Quarterly Report for Phillips 66 Denver Terminal Fenceline Monitoring Plan-Q4 2025

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MONTROSE AIR QUALITY SERVICES

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II. Executive Summary

This report summarizes the findings related to the Phillips 66 fenceline monitoring plan during the period of October 1st of 2025 to December 31st of 2025 (Q4 of 2025). The data collected during this period were validated following all procedures described in the Phillips 66 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

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IV. Methods

A. Site Description

Phillips 66 operates a bulk fuel storage and distribution terminal at 3960 East 56th Avenue, Commerce City (Adams County), Colorado. Gasoline, Ethanol, Jet and Diesel fuel products are received from a pipeline and are stored and distributed to market by tank trucks. The principal components of the facility are as follows:

- Gasoline aboveground storage tanks
- Butane aboveground storage tanks
- Jet aboveground storage tanks
- Diesel aboveground storage tanks
- Additive aboveground storage tanks
- Ethanol aboveground storage tank
- Vapor combustor unit (VCU)

The facility lies in an industrial area near the Suncor refinery, another bulk terminal, two asphalt plants, a wastewater treatment facility and other nearby industrial sources of Covered Air Toxics.

B. Instrument Description

1. Open-Path Monitors

The Phillips 66 Denver Terminal 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 Phillips 66 open-path system will consist of four analyzers at the locations shown in Figure 1 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 Phillips 66 Denver Terminal 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, 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.

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. Thus, only the light-source/detector end of the monitoring path requires substantial power, communications equipment, and a large shelter.

The Phillips 66 Denver Terminal 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[1], 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 can achieve 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 once again been selected to reduce the need for substantial power at the retroreflector sites and improve detection limits by increasing effective path lengths.

The Phillips 66 Denver Terminal uses the LasIR™ Fence Line Monitoring Gas Analyzer manufactured by Unisearch Associates Inc. for the monitoring of Hydrogen Sulfide and Hydrogen Cyanide.[1] 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 utilizing 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 instrumentation is installed on a 10m, heavy-duty aluminum tower. The 3-sided, open latticework tower is fabricated using a high-strength aluminum alloy in three 10-foot sections and is engineered for the specified wind load per EIA RS-222G. The tower is designed not to twist, rotate or sway, providing a rigid platform for mounting the sensors. It features hinged base leg brackets that permit the tower to be pivoted down into a horizontal position for easy servicing of the sensors. The tower incorporates a lightning rod with a full height ground cable and ground rod.

The meteorological monitoring tower is located at the west end of the Phillips 66 property. This tower is outfitted with high quality meteorological instruments as outlined in Table 1 and is capable of continuous and accurate 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 anytime from anywhere. The specific meteorological instruments chosen meet EPA specifications for accuracy,

[1] These two compounds are neither used, stored, nor are they emitted from the Phillips 66 Denver Terminal. Therefore, the facility does not have the potential to emit either of these compounds, which comprise "Covered Air Toxics" under HB21-1189. In the event an Alert Threshold (Table 1-2 of the Fenceline Monitoring Plan) for either of these compounds is monitored, the monitored concentrations will be assigned a NS qualifier code and attributed to one or more of the near-by facilities described in Section 2.1 and Table 2-1 of the Fenceline Monitoring Plan titled "Other Industrial Facilities near the Phillips 66 Facility".

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 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 (^{o}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 utilizes four primary shelters to house the open path analyzers, identified as the orange and blue pins in Figure 1. Each orange pin shelter houses one (1) monostatic open-path tunable diode laser 4-channel H_2S (TDL) analyzer, one (1) monostatic open-path tunable diode laser 4-channel HCN (TDL) analyzer, and two (2) monostatic open-path ultraviolet differential optical absorption (UV-DOAS) analyzers. Each blue pin shelter houses one (1) fiber optic line from the monostatic open-path tunable diode laser 4-channel H_2S (TDL) analyzer in the orange pin shelter, one (1) fiber optic line from the monostatic open-path tunable diode laser 4-channel HCN (TDL) analyzer in the orange pin shelter, and one (1) monostatic open-path ultraviolet differential optical absorption (UV-DOAS) analyzer.

Each open-path analyzer location has multiple paths identified numerically 1 through 6. At the end of each path there is a retroreflector opposite the analyzer. For example, the line from the analyzer shelter to the retroreflector forms the path. 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.

For the hydrogen cyanide[2] and hydrogen sulfide[2] northwest path (Path 6) and northeast path (Path 1), laser light is transmitted from the most local orange pinned shelters under or above ground via fiber optic cable to the blue pinned shelters, then transmitted above ground to monitor the northwest path (Path 6) and northeast path (Path 1). The laser light reflects to a telescope mounted on the northwest path (Path 6) and northeast path (Path 1) instrument shelters then transmits back underground to the detector in the most local orange pinned shelter that the laser light originated from.

This monitoring program also includes meteorological monitoring as required in HB21-1189. Meteorological monitoring allows for the characterization of wind patterns for understanding the movement of the three covered air toxins and potential sources of emissions, and whether they are from the Phillips 66 bulk terminal or a neighboring facility. Since the Phillips 66 Denver Terminal does not store, emit, nor have the potential to emit hydrogen cyanide or hydrogen sulfide, the source of any potential detection by the Phillips 66 fenceline monitoring system will likely indicate emissions from a neighboring facility or source. A 10-meter meteorological tower will be installed near the Path 6 instrument shelter (Figure 1), so that power can be shared.

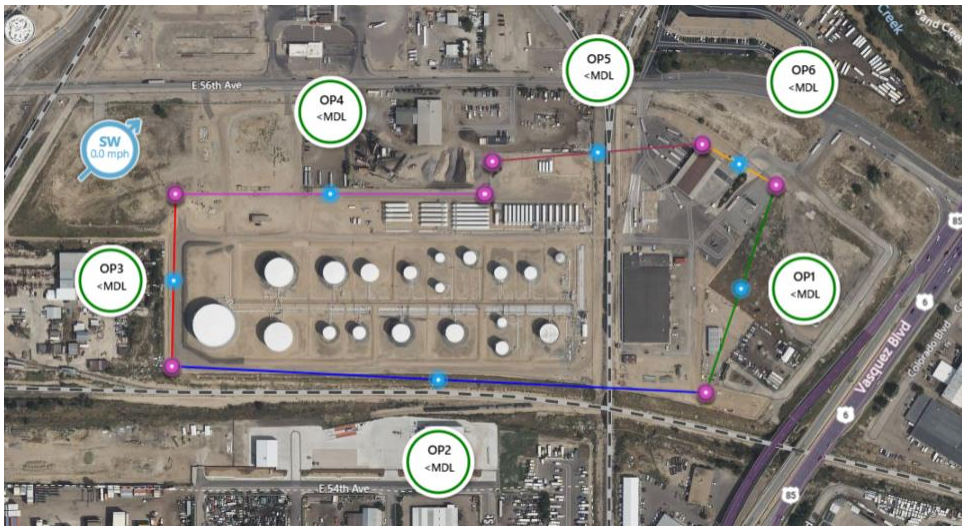

Figure 1: Approximate Layout of the Open-Path Analyzers, Retroreflector Locations, and Meteorological Station

[2] These two compounds are neither used, stored, nor are they emitted from the Phillips 66 Denver Terminal. Therefore, the facility does not have the potential to emit either of these compounds, which comprise "Covered Air Toxics" under HB21-1189.

Table 2: Descriptions of Each Individual Path

Path	Path Length	Compounds
1	226 meters	Hydrogen sulfide Hydrogen cyanide Benzene
2	550 meters	Hydrogen sulfide Hydrogen cyanide Benzene
3	165 meters	Hydrogen sulfide Hydrogen cyanide Benzene
4	315 meters	Hydrogen sulfide Hydrogen cyanide Benzene
5	222 meters	Hydrogen sulfide Hydrogen cyanide Benzene
6	138 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

Instrument	Automated Quality Control Parameter	Definition	Units	Evaluation criteria
UV-DOAS	MDL	Minimum detection limit	PPB	< 25% of alert threshold
	R^2	Percentage peak match	%	> 64
	Signal intensity	Signal intensity at full scale	%	> 40
	UV spectrometer temperature		^oC	35
TDL	MDL	Minimum detection limit	PPB	< 25% of alert threshold for all paths except H2S Paths 3,4 and 6 where the threshold is set to <50% of alert threshold
	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: ≤ 30% of reference gas value Precision: ± 25%
Baseline Stability	Continuous	± 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% 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: ≤ 30% of reference gas value Precision: ± 25%

Baseline Stability	Continuous	± 5%
Signal intensity (Absolute Power)	Continuous	>0.1 mA
Robustness	Continuous	Compound MDL < 25% of alert threshold for all paths except H2S Paths 3,4 and 6 where the threshold is set to <50% of alert threshold

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 Montrose’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 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 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 fenceline 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[1]	0th[2]	25th[2]	50th[2]	75th[2]	100th[2]	Avg	Pct Detect[3]	Pct Valid[4]	Median 1hr DL[5]
Oct-25	1	Benzene	0	0.22	0.66	0.92	1.33	26.31	1.17	3.39%	99.17%	1.27
Nov-25	1	Benzene	0	0.22	0.51	0.71	1.04	11.38	0.90	16.09%	98.90%	0.86
Dec-25	1	Benzene	0	0.26	0.71	0.98	1.51	38.20	1.32	14.97%	93.80%	1.19
Oct-25	1	H2S	0	0.42	4.03	6.81	10.88	54.67	8.55	0.05%	98.03%	9.71
Nov-25	1	H2S	0	0.52	2.94	4.85	8.25	46.22	6.78	0.00%	99.47%	6.92
Dec-25	1	H2S	0	0.40	3.18	5.16	8.54	54.05	7.11	0.01%	87.33%	7.36
Oct-25	1	HCN	0	0.01	0.18	0.34	0.67	12.60	0.75	0.01%	99.52%	0.48
Nov-25	1	HCN	0	0.01	0.29	0.73	1.83	12.05	1.34	0.00%	94.82%	1.05
Dec-25	1	HCN	0	0.01	0.34	1.09	2.40	10.64	1.59	0.00%	90.37%	1.57
Oct-25	2	Benzene	0	0.01	0.03	0.04	0.05	0.11	0.04	0.00%	81.79%	0.06
Nov-25	2	Benzene	0	0.00	0.03	0.04	0.05	0.65	0.05	0.00%	100.00%	0.06
Dec-25	2	Benzene	0	0.00	0.06	0.08	0.10	0.23	0.08	0.00%	96.91%	0.11
Oct-25	2	H2S	0	0.67	10.50	15.13	23.62	73.01	18.20	0.78%	84.21%	21.34
Nov-25	2	H2S	0	2.15	10.52	14.82	21.53	71.02	17.17	36.59%	82.65%	21.12
Dec-25	2	H2S	0	0.87	9.37	14.46	22.93	57.96	17.25	0.77%	88.75%	20.47
Oct-25	2	HCN	0	0.02	0.08	0.13	0.32	3.20	0.26	0.59%	99.46%	0.18
Nov-25	2	HCN	0	0.01	0.09	0.20	0.60	4.01	0.44	1.15%	95.46%	0.28
Dec-25	2	HCN	0	0.01	0.13	0.50	0.95	6.09	0.70	1.73%	95.21%	0.70
Oct-25	3	Benzene	0	0.20	0.43	0.61	0.96	36.08	0.99	12.53%	99.57%	0.76
Nov-25	3	Benzene	0	0.18	0.38	0.49	0.72	13.19	0.74	18.42%	99.79%	0.62
Dec-25	3	Benzene	0	0.24	0.54	0.78	1.25	90.36	1.36	13.63%	97.51%	0.97
Oct-25	3	H2S	0	1.60	15.47	25.76	43.07	149.41	31.75	1.64%	81.94%	37.24
Nov-25	3	H2S	0	2.38	15.21	25.47	43.98	127.07	31.56	1.55%	78.13%	36.71
Dec-25	3	H2S	0	1.88	9.80	15.46	23.84	90.52	19.30	0.15%	95.28%	22.04
Oct-25	3	HCN	0	0.02	0.42	2.19	4.29	12.75	2.68	2.96%	98.79%	2.96
Nov-25	3	HCN	0	0.10	2.98	4.21	5.67	13.12	4.49	5.09%	95.16%	5.65
Dec-25	3	HCN	0	0.38	2.79	3.81	5.29	12.77	4.21	5.64%	94.98%	5.02
Oct-25	4	Benzene	0	0.11	0.43	0.64	0.96	138.81	1.36	5.25%	99.15%	0.87
Nov-25	4	Benzene	0	0.06	0.18	0.29	0.47	7.50	0.41	17.30%	96.28%	0.34
Dec-25	4	Benzene	0	0.07	0.16	0.23	0.38	23.48	0.44	29.10%	99.05%	0.26
Oct-25	4	H2S	0	5.28	33.42	47.61	63.99	128.28	49.81	0.18%	78.93%	68.89
Nov-25	4	H2S	0	5.52	32.71	45.85	60.85	148.54	48.26	0.51%	85.41%	65.20
Dec-25	4	H2S	0	10.38	34.06	45.19	60.46	112.06	47.98	0.51%	84.73%	64.11

