor | 1.006 |
| | | March 15, 2022 | | 100.7% | efficiency |
| | ficiency test: | Warch 15, 2022 | | | |
| Date of last converter eff | 81.6 | | 80.08 | *% change: | 1.9% |
| Date of last converter eff Baseline Corr As found: | • | Prev response: | | | |
| Date of last converter eff Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 81.6 | | 1.020278 | *% change: | 1.9% 0.079245 |

Notes:

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

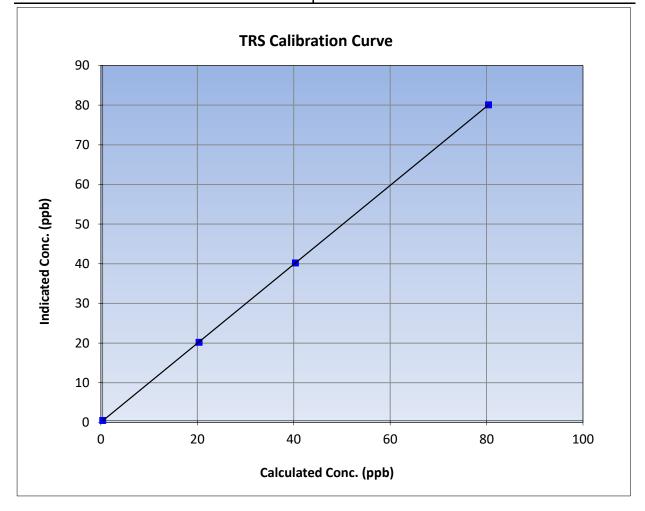


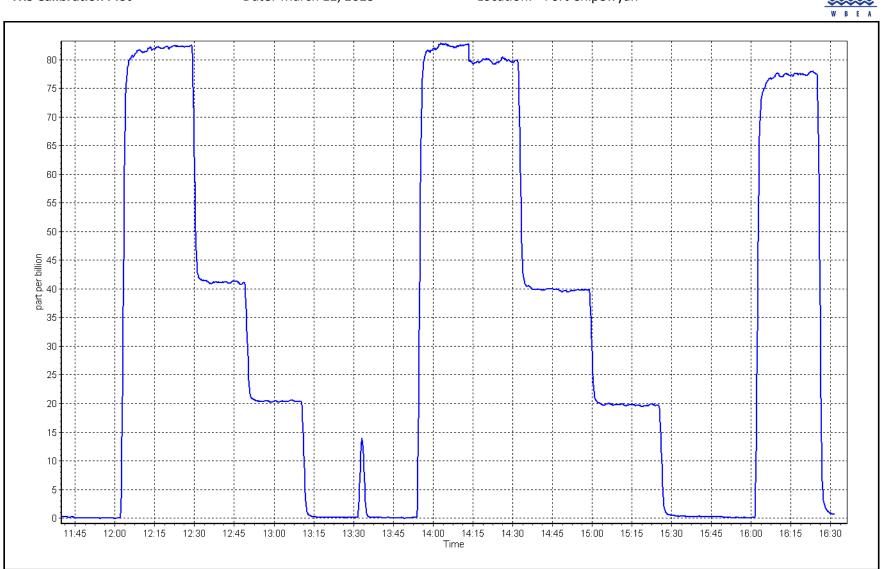
TRS Calibration Summary

| WBEA | | | Version-11-2021 | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|
| Station Information | | | | | | | |
| Calibration Date: | March 12, 2023 | Previous Calibration: | February 10, 2023 | | | | |
| Station Name: | Fort Chipewyan | Station Number: | AMS08 | | | | |
| Start Time (MST): | 11:41 | End Time (MST): | 16:35 | | | | |
| 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 | 0.1 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 80.0 | 79.7 | 1.0039 | correlation coefficient | 0.555554 | 20.335 |
| 40.0 | 39.8 | 1.0039 | Slope | 0.995571 | 0.90 - 1.10 |
| 20.0 | 19.8 | 1.0090 | Slope | 0.995571 | 0.90 - 1.10 |
| | | | - Intercept | 0.018651 | +/-3 |





Location: Fort Chipewyan





Station Name:

Reason:

Calibration Date:

Start time (MST):

Fort Chipewyan

March 13, 2023

7:00

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: February 6, 2023 End time (MST): 12:23

| | C | Calibration Standards | |
|-------------------|---|--|---|
| CC363447 | | Cal Gas Expiry Date: February 2, 2024 | |
| 48.80 | ppm | NO Cal Gas Conc: 48.80 | ppm |
| NA | | Removed Gas Exp Date: NA | |
| 48.80 | ppm | Removed Gas NO Conc: 48.80 | ppm |
| | | NO gas Diff: | |
| Feledyne API T700 | | Serial Number: 3252 | |
| eledyne API T701H | | Serial Number: 260 | |
| | 48.80 NA 48.80 Teledyne API T700 | CC363447 48.80 ppm NA 48.80 ppm | 48.80ppmNO Cal Gas Conc:48.80NARemoved Gas Exp Date:NA48.80ppmRemoved Gas NO Conc:48.80NO gas Diff:NO gas Diff:3252 |

| Analyzer Information | Anal | vzer | Inform | atior |
|----------------------|------|------|--------|-------|
|----------------------|------|------|--------|-------|

| Analyzer make: NOX Range (ppb): | | Analyzer serial #: 1426262592 | | | |
|------------------------------------|--------------|-------------------------------|----------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coeff or slope: | 1.844 | 1.882 | NO bkgnd or offset: | 6.9 | 7.9 |
| NOX coeff or slope: | 0.993 | 0.995 | NOX bkgnd or offset: | 6.9 | 8.1 |
| NO2 coeff or slope: | 1.000 | 1.000 | Reaction cell Press: | 252.6 | 256.6 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 0.986463 | 1.000657 |
| NO _x Cal Offset: | 2.200000 | 0.680000 |
| NO Cal Slope: | 0.990518 | 1.001428 |
| NO Cal Offset: | 1.180000 | 0.260000 |
| NO_2 Cal Slope: | 0.996180 | 1.016898 |
| NO ₂ Cal Offset: | -1.402288 | 0.900918 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|--|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 2.6 | 0.0 | | |
| as found span | 4918 | 82.0 | 800.3 | 800.3 | 0.0 | 787.2 | 788.3 | -1.1 | 1.0167 | 1.0152 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.3 | -0.1 | -0.2 | | |
| high point | 4918 | 82.0 | 800.3 | 800.3 | 0.0 | 801.3 | 801.7 | -0.3 | 0.9988 | 0.9983 |
| second point | 4959 | 41.0 | 400.2 | 400.2 | 0.0 | 400.8 | 400.7 | 0.2 | 0.9984 | 0.9987 |
| third point | 4980 | 20.5 | 200.1 | 200.1 | 0.0 | 202.4 | 201.3 | 1.1 | 0.9885 | 0.9939 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.0 | -0.2 | | |
| as left span | 4918 | 82.0 | 800.3 | 423.2 | 377.1 | 796.2 | 411.1 | 385.1 | 1.0052 | 1.0295 |
| | | | | | | | Average C | orrection Factor | 0.9952 | 0.9970 |
| Corrected As fo | ound NO _x = | 784.6 ppb | NO = | 785.7 ppb | * = > +/-5% | change initiates i | nvestigation | *Percent Chang | ge NO _x = | -0.9% |
| Previous Respo | onse NO _x = | 791.7 ppb | NO = | 793.9 ppb | | | | *Percent Chang | ge NO = | -1.0% |
| 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/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|--|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 790.4 | 413.3 | 377.1 | 383.4 | 0.9836 | 101.7% |
| 2nd GPT point (200 ppb O3) | 790.4 | 599.2 | 191.2 | 197.1 | 0.9701 | 103.1% |
| 3rd GPT point (100 ppb O3) | 790.4 | 696.1 | 94.3 | 97.1 | 0.9712 | 103.0% |
| | | | | Average Correction Factor | 0.9749 | 102.6% |

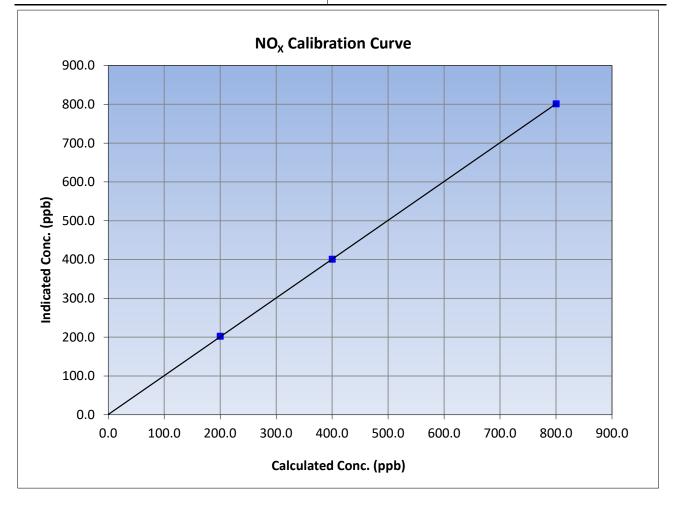
Notes:

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



NO_x Calibration Summary

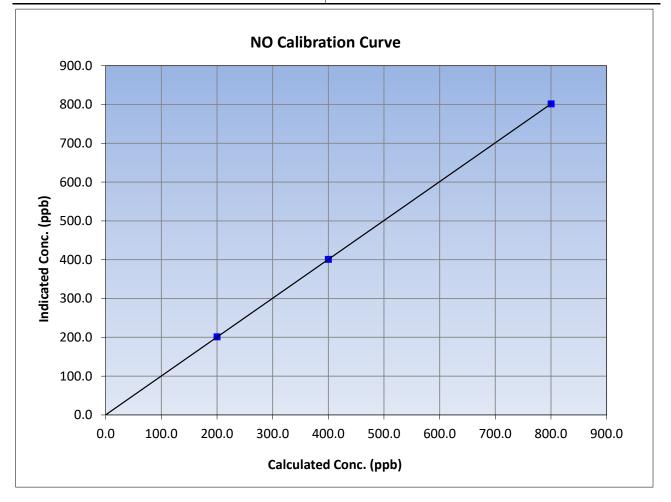
| WBEA | | Station | Information | | Version-04-2 |
|--|--|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March 2 | 13, 2023 | Previous Calibration: | February | / 6, 2023 |
| Station Name: | Fort Chipewyan | | | | S08 |
| Start Time (MST): | . , | | End Time (MST): | 12 | :23 |
| Analyzer make: | yzer make: Thermo 42i Analyzer serial #: 142626259 | | | 62592 | |
| | | Calibr | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.3 | | Correlation Coefficient | 0.999990 | ≥0.995 |
| 800.3 | 801.3 | 0.9988 | correlation coernelent | 0.5555550 | 20.333 |
| 400.2 | 400.8 | 0.9984 | Slone | 1 000657 | 0.90 - 1.10 |
| 200.1 | 202.4 | 0.9885 | Slope | 1.000657 | 0.90 - 1.10 |
| | | | Intercept | 0.680000 | +/-20 |





NO Calibration Summary

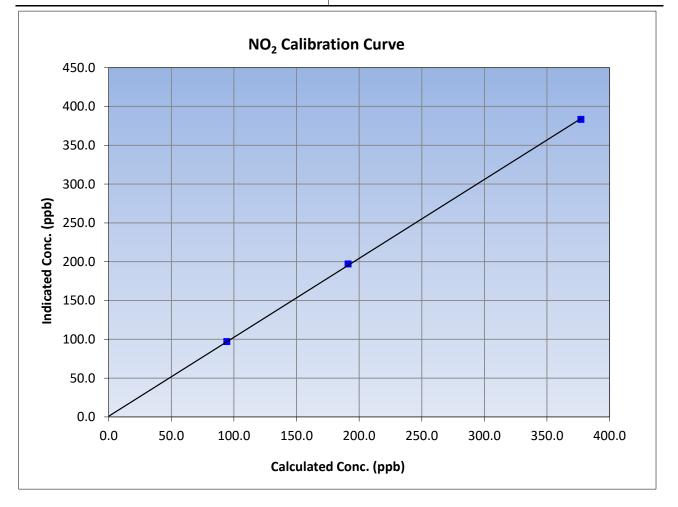
| WBEA | | Station | Information | | Version-04-20 |
|--|---|---------------------------|--------------------------------------|--------------------|---------------|
| | | Station | mormation | | |
| Calibration Date: | ion Date: March 13, 2023 | | March 13, 2023 Previous Calibration: | | / 6, 2023 |
| Station Name: | Fort Chipewyan | | Station Number: | Station Number: AM | |
| Start Time (MST): | 7: | 7:00 End Time (MST): | | 12 | :23 |
| Analyzer make: | ake: Thermo 42i Analyzer serial #: 1426 | | 62592 | | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999998 | ≥0.995 |
| 800.3 | 801.7 | 0.9983 | correlation coefficient | 0.999998 | 20.333 |
| 400.2 | 400.7 | 0.9987 | Slope | 1.001428 | 0.90 - 1.10 |
| 200.1 | 201.3 | 0.9939 | Siope | 1.001428 | 0.90 - 1.10 |
| | | | Intercept | 0.260000 | +/-20 |

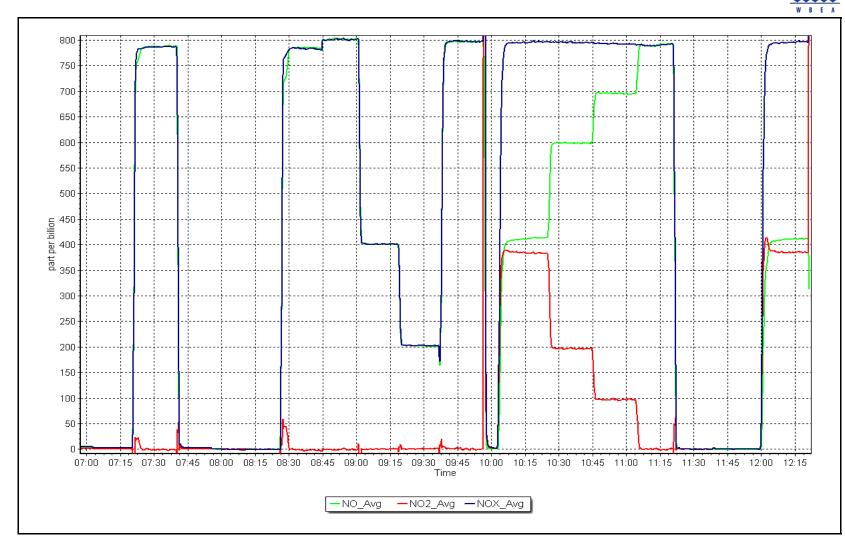




NO₂ Calibration Summary

| WBEA | | | | | Version-04-20 |
|--|---|----------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | ration Date: March 13, 2023 | | Previous Calibration: | February | y 6, 2023 |
| Station Name: | ame: Fort Chipewyan | | Station Number: | AM | S08 |
| Start Time (MST): | 7: | 7:00 End Time (MST): 12:23 | | :23 | |
| Analyzer make: | alyzer make: Thermo 42i Analyzer serial #: 14262625 | | 62592 | | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.2 | | Correlation Coefficient | 0.999933 | >0.005 |
| 377.1 | 383.4 | 0.9836 | Correlation Coefficient | 0.999955 | ≥0.995 |
| 191.2 | 197.1 | 0.9701 | Slope | 1.016898 | 0.90 - 1.10 |
| 94.3 | 97.1 | 0.9712 | Slope | 1.010898 | 0.30 - 1.10 |
| | | | Intercept | 0.900918 | +/-20 |









O₃ Calibration Report

Version-01-2020

| | | | | | Version-01-2020 |
|--|--|----------------------------------|--|---|---|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Chipewyan March 13, 2023 13:05 Routine | | Station number: Last Cal Date: End time (MST): | February 6, 2023 | |
| | | Calibration St | andards | | |
| O3 generation mode: Calibrator Make/Model: ZAG Make/Model: | Photometer Teledyne API T700 Teledyne API T701 | | Serial Number: Serial Number: | | |
| | | Analyzer Info | rmation | | |
| Analyzer make: Analyzer Range | : Teledyne API T400 e 0 - 500 ppb | | Analyzer serial #: | 3872 | |
| Calibration slope: | <u>Start</u> 1.007143 | <u>Finish</u> 1.002171 | Backgd or Offset: | <u>Start</u> -2.0 | <u>Finish</u> -2.0 |
| Calibration intercept: | -0.600000 | -0.880000 | Coeff or Slope: | | 1.036 |
| | | O ₃ Calibratio | on Data | | |
| Set Point | Total air flow rate (sccm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration ((ppm) (Ic) | Correction factor (Cc/Ic Limit = 0.95-1.05 |
| as found zero | 5000 | NA | 0.0 | 1.1 | |
| as found span | 5000 | 963.6 | 400.0 | 400.8 | 0.998 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| calibrator zero | 5000 | NA | 0.0 | 0.5 | |
| high point | 5000 | 961.7 | 400.0 | 400.6 | 0.999 |
| second point | 5000 | 810.3 | 200.0 | 199.1 | 1.005 |
| third point | 5000 | 701.3 | 100.0 | 97.8 | 1.022 |
| as left zero | 5000 | NA | 0.0 | 0.4 | |
| as left span | 5000 | 963.3 | 400.0 | 401.3 | 0.997 |
| | | | Avera | ge Correction Factor | 1.009 |
| Baseline Corr As found: | 399.7 | Previous response | | *% change | -0.6% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | NA NA | AF Slope: AF Correlation: | | AF Intercept: | |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

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

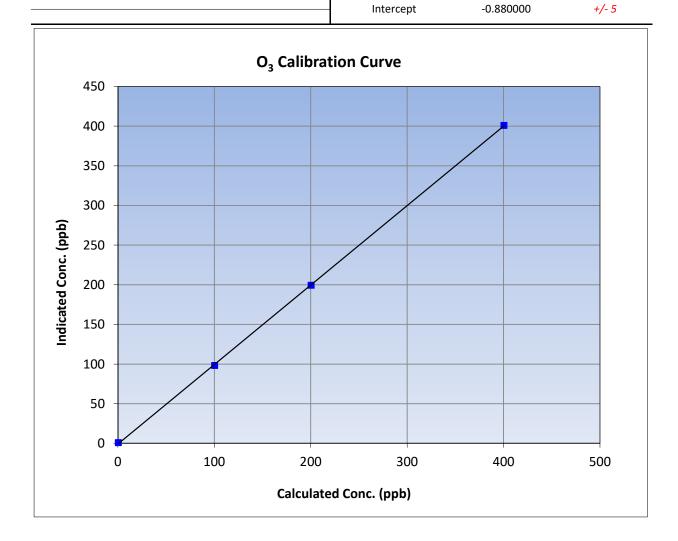
Calibration Performed By:

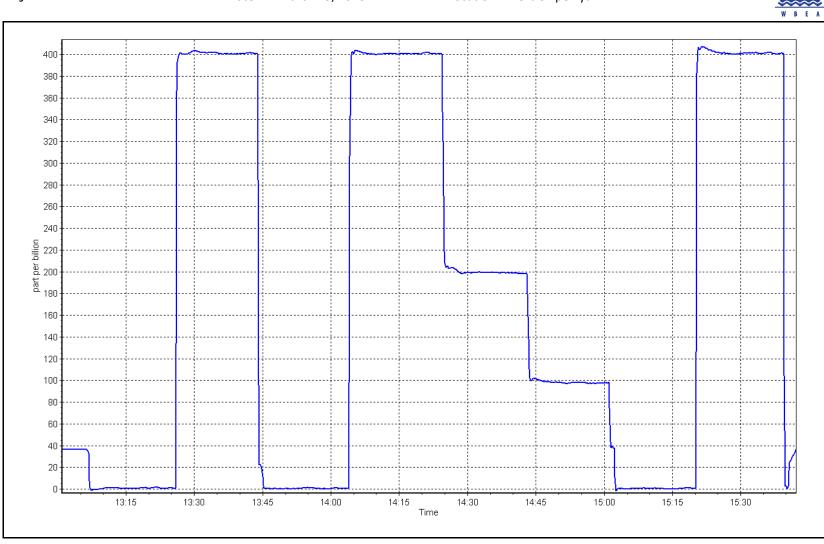
Karan Pandit



O₃ Calibration Summary

| WBEA | | | | | Version-01-2020 |
|--|---------------------------------------|------------------------------|-------------------------|----------|-----------------|
| | | Station | Information | | |
| Calibration Date: | March 13 | <i>,</i> 2023 | Previous Calibration: | Februar | y 6, 2023 |
| Station Name: | Fort Chip | ewyan | Station Number: | AM | 1508 |
| Start Time (MST): | 13:0 | 15 | End Time (MST): | 15 | 5:48 |
| Analyzer make: | Analyzer make: Teledyne | | Analyzer serial #: | 38 | 372 |
| | | Calib | ration Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
| 0.0 | 0.5 | | Correlation Coefficient | 0.999945 | ≥0.995 |
| 400.0 | 400.6 | 0.9985 | Correlation Coefficient | 0.333945 | 20.995 |
| 200.0 | 199.1 | 1.0045 | Slope | 1.002171 | 0.90 - 1.10 |
| 100.0 | 97.8 | 1.0225 | Siope | 1.0021/1 | 0.00 - 1.10 |





Date: March 13, 2023



T640 PM_{2.5} CALIBRATION

| WBEA | | | | | | Version-01-2023 |
|-------------------------------|----------------------|---------------------------|---------------------|---------------|-----------------|-----------------|
| | | Station Information | ı | | | |
| Station Name: | Fort Chipewyan | | Station number: | AMS 08 | | |
| Calibration Date: | March 13, 2023 | | Last Cal Date: | February 15 | , 2023 | |
| Start time (MST): | 9:43 | | End time (MST): | 11:24 | | |
| Analyzer Make: | ΑΡΙ | | S/N: | 216 | | |
| Particulate Fraction: | PM2.5 | | | | | |
| Flow Meter Make/Model: | Delta Cal | | S/N: | 1212 | | |
| Temp/RH standard: | Delta Cal | | S/N: | 1212 | | |
| | | Monthly Calibration T | est | | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| T (°C) | -18.9 | -18.5 | -18.9 | | | +/- 2 °C |
| P (mmHg) | 741.0 | 739.6 | 741.0 | | | +/- 10 mmHg |
| flow (LPM) | 5.01 | 4.98 | 5.01 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 13, 2023 | Last Cal Date: | February 1 | 5, 2023 | |
| | PM w/o HEPA: | 5.4 | PM w/ HEPA: | 0.0 |) | <0.2 ug/m3 |
| Note: this leak check will be | completed before the | quarterly work and will s | serve as the pre ma | intenance lea | ak check | |
| Inlet cleaning : | Inlet Head | | | | | |
| - | | | | | | |
| | | | | | | |
| | | Quarterly Calibration | ſest | | | |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| PMT Peak Test | 11.0 | 11.2 | 11.2 | | | 11.3 +/- 0.5 |
| Post-maintenanc | e leak check: | PM w/o HEPA: | 8.4 | w/ HEPA: | | 0.0 |
| Date Optical Chan | nber Cleaned: | March 13, | 2023 | | | <0.2 ug/m3 |
| Disposable Filte | r Changed: | March 13, | 2023 | - | | |
| | | | | - | | |
| | | Annual Maintenanc | 0 | | | |
| | | Annual Maintenanc | e | | | |
| Date Sample Tul | be Cleaned: | July 14, 2 | 022 | _ | | |
| Date RH/T Sense | or Cleaned: | July 14, 2 | 022 | _ | | |
| | | | | | | |
| Netze | Dump char | nged after leak check. Op | tical chambor close | ned No adjuc | tmonte me | de |
| Notes: | Fullip Clia | igen aller leak check. Op | | ieu. No aujus | | iue. |
| | | | | | | |

Calibration by:

Karan Pandit



CO Calibration Report

Version-01-2020

| | | Station Infor | mation | | | | | |
|--|--|---|---|--|--|--|--|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Chipewyan March 13, 2023 7:12 Maintenance | | Station number: Last Cal Date: End time (MST): | AMS08 February 14, 2023 12:05 | | | | |
| | | Calibration Sta | andards | | | | | |
| Cal Gas Concentration: | 3,030 | ppm | Cal Gas Exp Date: | December 1, 2028 | | | | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: | ALM014846 3,030 NA | ppm | Rem Gas Exp Date: Diff between cyl: | NA | | | | |
| Calibrator Make/Model: ZAG Make/Model: | API T700 API T701H | | Serial Number: Serial Number: | 5272 197 | | | | |
| | | Analyzer Infor | rmation | | | | | |
| Analyzer make: Analyzer Range: | | | Analyzer serial #: | 3505 | | | | |
| Calibration slope: Calibration intercept: | <u>Start</u> 0.983508 0.322926 | <u>Finish</u> 0.998892 0.030961 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> -0.014 0.996 | | | |
| CO Calibration Data | | | | | | | | |
| | | CO Calibratio | n Data | | | | | |
| Set Point | Dilution air flow rate (sccm) | CO Calibratio 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 | | Source gas flow rate | Calculated concentration (ppm) | | (Cc/Ic) | | | |
| | (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | (ppm) (Ic) | (Cc/lc) <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 66.7 33.3 | Calculated concentration (ppm) (Cc) 0.0 | (ppm) (Ic) 0.21 | (Cc/lc) <i>Limit = 0.95-1.05</i> | | | |
| as found zero as found span as found 2nd point as found 3rd point | (sccm) 5000 4933 | Source gas flow rate (sccm) 0.0 66.7 | Calculated concentration (ppm) (Cc) 0.0 40.4 | (ppm) (Ic) 0.21 40.7 | (Cc/Ic) <i>Limit = 0.95-1.05</i> 0.993 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response | (sccm) 5000 4933 4967 4983 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 | (ppm) (Ic) 0.21 40.7 20.6 10.4 | (Cc/lc) <i>Limit = 0.95-1.05</i> 0.993 0.978 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero | (sccm) 5000 4933 4967 4983 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 | (ppm) (lc) 0.21 40.7 20.6 10.4 0.0 | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point | (sccm) 5000 4933 4967 4983 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 | (ppm) (Ic) 0.21 40.7 20.6 10.4 0.0 40.4 | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point | (sccm) 5000 4933 4967 4983 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 33.3 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 20.2 | (ppm) (lc) 0.21 40.7 20.6 10.4 0.0 40.4 20.3 | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 0.993 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point | (sccm) 5000 4933 4967 4983 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 33.3 16.7 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 | (ppm) (IC) 0.21 40.7 20.6 10.4 0.0 40.4 20.3 10.1 | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 0.993 1.004 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero | (sccm) 5000 4933 4967 4983 5000 4934 4967 4983 5000 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 33.3 16.7 33.3 16.7 0.0 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 20.2 10.1 0.0 | (ppm) (IC) 0.21 40.7 20.6 10.4 0.0 40.4 20.3 10.1 0.0 | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 0.993 1.004 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point | (sccm) 5000 4933 4967 4983 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 33.3 16.7 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 20.2 10.1 0.0 40.4 20.2 10.1 | (ppm) (IC) 0.21 40.7 20.6 10.4 0.0 40.4 20.3 10.1 0.0 39.4 | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 0.993 1.004 1.026 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span | (sccm) 5000 4933 4967 4983 5000 4934 4967 4983 5000 2960 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 33.3 16.7 0.0 40.0 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 0.0 40.4 Averag | (ppm) (Ic) 0.21 40.7 20.6 10.4 0.0 40.4 20.3 10.1 0.0 39.4 ge Correction Factor | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 0.993 1.004 1.026 1.000 | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span Baseline Corr As found: | (sccm) 5000 4933 4967 4983 5000 4934 4967 4983 5000 2960 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 33.3 16.7 0.0 40.0 Prev response: | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 0.0 40.4 40.4 40.4 | (ppm) (IC) 0.21 40.7 20.6 10.4 0.0 40.4 20.3 10.1 0.0 39.4 ge Correction Factor *% change: | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 0.993 1.004 1.026 1.000 1.0% | | | |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span | (sccm) 5000 4933 4967 4983 5000 4934 4967 4983 5000 2960 | Source gas flow rate (sccm) 0.0 66.7 33.3 16.7 0.0 66.7 33.3 16.7 0.0 40.0 | Calculated concentration (ppm) (Cc) 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 0.0 40.4 20.2 10.1 0.0 40.4 Averag | (ppm) (Ic) 0.21 40.7 20.6 10.4 0.0 40.4 20.3 10.1 0.0 39.4 ge Correction Factor | (Cc/lc) Limit = 0.95-1.05 0.993 0.978 0.975 1.002 0.993 1.004 1.026 1.000 | | | |

Notes:

Peaked the IR source and changed the sample inlet filter after as founds. Adjusted the zero and span.

Calibration Performed By:

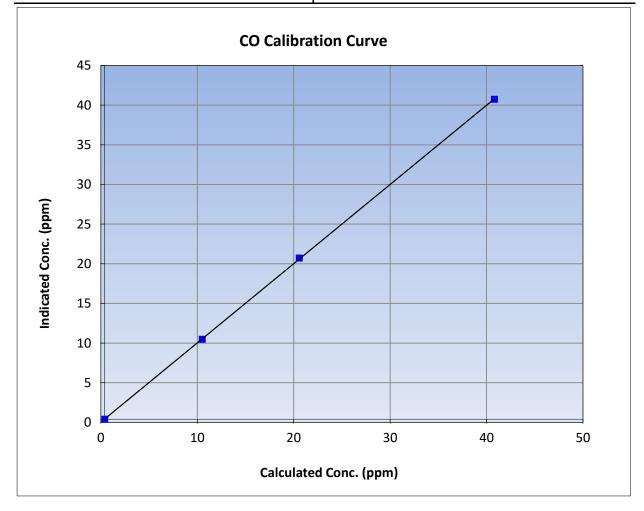


CO Calibration Summary

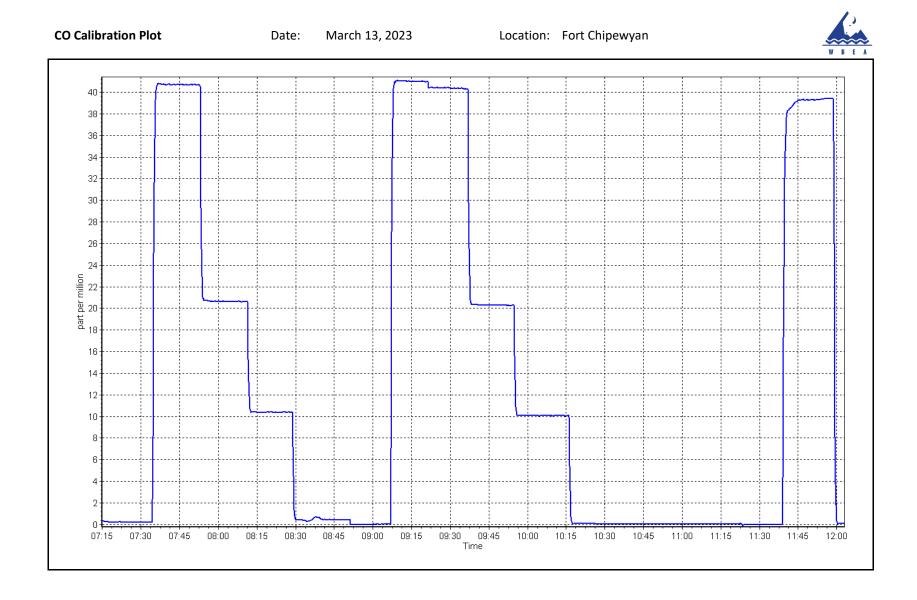
| Station Information | | | | | | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|--|--|
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 14, 2023 | | | | | | |
| Station Name: | Fort Chipewyan | Station Number: | AMS08 | | | | | | |
| Start Time (MST): | 7:12 | End Time (MST): | 12:05 | | | | | | |
| 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 | 0.999973 | ≥0.995 |
| 40.4 | 40.4 | 1.0016 | correlation coefficient | 0.999973 | 20.335 |
| 20.2 | 20.3 | 0.9931 | Slope | 0.998892 | 0.90 - 1.10 |
| 10.1 | 10.1 | 1.0040 | Slope | 0.998892 | 0.90 - 1.10 |
| | | | - Intercept | 0.030961 | +/-1.5 |



Version-01-2020





CO₂ Calibration Report

Version-01-2020

| | | | | | Version-01-2020 |
|--|--|--------------------------------|--|---------------------------------------|---|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Chipewyan March 12, 2023 11:46 Routine | | Station number: Last Cal Date: End time (MST): | AMS08 February 15, 2023 15:55 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 60,220 | ppm | Cal Gas Exp Date: | December 1, 2028 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: | ALM014846 60,220 NA Teledyne API T700 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | NA 5272 | |
| N2 Gen Make/Model: | NG 5000 | | Serial Number: | 771048318 | |
| | | Analyzer Info | rmation | | |
| , | :: Teledyne API T360 e 0 - 2,000 ppm | , | Analyzer serial #: | 289 | |
| | <u>Start</u> | Finish | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.006830 | 0.998937 | Backgd or Offset: | 0.019 | 0.006 |
| Calibration intercept: | -1.740000 | -4.820000 | Coeff or Slope: | 1.011 | 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/Ic Limit = 0.95-1.05 |
| as found zero | 3000 | 0.0 | 0.0 | 0.9 | |
| as found span | 2920 | 80.0 | 1605.9 | 1626.3 | 0.987 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 3000 | 0.0 | 0.0 | -0.1 | |
| high point | 2920 | 80.0 | 1605.9 | 1605.8 | 1.000 |
| second point | 2960 | 40.0 | 802.9 | 782.6 | 1.026 |
| third point | 2980 | 20.0 | 401.5 | 399.7 | 1.004 |
| as left zero | 3000 | 0.0 | 0.0 | 0.0 | |
| as left span | 2960 | 40.0 | 802.9 | 779.8 | 1.030 |
| | | | Averag | ge Correction Factor | 1.010 |
| Baseline Corr As found: | 1625.40 | Prev response: | | *% change: | 0.6% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | | | | , | |

Notes:

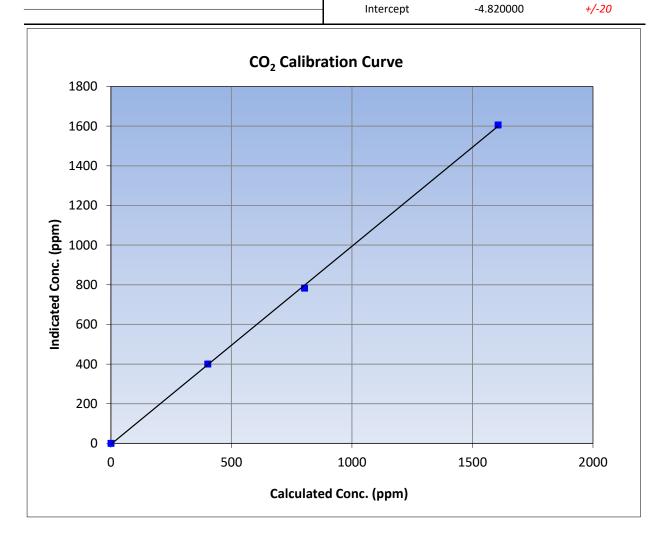
Sample inlet filter changed after as founds. Adjusted the zero and span.

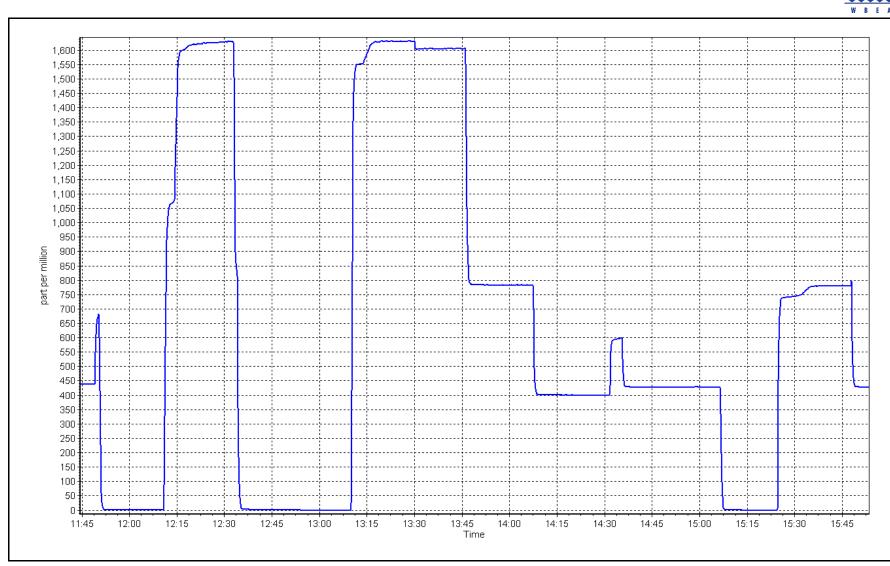
Calibration Performed By:



CO₂ Calibration Summary

| WBEA | | | | | Version-01-20 |
|--|--------------------------------------|------------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date | March 12 | 2, 2023 | Previous Calibration | February | / 15, 2023 |
| Station Name | Fort Chip | ewyan | Station Number | AMS08 | |
| Start Time (MST) | 11:46 | | End Time (MST) | 15 | 5:55 |
| Analyzer make Teledyne API T360 | | Analyzer serial # | 289 | | |
| | | Calibi | ration Data | | |
| alculated concentration Ir (ppm) (Cc) | ndicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999793 | ≥0.995 |
| 1605.9 | 1605.8 | 1.0000 | | 0.000700 | 20.000 |
| 802.9 | 782.6 | 1.0260 | - Slope | 0.998937 | 0.90 - 1.10 |
| 401.5 | 399.7 | 1.0044 | Siope | 0.338337 | 0.90 - 1.10 |
| | | | | | |





Location: Fort Chipewyan





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS09 BARGE LANDING MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|------------------------------------|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Barge Landing March 10, 2023 10:58 Routine | | Station number: Last Cal Date: End time (MST): | AMS09 February 3, 2023 14:05 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 49.96 CC151285 | ppm | Cal Gas Exp Date: | January 5, 2025 | |
| Removed Cal Gas Conc: | 49.96 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | r r | Diff between cyl: | | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 3812 | |
| ZAG Make/Model: | API T701 | | Serial Number: | 4888 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1118148498 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.002493 | 1.001709 | Backgd or Offset: | 9.8 | 9.7 |
| Calibration intercept: | 0.431711 | 0.631572 | Coeff or Slope: | 0.986 | 0.986 |
| | | SO ₂ Calibration | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/lc) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4919 | 80.2 | 801.5 | 801.7 | 1.000 |
| 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 | 803.3 | 0.998 |
| second point | 4959 | 40.1 | 400.8 | 402.3 | 0.996 |
| third point | 4980 | 20.0 | 199.8 | 201.1 | 0.994 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as left span | 4919 | 80.2 | 801.5 | 808.0 | 0.992 |
| | | | Avera | ge Correction Factor | 0.996 |
| Baseline Corr As found: | 801.60 | Previous response | 803.92 | *% change | -0.3% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |

Notes:

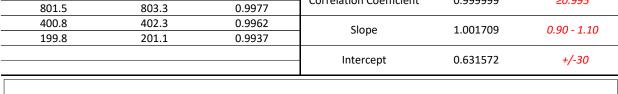
Changed sample inlet filter after as founds. No adjustments made.

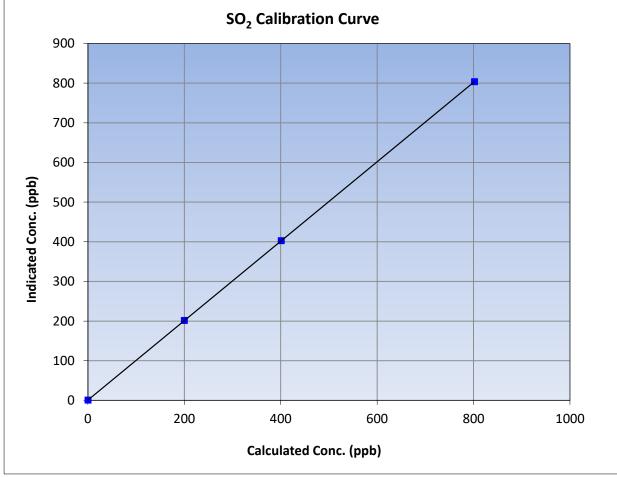
Calibration Performed By:

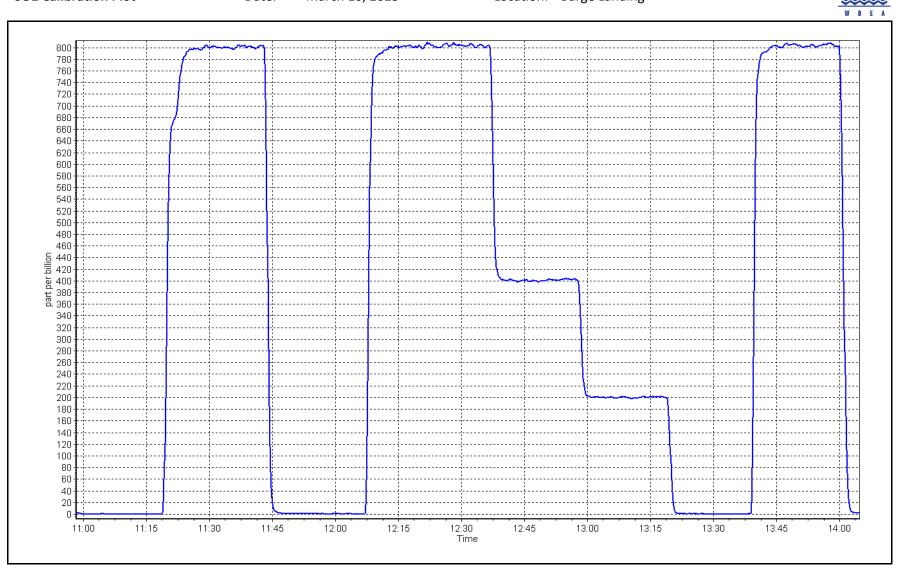


SO₂ Calibration Summary

| WBEA | | | | Version-01-20 |
|--|---------------------------------------|------------------------------|-------------------------|-------------------------|
| | | Station | Information | |
| Calibration Date: | March 10 |), 2023 | Previous Calibration: | February 3, 2023 |
| Station Name: | Name: Barge Landing | | Station Number: | AMS09 |
| Start Time (MST): 10:58 Analyzer make: Thermo 43i | | 58 | End Time (MST): | 14:05 |
| | | o 43i | Analyzer serial #: | 1118148498 |
| | | Calib | ration Data | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |
| 0.0 | 0.3 | | Correlation Coefficient | 0.999999 ≥ <i>0.995</i> |
| 901 E | 802 C | 0.0077 | Correlation Coefficient | 0.333333 20.995 |







Location: Barge Landing



TRS Calibration Report

| WBEA | | | | | Version-11-2021 |
|---|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Barge Landing March 23, 2023 9:07 Routine | | Station number: Last Cal Date: End time (MST): | AMS09 February 28, 2023 13:47 | |
| | | 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: | | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | 3812 | |
| ZAG Make/Model: | API T701 | | Serial Number: | 4888 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i-TLE CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1331259320 519 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 1.003148 -0.000990 | 1.006146 0.019102 | Backgd or Offset: Coeff or Slope: | | 2.76 1.130 |
| | | TRS As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as found span | 4918 | 82.1 | 80.0 | 77.5 | 1.032 |
| as found 2nd point | 4959 | 41.1 | 40.0 | 38.7 | 1.034 |
| as found 3rd point | 4979 | 20.5 | 20.0 | 19.2 | 1.040 |
| new cylinder response | | | | | |
| | | TRS Calibrat | 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 | 0.0 | |
| high point | 4918 | 82.1 | 80.0 | 80.5 | 0.993 |
| second point | 4959 | 41.1 | 40.0 | 40.2 | 0.996 |
| third point | 4979 | 20.5 | 20.0 | 20.2 | 0.989 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4918 | 82.1 | 80.0 | 80.3 | 0.996 |
| SO2 Scrubber Check | 4920 | 80.2 | 802.0 | 0.0 | |
| Date of last scrubber cha | - | 28-Feb-23 | | Ave Corr Factor | 0.993 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 77.5 | Prev response: | | *% change: | -3.5% |
| Baseline Corr 2nd AF pt: | 38.7 | AF Slope: | | AF Intercept: | -0.080930 |
| Baseline Corr 3rd AF pt: | 19.2 | AF Correlation: | 0.999995 | * = > +/-5% change initiate | es investigation |

Notes:

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

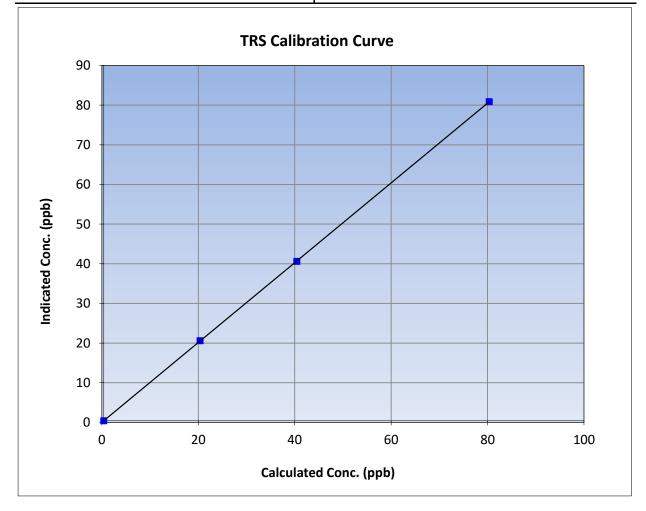


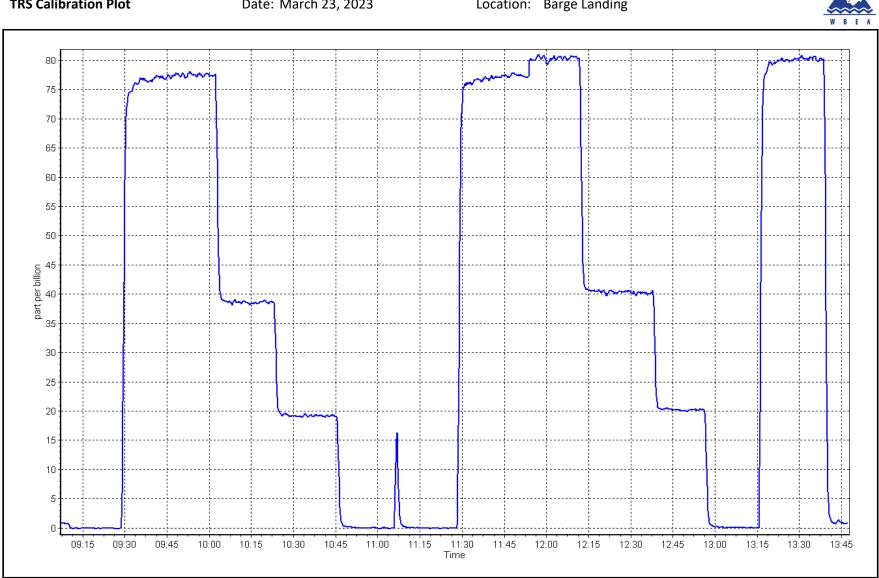
TRS Calibration Summary

| WBEA | | | Version-11-2021 | | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|--|
| Station Information | | | | | | | | |
| Calibration Date: | March 23, 2023 | Previous Calibration: | February 28, 2023 | | | | | |
| Station Name: | Barge Landing | Station Number: | AMS09 | | | | | |
| Start Time (MST): | 9:07 | End Time (MST): | 13:47 | | | | | |
| Analyzer make: | Thermo 43i-TLE | Analyzer serial #: | 1331259320 | | | | | |

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 | 0.999995 | ≥0.995 |
| 80.0 | 80.5 | 0.9933 | correlation coefficient | 0.999995 | 20.335 |
| 40.0 | 40.2 | 0.9958 | Slope | 1.006146 | 0.90 - 1.10 |
| 20.0 | 20.2 | 0.9886 | Siope | 1.000140 | 0.30 - 1.10 |
| | | | Intercept | 0.019102 | +/-3 |





Location: Barge Landing



THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|-------------------------------------|----------------|---------------|-------------------------|----------------|-----------------|
| | | Statio | on Information | | |
| Station Name: | Barge Landing | | Station number: AN | /IS09 | |
| Calibration Date: | March 10, 2023 | | Last Cal Date: Fe | bruary 3, 2023 | |
| Start time (MST): | 10:58 | | End time (MST): 14 | :03 | |
| Reason: | Routine | | | | |
| | | Calibra | ation Standards | | |
| Gas Cert Reference: | C | C151285 | Cal Gas Expiry Date: Ja | nuary 5, 2025 | |
| CH4 Cal Gas Conc. | 497.6 | ppm | CH4 Equiv Conc. | 1067.1 | ppm |
| C3H8 Cal Gas Conc. | 207.1 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: NA | A | |
| 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 | |
| | | Analyz | zer Information | | |
| Analyzer make | : Thermo 55i | | Analyzer serial #: 11 | 70050131 | |
| THC Range (ppm) | | | | | |
| NMHC Range (ppm) | : 0 - 50 ppm | | CH4 Range (ppm): 0 - | 50 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : 1.99E-04 | 2.03E-04 | NMHC SP Ratio: | 4.28E-05 | 4.30E-05 |
| CH4 Retention time | : 12.2 | 12.6 | NMHC Peak Area: | 213327 | 212383 |

| THC Calibration Data | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|--|---------------------|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4919 | 80.2 | 17.12 | 16.69 | 1.026 | |
| 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 | 17.11 | 1.000 | |
| second point | 4960 | 40.1 | 8.56 | 8.50 | 1.007 | |
| third point | 4980 | 20.0 | 4.27 | 4.23 | 1.010 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4919 | 80.2 | 17.12 | 17.12 | 1.000 | |
| | | | A | Average Correction Factor | 1.006 | |
| Baseline Corr AF: | 16.69 | Prev response | 17.10 | *% change | -2.4% | |
| 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 | 0.0 | | |
| as found span | 4919 | 80.2 | 9.14 | 9.07 | 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 | 80.2 | 9.14 | 9.14 | 1.000 | |
| second point | 4960 | 40.1 | 4.57 | 4.55 | 1.003 | |
| third point | 4980 | 20 | 2.28 | 2.27 | 1.002 | |
| as left zero | 5000 | 0 | 0.00 | 0.00 | | |
| as left span | 4919 | 80.2 | 9.14 | 9.14 | 0.999 | |
| | | | ŀ | Average Correction Factor | 1.002 | |
| Baseline Corr AF: | 9.07 | Prev response | 9.08 | *% change | -0.1% | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates investigation</pre> | | |

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

| | | CH4 Calibra | tion Data | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4919 | 80.2 | 7.98 | 7.63 | 1.047 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4919 | 80.2 | 7.98 | 7.97 | 1.001 |
| second point | 4960 | 40.1 | 3.99 | 3.95 | 1.011 |
| third point | 4980 | 20.0 | 1.99 | 1.95 | 1.020 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4919 | 80.2 | 7.98 | 7.98 | 1.000 |
| | | | A | verage Correction Factor | 1.011 |
| Baseline Corr AF: | 7.63 | Prev response | 8.02 | *% change | -5.2% |
| 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: | | 1.001427 | | 0.999991 | |
| THC Cal Offset: | | -0.043961 | | -0.027960 | |
| CH4 Cal Slope: | | 1.007423 | | 0.999623 | |
| CH4 Cal Offset: | | -0.020126 | | -0.022149 | |
| NMHC Cal Slope: | | 0.996127 | | 1.000225 | |
| NMHC Cal Offset: | | -0.024834 | | -0.005211 | |
| | | | | | |

Notes: Changed sample inlet filter after as founds. Calibrated span to adjust CH4 RT, no dipping in signal

Calibration Performed By: Ryan Power



THC Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March 2 | 10, 2023 | Previous Calibration: | February | 3, 2023 |
| itation Name: | Barge I | anding | Station Number: | AMS09 | |
| itart Time (MST): | 10 | :58 | End Time (MST): | 14: | 03 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11700 | 50131 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 17.12 | 0.00 17.11 | 1.0004 | Correlation Coefficient | 0.999984 | ≥0.995 |
| 8.56 4.27 | 8.50 4.23 | 1.0073 1.0101 | Slope | 0.999991 | 0.90 - 1.10 |
| | | | Intercept | -0.027960 | +/-0.5 |
| 18.0 | | THC Calibratio | | 2 | |
| 16.0 — | | | | | |
| 14.0 | | | | | |
| 12.0 | | | | | |
| (ud 10.0 | | | | | |
| Conc. | | | | | |
| Indicated Conc. (ppm) | | | | | |
| 4 .0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | | | | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



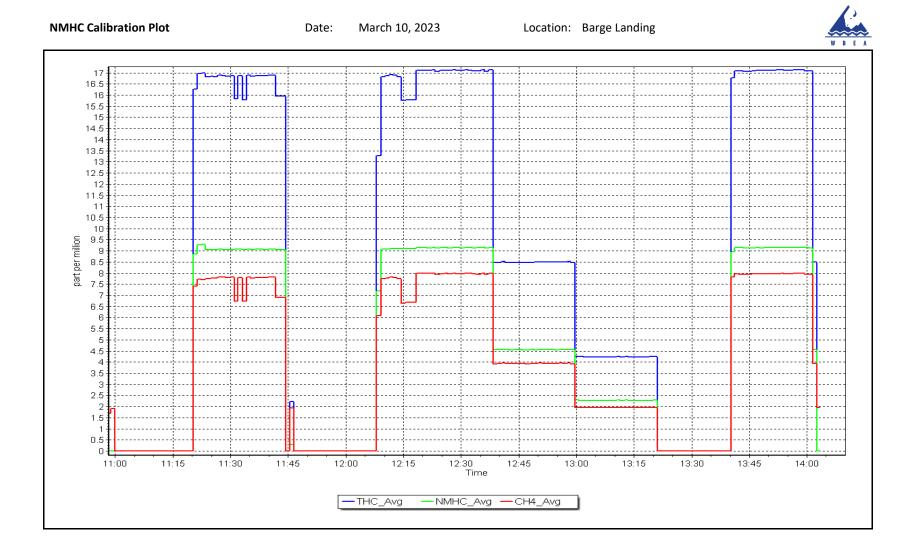
CH₄ Calibration Summary

| | | | | | Version-01-202 |
|---|--|---------------------------|-------------------------|-----------|----------------|
| | | Station I | nformation | | |
| Calibration Date: | March | 10, 2023 | Previous Calibration: | February | 3, 2023 |
| Station Name: | Barge | Barge Landing | | AM | S09 |
| Start Time (MST): | 10 | :58 | End Time (MST): | 14: | 03 |
| Analyzer make: | Ther | no 55i | Analyzer serial #: | 11700 | 50131 |
| | | | | | |
| | | Calibra | tion Data | | |
| Calculated concentrati (ppm) (Cc) | on Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999960 | ≥0.995 |
| 7.98 | 7.97 | 1.0014 | | | |
| 3.99 1.99 | 3.95 1.95 | 1.0113 1.0197 | Slope | 0.999623 | 0.90 - 1.10 |
| 1.33 | 1.95 | 1.0137 | | 0.0004.40 | 10- |
| | | | Intercept | -0.022149 | +/-0.5 |
| 9.0 8.0 7.0 6.0 (uud) 5.0 | | | | | |
| Indicated Conc. (ppm) - 0.0 - 3.0 | | | | | |
| – 0.6 udicate | | | | | |
| 2.0 - | | | | | |
| 1.0 - | | | | | |
| 0.0 🖛 | 0 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculated | l Conc. (ppm) | | |



NMHC Calibration Summary

| | | | Station | Information | | | |
|------------------------|-------------------------|---|---------------------------|-------------------|---------------------|----------|---------------|
| Calibration | Date: | March | 10, 2023 | Previous Calib | ration: | February | y 3, 2023 |
| Station Na | me: | Barge | Landing | Station Number: A | | AM | S09 |
| Start Time | (MST): | 1 | 0:58 | End Time | (MST): | 14 | :03 |
| Analyzer m | nake: | Ther | mo 55i | Analyzer se | erial #: | 11700 | 50131 |
| | | | | | | | |
| | | | Calibra | ation Data | | | |
| Calculated co (ppm) | | n Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Sta | tistical Evaluation | | <u>Limits</u> |
| 0.0 | | 0.00 | | Correlation Coef | ficient 0. | 999996 | ≥0.995 |
| 9.1 4.5 | | 9.14 4.55 | 0.9997 | | | | |
| 2.2 | | 2.27 | 1.0018 | – Slope | 1. | 000225 | 0.90 - 1.10 |
| | | | | – Intercept | -0. | .005211 | +/-0.5 |
| | 9.0 - 8.0 - 7.0 - | | | | | | - |
| dd) | 6.0 - 5.0 - | | | | | | |
| , ono | 5.0 | | | | | | |
| ated C | 4.0 - | | | | | | |
| Indic | 3.0 — | | | | | | |
| | 2.0 - | | | | | | |
| | 1.0 - | | | | | | |
| | 0.0 🖌 | | | | | | |
| | 0.0 | 2.0 | 4.0 | 6.0 | | 8.0 | 10.0 |
| | | | Calculate | d Conc. (ppm) | | | |





THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|--|--|---------------|--|---------------|-----------------|
| | | Stati | on Information | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Barge Landing March 20, 2023 8:10 Maintenance | | Station number: AN Last Cal Date: M End time (MST): 12 | arch 10, 2023 | |
| | | Calibr | ation Standards | | |
| Gas Cert Reference: | C | C151285 | Cal Gas Expiry Date: Ja | nuary 5, 2025 | |
| CH4 Cal Gas Conc. | 497.6 | ppm | CH4 Equiv Conc. | 1067.1 | ppm |
| C3H8 Cal Gas Conc. | 207.1 | ppm | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: NA | 4 | |
| Removed CH4 Conc. | 497.6 | ppm | CH4 Equiv Conc. | 1067.1 | ppm |
| Removed C3H8 Conc. Diff between cyl (CH ₄) | 207.1 | ppm | Diff between cyl (THC): Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 38 | 12 | |
| ZAG make/model: | API T701 | | Serial Number: 48 | 88 | |
| | | Analy | zer Information | | |
| Analyzer make | : Thermo 55i | | Analyzer serial #: 11 | 70050131 | |
| 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 | : 2.03E-04 | 2.16E-04 | NMHC SP Ratio: | 4.30E-05 | 4.38E-05 |
| CH4 Retention time | : 12.6 | 13.0 | NMHC Peak Area: | 212383 | 208794 |

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 | 0.02 | |
| as found span | 4919 | 80.2 | 17.12 | 16.55 | 1.034 |
| as found 2nd point | 4960 | 40.1 | 8.56 | 7.90 | 1.083 |
| as found 3rd point | 4980 | 20.0 | 4.27 | 4.08 | 1.046 |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4919 | 80.2 | 17.12 | 17.10 | 1.001 |
| second point | 4960 | 40.1 | 8.56 | 8.49 | 1.008 |
| third point | 4980 | 20.0 | 4.27 | 4.24 | 1.007 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4919 | 80.2 | 17.12 | 17.08 | 1.002 |
| | | | Aver | rage Correction Factor | 1.005 |
| Baseline Corr AF: | 16.53 | Prev response | 17.09 | *% change | -3.4% |
| Baseline Corr 2nd AF: | 7.9 | AF Slope: | 0.964242 | AF Intercept: | -0.081318 |
| Baseline Corr 3rd AF: | 4.1 | AF Correlation: | 0.999323 | * = > +/-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 <i>Limit=</i> 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.0 | |
| as found span | 4919 | 80.2 | 9.14 | 9.11 | 1.003 |
| as found 2nd point | 4960 | 40.1 | 4.57 | 4.5 | 1.006 |
| as found 3rd point | 4980 | 20.0 | 2.28 | 2.26 | 1.008 |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4919 | 80.2 | 9.14 | 9.13 | 1.001 |
| second point | 4960 | 40.1 | 4.57 | 4.55 | 1.004 |
| third point | 4980 | 20 | 2.28 | 2.28 | 0.999 |
| as left zero | 5000 | 0 | 0.00 | 0.00 | |
| as left span | 4919 | 80.2 | 9.14 | 9.11 | 1.003 |
| | | | Aver | age Correction Factor | 1.001 |
| Baseline Corr AF: | 9.11 | Prev response | 9.13 | *% change | -0.3% |
| Baseline Corr 2nd AF: | 4.5 | AF Slope: | 0.997337 | AF Intercept: | -0.007421 |
| Baseline Corr 3rd AF: | 2.3 | AF Correlation: | 0.999996 | * = > +/-5% change initiate | es investigation |

CH4 Calibration Data

| | | CH4 Calibra | tion Data | | |
|-----------------------|-------------------|----------------------|----------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.02 | |
| as found span | 4919 | 80.2 | 7.98 | 7.44 | 1.073 |
| as found 2nd point | 4960 | 40.1 | 3.99 | 3.24 | 1.232 |
| as found 3rd point | 4980 | 20.0 | 1.99 | 1.82 | 1.094 |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4919 | 80.2 | 7.98 | 7.96 | 1.003 |
| second point | 4960 | 40.1 | 3.99 | 3.95 | 1.010 |
| third point | 4980 | 20.0 | 1.99 | 1.96 | 1.016 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4919 | 80.2 | 7.98 | 7.97 | 1.002 |
| | | | Aver | age Correction Factor | 1.010 |
| Baseline Corr AF: | 7.42 | Prev response | 7.96 | *% change | -7.2% |
| Baseline Corr 2nd AF: | 3.22 | AF Slope: | 0.924642 | AF Intercept: | -0.097893 |
| Baseline Corr 3rd AF: | 1.80 | AF Correlation: | 0.994383 | * = > +/-5% change initiat | es investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| THC Cal Slope: | | 0.999991 | | 0.998949 | |
| THC Cal Offset: | | -0.027960 | | -0.021159 | |
| CH4 Cal Slope: | | 0.999623 | | 0.997790 | |
| CH4 Cal Offset: | | -0.022149 | | -0.015750 | |
| NMHC Cal Slope: | | 1.000225 | | 0.998962 | |
| NMHC Cal Offset: | | -0.005211 | | -0.001412 | |

Notes:

CH4 channel dipping. Actuator and pump changed. Zero and Span adjusted.

Calibration Performed By: Meliss

Melissa Lemay



THC Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 20, 2023 | Previous Calibration: | March 1 | 0, 2023 |
| itation Name: | Barge I | anding | Station Number: | AMS09 | |
| itart Time (MST): | 8: | 10 | End Time (MST): | 12: | 16 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11700 | 50131 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999986 | ≥0.995 |
| 17.12 8.56 | 17.10 8.49 | 1.0011 1.0080 | | | |
| 4.27 | 4.24 | 1.0080 | Slope | 0.998949 | 0.90 - 1.10 |
| | | | Intercept | -0.021159 | +/-0.5 |
| 16.0 | | | | | |
| 16.0 | | | | | |
| 14.0 | | | / | | |
| 12.0 | | | | | |
| | | | | | |
| udd 10.0 | | | | | |
| (bbm) 10.0 8.0 | | | | | |
| | | | | | |
| 0.0 udicated | | | | | |
| - 0.6 di | | | | | |
| 드 4.0 — | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| | | | | | |
| 0.0 | _ | 2 | 10.0 | 45.0 | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | | | | |



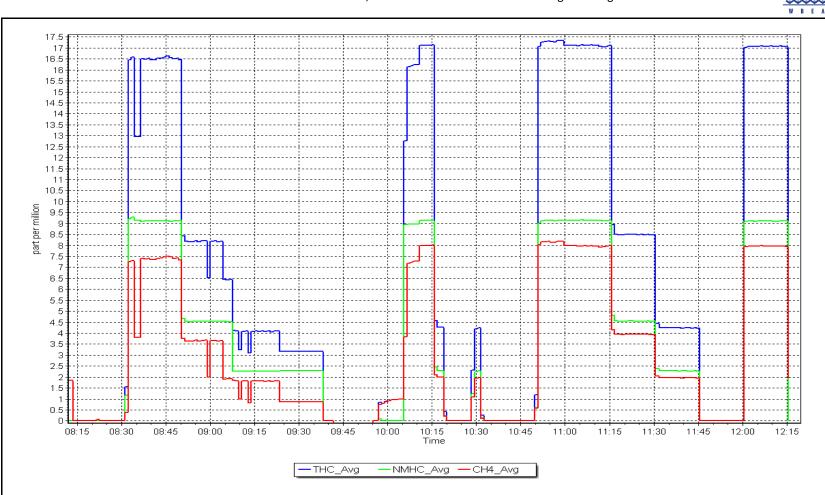
CH₄ Calibration Summary

| | | Station I | nformation | | Version-01-2020 |
|------------------------------------|--|---------------------------------|-------------------------|-----------|-----------------|
| Calibration Date: | Mare | ch 20, 2023 | Previous Calibration: | March 1 | .0, 2023 |
| Station Name: | Bar | ge Landing | Station Number: | AM | S09 |
| Start Time (MST) | : | 8:10 | End Time (MST): | 12: | 16 |
| Analyzer make: | Th | ermo 55i | Analyzer serial #: | 11700 | 50131 |
| | | Calibra | ition Data | | |
| Calculated concentra (ppm) (Cc) | tion Indicated concentrati (ppm) (Ic) | on Correction factor (Cc/Ic) | Statistical Eval | luation | <u>Limits</u> |
| 0.00 7.98 | 0.00 7.96 | 1.0029 | Correlation Coefficient | 0.999979 | ≥0.995 |
| 3.99 1.99 | 3.95 1.96 | 1.0103 1.0155 | Slope | 0.997790 | 0.90 - 1.10 |
| | | | - Intercept | -0.015750 | +/-0.5 |
| 9.0 - 8.0 - | | CH₄ Calibratio | | | |
| 7.0 - | | | | | |
| 6.0 - | | | | | |
| (mdd) 5.0 - | | | | | |
| | | | | | |
| ndicated - | | | | | |
| 2.0 - | | | | | |
| 1.0 - | | | | | |
| 0.0 | | 4.0 | 6.0 | × 0 | 10.0 |
| | .0 2.0 | | 6.0 | 8.0 | 10.0 |
| | | Calculated | d Conc. (ppm) | | |



NMHC Calibration Summary

| | | Station I | nformation | | |
|--|--------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 20, 2023 | Previous Calibration: | March 1 | 0, 2023 |
| Station Name: | Barge | Landing | Station Number: | AMS | S09 |
| Start Time (MST): | 8:10 | | End Time (MST): | 12: | 16 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11700 | 50131 |
| | | Calibra | ition Data | | |
| Calculated concentration I (ppm) (Cc) | ndicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999996 | ≥0.995 |
| <u>9.14</u> 4.57 | 9.13 4.55 | 1.0007 1.0038 | | | |
| 2.28 | 2.28 | 0.9992 | Slope | 0.998962 | 0.90 - 1.10 |
| | | | Intercept | -0.001412 | +/-0.5 |
| 9.0 8.0 7.0 6.0 5.0 | | | | | |
| _ ^ ^ | | | | | |
| 0.6 Judicated | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculated | l Conc. (ppm) | | |





THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|-------------------------------------|----------------|---------------|--------------------------|--|-----------------|
| | | Statio | n Information | | |
| Station Name: | Barge Landing | | Station number: AN | /IS09 | |
| Calibration Date: | March 28, 2023 | 3 | Last Cal Date: Ma | arch 20, 2023 | |
| Start time (MST): | 10:37 | | End time (MST): 16 | :45 | |
| Reason: | Install | | | | |
| | | Calibra | tion Standards | | |
| Gas Cert Reference: | (| CC151285 | Cal Gas Expiry Date: Jar | 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 | A Contraction of the second seco | |
| 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 | |
| | | Analyzo | er 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>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : | 2.49E-04 | NMHC SP Ratio: | | 4.79E-05 |
| CH4 Retention time | : | 15.2 | NMHC Peak Area: | | 190949 |

THC Calibration Data

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> |
|-----------------------|-------------------|----------------------|--------------------|---------------------------|----------------------------|
| as found zero | | | | | |
| 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 | 4919 | 80.2 | 17.12 | 17.09 | 1.002 |
| second point | 4960 | 40.1 | 8.56 | 8.52 | 1.004 |
| third point | 4980 | 20.0 | 4.27 | 4.28 | 0.998 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4919 | 80.2 | 17.12 | 17.10 | 1.001 |
| | | | A | verage Correction Factor | 1.001 |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initia | tes investigation |
| | | | | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| NMHC Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (0 | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | |
| as found zero | | | | | | | |
| as found span | | | | | | | |
| as found 2nd point | | | | | | | |
| as found 3rd point | | | | | | | |
| new cylinder response | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| high point | 4919 | 80.2 | 9.14 | 9.13 | 1.001 | | |
| second point | 4960 | 40.1 | 4.57 | 4.56 | 1.002 | | |
| third point | 4980 | 20 | 2.28 | 2.30 | 0.993 | | |
| as left zero | 5000 | 0 | 0.00 | 0.00 | | | |
| as left span | 4919 | 80.2 | 9.14 | 9.13 | 1.001 | | |
| | | | A | verage Correction Factor | 0.998 | | |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation | | |

CH4 Calibration Data

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | c) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|
| as found zero | | | | | |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4919 | 80.2 | 7.98 | 7.96 | 1.003 |
| second point | 4960 | 40.1 | 3.99 | 3.96 | 1.007 |
| third point | 4980 | 20.0 | 1.99 | 1.98 | 1.004 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4919 | 80.2 | 7.98 | 7.98 | 1.001 |
| | | | A | verage Correction Factor | 1.005 |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | Finish | |
| THC Cal Slope: | | | | 0.997787 | |
| THC Cal Offset: | | | | 0.002047 | |
| CH4 Cal Slope: | | | | 0.996643 | |
| CH4 Cal Offset: | | | | -0.003745 | |
| NMHC Cal Slope: | | | | 0.998523 | |
| NMHC Cal Offset: | | | | 0.006592 | |

Notes:

Replaced after a failed nightly span, the baseline also drifted to around 1 ppm THC. Adjusted window timings and span, used new zero chromatogram.

Calibration Performed By: Bi



THC Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| Calibration Date: | March | 28, 2023 | Previous Calibration: | March 2 | 0, 2023 |
| Station Name: | Barge | Landing | Station Number: | AM | S09 |
| Start Time (MST): | 10 | :37 | End Time (MST): | 16: | 45 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11935 | 85649 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999995 | ≥0.995 |
| 17.12 | 17.09 | 1.0017 | | | |
| 8.56 4.27 | 8.52 4.28 | 1.0045 0.9978 | Slope | 0.997787 | 0.90 - 1.10 |
| 7.27 | 4.20 | 0.5578 | Intercept | 0.002047 | +/-0.5 |
| 16.0 | | | | | |
| 16.0 | | | | | |
| 14.0 | | | | | |
| 12.0 | | | | | |
| 10.0 (bbm) 10.0 (bbm) 8.0 (bbm) | | | | | |
| Conc 8.0 | | | | | |
| 0.6 undicated | | | | | |
| 드 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | | | | |
| | F | 0 | 10.0 | 1 E O | 20 0 |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |



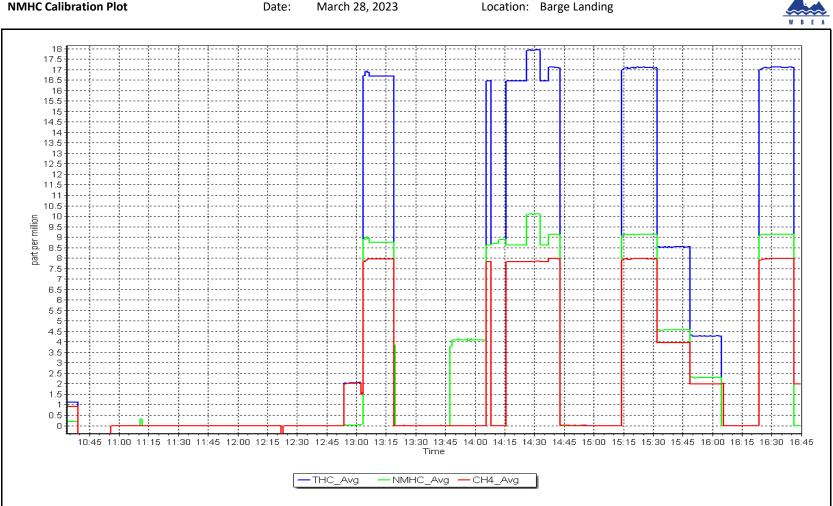
CH₄ Calibration Summary

| | | Station I | nformation | | |
|--------------------------------|---------------------------------------|---------------------------------|-------------------------|-----------|---------------|
| Calibration Date: | Marc | ch 28, 2023 | Previous Calibration: | March 2 | 0, 2023 |
| Station Name: | | ge Landing | Station Number: | AMS | |
| Start Time (MST): | | 10:37 | End Time (MST): | 16: | 45 |
| Analyzer make: | Th | ermo 55i | Analyzer serial #: | 11935 | 85649 |
| | | | | | |
| | | | ition Data | | |
| (ppm) (Cc) | on Indicated concentration (ppm) (Ic) | on Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999996 | ≥0.995 |
| 7.98 | 7.96 | 1.0032 1.0070 | | | |
| 1.99 | 1.98 | 1.0042 | Slope | 0.996643 | 0.90 - 1.10 |
| | | | Intercept | -0.003745 | +/-0.5 |
| 7.0 - 6.0 - E | | | | | |
| dd 5.0 - כנ | | | | | |
| Indicated Conc. (ppm) - 0.6 | | | | | |
| É E | | | | | |
| – 0.6 Judica | | | | | |
| <u>ipu</u> 3.0 – 2.0 – | | | | | |
| | | | | | |
| 2.0 - | | | | | |
| 2.0 - 1.0 - | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |



NMHC Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| Calibration Date: | March | 28, 2023 | Previous Calibration: | March 2 | 0, 2023 |
| itation Name: | Barge | Landing | Station Number: | AM | S09 |
| itart Time (MST): | 10 |):37 | End Time (MST): | 16: | 45 |
| Analyzer make: | Ther | mo 55i | Analyzer serial #: | 11935 | 85649 |
| | | | | | |
| | | 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 | 0.999994 | ≥0.995 |
| 9.14 4.57 | 9.13 4.56 | 1.0007 1.0016 | | | |
| 2.28 | 2.30 | 0.9926 | Slope | 0.998523 | 0.90 - 1.10 |
| | | | Intercept | 0.006592 | +/-0.5 |
| 9.0 8.0 7.0 6.0 | | | | | |
| b) 5.0 | | | | | |
| 6.0 | | | | | |
| 3.0 | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| 0.0 | 2.0 | | l Conc. (ppm) | 0.0 | 10.0 |





$NO_X \setminus NO \setminus NO_2$ Calibration Report

| | | Station | Information | | | | |
|--|--|--|--------------------------------------|----------------|---------------|--|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Barge Landing March 15, 2023 9:45 Routine | Station number: AMS09 Last Cal Date: February 22, 2023 End time (MST): 15:12 | | | | | |
| | | Calibrat | ion Standards | | | | |
| NO Gas Cylinder #: | DT0036634 | | Cal Gas Expiry Date: Jar | nuary 28, 2024 | 4 | | |
| NOX Cal Gas Conc: | 50.00 | ppm | NO Cal Gas Conc: | 49.70 | ppm | | |
| Removed Cylinder #: | NA | | Removed Gas Exp Date: NA | \ | | | |
| Removed Gas NOX Conc: NOX gas Diff: | 50.00 | ppm | Removed Gas NO Conc: NO gas Diff: | 49.70 | ppm | | |
| Calibrator Model: | API T700 | | Serial Number: | 3812 | | | |
| ZAG make/model: | API T701 | | Serial Number: | 4888 | | | |
| | | Analyze | r Information | | | | |
| Analyzer make: | Thermo 42i | | Analyzer serial #: 14 | 26262593 | | | |
| NOX Range (ppb): | | | - , | | | | |
| / | Start | Finish | | <u>Start</u> | Finish | | |
| NO coeff or slope | | 1.175 | NO bkgnd or offset: | 10.3 | 10.5 | | |
| NOX coeff or slope | | 0.995 | NOX bkgnd or offset: | 10.3 | 10.5 | | |
| NO2 coeff or slope | | 1.000 | Reaction cell Press: | 179.2 | 175.2 | | |
| | | | | | | | |
| | | | tion Statistics | | | | |
| | | <u>Start</u> | | <u>Finish</u> | | | |

| NO _x Cal Slope: | 0.998455 | 0.998241 |
|-----------------------------|-----------|-----------|
| NO _x Cal Offset: | 0.648644 | 0.748819 |
| NO Cal Slope: | 1.000928 | 1.000056 |
| NO Cal Offset: | -0.732611 | -0.352413 |
| NO ₂ Cal Slope: | 1.000063 | 1.001921 |
| NO ₂ Cal Offset: | -1.156786 | -0.892005 |
| | | |



$NO_X \setminus NO \setminus NO_2$ 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 | 0.0 | | |
| as found span | 4919 | 80.5 | 805.1 | 800.3 | 4.8 | 787.0 | 781.9 | 5.1 | 1.023 | 1.023 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | | |
| high point | 4919 | 80.5 | 805.1 | 800.3 | 4.8 | 804.0 | 800.0 | 3.4 | 1.001 | 1.000 |
| second point | 4959 | 40.2 | 402.1 | 399.7 | 2.4 | 402.7 | 399.6 | 3.1 | 0.998 | 1.000 |
| third point | 4979 | 20.1 | 201.0 | 199.8 | 1.2 | 201.9 | 198.7 | 3.2 | 0.996 | 1.006 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | | |
| as left span | 4919 | 80.5 | 805.1 | 450.4 | 354.7 | 799.3 | 445.0 | 354.3 | 1.007 | 1.012 |
| | | | | | | | Average C | Correction Factor | 0.998 | 1.002 |
| Corrected As fo | ound NO _x = | 787.1 ppb | NO = | 782.0 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chang | ge NO _x = | -2.2% |
| Previous Respo | nse NO _x = | 804.5 ppb | NO = | 800.3 ppb | | | | *Percent Chang | ge NO = | -2.3% |
| 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 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) | 794.5 | 444.6 | 354.7 | 354.9 | 1.000 | 100.0% |
| 2nd GPT point (200 ppb O3) | 794.5 | 664.2 | 135.1 | 133.8 | 1.010 | 99.0% |
| 3rd GPT point (100 ppb O3) | 794.5 | 728.8 | 70.5 | 69.2 | 1.019 | 98.1% |
| | | | ŀ | Average Correction Factor | 1.010 | 99.1% |

Notes:

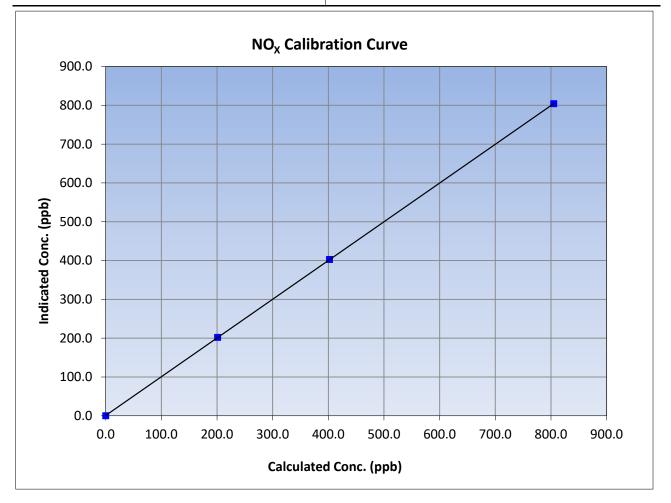
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

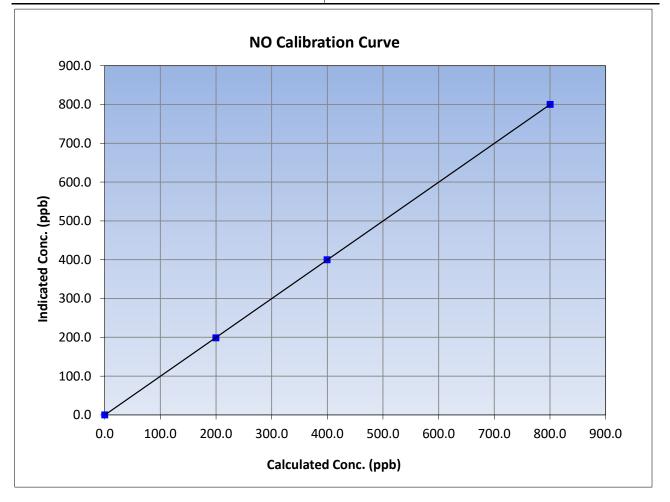
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 15, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Barge I | anding | Station Number: | AM | S09 |
| Start Time (MST): | 9: | 45 | End Time (MST): | 15 | :12 |
| Analyzer make: | Therr | no 42i | | | 6262593 |
| | | 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 |
| 805.1 | 804.0 | 1.0013 | correlation coefficient | 0.555557 | 20.995 |
| 402.1 | 402.7 | 0.9984 | Clana | 0.998241 | 0.90 - 1.10 |
| 201.0 | 201.9 | 0.9957 | Slope | 0.998241 | 0.90 - 1.10 |
| | | | Intercept | 0.748819 | +/-20 |





NO Calibration Summary

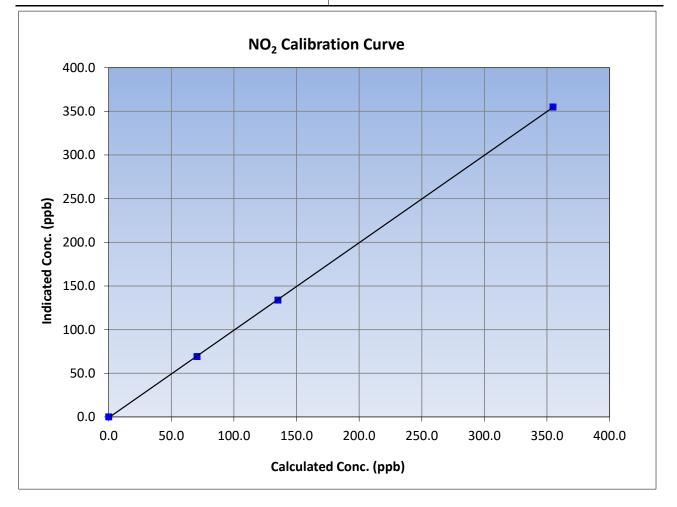
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|---------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 15, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Barge I | Landing | Station Number: | AM | S09 |
| Start Time (MST): | 9: | 45 | End Time (MST): | 15 | :12 |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 142626 | | 62593 |
| | | 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 | 0.999997 | ≥0.995 |
| 800.3 | 800.0 | 1.0003 | correlation coefficient | 0.999997 | 20.995 |
| 399.7 | 399.6 | 1.0001 | Slope | 1.000056 | 0.90 - 1.10 |
| 199.8 | 198.7 | 1.0057 | Siope | 1.000056 | 0.90 - 1.10 |
| | | | Intercept | -0.352413 | +/-20 |

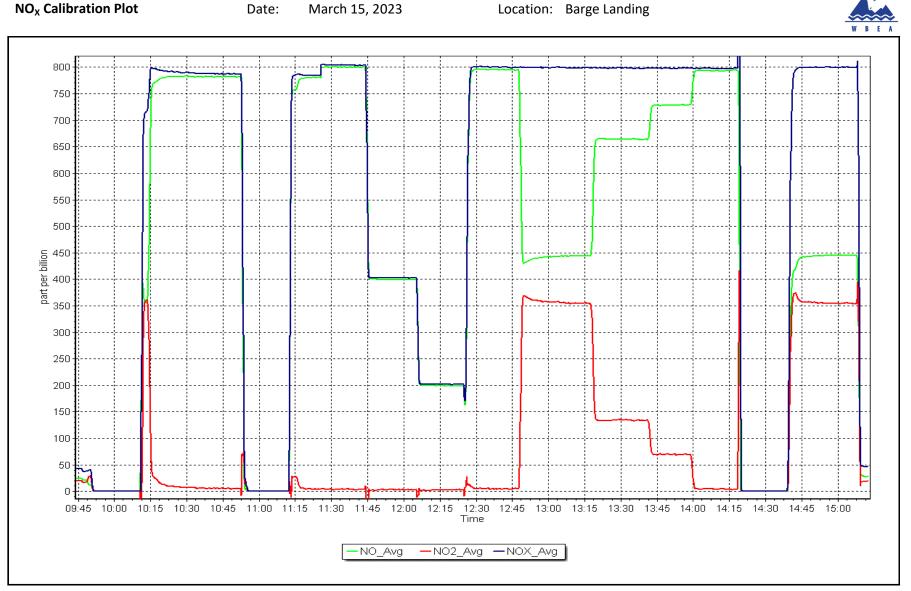




NO₂ Calibration Summary

| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 15, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Barge I | Landing | Station Number: | AM | S09 |
| Start Time (MST): | 9: | 45 | End Time (MST): | 15 | :12 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: 1426 | | 5262593 |
| | | 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 |
| 354.7 | 354.9 | 0.9995 | correlation coefficient | 0.999975 | 20.995 |
| 135.1 | 133.8 | 1.0099 | Slope | 1.001921 | 0.90 - 1.10 |
| 70.5 | 69.2 | 1.0192 | Siope | 1.001921 | 0.90 - 1.10 |
| | | | Intercept | -0.892005 | +/-20 |





