



February 27th, 2026

Environmental Authority
c/o Department of Environment and Natural Resources
169 South Shore Road
Paget, DV 04
Bermuda
Attn: Pollution Control,

Re: BELCO Annual Ambient Air Quality Monitoring Report for the period January 1st to December 31st, 2025

On behalf of the Bermuda Electric Light Company Limited, please find attached the 2025 Annual Ambient Air Quality Monitoring System (AQMS) Report for the period January 1st to December 31st, 2025, as required under Condition 6.3.1 and 6.3.4 of BELCO's Operating License OL#114.

Zero (0) exceedances of the Bermuda Ambient Air Quality Standards (BAAQS) were recorded during this reporting period. Annual average concentrations of all gaseous and particulate parameters were measured to be below the BAAQS.

All monitoring equipment was routinely maintained and calibrated throughout the year. The ambient air quality monitoring program was independently audited in June and December of 2025, as required by condition 5.4.7 of BELCO's Operating License Conditions.

Please let me know if you have any questions about this report or if you wish to discuss the data presented here further.

Kind Regards,

Shane Robinson
OHSE Environmental Technician
Bermuda Electric Light Company, Ltd.

Encl.: FINAL BELCO 2024 Annual AQMS Report; BELCO AQMS Dataset – 2025 Annual

CR-02-02-01
R0021

BERMUDA ELECTRIC LIGHT COMPANY, LTD.

ANNUAL AMBIENT AIR QUALITY MONITORING REPORT

FOR THE PERIOD

JANUARY 1ST TO DECEMBER 31ST, 2025

FEBRUARY 27TH, 2026

PREPARED BY: SHANE ROBINSON

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Introduction

This report summarizes the findings and operation of BELCO's Ambient Air Quality Monitoring for the period January 1st to December 31st, 2025, as required by Condition 6.3.1 and 6.3.4 of BELCO's Operating License, #OL-114.

BELCO operates and maintains four ambient air quality monitoring stations. 'BDA1' is located on Cemetery Lane, Pembroke, and measures both pollutant and meteorological parameters. 'BDA2' is located on Langton Crescent, Pembroke, and measures pollutant parameters. 'BDA3' is located in the northwest corner of BELCO's Pembroke Power Station and measures meteorological parameters. 'BDA4' did not operate throughout 2025 and is currently stored at BELCO's Pembroke Power Station.

Exceedance Report

During the reporting period, zero (0) exceedances of the Bermuda Ambient Air Quality Standards (BAAQS) were recorded at BELCO's ambient air quality monitoring stations, 'BDA1' and 'BDA2'; please refer to Table 1 and Table 2 for details. Annual averages of all measured pollutant parameters were below the annual BAAQS at both 'BDA1' and 'BDA2', stations in 2025.

Table 1: BAAQS exceedance record for the reporting period.

Station	Parameter	BAAQS - 1-Hr ($\mu\text{g}/\text{m}^3$)	Max. 1-Hr Avg. ($\mu\text{g}/\text{m}^3$)	# of Exceed. (1-hr)	BAAQS - 24-Hr ($\mu\text{g}/\text{m}^3$)	Max. 24-hr Avg. ($\mu\text{g}/\text{m}^3$)	# of Exceed. (24-Hr)	BAAQS – Annual ($\mu\text{g}/\text{m}^3$)	Annual Avg. ($\mu\text{g}/\text{m}^3$)	# of Exceed. (Annual)
BDA1	NO₂	400	47	0	200	7	0	60	3	0
	SO₂	450	28	0	150	10	0	30	1	0
	PM₁₀	-	-	-	50	28	0	30	12	0
	PM 2.5	-	-	-	35	10	0	12	3	0
BDA2	NO₂	400	95	0	200	55	0	60	3	0
	SO₂	450	196	0	150	12	0	30	4	0
	PM₁₀	-	-	-	50	37	0	30	10	0
	PM 2.5	-	-	-	35	12	0	12	3	0
Total Number of BAAQS Exceedances Recorded During Reporting Period										0

Table 2: BAAQS exceedance log for the reporting period.

Station	Parameter	Averaging Period	Date/Time (AST)	Concentration (ug/m3)	BAAQS (ug/m3)
-	-	-	-	-	-

Annual Data

All valid data collected during the reporting period is provided in tabular form in the excel spreadsheet titled “BELCO AQMS Dataset – 2025 Annual”, which has been provided electronically with this report.

Data Availability

An annual summary of data availability figures for 2025 is provided in Table 3 and illustrated in Figures 1-4.

Data collection at all sites was interrupted for periods of time throughout 2025 in order to perform routine maintenance, recalibrate instrumentation, audit instrumentation, lower the meteorological tower in high winds, and to troubleshoot and resolve instrument failures. Detailed explanations of significant periods of downtime (>6 hours) can be found in the quarterly reports submitted throughout 2025.

Table 3: Annual summary of data availability figures for BDA1, BDA2, and BDA3.

	Q1	Q2	Q3	Q4	2025 Annual	Target
BDA1 - Pollutant Parameters						
NO ₂	98.9%	98.8%	99.5%	91.9%	97.3%	75.0%
SO ₂	98.8%	98.6%	99.5%	91.5%	97.1%	75.0%
PM ₁₀	99.8%	99.3%	98.8%	84.4%	95.6%	75.0%
PM 2.5	99.8%	99.6%	99.2%	95.3%	98.5%	75.0%
BDA1 - Meteorological Parameters						
Wind Direction	96.4%	99.5%	99.5%	99.5%	99.6%	90.0%

Horiz. Wind Speed	99.8%	99.5%	99.5%	99.5%	99.6%	90.0%
Vert. Wind Speed	99.8%	99.5%	99.5%	99.5%	99.6%	90.0%
Temperature	100.0%	99.9%	99.9%	99.9%	99.9%	90.0%
Rel. Humidity	100.0%	99.9%	99.9%	99.9%	99.9%	90.0%
BDA2 - Pollutant Parameters						
NO ₂	96.4%	92.4%	93.5%	93.5%	94.0%	75.0%
SO ₂	95.8%	95.6%	91.9%	91.9%	93.8%	75.0%
PM ₁₀	98.1%	92.7%	63.4%	40.6%	73.7%	75.0%
PM 2.5	97.6%	92.5%	63.3%	42.6%	74.0%	75.0%
BDA3 - Meteorological Parameters (SODAR, 65m)						
Wind Direction	68.9%	56.0%	78.3%	74.0%	69.3%	90.0%
Horiz. Wind Speed	68.9%	56.0%	78.2%	73.7%	69.2%	90.0%
Vert. Wind Speed	79.3%	65.8%	86.1%	83.5%	78.7%	90.0%

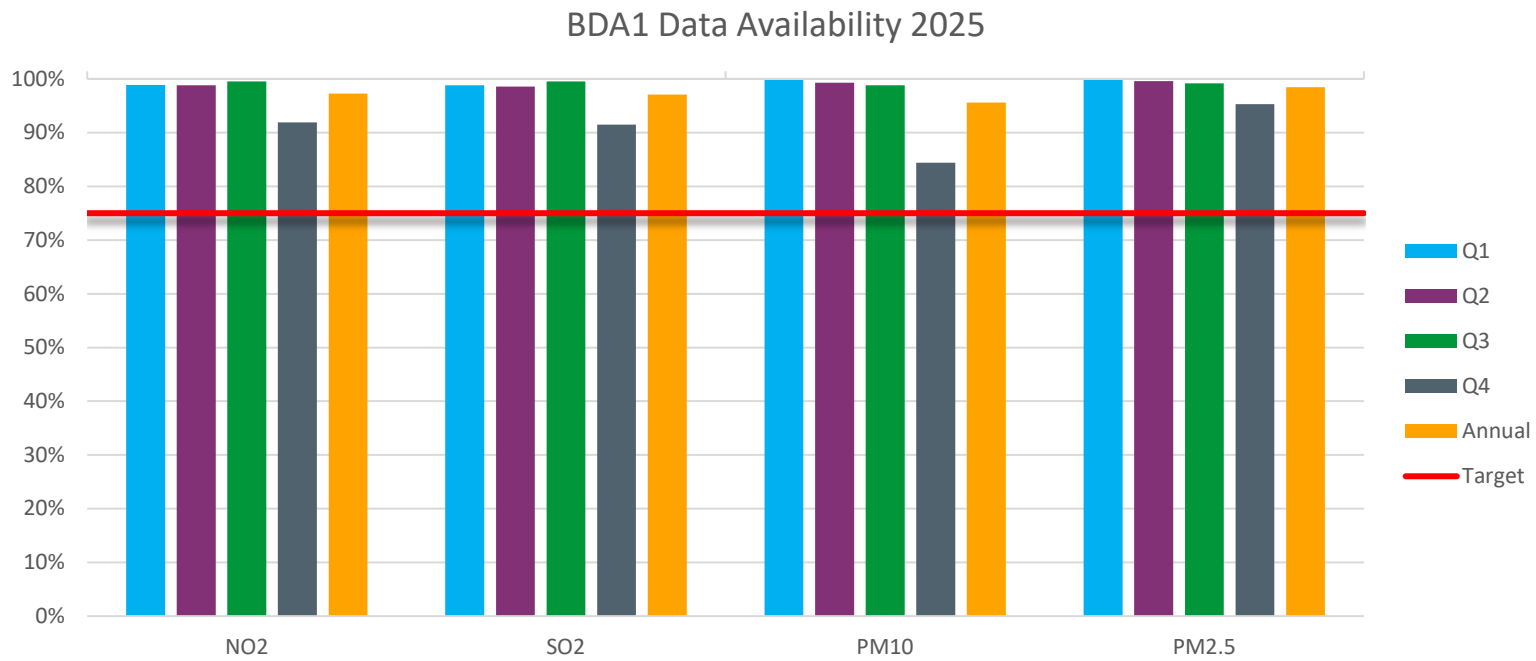


Fig. 1: Data Availability Rates for BDA1 monitoring station, pollutant parameters.

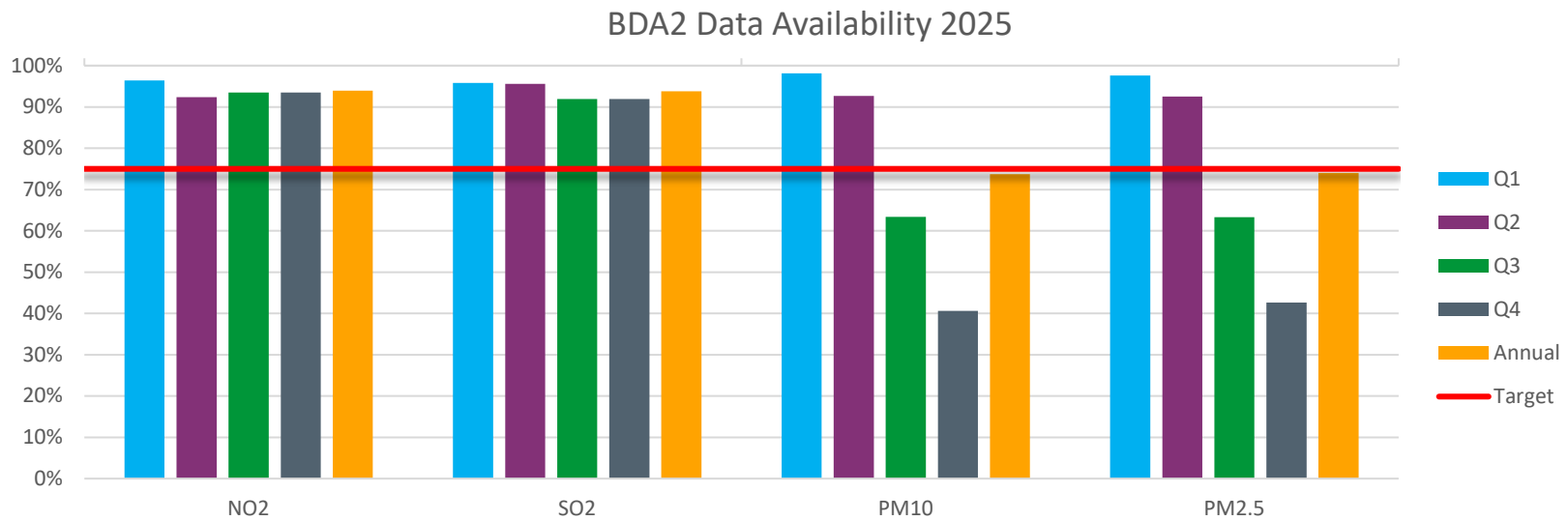


Fig. 2: Data Availability Rates for BDA2 monitoring station, pollutant parameters.

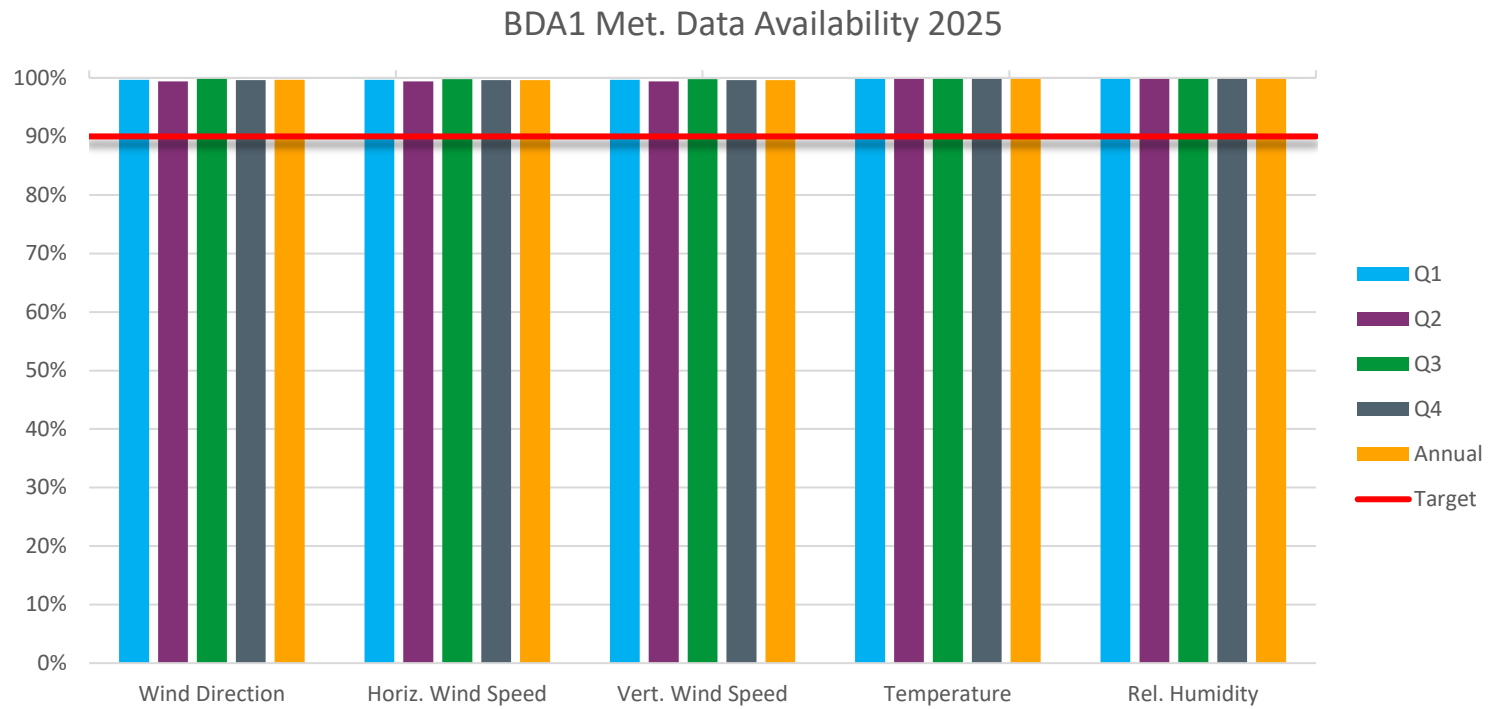


Fig. 3: Data Availability Rates for BDA1 monitoring station, meteorological parameters.

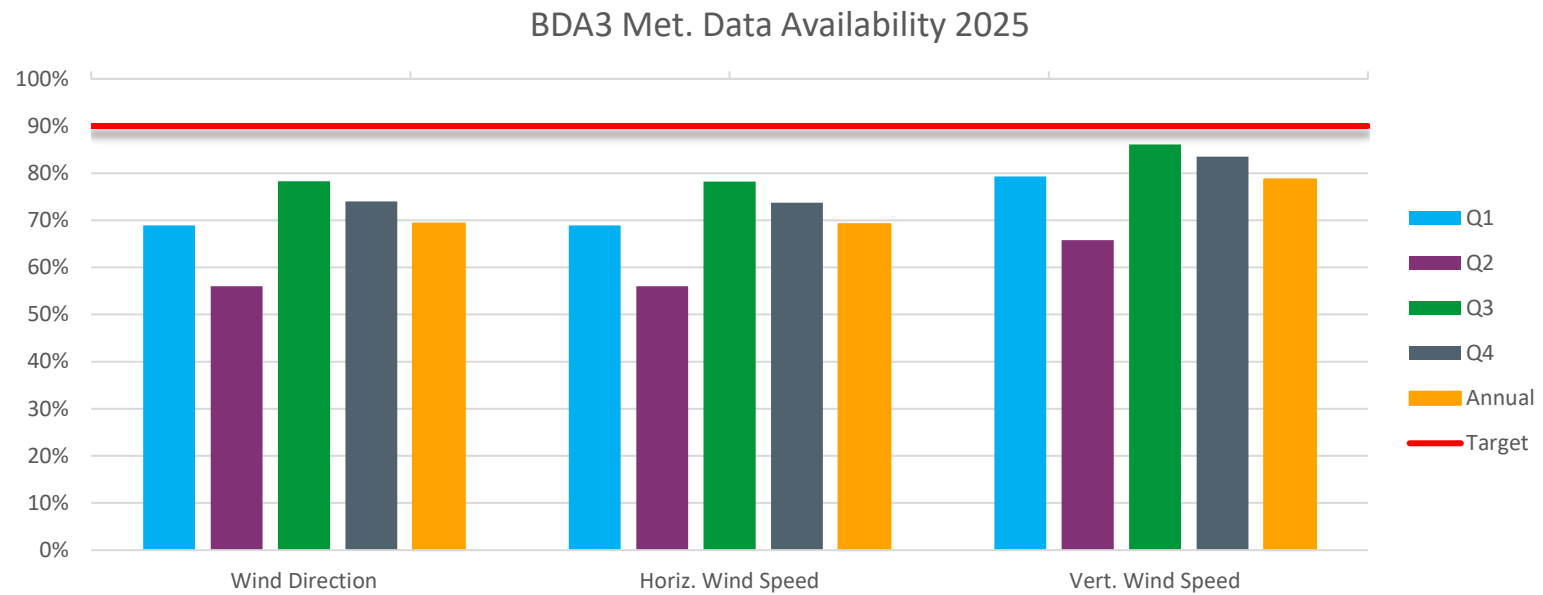


Fig. 4: Data Availability Rates for BDA3 monitoring station, meteorological parameters.

Year-on-Year Comparison of Average & Maximum Recorded Pollutant Concentrations

Year-on-year comparisons of maximum 1-hr average concentrations of SO₂ and NO₂, maximum 24-hr average concentrations of SO₂, PM₁₀, and PM 2.5 as well as annual averages of SO₂, PM₁₀ and PM 2.5 recorded at BELCO's 'BDA1', 'and BDA2' monitoring stations during the years 2006-2025 are illustrated in Figures 5-12. Year-on-year illustrations of data collected from the 'BDA4' monitoring station may not be representative of the values recorded over a full calendar year as data collected in 2020 was limited to the months of October-December with operations suspended in June 2022.

With regards to trends observed in Nitrogen Dioxide (NO₂) concentrations recorded:

- Max. 1-hr avg. concentrations of NO₂ are trending downward at 'BDA1'; trending upward at 'BDA2'.
- Annual avg. concentrations of NO₂ are trending upward at 'BDA1'; trending upward at 'BDA2'.

With regards to trends observed in Sulphur Dioxide (SO₂) concentrations recorded:

- Max. 1-hr avg. concentrations of NO₂ are trending downward at 'BDA1'; trending upward at 'BDA2'.
- Max 24-hr avg. concentrations of SO₂ are trending downward at 'BDA1'; trending downward at 'BDA2'.
- Annual avg. concentrations of SO₂ are trending stable at 'BDA1'; trending stable at 'BDA2'.

With regards to trends observed in Particulate Matter <10 microns in diameter (PM₁₀) concentrations recorded:

- Max 24-hr avg. concentrations of PM₁₀ are trending upward at 'BDA1'; trending downward at 'BDA2'.
- Annual avg. concentrations of PM₁₀ are trending as upward at 'BDA1'; trending downward at 'BDA2'.

With regards to trends observed in Particulate Matter <2.5 microns in diameter (PM 2.5) concentrations recorded:

- Max 24-hr avg. concentrations of PM 2.5 are below BAAQS thresholds at BDA1 and BDA2.
- Annual avg. concentrations of PM 2.5 are below BAAQS thresholds at BDA1 and BDA2.

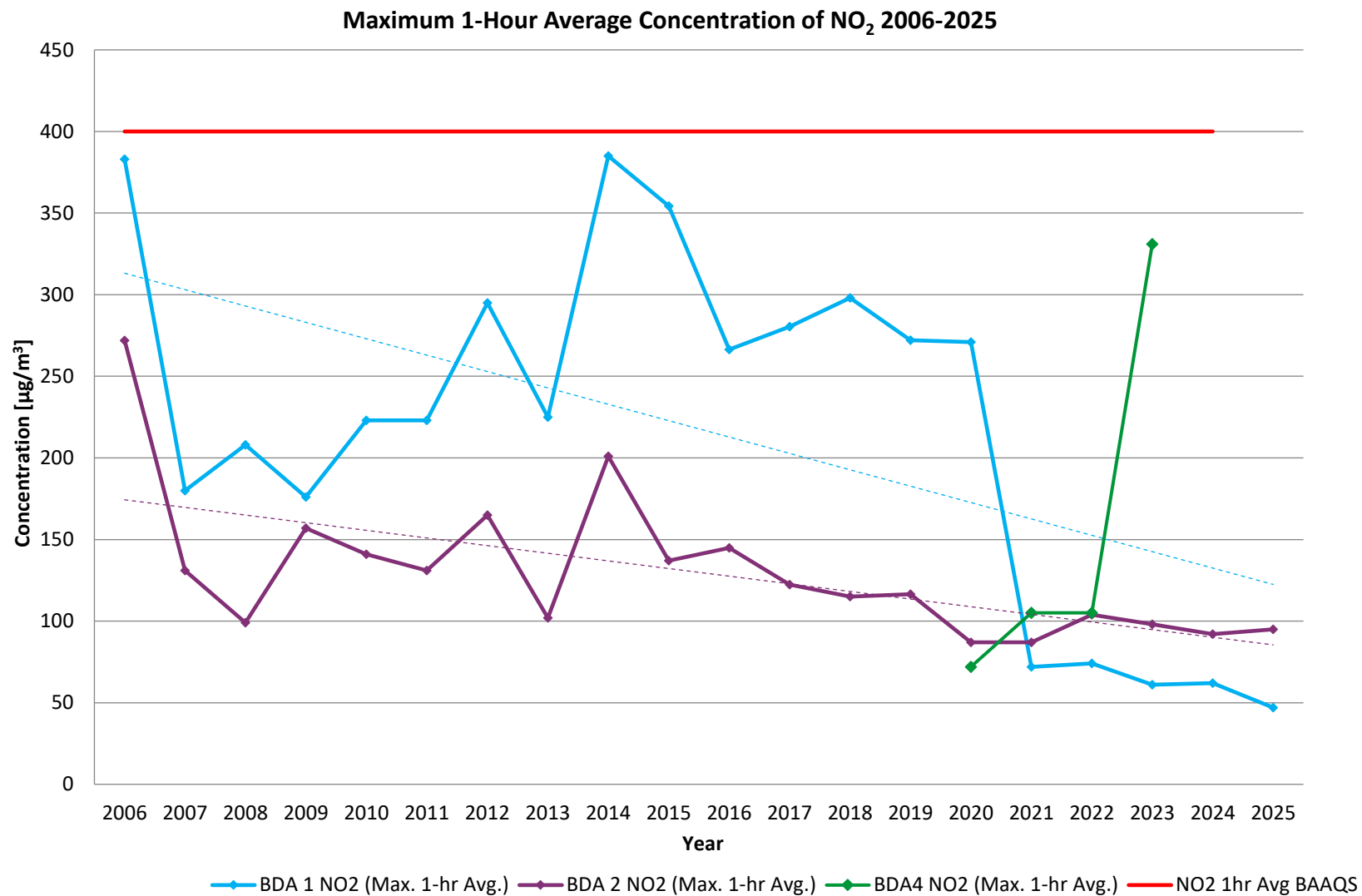


Fig. 5: Maximum 1-Hour Average Concentration of NO₂ Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2006-2025

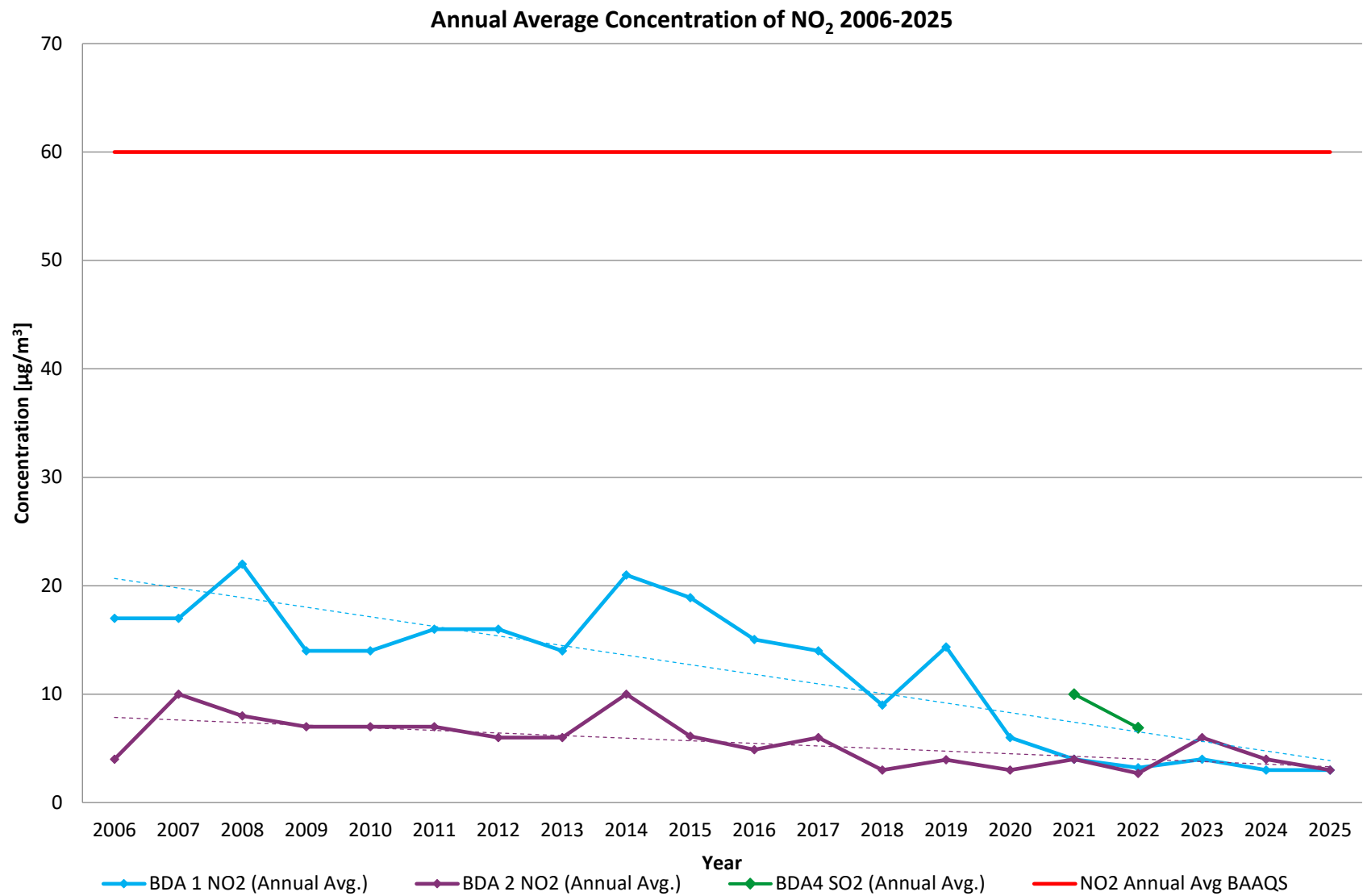


Fig 6: Annual Average Concentration of NO₂ Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2006-2025