Oct-25	4	HCN	0	0.05	0.71	1.32	2.21	12.29	1.77	0.00%	92.37%	1.89
Nov-25	4	HCN	0	0.07	0.82	1.59	2.91	15.75	2.23	0.02%	69.46%	2.30
Dec-25	4	HCN	0	0.03	0.73	1.58	3.15	13.60	2.24	0.42%	96.03%	2.24
Oct-25	5	Benzene	0	0.11	0.28	0.44	0.68	8.47	0.60	20.67%	97.33%	0.50
Nov-25	5	Benzene	0	0.11	0.26	0.40	0.66	7.20	0.56	24.33%	35.15%	0.43
Dec-25	5	Benzene	0	0.19	0.51	0.69	1.01	28.52	1.01	5.96%	72.08%	0.91
Oct-25	5	H2S	0	1.00	11.42	19.31	30.23	59.97	21.40	0.26%	74.28%	27.71
Nov-25	5	H2S	0	1.31	13.00	22.52	32.67	59.41	23.26	0.00%	67.78%	33.04
Dec-25	5	H2S	0	1.56	8.80	15.83	25.42	57.91	17.94	0.00%	66.55%	22.91
Oct-25	5	HCN	0	0.13	0.72	1.22	2.24	17.76	2.03	1.07%	98.64%	1.72
Nov-25	5	HCN	0	0.08	1.33	3.02	5.15	20.53	3.67	2.39%	99.62%	4.12
Dec-25	5	HCN	0	0.02	1.38	3.10	5.13	17.98	3.72	4.95%	81.99%	4.07
Oct-25	6	Benzene	0	0.12	0.21	0.28	0.45	17.43	0.62	18.92%	99.45%	0.37
Nov-25	6	Benzene	0	0.16	0.36	0.72	1.71	18.08	1.51	54.12%	99.24%	0.59
Dec-25	6	Benzene	0	0.18	0.46	0.82	1.82	24.26	1.70	55.41%	98.46%	0.69
Oct-25	6	H2S	0	0.94	11.20	23.11	41.25	112.19	28.68	0.00%	93.81%	33.19
Nov-25	6	H2S	0	0.84	12.11	23.03	40.09	109.58	28.47	0.10%	93.00%	33.05
Dec-25	6	H2S	0	0.95	14.01	24.93	41.70	122.29	29.92	0.27%	76.46%	35.97
Oct-25	6	HCN	0	0.03	0.26	0.69	2.33	44.75	2.91	2.01%	81.98%	0.98
Nov-25	6	HCN	0	0.03	0.19	0.59	1.40	5.62	0.93	0.07%	81.96%	0.86
Dec-25	6	HCN	0	0.01	0.26	0.93	1.73	7.33	1.03	0.33%	81.62%	1.33

[1] number of 1-hour measurements above the notification threshold value
[2] data quartiles = the value at which a defined percentage of data existing below this value (valid data only)
[3] 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).
[4] the proportion of the 1h measurements that pass all data verification measures compared to the possible hourly averages.
[5] 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 “P66 FLMP Data Packet_Q4 2025”. All 5min data have been validated based on the procedures described in the P66 fenceline monitoring plan.

C. Discussion of Invalidated Data

The data was validated based on the procedures mentioned in the fenceline monitoring plan. There was a high data invalidation rate for benzene Path 5 for the month of November. All instrument parameters were normal (integration time, peak match percentage, system temperature and pressure) but the minimum detection limit was zero which caused the data to be invalid. Montrose is investigating the reason for this issue. A Montrose scientist troubleshooted the instrument by adjusting the internal lenses and replacing the internal fan. Based on the findings, the internal fan malfunction was causing ozone buildup inside the UVDOAS head which caused issues to the MDL. The Montrose scientist managed to resolve the issue. A non-conformance report has been created regarding this issue. Additionally, a new QA/QC check has been applied to all UVDOAS instruments through Montrose’s online platform which will send alerts to the Montrose team in case an instrument MDL appears to be zero.

D. Discussion of Results

As shown in the summary plots, the concentrations of the three compounds of interest were below detection limit in most cases. There were no threshold exceedances during this period of the fenceline monitoring for any of the compounds. For benzene, the average median MDL value was 0.6 ppb, for H2S the average median MDL value was approximately 31.5 ppb, and for HCN the corresponding average median MDL was around 2.1 ppb. As discussed in Section C, the higher H2S MDL values are related to the path lengths being shorter than 500 meters. Phillips 66 does not store nor emit H2S and HCN.

Back up measures were implemented for Benzene monitoring in Path 2 due to an instrument malfunction for the period of October 1st to October 14th. A benzene absorption tube was installed in the middle of the path and collected sample for 14 days. The tube was sent to the accredited lab, Enthalpy, to be analyzed using method 325. The results of the tube analysis are summarized in Appendix F.