Location: Barge Landing



T640 PM_{2.5} CALIBRATION

| W D E A | | | | | Version-01-2023 |
|-------------------------------|------------------------|---------------------------|--------------------|----------------------|-----------------|
| | | Station Information | l | | |
| Station Name: | Barge Landing | | Station number: | AMS 09 | |
| Calibration Date: | March 23, 2023 | | Last Cal Date: | February 28, 2023 | |
| Start time (MST): | 12:14 | | End time (MST): | 12:44 | |
| Analyzer Make: | API T640 | | S/N: | 321 | |
| Particulate Fraction: | PM2.5 | | | | |
| Flow Meter Make/Model: | Alicat FP-25BT | | S/N: | 388753 | |
| Temp/RH standard: | Alicat FP-25BT | | S/N: | 388753 | |
| | | Monthly Calibration To | est | | |
| Parameter | <u>As found</u> | Measured | <u>As left</u> | <u>Adjusted</u> | (Limits) |
| T (°C) | 0.0 | -0.66 | 0.0 | | +/- 2 °C |
| P (mmHg) | 727.6 | 729.67 | 727.6 | | +/- 10 mmHg |
| flow (LPM) | 5.02 | 5.032 | 5.02 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 23, 2023 | Last Cal Date: | February 28, 2023 | _ |
| | PM w/o HEPA: | 5.7 | PM w/ HEPA: | 0.0 | <0.2 ug/m3 |
| Note: this leak check will be | e completed before the | quarterly work and will s | erve as the pre ma | intenance leak check | |
| Inlet cleaning : | Inlet Head | | | | |
| | | | | | |
| | | Quarterly Calibration 1 | lost. | | |
| Daramator | Actourd | | | Adjusted | (Limite) |
| Parameter PMT Book Test | <u>As found</u> | Post maintenance | <u>As left</u> | Adjusted | |
| PMT Peak Test | - | - | - | | 11.3 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | - | w/ HEPA: | - |
| Date Optical Cham | nber Cleaned: | February 28 | , 2023 | | <0.2 ug/m3 |
| Disposable Filte | r Changed: | February 28 | , 2023 | | |
| | | | | | |
| | | | | | |
| | | Annual Maintenance | 9 | | |
| Date Sample Tul | be Cleaned: | November 15 | 5, 2022 | | |
| Date RH/T Sense | or Cleaned: | November 15 | 5, 2022 | | |
| | | | | | |
| | | No adjustments | made. Leak check | passed. | |
| Notes: | | | | | |
| Calibration by: | Braiden Boutilier | | | | |
| | | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS11 LOWER CAMP MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---------------------------------------|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Lower Camp March 7, 2023 10:53 Routine | | Station number: Last Cal Date: End time (MST): | AMS11 February 7, 2023 14:06 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.25 | ppm | Cal Gas Exp Date: | February 23, 2025 | |
| Cal Gas Cylinder #: | CC2216 | | | | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 49.25 | ppm | Rem Gas Exp Date: | NA | |
| Calibrator Make/Model: | NA Teledyne API T700 | | Diff between cyl: Serial Number: | 3807 | |
| ZAG Make/Model: | Teledyne API T700 | | Serial Number: | 196 | |
| | releague Air 1701 | | Schull Humber. | 150 | |
| | | Analyzer Info | rmation | | |
| Analyzer make: Analyzer Range | | | Analyzer serial #: | 100841398 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.992304 | 0.995374 | Backgd or Offset: | | 14.0 |
| Calibration intercept: | -0.508143 | -0.208611 | Coeff or Slope: | 1.051 | 1.051 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as found span | 4919 | 81.3 | 800.8 | 798.2 | 1.003 |
| 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 | 800.8 | 797.6 | 1.004 |
| second point | 4959 | 40.7 | 400.9 | 397.2 | 1.009 |
| third point | 4980 | 20.3 | 199.9 | 199.1 | 1.004 |
| as left zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as left span | 4919 | 81.3 | 800.8 | 798.1 | 1.003 |
| | | | Averag | ge Correction Factor | 1.006 |
| Baseline Corr As found: | 798.20 | Previous response | 794.09 | *% change | 0.5% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| | NA | AF Correlation: | | | |

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

Calibration Performed By:

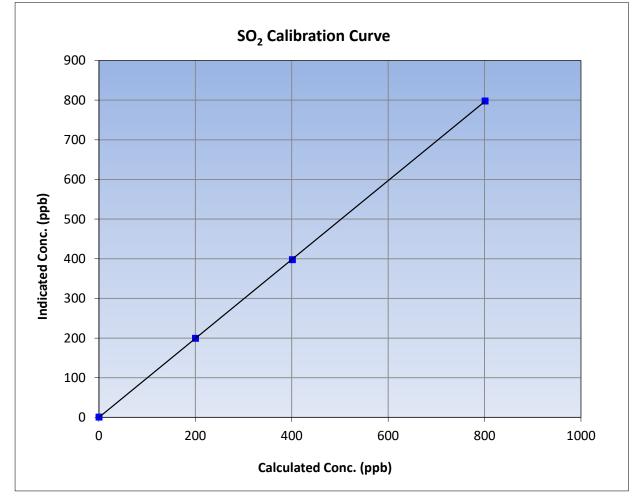
Mohammed Kashif

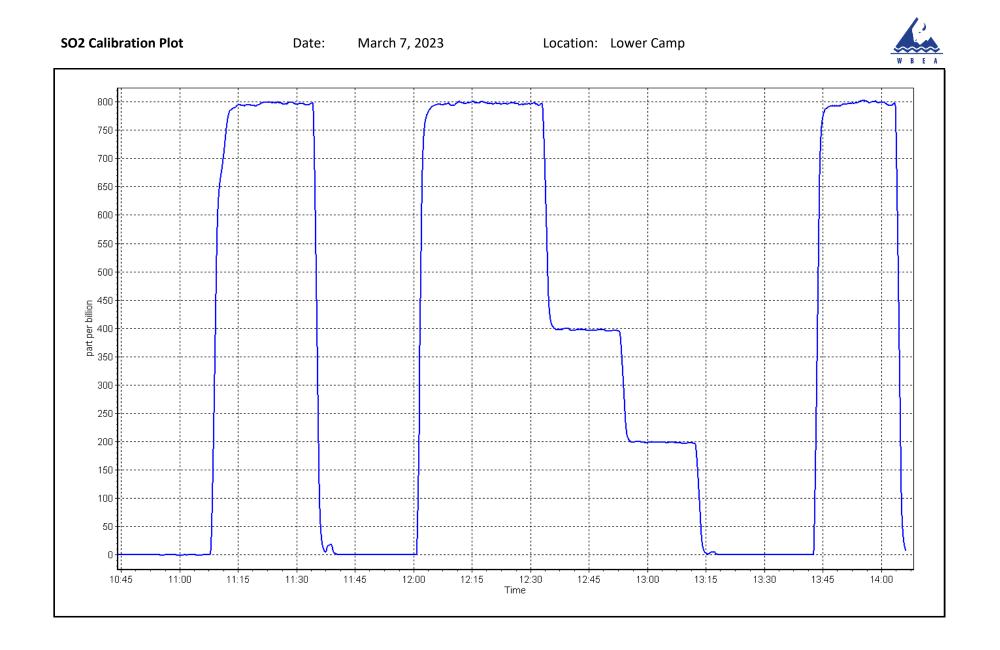


SO₂ Calibration Summary

| WBEA | | | | Version-01-2020 |
|---|-------------------------------------|------------------------------|------------------------|------------------|
| | | Station I | Information | |
| Calibration Date: | March 7 | , 2023 | Previous Calibration: | February 7, 2023 |
| Station Name: | Lower (| Camp | Station Number: | AMS11 |
| Start Time (MST): | 10:53 | | End Time (MST): | 14:06 |
| Analyzer make: | nalyzer make: Thermo 43i | | Analyzer serial #: | 100841398 |
| | | | | |
| | | Calibra | ation Data | |
| Calculated concentration In (ppb) (Cc) | dicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |

| 0.0 | 0.4 | | Correlation Coefficient | 0.999989 | ≥0.995 | |
|-------|-------|--------|-------------------------|-----------|-------------|--|
| 800.8 | 797.6 | 1.0040 | correlation coefficient | 0.999909 | 20.995 | |
| 400.9 | 397.2 | 1.0094 | Slope | 0.995374 | 0.90 - 1.10 | |
| 199.9 | 199.1 | 1.0042 | Siope | 0.555574 | 0.90 - 1.10 | |
| | | | Intercept | -0.208611 | +/-30 | |







H₂S Calibration Report

| | Station Info | rmation | | Version-11-2 |
|------------------------|---|--|--|--|
| | Station info | | | |
| • | | | | |
| | | | • | |
| - | | End time (MST): | 16:03 | |
| Routine | | | | |
| | Calibration S | tandards | | |
| 5 129 | nnm | Cal Gas Evn Date: | January 4, 2025 | |
| | ppin | cui dus Exp Dute. | Junuary 1, 2023 | |
| | nnm | Rem Gas Exp Date: | NA | |
| | PPIII | • | | |
| | | | 3807 | |
| | | | | |
| AITTOIT | | Schar Wumber. | 190 | |
| | Analyzer Info | ormation | | |
| Thermo 450iQ | | Analyzer serial #: | CM20080003 | |
| NA | | Converter serial #: | NA | |
| 0 - 100 ppb | | | | |
| Start | Finish | | Start | Finish |
| | | Backed or Officate | | 13.9 |
| | | | | |
| 0.454865 | 0.532956 | Coeff of Slope: | 1.043 | 1.043 |
| | H ₂ S As Four | nd Data | | |
| | | | | Baseline Adjuste |
| Dilution air flow rate | Source gas flow rate | | Indicated | Correction facto |
| (sccm) | (sccm) | | concentration (ppb) (Ic) | (Cc/(Ic-AFzero) |
| | | . , | | Limit = 0.90-1.10 |
| | | | | |
| | | | | 1.014 |
| | | | | 1.001 |
| 4982 | 18.6 | 20.2 | 20.1 | 1.025 |
| | | | | |
| | H ₂ S Calibrat | ion Data | | |
| Dilution air flow rate | Source gas flow rate | Calculated | Indicated | Correction facto |
| (sccm) | (sccm) | | concentration (ppb) (Ic) | (Cc/lc) |
| 5000 | 0.0 | | 0.4 | Limit = 0.95-1.05 |
| | | | - | 0.970 |
| | | | | 0.970 |
| | | | | |
| | | | | 0.953 |
| | | | | |
| | | | | 0.997 |
| | 81.1 | 0.118 | 1 | |
| | | | Ave Corr Factor | 0.959 |
| iciency test: | | | | efficiency |
| | Drawraananaa | 80.15 | *% change: | -1.7% |
| 78.8 | Prev response: | 80.15 | /o change. | |
| 78.8 39.9 | AF Slope: | | AF Intercept: | 0.416680 |
| | • | 0.987574 | 0 | |
| | NA 0 - 100 ppb <u>Start</u> 0.997193 0.454865 Dilution air flow rate (sccm) 5000 4926 4963 4982 Dilution air flow rate | Lower Camp March 28, 2023 9:47 Routine Calibration S 5.429 ppm CC501097 5.429 ppm NA API T700 API T701H API T701H API T701H Charles Calibration S CC301097 5.429 ppm NA API T700 API T701H CC30100 ppb Start Finish 0.997193 1.026375 0.454865 0.532956 CC30100 pb CC3010 ppb CC3010 ppb C | March 28, 2023 9:47 Routine Last Cal Date: End time (MST): End time (MST): Start 0.97193 ppm Calibration Standards CC501097 Cal Gas Exp Date: Date: Start 0.997193 Diff between cyl: Serial Number: Serial Number: API T700 API T701H Serial Number: Serial Number: Thermo 450iQ NA 0.997193 Analyzer Information Converter serial #: Converter serial #: Converter serial #: 0.454865 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 | Lower Camp March 28, 2023 Station number: Last Cal Date: End time (MST): AMS11 February 8, 2023 9:47 Routine End time (MST): 16:03 5.429 CC501097 5.429 ppm Cal Gas Exp Date: Diff between cyl: Serial Number: January 4, 2025 API T700 API T700 Serial Number: 3807 API T701H Serial Number: 196 CAIO80003 Serial Number: State API T701H CM20080003 Serial Number: State API T701H CM20080003 Serial Number: State NA CM20080003 CONVerter serial #: State NA State State Serial Number: State 14.0 OL26375 Backgd or Offset: 14.0 State 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) Indicated concentration (ppb) (cc) Source gas flow rate (sccm) Calculated concentration (ppb) (cc) Indicated concentration (ppb) (cc) |

Notes:

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

Calibration Performed By:

Mohammed Kashif

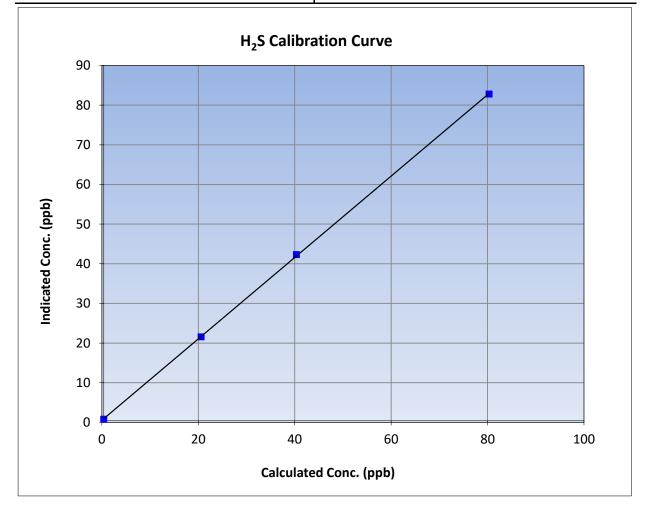


H₂S Calibration Summary

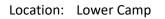
| WBEA | | | Version-11-2021 | | | | |
|---------------------|----------------|-----------------------|------------------|--|--|--|--|
| Station Information | | | | | | | |
| Calibration Date: | March 28, 2023 | Previous Calibration: | February 8, 2023 | | | | |
| Station Name: | Lower Camp | Station Number: | AMS11 | | | | |
| Start Time (MST): | 9:47 | End Time (MST): | 16:03 | | | | |
| Analyzer make: | Thermo 450iQ | Analyzer serial #: | CM20080003 | | | | |

Calibration Data

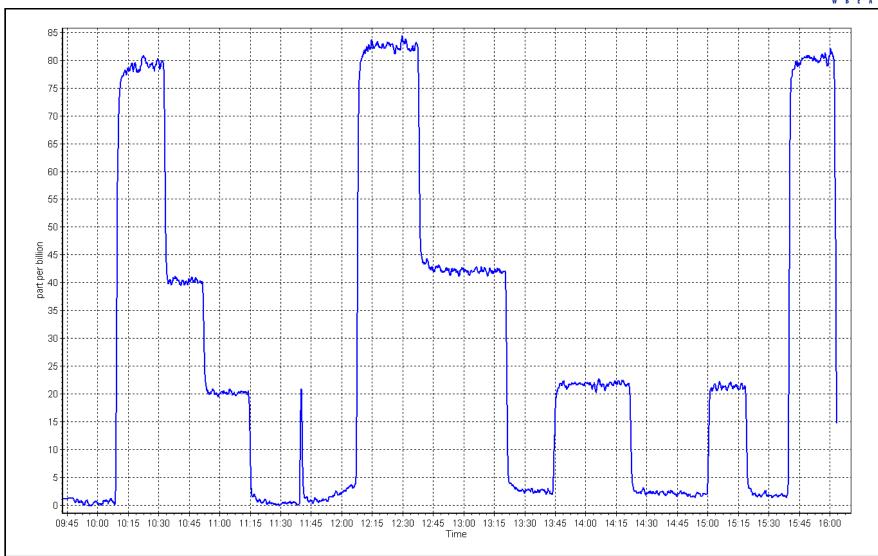
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.4 | | Correlation Coefficient | 0.999953 | ≥0.995 |
| 79.9 | 82.4 | 0.9699 | correlation coefficient | 0.999933 | 20.335 |
| 40.0 | 41.9 | 0.9537 | Slope | 1.026375 | 0.90 - 1.10 |
| 20.2 | 21.2 | 0.9525 | Slope | | 0.30 - 1.10 |
| | | | Intercept | 0.532956 | +/-3 |



H₂S Calibration Plot









THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|--|---|---------------|-------------------------|----------------|-----------------|
| | | Stati | on Information | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Lower Camp March 7, 2023 10:53 Routine | • | | | |
| | | Calibr | ration Standards | | |
| Gas Cert Reference: | | CC2216 | Cal Gas Expiry Date: Fe | bruary 23, 202 | 5 |
| CH4 Cal Gas Conc. | 502.0 | ppm | CH4 Equiv Conc. | 1067.1 | ppm |
| C3H8 Cal Gas Conc. | 205.5 | ppm | | | |
| Removed Gas Cert: | | | Removed Gas Expiry: | | |
| Removed CH4 Conc. | 502.0 | ppm | CH4 Equiv Conc. | 1067.1 | ppm |
| Removed C3H8 Conc. | 205.5 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 38 | 307 | |
| ZAG make/model: | API T701 | | Serial Number: 19 | 96 | |
| | | Analy | zer Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 15 | 505164381 | |
| , THC Range (ppm): | | | , | | |
| NMHC Range (ppm) | : 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : 3.09E-04 | 3.02E-04 | NMHC SP Ratio: | 5.97E-05 | 5.86E-05 |
| CH4 Retention time | : 14.0 | 13.8 | NMHC Peak Area: | 153551 | 156599 |

| | | THC Calibra | ntion 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 | 17.71 | 0.980 | |
| 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 | 8.62 | 1.008 | |
| third point | 4980 | 20.3 | 4.33 | 4.30 | 1.007 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4919 | 81.3 | 17.35 | 17.42 | 0.996 | |
| | | | A | Average Correction Factor | 1.006 | |
| Baseline Corr AF: | 17.71 | Prev response | 17.41 | *% change | 1.7% | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates investigation</pre> | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| | | NMHC Calib | ration Data | | | |
|-----------------------|-------------------|----------------------|-------------------|--|---------------------|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4919 | 81.3 | 9.19 | 9.35 | 0.983 | |
| 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 | 4.56 | 1.010 | |
| third point | 4980 | 20.3 | 2.29 | 2.28 | 1.008 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4919 | 81.3 | 9.19 | 9.22 | 0.997 | |
| | | | ŀ | Average Correction Factor | 1.007 | |
| Baseline Corr AF: | 9.35 | Prev response | 9.19 | *% change | 1.6% | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates investigation</pre> | | |

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

| | | | lion 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 | 8.16 | 8.37 | 0.975 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| high point | 4919 | 81.3 | 8.16 | 8.16 | 1.000 | |
| second point | 4959 | 40.7 | 4.09 | 4.06 | 1.007 | |
| third point | 4980 | 20.3 | 2.04 | 2.03 | 1.006 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4919 | 81.3 | 8.16 | 8.20 | 0.995 | |
| | | | A | verage Correction Factor | 1.004 | |
| Baseline Corr AF: | 8.37 | Prev response | 8.22 | *% 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: | | 1.004951 | | 0.998030 | | |
| THC Cal Offset: | | -0.022988 | | -0.019190 | | |
| CH4 Cal Slope: | | 1.008833 1.000126 | | | | |
| CH4 Cal Offset: | -0.014688 | | | -0.010089 | | |
| NMHC Cal Slope: | | 1.001278 | | 0.996404 | | |
| NMHC Cal Offset: | | -0.007900 | | -0.009301 | | |

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

Calibration Performed By:

Mohammed Kashif



THC Calibration Summary

| Calibration Date: Station Name: Start Time (MST): Analyzer make: Calculated concentration (ppm) (Cc) 0.00 17.35 8.69 4.33 | Lower 10 Thern | :53 no 55i | Previous Calibration: Station Number: End Time (MST): Analyzer serial #: tion Data Statistical Evalu | February AMS 14: 150516 | 511 06 |
|--|--|--|---|----------------------------------|--------------------|
| tation Name: tart Time (MST): analyzer make: Calculated concentration (ppm) (Cc) 0.00 17.35 8.69 | Lower 10 Thern Indicated concentration (ppm) (Ic) 0.00 17.32 8.62 | Camp 53 no 55i Calibra Correction factor (Cc/Ic) 1.0020 | Station Number: End Time (MST): Analyzer serial #: tion Data Statistical Evalu | AM5 14: 15051(| 511 06 54381 |
| Calculated concentration (ppm) (Cc) 0.00 17.35 8.69 | 10 Thern Indicated concentration (ppm) (Ic) 0.00 17.32 8.62 | :53 no 55i Calibra Correction factor (Cc/Ic) 1.0020 | Analyzer serial #: tion Data Statistical Evalu | 15051(| 54381 |
| Calculated concentration (ppm) (Cc) 0.00 17.35 8.69 | Thern Indicated concentration (ppm) (Ic) 0.00 17.32 8.62 | no 55i Calibra Correction factor (Cc/Ic) 1.0020 | Analyzer serial #: tion Data Statistical Evalu | 15051(| 54381 |
| Calculated concentration (ppm) (Cc) 0.00 17.35 8.69 | Indicated concentration (ppm) (Ic) 0.00 17.32 8.62 | Calibra Correction factor (Cc/Ic) 1.0020 | tion Data Statistical Evalu | | |
| (ppm) (Cc) 0.00 17.35 8.69 | (ppm) (Ic) 0.00 17.32 8.62 | Correction factor (Cc/Ic) 1.0020 | Statistical Evalu | ation | <u>Limits</u> |
| (ppm) (Cc) 0.00 17.35 8.69 | (ppm) (Ic) 0.00 17.32 8.62 | 1.0020 | | ation | <u>Limits</u> |
| 17.35 8.69 | 17.32 8.62 | | Correlation Coefficient | | |
| 8.69 | 8.62 | | | 0.999988 | ≥0.995 |
| | | | | - | |
| 4.55 | 4.50 | 1.0070 | Slope | 0.998030 | 0.90 - 1.10 |
| | | 1.0070 | Intercept | -0.019190 | +/-0.5 |
| 18.0 | | | | | |
| 20.0 | | | | | |
| 16.0 | | | | _ | |
| 14.0 | | | | | |
| | | | | | |
| ີ ແລະ 12.0 | | | | | |
| | | | | | |
| 0.8 ted Co | | | | | |
| 12.0 | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | _ | | | |
| 0.0 | 5. | .0 | 10.0 | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



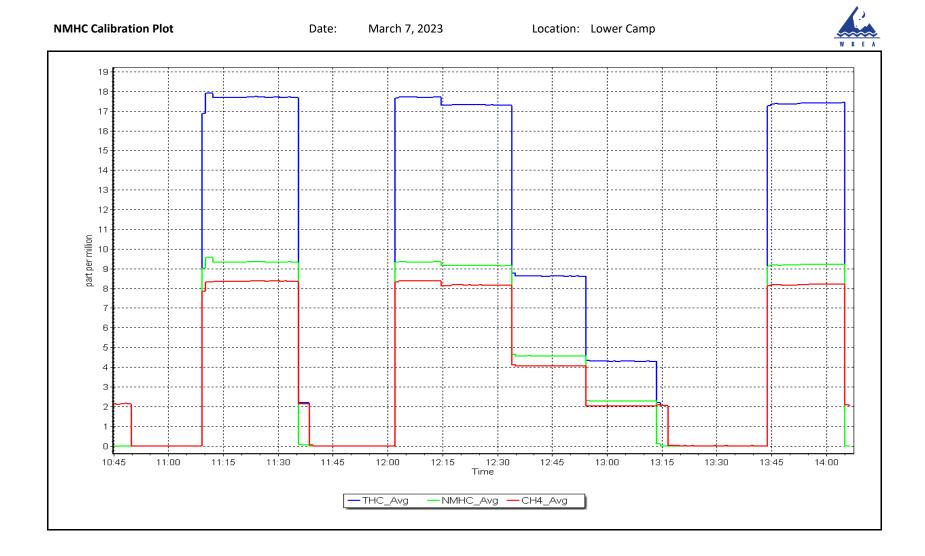
CH₄ Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|-----------------------------|------------------------------------|----------------|---------------|
| Calibration Date: | March | | Previous Calibration: | February | 7 2023 |
| Station Name: | | March 7, 2023 Lower Camp | | | |
| Start Time (MST): | | | Station Number: End Time (MST): | AMS11 14:06 | |
| Analyzer make: | | 10:53 Thermo 55i | | 1505164381 | |
| maryzer make. | Then | | | | |
| | | 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 | 0.999987 | ≥0.995 |
| 8.16 4.09 | 8.16 | 1.0000 1.0065 | | | |
| 2.04 | 2.03 | 1.0059 | Slope | 1.000126 | 0.90 - 1.10 |
| | | | Intercept | -0.010089 | +/-0.5 |
| 8.0 7.0 6.0 | | | | | |
| (udd 5.0 | | | | | |
| 4.0 | | | | | |
| 0.8 Undicated | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | | | |



NMHC Calibration Summary

| | | Station I | nformation | | |
|--|--|-----------------------------|-------------------------|------------------------|-------------|
| Calibration Date: | March | March 7, 2023 Lower Camp | | February | 7, 2023 |
| Station Name: | Lowe | | | AM | AMS11 |
| Start Time (MST):10:53Analyzer make:Thermo 55i | | :53 | End Time (MST): | 14:06 | |
| | | no 55i | Analyzer serial #: | 15051 | 1505164381 |
| | | Calibra | tion Data | | |
| Calculated concentratic (ppm) (Cc) | on Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | | Statistical Evaluation | |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999990 | ≥0.995 |
| 9.19 4.60 | 9.16 4.56 | 1.0036 1.0095 | | | |
| 2.29 | 2.28 | 1.0095 | Slope | 0.996404 | 0.90 - 1.10 |
| | | | Intercept | -0.009301 | +/-0.5 |
| 9.0 8.0 7.0 | | | | | |
| (bbm) - 0.0 - 5.0 | | | | | |
| | | | | | |
| - 0.4 Judicated | | | | | |
| 2.0 | | | | | |
| 1.0 - | | | | | |
| 0.0 • | 0 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculated | l Conc. (ppm) | | |





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|----------------------------|--|------------------------------------|--------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Fort McKay South March 2, 2023 10:07 Routine | | Station number: Last Cal Date: End time (MST): | AMS13 February 2, 2023 16:10 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 50.55 | ppm | Cal Gas Exp Date: | December 29, 2028 | |
| Cal Gas Cylinder #: | CC260812 | | | | |
| Removed Cal Gas Conc: | 50.55 | ppm | Rem Gas Exp Date: | N/A | |
| Removed Gas Cyl #: | N/A API T700 | | Diff between cyl: Serial Number: | 2448 | |
| Calibrator Make/Model: ZAG Make/Model: | API 700 API 701 | | Serial Number: | 1117 | |
| | | | | 111, | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 599 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.001413 | 1.006516 | Backgd or Offset: | | 80.5 |
| Calibration intercept: | -2.738219 | -2.298208 | Coeff or Slope: | 0.735 | 0.735 |
| | | 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) | | <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 1.2 | |
| as found span | 4921 | 79.1 | 799.7 | 802.7 | 0.996 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.3 | |
| high point | 4921 | 79.1 | 799.7 | 803.8 | 0.995 |
| second point | 4961 | 39.5 | 399.3 | 398.6 | 1.002 |
| third point | 4980 | 19.8 | 200.2 | 196.4 | 1.019 |
| as left zero | 5000 4921 | 0.0 79.1 | 0.0 799.7 | 0.3 798.9 | |
| as left span | 4921 | 79.1 | | 798.9 ge Correction Factor | 1.001 |
| Deceline Corr As faura d | 001 50 | Drovious | | | |
| Baseline Corr As found: | 801.50 | Previous response | | *% change | 0.4% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

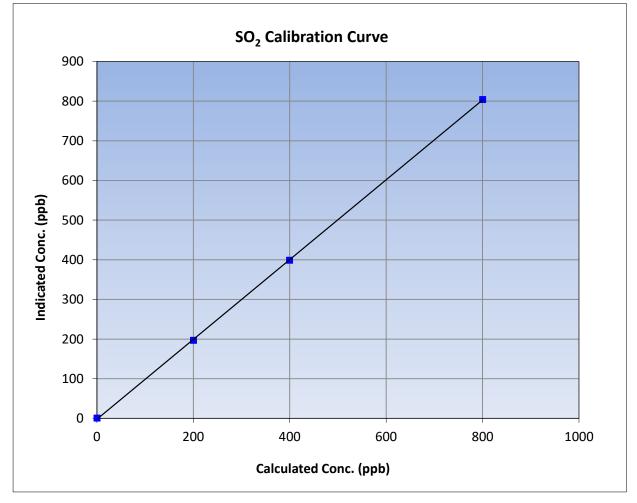
Changed the inlet filter after as founds. Adjusted zero only.

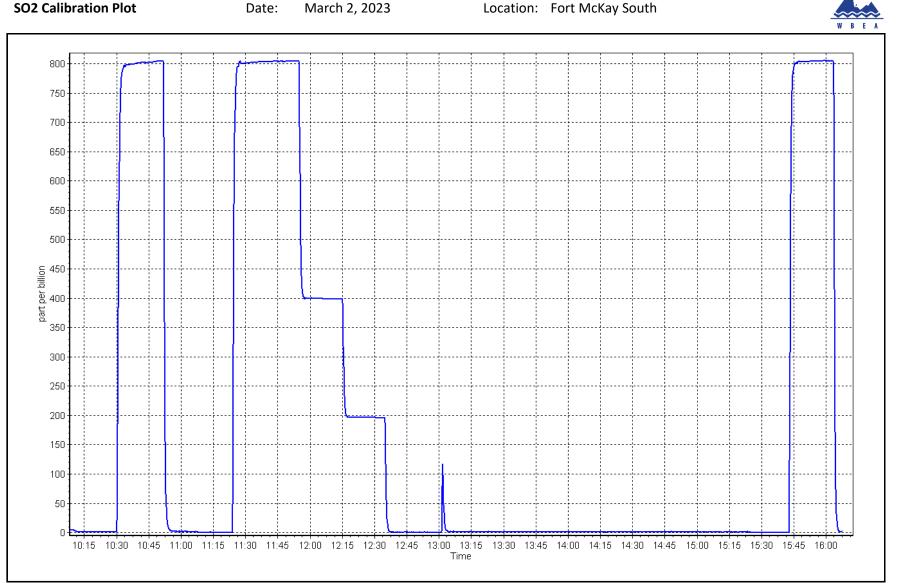
Calibration Performed By:



SO₂ Calibration Summary

| WBEA | | | | | Version-01-20 |
|--|------------|------------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2, | 2023 | Previous Calibration: | Februar | y 2, 2023 |
| Station Name: | Fort McKa | y South | Station Number: | AM | 1513 |
| Start Time (MST): | 10:0 | 7 | End Time (MST): | 16 | :10 |
| Analyzer make: | API T1 | 00 | Analyzer serial #: 599 | | 99 |
| | | Calibr | ation Data | | |
| | | | | | |
| Calculated concentration (ppb) (Cc) | (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
| 0.0 | 0.3 | | Correlation Coefficient | 0.999952 | ≥0.995 |
| 799.7 | 803.8 | 0.9949 | correlation coefficient | 0.555552 | 20.995 |
| 399.3 | 398.6 | 1.0018 | Slope | 1.006516 | 0.90 - 1.10 |
| 200.2 | 196.4 | 1.0193 | Siohe | 1.000310 | 0.30 - 1.10 |
| | | | Intercept | -2.298208 | +/-30 |





Location: Fort McKay South



TRS Calibration Report

| WBEA | | | | | Version-11-20 |
|--|---|--|---|---|---|
| | | Station Infor | mation | | |
| tation Name: alibration Date: tart time (MST): eason: | Fort McKay South March 1, 2023 9:43 Routine | | Station number: Last Cal Date: End time (MST): | AMS13 February 7, 2023 14:15 | |
| | | Calibration St | andards | | |
| al Gas Concentration: | 5.34 | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Cal Gas Cylinder #: | CC500241 | | | | |
| emoved Cal Gas Conc: | 5.34 | ppm | Rem Gas Exp Date: | | |
| emoved Gas Cyl #: | NA | | Diff between cyl: | | |
| Calibrator Make/Model: | Teledyne API T700 | | Serial Number: | 2448 | |
| AG Make/Model: | Teledyne API 701 | | Serial Number: | 1117 | |
| | | Analyzer Info | rmation | | |
| nalyzer make: | Thermo 43i TLE | | Analyzer serial #: | 1180540017 | |
| Converter make: | CDN-101 | | Converter serial #: | 521 | |
| nalyzer Range | 0 - 100 ppb | | | | |
| | Start | Finish | | Start | Finish |
| Calibration slope: | 1.002489 | 0.987178 | Backgd or Offset: | 3.69 | 3.69 |
| Calibration intercept: | -0.082182 | 0.057822 | 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 | 79.2 | 1.019 |
| as found 2nd point | 4962 | 37.7 | 40.3 | 39.4 | 1.025 |
| as found 3rd point | 4981 | 18.9 | 20.2 | 19.4 | 1.046 |
| new cylinder response | | | | | |
| | | TRS Calibration | 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 | | | (Cc) | | Limit = 0.95-1.05 |
| | 5000 | 0.0 | 0.0 | 0.2 | |
| high noint | 5000 | 0.0 | 0.0 | 0.2 79 7 | |
| high point | 4925 | 75.5 | 80.6 | 79.7 | 1.012 |
| second point | 4925 4962 | 75.5 37.7 | 80.6 40.3 | 79.7 39.8 | 1.012 1.012 |
| second point third point | 4925 4962 4981 | 75.5 37.7 18.9 | 80.6 40.3 20.2 | 79.7 39.8 19.8 | 1.012 |
| 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 | 79.7 39.8 19.8 0.4 | 1.012 1.012 1.019 |
| 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 | 79.7 39.8 19.8 0.4 79.8 | 1.012 1.012 1.019 |
| 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 | 79.7 39.8 19.8 0.4 79.8 0.0 | 1.012 1.012 1.019 1.010 |
| second point third point as left zero as left span O2 Scrubber Check Date of last scrubber char | 4925 4962 4981 5000 4925 4921 mge: | 75.5 37.7 18.9 0.0 75.5 | 80.6 40.3 20.2 0.0 80.6 | 79.7 39.8 19.8 0.4 79.8 0.0 Ave Corr Factor | 1.012 1.012 1.019 1.010 |
| second point third point as left zero as left span O2 Scrubber Check Date of last scrubber chai Date of last converter eff | 4925 4962 4981 5000 4925 4921 nge: iciency 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 | 79.7 39.8 19.8 0.4 79.8 0.0 Ave Corr Factor | 1.012 1.012 1.019 1.010 1.014 efficiency |
| second point third point as left zero as left span O2 Scrubber Check Date of last scrubber chan Date of last converter effi Baseline Corr As found: | 4925 4962 4981 5000 4925 4921 nge: iciency test: 79.1 | 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 80.74 | 79.7 39.8 19.8 0.4 79.8 0.0 Ave Corr Factor *% change: | 1.012 1.012 1.019 1.010 1.014 efficiency -2.1% |
| second point third point as left zero as left span O2 Scrubber Check Date of last scrubber chai Date of last converter eff | 4925 4962 4981 5000 4925 4921 nge: iciency 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 80.74 0.982925 | 79.7 39.8 19.8 0.4 79.8 0.0 Ave Corr Factor | 1.012 1.012 1.019 1.010 1.014 efficiency |

Notes:

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

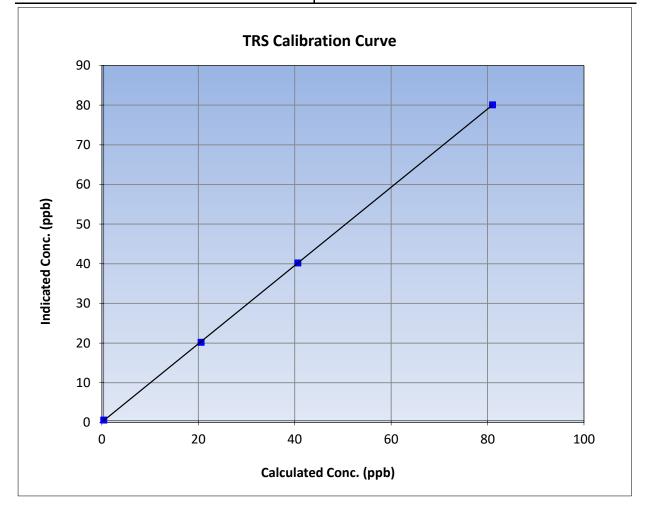


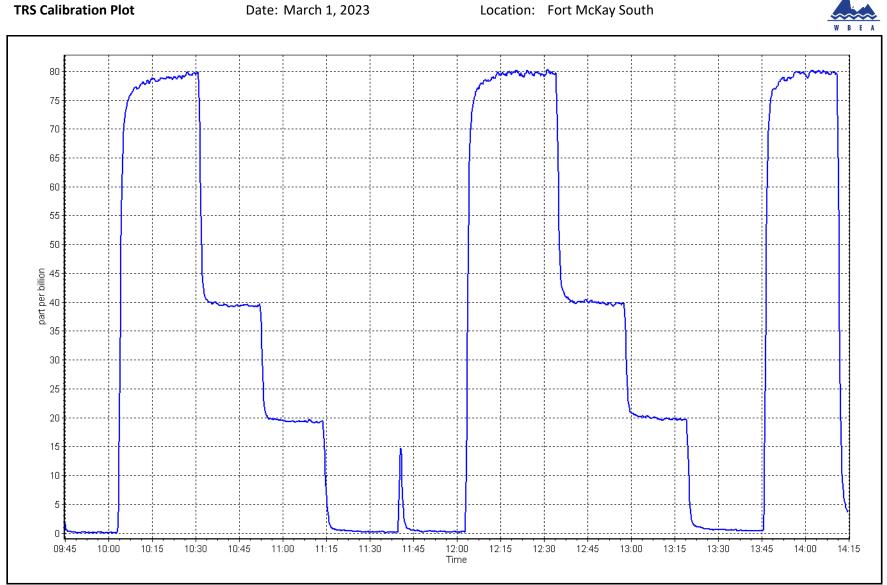
TRS Calibration Summary

| | Stati | on Information | |
|-------------------|------------------|-----------------------|------------------|
| Calibration Date: | March 1, 2023 | Previous Calibration: | February 7, 2023 |
| Station Name: | Fort McKay South | Station Number: | AMS13 |
| Start Time (MST): | 9:43 | End Time (MST): | 13:36 |
| Analyzer make: | Thermo 43i TLE | Analyzer serial #: | 1180540017 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.2 | | Correlation Coefficient | 0.999984 | ≥0.995 |
| 80.6 | 79.7 | 1.0116 | correlation coefficient | 0.999964 | 20.335 |
| 40.3 | 39.8 | 1.0117 | Slope | 0.987178 | 0.90 - 1.10 |
| 20.2 | 19.8 | 1.0195 | 510pe | 0.987178 | 0.90 - 1.10 |
| | | | - Intercept | 0.057822 | +/-3 |





Location: Fort McKay South



THC / CH₄ / NMHC Calibration Report

| | | Stat | ion Information | | |
|--|--|---------------|---|----------------|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Fort McKay So March 2, 2023 10:07 Maintenance | uth | Station number: AMS13 Last Cal Date: February 2, 2023 End time (MST): 16:10 | | |
| | | Calib | ration Standards | | |
| Gas Cert Reference: | | 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/ | 4 | |
| 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 | 48 | |
| ZAG make/model: | API 701 | | Serial Number: 11 | .17 | |
| | | Analy | yzer Information | | |
| Analyzer make: | Thermo 55i | | Analyzer serial #: 11 | 52430012 | |
| 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: | 2.39E-04 | 2.39E-04 | 4 NMHC SP Ratio: | 4.69E-05 | 4.70E-05 |
| CH4 Retention time: | 12.0 | 12.0 | NMHC Peak Area: | 193720 | 193333 |

| THC Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|--|---------------------|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as found span | 4921 | 79.1 | 17.05 | 16.85 | 1.012 | | |
| 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 | 17.07 | 0.999 | | |
| second point | 4961 | 39.5 | 8.51 | 8.35 | 1.019 | | |
| third point | 4980 | 19.8 | 4.27 | 4.11 | 1.039 | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4921 | 79.1 | 17.05 | 17.06 | 0.999 | | |
| | | | А | verage Correction Factor | 1.019 | | |
| Baseline Corr AF: | 16.85 | Prev response | 16.98 | *% change | -0.8% | | |
| 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 | 4921 | 79.1 | 9.08 | 8.88 | 1.023 | | |
| 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 | 9.10 | 0.998 | | |
| second point | 4961 | 39.5 | 4.53 | 4.47 | 1.015 | | |
| third point | 4980 | 19.8 | 2.27 | 2.21 | 1.027 | | |
| as left zero | 5000 | 0 | 0.00 | 0.00 | | | |
| as left span | 4921 | 79.1 | 9.08 | 9.08 | 1.000 | | |
| | | | A | Average Correction Factor | 1.013 | | |
| Baseline Corr AF: | 8.88 | Prev response | 9.04 | *% change | -1.8% | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates investigation</pre> | | | |

CH4 Calibration Data Source gas flow rate Set Point Dil air 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 79.1 7.97 7.97 0.999 as found span 4921 as found 2nd point as found 3rd point new cylinder response calibrator zero 5000 0.0 0.00 0.00 ----7.97 4921 79.1 7.97 1.000 high point second point 4961 39.5 3.98 3.89 1.023 third point 4980 19.8 1.99 1.89 1.053 0.00 as left zero 5000 0.0 0.00 ----7.97 7.99 as left span 4921 79.1 0.997 Average Correction Factor 1.025 **Baseline Corr AF:** 7.97 Prev response 7.94 *% change 0.4% Baseline Corr 2nd AF: AF Slope: NA AF Intercept: * = > +/-5% change initiates investigation Baseline Corr 3rd AF: NA AF Correlation: **Calibration Statistics** <u>Start</u> Finish THC Cal Slope: 1.002074 1.003410 THC Cal Offset: -0.104181 -0.099393 CH4 Cal Slope: 1.003774 1.003172

-0.056196

1.000594

-0.047785

| ~. | Changed the inlet filter after as founds. Enabled and captured a new zero chromatogram, and adjusted |
|----|--|
| 5. | the span. Enabled use flat baseline as well. Maintenance to be continued next day. |

Calibration Performed By: Karan Pandit

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Notes

-0.058596

1.003631

-0.040597



THC Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 2, 2023 | Previous Calibration: | February | 2, 2023 |
| tation Name: | Fort Mck | ay South | Station Number: | AM | 513 |
| itart Time (MST): | 10 | :07 | End Time (MST): | 16: | 10 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11524 | 30012 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 17.05 | 0.00 17.07 | 0.9988 | Correlation Coefficient | 0.999832 | ≥0.995 |
| 8.51 4.27 | 8.35 4.11 | 1.0189 1.0387 | Slope | 1.003410 | 0.90 - 1.10 |
| | | | Intercept | -0.099393 | +/-0.5 |
| 18.0 | | | | | |
| | | | | | |
| | | | | | |
| 14.0 | | | | | |
| 12.0 | | | | | |
| (udd 10.0 | | | | | |
| (bbm) 10.0 8.0 | | | | | |
| | | | | | |
| 0.6 udicated | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | | | | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | | | | |



CH₄ Calibration Summary

| Station Information Calibration Date: March 2, 2023 Previous Calibration: February 2, 2023 Station Nume:: Fort McKay South Station Number:: Information AMS13 Statr Time (MST): 10:10 Analyzer make: Thermo 55i Analyzer serial #: 1152430012 Calibration Data Caluated concentration indicated concentration Correction factor (Cc/tcl Statistical Evaluation Lings 0.00 0.00 correlation Coefficient 0.999743 20.9958 3.98 3.98 1.0234 Slope 1.003172 0.09-1.10 O CH4 Calibration Curve 0 CH4 Calibration Curve 0 CH4 Calibration Curve 0 0 CH4 Calibration Curve 0 0 0 0 0 0 0 0 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Version-01-202</th> | | | | | | | Version-01-202 |
|---|-------------------|-------|--------------------------------|----------------|------------------|-----------|----------------|
| Station Name: Fort McKay South Station Number: ANS13 Start Time (MST): 10:07 End Time (MST): 16:10 Analyzer make: Thermo 55i Analyzer serial #: 1152430012 Calibration Data Calibration Coefficient 0.999743 20.995 3.98 3.89 1.0234 Slope 1.003172 0.90-1.10 CH4 Calibration Curve 0.00 0.00 | | | Statio | on Information | | | |
| Start Time (MST): 10:07 End Time (MST): 16:10 Analyzer make: Thermo 55i Analyzer serial #: 1152430012 Calibration Data Calibration Correlation (cpm) (c) Statistical Evaluation Limits Calibration Data Limits 0.00 0.00 0.00 0.099743 20.995 7.97 7.97 0.9998 1.0234 Slope 1.003172 0.90-1.10 1.99 1.89 1.0530 Intercept -0.058596 +/0.5 CH4 Calibration Curve 90 60 00 00 00 00 00 00 0.00 | Calibration Date | : M | arch 2, 2023 | Previous C | alibration: | February | 2, 2023 |
| Analyzer make: Thermo 55i Analyzer serial #: 1152430012 Callibration Data Callibration Data Calculated concentration Indicated concentration Indicated concentration Correction factor (CC/Ic) Statistical Evaluation Limits 0.00 0.00 | Station Name: | For | t McKay South | Statio | n Number: | AMS | 513 |
| Calibration Data Calibration Data Correction factor (Cc/lc) Statistical Evaluation Limits 0.00 0.00 | Start Time (MST) |): | 10:07 | End Ti | ime (MST): | 16: | 10 |
| Calculated concentration (ppm) (Cc) Indicated concentration (ppm) (Cc) Correction factor (Cc/Ic) Statistical Evaluation Linxis 0.00 0.00 | Analyzer make: | - | Thermo 55i | Analyz | er serial #: | 115243 | 30012 |
| Calculated concentration (ppm) (Cc) Indicated concentration (ppm) (Cc) Correction factor (Cc/Ic) Statistical Evaluation Linxis 0.00 0.00 | | | | | | | |
| (ppm) (cc) (ppm) (tc) Correction factor (CC/c) Statistical Evaluation Links 0.00 0.00 7.97 7.97 0.9998 Correlation Coefficient 0.999743 20.995 7.98 3.89 1.0234 Slope 1.003172 0.90-1.10 Intercept -0.058596 +//0.5 CH ₄ Calibration Curve 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | | | Cal | ibration Data | | | |
| 7.97 7.97 0.9998 Correlation Coefficient 0.999743 20.95 3.98 3.89 1.0234 Slope 1.003172 0.90-1.10 1.99 1.89 1.0530 Intercept -0.058596 +/-0.5 CH4 Calibration Curve 9.0 8.0 7.0 6.0 | | | ation Correction factor (Co | c/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 3.98 3.89 1.0234 1.99 1.89 1.0530 Slope 1.003172 0.90-1.10 Intercept -0.058596 +/0.5 CH4 Calibration Curve 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | | | | Correlation (| Coefficient | 0.999743 | ≥0.995 |
| 1.99 1.89 1.0530 Stope 1.003172 0.90-1.10 Intercept -0.058596 +/0.5 CH ₄ Calibration Curve 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | | | | | | | |
| Intercept -0.058596 +/0.5 CH ₄ Calibration Curve 9.0 6.0 7.0 6.0 | | | | Slop | be | 1.003172 | 0.90 - 1.10 |
| 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0 | | | | Interc | cept | -0.058596 | +/-0.5 |
| | 7.0 6.0 | | | | | | |
| | b 4.0 | | | | | | |
| | 0.6 udicat | | | | | | |
| 0.0 | | | | | | | |
| | 1.0 | | | | | | |
| | | 0.0 2 | .0 4.0 |) 6 | 5.0 | 8.0 | 10.0 |
| Calculated Conc. (ppm) | | 2 | | | | 5.0 | _0.0 |

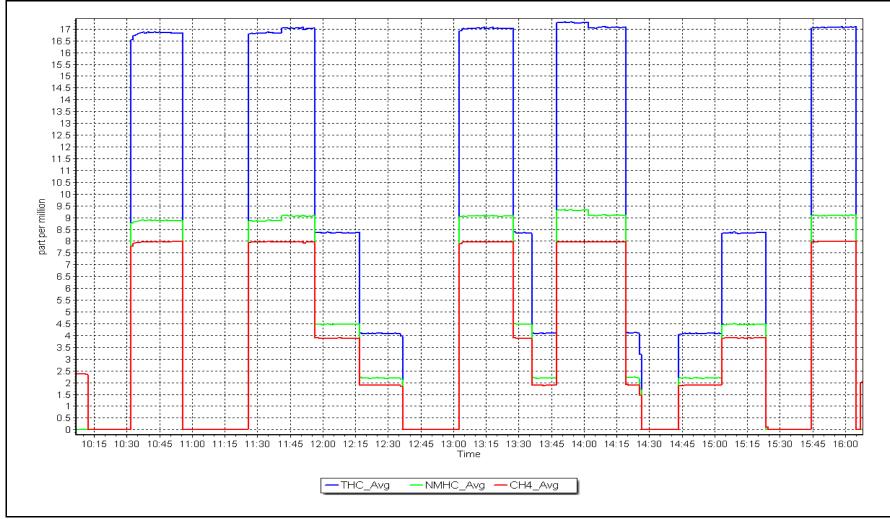


NMHC Calibration Summary

| | | | Station I | nformation | | |
|-------------|--------------------------|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibratio | on Date: | March | 2, 2023 | Previous Calibration: | February | 2, 2023 |
| Station Na | ame: | Fort Mc | Kay South | Station Number: | AMS | S13 |
| Start Time | e (MST): | 10 | :07 | End Time (MST): | 16: | 10 |
| Analyzer r | make: | Therr | no 55i | Analyzer serial #: | 11524 | 30012 |
| | | | Calibra | tion Data | | |
| | concentration m) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| | .00 .08 | 0.00 9.10 | 0.9978 | Correlation Coefficient | 0.999894 | ≥0.995 |
| | .53 | 4.47 | 1.0147 | Clana | 1 002624 | 0.00 1.10 |
| | .27 | 2.21 | 1.0266 | Slope | 1.003631 | 0.90 - 1.10 |
| | | | | Intercept | -0.040597 | +/-0.5 |
| : | 10.0 9.0 | | | | | • |
| | 8.0 | | | | | |
| | 7.0 | | | / | | |
| Conc. (ppm) | 6.0 | | | | | |
| onc. (| 5.0 | | | | | |
| | 4.0 | | | | | |
| Indicated | 3.0 | | | | | |
| - | 2.0 | | | | | |
| | 1.0 | | | | | |
| | 0.0 | | | | | |
| | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | Calculated | l Conc. (ppm) | | |

NMHC Calibration Plot







THC / CH₄ / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 | |
|-------------------------------------|---------------|--|-------------------------|----------------|-----------------|--|
| | | Statio | on Information | | | |
| Station Name: | Fort McKay So | Fort McKay South Station number: AMS13 | | | | |
| Calibration Date: | March 3, 2023 | | Last Cal Date: M | arch 2, 2023 | | |
| Start time (MST): | 10:12 | | End time (MST): 10 |):53 | | |
| Reason: | Removal | | | | | |
| | | Calibr | ation Standards | | | |
| Gas Cert Reference: | | CC260812 | Cal Gas Expiry Date: De | ecember 29, 20 | 28 | |
| CH4 Cal Gas Conc. | 503.6 | ppm | CH4 Equiv Conc. | 1077.5 | ppm | |
| C3H8 Cal Gas Conc. | 208.7 | ppm | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: N | 4 | | |
| 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 | 48 | | |
| ZAG make/model: | API 701 | | Serial Number: 11 | 17 | | |
| | | Analy | zer Information | | | |
| Analyzer make | : Thermo 55i | | Analyzer serial #: 11 | 52430012 | | |
| , 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 | : 2.39E-04 | 2.39E-04 | NMHC SP Ratio: | 4.70E-05 | 4.70E-05 | |
| CH4 Retention time | : 12.0 | 12.0 | NMHC Peak Area: | 193333 | 193333 | |

| THC Calibration Data | | | | | | | | |
|-----------------------|-------------------|----------------------|----------------------|---------------------------|---------------------|--|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | | |
| as found span | 4921 | 79.1 | 17.05 | 17.18 | 0.992 | | | |
| 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 | | | | | | | | |
| | | | Aver | age Correction Factor | | | | |
| Baseline Corr AF: | 17.18 | Prev response | 16.98 | *% change | 1.2% | | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initia | ites investigation | | | |



THC / CH₄ / NMHC Calibration Report

Version-01-2020

| | | | | VE131011-01-2 |
|-------------------|------------------------------------|--|---|--|
| | | | | |
| | | | | |
| | | | | CF <i>Limit=</i> 0.95-1.0 |
| | | | | |
| 4921 | 79.1 | 9.08 | 9.19 | 0.988 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | Avera | ge Correction Factor | |
| 9.19 | Prev response | 9.04 | *% change | 1.6% |
| NA | AF Slope: | | AF Intercept: | |
| NA | AF Correlation: | | * = > +/-5% change initiat | tes investigation |
| | | | | |
| | CH4 Calibrat | tion Data | | |
| Dil air flow rate | | | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.0 |
| 5000 | | | | |
| | | | | 0.998 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | Avera | ge Correction Eactor | |
| 7.00 | Broy rosponso | | - | 0.6% |
| | - | 7.94 | • | 0.0% |
| | • | | • | tos invostigation |
| NA | AF Correlation: | | | les investigation |
| | Calibration | Statistics | | |
| | Start | | Finish | |
| | 1.002074 | | | |
| | -0.104181 | | | |
| | 1.003774 | | | |
| | | | | |
| | -0 056196 | | | |
| | -0.056196 1 000594 | | | |
| | -0.056196 1.000594 -0.047785 | | | |
| | NA NA | Dil air flow rate Source gas flow rate 5000 0 4921 79.1 9.19 Prev response NA AF Slope: NA AF Slope: NA AF Slope: Dil air flow rate Source gas flow rate 5000 0.0 4921 79.1 CH4 Calibration: CH4 Calibration: Dil air flow rate Source gas flow rate 5000 0.0 4921 79.1 Output AF Slope: NA AF Correlation: Calibration Start 1.002074 -0.104181 | 5000 0 0.00 4921 79.1 9.08 4921 79.1 9.08 Avera 9.19 Prev response 9.04 NA AF Slope: NA AF Correlation: Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) 5000 0.0 0.00 4921 79.1 7.97 4921 79.1 7.97 AF Correlation: Avera ASS AF Correlation: AVERA AF Correlation: AVERA AF Correlation: AVERA AF Correlation: AF Correlation: Avera 7.99 Prev response 7.94 AF Correlation: Calibration Statistics Start 1.002074 -0.104181 -0.104181 | Dil air flow rate Source gas flow rate Calc conc (ppm) (tc) Ind conc (ppm) (tc) 5000 0 0.00 0.00 4921 79.1 9.08 9.19 Average Correction Factor 9.19 Prev response 9.04 *% change NA AF Slope: AF Intercept: NA NA AF Correlation: * = > +/-5% change initia Dil air flow rate Source gas flow rate Calc conc (ppm) (fc) Ind conc (ppm) (fc) 5000 0.0 0.00 0.00 4921 79.1 7.97 7.99 Average Correction Factor 5000 0.0 0.00 0.00 4921 79.1 7.97 7.99 Average Correction Factor 7.99 Prev response 7.94 *% change NA AF Slope: AF Intercept: NA NA AF Slope: AF Intercept: NA NA AF Correlation: * = > +/-5% change initia |

Notes:

Removal calibration. Just zero and span to validate yesterday calibration/maintenance.

Calibration Performed By: Sean Bala

NMHC Calibration Plot



17.5 17 16.5 16 15.5 15 14.5 14 13.5 13 12.5 12 11.5 11 10.5 10 part per million 9.5 9 8.5 8 7.5 6.5 6 5.5 5 4.5 4 3.5 3 2.5 2 1.5 -0.5 0. 10:30 10:45 Time -THC_Avg -NMHC_Avg -CH4_Avg



THC / CH₄ / NMHC Calibration Report

| WBEA | | | | | | Version-01-2020 |
|-------------------------------------|---------------|----------|------------|-------------------------|--------------|-----------------|
| | | | Station I | nformation | | |
| Station Name: | Fort McKay So | buth | | Station number: AN | AS13 | |
| Calibration Date: | March 3, 2023 | 3 | | Last Cal Date: Ma | arch 2, 2023 | |
| Start time (MST): | 11:08 | | | End time (MST): 15 | :19 | |
| Reason: | Install | | | | | |
| | | | Calibratio | on Standards | | |
| Gas Cert Reference: | | CC260812 | | Cal Gas Expiry Date: De | | 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: NA | 4 | |
| 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 | 48 | |
| ZAG make/model: | API 701 | | | Serial Number: 11 | 17 | |
| | | | Analyzer | Information | | |
| Analyzer make | : Thermo 55i | | | Analyzer serial #: 11 | 70050130 | |
| THC Range (ppm) | : 0 - 20 ppm | | | | | |
| NMHC Range (ppm) | : 0 - 10 ppm | | | CH4 Range (ppm): 0 - | - 10 ppm | |
| | <u>Start</u> | <u> </u> | Finish | | <u>Start</u> | Finish |
| CH4 SP Ratio | : NA | 2. | 16E-04 | NMHC SP Ratio: | NA | 5.11E-04 |
| CH4 Retention time | : NA | | 12.8 | NMHC Peak Area: | NA | 177635 |

THC Calibration Data

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> |
|-----------------------|-------------------|----------------------|--------------------|---------------------------|----------------------------|
| as found zero | | | | | |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4921 | 79.1 | 17.05 | 17.10 | 0.997 |
| second point | 4961 | 39.5 | 8.51 | 8.42 | 1.011 |
| third point | 4980 | 19.8 | 4.27 | 4.13 | 1.034 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4921 | 79.1 | 17.05 | 17.20 | 0.991 |
| | | | Α | verage Correction Factor | 1.014 |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initia | tes investigation |
| | | | | | |



THC / CH₄ / NMHC Calibration Report

Version-01-2020

| | | NMHC Calibr | ation Data | | |
|-----------------------|-------------------|----------------------|----------------------|---------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | | | | | |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0 | 0.00 | 0.00 | |
| high point | 4921 | 79.1 | 9.08 | 9.13 | 0.995 |
| second point | 4960 | 39.5 | 4.53 | 4.50 | 1.007 |
| third point | 4980 | 19.8 | 2.27 | 2.21 | 1.027 |
| as left zero | 5000 | 0 | 0.00 | 0.00 | |
| as left span | 4921 | 79.1 | 9.08 | 9.16 | 0.991 |
| | | | Avera | age Correction Factor | 1.010 |
| Baseline Corr AF: | NA | Prev response | NA | *% change | NA |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initia | tes investigation |
| | | 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 | | | | | |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4921 | 79.1 | 7.97 | 7.98 | 0.999 |
| second point | 4960 | 39.5 | 3.98 | 3.92 | 1.016 |
| third point | 4980 | 19.8 | 1.99 | 1.91 | 1.042 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4921 | 79.1 | 7.97 | 8.03 | 0.992 |

| | | | | Average Correction Factor | 1.019 |
|-----------------------|----|-----------------|--|---------------------------|-------|
| 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: | <pre>* = > +/-5% change initiates investigation</pre> | | |

| | Calibration Statistic | 5 | |
|------------------|-----------------------|---------------|--|
| | <u>Start</u> | <u>Finish</u> | |
| THC Cal Slope: | NA | 1.005694 | |
| THC Cal Offset: | NA | -0.086175 | |
| CH4 Cal Slope: | NA | 1.003875 | |
| CH4 Cal Offset: | NA | -0.046747 | |
| NMHC Cal Slope: | NA | 1.007142 | |
| NMHC Cal Offset: | NA | -0.039766 | |

Install calibration. First CH4 3rd point was failing 5.6%. Do a zero chromatogram and use zero Notes: chromatogram. Noticed that the alarm for Detector and filter temperature is on/off. Readjust it to 175° C and it clears off the alarms. Adjusted span.

Calibration Performed By:



THC Calibration Summary

| | | . | 6 | | Version-01-202 |
|-------------------------------------|---|-------------------------------------|-------------------------|---------------|----------------|
| | | | nformation | | |
| Calibration Date: | | March 3, 2023 Previous Calibration: | | March 2, 2023 | |
| Station Name: | Fort Mc | Kay South | Station Number: | AM | S13 |
| Start Time (MST): | 11 | :08 | End Time (MST): | 15: | 19 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11700 | 50130 |
| | | Calibra | tion Data | | |
| Calculated concentrat (ppm) (Cc) | ion Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 17.05 | 0.00 17.10 | 0.9966 | Correlation Coefficient | 0.999883 | ≥0.995 |
| 8.51 4.27 | 8.42 4.13 | 1.0110 1.0340 | Slope | 1.005694 | 0.90 - 1.10 |
| | | | Intercept | -0.086175 | +/-0.5 |
| 18.0 | | THC Calibratio | n Curve | | |
| 16.0 - | | | | | |
| 14.0 - | | | | | |
| 12.0 - | | | | | |
| udd 10.0 - | | | | | |
| Conc 8.0 – | | | | | |
| Indicated Conc. (ppm) | | | | | |
| - 4.0 - | | | | | |
| 2.0 - | | | | | |
| 0.0 | | 2 | 10.0 | 45.0 | |
| 0. | υ 5 | .0 | | 15.0 | 20.0 |
| | | Calculated | l Conc. (ppm) | | |



CH₄ Calibration Summary

| | | | | | | Version-01-20 |
|-----------------------|-------------------------|---------------------------------------|---------------------------------|-------------------|-------------------|---------------|
| | | | Station | Information | | |
| Calibratio | n Date: | Mar | March 3, 2023 | | ation: Marc | h 2, 2023 |
| Station Na | ame: | Fort N | Fort McKay South | | mber: A | MS13 |
| Start Time | e (MST): | | 11:08 | End Time (I | MST): | 15:19 |
| Analyzer r | make: | Th | ermo 55i | Analyzer se | rial #: 117 | 0050130 |
| | | | | | | |
| | | | Calibr | ation Data | | |
| | concentratio n) (Cc) | n Indicated concentrati (ppm) (Ic) | on Correction factor (Cc/Ic) | Stati | stical Evaluation | <u>Limits</u> |
| | .00 | 0.00 | | Correlation Coeff | icient 0.999841 | ≥0.995 |
| | .97 | 7.98 | 0.9987 | | | |
| | .98 .99 | 3.92 1.91 | 1.0160 1.0420 | – Slope | 1.003875 | 0.90 - 1.10 |
| | .55 | 1.51 | 1.0420 | – Intercept | -0.046747 | +/-0.5 |
| | | | CH ₄ Calibratio | n Curve | | |
| | 9.0 | | | | | |
| | | | | | | |
| | 8.0 | | | | <u> </u> | |
| | | | | | | |
| | 7.0 | | | | | |
| | | | | | | |
| | 6.0 | | | | | |
| Indicated Conc. (ppm) | | | | | | |
| dd) | 5.0 - | | | | | |
| лс. | | | | | | |
| Ō | 4.0 | | | | | |
| ted | | | | | | |
| lica | 3.0 | | | | | |
| Ind | | | | | | |
| | 2.0 | | | | | |
| | | | | | | |
| | 1.0 + | | | | | |
| | | | | | | |
| | 0.0 🖌 | | | | | |
| | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | | | | |
| | | | Calculate | d Conc. (ppm) | | |

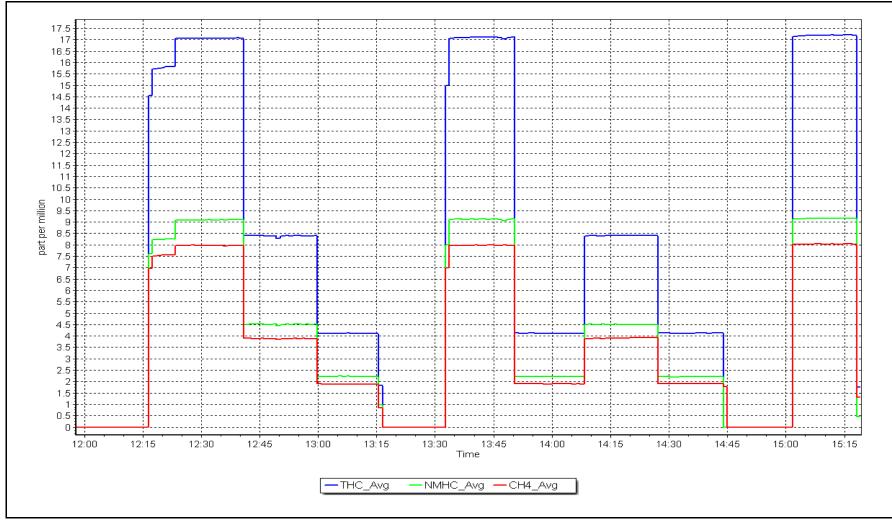


NMHC Calibration Summary

| | | Station I | nformation | | |
|--|--|----------------------------------|-------------------------|-----------|---------------|
| alibration Date: | Ma | rch 3, 2023 | Previous Calibration: | March 2 | 2, 2023 |
| tation Name: | Fort | McKay South | Station Number: | AMS | 513 |
| tart Time (MST) | | 11:08 | End Time (MST): | 15: | |
| nalyzer make: | TI | nermo 55i | Analyzer serial #: | 117005 | 50130 |
| | | Calibra | tion Data | | |
| alculated concentra (ppm) (Cc) | ation Indicated concentrat (ppm) (Ic) | ion Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 9.08 | 0.00 9.13 | 0.9949 | Correlation Coefficient | 0.999913 | ≥0.995 |
| 4.53 2.27 | 4.50 2.21 | 1.0072 1.0270 | Slope | 1.007142 | 0.90 - 1.10 |
| | | | Intercept | -0.039766 | +/-0.5 |
| 10.0 | | NMHC Calibra | | | |
| 9.0 | | | | | <u> </u> |
| 8.0 | | | | | |
| 7.0 | | | | | |
| E 6.0 | | | | | |
| 6.0 (bbm) 5.0 | | | | | |
| b 4.0 | | | | | |
| 1.0 1.0 | | | | | |
| – 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | | | | | |
| C | 0.0 2.0 | 9 4.0 | 6.0 | 8.0 | 10.0 |
| | | Calculater | l Conc. (ppm) | | |

NMHC Calibration Plot







NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| Station Information | | | | | | | | | |
|---|---|---|--|--|-----------------------------|--|--|--|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Fort McKay South March 23, 2023 8:20 Routine | Station number: AMS 13 Last Cal Date: February 10, 2023 End time (MST): 12:59 | | | | | | | |
| | | Calibratio | on Standards | | | | | | |
| NO Gas Cylinder #: | T2Y1P76 | | Cal Gas Expiry Date: [| December 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 | N/A | | | | | |
| Removed Gas NOX Conc: | 50.98 | ppm | Removed Gas NO Conc: | 49.32 | ppm | | | | |
| NOX gas Diff: | | | NO gas Diff: | | | | | | |
| Calibrator Model: | API T700 | | Serial Number: | 2448 | | | | | |
| ZAG make/model: | API T701 | | Serial Number: | 1117 | | | | | |
| Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope | 0 - 1000 ppb <u>Start</u> : 1.204 : 0.992 | <i>Finish</i> 1.213 0.992 | Information Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: | <u>Start</u> 9.5 9.6 | <u>Finish</u> 9.7 9.7 | | | | |
| NO2 coeff or slope | : 1.000 | 1.000 | Reaction cell Press: | 192.6 | 196.2 | | | | |
| NO _x Cal Slope NO _x Cal Offset | | Calibrati <u>Start</u> 0.999138 -2.151243 | on Statistics | <u>Finish</u> 1.000036 -2.351272 | | | | | |
| NO Cal Slope | | 1.002334 | | 1.002705 | | | | | |
| NO Cal Offset | | -3.145082 | | -3.225164 | | | | | |
| NO ₂ Cal Slope | | 0.996233 | | 0.998357 | | | | | |
| 2 I | | | | | | | | | |

-0.877794

-0.332208



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|---|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.2 | 0.0 | | |
| as found span | 4919 | 81.1 | 826.9 | 800.0 | 26.9 | 823.1 | 794.6 | 28.5 | 1.0046 | 1.0067 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | | |
| high point | 4919 | 81.1 | 826.9 | 800.0 | 26.9 | 825.7 | 800.4 | 25.3 | 1.0014 | 0.9994 |
| second point | 4960 | 40.6 | 413.9 | 400.4 | 13.5 | 410.4 | 396.9 | 13.5 | 1.0085 | 1.0089 |
| third point | 4980 | 20.3 | 207.0 | 200.2 | 6.7 | 202.4 | 194.3 | 8.1 | 1.0226 | 1.0305 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | | |
| as left span | 4919 | 81.1 | 826.9 | 379.9 | 447.0 | 836.8 | 381.6 | 455.2 | 0.9881 | 0.9954 |
| | | | | | | | Average C | orrection Factor | 1.0108 | 1.0129 |
| Corrected As fo | ound NO _x = | 823.3 ppb | NO = | 794.8 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chan | ge NO _x = | -0.1% |
| Previous Respo | nse NO _x = | 824.0 ppb | NO = | 798.7 ppb | | | | *Percent Chan | ge NO = | -0.5% |
| Baseline Corr 2 | nd pt NO _x = | NA ppb | NO = | NA ppb | As found | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | rd pt NO _x = | NA ppb | NO = | NA ppb | As found | d NO r^2 : | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (C | Indicated NO2 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|--|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 795.0 | 374.9 | 447.0 | 446.2 | 1.0018 | 99.8% |
| 2nd GPT point (200 ppb O3) | 795.0 | 583.1 | 238.8 | 237.8 | 1.0043 | 99.6% |
| 3rd GPT point (100 ppb O3) | 795.0 | 688.9 | 133.0 | 132.2 | 1.0062 | 99.4% |
| | | | | Average Correction Factor | 1.0041 | 99.6% |

Notes:

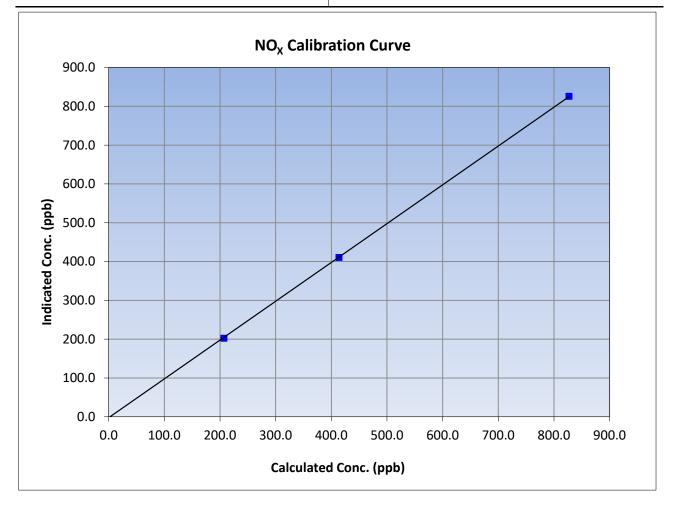
Changed the inlet filter after as founds. Used 2nd NO reference point due to drift. Adjusted span only.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

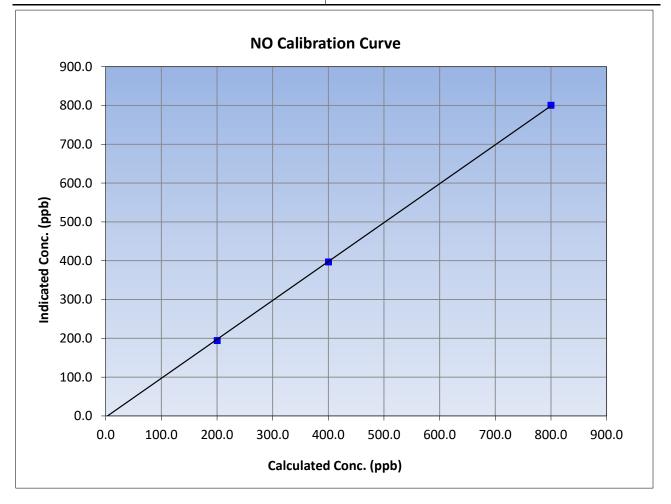
| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | Date: March 23, 2023 | | Previous Calibration: | February | 10, 2023 | |
| Station Name: | Fort Mck | (ay South | Station Number: | AM | S 13 | |
| Start Time (MST): | Time (MST): 8:20 | | End Time (MST): | 12 | :59 | |
| Analyzer make: | Analyzer make: Thermo 42i | | | 14106 | 661329 | |
| | | 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 | 0.999966 | ≥0.995 | |
| 826.9 | 825.7 | 1.0014 | conclation coefficient | 0.555500 | 20.000 | |
| 413.9 | 410.4 | 1.0085 | Slope | 1.000036 | 0.90 - 1.10 | |
| 207.0 | 202.4 | 1.0226 | Slope | 1.000030 | 0.90 - 1.10 | |
| | | | Intercept | -2.351272 | +/-20 | |





NO Calibration Summary

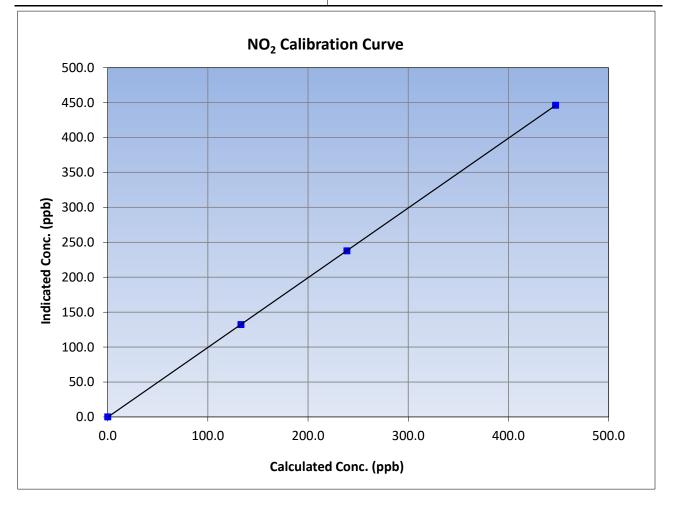
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|---------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | libration Date: March 23, 2023 | | Previous Calibration: | February | 10, 2023 |
| Station Name: | Fort Mck | (ay South | Station Number: | AM | S 13 |
| Start Time (MST): | ime (MST): 8:20 | | End Time (MST): | 12 | :59 |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 141066 | | 61329 |
| | | 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 | 0.999930 | ≥0.995 |
| 800.0 | 800.4 | 0.9994 | correlation coefficient | 0.999930 | 20.335 |
| 400.4 | 396.9 | 1.0089 | Slope | 1.002705 | 0.90 - 1.10 |
| 200.2 | 194.3 | 1.0305 | Slope | 1.002705 | 0.90 - 1.10 |
| | | | Intercept | -3.225164 | +/-20 |





NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | ibration Date: March 23, 2023 | | Previous Calibration: | February | 10, 2023 |
| Station Name: | Name: Fort McKay South | | Station Number: | AM | S 13 |
| Start Time (MST): | tart Time (MST): 8:20 | | End Time (MST): | 12 | :59 |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1410 | | 661329 |
| | | | | | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999997 | >0.005 |
| 447.0 | 446.2 | 1.0018 | correlation coefficient | 0.999997 | ≥0 <i>.995</i> |
| 238.8 | 237.8 | 1.0043 | Slope | 0.998357 | 0.90 - 1.10 |
| 133.0 | 132.2 | 1.0062 | Slope | 0.556557 | 0.90 - 1.10 |
| | | | Intercept | -0.332208 | +/-20 |







O₃ Calibration Report

Version-01-2020

| | | | | | Version-01-202 |
|--|---|---------------------------------------|--|---|--|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Fort McKay South March 22, 2023 8:54 Routine | | Station number: Last Cal Date: End time (MST): | February 3, 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> 0.997629 1.040000 | <u>Finish</u> 0.997886 0.320000 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> 3.7 0.964 |
| | | 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 | 0.0 | 0.0 | -0.1 | |
| as found span | 5000 | 969.9 | 400.0 | 399.0 | 1.003 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.3 | |
| high point | 5000 | 980.6 | 400.0 | 399.1 | 1.002 |
| second point | 5000 | 838.0 | 200.0 | 200.4 | 0.998 |
| third point | 5000 | 735.3 | 100.0 | 100.6 | 0.994 |
| as left zero | 5000 | 0.0 | 0.0 | -1.0 | |
| as left span | 5000 | 979.1 | 400.0 | 400.8 | 0.998 |
| | | | Avera | ge Correction Factor | 0.998 |
| Baseline Corr As found: | 399.1 | Previous response | 400.1 | *% change | -0.2% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |

Notes:

Changed inlet filter after as founds. Zero adjusted.

Calibration Performed By:

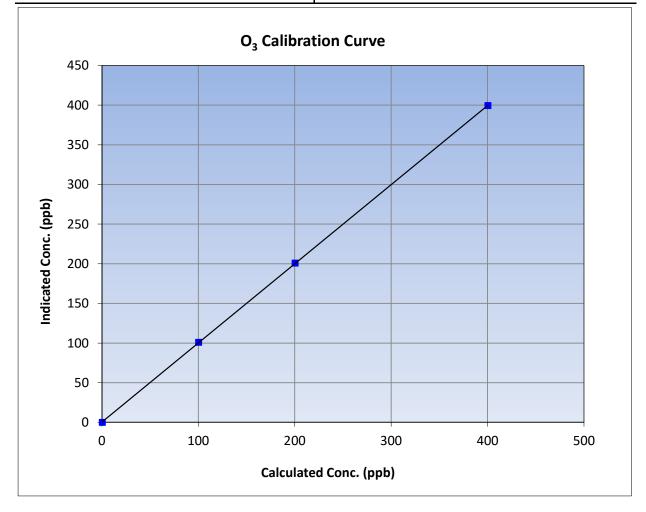
Sean Bala



O₃ Calibration Summary

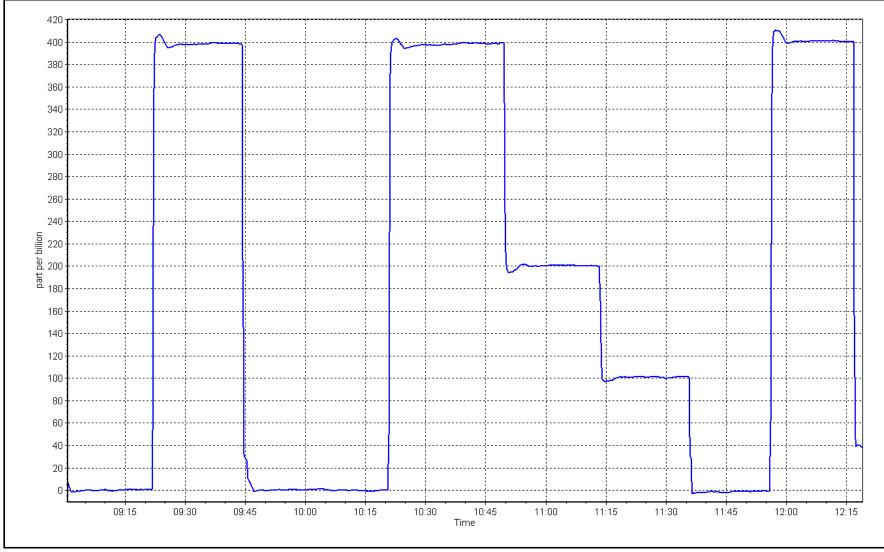
| | | Version-01-2020 |
|-------------------------------|---|--|
| S | station Information | |
| March 22, 2023 | Previous Calibration: | February 3, 2023 |
| Fort McKay South | Station Number: | AMS13 |
| 8:54 | End Time (MST): | 12:20 |
| Teledyne API T400 | Analyzer serial #: | 3871 |
| | Calibration Data | |
| ed concentration Correction f | Calibration Data | Limits |
| | March 22, 2023 Fort McKay South 8:54 Teledyne API T400 | Fort McKay South Station Number: 8:54 End Time (MST): Teledyne API T400 Analyzer serial #: Calibration Data ted concentration Correction factor Statistical Evaluation |

| (ppb) (Cc) | (ppb) (Ic) | (Cc/Ic) | Statistical Evaluation | | <u>Linits</u> |
|------------|------------|---------|-------------------------|----------|---------------|
| 0.0 | -0.3 | | Correlation Coefficient | 0.999988 | ≥0.995 |
| 400.0 | 399.1 | 1.0023 | correlation coernelent | 0.555500 | 20.000 |
| 200.0 | 200.4 | 0.9980 | Slope | 0.997886 | 0.90 - 1.10 |
| 100.0 | 100.6 | 0.9940 | Siope | 0.557880 | 0.50 - 1.10 |
| | | | – Intercept | 0.320000 | +/- 5 |











T640 PM_{2.5} CALIBRATION

| | | Station Information | | | | | | | |
|-------------------------------|----------------------|---------------------------|------------------------|-----------------|----------------|--------------|--|--|--|
| Station Name: | Fort McKay South | | Station number: AMS 13 | | | | | | |
| Calibration Date: | March 22, 2023 | | Last Cal Date: | February 16, 2 | 2023 | | | | |
| Start time (MST): | 9:34 | | End time (MST): | 11:32 | | | | | |
| 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 Te | est | | | | | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | <u>A</u> | <u>djusted</u> | (Limits) | | | |
| T (°C) | -7.3 | -6.9 | -7.3 | | | +/- 2 °C | | | |
| P (mmHg) | 729.5 | 729.1 | 729.5 | | | +/- 10 mmHg | | | |
| flow (LPM) | 5.01 | 5.02 | 5.01 | | | +/- 0.25 LPM | | | |
| Leak Test: | Date of check: | March 22, 2023 | Last Cal Date: | February 16 | 5, 2023 | | | | |
| | PM w/o HEPA: | 7.2 | 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 | ntenance leal | < check | | | | |
| Inlet cleaning : | Inlet Head | \checkmark | | | | | | | |
| | | | | | | | | | |
| | | Quarterly Calibration T | act | | | | | | |
| Daramatar | As found | | | | diuctod | (Limite) | | | |
| Parameter | As found | Post maintenance | <u>As left</u> | <u> </u> | <u>djusted</u> | (Limits) | | | |
| PMT Peak Test | 10.9 | 11.1 | 10.7 | | \checkmark | 10.9 +/- 0.5 | | | |
| Post-maintenance | e leak check: | PM w/o HEPA: | 29.1 | w/ HEPA: | | 0.0 | | | |
| Date Optical Cham | | March 22, 2 | 2023 | | | <0.2 ug/m3 | | | |
| Disposable Filte | r Changed: | March 22, 2 | 2023 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | Annual Maintenance | 2 | | | | | | |
| Date Sample Tub | e Cleaned: | | | | | | | | |
| Date RH/T Senso | or Cleaned: | | | | | | | | |
| | | | | | | | | | |
| Notes: | | Inlet inspected and clea | and Duran was as | | | | | | |
| | | innet inspected and clea | ined. Pump was rei | blaced as well. | | | | | |

Calibration by:

Sean Bala



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS14 ANZAC MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|--|----------------------------|--|-------------------------------------|--------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac March 17, 2023 6:45 Routine | | Station number: Last Cal Date: End time (MST): | AMS 14 February 21, 2023 9:16 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.95 | ppm | Cal Gas Exp Date: | January 5, 2025 | |
| Cal Gas Cylinder #: | CC279389 | | | | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 49.95 NA | ppm | Rem Gas Exp Date: Diff between cyl: | NA | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 5239 | |
| ZAG Make/Model: | API T701H | | Serial Number: | 357 | |
| | | Analyzer Info | rmation | | |
| Analyzer make | , Thormo 12i | Analyzer mio | | 0710221222 | |
| Analyzer Range | | | Analyzer serial #: | 0710321322 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.993711 | 0.997012 | Backgd or Offset: | | 25.1 |
| Calibration intercept: | -1.045321 | -1.625104 | Coeff or Slope: | 0.795 | 0.795 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration C | orrection factor (Cc/Ic) |
| Set Point | (sccm) | (sccm) | concentration (ppb) (Cc) | (ppb) (Ic) | <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as found span | 4920 | 80.1 | 800.2 | 800.0 | 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 | 80.1 | 800.2 | 797.3 | 1.004 |
| second point | 4960 | 40.0 | 399.6 | 395.5 | 1.010 |
| third point | 4980 | 20.0 | 199.8 | 195.6 | 1.021 |
| as left zero | 5000 | 0.0 | 0.0 | 0.5 | |
| as left span | 4920 | 80.1 | 800.2 Averag | 795.1 ge Correction Factor | 1.006 1.012 |
| | _ | | | | |
| Baseline Corr As found: | 799.60 | Previous response | | *% change | 0.7% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

No Maintenance or adjustments done.