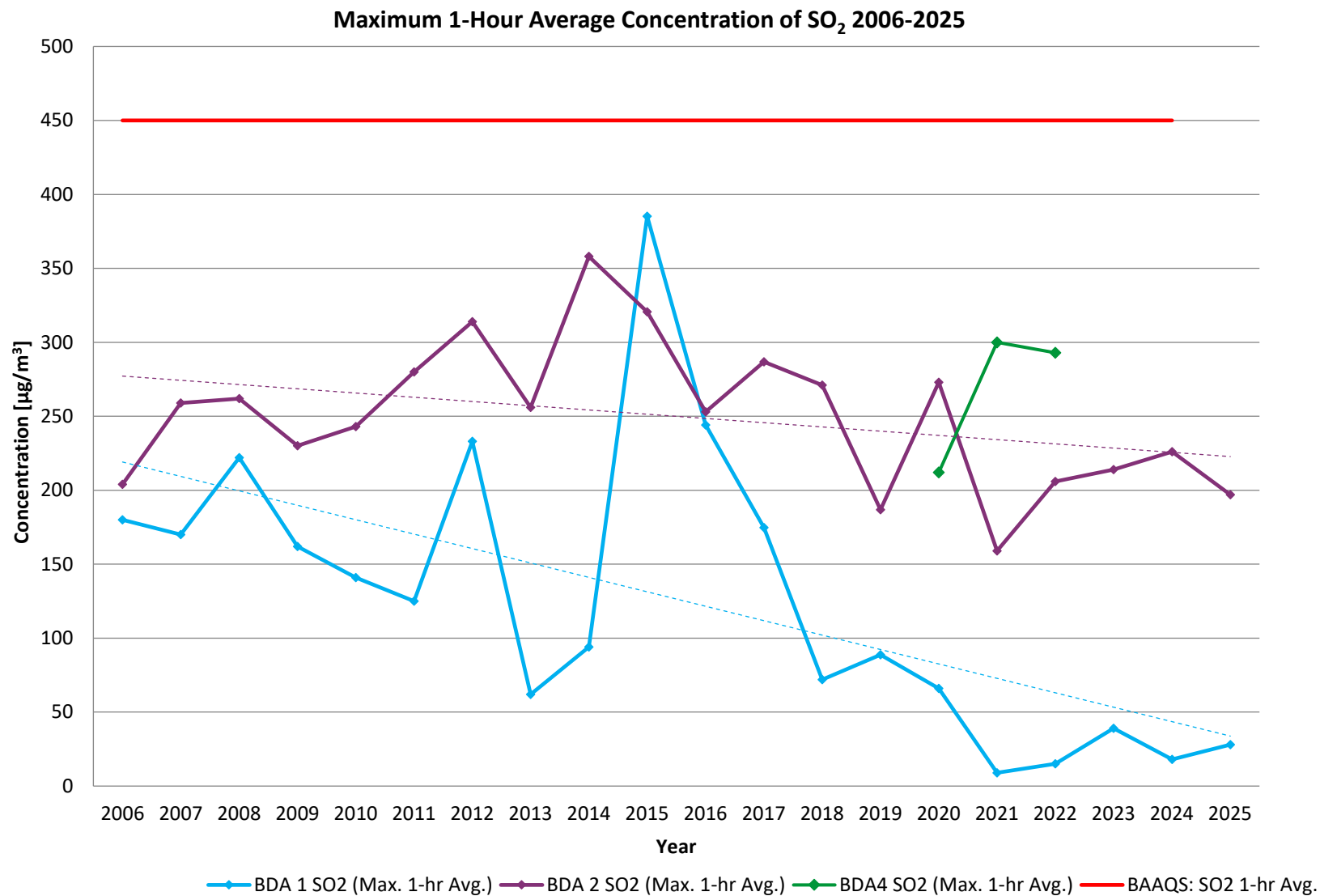


Fig 7: Maximum 1-Hour Average Concentration of SO₂ Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2006-2025

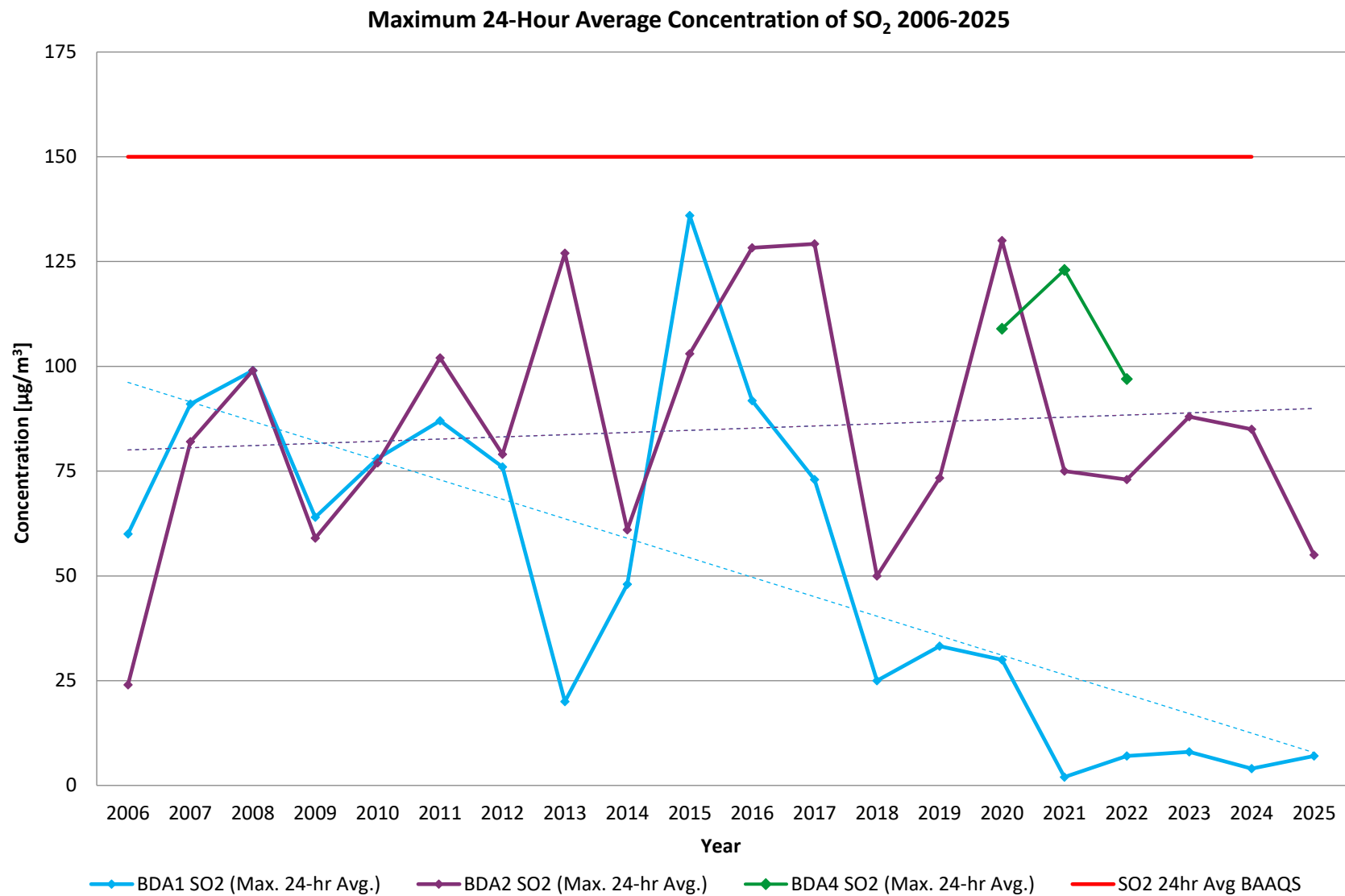


Fig. 8: Maximum 24-Hour Average Concentration of SO₂ Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2006-2025

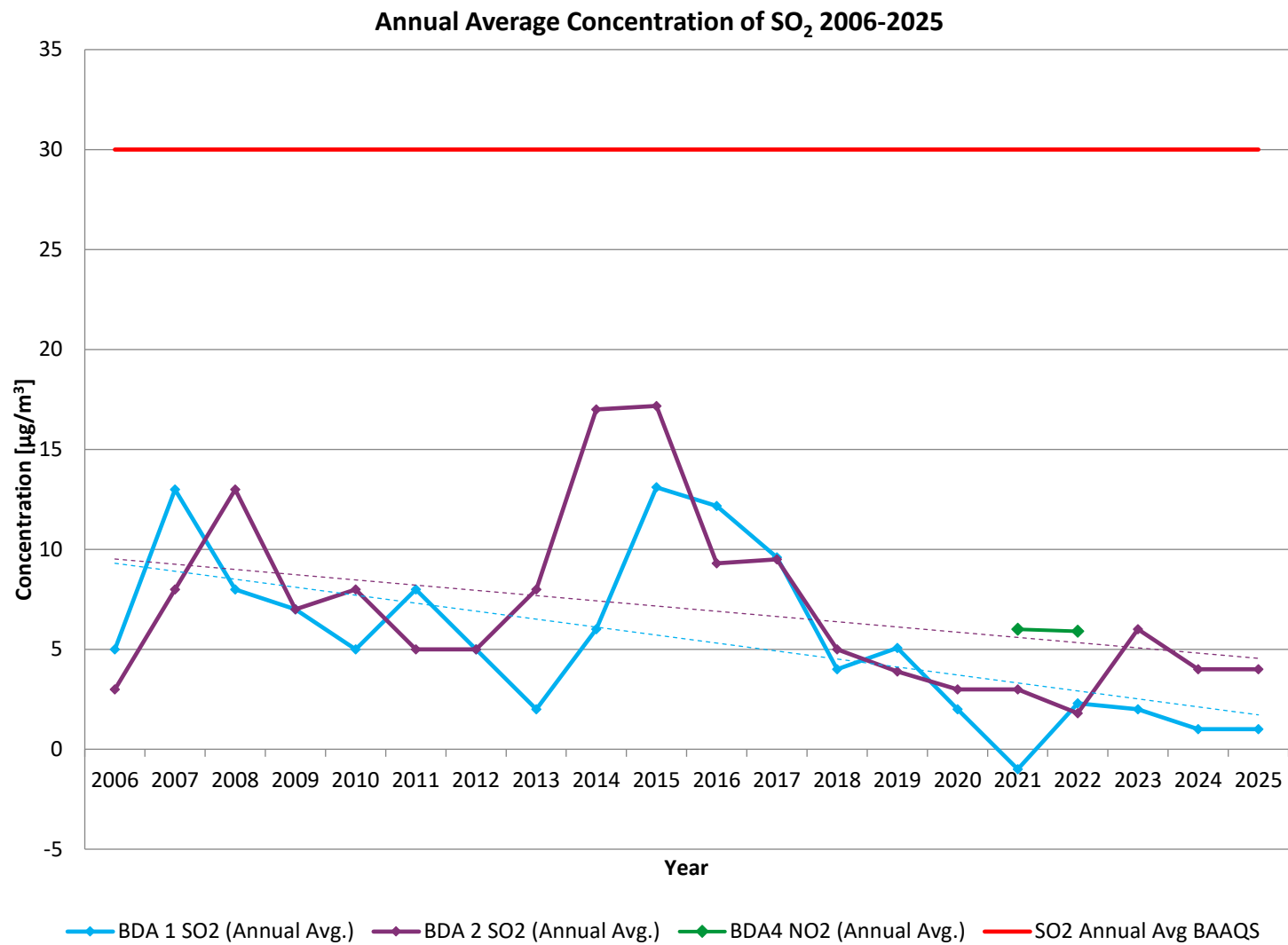


Fig. 9: Annual Average Concentration of SO₂ Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2006-2025

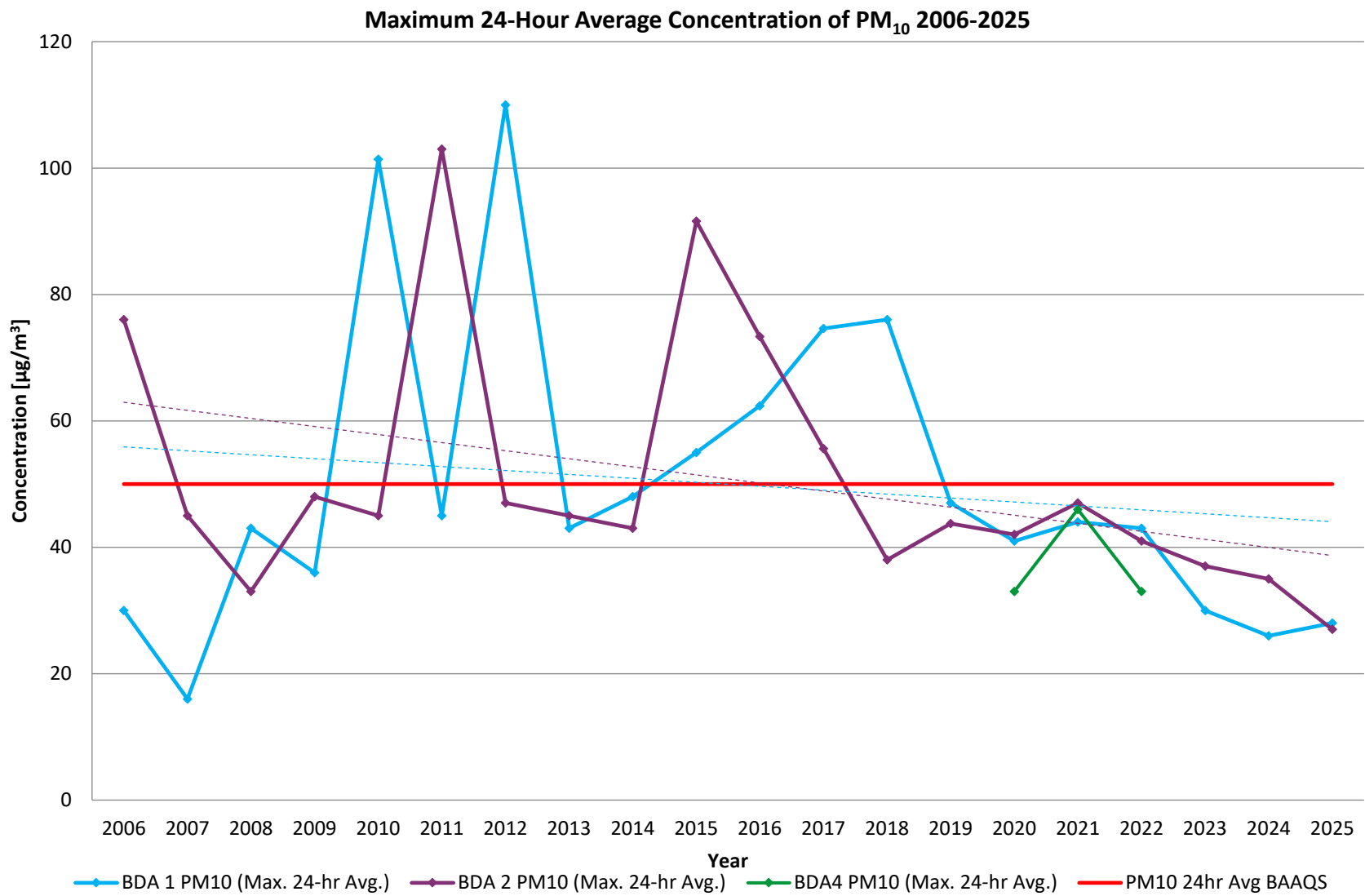


Fig. 10: Maximum 24-Hour Average Concentration of PM₁₀ Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2006-2025

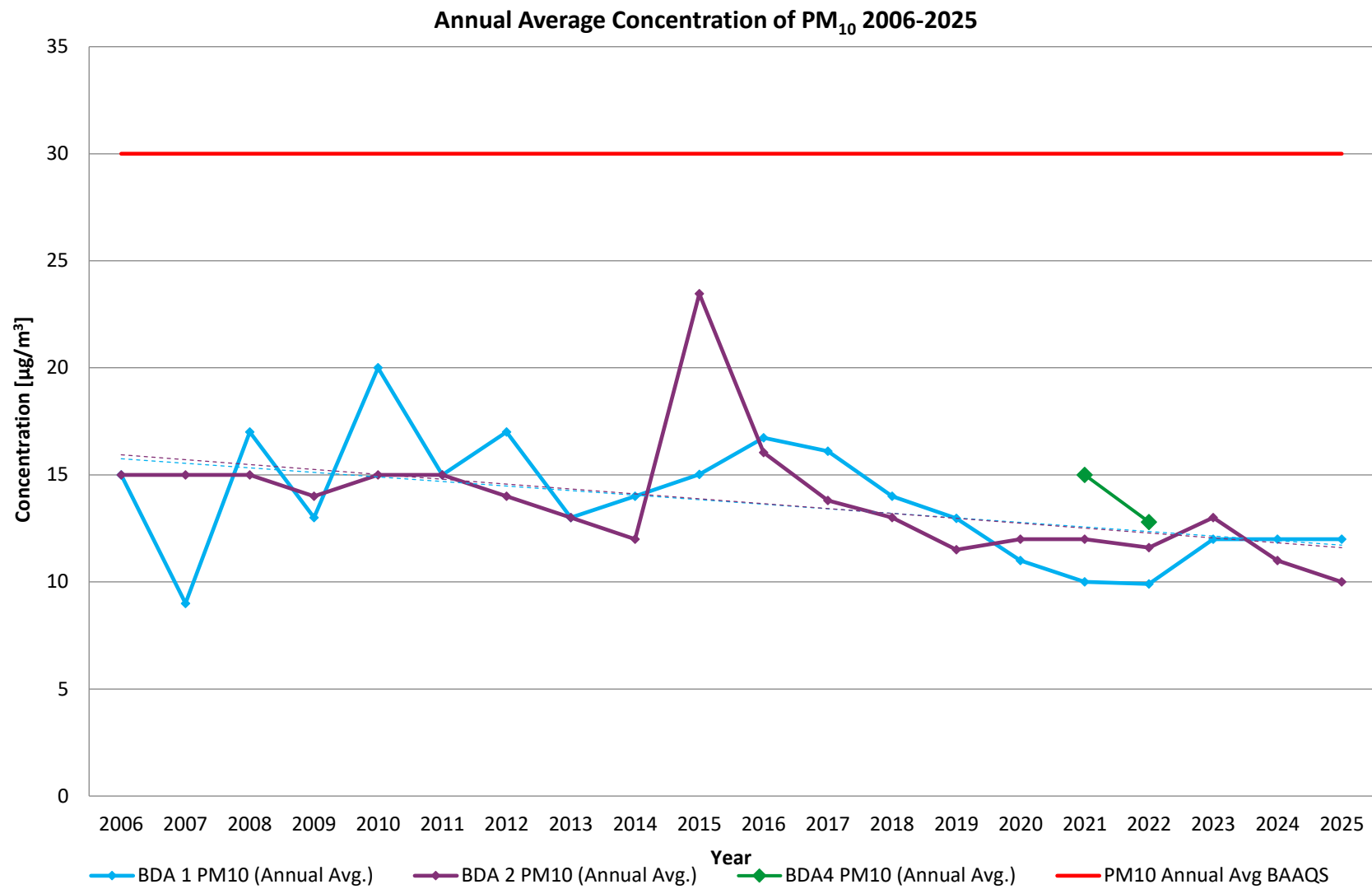


Fig. 11: Annual Average Concentration of PM₁₀ Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2006-2025

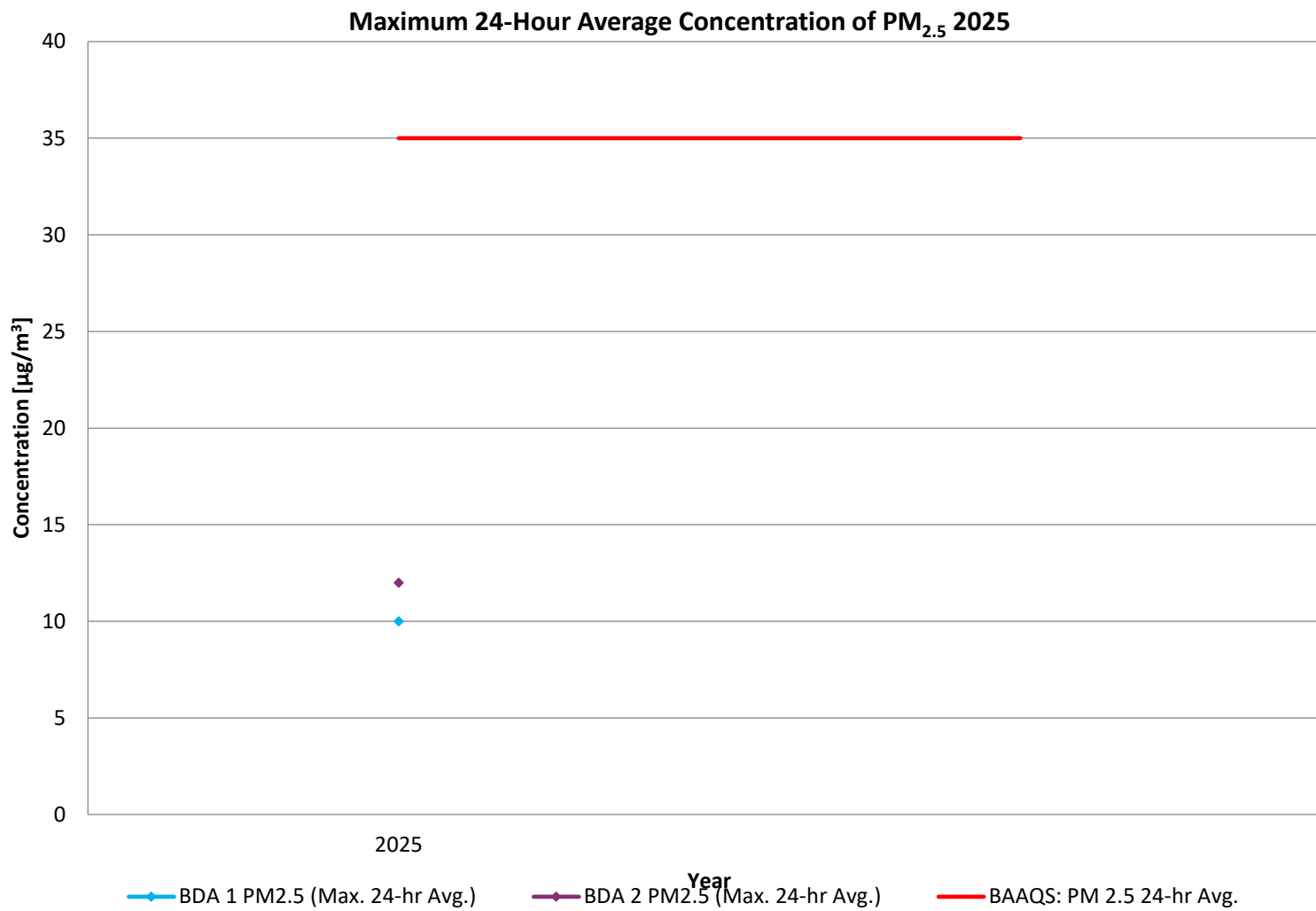


Fig. 12: Maximum 24-Hour Average Concentration of PM 2.5 Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2025

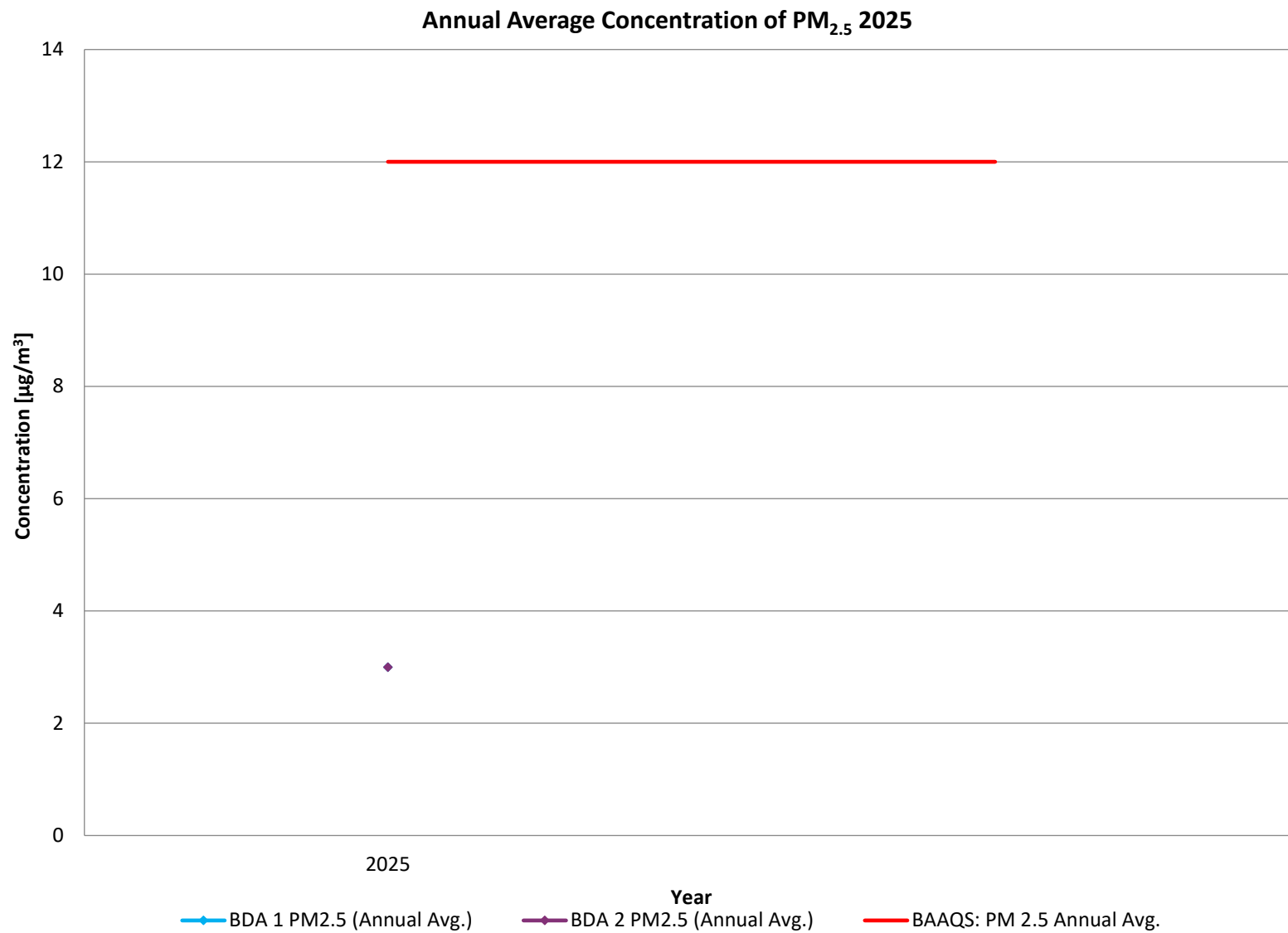


Fig. 13: Annual Average Concentration of PM 2.5 Recorded at BDA1, BDA2, and BDA4 Monitoring Stations 2025

Semiannual Audits

BELCO's Air Quality Monitoring System (AQMS) was audited in June and December of 2025 by an independent auditor, Environmental Engineering & Measurement Services, Inc., as per condition 5.4.7 of BELCO's Operating License Conditions. Full copies of the audit reports are provided in **Appendix A**.

Conclusion

Zero (0) exceedances of the Bermuda Ambient Air Quality Standards (BAAQS) were recorded during this reporting period. Annual average concentrations of all gaseous and particulate parameters were measured to be below BAAQS. All monitoring equipment was routinely maintained and calibrated throughout the year. Independent audits of BELCO's air quality monitoring program were completed in June and December of 2024.

Appendix A

Semiannual Audit Reports

NO_x / SO₂ / PM_{2.5} / PM₁₀ / and Meteorological Performance Audit Report of BELCO Monitoring Network

Performed June 2025

Prepared for:

**Bermuda Electric Light Company
P.O. 88821**

Prepared by:



**4577E NW 6th St Ext.
Gainesville, FL 32609**

**Report Submitted:
December 2025**

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Appendix A Audit Data Sheets

Appendix B Maps of Locations

Appendix C Audit Standards Certifications

List of Acronyms and Abbreviations

ASTM	American Society for Testing and Materials
BELCO	Bermuda Electric Light Company Limited
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
DAS	data acquisition system
EEMS	Environmental, Engineering & Measurement Services, Inc.
EPA	Environmental Protection Agency
FRM	Federal Reference Method
HWSP	Horizontal wind speed
lpm	liters per minute
mm Hg	millimeters of mercury
m/s	meters per second
NIST	National Institute of Standards and Technology
NO	nitric oxide
NO ₂	Nitrogen dioxide
NO _x	nitrogen oxide air pollutants (NO and NO ₂)
NPAP	National Performance Audit Program
QAPP	Quality Assurance Project Plan
OAQPS	Office of Air Quality Planning and Standards
QMP	Quality Management Plan
PM	particulate matter
PM _{2.5}	particulate matter of 2.5 microns in aerodynamic diameter or less
PM ₁₀	particulate matter of 10 microns in aerodynamic diameter or less
ppm	parts per million
PQAO	Primary Quality Assurance Organization
PSD	prevention of significant deterioration
QA	quality assurance
rpm	revolutions per minute
S/N	serial number
SLT	State, Local and Tribal
SO ₂	sulfur dioxide
SOP	standard operating procedure
TRC	TRC Environmental Corporation
TTP	Through-The-Probe
VWSP	Vertical wind speed
WDR	Wind direction
µg/m ³	micrograms per cubic meter

1.0 Introduction

Environmental, Engineering & Measurement Services, Inc. (EEMS) was contracted by Bermuda Electric Light Company Limited (BELCO) to perform audits of the air quality monitoring network operated by BELCO. This monitoring network is maintained by TRC on behalf of BELCO. The purpose of the network is to fulfill and comply with specific requirements as prescribed in section **5.4 Ambient Air Quality Monitoring Programme** of the “*Operating Licence Conditions, Clean Air Act, 1991, Bermuda Electric Light Company Limited, Licence number OL-114*”, issued by the Department of Environmental & Natural Resources and Environmental Authority.

