

# **Quarterly Report for Goodrich Corporation Fenceline Monitoring Plan-Q1 2026**

**Prepared For:  
Goodrich Corporation  
50 William White Blvd  
Pueblo, CO 81001**

**Prepared By:  
Onterris Air Quality Services, LLC  
5270 Joyce Dr. Unit B  
Golden, CO 80403**

**For Submission To:  
Colorado Department of Public Health and Environment  
4300 Cherry Creek S Dr.  
Denver, Colorado 80246**

**Document Number: 317AA-062625-RT-1211  
Submittal Date: April 20<sup>th</sup>, 2026**

## Table of Contents

---

<b>Executive Summary</b> .....	5
<b>Contact Information</b> .....	5
<b>Methods</b> .....	5
Site Description.....	5
Instrument Description.....	6
System Design.....	8
Data Validation and QA/QC Procedures.....	10
<b>Results</b> .....	15
Monthly Data Summary.....	15
Summary of Invalidated Data.....	17
Discussion of Invalidated Data.....	17
Discussion of Results.....	17
Summary Plots.....	18
Discussion of Changes to Monitoring System, Operations, and/or Procedures.....	30
<b>Appendices</b> .....	30
Appendix A: Calibration and QA/QC Data.....	30
Appendix B: Qualifier Codes.....	32
Appendix C: Field Data Sheets.....	34
Appendix D: Non-Conformance/Corrective Action Data Sheets.....	35
Appendix E: Calibration Verification Forms.....	36
Appendix E: Audits.....	37

## Table of Figures

---

Figure 1. The Goodrich Carbon Brake Manufacturing Process.....	5
Figure 2: Approximate Layout of the Open-Path Analyzers, Retroreflector Locations, and Meteorological Station.....	9
Figure 3: Timeseries of Benzene Path 1.....	18
Figure 4: Timeseries of H <sub>2</sub> S Path 1.....	18
Figure 5: Timeseries of HCN Path 1.....	19
Figure 6: Timeseries of Benzene Path 2.....	19
Figure 7: Timeseries of H <sub>2</sub> S Path 2.....	20
Figure 8: Timeseries of HCN Path 2.....	20
Figure 9: Timeseries of Benzene Path 3.....	21
Figure 10: Timeseries of H <sub>2</sub> S Path 3.....	21
Figure 11: Timeseries of HCN Path 3.....	21
Figure 12: Timeseries of Benzene Path 4.....	21
Figure 13: Timeseries of H <sub>2</sub> S Path 4.....	23
Figure 14: Timeseries of HCN Path 4.....	23
Figure 15: Timeseries of Benzene Path 5.....	24
Figure 16: Timeseries of H <sub>2</sub> S Path 5.....	24
Figure 17: Timeseries of HCN Path 5.....	25
Figure 18: Timeseries of Benzene Path 6.....	25
Figure 19: Timeseries of H <sub>2</sub> S Path 6.....	26
Figure 20: Timeseries of HCN Path 6.....	26
Figure 21: Temperature Timeseries.....	27
Figure 22: Relative Humidity Timeseries.....	27
Figure 23: Barometric Pressure Timeseries.....	27

Figure 24: Wind Rose Plot.....	28
Figure 25: Benzene Box Plots for Paths 1 to 6.....	28
Figure 26: H <sub>2</sub> S Box Plots for Paths 1 to 6.....	29
Figure 27: HCN Box Plots for Paths 1 to 6.....	29

## **Table of Tables**

---

Table 1: Performance Specifications for Installed Meteorological Sensors.....	8
Table 2: Descriptions of Each Individual Path.....	9
Table 3: List of Automated Quality Control Parameters and Corresponding Evaluation Criteria.....	10
Table 4: UV DOAS QC Checks.....	11
Table 5: TDL QC Checks.....	12
Table 6: Monthly Data Summary.....	15
Table 7: Verification Activities.....	31
Table 8: Percent Recovery for Meteorological Parameters.....	31
Table 9: List of Data Invalidation Codes.....	32

## I. Goodrich Corporation Fenceline Monitoring Plan Quarterly Report – Q1 2026

### II. Executive Summary

This report summarizes the findings related to the Goodrich Corporation fenceline monitoring plan during the period of January 1<sup>st</sup> of 2026 to March 31<sup>st</sup> of 2026 (Q1 of 2026). The data collected during this period were validated following all procedures described in the Goodrich Corporation fenceline monitoring plan. This report includes tables with the validated and invalidated data, statistical analysis results and timeseries of the compounds of interest and meteorological parameters.

### III. Contact Information

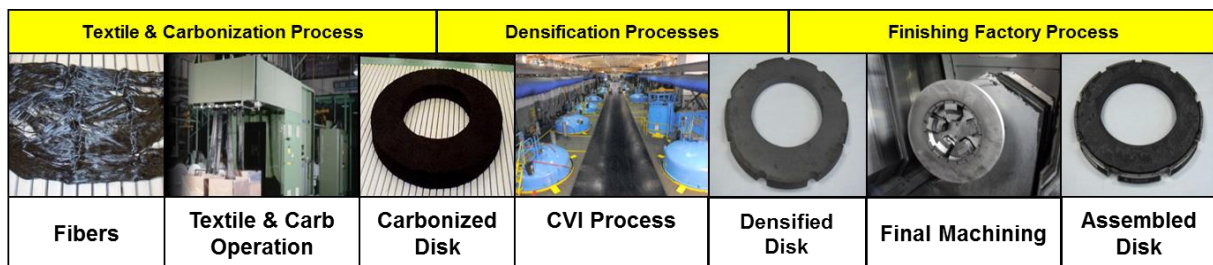
For any questions related to this report please contact:

- David Andreaccio ([David.Andreaccio@collins.com](mailto:David.Andreaccio@collins.com))
- Daniel Hall ([Daniel.Hall@collins.com](mailto:Daniel.Hall@collins.com))
- Desiree Mondragon ([Desiree.J.Mondragon@collins.com](mailto:Desiree.J.Mondragon@collins.com))

### IV. Methods

#### A. Site Description

Goodrich operates an aircraft brakes manufacturing facility at 50 William White Blvd, Pueblo, CO 81001. The carbon brake manufacturing process is a series of seven operational steps: the textile of preforms, carbonization of preforms, chemical vapor deposition (CVD) of preforms, intermediate machining of preforms, an additional CVD cycle, final dimensional machining, and final assembly.



← 82.5 Days →

Figure 1. The Goodrich Carbon Brake Manufacturing Process

These specific processes can be more generally separated into four manufacturing areas: textile, furnace operations, machining, and finishing. The textile process transforms raw polyacrylonitrile (PAN) fibers into a three-dimensional matrix or brake preform. Brake preforms are then batch processed in high-temperature, low-pressure reactors (furnaces). The two major processes completed are carbonization and densification. Carbonization converts the raw PAN preforms to a carbon fiber preform and removes impurities. The densification process cracks a feed hydrocarbon stream to infiltrate and sequester molecular carbon on the carbon fiber preform. The machining of preforms is completed in two stages: once in the middle of the densification and once following densification. After the final machining operations, the final assembly operations include application of an oxidation protection system and hardware installation. Additionally, the carbon brake manufacturing process requires extensive chemical processing infrastructure including waste heat recovery, steam generation, cooling water systems, gas purification, and gas storage and delivery systems

## **B. Instrument Description**

### **1. Open-Path Monitors**

The Goodrich Corporation fenceline air monitoring system includes both open-path tunable diode laser spectrometers (TDLAS), and open-path ultraviolet Doppler optical absorption spectrometers (UVDOAS). Open-path monitors operate by projecting a beam of light through open air to retroreflectors that reflect the light back to the monitor where spectral absorption characteristics are measured. As the light travels along the path length a certain amount of this light will be absorbed by the various chemical species present in the air. Because all gases absorb light differently according to their own unique spectral characteristics, it is possible to use measurements of absorption intensity at specific wavelengths as a proxy for measuring a target gas' concentration in the air.

Therefore, along a known path length, an absorption measurement taken at the appropriate wavelength for the target molecule can easily be used to solve for its average concentration over the length of the beam.

The Goodrich Corporation system will consist of three TDL analyzers and six UVDOAS analyzers at the locations shown in Figure 2 and as outlined in Table 2. The light is transmitted to a retroreflector and back to a detector co-located with the transmitter. The analyzer software will provide five-minute and hourly-average concentration measurements for each path.

#### **- *Open Path (OP) Ultraviolet Differential Optical Absorption Spectroscopy (UVDOAS)***

For the monitoring of benzene, the Goodrich Corporation facility uses Open Path (OP) Ultraviolet Differential Optical Absorption Spectroscopy (UVDOAS). This technology quantifies concentrations of gaseous compounds by measuring the absorption of ultraviolet light by chemical compounds in the air and applying the Beer-Lambert Law. UVDOAS typically uses unique absorptions of specific wavelengths of ultraviolet light in a wavelength range of 245 to 380 nanometers (nm). Benzene peaks are found close to the 253 nm wavelength.

Open path UVDOAS instrumentation consists of a light source, transmitting and receiving optics (telescopes), a spectrometer, a reflector or receiver, a detector, and a data processing computer. A Xenon light source provides light, which is focused in a collimated beam before it is sent through a transmitting telescope and into the measurement path. A receiving telescope collects the light and directs it to the spectrometer which diffracts the light onto the detector. The detector is typically a solid-state array such as a charge-coupled device (CCD). This allows the detector to collect light of different wavelengths without moving parts. The spectra bands can be extracted from the spectrum and compared to reference spectra to determine which compounds were present along the path and at what concentrations.

A combination of monostatic and bistatic open path instruments have been selected to reduce the need for substantial power at the retroreflector sites and improve detection limits by increasing effective path lengths.

The Goodrich Corporation facility uses the UV Sentry Open Path Multi-Gas Analyzer (UV Sentry) manufactured by Cerex Monitoring Solutions, LLC for the monitoring of benzene. The UV Sentry should not fail nor require calibration due to having no moving parts, therefore keeping maintenance and consumables to a minimum. The UV Sentry has an on-board computer and saves raw spectral data independent of calibration. These spectra may be used at any time to verify real time measurements. Additionally, the UV Sentry records signal intensity and minimum detection limits (MDLs) for benzene in real time as data quality indicators. Real time MDL output supports both American Society for Testing and Materials (ASTM) and U.S. Environmental Protection Agency (USEPA) methods. The UV Sentry also has a flow through calibration cell to allow for regular QA audits and bump tests.

#### **- Open Path (OP) Tunable Diode Laser Absorption Spectroscopy (TDLAS)**

For the monitoring of Hydrogen Sulfide and Hydrogen Cyanide<sup>1</sup>, an Open Path (OP) Tunable Diode Laser Absorption Spectroscopy (TDLAS) is used. OP-TDLAS offers some significant operational and cost advantages over other measurement technologies such as Fourier Transform Infrared Spectroscopy (FTIR). Tunable diode lasers (TDL) are designed to focus on single absorption wavelengths specific to a compound of concern in the gaseous form. They are capable of low detection limits and are generally interferent-free. Similar to UVDOAS, quantitative measurements in direct gas phase laser absorption spectroscopy are based on the Beer-Lambert Law. A TDL uses a diode to generate light within a narrow frequency range that contains a relatively unique absorption wavelength of the chemical of interest. The laser frequency is “tuned” by changing the temperature of the diode or the current being fed to the diode or both so that it matches the spectral absorption line of interest.

Similar to the UVDOAS system, the OP-TDLAS system consists of a light source, a spectrometer, a reflector, a photodiode detector, and a data processing computer. Monostatic (as opposed to bistatic) open path instruments have been selected to reduce the need for substantial power at the retroreflector sites and improve detection limits by increasing effective path lengths.

The Goodrich Corporation facility uses the LasIR™ Fence Line Monitoring Gas Analyzer manufactured by Unisearch Associates Inc. for the monitoring of Hydrogen Sulfide and Hydrogen Cyanide.<sup>1</sup> The LasIR™ allows one laser to send beams at two different wavelengths down each path length (one for each compound). Additionally, the beam can be split allowing it to monitor two path lengths with one laser. The controller uses a near infrared (NIR) Tunable Diode Laser Absorption Spectrometer System which uses a single mode laser mounted in a thermoelectric cooler. A Windows based software package displays the data on a host laptop PC. The LasIR™ also has a flow through calibration cell to allow for regular QA audits and bump tests.

## **2. Meteorological Monitors**

The meteorological monitoring tower is located at the northwest end of the Goodrich Corporation property. This tower is outfitted with high quality meteorological instruments, as outlined in Table 1, and are capable of accurate and continuous real time measurements. All sensors will be connected to a datalogger which will store the data, as well as broadcast it out to a cellular modem so that data can be viewed or downloaded at any time, from anywhere. The specific meteorological instruments chosen meet EPA specifications for

---

<sup>1</sup> Hydrogen sulfide is not used, stored at, nor emitted from the Goodrich Corporation. Therefore, the facility does not have the potential to emit this compound, which comprise “Covered Air Toxics” under HB21-1189.

accuracy, range and resolution (Table 1) and have been deemed appropriate for use in the fenceline monitoring system. Data from these sensors will be used to calculate 1-hour rolling averages which are updated every five minutes.

**Table 1: Performance Specifications for Installed Meteorological Sensors**

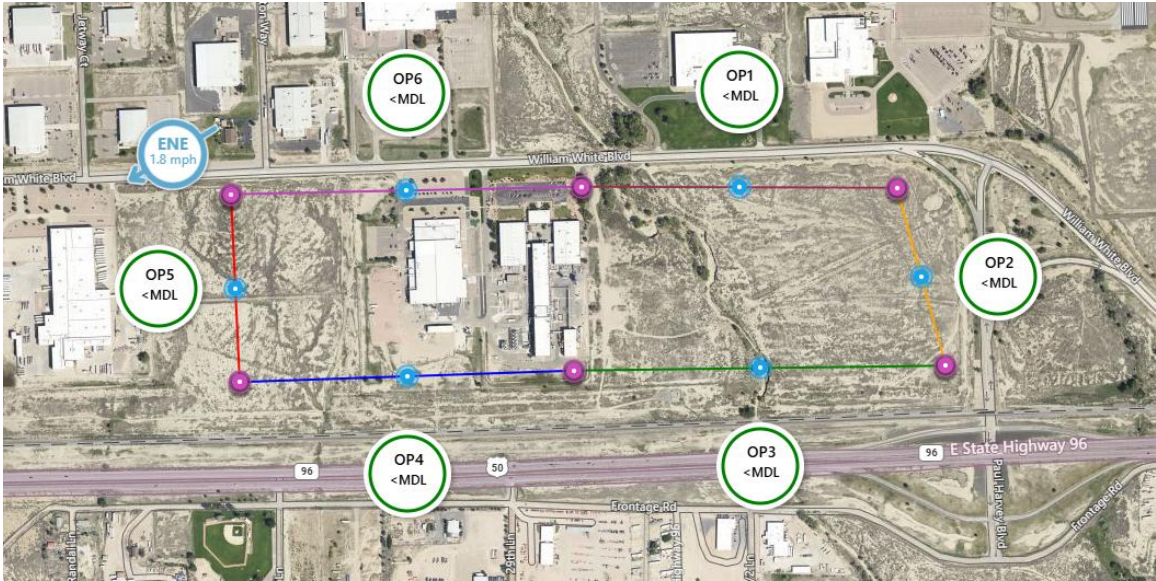
Parameter	Sensor Make and model	Reporting units	Accuracy	Range
Horizontal wind speed	Met One 010C	Meters per second (m/s)	± 0.1	0 to 55
Horizontal wind direction	Met One 020D	Degrees (°)	± 3	0 to 360
Temperature	Met One 065	Degrees of Celsius (°C)	± 0.15	-30 to +50
Relative humidity	Met One 083F/0/35	Percentage (%)	± 2	0 to 100
Barometric pressure	Met One 0192	Atmospheres (atm)	± 0.001	0.3 to 1.09

### C. System Design

The fenceline monitoring system will utilize three primary shelters to house the open path analyzers. Shelters 1 and 6 (Figure 2) will house one (1) monostatic open-path tunable diode laser (TDL) analyzer, one (1) monostatic open-path ultraviolet differential optical absorption (UV-DOAS) analyzer and one (1) bistatic open-path UV-DOAS receiver. Shelter 3 will house one (1) monostatic open-path TDL analyzer, and two (2) bistatic open-path UV-DOAS receivers.

Each open-path analyzer location will have multiple paths, where each path is measured continuously. At the end of each path there will be a retroreflector opposite the analyzer for the monostatic systems and a receiver opposite the analyzer for the bistatic systems. Each path ID consists of a number that ranges from 1 to 6 (Figure 2, Table 2). The specific locations for all open path equipment were selected to provide coverage of all facility emission sources within the constraints of the facility footprint.

This monitoring program also includes meteorological monitoring as required in HB21-1189. Meteorological monitoring is necessary to characterize wind patterns for understanding movement of the three target compounds and potential sources of emissions, whether they originate from the site or a neighboring facility. A meteorological tower will be installed near Shelter 6 (Figure 2) so that power can be shared.