Calibration Performed By:

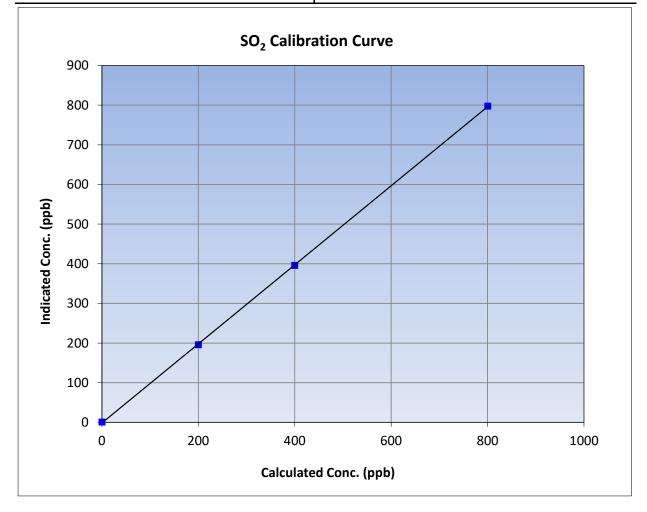


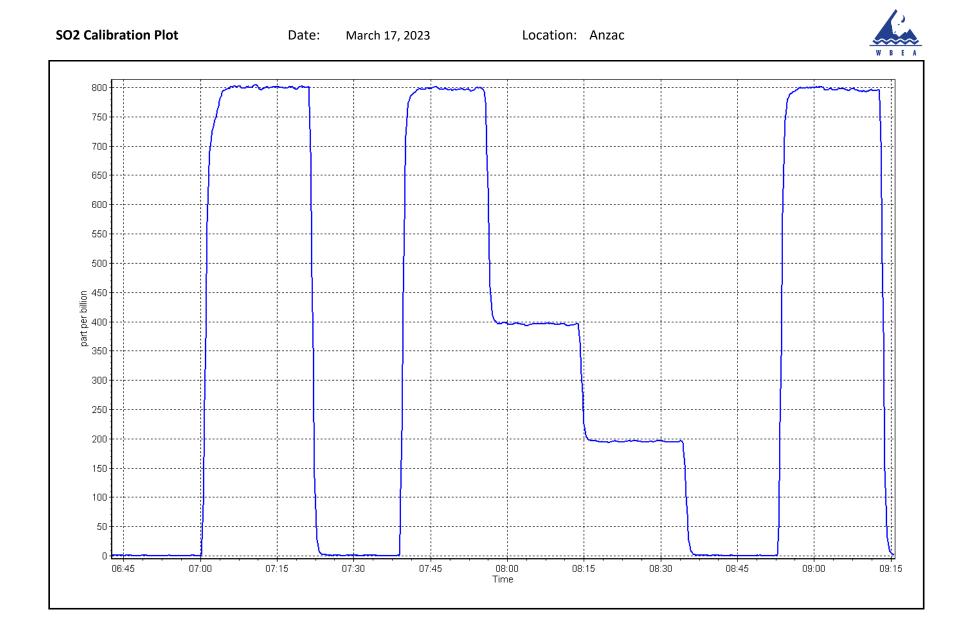
SO₂ Calibration Summary

| | | Version-01-2020 |
|----------------|---------------------------------|---|
| Stati | ion Information | |
| March 17, 2023 | Previous Calibration: | February 21, 2023 |
| Anzac | Station Number: | AMS 14 |
| 6:45 | End Time (MST): | 9:16 |
| Thermo 43i | Analyzer serial #: | 0710321322 |
| | March 17, 2023 Anzac 6:45 | AnzacStation Number:6:45End Time (MST): |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.5 | | Correlation Coefficient | 0.999967 | ≥0.995 |
| 800.2 | 797.3 | 1.0036 | correlation coefficient | 0.999907 | 20.995 |
| 399.6 | 395.5 | 1.0104 | Slope | 0.997012 | 0.90 - 1.10 |
| 199.8 | 195.6 | 1.0215 | Siope | 0.997012 | 0.30 - 1.10 |
| | | | Intercept | -1.625104 | +/-30 |







TRS Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac March 1, 2023 8:49 Routine | | Station number: Last Cal Date: End time (MST): | AM514 February 3, 2023 12:51 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.38 EY0000859 | ppm | Cal Gas Exp Date: | February 3, 2023 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 5.38 NA | ppm | Rem Gas Exp Date: Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | API T700 API 701H | | Serial Number: Serial Number: | 5252 357 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i-TLE CD Nova CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1180540019 503 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.004840 | 1.004840 | Backgd or Offset: | | 5.76 |
| Calibration intercept: | -0.021121 | 0.178882 | Coeff or Slope: | 1.008 | 1.031 |
| | | 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 | 78.7 | 1.020 |
| as found 2nd point | 4962 | 37.2 | 40.0 | 39.2 | 1.029 |
| as found 3rd point | 4981 | 18.6 | 20.0 | 19.4 | 1.048 |
| new cylinder response | | | | | |
| | | TRS Calibrat | 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 | 0.5 | |
| high point | 4925 | 74.3 | 80.0 | 80.7 | 0.991 |
| second point | 4962 | 37.2 | 40.0 | 40.2 | 0.996 |
| third point | 4981 | 18.6 | 20.0 | 20.0 | 1.001 |
| as left zero | 5000 | 0.0 | 0.0 | 0.5 | |
| as left span | 4925 | 74.3 | 80.0 | 80.4 | 0.995 |
| SO2 Scrubber Check | 4920 | 80.0 | 800.0 | -0.1 | |
| Date of last scrubber cha | | | | Ave Corr Factor | 0.996 |
| Date of last converter ef | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 78.4 | Prev response: | 80.32 | *% change: | -2.5% |
| Baseline Corr 2nd AF pt: | 38.9 | AF Slope: | 0.982257 | AF Intercept: | 0.019323 |
| Baseline Corr 3rd AF pt: | 19.1 | AF Correlation: | 0.999942 | | |
| | | | | * = > +/-5% change initiat | es investigation |

Notes:

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

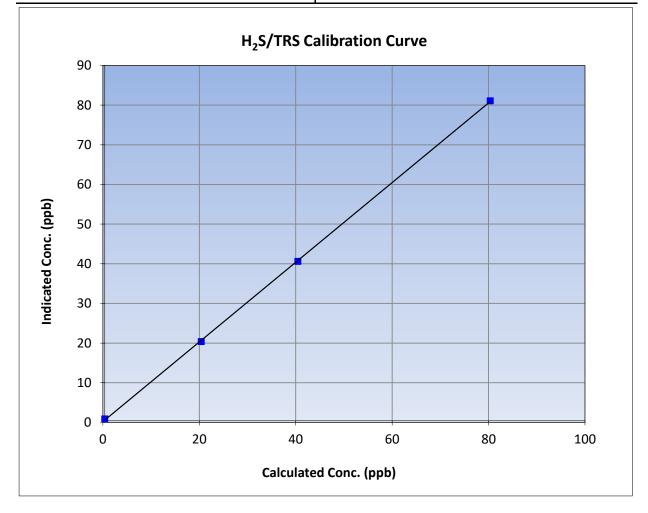


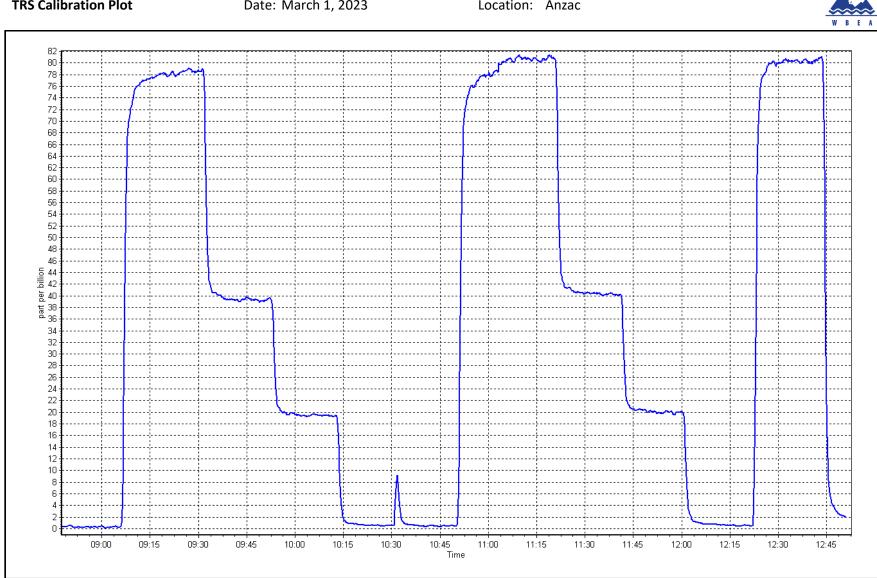
TRS Calibration Summary

| WBEA | | | Version-11-2021 |
|-------------------|----------------|-----------------------|------------------|
| | Stati | on Information | |
| Calibration Date: | March 1, 2023 | Previous Calibration: | February 3, 2023 |
| Station Name: | Anzac | Station Number: | AMS14 |
| Start Time (MST): | 8:49 | End Time (MST): | 12:51 |
| 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 | 0.5 | | Correlation Coefficient | 0.999926 | ≥0.995 |
| 80.0 | 80.7 | 0.9908 | correlation coefficient | 0.999920 | 20.995 |
| 40.0 | 40.2 | 0.9959 | Slope | 1.004840 | 0.90 - 1.10 |
| 20.0 | 20.0 | 1.0008 | Slope | 1.004840 | 0.90 - 1.10 |
| | | | Intercept | 0.178882 | +/-3 |





Location: Anzac



THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | | Version-01-2020 |
|--|---|---------------|---|----------------|-----|-----------------|
| | | Stat | ion Information | | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac March 1, 2023 7:45 Cylinder Change | 2 | Station number: Al Last Cal Date: Fe End time (MST): 8: | ebruary 21, 20 | 23 | |
| | | Calib | ration Standards | | | |
| Gas Cert Reference: | C | C279389 | Cal Gas Expiry Date: Ja | nuary 5, 2025 | | |
| CH4 Cal Gas Conc. | 499.3 | ppm | CH4 Equiv Conc. | 1068.8 | ppm | |
| C3H8 Cal Gas Conc. | 207.1 | ppm | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: | | NA | |
| Removed CH4 Conc. | 499.3 | ppm | CH4 Equiv Conc. | 1068.8 | ppm | |
| Removed C3H8 Conc. | 207.1 | ppm | Diff between cyl (THC): | | | |
| Diff between cyl (CH ₄): | | | Diff between cyl (NM): | | | |
| Calibrator Model: | API T700 | | Serial Number: 52 | 252 | | |
| ZAG make/model: | API 701H | | Serial Number: 3 | 57 | | |
| | | Anal | yzer Information | | | |
| Analyzer make: | Thermo 55i | | Analyzer serial #: 12 | 118148494 | | |
| THC Range (ppm): | | | | | | |
| NMHC Range (ppm): | 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | | <u>Finish</u> |
| CH4 SP Ratio: | 3.85E-04 | 3.85E-0 | 4 NMHC SP Ratio: | 4.46E-05 | | 4.46E-05 |
| CH4 Retention time: | 12.00 | 12.00 | NMHC Peak Area: | 204554 | | 204554 |

| THC Calibration Data | | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | | |
| as found span | 4920 | 80.1 | 17.12 | 17.02 | 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 | 17.12 | 16.98 | 1.008 | | | |
| second point | | | | | | | | |
| third point | | | | | | | | |
| as left zero | | | | | | | | |
| as left span | | | | | | | | |
| | | | A | verage Correction Factor | 1.008 | | | |
| Baseline Corr AF: | 17.02 | Prev response | 16.92 | *% 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-01-2020

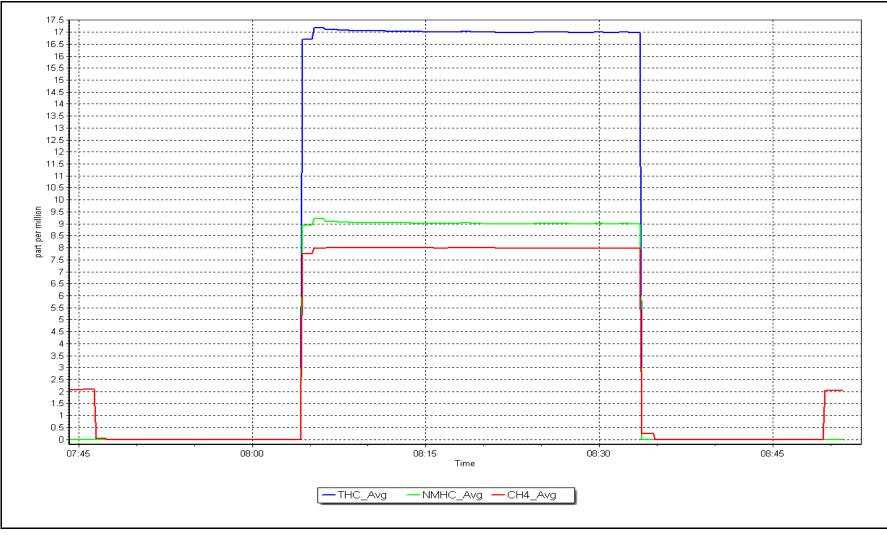
| | | NMHC Calibr | | | |
|-----------------------------------|-------------------|----------------------|----------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.1 | 9.12 | 9.02 | 1.011 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.1 | 9.12 | 9.00 | 1.013 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Avera | age Correction Factor | 1.013 |
| Baseline Corr AF: | 9.02 | Prev response | 9.01 | *% change | 0.1% |
| 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 | 7.99 | 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 | 80.1 | 8.00 | 7.98 | 1.002 |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | | | | | |
| | | | Aver | age Correction Factor | 1.002 |
| Baseline Corr AF: | 7.99 | Prev response | 7.98 | *% change | 0.1% |
| Baseline Corr 2nd AF: | NA | AF Slope: | 1.50 | AF Intercept: | 0.1/0 |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| Baseline Corr Sra AL. | | Calibration | Statistics | , | |
| | | | | Finish | |
| THC Cal Classe | | <u>Start</u> | | | |
| THC Cal Slope: THC Cal Offset: | | 0.988889 | | 0.991693 | |
| | | -0.013842 | | 0.000000 | |
| CH4 Cal Slope: | | 0.999568 | | 0.997671 | |
| CH4 Cal Offset: | | -0.016046 | | 0.000000 | |
| NMHC Cal Slope: | | 0.989676 | | 0.986890 | |
| NMHC Cal Offset: | | -0.015788 | | 0.000000 | |
| Notes: | | Ni | trogen Cylinder Chan | | |

Calibration Performed By:

Melissa Lemay

NMHC Calibration Plot







THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | | Version-01-2020 |
|--------------------------------------|----------------|----------------------|-------------------------|---------------|-----|-----------------|
| | | Statio | on Information | | | |
| Station Name: | Anzac | | Station number: AN | VIS 14 | | |
| Calibration Date: | March 17, 2023 | | Last Cal Date: Fe | bruary 21, 20 | 23 | |
| Start time (MST): | 6:45 | End time (MST): 9:15 | | | | |
| Reason: | Routine | | | | | |
| | | Calibra | ation Standards | | | |
| Gas Cert Reference: | C | C279389 | Cal Gas Expiry Date: Ja | nuary 5, 2025 | | |
| CH4 Cal Gas Conc. | 499.3 | ppm | CH4 Equiv Conc. | 1068.8 | ppm | |
| C3H8 Cal Gas Conc. | 207.1 | ppm | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: | | NA | |
| Removed CH4 Conc. | 499.3 | ppm | CH4 Equiv Conc. | 1068.8 | ppm | |
| Removed C3H8 Conc. | 207.1 | ppm | Diff between cyl (THC): | | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | | |
| Calibrator Model: | API T700 | | Serial Number: 52 | .52 | | |
| ZAG make/model: | API 701H | | Serial Number: 35 | 7 | | |
| | | Analyz | zer Information | | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 11 | 18148494 | | |
| THC Range (ppm): | : 0 - 20 ppm | | | | | |
| NMHC Range (ppm): | : 0 - 10 ppm | | CH4 Range (ppm): 0 - | · 10 ppm | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | | <u>Finish</u> |
| CH4 SP Ratio | : 3.85E-04 | 3.85E-04 | NMHC SP Ratio: | 4.46E-05 | | 4.46E-05 |
| CH4 Retention time: | : 12.00 | 12.00 | NMHC Peak Area: | 204554 | | 204554 |

| THC Calibration Data | | | | | | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (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 | 80.1 | 17.12 | 17.02 | 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 | 17.12 | 17.04 | 1.005 | | | |
| second point | 4960 | 40.0 | 8.55 | 8.50 | 1.006 | | | |
| third point | 4980 | 20.0 | 4.28 | 4.21 | 1.016 | | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | | |
| as left span | 4920 | 80.1 | 17.12 | 16.97 | 1.009 | | | |
| | | | ŀ | Average Correction Factor | 1.009 | | | |
| Baseline Corr AF: | 17.02 | Prev response | 16.92 | *% change | 0.6% | | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initial | tes investigation | | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| | | NMHC Calib | ration Data | | |
|-----------------------|-------------------|----------------------|-------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.1 | 9.12 | 9.09 | 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 | 80.1 | 9.12 | 9.10 | 1.003 |
| second point | 4960 | 40.0 | 4.56 | 4.54 | 1.004 |
| third point | 4980 | 20.0 | 2.28 | 2.24 | 1.017 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.1 | 9.12 | 9.06 | 1.007 |
| | | | ŀ | Average Correction Factor | 1.008 |
| Baseline Corr AF: | 9.09 | Prev response | 9.01 | *% 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 Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.1 | 8.00 | 7.93 | 1.009 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.1 | 8.00 | 7.94 | 1.007 |
| second point | 4960 | 40.0 | 3.99 | 3.97 | 1.006 |
| third point | 4980 | 20.0 | 2.00 | 1.97 | 1.014 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.1 | 8.00 | 7.91 | 1.011 |
| | | | A | verage Correction Factor | 1.009 |
| Baseline Corr AF: | 7.93 | Prev response | 7.98 | *% change | -0.6% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| THC Cal Slope: | | 0.988889 | | 0.996031 | |
| THC Cal Offset: | | -0.013842 | -0.019815 | | |
| CH4 Cal Slope: | | 0.999568 | 0.993278 | | |
| CH4 Cal Offset: | | -0.016046 | -0.004047 | | |
| NMHC Cal Slope: | | 0.989676 | | 0.998568 | |
| NMHC Cal Offset: | | -0.015788 | | -0.013765 | |

Notes:

No adjustments done. Hydrogen Cylinder changed out.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 17, 2023 | Previous Calibration: | February | 21, 2023 |
| Station Name: | An | zac | Station Number: | AMS | 5 14 |
| Start Time (MST): | 6: | 45 | End Time (MST): | 9:: | 15 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11181 | 48494 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 17.12 | 0.00 17.04 | 1.0048 | Correlation Coefficient | 0.999992 | ≥0.995 |
| 8.55 4.28 | 8.50 4.21 | 1.0060 1.0155 | Slope | 0.996031 | 0.90 - 1.10 |
| | | | Intercept | -0.019815 | +/-0.5 |
| 18.0 | | | | | |
| 16.0 | | | | | |
| 14.0 | | | | | |
| 12.0 | | | | | |
| | | | | | |
| uc. (| | | | | |
| 0.8 Co | | | | | |
| 0.0 udicated | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | - | | | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | Calculated | l Conc. (ppm) | | |



CH₄ Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|--|---------------------------------------|----------------------------|-------------------------|-------------------|---------------|
| Calibration Date: | March : | 17, 2023 | Previous Calibration: | February 21, 2023 | |
| Station Name: | Anzac | | Station Number: | AMS | 5 14 |
| Start Time (MST): | 6: | 45 | End Time (MST): | 9:: | 15 |
| Analyzer make: | Therr | 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 7.94 | 1.0074 | Correlation Coefficient | 0.999996 | ≥0.995 |
| 3.99 2.00 | 3.97 1.97 | 1.0074 1.0061 1.0138 | Slope | 0.993278 | 0.90 - 1.10 |
| 2.00 | 1.97 | 1.0158 | Intercept | -0.004047 | +/-0.5 |
| 8.0 7.0 6.0 | | | | | |
| (Long 5.0 | | | | | |
| ndicated | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |



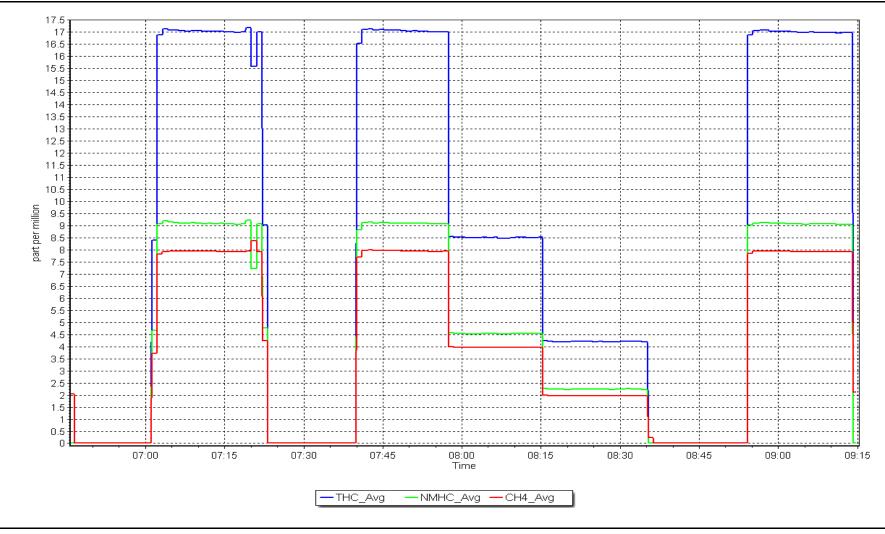
NMHC Calibration Summary

Version-01-2020

| | | | Station I | nformation | | |
|-------------|--------------------------|---|---------------------------|-------------------------|-----------|---------------|
| Calibratio | on Date: | March | 17, 2023 | Previous Calibration: | February | 21, 2023 |
| Station Na | ame: | Ar | izac | Station Number: | AMS | 5 14 |
| Start Time | e (MST): | 6 | :45 | End Time (MST): | 9:: | 15 |
| Analyzer r | make: | Ther | mo 55i | Analyzer serial #: | 11181 | 48494 |
| | | | Calibra | tion Data | | |
| | concentratio n) (Cc) | n Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eva | aluation | <u>Limits</u> |
| | .00 | 0.00 | | Correlation Coefficient | 0.999985 | ≥0.995 |
| | .12 | 9.10 4.54 | 1.0026 1.0036 | | | |
| | .28 | 2.24 | 1.0036 | Slope | 0.998568 | 0.90 - 1.10 |
| | _ | | | Intercept | -0.013765 | +/-0.5 |
| (| 9.0 8.0 7.0 6.0 | | | | | |
| Conc. (ppm) | 5.0 - | | | | | |
| | 4.0 - | | | | | |
| Indicated | 3.0 - | | | | | |
| = | 2.0 | | | | | |
| | 1.0 - | | | | | |
| | 0.0 | | | | | 10.0 |
| | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | Calculated | d Conc. (ppm) | | |

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | Stat | ion Information | | | | |
|--|---|---------------|--|----------------------------|----------------------|--|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac March 2, 2023 7:45 Routine | | Station number: AMS 14 Last Cal Date: February 2, 2023 End time (MST): 12:16 | | | | |
| | | Calib | oration 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 | | | |
| | | Anal | yzer Information | | | | |
| | | | , | | | | |
| Analyzer make: | Thermo 42i | | | 1426262592 | | | |
| Analyzer make: NOX Range (ppb): | | | Analyzer serial #: | 1426262592 | | | |
| - | | <u>Finish</u> | | 1426262592 <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 | <u>Finish</u> | Analyzer serial #: | <u>Start</u> | | | |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.011937 | 0.993239 |
| NO _x Cal Offset: | -0.743109 | -0.747177 |
| NO Cal Slope: | 1.013337 | 0.995505 |
| NO Cal Offset: | -1.947043 | -2.010875 |
| NO ₂ Cal Slope: | 1.000011 | 0.999852 |
| NO ₂ Cal Offset: | 0.089892 | 0.368111 |



$NO_X \setminus NO \setminus NO_2$ 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 | 0.4 | | |
| as found span | 4921 | 78.6 | 800.5 | 786.8 | 13.7 | 796.8 | 781.7 | 15.1 | 1.0047 | 1.0066 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | -0.1 | 0.2 | | |
| high point | 4921 | 78.6 | 800.5 | 786.8 | 13.7 | 794.7 | 782.1 | 12.6 | 1.0073 | 1.0061 |
| second point | 4961 | 39.3 | 400.2 | 393.4 | 6.8 | 396.7 | 389.1 | 7.6 | 1.0088 | 1.0110 |
| third point | 4980 | 19.6 | 199.6 | 196.2 | 3.4 | 196.3 | 191.1 | 5.2 | 1.0169 | 1.0267 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | -0.1 | 0.3 | | |
| as left span | 4921 | 78.6 | 800.5 | 396.5 | 404.0 | 791.4 | 387.9 | 403.5 | 1.0115 | 1.0223 |
| | | | | | | | Average C | orrection Factor | 1.0110 | 1.0146 |
| Corrected As fo | ound NO _x = | 796.6 ppb | NO = | 781.9 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chang | ge NO _x = | -1.6% |
| Previous Respo | nse NO _x = | 809.3 ppb | NO = | 795.4 ppb | | | | *Percent Chang | ge NO = | -1.7% |
| Baseline Corr 2 | nd pt NO _x = | NA ppb | NO = | NA ppb | As found | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | rd pt NO _x = | NA ppb | NO = | NA ppb | As found | d NO r ² : | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 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) | 776.1 | 385.8 | 404.0 | 404.2 | 0.9994 | 100.1% |
| 2nd GPT point (200 ppb O3) | 776.1 | 591.4 | 198.4 | 198.8 | 0.9979 | 100.2% |
| 3rd GPT point (100 ppb O3) | 776.1 | 683.8 | 106.0 | 106.5 | 0.9951 | 100.5% |
| | | | | Average Correction Factor | 0.9975 | 100.3% |

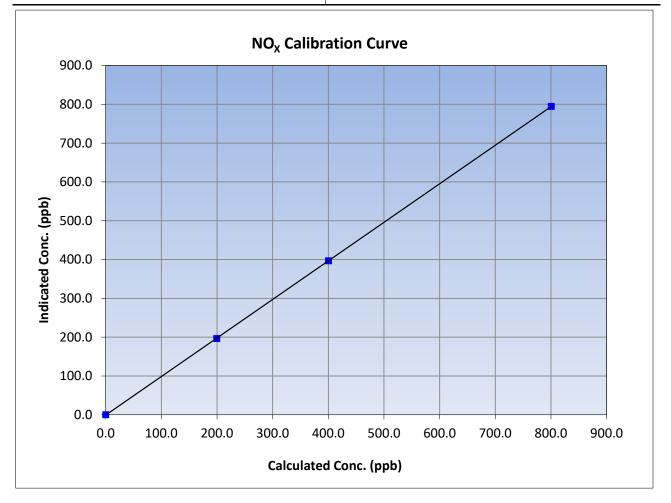
Notes:

No maintenance or adjustments done.



NO_x Calibration Summary

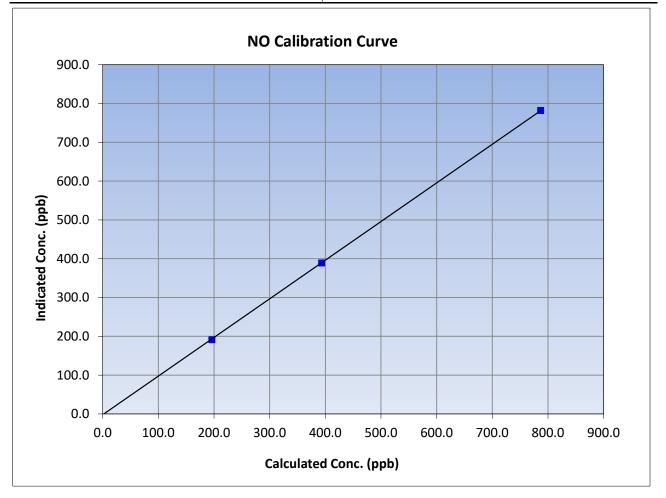
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|--------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 2, 2023 | Previous Calibration: | February | , 2, 2023 |
| Station Name: | An | zac | Station Number: | AM | S 14 |
| Start Time (MST): | 7: | 45 | End Time (MST): | 12 | :16 |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 14262 | | 62592 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.2 | | Correlation Coefficient | 0.999993 | ≥0.995 |
| 800.5 | 794.7 | 1.0073 | correlation coefficient | 0.5555555 | 20.333 |
| 400.2 | 396.7 | 1.0088 | Slope | 0.993239 | 0.90 - 1.10 |
| 199.6 | 196.3 | 1.0169 | Slope | 0.995259 | 0.90 - 1.10 |
| | | | Intercept | -0.747177 | +/-20 |





NO Calibration Summary

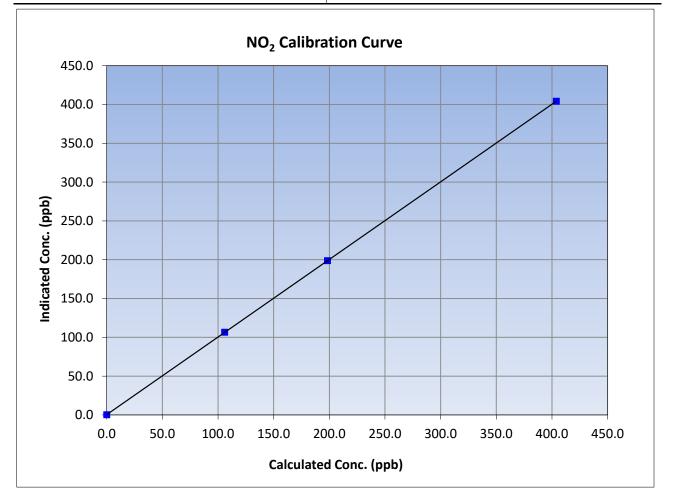
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|----------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 2, 2023 | Previous Calibration: | February | y 2, 2023 |
| Station Name: | An | izac | Station Number: | AM | S 14 |
| Start Time (MST): | 7: | :45 | End Time (MST): | 12 | :16 |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1426262 | | 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 | 0.999972 | ≥0.995 |
| 786.8 | 782.1 | 1.0061 | correlation coefficient | 0.555572 | 20.995 |
| 393.4 | 389.1 | 1.0110 | Clana | 0.995505 | 0.90 - 1.10 |
| 196.2 | 191.1 | 1.0267 | Slope | 0.995505 | 0.90 - 1.10 |
| | | | Intercept | -2.010875 | +/-20 |

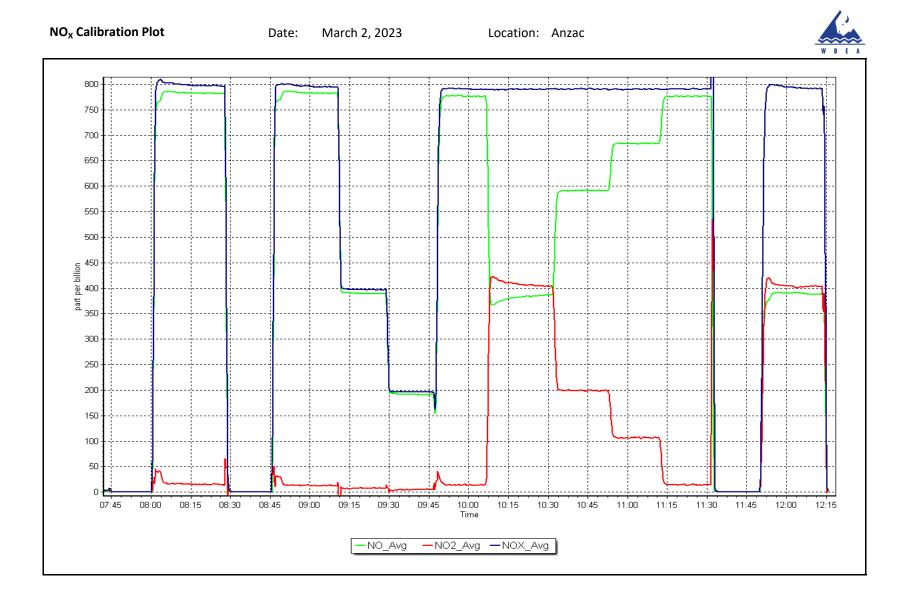




NO₂ Calibration Summary

| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|---------------------------|-----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | March | 2, 2023 | Previous Calibration: | February | , 2, 2023 | |
| Station Name: | An | zac | Station Number: | AM | S 14 | |
| Start Time (MST): | 7: | 45 | End Time (MST): | 12 | :16 | |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 142626 | | 62592 | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | 0.2 | | Correlation Coefficient | 0.999999 | ≥0.995 | |
| 404.0 | 404.2 | 0.9994 | correlation coernelent | 0.5555555 | 20.333 | |
| 198.4 | 198.8 | 0.9979 | Clana | 0.999852 | 0.90 - 1.10 | |
| 106.0 | 106.5 | 0.9951 | Slope | 0.999852 | 0.90 - 1.10 | |
| | | | Intercept | 0.368111 | +/-20 | |







O₃ Calibration Report

Version-01-2020

| | | | | | Version-01-2020 |
|---|--|---|--|---|---|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Anzac March 30, 2023 7:34 Routine | | Station number: Last Cal Date: End time (MST): | February 21, 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> 0.995743 0.420000 | <u>Finish</u> 1.001686 0.080000 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> 0.9 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 | -0.1 | |
| as found span | 5000 | 883.9 | 400.0 | 395.6 | 1.011 |
| as found 2nd point as found 3rd point | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.5 | |
| high point | 5000 | 885.2 | 400.0 | 400.5 | 0.999 |
| second point | 5000 | 771.0 | 200.0 | 200.6 | 0.997 |
| third point | 5000 | 671.5 | 100.0 | 100.9 | 0.991 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 5000 | 881.6 | 400.0 | 402.7 | 0.993 |
| • | | | Avera | ge Correction Factor | 0.996 |
| Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 395.7 NA NA | Previous response AF Slope: AF Correlation: | | *% change AF Intercept: | -0.8% |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

No maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay

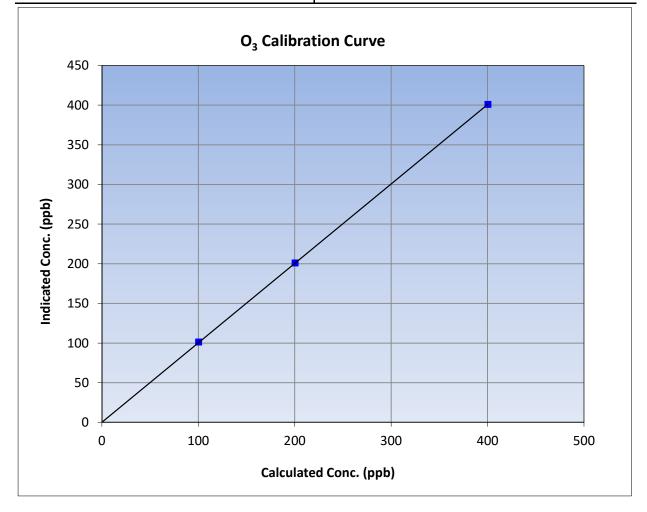


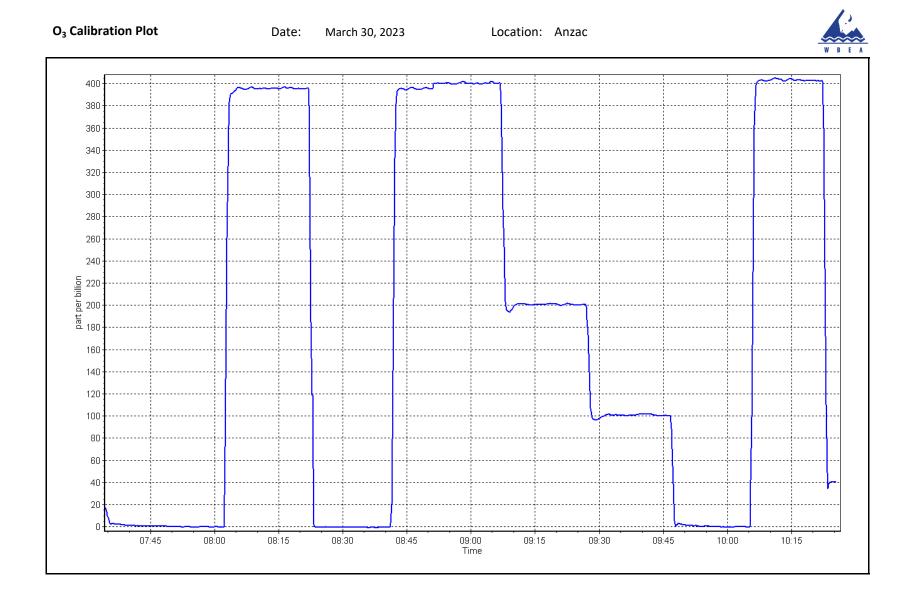
O₃ Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|----------------|-----------------------|-------------------|
| | Stati | on Information | |
| Calibration Date: | March 30, 2023 | Previous Calibration: | February 21, 2023 |
| Station Name: | Anzac | Station Number: | AMS14 |
| Start Time (MST): | 7:34 | End Time (MST): | 10:25 |
| 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 | -0.5 | | Correlation Coefficient | 0.999990 | ≥0.995 |
| 400.0 | 400.5 | 0.9988 | correlation coefficient | 0.9999990 | 20.995 |
| 200.0 | 200.6 | 0.9970 | Slope | 1.001686 | 0.90 - 1.10 |
| 100.0 | 100.9 | 0.9911 | Slope | 1.001080 | 0.30 - 1.10 |
| | | | Intercept | 0.080000 | +/- 5 |







T640 PM_{2.5} CALIBRATION

| WBEA | | | | | | Version-01-2023 |
|-------------------------------|----------------------|---------------------------|--------------------|---------------|-----------------|-----------------|
| | | Station Information | | | | |
| Station Name: | Anzac | | Station number: | | | |
| Calibration Date: | March 30, 2023 | | Last Cal Date: | | , 2023 | |
| Start time (MST): | 6:25 | | End time (MST): | /:2/ | | |
| Analyzer Make: | API T640 | | S/N: | 825 | | |
| Particulate Fraction: | PM2.5 | | | | | |
| Flow Meter Make/Model: | Alicat FP-25 | | S/N: | 388753 | | |
| Temp/RH standard: | Alicat FP-25 | | S/N: | 388753 | | |
| | | Monthly Calibration Te | est | | | |
| Parameter | <u>As found</u> | Measured | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| T (°C) | -15 | -14.8 | -15 | | | +/- 2 °C |
| P (mmHg) | 715.2 | 716.2 | 715.2 | | | +/- 10 mmHg |
| flow (LPM) | 5 | 5.09 | 5 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 30, 2023 | Last Cal Date: | February 2 | 22, 2023 | |
| | PM w/o HEPA: | 3.2 | PM w/ HEPA: | 0 | | <0.2 ug/m3 |
| Note: this leak check will be | | | erve as the pre ma | intenance lea | ak check | |
| Inlet cleaning : | Inlet Head | ✓ | | | | |
| | | | | | | |
| | | Quarterly Calibration T | est | | | |
| <u>Parameter</u> | <u>As found</u> | Post maintenance | As left | | <u>Adjusted</u> | (Limits) |
| PMT Peak Test | 9.1 | 10 | 10.8 | | ✓ | 10.9 +/- 0.5 |
| Post-maintenanc | e leak check: | PM w/o HEPA: | 100 | w/ HEPA: | | 0 |
| Date Optical Chan | | March 30, 2 | | w/ IILFA. | | <0.2 ug/m3 |
| Disposable Filte | - | March 30, 2 | | | | 1012 06/110 |
| · | <u> </u> | · · · | | | | |
| | | Annual Maintenance | 2 | | | |
| | | | | | | |
| Date Sample Tu | | June 21, 2 | | | | |
| Date RH/T Sens | or Cleaned: | June 21, 2 | 022 | | | |
| | PMT adjusted after (| cleaning. Zero and Flow a | also checked befor | e and after d | eaning. H | ead Cleaned |
| Notes: | | | | | | |
| Calibration by: | Melissa Lemay | | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Wapasu March 9, 2023 10:07 Routine | | Station number: Last Cal Date: End time (MST): | AMS17 February 14, 2023 13:28 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | <u>50.38</u> | ppm | Cal Gas Exp Date: | January 12, 2029 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: | <u>ALM066507</u> <u>50.38</u> n/a | ppm | Rem Gas Exp Date: Diff between cyl: | n/a | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 2449 | |
| ZAG Make/Model: | API 701H | | Serial Number: | 359 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1218153459 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.000068 | 0.999724 | Backgd or Offset: | | 12.4 |
| Calibration intercept: | -1.979730 | -1.859598 | Coeff or Slope: | 1.099 | 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) | orrection 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 | 797.9 | 1.003 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.2 | |
| high point | 4921 | 79.4 | 800.0 | 799.5 | 1.001 |
| second point | 4960 | 39.7 | 400.0 | 395.3 | 1.012 |
| third point | 4980 | 19.8 | 199.5 | 196.7 | 1.014 |
| as left zero | 5000 | 0.0 | 0.0 | 0.5 | |
| as left span | 4920 | 79.4 | 800.1 Averas | 802.2 ge Correction Factor | 0.997 |
| | | | | · · · · · · · · · · · · · · · · · · · | |
| Baseline Corr As found: | 797.80 | Previous response | 798.04 | *% change | 0.0% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

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

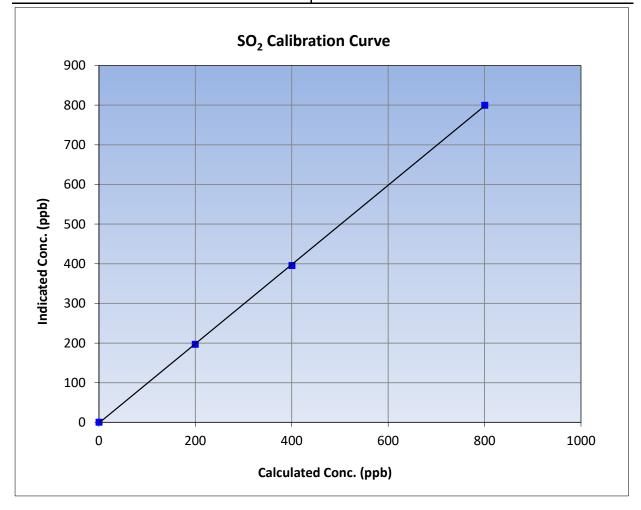
Calibration Performed By:



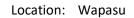
SO₂ Calibration Summary

| WBEA | | | | Version-01-2020 |
|---|--------------------------------------|------------------------------|------------------------|-------------------|
| | | Station | Information | |
| Calibration Date: | March 9 | , 2023 | Previous Calibration: | February 14, 2023 |
| Station Name: | Wapasu | | Station Number: | AMS17 |
| Start Time (MST): | -): 10:07 | | End Time (MST): | 13:28 |
| Analyzer make: | Thermo | o 43i | Analyzer serial #: | 1218153459 |
| | | | | |
| | | Calibra | tion Data | |
| | | Calibra | ation Data | |
| Calculated concentration In (ppb) (Cc) | ndicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | <u>Limits</u> |

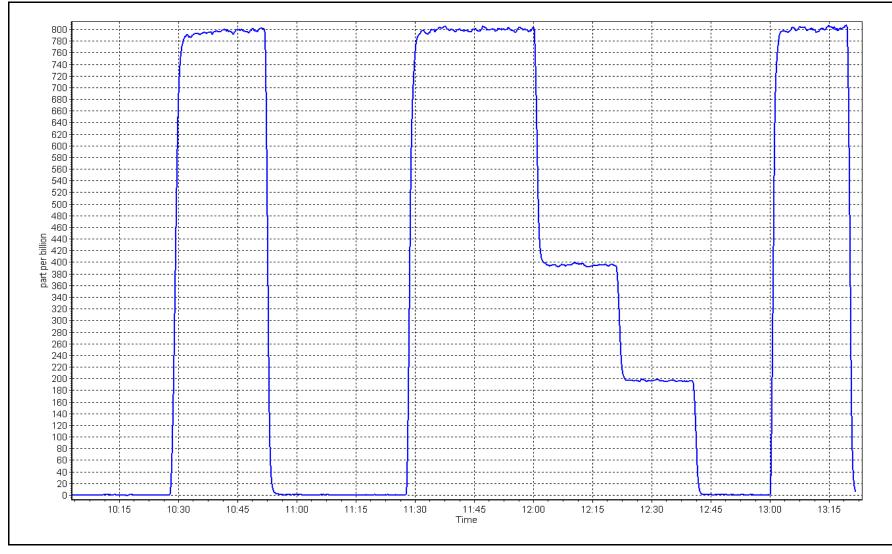
| 0.0 | 0.2 | | Correlation Coefficient | 0.999956 | ≥0.995 |
|-------|-------|--------|-------------------------|-----------|-------------|
| 800.0 | 799.5 | 1.0006 | correlation coefficient | 0.999950 | |
| 400.0 | 395.3 | 1.0120 | Slope | 0.999724 | 0.90 - 1.10 |
| 199.5 | 196.7 | 1.0143 | Slope | | |
| | | | Intercept | -1.859598 | +/-30 |
| | | | intercept | 1.0555550 | 17 30 |













H₂S Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Wapasu March 8, 2023 10:19 Routine | | Station number: Last Cal Date: End time (MST): | AMS17 February 16, 2023 14:42 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.076 CC511852 | ppm | Cal Gas Exp Date: | September 16, 2024 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 5.076 n/a | ppm | Rem Gas Exp Date: Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | АРІ T700 АРІ T701Н | | Serial Number: Serial Number: | 2449 359 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 450i n/a 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1218153583 n/a | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.995568 | 0.990568 | Backgd or Offset: | 13.0 | 12.7 |
| Calibration intercept: | 0.080792 | 0.180784 | Coeff or Slope: | 1.085 | 1.085 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4921 | 78.8 | 80.0 | 79.7 | 1.005 |
| as found 2nd point | 4961 | 39.4 | 40.0 | 40.1 | 1.000 |
| as found 3rd point | 4980 | 19.7 | 20.0 | 20.1 | 1.000 |
| new cylinder response | | H ₂ S Calibrati | ion Data | | |
| | | Ti ₂ 5 calibrati | | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.5 | |
| high point | 4921 | 78.8 | 80.0 | 79.6 | 1.005 |
| second point | 4961 | 39.4 | 40.0 | 39.6 | 1.010 |
| third point | 4980 | 19.7 | 20.0 | 19.7 | 1.015 |
| as left zero | 5000 | 0.0 | 0.0 | 0.7 | |
| as left span | 4921 | 78.8 | 80.0 | 78.5 | 1.019 |
| SO2 Scrubber Check | 4921 | 79.4 | 800.0 | -0.2 | |
| Date of last scrubber cha | nge: | n/a | | Ave Corr Factor | 1.010 |
| Date of last converter eff | ficiency test: | n/a | | | efficiency |
| Baseline Corr As found: | 79.6 | Prev response: | 79.73 | *% change: | -0.2% |
| Baseline Corr 2nd AF pt: | 40.0 | AF Slope: | | AF Intercept: | 0.180802 |
| Baseline Corr 3rd AF pt: | 20.0 | AF Correlation: | | • | |
| • | | | | * = > +/-5% change initiate | es investigation |

Notes:

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

Calibration Performed By:

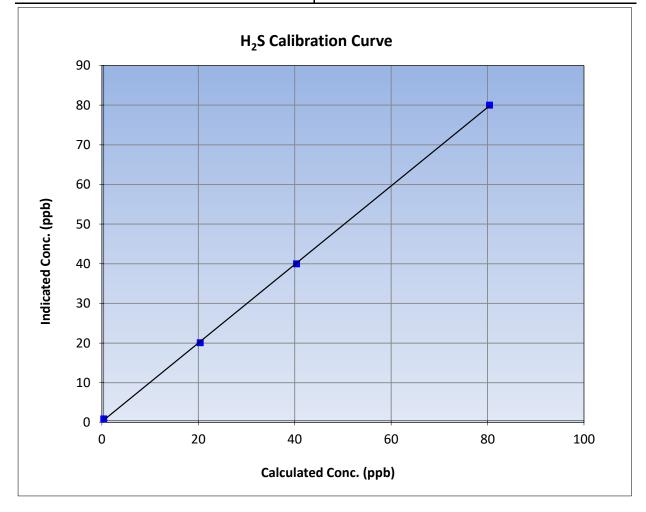


H₂S Calibration Summary

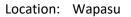
| | Stat | ion Information | |
|-------------------|---------------|-----------------------|-------------------|
| Calibration Date: | March 8, 2023 | Previous Calibration: | February 16, 2023 |
| Station Name: | Wapasu | Station Number: | AMS17 |
| Start Time (MST): | 10:19 | End Time (MST): | 14:42 |
| Analyzer make: | Thermo 450i | Analyzer serial #: | 1218153583 |

Calibration Data

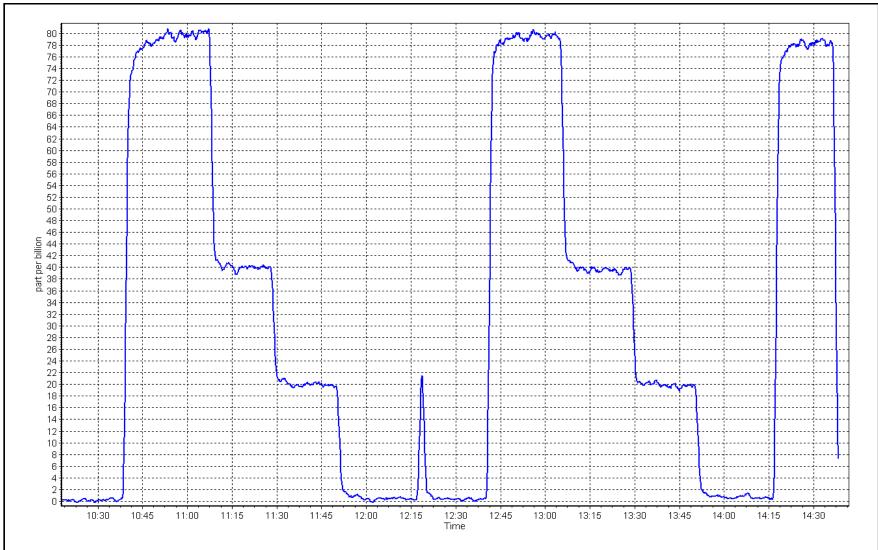
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.5 | | Correlation Coefficient | 0.999925 | ≥0.995 |
| 80.0 | 79.6 | 1.0050 | correlation coefficient | 0.999923 | 20.333 |
| 40.0 | 39.6 | 1.0100 | Slope | 0.990568 | 0.90 - 1.10 |
| 20.0 | 19.7 | 1.0153 | Slope | | 0.30 - 1.10 |
| | | | Intercept | 0.180784 | +/-3 |



H₂S Calibration Plot









THC Calibration Report

Version-01-2020

| | Station Info | rmation | | |
|---|---|---|---|--|
| Wapasu March 9, 2023 10:07 Routine | | Station number: Last Cal Date: End time (MST): | AMS17 February 14, 2023 13:28 | |
| | Calibration S | tandards | | |
| ALM(<u>503.5</u> <u>208.3</u> | 066507 ppm ppm | Cal Gas Expiry Date: CH4 Equiv Conc. | January 12, 2029 1076.3 | ppm |
| r <u>503.5</u> <u>208.3</u> API T700 API 701H | n/a ppm ppm | Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number: | n/a 1076.3 2449 359 | ppm |
| | Analyzer Info | ormation | | |
| Thermo 51i-LT 0 - 20 ppm | ,, | Analyzer serial #: | 1218153352 | |
| <u>Start</u> 1.011424 -0.037301 | <u>Finish</u> 1.000425 -0.058335 | - | | <u>Finish</u> 3.140 4.250 |
| | THC Calibrat | ion Data | | |
| Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| 5000 | 0.0 | 0.00 | 0.08 | |
| 4921 | 79.4 | 17.09 | 17.48 | 0.978 |
| | | | | |
| 5000 | 0.0 | 0.00 | -0.03 | |
| | | 17.09 | 17.07 | 1.001 |
| 4960 | 39.7 | 8.55 | 8.43 | 1.014 |
| 4980 | 19.8 | 4.26 | 4.20 | 1.014 |
| 5000 | 0.0 | 0.00 | 0.00 | |
| 4920 | 79.4 | 17.09 | 17.07 | 1.001 |
| | | | | 1.010 |
| 17.40 | Previous response | 17.25 | *% change | 0.9% |
| NA | AF Slope: | | AF Intercept: | |
| NA | AF Correlation: | | / intercepti | |
| | March 9, 2023 10:07 Routine ALMO <u>503.5</u> 208.3 7 503.5 208.3 API 7700 API 701H Thermo 51i-LT 0 - 20 ppm <u>Start</u> 1.011424 -0.037301 Dilution air flow rate (sccm) 5000 4921 5000 4921 5000 4921 4960 4920 5000 4920 | Wapasu March 9, 2023 10:07 Routine Calibration S ALM066507 503.5 ppm 208.3 ppm 208.3 ppm API 7700 API 7701H Analyzer Info Thermo 51i-LT 0 - 20 ppm Start Start 1.011424 1.000425 -0.037301 -0.058335 THC Calibrat Dilution air flow rate (sccm) Source gas flow rate (sccm) 5000 0.0 4921 79.4 4960 39.7 4980 19.8 5000 0.0 4920 79.4 | Wapasu March 9, 2023 10:07 RoutineStation number: Last Cal Date: End time (MST): End time (MST):Calibration StandardsALM066507Cal Gas Expiry Date: S03.5 ppm n/aS03.5 208.3 ppm n/aRemoved Gas Expiry: CH4 Equiv Conc. 208.3 ppmS03.5 208.3 208.3 ppmDiff between cyl: Serial Number: API 7700 API 7700 API 701HSerial Number: Serial Number: API 701HThermo 51i-LT 0 - 20 ppmFinish 1.011424 1.000425 -0.037301Background: coefficient:Dilution air flow rate (sccm)Source gas flow rate (sccm) (ppm) (Cc)Calculated Concentration (ppm) (Cc)Dilution air flow rate 4921Source gas flow rate 79.4Calculated Concentration (ppm) (Cc)S000 49210.00.004980 498019.84.26S000 49200.00.004980 492019.84.26S000 49200.00.00492079.417.094980 492019.84.26S000 49200.00.004920 492079.417.09 | Wapasu Station number: AMS17 March 9, 2023 Last Cal Date: February 14, 2023 10:07 End time (MST): 13:28 Routine Calibration Standards January 12, 2029 503.5 ppm CH4 Equiv Conc. 1076.3 208.3 ppm n/a Removed Gas Expiry: n/a API 700 Serial Number: 2449 API 701H Serial Number: 2449 API 701H Serial Number: 359 Intermo 51i-LT 1.011424 1.000425 Background: 3.090 -0.037301 -0.058335 Coefficient: 4.324 Indicated Concentration (ppm) (cc) (cc) (sccm) (sccm) (sccm) (cpm) (cc) (cc) Indicated Concentration (ppm) (cc) (sccm) 0.00 0.00 0.08 4921 79.4 17.09 17.48 4980 19.8 4.26 4.20 5000 0.00 0.00 0.00 0.00 4921 79.4 17.09 17.07 4960 39.7 8.55 8.43 4980 |

Notes:

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

Calibration Performed By:

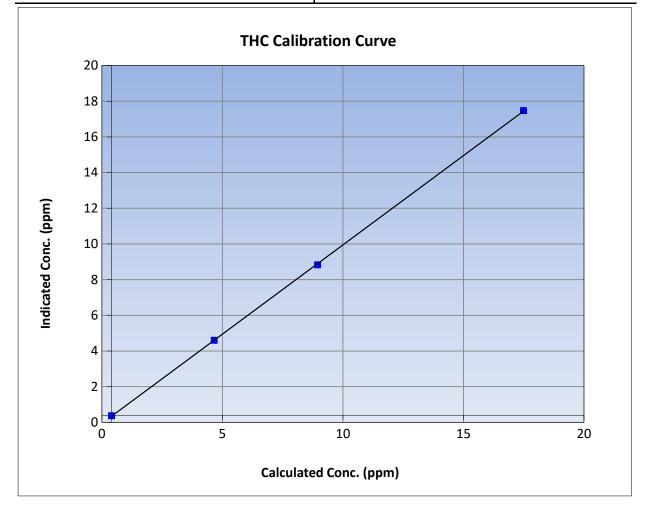


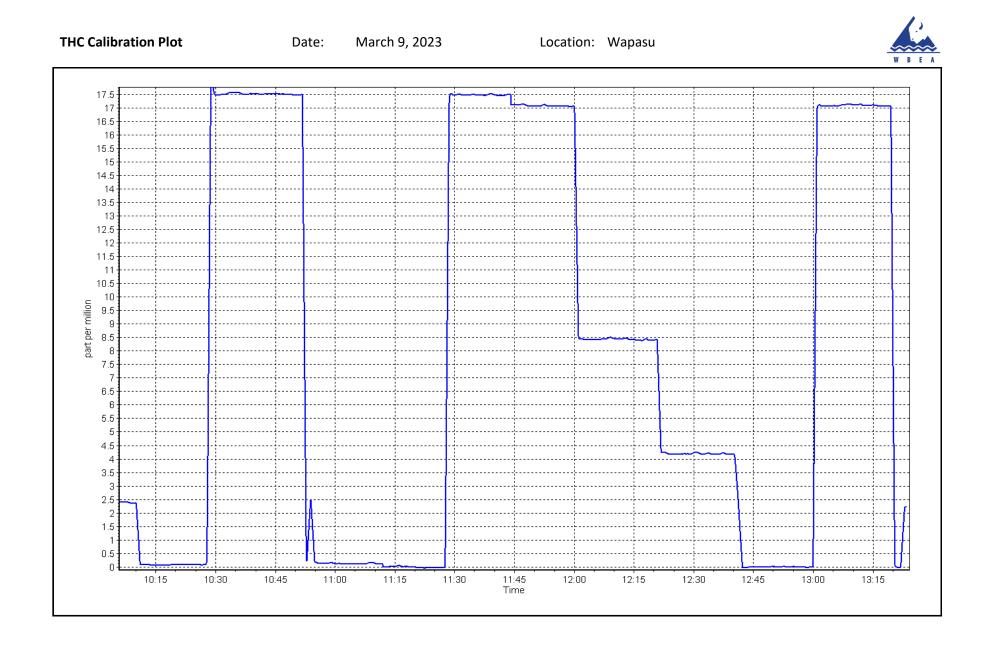
THC Calibration Summary

| W B E A | | | Version-01-2020 | | |
|---------------------|---------------|-----------------------|-------------------|--|--|
| Station Information | | | | | |
| Calibration Date: | March 9, 2023 | Previous Calibration: | February 14, 2023 | | |
| Station Name: | Wapasu | Station Number: | AMS17 | | |
| Start Time (MST): | 10:07 | End Time (MST): | 13:28 | | |
| 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 | 0.999961 | ≥0.995 |
| 17.09 | 17.07 | 1.0011 | correlation coefficient | 0.999901 | 20.333 |
| 8.55 | 8.43 | 1.0141 | Slope | 1.000425 | 0.90 - 1.10 |
| 4.26 | 4.20 | 1.0139 | Slope | 1.000425 | 0.30 - 1.10 |
| | | | Intercept | -0.058335 | +/-1.5 |







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | Statio | on Information | | |
|--|---|---------------|--|-----------------|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Wapasu March 23, 2023 9:09 Routine | | Station number: A Last Cal Date: Fo End time (MST): 14 | ebruary 23, 202 | 23 |
| | | Calibr | ation Standards | | |
| NO Gas Cylinder #: | Т3 | 75YK8 | Cal Gas Expiry Date: A | pril 13, 2025 | |
| , NOX Cal Gas Conc: | <u>49.11</u> | 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: | 48.07 | ppm |
| NOX gas Diff: | | | NO gas Diff: | | |
| Calibrator Model: | API T700 | | Serial Number: 24 | | |
| ZAG make/model: | API T701H | | Serial Number: 3 | 59 | |
| | | Analy | zer Information | | |
| | | - | | 22 | |
| - | Teledyne API T200 | J | Analyzer serial #: 83 | 33 | |
| NOX Range (ppb): | add 000 - 1000 | | | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coeff or slope | | 0.820 | NO bkgnd or offset: | 0.1 | 0.1 |
| NOX coeff or slope | | 0.812 | NOX bkgnd or offset: | -0.4 | -0.4 |
| NO2 coeff or slope | : 1.000 | 1.000 | Reaction cell Press: | 4.5 | 4.4 |
| | | | | | |
| | | Calibi | ration Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| NO _x Cal Slope | : | 0.98971 | 9 | 0.987970 | |
| | | | _ | | |

| NO _x Cal Slope: | 0.989719 | 0.987970 |
|-----------------------------|-----------|-----------|
| NO _x Cal Offset: | -1.420000 | -1.020000 |
| NO Cal Slope: | 0.990300 | 0.989414 |
| NO Cal Offset: | -1.880000 | -1.920000 |
| NO ₂ Cal Slope: | 0.986936 | 0.999015 |
| NO ₂ Cal Offset: | -0.501997 | 0.401105 |
| | | |



$NO_X \setminus NO \setminus NO_2$ 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 | 0.2 | -0.3 | 0.6 | | |
| as found span | 4917 | 83.2 | 817.2 | 799.9 | 17.3 | 805.1 | 788.1 | 17.1 | 1.0150 | 1.0150 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | -0.1 | 0.3 | | |
| high point | 4917 | 83.2 | 817.2 | 799.9 | 17.3 | 807.2 | 790.4 | 16.8 | 1.0124 | 1.0120 |
| second point | 4958 | 41.6 | 408.6 | 399.9 | 8.7 | 401.3 | 392.9 | 8.5 | 1.0182 | 1.0179 |
| third point | 4979 | 20.8 | 204.3 | 200.0 | 4.3 | 200.1 | 194.1 | 6.1 | 1.0210 | 1.0302 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.1 | 0.2 | | |
| as left span | 4917 | 83.2 | 817.2 | 410.0 | 407.2 | 798.5 | 394.7 | 403.8 | 1.0234 | 1.0387 |
| | | | | | | | Average C | orrection Factor | 1.0172 | 1.0201 |
| Corrected As fo | ound NO _x = | 804.9 ppb | NO = | 788.4 ppb | * = > +/-59 | % change initiates i | investigation | *Percent Chang | ge NO _x = | -0.3% |
| Previous Respo | nse NO _x = | 807.4 ppb | NO = | 790.2 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) (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) | 784.9 | 395.0 | 407.2 | 407.2 | 1.0000 | 100.0% |
| 2nd GPT point (200 ppb O3) | 784.9 | 589.8 | 212.4 | 212.5 | 0.9996 | 100.0% |
| 3rd GPT point (100 ppb O3) | 784.9 | 689.7 | 112.5 | 113.0 | 0.9956 | 100.4% |
| | | | | Average Correction Factor | 0.9984 | 100.2% |

Notes:

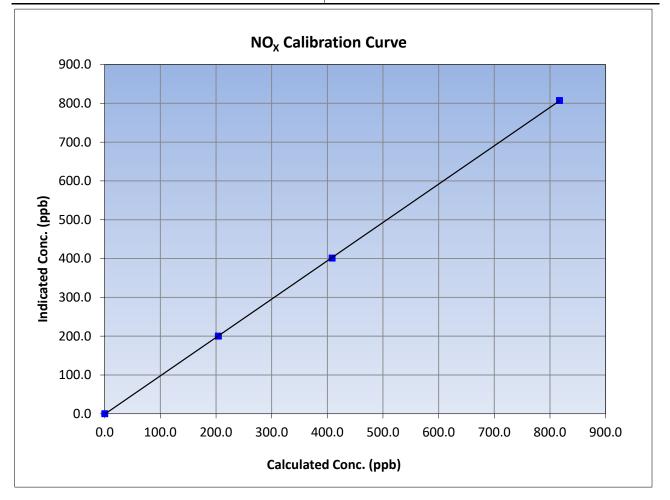
Sample inlet filter changed after as founds. No adjustments made. Used the second NO reference point.

Calibration Performed By:



NO_x Calibration Summary

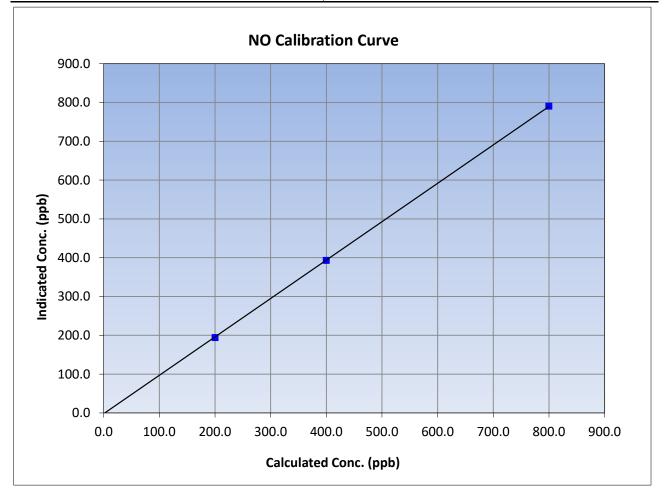
| WBEA | | | | | Version-04-2 | |
|--------------------------|-------------------------|---------------------------|-------------------------|-----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 2 | Previous Calibration: | February 23, 2023 | | | |
| Station Name: | Wa | pasu | Station Number: | AMS17 | | |
| Start Time (MST): 9:09 | | | End Time (MST): | 14:05 | | |
| Analyzer make: | Teledyne | API T200 | Analyzer serial #: | 833 | | |
| Calculated concentration | Indicated concentration | | ation Data | | | |
| (ppb) (Cc) | (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | |
| 0.0 | 0.2 | | Correlation Coefficient | 0.999987 | ≥0.995 | |
| 817.2 | 807.2 | 1.0124 | correlation coefficient | 0.555507 | 20.000 | |
| 408.6 | 401.3 | 1.0182 | Slope | 0.987970 | 0.90 - 1.10 | |
| 204.3 | 200.1 | 1.0210 | Slope | 0.987970 | 0.90 - 1.10 | |
| | | | Intercept | -1.020000 | +/-20 | |





NO Calibration Summary

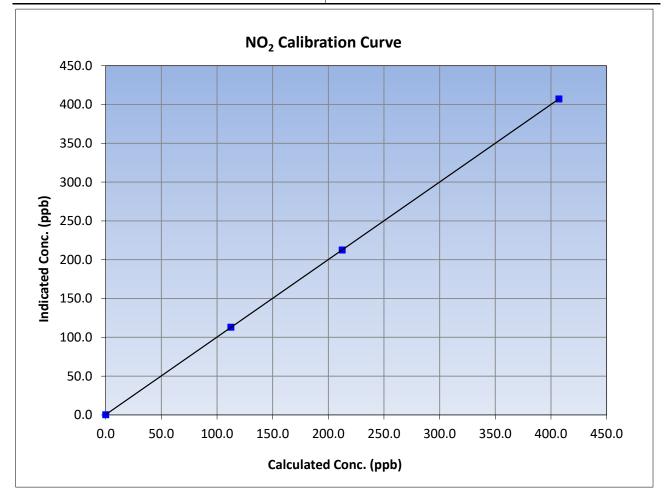
| WBEA | | | | | Version-04-2 | |
|--|---------------------------------------|--------------------------------------|----------------------------------|--------------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | alibration Date: March 23, 2023 | | | Februar | uary 23, 2023 | |
| Station Name: Wapasu | | | Station Number: | AMS17 | | |
| Start Time (MST): 9: | | 09 | End Time (MST): | | 14:05 | |
| Analyzer make: | Teledyne | API T200 | Analyzer serial #: | 833 | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Calibra Correction factor (Cc/Ic) | ation Data Statistical Evalua | ation | <u>Limits</u> | |
| 0.0 | -0.1 | | | | | |
| 799.9 | 790.4 | 1.0120 | Correlation Coefficient | 0.999976 | ≥0.995 | |
| 399.9 | 392.9 | 1.0179 | Clana | 0.989414 0.9 | 0.90 - 1.10 | |
| 200.0 | 194.1 | 1.0302 | Slope | 0.969414 | 0.90 - 1.10 | |
| | | | Intercept | -1.920000 | +/-20 | |

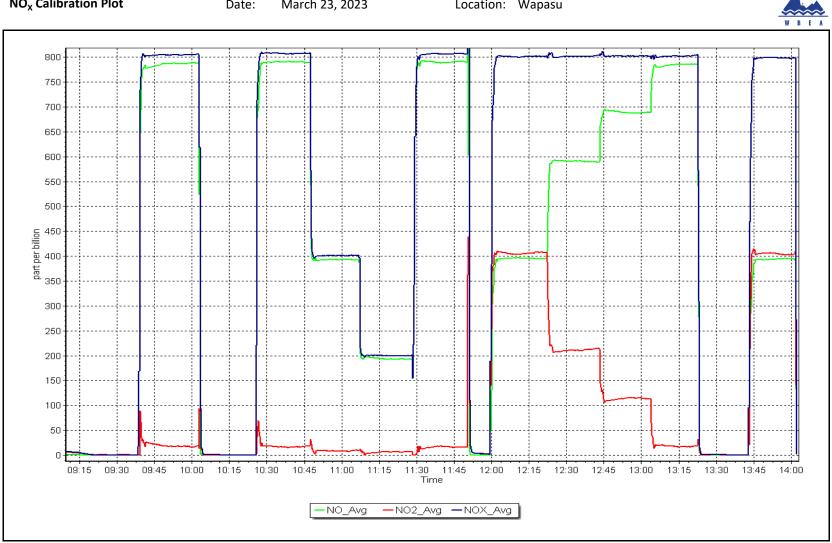




NO₂ Calibration Summary

| WBEA | | | | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 2 | March 23, 2023 | | Februar | y 23, 2023 | |
| Station Name: | Wa | pasu | Station Number: | AN | MS17 | |
| Start Time (MST): | 9:09 | | End Time (MST): | 1 | 4:05 | |
| Analyzer make: | Teledyne | API T200 | Analyzer serial #: 8 | | 833 | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> | |
| 0.0 | 0.3 | | Correlation Coefficient | 0.999999 | ≥0.995 | |
| 407.2 | 407.2 | 1.0000 | correlation coernelent | 0.555555 | 20.000 | |
| 212.4 | 212.5 | 0.9996 | Slope | 0.999015 | 0.90 - 1.10 | |
| 112.5 | 113.0 | 0.9956 | Slope | 0.999015 | 0.90 - 1.10 | |
| | | | Intercept | 0.401105 | +/-20 | |







O₃ Calibration Report

Version-01-2020

| | | | | | Version-01-2020 | |
|--------------------------|---------------------|---------------------------|--------------------------|---------------------------|--------------------------|--|
| | | Station Infor | mation | | | |
| Station Name: | Wapasu | | Station number: | AMS17 | | |
| Calibration Date: | March 3, 2023 | | | | | |
| Start time (MST): | 10:33 | | End time (MST): | - | | |
| Reason: | Routine | | End time (1001). | 13.50 | | |
| | 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: | ΔΡΙ Τ400 | Analyzer into | Analyzer serial #: | 3870 | | |
| Analyzer Range | | | Allalyzer Sellar #. | 3070 | | |
| Analyzer hange | 0 300 pp5 | | | | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | |
| Calibration slope: | 1.005686 | 1.006086 | Backgd or Offset: | -1.8 | -1.8 | |
| Calibration intercept: | -0.320000 | -0.540000 | Coeff or Slope: | 1.020 | 1.020 | |
| | | O ₃ Calibratio | on Data | | | |
| Set Point | Total air flow rate | Calibrator Lamp | Calculated | Indicated concentration C | | |
| | (sccm) | Voltage Drive | concentration (ppb) (Cc) | (ppm) (Ic) | <i>Limit = 0.95-1.05</i> | |
| as found zero | 5000 | 0.0 | 0.0 | -0.3 | | |
| as found span | 5000 | 1077.3 | 400.0 | 403.4 | 0.992 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.1 | | |
| high point | 5000 | 1077.3 | 400.0 | 402.1 | 0.995 | |
| second point | 5000 | 900.3 | 200.0 | 200.5 | 0.998 | |
| third point | 5000 | 789.5 | 100.0 | 99.6 | 1.004 | |
| as left zero | 5000 | 0.0 | 0.0 | -0.1 | | |
| as left span | 5000 | 1077.3 | 400.0 | 406.3 | 0.984 | |
| • | | | Avera | ge Correction Factor | 0.999 | |
| Baseline Corr As found: | 403.7 | Previous response | 402.0 | *% change | 0.4% | |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | | |
| P P | | | | | | |

Notes:

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

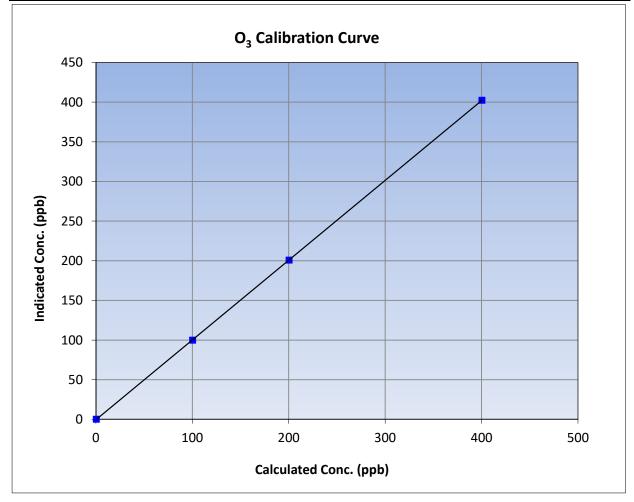
Calibration Performed By:

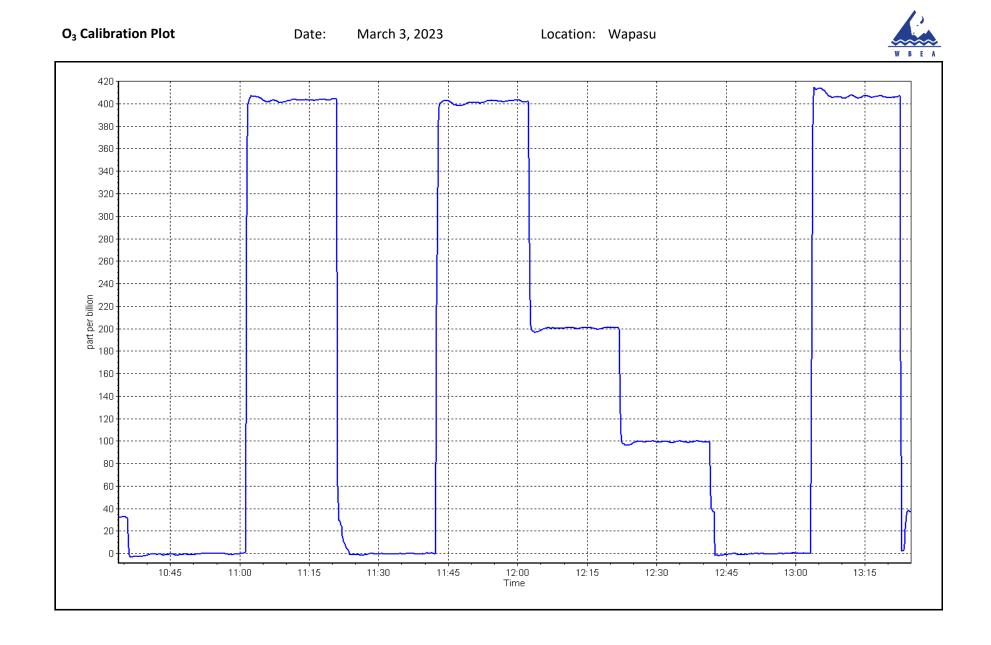
Karan Pandit



O₃ Calibration Summary

| WBEA | | | | | Version-01-202 |
|--|---------------------------------------|------------------------------|-------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | , 2023 | Previous Calibration: | Februar | y 6, 2023 |
| Station Name: | Wapa | asu | Station Number: | AM | 1517 |
| Start Time (MST): | 10:3 | 3 | End Time (MST): | 13:30 | |
| Analyzer make: | API T4 | 400 | Analyzer serial #: | 38 | 370 |
| | | | | | |
| | | Calibu | ation Data | | |
| | | | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | tion | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999995 | ≥0.995 |
| 400.0 | 402.1 | 0.9948 | Correlation Coefficient | 0.999995 | 20.995 |
| 200.0 | 200.5 | 0.9975 | Slope | 1.006086 | 0.90 - 1.10 |
| 100.0 | 99.6 | 1.0040 | Siope | 1.000080 | 0.90 - 1.10 |
| | | | Intercept | -0.540000 | +/- 5 |







T640 PM_{2.5} CALIBRATION

| WBEA | | | | | | Version-01-202 |
|------------------------------------|-----------------|--------------------------|--------------------|--------------|-----------------|----------------|
| | | Station Information | | | | |
| Station Name: | Wapasu | | Station number: | AMS 17 | | |
| Calibration Date: | March 23, 2023 | | Last Cal Date: | | 3, 2023 | |
| Start time (MST): | 10:50 | | End time (MST): | 12:02 | | |
| Analyzer Make: | API T640 | | S/N: | 1183 | | |
| Particulate Fraction: | PM2.5 | | | | | |
| Flow Meter Make/Model: | Delta Cal | | S/N: | 1102 | | |
| Temp/RH standard: | Delta Cal | | S/N: | 1102 | | |
| | | Monthly Calibration Te | est | | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| т (°С) | -1.8 | -1.8 | -1.8 | | | +/- 2 °C |
| P (mmHg) | 706.9 | 708.4 | 706.9 | | | +/- 10 mmHg |
| flow (LPM) | 5.02 | 5.06 | 5.02 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 23, 2023 | Last Cal Date: | February | 23, 2023 | |
| Note: this leak check will be | PM w/o HEPA: | 4.8 | PM w/ HEPA: | - | .0 | <0.2 ug/m3 |
| | | | | | | |
| _ | | Quarterly Calibration T | | | | |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | | Adjusted | (Limits) |
| PMT Peak Test | 11.0 | 11.1 | 11.1 | | | 10.9 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | 8.1 | w/ HEPA: | | 0.0 |
| Date Optical Cham | - | March 23, 2 | | | | <0.2 ug/m3 |
| Disposable Filte | r Changed: | March 23, 2 | 2023 | | | |
| | | Annual Maintenance | 2 | | | |
| | | | | | | |
| Date Sample Tul Date RH/T Sense | - | | | | | |
| Date Kill i Selisi | | | | | | |
| | | | | | | |
| Notes: | No adjustme | ents made. Leak check pa | ssed. Optical chan | nber and inl | et head clea | ned. |
| | | | | | | |

Calibration by:

Karan Pandit



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--------------------------|----------------------------------|--------------------------------|--|---|--|
| Station Name: | Stony Mountain | | Station number: | AMS 18 | |
| Calibration Date: | March 30, 2023 | | Last Cal Date: | February 17, 2023 | |
| Start time (MST): | 9:58 | | End time (MST): | 12:52 | |
| Reason: | Routine | | | | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.40 | | Cal Gas Exp Date: | February 23, 2025 | |
| Cal Gas Cylinder #: | 49.40 CC463851 | ppm | Cal Gas Exp Date: | reprudry 25, 2025 | |
| Removed Cal Gas Conc: | 49.40 | | Pom Cas Eve Data: | ΝΑ | |
| Removed Gas Cyl #: | 49.40 NA | ppm | Rem Gas Exp Date: Diff between cyl: | NA | |
| | | | Serial Number: | 2658 | |
| Calibrator Make/Model: | Teledyne API T700 | | | | |
| ZAG Make/Model: | Teledyne API 701H | | Serial Number: | 360 | |
| | | Analyzer Info | rmation | | |
| Analyzer make | · Thermo 43i | | Analyzer serial #: | IC1501301453 | |
| Analyzer Range | | | Analyzer serial #. | JC1J013014J3 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.008829 | 1.006974 | Backgd or Offset: | 23.0 | 22.9 |
| Calibration intercept: | -0.882227 | -1.482948 | Coeff or Slope: | 0.817 | 0.817 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration ((ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5009 | 0.0 | 0.0 | -0.6 | |
| as found span | 4919 | 81.0 | 800.3 | 801.6 | 0.998 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.2 | |
| high point | 4919 | 81.0 | 800.3 | 804.6 | 0.995 |
| second point | 4959 | 40.5 | 400.2 | 402.1 | 0.995 |
| third point | 4979 | 20.2 | 199.6 | 197.4 | 1.011 |
| as left zero | 5000 | 0.0 | 0.0 | -0.5 | |
| as left span | 4919 | 81.0 | 800.3 | 803.1 | 0.996 |
| · | | | | ge Correction Factor | 1.000 |
| Baseline Corr As found: | 802.20 | Previous response | 806.46 | *% change | -0.5% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | 0.070 |
| Baseline Corr 3rd AF pt: | NA | AF Sope. AF Correlation: | | Ai intercept. | |
| basenne Con Siu AF pl. | IN/A | AF CUITEIdtion. | | | |

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

Calibration Performed By:

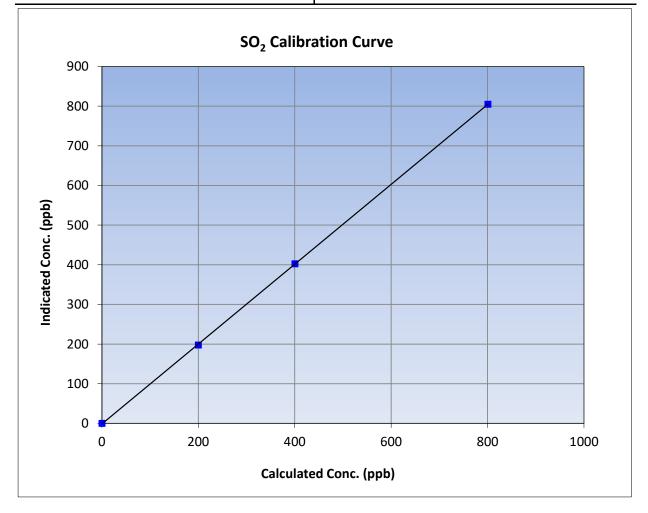


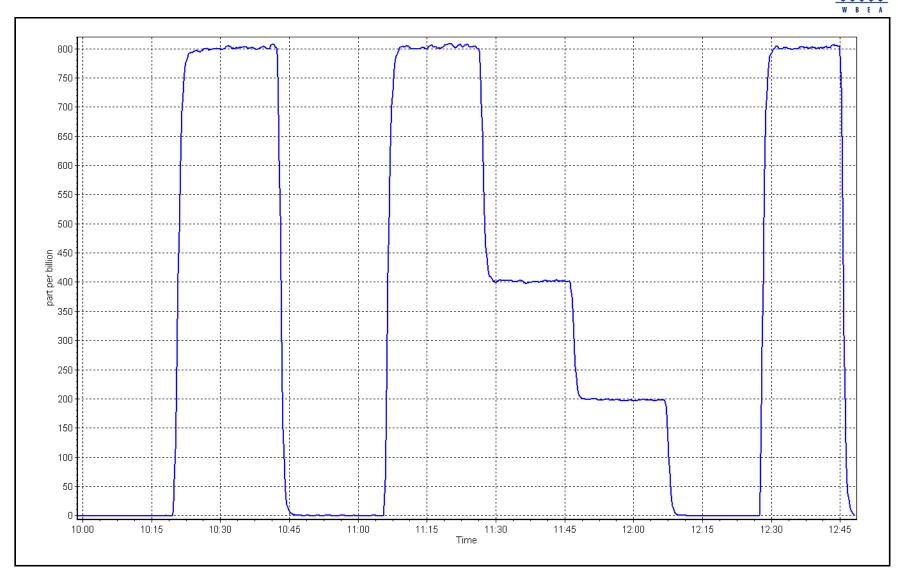
SO₂ Calibration Summary

| W B E A | | | Version-01-2020 | | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|--|
| Station Information | | | | | | | | |
| Calibration Date: | March 30, 2023 | Previous Calibration: | February 17, 2023 | | | | | |
| Station Name: | Stony Mountain | Station Number: | AMS 18 | | | | | |
| Start Time (MST): | 9:58 | End Time (MST): | 12:52 | | | | | |
| Analyzer make: | Thermo 43i | Analyzer serial #: | JC1501301453 | | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | -0.2 | | Correlation Coefficient | 0.999982 | ≥0.995 |
| 800.3 | 804.6 | 0.9946 | correlation coefficient | 0.333302 | 20.333 |
| 400.2 | 402.1 | 0.9952 | Slope | 1.006974 | 0.90 - 1.10 |
| 199.6 | 197.4 | 1.0112 | Slope | 1.000974 | 0.90 - 1.10 |
| | | | Intercept | -1.482948 | +/-30 |