E. Summary Plots

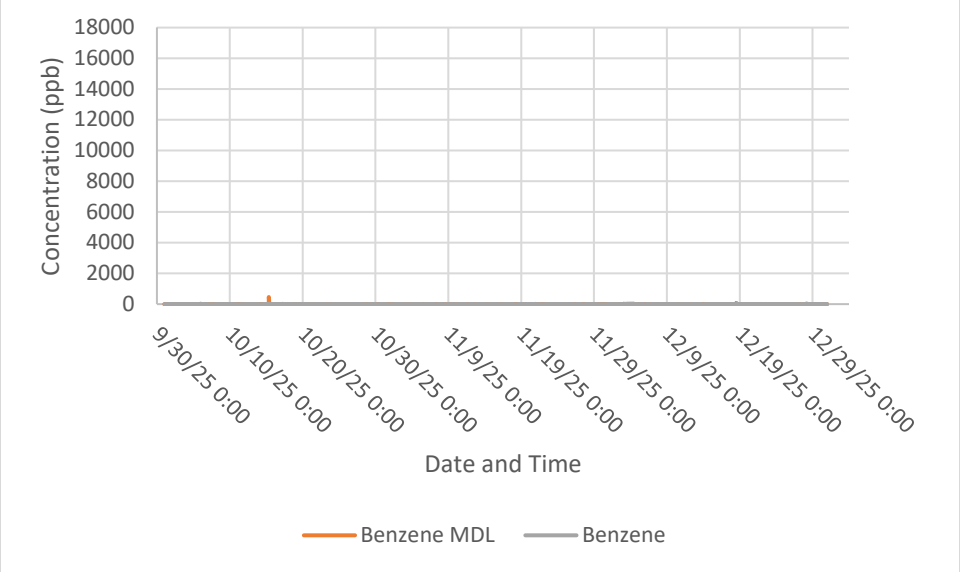

Figure 2. Timeseries of Benzene Path 1

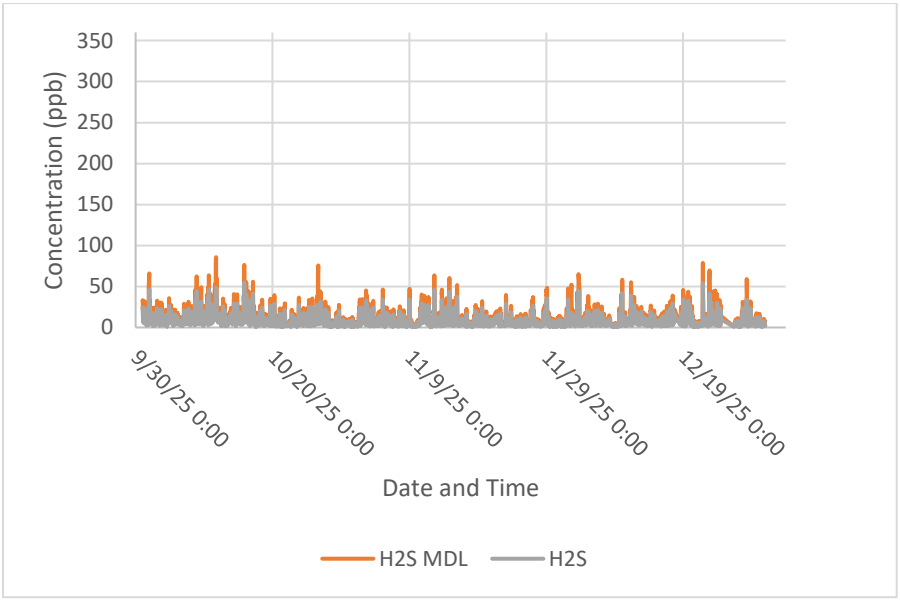

Figure 3. Timeseries of H_2S Path 1

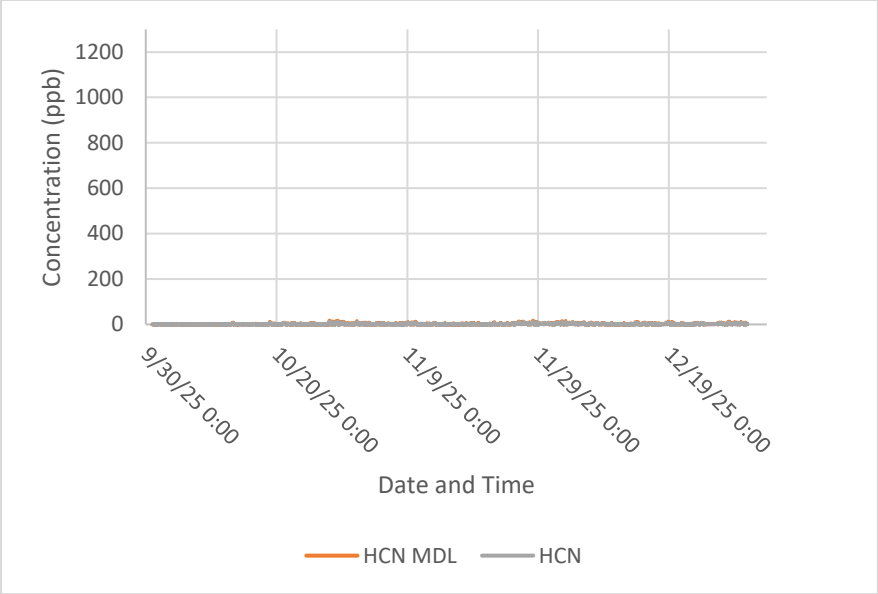

Figure 4. Timeseries of HCN Path 1

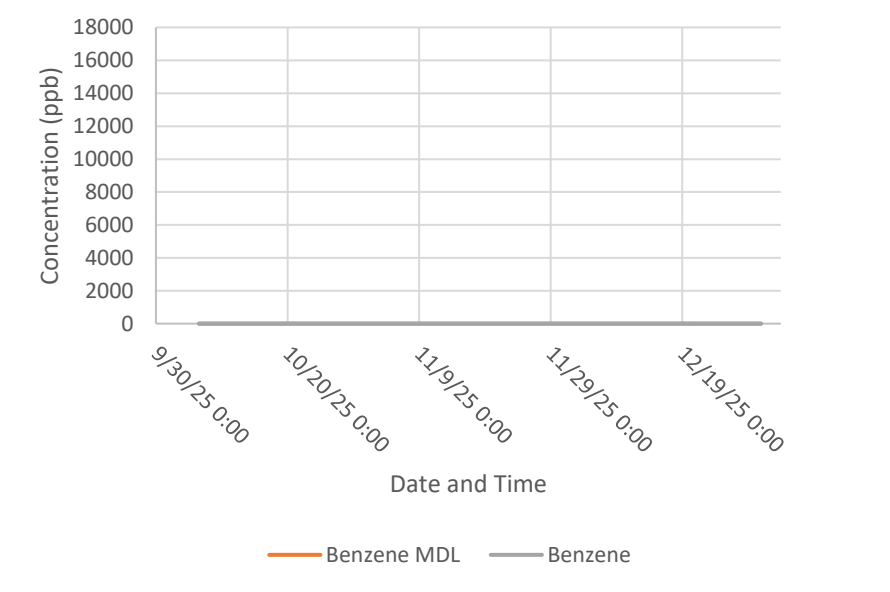

Figure 5. Timeseries of Benzene Path 2

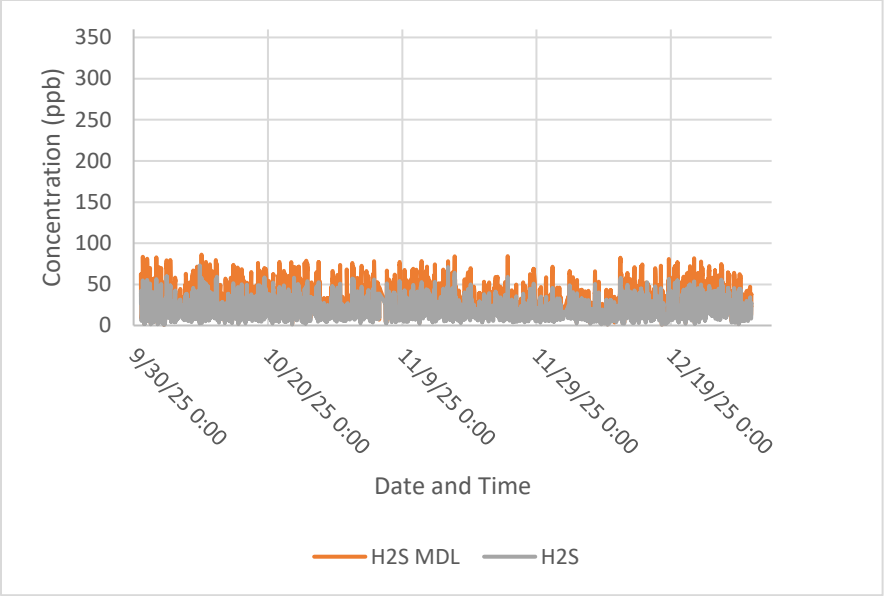

Figure 6. Timeseries of H_2S Path 2

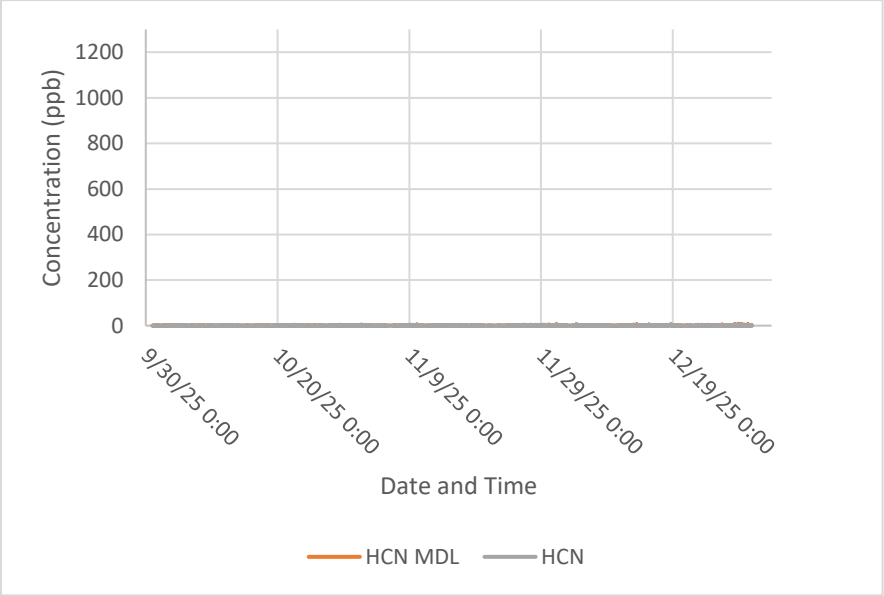

Figure 7. Timeseries of HCN Path 2

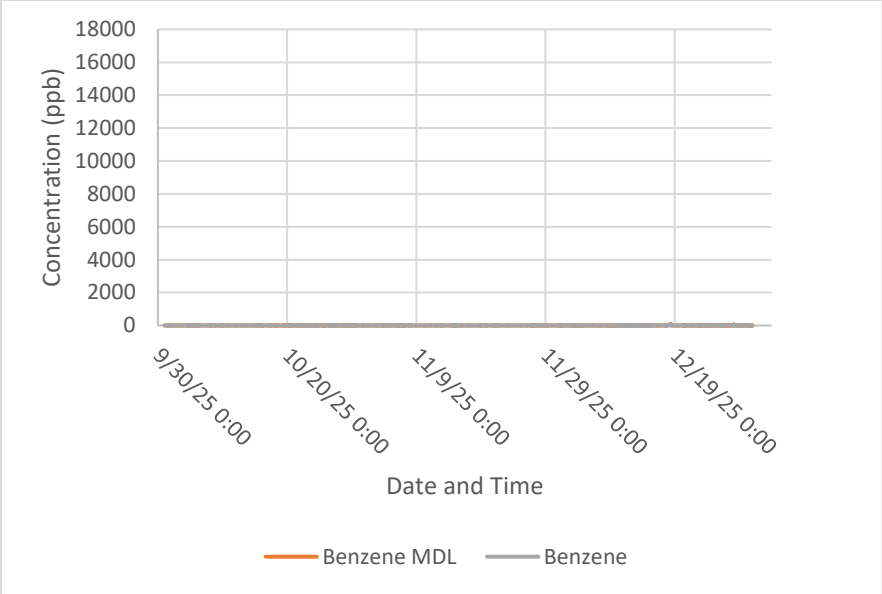

Figure 8. Timeseries of Benzene Path 3

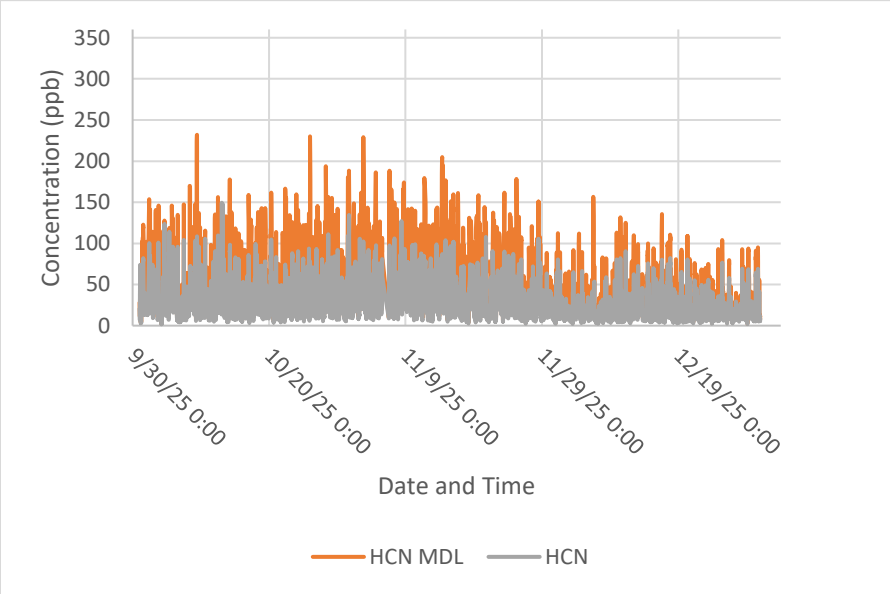

Figure 9. Timeseries of H_2S Path 3

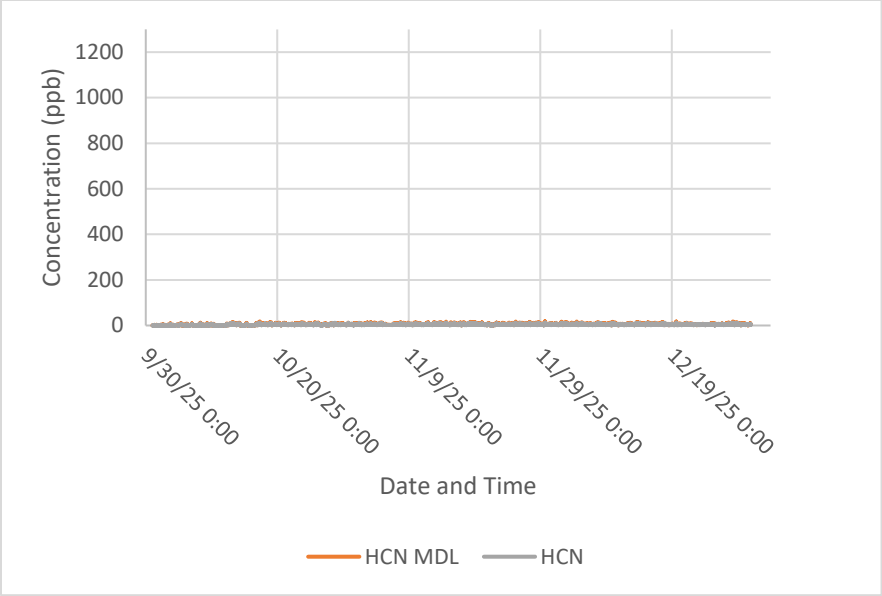

Figure 10. Timeseries of HCN Path 3

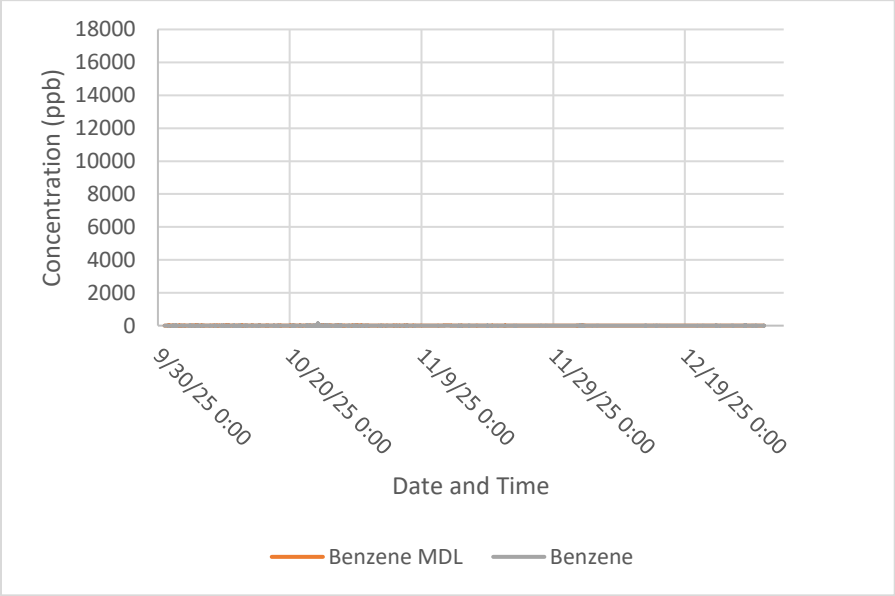