**Figure 2. Approximate Layout of the Goodrich Corporation FLMP**

**Table 2: Descriptions of Each Individual Path**

Path	Path Length (one way)	Compounds
1	558 meters	Hydrogen sulfide Hydrogen cyanide Benzene
2	283 meters	Hydrogen sulfide Hydrogen cyanide Benzene
3	613 meters	Hydrogen sulfide Hydrogen cyanide Benzene
4	566 meters	Hydrogen sulfide Hydrogen cyanide Benzene
5	297 meters	Hydrogen sulfide Hydrogen cyanide Benzene
6	569 meters	Hydrogen sulfide Hydrogen cyanide Benzene

## D. Data Validation and QA/QC Procedures

### -Automated Quality Control Procedures

Many Quality Control procedures for the fenceline monitoring network are integrated directly into the AirSense data platform and are outlined as follows. These automated procedures allow for the ability to screen data not suitable for public display due to atmospheric or operational issues. These automated quality control checks include:

- Inspection of daily reports generated by the AirSense platform which summarize data recovery for each analyzer/sensor and suspect data flags;
- Monitoring of real time alerts and daily reports generated by the AirSense data platform that flag:
  - No data;
  - Data sticking – if values are repeated for a number of sampling intervals (does not apply to data below the detection limit);
  - Range exceedances – if values are outside a reasonable minimum or maximum value;
  - Data recovery;
  - Monitoring instrument parameters that may indicate equipment degradation/failure or a need for maintenance and/or cleaning;
  - Signal intensity (open path instruments);
  - Instrument or sensor alarms or error codes;
  - Analyzer and shelter temperatures; and
  - Laser parameters (TDL instruments)

**Table 3: List of Automated Quality Control Parameters and Corresponding Evaluation Criteria**

<b>Instrument</b>	<b>Automated Quality Control Parameter</b>	<b>Definition</b>	<b>Units</b>	<b>Evaluation criteria</b>
UV-DOAS	MDL	Minimum detection limit	PPB	< 25% of alert threshold
	R <sup>2</sup>	Percentage peak match	%	> 64
	Signal intensity	Signal intensity at full scale	%	> 40
	UV spectrometer temperature		°C	35
TDL	MDL	Minimum detection limit	PPB	< 25% of alert threshold for paths 1,3,4,6 <50% of alert threshold

				for H2S paths 2 and 4
	Absolute Signal	Detector Signal	mA	> 0.1
	Laser temperature stability	Absolute value of (laser temperature- laser temperature in long average) *100/ laser temperature in long average	%	< 5
	R	Peak correlation		> 0.8

**-Instrument Quality Control Checks**

Both the UV-DOAS and TDL systems are designed to require only modest service and maintenance. Section 5.4 of the FLMP summarizes the UV-DOAS and TDL maintenance activities as recommended by the manufacturer. These activities will help ensure data integrity and maximize up-time. For the UV-DOAS system, a calibration verification bump test is performed on a quarterly basis using a flow through cell. For the UV-DOAS system, precision is calculated by evaluating the variance of pollutant concentrations during a period of low atmospheric variability. Five-minute data are selected when concentrations are well above the minimum detection limit (MDL) during periods of low variability. The precision can then be determined by calculating the coefficient of variation (CV). For the UV-DOAS, robustness can be determined by calculating the desired signal intensity in order for the benzene minimum detection limit to be lower than 25% of the notification threshold. If the measured signal intensity is found to be below the desired value, corrective action will be required (e.g., replace light source, instrument alignment, etc.). The QC checks for the UVDOAS are summarized in Table 4.

**Table 4: UV DOAS QC Checks**

QA/QC Check	Frequency	Acceptance Criteria
Accuracy and precision (Bump Test)	Quarterly	Accuracy: $\leq 30\%$ of reference gas value Precision: $\pm 25\%$
Baseline Stability	Continuous	$\pm 5\%$
Signal intensity	Continuous	$>60\%$
Robustness	Continuous	Compound MDL lower than 25% of notification threshold

For the TDL system, a calibration verification bump test is performed on a quarterly basis. The bump test simulates system-observed gas content at the required path average concentration and is used to verify

that the system can detect concentrations at or below the levels of concern. For the TDL system, precision will be calculated by evaluating the variance of pollutant concentrations during a period of low atmospheric variability. Five-minute data will be selected when concentrations are well above the minimum detection limit during periods of low variability. The precision can then be determined by calculating the coefficient of variation (CV). If there are no periods of low variability with concentrations above the minimum detection limit, bump test data will be used for the precision determination. For the TDL system, robustness can be determined by calculating the desired signal intensity for the hydrogen sulfide and hydrogen cyanide minimum detection limit to be lower than 25% (and 50% for H2S Paths 2 and 5) of the corresponding notification thresholds. If the measured signal intensity is found to be below the desired value, corrective action will be required (e.g., replace laser, instrument alignment, etc.). The QC checks for the TDL are summarized in the table as follows.

**Table 5: TDL QC Checks**

QA/QC Check	Frequency	Acceptance Criteria
Accuracy and precision (Bump Test)	Quarterly	Accuracy: $\leq 30\%$ of reference gas value Precision: $\pm 25\%$
Baseline Stability	Continuous	$\pm 5\%$
Signal intensity (Absolute Power)	Continuous	$>0.1$ mA
Robustness	Continuous	Compound MDL $< 25\%$ of alert threshold for paths 1,3,4,6 and Compound MDL $<50\%$ of alert threshold for H2S paths 2 and 4

Wind speed, wind direction, temperature, relative humidity and barometric pressure measurement systems will be aligned, tested and calibrated at the time of installation and at six-month intervals thereafter using test equipment traceable to NIST or other authoritative standards and following standard operating procedures. Calibrations are performed immediately following scheduled semi-annual meteorological audits and performance of scheduled preventive and/or corrective maintenance for the monitoring instruments. Following initial startup calibrations and continuing throughout the monitoring program, the field operator performs quarterly site checks on the meteorological monitoring systems. During these checks, sensors will be observed for proper operation. The monitoring instruments and support equipment are visually inspected to confirm operational integrity. The current data logger readings are assessed for agreement with prevailing conditions.

**-Data Quality Assurance**

All continuous data from the monitoring equipment are transferred to the cloud-based servers every five minutes. Each business day, a data technician checks the data files to ensure that all data were successfully transmitted and stored in the database. If data are missing, they are manually retrieved from the computers that control each piece of equipment or the on-site data logger for the meteorological

equipment. This data is the raw data collected from the instrument computers or data logger and is considered “Level 1” data. These data are used to monitor instrument operations on a regular basis but are not used for reporting until subject to further review and validation. Level 1 (raw) data files are kept intact and unedited. These data are not subject to reduction or reformatting.

“Level 1” data are “raw” data; i.e., data obtained directly from the instrument computers or data logger that have not yet been subjected to quality assurance review. Electronic files of the raw data record are archived “as is”; no alteration is made to the raw data files. All data processing, editing and validation work is accomplished by working with copies of the raw data files produced by the data management system software upon request. Level 1 data are manually reviewed for reasonableness and completeness. Initial (daily) review of the data occurs no more than four days after sample acquisition because of weekends and holidays. Daily data review includes checking for status or event flags, reasonableness of reported averaged data values (out-of-range, inconsistent or excessive transition values) and any missing data periods. The operating status of each instrument is also reviewed (e.g., sample flow rates; other internal operating parameters). Meteorological data are reviewed for agreement with local seasonal and prevailing conditions and internal consistency. These daily reviews support “Level 2” validation of the data and provide a decision basis for investigative actions, instrument adjustment and calibration. The data analyst annotates the separate data processing file (i.e., an electronic copy of the original raw data file) and produces a summary report of any suspect data or out-of-tolerance operating conditions. Any situation requiring investigative and/or corrective action is immediately brought to the attention of the Project Manager and Technical Lead. A “Non-Conformance / Corrective Action” (NC/CA) report documenting all pertinent information regarding suspect data, a non-conformance event or out-of-tolerance operating condition is generated and updated with further information as it becomes available until the problem is fully resolved.

All data reporting forms and activity logs completed during the previous month are stored in Onterris's local Denver office and are reviewed against the electronic data record on a monthly basis in support of data processing and validation. Monthly review of the field monitoring documentation will include:

- All completed routine site check forms;
- Documentation of the QC tests performed on the monitors during the previous month;
- Documentation of any maintenance activities performed on the monitors during the previous month;
- Documentation of any quality assurance audits performed on the meteorological sensors during the previous month; and
- Documentation of any Non-Conformance/Corrective Action (NC/CA) events that occurred during the previous month.

During “Level 2” data validation, the data file of each continuously-monitored parameter is processed at monthly intervals to develop an initial data report to be reviewed for completeness and correctness. Any corrections or additions to the raw “Level 1” data file are annotated in the processing data file with explanatory comments. Any hours incorporating a test, calibration or other quality control check, corrective or preventive maintenance, instrument malfunction, power failures, weather event, etc. are removed from the data set and annotated with the appropriate null data code (for detail on null data codes and corresponding descriptions see Table 11 of Appendix F). Results of this review, including any data losses equal to or greater than one hourly block average, are documented and dated by the data technician in “Level 2” data files. The data technician enters and annotates any null data codes or corrections required in the “Level 2” electronic data file. When all entries or corrections are complete, the data are designated as “Level 2 - Final” data and are archived for subsequent final data validation review.

“Level 3” data validation review is performed by senior project personnel other than the data processing analyst. During the Level 3 data validation process, data losses due to activity or instrument malfunction are corroborated against documentation noted by the station field operators on completed field forms. The field form record identifying data affected by these activities and events are inter-compared with corresponding status flags entered by the operator in the digital data record. Documented results of QA/QC checks performed on each analyzer are evaluated with respect to relevant acceptance and performance criteria outlined in the fence line monitoring plan. Reports documenting unacceptable operating conditions or non-conformance/corrective action (NC/CA) events that may have adversely impacted data quality are also reviewed. If discrepancies or questionable data values are identified during the validation process, the entire data record is reviewed (including all annotated corrections made for Level 2 data). Any additional corrections or revisions made to the data report file during the data validation review are documented, dated and signed by the validation reviewer. The corrections are then entered into the electronic data file and re-processed. A separate file containing the corrections is checked for accuracy against the documented corrections. When all corrections are complete and checked, a final “Level 3 - Validated” data file is produced.

## V. Results

### A. Monthly Data Summary

**Table 6: Monthly Data Summary**

Month	Path	Compound	Number of Exceedances <sup>1</sup>	0th <sup>2</sup>	25th <sup>2</sup>	50th <sup>2</sup>	75th <sup>2</sup>	100th <sup>2</sup>	Avg	Pct Detect <sup>3</sup>	Pct Valid <sup>4</sup>	Median 1hr DL <sup>5</sup>
Jan-26	1	Benzene	0	0.5	2.2	3.5	6.9	394.5	6.5	0.00%	99%	5.0
Feb-26	1	Benzene	0	0.5	1.9	3.2	5.5	15.7	3.9	0.00%	99.37%	4.6
Mar-26	1	Benzene	0	0.3	1.0	1.6	2.5	19.0	2.1	0.00%	99.05%	2.4
Jan-26	1	H2S	0	0.2	5.2	8.3	11.7	39.2	9.1	0.00%	90.50%	11.8
Feb-26	1	H2S	0	0.5	6.5	9.5	13.0	43.0	10.4	0.00%	99.60%	13.5
Mar-26	1	H2S	0	0.6	7.0	9.8	13.5	47.7	11.1	0.07%	97.72%	13.9
Jan-26	1	HCN	0	0.1	0.9	1.3	1.6	5.5	1.4	0.20%	90.58%	1.8
Feb-26	1	HCN	0	0.1	0.7	1.2	1.7	4.1	1.2	0.26%	99.60%	1.7
Mar-26	1	HCN	0	0.0	0.3	0.6	1.3	6.9	0.9	0.11%	97.11%	0.8
Jan-26	2	Benzene	0	0.2	0.6	0.9	1.2	40.8	1.5	0.08%	98.54%	1.2
Feb-26	2	Benzene	0	0.2	0.5	0.7	0.9	5.6	0.8	0.15%	99.38%	1.0
Mar-26	2	Benzene	0	0.2	0.4	0.6	0.8	13.8	0.7	0.00%	99.41%	0.8
Jan-26	2	H2S	0	1.8	9.7	15.2	25.6	108.9	20.9	0.00%	94.18%	21.7
Feb-26	2	H2S	0	1.9	12.1	17.9	26.7	121.7	22.0	0.18%	98.29%	25.4
Mar-26	2	H2S	0	0.9	11.3	16.9	26.9	106.9	20.7	0.20%	96.53%	24.1
Jan-26	2	HCN	0	0.1	0.8	2.1	6.0	36.8	4.0	12.10%	86.46%	2.4
Feb-26	2	HCN	0	0.1	0.9	2.4	7.4	32.8	4.8	13.66%	87.03%	2.7
Mar-26	2	HCN	0	0.2	1.0	2.4	5.1	54.0	3.9	9.82%	98.40%	3.0
Jan-26	3	Benzene	0	0.0	0.0	64.3	126.5	724.2	24.2	0.09%	96.81%	90.6
Feb-26	3	Benzene	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00%	99.24%	0.0
Mar-26	3	Benzene	0	0.0	0.0	0.3	0.5	10.8	0.4	0.58%	99.46%	0.4
Jan-26	3	H2S	0	0.6	4.4	6.5	9.5	43.1	7.4	0.14%	92.99%	9.2
Feb-26	3	H2S	0	0.6	4.7	6.6	9.7	32.6	7.8	0.31%	96.86%	9.4

Mar-26	3	H2S	0	0.4	4.2	6.0	8.5	38.1	6.9	0.00%	99.30%	8.5
Jan-26	3	HCN	0	0.1	0.7	1.0	1.5	8.7	1.2	3.19%	83.61%	1.4
Feb-26	3	HCN	0	0.0	0.7	1.0	1.4	10.0	1.2	1.37%	84.90%	1.3
Mar-26	3	HCN	0	0.0	0.6	0.8	1.1	5.9	0.9	0.57%	96.01%	1.1
Jan-26	4	Benzene	0	0.2	0.5	0.7	1.0	99.9	1.4	0.00%	98.23%	0.9
Feb-26	4	Benzene	0	0.1	0.3	0.5	0.7	9.5	0.6	0.00%	99.21%	0.7
Mar-26	4	Benzene	0	0.1	0.3	0.4	0.6	125.5	0.6	0.00%	99.10%	0.6
Jan-26	4	H2S	0	0.1	1.9	3.0	4.3	21.0	3.5	0.03%	83.73%	4.3
Feb-26	4	H2S	0	0.2	2.3	3.5	5.0	38.4	4.1	0.00%	99.59%	4.9
Mar-26	4	H2S	0	0.3	2.1	3.1	4.3	35.0	3.6	0.00%	99.22%	4.4
Jan-26	4	HCN	0	0.2	1.5	2.1	2.9	11.1	2.4	13.50%	57.49%	2.5
Feb-26	4	HCN	0	0.1	1.2	2.1	3.0	11.1	2.4	16.33%	71.63%	2.4
Mar-26	4	HCN	0	0.1	0.5	1.7	2.8	31.4	2.2	9.79%	80.07%	2.1
Jan-26	5	Benzene	0	0.1	0.4	0.6	0.8	32.1	0.8	0.00%	74.62%	0.8
Feb-26	5	Benzene	0	0.1	0.4	0.6	1.0	18.2	0.8	0.00%	96.21%	0.9
Mar-26	5	Benzene	0	0.1	0.5	0.8	1.3	19.8	1.1	0.00%	93.13%	1.1
Jan-26	5	H2S	0	0.2	5.8	10.6	15.8	84.1	11.9	0.06%	93.58%	15.0
Feb-26	5	H2S	0	0.3	4.6	9.0	15.4	75.2	11.2	0.00%	99.06%	12.9
Mar-26	5	H2S	0	0.4	4.5	8.5	14.6	78.2	11.2	0.19%	87.04%	12.0
Jan-26	5	HCN	0	0.1	0.6	1.6	2.8	20.3	2.0	0.36%	93.16%	2.3
Feb-26	5	HCN	0	0.1	0.9	2.0	3.0	25.6	2.4	0.43%	98.60%	2.9
Mar-26	5	HCN	0	0.1	0.9	1.9	2.9	21.3	2.2	0.58%	81.43%	2.8
Jan-26	6	Benzene	0	0.2	0.5	0.7	1.0	41.9	1.0	24.03%	97.89%	1.0
Feb-26	6	Benzene	0	0.1	0.4	0.7	0.9	5.5	0.7	31.23%	99.26%	0.9
Mar-26	6	Benzene	0	0.1	0.3	0.6	0.7	4.8	0.6	0.30%	99.43%	0.8
Jan-26	6	H2S	0	0.1	3.7	5.2	7.4	26.5	5.9	0.00%	93.57%	7.4
Feb-26	6	H2S	0	0.2	3.6	5.5	8.0	46.9	6.7	0.00%	92.27%	7.8
Mar-26	6	H2S	0	0.2	2.6	4.6	7.6	42.7	6.0	0.00%	96.72%	6.5
Jan-26	6	HCN	0	0.0	0.1	0.3	0.5	3.6	0.3	0.80%	93.99%	0.5
Feb-26	6	HCN	0	0.0	0.1	0.3	0.5	3.0	0.4	0.29%	93.19%	0.4
Mar-26	6	HCN	0	0.0	0.1	0.2	0.5	3.7	0.3	0.27%	97.93%	0.3

<sup>1</sup> number of 1-hour measurements above the notification threshold value

<sup>2</sup> data quartiles = the value at which a defined percentage of data existing below this value (valid data only)

<sup>3</sup> the percentage of hourly averages above the detection limit (DL) as compared to the total possible hourly averages (excluding data collected during QA/QC activities, calibration, or maintenance).