Location: Stony Mountain



TRS Calibration Report

| WBEA | | | | | |
|--|---|--|---|--|--|
| WDEA | | Charles I. Ca | | | Version-11-2 |
| | | Station Info | | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Stony Mountain March 7, 2023 10:34 Routine | | Station number: Last Cal Date: End time (MST): | AMS18 February 13, 2023 14:45 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.479 | nnm | Cal Gas Exp Date: | January 4, 2025 | |
| Cal Gas Cylinder #: | CC500395 | ppm | Cal Gas Exp Date. | January 4, 2025 | |
| Removed Cal Gas Conc: | 5.479 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | ppm | Diff between cyl: | | |
| Calibrator Make/Model: | | | Serial Number: | 2658 | |
| ZAG Make/Model: | Teledyne API T701 | | Serial Number: | 360 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: | Thermo 43i-TLE | | Analyzer serial #: | 1218153359 | |
| Converter make: | CD Nova CDN-101 | | Converter serial #: | | |
| Analyzer Range | 0 - 100 ppb | | | | |
| | | Finish | | Charact | Finish |
| Calibration clone: | <u>Start</u> 1.000870 | <u>Finish</u> 1.005159 | Backgd or Offset: | <u>Start</u> 2.63 | <u>Finish</u> 2.56 |
| Calibration slope: | | 0.260882 | Coeff or Slope: | | 1.151 |
| Calibration intercept: | 0.161019 | 0.260882 | coeff of slope: | 1.151 | 1.151 |
| | | TRS As Four | nd Data | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated | Baseline Adjusted Correction factor |
| Set Point | (sccm) | (sccm) | concentration (ppb) (Cc) | concentration (ppb) (Ic) | |
| as found zero | (sccm) 5000 | - | | concentration (ppb) (Ic) | |
| as found zero | | (sccm) | (Cc) | | Limit = 0.90-1.10 |
| as found zero as found span | 5000 | (sccm) 0.0 | (Cc) 0.0 | 0.1 | Limit = 0.90-1.10 |
| as found zero | 5000 4927 | (sccm) 0.0 73.0 | (Cc) 0.0 80.0 | 0.1 80.7 | Limit = 0.90-1.10 0.992 |
| as found zero as found span as found 2nd point | 5000 4927 4964 | (sccm) 0.0 73.0 36.5 | (Cc) 0.0 80.0 40.0 | 0.1 80.7 40.8 | 0.992 0.983 |
| as found zero as found span as found 2nd point as found 3rd point | 5000 4927 4964 | (sccm) 0.0 73.0 36.5 | (Cc) 0.0 80.0 40.0 20.0 | 0.1 80.7 40.8 | Limit = 0.90-1.10 0.992 0.983 |
| as found zero as found span as found 2nd point as found 3rd point | 5000 4927 4964 4983 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat | (Cc) 0.0 80.0 40.0 20.0 | 0.1 80.7 40.8 20.3 | Limit = 0.90-1.10 |
| as found zero as found span as found 2nd point as found 3rd point | 5000 4927 4964 4983 Dilution air flow rate | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate | (Cc) 0.0 80.0 40.0 20.0 ion Data | 0.1 80.7 40.8 20.3 | Limit = 0.90-1.10 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response | 5000 4927 4964 4983 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated | 0.1 80.7 40.8 20.3 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction facto (Cc/lc) |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response | 5000 4927 4964 4983 Dilution air flow rate | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) | 0.1 80.7 40.8 20.3 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction facto (Cc/lc) |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point | 5000 4927 4964 4983 Dilution air flow rate (sccm) | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) | Limit = 0.90-1.10 0.992 0.983 0.992 Correction facto (Cc/lc) Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction factor (Cc/lc) Limit = 0.95-1.02 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction facto (Cc/lc) Limit = 0.95-1.05 0.992 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 36.5 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 40.6 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction facto (Cc/lc) Limit = 0.992 0.992 0.985 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 4983 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 36.5 18.3 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 40.6 20.4 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction factor (Cc/lc) Limit = 0.95-1.05 0.992 0.985 0.983 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 4983 5000 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 36.5 18.3 0.0 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 0.0 0.0 0.0 0.0 0.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 40.6 20.4 0.3 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction factor (Cc/lc) Limit = 0.95-1.05 0.992 0.985 0.983 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span iO2 Scrubber Check | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 4983 5000 4927 4927 4923 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 36.5 18.3 0.0 73.0 36.5 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 0.0 80.0 0.0 80.0 0.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 40.6 20.4 0.3 80.6 0.1 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction factor (Cc/Ic) Limit = 0.95-1.00 0.992 0.985 0.983 0.992 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 4983 5000 4927 4923 inge: | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 36.5 18.3 0.0 73.0 73.0 73.0 73.0 77.1 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 0.0 80.0 0.0 80.0 0.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 40.6 20.4 0.3 80.6 | Limit = 0.90-1.10 0.992 0.983 0.992 Correction factor (Cc/lc) Limit = 0.95-1.05 0.992 0.985 0.983 0.992 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter eff | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 4983 5000 4927 4923 inge: ficiency test: | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 73.0 36.5 18.3 0.0 73.0 73.0 17-Dec-21 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 771.0 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 40.6 20.4 0.3 80.6 0.1 Ave Corr Factor | Limit = 0.90-1.10 0.992 0.983 0.992 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.992 0.985 0.983 0.992 0.992 0.992 0.987 efficiency |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter eff Baseline Corr As found: | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 4983 5000 4927 4923 inge: ficiency test: 80.6 | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 73.0 36.5 18.3 0.0 73.0 73.0 17-Dec-21 Prev response: | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 771.0 80.22 | 0.1 80.7 40.8 20.3 0.3 0.2 80.6 40.6 20.4 0.3 80.6 0.1 Ave Corr Factor *% change: | Limit = 0.90-1.10 0.992 0.983 0.992 Correction factor (Cc/Ic) Limit = 0.95-1.05 0.992 0.985 0.983 0.992 0.987 efficiency 0.5% |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span SO2 Scrubber Check Date of last scrubber cha Date of last converter eff | 5000 4927 4964 4983 Dilution air flow rate (sccm) 5000 4927 4964 4983 5000 4927 4923 inge: ficiency test: | (sccm) 0.0 73.0 36.5 18.3 TRS Calibrat Source gas flow rate (sccm) 0.0 73.0 73.0 36.5 18.3 0.0 73.0 73.0 17-Dec-21 | (Cc) 0.0 80.0 40.0 20.0 ion Data Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 40.0 20.0 0.0 80.0 100 100 100 100 100 100 100 | 0.1 80.7 40.8 20.3 Indicated concentration (ppb) (Ic) 0.2 80.6 40.6 20.4 0.3 80.6 0.1 Ave Corr Factor | Limit = 0.90-1.10 0.992 0.983 0.992 Correction facto (Cc/lc) Limit = 0.95-1.05 0.992 0.985 0.983 0.992 0.987 efficiency |

Notes:

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

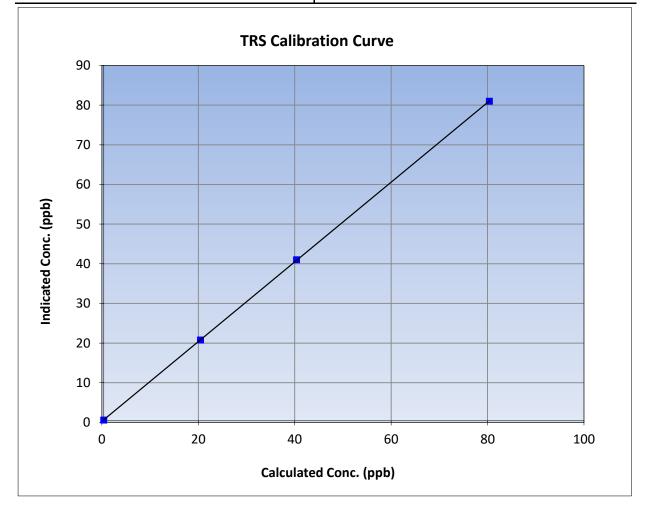


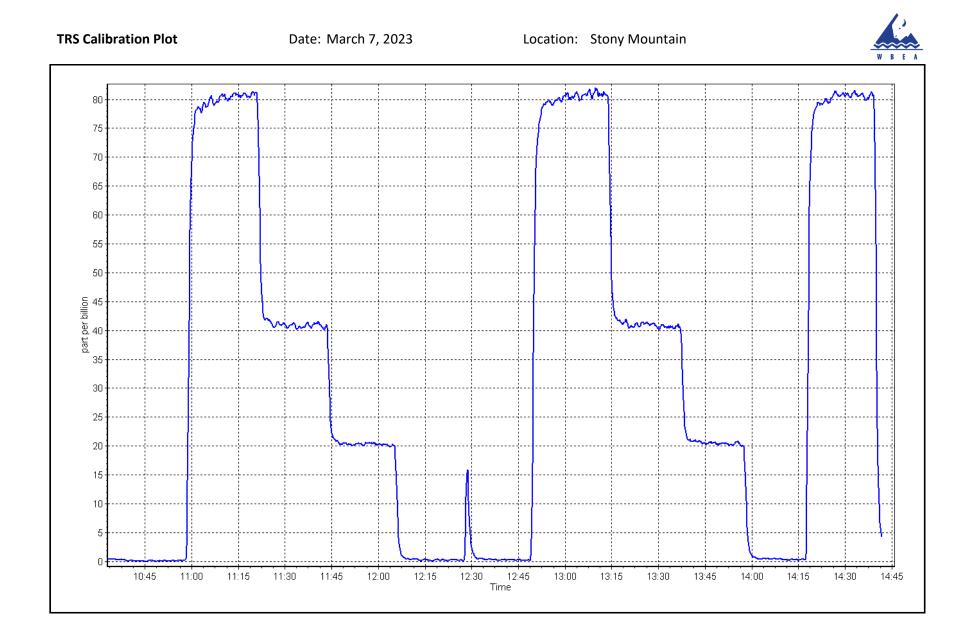
TRS Calibration Summary

| WBEA | | | Version-11-2021 | | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|--|
| Station Information | | | | | | | | |
| Calibration Date: | March 7, 2023 | Previous Calibration: | February 13, 2023 | | | | | |
| Station Name: | Stony Mountain | Station Number: | AMS18 | | | | | |
| Start Time (MST): | 10:34 | End Time (MST): | 14:45 | | | | | |
| 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 | 0.999992 | ≥0.995 |
| 80.0 | 80.6 | 0.9925 | correlation coefficient | 0.999992 | 20.995 |
| 40.0 | 40.6 | 0.9850 | Slope | 1.005159 | 0.90 - 1.10 |
| 20.0 | 20.4 | 0.9827 | Slope | 1.005155 | 0.90 - 1.10 |
| | | | Intercept | 0.260882 | +/-3 |







THC / CH_4 / NMHC Calibration Report

| | | Sta | tion Information | | | | |
|--|---|---------|---|-----------------|---------------|--|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Stony Mountain March 30, 2023 9:58 Routine | | Station number: AMS 18 Last Cal Date: February 17, 2023 End time (MST): 12:52 | | | | |
| | | Cali | bration Standards | | | | |
| Gas Cert Reference: | C | C463851 | Cal Gas Expiry Date: Fe | ebruary 23, 202 | 5 | | |
| CH4 Cal Gas Conc. | 500.8 | ppm | CH4 Equiv Conc. | 1066.8 | ppm | | |
| C3H8 Cal Gas Conc. | 205.8 | ppm | | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: N | A | | | |
| Removed CH4 Conc. | 500.8 | ppm | CH4 Equiv Conc. | 1066.8 | ppm | | |
| Removed C3H8 Conc. | 205.8 | ppm | Diff between cyl (THC): | | | | |
| Diff between cyl (CH ₄ |): | | Diff between cyl (NM): | | | | |
| Calibrator Model: | Teledyne API T7 | 00 | Serial Number: 26 | 558 | | | |
| ZAG make/model: | Teledyne API T7 | 01H | Serial Number: 36 | 50 | | | |
| | | Ana | lyzer Information | | | | |
| Analyzer make | e: Thermo 55i | | Analyzer serial #: 11 | 180320039 | | | |
| 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 | b: 3.06E-04 | 3.06E-0 | 04 NMHC SP Ratio: | 5.66E-05 | 5.66E-05 | | |
| CH4 Retention time | e: 14.60 | 14.60 |) NMHC Peak Area: | 162130 | 162130 | | |

| THC Calibration Data | | | | | | |
|-----------------------|-------------------|----------------------|---------------------|----------------------------|---------------------|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Co | c) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4919 | 81.0 | 17.28 | 17.31 | 0.998 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| high point | 4919 | 81.0 | 17.28 | 17.23 | 1.003 | |
| second point | 4959 | 40.5 | 8.64 | 8.60 | 1.004 | |
| third point | 4979 | 20.2 | 4.31 | 4.28 | 1.007 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4919 | 81.0 | 17.28 | 17.26 | 1.001 | |
| | | | A | verage Correction Factor | 1.005 | |
| Baseline Corr AF: | 17.31 | Prev response | 17.32 | *% change | 0.0% | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| | | NMHC Calib | ration Data | | |
|-----------------------|-------------------|----------------------|-------------------|----------------------------|---------------------|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4919 | 81.0 | 9.17 | 9.16 | 1.001 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4919 | 81.0 | 9.17 | 9.10 | 1.007 |
| second point | 4959 | 40.5 | 4.58 | 4.56 | 1.006 |
| third point | 4979 | 20.2 | 2.29 | 2.27 | 1.006 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4919 | 81 | 9.17 | 9.09 | 1.009 |
| | | | ŀ | Average Correction Factor | 1.006 |
| Baseline Corr AF: | 9.16 | Prev response | 9.16 | *% change | -0.1% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |

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

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | c) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4919 | 81.0 | 8.11 | 8.15 | 0.995 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| high point | 4919 | 81.0 | 8.11 | 8.12 | 0.999 | |
| second point | 4959 | 40.5 | 4.06 | 4.04 | 1.003 | |
| third point | 4979 | 20.2 | 2.02 | 2.01 | 1.009 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4919 | 81.0 | 8.11 | 8.17 | 0.993 | |
| | | | A | verage Correction Factor | 1.004 | |
| Baseline Corr AF: | 8.15 | Prev response | 8.15 | *% change | 0.0% | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation | |
| | | Calibration | Statistics | | | |
| | | <u>Start</u> | | Finish | | |
| THC Cal Slope: | | 1.002575 | | 0.997054 | | |
| THC Cal Offset: | | -0.009777 | | -0.008797 | | |
| CH4 Cal Slope: | | 1.007610 | | 1.001440 | | |
| CH4 Cal Offset: | | -0.020602 | | -0.011209 | | |
| NMHC Cal Slope: | | 0.998345 | | 0.992924 | | |
| NMHC Cal Offset: | | 0.010426 | | 0.002412 | | |

Notes:

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

Calibration Performed By:

Karan Pandit



THC Calibration Summary

| | | Station I | nformation | | |
|---|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March 3 | 30, 2023 | Previous Calibration: | February | 17, 2023 |
| Station Name: | Stony Mountain | | Station Number: | AMS | 5 18 |
| Start Time (MST): | 9: | 58 | End Time (MST): | 12: | 52 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: 1180 | | 20039 |
| | | 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 | 0.999999 | ≥0.995 |
| 17.28 | 17.23 | 1.0032 | | | |
| 8.64 4.31 | 8.60 4.28 | 1.0045 1.0071 | Slope | 0.997054 | 0.90 - 1.10 |
| 4.31 | 4.20 | 1.0071 | Intercept | -0.008797 | +/-0.5 |
| 18.0 16.0 | | | | | |
| 14.0 | | | | | |
| E 12.0 | | | | | |
| (b b) 12.0 (b b) 10.0 (b c) 10.0 (b c) 10.0 (b c) 10.0 (c | | | | | |
| - 0.8 dt | | | | | |
| 0.8 Indicated | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | 2 | 10.0 | 15.0 | |
| 0.0 | 5 | .0 | | 15.0 | 20.0 |
| | | Calculated | l Conc. (ppm) | | |



CH₄ Calibration Summary

| | | Station I | nformation | | |
|---|--|---------------------------|-------------------------|-----------------------------|---------------|
| Calibration Date: | March | | Previous Calibration: | Fahruar | 17 2022 |
| Station Name: | | 30, 2023 1ountain | Station Number: | February 17, 2023 AMS 18 | |
| | - | :58 | | Alvi: 12: | |
| Start Time (MST): | | | End Time (MST): | | |
| Analyzer make: | men | no 55i | Analyzer serial #: | 11803 | 20039 |
| | | Calibra | tion Data | | |
| Calculated concentratio (ppm) (Cc) | on Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999991 | ≥0.995 |
| 8.11 | 8.12 | 0.9991 | | | |
| 4.06 | 4.04 | 1.0034 1.0088 | Slope | 1.001440 | 0.90 - 1.10 |
| 2.02 | 2.01 | 1.0000 | Intercept | -0.011209 | +/-0.5 |
| 8.0 - 7.0 - 6.0 - E | | | | | |
| لطق 5.0 – ن | | | | | |
| - 0.4 - Da | | | | | |
| Indicated Conc. (ppm) 4.0 + 3.0 + | | | | | |
| 2.0 | | | | | |
| 1.0 — | | | | | |
| 0.0 🖛 | 0 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | l Conc. (ppm) | | |



NMHC Calibration Summary

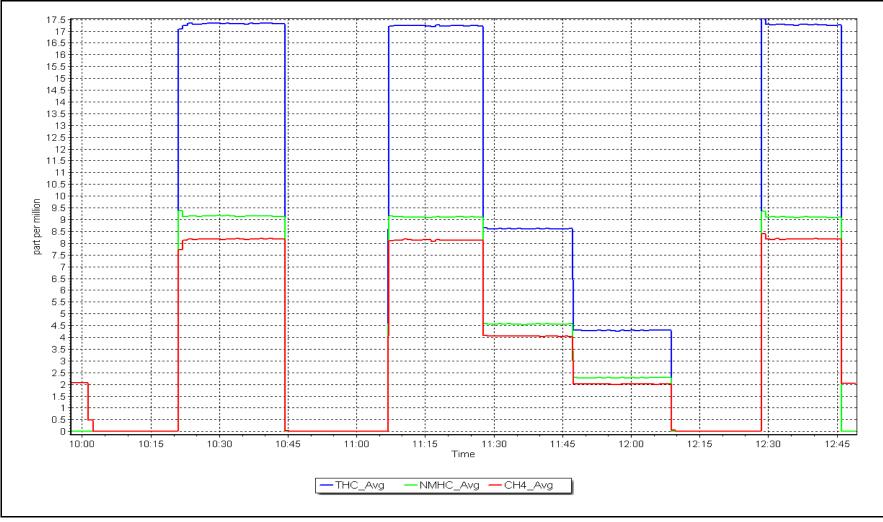
| | | Station I | nformation | | |
|---|--------------------------------------|---------------------------|-------------------------|-------------|---------------|
| Calibration Date: | March | 30, 2023 | Previous Calibration: | February | 17, 2023 |
| Station Name: | Stony N | Aountain | Station Number: | ber: AMS 18 | |
| Start Time (MST): | 9 | :58 | End Time (MST): | 12: | 52 |
| Analyzer make: | Ther | mo 55i | Analyzer serial #: | 11803 | 20039 |
| | | Calibra | tion Data | | |
| Calculated concentration Ir (ppm) (Cc) | ndicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 1.000000 | ≥0.995 |
| 9.17 4.58 | 9.10 4.56 | 1.0071 1.0058 | | | |
| 2.29 | 2.27 | 1.0056 | Slope | 0.992924 | 0.90 - 1.10 |
| | | | Intercept | 0.002412 | +/-0.5 |
| 9.0 8.0 7.0 6.0 5.0 | | | | | |
| 5.0 | | | | | |
| | | | | | |
| Indicated 3.0 | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | 2.0 | 1.0 | | 8.0 | 10.0 |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |

NMHC Calibration Plot

Date: March 30, 2023

Location: Stony Mountain







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information Station Name: Stony Mountain Station number: AMS 18 Calibration Date: March 22, 2023 Last Cal Date: February 22, 2023 Start time (MST): 9:43 End time (MST): 14:15 Reason: Routine **Calibration Standards** NO Gas Cylinder #: T2XX7ME Cal Gas Expiry Date: January 14, 2024 NOX Cal Gas Conc: NO Cal Gas Conc: 49.22 50.48 ppm ppm Removed Cylinder #: NA Removed Gas Exp Date: NA Removed Gas NOX Conc: Removed Gas NO Conc: 50.48 ppm 49.22 ppm NOX gas Diff: NO gas Diff: Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API 701H Serial Number: 360 **Analyzer Information** Analyzer make: Thermo 42i Analyzer serial #: 1336160088 NOX Range (ppb): 0 - 1000 ppb Start Finish Start Finish

| | Start | 1111311 | | Start | 1111311 |
|---------------------|-------|---------|----------------------|-------|---------|
| NO coeff or slope: | 1.043 | 1.062 | NO bkgnd or offset: | 2.9 | 3.0 |
| NOX coeff or slope: | 0.987 | 0.984 | NOX bkgnd or offset: | 2.9 | 3.0 |
| NO2 coeff or slope: | 0.999 | 0.999 | Reaction cell Press: | 222.7 | 223.9 |
| | | | | | |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.002587 | 0.999873 |
| NO _x Cal Offset: | 0.289742 | -0.210265 |
| NO Cal Slope: | 1.003123 | 1.002239 |
| NO Cal Offset: | -0.910073 | -0.950426 |
| NO ₂ Cal Slope: | 0.999064 | 0.999365 |
| NO ₂ Cal Offset: | 0.020158 | -0.185598 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | | ution Calibratio | ii bata | | | | |
|-------------------|------------------------------|--------------------------------|---|--|---|--|---|--|---|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | | |
| as found span | 4919 | 81.3 | 820.8 | 800.3 | 20.5 | 809.4 | 786.6 | 22.9 | 1.0140 | 1.0174 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | | |
| high point | 4919 | 81.3 | 820.8 | 800.3 | 20.5 | 820.4 | 801.2 | 19.2 | 1.0004 | 0.9988 |
| second point | 4959 | 40.7 | 410.9 | 400.7 | 10.3 | 411.1 | 401.3 | 9.8 | 0.9996 | 0.9984 |
| third point | 4980 | 20.3 | 204.9 | 199.8 | 5.1 | 204.0 | 197.6 | 6.4 | 1.0046 | 1.0112 |
| 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 | 362.9 | 457.9 | 821.8 | 358.8 | 463.0 | 0.9987 | 1.0113 |
| | | | | | | | Average C | orrection Factor | 1.0015 | 1.0028 |
| Corrected As fou | und NO _x = | 809.4 ppb | NO = | 786.7 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chan | ge NO _x = | -1.7% |
| Previous Respon | nse NO _X = | 823.2 ppb | NO = | 801.9 ppb | | | | *Percent Chan | ge NO = | -1.9% |
| Baseline Corr 2nd | nd pt NO _X = | NA ppb | NO = | NA ppb | As found | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3rd | d pt NO _x = | NA ppb | NO = | NA ppb | As foun | d NO r^2 : | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 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) | 799.3 | 361.9 | 457.9 | 457.4 | 1.0011 | 99.9% |
| 2nd GPT point (200 ppb O3) | 799.3 | 588.6 | 231.2 | 231.1 | 1.0004 | 100.0% |
| 3rd GPT point (100 ppb O3) | 799.3 | 695.6 | 124.2 | 123.5 | 1.0056 | 99.4% |
| | | | | Average Correction Factor | 1.0023 | 99.8% |

Notes:

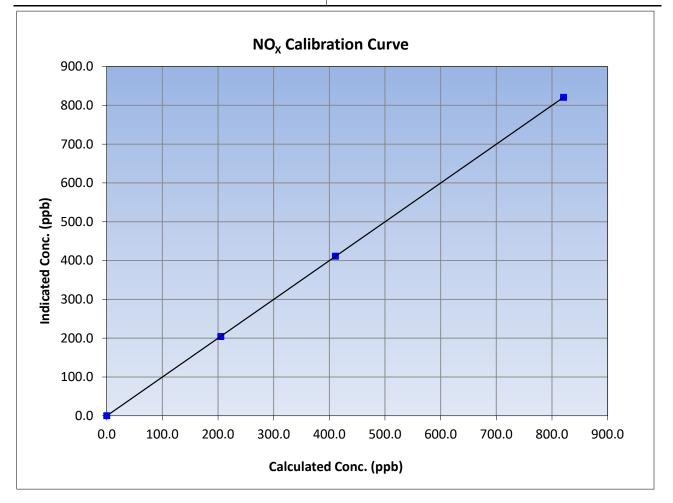
Sample inlet filter changed after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

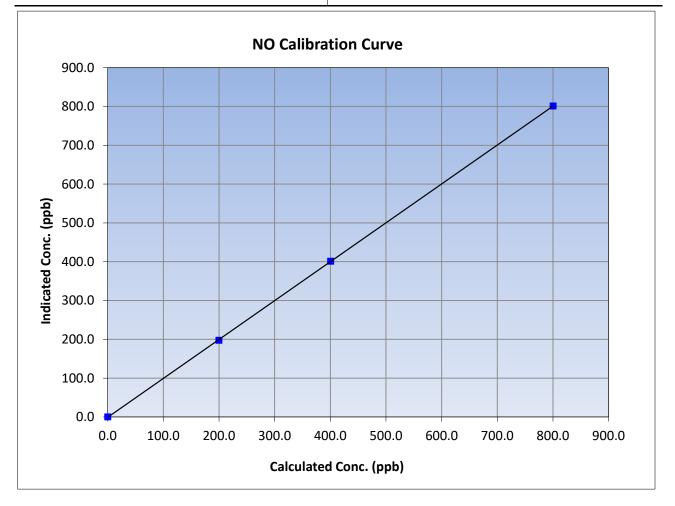
| WBEA | | Station | Information | | Version-04-2 |
|--|---------------------------------------|--------------------------------------|---------------------------------|-----------|----------------|
| | | | | | |
| Calibration Date: | March 2 | 22, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Stony N | Iountain | Station Number: | AM | S 18 |
| Start Time (MST): | MST): 9:43 | | End Time (MST): | 14 | :15 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 13361 | .60088 |
| 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 | | | | |
| 820.8 | 820.4 | 1.0004 | Correlation Coefficient | 0.999998 | ≥0 <i>.995</i> |
| 410.9 | 411.1 | 0.9996 | Slope | 0.999873 | 0.90 - 1.10 |
| 204.9 | 204.0 | 1.0046 | Siope | 0.333075 | 0.90 - 1.10 |
| | | | Intercept | -0.210265 | +/-20 |





NO Calibration Summary

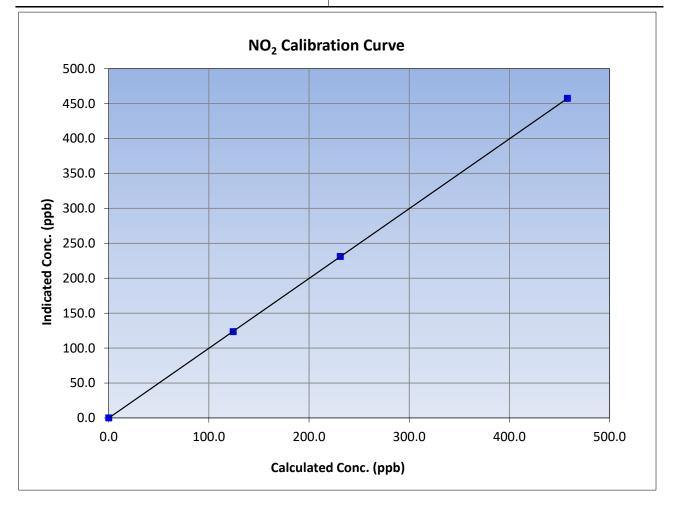
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|--|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 22, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Stony N | Iountain | Station Number: | AM | S 18 |
| Start Time (MST): | 9: | 43 | End Time (MST): | 14: | :15 |
| Analyzer make: | Therr | Thermo 42i Analyzer serial #: 1336160088 | | | |
| | | 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 | >0.005 |
| 800.3 | 801.2 | 0.9988 | correlation coefficient | 0.999900 | ≥0.995 |
| 400.7 | 401.3 | 0.9984 | Slope | 1.002239 | 0.90 - 1.10 |
| 199.8 | 197.6 | 1.0112 | Siope | 1.002239 | 0.30 - 1.10 |
| | | | Intercept | -0.950426 | +/-20 |

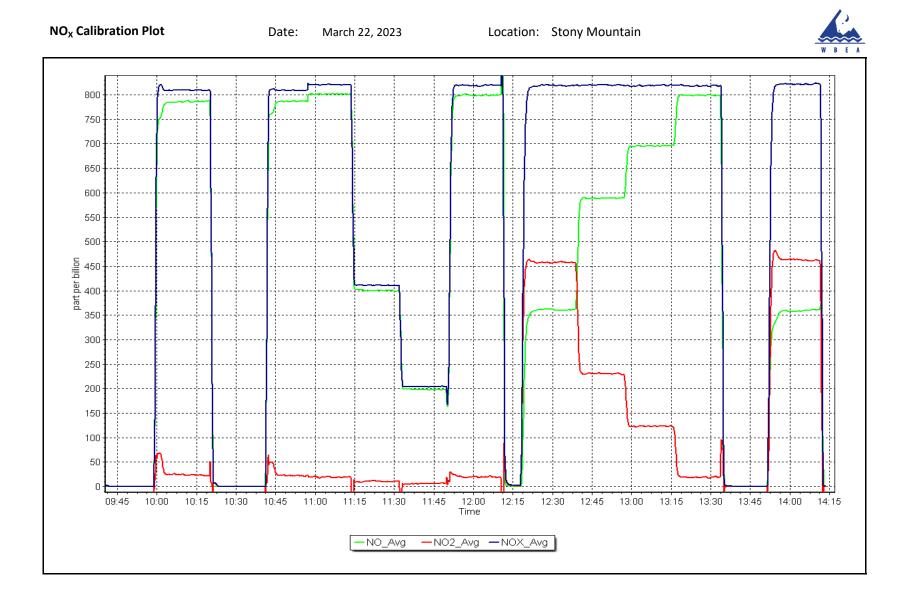




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 22, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Stony Mountain | | Station Number: | AM | S 18 |
| tart Time (MST): 9:43 | | End Time (MST): | 14:15 | | |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 13361 | 60088 |
| | | | | | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999998 | ≥0.995 |
| 457.9 | 457.4 | 1.0011 | correlation coefficient | 0.999996 | 20.333 |
| 231.2 | 231.1 | 1.0004 | Slope | 0.999365 | 0.90 - 1.10 |
| 124.2 | 123.5 | 1.0056 | Slope | 0.555505 | 0.50 1.10 |
| | | | Intercept | -0.185598 | +/-20 |





CALS_348



T640 PM_{2.5} CALIBRATION

| WBEA | | | | | | Version-01-2023 |
|-------------------------------|---------------------|------------------------------------|---|---------------|-----------------|-----------------|
| | | Station Information | | | | |
| Station Name: | Stony Mountain | | Station number: | | | |
| Calibration Date: | March 22, 2023 | | Last Cal Date: | | 4, 2023 | |
| Start time (MST): | 11:05 | | End time (MST): | 12:06 | | |
| Analyzer Make: | API T640 | | S/N: | 1335 | | |
| Particulate Fraction: | PM2.5 | | | | | |
| Flow Meter Make/Model: | Delta Cal | | S/N: | 1102 | | |
| Temp/RH standard: | Delta Cal | | S/N: | 1102 | | |
| | | Monthly Calibration Te | est | | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| T (°C) | -3.1 | -3.2 | -3.1 | | | +/- 2 °C |
| P (mmHg) | 692.0 | 693.3 | 692.0 | | | +/- 10 mmHg |
| flow (LPM) | 4.99 | 4.95 | 4.99 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 22, 2023 | Last Cal Date: | February | 24, 2023 | |
| Note: this leak check will be | PM w/o HEPA: | 6.7 | PM w/ HEPA: | 0. | - | <0.2 ug/m3 |
| Inlet cleaning : | Inlet Head | | | | | |
| | | Quarterly Calibration T | est | | | |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| PMT Peak Test | 10.0 | 10.4 | 11.0 | | \checkmark | 10.9 +/- 0.5 |
| Post-maintenanc | e leak check: | PM w/o HEPA: | 8.6 | w/ HEPA: | | 0.0 |
| Date Optical Chan | nber Cleaned: | March 22, 2 | 2023 | | | <0.2 ug/m3 |
| Disposable Filte | er Changed: | March 22, 2 | 2023 | | | |
| | | | | | | |
| | | Annual Maintenance | e | | | |
| Date Sample Tul | be Cleaned: | August 30, | 2022 | | | |
| Date RH/T Sense | | August 30, | 2022 | | | |
| | | | | | | |
| Notes: | No adjustments made | to temperature, pressure of passed | or flow. Optical chan d. PMT adjusted. | nber and inle | t head clear | ed. Leak check |
| Calibration by: | Karan Pandit | | | | | |



CO Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---------------------------------------|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Stony Mountain March 24, 2023 9:30 Routine | | Station number: Last Cal Date: End time (MST): | AMS 18 February 24, 2023 12:18 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 3,050 | ppm | Cal Gas Exp Date: | December 1, 2028 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: | ALM063503 3,050 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | | Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API T700 Teledyne API T701 | | Serial Number: Serial Number: | 2658 360 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 3504 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.997892 | 1.002302 | Backgd or Offset: | -0.009 | -0.009 |
| Calibration intercept: | 0.161801 | 0.205803 | Coeff or Slope: | 0.904 | 0.904 |
| | | CO Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4933 | 66.7 | 40.7 | 40.9 | 0.994 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4933 | 66.7 | 40.7 | 40.9 | 0.995 |
| second point | 4966 | 33.3 | 20.3 | 20.8 | 0.978 |
| third point | 4983 | 16.7 | 10.2 | 10.4 | 0.982 |
| as left zero | 3000 | 0.0 | 0.0 | 0.2 | |
| as left span | 2960 | 40.0 | 40.7 | 41.1 | 0.991 |
| | | | Avera | ge Correction Factor | 0.985 |
| Baseline Corr As found: | 40.80 | Prev response: | | *% change: | 0.1% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

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

Calibration Performed By:

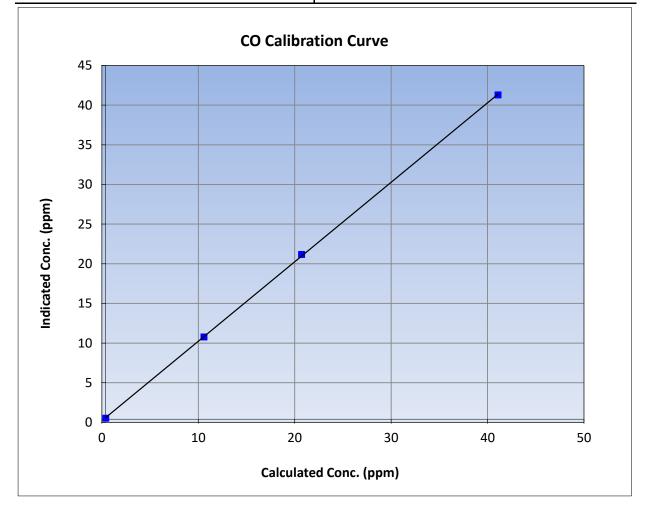


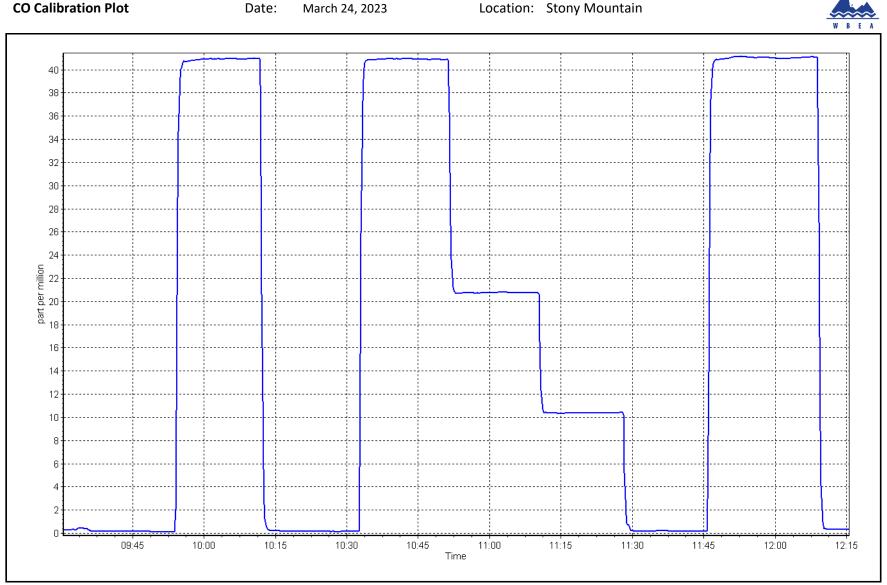
CO Calibration Summary

| Station Information | | | | | | |
|---------------------|------------------------|--|--|--|--|--|
| March 24, 2023 | Previous Calibration: | February 24, 2023 | | | | |
| Stony Mountain | Station Number: | AMS 18 | | | | |
| 9:30 | End Time (MST): | 12:18 | | | | |
| API T300 | Analyzer serial #: | 3504 | | | | |
| | Stony Mountain 9:30 | Stony Mountain Station Number: 9:30 End Time (MST): | | | | |

Calibration Data

| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999939 | ≥0.995 |
| 40.7 | 40.9 | 0.9949 | correlation coefficient | 0.999939 | 20.333 |
| 20.3 | 20.8 | 0.9781 | Slope | 1.002302 | 0.90 - 1.10 |
| 10.2 | 10.4 | 0.9824 | Slope | 1.002302 | 0.30 - 1.10 |
| | | | - Intercept | 0.205803 | +/-1.5 |





March 24, 2023

Location: Stony Mountain



CO₂ Calibration Report

Version-01-2020

| | | | | | Version-01-2020 |
|--|---|---------------------------------------|---|---------------------------------------|---|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Stony Mountain March 29, 2023 9:42 Maintenance | | Station number: Last Cal Date: End time (MST): | AMS 18 February 8, 2023 13:18 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: Removed Cal Gas Conc: | 60,220 ALM063503 60,220 | ppm ppm | Cal Gas Exp Date: Rem Gas Exp Date: | December 1, 2026 | |
| Removed Gas Cyl #: Calibrator Make/Model: N2 Gen Make/Model: | NA Teledyne API T700 Peak Scientific | | Diff between cyl: Serial Number: Serial Number: | 2658 771048317 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | : API T360 e 0 - 2,000 ppm | , | Analyzer serial #: | 283 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 0.999561 1.700000 | <u>Finish</u> 1.008751 4.460000 | Backgd or Offset: Coeff or Slope: | <u>Start</u> -0.059 1.066 | <u>Finish</u> -0.059 1.066 |
| | | CO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/lc Limit = 0.95-1.05 |
| as found zero | 3000 | 0.0 | 0.0 | 0.6 | |
| as found span | 2920 | 80.0 | 1605.9 | 1612.7 | 0.996 |
| as found 2nd point | 2960 | 40.0 | 802.9 | 815.4 | 0.985 |
| as found 3rd point | 2980 | 20.0 | 401.5 | 405.9 | 0.989 |
| new cylinder response | | | | | |
| calibrator zero | 3000 | 0.0 | 0.0 | 0.5 | |
| high point | 2920 | 80.0 | 1605.9 | 1620.5 | 0.991 |
| second point | 2960 | 40.0 | 802.9 | 822.1 | 0.977 |
| third point | 2980 | 20.0 | 401.5 | 409.6 | 0.980 |
| as left zero | 3000 | 0.0 | 0.0 | 0.5 | |
| as left span | 2930 | 80.0 | 1600.5 | 1619.4 | 0.988 |
| | | | Averag | e Correction Factor | 0.983 |
| Baseline Corr As found: | 1612.10 | Prev response: | | *% change: | 0.3% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 814.8 405.3 | AF Slope: AF Correlation: | 1.004019 0.999964 | AF Intercept: | 3.260000 |
| | | | | * = > +/-5% change initiat | es investigation |

Notes:

Pump and sample inlet filter changed after multipoint as founds. No adjustments made.

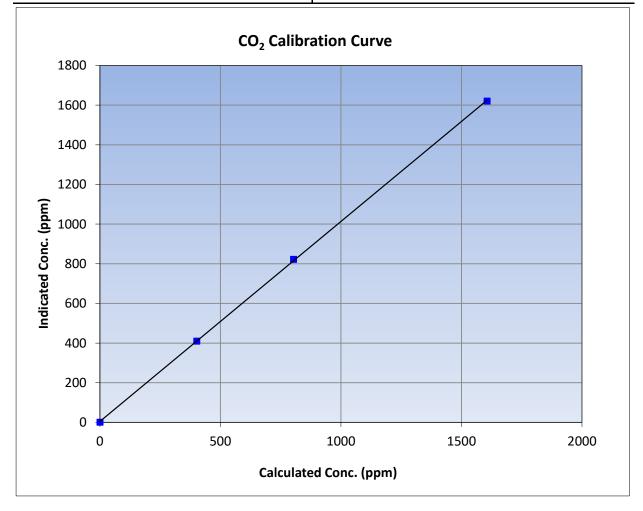
Calibration Performed By:



CO₂ Calibration Summary

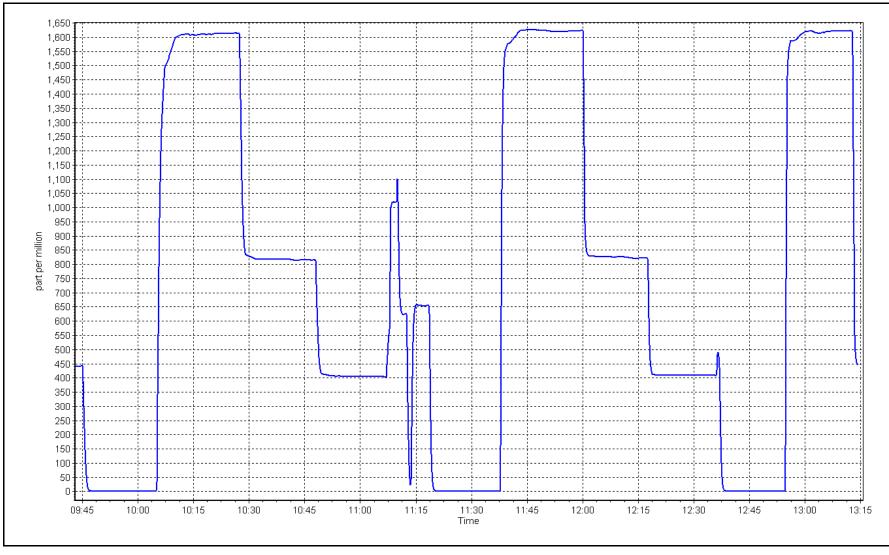
| | Stat | tion Information | |
|------------------|----------------|----------------------|------------------|
| Calibration Date | March 29, 2023 | Previous Calibration | February 8, 2023 |
| Station Name | Stony Mountain | Station Number | AMS 18 |
| Start Time (MST) | 9:42 | End Time (MST) | 13:18 |
| Analyzer make | API T360 | Analyzer serial # | 283 |
| | | | |

| (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|------------|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.5 | | Correlation Coefficient | 0.999937 | ≥0.995 |
| 1605.9 | 1620.5 | 0.9910 | correlation coefficient | 0.999937 | 20.995 |
| 802.9 | 822.1 | 0.9767 | Slope | 1.008751 | 0.90 - 1.10 |
| 401.5 | 409.6 | 0.9801 | Slope | 1.008731 | 0.90 - 1.10 |
| | | | Intercept | 4.460000 | +/-10 |











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS19 FIREBAG MARCH 2023

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

April 29, 2023







SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|--|----------------------------|--|-------------------------------------|--------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Firebag March 7, 2023 11:15 Routine | | Station number: Last Cal Date: End time (MST): | AMS 19 February 7, 2023 14:43 | |
| | | 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 Range | | | Analyzer serial #: | 1410661308 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.998105 -0.121714 | 1.000420 -0.181972 | Backgd or Offset: Coeff or Slope: | | 10.0 0.976 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration C | |
| | (sccm) | (sccm) | concentration (ppb) (Cc) | (ppb) (Ic) | <i>Limit = 0.95-1.05</i> |
| as found zero | 4999 | 0.0 | 0.0 | -0.2 | |
| as found span | 4919 | 81.1 | 799.5 | 808.0 | 0.989 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 4999 | 0.0 | 0.0 | 0.1 | |
| high point | 4919 | 81.1 | 799.5 | 799.7 | 1.000 |
| second point third point | <u>4959</u> 4980 | 40.6 | 400.3 200.1 | 400.3 199.6 | 1.000 |
| as left zero | 4980 | 0.0 | 0.0 | 0.0 | |
| as left span | 4955 | 81.1 | 799.5 | 799.4 | 1.000 |
| as icit span | 7717 | 01.1 | | ge Correction Factor | 1.000 |
| Baseline Corr As found: | 808.20 | Previous response | | *% change | 1.3% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | 2.0/0 |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By:



400.3

400.3

Wood Buffalo Environmental Association

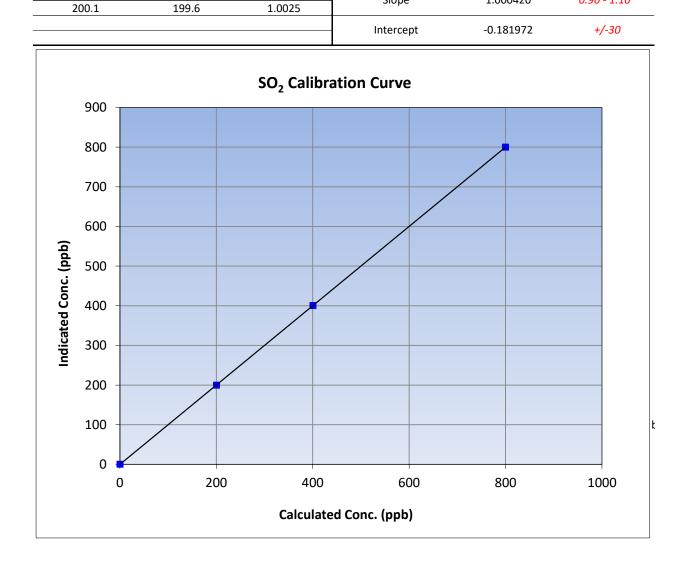
SO₂ Calibration Summary

Slope

1.000420

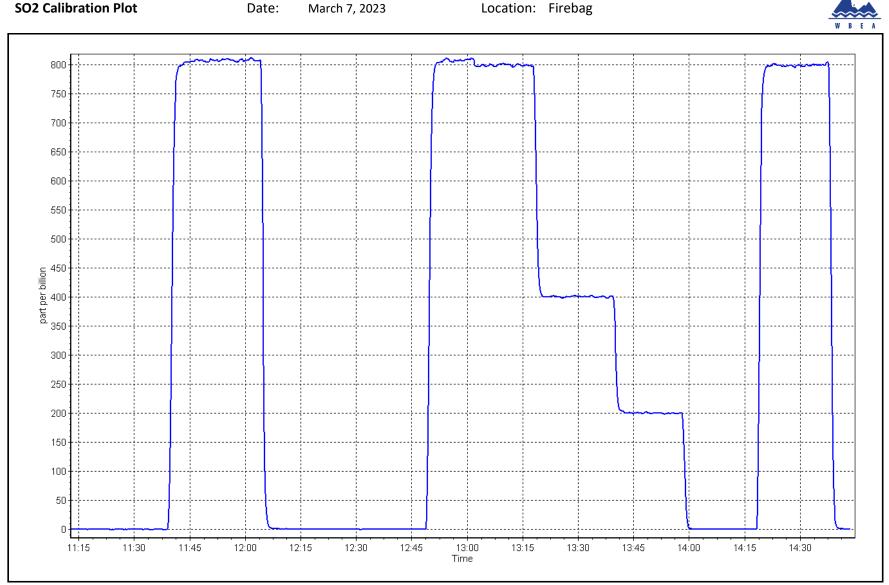
| | | Chatlan | Information | | version-01- |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 7 | , 2023 | Previous Calibration: | February | 7, 2023 |
| Station Name: | Fireb | ag | Station Number: | AMS | 5 19 |
| Start Time (MST): | 11:15 | | End Time (MST): | 14: | 43 |
| Analyzer make: Thern | | o 43i | Analyzer serial #: 1410 | | 61308 |
| | | | | | |
| | | Calib | ration Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | วท | <u>Limits</u> |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999999 | ≥0.995 |
| 799.5 | 799.7 | 0.9997 | conclution coefficient | 0.5555555 | 20.995 |

0.9999



Version-01-2020

0.90 - 1.10





H₂S Calibration Report

| WBEA | | 2 | | • | |
|--|---|--|---|---|--|
| WBEA | | Charles I. Co | | | Version-11- |
| | | Station Info | | | |
| Station Name: | Firebag | | Station number: | AMS19 | |
| Calibration Date: | March 2, 2023 | | Last Cal Date: | February 6, 2023 | |
| tart time (MST): | 11:30 | | End time (MST): | 16:07 | |
| leason: | Routine | | | | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.114 | | Cal Gas Exp Date: | February 5, 2024 | |
| Cal Gas Cylinder #: | CC517427 | ppm | Cal Gas Exp Date. | 1 ebi dai y 5, 2024 | |
| Removed Cal Gas Conc: | 5.114 | ppm | Rem Gas Exp Date: | n/a | |
| Removed Gas Cyl #: | n/a | PPIII | Diff between cyl: | , a | |
| Calibrator Make/Model: | • | | Serial Number: | 1607 | |
| AG Make/Model: | Teledyne API T701 | | Serial Number: | 1118 | |
| AG Make/Model: | Teledyne API 1701 | | Serial Number: | 1118 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: | Thermo 43i-TLE | | Analyzer serial #: | 1336160090 | |
| Converter make: | Global | | Converter serial #: | 2022-222 | |
| Analyzer Range | 0 - 100 ppb | | | | |
| ,00 | | eta ta t | | Charle 1 | et at d |
| | <u>Start</u> | <u>Finish</u> | Dud bott | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.997909 | 1.003769 | Backgd or Offset: | 2.96 | 3.18 |
| Calibration intercept: | 0.118481 | 0.038321 | Coeff or Slope: | 0.979 | 0.990 |
| | | H ₂ S As Four | nd Data | | |
| | | | | | Baseline Adjuste |
| Cat Daint | Dilution air flow rate | Source gas flow rate | Calculated | Indicated | Correction facto |
| Set Point | (sccm) | (sccm) | concentration (ppb) | concentration (ppb) (Ic) | (Cc/(Ic-AFzero) |
| | | | (Cc) | | <i>Limit = 0.90-1.1</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4922 | 78.2 | 80.0 | 79.3 | 1.010 |
| as found 2nd point | 4961 | 39.1 | 40.0 | 39.8 | 1.007 |
| as found 3rd point | 4980 | 19.6 | 20.0 | 20.0 | 1.007 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrati | ion Data | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated | Correction facto |
| Set Point | (sccm) | (sccm) | concentration (ppb) | concentration (ppb) (Ic) | (Cc/Ic) |
| | (seeiii) | (seeiii) | (Cc) | concentration (ppb) (ic) | Limit = 0.95-1.0 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| | | | 80.0 | 80.3 | 0.996 |
| high point | 4922 | 78.2 | | | - |
| second point | 4961 | 39.1 | 40.0 | 40.2 | 0.995 |
| second point third point | 4961 4980 | 39.1 19.6 | 40.0 20.0 | 40.2 20.2 | 0.992 |
| second point third point as left zero | 4961 4980 5000 | 39.1 19.6 0.0 | 40.0 20.0 0.0 | 40.2 20.2 0.0 | 0.992 |
| second point third point as left zero as left span | 4961 4980 5000 4922 | 39.1 19.6 0.0 78.2 | 40.0 20.0 0.0 80.0 | 40.2 20.2 0.0 80.1 | 0.992 |
| second point third point as left zero as left span O2 Scrubber Check | 4961 4980 5000 4922 4922 | 39.1 19.6 0.0 | 40.0 20.0 0.0 | 40.2 20.2 0.0 | 0.992 |
| second point third point as left zero as left span O2 Scrubber Check | 4961 4980 5000 4922 4922 | 39.1 19.6 0.0 78.2 | 40.0 20.0 0.0 80.0 | 40.2 20.2 0.0 80.1 | 0.992 0.998 |
| second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha | 4961 4980 5000 4922 4922 ange: | 39.1 19.6 0.0 78.2 78.3 | 40.0 20.0 0.0 80.0 | 40.2 20.2 0.0 80.1 0.0 | 0.992 0.998 |
| second point third point as left zero as left span 602 Scrubber Check Date of last scrubber cha Date of last converter ef | 4961 4980 5000 4922 4922 ange: ficiency test: | 39.1 19.6 0.0 78.2 78.3 December 9, 2021 n/a | 40.0 20.0 0.0 80.0 800.2 | 40.2 20.2 0.0 80.1 0.0 Ave Corr Factor | 0.992 0.998 0.994 efficiency |
| second point third point as left zero as left span 602 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found: | 4961 4980 5000 4922 4922 ange: ficiency test: 79.2 | 39.1 19.6 0.0 78.2 78.3 December 9, 2021 n/a Prev response: | 40.0 20.0 0.0 80.0 800.2 79.93 | 40.2 20.2 0.0 80.1 0.0 Ave Corr Factor *% change: | 0.992 0.998 0.994 efficiency -0.9% |
| second point third point as left zero | 4961 4980 5000 4922 4922 ange: ficiency test: | 39.1 19.6 0.0 78.2 78.3 December 9, 2021 n/a | 40.0 20.0 0.0 80.0 800.2 79.93 0.990191 | 40.2 20.2 0.0 80.1 0.0 Ave Corr Factor | 0.992 0.998 0.994 efficiency |

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

Calibration Performed By:

Notes:

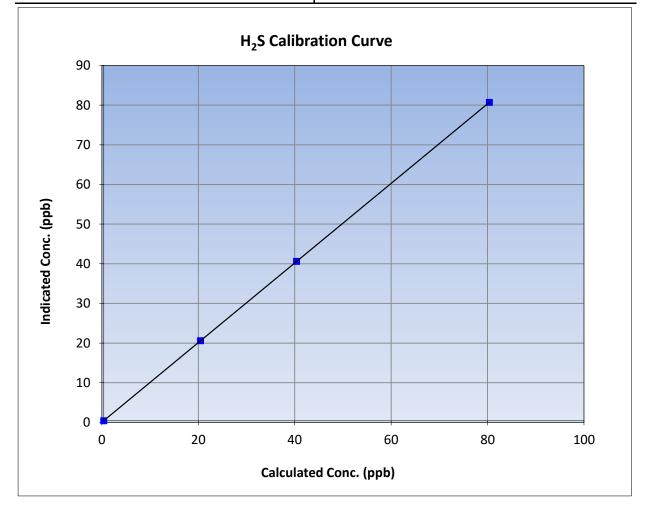
Braiden Boutilier

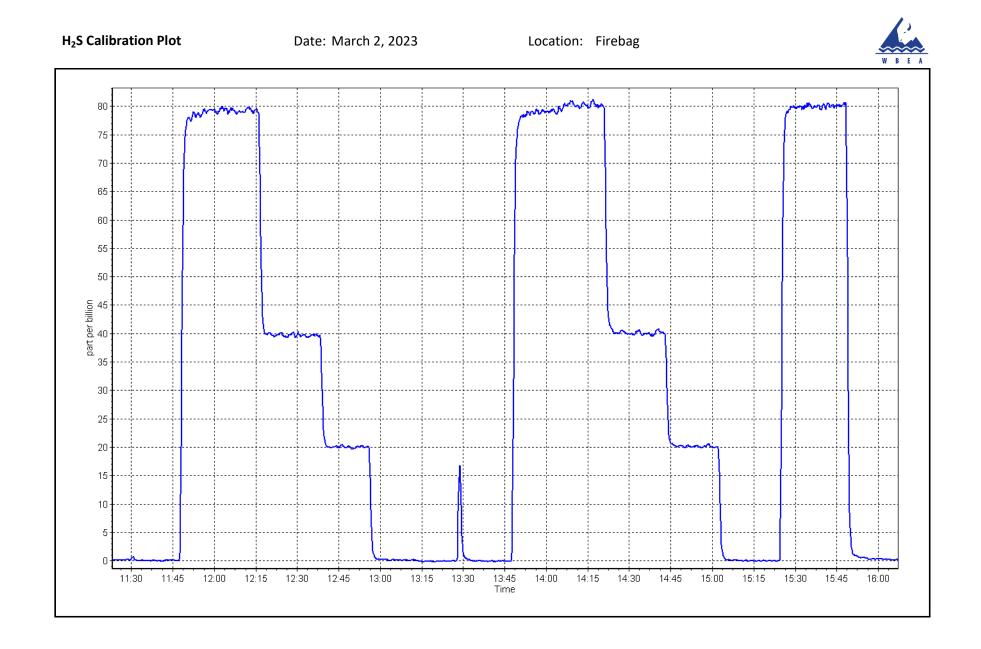


H₂S Calibration Summary

| WBEA | | | Version-11-2021 |
|-------------------|----------------|-----------------------|------------------|
| | Stati | on Information | |
| Calibration Date: | March 2, 2023 | Previous Calibration: | February 6, 2023 |
| Station Name: | Firebag | Station Number: | AMS19 |
| Start Time (MST): | 11:30 | End Time (MST): | 16:07 |
| Analyzer make: | Thermo 43i-TLE | Analyzer serial #: | 1336160090 |

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.0 | | Correlation Coefficient | 0.999999 | ≥0.995 |
| 80.0 | 80.3 | 0.9960 | correlation coefficient | 0.9999999 | 20.333 |
| 40.0 | 40.2 | 0.9948 | Slope | 1.003769 | 0.90 - 1.10 |
| 20.0 | 20.2 | 0.9925 | Slope | 1.003709 | 0.30 - 1.10 |
| | | | - Intercept | 0.038321 | +/-3 |







THC Calibration Report

Version-01-2020

| | | Station Info | rmation | | |
|---|---|---|---|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Firebag March 7, 2023 11:15 Routine | | Station number: Last Cal Date: End time (MST): | AMS 19 February 7, 2023 14:43 | |
| | | 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 | e: Thermo 51i-LT e: 0 - 20 ppm | | Analyzer serial #: | 1336160089 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 0.986792 0.033117 | <u>Finish</u> 0.998521 -0.017736 | Background: Coefficient: | | <u>Finish</u> 2.24 3.732 |
| | | 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) <i>Limit = 0.95-1.05</i> |
| | | | | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.12 | |
| as found zero as found span | 5000 4919 | 0.0 81.1 | 0.00 17.31 | 0.12 17.56 | 0.985 |
| as found span as found 2nd point as found 3rd point | | | | - | |
| as found span as found 2nd point | | | | - | |
| as found span as found 2nd point as found 3rd point new cylinder response | 4919 | 81.1 | 17.31 | 17.56 | 0.985 |
| as found span as found 2nd point as found 3rd point new cylinder response calibrator zero | 4919 4999 | 0.0 | 0.00 | 0.02 | 0.985 |
| as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point | 4919 4999 4919 | 81.1 0.0 81.1 | 17.31 0.00 17.31 8.66 4.33 | 0.02 17.29 | 0.985 1.001 |
| as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero | 4919 4999 4919 4959 4980 5000 | 81.1 0.0 81.1 40.6 20.3 0.0 | 17.31 0.00 17.31 8.66 4.33 0.00 | 0.02 17.29 8.59 4.28 0.05 | 0.985 1.001 1.009 1.012 |
| as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point | 4919 4999 4919 4959 4980 | 81.1 0.0 81.1 40.6 20.3 | 17.31 0.00 17.31 8.66 4.33 0.00 17.31 | 0.02 17.29 8.59 4.28 0.05 17.35 | 0.985 1.001 1.009 1.012 0.997 |
| 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 | 4919 4999 4919 4959 4980 5000 4919 | 81.1 0.0 81.1 40.6 20.3 0.0 81.1 | 17.31 0.00 17.31 8.66 4.33 0.00 17.31 Averag | 0.02 17.29 8.59 4.28 0.05 17.35 ge Correction Factor | 0.985 1.001 1.009 1.012 0.997 1.007 |
| 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: | 4919 4999 4919 4959 4980 5000 4919 17.44 | 81.1 0.0 81.1 40.6 20.3 0.0 81.1 Previous response | 17.31 0.00 17.31 8.66 4.33 0.00 17.31 Averag 17.11 | 0.02 17.29 8.59 4.28 0.05 17.35 ge Correction Factor *% change | 0.985 1.001 1.009 1.012 0.997 1.007 1.9% |
| 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 | 4919 4999 4919 4959 4980 5000 4919 | 81.1 0.0 81.1 40.6 20.3 0.0 81.1 | 17.31 0.00 17.31 8.66 4.33 0.00 17.31 Averag 17.11 | 0.02 17.29 8.59 4.28 0.05 17.35 ge Correction Factor | 0.985 1.001 1.009 1.012 0.997 1.007 1.9% |

Notes:

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

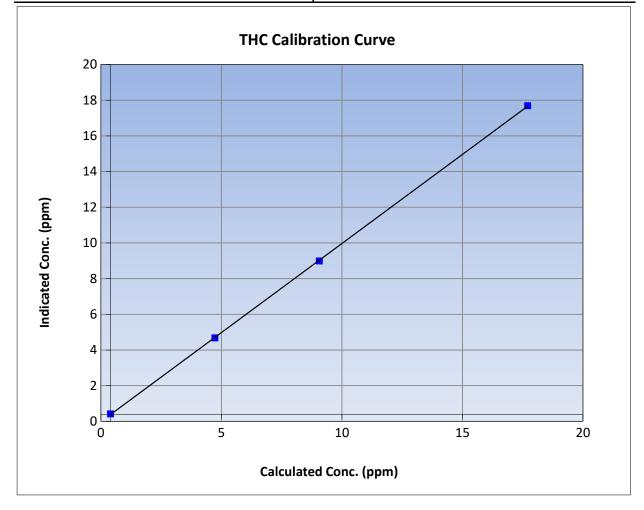
Calibration Performed By:

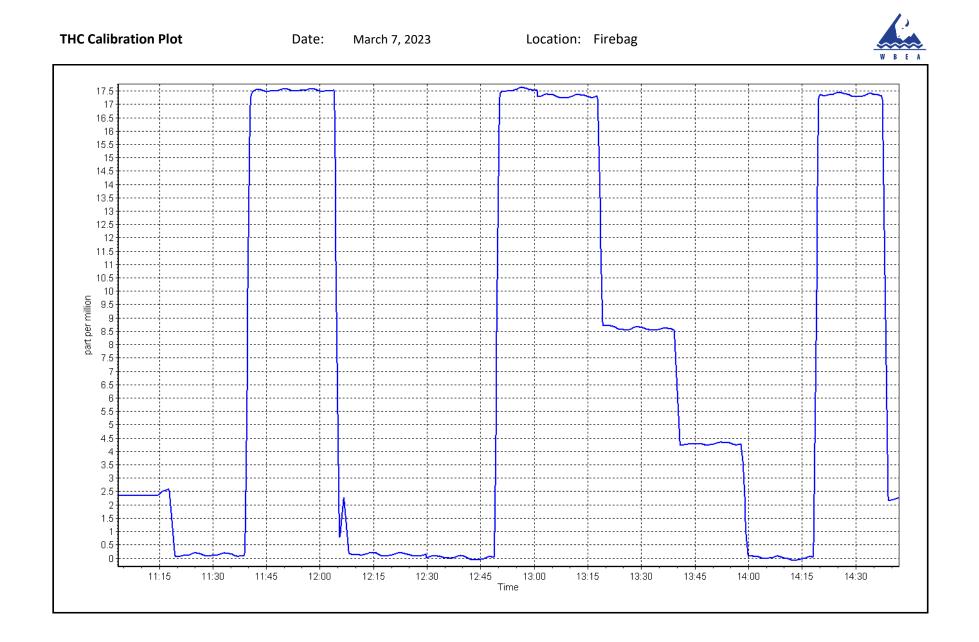


THC Calibration Summary

| W B E A | | | Version-01-2020 |
|-------------------|---------------|-----------------------|------------------|
| | Stati | ion Information | |
| Calibration Date: | March 7, 2023 | Previous Calibration: | February 7, 2023 |
| Station Name: | Firebag | Station Number: | AMS 19 |
| Start Time (MST): | 11:15 | End Time (MST): | 14:43 |
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1336160089 |

| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|--|------------------------------|-------------------------|-----------|---------------|
| 0.00 | 0.02 | | Correlation Coefficient | 0.999969 | ≥0.995 |
| 17.31 | 17.29 | 1.0009 | correlation coefficient | 0.555505 | 20.333 |
| 8.66 | 8.59 | 1.0086 | Slope | 0.998521 | 0.90 - 1.10 |
| 4.33 | 4.28 | 1.0115 | 510pe | 0.998521 | 0.30 - 1.10 |
| | | | Intercept | -0.017736 | +/-1.5 |







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | Statio | n Information | | |
|--|--|--|---|---|--------------------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Firebag March 3, 2023 11:14 Routine | | Station number: Last Cal Date: End time (MST): | February 8, 2023 | |
| | | Calibra | tion 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 | Finish 1.041 0.996 1.000 | er Information Analyzer serial #: NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press: | 1410661309 <u>Start</u> 7.3 7.3 210.9 | <u>Finish</u> 7.2 7.3 206.6 |
| | | Calibra | ation Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| NO _x Cal Slope: | | 0.997423 | | 0.994815 | |
| NO _x Cal Offset: | | 0.135510 | | 0.755137 | |
| NO Cal Slope: | | 0.998470 | | 0.993858 | |
| NO Cal Offset: | | -0.351682 | | 0.287575 | |
| NO ₂ Cal Slope: | | 0.999864 | | 1.003159 | |
| NO ₂ Cal Offset: | | -0.568980 | | 0.561215 | |



$NO_X \setminus NO \setminus NO_2$ 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 | 4999 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.2 | -0.1 | | |
| as found span | 4919 | 81.0 | 828.1 | 800.3 | 27.9 | 825.0 | 794.6 | 30.1 | 1.0038 | 1.0071 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 4999 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | | |
| high point | 4919 | 81.0 | 828.1 | 800.3 | 27.9 | 824.0 | 795.3 | 29.1 | 1.0050 | 1.0063 |
| second point | 4960 | 40.5 | 414.0 | 400.1 | 13.9 | 413.7 | 398.6 | 15.1 | 1.0008 | 1.0038 |
| third point | 4980 | 20.2 | 206.5 | 199.6 | 6.9 | 206.5 | 198.7 | 7.8 | 1.0001 | 1.0044 |
| 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 | 364.8 | 463.4 | 827.0 | 358.3 | 468.3 | 1.0014 | 1.0181 |
| | | | | | | | Average C | orrection Factor | 1.0020 | 1.0048 |
| Corrected As fo | ound NO _x = | 825.2 ppb | NO = | 794.8 ppb | * = > +/-5% | 6 change initiates i | nvestigation | *Percent Chan | ge NO _x = | -0.1% |
| Previous Respo | onse NO _x = | 826.1 ppb | NO = | 798.7 ppb | | | | *Percent Chan | ge NO = | -0.5% |
| 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 | $1 	NO r^2$: | | NO SI: | NO Int: | |
| | | | | | As found | $1 NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 concentration (ppb) (Ic) | NO2 Correction factor (Cc/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) | 793.1 | 357.6 | 463.4 | 465.2 | 0.9961 | 100.4% |
| 2nd GPT point (200 ppb O3) | 793.1 | 575.8 | 245.2 | 246.5 | 0.9946 | 100.5% |
| 3rd GPT point (100 ppb O3) | 793.1 | 686.4 | 134.6 | 136.2 | 0.9880 | 101.2% |
| | | | | Average Correction Factor | 0.9929 | 100.7% |

Notes:

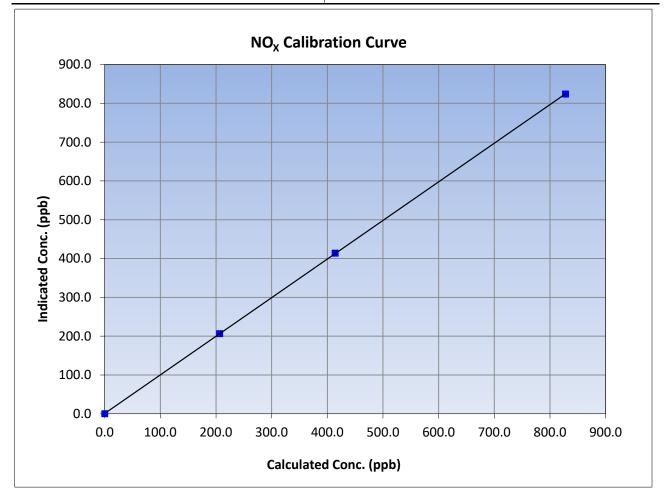
No adjustments made. Changed sample inlet filter after as founds.

Calibration Performed By:



NO_x Calibration Summary

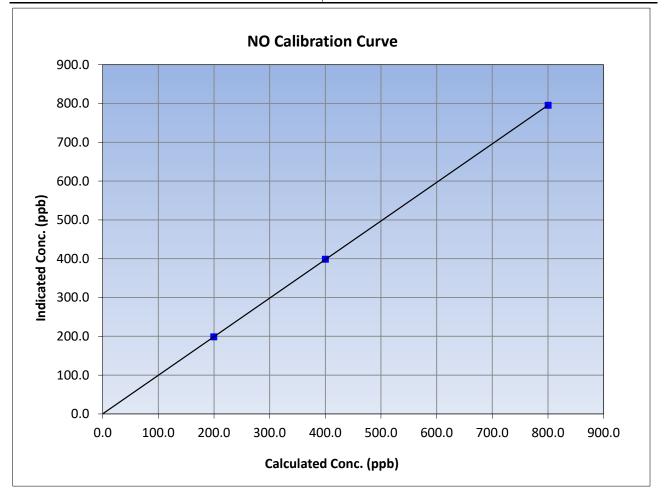
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | February | / 8, 2023 |
| Station Name: | Fire | ebag | Station Number: | AM | S 19 |
| Start Time (MST): | 11 | :14 | End Time (MST): | 16 | :11 |
| Analyzer make: | | | Analyzer serial #: | 14106 | 61309 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 828.1 | 824.0 | 1.0050 | correlation coefficient | 0.5555554 | 20.999 |
| 414.0 | 413.7 | 1.0008 | Slopp | 0.994815 | 0.90 - 1.10 |
| 206.5 | 206.5 | 1.0001 | Slope | 0.994615 | 0.90 - 1.10 |
| | | | Intercept | 0.755137 | +/-20 |





NO Calibration Summary

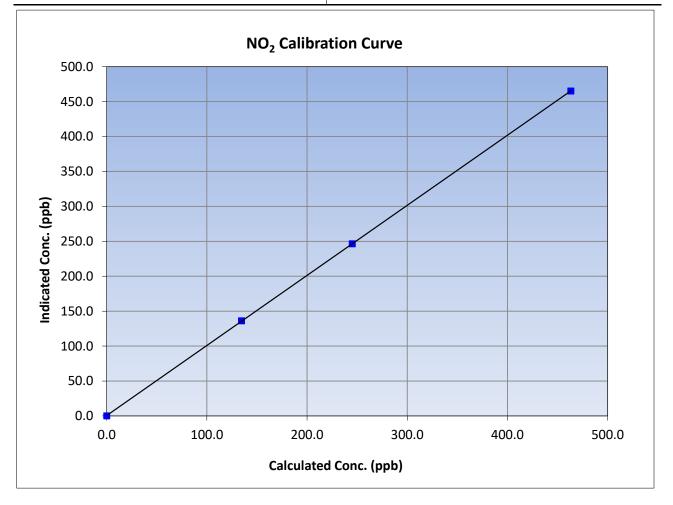
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|----------------|
| | | Station | Information | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | Februar | y 8, 2023 |
| Station Name: | Fire | ebag | Station Number: | AM | S 19 |
| Start Time (MST): | 11 | :14 | End Time (MST): | 16 | :11 |
| Analyzer make: | | | Analyzer serial #: | 14106 | 661309 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999998 | ≥0.995 |
| 800.3 | 795.3 | 1.0063 | correlation coernelent | 0.5555558 | 20.995 |
| 400.1 | 398.6 | 1.0038 | Slope | 0.993858 | 0.90 - 1.10 |
| 199.6 | 198.7 | 1.0044 | Slope | 0.995656 | 0.90 - 1.10 |
| | | | Intercept | 0.287575 | +/-20 |

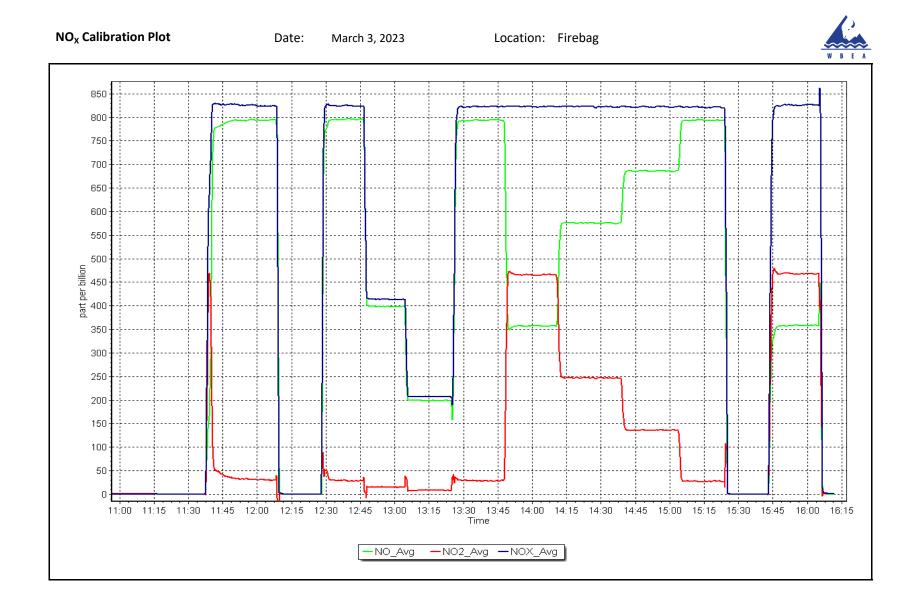




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 3, 2023 | Previous Calibration: | February | y 8, 2023 |
| Station Name: | Fire | ebag | Station Number: | AM | S 19 |
| Start Time (MST): | 11 | :14 | End Time (MST): | 16 | :11 |
| Analyzer make: | | | Analyzer serial #: | 14106 | 61309 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 463.4 | 465.2 | 0.9961 | correlation coefficient | 0.555554 | 20.995 |
| 245.2 | 246.5 | 0.9946 | Slope | 1.003159 | 0.90 - 1.10 |
| 134.6 | 136.2 | 0.9880 | Siope | 1.005159 | 0.90 - 1.10 |
| | | | Intercept | 0.561215 | +/-20 |







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS20 MACKAY RIVER MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---------------------------------------|---|
| Station Name: Calibration Date: Start time (MST): Reason: | MacKay River March 1, 2023 10:51 Routine | | Station number: Last Cal Date: End time (MST): | AMS20 February 1, 2023 14:17 | |
| | | | | | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | <u>49.22</u> | ppm | Cal Gas Exp Date: | February 23, 2025 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: | <u>CC306868</u> <u>49.22</u> | nnm | Rem Gas Exp Date: | ΝΔ | |
| Removed Gas Cyl #: | | ppin | Diff between cyl: | NA | |
| • | NA Taladuna ADI T700 | | Serial Number: | 1220 | |
| Calibrator Make/Model: | Teledyne API T700 | | | - | |
| ZAG Make/Model: | Teledyne API 701 | | Serial Number: | 4522 | |
| | | Analyzer Info | rmation | | |
| Analyzer make | : Thermo 43i | | Analyzer serial #: | 1501301450 | |
| Analyzer Range | | | | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.999451 | 0.992140 | Backgd or Offset: | 18.6 | 19.1 |
| Calibration intercept: | 2.850831 | 3.311046 | Coeff or Slope: | 0.974 | 0.974 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/lc Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | -0.1 | |
| as found span | 4919 | 81.3 | 800.3 | 794.1 | 1.008 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4919 | 81.3 | 800.3 | 796.0 | 1.005 |
| second point | 4959 | 40.7 | 400.7 | 401.5 | 0.998 |
| third point | 4980 | 20.3 | 199.8 | 205.4 | 0.973 |
| as left zero | 5000 | 0.0 | 0.0 | -0.1 | |
| as left span | 4919 | 81.3 | 800.3 | 796.6 | 1.005 |
| | | | Averag | ge Correction Factor | 0.992 |
| Baseline Corr As found: | 794.20 | Previous response | 802.68 | *% change | -1.1% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| baseline Con Zhu Ar pl. | | | | | |

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

Calibration Performed By:

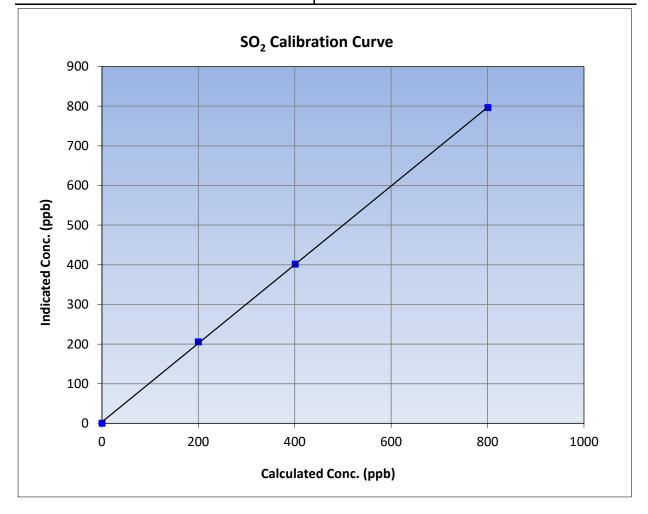
Mohammed Kashif

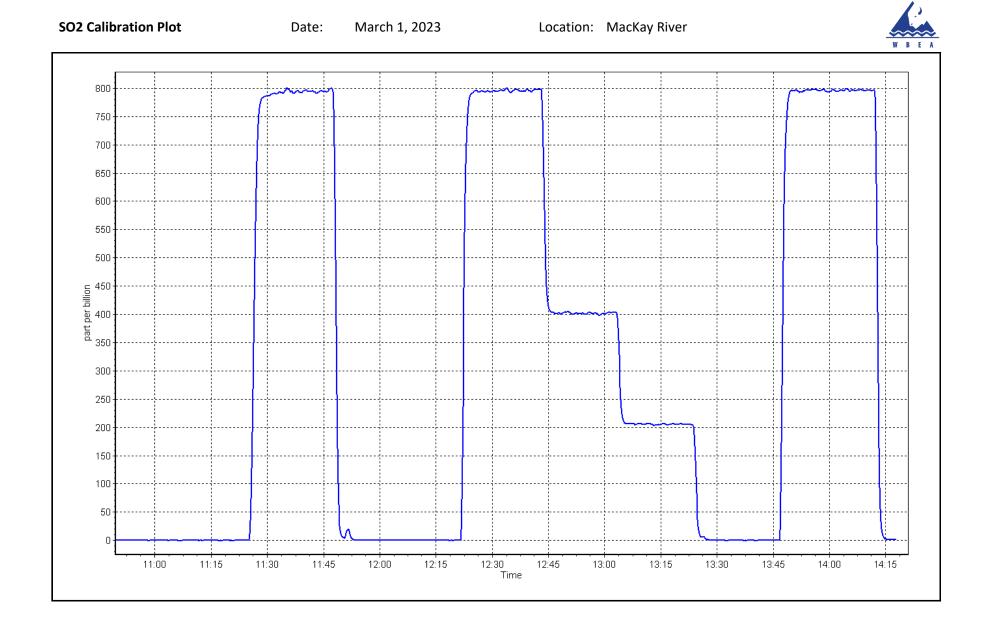


SO₂ Calibration Summary

| WBEA | | | Version-01-2020 | | |
|---------------------|---------------|-----------------------|------------------|--|--|
| Station Information | | | | | |
| Calibration Date: | March 1, 2023 | Previous Calibration: | February 1, 2023 | | |
| Station Name: | MacKay River | Station Number: | AMS20 | | |
| Start Time (MST): | 10:51 | End Time (MST): | 14:17 | | |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1501301450 | | |
| | | | | | |

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999921 | ≥0.995 |
| 800.3 | 796.0 | 1.0054 | correlation coefficient | 0.999921 | 20.335 |
| 400.7 | 401.5 | 0.9979 | Slope | 0.992140 | 0.90 - 1.10 |
| 199.8 | 205.4 | 0.9728 | Slope | 0.992140 | 0.90 - 1.10 |
| | | | Intercept | 3.311046 | +/-30 |







H₂S Calibration Report

| WBEA | | - | | | Version-11-2 |
|---|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | v Cr SIOII-11-2 |
| Station Name: Calibration Date: Start time (MST): Reason: | MacKay River March 2, 2023 10:17 Routine | | Station number: Last Cal Date: End time (MST): | AMS20 February 13, 2023 15:13 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 4.87 | ppm | Cal Gas Exp Date: | May 5, 2023 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make (Madel) | EY0001922 4.87 NA | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | NA 1220 | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API 700 | | Serial Number: Serial Number: | 4522 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Teledyne API T101 Internal 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 196 NA | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.990859 0.878999 | 1.005578 0.338970 | Backgd or Offset: Coeff or Slope: | | 47.9 0.991 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjuste Correction facto (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.5 | |
| as found span | 4918 | 82.1 | 80.0 | 81.0 | 0.993 |
| as found 2nd point | 4959 | 41.1 | 40.0 | 41.3 | 0.981 |
| as found 3rd point | 4979 | 20.5 | 20.0 | 21.3 | 0.960 |
| new cylinder response | | | - Data | | |
| | | 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 facto (Cc/lc) Limit = 0.95-1.0 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.1 | |
| high point | 4918 | 82.1 | 80.0 | 80.5 | 0.993 |
| second point | 4918 | 41.1 | 40.0 | 40.9 | 0.995 |
| third point | 4979 | 20.5 | 20.0 | 20.8 | 0.960 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as left span | 4918 | 82.1 | 80.0 | 79.9 | 1.001 |
| O2 Scrubber Check | 4919 | 80.0 | 800.2 | 0.1 | |
| Date of last scrubber cha | | December 15, 2020 | | Ave Corr Factor | 0.977 |
| Date of last converter eff | | | | | efficiency |
| Baseline Corr As found: | 80.5 | Prev response: | 80.11 | *% change: | 0.5% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 40.8 20.8 | AF Slope: AF Correlation: | 1.004434 0.999898 | AF Intercept: | 0.879013 |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

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

Calibration Performed By:

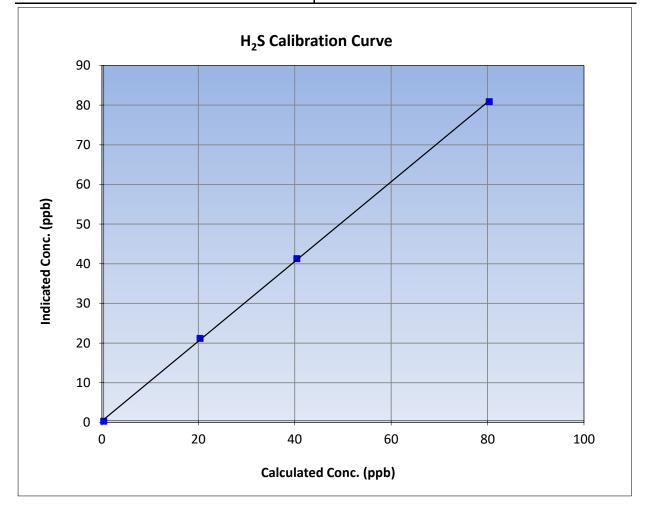
Mohammed Kashif

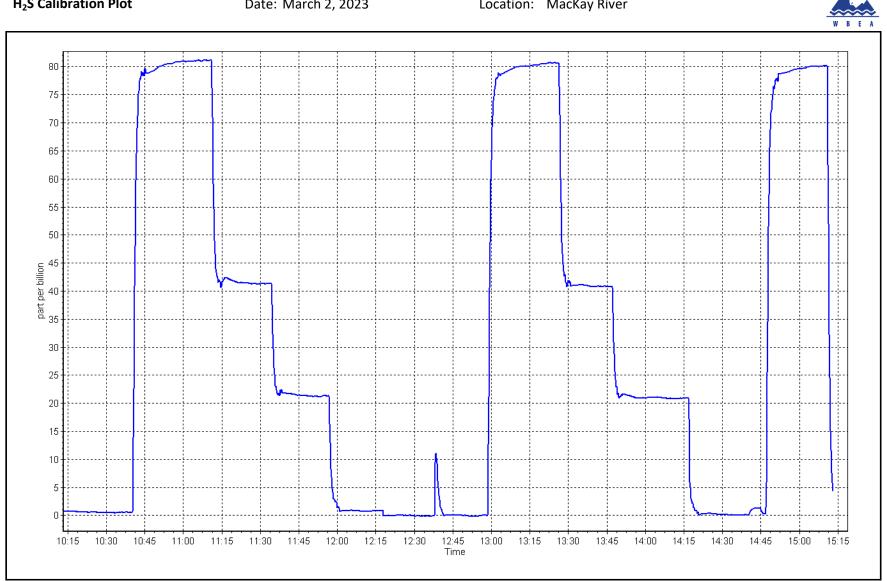


H₂S Calibration Summary

| WBEA | | | Version-11-2021 | | |
|---------------------|-------------------|-----------------------|-------------------|--|--|
| Station Information | | | | | |
| Calibration Date: | March 2, 2023 | Previous Calibration: | February 13, 2023 | | |
| Station Name: | MacKay River | Station Number: | AMS20 | | |
| Start Time (MST): | 10:17 | End Time (MST): | 15:13 | | |
| Analyzer make: | Teledyne API T101 | Analyzer serial #: | 196 | | |
| | | | | | |

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | -0.1 | | Correlation Coefficient | 0.999860 | ≥0.995 |
| 80.0 | 80.5 | 0.9933 | correlation coefficient | 0.999800 | 20.333 |
| 40.0 | 40.9 | 0.9787 | Slope | 1.005578 | 0.90 - 1.10 |
| 20.0 | 20.8 | 0.9600 | Slope | 1.005578 | 0.90 - 1.10 |
| | | | - Intercept | 0.338970 | +/-3 |





Location: MacKay River



H₂S Calibration Report

| WBEA | | | | | Version-11-20 |
|---|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | MacKay River March 8, 2023 10:20 Maintenance | | Station number: Last Cal Date: End time (MST): | AMS20 March 2, 2023 15:58 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 4.87 | ppm | Cal Gas Exp Date: | May 5, 2023 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | EY0001922 4.87 NA Teledyne API T700 Teledyne API 701 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 1220 4522 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Teledyne API T101 Internal 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 196 NA | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 1.005578 0.338970 | 0.999432 0.479018 | Backgd or Offset: Coeff or Slope: | | 44.9 1.008 |
| | | 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 | -1.4 | |
| as found span | 4918 | 82.1 | 80.0 | 77.8 | 1.010 |
| as found 2nd point | 4959 | 41.1 | 40.0 | 38.7 | 0.998 |
| as found 3rd point | 4979 | 20.5 | 20.0 | 19.0 | 0.979 |
| 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 | 4918 | 82.1 | 80.0 | 80.2 | 0.997 |
| second point | 4959 | 41.1 | 40.0 | 40.7 | 0.984 |
| third point | 4979 | 20.5 | 20.0 | 20.8 | 0.960 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as left span | 4918 | 82.1 | 80.0 | 79.4 | 1.007 |
| O2 Scrubber Check | | | - | | |
| Date of last scrubber cha | | December 15, 2020 |) | Ave Corr Factor | 0.980 |
| ate of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 79.2 | Prev response: | 80.75 | *% change: | -2.0% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 40.1 20.4 | AF Slope: AF Correlation: | | AF Intercept: | -1.060971 |
| Dasellille Coll Slu AF DL. | | | | | |

Adjusted zero and span.