Figure 11. Timeseries of Benzene Path 4

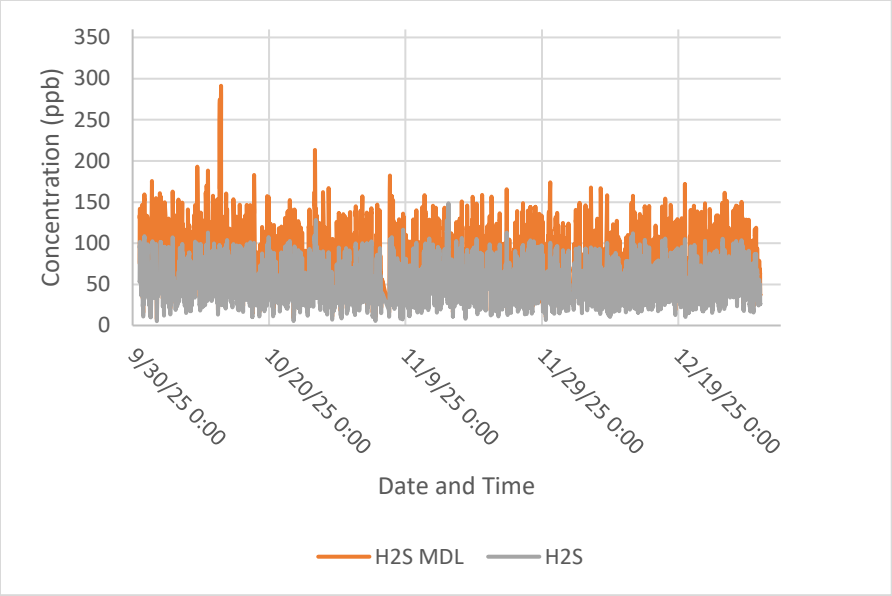

Figure 12. Timeseries of H_2S Path 4

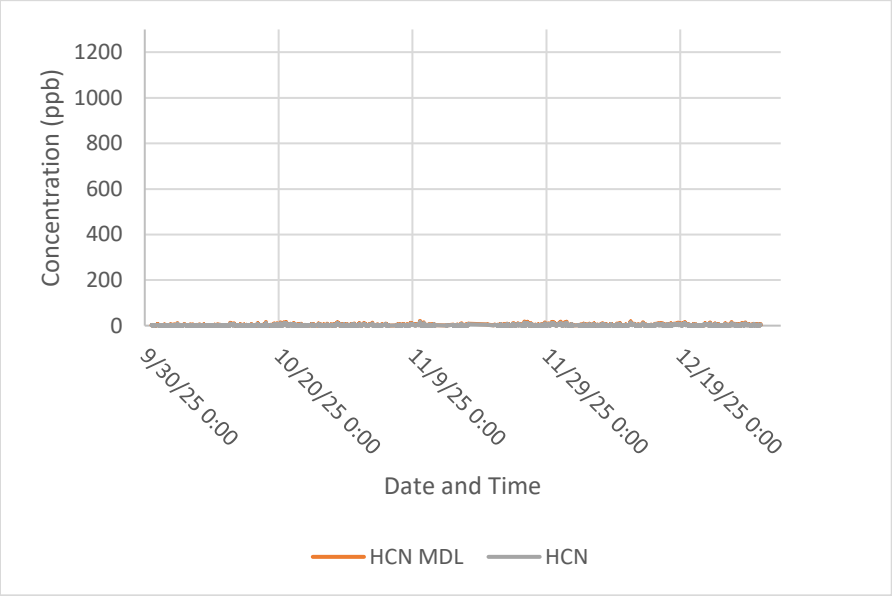

Figure 13. Timeseries of HCN Path 4

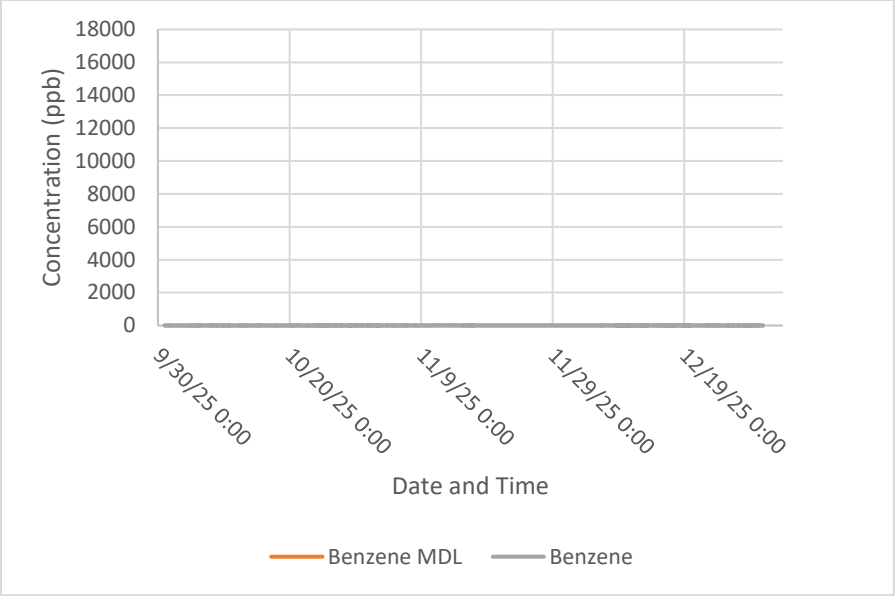

Figure 14. Timeseries of Benzene Path 5

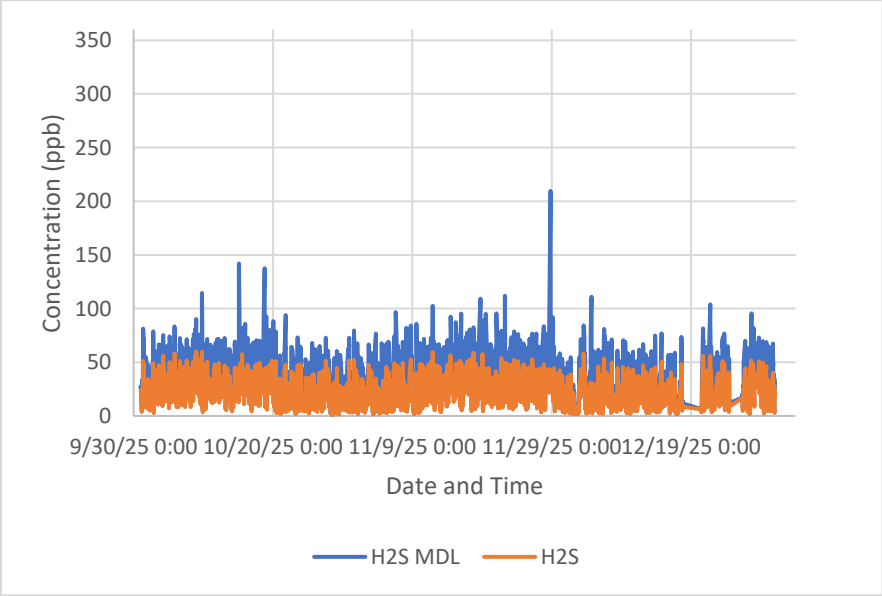

Figure 15. Timeseries of H_2S Path 5

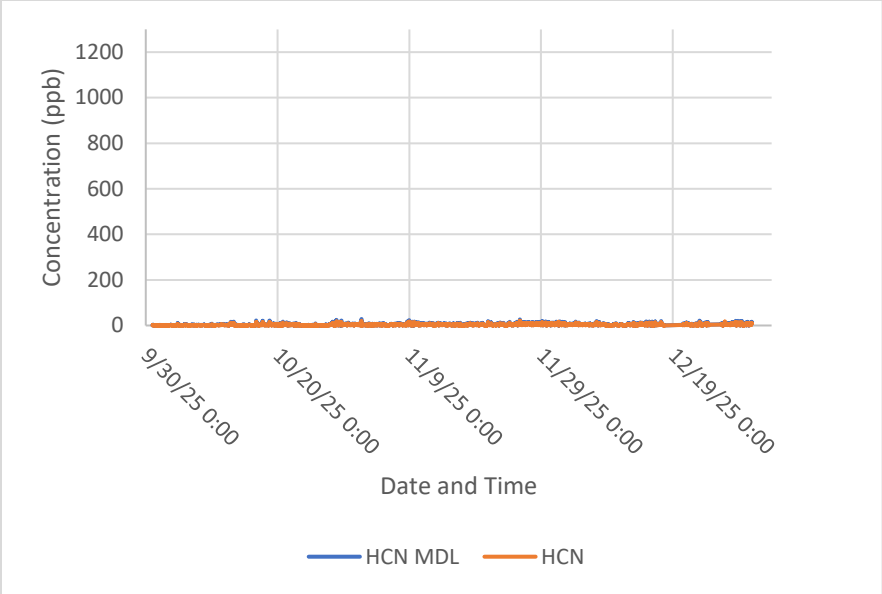

Figure 16. Timeseries of HCN Path 5

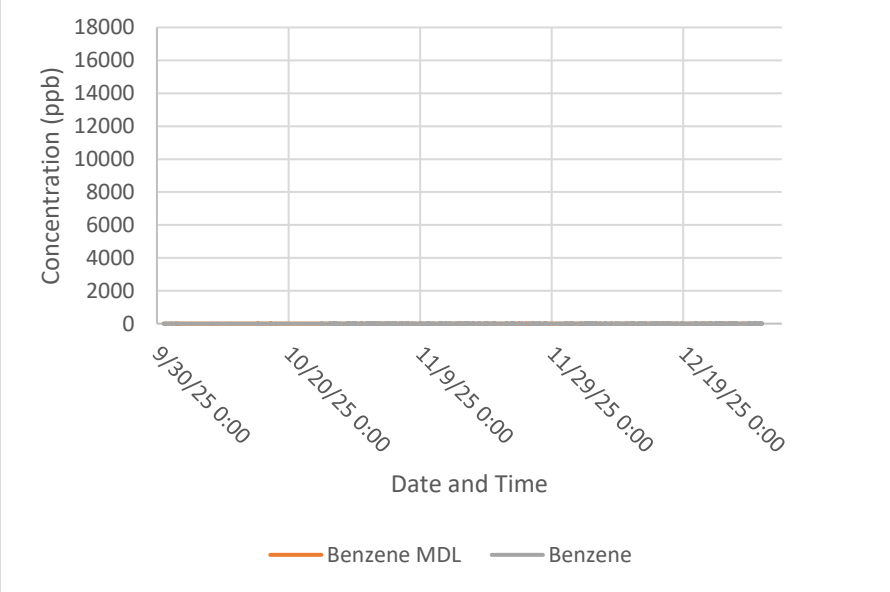

Figure 17. Timeseries of Benzene Path 6

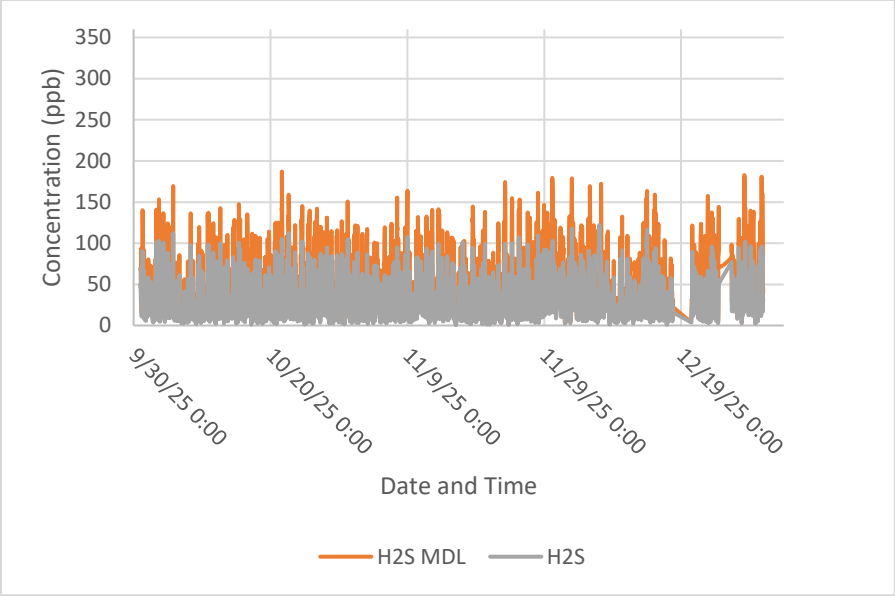

Figure 18. Timeseries of H_2S Path 6

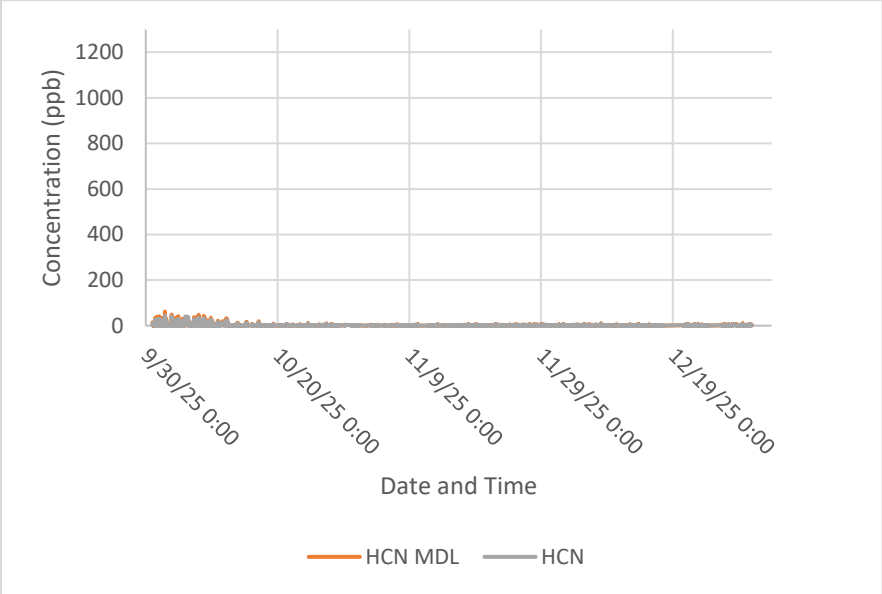

Figure 19. Timeseries of HCN Path 6

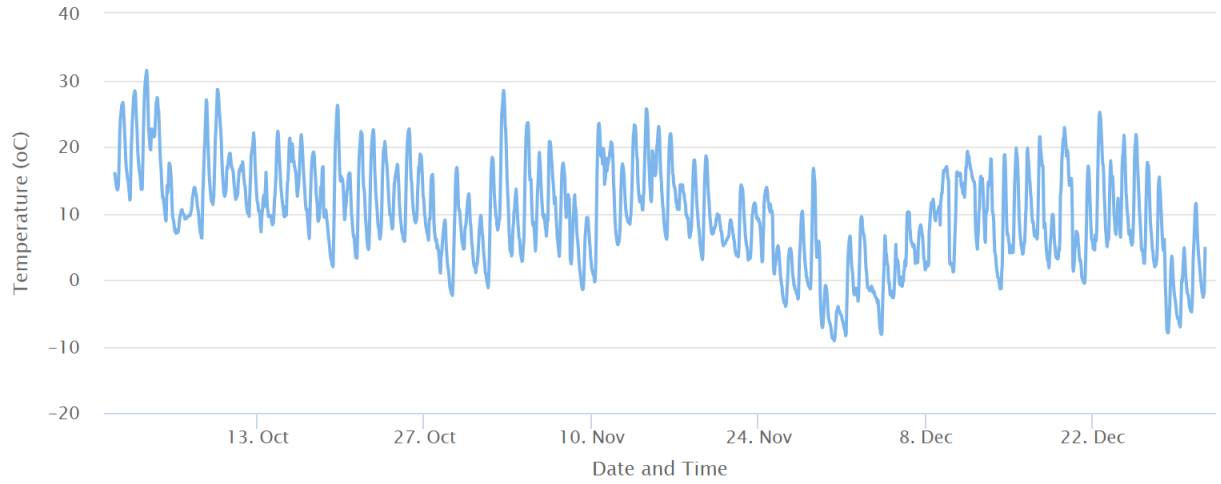

Figure 20. Temperature Timeseries (2025)