<sup>4</sup> the proportion of the 1h measurements that pass all data verification measures compared to the possible hourly averages.

<sup>5</sup> the median 1-hr detection limit observed across validated measurements per compound for the month specified.

## **B. Summary of Invalidated Data**

The invalidated data can be found in file “Goodrich Corporation FLMP Data Packet\_Q1 2026”. All 5 min data have been validated based on the procedures described in the Goodrich Corporation fenceline monitoring plan.

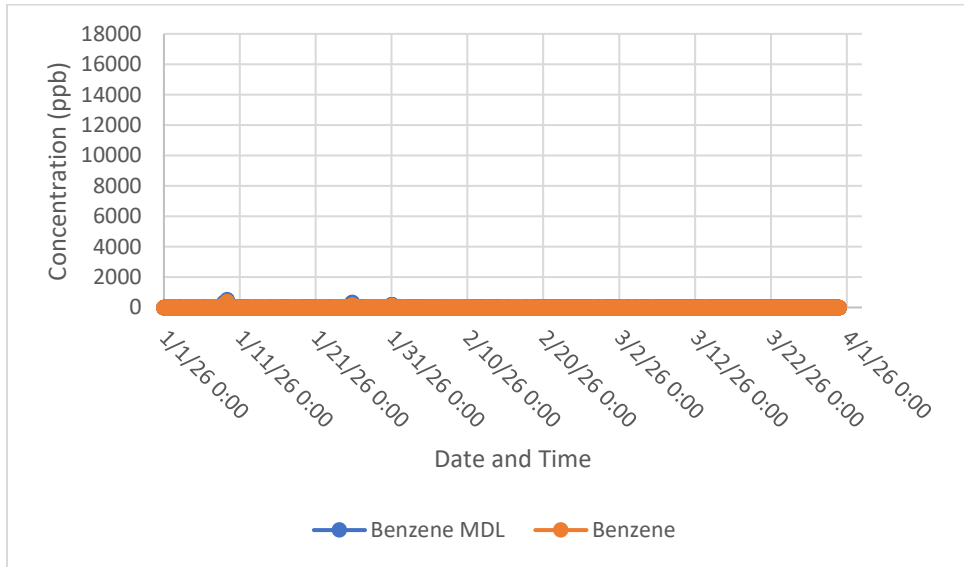
## **C. Discussion of Invalidated Data**

The data was validated based on the procedures mentioned in the fenceline monitoring plan. During this quarter of the fenceline monitoring program operation, there was a relatively high invalidation rate for HCN Path 4 for the period of January and February 2026, with an average valid data percentage of approximately 72% and 57% respectively. The higher invalidation rate is related to the higher MDLs that were observed during this period. All other compounds had high validation rates exceeding 95% in most cases.

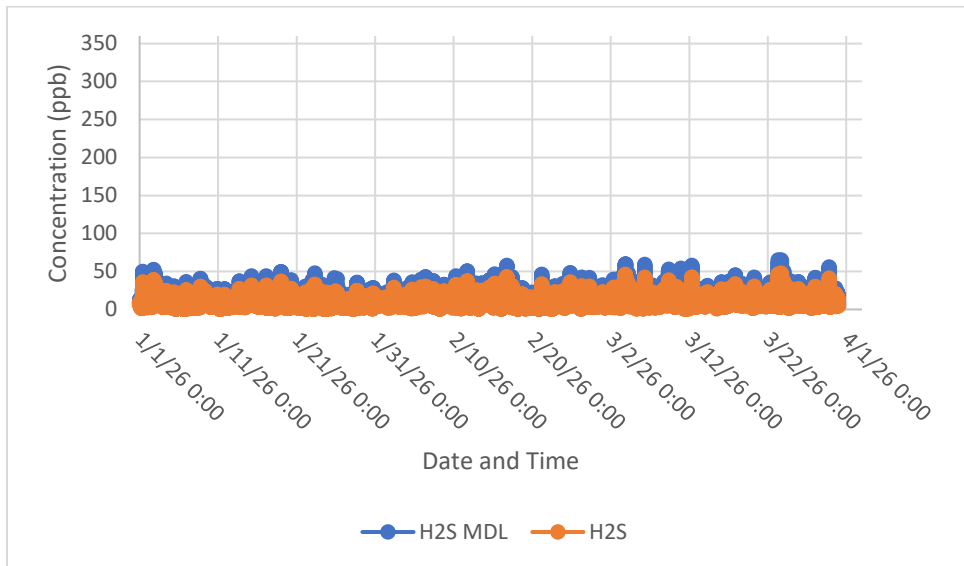
## **D. Discussion of Results**

As shown in the summary plots, the concentration of the three compounds of interest was below detection limit in most cases. There were no threshold exceedances during Q1 of 2026 for any of the compounds. For benzene the average median MDL value was around 6.3 ppb, for H<sub>2</sub>S the average median MDL value was approximately 11.8 ppb, and for HCN the corresponding average median MDL was around 1.8 ppb.

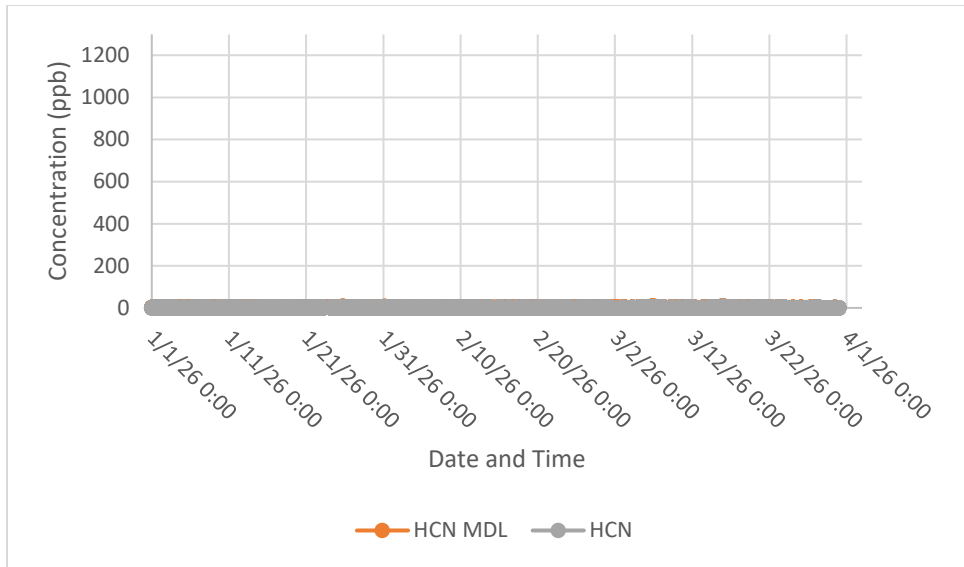
### E. Summary Plots



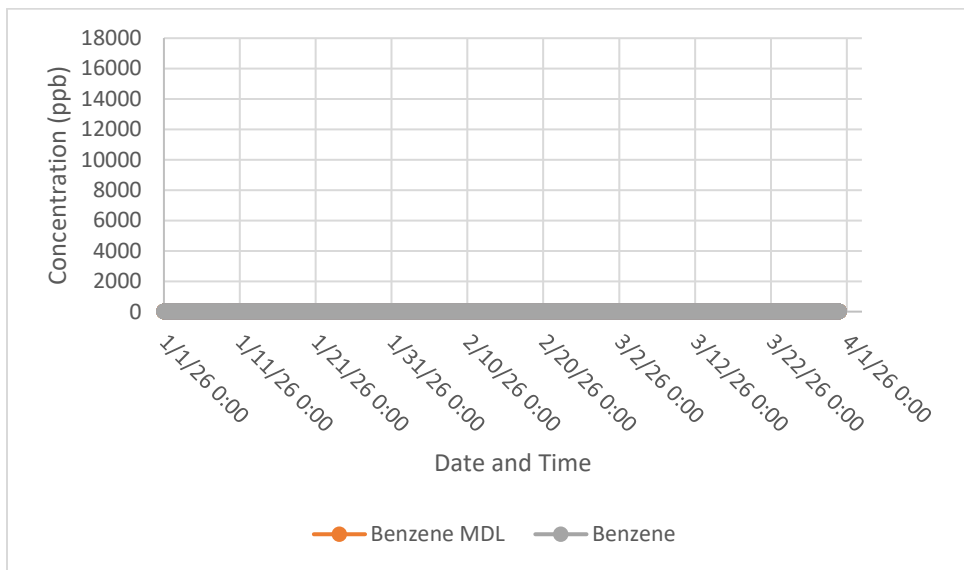
**Figure 3. Timeseries of Benzene Path 1**



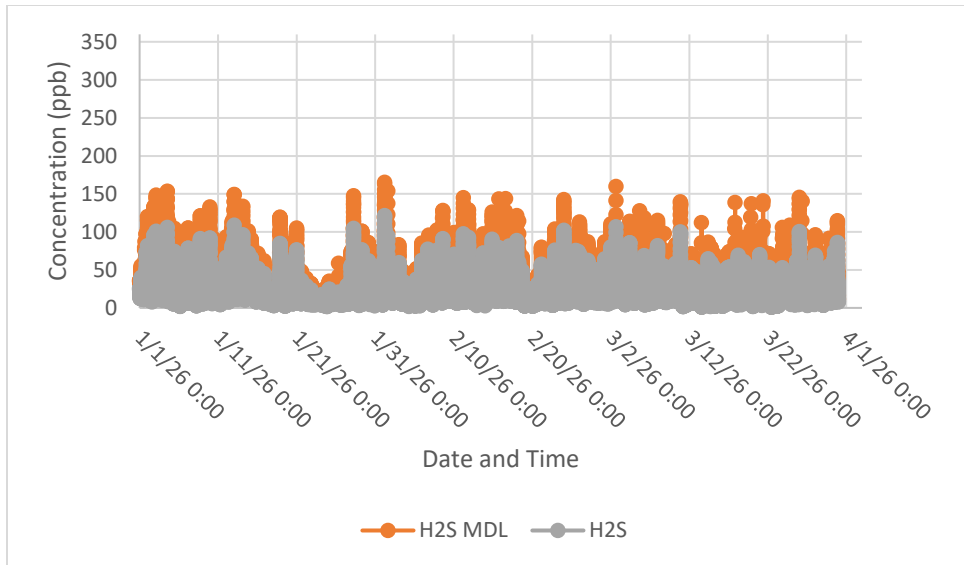
**Figure 4. Timeseries of H<sub>2</sub>S Path 1**



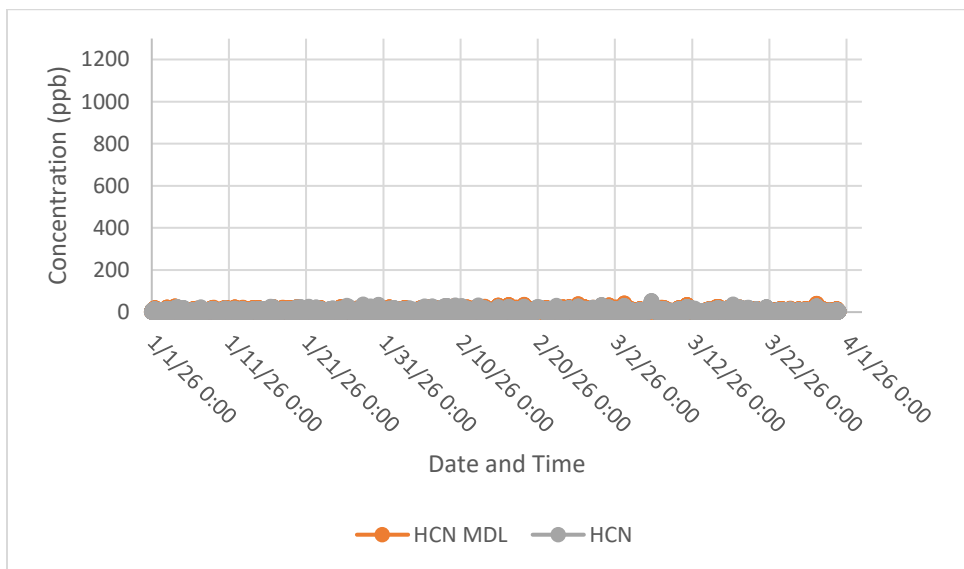
**Figure 5. Timeseries of HCN Path 1**



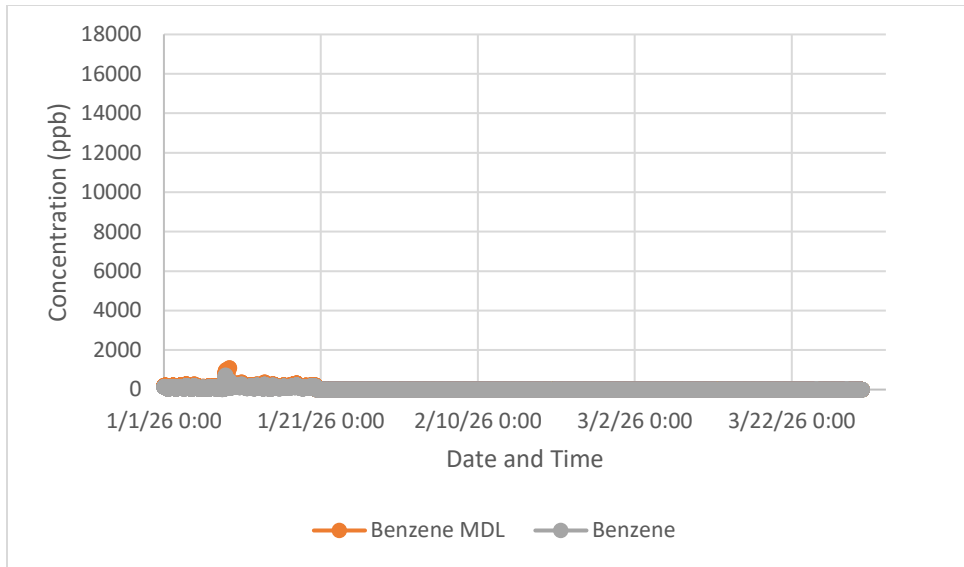
**Figure 6. Timeseries of Benzene Path 2**



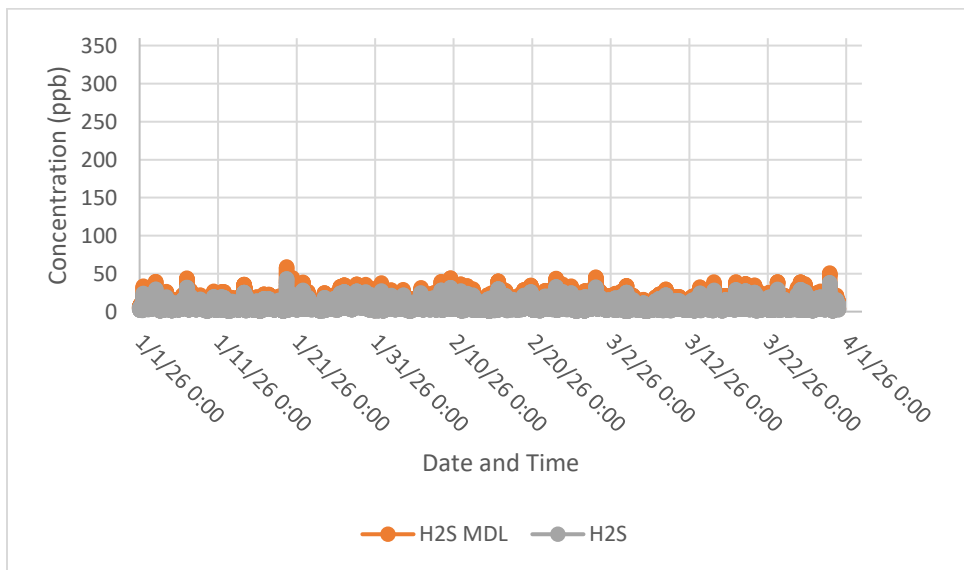
**Figure 7. Timeseries of H<sub>2</sub>S Path 2**