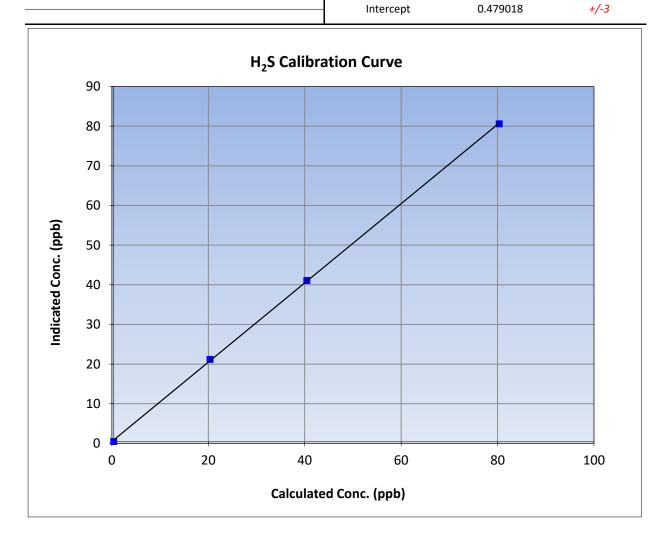
Calibration Performed By:

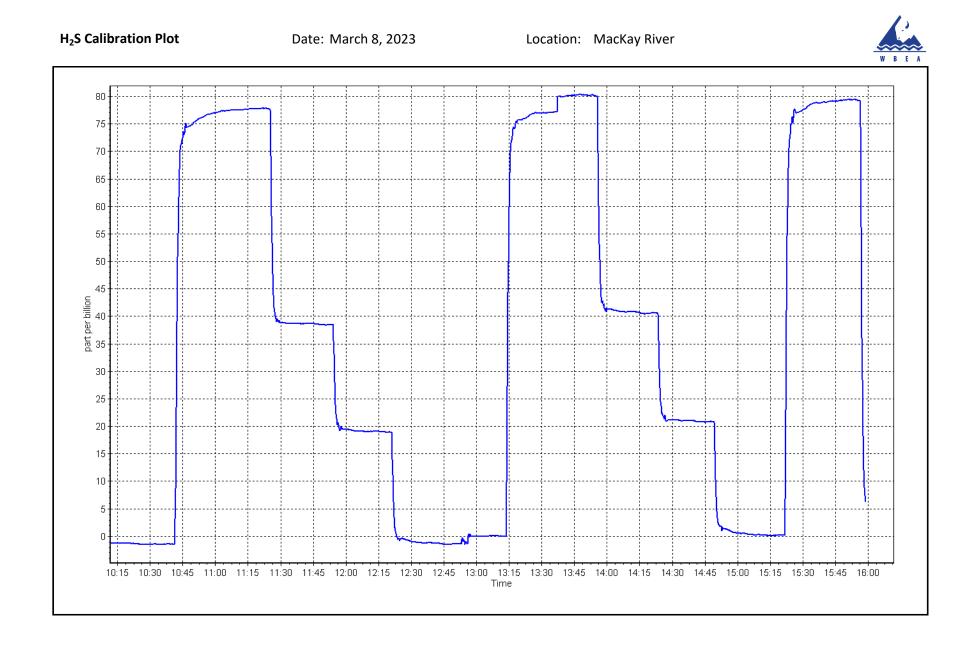
Mohammed Kashif



H₂S Calibration Summary

| WBEA | | | | | Version-11-202 | |
|--|---------------------------------------|------------------------------|-------------------------|----------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 8, 2023 | | Previous Calibration: | Marc | ch 2, 2023 | |
| Station Name: | MacKay River | | Station Number: | A | AMS20 | |
| Start Time (MST): | 10:20 | | End Time (MST): | | 15:58 | |
| Analyzer make: | make: Teledyne API T101 | | Analyzer serial #: | | 196 | |
| | | | | | | |
| | | Calib | ration 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 | 0.999897 | ≥0.995 | |
| 80.0 | 80.2 | 0.9971 | correlation coefficient | 0.999897 | 20.995 | |
| 40.0 | 40.7 | 0.9836 | Slope | 0.999432 | 0.90 - 1.10 | |
| 20.0 | 20.8 | 0.9600 | Jiope | 0.333432 | 0.30 - 1.10 | |
| | | | | | 1.5 | |







THC Calibration Report

Version-01-2020

| | | Station Info | rmation | | |
|---|--|---|---|--|---|
| Station Name: Calibration Date: Start time (MST): Reason: | MacKay River March 1, 2023 10:51 Routine | | Station number: Last Cal Date: End time (MST): | AMS20 February 1, 2023 14:17 | |
| | | Calibration S | tandards | | |
| Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc. | CC30 <u>499.40</u> <u>206.20</u> | 6868 ppm ppm | Cal Gas Expiry Date: CH4 Equiv Conc. | February 23, 2025 1066.45 | ppm |
| Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: | N <u>499.40</u> <u>206.20</u> Teledyne API T700 | A ppm ppm | Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: | NA 1066.45 1220 | ppm |
| ZAG Make/Model: | Teledyne API 701 | | Serial Number: | 4522 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Analyzer Range: | : Thermo 51i-LT : 0 - 20 ppm | | Analyzer serial #: | 1501663727 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 0.996170 0.044213 | <u>Finish</u> 0.993043 0.145942 | Background: Coefficient: | | <u>Finish</u> 2.870 5.253 |
| | | | | | |
| | | THC Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | THC Calibrat Source gas flow rate (sccm) | calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/lc) Limit = 0.95-1.05 |
| Set Point as found zero | | Source gas flow rate | Calculated Concentration | | , |
| as found zero as found span | (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | (ppm) (lc) | <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 (ppm) (Cc) 0.00 | (ppm) (Ic) -0.46 | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point | (sccm) 5000 | Source gas flow rate (sccm) 0.0 | Calculated Concentration (ppm) (Cc) 0.00 | (ppm) (Ic) -0.46 | 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 81.3 | Calculated Concentration (ppm) (Cc) 0.00 17.34 | (ppm) (Ic) -0.46 17.22 | 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 17.34 0.00 | (ppm) (lc) -0.46 17.22 0.05 | 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 5000 4919 | Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 | Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00 17.34 | (ppm) (lc) -0.46 17.22 0.05 17.29 | 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 | Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 | Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 | (ppm) (lc) -0.46 17.22 0.05 17.29 8.89 | Limit = 0.95-1.05 1.007 1.003 0.977 |
| 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 17.34 0.00 17.34 8.68 4.33 | (ppm) (lc) -0.46 17.22 0.05 17.29 8.89 4.50 | Limit = 0.95-1.05 1.007 1.003 0.977 0.963 |
| 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 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 17.34 0.00 17.34 8.68 4.33 0.00 | (ppm) (lc) -0.46 17.22 0.05 17.29 8.89 4.50 0.12 | Limit = 0.95-1.05 1.007 1.003 0.977 0.963 |
| 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 17.34 0.00 17.34 8.68 4.33 0.00 17.34 | (ppm) (lc) -0.46 17.22 0.05 17.29 8.89 4.50 0.12 17.12 | Limit = 0.95-1.05 1.007 1.003 0.977 0.963 1.013 |
| 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 | Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0 81.3 | Calculated Concentration (ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00 17.34 Aver | (ppm) (lc) -0.46 17.22 0.05 17.29 8.89 4.50 0.12 17.12 Tage Correction Factor | Limit = 0.95-1.05 1.007 1.003 0.977 0.963 1.013 0.981 |
| 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 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 17.34 0.00 17.34 8.68 4.33 0.00 17.34 | (ppm) (lc) -0.46 17.22 0.05 17.29 8.89 4.50 0.12 17.12 | Limit = 0.95-1.05 |

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

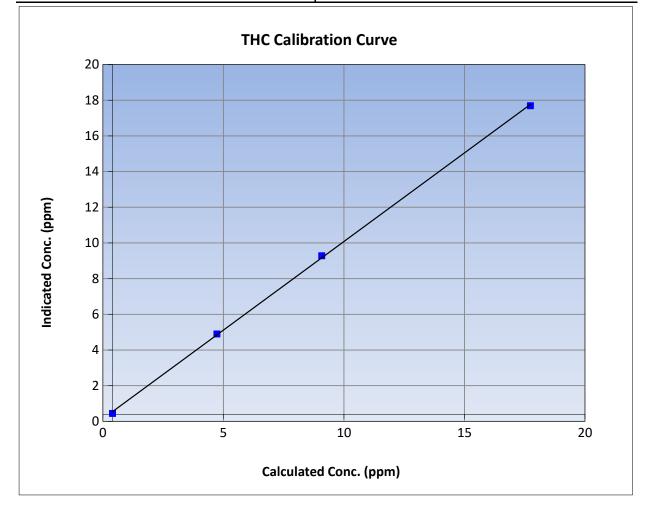
Calibration Performed By:



THC Calibration Summary

| WBEA | | | Version-01-2020 | | | |
|---------------------|---------------|-----------------------|------------------|--|--|--|
| Station Information | | | | | | |
| Calibration Date: | March 1, 2023 | Previous Calibration: | February 1, 2023 | | | |
| Station Name: | MacKay River | Station Number: | AMS20 | | | |
| Start Time (MST): | 10:51 | End Time (MST): | 14:17 | | | |
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1501663727 | | | |

| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|--|------------------------------|-------------------------|----------|---------------|
| 0.00 | 0.05 | | Correlation Coefficient | 0.999803 | ≥0.995 |
| 17.34 | 17.29 | 1.0027 | correlation coefficient | 0.999803 | 20.333 |
| 8.68 | 8.89 | 0.9770 | Slope | 0.993043 | 0.90 - 1.10 |
| 4.33 | 4.50 | 0.9625 | Slope | 0.993045 | 0.50 - 1.10 |
| | | | - Intercept | 0.145942 | +/-1.5 |









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: February 2, 2023 End time (MST): 15:41

ppm

ppm

| | | (| Calibration Standards |
|-----------------------|-----------------|---------|-------------------------------------|
| NO Gas Cylinder #: | ٦ | F376265 | 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 T7 | 00 | Serial Number: 1220 |
| ZAG make/model: | Teledyne API 70 | 1 | Serial Number: 4522 |
| | | | |

MacKay River

March 9, 2023

10:48

Routine

Analyzer Information

| Analyzer make: Th NOX Range (ppb): 0 | | Analyzer serial #: 1505164379 | | | | |
|---|--------------|-------------------------------|----------------------|--------------|---------------|--|
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | |
| NO coeff or slope: | 1.364 | 1.412 | NO bkgnd or offset: | 3.8 | 3.9 | |
| NOX coeff or slope: | 0.990 | 0.990 | NOX bkgnd or offset: | 3.8 | 3.9 | |
| NO2 coeff or slope: | 0.995 | 0.995 | Reaction cell Press: | 176.8 | 182.5 | |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 0.993580 | 1.000735 |
| NO _x Cal Offset: | 3.070250 | 3.529487 |
| NO Cal Slope: | 0.997347 | 1.004217 |
| NO Cal Offset: | 1.531522 | 2.250337 |
| NO ₂ Cal Slope: | 0.998061 | 1.000187 |
| NO ₂ Cal Offset: | -1.818500 | -1.449451 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| Dilution Calibration Data | | | | | | | | | | |
|---------------------------|------------------------------|--------------------------------|---|--|---|--|---|--|---|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | | |
| as found span | 4917 | 83.3 | 819.5 | 800.3 | 19.2 | 803.5 | 784.2 | 19.3 | 1.0199 | 1.0205 |
| 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 | 822.2 | 805.0 | 17.3 | 0.9967 | 0.9942 |
| second point | 4956 | 41.7 | 410.4 | 400.8 | 9.6 | 415.0 | 405.3 | 9.7 | 0.9890 | 0.9890 |
| third point | 4979 | 20.8 | 204.6 | 199.9 | 4.8 | 212.4 | 205.6 | 6.8 | 0.9635 | 0.9721 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | | |
| as left span | 4917 | 83.3 | 819.5 | 462.2 | 357.3 | 813.3 | 455.6 | 357.7 | 1.0076 | 1.0145 |
| | | | | | | | Average C | orrection Factor | 0.9830 | 0.9851 |
| Corrected As fo | ound NO _x = | 803.6 ppb | NO = | 784.3 ppb | * = > +/-5 | % change initiates i | investigation | *Percent Chan | ge NO _x = | -1.7% |
| Previous Respo | onse NO _x = | 817.3 ppb | NO = | 799.7 ppb | | | | *Percent Chan | ge NO = | -2.0% |
| Baseline Corr 2 | 2nd pt NO _x = | NA ppb | NO = | NA ppb | As foun | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | Brd pt NO _X = | NA ppb | NO = | NA ppb | As foun | d NO r ² : | | NO SI: | NO Int: | |
| | | | | | As foun | d NO ₂ r ² : | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (C | Indicated NO2 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|--|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 795.4 | 457.3 | 357.3 | 356.9 | 1.0010 | 99.9% |
| 2nd GPT point (200 ppb O3) | 795.4 | 618.1 | 196.5 | 194.1 | 1.0121 | 98.8% |
| 3rd GPT point (100 ppb O3) | 795.4 | 703.8 | 110.8 | 107.7 | 1.0284 | 97.2% |
| | | | | Average Correction Factor | 1.0138 | 98.6% |

Notes:

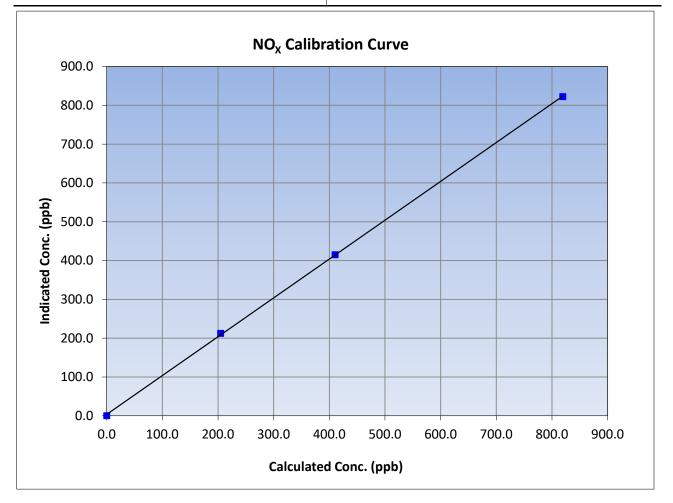
Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

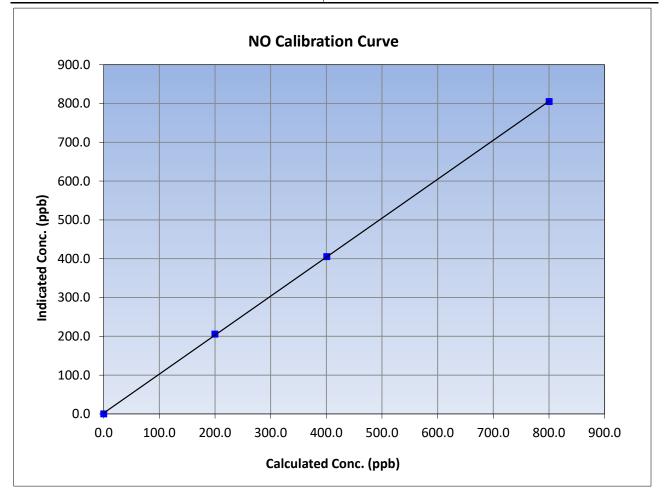
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | ration Date: March 9, 2023 | | Previous Calibration: | February | y 2, 2023 |
| Station Name: | MacKay River | | Station Number: | AM | S20 |
| Start Time (MST): | ne (MST): 10:48 | | End Time (MST): | 15 | :41 |
| Analyzer make: Thermo 42i | | | Analyzer serial #: 1505 | | 164379 |
| | | 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 | 0.999916 | ≥0.995 |
| 819.5 | 822.2 | 0.9967 | correlation coefficient | 0.555510 | 20.333 |
| 410.4 | 415.0 | 0.9890 | Slope | 1.000735 | 0.90 - 1.10 |
| 204.6 | 212.4 | 0.9635 | Slope | 1.000735 | 0.90 - 1.10 |
| | | | Intercept | 3.529487 | +/-20 |





NO Calibration Summary

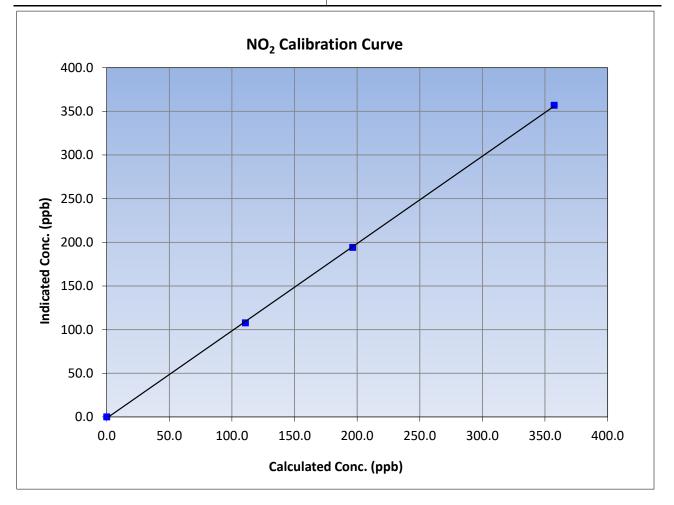
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|------------------|----------------|
| | | Station | Information | | |
| Calibration Date: March 9, 2023 | | Previous Calibration: | Februar | y 2, 2023 | |
| Station Name: | MacKa | ny River | Station Number: | AM | IS20 |
| Start Time (MST): | rt Time (MST): 10:48 | | End Time (MST): | 15 | :41 |
| Analyzer make: Thermo 42i | | | Analyzer serial #: | al #: 1505164379 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999963 | ≥0.995 |
| 800.3 | 805.0 | 0.9942 | correlation coefficient | 0.555505 | 20.335 |
| 400.8 | 405.3 | 0.9890 | Clana | 1.004217 | 0.90 - 1.10 |
| 199.9 | 205.6 | 0.9721 | Slope | 1.004217 | 0.90 - 1.10 |
| | | | Intercept | 2.250337 | +/-20 |

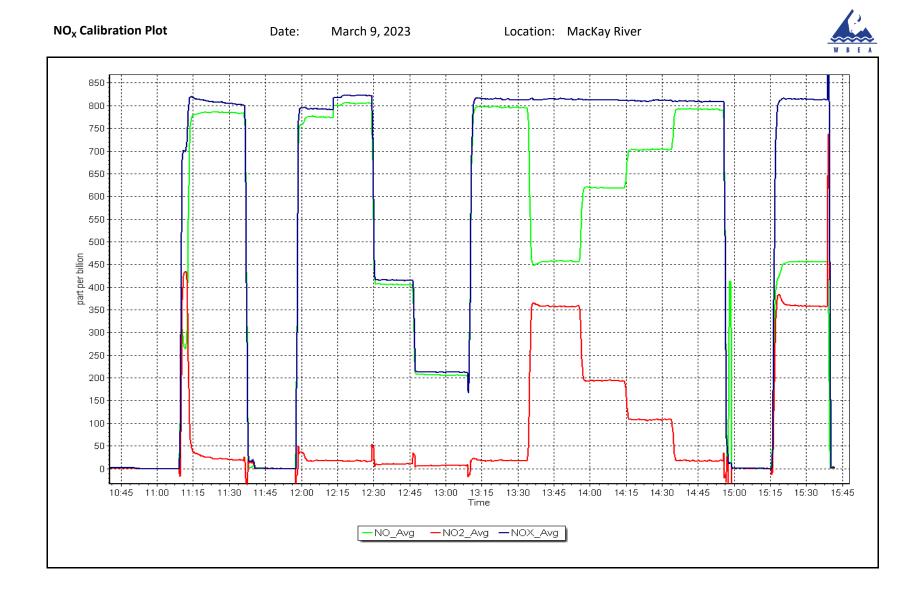




NO₂ Calibration Summary

| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|--------------------------|-----------|---------------|
| | | Station | Information | | |
| alibration Date: March 9, 2023 | | | Previous Calibration: | February | y 2, 2023 |
| Station Name: | МасКа | ay River | Station Number: | AM | S20 |
| Start Time (MST): | 10 | End Time (MST): | 15 | :41 | |
| 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 | 0.1 | | Correlation Coefficient | 0.999897 | ≥0.995 |
| 357.3 | 356.9 | 1.0010 | correlation coernelent | 0.555657 | 20.995 |
| 196.5 | 194.1 | 1.0121 | Slope | 1 000197 | 0.90 - 1.10 |
| 110.8 | 107.7 | 1.0284 | Slope | 1.000187 | 0.90 - 1.10 |
| | | | Intercept | -1.449451 | +/-20 |







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS21 CONKLIN MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|--|--------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Conklin March 3, 2023 10:17 Routine | | Station number: Last Cal Date: End time (MST): | AMS21 February 6, 2023 13:00 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.93 | ppm | Cal Gas Exp Date: | January 5, 2025 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: | <u>CC259455</u> 49.93 | ppm | Rem Gas Exp Date: Diff between cyl: | NA | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API T700 Teledyne API 701 | | Serial Number: Serial Number: | 3810 262 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1428701363 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.999888 0.415841 | 1.005625 0.356047 | Backgd or Offset: Coeff or Slope: | 27.9 0.914 | 28.6 0.914 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration C (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5005 | 0.0 | 0.0 | 0.3 | |
| as found span | 4920 | 80.2 | 800.8 | 800.9 | 1.000 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5005 | 0.0 | 0.0 | -0.1 | |
| high point | 4920 | 80.2 | 800.8 | 805.6 | 0.994 |
| second point | 4960 | 40.1 | 400.4 | 402.9 | 0.994 |
| third point | 4980 | 20.0 | 200.1 | | 0.989 |
| as left zero as left span | 5005 4920 | 80.2 | 800.8 | 802.5 | 0.998 |
| as iert spari | 4920 | 00.2 | | ge Correction Factor | 0.998 |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | 800.60 NA | Previous response AF Slope: | 801.17 | *% change AF Intercept: | -0.1% |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiate | es investigation |

Adjusted the zero only.

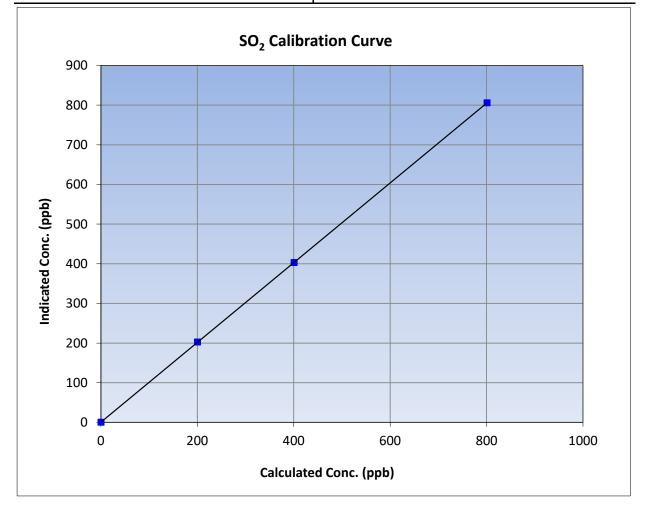
Calibration Performed By:

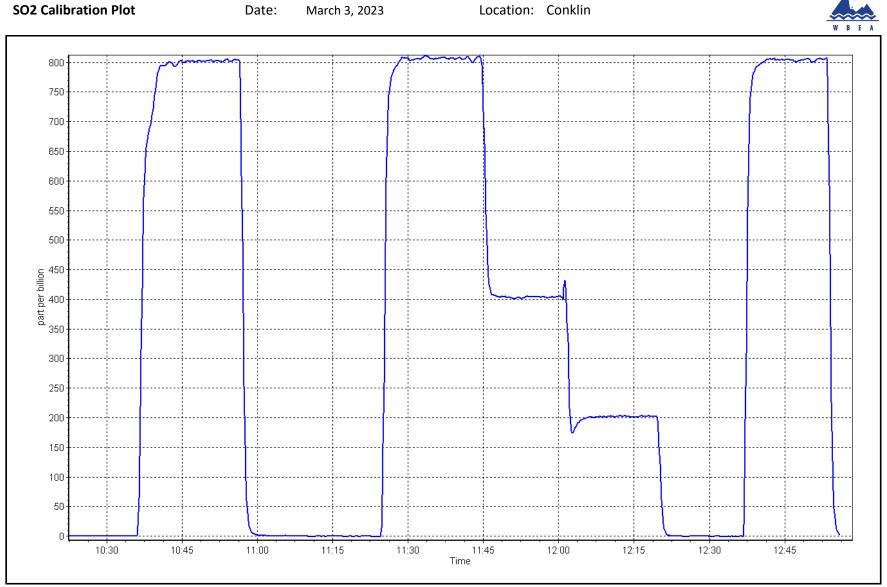


SO₂ Calibration Summary

Version-01-2020 **Station Information** Calibration Date: March 3, 2023 **Previous Calibration:** February 6, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:17 End Time (MST): 13:00 Analyzer make: Thermo 43i Analyzer serial #: 1428701363

| Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) | | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|---|-------|------------------------------|-------------------------|----------|---------------|
| 0.0 | -0.1 | | Correlation Coefficient | 0.999998 | ≥0.995 |
| 800.8 | 805.6 | 0.9941 | correlation coefficient | 0.999998 | 20.333 |
| 400.4 | 402.9 | 0.9939 | Sland | 1.005625 | 0.90 - 1.10 |
| 200.1 | 202.3 | 0.9892 | Slope | 1.005025 | 0.90 - 1.10 |
| | | | - Intercept | 0.356047 | +/-30 |







TRS Calibration Report

| | | | | • | |
|---|---|--------------------------------|--|---------------------------------------|---|
| WBEA | | | | | Version-11-2022 |
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Conklin March 22, 2023 9:27 Routine | | Station number: Last Cal Date: End time (MST): | AMS21 February 8, 2023 13:20 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.03 | ppm | Cal Gas Exp Date: | April 16, 2022 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | CC505493 5.03 NA API T700 API 701 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 3810 263 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i-TLE CD-Nova 101 0 - 100 ppb | · | Analyzer serial #: Converter serial #: | 1236656116 NA | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.983711 0.237934 | 1.019442 0.237078 | Backgd or Offset: Coeff or Slope: | | 2.9 0.991 |
| | | 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 | 77.3 | 1.029 |
| as found 2nd point | 4960 | 39.8 | 40.0 | 39.2 | 1.011 |
| as found 3rd point | 4980 | 19.9 | 20.0 | 19.7 | 0.996 |
| new cylinder response | | | | | |
| | | TRS Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.1 | |
| high point | 4921 | 79.5 | 80.0 | 81.5 | 0.981 |
| second point | 4960 | 39.8 | 40.0 | 41.5 | 0.965 |
| third point | 4980 | 19.9 | 20.0 | 20.8 | 0.962 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4921 | 79.5 | 80.0 | 81.0 | 0.987 |
| SO2 Scrubber Check | 4920 | 80.2 | 802.0 | -0.1 | |
| Date of last scrubber cha | - | | | Ave Corr Factor | 0.970 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | 77.7 39.6 | Prev response: AF Slope: | 0.969850 | *% change: AF Intercept: | -1.5% -0.001815 |
| Baseline Corr 3rd AF pt: | 20.1 | AF Correlation: | 0.999866 | * = > +/-5% change initiat | es investigation |

Notes:

Adjusted the span only.

Calibration Performed By:

Denny Ray Estador

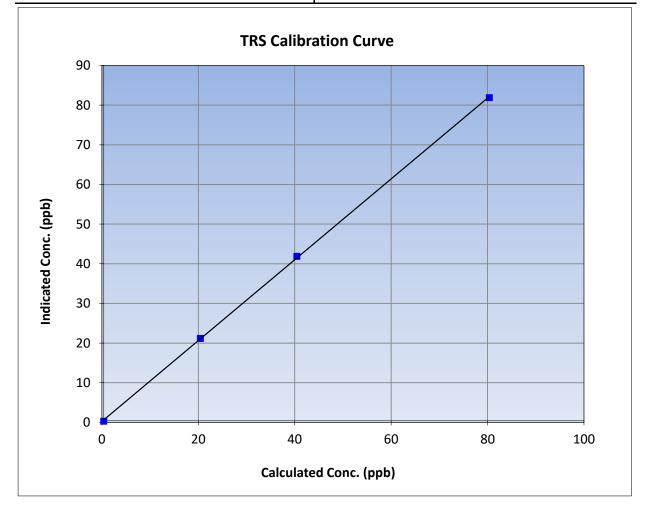


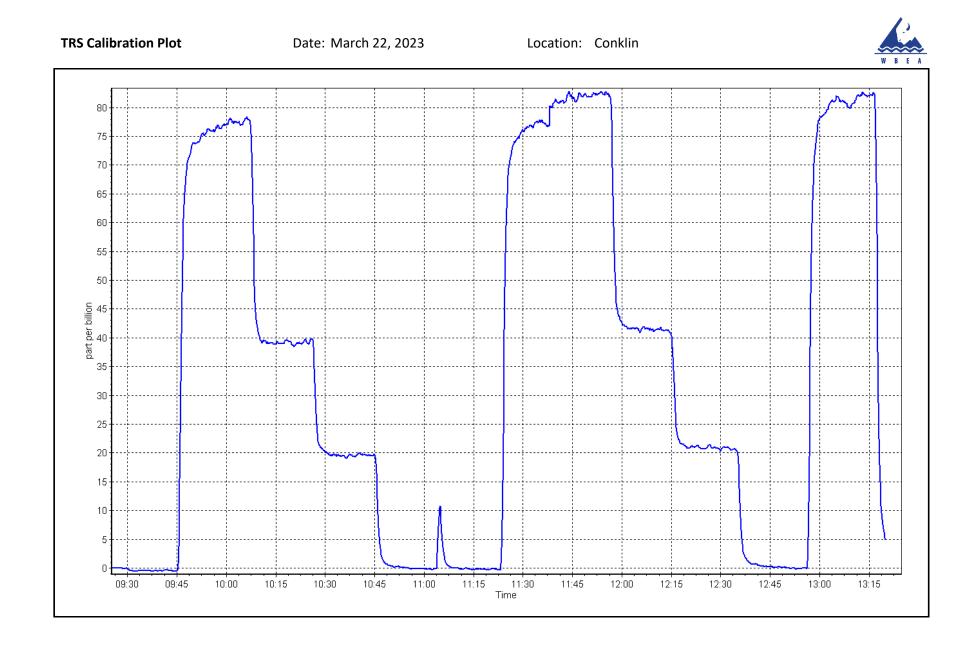
TRS Calibration Summary

| WBEA | | | Version-11-2021 | | | | |
|---------------------|----------------|-----------------------|------------------|--|--|--|--|
| Station Information | | | | | | | |
| Calibration Date: | March 22, 2023 | Previous Calibration: | February 8, 2023 | | | | |
| Station Name: | Conklin | Station Number: | AMS21 | | | | |
| Start Time (MST): | 9:27 | End Time (MST): | 13:20 | | | | |
| 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 | -0.1 | | Correlation Coefficient | 0.999889 | ≥0.995 |
| 80.0 | 81.5 | 0.9812 | correlation coefficient | 0.555855 | 20.333 |
| 40.0 | 41.5 | 0.9648 | Slope | 1.019442 | 0.90 - 1.10 |
| 20.0 | 20.8 | 0.9625 | Slope | 1.019442 | 0.30 - 1.10 |
| | | | Intercept | 0.237078 | +/-3 |







THC / CH_4 / NMHC Calibration Report

| | | Stat | tion Information | | | | |
|--------------------------------------|-----------------|---------------|--------------------------|--|---------------|--|--|
| Station Name: | Conklin | | Station number: AN | /IS21 | | | |
| Calibration Date: | March 3, 2023 | | Last Cal Date: Fe | bruary 3, 2023 | | | |
| Start time (MST): | 10:17 | | End time (MST): 13:00 | | | | |
| Reason: | Routine | | | | | | |
| | | Calib | oration Standards | | | | |
| Gas Cert Reference: | (| CC259455 | Cal Gas Expiry Date: Jar | nuary 5, 2025 | | | |
| CH4 Cal Gas Conc. | 497.9 | ppm | CH4 Equiv Conc. | 1067.7 | ppm | | |
| C3H8 Cal Gas Conc. | 207.2 | ppm | | | | | |
| Removed Gas Cert: | | NA | Removed Gas Expiry: NA | A Contraction of the second seco | | | |
| 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 |)1 | Serial Number: 69 | 1 | | | |
| | | Ana | 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 | 04 NMHC SP Ratio: | 4.56E-05 | 4.56E-05 | | |
| CH4 Retention time: | 12.60 | 12.60 | NMHC Peak Area: | 200658 | 200658 | | |

| | тнс | Calib | ration | Data |
|--|-----|-------|--------|------|
|--|-----|-------|--------|------|

| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (0 | Cc) Ind conc (ppm) (Ic) | CF <i>Limit=</i> 0.95-1.05 |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|----------------------------|
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.2 | 17.13 | 17.22 | 0.994 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.2 | 17.13 | 17.20 | 0.996 |
| second point | 4960 | 40.1 | 8.56 | 8.64 | 0.992 |
| third point | 4980 | 20.0 | 4.27 | 4.34 | 0.985 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.2 | 17.13 | 17.10 | 1.001 |
| | | | ŀ | Average Correction Factor | 0.991 |
| Baseline Corr AF: | 17.22 | Prev response | 17.14 | *% change | 0.5% |
| 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-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 | 9.17 | 0.997 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | |
| high point | 4920 | 80.2 | 9.14 | 9.17 | 0.997 |
| second point | 4960 | 40.1 | 4.57 | 4.60 | 0.993 |
| third point | 4980 | 20.0 | 2.28 | 2.31 | 0.985 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.2 | 9.14 | 9.10 | 1.005 |
| | | | ŀ | Average Correction Factor | 0.992 |
| Baseline Corr AF: | 9.17 | Prev response | 9.14 | *% 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 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 Limit= 0.95-1.05 |
|-------------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as found span | 4920 | 80.2 | 7.99 | 8.05 | 0.992 |
| 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 | 0.994 |
| second point | 4960 | 40.1 | 3.99 | 4.03 | 0.990 |
| third point | 4980 | 20.0 | 1.99 | 2.03 | 0.984 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.2 | 7.99 | 8.00 | 0.998 |
| | | | A | verage Correction Factor | 0.989 |
| Baseline Corr AF: | 8.05 | Prev response | 8.00 | *% change | 0.6% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |
| | | Calibration | Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| THC Cal Slope: 0.998993 | | | 1.003632 | | |
| THC Cal Offset: | 0.030589 0.026595 | | | | |
| CH4 Cal Slope: | | 1.001541 | 1.005332 | | |
| CH4 Cal Offset: | | -0.002053 | | 0.011959 | |
| NMHC Cal Slope: | | 0.996416 | | 1.002247 | |
| NMHC Cal Offset: | | 0.033041 | | 0.014236 | |

Notes:

No adjustments made. Changed N2 cylinder after the as founds.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| Calibration Date: | March | 3, 2023 | Previous Calibration: | February | 3, 2023 |
| itation Name: | | ıklin | Station Number: | AM | |
| itart Time (MST): | 10 | :17 | End Time (MST): | 13: | 00 |
| Analyzer make: | Thern | no 55i | Analyzer serial #: | 11814 | 8495 |
| | | Calibra | tion Data | | |
| alculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 17.13 | 0.00 17.20 | 0.9957 | Correlation Coefficient | 0.999989 | ≥0.995 |
| 8.56 4.27 | 8.64 4.34 | 0.9915 0.9845 | Slope | 1.003632 | 0.90 - 1.10 |
| | | | Intercept | 0.026595 | +/-0.5 |
| 20.0 | | THC Calibratio | | | |
| 18.0 | | | | | |
| 16.0 | | | | | |
| 14.0 | | | | | |
| E 12.0 | | | | | |
| 3) 30.0 | | | | | |
| Indicated Conc. (ppm) 0.0 (ppm) 0.0 (bpm) | | | | | |
| Indica | | | | | |
| 4.0 | | | | | |
| 2.0 | | | | | |
| 0.0 | | - | | | |
| 0.0 | 5 | .0 | | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



CH₄ Calibration Summary

| | | Chatlan I | -f | | Version-06-20 |
|---------------------------------------|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | | nformation | | |
| Calibration Date: | | 3, 2023 | Previous Calibration: | February | |
| tation Name: | | nklin | Station Number: | AM | |
| tart Time (MST): | |):17 | End Time (MST): | 13: | |
| nalyzer make: | Ther | mo 55i | Analyzer serial #: | 11814 | .8495 |
| | | Calibra | tion Data | | |
| alculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 7.99 | 0.00 8.03 | 0.9940 | Correlation Coefficient | 0.999990 | ≥0.995 |
| 3.99 1.99 | 4.03 | 0.9899 | Slope | 1.005332 | 0.90 - 1.10 |
| 1.55 | 2.05 | 0.9855 | Intercept | 0.011959 | +/-0.5 |
| 8.0 7.0 6.0 | | | | | |
| Indicated Conc. (ppm) | | | | | |
| 4.0 | | | | | |
| 0.6 dicate | | | | | |
| 2.0 | | | | | |
| 10 | | | | | |
| 1.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |

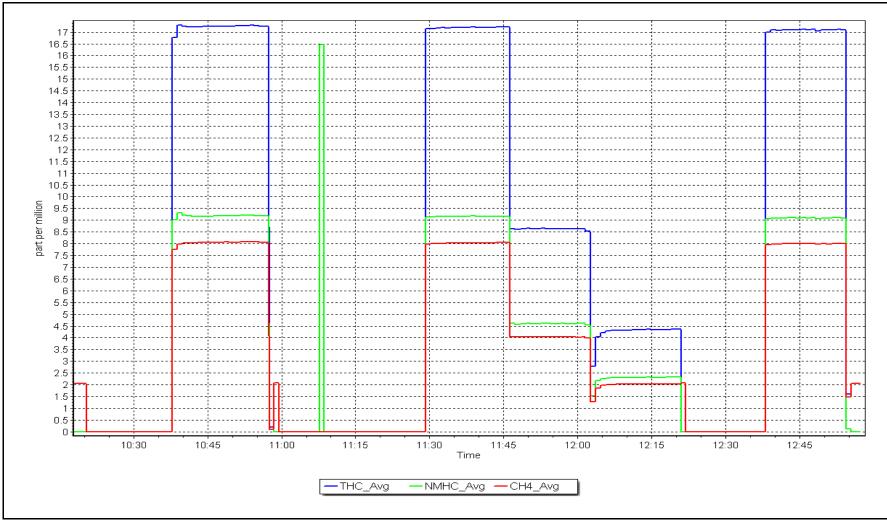


NMHC Calibration Summary

| | | Station I | nformation | | |
|--|--|-----------------------------------|-------------------------|----------|---------------|
| Calibration Date: | Ma | rch 3, 2023 | Previous Calibration: | February | 3, 2023 |
| Station Name: | | Conklin | Station Number: | AM | 521 |
| start Time (MST): | | 10:17 | End Time (MST): | 13: | 00 |
| analyzer make: | TI | nermo 55i | Analyzer serial #: | 11814 | 8495 |
| | | Calibra | tion Data | | |
| Calculated concentrat (ppm) (Cc) | ion Indicated concentrat (ppm) (Ic) | cion Correction factor (Cc/Ic) | Statistical Eval | uation | <u>Limits</u> |
| 0.00 9.14 | 0.00 9.17 | 0.9970 | Correlation Coefficient | 0.999989 | ≥0.995 |
| 4.57 | 4.60 | 0.9932 | Class a | 4 000047 | |
| 2.28 | 2.31 | 0.9854 | Slope | 1.002247 | 0.90 - 1.10 |
| | | | Intercept | 0.014236 | +/-0.5 |
| 9.0 - 8.0 - | | | | | • |
| 7.0 - | | | / | | |
| (bbu) - 0.0 - 0. | | | | | |
| l) 5.0 - | | | | | |
| 00 90, 4.0 - | | | | | |
| - 0.4 - - 0.6 - | | | | | |
| 2.0 - | | | | | |
| 1.0 - | | | | | |
| 0.0 | | | | | |
| 0. | 0 2.0 | 0 4.0 | 6.0 | 8.0 | 10.0 |
| | | | | | |









THC / CH_4 / NMHC Calibration Report

| | | | Station | Information | | |
|--|--|-----|-----------------------------|---|--------------|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Conklin March 17, 2023 9:45 Cylinder Change | | ለS21 arch 3, 2023 :30 | | | |
| | | | Calibratio | on Standards | | |
| Gas Cert Reference: | (| | | | | |
| 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. Diff between cyl (CH ₄): | 207.2 | ppm | | Diff between cyl (THC): 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 | |
| | | | Analyzer | Information | | |
| Analyzer make: | : Thermo 55i | | | Analyzer serial #: 11 | 8148495 | |
| THC Range (ppm) | : 0 - 20 ppm | | | | | |
| NMHC Range (ppm): | • • | | | CH4 Range (ppm): 0 - 10 ppm | | |
| | <u>Start</u> | | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : 1.86E-04 | - | 1.86E-04 | NMHC SP Ratio: | 4.56E-05 | 4.56E-05 |
| CH4 Retention time: | : 12.60 | | 12.60 | NMHC Peak Area: | 200658 | 200658 |

THC Calibration Data

| | | | cion 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> 5 | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as found span | 4920 | 80.2 | 17.13 | 17.78 | 0.963 | | |
| as found 2nd point | | | | | | | |
| as found 3rd point | | | | | | | |
| new cylinder response | | | | | | | |
| calibrator zero | | | | | | | |
| high point | | | | | | | |
| second point | | | | | | | |
| third point | | | | | | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4920 | 80.2 | 17.13 | 17.69 | 0.968 | | |
| | | | Aver | age Correction Factor | | | |
| Baseline Corr AF: | 17.78 | Prev response | 17.21 | *% change | 3.2% | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | * = > +/-5% change initiates investigation | | | | |
| | | | | | | | |



THC / CH_4 / NMHC Calibration Report

Version-06-2022

| NMHC Calibration Data | | | | | | | |
|-----------------------|-------------------|----------------------|----------------------|---------------------------|---------------------|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc) | Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as found span | 4920 | 80.2 | 9.14 | 9.57 | 0.955 | | |
| as found 2nd point | | | | | | | |
| as found 3rd point | | | | | | | |
| new cylinder response | | | | | | | |
| calibrator zero | | | | | | | |
| high point | | | | | | | |
| second point | | | | | | | |
| third point | | | | | | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4920 | 80.2 | 9.14 | 9.49 | 0.963 | | |
| | | | Ave | rage Correction Factor | | | |
| Baseline Corr AF: | 9.57 | Prev response | 9.17 | *% change | 4.1% | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initia | tes investigation | | |

| 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 | 8.20 | 0.974 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | | | | | | |
| high point | | | | | | |
| second point | | | | | | |
| third point | | | | | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4920 | 80.2 | 7.99 | 8.20 | 0.974 | |
| | | | Avera | age Correction Factor | | |
| Baseline Corr AF: | 8.20 | Prev response | 8.04 | *% change | 2.0% | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | +/-5% change initiates investigation | |
| | | Calibration | Statistics | | | |
| | | <u>Start</u> | | Finish | | |
| THC Cal Slope: | | 1.003632 | | | | |
| THC Cal Offset: | | 0.026595 | | | | |
| CH4 Cal Slope: | | 1.005332 | | | | |
| CH4 Cal Offset: | | 0.011959 | | | | |
| NMHC Cal Slope: | | 1.002247 | | | | |
| NMHC Cal Offset: | | 0.014236 | | | | |

Notes:

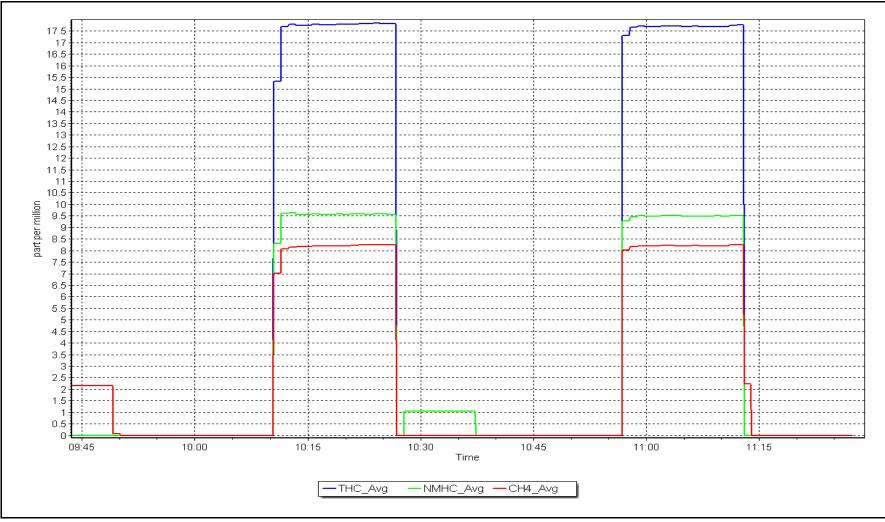
Replaced H2 Cylinder.

Calibration Performed By:

Denny Ray Estador

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: Conklin March 29, 2023 9:37 Routine

Station number: AMS21 Last Cal Date: February 24, 2023 End time (MST): 13:35

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

| NO Gas Cylinder #: | T2Y1P1H | | Cal Gas Expiry Date: Dece | ember 11, 2 | 023 |
|-----------------------|------------------|-----|---------------------------|-------------|-----|
| NOX Cal Gas Conc: | 51.09 | ppm | NO Cal Gas Conc: | 50.39 | ppm |
| Removed Cylinder #: | n/a | | Removed Gas Exp Date: n/a | | |
| Removed Gas NOX Conc: | 51.09 | ppm | Removed Gas NO Conc: | 50.39 | ppm |
| NOX gas Diff: | | | NO gas Diff: | | |
| Calibrator Model: | Teledyne API T7 | 50 | Serial Number: | 282 | |
| ZAG make/model: | Teledyne API T70 |)1 | Serial Number: | 361 | |
| | | | | | |

| Analy | vzer | Inform | ation |
|-------|------|--------|-------|
| Alla | 7201 | | acion |

| Analyzer make: T NOX Range (ppb): C | | , | | | |
|--|--------------|---------------|----------------------|--------------|---------------|
| | <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: | 224.3 | 220.7 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.004927 | 1.009334 |
| NO _x Cal Offset: | 1.765059 | 2.026079 |
| NO Cal Slope: | 1.004393 | 1.010890 |
| NO Cal Offset: | 0.961963 | 0.963352 |
| NO ₂ Cal Slope: | 1.001583 | 1.002951 |
| NO ₂ Cal Offset: | -0.384496 | -0.706596 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dil | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|---|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.2 | 0.0 | | |
| as found span | 4921 | 79.4 | 811.2 | 800.1 | 11.1 | 822.7 | 809.4 | 13.3 | 0.9861 | 0.9885 |
| 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 | 811.2 | 800.1 | 11.1 | 819.9 | 809.4 | 10.5 | 0.9894 | 0.9885 |
| second point | 4960 | 39.7 | 405.7 | 400.1 | 5.6 | 412.2 | 405.6 | 6.6 | 0.9842 | 0.9865 |
| third point | 4980 | 19.8 | 202.3 | 199.6 | 2.8 | 208.6 | 204.0 | 4.6 | 0.9699 | 0.9782 |
| 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 | 370.5 | 440.7 | 818.3 | 378.8 | 439.6 | 0.9914 | 0.9782 |
| | | | | | | | Average C | orrection Factor | 0.9812 | 0.9844 |
| Corrected As fo | ound NO _x = | 822.9 ppb | NO = | 809.6 ppb | * = > +/-5% | % change initiates i | nvestigation | *Percent Chan | ge NO _x = | 0.7% |
| Previous Respo | onse NO _x = | 817.0 ppb | NO = | 804.6 ppb | | | | *Percent Chan | ge NO = | 0.6% |
| Baseline Corr 2 | 2nd pt NO _x = | NA ppb | NO = | NA ppb | As found | d $NO_{\chi} r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | Brd pt NO _X = | NA ppb | NO = | NA ppb | As found | $1 	 NO r^2$: | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: ; | NO ₂ Int: | |
| | | | | | | | | | | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/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) | 805.0 | 375.4 | 440.7 | 441.7 | 0.9978 | 100.2% |
| 2nd GPT point (200 ppb O3) | 805.0 | 598.0 | 218.1 | 217.6 | 1.0024 | 99.8% |
| 3rd GPT point (100 ppb O3) | 805.0 | 701.9 | 114.2 | 113.2 | 1.0090 | 99.1% |
| | | | / | Average Correction Factor | 1.0030 | 99.7% |

Notes:

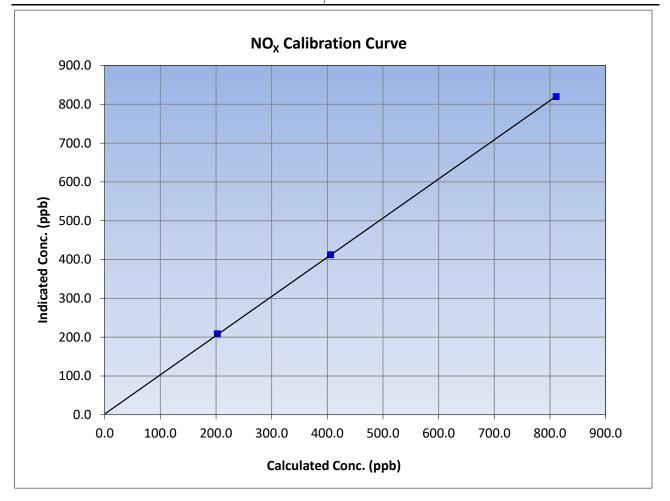
No adjustments required.

Calibration Performed By:



NO_x Calibration Summary

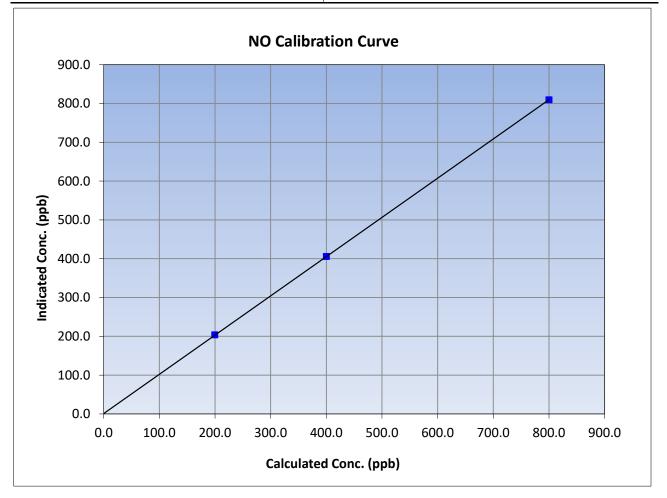
| WBEA | | | | | Version-04-202 |
|--|---------------------------------------|---------------------------|-------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 29, 2023 | Previous Calibration: | February | 24, 2023 |
| Station Name: | Cor | nklin | Station Number: | AM | IS21 |
| Start Time (MST): | 9:37 | | End Time (MST): | 13 | :35 |
| Analyzer make: | Thermo 42i | | Analyzer serial #: | 15016 | 63731 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999969 | ≥0.995 |
| 811.2 | 819.9 | 0.9894 | correlation coernelent | 0.999909 | 20.995 |
| 405.7 | 412.2 | 0.9842 | Slope | 1.009334 | 0.90 - 1.10 |
| 202.3 | 208.6 | 0.9699 | Slope | 1.009554 | 0.90 - 1.10 |
| | | | Intercept | 2.026079 | +/-20 |





NO Calibration Summary

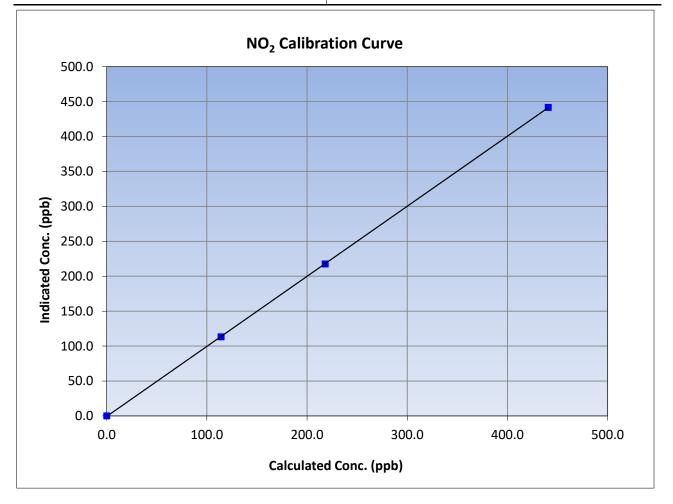
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 29, 2023 | | Previous Calibration: | February | 24, 2023 |
| Station Name: | Cor | nklin | Station Number: | AM | IS21 |
| Start Time (MST): | 9: | 37 | End Time (MST): | 13 | :35 |
| Analyzer make: | Thermo 42i | | Analyzer serial #: | 15016 | 63731 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999992 | ≥0.995 |
| 800.1 | 809.4 | 0.9885 | correlation coernelent | 0.5555552 | 20.333 |
| 400.1 | 405.6 | 0.9865 | Clana | 1.010890 | 0.90 - 1.10 |
| 199.6 | 204.0 | 0.9782 | Slope | 1.010890 | 0.90 - 1.10 |
| | | | Intercept | 0.963352 | +/-20 |

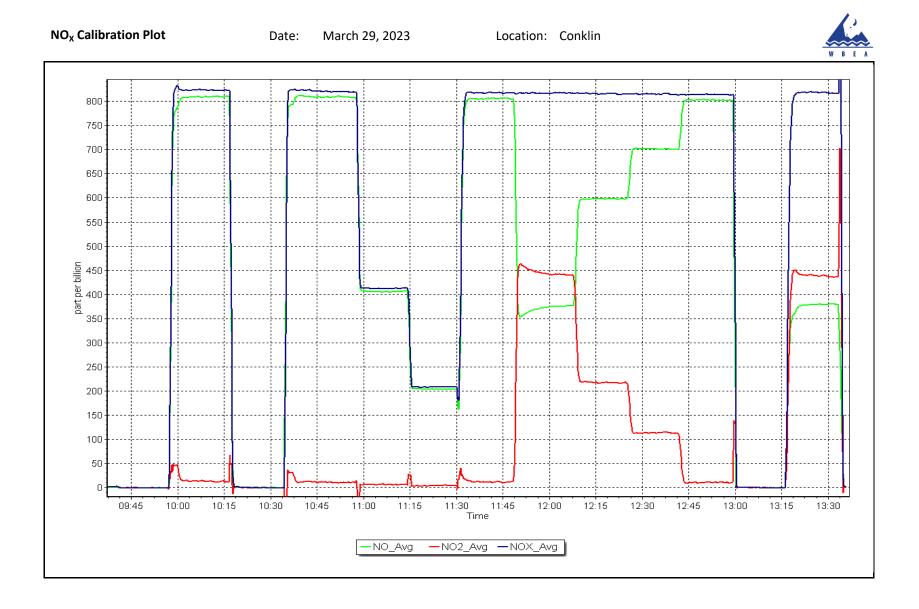




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 29, 2023 | | Previous Calibration: | February | 24, 2023 |
| Station Name: | Cor | nklin | Station Number: | AM | S21 |
| Start Time (MST): | 9:37 | | End Time (MST): | 13 | :35 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 15016 | 63731 |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | | 0.000000 | |
| 440.7 | 441.7 | 0.9978 | Correlation Coefficient | 0.999988 | ≥0.995 |
| 218.1 | 217.6 | 1.0024 | Slope | 1.002951 | 0.90 - 1.10 |
| 114.2 | 113.2 | 1.0090 | Slope | 1.002951 | 0.50 1.10 |
| | | | Intercept | -0.706596 | +/-20 |







O₃ Calibration Report

Version-01-2020

| | | | | | Version-01-202 |
|--|---|---------------------------------------|--|---|--|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Conklin March 9, 2023 10:34 Routine | | Station number: Last Cal Date: End time (MST): | February 3, 2023 | |
| | | 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> 1.001543 0.380000 | <u>Finish</u> 1.000343 0.240000 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> -0.7 1.002 |
| | | 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 | -0.5 | |
| as found span | 5000 | 935.6 | 400.0 | 400.0 | 1.000 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.2 | |
| high point | 5000 | 933.0 | 400.0 | 400.0 | 1.000 |
| second point | 5000 | 799.4 | 200.0 | 201.0 | 0.995 |
| third point | 5000 | 701.9 | 100.0 | 100.4 | 0.996 |
| as left zero | 5000 | 0.0 | 0.0 | -0.3 | |
| as left span | 5000 | 936.0 | 400.0 | 403.4 ge Correction Factor | 0.992 |
| | | | Avelag | | 0.337 |
| Baseline Corr As found: | 400.5 | Previous response | | *% change | -0.1% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiate | es investigation |

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador



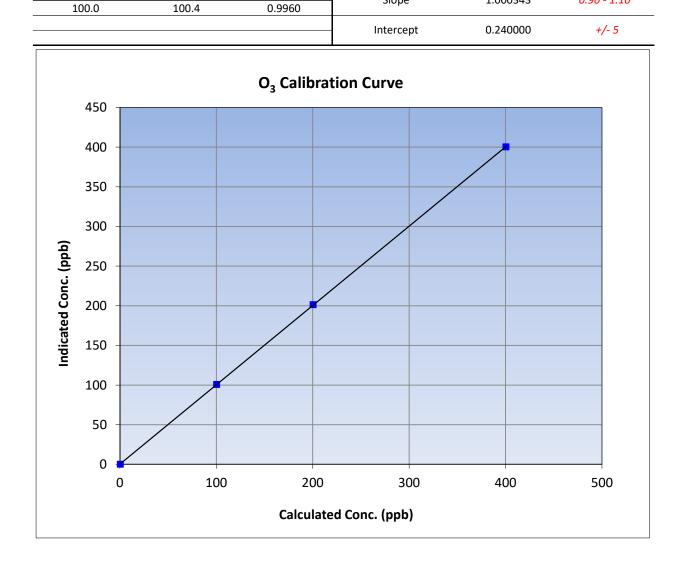
O₃ Calibration Summary

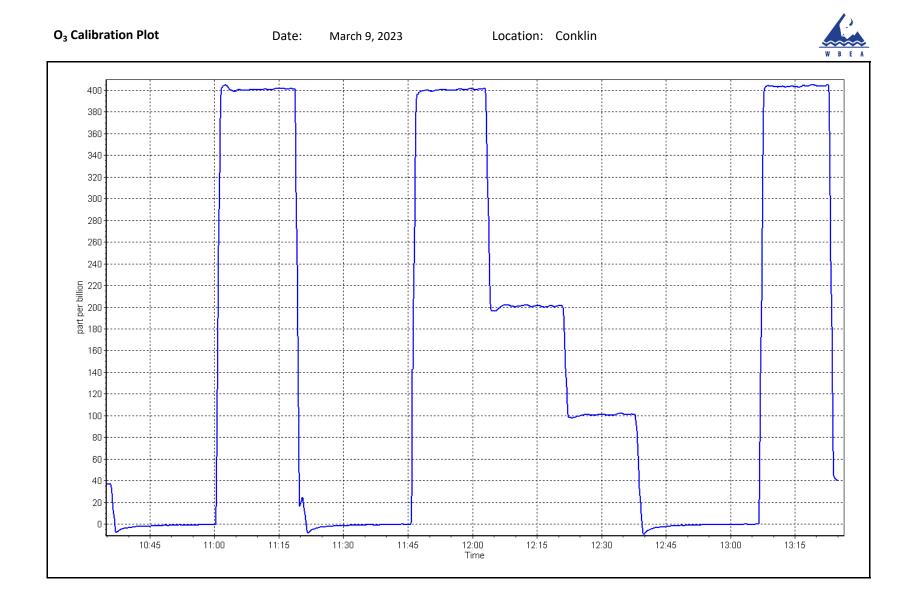
Slope

1.000343

0.90 - 1.10

| WBEA | | | | | Version-01-202 |
|---|----------------------|------------------------------|-------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | March 9 | , 2023 | Previous Calibration: | Februar | y 3, 2023 |
| Station Name: | Conk | lin | Station Number: | AM | 1521 |
| Start Time (MST): | 10:3 | 4 | End Time (MST): | 13 | 3:26 |
| Analyzer make: | nalyzer make: Thermo | | Analyzer serial #: | 15016 | 663734 |
| | | Calibu | ration Data | | |
| | | Calibi | | | |
| Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) | | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
| 0.0 | -0.2 | | Correlation Coefficient | 0.999991 | >0.00E |
| 400.0 | 400.0 | 1.0000 | Correlation Coefficient | 0.999991 | ≥0.995 |
| 200.0 | 201.0 | 0.9950 | Slone | 1 000343 | 0 90 - 1 10 |







T640 PM_{2.5} CALIBRATION

| WBEA | | | | | Version-01-202 |
|-------------------------------|-------------------|-------------------------|---------------------|------------------------|----------------|
| | | Station Information | | | |
| Station Name: | Conklin | | Station number: | AMS 21 | |
| Calibration Date: | March 29, 2023 | | | February 8, 2023 | |
| Start time (MST): | 10:02 | | End time (MST): | 11:10 | |
| Analyzer Make: | API T640 | | S/N: | 1547 | |
| Particulate Fraction: | PM2.5 | | | | |
| Flow Meter Make/Model: | DeltaCal | | S/N: | 954 | |
| Temp/RH standard: | DeltaCal | | S/N: | 954 | |
| | | Monthly Calibration Te | est | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | <u>Adjusted</u> | (Limits) |
| T (°C) | -0.2 | -0.4 | -0.2 | | +/- 2 °C |
| P (mmHg) | 710.8 | 707.4 | 710.8 | | +/- 10 mmHg |
| flow (LPM) | 5 | 5.06 | 5 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 29, 2023 | Last Cal Date: | February 8, 2023 | _ |
| Note: this leak check will be | PM w/o HEPA: | 3.6 | PM w/ HEPA: | 0 | <0.2 ug/m3 |
| | | | | | |
| _ | | Quarterly Calibration T | | | <i></i> |
| <u>Parameter</u> | <u>As found</u> | Post maintenance | <u>As left</u> | Adjusted | (Limits) |
| PMT Peak Test | 11.1 | 11.9 | 11 | \checkmark | 10.9 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | 3.3 | w/ HEPA: | 0 |
| Date Optical Chan | | March 29, 2023 | | | <0.2 ug/m3 |
| Disposable Filte | er Changed: | March 29, 2023 | | | |
| | | Annual Maintenana | | | |
| | | Annual Maintenance | 2 | | |
| Date Sample Tul | be Cleaned: | | | | |
| Date RH/T Sense | or Cleaned: | | | | |
| | | | | | |
| Notes: | Adjust | ment made for PMT Peak | Test. Inspect inlet | head; relatively clear | 1. |
| | | | | | |
| Calibration by: | Denny Ray Estador | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS22 JANVIER MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|---|--|--|--|--|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Janvier March 15, 2023 10:37 Routine | | Station number: Last Cal Date: End time (MST): | AMS 22 February 22, 2023 14:05 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 50.11 | ppm | Cal Gas Exp Date: | January 18, 2029 | |
| Cal Gas Cylinder #: | CC281519 | | | | |
| 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: | 1.000663 | 0.998449 | Backgd or Offset: | 21.4 | 21.5 |
| Calibration intercept: | 0.364554 | 0.464715 | Coeff or Slope: | 1.031 | 1.022 |
| | | | | | |
| | | SO ₂ Calibratio | on Data | | |
| | Dilution air flow rate | _ | | Indicated concentration (| Correction factor (Cc/Ic) |
| Set Point | Dilution air flow rate (sccm) | SO ₂ Calibration | Calculated concentration (ppb) (Cc) | Indicated concentration ((ppb) (Ic) | Correction factor (Cc/lc) Limit = 0.95-1.05 |
| Set Point as found zero | | Source gas flow rate | Calculated | | |
| | (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) | Calculated concentration (ppb) (Cc) 0.0 | (ppb) (Ic) 0.1 | Limit = 0.95-1.05 |
| as found zero as found span | (sccm) 5000 | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) 0.0 | (ppb) (Ic) | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point | (sccm) 5000 | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) 0.0 | (ppb) (Ic) | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero | (sccm) 5000 4920 5000 | Source gas flow rate (sccm) 0.0 79.8 0.0 | Calculated concentration (ppb) (Cc) 0.0 799.8 | (ppb) (Ic) 0.1 803.6 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 4920 | Source gas flow rate (sccm) 0.0 79.8 | Calculated concentration (ppb) (Cc) 0.0 799.8 | (ppb) (Ic) 0.1 803.6 | 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 | (sccm) 5000 4920 | Source gas flow rate (sccm) 0.0 79.8 0.0 79.8 39.9 | Calculated concentration (ppb) (Cc) 0.0 799.8 0.0 799.8 399.9 | (ppb) (Ic) 0.1 803.6 0.1 798.6 400.6 | 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) 5000 4920 5000 4920 4920 4960 4980 | Source gas flow rate (sccm) 0.0 79.8 0.0 79.8 39.9 20.0 | Calculated concentration (ppb) (Cc) 0.0 799.8 0.0 799.8 399.9 200.4 | (ppb) (Ic) 0.1 803.6 0.1 798.6 400.6 200.5 | Limit = 0.95-1.05 0.995 1.001 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero | (sccm) 5000 4920 5000 4920 4920 4960 4980 5000 | Source gas flow rate (sccm) 0.0 79.8 0.0 79.8 39.9 20.0 0.0 | Calculated concentration (ppb) (Cc) 0.0 799.8 0.0 0.0 799.8 399.9 200.4 0.0 | (ppb) (Ic) 0.1 803.6 0.1 798.6 400.6 200.5 0.4 | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point | (sccm) 5000 4920 5000 4920 4920 4960 4980 | Source gas flow rate (sccm) 0.0 79.8 0.0 79.8 39.9 20.0 | Calculated concentration (ppb) (Cc) 0.0 799.8 0.0 799.8 399.9 200.4 0.0 799.8 | (ppb) (Ic) 0.1 803.6 0.1 798.6 400.6 200.5 0.4 800.8 | 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 as left zero | (sccm) 5000 4920 5000 4920 4920 4960 4980 5000 | Source gas flow rate (sccm) 0.0 79.8 0.0 79.8 39.9 20.0 0.0 | Calculated concentration (ppb) (Cc) 0.0 799.8 0.0 799.8 399.9 200.4 0.0 799.8 | (ppb) (Ic) 0.1 803.6 0.1 798.6 400.6 200.5 0.4 | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero | (sccm) 5000 4920 5000 4920 4920 4960 4980 5000 | Source gas flow rate (sccm) 0.0 79.8 0.0 79.8 39.9 20.0 0.0 | Calculated concentration (ppb) (Cc) 0.0 799.8 0.0 799.8 399.9 200.4 0.0 799.8 200.4 0.0 799.8 Averag | (ppb) (Ic) 0.1 803.6 0.1 798.6 400.6 200.5 0.4 800.8 | 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 as left zero as left span | (sccm) 5000 4920 5000 4920 4960 4980 5000 4920 | Source gas flow rate (sccm) 0.0 79.8 0.0 79.8 39.9 20.0 0.0 79.8 39.9 20.0 0.0 79.8 | Calculated concentration (ppb) (Cc) 0.0 799.8 0.0 799.8 399.9 200.4 0.0 799.8 200.4 0.0 799.8 Average 800.68 | (ppb) (Ic) 0.1 803.6 0.1 798.6 400.6 200.5 0.4 800.8 ge Correction Factor | Limit = 0.95-1.05 0.995 1.001 0.998 1.000 0.999 1.000 |

Inlet filter changed after as founds. Adjusted span only.

Calibration Performed By:

Rene Chamberland

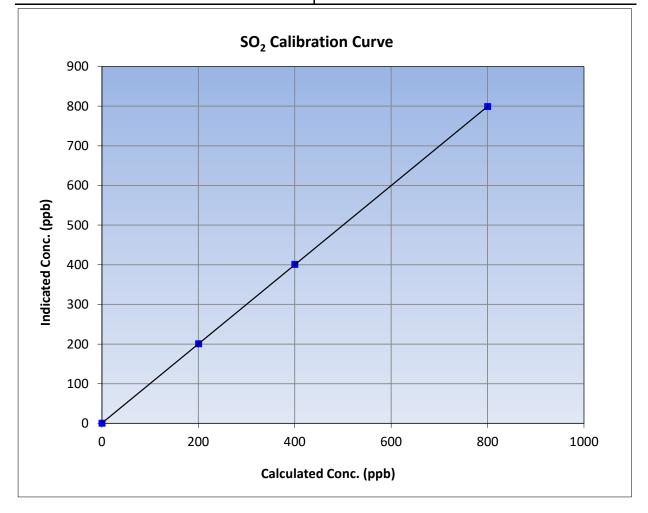


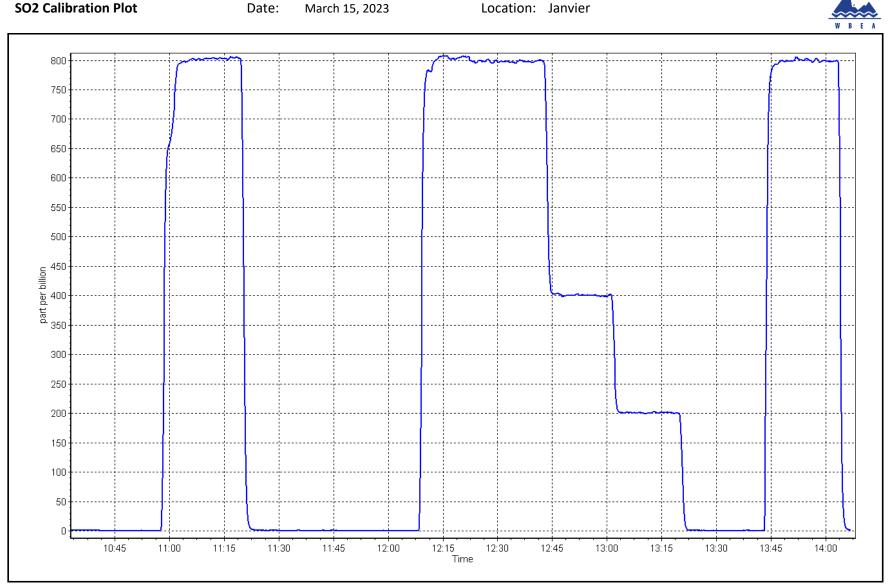
SO₂ Calibration Summary

| W B E A | | | Version-01-2020 | | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|--|
| Station Information | | | | | | | | |
| Calibration Date: | March 15, 2023 | Previous Calibration: | February 22, 2023 | | | | | |
| Station Name: | Janvier | Station Number: | AMS 22 | | | | | |
| Start Time (MST): | 10:37 | End Time (MST): | 14:05 | | | | | |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1152430006 | | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999997 | ≥0.995 |
| 799.8 | 798.6 | 1.0015 | correlation coefficient | 0.333337 | 20.333 |
| 399.9 | 400.6 | 0.9982 | Slope | 0.998449 | 0.90 - 1.10 |
| 200.4 | 200.5 | 0.9997 | Slope | 0.998449 | 0.30 - 1.10 |
| | | | Intercept | 0.464715 | +/-30 |







TRS Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Janvier March 29, 2023 10:46 Routine | | Station number: Last Cal Date: End time (MST): | AMS22 February 24, 2023 15:08 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.03 DT0018680 | ppm | Cal Gas Exp Date: | April 16, 2022 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 5.03 NA | ppm | Rem Gas Exp Date: Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | Teledyne API T700 Teledyne API T701 | | Serial Number: Serial Number: | 3806 4890 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i-TLE CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1151680031 587 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.002650 | 0.999222 | Backgd or Offset: | 3.56 | 3.50 |
| Calibration intercept: | 0.120931 | 0.140953 | Coeff or Slope: | 1.239 | 1.220 |
| | | 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 | 4920 | 79.5 | 80.0 | 80.2 | 0.999 |
| as found 2nd point | 4960 | 39.8 | 40.0 | 40.8 | 0.984 |
| as found 3rd point | 4980 | 19.9 | 20.0 | 20.6 | 0.977 |
| new cylinder response | | | | | |
| | | TRS Calibrat | 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/lc) <i>Limit = 0.95-1.05</i> |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4920 | 79.5 | 80.0 | 80.0 | 1.000 |
| second point | 4960 | 39.8 | 40.0 | 40.3 | 0.994 |
| third point | 4980 | 19.9 | 20.0 | 20.1 | 0.996 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as left span | 4920 | 79.5 | 80.0 | 79.9 | 1.001 |
| SO2 Scrubber Check | 4920 | 79.8 | 798.0 | 0.1 | |
| Date of last scrubber cha | - | | | Ave Corr Factor | 0.996 |
| Date of last converter ef | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 80.1 | Prev response: | 80.32 | *% change: | -0.3% |
| Baseline Corr 2nd AF pt: | 40.7 | AF Slope: | 1.000369 | AF Intercept: | 0.400787 |
| Baseline Corr 3rd AF pt: | 20.5 | AF Correlation: | 0.999919 | | |
| | | | | * = > +/-5% change initiat | es investigation |

Notes:

Changed out the inlet filter after as founds. Scrubber check passed. Adjusted span only.