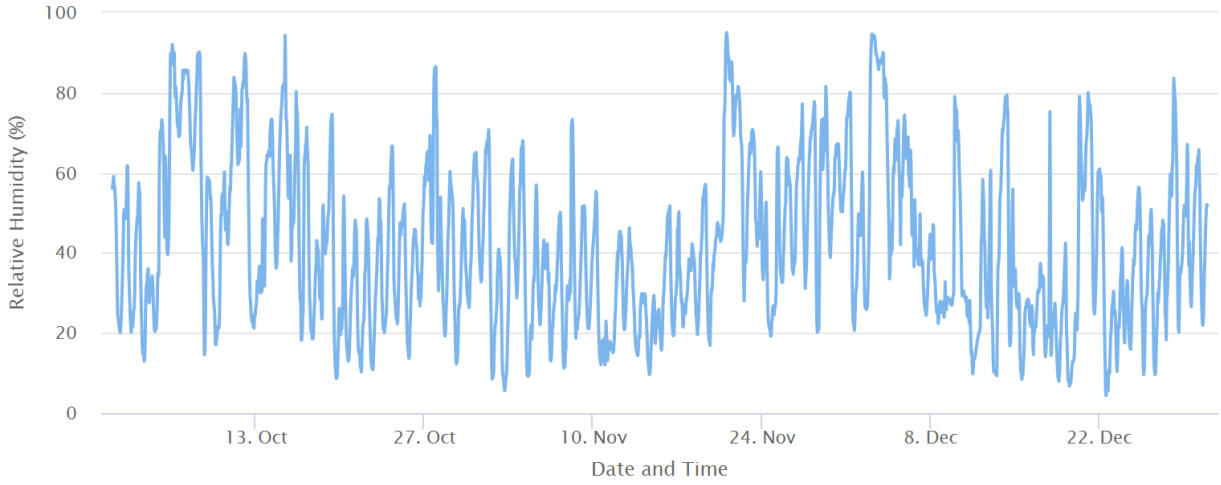

Figure 21. Relative Humidity Timeseries (2025)

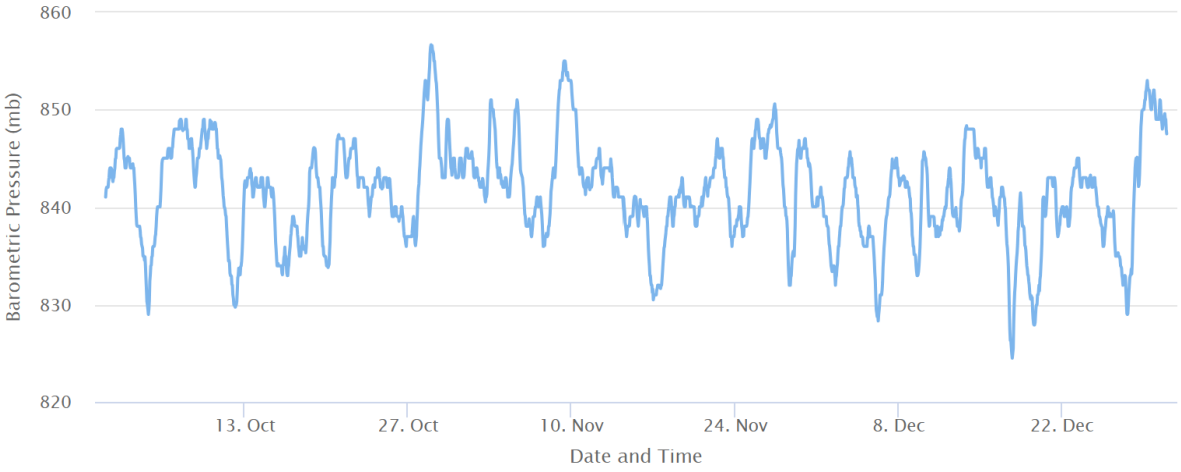

Figure 22. Barometric Pressure Timeseries (2025)

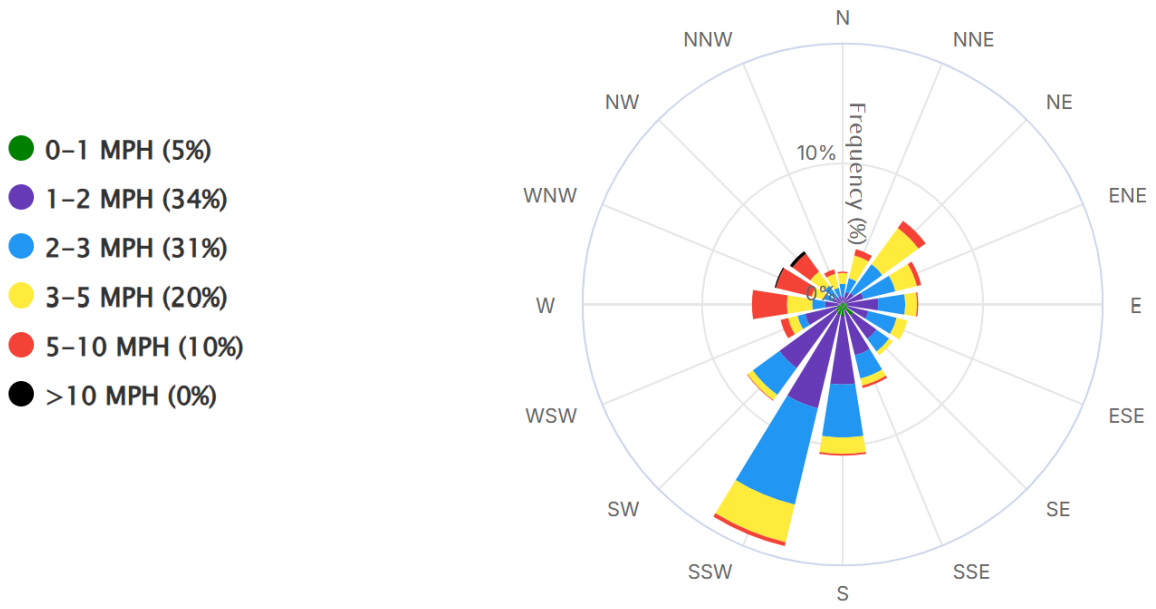

Figure 23. Wind Rose Plot

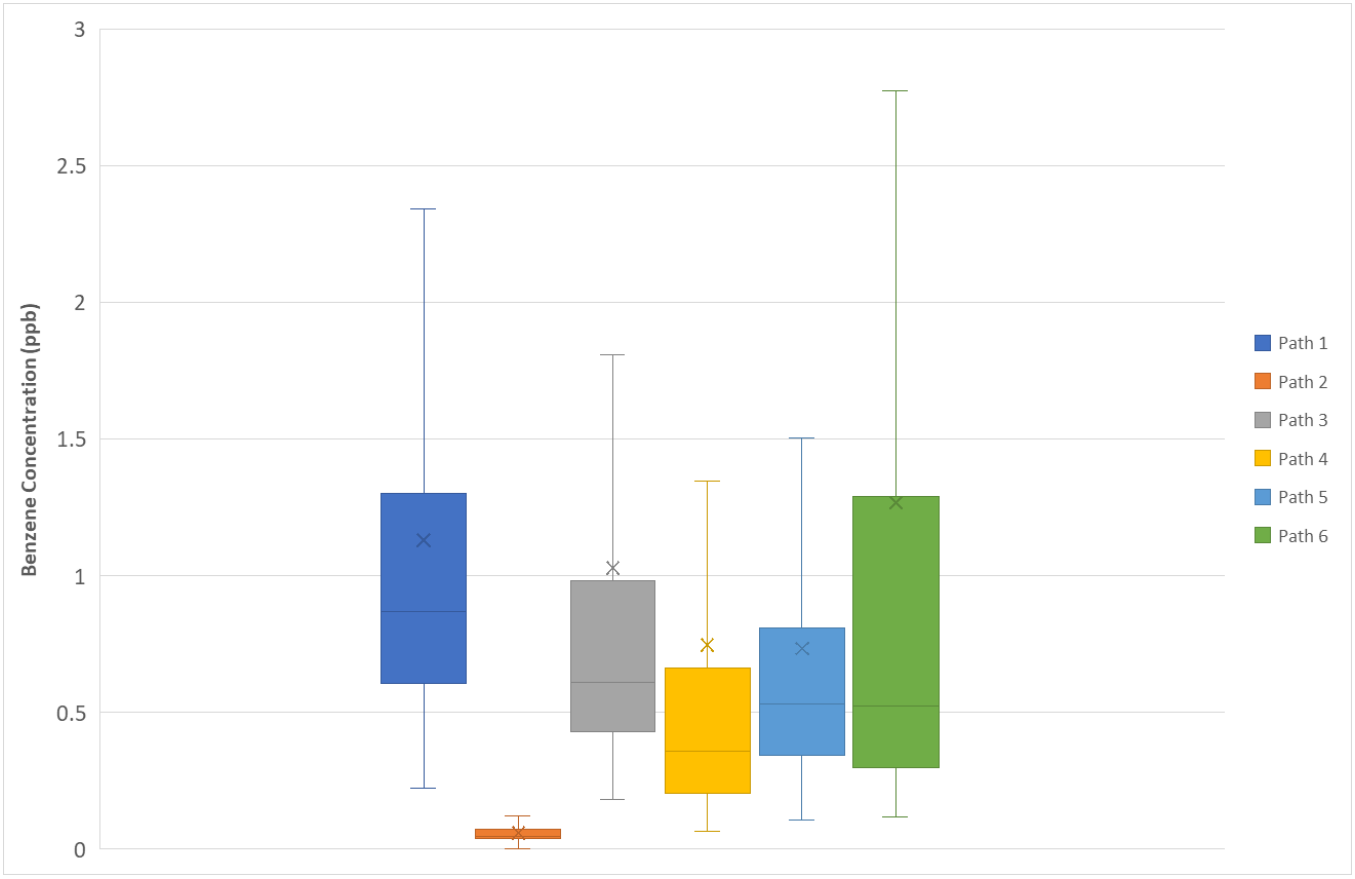

Figure 24. Benzene Box Plots for Paths 1 to 6

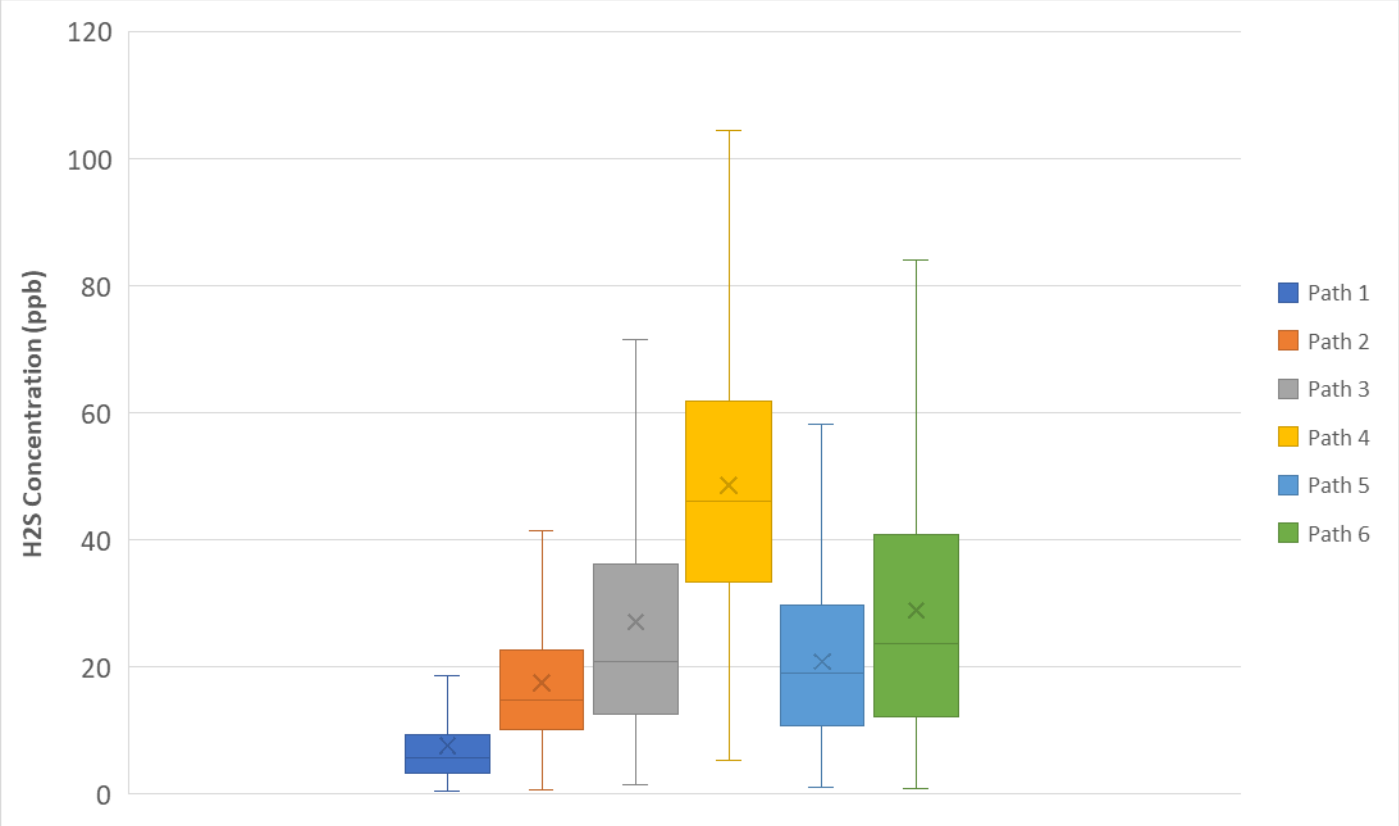

Figure 25. H_2S Box Plots for Paths 1 to 6.