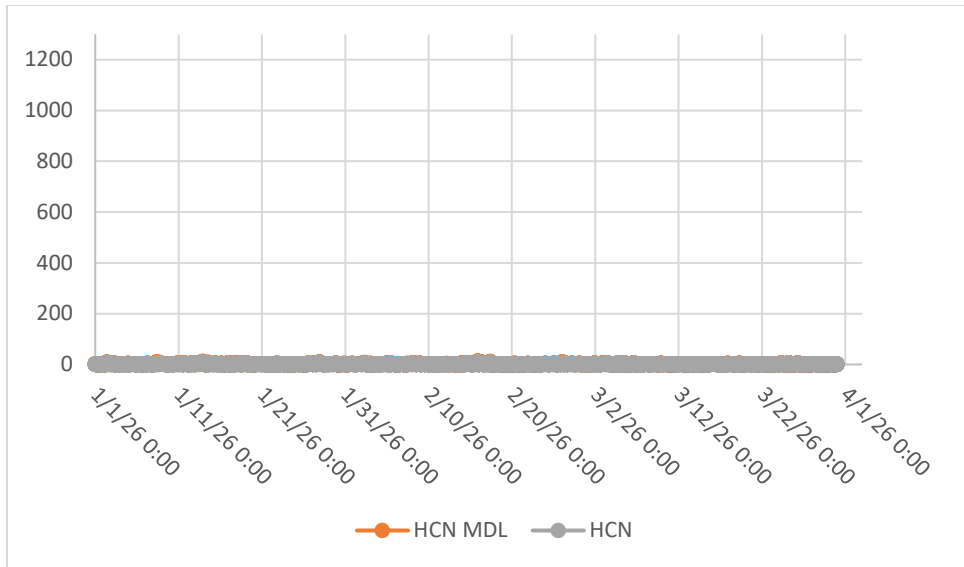
**Figure 8. Timeseries of HCN Path 2**



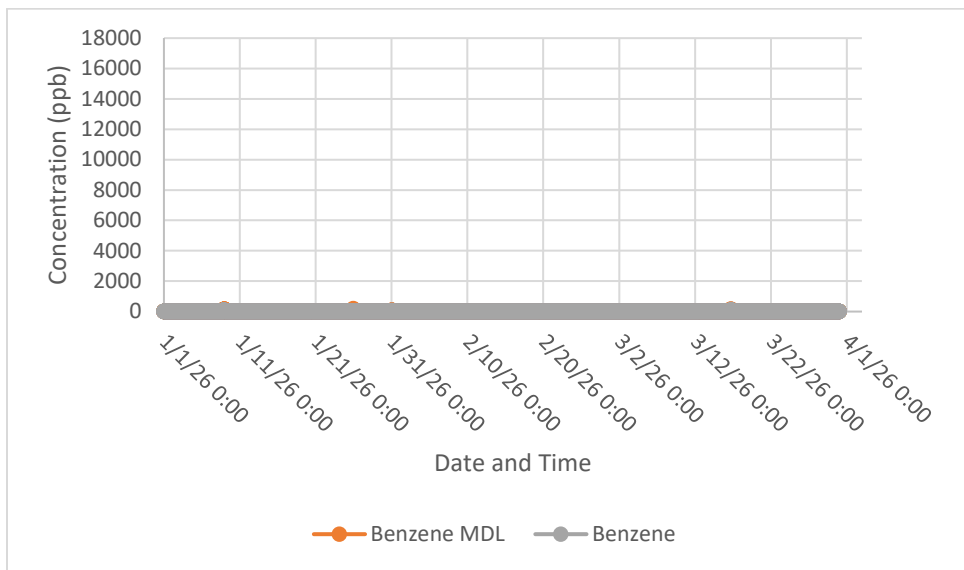
**Figure 9. Timeseries of Benzene Path 3**



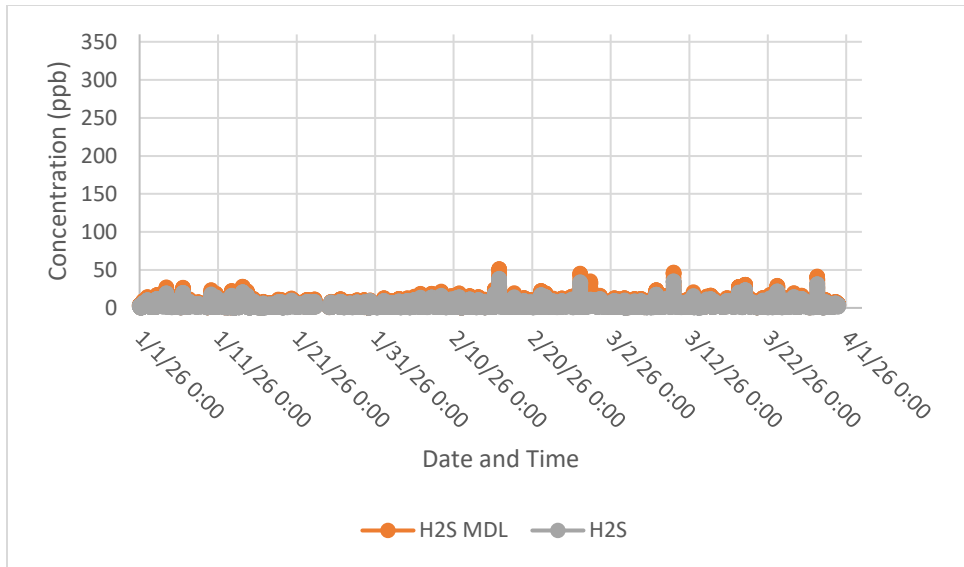
**Figure 10. Timeseries of H2S Path 3**



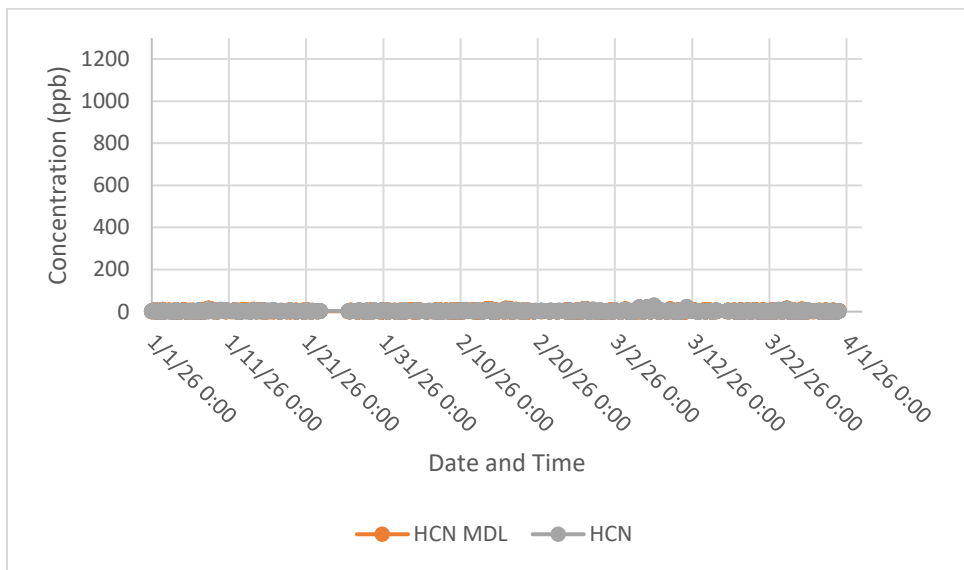
**Figure 11. Timeseries of HCN Path 3**



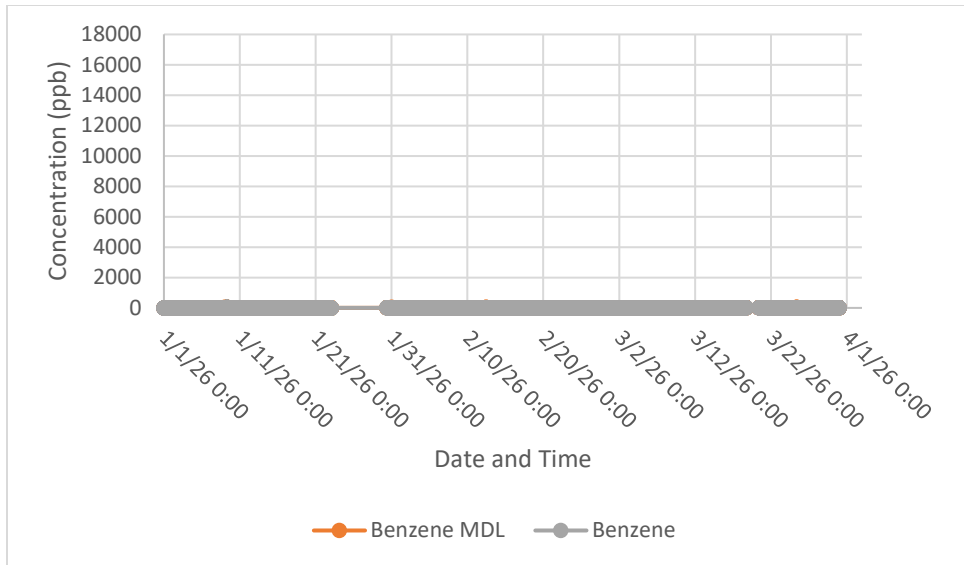
**Figure 12. Timeseries of Benzene Path 4**



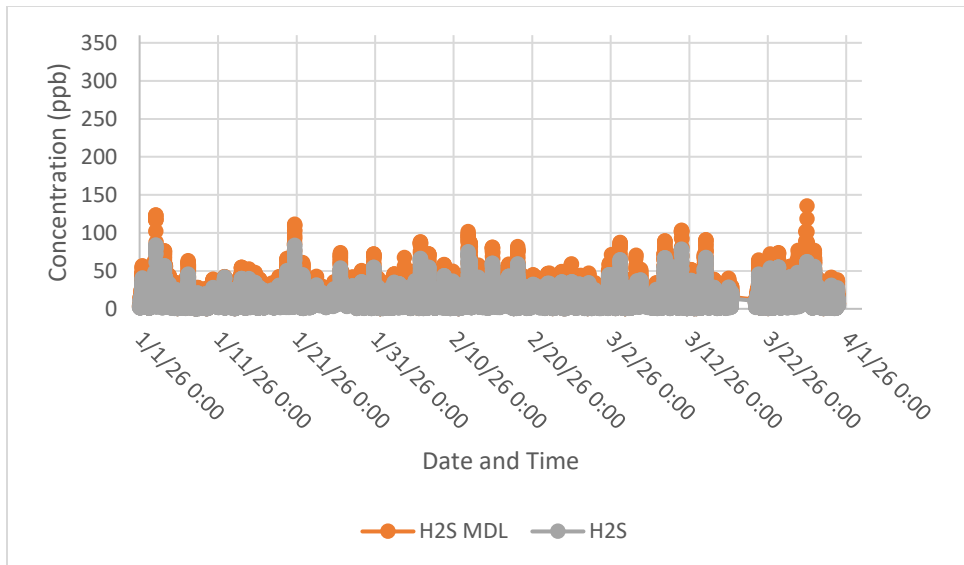
**Figure 13. Timeseries of H2S Path 4**



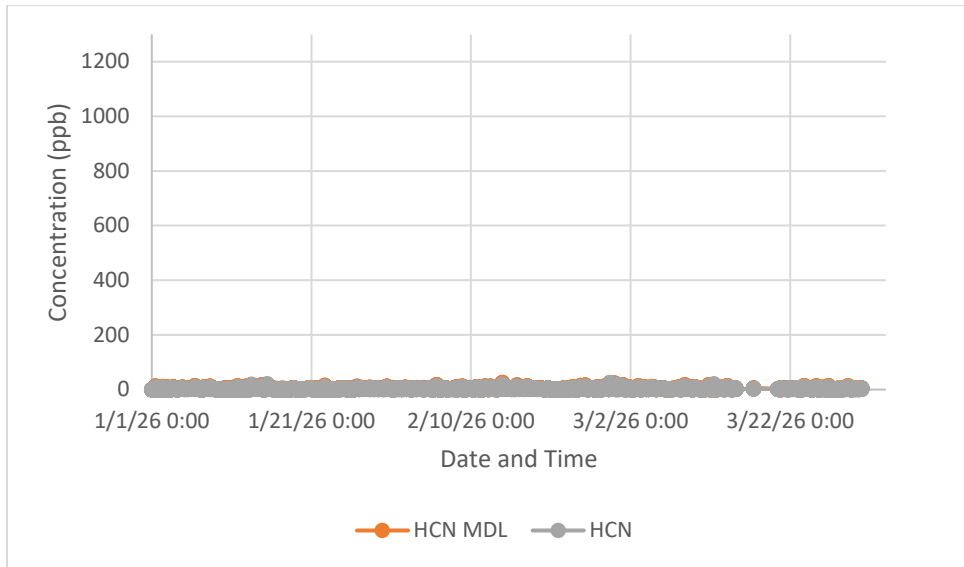
**Figure 14. Timeseries of HCN Path 4**



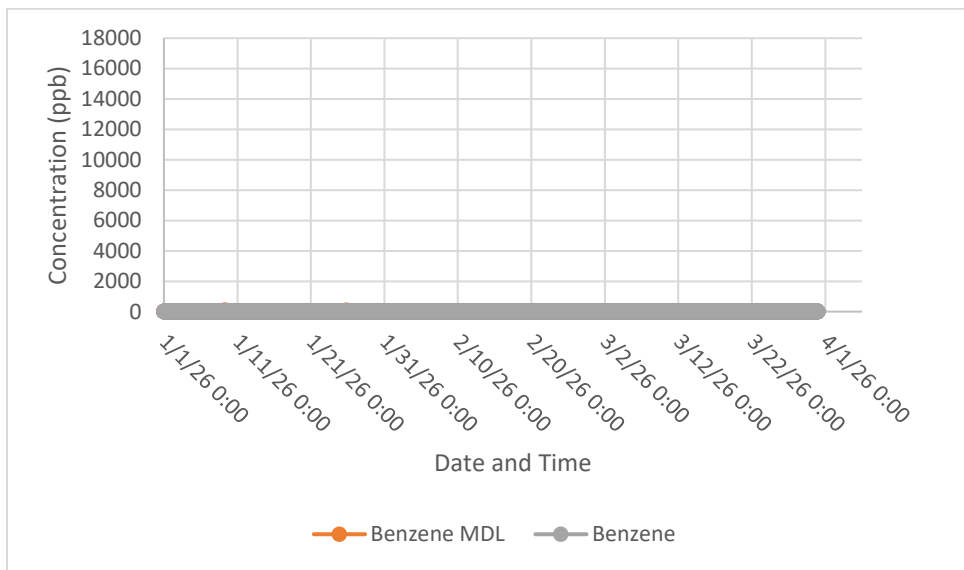
**Figure 15. Timeseries of Benzene Path 5**