The monitoring network quality assurance (QA) procedures must meet the requirements of US EPA for Prevention of Significant Deterioration (PSD) air quality analysis per 40 CFR (code of Federal Regulation) Part 58, Appendix B. As such, and as specified in the Operating License, the monitoring network must be independently audited. EEMS performed the independent audits following the procedures used for the National Performance Audit Program (NPAP) as is required of both PSD and State, Local, and Tribal (SLT) air monitoring Stations by the U.S. EPA.

The NPAP is a QA program implemented by the EPA Office of Air Quality Planning and Standards (OAQPS) to conduct audits of gaseous air pollutant monitors by standard methods throughout each region of the U.S. The method includes introduction of National Institute of Standards and Technology (NIST) traceable audit gases to the station monitors through the ambient sample inlet, including all filters and fittings. This method evaluates measurement system accuracy including the entire sample train. The audit gas concentrations are also usually measured and verified with an audit analyzer on-site which is calibrated at the time of the audit. The method allows for a “flowrate-based” audit in situations where the mobile audit lab cannot be deployed. The “flowrate-based” audit procedures were followed for audits of the BELCO network.

EEMS performed the Through-The-Probe (TTP) pollutant monitor audits following EPA’s Quality Assurance Guidance Document – Method Compendium – *Field Standard Operating Procedures (SOP) for the Federal PM_{2.5} Performance Evaluation Program and NPAP TTP Audit SOP*.

Meteorological sensors and the operational parameters of the particulate matter (PM) samplers at the stations were also audited with EEMS NIST-traceable standards. The meteorological audits were performed in accordance with the EPA *QA Handbook Volume IV – Meteorological Measurements*. All procedures and guidance documents used to perform the audits can be found at the EPA OAQPS website: <https://www.epa.gov/amtic>.

This report includes the results of the TTP audits, PM audits, and meteorological sensors audits conducted June 12th and 13th, 2025. The two stations in the monitoring network are located near and to the east and northeast of the power generation station in Hamilton. The BDA1 site is located to be impacted mostly by vehicle traffic since the older generators with lower discharge stacks have

been removed. The BDA2 site is farther from the plant and located to be impacted by the taller stacks and the recently added generators. Map images of the sites are included in Appendix B. The locations of the monitoring stations are provided in Table 1.

Table 1 Station Locations

Station	Latitude (°)	Longitude (°)	Elevation (meters)
BDA1	32.299403	-64.790214	11
BDA2	32.302913	-64.787001	38

The audited monitoring equipment operating at the stations is presented in Table 2.

Table 2 Equipment Audited

Station	Parameter	Manufacture	Model	Serial #
BDA1	PM ₁₀ & PM _{2.5}	TEI	TEOM 1405-DF	247512007
BDA1	Sulfur Dioxide	Teledyne API	T 100	2782
BDA1	Nitrogen Dioxide	Teledyne API	T 200	3322
BDA1	14.5 meter Wind Direction	R.M. Young	AQ-5305	171051
BDA1	14.5 meter Wind Speed	R.M. Young	AQ-5305	171051
BDA1	14.5 meter Vertical Wind Speed	R.M. Young	27106T	08600
BDA1	3.5 meter Temperature	R.M. Young	41342	031516
BDA1	3.5 meter Relative Humidity	Met One	083D-1-35	E5744
BDA2	PM ₁₀ & PM _{2.5}	TEI	TEOM 1405-DF	238341611
BDA2	Sulfur Dioxide	Teledyne API	T-100	5507
BDA2	Nitrogen Dioxide	Teledyne API	T-200	6542

Additional support materials operated at each site include a Teledyne API multi-gas dilution system (model T 700), Teledyne API zero-air generator (model 701), and NIST-traceable calibration gases.

Details of the audits are presented in the following sections:

Section 2.0	Audit Methods and Equipment
Section 3.0	Audit Results
Section 4.0	Technical Systems Audit
Appendix A	Audit Data Sheets
Appendix B	Maps of Locations
Appendix C	Audit Standards Certifications

The preparation of this report, and all the activities and tasks described in this report, were performed by an accredited NPAP-TTP/PEP mobile lab Field Scientist. All procedures followed during the audits were provided by OAQPS and are available at the OAQPS website:

<https://www.epa.gov/amtic>.

The Field Scientist certificates of achievement are included in Appendix C with the certification of the audit standards.

Any questions related to the audits or audit report should be addressed to:

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Telephone: 352-262-0802
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E-mail: eric.hebert@ee-ms.com

2.0 Audit Methods and Equipment

This section describes the steps followed in the performance of these audits. EEMS followed the documents referenced above rigorously.

2.1 Certification of EEMS Standards

All standards owned and maintained by EEMS undergo annual NIST-traceable certification. The standards include EPA Protocol Gas standards, digital multimeters, meteorological sensors and standards, and various flowrate measurement systems including DeltaCal devices and BIOS primary dry piston standards. Copies of the annual certifications of the EEMS standards used for the audits are included in Appendix C.

2.2 Protocol Gas Standard and Dilution System Calibration

EEMS owns and maintains a Thermo Environmental Instruments Inc. (TEI) 48iTLE carbon monoxide (CO) analyzer which is used to verify standard audit gas concentrations during TTP audits. The CO analyzer is mounted and operated in a climate controlled mobile laboratory with a multi-gas dilution system and NIST-traceable EPA Protocol Gas standards. The EEMS mobile lab could not be used for the BELCO station audits.

For the BELCO audits, EEMS owned primary flowrate standards were used to calibrate an EEMS owned dilution system. An EPA Protocol gas standard (certified by EPA in second quarter 2022) in conjunction with a BELCO owned zero air system (dedicated for audit only) were used with the dilution system calibrated by EEMS to generate audit gas concentrations to challenge the station monitors.

2.3 Summary of Field Activities

Onsite activity began on Monday June 9th which included the setup of the zero air, audit gas cylinder, and warmup of the EEMS dilution system. On Thursday the 12th, EEMS personnel met TRC personnel at BDA1. The EEMS dilution system was calibrated, followed by audits of the gaseous pollutant monitors, the TEOM, and meteorological sensors.

On Friday the 13th, the audit equipment was transported to BDA2, and TTP audits of the gaseous monitors and the audit of the TEOM were performed.

Photos of the sites are included in Figures 1 through 3.

Figure 1 BDA1 Station

The vegetation at BDA2 has been addressed. The growing vegetation will remain a challenge to maintain. It is suggested that a more routine and regularly scheduled maintenance plan be developed in order to minimize data quality impact. The text below is from 40 CFR Part 58 App E which defines distances from pollutant inlets to trees and shrubbery. It is a great improvement to siting criteria to have the vegetation in control and compliance with EPA siting criteria.

Note - From 40 CFR Part 58 App E:

5. Spacing From Trees

(a) Trees can provide surfaces for SO₂, O₃, or NO₂ adsorption or reactions, and surfaces for particle deposition. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where the trees are of a sufficient height and leaf canopy density to interfere with the normal airflow around the probe, inlet, or monitoring path. To reduce this possible interference/obstruction, the probe, inlet, or at least 90 percent of the monitoring path must be at least 10 meters or further from the drip line of trees.

(b) The scavenging effect of trees is greater for O₃ than for other criteria pollutants. Monitoring agencies must take steps to consider the impact of trees on ozone monitoring sites and take steps to avoid this problem.

(c) For microscale sites of any air pollutant, no trees or shrubs should be located between the probe and the source under investigation, such as a roadway or a stationary source.

Figures 2 and 3 include views of BDA2 following the vegetation control.

Figure 2 BDA2 Vegetation in Compliance



Figure 3 BDA2 Vegetation in Compliance From Parking Area



Figure 4 includes a photo of a potential safety hazard at BDA1. As can be seen in the photo the supports for the electrical service panel are completely rusted through, and the panel is only supported by the electrical conduit. The condition has worsened since the previous audit visit in December. The electrical service panel is beginning to lean. The support should be repaired as soon as possible.

Similar corrosion is beginning to form on the tower leg brackets that are secured in the concrete tower foundation. It is suggested that the visible rust be removed and protective coating and rust prevention applied before the condition worsens and compromises the tower.

Figure 4 Potential Safety Hazard – BDA1 Electrical Panel

2.4 Gaseous Pollutant Monitor Audit Activities

The site audits were accomplished by generating audit test gas using the dedicated dilution system, the dedicated BELCO zero air system, and EPA certified NIST-traceable audit gas cylinder. The dilution system was calibrated using the EEMS NIST-traceable primary flowrate standards. The audit gas was delivered to the station monitors at the station sample inlets, through all filters and fittings. The generated audit gas concentrations were calculated based on the flow rates and NIST-traceable multi-blend audit gas cylinder concentrations.

Audit test gas concentrations were selected from the OAQPS list of approved audit levels from 40 CFR Part 58. Table 3 provides the approved list of audit levels. Audit concentrations from at least three audit levels were selected for each monitor audit.

Table 3 Approved Audit Levels

Audit Level	Concentration Range, ppm			
	O₃	SO₂	NO₂	CO
1	0.004 - 0.0059	0.0003 - 0.0029	0.0003 - 0.0029	0.020 - 0.059
2	0.006 - 0.019	0.0030 - 0.0049	0.0030 - 0.0049	0.060 - 0.199
3	0.020 - 0.039	0.0050 - 0.0079	0.0050 - 0.0079	0.200 - 0.899
4	0.040 - 0.069	0.0080 - 0.0199	0.0080 - 0.0199	0.900 - 2.999
5	0.070 - 0.089	0.0200 - 0.0499	0.0200 - 0.0499	3.000 - 7.999
6	0.090 - 0.119	0.0500 - 0.0999	0.0500 - 0.0999	8.000 - 15.999
7	0.120 - 0.139	0.1000 - 0.1499	0.1000 - 0.2999	16.000 - 30.999
8	0.140 - 0.169	0.1500 - 0.2599	0.3000 - 0.4999	31.000 - 39.999
9	0.170 - 0.189	0.2600 - 0.7999	0.5000 - 0.7999	40.000 - 49.999
10	0.190 - 0.259	0.8000 - 1.000	0.8000 - 1.000	50.000 - 60.000

Specific audit concentrations were selected to be comparable with concentrations used for monitor calibrations, measured ambient concentrations, and instrument operating range. All station monitor values were obtained from the station DAS. Problems observed with the gaseous pollutant monitors are detailed in Section 3. The final results of the TTP audits are included in Section 3.0.

2.5 PM Sampler Audit Activities

The assessments were performed following manufacturer's recommendations using the EEMS DeltaCal and BIOS primary standards. The sample trains integrity checks were also performed. The time and date were verified for the samplers. The results of the verifications are summarized in Section 3.0.

2.6 Meteorological Audit Activities

The site temperature and relative humidity sensors were removed from normal operation in order to be verified with a certified EEMS standard. All station sensor values were obtained from the station DAS.

The station temperature sensor was placed in three separate water baths with the EEMS standard and the measurements were compared. The station relative humidity sensor was verified in ambient conditions and using a test chamber with water vapor. Humidity within the chamber was verified with the NIST-traceable EEMS handheld transfer standard.

The orientation of the sensor support crossarm was verified with the EEMS NIST-traceable transit both before and after lowering the tower for the sensor audits. The wind direction sensor orientation accuracy was tested by aligning the sensor with the crossarm after lowering the tower.

The linearity of the wind direction sensor was audited using a mounting jig in order to maintain the same orientation when in operation. Figure 5 includes a photo of the sensor during the audit. The linearity of the sensor was verified by changing the wind direction sensor in 30-degree increments and verifying that the output also increased by 30 degrees.

The wind speed sensors were audited by rotating the propeller shafts at known speeds and calculating the corresponding wind speeds in meters per second (m/s). The relationship of revolutions per minute (rpm) to wind speed in m/s is provided by the sensor manufacturer.

Figure 5 BDA1 Wind Sensor Audit

3.0 Audit Results

3.1 TTP Audit Results

Gaseous pollutant audit results are summarized in Tables 4 and 5.

The results of the TTP audits indicate that all monitors at both stations are responding lower than expected when challenged with audit gas. It should be noted that the site staff reported that the monitors are normally adjusted if audit, QC, or calibration results are greater than $\pm 7\%$.

Although all test points were not within the acceptance limits of $\pm 15\%$ (or 1.5 ppb for audit levels less than 3) of any single audit point, the observed bias is a result of audit gas cylinder concentration drift or contamination, as verified by subsequent testing. The drift is more prevalent in the SO₂ concentration rather than the NO concentration.

As observed during previous audits, the results obtained using the EEMS dilution system, and audit gas cylinder indicate a consistent difference from the TRC calibration system. The difference between the systems has increased since the previous audit by approximately 10% to a difference of approximately 15%. During the audit at BDA1 the EEMS audit gas delivery line was replaced with the TRC calibration gas delivery line without changing any other system components or settings. The audit gas standard was also switched to the TRC gas cylinder. Both of these tests were intended to confirm that the difference was caused by a difference between the standard gas cylinders and not the calibration of the monitors or dilution systems. Results of this test confirmed that the dilution systems are calibrated accurately, and the difference can be attributed to the gas cylinders. This was also verified by using a new audit gas cylinder during a subsequent audit in December.

Converter efficiencies for the NO_x monitors were evaluated based on the OAQPS Quality Assurance Guidance Document 2.3 *Reference Method for the Determination of Nitrogen Dioxide in the Atmosphere (Chemiluminescence) February 2002*, which uses the slope of the test point rather than the individual test points. Converter efficiencies for each test point are included on the audit forms in Appendix A.

The field audit forms are included in Appendix A. Other observations noted for the monitors are included after the tables. Observations related to site operations are included in Section 4.

Table 4 Gaseous Pollutant Monitor Audit Results BDA1

Parameter and Audit Level	Audit Value (ppm)	Site Value (ppm)	Actual Difference (ppm)	% Difference *	Pass Warning Fail *
BDA1					
NO ₂ -- level 7	0.2733	0.2498	-0.0235	-8.6 %	Pass
NO ₂ -- level 7	0.1875	0.1708	-0.0167	-8.9 %	Pass
NO ₂ -- level 6	0.0514	0.0458	-0.0056	-10.8 %	Warning
NO ₂ -- level 4	0.0151	0.0136	-0.0015	-9.6 %	Pass
NO ₂ -- level 3	0.0057	0.0056	-0.0001	-1.2 %	Pass
NO Conv Eff -- level 7		100.0 %			
NO Conv Eff -- level 7		99.3 %			
NO Conv Eff -- level 6		100.0 %			
NO Conv Eff -- level 4		100.4 %			
NO Conv Eff -- level 3		103.7 %			
Converter Efficiency Calculated by OAQPS QA Guidance Doc 2.3 February 2002				99.8 %	Pass
SO ₂ -- level 9	0.3526	0.2958	-0.0568	-16.1 %	Fail
SO ₂ -- level 8	0.2380	0.1995	-0.0385	-16.2 %	Fail
SO ₂ -- level 6	0.0938	0.0781	-0.0157	-16.7 %	Fail
SO ₂ -- level 5	0.0470	0.0384	-0.0086	-18.3 %	Warning
SO ₂ -- level 4	0.0194	0.0165	-0.0029	-14.9 %	Warning
SO ₂ -- level 2	0.0047	0.0047	0.0000	N/A	Pass

***Note: bias observed due to audit gas concentration drift not accuracy of dilution system or monitor**

Table 5 Gaseous Pollutant Monitor Audit Results BDA2

Parameter and Audit Level	Audit Value (ppm)	Site Value (ppm)	Actual Difference (ppm)	% Difference *	Pass Warning Fail *
BDA2					
NO ₂ – level 7	0.2778	0.2732	-0.0046	-1.7 %	Pass
NO ₂ – level 7	0.1896	0.1865	-0.0031	-1.6 %	Pass
NO ₂ – level 6	0.0509	0.0513	0.0004	0.8 %	Pass
NO ₂ – level 4	0.0155	0.0153	-0.0001	-0.9 %	Pass
NO ₂ – level 3	0.0063	0.0063	-0.0000	-0.5 %	Pass
NO Conv Eff -- level 7		100.3 %			
NO Conv Eff -- level 7		99.6 %			
NO Conv Eff -- level 6		101.6 %			
NO Conv Eff -- level 4		100.9 %			
NO Conv Eff -- level 3		96.7 %			
Converter Efficiency Calculated by OAQPS QA Guidance Doc 2.3 February 2002				100.0 %	Pass
SO ₂ -- level 9	0.3526	0.3043	-0.0483	-13.7 %	Warning
SO ₂ -- level 8	0.2380	0.2046	-0.0334	-14.0 %	Warning
SO ₂ -- level 6	0.0938	0.0800	-0.0138	-14.7 %	Warning
SO ₂ -- level 5	0.0470	0.0401	-0.0069	-14.7 %	Warning
SO ₂ -- level 4	0.0194	0.0165	-0.0029	-14.8 %	Warning
SO ₂ -- level 2	Not tested	Not tested	Not tested	N/A	---

***Note: bias observed due to audit gas concentration drift not accuracy of dilution system or monitor**

As observed during the previous audit, the monitors at BDA2 respond slower to changes in audit gas concentration when compared to the monitors at BDA1. The response of the NO_x monitor was slower than the SO₂ monitor especially from 50ppb and lower when the monitor did not switch to “fast” sampling mode.

3.2 PM Samplers Operational Verification Audit Results

The summary data for all flowrate channels, for both TEOM monitors, are reported in Table 6 below. The flowrate is the most critical variable and each of the other variables (temperature and pressure) are used to determine the flowrate, therefore errors in the temperature and pressure measurements will be reflected in the flowrate parameter.

The final PM verification forms for all measured variables are included in Appendix A. The time and dates of all samplers were verified and found to be within acceptable limits.

Table 6 PM Sampler Flow rate Verifications

Sampler and Parameter	Audit Flow Rate (lpm)	Sampler Flow Rate (lpm)	% Difference	Pass / Fail
BDA1				
TEOM Total	16.54	16.68	0.85 %	Pass
TEOM Bypass	11.76	12.00	2.07 %	Pass
TEOM PM 2.5	3.10	3.00	-3.30 %	Pass
TEOM Coarse	1.68	1.67	-0.58 %	Pass
BDA2				
TEOM Total	16.29	16.68	2.39 %	Pass
TEOM Bypass	11.64	11.99	3.03 %	Pass
TEOM PM 2.5	3.00	3.00	-0.10 %	Pass
TEOM Coarse	1.65	1.67	1.22 %	Pass

The mass verification measurements of both TEOM samplers were found to be within acceptable criteria.

3.3 Meteorological Sensors Audit Results

The average alignment accuracy error of the wind direction sensor was within acceptance limits. The wind direction sensor is linear throughout the range. Both the horizontal and vertical wind speed sensors were found to be accurate.

The starting torque measurements for the wind direction sensor was found to be above the acceptance limits established in the QAPP.

The relative humidity sensor was verified using a NIST-traceable EEMS transfer standard. The sensor filter was dirty and was cleaned by site operator during the audit.

The BDA1 temperature sensor was found to be within 0.5 degree Celsius when compared to the NIST-traceable standard.

Summaries of all the meteorological sensor audits are included in Table 8. All audit results were within commonly adopted data quality acceptance criteria. Complete data sheets with each audit point for each sensor are included in Appendix A.

Table 7 Meteorological Sensors Audit Summary

Parameter	Audit Value	Station Value	Difference	Units
BDA1				
14.5 m WDR Accuracy	67.6	63.4	-4.2	Degrees
14.5 m WDR Accuracy	247.6	256.2	5.0	Degrees
14.5 m WDR Accuracy Average Error			0.4	Degrees
14.5 m WDR std dev of the linearity error	CW (30 deg x 12)		1.60	Degrees
14.5 m WDR std dev of the linearity error	CCW (30 deg x 12)		1.40	Degrees
14.5 m HWSP < 5 m/s avg. error			0.00	m/s
14.5 m HWSP > 5 m/s avg. error			-0.17 %	% diff (m/s)

Parameter	Audit Value	Station Value	Difference	Units
14.5 m VWSP CW avg. error			-0.04	m/s
14.5 m VWSP CCW avg. error			0.04	m/s
3.5 m Temperature	0.04	0.48	0.44	Degree C
3.5 m Temperature	27.14	27.23	0.09	Degree C
3.5 m Temperature	43.54	43.44	-0.107	Degree C
3.5 m Relative Humidity	60.5	65.5	5.0 %	% RH
3.5 m Relative Humidity	89.8	91.6	1.8 %	% RH
3.5 m Relative Humidity	22.1	28.3	6.2 %	% RH

4.0 Technical Systems Audit

Technical systems audits (TSA) are comprised of the overall evaluation of a total monitoring program. A TSA includes a thorough, systematic, on-site, qualitative audit of facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and the reporting aspects of a system. All aspects of the monitoring program are reviewed to assess if the program is meeting the data quality objectives (DQO) and the goals of the program.

The 40 CFR Part 58 Appendix A Section 2.5 defines the requirements for TSA for each Primary Quality Assurance Organization (PQAO) and can be found at: https://www.ecfr.gov/cgi-bin/text-idx?SID=8dc5bfe4312574da8db9f99dbaa6f784&mc=true&node=ap40.6.58_161.a&rgn=div9 Additional information related to the specific procedures of a TSA was presented at the National Ambient Air Monitoring Conference workshop QA 101 training session: **Technical Systems Audits QA 101 Session**, *Greg Noah, EPA OAQPS, RTP, NC, Stephanie McCarthy, EPA Region 4, SESD, Athens, GA.*

Although a formal TSA was not conducted in conjunction with the performance and accuracy evaluations of the pollutant monitors and meteorological sensors, some general observations of the monitoring program were noted. This section summarizes those observations to assist the BELCO program manager with addressing the data quality aspects of the air monitoring network.

4.1 Management and Project Documentation

Determining and defining the goals of an air quality monitoring program is essential for the success of the program. The Quality Management Plan (QMP) developed and implemented by the entity responsible for administering the program, and the specific Quality Assurance Project Plan (QAPP) governing the project operation are the documents which define the goals. Those documents should be completed and routinely reviewed and updated. The QMP and QAPP will be reviewed during a TSA to evaluate if the monitoring network is being operated (including data validation and reporting) in adherence with the documentation.

All Standard Operating Procedures (SOP) should be included in the QAPP and available either electronically or hardcopy at each monitoring location. The SOP should clearly define the responsibilities of the site operator with respect to each monitor and DAS at each site and all aspects relating to:

- Routine operation and diagnostics
- Acceptable operational and diagnostic criteria
- QC/QA procedures, criteria, and corrective actions
- Routine maintenance

4.1.1 Site Documentation

As observed during previous audits, the hardcopy logbooks could be improved. Some suggestions to improve the site documentation are outlined below.

1. Logbooks should have each entry dated when entered with no blank spaces between entries. Each visit is documented in succession.
2. Each entry in the logbook should be signed or initialed. Corrections to entries should be a single strike-through initialized and dated.
3. The logbook should be duplicated (ideally electronically) and available to data validation and QA staff.
4. Ideally page numbers should be included on each page.

4.2 Siting Criteria

Appendix E to 40 CFR Part 58 defines air quality monitoring siting criteria for pollutant monitors. It was observed that the BDA2 station vegetation issues have been improved and are now compliant with EPA guidance documents. It is recommended that the routine and regular maintenance be added to the QAPP and SOP for BDA2.

4.3 Monitor Configuration

It was observed that all the gaseous pollutant monitors in the network did not respond in the same manner when audit gas concentration was changed. This could cause inaccurate measurements of short duration pollutant plumes. It is suggested that all the monitor configuration settings be reviewed and the desired configuration be implemented at all sites for all monitors. The configuration file should be documented and be included in the QAPP.

All monitor and sampler time and date settings should be verified regularly. If for some reason data are not available on the data loggers at the sites, data could be recovered directly from the monitors and samplers, therefore it is important that the time and date are correct.

4.4 Shelter Temperature

The shelters do not have an independent sensor to measure and record shelter temperature. Currently the internal monitor temperature is being logged and monitored. The monitors are designed and designated by the EPA to be operated within a specific temperature range. Shelter temperature should be added to the stations.

4.5 Sample Inlet Maintenance

The sample inlet filters were observed to be clean and recently changed at both sites. Filter change frequency and log of filter changes should be documented.

4.6 Automatic Monitor Span/Precision Tests and TEOM Verifications

The network would benefit from having automatic span/precision/and zero checks configured and performed using the site dilution systems and data loggers. This would help to identify issues with the monitors and reduce data loss.

The operational parameters of the TEOM monitors should be verified monthly for the same reasons as mentioned for the gaseous pollutant monitors.