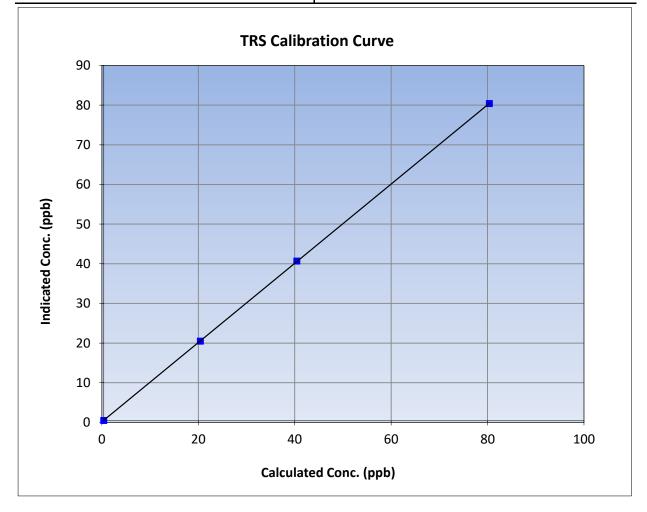


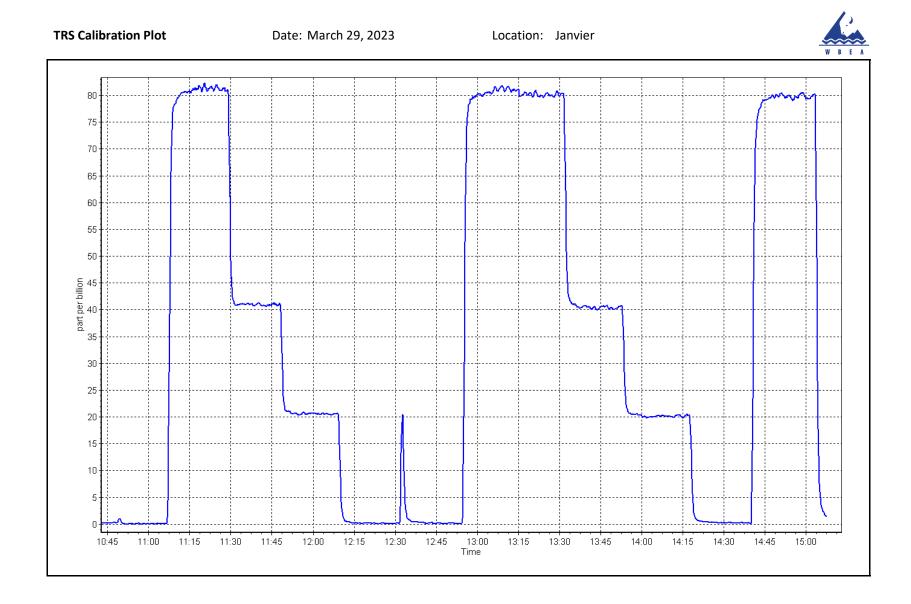
TRS Calibration Summary

| WBEA | | | Version-11-2021 | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|
| Station Information | | | | | | | |
| Calibration Date: | March 29, 2023 | Previous Calibration: | February 24, 2023 | | | | |
| Station Name: | Janvier | Station Number: | AMS22 | | | | |
| Start Time (MST): | 10:46 | End Time (MST): | 15:08 | | | | |
| Analyzer make: | Thermo 43i-TLE | Analyzer serial #: | 1151680031 | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999991 | ≥0.995 |
| 80.0 | 80.0 | 0.9998 | correlation coefficient | 0.999991 | 20.333 |
| 40.0 | 40.3 | 0.9936 | Slope | 0.999222 | 0.90 - 1.10 |
| 20.0 | 20.1 | 0.9960 | | | 0.90 - 1.10 |
| | | | - Intercept | 0.140953 | +/-3 |







THC / CH_4 / NMHC Calibration Report

| W B E A | | | | | Version-01-2020 |
|--------------------------------------|-----------------|---------------|-------------------------|----------------|-----------------|
| | | Stati | on Information | | |
| Station Name: | Janvier | | Station number: AN | AS 22 | |
| Calibration Date: | March 15, 2023 | | Last Cal Date: Fe | bruary 22, 202 | 23 |
| Start time (MST): | 10:37 | | End time (MST): 14 | :05 | |
| Reason: | Routine | | | | |
| | | Calibi | ration Standards | | |
| Gas Cert Reference: | C | C281519 | Cal Gas Expiry Date: Ja | nuary 18, 2029 |) |
| CH4 Cal Gas Conc. | 502.8 | ppm | CH4 Equiv Conc. | 1075.9 | ppm |
| C3H8 Cal Gas Conc. | 208.4 | ppm | | | |
| Removed Gas Cert: | | N/A | Removed Gas Expiry: N/ | 'A | |
| Removed CH4 Conc. | 502.8 | ppm | CH4 Equiv Conc. | 1075.9 | ppm |
| Removed C3H8 Conc. | 208.4 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | |
| Calibrator Model: | Teledyne API 70 | 0 | Serial Number: 38 | 06 | |
| ZAG make/model: | Teledyne API 70 | 1 | Serial Number: 48 | 90 | |
| | | Analy | zer Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 11 | 72750023 | |
| THC Range (ppm): | : 0 - 20 ppm | | | | |
| NMHC Range (ppm): | : 0 - 10 ppm | | CH4 Range (ppm): 0 - | · 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio: | 2.180E-04 | 2.150E-0 | 4 NMHC SP Ratio: | 4.50E-05 | 4.51E-05 |
| CH4 Retention time: | 13.20 | 13.20 | NMHC Peak Area: | 203120 | 202703 |

| THC Calibration Data | | | | | | |
|-----------------------|-------------------|----------------------|---------------------|--|----------------------------|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Cc | :) Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4920 | 79.8 | 17.17 | 17.43 | 0.985 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| high point | 4920 | 79.8 | 17.17 | 17.16 | 1.001 | |
| second point | 4960 | 39.9 | 8.59 | 8.55 | 1.005 | |
| third point | 4980 | 20.0 | 4.30 | 4.25 | 1.013 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4920 | 79.8 | 17.17 | 17.25 | 0.996 | |
| | | | A۱ | verage Correction Factor | 1.006 | |
| Baseline Corr AF: | 17.43 | Prev response | 17.21 | *% change | 1.3% | |
| 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 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 | 9.40 | 0.974 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0 | 0.00 | 0.00 | |
| high point | 4920 | 79.8 | 9.15 | 9.10 | 1.005 |
| second point | 4960 | 39.9 | 4.57 | 4.55 | 1.006 |
| third point | 4980 | 20.0 | 2.29 | 2.26 | 1.013 |
| as left zero | 5000 | 0 | 0.00 | 0.00 | |
| as left span | 4920 | 79.8 | 9.15 | 9.16 | 0.999 |
| | | | ŀ | Average Correction Factor | 1.008 |
| Baseline Corr AF: | 9.40 | Prev response | 9.17 | *% change | 2.4% |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |

| CH4 | Calib | ration | Data |
|-----|-------|--------|------|
| | Callb | ιαιισπ | ναια |

| | | CH4 Calibra | LION Data | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | c) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4920 | 79.8 | 8.03 | 8.04 | 0.999 | |
| as found 2nd point | | | | | | |
| as found 3rd point | | | | | | |
| new cylinder response | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| high point | 4920 | 79.8 | 8.03 | 8.06 | 0.996 | |
| second point | 4960 | 39.9 | 4.01 | 4.00 | 1.003 | |
| third point | 4980 | 20.0 | 2.01 | 1.99 | 1.013 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4920 | 79.8 | 8.03 | 8.09 | 0.992 | |
| | | | A | verage Correction Factor | 1.004 | |
| Baseline Corr AF: | 8.04 | Prev response | 8.05 | *% 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: | | 1.003856 | 1.000168 | | | |
| THC Cal Offset: | | -0.027606 | | -0.027388 | | |
| CH4 Cal Slope: | | 1.004586 | | 1.005284 | | |
| CH4 Cal Offset: | | -0.017766 | | -0.018965 | | |
| NMHC Cal Slope: | | 1.003078 | | 0.995905 | | |
| NMHC Cal Offset: | | -0.009039 | | -0.008823 | | |

Notes:

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

Calibration Performed By:

Rene Chamberland



THC Calibration Summary

| | | Station I | nformation | | |
|---|---|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 15, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Jan | Janvier | | AMS | 5 22 |
| Start Time (MST): | 10 | :37 | End Time (MST): | 14: | 05 |
| Analyzer make: | Thern | no 55i | Analyzer serial #: | 11727 | 50023 |
| | | Calibra | tion Data | | |
| Calculated concentrati (ppm) (Cc) | ion Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 17.17 | 0.00 17.16 | 1.0006 | Correlation Coefficient | 0.999988 | ≥0.995 |
| 8.59 4.30 | 8.55 4.25 | 1.0045 1.0129 | Slope | 1.000168 | 0.90 - 1.10 |
| | | | Intercept | -0.027388 | +/-0.5 |
| 20.0 - | | THC Calibratio | n Curve | | |
| 18.0 - | | | | | |
| 16.0 - | | | | | |
| 14.0 - | | | | | |
| ີ ແ ຊີ 12.0 - | | | | | |
| u) 10.0 - | | | | | |
| Indicated Conc. (ppm) 10.0 - 8.0 - 6.0 - | | | | | |
| ndica - 0.9 | | | | | |
| 4.0 - | | | | | |
| 2.0 - | | | | | |
| 0.0 🗸 | | 2 | 10.0 | 45.0 | 20.0 |
| 0.0 | J 5 | .0 | | 15.0 | 20.0 |
| | | Calculated | Conc. (ppm) | | |



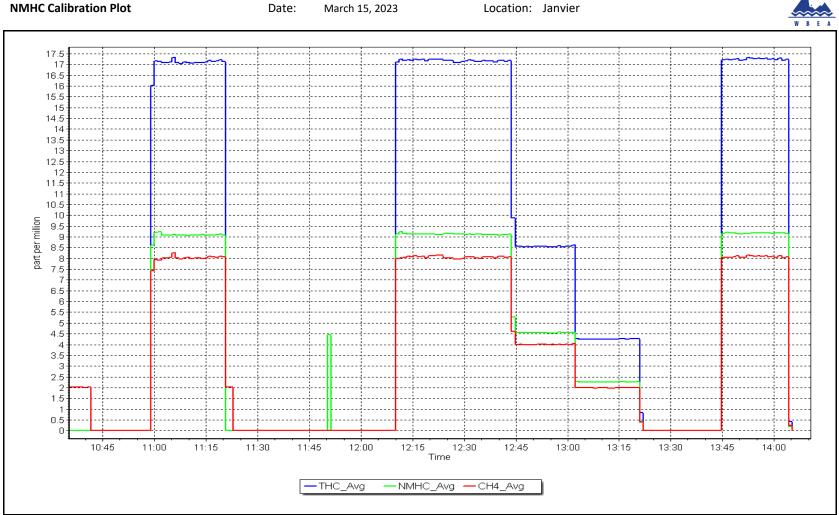
CH₄ Calibration Summary

| | | | Station I | nformation | | |
|-----------------------|--------------------------|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibratio | on Date: | March 1 | | Previous Calibration: | February | 22, 2023 |
| Station Na | | Jan | | Station Number: | AMS | |
| Start Time | | 10 | | End Time (MST): | 14: | |
| Analyzer i | | Therm | | Analyzer serial #: | 11727 | |
| | | | | | | |
| | | | Calibra | tion Data | | |
| | concentration m) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| |).00 3.03 | 0.00 8.06 | 0.9958 | Correlation Coefficient | 0.999974 | ≥0.995 |
| | .03 .01 | 4.00 | 1.0026 | | | |
| | 2.01 | 1.99 | 1.0127 | Slope | 1.005284 | 0.90 - 1.10 |
| | | | | Intercept | -0.018965 | +/-0.5 |
| (mq | 8.0 7.0 6.0 | | | | | |
| Indicated Conc. (ppm) | 5.0 | | | | | |
| ndicated | 3.0 | | | | | |
| - | 2.0 | | | | | |
| 1 | 1.0 | | | | | |
| | 0.0 | 2.0 | 4.0 | <u> </u> | 8.0 | 10.0 |
| | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | Calculated | l Conc. (ppm) | | |



NMHC Calibration Summary

| | | Station I | nformation | | |
|---|--------------------------------------|---------------------------|-------------------------|-------------------|---------------|
| alibration Date: | March | 15, 2023 | Previous Calibration: | February 22, 2023 | |
| tation Name: | Jar | nvier | Station Number: | AMS | 5 22 |
| tart Time (MST): | 10 |):37 | End Time (MST): | 14: | 05 |
| nalyzer make: | Ther | mo 55i | Analyzer serial #: | 11727 | 50023 |
| | | Calibra | tion Data | | |
| Calculated concentration Ir (ppm) (Cc) | ndicated concentration (ppm) (lc) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999995 | ≥0.995 |
| 9.15 4.57 | 9.10 4.55 | <u>1.0047</u> 1.0063 | | | |
| 2.29 | 2.26 | 1.0130 | Slope | 0.995905 | 0.90 - 1.10 |
| | | | Intercept | -0.008823 | +/-0.5 |
| 9.0 8.0 7.0 () 6.0 | | | | | • |
| 6.0 (bbm) 5.0 | | | | | |
| - 10 | | | | | |
| 0.5 udicated | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| 0.0 | 2.0 | | l Conc. (ppm) | 0.0 | 10.0 |







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information Station Name: Janvier Station number: AMS 22 Calibration Date: March 9, 2023 Last Cal Date: February 23, 2023 Start time (MST): 12:20 End time (MST): 17:03 Routine Reason: **Calibration Standards** April 16, 2023 NO Gas Cylinder #: CC424183 Cal Gas Expiry Date: NOX Cal Gas Conc: NO Cal Gas Conc: 48.60 48.60 ppm ppm Removed Cylinder #: NA Removed Gas Exp Date: NA Removed Gas NO Conc: Removed Gas NOX Conc: 48.60 ppm 48.60 ppm NOX gas Diff: NO gas Diff: Calibrator Model: Teledyne API T700 Serial Number: 3806 ZAG make/model: Teledyne API T701 Serial Number: 4890 **Analyzer Information** Analyzer make: Teledyne API T200 Analyzer serial #: 7117 NOX Range (ppb): 0 - 1000 ppb Start Finish Start Finish

| | otort | | | 00010 | 1111011 |
|---------------------|-------|-------|----------------------|-------|---------|
| NO coeff or slope: | 1.019 | 1.019 | NO bkgnd or offset: | -0.3 | -0.3 |
| NOX coeff or slope: | 1.009 | 1.009 | NOX bkgnd or offset: | 0.4 | 0.4 |
| NO2 coeff or slope: | 1.000 | 1.000 | Reaction cell Press: | 5.1 | 5.1 |
| | | | | | |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.000016 | 1.001316 |
| NO _x Cal Offset: | 0.328470 | 0.648371 |
| NO Cal Slope: | 0.999486 | 1.001644 |
| NO Cal Offset: | -0.011076 | 0.008462 |
| NO ₂ Cal Slope: | 0.999574 | 1.000730 |
| NO ₂ Cal Offset: | 0.324675 | 0.876715 |



$NO_X \setminus NO \setminus NO_2$ 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 | 0.0 | 0.0 | | |
| as found span | 4918 | 82.3 | 799.9 | 799.9 | 0.0 | 798.3 | 796.4 | 1.9 | 1.0020 | 1.0044 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | -0.2 | | |
| high point | 4918 | 82.3 | 799.9 | 799.9 | 0.0 | 801.4 | 801.2 | 0.2 | 0.9981 | 0.9984 |
| second point | 4959 | 41.2 | 400.4 | 400.4 | 0.0 | 401.6 | 401.4 | 0.2 | 0.9971 | 0.9976 |
| third point | 4980 | 20.6 | 200.2 | 200.2 | 0.0 | 202.0 | 200.1 | 1.9 | 0.9911 | 1.0005 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | -0.2 | | |
| as left span | 4918 | 82.3 | 799.9 | 408.7 | 391.2 | 800.6 | 417.0 | 383.6 | 0.9991 | 0.9801 |
| | | | | | | | Average C | orrection Factor | 0.9955 | 0.9989 |
| Corrected As fo | und NO _x = | 798.3 ppb | NO = | 796.4 ppb | * = > +/-59 | % change initiates | investigation | *Percent Chang | ge NO _x = | -0.2% |
| Previous Respo | nse NO _x = | 800.2 ppb | NO = | 799.5 ppb | | | | *Percent Chang | ge NO = | -0.4% |
| 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 | d NO r ² : | | NO SI: | NO Int: | |
| | | | | | As foun | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 concentration (ppb) (Ic) | NO2 Correction factor (Cc/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 | 409.3 | 391.2 | 391.9 | 0.9982 | 100.2% |
| 2nd GPT point (200 ppb O3) | 800.5 | 608.6 | 191.9 | 193.3 | 0.9928 | 100.7% |
| 3rd GPT point (100 ppb O3) | 800.5 | 707.7 | 92.8 | 94.9 | 0.9779 | 102.3% |
| | | | | Average Correction Factor | 0.9896 | 101.1% |

Notes:

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

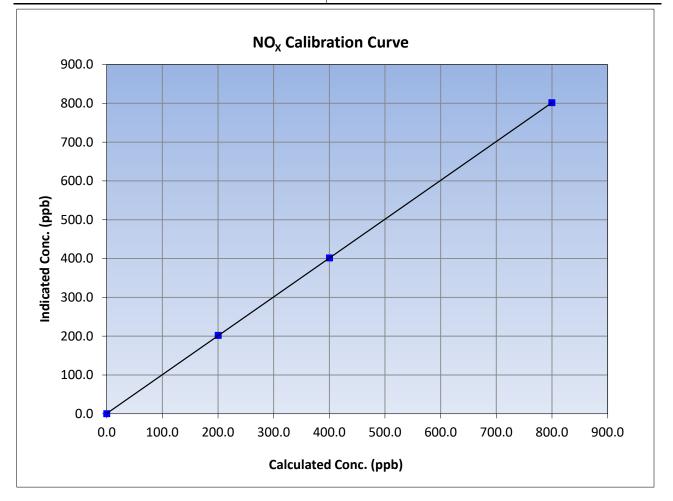
Calibration Performed By:

Rene Chamberland



NO_x Calibration Summary

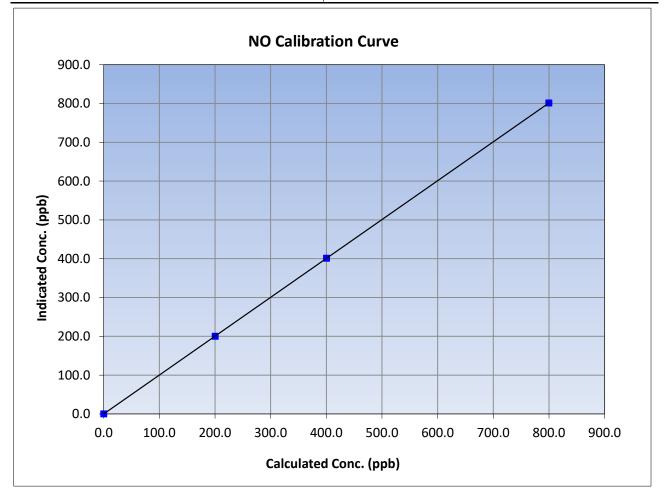
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 9, 2023 | Previous Calibration: | Februar | y 23, 2023 |
| Station Name: | Janvier | | Station Number: | AM | 1S 22 |
| Start Time (MST): | 12 | :20 | End Time (MST): | 17 | 7:03 |
| Analyzer make: Teledyne API T200 | | | Analyzer serial #: 7117 | | 117 |
| | | 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 |
| 799.9 | 801.4 | 0.9981 | correlation coernicient | 0.555550 | 20.995 |
| 400.4 | 401.6 | 0.9971 | Slope | 1.001316 | 0.90 - 1.10 |
| 200.2 | 202.0 | 0.9911 | Slope | 1.001510 | 0.90 - 1.10 |
| | | | Intercept | 0.648371 | +/-20 |





NO Calibration Summary

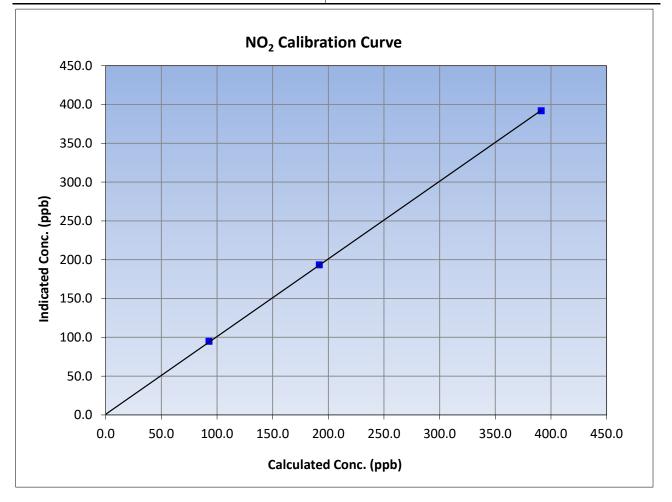
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 9, 2023 | Previous Calibration: | Februar | y 23, 2023 |
| Station Name: | Jan | vier | Station Number: | AN | /IS 22 |
| Start Time (MST): | 12 | :20 | End Time (MST): | 1 | 7:03 |
| Analyzer make: Teledyne API T200 | | | Analyzer serial #: 7117 | | 117 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.2 | | Correlation Coefficient | 0.999999 | ≥0.995 |
| 799.9 | 801.2 | 0.9984 | correlation coefficient | 0.5555555 | 20.995 |
| 400.4 | 401.4 | 0.9976 | Clana | 1.001644 | 0.90 - 1.10 |
| 200.2 | 200.1 | 1.0005 | Slope | 1.001044 | 0.90 - 1.10 |
| | | | Intercept | 0.008462 | +/-20 |

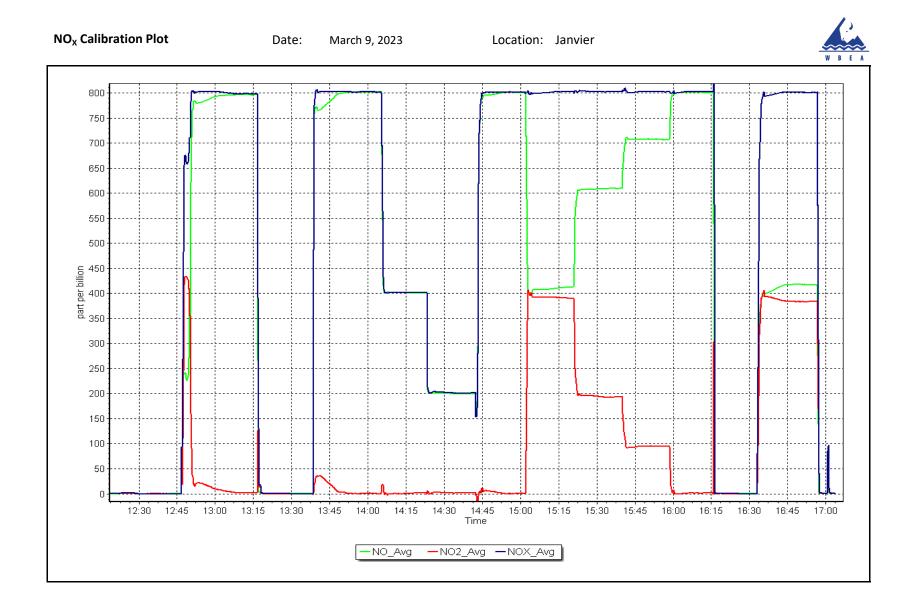




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 9, 2023 | Previous Calibration: | Februar | y 23, 2023 |
| Station Name: | Janvier | | Station Number: | AM | 1S 22 |
| Start Time (MST): | 12 | :20 | End Time (MST): | 17 | 7:03 |
| Analyzer make: Teledyne API T200 | | | Analyzer serial #: 7117 | | 117 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.2 | | Correlation Coefficient | 0.999966 | ≥0.995 |
| 391.2 | 391.9 | 0.9982 | correlation coernelent | 0.555500 | 20.000 |
| 191.9 | 193.3 | 0.9928 | Slope | 1.000730 | 0.90 - 1.10 |
| 92.8 | 94.9 | 0.9779 | Slope | 1.000730 | 0.90 - 1.10 |
| | | | Intercept | 0.876715 | +/-20 |







O₃ Calibration Report

Version-01-2020

| | | | | | Version-01-2020 |
|--|--|---------------------------------------|--|---|--|
| | | Station Infor | mation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Janvier March 28, 2023 10:33 Routine | | Station number: Last Cal Date: End time (MST): | February 14, 2023 | |
| | | Calibration St | andards | | |
| O3 generation mode: Calibrator Make/Model: ZAG Make/Model: | Photometer Teledyne API T700 Teledyne API T701 | | Serial Number: Serial Number: | | |
| | | Analyzer Info | rmation | | |
| Analyzer make: Analyzer Range | : Teledyne API T400 e 0 - 500 ppb | | Analyzer serial #: | 3869 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 1.000057 0.440000 | <u>Finish</u> 1.000429 0.000000 | Backgd or Offset: Coeff or Slope: | <u>Start</u> -2.0 1.011 | <u>Finish</u> -2.0 1.011 |
| | | O ₃ Calibratio | on Data | | |
| Set Point | Total air flow rate (sccm) | Calibrator Lamp Voltage Drive | Calculated concentration (ppb) (Cc) | Indicated concentration ((ppm) (Ic) | Correction factor (Cc/lc) Limit = 0.95-1.05 |
| as found zero | 5000 | 800.0 | 0.0 | -0.1 | |
| as found span | 4893 | 899.1 | 400.0 | 399.3 | 1.002 |
| as found 2nd point as found 3rd point | | | | | |
| calibrator zero | 5000 | 800.0 | 0.0 | 0.2 | |
| high point | 4893 | 899.1 | 400.0 | 400.3 | 0.999 |
| second point | 4893 | 753.4 | 200.0 | 199.9 | 1.001 |
| third point | 4893 | 655.7 | 100.0 | 99.9 | 1.001 |
| as left zero | 5000 | 800.0 | 0.0 | 0.1 | |
| as left span | 4816 | 899.1 | 400.0 | 401.0 | 0.998 |
| | | | Avera | ge Correction Factor | 1.000 |
| Baseline Corr As found: Baseline Corr 2nd AF pt: | 399.4 NA | Previous response AF Slope: | | *% change AF Intercept: | -0.3% |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiate | es investigation |

Notes:

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

Calibration Performed By:

Rene Chamberland

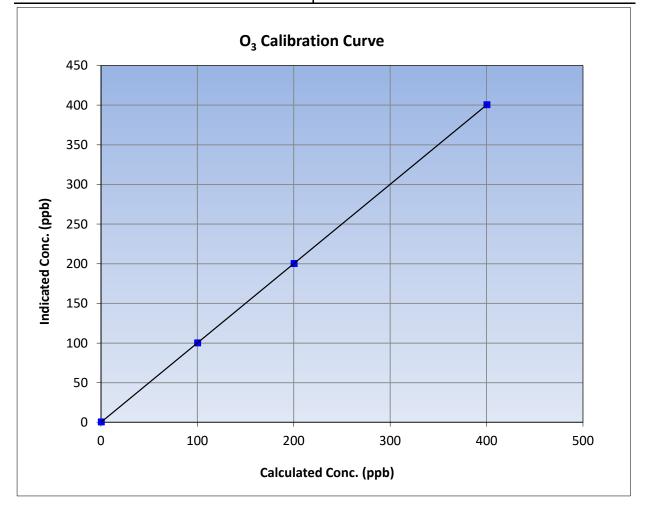


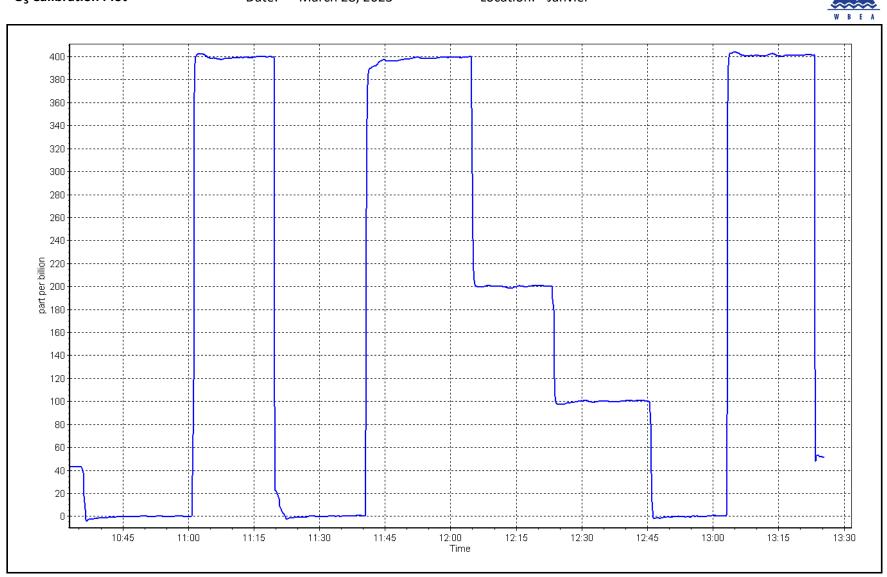
O₃ Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|-------------------|-----------------------|-------------------|
| | Statio | on Information | |
| Calibration Date: | March 28, 2023 | Previous Calibration: | February 14, 2023 |
| Station Name: | Janvier | Station Number: | AMS 22 |
| Start Time (MST): | 10:33 | End Time (MST): | 13:26 |
| Analyzer make: | Teledyne API T400 | Analyzer serial #: | 3869 |
| | | | |

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 | 0.999999 | ≥0.995 |
| 400.0 | 400.3 | 0.9993 | correlation coefficient | 0.555555 | 20.333 |
| 200.0 | 199.9 | 1.0005 | Slope | 1.000429 | 0.90 - 1.10 |
| 100.0 | 99.9 | 1.0010 | Slope | 1.000429 | 0.30 - 1.10 |
| | | | Intercept | 0.000000 | +/- 5 |





O₃ Calibration Plot

Location: Janvier



T640 PM_{2.5} CALIBRATION

| WDEA | | | | | Version-01-2023 |
|-------------------------------|------------------------|---------------------------|-------------------------|----------------------|-------------------|
| | | Station Information | 1 | | |
| Station Name: | Janvier | | Station number: | AMS 22 | |
| Calibration Date: | March 29, 2023 | | Last Cal Date: | February 24, 2023 | |
| Start time (MST): | 12:11 | | End time (MST): | 13:33 | |
| 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 T | est | | |
| Parameter | <u>As found</u> | Measured | <u>As left</u> | <u>Adjuste</u> | <u>d (Limits)</u> |
| ⊤ (°C) | 0.6 | 0 | 0.6 | | +/- 2 °C |
| P (mmHg) | 716.4 | 714.9 | 716.4 | | +/- 10 mmHg |
| flow (LPM) | 5.01 | 4.88 | 5.01 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 29, 2023 | Last Cal Date: | February 24, 2023 | 1 |
| | PM w/o HEPA: | | PM w/ HEPA: | 0 | <0.2 ug/m3 |
| Note: this leak check will be | e completed before the | quarterly work and will s | serve as the pre ma | intenance leak checl | K |
| Inlet cleaning : | Inlet Head | | | | |
| | | | | | |
| | | One de la Califación d | | | |
| . . | | Quarterly Calibration 1 | | | |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | <u>Adjuste</u> | |
| PMT Peak Test | | | | | 11.3 +/- 0.5 |
| Post-maintenanc | e leak check: | PM w/o HEPA: | | w/ HEPA: | |
| Date Optical Chan | nber Cleaned: | January 26, | 2023 | · · · · · | <0.2 ug/m3 |
| Disposable Filte | er Changed: | January 26, | 2023 | | |
| | | | | | |
| | | | _ | | |
| | | Annual Maintenanc | e | | |
| Date Sample Tul | be Cleaned: | October 6, | 2022 | | |
| Date RH/T Sense | or Cleaned: | October 6, | 2022 | | |
| | | | | | |
| Notes: | | Verified flow, temperat | ure, and pressure. Leak | test passed. | |
| | | | | | |
| Calibration by: | Rene Chamberland | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS23 FORT HILLS MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Hills March 2, 2023 11:31 Routine | | Station number: Last Cal Date: End time (MST): | AMS23 February 1, 2023 14:55 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.76 | ppm | Cal Gas Exp Date: | January 5, 2025 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: | CC281425 49.76 | ppm | Rem Gas Exp Date: | N/A | |
| Removed Gas Cyl #: | 49.70 N/A | ppm | Diff between cyl: | N/A | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 451 | |
| ZAG Make/Model: | API T701 | | Serial Number: | 5611 | |
| | | | | | |
| | | Analyzer Info | | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1160290012 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.997162 | 0.995960 | Backgd or Offset: | 18.1 | 18.5 |
| Calibration intercept: | -0.103174 | -0.582785 | Coeff or Slope: | 1.048 | 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 ((ppb) (Ic) | Correction factor (Cc/I Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | -0.1 | |
| as found span | 4920 | 80.3 | 799.1 | 791.0 | 1.010 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.2 | |
| high point | 4920 | 80.3 | 799.1 | 795.5 | 1.005 |
| second point | 4960 | 40.2 | 400.1 | 398.0 | 1.005 |
| third point | 4980 | 20.1 | 200.0 | 197.5 | 1.013 |
| as left zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as left span | 4920 | 80.3 | 799.1 | 799.2 ge Correction Factor | 1.000 |
| | | | | | |
| Baseline Corr As found: | 791.10 | Previous response | | *% change | -0.7% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

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

Calibration Performed By:



400.1

398.0

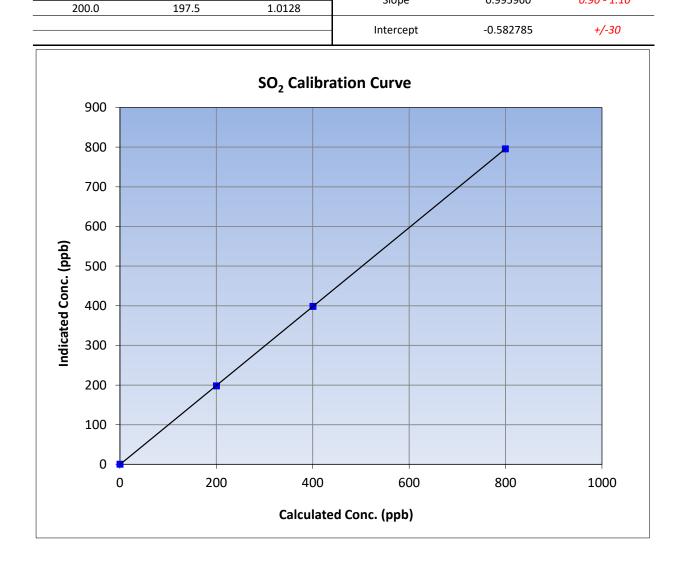
Wood Buffalo Environmental Association

SO₂ Calibration Summary

Slope

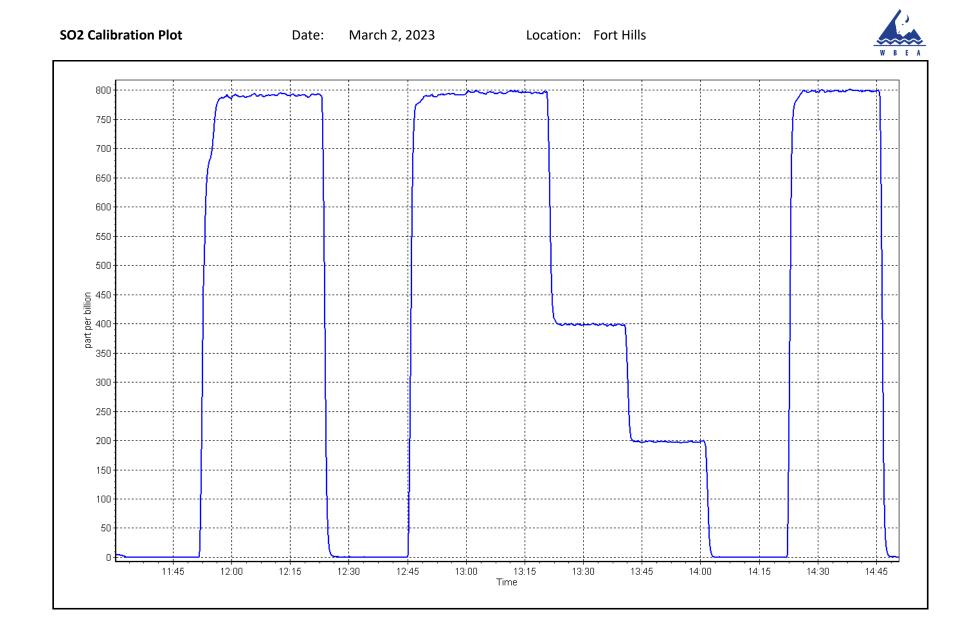
| WBEA | | | | | Version-01-2020 |
|--|---------------------------------------|------------------------------|-------------------------|----------|-----------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | , 2023 | Previous Calibration: | February | 1, 2023 |
| Station Name: | Fort H | lills | Station Number: | AM | S23 |
| Start Time (MST): | 11:3 | 31 | End Time (MST): | 14: | 55 |
| Analyzer make: | Therm | o 43i | Analyzer serial #: | 11602 | 90012 |
| | | Calib | ration Data | | |
| | | Calibi | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluatio | n | <u>Limits</u> |
| 0.0 | 0.2 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 799.1 | 795.5 | 1.0045 | conclution coefficient | 0.555554 | 20.995 |

1.0052



0.90 - 1.10

0.995960



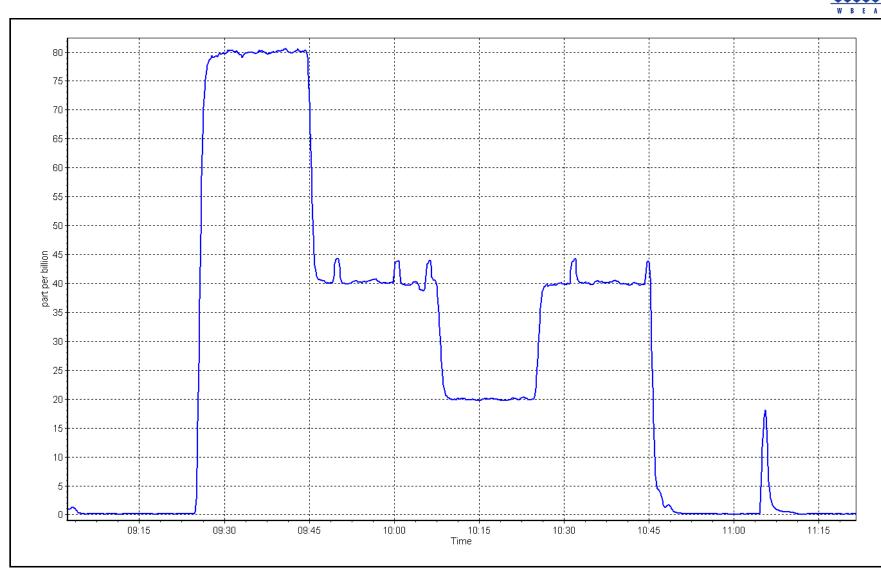
CALS_444



TRS Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|---|--------------------------------|--|---------------------------------------|--|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Hills March 17, 2023 9:03 Removal | | Station number: Last Cal Date: End time (MST): | AMS23 February 14, 2023 12:00 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.20 CC517372 | ppm | Cal Gas Exp Date: | February 5, 2024 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 5.20 N/A | ppm | Rem Gas Exp Date: Diff between cyl: | N/A | |
| Calibrator Make/Model: ZAG Make/Model: | API T700 API T701 | | Serial Number: Serial Number: | 451 5611 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQ TLE CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 12113311965 594 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 1.004890 -0.158196 | | Backgd or Offset: Coeff or Slope: | | N/A N/A |
| | | 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 | 0.2 | |
| as found span | 4923 | 77.0 | 80.0 | 80.2 | 1.000 |
| as found 2nd point | 4962 | 38.5 | 40.0 | 40.1 | 1.002 |
| as found 3rd point | 4981 | 19.2 | 19.9 | 19.9 | 1.013 |
| 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 | | | | | |
| high point | | | | | |
| second point | | | | | |
| third point | | | | | |
| as left zero | | | | | |
| as left span | 4000 | 70.0 | 702.0 | | |
| SO2 Scrubber Check | 4922 | 78.3 | 783.0 | | |
| Date of last scrubber cha Date of last converter eff | • | | | Ave Corr Factor | efficiency |
| | · | | | | |
| Baseline Corr As found: | 80.0 | Prev response: | 80.24 | *% change: | -0.3% |
| Baseline Corr 2nd AF pt: | 39.9 | AF Slope: | | AF Intercept: | 0.081840 |
| Baseline Corr 3rd AF pt: | 19.7 | AF Correlation: | 0.999989 | | |
| | | | | * = > +/-5% change initiat | es investigation |

Notes: Pump flow on the instrument is dropping and the readings spiking during the drop, changed the pump and still getting the same problem, removing the instrument to replace it with a new one.



TRS Calibration Plot



CALS_446



TRS Calibration Report

| WBEA | | | | | Version-11-20 |
|---|---|--|---|---|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Hills March 17, 2023 14:30 Install | | Station number: Last Cal Date: End time (MST): | AMS23 February 14, 2023 18:56 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.20 CC517372 | ppm | Cal Gas Exp Date: | February 5, 2024 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: | 5.20 N/A | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | N/A 451 | |
| AG Make/Model: | API 1700 API T701 | | Serial Number: | 5611 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQ TLE CDN-101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1300156232 594 | |
| Calibration slope: Calibration intercept: | <u>Start</u> | <u>Finish</u> 0.998462 -0.258331 | Backgd or Offset: Coeff or Slope: | <u>Start</u> | <u>Finish</u> 1.75 1.031 |
| | | 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 | | | | | 2 0.00 1.120 |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| | | TRS Calibrat | ion Data | | |
| | | TK5 Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | (Cc/Ic) |
| Set Point calibrator zero | | Source gas flow rate | Calculated concentration (ppb) | | (Cc/Ic) |
| calibrator zero | (sccm) 5000 | Source gas flow rate (sccm) 0.0 | Calculated concentration (ppb) (Cc) 0.0 | concentration (ppb) (Ic) 0.1 | (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| | (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | concentration (ppb) (Ic) | (Cc/lc) <i>Limit = 0.95-1.05</i> |
| calibrator zero high point | (sccm) 5000 4923 | Source gas flow rate (sccm) 0.0 77.0 | Calculated concentration (ppb) (Cc) 0.0 80.0 | concentration (ppb) (Ic) 0.1 79.8 | (Cc/lc) Limit = 0.95-1.05 1.003 |
| calibrator zero high point second point | (sccm) 5000 4923 4962 | Source gas flow rate (sccm) 0.0 77.0 38.5 | Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 | concentration (ppb) (Ic) 0.1 79.8 39.5 | (Cc/lc) <i>Limit = 0.95-1.05</i> 1.003 1.013 |
| calibrator zero high point second point third point as left zero as left span | (sccm) 5000 4923 4962 4981 | Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 | Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 | concentration (ppb) (Ic) 0.1 79.8 39.5 19.3 | (Cc/lc) <i>Limit = 0.95-1.05</i> 1.003 1.013 |
| calibrator zero high point second point third point as left zero as left span O2 Scrubber Check | (sccm) 5000 4923 4962 4981 5000 4923 | Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 | Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 | concentration (ppb) (Ic) 0.1 79.8 39.5 19.3 0.0 79.0 | (Cc/lc) Limit = 0.95-1.05 1.003 1.013 1.034 1.013 |
| calibrator zero high point second point third point as left zero as left span O2 Scrubber Check Date of last scrubber cha | (sccm) 5000 4923 4962 4981 5000 4923 ange: | Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 | Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 | concentration (ppb) (Ic) 0.1 79.8 39.5 19.3 0.0 79.0 Ave Corr Factor | Limit = 0.95-1.05 |
| calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef | (sccm) 5000 4923 4962 4981 5000 4923 ange: ficiency test: | Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0 | Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0 | concentration (ppb) (Ic) 0.1 79.8 39.5 19.3 0.0 79.0 Ave Corr Factor | (Cc/lc) Limit = 0.95-1.05 1.003 1.013 1.034 1.013 1.016 efficiency |
| calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found: | (sccm) 5000 4923 4962 4981 5000 4923 ange: ficiency test: NA | Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0 Prev response: | Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0 80.0 | concentration (ppb) (Ic) 0.1 79.8 39.5 19.3 0.0 79.0 Ave Corr Factor *% change: | (Cc/lc) Limit = 0.95-1.05 1.003 1.013 1.034 1.013 1.016 efficiency NA |
| calibrator zero high point second point third point as left zero | (sccm) 5000 4923 4962 4981 5000 4923 ange: ficiency test: NA | Source gas flow rate (sccm) 0.0 77.0 38.5 19.2 0.0 77.0 | Calculated concentration (ppb) (Cc) 0.0 80.0 40.0 19.9 0.0 80.0 80.0 | concentration (ppb) (Ic) 0.1 79.8 39.5 19.3 0.0 79.0 Ave Corr Factor | (Cc/lc) Limit = 0.95-1.05 1.003 1.013 1.034 1.013 1.016 efficiency |

Installing a new green tagged TRS due to noise issues. Scrubber test was completed earlier today. Adjusted the span only.

Calibration Performed By:

Notes:

Rene Chamberland

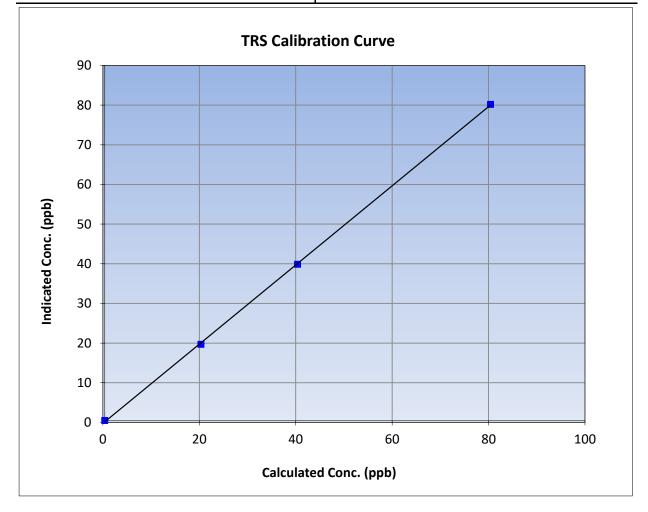


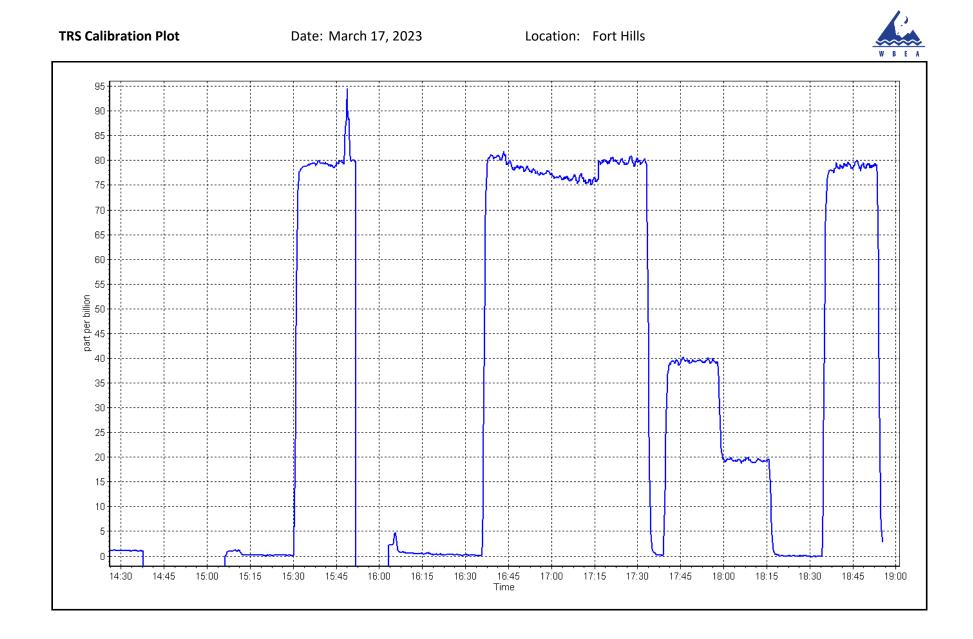
TRS Calibration Summary

| WBEA | | | Version-11-2021 | | | | | | |
|---------------------|-----------------|-----------------------|-------------------|--|--|--|--|--|--|
| Station Information | | | | | | | | | |
| Calibration Date: | March 17, 2023 | Previous Calibration: | February 14, 2023 | | | | | | |
| Station Name: | Fort Hills | Station Number: | AMS23 | | | | | | |
| Start Time (MST): | 14:30 | End Time (MST): | 18:56 | | | | | | |
| Analyzer make: | Thermo 43iQ TLE | Analyzer serial #: | 1300156232 | | | | | | |

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 | 0.999908 | ≥0.995 |
| 80.0 | 79.8 | 1.0025 | correlation coefficient | 0.999908 | 20.995 |
| 40.0 | 39.5 | 1.0126 | Slope | 0.998462 | 0.90 - 1.10 |
| 19.9 | 19.3 | 1.0336 | Slope | 0.998402 | 0.90 - 1.10 |
| | | | Intercept | -0.258331 | +/-3 |







THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|--------------------------------------|---------------|---------------|--------------------------|----------------|-----------------|
| | | Statio | on Information | | |
| Station Name: | Fort Hills | | Station number: AN | AS23 | |
| Calibration Date: | March 2, 2023 | | Last Cal Date: Fe | bruary 1, 2023 | |
| Start time (MST): | 11:31 | | End time (MST): 14 | :55 | |
| Reason: | Routine | | | | |
| | | Calibra | ation Standards | | |
| Gas Cert Reference: | C | C281425 | Cal Gas Expiry Date: Jai | nuary 5, 2025 | |
| CH4 Cal Gas Conc. | 500.2 | ppm | CH4 Equiv Conc. | 1070.6 | ppm |
| C3H8 Cal Gas Conc. | 207.4 | ppm | | | |
| Removed Gas Cert: | | N/A | Removed Gas Expiry: N/ | Ά | |
| Removed CH4 Conc. | 500.2 | ppm | CH4 Equiv Conc. | 1070.6 | ppm |
| Removed C3H8 Conc. | 207.4 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 45 | 1 | |
| ZAG make/model: | API T701 | | Serial Number: 56 | 511 | |
| | | Analy | zer Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 11 | 93585648 | |
| THC Range (ppm): | : 0 - 20 ppm | | | | |
| NMHC Range (ppm) | : 0 - 10 ppm | | CH4 Range (ppm): 0 - | · 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| CH4 SP Ratio | : 2.28E-04 | 2.36E-04 | NMHC SP Ratio: | 5.02E-05 | 5.24E-05 |
| CH4 Retention time: | : 13.0 | 13.0 | NMHC Peak Area: | 183429 | 175506 |

| 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 | 80.3 | 17.19 | 16.62 | 1.035 | | |
| 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 | 17.21 | 0.999 | | |
| second point | 4960 | 40.2 | 8.61 | 8.62 | 0.998 | | |
| third point | 4980 | 20.1 | 4.30 | 4.33 | 0.994 | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | |
| as left span | 4920 | 80.3 | 17.19 | 17.23 | 0.998 | | |
| | | | Av | verage Correction Factor | 0.997 | | |
| Baseline Corr AF: | 16.62 | Prev response | 17.27 | *% change | -3.9% | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiates investigation | | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| NMHC Calibration Data | | | | | | | | |
|-----------------------|-------------------|----------------------|-------------------|--|---------------------|--|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | | |
| as found span | 4920 | 80.3 | 9.16 | 8.80 | 1.040 | | | |
| 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 | 9.18 | 0.998 | | | |
| second point | 4960 | 40.2 | 4.59 | 4.63 | 0.990 | | | |
| third point | 4980 | 20.1 | 2.29 | 2.36 | 0.974 | | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | | |
| as left span | 4920 | 80.3 | 9.16 | 9.18 | 0.998 | | | |
| | | | ŀ | Average Correction Factor | 0.987 | | | |
| Baseline Corr AF: | 8.80 | Prev response | 9.20 | *% change | -4.6% | | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | <pre>* = > +/-5% change initiates investigation</pre> | | | | |

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

| | | CH4 Calibra | 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 0.00 | |
| as found span | 4920 | 80.3 | 8.03 | 7.81 | 1.028 |
| 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 | 8.03 | 1.000 |
| second point | 4960 | 40.2 | 4.02 | 3.99 | 1.008 |
| third point | 4980 | 20.1 | 2.01 | 1.98 | 1.018 |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | |
| as left span | 4920 | 80.3 | 80.3 8.03 | | 0.997 |
| | | | A | verage Correction Factor | 1.009 |
| Baseline Corr AF: | 7.81 | Prev response | 8.06 | *% change | -3.2% |
| 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: | | 1.005188 | | 1.000597 | |
| THC Cal Offset: | | -0.012392 | | 0.010408 | |
| CH4 Cal Slope: | | 1.007325 | | 1.000840 | |
| CH4 Cal Offset: | | -0.029242 | | -0.020438 | |
| NMHC Cal Slope: | | 1.003089 | | 1.000146 | |
| NMHC Cal Offset: | | 0.017251 | | 0.031047 | |

Notes:

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

Calibration Performed By: Max Farrell



THC Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|---|---|---------------------------|-------------------------|----------|---------------|
| Calibration Date: | March | March 2, 2023 | | February | 1, 2023 |
| Station Name: | Fort | : Hills | Station Number: | AM | S23 |
| Start Time (MST): | 11 | :31 | End Time (MST): | 14: | 55 |
| Analyzer make: | Therr | no 55i | Analyzer serial #: | 11935 | 85648 |
| | | Calibra | tion Data | | |
| Calculated concentrati (ppm) (Cc) | ion Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999998 | ≥0.995 |
| 17.19 | <u> </u> | 0.9990 | | | |
| 8.61 4.30 | 4.33 | 0.9981 | Slope | 1.000597 | 0.90 - 1.10 |
| | | | Intercept | 0.010408 | +/-0.5 |
| 20.0 18.0 | | | | | |
| 16.0 - | | | | / | |
| 14.0 - | | | | | |
| ີ ຍັ 12.0 – | | | | | |
| ິພຸ 12.0 – (ຍຸ່ມ ເມີຍອີ ເມີຍອີ ເມີຍອີ | | | | | |
| ated Co | | | | | |
| – 0.8 Indicated – 0.9 – | | | | | |
| 4.0 - | | | | | |
| 2.0 - | | | | | |
| 0.0 🖛 | | .0 | 10.0 | 15.0 | 20.0 |
| 0.0 | | | 10.0 | 10.0 | 20.0 |



CH₄ Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|---|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March | 2, 2023 | Previous Calibration: | February | 1, 2023 |
| Station Name: | | : Hills | Station Number: | AM | |
| Start Time (MST): | | :31 | End Time (MST): | 14: | |
| Analyzer make: | | no 55i | Analyzer serial #: | 11935 | |
| ·····,· | | | | | |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999969 | ≥0.995 |
| 8.03 4.02 | 8.03 3.99 | 1.0002 1.0081 | | | |
| 2.01 | 1.98 | 1.0181 | Slope | 1.000840 | 0.90 - 1.10 |
| | | | Intercept | -0.020438 | +/-0.5 |
| 7.0 6.0 (mu 5.0 | | | | | |
| ouc (l | | | | | |
| 9 4.0 | | | | | |
| Indicated Conc. (ppm) 0.4 0.7 0.7 0.7 | | | | | |
| 2.0 | | | | | |
| 10 | | | | | |
| 1.0 | | | | | |
| | | | | | |
| | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |



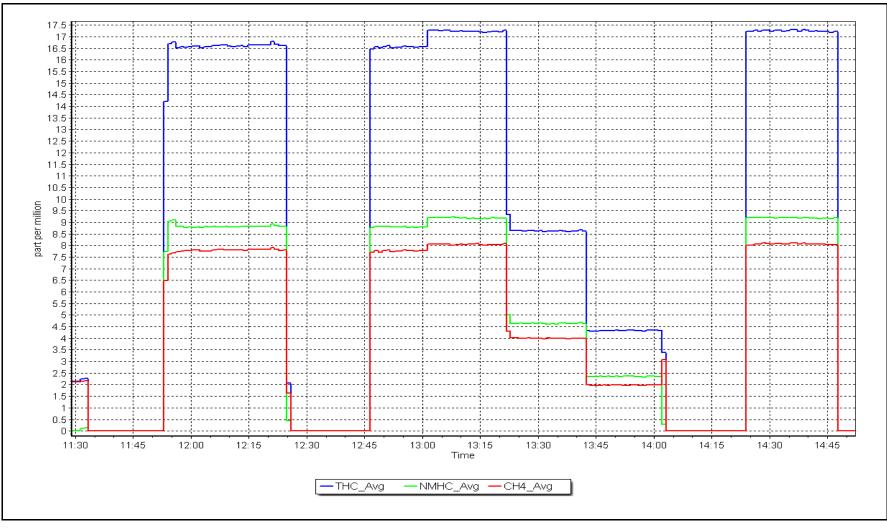
NMHC Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| Calibration Date: | March 2, 2023 | | Previous Calibration: | February | 1, 2023 |
| tation Name: | Fort | Hills | Station Number: | AM | S23 |
| tart Time (MST): | 11 | :31 | End Time (MST): | 14: | 55 |
| analyzer make: | Therr | no 55i | Analyzer serial #: | 11935 | 85648 |
| | | Calibra | ition Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | uation | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999947 | ≥0.995 |
| 9.16 4.59 | 9.18 4.63 | 0.9982 | | | |
| 2.29 | 2.36 | 0.9736 | Slope | 1.000146 | 0.90 - 1.10 |
| | | | Intercept | 0.031047 | +/-0.5 |
| 9.0 | | | | | |
| (bbm) 5.0 Couc | | | | | |
| 5 .0 | | | | | |
| | | | | | |
| 0.4 Undicated | | | | | |
| 2.0 | | | | | |
| 1.0 | | | | | |
| 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | d Conc. (ppm) | | |

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | Station | Information | | |
|--|---|-----|---------------|--|--------------|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Fort Hills March 1, 2023 10:10 Maintenance | | | Station number: AMS23 Last Cal Date: February 23, 2023 End time (MST): 18:08 | | |
| | | | Calibrati | ion Standards | | |
| NO Gas Cylinder #: | CC332703 | | | Cal Gas Expiry Date: Jan | uary 28, 202 | 4 |
| NOX Cal Gas Conc: | 49.7 | ppm | | NO Cal Gas Conc: | 49.7 | ppm |
| Removed Cylinder #: | N/A | | | Removed Gas Exp Date: N/A | ١ | |
| Removed Gas NOX Conc: | 49.7 | ppm | | Removed Gas NO Conc: | 49.7 | ppm |
| NOX gas Diff: | | | | NO gas Diff: | | |
| Calibrator Model: | Teledyne API T750 | | | Serial Number: | 275 | |
| ZAG make/model: | Teledyne API T751H | 1 | | Serial Number: | 307 | |
| | | | Analyze | r Information | | |
| Analyzer make: | Thermo 42i | | | Analyzer serial #: 115 | 2430007 | |
| NOX Range (ppb): | | | | | | |
| | <u>Start</u> | | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coeff or slope: | 1.815 | | 1.025 | NO bkgnd or offset: | 5.1 | 2.8 |

| | <u>Start</u> | Finish | | <u>Start</u> | Finish |
|---------------------|--------------|--------|----------------------|--------------|--------|
| NO coeff or slope: | 1.815 | 1.025 | NO bkgnd or offset: | 5.1 | 2.8 |
| NOX coeff or slope: | 0.996 | 0.995 | NOX bkgnd or offset: | 5.6 | 3.1 |
| NO2 coeff or slope: | 1.000 | 1.000 | Reaction cell Press: | 266.3 | 155 |
| | | | | | |

| Calibration | Statistics |
|-------------|------------|
|-------------|------------|

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.004364 | 0.992756 |
| NO _x Cal Offset: | 0.065025 | 0.201484 |
| NO Cal Slope: | 1.005722 | 0.995756 |
| NO Cal Offset: | -0.434914 | -1.598210 |
| NO ₂ Cal Slope: | 0.999767 | 0.998881 |
| NO ₂ Cal Offset: | -0.637319 | 0.599000 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | on Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|---|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.0 | -0.2 | | |
| as found span | 4920 | 80.5 | 800.2 | 800.2 | 0.0 | 762.0 | 759.4 | 2.6 | 1.050 | 1.054 |
| as found 2nd | 4960 | 40.2 | 399.6 | 399.6 | 0.0 | 383.4 | 381.4 | 2.0 | 1.0422 | 1.0476 |
| as found 3rd | 4980 | 20.1 | 199.8 | 199.8 | 0.0 | 190.5 | 188.6 | 1.9 | 1.0488 | 1.0593 |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 0.3 | 1.3 | | |
| high point | 4920 | 80.5 | 800.2 | 800.2 | 0.0 | 795.2 | 796.1 | -0.9 | 1.006 | 1.005 |
| second point | 4960 | 40.2 | 399.6 | 399.6 | 0.0 | 396.3 | 395.4 | 0.9 | 1.008 | 1.011 |
| third point | 4980 | 20.1 | 199.8 | 199.8 | 0.0 | 197.2 | 195.4 | 1.8 | 1.013 | 1.022 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | | |
| as left span | 4920 | 80.5 | 800.2 | 443.5 | 356.7 | 792.7 | 435.4 | 357.3 | 1.009 | 1.019 |
| | | | | | | | Average C | orrection Factor | 1.009 | 1.013 |
| Corrected As fo | ound NO _x = | 762.2 ppb | NO = | 759.4 ppb | * = > +/-5 | % change initiates | investigation | *Percent Chan | ge NO _x = | -5.4% |
| Previous Respo | onse NO _X = | 803.7 ppb | NO = | 804.3 ppb | | | | *Percent Chan | ge NO = | -5.9% |
| Baseline Corr 2 | 2nd pt NO _X = | 383.6 ppb | NO = | 381.4 ppb | As foun | ~ | 0.999980 | Nx SI: 0.9528 | 04 Nx Int: | 0.555 |
| Baseline Corr 3 | Brd pt NO _x = | 190.7 ppb | NO = | 188.6 ppb | As foun | d NO r ² : | 0.999983 | NO SI: 0.9497 | 92 NO Int: | 0.034 |
| | | | | | As foun | d $NO_2 r^2$: | 1.000000 | NO2 SI: 1.0008 | NO ₂ Int: | -0.200 |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (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 | | | 0.0 | -0.2 | | |
| as found GPT point (400 ppb NO2) | 756.7 | 413.3 | 343.4 | 343.5 | 0.9997 | 100.0% |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 790.8 | 434.1 | 356.7 | 357.2 | 0.999 | 100.1% |
| 2nd GPT point (200 ppb O3) | 790.8 | 615.0 | 175.8 | 176.0 | 0.999 | 100.1% |
| 3rd GPT point (100 ppb O3) | 790.8 | 701.3 | 89.5 | 89.2 | 1.003 | 99.7% |
| | | | | Average Correction Factor | 1.000 | 100.0% |

Notes:

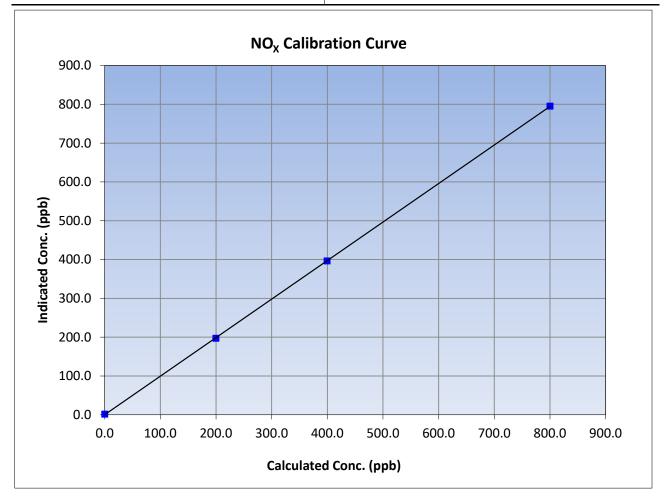
Completed multipoint as founds. Found the leak that caused the low chamber pressure and fixed the leak. Adjusted the span.

Calibration Performed By:



NO_x Calibration Summary

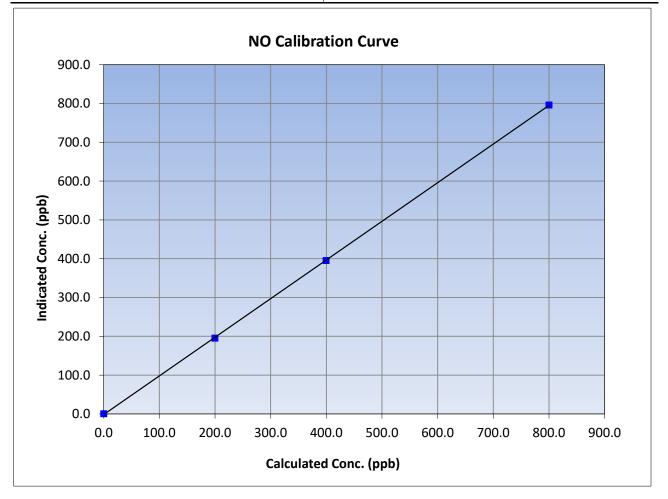
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 1, 2023 | Previous Calibration: | February | 23, 2023 |
| Station Name: | Fort Hills | | Station Number: | AM | S23 |
| Start Time (MST): | 10:10 | | End Time (MST): | 18 | :08 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 1152430007 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 1.5 | | Correlation Coefficient | 0.999988 | ≥0.995 |
| 800.2 | 795.2 | 1.0063 | correlation coefficient | 0.999900 | 20.995 |
| 399.6 | 396.3 | 1.0083 | Slope | 0.992756 | 0.90 - 1.10 |
| 199.8 | 197.2 | 1.0131 | Slope | 0.992750 | 0.90 - 1.10 |
| | | | Intercept | 0.201484 | +/-20 |





NO Calibration Summary

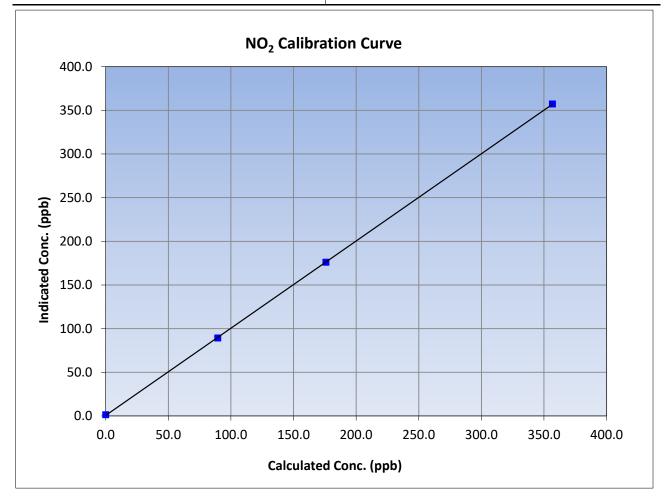
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 1, 2023 | Previous Calibration: | February | 23, 2023 |
| Station Name: | Fort | Fort Hills | | AM | S23 |
| Start Time (MST): | 10 | 10:10 | | 18 | :08 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 11524 | 30007 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.3 | | Correlation Coefficient | 0.999974 | ≥0.995 |
| 800.2 | 796.1 | 1.0051 | correlation coefficient | 0.555574 | 20.335 |
| 399.6 | 395.4 | 1.0106 | Clana | 0.995756 | 0.90 - 1.10 |
| 199.8 | 195.4 | 1.0225 | Slope | 0.995750 | 0.90 - 1.10 |
| | | | Intercept | -1.598210 | +/-20 |

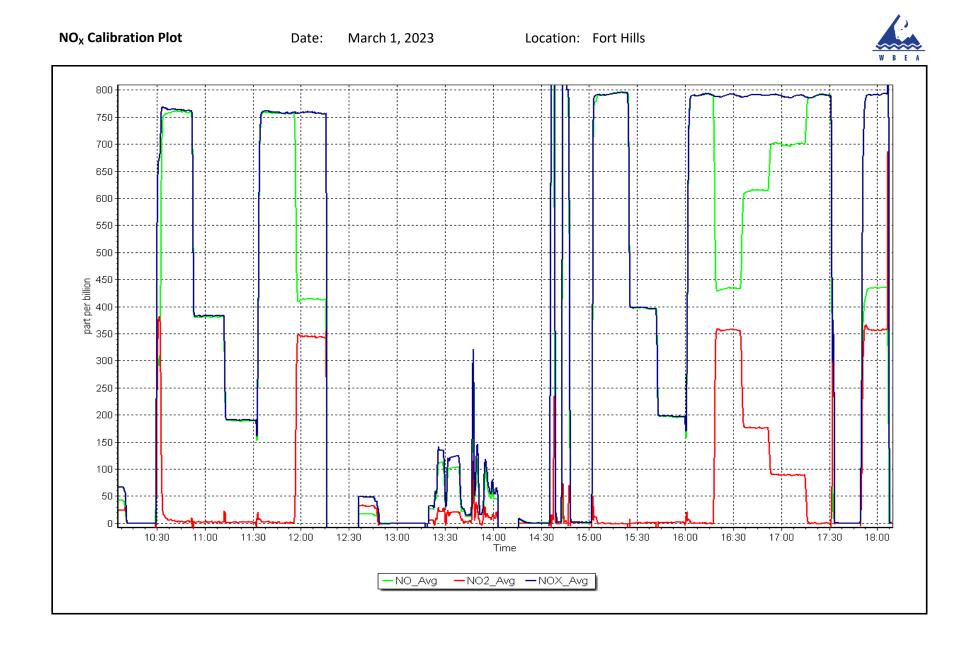




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 1, 2023 | Previous Calibration: | February | 23, 2023 |
| Station Name: | Fort Hills | | Station Number: | AM | S23 |
| Start Time (MST): | 10:10 | | End Time (MST): | 18 | :08 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 1152430007 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 1.3 | | Correlation Coefficient | 0.999982 | ≥0.995 |
| 356.7 | 357.2 | 0.9986 | correlation coefficient | 0.999982 | 20.995 |
| 175.8 | 176.0 | 0.9989 | Slope | 0.998881 | 0.90 - 1.10 |
| 89.5 | 89.2 | 1.0034 | Slope | 0.996661 | 0.90 - 1.10 |
| | | | Intercept | 0.599000 | +/-20 |







T640 PM_{2.5} CALIBRATION

| Calibration Date: M tart time (MST): 12 Analyzer Make: AF Particulate Fraction: PN Now Meter Make/Model: Ali | ort Hills arch 18, 2023 1:37 PI T640 M2.5 icat FP-25BT icat FP-25BT | Station Information | Station number: Last Cal Date: End time (MST): | February 1 [°] 13:25 1546 | 7, 2023 | |
|--|---|----------------------------|--|--|-----------------|--------------|
| Calibration Date: M tart time (MST): 12 Analyzer Make: AF Particulate Fraction: PN Now Meter Make/Model: Ali Temp/RH standard: Ali Parameter | arch 18, 2023 1:37 PI T640 V2.5 icat FP-25BT | | Last Cal Date: End time (MST): S/N: | February 1 [°] 13:25 1546 | 7, 2023 | |
| Start time (MST): 12 Analyzer Make: AF Particulate Fraction: PN Flow Meter Make/Model: Ali Femp/RH standard: Ali Parameter | 2:37 PI T640 M2.5 icat FP-25BT | | End time (MST): S/N: | 13:25 1546 | 7, 2023 | |
| Analyzer Make: AF Particulate Fraction: PN Flow Meter Make/Model: Ali Femp/RH standard: Ali <u>Parameter</u> | PI T640 M2.5 icat FP-25BT | | S/N: | 1546 | | |
| Particulate Fraction: PN Flow Meter Make/Model: Ali Femp/RH standard: Ali Parameter | И2.5 icat FP-25BT | | | | | |
| Flow Meter Make/Model: Ali Temp/RH standard: Ali <u>Parameter</u> | icat FP-25BT | | S/N: | 200755 | | |
| Temp/RH standard: Ali | | | S/N: | 200755 | | |
| Parameter | icat FP-25BT | | | 388/55 | | |
| | | | S/N: | 388755 | | |
| | | Monthly Calibration T | est | | | |
| T (°C) | <u>As found</u> | Measured | <u>As left</u> | | <u>Adjusted</u> | (Limits) |
| . (0) | 4.6 | 4.48 | 4.6 | | | +/- 2 °C |
| P (mmHg) | 735.81 | 735 | 735.81 | | | +/- 10 mmHg |
| flow (LPM) | 5.00 | 4.948 | 5.00 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 18, 2023 | Last Cal Date: | February | 17, 2023 | |
| | PM w/o HEPA: | NA | PM w/ HEPA: | N | A | <0.2 ug/m3 |
| | | Questadu Calibration 7 | Fact | | | |
| Devenue have | A. Coursel | Quarterly Calibration | | | A | (11-11-1) |
| Parameter | <u>As found</u> | Post maintenance | <u>As left</u> | | Adjusted | (Limits) |
| PMT Peak Test | NA | 11.2 | 11.2 | | | 11.3 +/- 0.5 |
| Post-maintenance lea | k check: | PM w/o HEPA: | 8.7 | w/ HEPA: | | 0.0 |
| Date Optical Chamber | - | March 18, | | | | <0.2 ug/m3 |
| Disposable Filter Cha | anged: _ | March 18, | 2023 | | | |
| | | Annual Maintenanc | e | | | |
| | | Castan bar 2 | c 2022 | | | |
| Date Sample Tube Cl Date RH/T Sensor Cle | - | September 2 September 2 | | | | |
| | - | Jeptember 2 | 0,2022 | | | |
| Notes: | Analyzer DOA | A. Removed asset: 11458 | 8, installed asset: 1 | 1808. No ad | justments n | nade. |

Braiden Boutilier



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|---|--|--------------------------------|--|---|---|
| Station Name: Calibration Date: Start time (MST): | Waskow ohci Pimat March 15, 2023 10:00 | tisiwin | Station number: Last Cal Date: End time (MST): | AMS25 January 3, 2023 12:12 | |
| Reason: | Install | | | | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 52.4 ET0016672 | ppm | Cal Gas Exp Date: | October 19, 2022 | |
| Removed Cal Gas Conc: | 52.4 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | 1-1- | Diff between cyl: | | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 747 | |
| ZAG Make/Model: | API T701 | | Serial Number: | 261 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | · | Analyzer serial #: | 1118148497 | |
| , 0 | | | | . | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.999783 | 1.006789 | Backgd or Offset: | 11.0 | 10.1 |
| Calibration intercept: | -0.314119 | -0.116149 | Coeff or Slope: | 1.212 | 1.039 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration C (ppb) (Ic) | Correction factor (Cc/lc Limit = 0.95-1.05 |
| as found zero | | | | | |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4924 | 76.3 | 799.6 | 804.6 | 0.994 |
| second point | 4962 | 38.2 | 400.3 | 403.9 | 0.991 |
| third point | 4981 | 19.1 | 200.2 | 200.6 | 0.998 |
| as left zero | 5000 | 0.0 | 0.0 | 0.4 | |
| as left span | 4924 | 76.3 | 799.6 | 808.9 | 0.988 |
| | | | Averag | e Correction Factor | 0.994 |
| Baseline Corr As found: | NA | Previous response | NA | *% change | NA |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

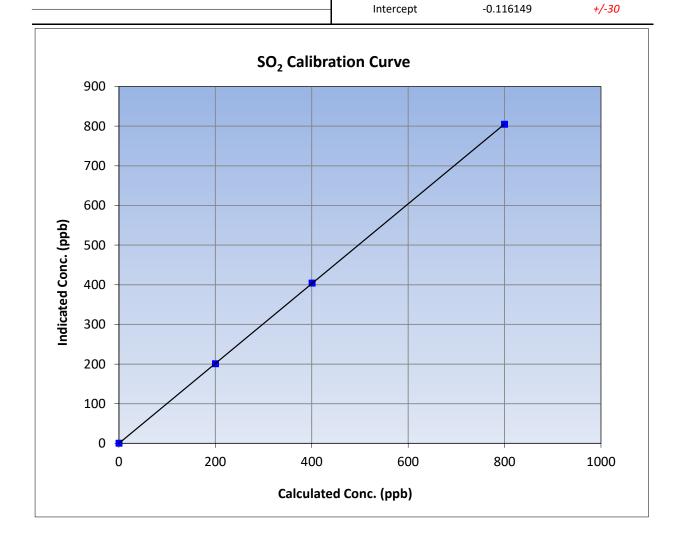
Install calibration from power being put back on. Flash lamp adjustment and Initial flash reference done. Zero and Span adjusted.

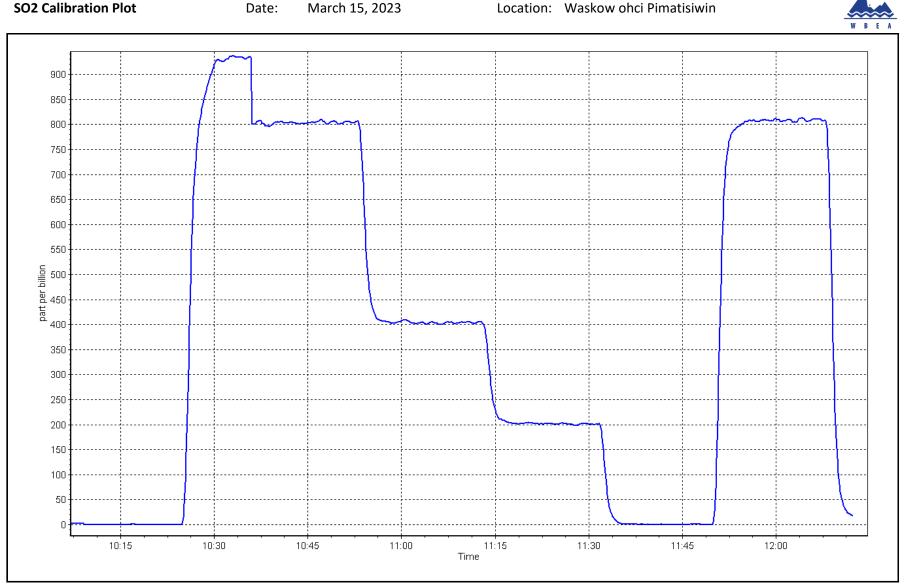
Calibration Performed By:



SO₂ Calibration Summary

| WBEA | | | | | Version-01-202 |
|--|---------------------------------------|------------------------------|-------------------------|----------|----------------|
| | | Station | Information | | |
| Calibration Date: | March 15 | 5, 2023 | Previous Calibration: | January | , 3, 2023 |
| Station Name: | Waskow ohci Pimatisiwin | | Station Number: | AM | 1S25 |
| Start Time (MST): | 10:0 | 00 | End Time (MST): | 12 | 2:12 |
| Analyzer make: | Thermo | o 43i | Analyzer serial #: | 1118: | 148497 |
| | | Calib | ration 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 | 0.999995 | ≥0.995 |
| 799.6 | 804.6 | 0.9938 | | 0.555555 | 20.993 |
| 400.3 | 403.9 | 0.9911 | Slope | 1.006789 | 0.90 - 1.10 |
| 200.2 | 200.6 | 0.9978 | Siope | 1.000789 | 0.30 - 1.10 |





SO2 Calibration Plot

March 15, 2023

Location: Waskow ohci Pimatisiwin



H₂S Calibration Report

| WBEA | | | | | Version-11-202 |
|---|---|---|--|---|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Waskow ohci Pima March 16, 2023 7:20 Install | tisiwin | Station number: Last Cal Date: End time (MST): | AMS25 January 11, 2023 10:14 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 4.90 | ppm | Cal Gas Exp Date: | May 5, 2023 | |
| Cal Gas Cylinder #: | LL119538 | | · | , . | |
| Removed Cal Gas Conc: | 4.90 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | NA | | Diff between cyl: | | |
| Calibrator Make/Model: | | | Serial Number: | 747 | |
| ZAG Make/Model: | API T701 | | Serial Number: | 261 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: | Thermo 43i-LTE | | Analyzer serial #: | 1170050146 | |
| Converter make: | Thermo 43C | | Converter serial #: | 328702539 | |
| Analyzer Range | 0 - 100 ppb | | | | |
| , 0 | Charact | Finish | | Charact | Finish |
| Calibration clone: | <u>Start</u> 1.002738 | <u>Finish</u> 1.003738 | Backad or Officiate | <u>Start</u> 3.3 | <u>Finish</u> 3.3 |
| Calibration slope: Calibration intercept: | 0.341605 | 0.281608 | Backgd or Offset: Coeff or Slope: | | 5.5 1.085 |
| and atton intercept. | 0.341003 | 0.281008 | coen or slope. | 1.085 | 1.085 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | | | | | |
| as found span | | | | | |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| | | H ₂ S Calibrati | on Data | | |
| | | | | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated | Correction factor |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | concentration (ppb) | Indicated concentration (ppb) (Ic) | (Cc/Ic) |
| | (sccm) | (sccm) | concentration (ppb) (Cc) | concentration (ppb) (Ic) | |
| calibrator zero | (sccm) 5000 | (sccm) 0.0 | concentration (ppb) (Cc) 0.0 | concentration (ppb) (Ic) 0.2 | (Cc/lc) <i>Limit = 0.95-1.05</i> |
| calibrator zero high point | (sccm) 5000 4918 | (sccm) 0.0 81.6 | concentration (ppb) (Cc) 0.0 80.0 | concentration (ppb) (Ic) 0.2 80.5 | (Cc/Ic) Limit = 0.95-1.05 0.993 |
| calibrator zero high point second point | (sccm) 5000 4918 4959 | (sccm) 0.0 81.6 40.8 | concentration (ppb) (Cc) 0.0 80.0 40.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 | (Cc/lc) <i>Limit = 0.95-1.05</i> 0.993 0.987 |
| calibrator zero high point second point third point | (sccm) 5000 4918 4959 4980 | (sccm) 0.0 81.6 40.8 20.4 | concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 | (Cc/Ic) Limit = 0.95-1.05 0.993 |
| calibrator zero high point second point third point as left zero | (sccm) 5000 4918 4959 4980 5000 | (sccm) 0.0 81.6 40.8 20.4 0.0 | concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 | (Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980 |
| calibrator zero high point second point third point as left zero as left span | (sccm) 5000 4918 4959 4980 5000 4912 | (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 | concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 | (Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 |
| calibrator zero high point second point third point as left zero as left span 602 Scrubber Check | (sccm) 5000 4918 4959 4980 5000 4912 4924 | (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 | concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 | (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 |
| calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha | (sccm) 5000 4918 4959 4980 5000 4912 4924 ange: | (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 | concentration (ppb) (Cc) 0.0 80.0 40.0 20.0 0.0 800.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor | (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987 |
| calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef | (sccm) 5000 4918 4959 4980 5000 4912 4924 ange: ficiency test: | (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 19-Jul-10 | concentration (ppb) (Cc) 80.0 40.0 20.0 0.0 800.0 800.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor | (Cc/lc) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987 efficiency |
| calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found: | (sccm) 5000 4918 4959 4980 5000 4912 4924 ange: ficiency test: NA | (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 19-Jul-10 Prev response: | concentration (ppb) (Cc) 80.0 40.0 20.0 0.0 800.0 800.0 800.0 | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor *% change: | (Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987 efficiency NA |
| calibrator zero high point second point third point as left zero as left span 302 Scrubber Check Date of last scrubber cha Date of last converter ef | (sccm) 5000 4918 4959 4980 5000 4912 4924 ange: ficiency test: | (sccm) 0.0 81.6 40.8 20.4 0.0 88.3 76.3 19-Jul-10 | concentration (ppb) (Cc) 0.0 80.0 20.0 0.0 800.0 800.0 800.0 NA NA | concentration (ppb) (Ic) 0.2 80.5 40.5 20.4 0.2 803.0 0.2 Ave Corr Factor | (Cc/Ic) Limit = 0.95-1.05 0.993 0.987 0.980 0.996 0.987 efficiency |

Notes:

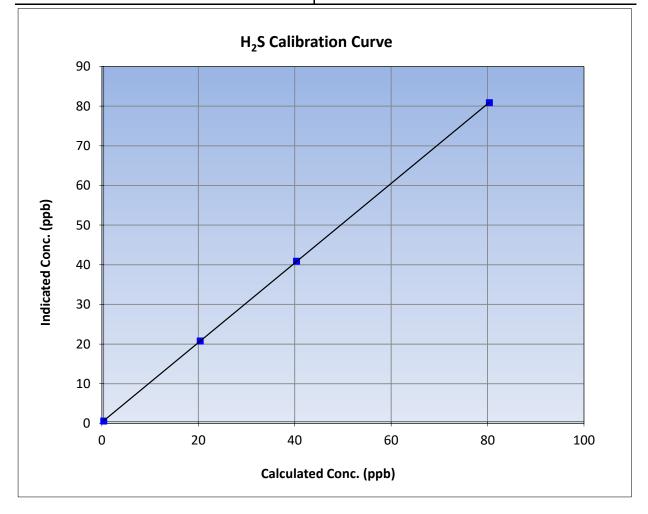
Sox scrubber checked after the calibrator zero. No adjustments done. Install Calibration after power put back on.



H₂S Calibration Summary

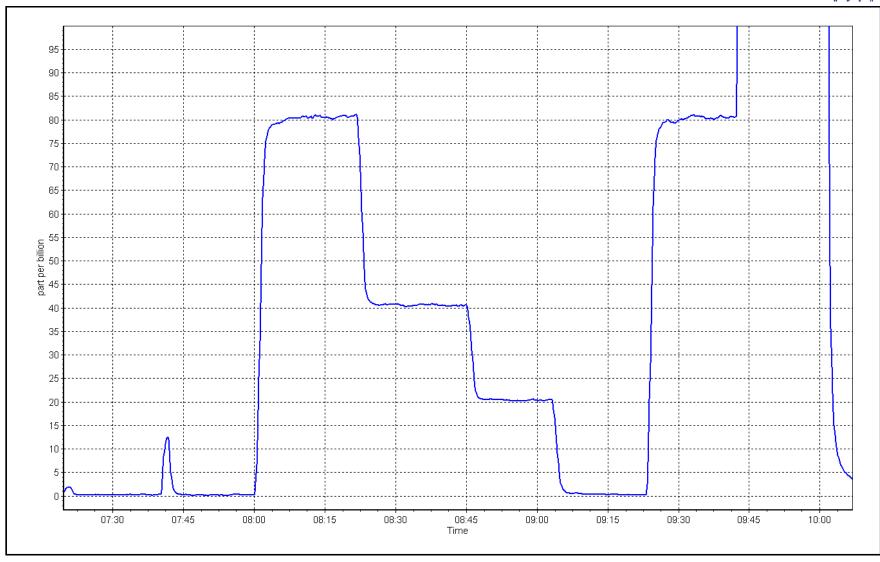
| WBEA | | | Version-11-2021 |
|-------------------|-------------------------|-----------------------|------------------|
| | Station | n Information | |
| Calibration Date: | March 16, 2023 | Previous Calibration: | January 11, 2023 |
| Station Name: | Waskow ohci Pimatisiwin | Station Number: | AMS25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

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.2 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 80.0 | 80.5 | 0.9935 | correlation coefficient | 0.555554 | 20.333 |
| 40.0 | 40.5 | 0.9873 | Slope | 1.003738 | 0.90 - 1.10 |
| 20.0 | 20.4 | 0.9799 | Slope | 1.003738 | 0.30 - 1.10 |
| | | | Intercept | 0.281608 | +/-3 |











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|--|-------------------------------------|---|---|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Christina Lake March 23, 2023 10:41 Routine | | Station number: Last Cal Date: End time (MST): | AMS 26 February 14, 2023 13:40 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.56 | ppm | Cal Gas Exp Date: | February 23, 2025 | |
| Cal Gas Cylinder #: | <u>CC362134</u> | | | | |
| Removed Cal Gas Conc: | 49.56 | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: | <u>NA</u> | | Diff between cyl: | | |
| Calibrator Make/Model: | API T700 | | Serial Number: | 2447 | |
| ZAG Make/Model: | API T701 | | Serial Number: | 953 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1173410001 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.994255 | 0.990536 | Backgd or Offset: | 16.4 | 16.5 |
| Calibration intercept: | -2.695113 | -2.994790 | 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 | 0.0 | |
| as found span | 4919 | 80.6 | 799.0 | 789.9 | 1.011 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.2 | |
| <u> </u> | 5000 4919 | 0.0 80.6 | 0.0 799.0 | 0.2 790.4 | 1.011 |
| calibrator zero high point second point | 4919 4960 | 80.6 40.3 | 799.0 399.4 | 790.4 389.9 | 1.011 1.024 |
| calibrator zero high point second point third point | 4919 4960 4980 | 80.6 40.3 20.2 | 799.0 399.4 200.2 | 790.4 389.9 192.9 | 1.011 |
| calibrator zero high point second point third point as left zero | 4919 4960 4980 5000 | 80.6 40.3 | 799.0 399.4 200.2 0.0 | 790.4 389.9 192.9 0.3 | 1.011 1.024 |
| calibrator zero high point second point third point | 4919 4960 4980 | 80.6 40.3 20.2 | 799.0 399.4 200.2 0.0 799.0 | 790.4 389.9 192.9 0.3 788.2 | 1.011 1.024 1.038 1.014 |
| calibrator zero high point second point third point as left zero | 4919 4960 4980 5000 | 80.6 40.3 20.2 0.0 | 799.0 399.4 200.2 0.0 799.0 | 790.4 389.9 192.9 0.3 | 1.011 1.024 1.038 |
| calibrator zero high point second point third point as left zero as left span | 4919 4960 4980 5000 | 80.6 40.3 20.2 0.0 80.6 | 799.0 399.4 200.2 0.0 799.0 Averag | 790.4 389.9 192.9 0.3 788.2 | 1.011 1.024 1.038 1.014 |
| calibrator zero high point second point third point as left zero | 4919 4960 4980 5000 4919 | 80.6 40.3 20.2 0.0 | 799.0 399.4 200.2 0.0 799.0 Averag 791.69 | 790.4 389.9 192.9 0.3 788.2 ge Correction Factor | 1.011 1.024 1.038 1.014 1.024 |

Notes:

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

Calibration Performed By:

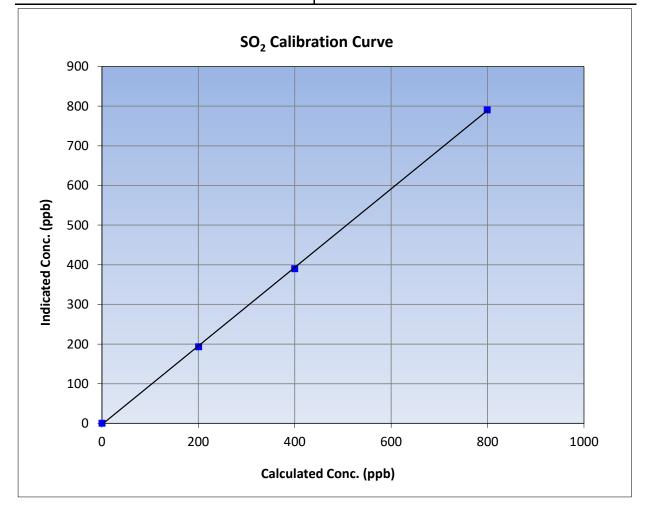
Mohammed Kashif

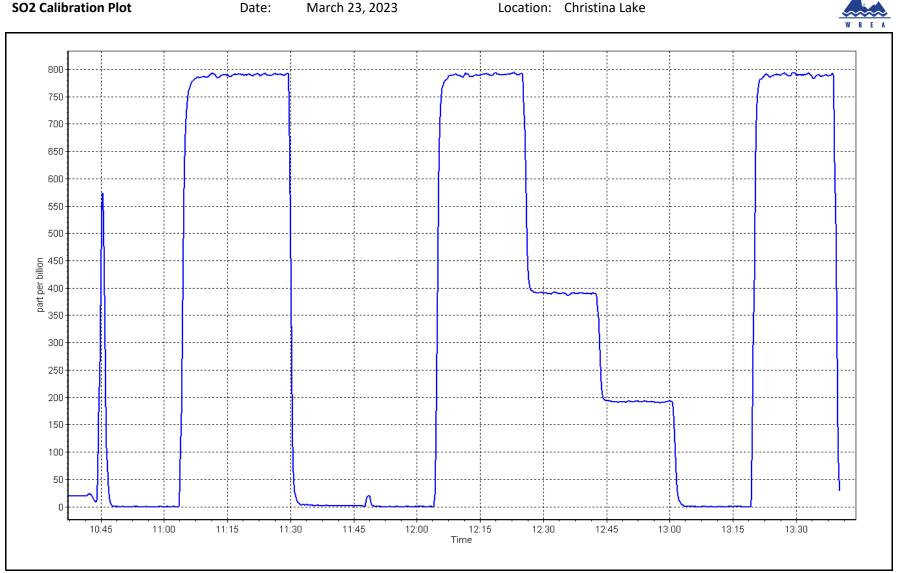


SO₂ Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|----------------|-----------------------|-------------------|
| | Stat | ion Information | |
| Calibration Date: | March 23, 2023 | Previous Calibration: | February 14, 2023 |
| Station Name: | Christina Lake | Station Number: | AMS 26 |
| Start Time (MST): | 10:41 | End Time (MST): | 13:40 |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1173410001 |
| | | | |

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.2 | | Correlation Coefficient | 0.999919 | ≥0.995 |
| 799.0 | 790.4 | 1.0108 | correlation coefficient | 0.999919 | 20.995 |
| 399.4 | 389.9 | 1.0244 | Slope | 0.990536 | 0.90 - 1.10 |
| 200.2 | 192.9 | 1.0379 | Slope | 0.990330 | 0.90 - 1.10 |
| | | | Intercept | -2.994790 | +/-30 |







H₂S Calibration Report

| WBEA | | | | | Version-11-202 |
|--|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Christina Lake March 22, 2023 10:38 Routine | | Station number: Last Cal Date: End time (MST): | AMS26 February 15, 2023 15:04 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 4.89 <u>EY0002466</u> | ppm | Cal Gas Exp Date: | February 9, 2024 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 4.89 NA | ppm | Rem Gas Exp Date: Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | API T700 API T701 | | Serial Number: Serial Number: | 2447 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> |
| Calibration slope: | 0.996758 | 0.979904 | Backgd or Offset: | 33.6 | 33.6 |
| Calibration intercept: | 0.098881 | 0.438608 | 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 | 0.5 | |
| as found span | 4918 | 81.8 | 80.0 | 80.6 | 0.999 |
| as found 2nd point | 4959 | 40.9 | 40.0 | 40.4 | 1.003 |
| as found 3rd point | 4979 | 20.4 | 20.0 | 20.1 | 1.018 |
| 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 | 0.6 | |
| high point | 4918 | 81.8 | 80.0 | 78.9 | 1.014 |
| second point | 4959 | 40.9 | 40.0 | 39.6 | 1.010 |
| third point | 4979 | 20.4 | 20.0 | 19.8 | 1.008 |
| as left zero | 5000 | 0.0 | 0.0 | 0.6 | |
| as left span | 4918 | 81.8 | 80.0 | 80.8 | 0.990 |
| as ieit spaii | 1010 | 80.6 | 806.1 | 0.1 | |
| • | 4919 | | | Avec Come Footon | 1.011 |
| O2 Scrubber Check | | 27-Feb-19 | | Ave Corr Factor | 1.011 |
| 602 Scrubber Check Date of last scrubber cha | inge: | | | | efficiency |
| 602 Scrubber Check Date of last scrubber cha Date of last converter ef | inge: ficiency test: | 27-Feb-19 | 79 84 | | efficiency |
| 02 Scrubber Check Date of last scrubber cha Date of last converter ef Baseline Corr As found: | nge: ficiency test: 80.1 | 27-Feb-19 Prev response: | | *% change: | efficiency 0.3% |
| 602 Scrubber Check Date of last scrubber cha | inge: ficiency test: | 27-Feb-19 | 1.002613 | | efficiency |

Changed sample inlet filter after MAF's, changed zero/span valve before calibrator zero. Ran scrubber check after calibrator zero. No adjustments made.