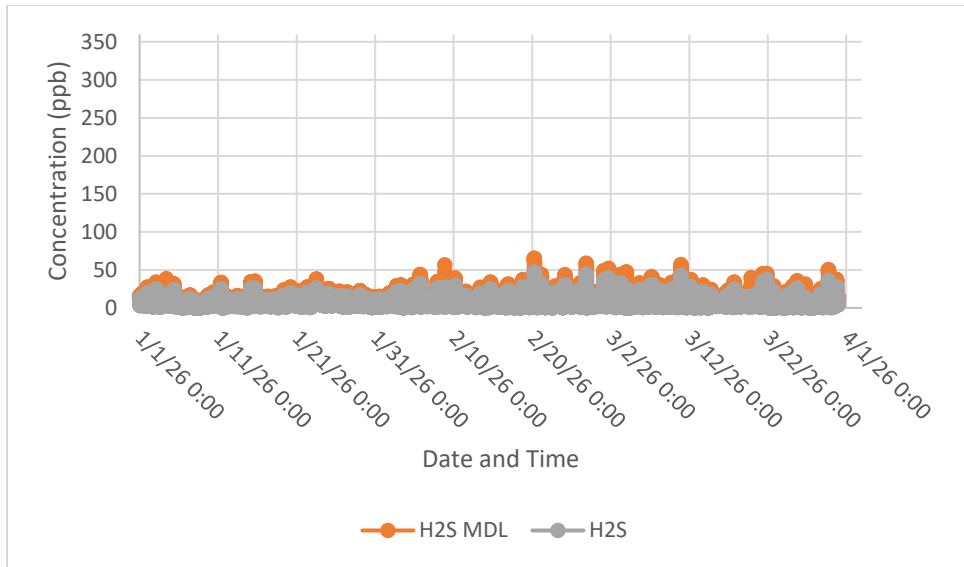
**Figure 16. Timeseries of H2S Path 5**



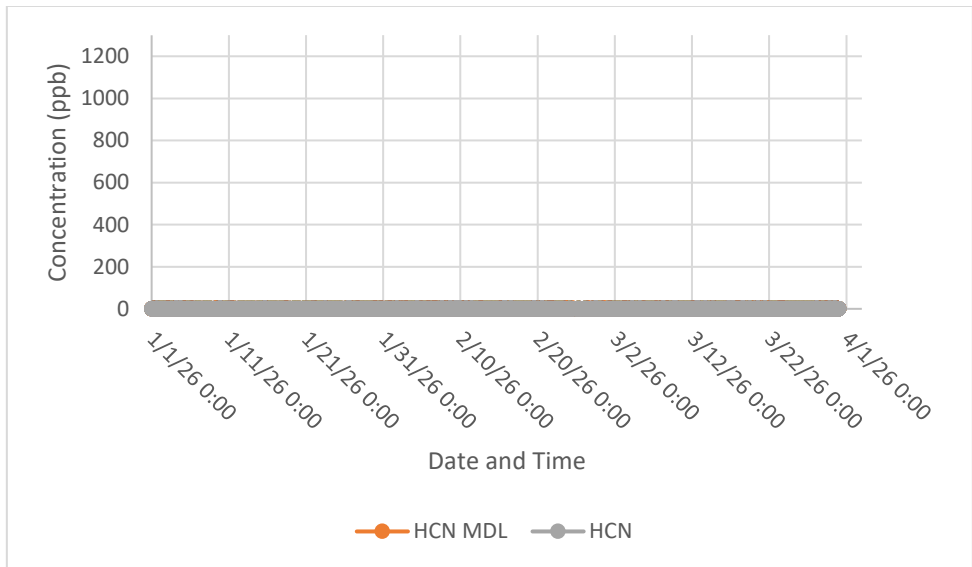
**Figure 17. Timeseries of HCN Path 5**



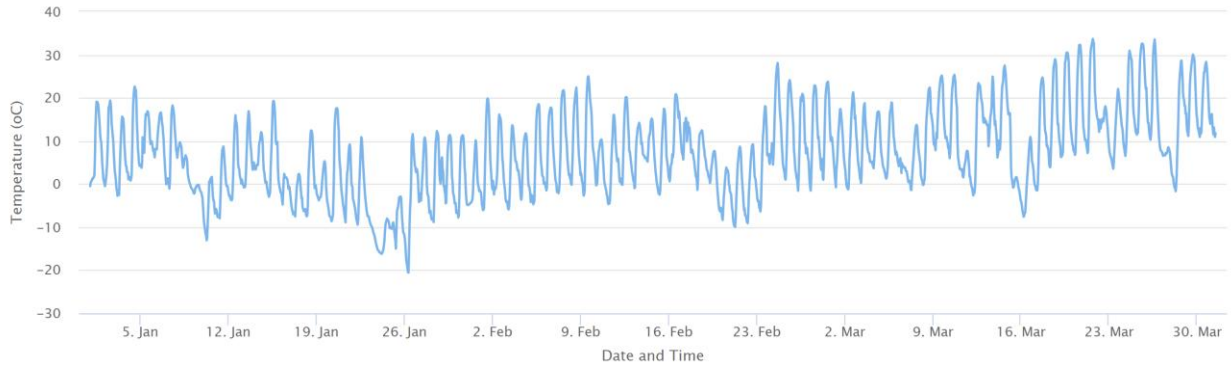
**Figure 18. Timeseries of Benzene Path 6**



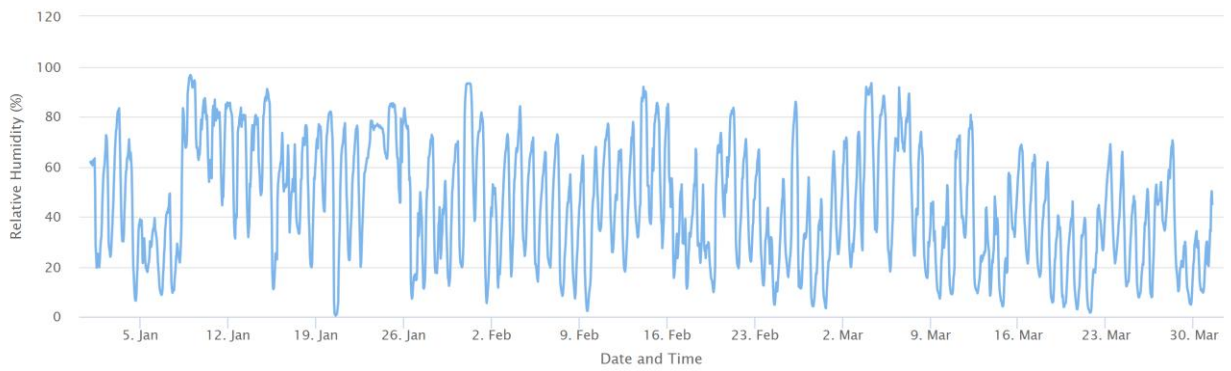
**Figure 19. Timeseries of H2S Path 6**



**Figure 20. Timeseries of HCN Path 6**



**Figure 21. Temperature Timeseries (2026)**

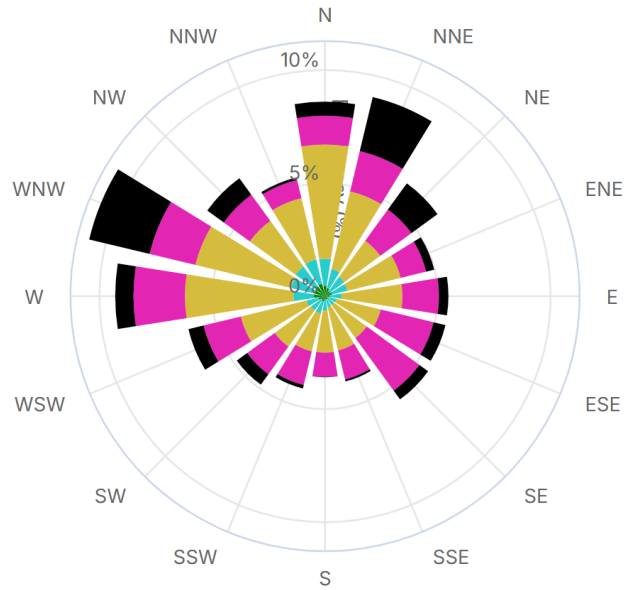


**Figure 22. Relative Humidity Timeseries (2026)**

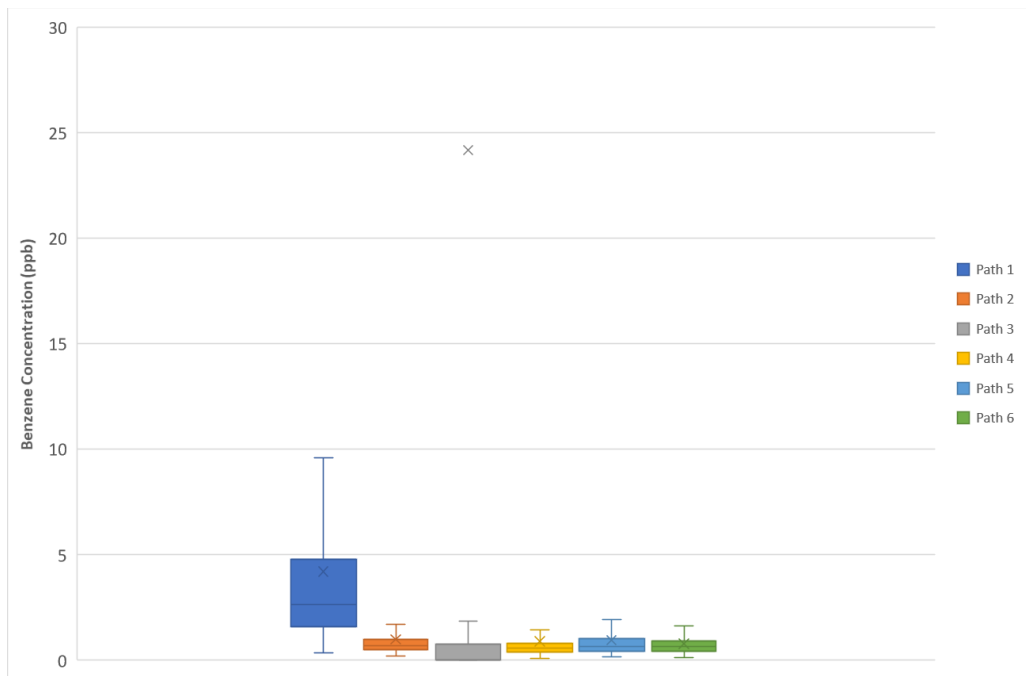


**Figure 23. Barometric Pressure Timeseries (2026)**

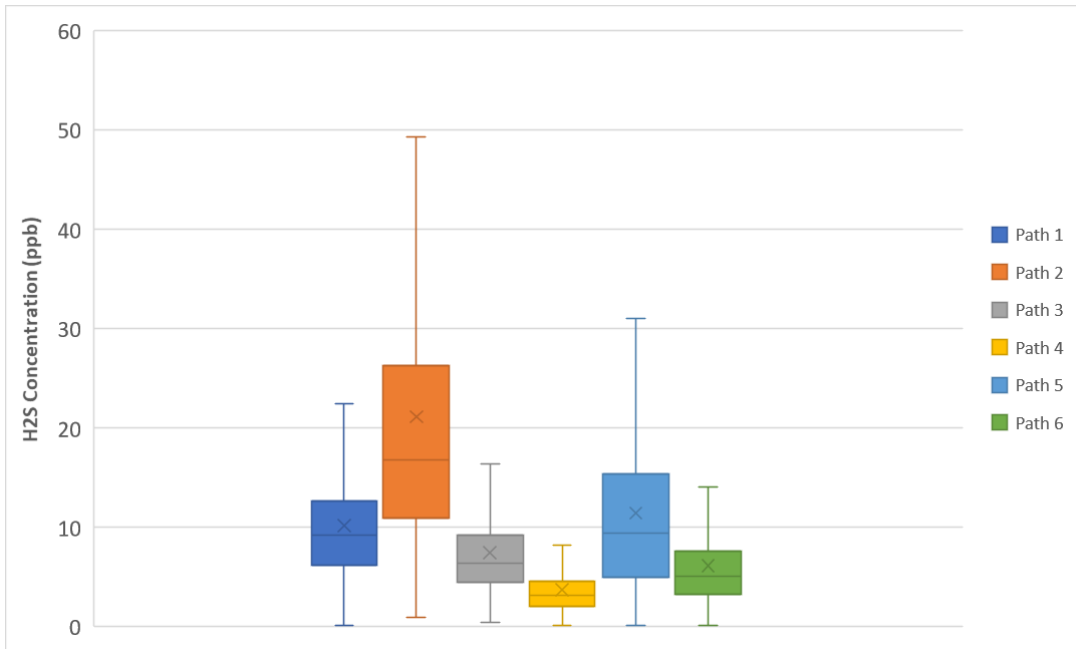
- 0–1 MPH (5%)
- 1–2 MPH (11%)
- 2–5 MPH (44%)
- 5–10 MPH (27%)
- >10 MPH (12%)



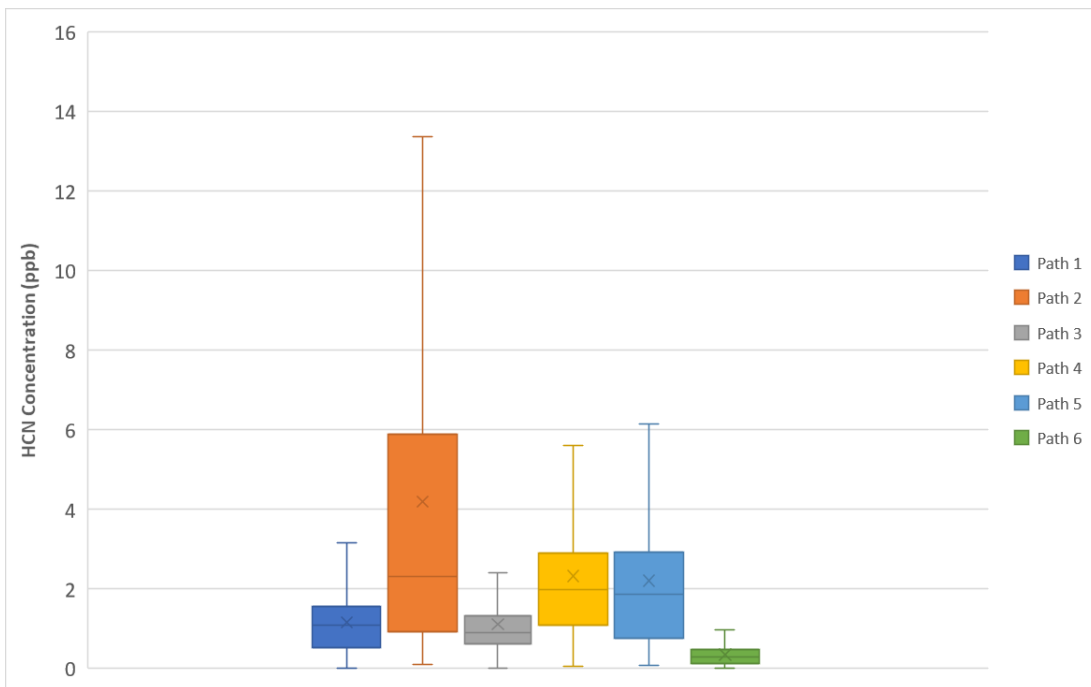
**Figure 24. Wind Rose Plot**



**Figure 25. Benzene Box Plots for Paths 1 to 6.**



**Figure 26. H<sub>2</sub>S Box Plots for Paths 1 to 6.**



**Figure 27. HCN Box Plots for Paths 1 to 6.**

## **F. Discussion of Changes to Monitoring System, Operations and/or Procedures**

Three main changes were performed to the fenceline monitoring plan procedures which are related with the automated QA/QC checks:

1. UV spectrometer temperature: the UV spectrometers were calibrated by the manufacturer at 35°C instead of the 39°C that the older models used to be calibrated at. Thus, for the automated QA/QC checks, we changed the acceptance criteria to accommodate the updated spectrometer calibration conditions.
2. TDL signal intensity: the manufacturer recommended to monitor the absolute detector power instead of the signal intensity. The reason was related to the fact that the laser signal intensity is affected by multiple instrument parameters (I/O Gain, Signal Gain, signal collimation etc.). Due to these interferences, the signal intensity values that are reported by the analyzer could potentially not be representative of the actual signal power that is measured by the detector. To avoid these issues, we replaced the “signal intensity” parameter on the automated QA/QC checks with the parameter “absolute detector power”. The criteria for the data to be considered valid is the absolute detector power to be >0.1 mA.
3. H2S MDL: For the purposes of the data validation, the H2S MDL threshold was increased from 25% to 50% of the alert threshold for Paths 2 and 5. This change was related to the fact that these two paths are shorter compared to the rest which causes them to have higher MDL values. The fenceline monitoring plan has been updated to reflect those changes and has been submitted to the Division for review.