APPENDIX A

Audit Data Sheets

FINAL SUMMARY AUDIT REPORT FLOW BASED
EEMS Van-3

Site Name: BDA1

Airs ID: 0

Auditor: Eric Hebert (EEMS)

Audit Date: 6/12/2025

Audit levels correspond to EPA approved audit levels found in CFR 40 Part 58

Parameter	Mobile Lab Response (ppm)	Station Response (ppm)	Percent Difference	Actual Difference (ppm)	Pass/Fail	Warning
Ozone						
Pre Zero						
Audit Level 5					N/A	
Audit Level 4					N/A	
Audit Level 3					N/A	
Audit Level 2					N/A	
Post Zero						
Airs ID:						
Pre Zero	0.0000					
CO Audit level 5	0.0000				N/A	
CO Audit level 4	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 2	0.0000				N/A	
CO Audit level 1	0.0000				N/A	
Post Zero	0.0000					
Oxides of Nitrogen						
Pre Zero	0.0000	0.0000		0.0000	Pass	
NO Audit Point #1	0.3728	0.3407	-8.6	-0.0321	Pass	
NO Audit Point #2	0.2517	0.2303	-8.5	-0.0214	Pass	
NO Audit Point #3	0.0992	0.0910	-8.3	-0.0082	Pass	
NO Audit Point #4	0.0496	0.0447	-9.9	-0.0049	Pass	
NO Audit Point #5	0.0205	0.0184	-10.2	-0.0021	Pass	Warning
NO Audit Point #6	0.0050	0.0046	-7.6	-0.0004	Pass	
Post Zero	0.0000	0.0001		0.0001	Pass	
Pre Zero	0.0000	-0.0002		-0.0002	Pass	
NOx Audit Point #1	0.3752	0.3415	-9.0	-0.0337	Pass	
NOx Audit Point #2	0.2533	0.2318	-8.5	-0.0215	Pass	
NOx Audit Point #3	0.0998	0.0901	-9.7	-0.0097	Pass	
NOx Audit Point #4	0.0500	0.0447	-10.7	-0.0053	Pass	
NOx Audit Point #5	0.0206	0.0187	-9.0	-0.0019	Pass	
NOx Audit Point #6	0.0050	0.0046	-8.0	-0.0004	Pass	
Post Zero	0.0000	-0.0003		-0.0003	Pass	
Pre Zero	0.0000	-0.0002		-0.0002	Pass	
NO2 Audit level 7	0.2733	0.2498	-8.6	-0.0235	Pass	
NO2 Audit level 7	0.1875	0.1708	-8.9	-0.0167	Pass	
NO2 Audit level 6	0.0514	0.0458	-10.8	-0.0056	Pass	Warning
NO2 Audit level 4	0.0151	0.0136	-9.6	-0.0015	Pass	
NO2 Audit level 3	0.0057	0.0056	-1.2	-0.0001	Pass	
Post Zero	0.0000	-0.0003		-0.0003	Pass	
Converter Efficiency NO2 level 7	100.0%					
Converter Efficiency NO2 level 7	99.3%					
Converter Efficiency NO2 level 6	100.0%					
Converter Efficiency NO2 level 4	100.4%					
Converter Efficiency NO2 level 3	103.7%					
Converter Efficiency calculated by OAQPS QA Guidance Doc 2.3 February 2002 =				99.8%	Pass	
Sulfur Dioxide						
Pre Zero	0.0000	0.0010		0.0010	Pass	
SO2 Audit level 9	0.3526	0.2958	-16.1	-0.0568	Fail	
SO2 Audit level 8	0.2380	0.1995	-16.2	-0.0385	Fail	
SO2 Audit level 6	0.0938	0.0781	-16.7	-0.0157	Fail	
SO2 Audit level 5	0.0470	0.0384	-18.3	-0.0086	Fail	
SO2 Audit level 4	0.0194	0.0165	-14.9	-0.0029	Pass	Warning
SO2 Audit level 2	0.0047	0.0047	0.4	0.0000	Pass	
Post Zero	0.0000	0.0006		0.0006	Pass	

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

Site Name: BDA1
Auditor: Eric Hebert (EEMS)
Station Manager: Bailey McAuley (TRC) / Kascia DaSilva (BELCO)

Airs ID: 0
Audit Date: 06/12/25

NITROGEN OXIDES REPORT

MOBILE LAB INSTRUMENTS					STATION INSTRUMENT INFORMATION		
Instrument:	Jzone -- # 0111 CO -- # 01132				Instrument:	NO/NOX	
Manufacturer:	Thermo	TEI			Manufacturer / Model #	T-API	T200
Model:	49i-A1ZCA	48i TLE			Property Number	3322	
Serial Number:	1180030022	1406960656			Last Calibration Date	01/00/00	
Calibration Date:	02/15/24	Calibrated			Offset / Slope	0.000	0.977
Slope	0.9997	on			Indicated Flow (ccm)	490	
Intercept	0.0003171	day of audit			In-Line Filter Change	1/0/1900	
					Instrument Range / units	500 ppb	
EPA Protocol	Certifying	Date	NO	NOx	DAS make / model / s/n	0	0
Gas #	Agency		Concentration (ppm)	Concentration (ppm)	Time Data Flagged (audit start / end)	0:00	0:00
EA0014042	EPA R7	5/6/2022	24.72	24.8	Local Primary Standard	EPA PROTOCOL GAS	
					Manifold Type:	Teflon	

FINAL NO ₂ AUDIT RESULTS			FINAL NO _x AUDIT RESULTS		
Audit NO Concentration (ppm)	Site Response (ppm)	Percent Difference	Audit NO _x CONCENTRATION (ppm)	SITE RESPONSE (ppm)	Percent Difference
0.0000	0.0000		0.0000	-0.0002	
0.3728	0.3407	-8.6	0.3752	0.3415	-9.0
0.2517	0.2303	-8.5	0.2533	0.2318	-8.5
0.0992	0.0910	-8.3	0.0998	0.0901	-9.7
0.0496	0.0447	-9.9	0.0500	0.0447	-10.7
0.0205	0.0184	-10.2	0.0206	0.0187	-9.0
0.0050	0.0046	-7.6	0.0050	0.0046	-8.0
0.0000	0.0001		0.0000	-0.0003	

NO Audit Point #1	Pass	Warning	NO _x Audit Point #1	Pass	Warning
NO Audit Point #2	Pass		NO _x Audit Point #2	Pass	
NO Audit Point #2	Pass		NO _x Audit Point #2	Pass	
NO Audit Point #3	Pass		NO _x Audit Point #3	Pass	Warning
NO Audit Point #4	Pass	Warning	NO _x Audit Point #4	Pass	
NO Audit Point #5	Pass		NO _x Audit Point #5	Pass	
NO Audit Point #6	N/A		NO _x Audit Point #6	N/A	

FINAL NO ₂ AUDIT RESULTS					Audit Limits	
Audit NO ₂ Concentration (ppm)	Site Response (ppm)	Percent Difference	Converter Efficiency	Actual Diff (ppm)	Pass	Bias < ±15% Levels 3 and above
0.00120	0.00078			-0.00042	Fail	Bias > ±15% OR > ± 1.5 ppb Levels 1 & 2
0.27330	0.24980	-8.6	100.0%	-0.02350	Warning	Bias > ±10% Levels 3 and above
0.18750	0.17080	-8.9	99.3%	-0.01670	Pass	above 96%
0.05140	0.04583	-10.8	100.0%	-0.00557		
0.01506	0.01361	-9.6	100.4%	-0.00145	Fail	<96%
0.00570	0.00563	-1.2	103.7%	-0.00007	Warning	Between 96%-97%
0.00000	0.00000			0.00000		

NO ₂ Audit level 7	Pass	Warning	Auditor Eric Hebert Print <i>Eric Hebert</i> Signature EPA person notified in case of audit failure		
NO ₂ Audit level 7	Pass				
NO ₂ Audit level 6	Pass	Warning			
NO ₂ Audit level 4	Pass				
NO ₂ Audit level 3	Pass				
Converter Efficiency NO ₂ level 7	Pass				
Converter Efficiency NO ₂ level 7	Pass				
Converter Efficiency NO ₂ level 6	Pass				
Converter Efficiency NO ₂ level 4	Pass				
Converter Efficiency NO ₂ level 3	Pass				
Converter Efficiency by slope =	Pass		Conv eff by slope = 99.8%		

Comments:
0

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

SULFUR DIOXIDE REPORT

Site Name: BDA1
Auditor: Eric Hebert (EEMS)
Station Manager: Bailey McAuley (TRC) / Kascia DaSilva (BELCO)

Airs ID: 0
Audit Date: 06/12/25

	<u>MOBILE LAB INSTRUMENTS</u>		EPA Protocol	Certifying Agency	Date	Concentration (ppm)
Instrument:	Ozone -- # 01114	CO -- # 01132	Gas #			
Manufacturer:	Thermo	TEI				
Model:	49i-A1ZCA	48i TLE	EA0014042	EPA R7	5/6/2022	23.38
Serial Number:	1180030022	1406960656				
Calibration Date:	02/15/24	Calibrated				
Slope	0.9997	on				
Intercept	0.0003171	day of audit				

	<u>STATION INSTRUMENT INFORMATION</u>	
Instrument:	SO2	
Manufacturer / Model #	T-API	T100
Property Number	2782	
Last Calibration Date	01/00/00	
Offset / Slope	0.083	0.990
Indicated Flow (ccm)	706	
In-Line Filter Change	1/0/1900	
Instrument Range / units	500 ppb	
DAS make / model / s/n	0	0
Time Data Flagged (audit start / end)	0:00	0:00
Local Primary Standard	EPA PROTOCOL GAS	
Manifold Type:	Teflon	

FINAL SULFUR DIOXIDE AUDIT RESULTS

Audit SO2 Concentration (ppm)	Site Response (ppm)	Percent Difference	Actual Diff (ppm)
0.0000	0.0010		0.00103
0.3526	0.2958	-16.1	-0.0568
0.2380	0.1995	-16.2	-0.0385
0.0938	0.0781	-16.7	-0.01566
0.0470	0.0384	-18.3	-0.0086
0.0194	0.0165	-14.9	-0.00290
0.0047	0.0047	0.4	2E-05
0.0000	0.0006		0.00056

	<u>Pass/Fail</u>	<u>Warning</u>
SO2 Audit level 9	Fail	
SO2 Audit level 8	Fail	
SO2 Audit level 6	Fail	
SO2 Audit level 5	Fail	
SO2 Audit level 4	Pass	Warning
SO2 Audit level 2	Pass	

Auditor	Eric Hebert
	Print
	<i>Eric Hebert</i>
	Signature
EPA person notified in case of audit failure	

Audit Limits

Pass	Bias < ±15% Levels 3 and above
Fail	Bias > ±15% OR difference from actual concentration > ± 1.5 ppb Levels 1 & 2
Warning	Bias > ±10% Levels 3 and above

Comments:

Additional tests confirm that bias is caused by audit gas cylinder drift or contamination.

FINAL SUMMARY AUDIT REPORT FLOW BASED

EEMS Van-3

Site Name: BDA2

Airs ID: 0

Auditor: Eric Hebert (EEMS)

Audit Date: 6/13/2025

Audit levels correspond to EPA approved audit levels found in CFR 40 Part 58

Parameter	Mobile Lab Response (ppm)	Station Response (ppm)	Percent Difference	Actual Difference (ppm)	Pass/Fail	Warning
Ozone						
Pre Zero						
Audit Level 5					N/A	
Audit Level 4					N/A	
Audit Level 3					N/A	
Audit Level 2					N/A	
Post Zero						
Carbon Monoxide						
Pre Zero	0.0000					
CO Audit level 5	0.000				N/A	
CO Audit level 4	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 2	0.0000				N/A	
CO Audit level 1	0.0000				N/A	
Post Zero	0.0000					
Oxides of Nitrogen						
Pre Zero	0.0000	0.0003		0.0003	Pass	
NO Audit Point #1	0.3728	0.3680	-1.3	-0.0048	Pass	
NO Audit Point #2	0.2517	0.2473	-1.7	-0.0044	Pass	
NO Audit Point #3	0.0992	0.0959	-3.3	-0.0033	Pass	
NO Audit Point #4	0.0496	0.0483	-2.5	-0.0013	Pass	
NO Audit Point #5	0.0205	0.0197	-3.9	-0.0008	Pass	
NO Audit Point #6	0.0050		#VALUE!		N/A	
Post Zero	0.0000	0.0001		0.0001	Pass	
Pre Zero	0.0000	0.0011		0.0011	Pass	
NOx Audit Point #1	0.3752	0.3676	-2.0	-0.0076	Pass	
NOx Audit Point #2	0.2533	0.2484	-1.9	-0.0049	Pass	
NOx Audit Point #3	0.0998	0.0965	-3.3	-0.0033	Pass	
NOx Audit Point #4	0.0500	0.0484	-3.1	-0.0016	Pass	
NOx Audit Point #5	0.0206	0.0201	-2.4	-0.0005	Pass	
NOx Audit Point #6	0.0050		#VALUE!		N/A	
Post Zero	0.0000	-0.0003		-0.0003	Pass	
Pre Zero	0.0000	0.0011		0.0011	Pass	
NO2 Audit level 7	0.2778	0.2732	-1.7	-0.0046	Pass	
NO2 Audit level 7	0.1896	0.1865	-1.6	-0.0031	Pass	
NO2 Audit level 6	0.0509	0.0513	0.8	0.0004	Pass	
NO2 Audit level 4	0.0155	0.0153	-0.9	-0.0001	Pass	
NO2 Audit level 3	0.0063	0.0063	-0.5	0.0000	Pass	Warning
Post Zero	0.0000	-0.0003		-0.0003	Pass	
Converter Efficiency NO2 level 7	100.3%					
Converter Efficiency NO2 level 7	99.6%					
Converter Efficiency NO2 level 6	101.6%					
Converter Efficiency NO2 level 4	100.9%					
Converter Efficiency NO2 level 3	96.7%					Warning
Converter Efficiency calculated by OAQPS QA Guidance Doc 2.3 February 2002 =				100.0%	Pass	
Sulfur Dioxide						
Pre Zero	0.0000	0.0001		0.0001	Pass	
SO2 Audit level 9	0.3526	0.3043	-13.7	-0.0483	Pass	Warning
SO2 Audit level 8	0.2380	0.2046	-14.0	-0.0334	Pass	Warning
SO2 Audit level 6	0.0938	0.0800	-14.7	-0.0138	Pass	Warning
SO2 Audit level 5	0.0470	0.0401	-14.7	-0.0069	Pass	Warning
SO2 Audit level 4	0.0194	0.0165	-14.8	-0.0029	Pass	Warning
SO2 Audit level 2	0.0047				N/A	
Post Zero	0.0000	0.0006		0.0006	Pass	

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

Site Name: BDA2
Auditor: Eric Hebert (EEMS)
Station Manager: Bailey McAuley (TRC) / Kascia DaSilva (BELCO)

Airs ID: 0
Audit Date: 06/13/25

NITROGEN OXIDES REPORT

MOBILE LAB INSTRUMENTS					STATION INSTRUMENT INFORMATION		
Instrument:	Jzone -- # 0111 CO -- # 01132				Instrument:	NO/NOX	
Manufacturer:	Thermo	TEI			Manufacturer / Model #	T-API	T200
Model:	49i-A1ZCA	48i TLE			Property Number	6542	
Serial Number:	1180030022	1406960656			Last Calibration Date	01/00/00	
Calibration Date:	02/15/24	Calibrated			Offset / Slope	1.142	0.300
Slope	0.9997	on			Indicated Flow (ccm)	470	
Intercept	0.0003171	day of audit			In-Line Filter Change	1/0/1900	
					Instrument Range / units	500 ppb	
EPA Protocol	Certifying	Date	NO	NOx	DAS make / model / s/n	0	0
Gas #	Agency		Concentration (ppm)	Concentration (ppm)	Time Data Flagged (audit start / end)	0:00	0:00
EA0014042	EPA R7	5/6/2022	24.72	24.8	Local Primary Standard	EPA PROTOCOL GAS	
					Manifold Type:	Teflon	

FINAL NO AUDIT RESULTS			FINAL NOx AUDIT RESULTS		
Audit NO Concentration (ppm)	Site Response (ppm)	Percent Difference	Audit NOX CONCENTRATION (ppm)	SITE RESPONSE (ppm)	Percent Difference
0.0000	0.0003		0.0000	0.0011	
0.3728	0.3680	-1.3	0.3752	0.3676	-2.0
0.2517	0.2473	-1.7	0.2533	0.2484	-1.9
0.0992	0.0959	-3.3	0.0998	0.0965	-3.3
0.0496	0.0483	-2.5	0.0500	0.0484	-3.1
0.0205	0.0197	-3.9	0.0206	0.0201	-2.4
0.0050		#VALUE!	0.0050		#VALUE!
0.0000	0.0001		0.0000	-0.0003	

Pass/Fail Warning

NO Audit Point #1 **Pass**
NO Audit Point #2 **Pass**
NO Audit Point #2 **Pass**
NO Audit Point #3 **Pass**
NO Audit Point #4 **Pass**
NO Audit Point #5 **N/A**
NO Audit Point #6 **N/A**

Pass/Fail Warning

NOx Audit Point #1 **Pass**
NOx Audit Point #2 **Pass**
NOx Audit Point #2 **Pass**
NOx Audit Point #3 **Pass**
NOx Audit Point #4 **Pass**
NOx Audit Point #5 **N/A**
NOx Audit Point #6 **N/A**

FINAL NO ₂ AUDIT RESULTS					Audit Limits	
Audit NO2 Concentration (ppm)	Site Response (ppm)	Percent Difference	Converter Efficiency	Actual Diff (ppm)	Pass	Bias < ±15% Levels 3 and above
0.00120	-0.00046			-0.00166	Fail	Bias > ±15% OR > ± 1.5 ppb Levels 1 & 2
0.27780	0.27320	-1.7	100.3%	-0.00460	Warning	Bias > ±10% Levels 3 and above
0.18960	0.18650	-1.6	99.6%	-0.00310	Pass	above 96%
0.05090	0.05130	0.8	101.6%	0.00040		
0.01546	0.01532	-0.9	100.9%	-0.00014	Fail	<96%
0.00630	0.00627	-0.5	96.7%	-0.00003	Warning	Between 96%-97%
0.00000	0.00000			0.00000		

Pass/Fail Warning

NO2 Audit level 7 **Pass**
NO2 Audit level 7 **Pass**
NO2 Audit level 6 **Pass**
NO2 Audit level 4 **Pass**
NO2 Audit level 3 **Pass**
Converter Efficiency NO2 level 7 **Pass**
Converter Efficiency NO2 level 7 **Pass**
Converter Efficiency NO2 level 6 **Pass**
Converter Efficiency NO2 level 4 **Pass**
Converter Efficiency NO2 level 3 **Pass**
Converter Efficiency by slope = **Pass**

Warning

Warning

Conv eff by slope
100.0%

Auditor	Eric Hebert
	Print
	<i>Eric Hebert</i>
	Signature
	EPA person notified in case of audit failure

Comments:
0

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

SULFUR DIOXIDE REPORT

Site Name: BDA2
Auditor: Eric Hebert (EEMS)
Station Manager: Bailey McAuley (TRC) / Kascia DaSilva (BELCO)

Airs ID: 0
Audit Date: 06/13/25

	<u>MOBILE LAB INSTRUMENTS</u>		EPA Protocol	Certifying Agency	Date	Concentration (ppm)
Instrument:	Ozone -- # 01114	CO -- # 01132	Gas #			
Manufacturer:	Thermo	TEI				
Model:	49i-A1ZCA	48i TLE	EA0014042	EPA R7	5/6/2022	23.38
Serial Number:	1180030022	1406960656				
Calibration Date:	02/15/24	Calibrated				
Slope	0.9997	on				
Intercept	0.0003171	day of audit				

	<u>STATION INSTRUMENT INFORMATION</u>	
Instrument:	SO2	
Manufacturer / Model #	T-API	T100
Property Number	5507	
Last Calibration Date	01/00/00	
Offset / Slope	1.063	0.094
Indicated Flow (ccm)	685	
In-Line Filter Change	1/0/1900	
Instrument Range / units	500 ppb	
DAS make / model / s/n	0	0
Time Data Flagged (audit start / end)	0:00	0:00
Local Primary Standard	EPA PROTOCOL GAS	
Manifold Type:	Teflon	

FINAL SULFUR DIOXIDE AUDIT RESULTS

Audit SO2 Concentration (ppm)	Site Response (ppm)	Percent Difference	Actual Diff (ppm)
0.0000	0.0001		0.00006
0.3526	0.3043	-13.7	-0.0483
0.2380	0.2046	-14.0	-0.0334
0.0938	0.0800	-14.7	-0.0138
0.0470	0.0401	-14.7	-0.0069
0.0194	0.0165	-14.8	-0.00287
0.0047			
0.0000	0.0006		0.00056

	<u>Pass/Fail</u>	<u>Warning</u>
SO2 Audit level 9	Pass	Warning
SO2 Audit level 8	Pass	Warning
SO2 Audit level 6	Pass	Warning
SO2 Audit level 5	Pass	Warning
SO2 Audit level 4	Pass	Warning
SO2 Audit level 2	N/A	

Auditor	Eric Hebert
	Print
	
	Signature
	EPA person notified in case of audit failure

Audit Limits

Pass	Bias < ±15% Levels 3 and above
Fail	Bias > ±15% OR difference from actual concentration > ± 1.5 ppb Levels 1 & 2
Warning	Bias > ±10% Levels 3 and above

Comments:

Observed bias is caused by drift or contamination of audit gas cylinder and not monitor or dilution system calibration.

Low-volume PM Sampler Performance Verification

Delta Cal Version 4.00P			Network :		BELCO	
Date & Time verified Yes			BDA1	TEI TEOM 1405-DF	s/n= 247512007	
Date & Time verified Yes			BDA2	TEI TEOM 1405-DF	s/n= 238341611	
BIOS Definer	148613	EEMS #	01421	standard Cert Date:	2/28/2025	
DeltaCal	1289	EEMS #	none	standard Cert Date:	2/21/2025	
Date & Site of Verification	6/12/2025 BDA1 - PM 2.5 & PM 10					
Parameter	flow raw	flow corr	TEOM	Difference	Acceptance Criteria	Pass/Fail
Calculated Total Flow Rate (Lpm)	---	16.54	16.68	0.85%	≤ ± 7%	Pass
Design Flow Rate (16.67 Lpm)	---	16.54		-0.78%	≤ ± 7%	Pass
By-pass Flow Rate (Lpm)	11.81	11.76	12.00	2.07%	≤ ± 7%	Pass
PM2.5 Flow Rate (Lpm)	3.11	3.10	3.00	-3.30%	≤ ± 10%	Pass
Coarse Flow Rate (Lpm)	1.68	1.68	1.67	-0.58%	≤ ± 10%	Pass
Ambient Temperature (°C)	28.2		28.01	-0.19	≤ ± 2 °C	Pass
Barometric Pressure (mm Hg)	769.5		767.6	-1.9	≤ ± 10 mm Hg	Pass
	Base		Reference			
Leak Check (PM2.5)	0.00		0.00		0.15 lpm	Pass
Leak Check (coarse)	-0.01		-0.01		0.15 lpm	Pass
Leak Check (bypass)	0.09		0.07		0.60 lpm	Pass
KO verification (PM2.5)				0.67%		Pass
KO verification (coarse)				0.75%		Pass
Date & Site of Verification	6/13/2024 BDA2 - PM 2.5 & PM 10					
Parameter	flow raw	flow corr	TEOM	Difference	Acceptance Criteria	Pass/Fail
Calculated Total Flow Rate (Lpm)	---	16.29	16.68	2.39%	≤ ± 7%	Pass
Design Flow Rate (16.67 Lpm)	---	16.29		-2.28%	≤ ± 7%	Pass
By-pass Flow Rate (Lpm)	11.69	11.64	11.99	3.03%	≤ ± 7%	Pass
PM2.5 Flow Rate (Lpm)	3.01	3.00	3.00	-0.10%	≤ ± 10%	Pass
Coarse Flow Rate (Lpm)	1.65	1.65	1.67	1.22%	≤ ± 10%	Pass
Ambient Temperature (°C)	28.87		29.05	0.18	≤ ± 2 °C	Pass
Barometric Pressure (mm Hg)	766.5		768.4	1.9	≤ ± 10 mm Hg	Pass
	Base		Reference			
Leak Check (PM2.5)	0.00		0.00		0.15 lpm	Pass
Leak Check (coarse)	-0.01		-0.01		0.15 lpm	Pass
Leak Check (bypass)	0.00		0.00		0.6 lpm	Pass
KO verification (PM2.5)				0.90%		Pass
KO verification (coarse)				0.82%		Pass

Client Name:		BELCO		Site Latitude:		32.299403	
Site Name:		BDA 1		Site Longitude:		-64.790214	
Audit/Calibration Date:		6/12/2025		GPS Accuracy (+/- distance):		2	
Enter Site Equipment Information Below:				Site Elevation:		11	
				Elevation and Accuracy Units:		meters	
				Site Magnetic Declination:		14.4 west	
				Direction reported as degre(°)		True	
Use pull downs in grey cells to indicate if equip. is not present		DAS Mfg.: Campbell		Other Mfg.:		Sensor height (m): 14.5	
		Model: Unknown		Other Model:			
		I.D. No.: Unknown					
YES	1st Wind Dir. Mfg.:	RM Young					
	Model:	05305-AQ					
	I.D. No.:	171051					
NO	2nd Wind Dir. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Wind Dir. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
YES	1st Horizontal Wind Spd. Mfg.:	RM Young		Other Mfg.:		Sensor height (m):	14.5
	Model:	05305-AQ		Other Model:			
	I.D. No.:	171051					
NO	2nd Horizontal Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	0
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Horizontal Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	0
	Model:			Other Model:			
	I.D. No.:						
YES	1st Vertical Wind Spd. Mfg.:	RM Young		Other Mfg.:		Sensor height (m):	14.5
	Model:	27106T		Other Model:			
	I.D. No.:	08600					
NO	2nd Vertical Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Vertical Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
YES	(Top) 1st Temperature Sensor Mfg.:	RM Young		Other Mfg.:		Sensor height (m):	3.5
	Model:	41342		Other Model:			
	I.D. No.:	031516					
NO	2nd Temperature Sensor Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Temperature Sensor Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	4th Temperature Sensor Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
YES	Relative Humidity Sensor Mfg.:	Met One		Other Mfg.:		Sensor height (m):	3.5
	Model:	083D-1-35		Other Model:			
	I.D. No.:	E5744					
NO	Barometric Pressure Sensor Sensor Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	Tipping Bucket Mfg.:						
	Model:						
	I.D. No.:						
NO	Electronic Rain Gage Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	Solar Radiation Sensor Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	Solar Radiation Translator Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	PM Sampler #1 Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	PM Sampler #2 Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						

Field Scientist : E. Hebert
 Site ID: BDA 1
 Audit/Calibration Date: 6/12/2025

Audit Equipment List Assigned to: Van 1

Reference Standard	Mfg.	Model	SN	ID Number	Slope	Intercept	Certification Date
Multimeter					1	0	
Voltage Source					1	0	
RTD (Temperature Reference)	FLUKE	1551	6339005	EEMS 01313	0.9999	0.00389	3/21/2025
Hygrometer (RH Reference)	Kimo	HQ210	1D250200407	None	1	0	4/3/2025
Pressure Reference	BGI	DeltaCal	1289	None	0.997975465	0.162805036	2/21/2025
Wind Speed Motor - Low	RM Young	18802		EEMS 01254	1	0	7/1/2024
Wind Speed Motor - High	RM Young	18811		EEMS 01255	1	0	7/1/2024
Solar Radiation Translator					1	0	
Solar Radiation Sensor					1	0	
Compass	Ushikata	S-25	199578	EEMS 1272	1	0	2/1/2025
Hi-vol orifice (QA)							
Hi-vol orifice (QS)							
Manometer							
GPS							

BELCO Meteorological QA Test Results

14.5 m Unadjusted Wind Direction

Site location:	BDA 1
Wind Monitor Mfg.:	RM Young
Model:	05305-AQ
ID No.:	171051
Vane SN:	N/A
Avg. Torque Reading (g-cm):	20
Magnetic Declination (deg):	-14.4

Date:	12-Jun-2025
Field Scientist :	E. Hebert

Datalogger Mfg./Model:	Campbell / Unknown
Datalogger ID:	Unknown

Ref. Compass ID:	Ushikata # EEMS 1272
mount alignment (° magnetic):	82

Sensor Alignment

Compass Reading (° True)	Site DAS	Difference	Vane Position	Remarks
67.6	63.4	-4.2	parallel to CA	PASS
247.6	252.6	5	parallel to CA	PASS
			perpendicular to CA	
			perpendicular to CA	
	Average	0.4		PASS

Linearity Test

Vane Direction	DAS (Deg.)	Difference	Vane Rotation	Remarks
0	2.0	2.5		PASS
30	29.1	-2.9	Clockwise	PASS
60	58.0	-1.1	Clockwise	PASS
90	88.6	0.6	Clockwise	PASS
120	118.8	0.2	Clockwise	PASS
150	149.0	0.2	Clockwise	PASS
180	181.5	2.5	Clockwise	PASS
210	213.0	1.5	Clockwise	PASS
240	241.9	-1.1	Clockwise	PASS
270	274.4	0.4	Clockwise	PASS
300	302.9	-1.5	Clockwise	PASS
330	332.1	0.0	Clockwise	PASS
	Std Dev	1.60		PASS
360	0.2			
330	332.1	1.9	Counterclockwise	PASS
300	302.4	1.8	Counterclockwise	PASS
270	274.5	2.1	Counterclockwise	PASS
240	243.9	-0.6	Counterclockwise	PASS
210	213.4	-0.5	Counterclockwise	PASS
180	181.2	-2.2	Counterclockwise	PASS
150	149.8	-1.4	Counterclockwise	PASS
120	119.3	-0.5	Counterclockwise	PASS
90	88.5	-0.8	Counterclockwise	PASS
60	58.3	-0.2	Counterclockwise	PASS
30	28.4	0.1	Counterclockwise	PASS
	Std Dev	1.40		PASS

14.5 m Unadjusted Wind Speed Calibration

Wind Monitor Mfg.:	RM Young
Model:	05305-AQ
ID:	171051
Cups or Propeller SN:	illegible
Avg. Torque Reading (g-cm):	0.7
Measurement Units:	m/s
RPM Multiplier:	0.00512

Calibrator Mfg.:	RM Young
Model:	18802
ID:	EEMS 01254
ID:	EEMS 01255

RPM Offset: 0

Synchronous Motor	RPM	Calculated wind speed (m/s)	DAS (m/s)	Difference (m/s)	Remarks
None	0	0.00	0.00	0.00	PASS
EEMS 01255	200	1.02	1.02	0.00	PASS
EEMS 01255	400	2.05	2.05	0.00	PASS
EEMS 01255	600	3.07	3.07	0.00	PASS
					PASS
EEMS 01255	1200	6.14	6.14	0.00	PASS
EEMS 01255	2400	12.29	12.29	0.00	PASS
EEMS 01255	4800	24.58	24.37	-0.21	PASS
EEMS 01255	9000	46.08	45.60	-0.48	PASS
High Speed					

Comments:

BELCO Meteorological QA Test Results

Site: BDA 1	Date: 6/12/2025																												
Sensor Height: 14.5 m																													
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left; padding: 2px;">site system</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">sensor mfg:</td> <td style="padding: 2px;">RM Young</td> </tr> <tr> <td style="padding: 2px;">sensor model:</td> <td style="padding: 2px;">27106T</td> </tr> <tr> <td style="padding: 2px;">sensor ID.:</td> <td style="padding: 2px;">08600</td> </tr> <tr> <td style="padding: 2px;">prop SN:</td> <td style="padding: 2px;">illegible</td> </tr> <tr> <td style="padding: 2px;">prop multiplier:</td> <td style="padding: 2px;">0.00627</td> </tr> <tr> <td colspan="2" style="padding: 2px;">DAS SN: Unknown</td> </tr> <tr> <td style="padding: 2px;">Total avg. prop torque (g-cm):</td> <td style="padding: 2px; background-color: #FFD700;">0.60</td> </tr> <tr> <td style="padding: 2px;">Bearings only avg. torque (g-cm):</td> <td style="padding: 2px; background-color: #FFD700;">N/A</td> </tr> </tbody> </table>	site system		sensor mfg:	RM Young	sensor model:	27106T	sensor ID.:	08600	prop SN:	illegible	prop multiplier:	0.00627	DAS SN: Unknown		Total avg. prop torque (g-cm):	0.60	Bearings only avg. torque (g-cm):	N/A	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left; padding: 2px;">reference system</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">motor mfg:</td> <td style="padding: 2px;">RM Young</td> </tr> <tr> <td style="padding: 2px;">model:</td> <td style="padding: 2px;">18802</td> </tr> <tr> <td style="padding: 2px;">motor ID:</td> <td style="padding: 2px;">EEMS 01254</td> </tr> <tr> <td style="padding: 2px;">certification date:</td> <td style="padding: 2px;">7/1/2024</td> </tr> </tbody> </table>	reference system		motor mfg:	RM Young	model:	18802	motor ID:	EEMS 01254	certification date:	7/1/2024
site system																													
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motor mfg:	RM Young																												
model:	18802																												
motor ID:	EEMS 01254																												
certification date:	7/1/2024																												
CW vertical wind speed (up)																													
input rpm	equivalent m/s	site response m/s	%diff	difference m/s																									
0	0.00	0.00	N/A	N/A	PASS																								
100	0.63	0.63	N/A	0.00	PASS																								
200	1.25	1.25	N/A	0.00	PASS																								
300	1.88	1.86	N/A	-0.02	PASS																								
400	2.51	2.48	N/A	-0.03	PASS																								
600	3.76	3.68	N/A	-0.08	PASS																								
900	5.64	5.52	-2.1%	-0.12	PASS																								
average				-0.04																									
CCW vertical wind speed (down)																													
input rpm	equivalent m/s	site response m/s	%diff	difference m/s																									
0	0.00	0.00	N/A	N/A	PASS																								
100	-0.63	-0.60	N/A	0.03	PASS																								
200	-1.25	-1.24	N/A	0.01	PASS																								
300	-1.88	-1.86	N/A	0.02	PASS																								
400	-2.51	-2.48	N/A	0.03	PASS																								
600	-3.76	-3.71	N/A	0.05	PASS																								
900	-5.64	-5.52	-2.1%	0.12	PASS																								
average				0.04																									

Comments:

BELCO Meteorological QA Test Results

Unadjusted Temperature

Site:	BDA 1
-------	-------

Date:	12-Jun-2025
Field Scientist :	E. Hebert

Site Sensor(s) Mfg.:	RM Young
Model:	41342
Measurement Units:	° C

Std. Mfg.:	FLUKE	Std. Slope:	0.9999
Std. Model:	1551	Std. Intercept:	0.0039
Std. ID No:	EEMS 01313	Certification Date:	3/21/2025

	3.5 m probe	Ref. Temp. Raw	Ref. Temp. Corr.	Site Temp. DAS	Difference	Remark
Sensor ID. No:	031516	0.04	0.04	0.48	0.44	PASS
		27.14	27.14	27.23	0.09	PASS
		43.54	43.54	43.44	-0.10	PASS
				Average	0.14	

BELCO Meteorological QA Test Results

Unadjusted Relative Humidity/Barometric Pressure

Site:	BDA 1
-------	-------

Date:	12-Jun-2025
Field Scientist :	E. Hebert

Relative Humidity

Site Sensor Make:	Met One
Model:	083D-1-35
Serial No:	E5744

Std. Mfg.:	Kimo	Std. Certification Date:	4/3/2025
Std. Model:	HQ210	Std. Slope:	1.0000
Std. ID No:	None	Std. Intercept:	0.0000

Salt Solution	Ref. Raw	Ref. Corr.	Site DAS	Difference	Remarks
% RH	% RH	% RH	% RH	% RH	
	60.5	60.5	65.5	5.0	PASS
	89.8	89.8	91.6	1.8	PASS
	22.1	22.1	28.3	6.2	PASS
			Average	4.33	

APPENDIX B

Maps of Locations

BELCO BDA1

BDA1

Google Earth

© 2013 Google
Image © 2013 DigitalGlobe



400 ft

BELCO BDA2

BDA2

Google Earth

© 2013 Google
Image © 2018 DigitalGlobe

300 ft



BELCO BDA1



BDA2

BDA1

Hamilton

Google Earth

© 2018 Google
Image © 2018 DigitalGlobe

1000 ft

N

APPENDIX C

Audit Standards Certifications

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E03NI99E33A00B6	Reference Number: 122-402181078-1
Cylinder Number: EA0014042	Cylinder Volume: 31.6 CF
Laboratory: 124 - Durham (SAP) - NC	Cylinder Pressure: 2217 PSIG
PGVP Number: B22021	Valve Outlet: 660
Gas Code: NO,NOX,SO2,BALN	Certification Date: Aug 16, 2021

Expiration Date: Aug 16, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	25.00 PPM	25.05 PPM	G1	+/- 1.4% NIST Traceable	08/09/2021, 08/16/2021
NITRIC OXIDE	25.00 PPM	25.05 PPM	G1	+/- 1.3% NIST Traceable	08/09/2021, 08/16/2021
SULFUR DIOXIDE	25.00 PPM	24.59 PPM	G1	+/- 1.0% NIST Traceable	08/09/2021, 08/16/2021
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	20061120	CC708068	49.82 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	Feb 02, 2025
PRM	12386	D685025	9.91 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Feb 20, 2020
GMIS	401423838102	CC505581	4.348 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.1	Feb 18, 2023
NTRM	17060735	CC486293	15.90 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.9%	Jul 23, 2023

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801333 NO	FTIR	Jul 28, 2021
Nicolet 6700 AHR0801333 NO2	FTIR	Jul 28, 2021
Nicolet 6700 AHR0801333 SO2	FTIR	Jul 28, 2021

Triad Data Available Upon Request



EEMS
Van 1
Flow based - Case method

[Signature]

Approved for Release

Challenge Cylinder #3 Certificate

EPA Protocol Gas Verification Program

Date of Assay: 6-May-22

Cylinder under Test: Airgas
EA0014042

Pollutant Gas: Nitric Oxide
Balance Gas: Nitrogen
Cylinder Pressure After Assay: 1935 psig

Assayed NO Concentration = 24.72

Vendor Certified NO Concentration = 25.05

% bias = -1.33%

95% Uncertainty of Analysis = 0.12%

Portion due to calibration 90.66%

Assayed NO_x Concentration = 24.80

Vendor Certified NO_x Concentration = 25.05

% bias = -0.99%

95% Uncertainty of Analysis = 0.18%

Portion due to calibration 91.26%

Reference Gas: SRM 1684b
FF55487

Expiration Date: 14-Sep-25

Analyst: T. Bui

Analytical Facility: EPA Region 7 Ambient Air Standards Laboratory,
Kansas City, KS

Challenge Cylinder #1 Certificate

EPA Protocol Gas Verification Program

Date of Assay: 9-Jun-22

Cylinder under Test: Airgas
EA0014042

Pollutant Gas: Sulfur Dioxide
Balance Gas: Nitrogen
Cylinder Pressure After Assay: 1875 psig

Assayed SO₂ Concentration = 23.39

Vendor Certified SO₂ Concentration = 24.59

% bias = -4.87%

95% uncertainty of analysis = 0.25%

Portion of uncertainty due to calibration = 95.71%

Reference Gas: SRM 1693a
FF25481

Expiration Date: 27-Jun-23

Analyst: T. Bui

Analytical Facility: EPA Region 7 Ambient Air Standards Laboratory,
Kansas City, KS

Challenge Cylinder #1 Certificate

EPA Protocol Gas Verification Program

Date of Assay: 16-Jun-22

Cylinder under Test: Airgas
EA0014042

Pollutant Gas: Sulfur Dioxide
Balance Gas: Nitrogen
Cylinder Pressure After Assay: 1875 psig

Assayed SO₂ Concentration = 23.37

Vendor Certified SO₂ Concentration = 24.59

% bias = -4.97%

95% uncertainty of analysis = 0.22%

Portion of uncertainty due to calibration = 95.51%

Reference Gas: SRM 1693a
FF25481

Expiration Date: 27-Jun-23

Analyst: T. Bui

Analytical Facility: EPA Region 7 Ambient Air Standards Laboratory,
Kansas City, KS

Certificate of Calibration

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES, INC.
4577 E NW 6TH STREET
GAINESVILLE, FL 32609
352-262-0802

P.O. Number:

EEMS

01421

ID Number: EEMS 01421



Description: PRIMARY FLOW CALIBRATOR

Manufacturer: MESA LABORATORIES INC

Model Number: DEFINER 220-H

Serial Number: 148613

Technician: MARK WINKLER

On-Site Calibration: ☐

Comments: Battery inside unit was replaced.

Calibration Date: 02/28/2025
Calibration Due: 02/28/2026
Procedure: TB 9-6680-293-40
Rev: 2/20/2013

Temperature: 69 °F
Humidity: 44 % RH

As Found Condition: IN TOLERANCE

Calibration Results: IN TOLERANCE

Limiting Attribute:

This instrument has been calibrated using standards traceable to the SI units through the National Institute of Standards and Technology (NIST) or other National Metrological Institute (NMI). The method of calibration is direct comparison to a known standard, derived from natural physical constants, ratio measurements or compared to consensus standards.

Reported uncertainties are expressed as expanded uncertainty values at an approximately 95% confidence level using a coverage factor of k=2. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement unless otherwise noted.

TMI's Quality System is accredited to ISO/IEC 17025:2017 and ANSI/ NCSL Z540-1-1994. ISO/IEC 17025:2017 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. This calibration complies with all the requirements of ANSI/ NCSL Z540-1-1994 and TMI's Quality Manual, QM-1.

Results contained in this document relate only to the item calibrated. Calibration due dates appearing on the certificate or label are determined by the client for administrative purposes and do not imply continued conformance to specifications.

This certificate shall not be reproduced, except in full, without the written permission of Technical Maintenance, Inc.

Measurements not currently on TMI's Scope of Accreditation are identified with an asterisk.

WALLY GYNN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
FL2146	FLUKE	MOLBOX1+ A700K-A	8/28/2024	8/28/2026
FL6426	DH INSTRUMENTS	1E4-VCR-V-Q	4/24/2024	4/24/2026
FL7536	FLUKE	3E4-VCR-V-Q	9/27/2024	9/27/2026



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994

Certificate of Calibration

Data Sheet

Parameter	Nominal	Minimum	Maximum	As Found	As Left	Unit	ADJ/FAIL
Flow Accuracy	500.00	495.00	505.00	502.41	502.41	scc/min	
Flow Accuracy	1000.0	990.0	1010.0	1005.6	1005.6	scc/min	
Flow Accuracy	2000.0	1980.0	2020.0	2006.4	2006.4	scc/min	
Flow Accuracy	4000.0	3960.0	4040.0	4007.5	4007.5	scc/min	
Flow Accuracy	6000.0	5940.0	6060.0	6018.9	6018.9	scc/min	
Flow Accuracy	8000.0	7920.0	8080.0	8024.9	8024.9	scc/min	
Flow Accuracy	10000	9900	10100	10037	10037	scc/min	
Flow Accuracy	12000	11880	12120	12052	12052	scc/min	
Flow Accuracy	15000	14850	15150	15061	15061	scc/min	
Flow Accuracy	24000	23760	24240	24133	24133	scc/min	
Flow Accuracy	30000	29700	30300	30141	30141	scc/min	

EEMS # 01421

BIOS 220-H

$$m = 1.005222$$

$$b = -0.008566 \text{ (SLPM)}$$

$$Corr = 1.00000$$

(90)



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES, INC.

4577 E NW 6TH STREET

P.O. Number:

GAINESVILLE, FL 32609

352-262-0802

ID Number: EEMS 01415



Description: PRIMARY FLOW CALIBRATOR

Calibration Date: 09/04/2024

Manufacturer: BIOS INTERNATIONAL CORP.

Calibration Due: 09/04/2025

Model Number: DEFINER 220-L

Procedure: TB 9-6680-293-40

Serial Number: 120910

Rev: 2/20/2013

Technician: MARK WINKLER

Temperature: 69 °F

Humidity: 51 % RH

On-Site Calibration: ☐

As Found Condition: IN TOLERANCE

Comments:

Calibration Results: IN TOLERANCE

Limiting Attribute:

This instrument has been calibrated using standards traceable to the SI units through the National Institute of Standards and Technology (NIST) or other National Metrological Institute (NMI). The method of calibration is direct comparison to a known standard, derived from natural physical constants, ratio measurements or compared to consensus standards.

Reported uncertainties are expressed as expanded uncertainty values at an approximately 95% confidence level using a coverage factor of k=2. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement unless otherwise noted.

TMI's Quality System is accredited to ISO/IEC 17025:2017 and ANSI/ NCSL Z540-1-1994. ISO/IEC 17025:2017 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. This calibration complies with all the requirements of ANSI/ NCSL Z540-1-1994 and TMI's Quality Manual, QM-1.

Results contained in this document relate only to the item calibrated. Calibration due dates appearing on the certificate or label are determined by the client for administrative purposes and do not imply continued conformance to specifications.

This certificate shall not be reproduced, except in full, without the written permission of Technical Maintenance, Inc.

Measurements not currently on TMI's Scope of Accreditation are identified with an asterisk.

WALLY GYNN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
FL2146	FLUKE	MOLBOX1+ A700K-A	8/28/2024	8/28/2026
FL6422	DH INSTRUMENTS	1E3-VCR-V-Q	6/27/2023	6/27/2025



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994

Certificate of Calibration

Data Sheet

<u>Parameter</u>	<u>Nominal</u>	<u>Minimum</u>	<u>Maximum</u>	<u>As Found</u>	<u>As Left</u>	<u>Unit</u>	<u>ADJ/FAIL</u>
Flow Measurement Accuracy	5.0000	4.9500	5.0500	5.0478	5.0478	sccm	
Flow Measurement Accuracy	10.000	9.900	10.100	10.057	10.057	sccm	
Flow Measurement Accuracy	20.000	19.800	20.200	20.174	20.174	sccm	
Flow Measurement Accuracy	50.000	49.500	50.500	50.462	50.462	sccm	
Flow Measurement Accuracy	80.000	79.200	80.800	80.749	80.749	sccm	
Flow Measurement Accuracy	100.000	99.000	101.000	100.835	100.835	sccm	
Flow Measurement Accuracy	200.000	198.000	202.000	201.910	201.910	sccm	
Flow Measurement Accuracy	500.000	495.000	505.000	504.876	504.876	sccm	

EEMS # 01415

Slope = 1.009801

int = -0.043403 (cc)

corr = 1.0000

(EV)



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

Phone: 813-978-3054 Fax 813-978-3758

www.tmicalibration.com



Certificate of Accuracy

Device Under Test: Flow Rate Client: EEMS Date Certified: 2/21/2025
Device Under Test Manufacturer: BGI Certificate Number: F-45709-1289
Device Under Test Model: DeltaCal DC1
Device Under Test Serial Number: 1289

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th St, Suite E, Gainesville FL, 32609

Reference Standard: Mesa Labs

Serial Number: 159956

Property Number: 01414

Certificate Date: 2/20/2025

Certificate Number: F-45708-159956

Uncertainty = $\pm 9.07\%$

Point	Reference Standard (LPM)	Device Under Test (LPM)	As Found Difference (LPM)	As Found % Error	Device Under Test Corrected (LPM)	% Error Corrected
1	1.62	1.83	0.21	13.1%	1.67	3.2%
2	2.86	3.00	0.14	4.9%	2.84	-0.6%
3	5.16	5.27	0.11	2.2%	5.12	-0.8%
4	7.22	7.37	0.15	2.1%	7.22	0.0%
5	9.31	9.46	0.15	1.6%	9.32	0.0%
6	11.64	11.77	0.13	1.1%	11.63	-0.1%
7	12.70	12.83	0.13	1.0%	12.69	0.0%
8	14.78	14.91	0.13	0.9%	14.78	0.0%
9	16.92	17.05	0.13	0.8%	16.92	0.0%
10	18.28	18.43	0.15	0.8%	18.30	0.1%

Slope = 0.99798

Intercept = 0.16281

Correlation = 0.99998

Tested By:

Eric Hebert
Signature

Eric Hebert
Printed Name

Approval:

Signature

Printed Name

This certificate applies only to the item identified and this report shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street, Suite E
Gainesville FL, 32609



Certificate of Accuracy

Device Under Test: Pressure
Device Under Test Manufacturer: BGI
Device Under Test Model: DeltaCal DC1
Device Under Test Serial Number: 1289

Client: EEMS

Date Certified: 2/20/2025
Certificate Number: P-45708-1289

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th St., Suite E, Gainesville, FL

Reference ASI DBX2

Serial Number: 118359
Property Number: N/A
Certification Date: 2/14/2025
Certificate X1302

Uncertainty = ± 1.12 %

Point	Reference Standard (mmHg)	Device Under Test (mmHg)	Difference (mmHg)	Percentage Error	Device Under Test Corrected (mmHg)	% Error Corrected
1	762.70	763.00	0.30	0.04%	762.68	0.00%
2	769.20	769.50	0.30	0.04%	769.19	0.00%
3	760.85	761.00	0.15	0.02%	760.68	-0.02%
4	758.49	759.00	0.51	0.07%	758.68	0.03%
5	754.30	754.50	0.20	0.03%	754.18	-0.02%
6	750.10	750.50	0.40	0.05%	750.17	0.01%
7	741.21	741.50	0.29	0.04%	741.17	-0.01%
8	728.60	729.00	0.40	0.05%	728.66	0.01%
9	720.50	721.00	0.50	0.07%	720.65	0.02%
10	712.10	712.50	0.40	0.06%	712.15	0.01%
11	700.30	700.50	0.20	0.03%	700.14	-0.02%

Slope = 0.99922

Intercept = 0.90990

Correlation = 0.99997

Tested By:

Signature

Eric Hebert

Printed Name

Approval:

Signature

Printed Name

This certificate applies only to the item identified and this certificate shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street Extension
Gainesville FL, 32609

Aquatech Scientific Instruments LLC

680 Heacock Rd, Suite 204A, Yardley, PA. 19067

web: www.aquatechscientific.com email: sales@aquatechscientific.com

PHONE: 215-428-9400 FAX: 267-790-0404

*Pressure
Standard*

PRESSURE CALIBRATION TEST REPORT

PREPARED FOR	MODEL	SERIAL #	SB #	DATE	TEMP
ERIC HEBERT	DBX2	118359	X1302	2/14/2025	20C

PRESSURE WHEN SET	INIT OFFSET
1005.3	-1.0

S/N =

118359

GNV

No EEMS #

DRUCK DPI-740	TEST UNIT	CORRECTION	ADJUSTMENT	ZONE	RANGE
1080.0	1080.1	-0.1	-0.10	ZONE 11	>1075
1060.0	1060.1	-0.1	-0.10	ZONE 10	1070
1040.0	1040.0	0.0	0.00	ZONE 9	1050
1020.0	1020.0	0.0	0.00	ZONE 8	1030
1000.0	999.9	0.1	0.10	ZONE 7	1010
980.0	979.8	0.2	0.20	ZONE 6	990
960.0	959.8	0.2	0.20	ZONE 5	970
940.0	939.8	0.2	0.20	ZONE 4	950
920.0	919.8	0.2	0.20	ZONE 3	930
900.0	899.7	0.3	0.30	ZONE 2	910
880.0	879.7	0.3	0.30	ZONE 1	890
860.0	859.7	0.3	0.30	ZONE 0	<865

Values represent actual (mb) data of test unit, prior to unit adjustment (calibration)

Pressure standard used is a NIST traceable instrument GE Druck DPI-740 S/N 74003994

Accuracy of +/-0.020% FS for all pressure ranges including non-linearity, hysteresis, repeatability, and temperature effects in a range of 15 deg to 120 deg F.

GE Druck DPI-740 S/N 74003994 Calibration Due Date: July 16th, 2025

NOTE: Calibration Due Date of test unit: 1 YEAR FROM TEST DATE

NIST TRACEABILITY

INNOCAL® 335	CAL: 07/16/2024
CP375873	Report: 1761057

HS Tariff and Census Schedule B: 9025.80

**Warren-Knight Instrument Company**

2045 Bennett Road

Philadelphia, PA 19116

Phone: 215-464-9300; Fax: 215-464-9303

Web: <http://www.warrenind.com>

Page 1 of 1

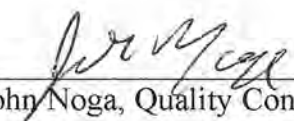
EEMS # 01272

Ver 3

CERTIFICATION OF CALIBRATION AND CONFORMANCE

We hereby certify that the equipment below has been manufactured and/or inspected by standards traceable to NIST. Calibration of the specified instrument has been performed in compliance with ANSI Z540-1 requirements. It is warranted that the equipment has been calibrated to be in full conformance with the drawings and specifications of the instrument. Calibration tests were performed on the material specified below and were in accordance with all applicable quality assurance requirements with data on file at our facility.

Customer Name:	EE & MS
Purchase Order #:	
Instrument:	USIKATA S-25 COMPASS
Serial Number:	199578
Quantity:	1
Calibration Due:	02/2025


John Noga, Quality Control

February 25, 2025

Measurement Standards
Theodolite Wild T-3 S/N 18801 - Calibration 01/07/2025 - Due 01/07/2026 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-7020 S/N 5167 - Calibration 01/05/2024 - Due 01/05/2029 NBR 731/224084-89 731/221617
Gage Block Set, SPI S/N 20899 Calibration 09/10/2024 Due 09/10/2025 Certificate of Calibration CAL2303478-1-0



Certificate of Accuracy

Transfer Standard: Anemometer Drive
Transfer Standard Manufacturer: R.M. Young Company
Transfer Standard Model: 18811
Transfer Standard Serial Number: CA 04013
Transfer Standard Property ID: EEMS 01254

Date Certified: 7/1/2024
Certificate Number: A-45474-1

Compared to: NIST Traceable Digital Tachometer Serial Number: 678176, Certified: 6/17/2024

CW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	20	20	0.0	0.0
	80	80	0.0	0.0
	160	160	0.0	0.0
	320	320	0.0	0.0
	640	640	0.0	0.0
	801	800	-1.0	1.0
	950	950	0.0	0.0

CCW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	20	20	0.0	0.0
	80	80	0.0	0.0
	160	160	0.0	0.0
	320	320	0.0	0.0
	640	640	0.0	0.0
	801	800	-1.0	1.0
	951	950	-1.0	1.0

*If no sign is given on the correction, the transfer standard RPM is indicating a lower RPM than actual. If the sign is negative, the transfer standard is indicating an RPM that is higher than actual.

Tested By:

	Tim Mendenhall
Signature	Printed Name

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street Extension
Gainesville FL, 32609



Certificate of Accuracy

Transfer Standard: Anemometer Drive
Transfer Standard Manufacturer: R.M. Young Company
Transfer Standard Model: 18802
Transfer Standard Serial Number: CA 04013
Transfer Standard Property ID: EEMS 01255

Date Certified: 7/1/2024
Certificate Number: A-45474-2

Compared to: NIST Traceable Digital Tachometer Serial Number: 678176, Certified: 6/17/2024

CW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	200	200	0.0	0.0
	800	800	0.0	0.0
	1600	1600	0.0	0.0
	3200	3200	0.0	0.0
	6401	6400	-1.0	1.0
	8000	8000	0.0	0.0
	10000	10000	0.0	0.0

CCW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	200	200	0.0	0.0
	800	800	0.0	0.0
	1600	1600	0.0	0.0
	3200	3200	0.0	0.0
	6401	6400	-1.0	1.0
	8000	8000	0.0	0.0
	10000	10000	0.0	0.0

*If no sign is given on the correction, the transfer standard RPM is indicating a lower RPM than actual. If the sign is negative, the transfer standard is indicating an RPM that is higher than actual.

Tested By:

	Tim Mendenhall
Signature	Printed Name

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street Extension
Gainesville FL, 32609



Certificate of Accuracy

Device Under Test: Thermometer Ambient Temperature
Device Under Test Manufacturer: Fluke
Device Under Test Model: 1551A Ex Stik
Device Under Test Serial Number: 6339005
Device Under Test Property ID: 01313

Date Certified: 3/21/2025
Certificate Number: T-45737-6339005

Client: EEMS

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th Street Extension, Gainesville, FL

Reference Standard: Fluke Stik RTD

Serial Number: 6196002
Property Number: 01224
Certificate Date: 1/8/2025
Certificate Number: A589754

Uncertainty = $\pm 1.12\%$

Point	Reference Standard (°C)	Device Under Test (°C)	As Found Difference (°C)	As Found Percentage Error	Corrected Device Under Test (°C)	Corrected % Error
1	-0.03	-0.01	0.02	-66.7%	-0.01	-53.7%
2	4.79	4.78	-0.01	-0.2%	4.78	-0.3%
3	13.15	13.15	0.00	0.0%	13.15	0.0%
4	20.11	20.11	0.00	0.0%	20.11	0.0%
5	28.00	28.00	0.00	0.0%	28.00	0.0%
6	36.85	36.85	0.00	0.0%	36.85	0.0%
7	42.01	42.01	0.00	0.0%	42.01	0.0%
8	48.27	48.26	-0.01	0.0%	48.26	0.0%
9	51.33	51.34	0.01	0.0%	51.34	0.0%

Slope = 0.99990

Intercept = 0.00389

Correlation = 1.00000

Tested By:

Signature

Eric Hebert

Printed Name

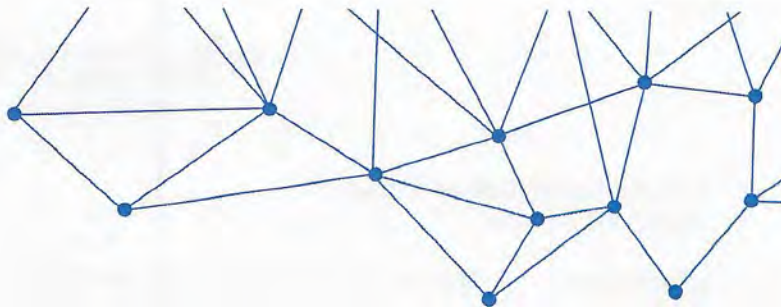
Approval:

Signature

Printed Name

This certificate applies only to the item identified and this certificate shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street Extension
Gainesville FL, 32609



**CERTIFICAT D'ETALONNAGE
CALIBRATION CERTIFICATE**

1 / 3

N°MSMO2526206V01

Ce certificat comprend une partie vérification en annexe
This certificate included a checking part attached

Délivré à :
Issued for :

Sauermann NA Corp

10 W COLLEGE AVENUE
UNIT B
19067 YARDLEY

**INSTRUMENT ETALONNE
CALIBRATED INSTRUMENT**

Désignation : **Thermo-hygromètre-qualité d'air HQ210**
Designation : **Thermo-hygro-air quality meter HQ210**

Constructeur : **Kimo**
Manufacturer :

Type : **HQ210**
Type :

N° de série : **1D250102396**
Serial Number :
N° Inventaire :
Inventory Number :

Ce certificat comprend **3** page(s)
The certificate includes

Date : **4 mars 2025**

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Responsable Métrologie
Metrology Manager
Sabrina LUTAUD

P.O. Angélique PINHO
Service Laboratoires



ETALONNAGE EN HYGROMETRIE

HYGROMETRY CALIBRATION

1- Caractéristiques de l'appareil :

Instrument features :

Désignation : Thermo-hygromètre-qualité d'air HQ210

Description : Thermo-hygro-air quality meter HQ210

Sonde d'hygrométrie avec capteur de température intégré, PT100 1/3 DIN.

Hygrometry probe and integrated temperature sensor, PT100 1/3 DIN.

N° série sonde / Probe S.N. : 1D250200407

N° inventaire sonde / Probe I.N. :

Echelle : 0 à 100 %HR

Range :

Résolution : 0,1 %HR

Resolution :

2- Méthode d'étalonnage :

Calibrating principles :

Les points d'étalonnage sont réalisés par comparaison avec les moyens suivants:

- MH012 Générateur d'hygrométrie, plage d'utilisation 10 à 86%HR,
- ETH111 étalon n°:20215104, certificat d'étalonnage n°USMO2416936, contrôlé(s) avec la référence ETH107 n°:150869 / 150842, raccordé(s) aux étalons nationaux par le certificat COFRAC n°H2441230F / T24119740D.

The points of calibration are realized with means of calibration according to:

- MH012 hygrometry generator, measuring rang 10 to 86%HR,
- ETH111 a standard sn°:20215104, calibration certificate n°USMO2416936, controlled with standard ETH107 sn°:150869 / 150842, traceable to standard national reference by COFRAC certificate n°H2441230F / T24119740D.