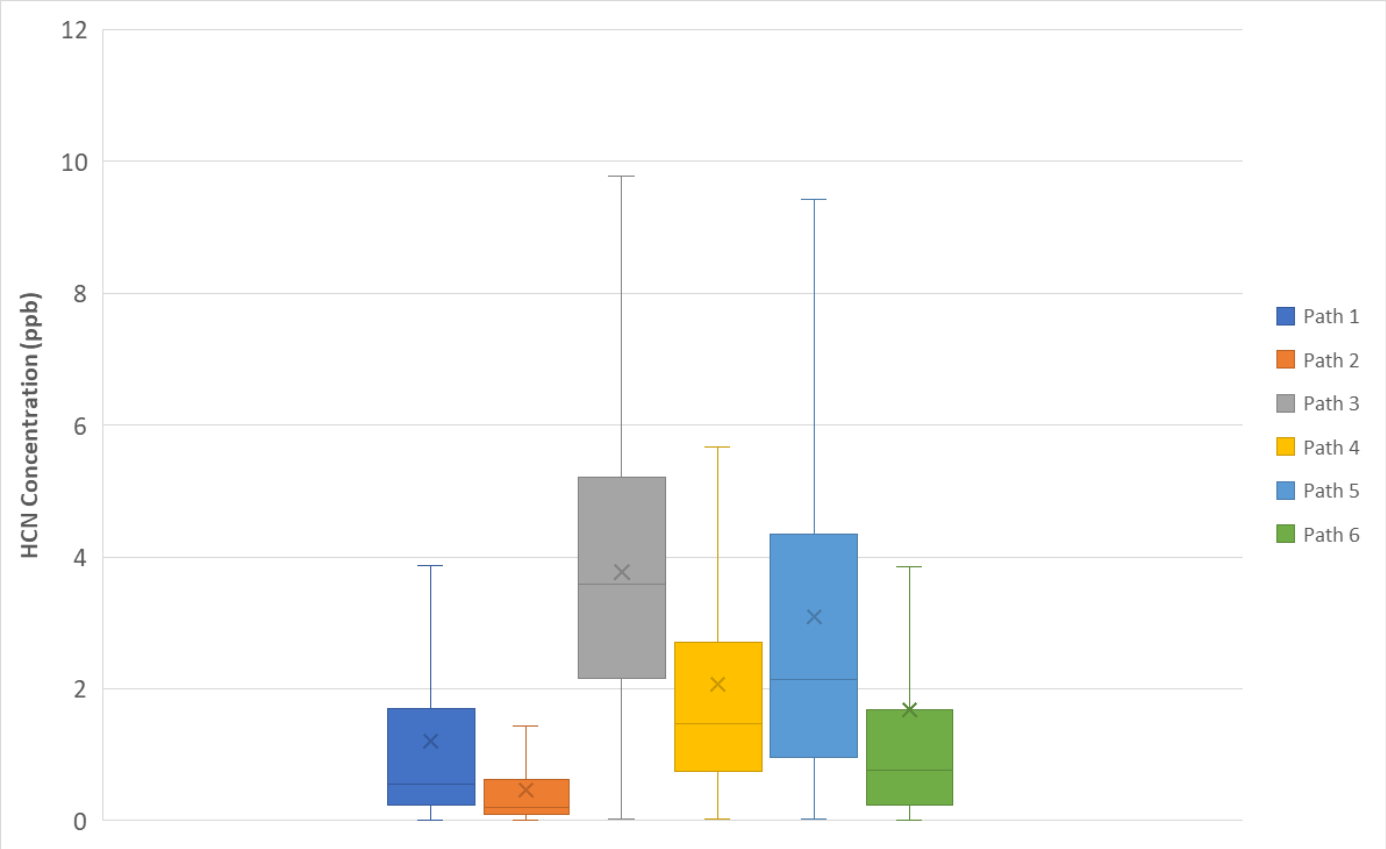

Figure 26. HCN Box Plots for Paths 1 to 6.

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^{o}C instead of the 39^{o}C that the older models were 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”. For the data to be considered valid, the absolute detector value must be >0.1mA.

3. MDL for H2S Paths 3,5 and 6: The minimum detection limit was set to 50% of the threshold for H2S for these three paths due to these paths being shorter than the rest.

VI. Appendices

A. Appendix A: Calibration and QA/QC Data

Table 7: Verification Activities

Date	Type of Verification	Path	Path Length[1]	Analyzer	Compound	Expected Concentration	Measured Concentration	Accuracy (%)	Precision (%)
12/8/2025	Bump test	1	452	UVDOAS	Benzene	100 ppm	122	21.6	19.4
12/8/2025	Bump test	1	452	UVDOAS	Benzene	200 ppm	253	26.5	3.1
12/8/2025	Bump test	2	1100	UVDOAS	Benzene	100 ppm	93	6.6	1.1
12/8/2025	Bump test	2	1100	UVDOAS	Benzene	200 ppm	190	5.1	2.9
12/8/2025	Bump test	3	330	UVDOAS	Benzene	100 ppm	113	17.2	13.6
12/8/2025	Bump test	3	330	UVDOAS	Benzene	200 ppm	217	10.5	8.6
12/8/2025	Bump test	4	630	UVDOAS	Benzene	100 ppm	109	10	7.9
12/8/2025	Bump test	4	630	UVDOAS	Benzene	200 ppm	181	9.7	4.2
12/8/2025	Bump test	5	444	UVDOAS	Benzene	100 ppm	99	2.6	2.8
12/8/2025	Bump test	5	444	UVDOAS	Benzene	200 ppm	179	10.7	2.8
12/8/2025	Bump test	6	276	UVDOAS	Benzene	100 ppm	103.6	8	9.1
12/8/2025	Bump test	6	276	UVDOAS	Benzene	200 ppm	227	13.5	6.2
12/1/2025	Audit Module	1	452	TDL	H2S	500 ppmm	455	9	0.6
12/1/2025	Audit Module	1	452	TDL	H2S	625 ppmm	592	5.3	1.4
12/1/2025	Audit Module	2	1100	TDL	H2S	500 ppmm	427	14.6	2.2
12/1/2025	Audit Module	2	1100	TDL	H2S	625 ppmm	541	13.3	3.9
12/1/2025	Audit Module	3	330	TDL	H2S	500 ppmm	457	9.8	7.7
12/1/2025	Audit Module	3	330	TDL	H2S	625 ppmm	510	18.3	8.7
12/1/2025	Audit Module	4	630	TDL	H2S	500 ppmm	360	28	12.3
12/15/2025	Audit Module	4	630	TDL	H2S	625 ppmm	532	14.8	1.8
12/1/2025	Audit Module	5	444	TDL	H2S	500 ppmm	392	21.7	2
12/1/2025	Audit Module	5	444	TDL	H2S	625 ppmm	552	11.7	2.05
12/1/2025	Audit Module	6	276	TDL	H2S	500 ppmm	407	18.6	1.5
12/1/2025	Audit Module	6	276	TDL	H2S	625 ppmm	512	18	1.5
12/1/2025	Audit Module	1	452	TDL	HCN	1010 ppmm	1023	1.3	0.2
12/1/2025	Audit Module	1	452	TDL	HCN	420ppmm	470	11.8	0.2
12/1/2025	Audit Module	2	1100	TDL	HCN	1010 ppmm	1036	2.6	0.2
12/1/2025	Audit Module	2	1100	TDL	HCN	420ppmm	457	11.4	8.7
12/1/2025	Audit Module	3	330	TDL	HCN	1010 ppmm	1046	3.6	0.1
12/1/2025	Audit Module	3	330	TDL	HCN	420 ppmm	480	14.4	0.2
12/1/2025	Audit Module	4	630	TDL	HCN	1010 ppmm	1036	2.6	0.2
12/1/2025	Audit Module	4	630	TDL	HCN	420 ppmm	469	11.7	0.3
12/1/2025	Audit Module	5	444	TDL	HCN	1010 ppmm	1062	5.1	0.2
12/1/2025	Audit Module	5	444	TDL	HCN	420 ppmm	483	15	2.1
12/1/2025	Audit Module	6	276	TDL	HCN	1010 ppmm	1052	4.2	0.1
12/1/2025	Audit Module	6	276	TDL	HCN	420 ppmm	488	16.2	0

[1]path length in meters

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

Qualifier Code	AQS Definition *(additional information added in parentheses)*	Type or Related Action
AB	Technician Unavailable. *(use if this affects scheduled QA/QC or necessary maintenance)	Null Data Qualifier
AD	Shelter Storm Damage.	Null Data Qualifier
AG	Sample Time out of Limits. *(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)	Null Data Qualifier
AI	Insufficient Data. (cannot calculate)	Null Data Qualifier
AL	Voided by Operator. *(e.g., Datum rejected by data validators)	Null Data Qualifier
AM	Miscellaneous Void.	Null Data Qualifier
AN	Machine Malfunction *(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)	Null Data Qualifier
AO	Bad Weather. *(Use if weather impacts open-path instrument operation/function)	Null Data Qualifier
AP	Vandalism. *(Use if vandalism impacts open-path instrument operation/function)	Null Data Qualifier
AQ	Collection Error. *(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)	Null Data Qualifier
AT	Calibration.	Null Data Qualifier
AU	Monitoring Waived.	Null Data Qualifier
AV	Power Failure.	Null Data Qualifier
AW	Wildlife Damage. *(Use if damage impacts open-path instrument operation/function)	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. **(use when data exceeds critical criteria, such as for MDL)*	Null Data Qualifier
IA	African Dust. **(use for any dust event)*	Informational
IT	Wildfire-U.S. **(use for any wildfire event)*	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. **(e.g., in the event of emissions influenced by nearby sources)*	Quality Assurance Qualifier
QP	Pressure Sensor Questionable. **(e.g., use if cell pressure is out of range, indicating malfunction)*	Quality Assurance Qualifier
QT	Temperature Sensor Questionable. **(e.g., use if cell temperature is out of range, indicating malfunction)*	Quality Assurance Qualifier
QV	Quality Control Multi-Point Verification.	Null Data Qualifier
QX	Does not meet QC criteria. **(e.g., data exceeds automatic criteria for rejection)*	Quality Assurance Qualifier
SC	Sampler Contamination.	Null Data Qualifier
ST	Calibration Verification Standard.	Null Data Qualifier
TC	Component Check & Retention Time Standard. **(use this code for additional instrument checks, e.g., a robustness tests)*	Null Data Qualifier