## **VI. Appendices**

### **A. Appendix A: Calibration and QA/QC Data**

**Table 7. Verification Activities**

<sup>1</sup>path length in meters

Date	Type of Verification	Path	Path Length <sup>1</sup>	Analyzer	Compound	Expected Concentration	Measured Concentration	Accuracy (%)	Precision (%)
3/12/2026	Bump test	1	613	UVDOAS	Benzene	100	104	13.8	15.8
3/12/2026	Bump test	1	613	UVDOAS	Benzene	200	206	6.6	8.9
3/12/2026	Bump test	2	566	UVDOAS	Benzene	100	109	10.6	7.1
3/12/2026	Bump test	2	566	UVDOAS	Benzene	200	193	3.7	2.1
3/12/2026	Bump test	3	613	UVDOAS	Benzene	100	83	22.6	18.2
3/12/2026	Bump test	3	613	UVDOAS	Benzene	200	212	6.2	4.8
3/12/2026	Bump test	4	566	UVDOAS	Benzene	100	88	18.4	18.8
3/12/2026	Bump test	4	566	UVDOAS	Benzene	200	206	5.3	5.5
3/17/2026	Bump test	5	594	UVDOAS	Benzene	100	106	6.4	89.9
3/17/2026	Bump test	5	594	UVDOAS	Benzene	200	184	7.9	2.2
3/12/2026	Bump test	6	569	UVDOAS	Benzene	100	118	18.2	17.1
3/12/2026	Bump test	6	569	UVDOAS	Benzene	200	181	10.3	13
3/12/2026	Audit Module	1	1116	TDL	H2S	500 ppm	524	4.8	1.4
3/12/2026	Audit Module	1	1116	TDL	H2S	625 ppm	482	22.8	1.4
3/12/2026	Audit Module	2	566	TDL	H2S	500 ppm	478	4.4	2.3
3/12/2026	Audit Module	2	566	TDL	H2S	625 ppm	471	24.7	1.4
3/12/2026	Audit Module	3	1226	TDL	H2S	500 ppm	432	13.6	2.3
3/12/2026	Audit Module	3	1226	TDL	H2S	625 ppm	454	27.3	12.9
3/12/2026	Audit Module	4	1132	TDL	H2S	500 ppm	441	11.8	2
3/12/2026	Audit Module	4	1132	TDL	H2S	625 ppm	456	27	0.9
3/12/2026	Audit Module	5	594	TDL	H2S	500 ppm	503	3.8	5.5
3/12/2026	Audit Module	5	594	TDL	H2S	625 ppm	480	23.1	1.7
3/12/2026	Audit Module	6	1138	TDL	H2S	500 ppm	492	2.2	2.3
3/12/2026	Audit Module	6	1138	TDL	H2S	625 ppm	518	17.1	2.2
3/12/2026	Audit Module	1	1116	TDL	HCN	1010 ppm	1013	3.2	0.1
3/12/2026	Audit Module	1	1116	TDL	HCN	445 ppm	459	3.2	0.3
3/12/2026	Audit Module	2	566	TDL	HCN	1010 ppm	980	3	0.1
3/12/2026	Audit Module	2	566	TDL	HCN	445 ppm	420	5.5	0.4
3/12/2026	Audit Module	3	1226	TDL	HCN	1010 ppm	1000	1	0.3
3/12/2026	Audit Module	3	1226	TDL	HCN	445 ppm	452	1.5	0.2
3/12/2026	Audit Module	4	1132	TDL	HCN	1010 ppm	986	2.4	0.3
3/12/2026	Audit Module	4	1132	TDL	HCN	445 ppm	438	11.7	0.7
3/12/2026	Audit Module	5	594	TDL	HCN	1010 ppm	1033	2.3	0.1
3/12/2026	Audit Module	5	594	TDL	HCN	445 ppm	482	8.2	0.2
3/12/2026	Audit Module	6	1138	TDL	HCN	1010 ppm	1028	1.7	0.1
3/12/2026	Audit Module	6	1138	TDL	HCN	445 ppm	468	5.1	0.4

**Table 8: Percent Recovery for Meteorological Parameters**

Parameter	Percent Data Recovery
Wind Speed	100%
Wind Direction	100%
Temperature	100%
Humidity	100%
Pressure	100%

## B. Appendix B: Qualifier Codes

**Table 9: List of Data Invalidation Codes**

<b>Qualifier Code</b>	<b>AQS Definition *(additional information added in parentheses)</b>	<b>Type or Related Action</b>
AB	Technician Unavailable. <i>*(use if this affects scheduled QA/QC or necessary maintenance)</i>	Null Data Qualifier
AD	Shelter Storm Damage.	Null Data Qualifier
AG	Sample Time out of Limits. <i>*(e.g., use if integration time is out of manufacturer recommended range and signal intensity and MDL cannot meet the critical criteria mentioned in the FLMP)</i>	Null Data Qualifier
AI	Insufficient Data. (cannot calculate)	Null Data Qualifier
AL	Voided by Operator. <i>*(e.g., Datum rejected by data validators)</i>	Null Data Qualifier
AM	Miscellaneous Void.	Null Data Qualifier
AN	Machine Malfunction <i>*(can be used for issues such as an instrument being out of alignment, or an analyzer being offline due to connection problems or instrument failure)</i>	Null Data Qualifier
AO	Bad Weather. <i>*(Use if weather impacts open-path instrument operation/function)</i>	Null Data Qualifier
AP	Vandalism. <i>*(Use if vandalism impacts open-path instrument operation/function)</i>	Null Data Qualifier
AQ	Collection Error. <i>*(use specifically for low analyzer signal events, or when a low analyzer signal prevents the reported data from meeting the critical criteria, while the calculated MDL is lower than 25% of notification threshold)</i>	Null Data Qualifier
AT	Calibration.	Null Data Qualifier
AU	Monitoring Waived.	Null Data Qualifier
AV	Power Failure.	Null Data Qualifier
AW	Wildlife Damage. <i>*(Use if damage impacts open-path instrument operation/function)</i>	Null Data Qualifier
AX	Precision Check.	Null Data Qualifier
AY	QC Control Points (zero/span).	Null Data Qualifier
AZ	QC Audit.	Null Data Qualifier
BA	Maintenance/Routine Repairs.	Null Data Qualifier
BH	Interference/co-elution/misidentification.	Null Data Qualifier
BJ	Operator Error.	Null Data Qualifier
BK	Site computer/data logger down.	Null Data Qualifier
BL	QA Audit.	Null Data Qualifier
BM	Accuracy check.	Null Data Qualifier
DA	Aberrant Data (Corrupt Files, Spikes, Shifts).	Null Data Qualifier
DL	Detection Limit Analyses.	Null Data Qualifier
EC	Exceeds Critical Criteria. <i>*(use when data exceeds critical criteria, such as for MDL)</i>	Null Data Qualifier

IA	African Dust. <i>*(use for any dust event)</i>	Informational
IT	Wildfire-U.S. <i>*(use for any wildfire event)</i>	Informational
J	Construction/Repairs in Area.	Informational
LJ	Identification of Analyte Is Acceptable; Reported Value Is An Estimate.	Quality Assurance Qualifier
MD	Value less than MDL.	Quality Assurance Qualifier
NS	Influenced by nearby sources. <i>*(e.g., in the event of emissions influenced by nearby sources)</i>	Quality Assurance Qualifier
QP	Pressure Sensor Questionable. <i>*(e.g., use if cell pressure is out of range, indicating malfunction)</i>	Quality Assurance Qualifier
QT	Temperature Sensor Questionable. <i>*(e.g., use if cell temperature is out of range, indicating malfunction)</i>	Quality Assurance Qualifier
QV	Quality Control Multi-point Verification.	Null Data Qualifier
QX	Does not meet QC criteria. <i>*(e.g., data exceeds automatic criteria for rejection)</i>	Quality Assurance Qualifier
SC	Sampler Contamination.	Null Data Qualifier
ST	Calibration Verification Standard.	Null Data Qualifier
TC	Component Check & Retention Time Standard. <i>*(use this code for additional instrument checks, e.g., a robustness tests)</i>	Null Data Qualifier

## **C. Appendix C: Field Data Sheets**

12:21 PM 1/20/2026 Montrose Onsite ML

Switched UV filters and Reflector filters for UV path 1 & 2

Cleaned reflectors and Aligned UV path 1 & 2

Data Backup UV path 1

1:10 PM 1/30/2026 Montrose Onsite ML

Aligned UV path 2

Data backup uv path 2

data backup TDL shelter 2

12:20 PM 2/19/2026 Montrose Onsite ML

Replaced UV bulbs and aligned UV path 1 & 2

9:45 AM 3/12/2026 Montrose Onsite ML

Quarterly UV Calibration Path 1 & 2

12:13 PM 3/20/2026 Montrose Onsite ML

Aligned UV path 2

Aligned H<sub>2</sub>S and HCN path 2

Cleaned path 2 reflector TDL

11:50 AM 3/25/2026 Montrose ONSITE EO

Aligned H<sub>2</sub>S path 1

3:14 pm 3/27/2026 Montrose ONSite ML

Aligned HCN path 1

12:41 AM 1/7/26 MONTROSE ONSITE CF  
SWAPPED ARDUINO PORTS UV PATH 3

1:00 PM 1/15/26 MONTROSE ONSITE CF  
ALIGNED PATH 4 H2S  
BACKUP PATH 3 & 4 UVs

11:04 am 1/30/2026 Montrose onsite ML  
ALigned H2S path 4  
Aligned UV path 4

10:18 AM 2/4/2026 Montrose Onsite ML  
Aligned H2S and HCN path 4 TDL  
Aligned UV path 4

10:22 AM 2/19/2026 Montrose Onsite ML  
Replaced UV bulbs and Aligned UV path 3 & 4

1:03 PM 3/4/2026 Montrose Onsite ML  
Alinged TDL H2S and HCN path 3

9:05 am 2/20/2026 Montrose Onsite ML  
Replaced Fan in UV head path 3

10:25 am 3/13/2026 Montrose Onsite ML

Quarterly Calibration UV path 3 & 4

9:30 am 3/17/2026 Montrose Onsite ML

Aligned UV path 4

10:38 am 3/20/2026 Montrose Onsite ML

Aligned H2S path 4 TDL

12:53 PM 1/20/2026 Montrose Onsite ML

Replaced UV filters and Reflector filters for UV path 5 & 6

Cleaned reflectors

Aligned UV path 5 & 6

Aligned HCN path 5

1:04 PM 1/30/2026 Montrose onsite ML

Aligned UV path 6

Aligned HCN path 5

Aligned H2S path 6

Replaced PC on UV 5

12:20 pm 2/4/2026 Montrose onsite ML

Aligned HCN path 5

Aligned UV path 5

Swapped Arduino port UV Path 5

10:20 AM 2/11/26 MONTROSE ONSITE CF, MF

ALIGN UV PATH 5 FOR MF TRAINING

SWAPPED ARDUINO PORTS UV PATH 5

10:30 AM 2/12/26 MONTROSE ONSITE EO

ALIGNED UV PATH 5 AND CHECKED ON FAN.

12:21 PM 2/19/2026 Montrose Onsite ML

Replaced UV bulbs and Aligned UV path 5 & 6

Aligned H2S and HCN path 5 TDL

Aligned HCN path 6 TDL

2:51 PM 3/4/2026 Montrose Onsite ML

Aligned TDL H2S and HCN path 5

Aligned TDL H2S and HCN path 6

Aligned UV path 5

12:30 PM 3/13/2026 Montrose Onsite ML

Quarterly Calibration UV path 5 & 6

12:15 PM 3/17/2026 Montrose Onsite ML

Aligned UV path 6

Recalibrated UV path 5

11:45 AM 3/20/2026 Montrose onsite ML

Aligned H2S and HCN path 5

Aligned UV path 5

11:50 AM 3/25/2026 Montrose Onsite EO

Aligned HCN Path 5

Aligned UV Path 5

Aligned H<sub>2</sub>S Path 6

3:03 PM 3/27/2026 Montrose Onsite ML

Aligned HCN and H<sub>2</sub>S path 5

**D. Appendix D: Non-Conformance/Corrective Action Data Sheets**

## **E. Appendix E: Calibration verification forms**

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: H2S Path 1 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	558 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	500 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	500	524	4.8
2	500	516	3.2
3	500	532	6.4
4	500	530	6
5	500	518	3.6
<b>Averages</b>	500	524	4.8


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	98.6%	≥ 80%
<b>Overall Percent Error</b>	4.8%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/2026  
 Instrument Model: H2S Path 1 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	558 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	625 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	625	484	22.6
2	625	492	21.3
3	625	486	22.2
4	625	482	22.9
5	625	468	25.1
<b>Averages</b>	625	482	22.8


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	98.6 %	≥ 80%
<b>Overall Percent Error</b>	22.8%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: H2S Path 2 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	283 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	500 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	500	490	2
2	500	482	3.6
3	500	462	7.6
4	500	470	6
5	500	486	2.8
<b>Averages</b>	500	478	4.4


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	97.7%	≥ 80%
<b>Overall Percent Error</b>	4.4%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

Page 1 of 2  
**TDL Calibration Form**

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: H2S Path 2 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	283 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	625 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	625	464	25.8
2	625	462	26.1
3	625	468	25.1
4	625	482	22.9
5	625	478	23.5
<b>Averages</b>	625	471	24.7


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	98.6	≥ 80%
<b>Overall Percent Error</b>	24.7	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: H2S Path 3 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	613 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	500 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	500	426	14.8
2	500	420	16
3	500	436	12.8
4	500	428	14.4
5	500	450	10
<b>Averages</b>	500	432	13.6


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	97.7%	≥ 80%
<b>Overall Percent Error</b>	13.6%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: H2S Path 3 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	613 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	625 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	625	448	28.3
2	625	450	28
3	625	450	28
4	625	448	28.3
5	625	476	23.8
<b>Averages</b>	625	454	27.3


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	98.1%	≥ 80%
<b>Overall Percent Error</b>	27.3 %	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: H2S Path 4 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	566 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	500 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	500	450	10
2	500	424	15.2
3	500	442	11.6
4	500	444	11.2
5	500	446	10.8
<b>Averages</b>	500	441	11.8


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	98%	≥ 80%
<b>Overall Percent Error</b>	11.8%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: H2S Path 4 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
<b>Optical Path separation(meters-one-way)</b>	566 m
<b>Compound (H2S/HCN)</b>	H2S

Standard Information	
<b>Compound External Audit Cell Concentration (PPMM)</b>	625 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	625	462	26.1
2	625	462	26.1
3	625	454	27.4
4	625	452	27.7
5	625	450	28
<b>Averages</b>	625	456	27


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.1%	≥ 80%
<b>Overall Percent Error</b>	27%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: H2S Path 5 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	297 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	500 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	500	540	8
2	500	516	3.2
3	500	498	0.4
4	500	496	0.8
5	500	466	0.7
<b>Averages</b>	500	503	3.8


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	94.5%	≥ 80%
<b>Overall Percent Error</b>	3.8%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Jarrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: H2S Path 5 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	297 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	625 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	625	490	21.6
2	625	490	21.6
3	625	478	23.5
4	625	480	23.2
5	625	464	25.8
<b>Averages</b>	625	480	23.1


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	98.3%	≥ 80%
<b>Overall Percent Error</b>	23.1%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: H2S Path 6 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	569 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	500 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	500	478	4.4
2	500	508	1.6
3	500	488	2.4
4	500	498	0.4
5	500	488	2.4
<b>Averages</b>	500	492	2.2


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	97.7 %	≥ 80%
<b>Overall Percent Error</b>	2.2%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

Page 1 of 2  
**TDL Calibration Form**

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: H2S Path 6 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	569 m
Compound (H2S/HCN)	H2S

Standard Information	
Compound External Audit Cell Concentration (PPMM)	625 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	625	500	20
2	625	520	16.8
3	625	536	14.2
4	625	524	16.2
5	625	508	18.7
<b>Averages</b>	625	518	17.1


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	97.8%	≥ 80%
<b>Overall Percent Error</b>	17.1%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: HCN Path 1 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	558 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	445 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	445	460	3.4
2	445	460	3.4
3	445	458	2.9
4	445	458	2.9
5	445	460	3.4
<b>Averages</b>	445	459	3.2


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.7%	≥ 80%
<b>Overall Percent Error</b>	3.2%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: HCN Path 1 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	558 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	1010 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	1010	1014	4
2	1010	1014	4
3	1010	1012	2
4	1010	1014	4
5	1010	1012	2
<b>Averages</b>	1010	1013	3.2


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.9%	≥ 80%
<b>Overall Percent Error</b>	3.2%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: HCN Path 2 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	283 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	445 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	445	418	6.1
2	445	420	5.6
3	445	422	5.2
4	445	422	5.2
5	445	420	5.6
<b>Averages</b>	445	420	5.5


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.6%	≥ 80%
<b>Overall Percent Error</b>	5.5%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: HCN Path 2 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
<b>Optical Path separation(meters-one-way)</b>	<u>283 m</u>
<b>Compound (H2S/HCN)</b>	<u>HCN</u>

Standard Information	
<b>Compound External Audit Cell Concentration (PPMM)</b>	<u>1010 PPMM</u>

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
<u>1</u>	<u>1010</u>	<u>980</u>	<u>3</u>
<u>2</u>	<u>1010</u>	<u>978</u>	<u>3.1</u>
<u>3</u>	<u>1010</u>	<u>980</u>	<u>3</u>
<u>4</u>	<u>1010</u>	<u>980</u>	<u>3</u>
<u>5</u>	<u>1010</u>	<u>980</u>	<u>3</u>
<b>Averages</b>	<u>1010</u>	<u>980</u>	<u>3</u>


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	<u>99.9%</u>	<b>≥ 80%</b>
<b>Overall Percent Error</b>	<u>3%</u>	<b>≤ 30%</b>

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: HCN Path 3 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	613 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	445 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	445	450	1.1
2	445	452	1.6
3	445	452	1.6
4	445	452	1.6
5	445	452	1.6
<b>Averages</b>	445	452	1.5


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.8%	≥ 80%
<b>Overall Percent Error</b>	1.5%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: HCN Path 3 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	613 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	1010 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	1010	1000	1
2	1010	1002	0.8
3	1010	1002	0.8
4	1010	998	1.2
5	1010	996	1.4
<b>Averages</b>	1010	1000	1


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.7%	≥ 80%
<b>Overall Percent Error</b>	1%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

Page 1 of 2  
**TDL Calibration Form**
**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

 Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

 Instrument Model: HCN Path 4 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	566 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	445 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	445	440	1.1
2	445	438	1.6
3	445	438	1.6
4	445	438	1.6
5	445	438	1.6
<b>Averages</b>	445	438	1.5


	Calculated Values	Expected Values
Overall Percent Precision	99.3%	≥ 80%
Overall Percent Error	11.7%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: HCN Path 4 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	566 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	1010 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	1010	992	1.8
2	1010	984	2.6
3	1010	986	2.4
4	1010	984	2.6
5	1010	984	2.6
<b>Averages</b>	1010	986	2.4