3- Conditions d'environnement :

Environmental conditions :

Température ambiante : 20,8 °C

Ambient temperature :

Humidité relative : 50,1 %HR

Relative humidity :

Pression atmosphérique : 1015 hPa

Atmospheric pressure :

4- Remarques :

Remarks

Néant

5- Résultats des mesures :

Measurement results :

n°	Vref	Unit	Vi	Unit	Vi-Vref	Unit	Incertitude
1	11,02	%HR	11,0	%HR	-0,020	%HR	0,463
2	43,82	%HR	43,8	%HR	-0,020	%HR	0,521
3	84,98	%HR	84,3	%HR	-0,680	%HR	0,792

Vref: valeur lue sur l'appareil étalon, Vi: valeur lue sur l'appareil du client. L'unité de l'incertitude de mesure est exprimée dans la même unité que Vref. Les incertitudes mentionnées prennent en compte les incertitudes de l'étalonnage (étalon de référence, moyen, condition d'environnement, résolution de l'appareil ...). Ces incertitudes sont élargies avec un coefficient k=2.

Contrôle en température	
Temperature check	
Vref (°C)	Vi (°C)
21,4	21,5

Vref: value displayed by our reference instrument, Vi: value displayed by customer's instrument. For uncertainty, unit is the same as the one of Vref. Uncertainties above mentioned take into account calibration uncertainties (reference instrument, calibration mean, environment conditions, instrument resolution...). These uncertainties are extended with coefficient k=2.

ANNEXE
PARTIE VERIFICATION / CHECKING PART

3 / 3

Éléments nécessaires à l'exploitation des résultats :

Data required for results processing :

Les conditions d'acceptation de l'appareil sont basées selon les tolérances constructeur de la société SAUERMANN.
Le jugement est porté suivant le critère $|Ecart| < Tolérance$.

-HYGROMETRIE : +/-2,38 %HR de 3 à 98 %HR

Jugement / Appraisal

HYGROMETRIE N° série sonde / Probe S.N. : 1D250200407

Conforme / Complying

Restrictions / Limitation :

Commentaires / Comments :

Prochaine date d'étalonnage en / Next recommended calibration date : 04/03/26

Vérification effectuée le : 04/03/25
Checking performed :



Certificate of Training

This is to certify that

Eric Hebert

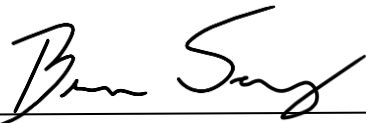
Has satisfactorily completed the:

Annual NPAP and PM_{2.5}-PEP Field Operations Proficiency Recertification Course

Held on
April 16-18, 2025

Certified by:

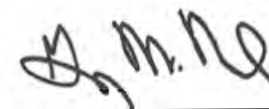
Brannon Seay

A handwritten signature in black ink, appearing to read "Brannon Seay", written over a horizontal line.

EPA National Performance Evaluation Program
(NPEP) Lead for PM_{2.5}, Pb, and NPAP
USEPA, OAQPS, AAMG



Greg Noah

A handwritten signature in black ink, appearing to read "Greg Noah", written over a horizontal line.

EPA National Performance Evaluation Program
(NPEP) Lead for PM_{2.5}, Pb, and NPAP
USEPA, OAQPS, AAMG

NO_x / SO₂ / PM_{2.5} / PM₁₀ / and Meteorological Performance Audit Report of BELCO Monitoring Network

Performed December 2025

Prepared for:

**Bermuda Electric Light Company
P.O. 90740**

Prepared by:



**4577E NW 6th St Ext.
Gainesville, FL 32609**

**Report Submitted:
January 2026**

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- Appendix A** Audit Data Sheets
Appendix B Maps of Locations
Appendix C Audit Standards Certifications

List of Acronyms and Abbreviations

ASTM	American Society for Testing and Materials
BELCO	Bermuda Electric Light Company Limited
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
DAS	data acquisition system
EEMS	Environmental, Engineering & Measurement Services, Inc.
EPA	Environmental Protection Agency
FRM	Federal Reference Method
HWSP	Horizontal wind speed
lpm	liters per minute
mm Hg	millimeters of mercury
m/s	meters per second
NIST	National Institute of Standards and Technology
NO	nitric oxide
NO ₂	Nitrogen dioxide
NO _x	nitrogen oxide air pollutants (NO and NO ₂)
NPAP	National Performance Audit Program
QAPP	Quality Assurance Project Plan
OAQPS	Office of Air Quality Planning and Standards
QMP	Quality Management Plan
PM	particulate matter
PM _{2.5}	particulate matter of 2.5 microns in aerodynamic diameter or less
PM ₁₀	particulate matter of 10 microns in aerodynamic diameter or less
ppm	parts per million
PQAO	Primary Quality Assurance Organization
PSD	prevention of significant deterioration
QA	quality assurance
rpm	revolutions per minute
S/N	serial number
SLT	State, Local and Tribal
SO ₂	sulfur dioxide
SOP	standard operating procedure
TRC	TRC Environmental Corporation
TTP	Through-The-Probe
VWSP	Vertical wind speed
WDR	Wind direction
µg/m ³	micrograms per cubic meter

1.0 Introduction

Environmental, Engineering & Measurement Services, Inc. (EEMS) was contracted by Bermuda Electric Light Company Limited (BELCO) to perform audits of the air quality monitoring network operated by BELCO. This monitoring network is maintained by TRC on behalf of BELCO. The purpose of the network is to fulfill and comply with specific requirements as prescribed in section **5.4 Ambient Air Quality Monitoring Programme** of the “*Operating Licence Conditions, Clean Air Act, 1991, Bermuda Electric Light Company Limited, Licence number OL-114*”, issued by the Department of Environmental & Natural Resources and Environmental Authority.

The monitoring network quality assurance (QA) procedures must meet the requirements of US EPA for Prevention of Significant Deterioration (PSD) air quality analysis per 40 CFR (code of Federal Regulation) Part 58, Appendix B. As such, and as specified in the Operating License, the monitoring network must be independently audited. EEMS performed the independent audits following the procedures used for the National Performance Audit Program (NPAP) as is required of both PSD and State, Local, and Tribal (SLT) air monitoring Stations by the U.S. EPA.

The NPAP is a QA program implemented by the EPA Office of Air Quality Planning and Standards (OAQPS) to conduct audits of gaseous air pollutant monitors by standard methods throughout each region of the U.S. The method includes introduction of National Institute of Standards and Technology (NIST) traceable audit gases to the station monitors through the ambient sample inlet, including all filters and fittings. This method evaluates measurement system accuracy including the entire sample train. The audit gas concentrations are also usually measured and verified with an audit analyzer on-site which is calibrated at the time of the audit. The method allows for a “flowrate-based” audit in situations where the mobile audit lab cannot be deployed. The “flowrate-based” audit procedures were followed for audits of the BELCO network.

EEMS performed the Through-The-Probe (TTP) pollutant monitor audits following EPA’s Quality Assurance Guidance Document – Method Compendium – *Field Standard Operating Procedures (SOP) for the Federal PM_{2.5} Performance Evaluation Program and NPAP TTP Audit SOP*.

Meteorological sensors and the operational parameters of the particulate matter (PM) samplers at the stations were also audited with EEMS NIST-traceable standards. The meteorological audits were performed in accordance with the EPA *QA Handbook Volume IV – Meteorological Measurements*. All procedures and guidance documents used to perform the audits can be found at the EPA OAQPS website: <https://www.epa.gov/amtic>.

This report includes the results of the TTP audits, PM audits, and meteorological sensors audits conducted December 9th and 10th, 2025. The two stations in the monitoring network are located near and to the east and northeast of the power generation station in Hamilton. The BDA1 site is located to be impacted mostly by vehicle traffic since the older generators with lower discharge

stacks have been removed. The BDA2 site is farther from the plant and located to be impacted by the taller stacks and the recently added generators. Map images of the sites are included in Appendix B. The locations of the monitoring stations are provided in Table 1.

Table 1 Station Locations

Station	Latitude (°)	Longitude (°)	Elevation (meters)
BDA1	32.299403	-64.790214	11
BDA2	32.302913	-64.787001	38

The audited monitoring equipment operating at the stations is presented in Table 2.

Table 2 Equipment Audited

Station	Parameter	Manufacture	Model	Serial #
BDA1	PM ₁₀ & PM _{2.5}	TEI	TEOM 1405-DF	247512007
BDA1	Sulfur Dioxide	Teledyne API	T 100	2782
BDA1	Nitrogen Dioxide	Teledyne API	T 200	3322
BDA1	14.5 meter Wind Direction	R.M. Young	AQ-5305	171051
BDA1	14.5 meter Wind Speed	R.M. Young	AQ-5305	171051
BDA1	14.5 meter Vertical Wind Speed	R.M. Young	27106T	08600
BDA1	3.5 meter Temperature	R.M. Young	41342	031516
BDA1	3.5 meter Relative Humidity	Met One	083D-1-35	E5744
BDA2	PM ₁₀ & PM _{2.5}	TEI	TEOM 1405-DF	238341611
BDA2	Sulfur Dioxide	Teledyne API	T-100	5507
BDA2	Nitrogen Dioxide	Teledyne API	T-200	6542

Additional support materials operated at each site include a Teledyne API multi-gas dilution system (model T 700), Teledyne API zero-air generator (model 701), and NIST-traceable calibration gases.

Details of the audits are presented in the following sections:

Section 2.0	Audit Methods and Equipment
Section 3.0	Audit Results
Section 4.0	Technical Systems Audit
Appendix A	Audit Data Sheets
Appendix B	Maps of Locations
Appendix C	Audit Standards Certifications

The preparation of this report, and all the activities and tasks described in this report, were performed by an accredited NPAP-TTP/PEP mobile lab Field Scientist. All procedures followed during the audits were provided by OAQPS and are available at the OAQPS website:

<https://www.epa.gov/amtic>.

The Field Scientist certificates of achievement are included in Appendix C with the certification of the audit standards.

Any questions related to the audits or audit report should be addressed to:

Eric Hebert
EEMS Inc.
P.O. Box 357593
Gainesville, FL 32635
Telephone: 352-262-0802
Fax: 352-371-1144
E-mail: eric.hebert@ee-ms.com

2.0 Audit Methods and Equipment

This section describes the steps followed in the performance of these audits. EEMS followed the documents referenced above rigorously.

2.1 Certification of EEMS Standards

All standards owned and maintained by EEMS undergo annual NIST-traceable certification. The standards include EPA Protocol Gas standards, digital multimeters, meteorological sensors and standards, and various flowrate measurement systems including DeltaCal devices and BIOS primary dry piston standards. Copies of the annual certifications of the EEMS standards used for the audits are included in Appendix C.

2.2 Protocol Gas Standard and Dilution System Calibration

EEMS owns and maintains a Thermo Environmental Instruments Inc. (TEI) 48iTLE carbon monoxide (CO) analyzer which is used to verify standard audit gas concentrations during TTP audits. The CO analyzer is mounted and operated in a climate controlled mobile laboratory with a multi-gas dilution system and NIST-traceable EPA Protocol Gas standards. The EEMS mobile lab could not be used for the BELCO station audits.

For the BELCO audits, EEMS owned primary flowrate standards were used to calibrate a spare BELCO owned dilution system, since the ozone generator in the EEMS system failed. A new EPA Protocol gas standard was also used due to the observed bias of the previous standard as reported following the second quarter audit. The BELCO owned zero air system (dedicated for audit only) was used with the dilution system calibrated by EEMS to generate audit gas concentrations to challenge the station monitors.

2.3 Summary of Field Activities

Onsite activity began on Monday December 8th which included the setup of the zero air, audit gas cylinder, and warmup of the EEMS dilution system. On Tuesday the 9th, EEMS personnel met TRC personnel at BDA1. The EEMS dilution system was calibrated, but following the calibration the ozone generator failed which prevented gas phase titration for the NO₂ audit. Therefore, a spare BELCO owned system was calibrated with the EEMS primary flowrate standards and used for audits of the gaseous pollutant monitors. Following the BDA1 gaseous pollutant monitor audits, the TEOM at BDA2 was audited at the request of TRC personnel, since it was planned to be replaced.

On Wednesday the 10th, the TEOM and meteorological sensors at BDA1 were audited. The audit equipment was transported to BDA2, and TTP audits of the gaseous monitors were performed.

Photos of the sites are included in Figures 1 through 3.

Figure 1 BDA1 Station



The vegetation at BDA2 has been addressed. The growing vegetation will remain a challenge to maintain. It is suggested that a more routine and regularly scheduled maintenance plan be developed in order to minimize data quality impact. The text below is from 40 CFR Part 58 App E which defines distances from pollutant inlets to trees and shrubbery. It is a great improvement to siting criteria to have the vegetation in control and compliance with EPA siting criteria.

Note - From 40 CFR Part 58 App E:

5. Spacing From Trees

(a) Trees can provide surfaces for SO₂, O₃, or NO₂ adsorption or reactions, and surfaces for particle deposition. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where the trees are of a sufficient height and leaf canopy density to interfere with the normal airflow around the probe, inlet, or monitoring path. To reduce this possible interference/obstruction, the probe, inlet, or at least 90 percent of the monitoring path must be at least 10 meters or further from the drip line of trees.

(b) The scavenging effect of trees is greater for O₃ than for other criteria pollutants. Monitoring agencies must take steps to consider the impact of trees on ozone monitoring sites and take steps to avoid this problem.

(c) For microscale sites of any air pollutant, no trees or shrubs should be located between the probe and the source under investigation, such as a roadway or a stationary source.

Figures 2 and 3 include views of BDA2 following the vegetation control.

Figure 2 BDA2 Vegetation in Compliance



Figure 3 BDA2 Vegetation in Compliance From Parking Area



Figure 4 includes a photo of a potential safety hazard at BDA1. As can be seen in the photo the supports for the electrical service panel are completely rusted through, and the panel is only supported by the electrical conduit. The condition has worsened since the previous audit visit in June. The electrical service panel is beginning to lean. The support should be repaired as soon as possible.

Similar corrosion is beginning to form on the tower leg brackets that are secured in the concrete tower foundation. It is suggested that the visible rust be removed and protective coating and rust prevention applied before the condition worsens and compromises the tower.

Figure 4 Potential Safety Hazard – BDA1 Electrical Panel

2.4 Gaseous Pollutant Monitor Audit Activities

The site audits were accomplished by generating audit test gas using the dedicated dilution system, the dedicated BELCO zero air system, and the new NIST-traceable audit gas cylinder. The dilution system was calibrated using the EEMS NIST-traceable primary flowrate standards. The audit gas was delivered to the station monitors at the station sample inlets, through all filters and fittings. The generated audit gas concentrations were calculated based on the flow rates and NIST-traceable multi-blend audit gas cylinder concentrations.

Audit test gas concentrations were selected from the OAQPS list of approved audit levels from 40 CFR Part 58. Table 3 provides the approved list of audit levels. Audit concentrations from at least three audit levels were selected for each monitor audit.

Table 3 Approved Audit Levels

Audit Level	Concentration Range, ppm			
	O₃	SO₂	NO₂	CO
1	0.004 - 0.0059	0.0003 - 0.0029	0.0003 - 0.0029	0.020 - 0.059
2	0.006 - 0.019	0.0030 - 0.0049	0.0030 - 0.0049	0.060 - 0.199
3	0.020 - 0.039	0.0050 - 0.0079	0.0050 - 0.0079	0.200 - 0.899
4	0.040 - 0.069	0.0080 - 0.0199	0.0080 - 0.0199	0.900 - 2.999
5	0.070 - 0.089	0.0200 - 0.0499	0.0200 - 0.0499	3.000 - 7.999
6	0.090 - 0.119	0.0500 - 0.0999	0.0500 - 0.0999	8.000 - 15.999
7	0.120 - 0.139	0.1000 - 0.1499	0.1000 - 0.2999	16.000 - 30.999
8	0.140 - 0.169	0.1500 - 0.2599	0.3000 - 0.4999	31.000 - 39.999
9	0.170 - 0.189	0.2600 - 0.7999	0.5000 - 0.7999	40.000 - 49.999
10	0.190 - 0.259	0.8000 - 1.000	0.8000 - 1.000	50.000 - 60.000

Specific audit concentrations were selected to be comparable with concentrations used for monitor calibrations, measured ambient concentrations, and instrument operating range. All station monitor values were obtained from the station DAS. Problems observed with the gaseous pollutant monitors are detailed in Section 3. The final results of the TTP audits are included in Section 3.0.

2.5 PM Sampler Audit Activities

The assessments were performed following manufacturer's recommendations using the EEMS DeltaCal and BIOS primary standards. Sample train integrity checks were also performed. The time and date were verified for the samplers. The results of the verifications are summarized in Section 3.0.

2.6 Meteorological Audit Activities

The site temperature and relative humidity sensors were removed from normal operation in order to be verified with a certified EEMS standard. All station sensor values were obtained from the station DAS.

The station temperature sensor was placed in three separate water baths with the EEMS standard and the measurements were compared. The station relative humidity sensor was verified in ambient conditions and using a test chamber with water vapor. Humidity within the chamber was verified with the NIST-traceable EEMS handheld transfer standard.

The orientation of the sensor support crossarm was verified with the EEMS NIST-traceable transit both before and after lowering the tower for the sensor audits. The wind direction sensor orientation accuracy was tested by aligning the sensor with the crossarm after lowering the tower.

The linearity of the wind direction sensor was audited using a mounting jig in order to maintain the same orientation when in operation. Figure 5 includes a photo of the sensor during the audit. The linearity of the sensor was verified by changing the wind direction sensor in 30-degree increments and verifying that the output also increased by 30 degrees.

The wind speed sensors were audited by rotating the propeller shafts at known speeds and calculating the corresponding wind speeds in meters per second (m/s). The relationship of revolutions per minute (rpm) to wind speed in m/s is provided by the sensor manufacturer.

Figure 5 BDA1 Wind Sensor Audit

3.0 Audit Results

3.1 TTP Audit Results

Gaseous pollutant audit results are summarized in Tables 4 and 5.

The results of the TTP audits indicate that all monitors at both stations are responding lower than expected when challenged with audit gas. It should be noted that the site staff reported that the monitors are normally adjusted if audit, QC, or calibration results are greater than $\pm 7\%$.

All test points were within the acceptance limits of $\pm 15\%$ (or 1.5 ppb for audit levels less than 3) of any single audit point. There was an observed bias of the NO converter efficiency. The issue may be a result of using the BELCO owned dilution system in “manual” mode during the audits. This was done to match only the flow rates verified with the EEMS flowrate standards. The converter efficiency results obtained may be questionable. It should be noted that the BDA1 converter was replaced by TRC following the audit.

Converter efficiencies for the NO_x monitors were evaluated based on the OAQPS Quality Assurance Guidance Document 2.3 Reference Method for the Determination of Nitrogen Dioxide in the Atmosphere (Chemiluminescence) February 2002, which uses the slope of the test point rather than the individual test points. Converter efficiencies for each test point are included on the audit forms in Appendix A.

The field audit forms are included in Appendix A. Other observations noted for the monitors are included after the tables. Observations related to site operations are included in Section 4.

Table 4 Gaseous Pollutant Monitor Audit Results BDA1

Parameter and Audit Level	Audit Value (ppm)	Site Value (ppm)	Actual Difference (ppm)	% Difference	Pass Warning Fail
BDA1					
NO ₂ – level 7	0.1699	0.1575	-0.0124	-7.3 %	Pass
NO ₂ – level 7	0.1077	0.1010	-0.0067	-6.2 %	Pass
NO ₂ – level 6	0.0519	0.0489	-0.0031	-5.9 %	Pass
NO ₂ – level 4	0.0188	0.0173	-0.0014	-7.6 %	Pass
NO ₂ – level 2	0.0047	0.0040	-0.0007	N/A	Pass
NO Conv Eff -- level 7		94.1 %			
NO Conv Eff -- level 7		96.5 %			
NO Conv Eff -- level 6		97.1 %			
NO Conv Eff -- level 4		94.3 %			
NO Conv Eff -- level 2		91.6 %			
Converter Efficiency Calculated by OAQPS QA Guidance Doc 2.3 February 2002				94.3 %	Fail
SO ₂ -- level 9	0.3273	0.3143	-0.0130	-4.0 %	Pass
SO ₂ -- level 8	0.2219	0.2141	-0.0078	-3.5 %	Pass
SO ₂ -- level 6	0.0816	0.0774	-0.0042	-5.2 %	Pass
SO ₂ -- level 5	0.0476	0.0436	-0.0040	-8.5 %	Pass
SO ₂ -- level 4	0.0173	0.0147	-0.0026	-14.9 %	Warning
SO ₂ -- level 2	Not tested	Not tested	Not tested	N/A	N/A

Table 5 Gaseous Pollutant Monitor Audit Results BDA2

Parameter and Audit Level	Audit Value (ppm)	Site Value (ppm)	Actual Difference (ppm)	% Difference	Pass Warning Fail
BDA2					
NO ₂ – level 7	0.1804	0.1677	-0.0127	-7.0 %	Pass
NO ₂ – level 7	0.0920	0.0852	-0.0068	-7.4 %	Pass
NO ₂ – level 6	0.0481	0.0461	-0.0020	-4.1 %	Pass
NO ₂ – level 4	0.0187	0.0177	-0.0009	-5.0 %	Pass
NO ₂ – level 3	0.0053	0.0050	-0.0004	-6.6 %	Pass
NO Conv Eff -- level 7		96.0 %			
NO Conv Eff -- level 7		95.8 %			
NO Conv Eff -- level 6		98.7 %			
NO Conv Eff -- level 4		98.0 %			
NO Conv Eff -- level 3		96.0 %			
Converter Efficiency Calculated by OAQPS QA Guidance Doc 2.3 February 2002				95.6 %	Fail
SO ₂ -- level 9	0.3273	0.3190	-0.0083	-2.5 %	Pass
SO ₂ -- level 8	0.2219	0.2184	-0.0035	-1.6 %	Pass
SO ₂ -- level 6	0.0816	0.0805	-0.0011	-1.3 %	Pass
SO ₂ -- level 5	0.0476	0.0461	-0.0015	-3.2 %	Pass
SO ₂ -- level 4	0.0173	0.0164	-0.0009	-5.3 %	Pass
SO ₂ -- level 2	0.0041	0.0033	-0.0008	N/A	Pass

As observed during the previous audit, the monitors at BDA2 respond slower to changes in audit gas concentration when compared to the monitors at BDA1. The NO_x monitor at BDA2 has been replaced, which corrected the slow response previously observed from 50ppb and lower when the monitor did not switch to “fast” sampling mode. However, the new monitor is only functioning in analog output mode.

3.2 PM Samplers Operational Verification Audit Results

The summary data for all flowrate channels, for both TEOM monitors, are reported in Table 6 below. The flowrate is the most critical variable and each of the other variables (temperature and pressure) are used to determine the flowrate, therefore errors in the temperature and pressure measurements will be reflected in the flowrate parameter.

The final PM verification forms for all measured variables are included in Appendix A. With the exception of one leak check, all variables were within acceptable limits. The time and dates of all samplers were verified and found to be within acceptable limits.

Table 6 PM Sampler Flow rate Verifications

Sampler and Parameter	Audit Flow Rate (lpm)	Sampler Flow Rate (lpm)	% Difference	Pass / Fail
BDA1				
TEOM Total	16.13	16.67	3.35 %	Pass
TEOM Bypass	11.51	12.00	4.26 %	Pass
TEOM PM 2.5	2.96	3.00	1.35 %	Pass
TEOM Coarse	1.66	1.67	0.60 %	Pass
BDA2				
TEOM Total	16.34	16.70	2.20 %	Pass
TEOM Bypass	11.94	12.00	0.50 %	Pass
TEOM PM 2.5	2.79	3.00	7.53 %	Pass
TEOM Coarse	1.61	1.67	3.73 %	Pass

The mass verification measurements of both TEOM samplers were found to be within acceptable criteria.

3.3 Meteorological Sensors Audit Results

The average alignment accuracy error of the wind direction sensor was within acceptance limits. The wind direction sensor is linear throughout the range. Both the horizontal and vertical wind speed sensors were found to be accurate.

The starting torque measurements for the wind direction sensor was found to be above the acceptance limits established in the QAPP.

The relative humidity sensor was verified using a NIST-traceable EEMS transfer standard. The sensor filter was dirty and was cleaned by site operator during the audit.

The BDA1 temperature sensor was found to be within 0.5 degree Celsius when compared to the NIST-traceable standard.

Summaries of all the meteorological sensor audits are included in Table 7. All audit results were within commonly adopted data quality acceptance criteria. Complete data sheets with each audit point for each sensor are included in Appendix A.

Table 7 Meteorological Sensors Audit Summary

Parameter	Audit Value	Station Value	Difference	Units
BDA1				
14.5 m WDR Accuracy	68.5	67.8	-0.7	Degrees
14.5 m WDR Accuracy	248.5	250.0	1.5	Degrees
14.5 m WDR Accuracy Average Error			0.4	Degrees
14.5 m WDR std dev of the linearity error	CW (30 deg x 12)		0.91	Degrees
14.5 m WDR std dev of the linearity error	CCW (30 deg x 12)		0.86	Degrees
14.5 m HWSP < 5 m/s avg. error			0.00	m/s
14.5 m HWSP > 5 m/s avg. error			0.00 %	% diff (m/s)

Parameter	Audit Value	Station Value	Difference	Units
14.5 m VWSP CW avg. error			-0.05	m/s
14.5 m VWSP CCW avg. error			0.05	m/s
3.5 m Temperature	0.06	0.17	0.11	Degree C
3.5 m Temperature	24.67	24.64	-0.03	Degree C
3.5 m Temperature	47.82	47.79	-0.03	Degree C
3.5 m Relative Humidity	65.7	68.4	2.7 %	% RH
3.5 m Relative Humidity	85.0	81.2	-3.8 %	% RH
3.5 m Relative Humidity	100.0	95.8	-4.2 %	% RH
3.5 m Relative Humidity	37.6	33.8	-3.8 %	% RH

4.0 Technical Systems Audit

Technical systems audits (TSA) are comprised of the overall evaluation of a total monitoring program. A TSA includes a thorough, systematic, on-site, qualitative audit of facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and the reporting aspects of a system. All aspects of the monitoring program are reviewed to assess if the program is meeting the data quality objectives (DQO) and the goals of the program.

The 40 CFR Part 58 Appendix A Section 2.5 defines the requirements for TSA for each Primary Quality Assurance Organization (PQAO) and can be found at: https://www.ecfr.gov/cgi-bin/text-idx?SID=8dc5bfe4312574da8db9f99dbaa6f784&mc=true&node=ap40.6.58_161.a&rgn=div9 Additional information related to the specific procedures of a TSA was presented at the National Ambient Air Monitoring Conference workshop QA 101 training session: **Technical Systems Audits QA 101 Session**, *Greg Noah, EPA OAQPS, RTP, NC, Stephanie McCarthy, EPA Region 4, SESD, Athens, GA.*

Although a formal TSA was not conducted in conjunction with the performance and accuracy evaluations of the pollutant monitors and meteorological sensors, some general observations of the monitoring program were noted. This section summarizes those observations to assist the BELCO program manager with addressing the data quality aspects of the air monitoring network.

4.1 Management and Project Documentation

Determining and defining the goals of an air quality monitoring program is essential for the success of the program. The Quality Management Plan (QMP) developed and implemented by the entity responsible for administering the program, and the specific Quality Assurance Project Plan (QAPP) governing the project operation are the documents which define the goals. Those documents should be completed and routinely reviewed and updated. The QMP and QAPP will be reviewed during a TSA to evaluate if the monitoring network is being operated (including data validation and reporting) in adherence with the documentation.

All Standard Operating Procedures (SOP) should be included in the QAPP and available either electronically or hardcopy at each monitoring location. The SOP should clearly define the responsibilities of the site operator with respect to each monitor and DAS at each site and all aspects relating to:

- Routine operation and diagnostics
- Acceptable operational and diagnostic criteria
- QC/QA procedures, criteria, and corrective actions
- Routine maintenance

4.1.1 Site Documentation

As observed during previous audits, the hardcopy logbooks could be improved. Some suggestions to improve the site documentation are outlined below.

1. Logbooks should have each entry dated when entered with no blank spaces between entries. Each visit is documented in succession.
2. Each entry in the logbook should be signed or initialed. Corrections to entries should be a single strike-through initialized and dated.
3. The logbook should be duplicated (ideally electronically) and available to data validation and QA staff.
4. Ideally page numbers should be included on each page.
5. Logbook entries should include equipment repairs and replacements including parts and/or serial numbers.

4.2 Siting Criteria

Appendix E to 40 CFR Part 58 defines air quality monitoring siting criteria for pollutant monitors. It was observed that the BDA2 station vegetation issues have been improved and are now compliant with EPA guidance documents. It is recommended that the routine and regular maintenance be added to the QAPP and SOP for BDA2.

4.3 Monitor Configuration

It was observed that all the gaseous pollutant monitors in the network did not respond in the same manner when audit gas concentration was changed. This could cause inaccurate measurements of short duration pollutant plumes. It is suggested that all the monitor configuration settings be reviewed and the desired configuration be implemented at all sites for all monitors. The configuration file should be documented and be included in the QAPP.