C. Appendix C: Field Data Sheets

4:39 PM 10/3/2025 Montrose Onsite ML

Aligned UV path 5

2:15 PM 10/13/2025 Montrose Onsite ML

Aligned H2S & HCN path 6

Aligned H2S and HCN PAth 5

ALigned UV path 5

12:15 PM 10/20/25 MONTROSE ONSITE CF

ALIGNED PATH 5 TDLS, CLEANED RETRO

11:34 AM 10/28/2025 Montrose onsite ML

Replaced UV and Ozone filer for UV path 1 & 6

Replaced bulb in UV path 1 & 6

Cleaned retro

Aligned UV path 1 & 6

11:58 AM 11/6/25 MONTROSE ONSITE CF

ALIGNED PATH 1 UV

DUSTED SHELTER 1

11:30 AM 11/17/25 MONTROSE ONSITE CF, KL

ALIGNED UV 5

1:21 PM 12/1/25 MONTROSE ONSITE CF

QUARTERLY CALIBRATIONS FOR ALL TDLS

ALIGNED, CLEANED RETRO UV 5

ALIGNED PATH 1 HCN

ALIGNED PATH 5 H2S

10:25 AM 12/5/2025 Montrose Onsite ML

Aligned UV path 5 & H2S path 5 TDL

2:49 PM 12/8/2025 Montrose Onsite ML CN

Quarterly Calibration Uv path 5

H2S and HCN path 5 alignments

3:53 PM 12/8/25 Montrose Onsite ML CN

Quarterly calibration UV path 1 & 6

Aligned H2S path 1 and HCN path 6 TDL

2:25 PM 12/15/25 MONTROSE ON SITE CF

ALIGNED PATH 5 UV AND TDLS

CLEANDED PATH F RETRO

30 AM 10/6/2025 Montrose onsite KL, CF

troubleshooted UV P2

Calibrated UV P2

Aligned UV P3

2:29 PM 10/13/2025 Montrose Onsite ML

Aligned H2S & HCN path 4

Aligned UV path 4

12:15 PM 10/20/25 MONTROSE ONSITE CF

ALIGNED PATH 3 TDLS, CLEANED RETRO

ALIGNED PATH 4 TDLS, CLEANED RETRO

12:06 PM 10/28/2025 Montrose onsite ML

Replaced retro & ozone filter for UV Path 4

Replaced Bulb UV path 4

Aligned HCN path 4

Aligned UV path 4

Cleaned retro

12:33 PM 10/28/2025 Montrose onsite ML

Replaced retro & ozone filer for UV path 2 & 3

Replaced bulb for UV path 3

Aligned UV path 2 & 3

12:00 PM 11/6/25 MONTRSOE ONSITE CF

CLEAND PATH 4 TDL RETRO

VISUALLY ALIGNED PATH 4 TDLS

DUSTED SHELTER 4

REPOWERED COMS UPS AFTER OUTAGE

12:46 PM 11/10/2025 Montrose Onsite ML

Aligned HCN and H2S path 4 and reported readings to Katia

10:30 AM 11/13/25 Montrose Onsite EO

Aligned UV and HCN path 4

11:30 AM 11/14/25 MONTROSE ONSITE CF, KL

CHECKED FFTS PATH 4

12:30 PM 11/19/25 Montrose ONSITE EO

Cleaned TDL reflector for Path 4.

2:08 PM 11/25/25 MONTROSE ONSITE CF

AIGNED PATH 3 HCN & H2S

DUSTED SHELTER 3

1:28 PM 12/1/25 MONTROSE ONSITE CF

QUARTERLY CALIBRATIONS ON ALL TDLS

11:48 AM 12/8/25 Montrose Onsite ML CN

Quarterly calibration UV path 2 & 3

1:40 PM 12/8/25 Montrose Onsite ML CN

Quarterly calibration UV path 4

Aligned Path 4 H2S

2:25 PM 12/15/25 MONTROSE ONSITE CF

ALIGNED PATH 3 & 4 TDLS

CLEANED PATH 4 RETRO

3:43 PM 12/22/2025 Montrose Onsite ML

Aligned HCN and H2S path 3 TDL

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

Form Title: Non-Conformance Report
Document Number: 331AA-QMS-FM-13
Revision Number: R0
Implementation Date: February 07, 2024
Form Owner (Department): MAQS
Form Approval: AHeitmann

Non-Conformance Report

Project: PROJ-029623	**Month: September 2025**

LOCATION/SITE: P66 Denver Terminal	**Parameter(s) Affected: Benzene Concentration**
Begin Date and Time (LST): 9/24/2025 9am	**End Date and Time (LST): 10/6/2025 12:50pm**
Equipment: UVDOAS OP2	**S/N#: N/A**

Description of Malfunction or Problem: Make specific reference to Assignable Cause(s). All tests results should be documented on appropriate form(s).

During calibration the technician encountered an issue with the operation of the UV.

Investigative Actions: Describe Assignable Cause(s). Make specific reference to all dates, times and performance test results. All tests results should be documented on appropriate form(s).

The issue was investigated. The head was replaced and the original head was sent for troubleshooting.

Corrective Action Taken: Make specific reference to all dates, times and performance test results.

The UV head secondary optics were replaced. Additionally the fiber cable was replaced with a different kind. It looks like the fiber cable had been degraded from the UV light. The instrument was then calibrated and the calibration verification passed. Additional backup measures were also implemented. A passive benzene tube was installed in the middle of the path on 10/1/2025 and will be collecting sample for 14days according to Method 325.

Is Problem Fully Resolved? **Yes ___x__ No ____** If "NO", Describe Further Action Required: (File updated NC/CA Report when problem is fully resolved)

Additional Attachments or Information? **Yes _____ No__X___** Client Notified? **Yes __x___ No_____** If so, **date__9/24/2025____**

Field Operator's Assessment of Data Status: (Check One)	☐ **Valid**	☐ **Suspect**	☒ **Invalid**

Additional notes on Data Validity Status: No UV data was collected during this time.

Originator's Signature: A.Liangou

QA Review: Aricia Boyd

Form Title: Non-Conformance Report	**Implementation Date:** February 07, 2024
Document Number: 331AA-QMS-FM-13	**Form Owner (Department):** MAQS
Revision Number: R0	**Form Approval:** AHeitmann

Non-Conformance Report

Project: PROJ-029623	**Month: November 2025**

LOCATION/SITE: P66 Denver Terminal	**Parameter(s) Affected: Benzene, H2S and HCN Paths 2,3 and 4**
Begin Date and Time (LST): 11/5/2025 16:48	**End Date and Time (LST): 11/6/2025 13:13pm**
Equipment: UVDOAS and TDLs Paths 2,3 and 4	**S/N: N/A**

Description of Malfunction or Problem: Make specific reference to Assignable Cause(s). All tests results should be documented on appropriate form(s).

A power surge caused the communication cabinet in Shelter 3 to shut down.

Investigative Actions: Describe Assignable Cause(s). Make specific reference to all dates, times and performance test results. All tests results should be documented on appropriate form(s).

UV Paths 2,3 and 4 and TDLs Paths 2,3 and 4 stopped reporting data to the public website.

Corrective Action Taken: Make specific reference to all dates, times and performance test results.

A technician power cycled the communication cabinet in Shelter 3 and the instruments came back online.

Is Problem Fully Resolved? **Yes ___x__ No ____** If "NO", Describe Further Action Required: (File updated NC/CA Report when problem is fully resolved)

Additional Attachments or Information? **Yes _____ No__X___** Client Notified? **Yes _x____ No_____**If so, **date_11/6/2025_____**

Field Operator's Assessment of Data Status: (Check One)	☐ **Valid**	☒ **Suspect**	☐ **Invalid**

Additional notes on Data Validity Status: No data was collected during that time for H2S and HCN Paths 2,3 and 4. The benzene data was collected and back filled.

Originator's Signature: A.Liangou

Form Title: Non-Conformance Report	**Implementation Date:** February 07, 2024
Document Number: 331AA-QMS-FM-13	**Form Owner (Department):** MAQS
Revision Number: R0	**Form Approval:** AHeitmann

QA Review: Aricia Boyd

Form Title: Non-Conformance Report
Document Number: 331AA-QMS-FM-13
Revision Number: R0
Implementation Date: February 07, 2024
Form Owner (Department): MAQS
Form Approval: AHeitmann

Non-Conformance Report

Project: PROJ-029623	**Month: November 2025**

LOCATION/SITE: P66 Denver Terminal	**Parameter(s) Affected: Benzene P5**
Begin Date and Time (LST): 11/5/2025 16:48	**End Date and Time (LST): 11/6/2025 13:13pm**
Equipment: UVDOAS Path 5	**S/N#:** N/A

Description of Malfunction or Problem: Make specific reference to Assignable Cause(s). All tests results should be documented on appropriate form(s).

Benzene MDL at P5 was zero for the period of November 17th to December 4th of 2025.

Investigative Actions: Describe Assignable Cause(s). Make specific reference to all dates, times and performance test results. All tests results should be documented on appropriate form(s).

All instrument parameters were within normal range.

Corrective Action Taken: Make specific reference to all dates, times and performance test results.

Montrose troubleshooted the instrument by readjusting the internal lenses to try and get better signal at the 290-300nm range. The internal fan was not working which caused ozone build up inside the instrument and was causing the signal to drop and the MDL to be zero. Montrose ordered a new fan. Additionally, a new QA/QC check was introduced in which Montrose will receive alerts in case the MDL of a UVDOAS goes to zero.

Is Problem Fully Resolved? **Yes** ___ **No** _x___ If "NO", Describe Further Action Required: (File updated NC/CA Report when problem is fully resolved)

Additional Attachments or Information? **Yes** _____ **No**__**X**___ Client Notified? **Yes** ____ **No**__**X**____If so, **date**_____

Field Operator's Assessment of Data Status: (Check One)	☐ **Valid**	☐ **Suspect**	☒ **Invalid**

Additional notes on Data Validity Status: The data during this time is considered invalid.

Originator's Signature: A.Liangou

QA Review: Aricia Boyd

E. Appendix E: Calibration Verification Forms

TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 1 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	226 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	454	9.2
2	500	458	8.4
3	500	452	9.6
4	500	452	9.6
5	500	458	8.4
Averages	500	455	9

	Calculated Values	Expected Values
Overall Percent Precision	99.4%	**≥ 80%**
Overall Percent Error	9%	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 1 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	226 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	590	5.6
2	625	602	3.7
3	625	594	5
4	625	596	4.6
5	625	578	7.5
Averages	625	592	5.3

	Calculated Values	Expected Values
Overall Percent Precision	98.6%	**≥ 80%**
Overall Percent Error	5.3 %	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

TDL Calibration Form

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 2 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	550 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	436	12.8
2	500	426	14.8
3	500	414	17.2
4	500	440	12
5	500	418	16.4
Averages	500	427	14.6

	Calculated Values	Expected Values
Overall Percent Precision	97.8 %	**≥ 80%**
Overall Percent Error	14.6 %	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

Montrose Air Quality Services
5120 Northshore Dr. North Little Rock, AR 72218
T: (501-)900-6400
www.montrose-env.com

TDL Calibration Form

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Document Number: 331AA-OPS-FM-15	**Form Owner (Department):** MAQS
Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 2 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	550 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	526	15.8
2	625	512	18.1
3	625	538	13.9
4	625	572	8.5
5	625	558	10.7
Averages	625	541	13.4

	Calculated Values	Expected Values
Overall Percent Precision	96.1 %	**≥ 80%**
Overall Percent Error	13.3 %	**≤ 30%**

TDL Calibration Form

Form Title: TDL Calibration Form	**Implementation Date:** August 8, 2024
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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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Document Number: 331AA-OPS-FM-15	**Form Owner (Department):** MAQS
Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 3 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	165 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	440	12
2	500	424	15.2
3	500	428	14.4
4	500	514	2.8
5	500	478	4.4
Averages	500	457	9.8

	Calculated Values	Expected Values
Overall Percent Precision	92.3 %	**≥ 80%**
Overall Percent Error	9.8 %	**≤ 30%**

TDL Calibration Form

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 3 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	165 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	586	6.2
2	625	454	27.4
3	625	536	14.2
4	625	462	26.1
5	625	514	17.8
Averages	625	510	18.3

	Calculated Values	**Expected Values**
Overall Percent Precision	91.3 %	**≥ 80%**
Overall Percent Error	18.3 %	**≤ 30%**

TDL Calibration Form

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Notes:
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Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 4 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	315 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	468	6.4
2	500	352	29.6
3	500	334	33.2
4	500	330	34
5	500	316	36.8
Averages	500	360	28

	Calculated Values	Expected Values
Overall Percent Precision	87.7 %	**≥ 80%**
Overall Percent Error	28%	**≤ 30%**

TDL Calibration Form

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Document Number: 331AA-OPS-FM-15	**Form Owner (Department):** MAQS
Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

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Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/15/25

Instrument Model: H2S Path 4 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	315 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	540	13.6
2	625	538	13.9
3	625	536	14.2
4	625	536	14.2
5	625	512	18.1
Averages	625	532	14.8

	Calculated Values	**Expected Values**
Overall Percent Precision	98.2 %	**≥ 80%**
Overall Percent Error	14.8 %	**≤ 30%**

TDL Calibration Form

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Document Number: 331AA-OPS-FM-15	**Form Owner (Department):** MAQS
Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 5 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	222 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	406	18.8
2	500	392	21.6
3	500	378	24.4
4	500	390	22
5	500	392	21.6
Averages	500	392	21.7

	Calculated Values	Expected Values
Overall Percent Precision	98%	**≥ 80%**
Overall Percent Error	21.7 %	**≤ 30%**

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Notes:
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Operator Signature(s):  Witness Signature(s): James Garrett

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 5 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	222 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	538	13.9
2	625	568	9.1
3	625	562	10.1
4	625	544	13
5	625	546	12.6
Averages	625	552	11.7

	Calculated Values	Expected Values
Overall Percent Precision	97.95 %	**≥ 80%**
Overall Percent Error	11.7%	**≤ 30%**

TDL Calibration Form

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Notes:
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Operator Signature(s):  Witness Signature(s): James Garrett

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 6 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	138 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	404	19.2
2	500	404	19.2
3	500	402	19.6
4	500	420	16
5	500	404	19.2
Averages	500	407	18.6