	Calculated Values	Expected Values
Overall Percent Precision	99.7%	≥ 80%
Overall Percent Error	2.4%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26

Instrument Model: HCN Path 5 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	297 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	445 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	445	480	7.9
2	445	482	8.3
3	445	482	8.3
4	445	482	8.3
5	445	482	8.3
<b>Averages</b>	445	482	8.2


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.8%	≥ 80%
<b>Overall Percent Error</b>	8.2%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: HCN Path 5 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	297 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	1010 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	1010	1032	2.2
2	1010	1034	2.4
3	1010	1034	2.4
4	1010	1034	2.4
5	1010	1032	2.2
<b>Averages</b>	1010	1033	2.3


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.9%	≥ 80%
<b>Overall Percent Error</b>	2.3%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: HCN Path 6 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	569 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	445 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	445	466	4.7
2	445	466	4.7
3	445	468	5.2
4	445	468	5.2
5	445	470	5.6
<b>Averages</b>	445	468	5.1


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.6%	≥ 80%
<b>Overall Percent Error</b>	5.1%	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> TDL Calibration Form	<b>Implementation Date:</b> August 8, 2024
<b>Document Number:</b> 331AA-OPS-FM-15	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 1	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: HCN Path 6 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path separation(meters-one-way)	569 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	1010 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	1010	1028	1.8
2	1010	1028	1.8
3	1010	1028	1.8
4	1010	1028	1.8
5	1010	1026	1.6
<b>Averages</b>	1010	1028	1.7


	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	99.9%	≥ 80%
<b>Overall Percent Error</b>	1.7 %	≤ 30%

**Form Title:** TDL Calibration Form  
**Document Number:** 331AA-OPS-FM-15  
**Revision Number:** Rev. 1

**Implementation Date:** August 8, 2024  
**Form Owner (Department):** MAQS  
**Form Approval:** Katia Liangou

**Notes:**

Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 1 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	613 m/ 0.00235m
Maximum Intensity (%)	87
Integration Time (ms)	40

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	100	118	18
2	100	119	19
3	100	91	9
4	100	107	7
5	100	84	16
<b>Averages</b>	100	104	13.8

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	84.2	≥ 75%
<b>Overall Percent Error</b>	13.8	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 1 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	613 m/ 0.0235m
Maximum Intensity (%)	87
Integration Time (ms)	40

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	200	182	9
2	200	203	1.5
3	200	230	15
4	200	199	0.5
5	200	214	7
<b>Averages</b>	200	206	6.6

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	91.1	≥ 75%
<b>Overall Percent Error</b>	6.6	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Mono Path 2 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	566 m/ 0.047m
Maximum Intensity (%)	83
Integration Time (ms)	75

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	100	97	3
2	100	111	11
3	100	115	15
4	100	113	13
5	100	111	11
<b>Averages</b>	100	109	10.6

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	92.9	≥ 75%
<b>Overall Percent Error</b>	10.6	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Mono Path 2 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	566 m/ 0.047m
Maximum Intensity (%)	83
Integration Time (ms)	75

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	200	190	5
2	200	199	0.5
3	200	192	4
4	200	188	6
5	200	194	3
<b>Averages</b>	200	193	3.7

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	97.9	≥ 75%
<b>Overall Percent Error</b>	3.7	≤ 30%

<b>Notes:</b>
Calibration verification passed.

Operator's Signature ..... *Katia Liangou*

Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 3 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	613 m/ 0.0235m
Maximum Intensity (%)	95
Integration Time (ms)	27

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	100	77	23
2	100	68	32
3	100	73	27
4	100	83	17
5	100	114	14
<b>Averages</b>	100	83	22.6

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	81.8	≥ 75%
<b>Overall Percent Error</b>	22.6	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 3 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	613 m/ 0.0235m
Maximum Intensity (%)	95
Integration Time (ms)	27

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	200	205	2.5
2	200	216	8
3	200	213	6.5
4	200	226	13
5	200	202	1
<b>Averages</b>	200	212	6.2

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	95.2	≥ 75%
<b>Overall Percent Error</b>	6.2	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 4 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	566 m/ 0.0235m
Maximum Intensity (%)	96
Integration Time (ms)	30

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	100	106	6
2	100	74	26
3	100	68	32
4	100	81	19
5	100	109	9
<b>Averages</b>	100	88	18.4

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
Overall Percent Precision	81.2	≥ 75%
Overall Percent Error	18.4	≤ 30%

<b>Notes:</b>
Calibration verification passed.

Operator's Signature ..... *Katia Liangou*

Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 4 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	566 m/ 0.0235m
Maximum Intensity (%)	96
Integration Time (ms)	30

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	200	210	5
2	200	215	7.5
3	200	217	8.5
4	200	196	2
5	200	193	3.5
<b>Averages</b>	200	206	5.3

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	94.5	≥ 75%
<b>Overall Percent Error</b>	5.3	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/17/26  
 Instrument Model: UV Mono Path 5 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	594 m/ 0.047m
Maximum Intensity (%)	92
Integration Time (ms)	45

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	100	100	0
2	100	103	3
3	100	105	5
4	100	124	24
5	100	100	0
<b>Averages</b>	100	106	6.4

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	89.9	≥ 75%
<b>Overall Percent Error</b>	6.4	≤ 30%

<b>Notes:</b>
Calibration verification passed.

Operator's Signature ..... *Katia Liangou*

Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/17/26

Instrument Model: UV Mono Path 5 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	594 m/ 0.047m
Maximum Intensity (%)	92
Integration Time (ms)	45

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	200	184	8
2	200	187	6.5
3	200	188	6
4	200	185	7.5
5	200	177	11.5
<b>Averages</b>	200	184	7.9

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	97.8	≥ 75%
<b>Overall Percent Error</b>	7.9	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 6 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	569 m/ 0.0235m
Maximum Intensity (%)	98
Integration Time (ms)	30

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	100	119	19
2	100	117	17
3	100	99	1
4	100	145	45
5	100	109	9
<b>Averages</b>	100	118	18.2

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	82.9	≥ 75%
<b>Overall Percent Error</b>	18.2	≤ 30%

<b>Notes:</b>
Calibration verification passed.

 Operator's Signature ..... *Katia Liangou*

 Witness's Signature ..... *James Garrett*

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 3/12/26  
 Instrument Model: UV Bi Path 6 Instrument Serial Number: \_\_\_\_\_

Instrument Parameters	
Optical Path Length (meters)	569 m/ 0.0235m
Maximum Intensity (%)	98
Integration Time (ms)	30

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	Benzene Concentration (PPM)	Measured Concentration (PPM)	Error (%)
1	200	202	1
2	200	181	9.5
3	200	182	9
4	200	203	1.5
5	200	139	30.5
<b>Averages</b>	200	181	10.3

<b>Form Title:</b> UVDOAS Calibration Form	<b>Implementation Date:</b> July 10, 2024
<b>Document Number:</b> 331AA-OPS-FM-13	<b>Form Owner (Department):</b> MAQS
<b>Revision Number:</b> Rev. 0	<b>Form Approval:</b> Katia Liangou

	Calculated Values	Expected Values
<b>Overall Percent Precision</b>	87	≥ 75%
<b>Overall Percent Error</b>	10.3	≤ 30%

<b>Notes:</b>
Calibration verification passed.

Operator's Signature ..... *Katia Liangou*

Witness's Signature ..... *James Garrett*



**Air Monitoring Program Audit Report  
First Quarter 2026 Performance Audit  
Collins Aerospace  
Pueblo, Colorado  
Meteorological Tower Met 1**

Prepared For:

**Collins Aerospace**

50 William White Blvd.

Pueblo, CO 81001

Prepared By:

**Montrose Air Quality Services, LLC**

9100 2nd ST NE, Suite 200

Albuquerque, Colorado 87114

Audit Date: January 28, 2026

Submittal Date: February 06, 2026

## Table of Contents

<u>Section</u>	<u>Page</u>
Executive Summary.....	1
1.0 Introduction.....	3
2.0 Performance Results.....	5
3.0 Summary and Recommendations.....	11
Appendix A EPA Accuracy Criteria and Manufacturer's Specifications	
Appendix B Audit Procedures	
Appendix C Audit Field Logs	
Appendix D Audit Equipment Certifications	

## Executive Summary

Montrose Air Quality Services (MAQS) conducted a field performance audit on the meteorological tower at Collins Aerospace on January 28, 2026. The tower is located in Pueblo, Colorado, and measures wind direction, wind speed, temperature, precipitation, relative humidity, solar radiation and barometric pressure.

Site coordinates for the meteorological tower are provided in Table E.1 and the tower location is shown in Figure E.1.

**Table E.1 Site Information for Collins Aerospace Meteorological Tower**

Site ID	North Latitude, deg	West Longitude, deg	Elevation, feet
Met 1	38.278918	-104.518169	4,647

Brief results summaries are presented in the following text.

Wind Direction: Sensor responded within audit criteria for torque, linearity. Sensor responded outside of audit criteria for alignment.

Sigma Theta: Sigma theta test responded within audit criteria.

Wind Speed: Sensor responded within audit criteria for the synchronous motor and the bearing torque tests.

Temperature: Sensors responded within audit criteria.

Realative Humidity: Sensor responded within audit criteria.

Barometric Pressure: The sensor responded within audit criteria.

Figure E.1 Collins Aerospace Met Tower Location



## **1.0 Introduction**

Montrose Air Quality Services (MAQS) conducted a field performance audit on the Collins Aerospace Met 1 meteorological tower on January 28, 2026. The purpose of the performance audit was to check the accuracy of the meteorological sensors against calibrated equipment.

The Collins Aerospace meteorological tower is located on Collins Aerospace property in Pueblo, Colorado. MAQS provided the auditor and audit assistant for the field audit. MAQS provided all test instrumentation and tools required to conduct audits of each sensor. The above measures ensure the requirements for independence as specified by the EPA Quality Assurance Guidelines.

The Collins Aerospace meteorological station collects data for wind direction, wind speed, temperature, relative humidity, and barometric pressure. Table 1.1 details the parameters measured at the tower, along with technical details of sensor placement and specifications.

**Table 1.1 Collins Aerospace Meteorological Sensors Technical Data**

<b>Parameter</b>	<b>Sensor Height Above Ground Level, m</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Operating Range</b>
Wind Direction	2.0	Met One	020D	D16687	0° to 360°
Wind Speed	2.0	Met One	010C	D16127	0 m/s to 50 m/s
Temperature	1.5	Met One	065	D15976	-30°C to 50°C
Relative Humidity	1.5	Met One	083F-0-35	D14161	0% to 100%
Barometric Pressure	1.0	Met One	092	C18609	600 – 1100 mbar

The procedures followed by the auditors conform to those specified in the following technical references:

- Title 40 CFR, Part 58, Appendix B: Quality Assurance Requirements for Prevention of Significant Deterioration (PSD) Air Monitoring
- EPA Quality Assurance Handbook for Air Pollution Measurement Systems: “Volume IV: Meteorological Measurements Version 2.0” (EPA-454/B-08-002, March 2008)

Each meteorological sensor was evaluated based on the comparison of performance versus the guidelines above.

The audit results and supporting documentation are presented in the remainder of this report. Section 2.0 presents the detailed sensor readings, audit values, and accuracy criteria. Section 3.0 presents a summary of results and recommendations for the meteorological tower. Appendix A contains the criteria used to determine the accuracy of response of each sensor, per EPA PSD criteria and manufacturer’s specifications. Quality assurance procedures are contained in Appendix B. The audit field logs are presented in Appendix C. The audit equipment calibration certifications are located in Appendix D.

## 2.0 Performance Results

The following tables present the performance results for each sensor at the Collins Aerospace Met 1 tower.

**Table 2.1 Wind Direction Linearity and Torque**

Data Point	Calibration Wheel Direction, deg	Sensor Output, deg	Difference <sup>1</sup> , deg	CW Bearing Torque <sup>2</sup> , g-cm	CCW Bearing Torque <sup>2</sup> , g-cm
1	0	3	-	< 3	< 3
2	30	33	0		
3	60	64	1		
4	90	94	0		
5	120	124	0		
6	150	154	0		
7	180	184	0		
8	210	214	0		
9	240	245	1		
10	270	275	0	<b>Slope:</b>	1.0108
11	300	306	1	<b>Intercept:</b>	9.1282
12	330	336	0	<b>R<sup>2</sup>:</b>	0.9999

Notes: <sup>1</sup> The difference at a given data point (n) is calculated as  

$$[\text{Sensor Output at Data Point (n+1)}] - [\text{Sensor Output at Data Point (n)}] - 30^\circ,$$
 where 30° represents the ideal difference between each sequential Data Point. Acceptance criteria is  $\pm 5^\circ$

<sup>2</sup> Acceptance criteria is  $\leq 6.45$  g-cm

**Table 2.2 Wind Direction Alignment Accuracy**

Reference Point	Audit Output, deg	Sensor Output, deg	Difference <sup>1</sup> , deg	Acceptance Criteria, deg	Magnetic Declination, deg
Cross Arm	10	9	-1	± 5	8.1
Reciprocal	190	190	0	± 5	8.1
Method Used for Audit Wind Direction Bearing:			<input checked="" type="checkbox"/> Compass <input type="checkbox"/> Transit/Compass <input type="checkbox"/> Transit/Solar Angles		

Note: <sup>1</sup> Difference = (Sensor Output) – (Audit Output).

**Table 2.3 Sigma Theta of Wind Direction**

Start-End Times:	1232-1233
Sigma Theta	
Sensor Output, deg	15.10
Calculated, deg	15.50
<b>Difference (Sensor – Calculated), deg</b>	<b>-0.4</b>
Acceptance Criteria, deg	± 5
Average Wind Direction	
Sensor Output, deg	19.01
Calculated, deg	18.50
<b>Difference (Sensor – Calculated), deg</b>	<b>0.51</b>
Acceptance Criteria, deg	± 5

**Table 2.4 Wind Speed Synchronous Motor and Torque Test**

Synchronous Motor Test					Bearing Torque Test		
Audit Motor Speed, rpm	Expected Speed, m/s	Sensor Speed, m/s	Difference <sup>1</sup> , %	Acceptance Criteria	CW Torque, g-cm	CCW Torque, g-cm	Acceptance Criteria, g-cm
0	0.27	0.27	0.00	0.25 m/s at wind speeds < 5 m/s	< 0.2	< 0.2	≤ 0.216
600	16.27	16.27	0.00	± 5% at wind speeds ≥ 5 m/s			
1800	48.23	48.27	-0.08				

Note: <sup>1</sup> Percent difference = [(Sensor Speed – Expected Speed)/Expected Speed] \*100%

**Table 2.5 Temperature**

Type of Comparison	Collocated Audit Thermometer Output, °C	Sensor Output, °C	Difference (Sensor – Audit), °C	Acceptance Criteria, °C
1	10.8	10.8	0.0	± 1.0
2	10.2	10.7	0.5	± 1.0
3	10.4	10.8	0.4	± 1.0

**Table 2.11 Relative Humidity**

<b>Repetition Number</b>	<b>Collocated Audit Output, %RH</b>	<b>Sensor Output, %RH</b>	<b>Absolute Difference, %RH</b>	<b>Acceptance Criteria, %RH</b>
1	860.3	861.0	3.0	± 7
2	860.3	861.0	2.8	± 7
3	860.3	861.0	2.6	± 7

**Table 2.13 Barometric Pressure**

<b>Repetition Number</b>	<b>Audit Pressure, mbar</b>	<b>Sensor Pressure, mbar</b>	<b>Absolute Difference, mbar</b>	<b>Acceptance Criteria, mbar</b>
1	860.3	861.0	0.7	± 3.0
2	860.3	861.0	0.7	± 3.0
3	860.3	861.0	0.7	± 3.0

### **3.0 Summary and Recommendations**

Below is a summary of the results of Collins Aerospace meteorological tower performance audit and recommendations:

**Wind Direction:** Sensor responded within audit criteria for torque, linearity. Sensor responded outside of audit criteria for alignment. Sensor was realigned to within audit criteria. No recommendations at this time.

**Sigma Theta:** Sigma theta test responded within audit criteria. No recommendations at this time.

**Wind Speed:** Sensor responded within audit criteria for the synchronous motor and the bearing torque tests. No recommendations at this time.

**Temperature:** Sensors responded within audit criteria. No recommendations at this time.

**Realative Humidity:** Sensor responded within audit criteria. No recommendations at this time.

**Barometric Pressure:** Sensor responded within audit criteria. No recommendations at this time.

**Appendix A**  
**EPA Accuracy Criteria and Manufacturer's Specifications**

Table A.1 contains the EPA PSD accuracy criteria and manufacturer's specifications used to determine the accuracy of each sensor response.