Calibration Performed By:

Notes:

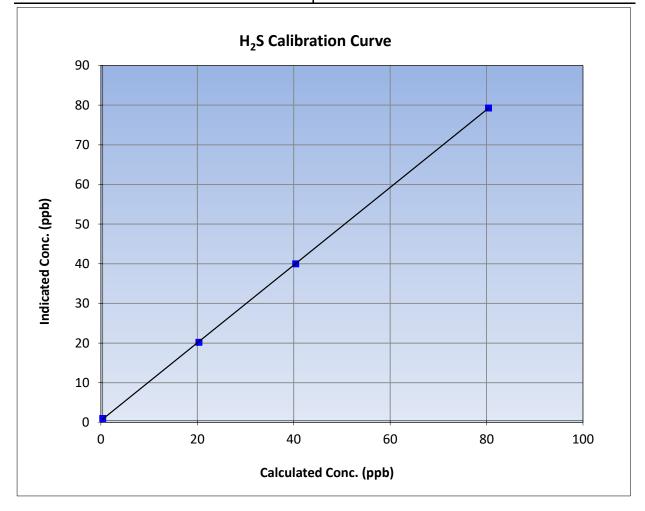
Mohammed Kashif

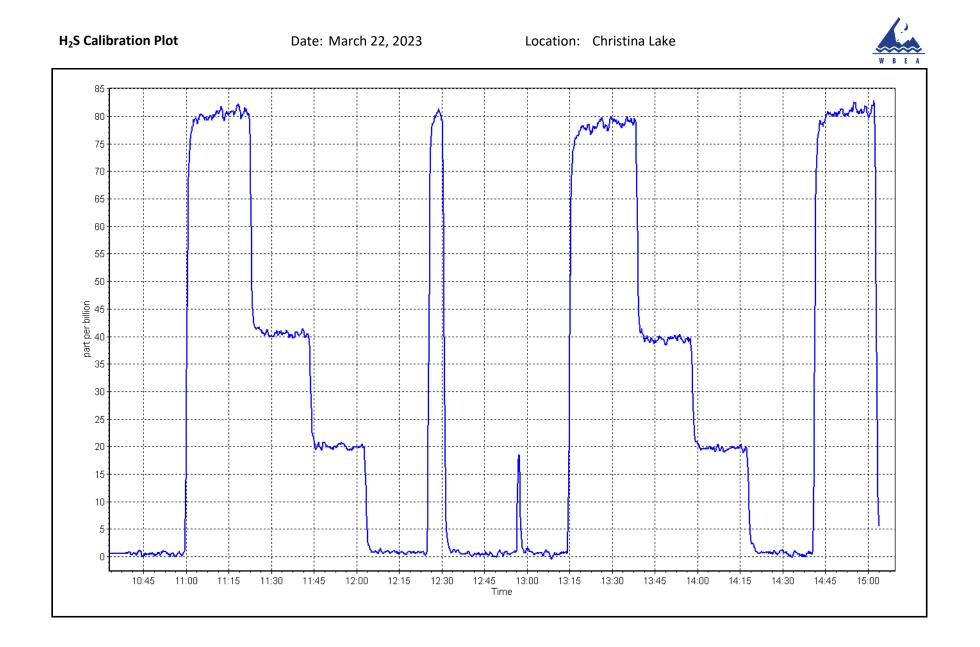


H₂S Calibration Summary

| WBEA | | | Version-11-202 |
|-------------------|----------------|-----------------------|-------------------|
| | Stat | ion Information | |
| Calibration Date: | March 22, 2023 | Previous Calibration: | February 15, 2023 |
| Station Name: | Christina Lake | Station Number: | AMS26 |
| Start Time (MST): | 10:38 | End Time (MST): | 15:04 |
| Analyzer make: | Thermo 450i | Analyzer serial #: | 1180030032 |
| Analyzer make: | Thermo 450i | Analyzer serial #: | 1180030032 |
| | | | |

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|----------|---------------|
| 0.0 | 0.6 | | Correlation Coefficient | 0.999980 | ≥0.995 |
| 80.0 | 78.9 | 1.0140 | correlation coefficient | 0.999980 | 20.995 |
| 40.0 | 39.6 | 1.0101 | Slope | 0.979904 | 0.90 - 1.10 |
| 20.0 | 19.8 | 1.0078 | Slope | 0.979904 | 0.30 - 1.10 |
| | | | - Intercept | 0.438608 | +/-3 |







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | Station | Information | | |
|---|--|--|--|--|--------------------------------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Christina Lake March 29, 2023 10:57 Routine | | Station number: AM Last Cal Date: Feb End time (MST): 15:0 | ruary 16, 202 | 23 |
| | | Calibrati | on Standards | | |
| NO Gas Cylinder #: | T2Y1P4C | | Cal Gas Expiry Date: Nov | ember 12, 20 | 023 |
| NOX Cal Gas Conc: | 50.82 | ppm | NO Cal Gas Conc: | 50.02 | ppm |
| Removed Cylinder #: | NA | | Removed Gas Exp Date: NA | | |
| Removed Gas NOX Conc | 50.82 | ppm | Removed Gas NO Conc: | 50.02 | ppm |
| NOX gas Diff: | | | NO gas Diff: | | |
| Calibrator Model: | API T700 | | Serial Number: | 2447 | |
| ZAG make/model: | API T701 | | Serial Number: | 953 | |
| Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope | 0 - 1000 ppb <u>Start</u> :: 1.713 :: 0.996 | Finish 1.713 0.996 1.000 | r Information Analyzer serial #: 117 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press: | 3480006 <u>Start</u> 2.8 2.9 191.9 | <u>Finish</u> 2.9 2.9 191.9 |
| | | Calibrat | ion Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| NO _x Cal Slope | : | 1.000661 | | 0.989754 | |
| NO _x Cal Offset | | -1.500000 | | -1.920000 | |
| NO Cal Slope | : | 1.000043 | | 0.990261 | |
| NO Cal Offset | | -2.080000 | | -2.780000 | |
| NO ₂ Cal Slope | | 1.003073 | | 1.001972 | |
| NO ₂ Cal Offset | | -0.020912 | | 0.216428 | |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|---|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | | |
| as found span | 4920 | 80.0 | 813.1 | 800.3 | 12.8 | 804.3 | 788.3 | 16.0 | 1.0110 | 1.0152 |
| 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 | 4920 | 80.0 | 813.1 | 800.3 | 12.8 | 803.9 | 791.1 | 12.8 | 1.0115 | 1.0117 |
| second point | 4960 | 40.0 | 406.6 | 400.2 | 6.4 | 399.4 | 392.3 | 7.1 | 1.0179 | 1.0200 |
| third point | 4980 | 20.0 | 203.3 | 200.1 | 3.2 | 197.3 | 192.3 | 5.0 | 1.0303 | 1.0405 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | | |
| as left span | 4920 | 80.0 | 813.1 | 398.4 | 414.7 | 807.0 | 389.8 | 417.0 | 1.0076 | 1.0221 |
| | | | | | | | Average C | orrection Factor | 1.0199 | 1.0240 |
| Corrected As fo | ound NO _x = | 804.3 ppb | NO = | 788.4 ppb | * = > +/-59 | % change initiates i | investigation | *Percent Chang | ge NO _x = | -1.0% |
| Previous Respo | nse NO _x = | 812.2 ppb | NO = | 798.3 ppb | | | | *Percent Chang | ge NO = | -1.3% |
| Baseline Corr 2 | nd pt NO _x = | NA ppb | NO = | NA ppb | As found | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | rd pt NO _x = | NA ppb | NO = | NA ppb | As found | d NO r ² : | | NO SI: | NO Int: | |
| | | | | | As found | d $NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 concentration (ppb) (Ic) | NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|---|---|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 789.7 | 387.8 | 414.7 | 415.8 | 0.9974 | 100.3% |
| 2nd GPT point (200 ppb O3) | 789.7 | 595.4 | 207.1 | 207.3 | 0.9990 | 100.1% |
| 3rd GPT point (100 ppb O3) | 789.7 | 697.0 | 105.5 | 106.5 | 0.9906 | 100.9% |
| | | | | Average Correction Factor | 0.9957 | 100.4% |

Notes:

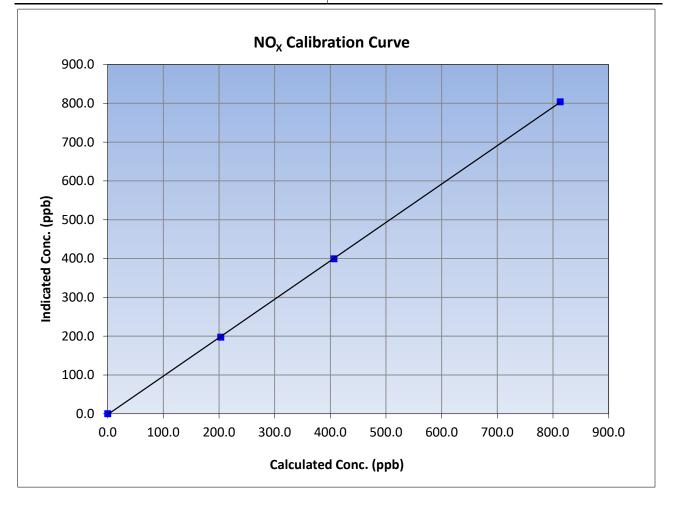
Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

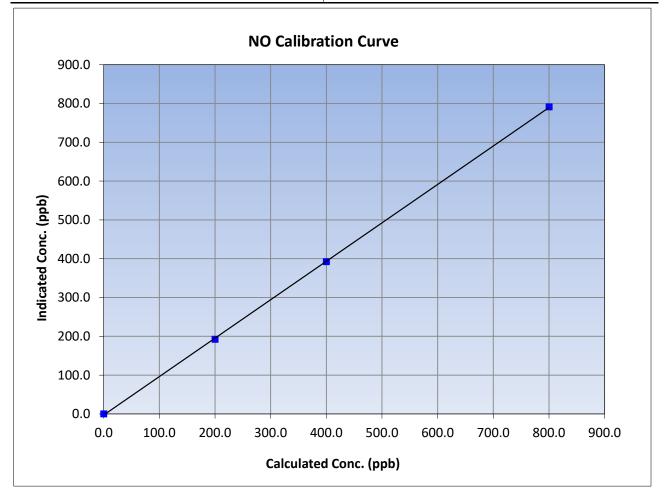
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|--------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 29, 2023 | Previous Calibration: | Februar | y 16, 2023 |
| Station Name: | Christi | na Lake | Station Number: | AN | /IS 26 |
| Start Time (MST): | 10 | :57 | End Time (MST): | 1 | 5:06 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: 14:00 | | 4:00 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999971 | ≥0.995 |
| 813.1 | 803.9 | 1.0115 | correlation coefficient | 0.999971 | 20.995 |
| 406.6 | 399.4 | 1.0179 | Slope | 0.989754 | 0.90 - 1.10 |
| 203.3 | 197.3 | 1.0303 | Slope | 0.969754 | 0.90 - 1.10 |
| | | | Intercept | -1.920000 | +/-20 |





NO Calibration Summary

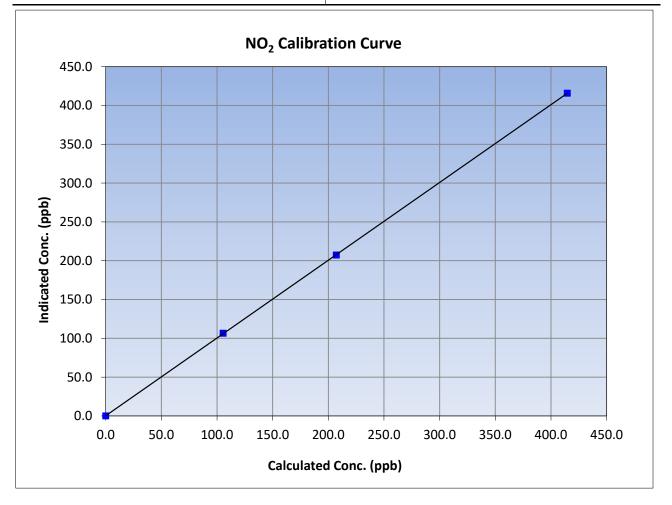
| WBEA | | | | | Version-04-2 |
|--|---|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March | 29, 2023 | Previous Calibration: | Februar | ry 16, 2023 |
| Station Name: | Christi | na Lake | Station Number: | AN | VIS 26 |
| Start Time (MST): | ST): 10:57 | | End Time (MST): | 1 | 5:06 |
| Analyzer make: | halyzer make: Thermo 42i Analyzer serial #: 14:00 | | | | 4:00 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999939 | ≥0.995 |
| 800.3 | 791.1 | 1.0117 | correlation coefficient | 0.5555555 | 20.995 |
| 400.2 | 392.3 | 1.0200 | Slope | 0.990261 | 0.90 - 1.10 |
| 200.1 | 192.3 | 1.0405 | Slope | 0.990201 | 0.90 - 1.10 |
| | | | Intercept | -2.780000 | +/-20 |

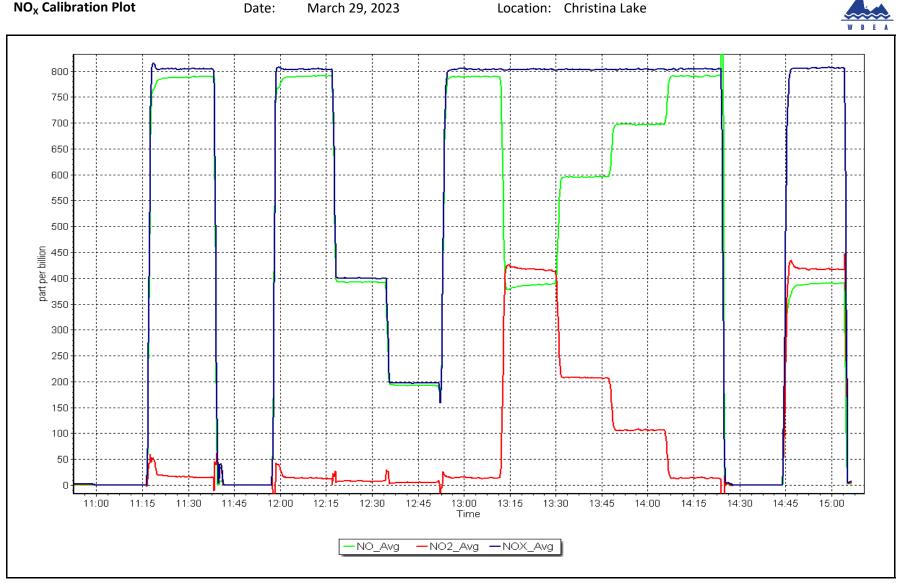




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 29, 2023 | Previous Calibration: | February | / 16, 2023 |
| Station Name: | Christi | na Lake | Station Number: | AM | IS 26 |
| Start Time (MST): | 10:57 | | End Time (MST): | 15 | :06 |
| Analyzer make: | e: Thermo 42i Analyzer serial #: 14:0 | | | | :00 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999994 | ≥0.995 |
| 414.7 | 415.8 | 0.9974 | correlation coefficient | 0.555554 | 20.995 |
| 207.1 | 207.3 | 0.9990 | Slope | 1.001972 | 0.90 - 1.10 |
| 105.5 | 106.5 | 0.9906 | Siope | 1.001972 | 0.90 - 1.10 |
| | | | Intercept | 0.216428 | +/-20 |





Location: Christina Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS27 JACKFISH 2/3 MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Inforn | nation | | |
|--|---|--------------------------------|--|--|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Jackfish 2/3 March 8, 2023 10:52 Routine | | Station number: Last Cal Date: End time (MST): | AMS 27 February 14, 2023 13:45 | |
| | | Calibration Sta | ndards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 50.58 <u>SG9133974BAL</u> | ppm | Cal Gas Exp Date: | December 29, 2028 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 50.58 <u>NA</u> | ppm | Rem Gas Exp Date: Diff between cyl: | NA | |
| Calibrator Make/Model: ZAG Make/Model: | API T700 API 701H | | 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: | 1.001161 -1.757862 | 1.002034 -2.538384 | Backgd or Offset: Coeff or Slope: | 7.4 0.979 | 7.8 0.990 |
| | | SO ₂ Calibratio | n 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/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as found span | 4921 | 79.1 | 800.2 | 790.0 | 1.013 |
| as found 2nd point as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4921 | 79.1 | 800.2 | 800.5 | 1.000 |
| second point | 4961 | 39.5 | 399.5 | 396.6 | 1.007 |
| third point | 4980 | 19.8 | 200.3 | 195.6 | 1.024 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as left span | 4921 | 79.1 | 800.2 Averas | 800.2 ge Correction Factor | 1.000 |
| | | | | | |
| Baseline Corr As found: | 789.80 | Previous response | 799.33 | *% change | -1.2% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | NA NA | AF Slope: AF Correlation: | | AF Intercept: | |

Notes:

Adjusted both zero & span.

Calibration Performed By:

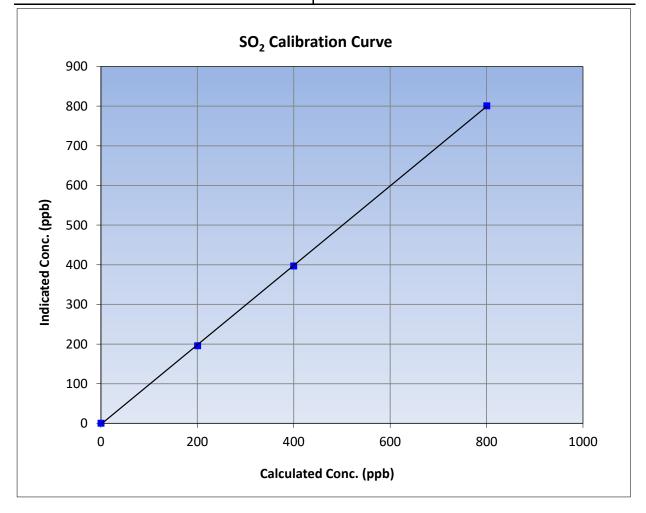
Denny Ray Estador

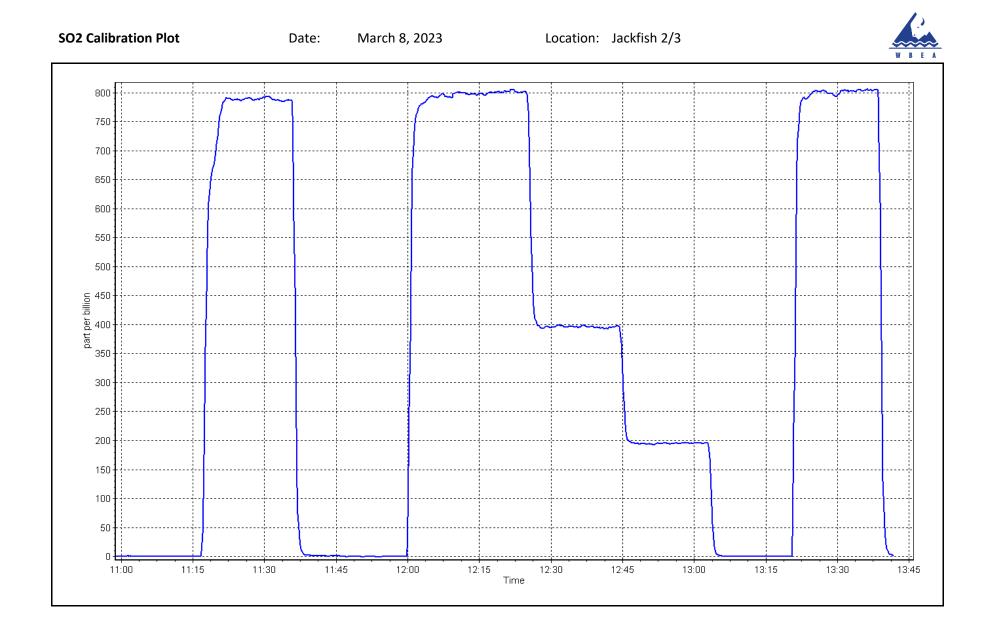


SO₂ Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|---------------|-----------------------|-------------------|
| | Stat | ion Information | |
| Calibration Date: | March 8, 2023 | Previous Calibration: | February 14, 2023 |
| Station Name: | Jackfish 2/3 | Station Number: | AMS 27 |
| Start Time (MST): | 10:52 | End Time (MST): | 13:45 |
| Analyzer make: | Thero 43iQ | Analyzer serial #: | 12124313138 |

| Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) | | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|---|-------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.0 | | Correlation Coefficient | 0.999954 | ≥0.995 |
| 800.2 | 800.5 | 0.9996 | correlation coefficient | 0.5555554 | 20.995 |
| 399.5 | 396.6 | 1.0074 | Slope | 1.002034 | 0.90 - 1.10 |
| 200.3 | 195.6 | 1.0241 | Slope | 1.002034 | 0.90 - 1.10 |
| | | | Intercept | -2.538384 | +/-30 |







H₂S Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Jackfish 2/3 March 23, 2023 9:29 Routine | | Station number: Last Cal Date: End time (MST): | AMS27 February 7, 2023 13:37 | |
| | | 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 #: | 5.41 NA | ppm | Rem Gas Exp Date: Diff between cyl: | NA 3811 | |
| Calibrator Make/Model: ZAG Make/Model: | API 700 API 701H | | Serial Number: 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> | <u>Finish</u> |
| Calibration slope: | 1.000628 | 0.983812 | Backgd or Offset: | | 25.4 |
| Calibration intercept: | -0.177928 | -0.138417 | Coeff or Slope: | | 0.949 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | 0.1 | |
| as found span | 4926 | 74.1 | 80.2 | 80.4 | 0.998 |
| as found 2nd point | 4963 | 37.0 | 40.0 | 39.9 | 1.006 |
| as found 3rd point | 4982 | 18.5 | 20.0 | 19.5 | 1.032 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.2 | |
| high point | 4926 | 74.1 | 80.2 | 78.9 | 1.016 |
| second point | 4963 | 37.0 | 40.0 | 39.1 | 1.024 |
| third point | 4982 | 18.5 | 20.0 | 19.2 | 1.042 |
| as left zero | 5000 | 0.0 | 0.0 | 0.2 | |
| as left span | 4926 | 74.1 | 80.2 | 79.0 | 1.015 |
| SO2 Scrubber Check | 4921 | 79.1 | 791.0 | 0.0 | |
| Date of last scrubber cha | inge: | | | Ave Corr Factor | 1.027 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 80.3 | Prev response: | | *% change: | 0.3% |
| Baseline Corr 2nd AF pt: | 39.8 | AF Slope: | | AF Intercept: | -0.217940 |
| Baseline Corr 3rd AF pt: | 19.4 | AF Correlation: | 0.999925 | * = > +/-5% change initiat | es investigation |

Notes:

No adjustments made.

Calibration Performed By:

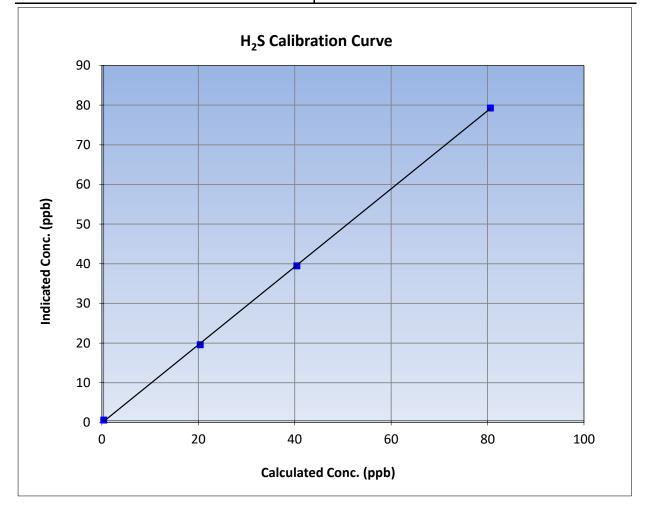
Denny Ray Estador



H₂S Calibration Summary

| | | Station Info | ormation | |
|--------------------------------|-------------|-------------------|------------------------|------------------|
| Calibration Date: | March 23, 2 | .023 | Previous Calibration: | February 7, 2023 |
| Station Name: | Jackfish 2 | /3 | Station Number: | AMS27 |
| Start Time (MST): | 9:29 | | End Time (MST): | 13:37 |
| Analyzer make: | API T101 | L | Analyzer serial #: | 621 |
| | | | | |
| | | Calibratio | on Data | |
| Calculated concentration Indic | | Correction factor | Statistical Evaluation | <u>Limits</u> |

| (ppb) (Cc) | (ppb) (Ic) | (Cc/Ic) | Statistical Evalu | <u>Linnes</u> | |
|------------|------------|---------|-------------------------|---------------|-------------|
| 0.0 | 0.2 | | Correlation Coefficient | 0.999916 | ≥0.995 |
| 80.2 | 78.9 | 1.0162 | correlation coefficient | 0.555510 | 20.333 |
| 40.0 | 39.1 | 1.0239 | Slope | 0.983812 | 0.90 - 1.10 |
| 20.0 | 19.2 | 1.0424 | 51006 | 0.983812 | 0.90 - 1.10 |
| | | | Intercept | -0.138417 | +/-3 |
| | | | | | |







80. -----75-70 65· 60. 55 -50-45 100 Juliiou 30. 25 20. 15 10 5 0------11:30 Time 09:45 10:00 10:15 09:30 10:30 10:45 11:00 11:15 11:45 12:00 12:15 12:30 12:45 13:00 13:15



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | Station | Information | | | |
|--|---|---------------|--|--------------|---------------|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Jackfish 2/3 March 28, 2023 9:45 Routine | | Station number: AMS27 Last Cal Date: February 22, 2023 End time (MST): 13:50 | | | |
| | | Calibrati | on Standards | | | |
| NO Gas Cylinder #: | T2Y1P35 | | Cal Gas Expiry Date: Dec | ember 11, 20 | 023 | |
| NOX Cal Gas Conc: | 51.44 | ppm | NO Cal Gas Conc: | 50.40 | ppm | |
| Removed Cylinder #: | NA | | Removed Gas Exp Date: NA | | | |
| Removed Gas NOX Conc: | 51.44 | ppm | Removed Gas NO Conc: | 50.40 | ppm | |
| NOX gas Diff: | | | NO gas Diff: | | | |
| Calibrator Model: | API T700 | | Serial Number: | 3811 | | |
| ZAG make/model: | API T701H | | Serial Number: | 135 | | |
| | | Analyzei | r Information | | | |
| Analyzer make: | API T200 | | Analyzer serial #: 446 | 0 | | |
| NOX Range (ppb): | | | | - | | |
| | | | | . | | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | |
| NO coeff or slope | | 1.241 | NO bkgnd or offset: | 0.9 | 0.9 | |
| NOX coeff or slope | | 1.228 | NOX bkgnd or offset: | 0.9 | 0.9 | |
| NO2 coeff or slope | : 1.000 | 1.000 | Reaction cell Press: | 4.4 | 4.4 | |
| | | Calibrat | ion Statistics | | | |
| | | Start | | Finish | | |
| NO _x Cal Slope | | 0.998669 | | 0.998179 | | |
| | • | 0.550005 | | 0.0001,0 | | |

| | 0.550005 | 0.550175 |
|-----------------------------|-----------|-----------|
| NO _x Cal Offset: | -3.017307 | -4.217263 |
| NO Cal Slope: | 1.000287 | 0.998789 |
| NO Cal Offset: | -2.020303 | -3.720948 |
| NO ₂ Cal Slope: | 0.990573 | 0.995821 |
| NO ₂ Cal Offset: | -1.100427 | -0.727241 |
| | | |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|---|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.2 | | |
| as found span | 4921 | 79.4 | 816.8 | 800.3 | 16.5 | 810.0 | 796.9 | 13.2 | 1.0084 | 1.0043 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | | |
| high point | 4921 | 79.4 | 816.8 | 800.3 | 16.5 | 813.6 | 797.5 | 16.1 | 1.0039 | 1.0035 |
| second point | 4960 | 39.7 | 408.5 | 400.2 | 8.3 | 400.2 | 393.9 | 6.2 | 1.0206 | 1.0160 |
| third point | 4980 | 19.8 | 203.7 | 199.6 | 4.1 | 195.7 | 192.2 | 3.5 | 1.0409 | 1.0385 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.5 | -0.3 | -0.2 | | |
| as left span | 4921 | 79.4 | 816.8 | 412.5 | 417.7 | 807.6 | 403.3 | 404.3 | 1.0114 | 1.0228 |
| | | | | | | | Average C | orrection Factor | 1.0218 | 1.0193 |
| Corrected As fo | ound NO _x = | 810.0 ppb | NO = | 797.1 ppb | * = > +/-5% | 6 change initiates i | investigation | *Percent Chang | ge NO _x = | -0.3% |
| Previous Respo | onse NO _x = | 812.7 ppb | NO = | 798.5 ppb | | | | *Percent Chang | ge NO = | -0.2% |
| Baseline Corr 2 | nd pt NO _x = | NA ppb | NO = | NA ppb | As found | $NO_{\rm X} r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | rd pt NO _x = | NA ppb | NO = | NA ppb | As found | $1 	NO r^2$: | | NO SI: | NO Int: | |
| | | | | | As found | $1 NO_2 r^2$: | | NO2 SI: | NO_2 Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (Co | Indicated NO2 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|---|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 796.1 | 394.9 | 417.7 | 414.9 | 1.0068 | 99.3% |
| 2nd GPT point (200 ppb O3) | 796.1 | 609.4 | 203.2 | 203.6 | 0.9981 | 100.2% |
| 3rd GPT point (100 ppb O3) | 796.1 | 707.9 | 104.7 | 101.1 | 1.0357 | 96.5% |
| | | | | Average Correction Factor | 1.0135 | 98.7% |

Notes:

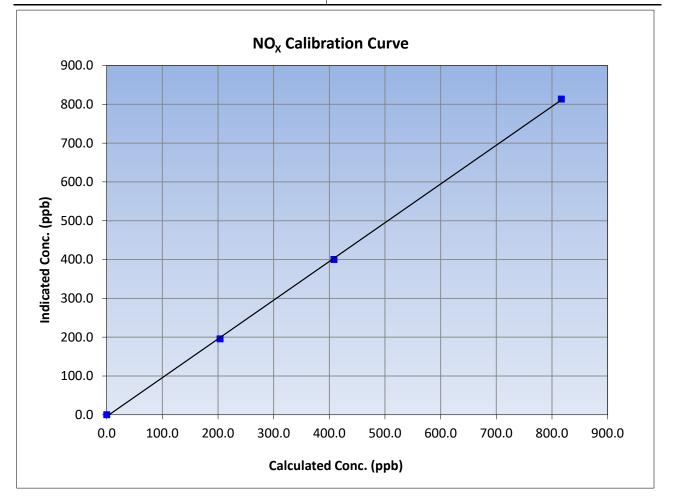
No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

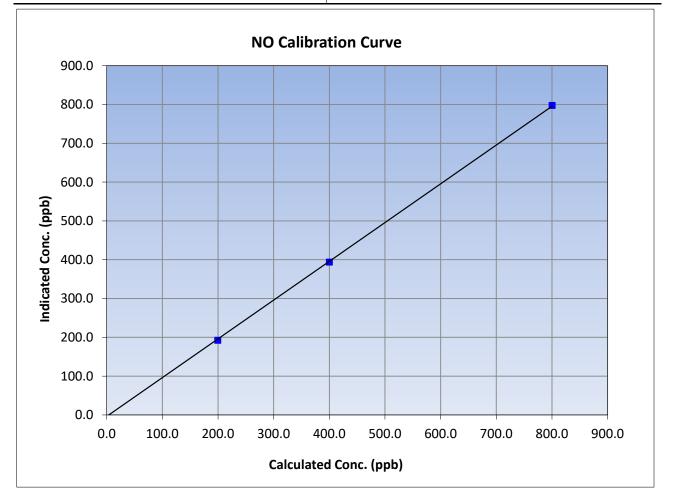
| WBEA | | Station | Information | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 28, 2023 | | Previous Calibration: | February | y 22, 2023 |
| Station Name: | Jackfi | sh 2/3 | Station Number: | AN | 1S27 |
| Start Time (MST): | 9:45 | | End Time (MST): | 13 | 3:50 |
| Analyzer make: | API | T200 | Analyzer serial #: 446 | | 460 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Correlation Coefficient | 0.999872 | ≥0.995 |
| 816.8 | 813.6 | 1.0039 | correlation coefficient | 0.999872 | 20.995 |
| 408.5 | 400.2 | 1.0206 | Slope | 0.998179 | 0.90 - 1.10 |
| 203.7 | 195.7 | 1.0409 | Siope | 0.998179 | 0.90 - 1.10 |
| | | | Intercept | -4.217263 | +/-20 |





NO Calibration Summary

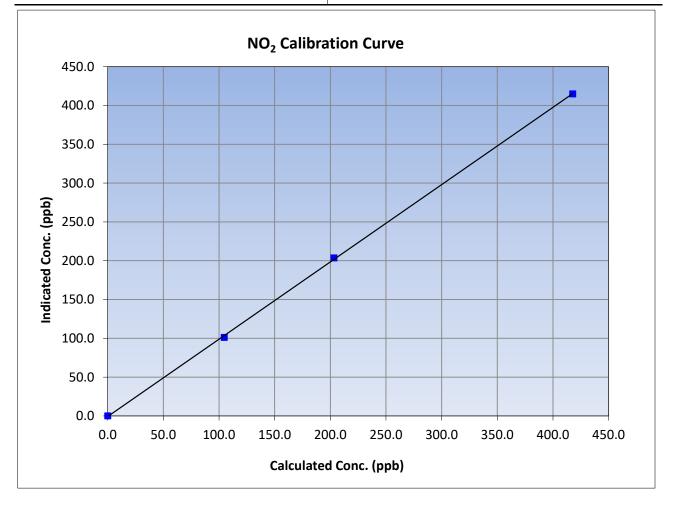
| WBEA | | Station | Information | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | | | | |
| Calibration Date: | March 2 | 28, 2023 | Previous Calibration: | Februar | y 22, 2023 |
| Station Name: | Jackfi | sh 2/3 | Station Number: | AN | MS27 |
| Start Time (MST): | 9:45 | | End Time (MST): | 1 | 3:50 |
| Analyzer make: | er make: API T200 | | Analyzer serial #: 44 | | 460 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999906 | ≥0.995 |
| 800.3 | 797.5 | 1.0035 | correlation coernelent | 0.999900 | 20.995 |
| 400.2 | 393.9 | 1.0160 | Slope | 0.998789 | 0.90 - 1.10 |
| 199.6 | 192.2 | 1.0385 | Slope | 0.998789 | 0.30 - 1.10 |
| | | | Intercept | -3.720948 | +/-20 |

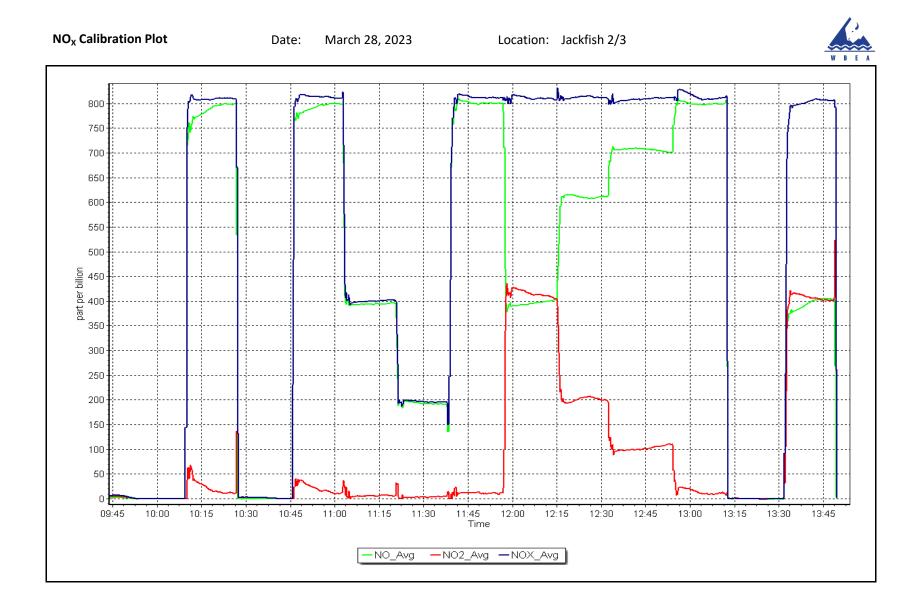




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--------------------------|----------------|--------------|----------------------------------|-----------|--------------|
| | | Station | Information | | |
| Calibration Date: | March 28, 2023 | | Previous Calibration: | | y 22, 2023 |
| Station Name: | Jackfi | Jackfish 2/3 | | AN | 1S27 |
| Start Time (MST): | 9:45 | | End Time (MST): | 13 | 3:50 |
| Analyzer make: | API | Т200 | Analyzer serial #: | 44 | 460 |
| Calculated concentration | | Calibra | ation Data Statistical Evalue | ation | Limits |
| (ppb) (Cc) | (ppb) (lc) | | | | |
| 0.0 | 0.1 | | Correlation Coefficient | 0.999887 | ≥0.995 |
| 417.7 | 414.9 | 1.0068 | | | |
| 203.2 | 203.6 | 0.9981 | Slope | 0.995821 | 0.90 - 1.10 |
| 104.7 | 101.1 | 1.0357 | • | | |
| | | | Intercept | -0.727241 | +/-20 |







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS29 SURMONT 2 MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|---|--------------------------------|--|---|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Surmont 2 March 13, 2023 10:09 Routine | | Station number: Last Cal Date: End time (MST): | AMS29 February 16, 2023 13:27 | |
| | | 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: | <u>CC356008</u> | nnm | Rem Gas Exp Date: | ΝΔ | |
| Removed Gas Cyl #: | <u>49.21</u> NA | ppm | Diff between cyl: | NA | |
| Calibrator Make/Model: | Teledyne API T700 | | Serial Number: | 5258 | |
| ZAG Make/Model: | Teledyne API T701 | | Serial Number: | 4297 | |
| | | | Schul Wullber. | 7237 | |
| | | Analyzer Info | rmation | | |
| Analyzer make: Analyzer Range | | | Analyzer serial #: | 1170050150 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.999443 | 1.006112 | Backgd or Offset: | | 12.4 |
| Calibration intercept: | -2.985140 | -2.145180 | Coeff or Slope: | 0.934 | 0.934 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration ((ppb) (Ic) | Correction factor (Cc/lc Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | -0.5 | |
| as found span | 4919 | 81.3 | 800.1 | 798.8 | 1.002 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.3 | |
| high point | 4919 | 81.3 | 800.1 | 804.0 | 0.995 |
| second point | 4959 | 40.7 | 400.6 | 399.3 | 1.003 |
| third point | 4979 | 20.3 | 199.8 | 197.5 | 1.012 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4919 | 81.3 | 800.1 | 803.0 | 0.996 |
| | | | Averag | ge Correction Factor | 1.003 |
| Baseline Corr As found: | 799.30 | Previous response | | *% change | 0.3% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | | |

Notes:

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

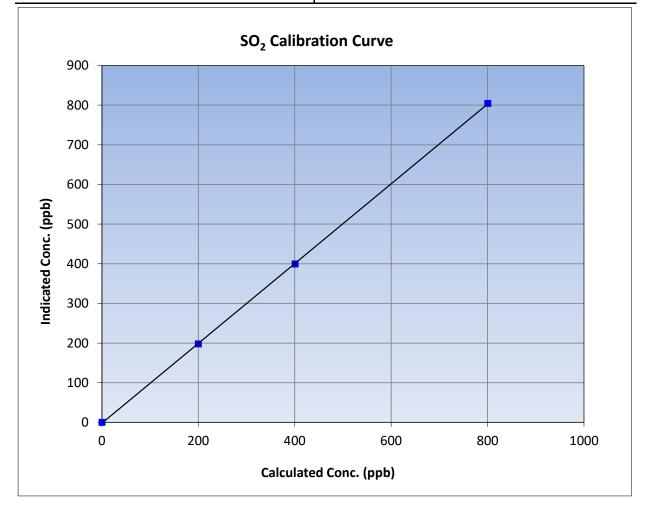
Calibration Performed By:

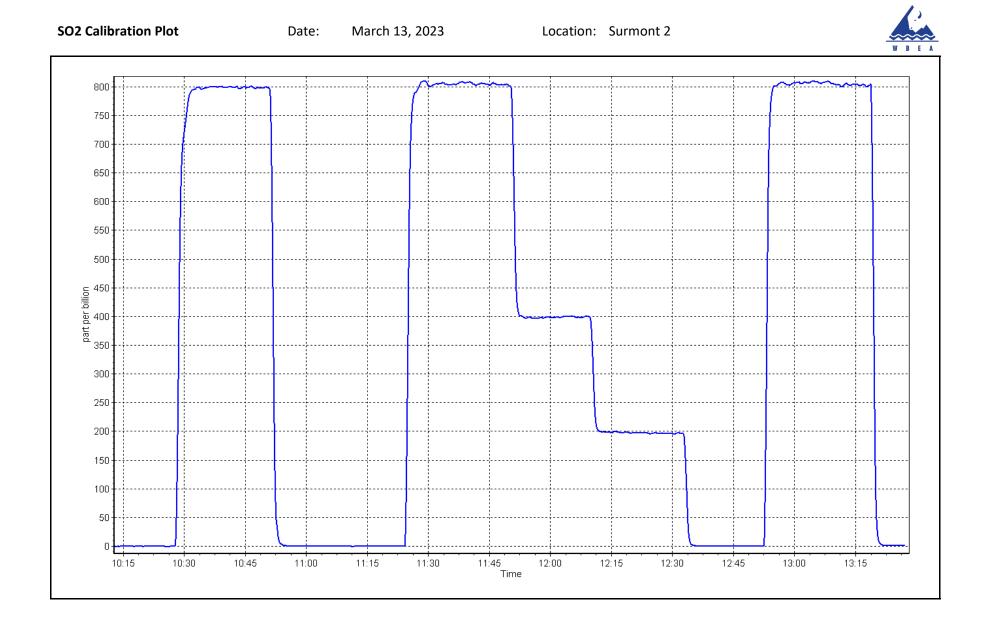


SO₂ Calibration Summary

| W B E A | | | Version-01-2020 |
|-------------------|----------------|-----------------------|-------------------|
| | Stati | on Information | |
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 16, 2023 |
| Station Name: | Surmont 2 | Station Number: | AMS29 |
| Start Time (MST): | 10:09 | End Time (MST): | 13:27 |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1170050150 |

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | -0.3 | | Correlation Coefficient | 0.999974 | ≥0.995 |
| 800.1 | 804.0 | 0.9952 | correlation coefficient | 0.555574 | 20.335 |
| 400.6 | 399.3 | 1.0032 | Slope | 1.006112 | 0.90 - 1.10 |
| 199.8 | 197.5 | 1.0117 | Slope | 1.000112 | 0.90 - 1.10 |
| | | | Intercept | -2.145180 | +/-30 |







THC Calibration Report

Version-01-2020

| | | Station Info | rmation | | |
|---|--|--|---|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Surmont 2 March 13, 2023 10:09 Routine | | Station number: Last Cal Date: End time (MST): | AMS29 February 16, 2023 13:27 | |
| | | Calibration S | tandards | | |
| Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc. | <u>499.0</u> 205.7 | 66008 ppm ppm | Cal Gas Expiry Date: CH4 Equiv Conc. | February 23, 2025 1064.7 | ppm |
| Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model: | 4 <u>99.0</u> 205.7 Teledyne API T700 Teledyne API T701 | IA ppm ppm | Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number: | NA 1064.7 5258 4297 | ppm |
| | | Analyzer Info | ormation | | |
| Analyzer make: Analyzer Range: | : Thermo 51i-LT : 0 - 20 ppm | | Analyzer serial #: | 1170050149 | |
| Calibration slope: Calibration intercept: | <u>Start</u> 0.995950 0.026135 | <u>Finish</u> 1.008880 -0.118074 | Background: Coefficient: | <u>Start</u> 4.36 5.223 | <u>Finish</u> 4.62 5.286 |
| | | THC Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.00 | 0.11 | |
| as found span | 4918 | 81.3 | 17.31 | 17.22 | 1.005 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | 5000 | 0.0 | 0.00 | -0.06 | |
| new cylinder response calibrator zero | 5000 4918 | 0.0 81.3 | 0.00 | -0.06 17.37 | 0.997 |
| new cylinder response | | | | | |
| new cylinder response calibrator zero high point | 4918 | 81.3 | 17.31 | 17.37 | 0.997 |
| new cylinder response calibrator zero high point second point | 4918 4959 | 81.3 40.7 | 17.31 8.67 | 17.37 8.62 | 0.997 1.005 |
| new cylinder response calibrator zero high point second point third point | 4918 4959 4979 | 81.3 40.7 20.3 | 17.31 8.67 4.32 | 17.37 8.62 4.17 | 0.997 1.005 |
| new cylinder response calibrator zero high point second point third point as left zero as left span | 4918 4959 4979 5000 | 81.3 40.7 20.3 0.0 81.3 | 17.31 8.67 4.32 0.00 17.31 Averag | 17.37 8.62 4.17 -0.17 17.40 ge Correction Factor | 0.997 1.005 1.036 |
| new cylinder response calibrator zero high point second point third point as left zero | 4918 4959 4979 5000 | 81.3 40.7 20.3 0.0 | 17.31 8.67 4.32 0.00 17.31 | 17.37 8.62 4.17 -0.17 17.40 | 0.997 1.005 1.036 0.995 |

Changed sample inlet filter after as founds. Adjusted zero.

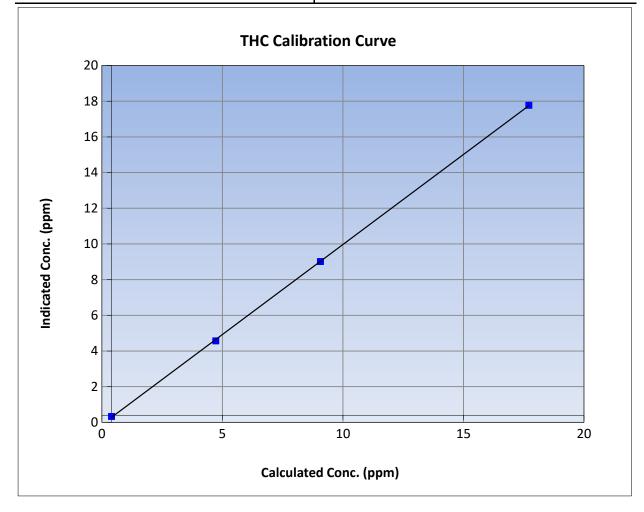
Calibration Performed By:

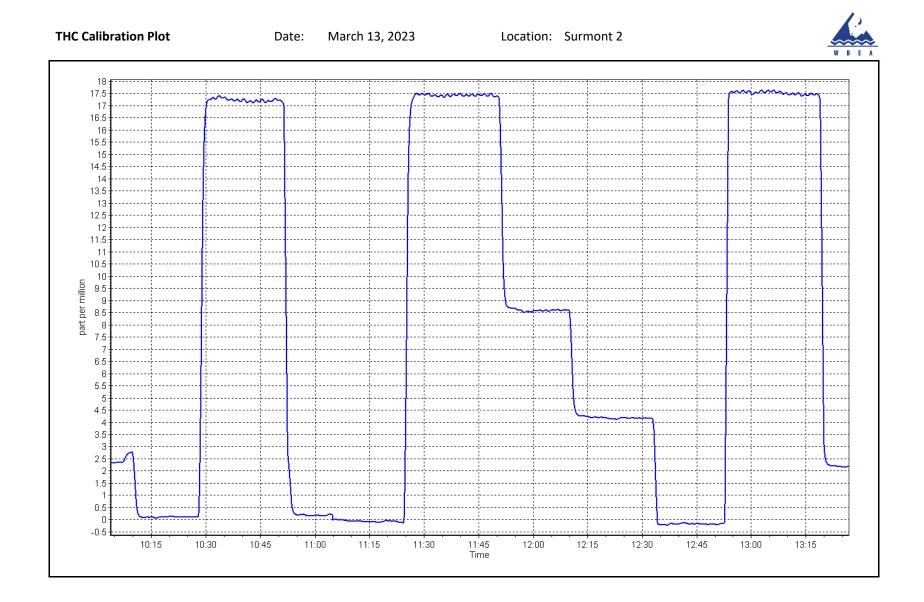


THC Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|----------------|-----------------------|-------------------|
| | Stati | on Information | |
| Calibration Date: | March 13, 2023 | Previous Calibration: | February 16, 2023 |
| Station Name: | Surmont 2 | Station Number: | AMS29 |
| Start Time (MST): | 10:09 | End Time (MST): | 13:27 |
| Analyzer make: | Thermo 51i-LT | Analyzer serial #: | 1170050149 |

| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|--|--|------------------------------|-------------------------|-----------|---------------|
| 0.00 | -0.06 | | Correlation Coefficient | 0.999950 | ≥0.995 |
| 17.31 | 17.37 | 0.9968 | correlation coefficient | 0.555550 | 20.000 |
| 8.67 | 8.62 | 1.0054 | Slope | 1.008880 | 0.90 - 1.10 |
| 4.32 | 4.17 | 1.0357 | 510pe | 1.008880 | 0.30 - 1.10 |
| | | | Intercept | -0.118074 | +/-1.5 |







H₂S Calibration Report

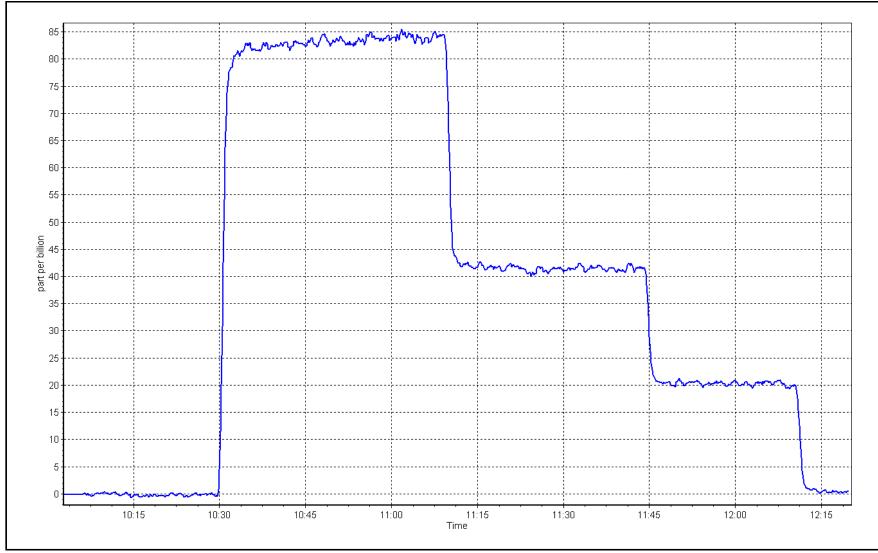
| WBEA | | | | | Version-11-2021 |
|---|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Surmont 2 March 29, 2023 10:05 Removal | | Station number: Last Cal Date: End time (MST): | AMS29 February 13, 2023 12:20 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | <u>5.391</u> <u>CC508338</u> | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: | <u>5.391</u> <u>CC508338</u> Teledyne API T700 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | NA 5258 | |
| ZAG Make/Model: | Teledyne API T701 | | Serial Number: | 4297 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 450i Internal 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1170050142 NA | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.994905 -0.062658 | | Backgd or Offset: Coeff or Slope: | 17.0 1.024 | 17.0 1.024 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | -0.2 | |
| as found span | 4926 | 74.2 | 80.0 | 83.0 | 0.962 |
| as found 2nd point | 4963 | 37.2 | 40.1 | 41.5 | 0.962 |
| as found 3rd point | 4982 | 18.6 | 20.1 | 20.3 | 0.978 |
| 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 | | | | | |
| high point | | | | | |
| second point | | | | | |
| third point | | | | | |
| as left zero as left span | | | | | |
| SO2 Scrubber Check | | | | | |
| Date of last scrubber cha | inge: | 15-Apr-21 | | Ave Corr Factor | |
| Date of last converter eff | | P | | | efficiency |
| Baseline Corr As found: | 83.2 | Prev response: | 79.53 | *% change: | 4.4% |
| Baseline Corr 2nd AF pt: | 41.7 | AF Slope: | | AF Intercept: | -0.344531 |
| Baseline Corr 3rd AF pt: | 20.5 | AF Correlation: | 0.999978 | | |
| | | | | * = > +/-5% change initiate | es investigation |

Notes:

As founds done in preparation to swap the 450i with a 43iQ-TLE with an external converter.

H₂S Calibration Plot







H₂S Calibration Report

| WBEA | | | | | Version-11-20 |
|---|--|--|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Surmont 2 March 30, 2023 9:33 Install | | Station number: Last Cal Date: End time (MST): | AMS29 March 29, 2023 15:27 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | <u>5.391</u> CC508338 | ppm | Cal Gas Exp Date: | January 4, 2025 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: | <u>5.391</u> <u>CC508338</u> Teledyne API T700 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | 5258 | |
| AG Make/Model: | Teledyne API T701 | | Serial Number: | 4297 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43iQ-TLE Global 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1200326170 2022-223 | |
| Calibration slope: Calibration intercept: | <u>Start</u> | <u>Finish</u> 1.002040 -0.162687 | Backgd or Offset: Coeff or Slope: | | <u>Finish</u> 1.22 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 Adjustec 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) (lc) | Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | |
| high point | 4926 | 74.2 | 80.0 | 80.1 | 0.999 |
| second point | 4963 | 37.2 | 40.1 | 39.9 | 1.005 |
| 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 | 80.4 | 0.995 |
| O2 Scrubber Check | 4919 | 81.3 | 813.0 | 0.0 | |
| ate of last scrubber cha | Ų | 30-Mar-23 | | Ave Corr Factor | 1.006 |
| ate of last converter ef | ficiency test: | | | | efficiency |
| aseline Corr As found: | NA | Prev response: | | *% change: | NA |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | NA NA | AF Slope: AF Correlation: | | AF Intercept: | NA |
| | | | | | |

Notes:

Install calibration. Swapped the 450i with a 43iQ-TLE and external global converter. Adjusted zero and span.

Calibration Performed By:

Braiden Boutilier

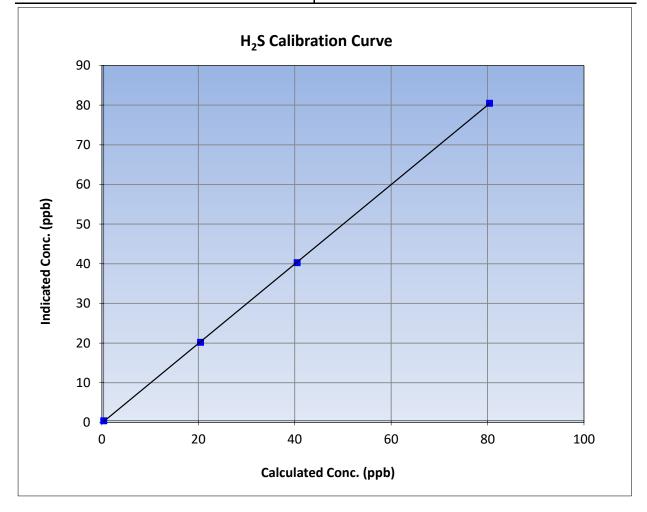


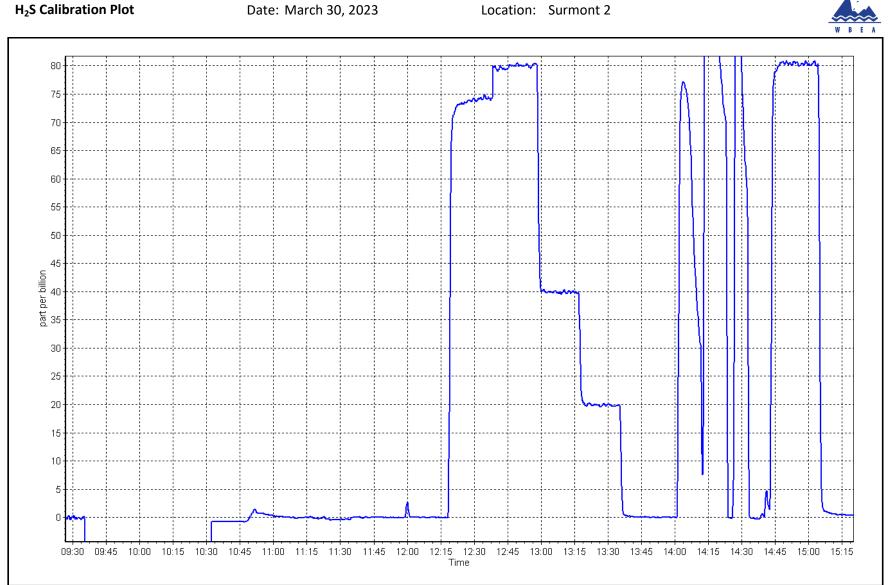
H₂S Calibration Summary

| WBEA | | | Version-11-2021 | | | | | | |
|---------------------|-----------------|-----------------------|-----------------|--|--|--|--|--|--|
| Station Information | | | | | | | | | |
| Calibration Date: | March 30, 2023 | Previous Calibration: | March 29, 2023 | | | | | | |
| Station Name: | Surmont 2 | Station Number: | AMS29 | | | | | | |
| Start Time (MST): | 9:33 | End Time (MST): | 15:27 | | | | | | |
| Analyzer make: | Thermo 43iQ-TLE | Analyzer serial #: | 1200326170 | | | | | | |

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 | 0.999980 | ≥0.995 |
| 80.0 | 80.1 | 0.9988 | correlation coefficient | 0.999980 | 20.995 |
| 40.1 | 39.9 | 1.0052 | Slope | 1.002040 | 0.90 - 1.10 |
| 20.1 | 19.8 | 1.0128 | Slope | 1.002040 | 0.90 - 1.10 |
| | | | Intercept | -0.162687 | +/-3 |





H₂S Calibration Plot

Location: Surmont 2



Station Name:

Reason:

Calibration Date:

Start time (MST):

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS29 Last Cal Date: February 22, 2023 End time (MST): 16:55

| | | | Calibration Standards | |
|------------------------------------|-------------------|------|---------------------------------------|---|
| NO Gas Cylinder #: | T12 | YYFE | Cal Gas Expiry Date: October 30, 2024 | |
| NOX Cal Gas Conc: | 47.46 | ppm | NO Cal Gas Conc: 47.46 pp | m |
| Removed Cylinder #: | 1 | 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 T700 | | Serial Number: 5258 | |
| ZAG make/model: | Teledyne API T701 | | Serial Number: 4297 | |
| | | | | |
| | | | Analyzer Information | |
| Analyzer make: NOX Range (ppb): | | | Analyzer serial #: 1170050148 | |

| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
|---------------------|--------------|---------------|----------------------|--------------|---------------|
| NO coeff or slope: | 1.340 | 1.340 | NO bkgnd or offset: | 1.3 | 1.3 |
| NOX coeff or slope: | 0.998 | 0.998 | NOX bkgnd or offset: | 1.4 | 1.4 |
| NO2 coeff or slope: | 1.000 | 1.000 | Reaction cell Press: | 168.4 | 168.4 |

| Calibration Statistics |
|------------------------|
|------------------------|

| | <u>Start</u> |
|-----------------------------|--------------|
| NO _x Cal Slope: | 1.000440 |
| NO _x Cal Offset: | 0.326827 |
| NO Cal Slope: | 1.000353 |
| NO Cal Offset: | -0.592834 |
| NO ₂ Cal Slope: | 1.006976 |
| NO ₂ Cal Offset: | 1.486191 |

Surmont 2

GPT Check

14:15

March 13, 2023

Finish



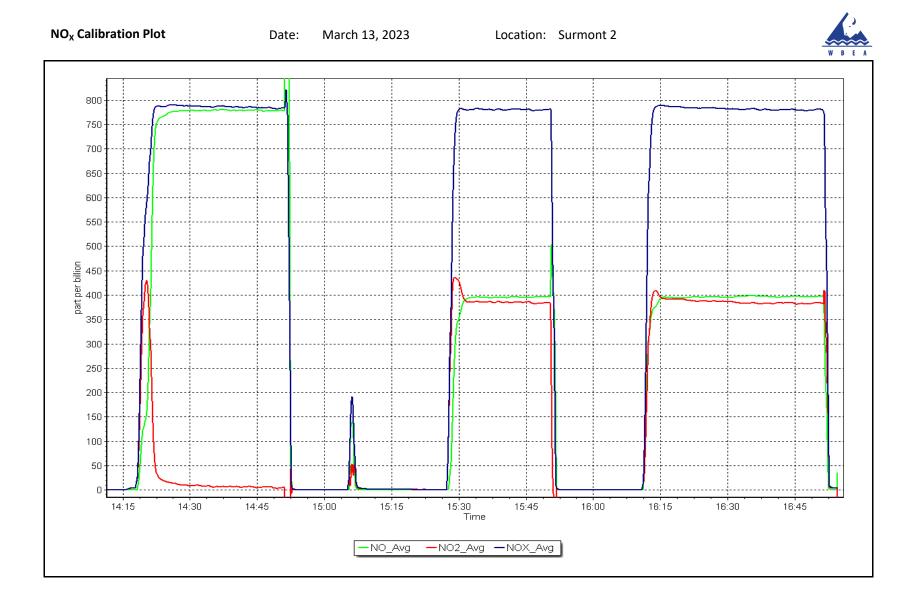
$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | on Data | | | | |
|------------------|------------------------------|-----------------------------------|---|--|---|--|---|--|--|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| as found span | 4916 | 84.2 | 799.2 | 799.2 | 0.0 | 783.8 | 778.8 | 5.1 | 1.0196 | 1.0262 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | | | | | | | | | | |
| high point | | | | | | | | | | |
| second point | | | | | | | | | | |
| third point | | | | | | | | | | |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | | |
| as left span | 4916 | 84.2 | 799.2 | 416.8 | 382.4 | 780.2 | 397.9 | 382.2 | 1.0243 | 1.0475 |
| | | | | | | | Average C | orrection Factor | | |
| Corrected As fo | ound NO _x = | 783.8 ppb | NO = | 778.8 ppb | * = > +/-5 | % change initiates | investigation | *Percent Chang | ge NO _X = | -2.1% |
| Previous Respo | nse NO _x = | 799.9 ppb | NO = | 798.9 ppb | | | | *Percent Chang | ge NO = | -2.6% |
| 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 | NO ₂ r^2 : | : | NO2 SI: | NO ₂ Int: | |
| | | | | G | PT Calibration | Data | | | | |
| O3 Setpo | int (ppb) | Indicated NO Ref concentration | | cated NO Drop entration (ppb) | Calculated N concentration (pp | 02 In | ndicated NO2 ntration (ppb) (Ic) | NO2 Correction fa Calibration Limit = As Found Limit = (| 0.95-1.05 | rter Efficiency n Limit = 96-104% |
| as found | GPT zero | | | | | | | | | |
| as found GPT poi | nt (400 ppb NO2) | | | | | | | | | |
| as found GPT poi | nt (200 ppb NO2) | | | | | | | | | |
| as found GPT poi | nt (100 ppb NO2) | | | | | | | | | |
| 1st GPT point | (400 ppb O3) | 778.8 | | 396.4 | 382.4 | | 384.0 | 0.9958 | 3 | 100.4% |
| 2nd GPT poin | t (200 ppb O3) | | | | | | | | | |
| 3rd GPT point | (100 ppb O3) | | | | | | | | | |
| | | | | | | Average Co | orrection Factor | 0.9958 | 3 | 100.4% |

Notes: Checking the output of the calibrator prior to the monthly NOx calibration. GPTPS 400 ozone point generated, GPT 400 ozone point checked.

Calibration Performed By:





Station Name:

Reason:

Calibration Date:

Start time (MST):

Surmont 2

10:06

Routine

March 16, 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: February 22, 2023 End time (MST): 15:50

| | | Cali | bration Standards | | | | |
|-----------------------|-----------------|---------|--------------------------|---------------|-----|--|--|
| NO Gas Cylinder #: | | T12YYFE | Cal Gas Expiry Date: Oc | tober 30, 202 | 4 | | |
| NOX Cal Gas Conc: | 47.46 | ppm | NO Cal Gas Conc: | 47.46 | ppm | | |
| Removed Cylinder #: | | NA | Removed Gas Exp Date: NA | λ | | | |
| Removed Gas NOX Conc: | 47.46 | ppm | Removed Gas NO Conc: | 47.46 | ppm | | |
| NOX gas Diff: | | | NO gas Diff: | | | | |
| Calibrator Model: | Teledyne API T7 | 00 | Serial Number: 52 | 58 | | | |
| ZAG make/model: | Teledyne API T7 | 01 | Serial Number: 4297 | | | | |
| | | Ana | lyzer Information | | | | |
| Analyzer make: | Thermo 42i | | Analyzer serial #: 11 | 70050148 | | | |

| NOX Range (ppb): 0 · | - 1000 ppb | | | | |
|----------------------|--------------|---------------|----------------------|--------------|---------------|
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coeff or slope: | 1.340 | 1.357 | NO bkgnd or offset: | 1.3 | 1.3 |
| NOX coeff or slope: | 0.998 | 0.996 | NOX bkgnd or offset: | 1.4 | 1.4 |
| NO2 coeff or slope: | 1.000 | 1.000 | Reaction cell Press: | 168.4 | 175.2 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.000440 | 0.999093 |
| NO _x Cal Offset: | 0.326827 | -1.251932 |
| NO Cal Slope: | 1.000353 | 0.999707 |
| NO Cal Offset: | -0.592834 | -1.991859 |
| NO ₂ Cal Slope: | 1.006976 | 0.998536 |
| NO ₂ Cal Offset: | 1.486191 | 0.601598 |



$NO_X \setminus NO \setminus NO_2$ 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 | -0.1 | -0.2 | 0.0 | | |
| as found span | 4916 | 84.2 | 799.2 | 799.2 | 0.0 | 790.1 | 788.0 | 2.1 | 1.0115 | 1.0142 |
| as found 2nd | | | | | | | | | | |
| as found 3rd | | | | | | | | | | |
| new cyl resp | | | | | | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | | |
| high point | 4916 | 84.2 | 799.2 | 799.2 | 0.0 | 797.4 | 797.7 | -0.3 | 1.0023 | 1.0019 |
| second point | 4958 | 42.1 | 399.6 | 399.6 | 0.0 | 398.6 | 397.2 | 1.4 | 1.0025 | 1.0061 |
| third point | 4979 | 21.1 | 200.3 | 200.3 | 0.0 | 196.9 | 195.9 | 1.0 | 1.0172 | 1.0223 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | | |
| as left span | 4916 | 84.2 | 799.2 | 412.9 | 386.3 | 790.0 | 403.0 | 387.1 | 1.0116 | 1.0246 |
| | | | | | | | Average C | orrection Factor | 1.0073 | 1.0101 |
| Corrected As fo | ound NO _x = | 790.2 ppb | NO = | 788.2 ppb | * = > +/-5% | 6 change initiates i | nvestigation | *Percent Chang | ge NO _x = | -1.2% |
| Previous Respo | nse NO _x = | 799.9 ppb | NO = | 798.9 ppb | | | | *Percent Chang | ge NO = | -1.4% |
| Baseline Corr 2 | nd pt NO _x = | NA ppb | NO = | NA ppb | As found | $1 NO_{\rm X} r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | rd pt NO _X = | NA ppb | NO = | NA ppb | As found | NO r^2 : | | NO SI: | NO Int: | |
| | | | | | As found | $1 NO_2 r^2$: | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (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) | 788.5 | 402.2 | 386.3 | 386.2 | 1.0003 | 100.0% |
| 2nd GPT point (200 ppb O3) | 788.5 | 587.0 | 201.5 | 201.6 | 0.9995 | 100.0% |
| 3rd GPT point (100 ppb O3) | 788.5 | 688.7 | 99.8 | 101.2 | 0.9862 | 101.4% |
| | | | | Average Correction Factor | 0.9953 | 100.5% |

Notes: Changed sample inlet filter after as founds. Adjusted span. Second high NO reference point used for Indicated NO reference concentrations.

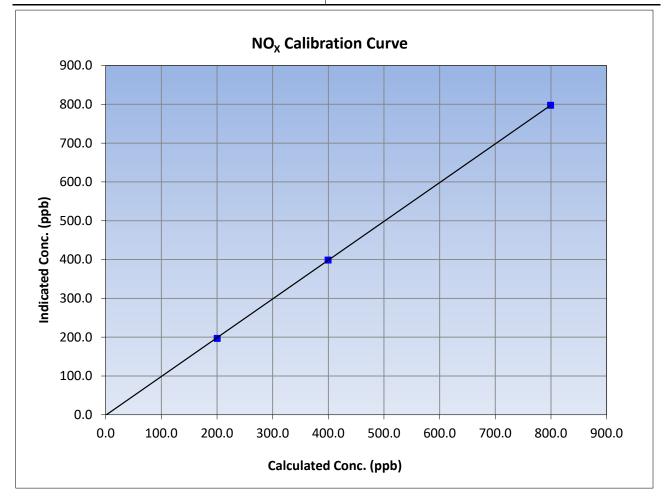
Calibration Performed By:

Braiden Boutilier



NO_x Calibration Summary

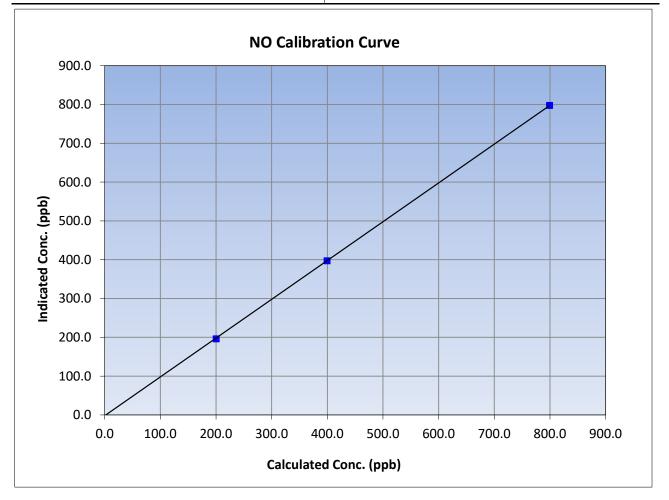
| WBEA | | | | | Version-04-20 |
|--|---------------------------------------|---------------------------|-------------------------------|--------------------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 16, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Surm | iont 2 | Station Number: | AM | S29 |
| Start Time (MST): | 10:06 | | End Time (MST): | 15 | :50 |
| Analyzer make: | Thermo 42i | | Analyzer serial #: | Analyzer serial #: 11700 | |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | c) Statistical Evaluation Lin | | |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999984 | ≥0.995 |
| 799.2 | 797.4 | 1.0023 | correlation coefficient | 0.555564 | 20.333 |
| 399.6 | 398.6 | 1.0025 | Slope | 0.999093 | 0.90 - 1.10 |
| 200.3 | 196.9 | 1.0172 | Slope | 0.999095 | 0.90 - 1.10 |
| | | | Intercept | -1.251932 | +/-20 |





NO Calibration Summary

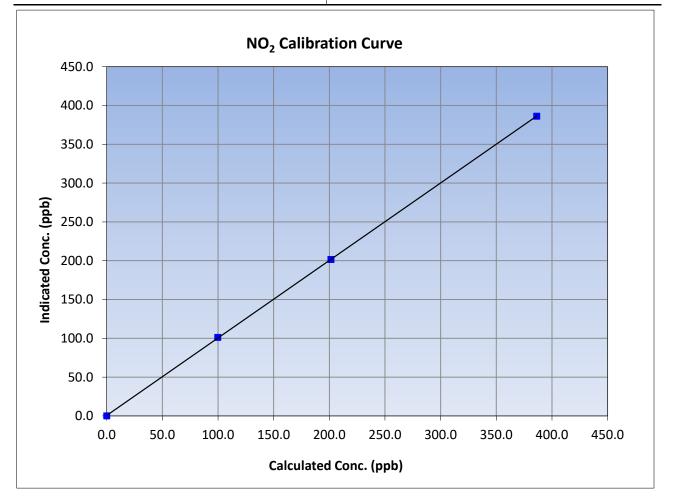
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|---------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 16, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Surm | iont 2 | Station Number: | AM | S29 |
| Start Time (MST): | 10:06 | | End Time (MST): | 15: | :50 |
| Analyzer make: | Thermo 42i | | Analyzer serial #: 11700 | | 050148 |
| | | 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 | 0.999972 | ≥0.995 |
| 799.2 | 797.7 | 1.0019 | correlation coernelent | 0.333372 | 20.995 |
| 399.6 | 397.2 | 1.0061 | Slope | 0.999707 | 0.90 - 1.10 |
| 200.3 | 200.3 195.9 1.0223 Slope | | Slope | 0.999707 | 0.90 - 1.10 |
| | | | Intercept | -1.991859 | +/-20 |

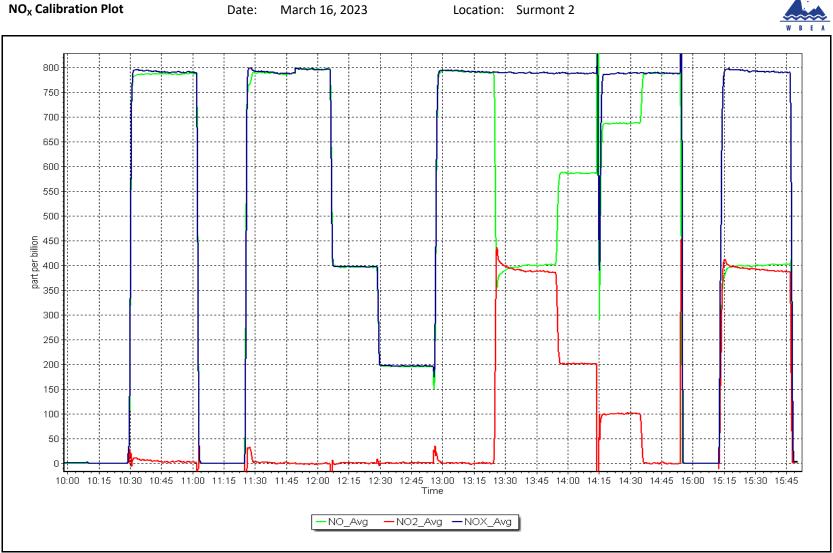




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|---------------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 2 | 16, 2023 | Previous Calibration: | February | 22, 2023 |
| Station Name: | Surm | nont 2 | Station Number: | AM | S29 |
| Start Time (MST): | 10:06 | | End Time (MST): | 15 | :50 |
| Analyzer make: | Thermo 42i | | Analyzer serial #: | 11700 | 50148 |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | ation Data Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Completion Coofficient | 0.000004 | |
| 386.3 | 386.2 | 1.0003 | Correlation Coefficient | 0.999984 | ≥0.995 |
| 201.5 | 201.6 | 0.9995 | Slope | 0.998536 | 0.90 - 1.10 |
| 99.8 | 101.2 | 0.9862 | Siope | 0.558550 | 0.50 1.10 |
| | | | Intercept | 0.601598 | +/-20 |







T640 PM_{2.5} CALIBRATION

| WDEA | | | | | | Version-01-2023 |
|-------------------------------|------------------------|---------------------------|---------------------|--------------|-----------------|-----------------|
| | | Station Information | n | | | |
| Station Name: | Surmont 2 | | Station number: | AMS 29 | | |
| Calibration Date: | March 13, 2023 | | Last Cal Date: | February 17 | 7, 2023 | |
| Start time (MST): | 13:04 | | End time (MST): | 14:09 | | |
| Analyzer Make: | API T640 | | S/N: | 253 | | |
| 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> | | <u>Adjusted</u> | (Limits) |
| T (°C) | -5.7 | -5.4 | -5.7 | | | +/- 2 °C |
| P (mmHg) | 706.8 | 707.77 | 706.8 | | | +/- 10 mmHg |
| flow (LPM) | 4.99 | 4.962 | 4.99 | | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 13, 2023 | Last Cal Date: | February | 17, 2023 | |
| | PM w/o HEPA: | 3.7 | PM w/ HEPA: | C | | <0.2 ug/m3 |
| Note: this leak check will be | e completed before the | quarterly work and will s | serve as the pre ma | intenance le | eak check | |
| Inlet cleaning : | Inlet Head | | | | | |
| | | | | | | |
| | | Quarterly Calibration | Test | | | |
| Parameter | As found | Post maintenance | As left | | Adjusted | (Limits) |
| PMT Peak Test | <u>, 10 10 0110</u> | <u> </u> | <u></u> | | | 11.3 +/- 0.5 |
| | | | | | | , |
| Post-maintenanc | e leak check: | PM w/o HEPA: | | w/ HEPA: | | |
| Date Optical Chan | | February 17 | | | <0.2 ug/m3 | |
| Disposable Filte | er Changed: | February 17 | 7, 2023 | | | |
| | | | | | | |
| | | Annual Maintenanc | ce | | | |
| | | | | | | |
| Date Sample Tu | | September 3 | | | | |
| Date RH/T Sens | or Cleaned: | October 6, | 2022 | | | |
| | | | | | | |
| Notes: | | No adjustments | s made, Leak check | bassed. | | |
| Calibration by: | Braiden Boutilier | | | | | |
| | | | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS30 ELLS RIVER MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|--|--|--------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Ells River March 1, 2023 9:43 Routine | | Station number: Last Cal Date: End time (MST): | AMS 30 February 15, 2023 12:45 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 50.53 | ppm | Cal Gas Exp Date: | December 29, 2028 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: | CC494126 50.53 API T700 | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: | 3061 | |
| ZAG Make/Model: | API T701H | | Serial Number: | 358 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1008841397 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 1.006172 -2.436019 | 1.004115 -2.615941 | Backgd or Offset: Coeff or Slope: | | 8.9 0.988 |
| | | SO ₂ Calibratio | on Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration ((ppb) (Ic) | Correction factor (Cc/lc) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | -0.5 | |
| as found span | 4921 | 79.2 | 800.4 | 800.1 | 1.000 |
| 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 | 802.6 | 0.997 |
| second point | 4960 | 39.6 | 400.2 | 397.2 | 1.008 |
| third point | 4980 | 19.8 | 200.1 | 196.2 | 1.020 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4921 | 79.2 | 800.4 | 801.7 | 0.998 |
| | | | Averag | ge Correction Factor | 1.008 |
| Baseline Corr As found: | 800.60 | Previous response | 802.87 | *% change | -0.3% |
| Baseline Corr 2nd AF pt: | NA | AF Slope: | | AF Intercept: | |
| Baseline Corr 3rd AF pt: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation |

Adjusted the zero only.