All monitor and sampler time and date settings should be verified regularly. If for some reason data are not available on the data loggers at the sites, data could be recovered directly from the monitors and samplers, therefore it is important that the time and date are correct.

4.4 Shelter Temperature

The shelters do not have an independent sensor to measure and record shelter temperature. Currently the internal monitor temperature is being logged and monitored. The monitors are designed and designated by the EPA to be operated within a specific temperature range. Shelter temperature should be added to the stations.

4.5 Sample Inlet Maintenance

The sample inlet filters were observed to be clean and recently changed at both sites. Filter change frequency and log of filter changes should be documented.

4.6 Automatic Monitor Span/Precision Tests and TEOM Verifications

The network would benefit from having automatic span/precision/and zero checks configured and performed using the site dilution systems and data loggers. This would help to identify issues with the monitors and reduce data loss.

The operational parameters of the TEOM monitors should be verified monthly for the same reasons as mentioned for the gaseous pollutant monitors.

APPENDIX A

Audit Data Sheets

Low-volume PM Sampler Performance Verification

Delta Cal Version 4.00P			Network :		BELCO	
Date & Time verified Yes			BDA1	TEI TEOM 1405-DF	s/n= 247512007	
Date & Time verified Yes			BDA2	TEI TEOM 1405-DF	s/n= 238341611	
BIOS Definer	159956	EEMS #	01414	standard Cert Date:	2/20/2025	
DeltaCal	200328	EEMS #	01453	standard Cert Date:	2/20/2025	
Date & Site of Verification	12/10/2025 BDA1 - PM 2.5 & PM 10					
Parameter	flow raw	flow corr	TEOM	Difference	Acceptance Criteria	Pass/Fail
Calculated Total Flow Rate (Lpm)	---	16.13	16.67	3.35%	≤ ± 7%	Pass
Design Flow Rate (16.67 Lpm)	---	16.13		-3.24%	≤ ± 7%	Pass
By-pass Flow Rate (Lpm)	11.51	11.51	12.00	4.26%	≤ ± 7%	Pass
PM2.5 Flow Rate (Lpm)	2.96	2.96	3.00	1.35%	≤ ± 10%	Pass
Coarse Flow Rate (Lpm)	1.66	1.66	1.67	0.60%	≤ ± 10%	Pass
Ambient Temperature (°C)	20.5		20.33	-0.17	≤ ± 2 °C	Pass
Barometric Pressure (mm Hg)	762.5		763	0.5	≤ ± 10 mm Hg	Pass
	Base		Reference			
Leak Check (PM2.5)	0.00		0.00		0.15 lpm	Pass
Leak Check (coarse)	-0.02		-0.01		0.15 lpm	Pass
Leak Check (bypass)	0.09		0.00		0.60 lpm	Pass
KO verification (PM2.5)				1.04%		Pass
KO verification (coarse)				1.04%		Pass
Date & Site of Verification	12/09/2025 BDA2 - PM 2.5 & PM 10					
Parameter	flow raw	flow corr	TEOM	Difference	Acceptance Criteria	Pass/Fail
Calculated Total Flow Rate (Lpm)	---	16.34	16.70	2.20%	≤ ± 7%	Pass
Design Flow Rate (16.67 Lpm)	---	16.34		-1.98%	≤ ± 7%	Pass
By-pass Flow Rate (Lpm)	11.94	11.94	12.00	0.50%	≤ ± 7%	Pass
PM2.5 Flow Rate (Lpm)	2.79	2.79	3.00	7.53%	≤ ± 10%	Pass
Coarse Flow Rate (Lpm)	1.61	1.61	1.67	3.73%	≤ ± 10%	Pass
Ambient Temperature (°C)	22.10		21.97	-0.13	≤ ± 2 °C	Pass
Barometric Pressure (mm Hg)	751.5		753.9	2.4	≤ ± 10 mm Hg	Pass
	Base		Reference			
Leak Check (PM2.5)	0.01		0.17		0.15 lpm	Fail
Leak Check (coarse)	0.02		-0.02		0.15 lpm	Pass
Leak Check (bypass)	0.16		0.00		0.6 lpm	Pass
KO verification (PM2.5)				0.84%		Pass
KO verification (coarse)				0.85%		Pass

FINAL SUMMARY AUDIT REPORT FLOW BASED

EEMS Van-3

Site Name: BDA1

Airs ID: 0

Auditor: Eric Hebert (EEMS)

Audit Date: 12/9/2025

Audit levels correspond to EPA approved audit levels found in CFR 40 Part 58

Parameter	Mobile Lab Response (ppm)	Station Response (ppm)	Percent Difference	Actual Difference (ppm)	Pass/Fail	Warning
Ozone						
Pre Zero						
Audit Level 5					N/A	
Audit Level 4					N/A	
Audit Level 3					N/A	
Audit Level 2					N/A	
Post Zero						
Airs ID:						
Pre Zero	0.0000					
CO Audit level 5	0.0000				N/A	
CO Audit level 4	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 2	0.0000				N/A	
CO Audit level 1	0.0000				N/A	
Post Zero	0.0000					
Oxides of Nitrogen						
Pre Zero	0.0000	0.0018		0.0018	Pass	
NO Audit Point #1	0.3267	0.3241	-0.8	-0.0026	Pass	
NO Audit Point #2	0.2214	0.2188	-1.2	-0.0026	Pass	
NO Audit Point #3	0.0815	0.0806	-1.1	-0.0009	Pass	
NO Audit Point #4	0.0475	0.0466	-1.9	-0.0009	Pass	
NO Audit Point #5	0.0173	0.0167	-3.3	-0.0006	Pass	
NO Audit Point #6	0.0041	0.0040	-2.4	-0.0001	Pass	
Post Zero	0.0000	0.0018		0.0018	Pass	
Pre Zero	0.0000	0.0019		0.0019	Pass	
NOx Audit Point #1	0.3290	0.3245	-1.4	-0.0045	Pass	
NOx Audit Point #2	0.2230	0.2179	-2.3	-0.0051	Pass	
NOx Audit Point #3	0.0820	0.0799	-2.6	-0.0021	Pass	
NOx Audit Point #4	0.0478	0.0466	-2.4	-0.0012	Pass	
NOx Audit Point #5	0.0174	0.0166	-4.7	-0.0008	Pass	
NOx Audit Point #6	0.0041	0.0038	-8.5	-0.0004	Pass	
Post Zero	0.0000	0.0016		0.0016	Pass	
Pre Zero	0.0000	0.0019		0.0019	Pass	
NO2 Audit level 7	0.1699	0.1575	-7.3	-0.0124	Pass	
NO2 Audit level 7	0.1077	0.1010	-6.2	-0.0067	Pass	
NO2 Audit level 6	0.0519	0.0489	-5.9	-0.0031	Pass	
NO2 Audit level 4	0.0188	0.0173	-7.6	-0.0014	Pass	
NO2 Audit level 2	0.0047	0.0040	-14.9	-0.0007	Pass	
Post Zero	0.0000	0.0016		0.0016	Pass	
Converter Efficiency NO2 level 7	94.1%					
Converter Efficiency NO2 level 7	96.5%					
Converter Efficiency NO2 level 6	97.1%					
Converter Efficiency NO2 level 4	94.3%					
Converter Efficiency NO2 level 2	91.6%					
Converter Efficiency calculated by OAQPS QA Guidance Doc 2.3 February 2002 =				94.3%	Fail	
Sulfur Dioxide						
Pre Zero	0.0000	0.0002		0.0002	Pass	
SO2 Audit level 9	0.3273	0.3143	-4.0	-0.0130	Pass	
SO2 Audit level 8	0.2219	0.2141	-3.5	-0.0078	Pass	
SO2 Audit level 6	0.0816	0.0774	-5.2	-0.0042	Pass	
SO2 Audit level 5	0.0476	0.0436	-8.5	-0.0040	Pass	
SO2 Audit level 4	0.0173	0.0147	-14.9	-0.0026	Pass	Warning
SO2 Audit level 2	0.0041				N/A	
Post Zero	0.0000	-0.0005		-0.0005	Pass	

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

Site Name: BDA1
 Auditor: Eric Hebert (EEMS)
 Station Manager: Bailey McAuley (TRC) / Kascia DaSilva (BELCO)

Airs ID: 0
 Audit Date: 12/09/25

NITROGEN OXIDES REPORT

MOBILE LAB INSTRUMENTS					STATION INSTRUMENT INFORMATION		
Instrument:	Ozone -- # 0111- CO -- # 01132				Instrument:	NO/NOX	
Manufacturer:	Thermo	TEI			Manufacturer / Model #	T-API	T200
Model:	49i-A1ZCA	48i TLE			Property Number	3322	
Serial Number:	1180030022	1406960656			Last Calibration Date	01/00/00	
Calibration Date:	02/15/24	Calibrated			Offset / Slope	1.005	-3.521
Slope	0.9997	on			Indicated Flow (ccm)	580.1	
Intercept	0.0003171	day of audit			In-Line Filter Change	1/0/1900	
					Instrument Range / units	500 ppb	
EPA Protocol Gas	Certifying Agency	Date	NO Concentration (ppm)	NOx Concentration (ppm)	DAS make / model / s/n	0	0
#	Agency				Time Data Flagged (audit start / end)	0:00	0:00
LL124812	AirGas	4/18/2025	20.16	20.23	Local Primary Standard	EPA PROTOCOL GAS	
					Manifold Type:	Teflon	

FINAL NO AUDIT RESULTS			FINAL NOx AUDIT RESULTS		
Audit NO Concentration (ppm)	Site Response (ppm)	Percent Difference	Audit NOX CONCENTRATION (ppm)	SITE RESPONSE (ppm)	Percent Difference
0.0000	0.0018		0.0000	0.0019	
0.3267	0.3241	-0.8	0.3290	0.3245	-1.4
0.2214	0.2188	-1.2	0.2230	0.2179	-2.3
0.0815	0.0806	-1.1	0.0820	0.0799	-2.6
0.0475	0.0466	-1.9	0.0478	0.0466	-2.4
0.0173	0.0167	-3.3	0.0174	0.0166	-4.7
0.0041	0.0040	-2.4	0.0041	0.0038	-8.5
0.0000	0.0018		0.0000	0.0016	

NO Audit Point #1 Pass/Fail Warning
 NO Audit Point #2 Pass
 NO Audit Point #2 Pass
 NO Audit Point #3 Pass
 NO Audit Point #4 Pass
 NO Audit Point #5 Pass
 NO Audit Point #6 N/A

NOx Audit Point #1 Pass/Fail Warning
 NOx Audit Point #2 Pass
 NOx Audit Point #2 Pass
 NOx Audit Point #3 Pass
 NOx Audit Point #4 Pass
 NOx Audit Point #5 Pass
 NOx Audit Point #6 N/A

FINAL NO ₂ AUDIT RESULTS					Audit Limits	
Audit NO2 Concentration (ppm)	Site Response (ppm)	Percent Difference	Converter Efficiency	Actual Diff (ppm)	Pass	Bias < ±15% Levels 3 and above
0.00110	0.00047			-0.00063	Fail	Bias > ±15% OR > ± 1.5 ppb Levels 1 & 2
0.16990	0.15750	-7.3	94.1%	-0.01240	Warning	Bias > ±10% Levels 3 and above
0.10770	0.10100	-6.2	96.5%	-0.00670	Pass	above 96%
0.05190	0.04885	-5.9	97.1%	-0.00305		
0.01876	0.01733	-7.6	94.3%	-0.00143	Fail	<96%
0.00470	0.00400	-14.9	91.6%	-0.00070	Warning	Between 96%-97%
0.00000	0.00000			0.00000		

NO2 Audit level 7 Pass/Fail Warning
 NO2 Audit level 7 Pass
 NO2 Audit level 6 Pass
 NO2 Audit level 4 Pass
 NO2 Audit level 2 Pass
 Converter Efficiency NO2 level 7 Fail
 Converter Efficiency NO2 level 7 Pass
 Converter Efficiency NO2 level 6 Pass
 Converter Efficiency NO2 level 4 Fail
 Converter Efficiency NO2 level 2 Fail
 Converter Efficiency by slope = Fail

Conv eff by slope
94.3%

Auditor	Eric Hebert
	Print
	<i>Eric Hebert</i>
	Signature
	EPA person notified in case of audit failure

Comments:
 0

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

SULFUR DIOXIDE REPORT

Site Name:	BDA1	Airs ID:	0
Auditor:	Eric Hebert (EEMS)	Audit Date:	12/09/25
Station Manager:	Bailey McAuley (TRC) / Kascia DaSilva (BELCO)		

	MOBILE LAB INSTRUMENTS		EPA Protocol	Certifying Agency	Date	Concentration (ppm)
	Ozone -- # 01114	CO -- # 01132	Gas #			
Instrument:	Thermo	TEI				
Manufacturer:	49i-A1ZCA	48i TLE	LL124812	AirGas	4/18/2025	20.2
Model:	1180030022	1406960656				
Serial Number:	02/15/24	Calibrated				
Calibration Date:	0.9997	on				
Slope	0.0003171	day of audit				
Intercept						

STATION INSTRUMENT INFORMATION

Instrument:	SO2	
Manufacturer / Model #	T-API	T100
Property Number	2782	
Last Calibration Date	01/00/00	
Offset / Slope	1.088	0.049
Indicated Flow (ccm)	713.5	
In-Line Filter Change	1/0/1900	
Instrument Range / units	500 ppb	
DAS make / model / s/n	0	0
Time Data Flagged (audit start / end)	0:00	0:00
Local Primary Standard	EPA PROTOCOL GAS	
Manifold Type:	Teflon	

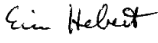
FINAL SULFUR DIOXIDE AUDIT RESULTS

Audit SO2 Concentration (ppm)	Site Response (ppm)	Percent Difference	Actual Diff (ppm)
0.0000	0.0002		0.00019
0.3273	0.3143	-4.0	-0.013
0.2219	0.2141	-3.5	-0.0078
0.0816	0.0774	-5.2	-0.00422
0.0476	0.0436	-8.5	-0.00403
0.0173	0.0147	-14.9	-0.00257
0.0041			
0.0000	-0.0005		-0.00045

SO2 Audit level 9	<u>Pass/Fail</u>	<u>Warning</u>
SO2 Audit level 8	Pass	
SO2 Audit level 6	Pass	
SO2 Audit level 5	Pass	
SO2 Audit level 4	Pass	Warning
SO2 Audit level 2	N/A	

Audit Limits

Pass	Bias < ±15% Levels 3 and above
Fail	Bias > ±15% OR difference from actual concentration > ± 1.5 ppb Levels 1 & 2
Warning	Bias > ±10% Levels 3 and above

Auditor	Eric Hebert
	Print
	
	Signature
	EPA person notified in case of audit failure

FINAL SUMMARY AUDIT REPORT FLOW BASED
EEMS Van-3

Site Name: BDA2
Auditor: Eric Hebert (EEMS)

Airs ID: 0
Audit Date: 12/10/2025

Audit levels correspond to EPA approved audit levels found in CFR 40 Part 58

Parameter	Mobile Lab Response (ppm)	Station Response (ppm)	Percent Difference	Actual Difference (ppm)	Pass/Fail	Warning
Ozone						
Pre Zero						
Audit Level 5					N/A	
Audit Level 4					N/A	
Audit Level 3					N/A	
Audit Level 2					N/A	
Post Zero						
Airs ID:						
Pre Zero	0.0000					
CO Audit level 5	0.0000				N/A	
CO Audit level 4	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 3	0.0000				N/A	
CO Audit level 2	0.0000				N/A	
CO Audit level 1	0.0000				N/A	
Post Zero	0.0000					
Oxides of Nitrogen						
Pre Zero	0.0000	0.0002		0.0002	Pass	
NO Audit Point #1	0.3267	0.3195	-2.2	-0.0072	Pass	
NO Audit Point #2	0.2214	0.2138	-3.4	-0.0076	Pass	
NO Audit Point #3	0.0815	0.0781	-4.2	-0.0034	Pass	
NO Audit Point #4	0.0475	0.0446	-6.2	-0.0030	Pass	
NO Audit Point #5	0.0173	0.0156	-9.9	-0.0017	Pass	
NO Audit Point #6	0.0041	0.0032	-21.5	-0.0009	Pass	
Post Zero	0.0000	0.0006		0.0006	Pass	
Pre Zero	0.0000	0.0017		0.0017	Pass	
NOx Audit Point #1	0.3290	0.3187	-3.1	-0.0103	Pass	
NOx Audit Point #2	0.2230	0.2134	-4.3	-0.0096	Pass	
NOx Audit Point #3	0.0820	0.0780	-4.9	-0.0040	Pass	
NOx Audit Point #4	0.0478	0.0444	-7.1	-0.0034	Pass	
NOx Audit Point #5	0.0174	0.0157	-9.8	-0.0017	Pass	
NOx Audit Point #6	0.0041	0.0032	-22.9	-0.0009	Pass	
Post Zero	0.0000	0.0010		0.0010	Pass	
Pre Zero	0.0000	0.0017		0.0017	Pass	
NO2 Audit level 7	0.1804	0.1677	-7.0	-0.0127	Pass	
NO2 Audit level 6	0.0920	0.0852	-7.4	-0.0068	Pass	
NO2 Audit level 5	0.0481	0.0461	-4.1	-0.0020	Pass	
NO2 Audit level 4	0.0187	0.0177	-5.0	-0.0009	Pass	
NO2 Audit level 3	0.0053	0.0050	-6.6	-0.0004	Pass	
Post Zero	0.0000	0.0010		0.0010	Pass	
Converter Efficiency NO2 level 7	96.0%					
Converter Efficiency NO2 level 6	95.8%					
Converter Efficiency NO2 level 5	98.7%					
Converter Efficiency NO2 level 4	98.0%					
Converter Efficiency NO2 level 3	96.0%					
Converter Efficiency calculated by OAQPS QA Guidance Doc 2.3 February 2002 =				95.6%	Fail	
Sulfur Dioxide						
Pre Zero	0.0000	0.0000		0.0000	Pass	
SO2 Audit level 9	0.3273	0.3190	-2.5	-0.0083	Pass	
SO2 Audit level 8	0.2219	0.2184	-1.6	-0.0035	Pass	
SO2 Audit level 6	0.0816	0.0805	-1.3	-0.0011	Pass	
SO2 Audit level 5	0.0476	0.0461	-3.2	-0.0015	Pass	
SO2 Audit level 4	0.0173	0.0164	-5.3	-0.0009	Pass	
SO2 Audit level 2	0.0041	0.0033	-19.3	-0.0008	Pass	
Post Zero	0.0000	0.0006		0.0006	Pass	

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

Site Name: BDA2
Auditor: Eric Hebert (EEMS)
Station Manager: Bailey McAuley (TRC) / Kascia DaSilva (BELCO)

Airs ID: 0
Audit Date: 12/10/25

NITROGEN OXIDES REPORT

MOBILE LAB INSTRUMENTS					STATION INSTRUMENT INFORMATION		
Instrument:	Jzone -- # 0111 CO -- # 01132				Instrument:	NO/NOX	
Manufacturer:	Thermo	TEI			Manufacturer / Model #	T-API	T200
Model:	49i-A1ZCA	48i TLE			Property Number	6638	
Serial Number:	1180030022	1406960656			Last Calibration Date	01/00/00	
Calibration Date:	02/15/24	Calibrated			Offset / Slope	0.961	0.500
Slope	0.9997	on			Indicated Flow (ccm)	541	
Intercept	0.0003171	day of audit			In-Line Filter Change	1/0/1900	
					Instrument Range / units	500 ppb	
EPA Protocol	Certifying	Date	NO	NOx	DAS make / model / s/n	0	0
Gas #	Agency		Concentration (ppm)	Concentration (ppm)	Time Data Flagged (audit start / end)	0:00	0:00
LL124812	AirGas	4/18/2025	20.16	20.23	Local Primary Standard	EPA PROTOCOL GAS	
					Manifold Type:	Teflon	

FINAL NO ₂ AUDIT RESULTS			FINAL NO _x AUDIT RESULTS		
Audit NO Concentration (ppm)	Site Response (ppm)	Percent Difference	Audit NO _x CONCENTRATION (ppm)	SITE RESPONSE (ppm)	Percent Difference
0.0000	0.0002		0.0000	0.0017	
0.3267	0.3195	-2.2	0.3290	0.3187	-3.1
0.2214	0.2138	-3.4	0.2230	0.2134	-4.3
0.0815	0.0781	-4.2	0.0820	0.0780	-4.9
0.0475	0.0446	-6.2	0.0478	0.0444	-7.1
0.0173	0.0156	-9.9	0.0174	0.0157	-9.8
0.0041	0.0032	-21.5	0.0041	0.0032	-22.9
0.0000	0.0006		0.0000	0.0010	

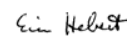
NO Audit Point #1 Pass/Fail Warning
NO Audit Point #2 Pass
NO Audit Point #2 Pass
NO Audit Point #3 Pass
NO Audit Point #4 Pass
NO Audit Point #5 Pass **Warning**
NO Audit Point #6 N/A

NO_x Audit Point #1 Pass/Fail Warning
NO_x Audit Point #2 Pass
NO_x Audit Point #2 Pass
NO_x Audit Point #3 Pass
NO_x Audit Point #4 Pass
NO_x Audit Point #5 Pass
NO_x Audit Point #6 N/A

FINAL NO ₂ AUDIT RESULTS					Audit Limits	
Audit NO ₂ Concentration (ppm)	Site Response (ppm)	Percent Difference	Converter Efficiency	Actual Diff (ppm)	Pass	Bias < ±15% Levels 3 and above
0.00110	-0.00063			-0.00173	Fail	Bias > ±15% OR > ± 1.5 ppb Levels 1 & 2
0.18040	0.16770	-7.0	96.0%	-0.01270	Warning	Bias > ±10% Levels 3 and above
0.09200	0.08520	-7.4	95.8%	-0.00680	Pass	above 96%
0.04810	0.04612	-4.1	98.7%	-0.00198		
0.01866	0.01773	-5.0	98.0%	-0.00093	Fail	<96%
0.00530	0.00495	-6.6	96.0%	-0.00035	Warning	Between 96%-97%
0.00000	0.00000			0.00000		

NO₂ Audit level 7 Pass/Fail Warning
NO₂ Audit level 6 Pass
NO₂ Audit level 5 Pass
NO₂ Audit level 4 Pass
NO₂ Audit level 3 Pass
Converter Efficiency NO₂ level 7 Fail **Warning**
Converter Efficiency NO₂ level 6 Fail
Converter Efficiency NO₂ level 5 Pass
Converter Efficiency NO₂ level 4 Pass
Converter Efficiency NO₂ level 3 Fail **Warning**
Converter Efficiency by slope = Fail

Conv eff by slope = 95.6%

Auditor	Eric Hebert
	Print
	
	Signature
EPA person notified in case of audit failure	

Comments:
0

FINAL THROUGH-THE-PROBE AUDIT REPORT
EEMS Van-3

SULFUR DIOXIDE REPORT

Site Name: BDA2
 Auditor: Eric Hebert (EEMS)
 Station Manager: Bailey McAuley (TRC) / Kascia DaSilva (BELCO)

Airs ID: 0
 Audit Date: 12/10/25

	MOBILE LAB INSTRUMENTS		EPA Protocol	Certifying Agency	Date	Concentration (ppm)
	Ozone -- # 01114	CO -- # 01132	Gas #			
Instrument:	Thermo	TEI				
Manufacturer:	49i-A1ZCA	48i TLE	LL124812	AirGas	4/18/2025	20.2
Model:	1180030022	1406960656				
Serial Number:	02/15/24	Calibrated				
Calibration Date:	0.9997	on				
Slope	0.0003171	day of audit				
Intercept						

STATION INSTRUMENT INFORMATION

	SO2	
	T-API	T100
Instrument:		
Manufacturer / Model #		
Property Number	5507	
Last Calibration Date	01/00/00	
Offset / Slope	1.080	0.182
Indicated Flow (ccm)	745.6	
In-Line Filter Change	1/0/1900	
Instrument Range / units	500 ppb	
DAS make / model / s/n	0	0
Time Data Flagged (audit start / end)	0:00	0:00
Local Primary Standard	EPA PROTOCOL GAS	
Manifold Type:	Teflon	

FINAL SULFUR DIOXIDE AUDIT RESULTS

Audit SO2 Concentration (ppm)	Site Response (ppm)	Percent Difference	Actual Diff (ppm)
0.0000	0.0000		0.00002
0.3273	0.3190	-2.5	-0.0083
0.2219	0.2184	-1.6	-0.0035
0.0816	0.0805	-1.3	-0.0011
0.0476	0.0461	-3.2	-0.00153
0.0173	0.0164	-5.3	-0.00092
0.0041	0.0033	-19.3	-0.00079
0.0000	0.0006		0.00061

	Pass/Fail	Warning
SO2 Audit level 9	Pass	
SO2 Audit level 8	Pass	
SO2 Audit level 6	Pass	
SO2 Audit level 5	Pass	
SO2 Audit level 4	Pass	
SO2 Audit level 2	Pass	

Audit Limits

Pass	Bias < ±15% Levels 3 and above
Fail	Bias > ±15% OR difference from actual concentration > ± 1.5 ppb Levels 1 & 2
Warning	Bias > ±10% Levels 3 and above

Auditor	Eric Hebert
	Print
	
	Signature
EPA person notified in case of audit failure	

Client Name:		BELCO		Site Latitude:		32.299403	
Site Name:		BDA 1		Site Longitude:		-64.790214	
Audit/Calibration Date:		12/10/2025		GPS Accuracy (+/- distance):		2	
Enter Site Equipment Information Below:				Site Elevation:		11	
				Elevation and Accuracy Units:		meters	
				Site Magnetic Declination:		14.4 west	
				Direction reported as degre(°)		True	
Use pull downs in grey cells to indicate if equip. is not present		DAS Mfg.: Campbell		Other Mfg.:		Sensor height (m): 14.5	
		Model: Unknown		Other Model:			
		I.D. No.: Unknown					
YES	1st Wind Dir. Mfg.:	RM Young					
	Model:	05305-AQ					
	I.D. No.:	171051					
NO	2nd Wind Dir. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Wind Dir. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
YES	1st Horizontal Wind Spd. Mfg.:	RM Young		Other Mfg.:		Sensor height (m):	14.5
	Model:	05305-AQ		Other Model:			
	I.D. No.:	171051					
NO	2nd Horizontal Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	0
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Horizontal Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	0
	Model:			Other Model:			
	I.D. No.:						
YES	1st Vertical Wind Spd. Mfg.:	RM Young		Other Mfg.:		Sensor height (m):	14.5
	Model:	27106T		Other Model:			
	I.D. No.:	08600					
NO	2nd Vertical Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Vertical Wind Spd. Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
YES	(Top) 1st Temperature Sensor Mfg.:	RM Young		Other Mfg.:		Sensor height (m):	3.5
	Model:	41342		Other Model:			
	I.D. No.:	031516					
NO	2nd Temperature Sensor Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	3rd Temperature Sensor Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
NO	4th Temperature Sensor Mfg.:			Other Mfg.:		Sensor height (m):	
	Model:			Other Model:			
	I.D. No.:						
YES	Relative Humidity Sensor Mfg.:	Met One		Other Mfg.:		Sensor height (m):	3.5
	Model:	083D-1-35		Other Model:			
	I.D. No.:	E5744					
NO	Barometric Pressure Sensor Sensor Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	Tipping Bucket Mfg.:						
	Model:						
	I.D. No.:						
NO	Electronic Rain Gage Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	Solar Radiation Sensor Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	Solar Radiation Translator Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	PM Sampler #1 Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						
NO	PM Sampler #2 Mfg.:			Other Mfg.:			
	Model:			Other Model:			
	I.D. No.:						

Field Scientist : E. Hebert
 Site ID: BDA 1
 Audit/Calibration Date: 12/10/2025

Audit Equipment List Assigned to: Van 1

Reference Standard	Mfg.	Model	SN	ID Number	Slope	Intercept	Certification Date
Multimeter					1	0	
Voltage Source					1	0	
RTD (Temperature Reference)	FLUKE	1551	6339005	EEMS 01313	0.9999	0.00389	3/21/2025
Hygrometer (RH Reference)	Kimo	HQ210	1D250200407	None	1	0	4/3/2025
Pressure Reference	BGI	DeltaCal	200328	EEMS 01453	1	0	2/20/2025
Wind Speed Motor - Low	RM Young	18802		EEMS 01254	1	0	7/1/2024
Wind Speed Motor - High	RM Young	18811		EEMS 01255	1	0	7/1/2024
Solar Radiation Translator					1	0	
Solar Radiation Sensor					1	0	
Compass	Ushikata	S-25	199578	EEMS 1272	1	0	2/1/2025
Hi-vol orifice (QA)							
Hi-vol orifice (QS)							
Manometer							
GPS							

BELCO Meteorological QA Test Results

14.5 m Unadjusted Wind Direction

Site location:	BDA 1
Wind Monitor Mfg.:	RM Young
Model:	05305-AQ
ID No.:	171051
Vane SN:	N/A
Avg. Torque Reading (g-cm):	15
Magnetic Declination (deg):	-14.4