**Table A.1 Summary of Accuracy Criteria and Manufacturers Specifications**

Parameter	PSD / Modeling Criteria	Manufacture Specifications (Varies Depending on Model)
Horizontal Wind Direction		
Accuracy	$\pm 5^\circ$	--
Bearing Torque	--	$\leq 6.45$ gram-cm
Sigma Theta of Wind Direction	$\pm 5^\circ$	--
Horizontal Wind Speed		
Accuracy	$\pm 0.25$ m/s at wind speeds $< 5$ m/s  $\pm 5\%$ at wind speeds $\geq 5$ m/s  (Maximum error 2.5 m/s)	--
Bearing Torque	--	$\leq 0.216$ gram-cm
Temperature	$\pm 1$ °C	--
Relative Humidity	$\pm 7\%$	--
Barometric Pressure	$\pm 3.0$ mbar	--

**Appendix B**  
**Audit Procedures**

## **Quality Assurance Procedures for Meteorological Stations**

Each meteorological sensor is evaluated based on the comparison of performance versus the EPA guidelines and manufacturer specifications. If any performance values are outside the recommended ranges, the results are immediately reported to field personnel so that any field repair and/or re-calibrations can be performed expeditiously. The formal written report will include these results for documentation purposes.

Each meteorological sensor is calibrated using procedures specifically designed to test its accuracy of response. General descriptions are given below. The procedures used by MAQS to audit the meteorological sensors reflect the requirements described in the EPA Quality Assurance Handbook for Air Pollution Measurement Systems: "Volume IV: Meteorological Measurements Version 2.0."

Upon arrival at the site, each variable is observed for reasonableness. Next the appropriate channels are taken offline and the audit manipulations to each sensor are conducted. While manipulating each sensor, the data logger sensor outputs are recorded and compared to audit input values. If the bias between the audit and site values exceeds the prescribed limits, the appropriate troubleshooting is conducted to determine the cause of the discrepancy. At the completion of the field performance audit, the sensors are put back on line and are checked for reasonableness.

### **B.1 Check of Sensor Heights**

The height of each sensor above ground is measured with a standard tape measure. The auditor may use a tripod mounted transit in conjunction with a tape measure for taller towers. The measured heights are then compared to those stated in the air monitoring program plan.

### **B.2 Wind Direction**

#### **B.2.1 Vane Calibration**

The wind vane orientation marker's stated azimuth is checked using the following technique. The solar azimuth angle technique is used to determine a known direction (solar azimuth). This measurement is conducted using a surveyor's transit mounted either on a field tripod or directly onto the wind direction sensor mounting plate. The auditor records the solar azimuth, elevation, date and time to verify accuracy. The auditor determines solar azimuth (sun angle) in degrees from true north based on solar ephemeris tables. The solar tables are specific to the site for current date and time. The transit is then used to measure the angle to a local topographical point or the sensor on the crossarm. This point will become the reference marker. The difference between that value and the known solar azimuth is used to determine a calculated azimuth angle for the reference marker. The now known azimuth for the reference marker is then used in a like manner to determine the orientation of the set pin of the sensor mounting plate. The solar azimuth check is normally done only once to establish a known direction for measurement of the orientation of the reference marker. A minimum of two reference points are taken for this test. In the event the solar azimuth angle technique cannot be used or simultaneous compass readings have been verified, the azimuth angles will be measured with compass bearings.

For determining compass bearings, the auditors utilize a Brunton pocket transit to measure the azimuth of each wind direction cross arm. The pocket transit compass is set to the local magnetic declination in degrees to establish the cross arm bearing from true north.

The wind direction sensor azimuth bearings are recorded with the wind vane aligned with the cross arm in both directions. The sensor outputs are compared to the measured true north bearings to determine accuracy.

### **B.2.2 Sensor Linearity and Overall Accuracy**

The wind sensor's ability to measure winds from any direction is tested by visually aligning the sensor with the reference markers established above. The sensor output values from the data logger are recorded and compared to the previously determined azimuths. An additional check for accuracy is conducted by checking the cross-arm alignment to ensure further accuracy. In order to perform the cross-arm alignment, the wind vane is aligned with the cross arm and the corresponding sensor output is recorded.

The horizontal wind direction sensor is checked for accuracy of response by aligning the wind vane with the crossarm. The crossarm bearings are measured with a pocket transit compass set to a local magnetic declination in degrees to establish the cross arm bearing from true north.

Sensor linearity is checked by removing the wind vane and replacing the vane with a protractor and vane angle fixture whenever available and is the preferred method. The sensor will be manipulated on the vane angle fixture and protractor at 30-degree intervals. The sensor manipulation will start at the zero-degree value and end at the 360-degree value for a total of twelve points.

### **B.2.3 Sigma Theta Test**

The wind direction sigma theta check is a test of the data logger sigma theta calculation. Any system errors attributable to the program algorithm and/or the signal from the sensors would be detected in the sigma theta output to the data logger. The sigma theta test is conducted by fixing the wind vane at a given direction for a given period of time and then moving the vane approximately 30 degrees for the same period of time. This interval is selected to correspond to one averaging period of the data logger. During this time, the wind speed sensor is set to a constant non-zero output on the logger. Installations that have a zero (0.0) wind speed output when the cups are removed will be set at a constant rotation of 300 to 600 rpm depending on the sensor transfer standard. Sensor output of the sigma theta and average wind direction are recorded from the data logger and compared to the expected calculated values.

### **B.2.4 Starting Threshold Torque**

The wind vane's starting threshold torque is measured using a NIST calibrated torque gauge. The gauge is applied to the wind vane shaft at the sensor's center of rotation and then a constant force is applied. The test is repeated 3-4 times, beginning at different points for a 360-degree rotation. The highest value (grams-cm) observed during the test is recorded as the torque of the sensor.

## **B.3 Horizontal Wind Speed**

### **B.3.1 Sensor Calibration**

The sensor is audited by removing the anemometer cups and applying a constant rate of rotation in the normal direction of spin, using a synchronous motor. This is done by connecting the motor shaft to the anemometer shaft using a non-rigid, non-slip connector. Using the anemometer specifications, the rpm is converted to wind speed and is compared to the sensor instantaneous output values recorded by the data logger.

### **B.3.2 Starting Threshold Torque**

The starting threshold torque measurement of the anemometer shaft follows the same procedure as that described for the horizontal wind direction. Due to the lower resistance of the wind speed sensor, a more sensitive torque watch is used.

### **B.4 Temperature**

The tower-mounted temperature sensor is audited using a single point ambient collocation with a NIST-traceable digital thermometer. This thermometer has a range of -40 to 150 °C in 0.1 °C graduations. The equilibrated thermometer reading is compared to the instantaneous sensor output on the data logger. In addition, the aspirator is checked for proper ventilation by inspecting operation of the fans, if applicable, and checking the air pathway for obstructions.

### **B.5 Relative Humidity**

The relative humidity sensor is checked for accuracy with a collocated digital sensor. The collocated test is performed by placing a second relative humidity sensor adjacent to and at the same level as the sensor located on the tower. The collocated sensor is carefully placed to match the exposure and setting of the tower sensor.

**Appendix C**  
**Audit Field Logs**



## Wind Direction Audit Log

Client: Collins Aerospace		Site: Met 1		Date: 28-Jan-26	
Sensor Manufacturer: Met One		Height: 2	Model: 020D	S/N: D16687	
Start Time:			Stop Time:		
<b>Bearing Check</b>		Torque Watch Manufacturer:			
Clockwise: < 3.0		Counter Clockwise: < 3.0		Acceptable Reading: ≤ 6.45	
<b>Solar Reference/Azimuth Check</b>					
<b>Reference Point</b>	<b>Compass Degrees</b>	<b>Sensor Output (Degrees)</b>	<b>Solar Angle/Azimuth</b>	<b>Degrees Difference</b>	
Cross Arm Align.	10	9		-1	
Reciprical	190	190		0	

### Sigma Theta Test

Datalogger Start Time: 1232		Sensor Output: 3		Wheel Output: 0	
Datalogger Stop Time: 1233		Sensor Output: 34		Wheel Output: 30	
Sigma Theta Sensor: 15.10		Sigma Theta Calc: 15.50		Avg. WD Sensor: 19.01	
				Avg WD Calc: 18.50	

### Linearity Check

Dial	Degrees	Delta Degrees	Dial	Degrees	Delta Degrees
0	3	-	210	214	0
30	33	0	240	245	1
60	64	1	270	275	0
90	94	0	300	306	1
120	124	0	330	336	0
150	154	0	360	3	-3
180	184	0	r = 0.9999	m = 1.0084	b = 2.9487

### Data Verification Check

### Verified By:

Datalogger Start Time (MST)	Datalogger Stop Time (MST)	Avg. Wind Direction Sensor	Avg. Wind Direction Database



## Wind Speed Audit Log

Client: Collins Aerospace	Site: Met 1	Date: 28-Jan-26	
Sensor Manufacturer: Met One	Height: 2	Model: 010C	S/N: D16127
Start Time:		Stop Time:	

<b>Bearing Check</b>	<b>Torque Watch Manufacturer:</b>		
Clockwise: < 0.2	Counter Clockwise: < 0.2	Acceptable Reading: ≤ 0.216	

<b>Synchronous Motor Test</b>					
RPM	AC Frequency of Motor	Sensor Output (volts)	Sensor Output (m/s)	Expected Output (m/s)	Percent Difference (sensor-exp)/exp
0.0			0.27	0.27	0.00
100					
300					
600			16.27	16.27	0.00
900					
1200					
1500					
1800			48.23	48.27	-0.08

<b>Synchronous Motor</b>			
Manufacturer:	Model No.:	S/N:	Date of Last Calibration:

<b>Data Verification Test</b>			
Time of Test	Max Wind Speed	Max Wind Speed (DB)	Verified By



## Temperature Co-Located Audit Log

Client: Collins Aerospace	Site: Met 1	Date: 28-Jan-26	
Sensor Manufacturer: Met One	Height: 1.5	Model: 065	S/N: D15976
Start Time:		Stop Time:	

### Co-Located Test

	Repetition #1	Repetition #2	Repetition #3	Repetition #4
Time				
Co-Located NIST (A)	10.8	10.2	10.4	
Sensor Output °C (B)	10.8	10.7	10.8	
Difference % (B-A)	0.0	0.5	0.4	
Does temperature sensor contain a motorized Aspirator:                      Yes                      No                      N/A				

### Time Averaged Test

Start Time	End Time	Audit Average RH %	Sensor Average RH %	Measured Difference %

### Auditor Notes and Comments



## Relative Humidity Co-Located Audit Log

Client: Collins Aerospace	Site: Met 1	Date: 28-Jan-26	
Sensor Manufacturer: Met One	Height: 1.5	Model: 083F-0-35	S/N: D14161
Start Time:		Stop Time:	

### Co-Located Test

	Repetition #1	Repetition #2	Repetition #3	Repetition #4
Time				
Co-Located NIST (A)	15.2	15.2	15.2	
Sensor Output % (B)	18.2	18.0	17.8	
Difference % (B-A)	3.0	2.8	2.6	
Does temperature sensor contain a motorized Aspirator:                      Yes                      No                      N/A				

### Time Averaged Test

Start Time	End Time	Audit Average RH %	Sensor Average RH %	Measured Difference %

### Auditor Notes and Comments



## Barometric Pressure Audit Log

Client: Collins Aerospace	Site: Met 1	Date: 28-Jan-26	
Sensor Manufacturer: Met One	Height: 1	Model: 092	S/N: C18609

NIST Barometer Comparison		
Field Barometer Manufacturer:	Model:	S/N:
Date of last comparison to NIST Barometer:		

Co-Located Ambient Test			
Time	Audit Pressure (A)	Sensor Pressure (B)	Absolute Difference
	860.3	861.0	0.7
	860.3	861.0	0.7
	860.3	861.0	0.7

Auditor Calculations

Auditor Comments and Notes

**Appendix D**  
**Audit Equipment Certifications**

**Instrument Service Laboratories**

8340 Washington Street NE  
Albuquerque, New Mexico 87113  
Phone (505) 842-1107 FAX (505) 842-9329

**I  
S  
L**

**CERTIFICATE of CALIBRATION**

Report No. 118520

Page ( 1 of 2 )

Submitted by :

MONTROSE AIR QUALITY SERVICES  
3500 COMANCHE RD NE  
ALBUQUERQUE, NM 87107  
PO#080949

**Description**

SPEED CALIBRATOR

Manufacturer YOUNG	Model No. 18802 / 18820A
Serial No. CA03127/CA03127	Inventory No. NONE
As Received: Instrument was :  Within Tolerance	As Returned: Instrument was :  Within Tolerance Specifications  Limitations : NONE
Comments :  <input checked="" type="checkbox"/> No adjustment required <input type="checkbox"/> Adjustment(s) required  <input type="checkbox"/> Functional repairs required	Calibration Environment  Procedure : ISL/YNG18802.001  Temperature : 71 ° Humidity : 28 %
Calibration Date : February 28, 2025	Recall Date : February 28, 2026

Instrument Service Laboratories certifies that the above listed instrument was calibrated in compliance with the requirements of MIL-STD 45662A and ANSI/NCCL Z540-1-1994. Instrument Service Laboratories measurement standards are traceable to the National Institute of Standards and Technology (NIST). Unless specifically noted, the calibration procedures used provide for a measurement uncertainty of less than or equal to one quarter of the specification of the instrument under test.

This report shall not be duplicated except if in full or written approval of Instrument Service Laboratories.

S. Linde Technician  
Certified by



**Instrument Service Laboratories**

8340 Washington Street NE  
Albuquerque, New Mexico 87113  
Phone (505) 842-1107 FAX (505) 842-9329

**I  
S  
L**

**CERTIFICATE of CALIBRATION**

Report No. 118522

Page ( 1 of 2 )

Submitted by :

MONTROSE AIR QUALITY  
3500 COMANCHE RD NE  
ALBUQUERQUE, NM 87107  
PO# 080949

**Description**

TEMP/HUMIDITY SENSOR

Manufacturer VAISALA	Model No. MI70/HMP75
Serial No. A4110035/A4220004	Inventory No. NONE
As Received: Instrument was :  Within Tolerance	As Returned: Instrument was :  Within Tolerance Specifications  Limitations : _____
Comments : <input checked="" type="checkbox"/> No adjustment required <input type="checkbox"/> Adjustment(s) required  <input type="checkbox"/> Functional repairs required	Calibration Environment  Procedure : ISL/VAIMI70.001  Temperature : 70 ° Humidity : 26 %
Calibration Date : March 14, 2025	Recall Date : March 14, 2026

Instrument Service Laboratories certifies that the above listed instrument was calibrated in compliance with the requirements of MIL-STD 45662A and ANSI/NCCL Z540-1-1994. Instrument Service Laboratories measurement standards are traceable to the National Institute of Standards and Technology (NIST). Unless specifically noted, the calibration procedures used provide for a measurement uncertainty of less than or equal to one quarter of the specification of the instrument under test.

This report shall not be duplicated except if in full or written approval of Instrument Service Laboratories.

P. Linde Technician  
Certified by



## CALIBRATION CERTIFICATE

### Instrument Details

Instrument: Handheld Digital Barometer  
Serial Number: 1825000048  
Calibration Certificate No: 250221-2P

Model No: ZM202N-A10038  
NovaLynx P/N: 230-M202

### Customer Details

Montrose Air Quality Services

RA# 502901 Ref PO# PO-080176

### Environmental Details

Temperature: 23°C

Relative Humidity: 37%

Barometric Pressure: 925 hPa (mb)

Calibration/Checking Procedure: Document 230-M202-A06

Date Received: Feb. 19, 2025

Cal Date: Feb. 21, 2025

### Calibration Results , after adjustment

Test Value millibars (mb)	Expected Value	Observed Reading millibars (mb)	Acceptable Limit
650.0 mb	650.0 mb	650.1 mb	± 0.2 mb
750.0 mb	750.0 mb	750.1 mb	± 0.2 mb
850.0 mb	850.0 mb	850.1 mb	± 0.2 mb
925.0 mb	925.0 mb	925.0mb	± 0.2 mb
1050.0 mb	1050.0 mb	1049.9 mb	± 0.2 mb

**Comments:** Unit was received in mb and calibration testing was done in mb for best resolution. The As Received Readings were compared to the Standards for Actual Pressure. The AS Found readings were reading were 0.6 mb high, Verified Original Factory Zero Settings, A minor adjustment was needed to correct the readings. All readings are now within tolerance .

The M202 Batteries Tested Ok at 1.46 Volts ~

This device has been tested with the following calibration devices:

Fluke Model 87 SN50501646 | ZM2000-A1000 SN2029000030  
Cal Due: January 11, 2026 | Cal Due: Sept. 18, 2025

All calibration standards have an accuracy ratio of 2:1 or better unless otherwise stated.  
Calibration performed at the NovaLynx Factory, Grass Valley, CA.

NovaLynx Corporation certifies that the above referenced products were calibrated and tested using standards whose calibrations are traceable to the National Institute of Standards and Technology. Work was completed according to the manufactures calibration procedures and specifications and complies with ANSI-Z540 and Former MIL-STD-45662A. This report shall not be reproduced except in full without the written approval of NovaLynx Corporation.

Technician:

  
William Begg, Service Manager, NovaLynx

Date: February 21, 2025