Calibration Performed By:

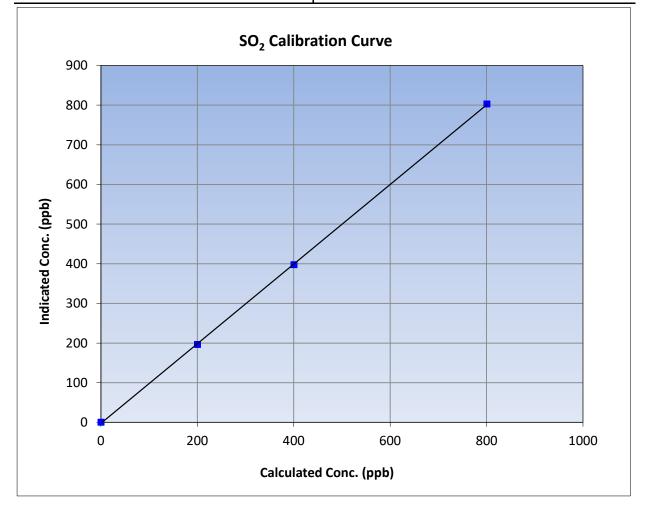


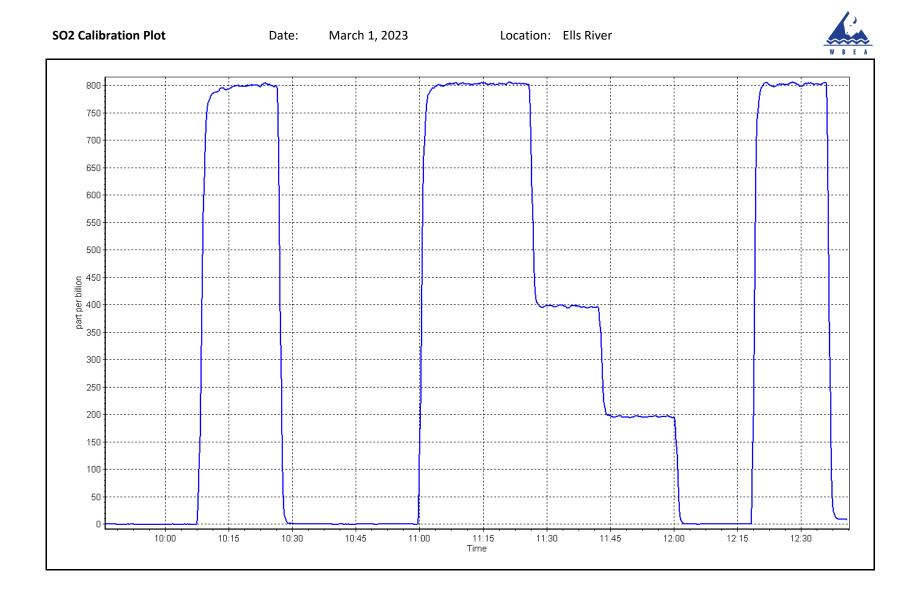
SO₂ Calibration Summary

| WBEA | | | Version-01-2020 | | | | | |
|---------------------|---------------|-----------------------|-------------------|--|--|--|--|--|
| Station Information | | | | | | | | |
| Calibration Date: | March 1, 2023 | Previous Calibration: | February 15, 2023 | | | | | |
| Station Name: | Ells River | Station Number: | AMS 30 | | | | | |
| Start Time (MST): | 9:43 | End Time (MST): | 12:45 | | | | | |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1008841397 | | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.0 | | Correlation Coefficient | 0.999949 | ≥0.995 |
| 800.4 | 802.6 | 0.9972 | correlation coefficient | 0.555545 | 20.333 |
| 400.2 | 397.2 | 1.0076 | Slope | 1.004115 | 0.90 - 1.10 |
| 200.1 | 196.2 | 1.0199 | Siope | | 0.30 - 1.10 |
| | | | Intercept | -2.615941 | +/-30 |







TRS Calibration Report

| WBEA | | | | | Version-11-2021 |
|--|--|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Ells River March 2, 2023 9:39 Routine | | Station number: Last Cal Date: End time (MST): | AMS30 February 13, 2023 13:20 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.08 EY0002443 | ppm | Cal Gas Exp Date: | February 9, 2024 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 5.08 | ppm | Rem Gas Exp Date: Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | API T700 API T701H | | Serial Number: Serial Number: | 3061 358 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i TLE CDN - 101 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1410661331 555 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 0.999493 | 0.998207 | Backgd or Offset: | 1.57 | 1.57 |
| Calibration intercept: | 0.040843 | 0.060852 | 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)) Limit = 0.90-1.10 |
| 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 | 39.4 | 1.016 |
| as found 3rd point | 4980 | 19.7 | 20.0 | 19.5 | 1.026 |
| new cylinder response | | | | | |
| | | TRS Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.1 | |
| high point | 4921 | 78.7 | 80.0 | 79.9 | 1.001 |
| 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 | 0.4 | |
| as left span | 4921 | 78.7 | 80.0 | 80.3 | 0.996 |
| SO2 Scrubber Check | 4921 | 79.2 | 800.4 | -0.1 | |
| Date of last scrubber cha | inge: | N/A | | Ave Corr Factor | 1.001 |
| Date of last converter ef | - | N/A | | 95.1% | efficiency |
| Baseline Corr As found: | 79.3 | Prev response: | 79.96 | *% change: | -0.8% |
| Baseline Corr 2nd AF pt: | 39.4 | AF Slope: | | AF Intercept: | -0.198955 |
| Baseline Corr 3rd AF pt: | 19.5 | AF Correlation: | | | |
| · | | | | * = > +/-5% change initiat | es investigation |

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador

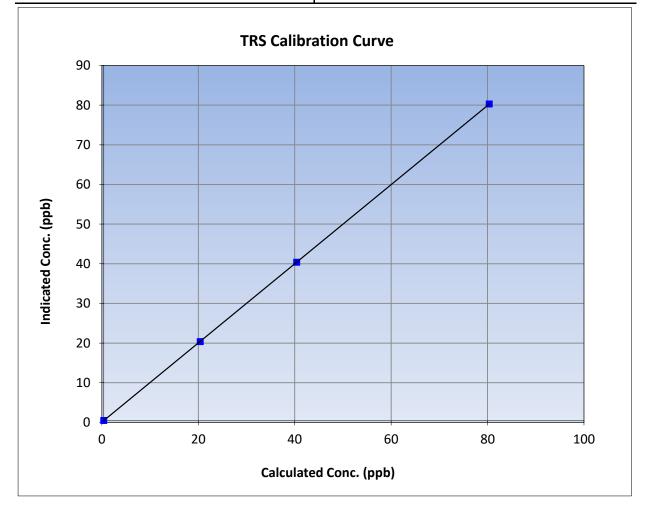


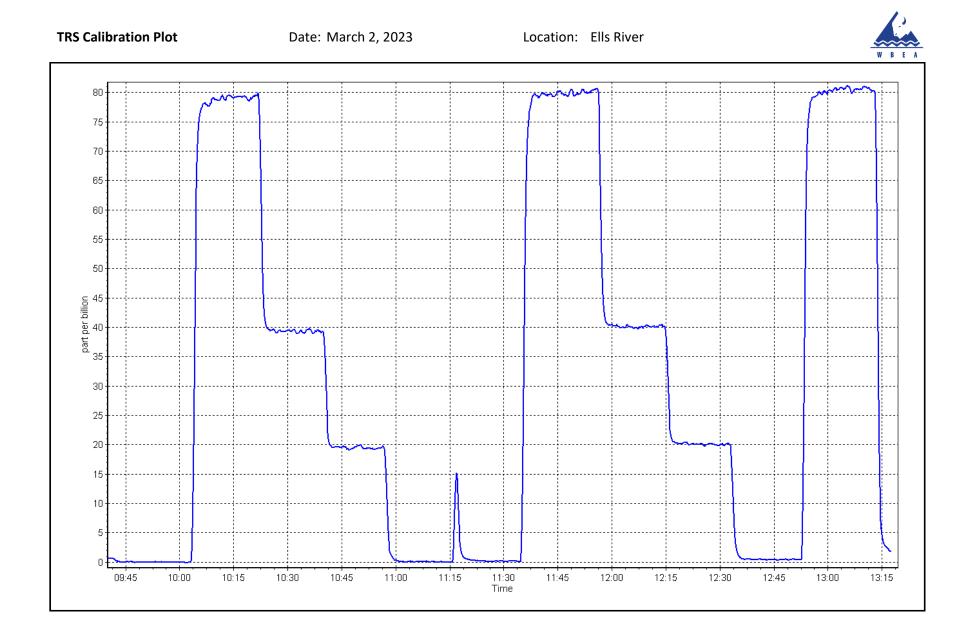
TRS Calibration Summary

| WBEA | | | Version-11-2021 | | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|--|
| Station Information | | | | | | | | |
| Calibration Date: | March 2, 2023 | Previous Calibration: | February 13, 2023 | | | | | |
| Station Name: | Ells River | Station Number: | AMS30 | | | | | |
| Start Time (MST): | 9:39 | End Time (MST): | 13:20 | | | | | |
| Analyzer make: | Thermo 43i TLE | Analyzer serial #: | 1410661331 | | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | 0.1 | | Correlation Coefficient | 0.999999 | ≥0.995 |
| 80.0 | 79.9 | 1.0008 | correlation coefficient | 0.3333333 | 20.333 |
| 40.0 | 40.0 | 1.0007 | Slope | 0.998207 | 0.90 - 1.10 |
| 20.0 | 20.0 | 1.0008 | Siope | | 0.90 - 1.10 |
| | | | Intercept | 0.060852 | +/-3 |







THC / CH_4 / NMHC Calibration Report

| WBEA | | | | | Version-01-2020 |
|--------------------------------------|---------------|---------------|-------------------------|----------------|-----------------|
| | | Statio | n Information | | |
| Station Name: | Ells River | | Station number: Al | MS 30 | |
| Calibration Date: | March 1, 2023 | | Last Cal Date: Fe | bruary 10, 202 | 3 |
| Start time (MST): | 9:43 | | End time (MST): 12 | 2:45 | |
| Reason: | Routine | | | | |
| | | Calibra | tion Standards | | |
| Gas Cert Reference: | C | C494126 | Cal Gas Expiry Date: De | ecember 29, 20 | 28 |
| CH4 Cal Gas Conc. | 499.7 | ppm | CH4 Equiv Conc. | 1075.0 | ppm |
| C3H8 Cal Gas Conc. | 209.2 | ppm | | | |
| Removed Gas Cert: | | | Removed Gas Expiry: | | |
| Removed CH4 Conc. | 499.7 | ppm | CH4 Equiv Conc. | 1075.0 | ppm |
| Removed C3H8 Conc. | 209.2 | ppm | Diff between cyl (THC): | | |
| Diff between cyl (CH ₄): | : | | Diff between cyl (NM): | | |
| Calibrator Model: | API T700 | | Serial Number: 30 | 061 | |
| ZAG make/model: | API T701H | | Serial Number: 35 | 58 | |
| | | Analyz | er Information | | |
| Analyzer make: | : Thermo 55i | | Analyzer serial #: 11 | 193585650 | |
| THC Range (ppm): | : 0 - 20 ppm | | | | |
| NMHC Range (ppm): | : 0 - 10 ppm | | CH4 Range (ppm): 0 | - 10 ppm | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | Finish |
| CH4 SP Ratio: | 0.000236 | 0.000234 | NMHC SP Ratio: | 4.96E-05 | 4.19E-05 |
| CH4 Retention time: | | 14.2 | NMHC Peak Area: | 183767 | 217301 |
| | 10.0 | 1.12 | | 100707 | 21,001 |

| THC Calibration Data | | | | | | | | | |
|-----------------------|-------------------|----------------------|---------------------|----------------------------|----------------------------|--|--|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (Co | c) Ind conc (ppm) (Ic) | CF <i>Limit= 0.95-1.05</i> | | | | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | | | | |
| as found span | 4921 | 79.2 | 17.03 | 16.46 | 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 | 16.99 | 1.002 | | | | |
| second point | 4960 | 39.6 | 8.51 | 8.40 | 1.014 | | | | |
| third point | 4980 | 19.8 | 4.26 | 4.17 | 1.021 | | | | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | | | | |
| as left span | 4921 | 79.2 | 17.03 | 17.01 | 1.001 | | | | |
| | | | A | verage Correction Factor | 1.012 | | | | |
| Baseline Corr AF: | 16.46 | Prev response | 16.88 | *% change | -2.6% | | | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | | | |
| Baseline Corr 3rd AF: | NA | -0.023379 | | * = > +/-5% change initiat | es investigation | | | | |



THC / CH_4 / NMHC Calibration Report

Version-01-2020

| NMHC Calibration Data | | | | | | | | | |
|-----------------------|-------------------|----------------------|-------------------|----------------------------|---------------------|--|--|--|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (| Cc) Ind conc (ppm) (Ic) | CF Limit= 0.95-1.05 | | | | |
| as found zero | 5000 | 0 | 0.00 | 0.00 | | | | | |
| as found span | 4921 | 79.2 | 9.11 | 8.74 | 1.043 | | | | |
| as found 2nd point | | | | | | | | | |
| as found 3rd point | | | | | | | | | |
| new cylinder response | | | | | | | | | |
| calibrator zero | 5000 | 0 | 0.00 | 0.00 | | | | | |
| high point | 4921 | 79.2 | 9.11 | 9.11 | 1.001 | | | | |
| second point | 4960 | 39.6 | 4.56 | 4.52 | 1.008 | | | | |
| third point | 4980 | 19.8 | 2.28 | 2.25 | 1.014 | | | | |
| 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: | 8.74 | Prev response | 9.00 | *% change | -3.0% | | | | |
| Baseline Corr 2nd AF: | NA | AF Slope: | | AF Intercept: | | | | | |
| Baseline Corr 3rd AF: | NA | AF Correlation: | | * = > +/-5% change initiat | es investigation | | | | |

| | | CH4 Calibra | tion Data | | | |
|-----------------------|-------------------|----------------------|--------------------|----------------------------|---------------------|--|
| Set Point | Dil air flow rate | Source gas flow rate | Calc conc (ppm) (C | c) Ind conc (ppm) (lc) | CF Limit= 0.95-1.05 | |
| as found zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as found span | 4921 | 79.2 | 7.91 | 7.72 | 1.025 | |
| 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 | 7.89 | 1.003 | |
| second point | 4960 | 39.6 | 3.96 | 3.88 | 1.020 | |
| third point | 4980 | 19.8 | 1.98 | 1.92 | 1.029 | |
| as left zero | 5000 | 0.0 | 0.00 | 0.00 | | |
| as left span | 4921 | 79.2 | 7.91 | 7.89 | 1.004 | |
| | | | A | verage Correction Factor | 1.017 | |
| Baseline Corr AF: | 7.72 | Prev response | 7.89 | *% 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: | | 0.994670 | | 0.998858 | | |
| THC Cal Offset: | | -0.054336 | | -0.050537 | | |
| CH4 Cal Slope: | | 1.000380 | | 0.997766 | | |
| CH4 Cal Offset: | | -0.030757 | | -0.031956 | | |
| NMHC Cal Slope: | | 0.989848 | | 1.000170 | | |
| NMHC Cal Offset: | | -0.023379 | | -0.018781 | | |

Changed N2 cylinder after the as founds. Adjusted the span.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|--|---------------------------------------|---------------------------|-------------------------|-------------------|---------------|
| Calibration Date: | March 1, 2023 | | Previous Calibration: | February 10, 2023 | |
| Station Name: | Ells I | River | Station Number: | AMS | 5 30 |
| Start Time (MST): | 9: | 43 | End Time (MST): | 12: | 45 |
| Analyzer make: | Thern | no 55i | Analyzer serial #: | 11935 | 85650 |
| | | Calibra | tion Data | | |
| Calculated concentration (ppm) (Cc) | Indicated concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.00 17.03 | 0.00 16.99 | 1.0021 | Correlation Coefficient | 0.999952 | ≥0.995 |
| 8.51 | 8.40 | 1.0135 | | | |
| 4.26 | 4.17 | 1.0209 | Slope | 0.998858 | 0.90 - 1.10 |
| | | | Intercept | -0.050537 | +/-0.5 |
| 16.0 | | | | / | |
| 18.0 | | | | _ | |
| 14.0 | | | | | |
| 12.0 | | | | | |
| 1 2.0 | | | | | |
| ud 10.0 | | | | | |
| 0.8 Conc | | | | | |
| 0.01 (bbm) | | | | | |
| <u> </u> | | | | | |
| 2.0 | | | | | |
| 0.0 | | | | | |
| 0.0 | 5 | .0 | 10.0 | 15.0 | 20.0 |
| | | Calculated | | | |



CH₄ Calibration Summary

Version-01-2020

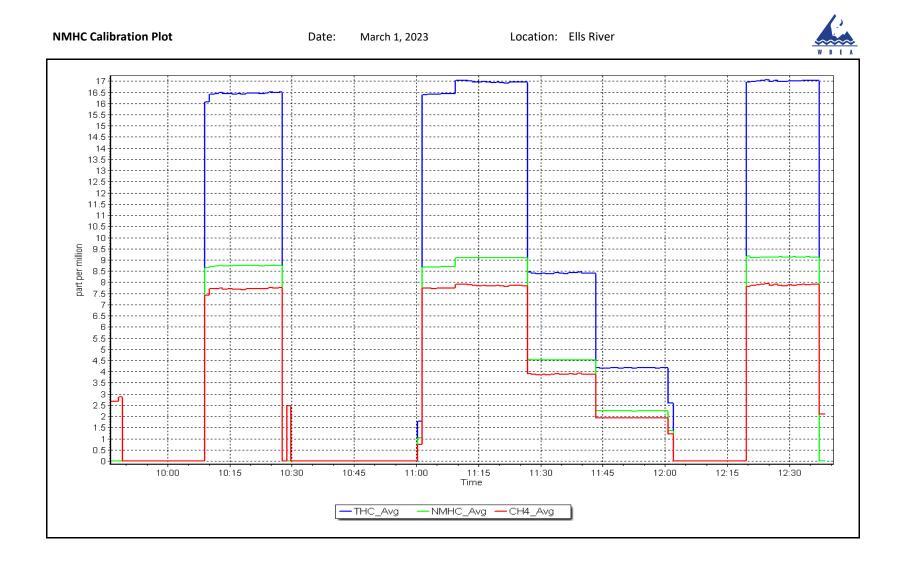
| (ppm) (Lc) (ppm) (Lc) (c) 0.00 0.00 7.91 7.89 1.0034 3.96 3.88 1.0198 1.98 1.92 1.0285 Intercept 0.999907 20.99 Intercept -0.031956 -/-0. CH4 Calibration Curve 9.0 CH4 Calibration Curve 9.0 8.0 7.0 6.0 9.0 8.0 7.0 6.0 9.0 9.0 9.0 9.0 <td< th=""><th></th><th></th><th>Station I</th><th>nformation</th><th></th><th></th></td<> | | | Station I | nformation | | |
|--|-------------------|-------|---------------------------|-------------------------|-------------------|---------------|
| Start Time (MST): 9:43 End Time (MST): 12:45 Analyzer make: Thermo 55i Analyzer serial #: 1193585650 Calibration Data Calibration Data Carrection factor (Cc/tc) Statistical Evaluation Imme 0:00 0:00 Correlation Coefficient 0.999907 2.99 3:36 3:88 1.0198 Slope 0.997766 0.90-1 0:00 CH4 Calibration Curve Intercept -0.031956 -/.0 CH4 Calibration Curve 0:00 O O O O O O O O O O O O O O O O O O <td>Calibration Date:</td> <td>March</td> <td>1, 2023</td> <td>Previous Calibration:</td> <td colspan="2">February 10, 2023</td> | Calibration Date: | March | 1, 2023 | Previous Calibration: | February 10, 2023 | |
| Analyzer make: Thermo 55i Analyzer serial #: 119358560 Calculated concentration indicated concentration (ppm) (ic) Carcetion factor (Cc/Ic) Statistical Evaluation Lenter Calculated concentration (ppm) (ic) Correction factor (Cc/Ic) Statistical Evaluation Lenter Out 0.00 | Station Name: | Ells | River | Station Number: | AMS | 5 30 |
| Calibration Data Calibration Data Correction factor (Cc/(c) Statistical Evaluation Lintic 0.00 0.00 | Start Time (MST): | 9: | 43 | End Time (MST): | 12: | 45 |
| Calculated concentration (ppm) (C) Indicated concentration (ppm) (C) Correction factor (Cc/lc) Statistical Evaluation Linest 0.999907 20.99 20.99 7.91 7.89 1.0034 Correlation Coefficient 0.999907 20.99 3.96 3.88 1.0198 Slope 0.997766 0.90-1 1.98 1.92 1.0285 Intercept -0.031956 c/c0 CH4 Calibration Curve 0 0 0 | Analyzer make: | Therr | no 55i | Analyzer serial #: | 11935 | 85650 |
| (ppm) (cc) (ppm) (lc) Correction factor (Cc/lc) Statistical Evaluation Links 0.00 0.00 Correlation Coefficient 0.999907 20.99 3.96 3.88 1.0198 Slope 0.997766 0.90-1 1.98 1.92 1.0285 Intercept -0.031956 +/-0 | | | Calibra | tion Data | | |
| 7.91 7.89 1.0034 Correlation Coefficient 0.999907 20.99 3.96 3.88 1.0198 Slope 0.997766 0.90-1 1.98 1.92 1.0285 Intercept -0.031956 */-0. CH ₄ Calibration Curve 9.0 6.0 6.0 6.0 6.0 6.0 6.0 9.0 3.0 4.0 4.0 6.0 6.0 6.0 9.0 1.0 1.0 1.0 1.0 1.0 | | | Correction factor (Cc/Ic) | Statistical Eva | luation | <u>Limits</u> |
| 3.96 3.88 1.0198 1.98 1.92 1.0285 Slope 0.997766 0.90-1 Intercept -0.031956 +/-0. CH ₄ Calibration Curve 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 | | | | Correlation Coefficient | 0.999907 | ≥0.995 |
| 1.98 1.92 1.0285 3:00P 0.997/06 0.997/0 | | | | | 0.007766 | |
| CH ₄ Calibration Curve | | | | Slope | 0.997766 | 0.90 - 1.10 |
| 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 | | | | Intercept | -0.031956 | +/-0.5 |
| | 7.0 | | | | | |
| | idi 5.0 — | | | | | |
| | ວັ ບ 4.0 | | | | | |
| | 0.6 udicate | | | | | |
| | | | | | | |
| 0.0 | 1.0 | | | | | |
| | 0.0 🖌 | | | | | |
| 0.0 2.0 4.0 6.0 8.0 10.0 | 0.0 | 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |



NMHC Calibration Summary

Version-01-2020

| | | Station I | nformation | | |
|---|---|---------------------------|---------------------------|-----------|---------------|
| Calibration Date: | Marc | ch 1, 2023 | Previous Calibration: | February | 10, 2023 |
| Station Name: | El | ls River | Station Number: | AMS | 5 30 |
| Start Time (MST) | : | 9:43 | End Time (MST): | 12: | 45 |
| Analyzer make: | The | ermo 55i | Analyzer serial #: | 11935 | 85650 |
| | | | | | |
| | | Calibra | ation Data | | |
| Calculated concentra (ppm) (Cc) | tion Indicated concentratic (ppm) (Ic) | Correction factor (Cc/Ic) | c) Statistical Evaluation | | <u>Limits</u> |
| 0.00 | 0.00 | | Correlation Coefficient | 0.999979 | ≥0.995 |
| 9.11 | 9.11 | 1.0006 | | 0.000070 | |
| 4.56 | 4.52 | <u>1.0077</u> 1.0144 | Slope | 1.000170 | 0.90 - 1.10 |
| 2.20 | 2.23 | 1.0174 | Intercept | -0.018781 | +/-0.5 |
| 9.0 - 8.0 - 7.0 - 2 6.0 - | | | | | |
| - 0.6 - 100 | | | | | |
| C 4.0 - | | | | | |
| Indica 3.0 - | | | | | |
| 2.0 - | | | | | |
| 1.0 - | | | | | |
| 0.0 | .0 2.0 | 4.0 | 6.0 | 8.0 | 10.0 |
| | | | d Conc. (ppm) | | |





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | Station | Information | | |
|--|--|---------|---------------|---|----------------|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Ells RiverStation number: AMS 30March 15, 2023Last Cal Date: February 1, 20239:24End time (MST): 13:40RoutineRoutine | | | | | |
| | | | Calibrati | on Standards | | |
| NO Gas Cylinder #: | | T2Y1P2R | | Cal Gas Expiry Date: D | ecember 11, 20 | 023 |
| NOX Cal Gas Conc: Removed Cylinder #: | 50.83 | ppm | | NO Cal Gas Conc: Removed Gas Exp Date: | 49.97 | ppm |
| Removed Gas NOX Conc: NOX gas Diff: | 50.83 | ppm | | Removed Gas NO Conc: NO gas Diff: | 49.97 | ppm |
| Calibrator Model: ZAG make/model: | API T700 API T701H | | | Serial Number: 3 Serial Number: 3 | | |
| | | | Analyzei | Information | | |
| Analyzer make: NOX Range (ppb): | | | | Analyzer serial #: 7 | 10321429 | |
| | <u>Start</u> | | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coeff or slope: | 1.029 | | 1.029 | NO bkgnd or offset: | 12.5 | 12.5 |
| NOX coeff or slope: | 0.992 | | 0.992 | NOX bkgnd or offset: | 12.4 | 12.4 |
| NO2 coeff or slope: | 1.000 | | 1.000 | Reaction cell Press: | 185.1 | 182.7 |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 1.001096 | 0.999129 |
| NO _x Cal Offset: | -0.800000 | -0.900000 |
| NO Cal Slope: | 1.001429 | 0.999714 |
| NO Cal Offset: | -1.540000 | -1.740000 |
| NO ₂ Cal Slope: | 1.001609 | 1.002165 |
| NO ₂ Cal Offset: | 0.350570 | 0.164860 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | n Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|---|--|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.3 | -0.3 | 0.0 | | |
| as found span | 4920 | 80.0 | 813.3 | 799.5 | 13.8 | 814.8 | 800.0 | 14.7 | 0.9981 | 0.9994 |
| 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 | 4920 | 80.0 | 813.3 | 799.5 | 13.8 | 812.1 | 798.3 | 13.9 | 1.0015 | 1.0015 |
| second point | 4960 | 40.0 | 406.6 | 399.8 | 6.9 | 404.9 | 397.3 | 7.6 | 1.0043 | 1.0062 |
| third point | 4980 | 20.0 | 203.3 | 199.9 | 3.4 | 201.5 | 196.3 | 5.1 | 1.0090 | 1.0182 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | | |
| as left span | 4920 | 80.0 | 813.3 | 432.3 | 381.0 | 812.3 | 423.3 | 389.0 | 1.0012 | 1.0213 |
| | | | | | | | Average C | orrection Factor | 1.0049 | 1.0087 |
| Corrected As fo | ound NO _x = | 815.1 ppb | NO = | 800.3 ppb | * = > +/-59 | % change initiates i | nvestigation | *Percent Chang | ge NO _X = | 0.2% |
| Previous Respo | nse NO _x = | 813.4 ppb | NO = | 799.1 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 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|---|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 793.6 | 426.4 | 381.0 | 381.9 | 0.9975 | 100.2% |
| 2nd GPT point (200 ppb O3) | 793.6 | 617.0 | 190.4 | 190.9 | 0.9972 | 100.3% |
| 3rd GPT point (100 ppb O3) | 793.6 | 704.1 | 103.3 | 103.9 | 0.9938 | 100.6% |
| | | | | Average Correction Factor | 0.9962 | 100.4% |

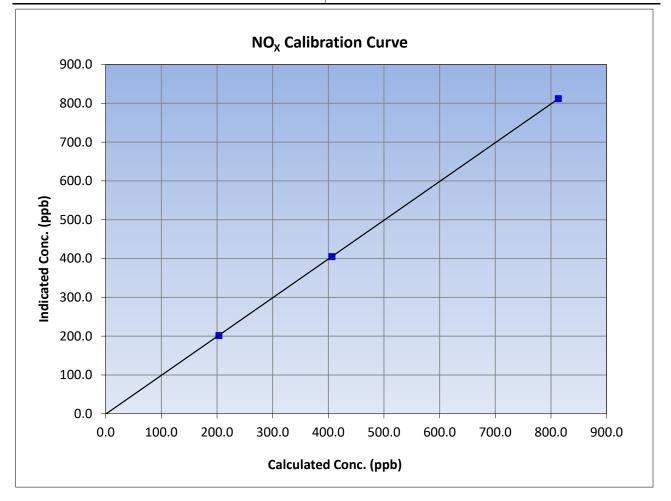
Notes:

No adjusments have been made.



NO_x Calibration Summary

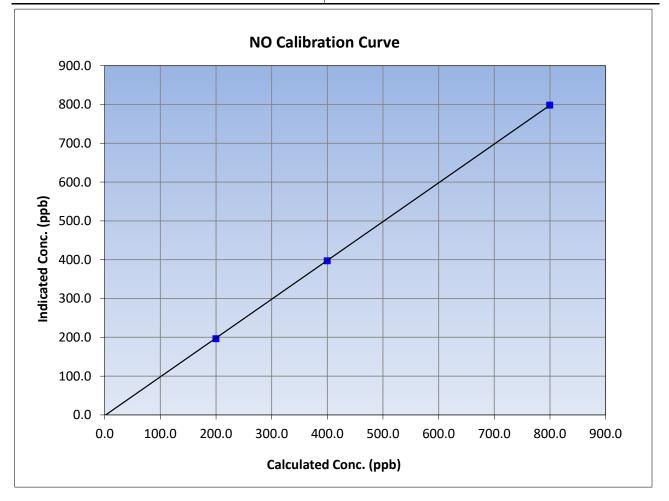
| WBEA | | Station | Information | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| Calibration Date: | March 2 | 15, 2023 | Previous Calibration: | February | / 1, 2023 |
| Station Name: | Ells | River | Station Number: | AMS | S 30 |
| Start Time (MST): | 9:24 | | End Time (MST): 13:40 | | |
| 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 | 0.999996 | ≥0.995 |
| 813.3 | 812.1 | 1.0015 | correlation coernelent | 0.555550 | 20.333 |
| 406.6 | 404.9 | 1.0043 | Slope | 0.999129 | 0.90 - 1.10 |
| 203.3 | 201.5 | 1.0090 | Slope | 0.999129 | 0.90 - 1.10 |
| | | | Intercept | -0.900000 | +/-20 |





NO Calibration Summary

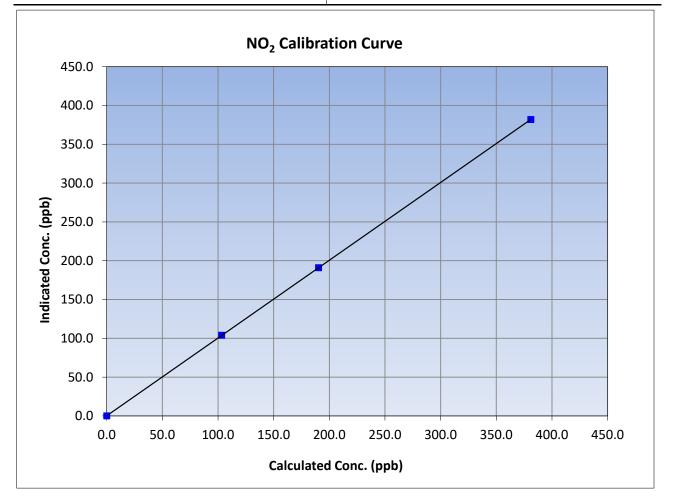
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|------------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 15, 2023 | | Previous Calibration: | February 1, 2023 | |
| Station Name: | Ells River | | Station Number: | AMS 30 | |
| Start Time (MST): | 9: | 24 | End Time (MST): | 13:40 | |
| Analyzer make: | Thermo 42i | | Analyzer serial #: | 71032 | 21429 |
| | | Calibra | ation Data | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999981 | ≥0.995 |
| 799.5 | 798.3 | 1.0015 | correlation coernelent | 0.555561 | 20.333 |
| 399.8 | 397.3 | 1.0062 | Slope | 0.999714 | 0.90 - 1.10 |
| 199.9 | 196.3 | 1.0182 | Slope | 0.999714 | 0.90 - 1.10 |
| | | | Intercept | -1.740000 | +/-20 |

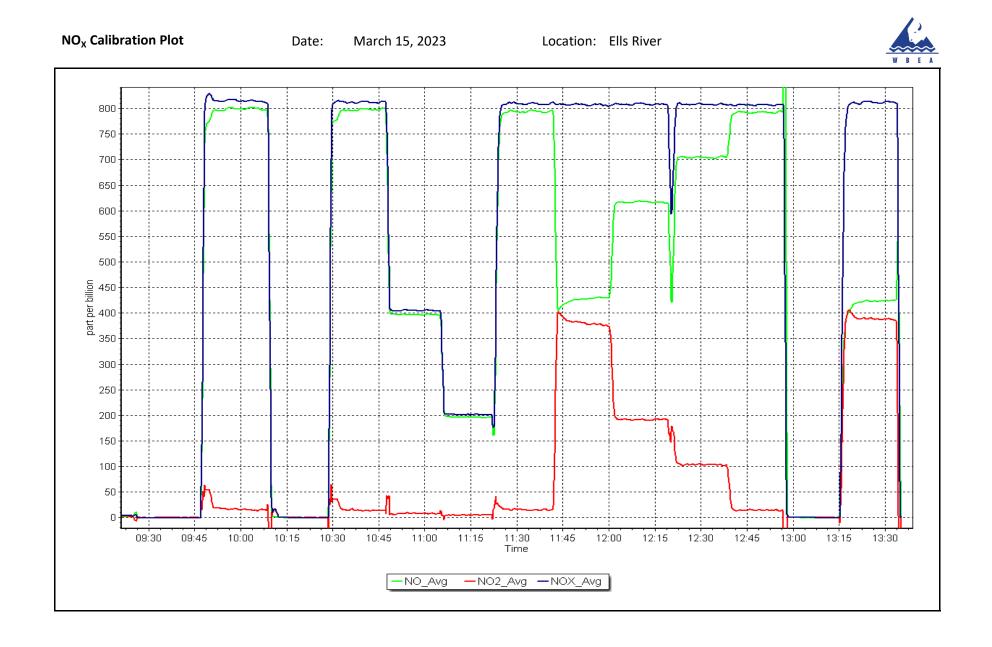




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|--------------------------------------|---------------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 15, 2023 | | Previous Calibration: | February | / 1, 2023 |
| Station Name: | Ells River | | Station Number: | AMS 30 | |
| Start Time (MST): | 9:24 | | End Time (MST): | 13:40 | |
| Analyzer make: | Thermo 42i | | Analyzer serial #: | 710321429 | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Calibra Correction factor (Cc/lc) | ation Data Statistical Evalu | ation | <u>Limits</u> |
| 0.0 | 0.0 | | Completion Coofficient | 0.000000 | |
| 381.0 | 381.9 | 0.9975 | Correlation Coefficient | 0.999999 | ≥0.995 |
| 190.4 | 190.9 | 0.9972 | Slope | 1.002165 | 0.90 - 1.10 |
| 103.3 | 103.9 | 0.9938 | Siope | 1.002105 | 0.30 - 1.10 |
| | | | Intercept | 0.164860 | +/-20 |







T640 PM_{2.5} CALIBRATION

| W B E A | | | | | Version-01-2023 |
|-------------------------------|-------------------|-------------------------|---------------------|---------------------------------------|-----------------|
| | | Station Information | | | |
| Station Name: | Ells River | | Station number: | | |
| Calibration Date: | March 16, 2023 | | | February 17, 2023 | |
| Start time (MST): | 9:41 | | End time (MST): | 10:50 | |
| 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 Te | est | | |
| <u>Parameter</u> | <u>As found</u> | Measured | <u>As left</u> | <u>Adjustec</u> | Limits) |
| Т ([°] С) | -11 | -11 | -11 | | +/- 2 °C |
| P (mmHg) | 739.3 | 736.7 | 739.3 | | +/- 10 mmHg |
| flow (LPM) | 5.01 | 5.05 | 5.01 | | +/- 0.25 LPM |
| Leak Test: | Date of check: | March 16, 2023 | Last Cal Date: | February 17, 2023 | _ |
| | PM w/o HEPA: | 4.2 | PM w/ HEPA: | 0 | <0.2 ug/m3 |
| Note: this leak check will be | | | erve as the pre ma | intenance leak check | |
| Inlet cleaning : | Inlet Head | | | | |
| | | | | | |
| | | Quarterly Calibration T | est | | |
| <u>Parameter</u> | <u>As found</u> | Post maintenance | <u>As left</u> | Adjusted | (Limits) |
| PMT Peak Test | 8.7 | 10.8 | 10.8 | | 10.9 +/- 0.5 |
| Post-maintenance | e leak check: | PM w/o HEPA: | 4.9 | w/ HEPA: | 0 |
| Date Optical Cham | ber Cleaned: | March 16, | 2023 | · · · · · · · · · · · · · · · · · · · | <0.2 ug/m3 |
| Disposable Filter | r Changed: | March 16, 2 | 2023 | | |
| | | | | | |
| | | Annual Maintenance | 2 | | |
| | | | | | |
| Date Sample Tub | - | | | | |
| Date RH/T Senso | or Cleaned: | | | | |
| | | No Martin and a | | 10 al a a a | |
| Notes: | | no adjustments r | nade. Inlet head st | ili clean. | |
| Calibration by: | Denny Ray Estador | | | | |



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS506 JACKFISH 1 MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|---|--|---|---|---|---|
| Station Name: Calibration Date: Start time (MST): Reason: | Jackfish 1 March 9, 2023 10:58 Routine | | Station number: Last Cal Date: End time (MST): | AMS 506 February 14, 2023 13:43 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | <u>50.52</u> | ppm | Cal Gas Exp Date: | December 29, 2028 | |
| Cal Gas Cylinder #: | <u>CC274266</u> | | | | |
| Removed Cal Gas Conc: | | ppm | Rem Gas Exp Date: | NA | |
| Removed Gas Cyl #: Calibrator Make/Model: | <u>NA</u> API T700 | | Diff between cyl: Serial Number: | 2659 | |
| ZAG Make/Model: | API 701 | | Serial Number: | 4427 | |
| | | | | | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | | | Analyzer serial #: | 1160290011 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: | 1.004300 | 1.001172 | Backgd or Offset: | 18.9 | 18.9 |
| Calibration intercept: | -1.536060 | -1.416002 | Coeff or Slope: | 0.960 | 0.966 |
| | | SO ₂ Calibratio | on Data | | |
| | | | | | |
| | Dilution air flow rate | Source gas flow rate | Calculated | Indicated concentration C | Correction factor (Cc/Ic) |
| 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 | (sccm) 5000 | | | | |
| 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) 5000 | (sccm) 0.0 | concentration (ppb) (Cc) | (ppb) (Ic) -0.6 | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point | (sccm) 5000 | (sccm) 0.0 | concentration (ppb) (Cc) | (ppb) (Ic) -0.6 | 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 | (sccm) 0.0 79.2 | concentration (ppb) (Cc) 0.0 800.2 | (ppb) (Ic) -0.6 794.0 | 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 | (sccm) 0.0 79.2 0.0 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 0.0 | (ppb) (Ic) -0.6 794.0 -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 | (sccm) 5000 4921 5000 4921 | (sccm) 0.0 79.2 0.0 79.2 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 800.2 | (ppb) (Ic) -0.6 794.0 -0.2 800.1 | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point | (sccm) 5000 4921 5000 4921 4960 | (sccm) 0.0 79.2 0.0 79.2 39.6 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 800.2 400.2 | (ppb) (lc) -0.6 794.0 -0.2 800.1 399.3 | 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 | (sccm) 5000 4921 5000 4921 4921 4960 4980 | (sccm) 0.0 79.2 0.0 79.2 39.6 19.8 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 800.2 400.2 200.1 | (ppb) (Ic) -0.6 794.0 -0.2 800.1 399.3 197.2 | 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 as left zero | (sccm) 5000 4921 5000 4921 4960 4980 5000 | (sccm) 0.0 79.2 0.0 79.2 39.6 19.8 0.0 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 800.2 400.2 200.1 0.0 | (ppb) (Ic) -0.6 794.0 -0.2 800.1 399.3 197.2 -0.3 | 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 | (sccm) 5000 4921 5000 4921 4921 4960 4980 | (sccm) 0.0 79.2 0.0 79.2 39.6 19.8 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 800.2 400.2 200.1 0.0 800.2 | (ppb) (Ic) -0.6 794.0 -0.2 800.1 399.3 197.2 | 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 as left zero as left span | (sccm) 5000 4921 5000 4921 4960 4980 5000 | (sccm) 0.0 79.2 0.0 79.2 39.6 19.8 0.0 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 800.2 200.1 0.0 800.2 Average | (ppb) (Ic) -0.6 794.0 -0.2 800.1 399.3 197.2 -0.3 801.7 | 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 4960 4980 5000 4921 | (sccm) 0.0 79.2 0.0 79.2 39.6 19.8 0.0 79.2 | concentration (ppb) (Cc) 0.0 800.2 0.0 0.0 800.2 200.1 0.0 800.2 Average 802.11 | (ppb) (Ic) -0.6 794.0 -0.2 800.1 399.3 197.2 -0.3 801.7 ge Correction Factor | Limit = 0.95-1.05 1.008 1.000 1.002 1.015 0.998 1.006 |

Notes:

Changed inlet filter after as founds. Adjusted span only.

Calibration Performed By:

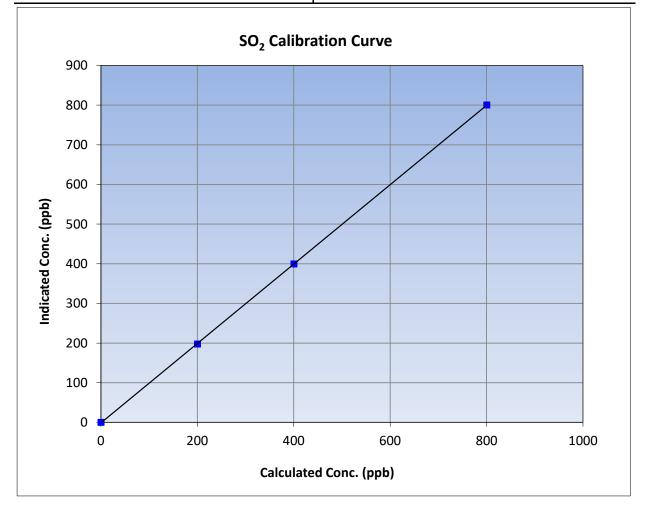


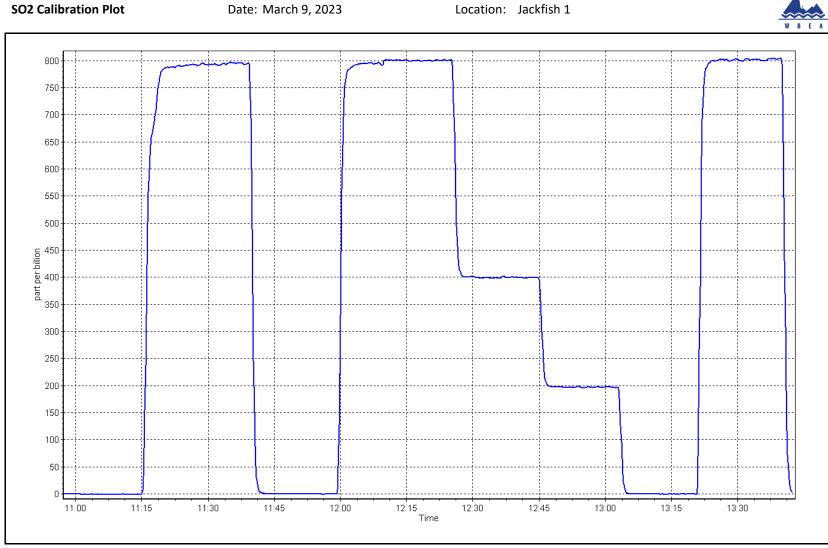
SO₂ Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|---------------|-----------------------|-------------------|
| | Stat | ion Information | |
| Calibration Date: | March 9, 2023 | Previous Calibration: | February 14, 2023 |
| Station Name: | Jackfish 1 | Station Number: | AMS 506 |
| Start Time (MST): | 10:58 | End Time (MST): | 13:43 |
| Analyzer make: | Thermo 43i | Analyzer serial #: | 1160290011 |

Calibration Data

| Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) | | Correction factor (Cc/Ic) | Statistical Evalua | <u>Limits</u> | | |
|---|-------|------------------------------|-------------------------|---------------|-------------|--|
| 0.0 | -0.2 | | Correlation Coefficient | 0.999987 | ≥0.995 | |
| 800.2 | 800.1 | 1.0001 | correlation coefficient | 0.555507 | 20.333 | |
| 400.2 | 399.3 | 1.0021 | Slope | 1.001172 | 0.90 - 1.10 | |
| 200.1 | 197.2 | 1.0145 | Slope | 1.001172 | 0.90 - 1.10 | |
| | | | Intercept | -1.416002 | +/-30 | |





Location: Jackfish 1





H₂S Calibration Report

| WBEA | | | | | Version-11-202 |
|--|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Jackfish 1 March 29, 2023 8:21 Routine | | Station number: Last Cal Date: End time (MST): | AMS506 February 24, 2023 12:06 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: Cal Gas Cylinder #: | 5.14 CC511843 | ppm | Cal Gas Exp Date: | September 16, 2024 | |
| Removed Cal Gas Conc: Removed Gas Cyl #: | 5.14 NA | ppm | Rem Gas Exp Date: Diff between cyl: | | |
| Calibrator Make/Model: ZAG Make/Model: | API 700 API 701 | | Serial Number: Serial Number: | 2659 4427 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | 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> |
| Calibration slope: | 0.995862 | 1.005003 | Backgd or Offset: | 1.04 | 3.42 |
| Calibration intercept: | 0.041428 | -0.178301 | Coeff or Slope: | 0.720 | 1.090 |
| | | 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 | 4922 | 77.8 | 80.0 | 76.4 | 1.040 |
| as found 2nd point | 4961 | 38.9 | 40.0 | 38.1 | 1.036 |
| as found 3rd point | 4981 | 19.4 | 19.9 | 18.4 | 1.055 |
| 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 | -0.1 | |
| high point | 4922 | 77.8 | 80.0 | 80.2 | 0.997 |
| second point | 4961 | 38.9 | 40.0 | 40.1 | 0.997 |
| third point | 4981 | 19.4 | 19.9 | 19.7 | 1.012 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4922 | 77.8 | 80.0 | 80.1 | 0.999 |
| O2 Scrubber Check | 4921 | 79.2 | 792.0 | 0.1 | |
| Date of last scrubber cha | - | 24-Feb-23 | | Ave Corr Factor | 1.002 |
| Date of last converter ef | ficiency test: | December 1, 2022 | | | efficiency |
| Baseline Corr As found: | 76.9 | Prev response: | | *% change: | -3.6% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 38.6 18.9 | AF Slope: AF Correlation: | | AF Intercept: | -0.579245 |
| • | | | | * = > +/-5% change initiate | |

Notes:

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

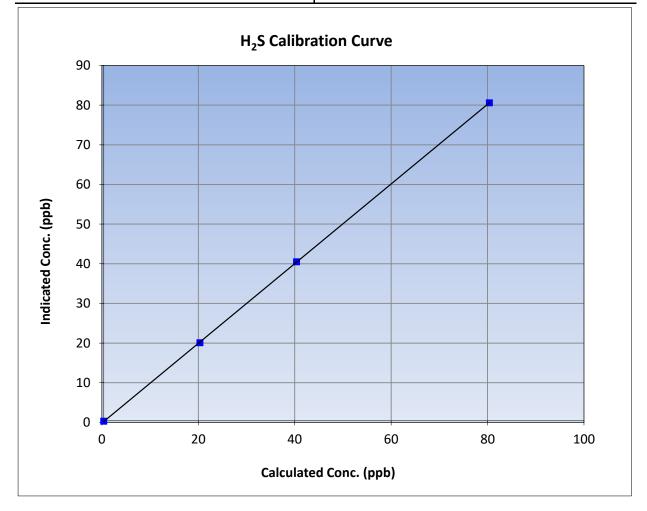


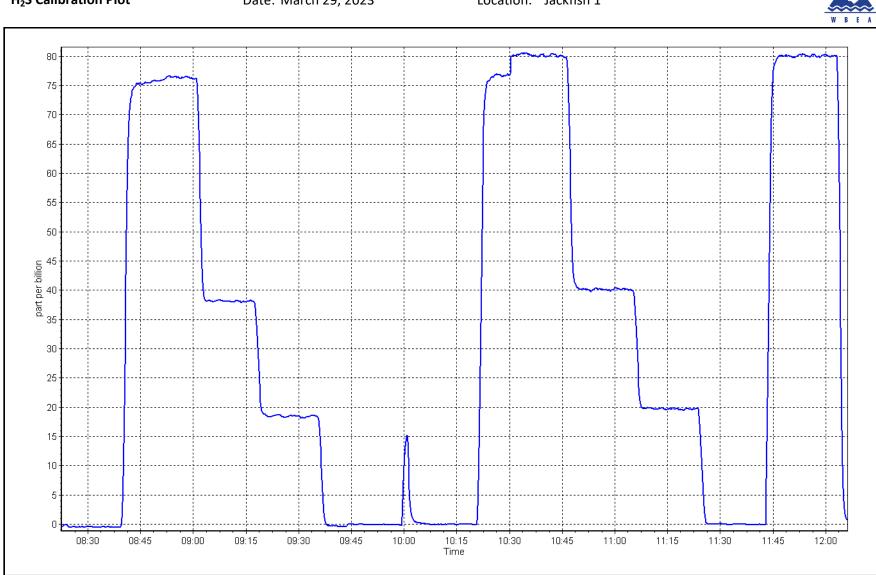
H₂S Calibration Summary

| WBEA | | | Version-11-2021 |
|-------------------|----------------|-----------------------|-------------------|
| | Stati | on Information | |
| Calibration Date: | March 29, 2023 | Previous Calibration: | February 24, 2023 |
| Station Name: | Jackfish 1 | Station Number: | AMS506 |
| Start Time (MST): | 8:21 | End Time (MST): | 12:06 |
| Analyzer make: | Thermo 43i-TLE | Analyzer serial #: | 1180540020 |

Calibration Data

| Calculated concentration (ppb) (Cc) | Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) | | Statistical Evalua | ation | <u>Limits</u> | |
|--|---|--------|-------------------------|-----------|---------------|--|
| 0.0 | -0.1 | | Correlation Coefficient | 0.999989 | ≥0.995 | |
| 80.0 | 80.2 | 0.9973 | correlation coefficient | 0.555505 | 20.335 | |
| 40.0 | 40.1 | 0.9973 | Slope | 1.005003 | 0.90 - 1.10 | |
| 19.9 | 19.7 | 1.0123 | Slope | 1.005005 | 0.90 - 1.10 | |
| | | | Intercept | -0.178301 | +/-3 | |







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | Station | Information | | | |
|--|--|---------|---|--------------------------------------|--------------|---------------|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Jackfish 1 March 30, 202 8:22 Routine | 3 | Station number: AMS506 Last Cal Date: February 15, 2023 End time (MST): 12:36 | | | | |
| | | | Calibrati | on Standards | | | |
| NO Gas Cylinder #: | | T26811M | | Cal Gas Expiry Date: | Octo | ber 30, 2024 | |
| NOX Cal Gas Conc: | <u>47.46</u> | ppm | | NO Cal Gas Conc: | 47.39 | ppm | |
| Removed Cylinder #: | 47.40 | NA | | Removed Gas Exp Date: | 47.20 | NA | |
| Removed Gas NOX Conc: NOX gas Diff: | <u>47.46</u> | ppm | | Removed Gas NO Conc: NO gas Diff: | <u>47.39</u> | ppm | |
| Calibrator Model: | API T700 | | | Serial Number: 26 | 59 | | |
| ZAG make/model: | API 701 | | | Serial Number: 44 | | | |
| | | | Analyzer | Information | | | |
| Analyzer make: | Thermo 42i | | | Analyzer serial #: 12 | 18153356 | | |
| NOX Range (ppb): | | | | / | | | |
| | <u>Start</u> | | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> | |
| NO coeff or slope: | 1.144 | | 1.130 | NO bkgnd or offset: | 3.3 | 3.2 | |
| NOX coeff or slope: | 0.992 | | 0.993 | NOX bkgnd or offset: | 3.4 | 3.3 | |
| NO2 coeff or slope: | 1.000 | | 1.000 | Reaction cell Press: | 173.4 | 172.2 | |
| | | | | | | | |

Calibration Statistics

| | <u>Start</u> | <u>Finish</u> |
|-----------------------------|--------------|---------------|
| NO _x Cal Slope: | 0.999791 | 1.003601 |
| NO _x Cal Offset: | -1.047992 | -0.808032 |
| NO Cal Slope: | 1.001240 | 1.002854 |
| NO Cal Offset: | -2.087973 | -1.627998 |
| NO ₂ Cal Slope: | 0.999204 | 1.003399 |
| NO ₂ Cal Offset: | -0.347850 | 0.523900 |



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | | | Dilu | ution Calibratio | on Data | | | | |
|-----------------|------------------------------|-----------------------------|---|--|---|--|---|--|---|---|
| Set Point | Dilution flow rate (sccm) | Source gas flow rate (sccm) | Calculated NOx concentration (ppb) (Cc) | Calculated NO concentration (ppb) (Cc) | Calculated NO2 concentration (ppb) (Cc) | Indicated NOx concentration (ppb) (Ic) | Indicated NO concentration (ppb) (Ic) | Indicated NO2 concentration (ppb) (Ic) | NOx Correction factor (Cc/Ic) Limit = 0.95-1.05 | NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i> |
| as found zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | | |
| as found span | 4916 | 84.4 | 801.1 | 799.9 | 1.2 | 812.2 | 807.9 | 4.2 | 0.9863 | 0.9901 |
| 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 | 803.1 | 800.9 | 2.2 | 0.9975 | 0.9987 |
| second point | 4958 | 42.2 | 400.5 | 400.0 | 0.6 | 402.3 | 400.2 | 2.1 | 0.9956 | 0.9994 |
| third point | 4979 | 21.1 | 200.3 | 200.0 | 0.3 | 198.1 | 196.0 | 2.2 | 1.0110 | 1.0203 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | | |
| as left span | 4916 | 84.4 | 801.1 | 401.7 | 399.4 | 803.4 | 404.6 | 398.7 | 0.9971 | 0.9928 |
| | | | | | | | Average C | orrection Factor | 1.0014 | 1.0061 |
| Corrected As fo | ound NO _x = | 812.1 ppb | NO = | 807.8 ppb | * = > +/-5 | % change initiates i | investigation | *Percent Chang | ge NO _x = | 1.5% |
| Previous Respo | onse NO _x = | 799.8 ppb | NO = | 798.8 ppb | | | | *Percent Chang | ge NO = | 1.1% |
| Baseline Corr 2 | and pt NO _x = | NA ppb | NO = | NA ppb | As foun | d $NO_X r^2$: | | Nx SI: | Nx Int: | |
| Baseline Corr 3 | ard pt NO _X = | NA ppb | NO = | NA ppb | As foun | d NO r^2 : | | NO SI: | NO Int: | |
| | | | | | As foun | d NO ₂ r ² : | | NO2 SI: | NO ₂ Int: | |

GPT Calibration Data

| O3 Setpoint (ppb) | Indicated NO Reference concentration (ppb) | Indicated NO Drop concentration (ppb) | Calculated NO2 concentration (ppb) (C | Indicated NO2 c) concentration (ppb) (Ic) | NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|--|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 799.5 | 401.3 | 399.4 | 401.0 | 0.9960 | 100.4% |
| 2nd GPT point (200 ppb O3) | 799.5 | 587.7 | 213.0 | 214.4 | 0.9934 | 100.7% |
| 3rd GPT point (100 ppb O3) | 799.5 | 689.3 | 111.4 | 112.9 | 0.9866 | 101.4% |
| | | | | Average Correction Factor | 0.9920 | 100.8% |

Notes:

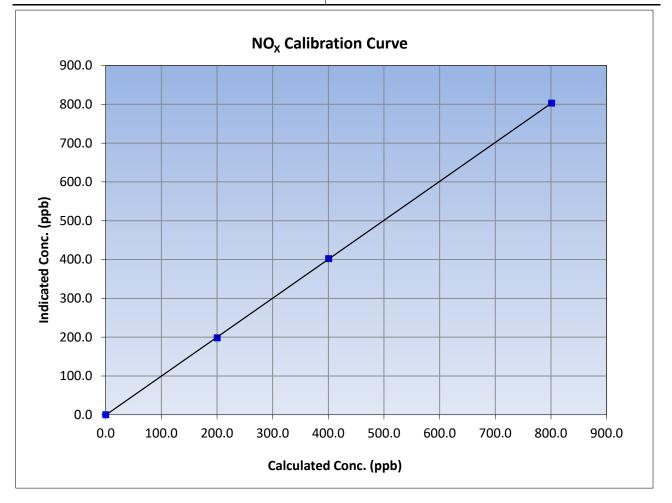
Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

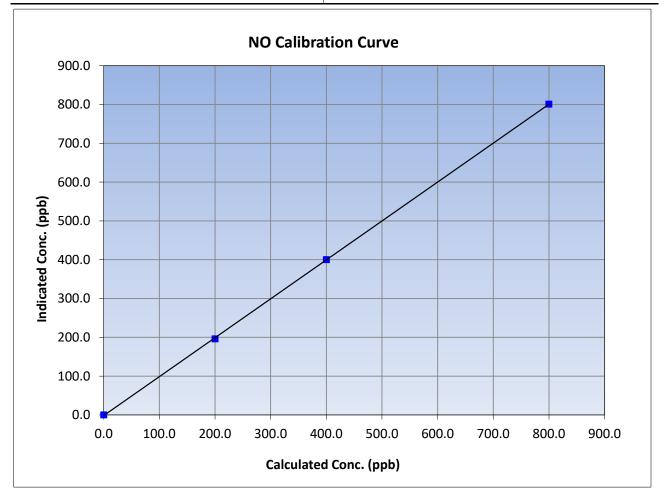
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | 30, 2023 | Previous Calibration: | February | 15, 2023 |
| Station Name: | Jackt | fish 1 | Station Number: | AMS | 506 |
| Start Time (MST): | 8: | 22 | End Time (MST): | 12 | :36 |
| Analyzer make: | | | | | 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 | 0.999981 | ≥0.995 |
| 801.1 | 803.1 | 0.9975 | correlation coefficient | 0.555561 | 20.995 |
| 400.5 | 402.3 | 0.9956 | Slope | 1.003601 | 0.90 - 1.10 |
| 200.3 | 198.1 | 1.0110 | Slope | 1.005001 | 0.90 - 1.10 |
| | | | Intercept | -0.808032 | +/-20 |





NO Calibration Summary

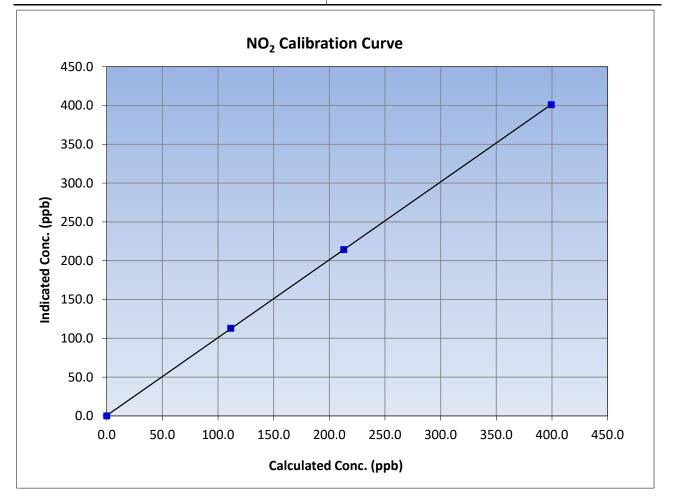
| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|-----------------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | 30, 2023 | Previous Calibration: | February | 15, 2023 |
| Station Name: | Jackt | ish 1 | Station Number: | AMS | 506 |
| Start Time (MST): | 8: | 22 | End Time (MST): | 12 | :36 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | l #: 1218153356 | |
| | | 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 | 0.999964 | ≥0.995 |
| 799.9 | 800.9 | 0.9987 | correlation coefficient | 0.999904 | 20.995 |
| 400.0 | 400.2 | 0.9994 | Clana | 1.002854 | 0.90 - 1.10 |
| 200.0 | 196.0 | 1.0203 | Slope | 1.002854 | 0.90 - 1.10 |
| | | | Intercept | -1.627998 | +/-20 |

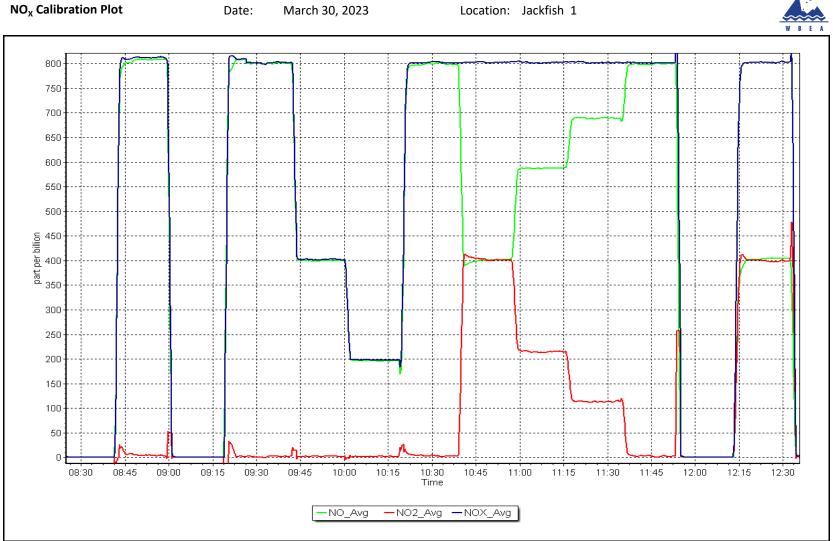




NO₂ Calibration Summary

| WBEA | | | | | Version-04-2 |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|
| | | Station | Information | | |
| Calibration Date: | March 3 | 30, 2023 | Previous Calibration: | February | 15, 2023 |
| Station Name: | Jackf | ish 1 | Station Number: | AMS | 506 |
| Start Time (MST): | 8: | 22 | End Time (MST): | 12 | :36 |
| Analyzer make: | Therr | no 42i | Analyzer serial #: | 12181 | 53356 |
| | | 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 | 0.999991 | ≥0.995 |
| 399.4 | 401.0 | 0.9960 | correlation coefficient | 0.999991 | 20.995 |
| 213.0 | 214.4 | 0.9934 | Slope | 1.003399 | 0.90 - 1.10 |
| 111.4 | 112.9 | 0.9866 | Slope | 1.005599 | 0.90 - 1.10 |
| | | | Intercept | 0.523900 | +/-20 |









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS508 KIRBY NORTH MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

| | | Station Infor | mation | | |
|---|--|--------------------------------|--|---|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Kirby North March 9, 2023 8:48 Routine | | Station number: Last Cal Date: End time (MST): | AMS508 February 2, 2023 14:04 | |
| | | Calibration St | andards | | |
| Cal Gas Concentration: | 49.18 | 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>CC303554</u> 49.18 <u>NA</u> API T700 API T701H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 3804 880 | |
| | | Analyzer Info | rmation | | |
| Analyzer make Analyzer Range | e: Thermo 43iQ e 0 - 1000 ppb | | Analyzer serial #: | 1182340007 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 1.001676 -1.468267 | 0.997350 -0.929311 | Backgd or Offset: Coeff or Slope: | | 19.6 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 C (ppb) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| as found zero | 5000 | 0.0 | 0.0 | 0.8 | |
| as found span | 4919 | 81.3 | 799.6 | 796.3 | 1.004 |
| as found 2nd point | | | | | |
| as found 3rd point | | | | | |
| new cylinder response | | | | | |
| calibrator zero | 5000 | 0.0 | 0.0 | 0.3 | |
| high point | 4919 | 81.3 | 799.6 | 797.3 | 1.003 |
| second point | 4959 | 40.7 | 400.3 | 397.4 | 1.007 |
| third point as left zero | <u> </u> | 20.3 | <u> </u> | <u> </u> | 1.012 |
| as left span | 4919 | 81.3 | 799.6 | 795.2 | 1.006 |
| | +J1J | | | ge Correction Factor | 1.008 |
| Baseline Corr As found: | 795.50 | Previous response AF Slope: | | *% change AF Intercept: | -0.5% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | NA NA | AF Slope. | | Ai intercept. | |

Changed sample inlet filter after as founds. Adjusted zero.

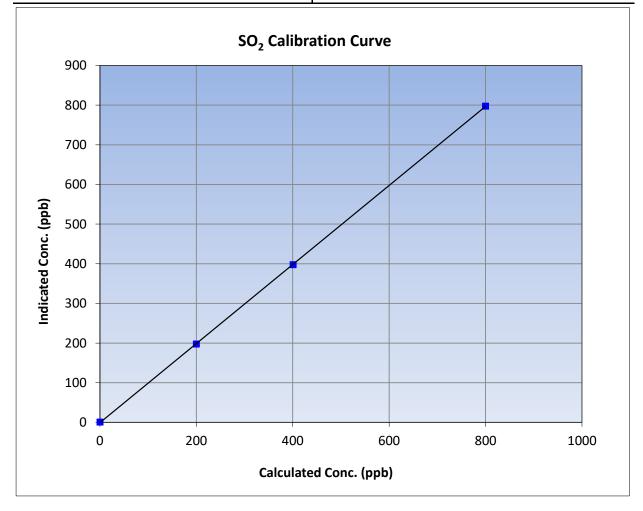
Calibration Performed By:

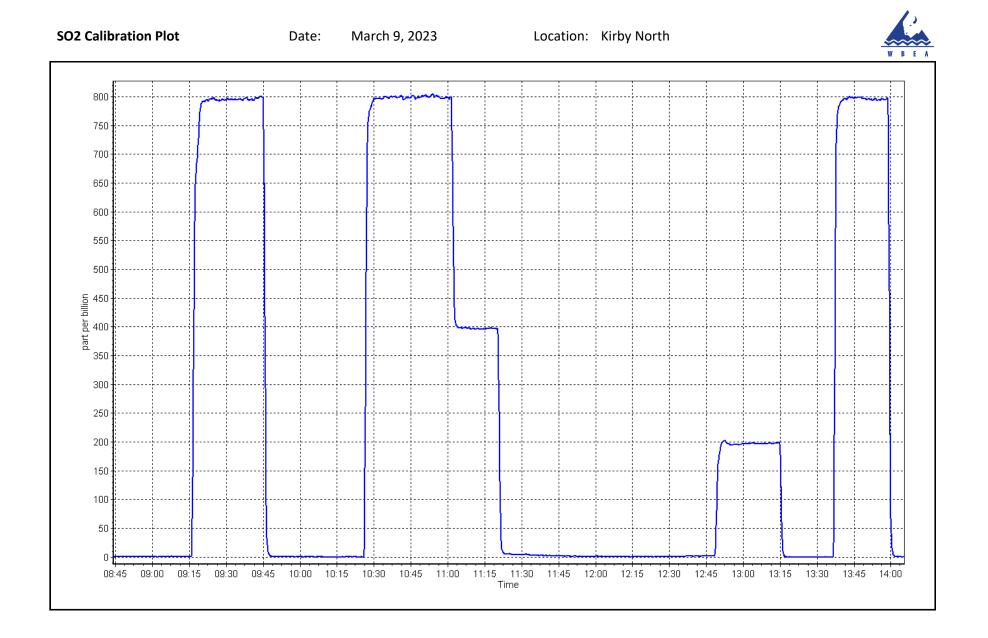


SO₂ Calibration Summary

| March 9, 2023 | Previous Calibration: | February 2, 2023 |
|---------------|-----------------------|---|
| Kirby North | Station Number: | AMS508 |
| 8:48 | End Time (MST): | 14:04 |
| Thermo 43iQ | Analyzer serial #: | 1182340007 |
| | Kirby North 8:48 | Kirby NorthStation Number:8:48End Time (MST): |

| Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evalua | ation | <u>Limits</u> |
|---|------------------------------|-------------------------|-----------|---------------|
| 0.0 0.3 | | Correlation Coefficient | 0.999989 | ≥0.995 |
| 799.6 797.3 | 1.0029 | correlation coefficient | 0.999909 | 20.995 |
| 400.3 397.4 | 1.0074 | Slope | 0.997350 | 0.90 - 1.10 |
| 199.7 197.2 | 1.0125 | Slope | 0.337330 | 0.90 - 1.10 |
| | | Intercept | -0.929311 | +/-30 |







H₂S Calibration Report

| W B E A | | | | | Version-11-20 |
|---|---|--------------------------------|--|---------------------------------------|---|
| | | Station Info | rmation | | |
| Station Name: Calibration Date: Start time (MST): Reason: | Kirby North March 9, 2023 8:48 Routine | | Station number: Last Cal Date: End time (MST): | AMS508 February 15, 2023 15:13 | |
| | | Calibration S | tandards | | |
| Cal Gas Concentration: | 5.167 | ppm | Cal Gas Exp Date: | February 5, 2024 | |
| Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model: | <u>CC517378</u> 5.167 <u>NA</u> API T750 API 751H | ppm | Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number: | NA 282 322 | |
| | | Analyzer Info | ormation | | |
| Analyzer make: Converter make: Analyzer Range | Thermo 43i TLE Global 0 - 100 ppb | | Analyzer serial #: Converter serial #: | 1150840012 2022-197 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| Calibration slope: Calibration intercept: | 0.995603 -0.101015 | 1.007456 -0.140937 | Backgd or Offset: Coeff or Slope: | | 1.67 1.009 |
| | | H ₂ S As Four | nd Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10 |
| as found zero | 5000 | 0.0 | 0.0 | -0.2 | |
| as found span | 4923 | 77.4 | 80.0 | 81.5 | 0.979 |
| as found 2nd point | 4961 | 38.8 | 40.1 | 40.5 | 0.985 |
| as found 3rd point | 4981 | 19.3 | 19.9 | 20.2 | 0.978 |
| new cylinder response | | | | | |
| | | H ₂ S Calibrat | ion Data | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> |
| calibrator zero | 5000 | 0.0 | 0.0 | -0.1 | |
| high point | 4923 | 77.4 | 80.0 | 80.5 | 0.994 |
| second point | 4961 | 38.8 | 40.1 | 40.1 | 1.000 |
| third point | 4981 | 19.3 | 19.9 | 20.0 | 0.997 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | |
| as left span | 4923 | 77.4 | 80.0 | 78.6 | 1.018 |
| O2 Scrubber Check | 4920 | 79.8 | 798.0 | 0.1 | |
| Date of last scrubber cha | - | 21-Sep-22 | | Ave Corr Factor | 0.997 |
| Date of last converter eff | ficiency test: | | | | efficiency |
| Baseline Corr As found: | 81.7 | Prev response: | 79.53 | *% change: | 2.7% |
| Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt: | 40.7 20.4 | AF Slope: AF Correlation: | | AF Intercept: | -0.240889 |
| | | | | * = > +/-5% change initiat | es investigation |

Changed sample inlet filter after as founds. Adjusted span. Ran scrubber check after cal zero. Second Sox scrubber check passed after hydrating the scrubber beads.

Calibration Performed By:

Notes:

Braiden Boutilier

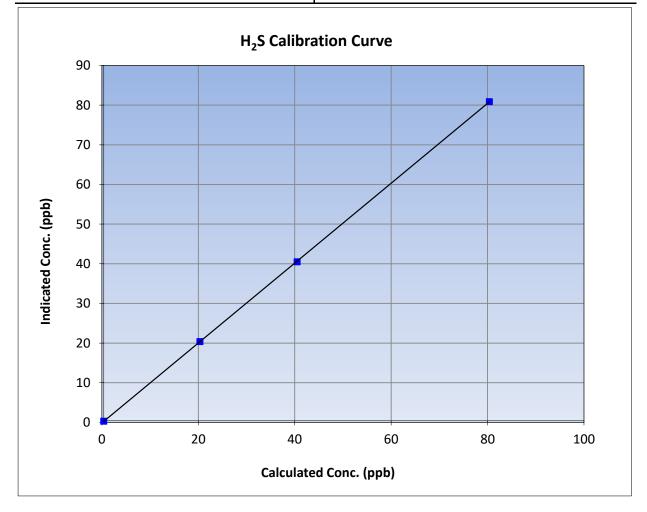


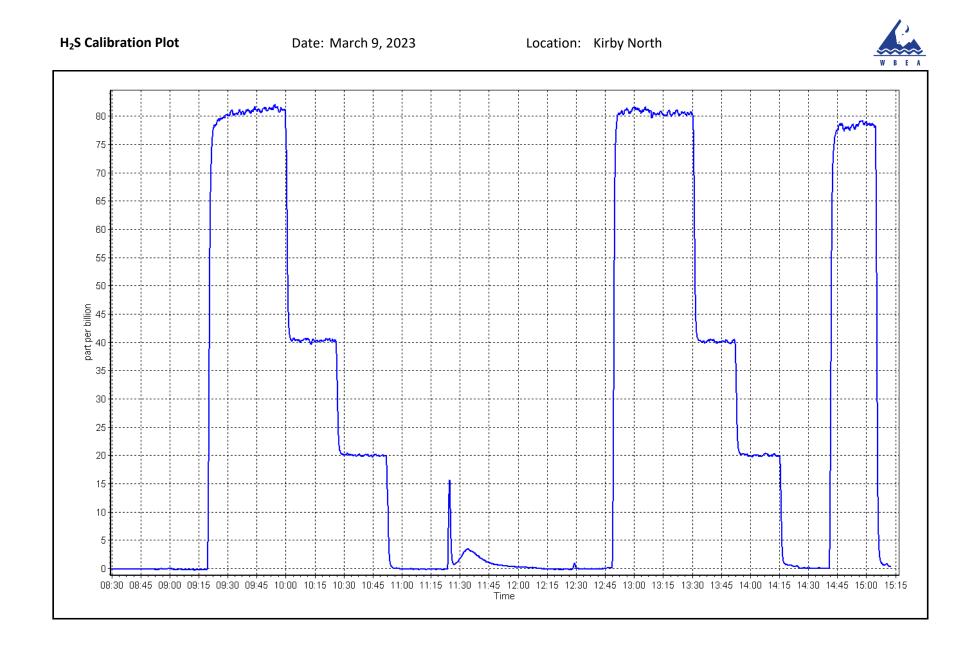
H₂S Calibration Summary

| WBEA | | | Version-11-2021 | | | | | | |
|---------------------|----------------|-----------------------|-------------------|--|--|--|--|--|--|
| Station Information | | | | | | | | | |
| Calibration Date: | March 9, 2023 | Previous Calibration: | February 15, 2023 | | | | | | |
| Station Name: | Kirby North | Station Number: | AMS508 | | | | | | |
| Start Time (MST): | 8:48 | End Time (MST): | 15:13 | | | | | | |
| Analyzer make: | Thermo 43i-TLE | Analyzer serial #: | 1150840012 | | | | | | |

Calibration Data

| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|---------------------------------------|------------------------------|-------------------------|-----------|---------------|
| 0.0 | -0.1 | | Correlation Coefficient | 0.999991 | ≥0.995 |
| 80.0 | 80.5 | 0.9935 | correlation coefficient | 0.999991 | 20.333 |
| 40.1 | 40.1 | 0.9999 | Slope | 1.007456 | 0.90 - 1.10 |
| 19.9 | 20.0 | 0.9972 | Slope | 1.007430 | 0.90 - 1.10 |
| | | | Intercept | -0.140937 | +/-3 |







THC Calibration Report

Version-01-2020

| | | Station Info | rmation | | |
|---|--|---|---|--|--|
| Station Name: Calibration Date: Start time (MST): Reason: | Kirby North March 9, 2023 8:48 Routine | | Station number: Last Cal Date: End time (MST): | AMS508 February 4, 2023 14:04 | |
| | | Calibration S | tandards | | |
| Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc. | CC30 496.6 205.5 | 03554 ppm ppm | Cal Gas Expiry Date: CH4 Equiv Conc. | March 23, 2025 1061.7 | ppm |
| Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model: | 496.6 205.5 АРІ Т700 АРІ Т701Н | NA 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> 1.002675 -0.018187 | <u>Finish</u> 0.998186 0.031226 | Background: Coefficient: | | <u>Finish</u> 2.86 3.706 |
| | | THC Calibrat | ion Data | | |
| | | | | | |
| Set Point | Dilution air flow rate (sccm) | Source gas flow rate (sccm) | Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) Limit = 0.95-1.05 |
| Set Point as found zero | | 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 | (sccm) 5000 | Source gas flow rate (sccm) 0.0 | Calculated Concentration (ppm) (Cc) 0.00 | Concentration (ppm) (Ic) 0.19 | Limit = 0.95-1.05 |
| as found zero as found span as found 2nd point as found 3rd point | (sccm) 5000 | Source gas flow rate (sccm) 0.0 | Calculated Concentration (ppm) (Cc) 0.00 | Concentration (ppm) (Ic) 0.19 | 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 81.3 | Calculated Concentration (ppm) (Cc) 0.00 17.26 | Concentration (ppm) (Ic) 0.19 17.80 | 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 | Source gas flow rate (sccm) 0.0 81.3 0.0 | Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00 | Concentration (ppm) (Ic) 0.19 17.80 0.06 | Limit = 0.95-1.05 0.970 |
| as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point | (sccm) 5000 4919 5000 4919 | Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 | Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00 17.26 | Concentration (ppm) (Ic) 0.19 17.80 0.06 17.29 | 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 | Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 | Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00 17.26 8.64 | Concentration (ppm) (Ic) 0.19 17.80 0.06 17.29 8.60 | Limit = 0.95-1.05 0.970 0.998 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 | (sccm) 5000 4919 5000 4919 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) (Ic) 0.19 17.80 0.06 17.29 8.60 4.34 | Limit = 0.95-1.05 0.970 0.998 1.005 0.993 |
| 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) 0.19 17.80 0.06 17.29 8.60 4.34 0.12 | Limit = 0.95-1.05 0.970 0.998 1.005 0.993 |
| 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 | 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) 0.19 17.80 0.06 17.29 8.60 4.34 0.12 17.32 | Limit = 0.95-1.05 0.970 0.998 1.005 0.993 0.997 |
| 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 0.00 17.26 Averag 17.29 | Concentration (ppm) (lc) 0.19 17.80 0.06 17.29 8.60 4.34 0.12 | 0.970 0.998 1.005 0.993 0.997 0.999 1.8% |

Notes:

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

Calibration Performed By:

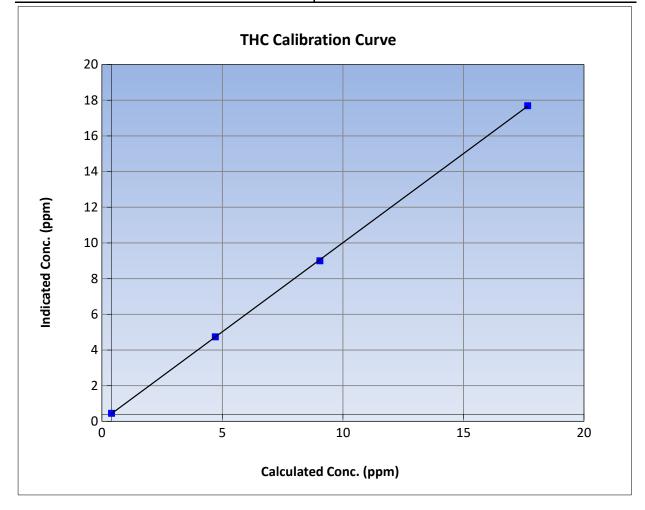


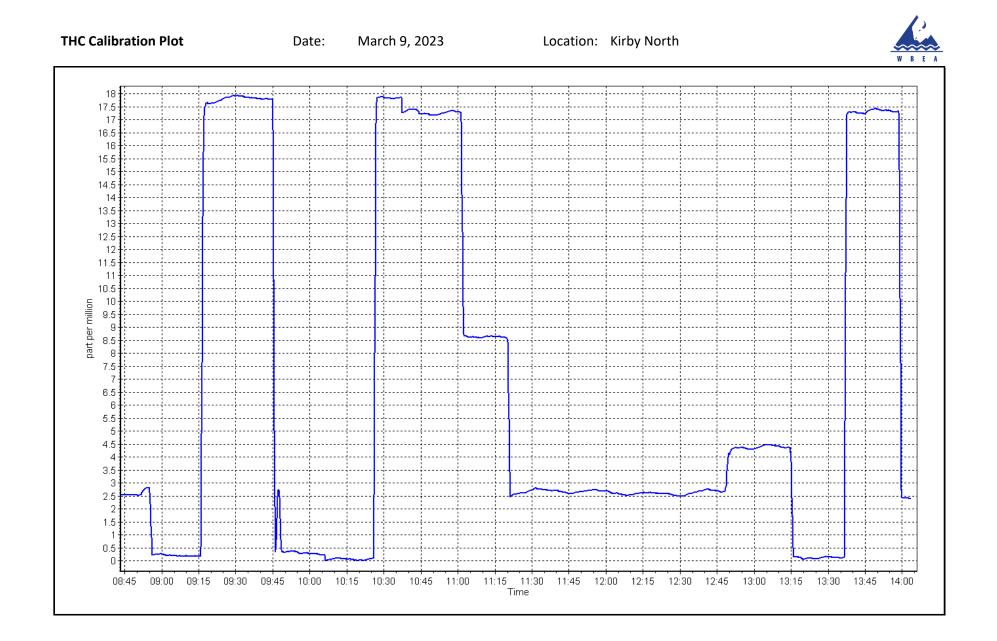
THC Calibration Summary

| WBEA | | | Version-01-2020 |
|-------------------|---------------|-----------------------|------------------|
| | Stat | ion Information | |
| Calibration Date: | March 9, 2023 | Previous Calibration: | February 4, 2023 |
| Station Name: | Kirby North | Station Number: | AMS508 |
| Start Time (MST): | 8:48 | End Time (MST): | 14:04 |
| Analyzer make: | Thermo 51i | Analyzer serial #: | 1182340005 |

Calibration Data

| Calculated Concentration (ppm) (Cc) | Indicated Concentration (ppm) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> |
|--|--|------------------------------|-------------------------|----------|---------------|
| 0.00 | 0.06 | | Correlation Coefficient | 0.999970 | ≥0.995 |
| 17.26 | 17.29 | 0.9984 | correlation coefficient | 0.999970 | 20.333 |
| 8.64 | 8.60 | 1.0050 | Slope | 0.998186 | 0.90 - 1.10 |
| 4.31 | 4.34 | 0.9929 | Slope | 0.998180 | 0.90 - 1.10 |
| | | | Intercept | 0.031226 | +/-1.5 |







NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

| | | Statio | on Information | | |
|--|--|----------------------|---|-------------------------------------|---------------|
| Station Name: Calibration Date: Start time (MST): Reason: | Kirby North March 8, 2023 11:35 Routine | | Station number: Last Cal Date: End time (MST): | AMS508 February 1, 2023 17:03 | |
| | | Calibra | ation Standards | | |
| NO Gas Cylinder #: NOX Cal Gas Conc: Removed Cylinder #: | 49.39 | T34ULGL ppm NA | Cal Gas Expiry Date: NO Cal Gas Conc: Removed Gas Exp Date: | 49.02 | ppm |
| Removed Gas NOX Conc: NOX gas Diff: | 49.39 | ppm | Removed Gas NO Conc: NO gas Diff: | | ppm |
| Calibrator Model: ZAG make/model: | API T700 API 701H | | Serial Number: Serial Number: | | |
| | | Analyz | er Information | | |
| Analyzer make: NOX Range (ppb): | | | Analyzer serial #: | 7029 | |
| | <u>Start</u> | <u>Finish</u> | | <u>Start</u> | <u>Finish</u> |
| NO coeff or slope: | | 1.026 | NO bkgnd or offset: | | 0.1 |
| NOX coeff or slope: NO2 coeff or slope: | | 1.023 1.000 | NOX bkgnd or offset: Reaction cell Press: | 0.3 4.8 | 0.3 5.0 |
| | | Calibr | ation Statistics | | |
| | | <u>Start</u> | | <u>Finish</u> | |
| NO _x Cal Slope: | | 1.002073 | } | 0.997146 | |
| NO _x Cal Offset: | | -1.391610 |) | -1.392505 | |
| NO Cal Slope: | | 1.001077 | , | 0.996559 | |
| NO Cal Offset: | | -2.093883 | | -2.174660 | |
| NO ₂ Cal Slope: | | 0.998942 | | 1.007853 | |

-0.787844

0.638504



$NO_X \setminus NO \setminus NO_2$ 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 | -0.2 | -0.2 | 0.0 | | |
| as found span | 4919 | 81.0 | 800.1 | 794.1 | 6.0 | 780.8 | 774.4 | 6.3 | 1.0247 | 1.0255 |
| 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 | 81.0 | 800.1 | 794.1 | 6.0 | 797.1 | 790.3 | 6.8 | 1.0038 | 1.0048 |
| second point | 4960 | 40.5 | 400.0 | 397.0 | 3.0 | 396.8 | 392.4 | 4.5 | 1.0081 | 1.0118 |
| third point | 4980 | 20.2 | 199.5 | 198.0 | 1.5 | 196.3 | 193.0 | 3.3 | 1.0164 | 1.0261 |
| as left zero | 5000 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.2 | 0.1 | | |
| as left span | 4919 | 81.0 | 800.1 | 415.1 | 385.0 | 792.0 | 408.2 | 383.8 | 1.0103 | 1.0170 |
| | | | | | | | Average C | orrection Factor | 1.0094 | 1.0142 |
| Corrected As fo | ound NO _x = | 781.0 ppb | NO = | 774.6 ppb | * = > +/-5% | 6 change initiates i | nvestigation | *Percent Chang | ge NO _x = | -2.5% |
| Previous Respo | onse NO _x = | 800.4 ppb | NO = | 792.9 ppb | | | | *Percent Chang | ge NO = | -2.4% |
| 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/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10 | Converter Efficiency Calibration Limit = 96-104% |
|----------------------------------|---|---------------------------------------|--|--|--|---|
| as found GPT zero | | | | | | |
| as found GPT point (400 ppb NO2) | | | | | | |
| as found GPT point (200 ppb NO2) | | | | | | |
| as found GPT point (100 ppb NO2) | | | | | | |
| 1st GPT point (400 ppb O3) | 788.7 | 409.7 | 385.0 | 388.3 | 0.9915 | 100.9% |
| 2nd GPT point (200 ppb O3) | 788.7 | 594.2 | 200.5 | 203.0 | 0.9877 | 101.2% |
| 3rd GPT point (100 ppb O3) | 788.7 | 697.1 | 97.6 | 99.8 | 0.9779 | 102.3% |
| | | | | Average Correction Factor | 0.9857 | 101.5% |

Notes:

Changed sample inlet filter after as founds. No adjustments made. Second High NO reference point used for converter efficiency.

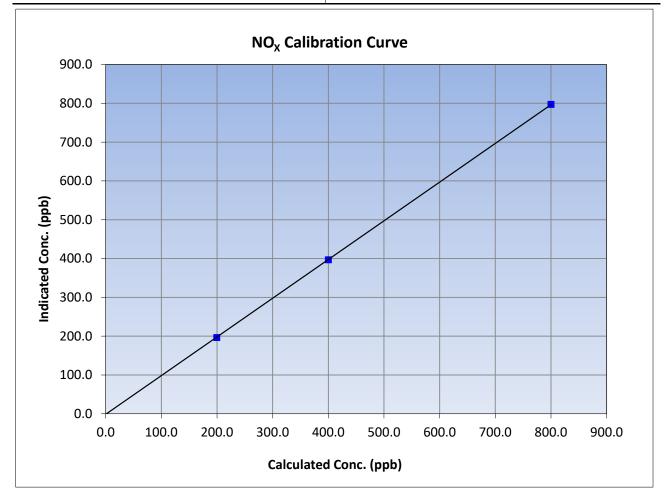
Calibration Performed By:

Braiden Boutilier



NO_x Calibration Summary

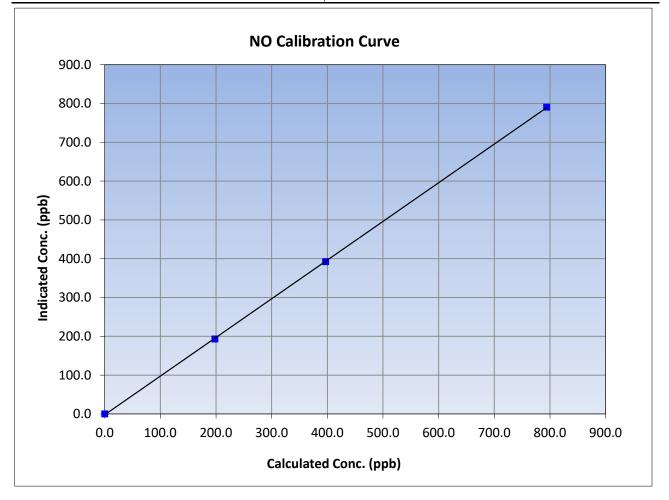
| WBEA | | Station | Information | | Version-04-2 | |
|--|---------------------------------------|---------------------------|----------------------------|-----------|---------------|--|
| Calibration Date: | March 8, 2023 | | Previous Calibration: Febr | | ruary 1, 2023 | |
| Station Name: | Kirby North | | Station Number: | AM | AMS508 | |
| Start Time (MST): | 11:35 | | End Time (MST): | 17:03 | | |
| Analyzer make: | API T200 | | Analyzer serial #: | 7029 | | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999988 | ≥0.995 | |
| 800.1 | 797.1 | 1.0038 | | 0.999988 | 20.333 | |
| 400.0 | 396.8 | 1.0081 | Slope | 0.997146 | 0.90 - 1.10 | |
| 199.5 | 196.3 | 1.0164 | | 0.997140 | 0.90 - 1.10 | |
| | | | Intercept | -1.392505 | +/-20 | |





NO Calibration Summary

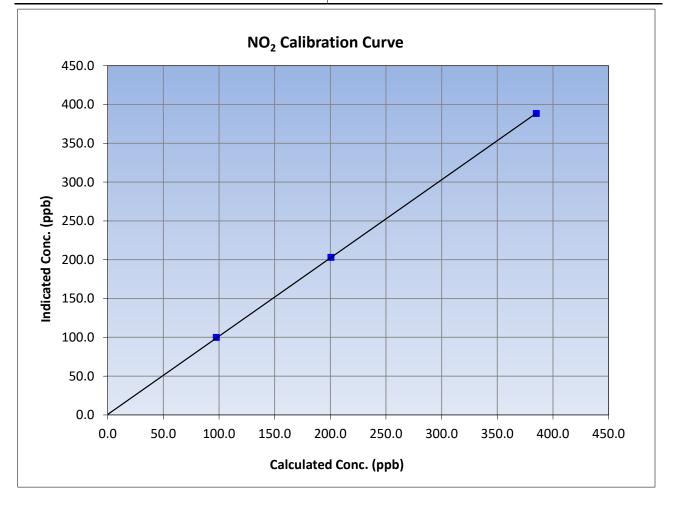
| WBEA | | | | | Version-04-202 | |
|--|---------------------------------------|---------------------------|-------------------------|----------------------|----------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 8, 2023 | | Previous Calibration: | Februa | iry 1, 2023 | |
| Station Name: | Kirby North | | Station Number: | AN | AMS508 | |
| Start Time (MST): | 11:35 | | End Time (MST): | 17:03 | | |
| 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 | 0.999966 | ≥0.995 | |
| 794.1 | 790.3 | 1.0048 | | 0.999900 | 20.999 | |
| 397.0 | 392.4 | 1.0118 | Slope | 0.996559 <i>0.90</i> | 0.90 - 1.10 | |
| 198.0 | 193.0 | 1.0261 | | | 0.90 - 1.10 | |
| | | | Intercept | -2.174660 | +/-20 | |

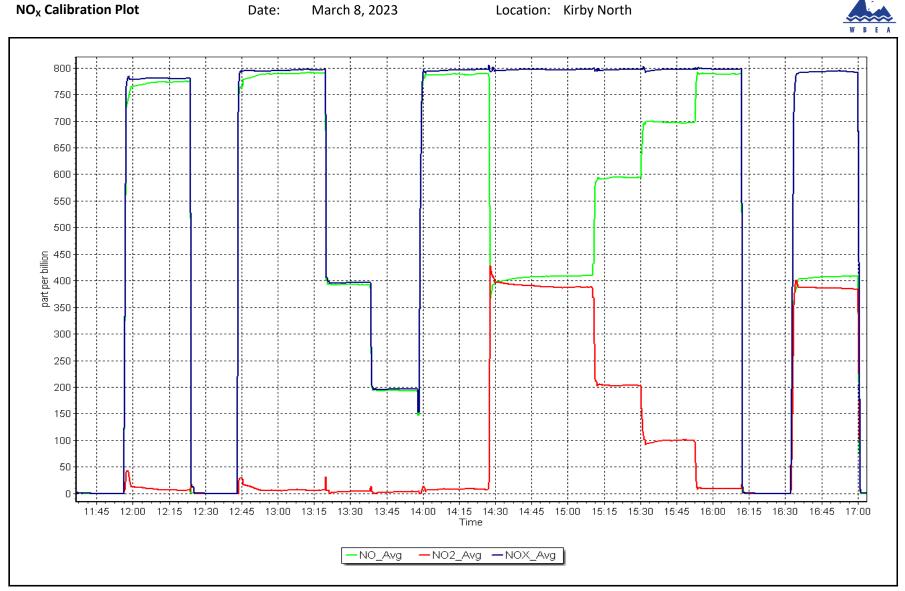




NO₂ Calibration Summary

| WBEA | | Chatian | Information | | Version-04-20 | |
|--|---------------------------------------|---------------------------|-------------------------|----------|---------------|--|
| | | Station | Information | | | |
| Calibration Date: | March 8, 2023 | | Previous Calibration: | Februai | ry 1, 2023 | |
| Station Name: | Kirby North | | Station Number: | AM | AMS508 | |
| Start Time (MST): | 11:35 | | End Time (MST): | 17:03 | | |
| Analyzer make: | API T200 | | Analyzer serial #: | 7029 | | |
| | | Calibra | ation Data | | | |
| Calculated concentration (ppb) (Cc) | Indicated concentration (ppb) (Ic) | Correction factor (Cc/Ic) | Statistical Evaluation | | <u>Limits</u> | |
| 0.0 | -0.1 | | Correlation Coefficient | 0.999983 | ≥0.995 | |
| 385.0 | 388.3 | 0.9915 | | 0.333383 | 20.333 | |
| 200.5 | 203.0 | 0.9877 | Slope | 1.007853 | 0.90 - 1.10 | |
| 97.6 | 99.8 | 0.9779 | | 1.007855 | 0.50 - 1.10 | |
| | | | Intercept | 0.638504 | +/-20 | |





Location: Kirby North



End of Report