Date:	10-Dec-2025
Field Scientist :	E. Hebert

Datalogger Mfg./Model:	Campbell / Unknown
Datalogger ID:	Unknown

Ref. Compass ID:	Ushikata # EEMS 1272
mount alignment (° magnetic):	83

Sensor Alignment

Compass Reading (° True)	Site DAS	Difference	Vane Position	Remarks
68.5	67.8	-0.7	parallel to CA	PASS
248.5	250.0	1.5	parallel to CA	PASS
			perpendicular to CA	
			perpendicular to CA	
	Average	0.4		PASS

Linearity Test

Vane Direction	DAS (Deg.)	Difference	Vane Rotation	Remarks
0	0.1	2.5		PASS
30	30.3	0.2	Clockwise	PASS
60	60.3	0.0	Clockwise	PASS
90	89.6	-0.7	Clockwise	PASS
120	120.1	0.5	Clockwise	PASS
150	149.3	-0.8	Clockwise	PASS
180	178.4	-0.9	Clockwise	PASS
210	208.2	-0.2	Clockwise	PASS
240	239.1	0.9	Clockwise	PASS
270	269.4	0.4	Clockwise	PASS
300	299.8	0.4	Clockwise	PASS
330	329.1	0.0	Clockwise	PASS
	Std Dev	0.91		PASS
360	0.1			
330	329.3	-0.8	Counterclockwise	PASS
300	299.6	1.8	Counterclockwise	PASS
270	270.2	0.6	Counterclockwise	PASS
240	239.1	-1.1	Counterclockwise	PASS
210	208.9	-0.2	Counterclockwise	PASS
180	179.1	0.2	Counterclockwise	PASS
150	149.7	0.6	Counterclockwise	PASS
120	119.9	0.2	Counterclockwise	PASS
90	91.0	1.1	Counterclockwise	PASS
60	60.3	-0.7	Counterclockwise	PASS
30	30.1	-0.2	Counterclockwise	PASS
	Std Dev	0.86		PASS

14.5 m Unadjusted Wind Speed Calibration

Wind Monitor Mfg.:	RM Young
Model:	05305-AQ
ID:	171051
Cups or Propeller SN:	illegible
Avg. Torque Reading (g-cm):	0.6
Measurement Units:	m/s
RPM Multiplier:	0.00512

Calibrator Mfg.:	RM Young
Model:	18802
ID:	EEMS 01254
ID:	EEMS 01255

RPM Offset: 0

Synchronous Motor	RPM	Calculated wind speed (m/s)	DAS (m/s)	Difference (m/s)	Remarks
None	0	0.00	0.00	0.00	PASS
EEMS 01255	200	1.02	1.02	0.00	PASS
EEMS 01255	400	2.05	2.05	0.00	PASS
EEMS 01255	600	3.07	3.07	0.00	PASS
					PASS
EEMS 01255	1200	6.14	6.14	0.00	PASS
EEMS 01255	2400	12.29	12.29	0.00	PASS
EEMS 01255	4800	24.58	24.58	0.00	PASS
EEMS 01255	9000	46.08	46.08	0.00	PASS
High Speed					

Comments:

BELCO Meteorological QA Test Results

Site: BDA 1	Date: 12/10/2025																												
Sensor Height: 14.5 m																													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">site system</th> </tr> <tr> <td style="padding: 2px;">sensor mfg:</td> <td style="padding: 2px;">RM Young</td> </tr> <tr> <td style="padding: 2px;">sensor model:</td> <td style="padding: 2px;">27106T</td> </tr> <tr> <td style="padding: 2px;">sensor ID.:</td> <td style="padding: 2px;">08600</td> </tr> <tr> <td style="padding: 2px;">prop SN:</td> <td style="padding: 2px;">illegible</td> </tr> <tr> <td style="padding: 2px;">prop multiplier:</td> <td style="padding: 2px;">0.00627</td> </tr> <tr> <td colspan="2" style="padding: 2px;">DAS SN: Unknown</td> </tr> <tr> <td colspan="2" style="padding: 2px;">Total avg. prop torque (g-cm): 0.60</td> </tr> <tr> <td colspan="2" style="padding: 2px;">Bearings only avg. torque (g-cm):</td> </tr> </table>	site system		sensor mfg:	RM Young	sensor model:	27106T	sensor ID.:	08600	prop SN:	illegible	prop multiplier:	0.00627	DAS SN: Unknown		Total avg. prop torque (g-cm): 0.60		Bearings only avg. torque (g-cm):		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">reference system</th> </tr> <tr> <td style="padding: 2px;">motor mfg:</td> <td style="padding: 2px;">RM Young</td> </tr> <tr> <td style="padding: 2px;">model:</td> <td style="padding: 2px;">18802</td> </tr> <tr> <td style="padding: 2px;">motor ID:</td> <td style="padding: 2px;">EEMS 01254</td> </tr> <tr> <td style="padding: 2px;">certification date:</td> <td style="padding: 2px;">7/1/2024</td> </tr> </table>	reference system		motor mfg:	RM Young	model:	18802	motor ID:	EEMS 01254	certification date:	7/1/2024
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prop SN:	illegible																												
prop multiplier:	0.00627																												
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Bearings only avg. torque (g-cm):																													
reference system																													
motor mfg:	RM Young																												
model:	18802																												
motor ID:	EEMS 01254																												
certification date:	7/1/2024																												
CW vertical wind speed (up)																													
input rpm	equivalent m/s	site response m/s	%diff	difference m/s																									
0	0.00	0.00	N/A	N/A	PASS																								
100	0.63	0.61	N/A	-0.02	PASS																								
200	1.25	1.22	N/A	-0.03	PASS																								
300	1.88	1.86	N/A	-0.02	PASS																								
400	2.51	2.46	N/A	-0.05	PASS																								
600	3.76	3.70	N/A	-0.06	PASS																								
900	5.64	5.53	-2.0%	-0.11	PASS																								
average				-0.05																									
CCW vertical wind speed (down)																													
input rpm	equivalent m/s	site response m/s	%diff	difference m/s																									
0	0.00	0.00	N/A	N/A	PASS																								
100	-0.63	-0.62	N/A	0.01	PASS																								
200	-1.25	-1.23	N/A	0.02	PASS																								
300	-1.88	-1.82	N/A	0.06	PASS																								
400	-2.51	-2.46	N/A	0.05	PASS																								
600	-3.76	-3.70	N/A	0.06	PASS																								
900	-5.64	-5.55	-1.6%	0.09	PASS																								
average				0.05																									

Comments:

BELCO Meteorological QA Test Results

Unadjusted Temperature

Site:	BDA 1
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Date:	10-Dec-2025
Field Scientist :	E. Hebert

Site Sensor(s) Mfg.:	RM Young
Model:	41342
Measurement Units:	° C

Std. Mfg.:	FLUKE	Std. Slope:	0.9999
Std. Model:	1551	Std. Intercept:	0.0039
Std. ID No:	EEMS 01313	Certification Date:	3/21/2025

	3.5 m probe	Ref. Temp. Raw	Ref. Temp. Corr.	Site Temp. DAS	Difference	Remark
Sensor ID. No:	031516	0.06	0.06	0.17	0.11	PASS
		24.67	24.67	24.64	-0.03	PASS
		47.82	47.82	47.79	-0.03	PASS
				Average	0.02	

BELCO Meteorological QA Test Results

Unadjusted Relative Humidity/Barometric Pressure

Site:	BDA 1
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Date:	10-Dec-2025
Field Scientist :	E. Hebert

Relative Humidity

Site Sensor Make:	Met One
Model:	083D-1-35
Serial No:	E5744

Std. Mfg.:	Kimo	Std. Certification Date:	4/3/2025
Std. Model:	HQ210	Std. Slope:	1.0000
Std. ID No:	1D250200407	Std. Intercept:	0.0000

Salt Solution	Ref. Raw	Ref. Corr.	Site DAS	Difference	Remarks
% RH	% RH	% RH	% RH	% RH	
	65.7	65.7	68.4	2.7	PASS
	85.0	85.0	81.2	-3.8	PASS
	100.0	100.0	95.8	-4.2	PASS
	37.6	37.6	33.8	-3.8	PASS
			Average	-2.28	

APPENDIX B

Maps of Locations

BELCO BDA1

BDA1

Google Earth

© 2013 Google
Image © 2013 DigitalGlobe



400 ft

BELCO BDA2

BDA2

Google Earth

© 2013 Google
Image © 2018 DigitalGlobe

300 ft



BELCO BDA1



BDA2

BDA1

Bermud

Hamilton

Google Earth

© 2018 Google
Image © 2018 DigitalGlobe

1000 ft

N

APPENDIX C

Audit Standards Certifications

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Part Number: E03NI99E80A00E3
Cylinder Number: LL124812
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12025
Gas Code: NO,NOX,SO2,BALN

Reference Number: 160-403313471-1
Cylinder Volume: 83.4 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Apr 18, 2025

Expiration Date: Apr 18, 2028

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	20.00 PPM	20.23 PPM	G1	+/- 1.1% NIST Traceable	04/11/2025, 04/18/2025
NITRIC OXIDE	20.00 PPM	20.16 PPM	G1	+/- 0.9% NIST Traceable	04/11/2025, 04/18/2025
SULFUR DIOXIDE	20.00 PPM	20.20 PPM	G1	+/- 0.7% NIST Traceable	04/11/2025, 04/18/2025
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	DDCK2023082809	CC733068	20.26 PPM NITRIC OXIDE/NITROGEN	+/- 0.6%	Aug 28, 2026
PRM	C1948110.03	APEX 1324265	20.02 PPM NITRIC OXIDE/NITROGEN	0.5%	Dec 22, 2023
GMIS	124206889126	CC323202	4.367 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jan 04, 2027
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	DDCKA0614202219	EB0142401	14.25 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 14, 2026
SRM	1693a	FF25467	50.33 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 27, 2023

The SRM, NTRM, PRM, or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Apr 03, 2025
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Apr 17, 2025
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Apr 10, 2025

Triad Data Available Upon Request



[Signature]
Approved for Release



Certificate of Accuracy

Device Under Test: Thermometer Ambient Temperature Date Certified: 3/21/2025
Device Under Test Manufacturer: Fluke Certificate Number: T-45737-6339005
Device Under Test Model: 1551A Ex Stik
Device Under Test Serial Number: 6339005 Client: EEMS
Device Under Test Property ID: 01313

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th Street Extension, Gainesville, FL

Reference Standard: Fluke Stik RTD

Serial Number: 6196002
Property Number: 01224
Certificate Date: 1/8/2025
Certificate Number: A589754

Uncertainty = $\pm 1.12\%$

Point	Reference Standard (°C)	Device Under Test (°C)	As Found Difference (°C)	As Found Percentage Error	Corrected Device Under Test (°C)	Corrected % Error
1	-0.03	-0.01	0.02	-66.7%	-0.01	-53.7%
2	4.79	4.78	-0.01	-0.2%	4.78	-0.3%
3	13.15	13.15	0.00	0.0%	13.15	0.0%
4	20.11	20.11	0.00	0.0%	20.11	0.0%
5	28.00	28.00	0.00	0.0%	28.00	0.0%
6	36.85	36.85	0.00	0.0%	36.85	0.0%
7	42.01	42.01	0.00	0.0%	42.01	0.0%
8	48.27	48.26	-0.01	0.0%	48.26	0.0%
9	51.33	51.34	0.01	0.0%	51.34	0.0%

Slope = 0.99990

Intercept = 0.00389

Correlation = 1.00000

Tested By:

Signature

Eric Hebert

Printed Name

Approval:

Signature

Printed Name

This certificate applies only to the item identified and this certificate shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.

4577 NW 6th Street Extension

Gainesville FL, 32609



Certificate of Accuracy

Device Under Test: Flow Rate Client: EEMS Date Certified: 2/20/2025
Device Under Test Manufacturer: Mesa Labs Certificate Number: F-45708-159956
Device Under Test Model: BIOS 530-H+
Device Under Test Serial Number: 159956
Device Under Test Property ID: 01414

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th St, Suite E, Gainesville FL, 32609

Reference Standard: BG1 TetraCal TC12

Serial Number: 577

Property Number: none

Certificate Date: 2/13/2025

Certificate Number: UNTL00690/25

Uncertainty = ± 1.12 %

Point	Reference Standard (LPM)	Device Under Test (LPM)	As Found Difference (LPM)	As Found % Error	Device Under Test Corrected (LPM)	% Error Corrected
1	1.55	1.60	0.04	2.9%	1.55	-0.2%
2	2.45	2.52	0.07	3.0%	2.45	0.2%
3	3.73	3.84	0.11	2.9%	3.74	0.2%
4	4.46	4.58	0.12	2.6%	4.46	0.0%
5	5.24	5.37	0.13	2.5%	5.24	-0.1%
6	6.20	6.37	0.17	2.8%	6.22	0.2%
7	8.19	8.39	0.20	2.5%	8.19	0.0%
8	10.19	10.41	0.22	2.2%	10.16	-0.3%
9	12.55	12.85	0.30	2.4%	12.54	0.0%
10	13.87	14.21	0.34	2.4%	13.87	0.0%
11	16.17	16.58	0.40	2.5%	16.18	0.1%
12	18.29	18.74	0.45	2.5%	18.30	0.0%

Slope = 1.02371

Intercept = 0.01158

Correlation = 1.00000

Tested By:

Eric Hebert
Signature

Eric Hebert
Printed Name

Approval:

Signature

Printed Name

This certificate applies only to the item identified and this report shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street, Suite E
Gainesville FL, 32609



Certificate of Accuracy

Device Under Test: Flow Rate Client: EEMS Date Certified: 2/22/2025
Device Under Test Manufacturer: Mesa Labs Certificate Number: F-45710-148737
Device Under Test Model: BIOS 220-L
Device Under Test Serial Number: 148737
Device Under Test Property ID: 01419

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th St, Suite E, Gainesville FL, 32609

Reference Standard: Mesa Labs

Serial Number: 120910

Property Number: 01415

Certificate Date: 9/4/2024

Certificate Number: A5714829

Uncertainty = $\pm 2.27\%$

Point	Reference Standard (SCCM)	Device Under Test (SCCM)	As Found Difference (SCCM)	As Found % Error	Device Under Test Corrected (SCCM)	% Error Corrected
1	40.65	40.26	-0.39	-1.0%	40.30	-0.9%
2	63.23	62.78	-0.45	-0.7%	63.42	0.3%
3	127.84	123.96	-3.88	-3.0%	126.32	-1.2%
4	180.62	178.01	-2.61	-1.4%	181.77	0.6%
5	279.38	275.91	-3.47	-1.2%	282.29	1.0%
6	336.65	327.08	-9.57	-2.8%	334.99	-0.5%
7	388.65	378.46	-10.19	-2.6%	387.75	-0.2%
8	452.65	441.85	-10.80	-2.4%	452.84	0.0%

Slope = 0.97342

Intercept = 1.04251

Correlation = 0.99990

Tested By:

Eric Hebert
Signature

Eric Hebert
Printed Name

Approval:

Signature

Printed Name

This certificate applies only to the item identified and this report shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street, Suite E
Gainesville FL, 32609



Certificate of Accuracy

Device Under Test: Thermometer Ambient Temperature
Device Under Test Manufacturer: BGI
Device Under Test Model: DeltaCal DC1
Device Under Test Serial Number: 200328
Device Under Test Property ID: 01453

Date Certified: 2/21/2025
Certificate Number: T-45709-200328

Client: EEMS

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th Street Extension, Gainesville, FL

Reference Standard: Fluke Slik RTD

Serial Number: 6196002
Property Number: 01224
Certificate Date: 1/8/2025
Certificate Number: A589754

Uncertainty = $\pm 1.12\%$

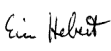
Point	Reference Standard (°C)	Device Under Test (°C)	As Found Difference (°C)	As Found Percentage Error	Corrected Device Under Test (°C)	Corrected % Error
1	3.54	2.80	-0.74	-20.9%	3.67	3.6%
2	5.79	5.00	-0.79	-13.6%	5.73	-1.0%
3	8.94	8.80	-0.14	-1.6%	9.35	4.6%
4	12.67	12.00	-0.67	-5.3%	12.33	-2.7%
5	14.92	14.30	-0.62	-4.2%	14.50	-2.8%
6	18.45	18.30	-0.15	-0.8%	18.29	-0.9%
7	25.75	26.60	0.85	3.3%	26.16	1.6%
8	28.60	29.50	0.90	3.1%	28.89	1.0%
9	29.60	30.30	0.70	2.4%	29.63	0.1%
10	31.85	32.70	0.85	2.7%	31.90	0.2%
11	34.39	35.00	0.61	1.8%	34.05	-1.0%

Slope = 1.05884

Intercept = -1.07465

Correlation = 0.99968

Tested By:


Signature

Eric Hebert
Printed Name

Approval:

Signature

Printed Name

This certificate applies only to the item identified and this certificate shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street Extension
Gainesville FL, 32609



Certificate of Accuracy

Device Under Test: Flow Rate Client: EEMS Date Certified: 2/20/2025
Device Under Test Manufacturer: BGI DCI Certificate Number: F-45708-200328
Device Under Test Model: DeltaCal
Device Under Test Serial Number: 200328
Device Under Test Property ID: 01453

Procedure: The above identified Device Under Test was verified on the date shown above in direct comparison to the NIST Traceable Standard listed below.

Performed at: 4577 NW 6th St, Suite E, Gainesville FL, 32609

Reference Standard: MESA Defender 530 + H

Serial Number: 159956

Property Number: 01414

Certificate Date: 8/23/2024

Certificate Number: A5700374

Uncertainty = $\pm 1.82\%$

Point	Reference Standard (LPM)	Device Under Test (LPM)	As Found Difference (LPM)	As Found % Error	Device Under Test Corrected (LPM)	% Error Corrected
1	1.73	1.71	-0.02	-1.4%	1.76	1.7%
2	3.17	3.04	-0.13	-4.1%	3.15	-0.6%
3	5.33	5.11	-0.22	-4.1%	5.31	-0.4%
4	6.69	6.45	-0.24	-3.7%	6.70	0.1%
5	8.83	8.51	-0.32	-3.7%	8.85	0.1%
6	10.32	9.92	-0.40	-3.8%	10.32	0.0%
7	11.78	11.34	-0.44	-3.8%	11.79	0.1%
8	12.74	12.24	-0.49	-3.9%	12.73	0.0%
9	14.34	13.76	-0.58	-4.0%	14.32	-0.1%
10	16.75	16.06	-0.69	-4.1%	16.71	-0.2%
11	17.88	17.18	-0.70	-3.9%	17.88	0.0%
12	18.88	18.19	-0.69	-3.6%	18.93	0.3%

Slope = 0.96014

Intercept = 0.01578

Correlation = 0.99998

Tested By:

Eric Hebert
Signature

Eric Hebert
Printed Name

Approval:

Signature

Printed Name

This certificate applies only to the item identified and this report shall not be reproduced except in full without EEMS approval.

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street, Suite E
Gainesville FL, 32609

**Warren-Knight Instrument Company**

2045 Bennett Road

Philadelphia, PA 19116

Phone: 215-464-9300; Fax: 215-464-9303

Web: <http://www.warrenind.com>

Page 1 of 1

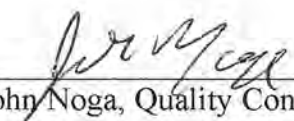
EEMS # 01272

Ver 3

CERTIFICATION OF CALIBRATION AND CONFORMANCE

We hereby certify that the equipment below has been manufactured and/or inspected by standards traceable to NIST. Calibration of the specified instrument has been performed in compliance with ANSI Z540-1 requirements. It is warranted that the equipment has been calibrated to be in full conformance with the drawings and specifications of the instrument. Calibration tests were performed on the material specified below and were in accordance with all applicable quality assurance requirements with data on file at our facility.

Customer Name:	EE & MS
Purchase Order #:	
Instrument:	USIKATA S-25 COMPASS
Serial Number:	199578
Quantity:	1
Calibration Due:	02/2025


John Noga, Quality Control

February 25, 2025

Measurement Standards
Theodolite Wild T-3 S/N 18801 - Calibration 01/07/2025 - Due 01/07/2026 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-7020 S/N 5167 - Calibration 01/05/2024 - Due 01/05/2029 NBR 731/224084-89 731/221617
Gage Block Set, SPI S/N 20899 Calibration 09/10/2024 Due 09/10/2025 Certificate of Calibration CAL2303478-1-0



Certificate of Accuracy

Transfer Standard: Anemometer Drive
Transfer Standard Manufacturer: R.M. Young Company
Transfer Standard Model: 18811
Transfer Standard Serial Number: CA 04013
Transfer Standard Property ID: EEMS 01254

Date Certified: 7/1/2024
Certificate Number: A-45474-1

Compared to: NIST Traceable Digital Tachometer Serial Number: 678176, Certified: 6/17/2024

CW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	20	20	0.0	0.0
	80	80	0.0	0.0
	160	160	0.0	0.0
	320	320	0.0	0.0
	640	640	0.0	0.0
	801	800	-1.0	1.0
	950	950	0.0	0.0

CCW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	20	20	0.0	0.0
	80	80	0.0	0.0
	160	160	0.0	0.0
	320	320	0.0	0.0
	640	640	0.0	0.0
	801	800	-1.0	1.0
	951	950	-1.0	1.0

*If no sign is given on the correction, the transfer standard RPM is indicating a lower RPM than actual. If the sign is negative, the transfer standard is indicating an RPM that is higher than actual.

Tested By:

	Tim Mendenhall
Signature	Printed Name

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street Extension
Gainesville FL, 32609



Certificate of Accuracy

Transfer Standard: Anemometer Drive
Transfer Standard Manufacturer: R.M. Young Company
Transfer Standard Model: 18802
Transfer Standard Serial Number: CA 04013
Transfer Standard Property ID: EEMS 01255

Date Certified: 7/1/2024
Certificate Number: A-45474-2

Compared to: NIST Traceable Digital Tachometer Serial Number: 678176, Certified: 6/17/2024

CW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	200	200	0.0	0.0
	800	800	0.0	0.0
	1600	1600	0.0	0.0
	3200	3200	0.0	0.0
	6401	6400	-1.0	1.0
	8000	8000	0.0	0.0
	10000	10000	0.0	0.0

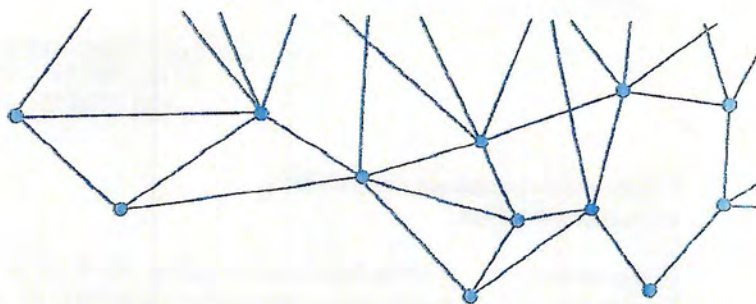
CCW	Reference Standard (RPM)	Transfer Standard (RPM)	Difference (RPM)	Transfer Standard Correction* (RPM)
	200	200	0.0	0.0
	800	800	0.0	0.0
	1600	1600	0.0	0.0
	3200	3200	0.0	0.0
	6401	6400	-1.0	1.0
	8000	8000	0.0	0.0
	10000	10000	0.0	0.0

*If no sign is given on the correction, the transfer standard RPM is indicating a lower RPM than actual. If the sign is negative, the transfer standard is indicating an RPM that is higher than actual.

Tested By:

	Tim Mendenhall
Signature	Printed Name

Environmental Engineering & Measurement Services, Inc.
4577 NW 6th Street Extension
Gainesville FL, 32609



CERTIFICAT D'ETALONNAGE
CALIBRATION CERTIFICATE
N°MSMO2526206V01

1 / 3

Ce certificat comprend une partie vérification en annexe
This certificate included a checking part attached

Délivré à :
Issued for :

Sauermann NA Corp

10 W COLLEGE AVENUE
UNIT B
19067 YARDLEY

FEEMS #
01223
(Signature)

INSTRUMENT ETALONNE
CALIBRATED INSTRUMENT

Désignation : **Thermo-hygromètre-qualité d'air HQ210**
Designation : **Thermo-hygro-air quality meter HQ210**

Constructeur : **Kimo**
Manufacturer :

Type : **HQ210**
Type :

N° de série : **1D250102396**
Serial Number :

N° Inventaire :
Inventory Number :

RH

Ce certificat comprend **3** page(s)
The certificate includes

Date : **4 mars 2025**

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This document is complying standard FD X 07-012

Responsable Métrologie
Metrology Manager
Sabrina LUTAUD

P.O. Angélique PINHO
Service Laboratoires



1- Caractéristiques de l'appareil :

Instrument features :

Désignation : Thermo-hygromètre-qualité d'air HQ210
Description : Thermo-hygro-air quality meter HQ210

Sonde d'hygrométrie avec capteur de température intégré, PT100 1/3 DIN.
Hygrometry probe and integrated temperature sensor, PT100 1/3 DIN.

N° série sonde / Probe S.N. : 1D250200407 N° inventaire sonde / Probe I.N. :

Echelle : 0 à 100 %HR Résolution : 0,1 %HR
Range : Resolution :

2- Méthode d'étalonnage :

Calibrating principles :

Les points d'étalonnage sont réalisés par comparaison avec les moyens suivants:

- MH012 Générateur d'hygrométrie, plage d'utilisation 10 à 86%HR,
- ETH111 étalon n°:20215104, certificat d'étalonnage n°USMO2416936, contrôlé(s) avec la référence ETH107 n°:150869 / 150842, raccordé(s) aux étalons nationaux par le certificat COFRAC n°H2441230F / T24119740D.

The points of calibration are realized with means of calibration according to:

- MH012 hygrometry generator, measuring rang 10 to 86%HR,
- ETH111 a standard sn°:20215104, calibration certificate n°USMO2416936, controlled with standard ETH107 sn°:150869 / 150842, traceable to standard national reference by COFRAC certificate n°H2441230F / T24119740D.

3- Conditions d'environnement :

Environmental conditions :

Température ambiante : 20,8 °C Humidité relative : 50,1 %HR Pression atmosphérique : 1015 hPa
Ambient temperature : Relative humidity : Atmospheric pressure :

4- Remarques :

Remarks

Néant

5- Résultats des mesures :

Measurement results :

n°	Vref	Unit	Vi	Unit	Vi-Vref	Unit	Incertitude
1	11,02	%HR	11,0	%HR	-0,020	%HR	0,463
2	43,82	%HR	43,8	%HR	-0,020	%HR	0,521
3	84,98	%HR	84,3	%HR	-0,680	%HR	0,792

Vref: valeur lue sur l'appareil étalon, Vi: valeur lue sur l'appareil du client. L'unité de l'incertitude de mesure est exprimée dans la même unité que Vref. Les incertitudes mentionnées prennent en compte les incertitudes de l'étalonnage (étalon de référence, moyen, condition d'environnement, résolution de l'appareil ...). Ces incertitudes sont élargies avec un coefficient k=2.

Contrôle en température	
Temperature check	
Vref (°C)	Vi (°C)
21,4	21,5

Vref: value displayed by our reference instrument, Vi: value displayed by customer's instrument. For uncertainty, unit is the same as the one of Vref. Uncertainties above mentioned take into account calibration uncertainties (reference instrument, calibration mean, environment conditions, instrument resolution...). These uncertainties are extended with coefficient k=2.

ANNEXE
PARTIE VERIFICATION / CHECKING PART

3 / 3

Eléments nécessaires à l'exploitation des résultats :

Data required for results processing :

Les conditions d'acceptation de l'appareil sont basées selon les tolérances constructeur de la société SAUERMANN.
Le jugement est porté suivant le critère $|Ecart| < Tolérance$.

-HYGROMETRIE : $\pm 2,38$ %HR de 3 à 98 %HR

Jugement / Appraisal

HYGROMETRIE N° série sonde / Probe S.N. : 1D250200407

Conforme / Complying

Restrictions / Limitation :

Commentaires / Comments :

Prochaine date d'étalonnage en / Next recommended calibration date : 04/03/26

Vérification effectuée le : 04/03/25
Checking performed :





Certificate of Training

This is to certify that

Eric Hebert

Has satisfactorily completed the:

Annual NPAP and PM_{2.5}-PEP Field Operations Proficiency Recertification Course

Held on
April 16-18, 2025

Certified by:

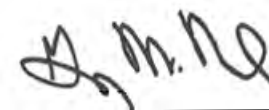
Brannon Seay

A handwritten signature in black ink, appearing to read "Brannon Seay", written over a horizontal line.

EPA National Performance Evaluation Program
(NPEP) Lead for PM_{2.5}, Pb, and NPAP
USEPA, OAQPS, AAMG



Greg Noah

A handwritten signature in black ink, appearing to read "Greg Noah", written over a horizontal line.

EPA National Performance Evaluation Program
(NPEP) Lead for PM_{2.5}, Pb, and NPAP
USEPA, OAQPS, AAMG