	Calculated Values	Expected Values
Overall Percent Precision	98.5%	**≥ 80%**
Overall Percent Error	18.6%	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

Form Title: TDL Calibration Form	**Implementation Date:** August 8, 2024
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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: H2S Path 6 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	138 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	506	19
2	625	526	15.8
3	625	502	19.7
4	625	514	17.8
5	625	514	17.8
Averages	625	512	18

	Calculated Values	Expected Values
Overall Percent Precision	98.5 %	**≥ 80%**
Overall Percent Error	18 %	**≤ 30%**

TDL Calibration Form

Form Title: TDL Calibration Form	**Implementation Date:** August 8, 2024
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Notes:
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Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 1 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	226 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	420 PPMM

File #	**Compound Concentration (PPMM)**	**Measured Concentration (PPMM)**	**Error (% Reading)**
1	420	468	11.4
2	420	470	11.9
3	420	470	11.9
4	420	470	11.9
5	420	470	11.9
Averages	420	470	11.8

	Calculated Values	**Expected Values**
Overall Percent Precision	99.8 %	**≥ 80%**
Overall Percent Error	11.8%	**≤ 30%**

TDL Calibration Form

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Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 1 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	226 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	1020	1
2	1010	1024	1.4
3	1010	1024	1.4
4	1010	1024	1.4
5	1010	1024	1.4
Averages	1010	1023	1.3

	Calculated Values	Expected Values
Overall Percent Precision	99.8 %	**≥ 80%**
Overall Percent Error	1.3 %	**≤ 30%**

TDL Calibration Form

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Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 2 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	550 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	420 PPMM

File #	**Compound Concentration (PPMM)**	**Measured Concentration (PPMM)**	**Error (% Reading)**
1	420	392	6.7
2	420	470	11.9
3	420	470	11.9
4	420	478	13.8
5	420	474	12.9
Averages	420	457	11.4

	Calculated Values	**Expected Values**
Overall Percent Precision	91.3 %	**≥ 80%**
Overall Percent Error	11.4 %	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 2 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	550 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	1038	2.8
2	1010	1034	2.4
3	1010	1038	2.8
4	1010	1036	2.6
5	1010	1036	2.6
Averages	1010	1036	2.6

	Calculated Values	Expected Values
Overall Percent Precision	99.8%	**≥ 80%**
Overall Percent Error	2.6 %	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 3 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	165 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	420 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	420	480	14.3
2	420	482	14.8
3	420	480	14.3
4	420	480	14.3
5	420	480	14.3
Averages	420	480	14.4

	Calculated Values	Expected Values
Overall Percent Precision	99.8%	**≥ 80%**
Overall Percent Error	14.4%	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 3 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	165 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	1044	3.4
2	1010	1048	3.8
3	1010	1046	3.6
4	1010	1046	3.6
5	1010	1046	3.6
Averages	1010	1046	3.6

	Calculated Values	Expected Values
Overall Percent Precision	99.9%	**≥ 80%**
Overall Percent Error	3.6 %	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): 

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TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 4 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	315 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	420 PPMM

File #	Compound Concentration (PPMM)	Measured Concentration (PPMM)	Error (% Reading)
1	420	470	11.9
2	420	468	11.4
3	420	470	11.9
4	420	470	11.9
5	420	468	11.4
Averages	420	469	11.7

	Calculated Values	Expected Values
Overall Percent Precision	99.7 %	**≥ 80%**
Overall Percent Error	11.7 %	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 4 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	315 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	1038	2.8
2	1010	1036	2.6
3	1010	1034	2.4
4	1010	1038	2.8
5	1010	1036	2.6
Averages	1010	1036	2.6

	Calculated Values	Expected Values
Overall Percent Precision	99.8 %	**≥ 80%**
Overall Percent Error	2.6 %	**≤ 30%**

TDL Calibration Form

Form Title: TDL Calibration Form	**Implementation Date:** August 8, 2024
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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Notes:
Calibration verification passed.

Operator Signature(s): 

Witness Signature(s): James Garrett

TDL Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 5 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	222 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	420 PPMM

File #	**Compound Concentration (PPMM)**	**Measured Concentration (PPMM)**	**Error (% Reading)**
1	420	498	18.6
2	420	478	13.8
3	420	482	14.8
4	420	478	13.8
5	420	478	13.8
Averages	420	483	15

	Calculated Values	**Expected Values**
Overall Percent Precision	97.9%	**≥ 80%**
Overall Percent Error	15 %	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

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TDL Calibration Form

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Document Number: 331AA-OPS-FM-15	**Form Owner (Department):** MAQS
Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 5 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	222 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	1064	5.3
2	1010	1064	5.3
3	1010	1062	5.1
4	1010	1060	5
5	1010	1060	5
Averages	1010	1062	5.1

	Calculated Values	**Expected Values**
Overall Percent Precision	99.8 %	**≥ 80%**
Overall Percent Error	5.1 %	**≤ 30%**

TDL Calibration Form

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

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TDL Calibration Form

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Document Number: 331AA-OPS-FM-15	**Form Owner (Department):** MAQS
Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 6 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	138 m
Compound (H2S/HCN)	HCN

Standard Information	
Compound External Audit Cell Concentration (PPMM)	420 PPMM

File #	**Compound Concentration (PPMM)**	**Measured Concentration (PPMM)**	**Error (% Reading)**
1	420	488	16.2
2	420	488	16.2
3	420	488	16.2
4	420	488	16.2
5	420	488	16.2
Averages	420	488	16.2

	Calculated Values	**Expected Values**
Overall Percent Precision	100 %	**≥ 80%**
Overall Percent Error	16.2%	**≤ 30%**

TDL Calibration Form

Form Title: TDL Calibration Form	**Implementation Date:** August 8, 2024
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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

TDL Calibration Form

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Revision Number: Rev. 1	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/1/25

Instrument Model: HCN Path 6 Instrument Serial Number: _____

Instrument Parameters	
Optical Path separation(meters-one-way)	138 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	1054	4.4
2	1010	1052	4.2
3	1010	1052	4.2
4	1010	1052	4.2
5	1010	1052	4.2
Averages	1010	1052	4.2

	Calculated Values	Expected Values
Overall Percent Precision	99.9%	**≥ 80%**
Overall Percent Error	4.2%	**≤ 30%**

TDL Calibration Form

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

Notes:
Calibration verification passed.

Operator Signature(s):  Witness Signature(s): James Garrett

UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 1 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	452 m/ 0.047m
Maximum Intensity (%)	91.9
Integration Time (ms)	90

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	100	109	9
2	100	140	4
3	100	145	45
4	100	103	3
5	100	111	11
Averages	100	122	21.6

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

	Calculated Values	**Expected Values**
Overall Percent Precision	80.6	**≥ 75%**
Overall Percent Error	21.6	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

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UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 1 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	452 m/ 0.047m
Maximum Intensity (%)	91.9
Integration Time (ms)	90

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	200	245	22.5
2	200	255	27.5
3	200	260	30
4	200	257	28.5
5	200	248	24
Averages	200	253	26.5

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

	Calculated Values	**Expected Values**
Overall Percent Precision	96.9 %	**≥ 75%**
Overall Percent Error	26.5%	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

Montrose Air Quality Services
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UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 2 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	1100 m/ 0.047m
Maximum Intensity (%)	82
Integration Time (ms)	31

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	100	95	5
2	100	92	8
3	100	93	7
4	100	93	7
5	100	94	6
Averages	100	93	6.6

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

	Calculated Values	**Expected Values**
Overall Percent Precision	98.9	**≥ 75%**
Overall Percent Error	6.6	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 2 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	1100 m/ 0.047m
Maximum Intensity (%)	82
Integration Time (ms)	31

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	200	189	5.5
2	200	188	6
3	200	198	1
4	200	192	4
5	200	182	9
Averages	200	190	5.1

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

	Calculated Values	**Expected Values**
Overall Percent Precision	97.1	**≥ 75%**
Overall Percent Error	5.1	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 3 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	330 m/ 0.047m
Maximum Intensity (%)	80
Integration Time (ms)	45

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	100	113	13
2	100	122	22
3	100	123	23
4	100	90	10
5	100	118	18
Averages	100	113	17.2

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

	Calculated Values	**Expected Values**
Overall Percent Precision	86.4	**≥ 75%**
Overall Percent Error	17.2	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/2025

Instrument Model: UV Mono Path 3 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	330 m/ 0.047m
Maximum Intensity (%)	80
Integration Time (ms)	45

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	200	217	8.5
2	200	189	5.5
3	200	215	7.5
4	200	231	15.5
5	200	231	15.5
Averages	200	217	10.5

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Revision Number: Rev. 0	**Form Approval:** Katia Liangou

	Calculated Values	**Expected Values**
Overall Percent Precision	91.4	**≥ 75%**
Overall Percent Error	10.5	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

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UVDOAS Calibration Form

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Revision Number: Rev. 0	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 4 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	630 m/ 0.047m
Maximum Intensity (%)	99
Integration Time (ms)	40

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	100	103	3
2	100	115	15
3	100	117	17
4	100	113	13
5	100	99	1
Averages	100	109	10

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UVDOAS Calibration Form

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Revision Number: Rev. 0	**Form Approval:** Katia Liangou

	Calculated Values	**Expected Values**
Overall Percent Precision	92.1	**≥ 75%**
Overall Percent Error	10	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

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UVDOAS Calibration Form

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Revision Number: Rev. 0	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 4 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	630 m/ 0.047m
Maximum Intensity (%)	99
Integration Time (ms)	40

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	200	171	14.5
2	200	192	4
3	200	179	10.5
4	200	175	12.5
5	200	186	7
Averages	200	181	9.7

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Document Number: 331AA-OPS-FM-13	**Form Owner (Department):** MAQS
Revision Number: Rev. 0	**Form Approval:** Katia Liangou

	Calculated Values	**Expected Values**
Overall Percent Precision	95.8	**≥ 75%**
Overall Percent Error	9.7	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

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Revision Number: Rev. 0	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 5 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	444 m/ 0.047m
Maximum Intensity (%)	72
Integration Time (ms)	49

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	100	98	2
2	100	96	4
3	100	102	2
4	100	102	2
5	100	97	3
Averages	100	99	2.6

Montrose Air Quality Services
5120 Northshore Dr. North Little Rock, AR 72218
T: (501-)900-6400
www.montrose-env.com

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

	Calculated Values	**Expected Values**
Overall Percent Precision	97.2	**≥ 75%**
Overall Percent Error	2.6	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 5 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	444 m/ 0.047m
Maximum Intensity (%)	72
Integration Time (ms)	49

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	200	171	14.5
2	200	178	11
3	200	184	8
4	200	184	8
5	200	176	12
Averages	200	179	10.7

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Document Number: 331AA-OPS-FM-13	**Form Owner (Department):** MAQS
Revision Number: Rev. 0	**Form Approval:** Katia Liangou

	Calculated Values	**Expected Values**
Overall Percent Precision	97.2	**≥ 75%**
Overall Percent Error	10.7	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

Montrose Air Quality Services
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www.montrose-env.com

UVDOAS Calibration Form

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Document Number: 331AA-OPS-FM-13	**Form Owner (Department):** MAQS
Revision Number: Rev. 0	**Form Approval:** Katia Liangou

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 6 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	276 m/ 0.047m
Maximum Intensity (%)	88
Integration Time (ms)	20

Standard Information	
Benzene Standard Concentration (PPM)	100

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	100	99	1
2	100	110	10
3	100	107	7
4	100	90	10
5	100	112	12
Averages	100	103.6	8

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UVDOAS Calibration Form

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

	Calculated Values	**Expected Values**
Overall Percent Precision	90.9	**≥ 75%**
Overall Percent Error	8	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

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UVDOAS Calibration Form

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

Operator Name(s): Katia Liangou Test Date (YYYY/MM/DD): 12/8/25

Instrument Model: UV Mono Path 6 Instrument Serial Number: _____

Instrument Parameters	
Optical Path Length (meters)	276 m/ 0.047m
Maximum Intensity (%)	96
Integration Time (ms)	35

Standard Information	
Benzene Standard Concentration (PPM)	200

File #	**Benzene Concentration (PPM)**	**Measured Concentration (PPM)**	**Error (%)**
1	200	212	6
2	200	215	7.5
3	200	234	17
4	200	236	18
5	200	238	19
Averages	200	227	13.5

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

	Calculated Values	**Expected Values**
Overall Percent Precision	93.8	**≥ 75%**
Overall Percent Error	13.5	**≤ 30%**

Notes:
Calibration verification passed.

Operator's Signature Katia Liangou

Witness's Signature James Garrett

Montrose Air Quality Services
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www.montrose-env.com

F. Appendix F: Back up Measures Results

Real Time Air – Denver

990 W 43rd Ave
Denver, CO 80211

Phillips 66 Denver

Client Project# PROJ-043819
Samples Received: 10/17/2025

Analytical Report
2025ZZ103

EPA Method 325B Analysis

Report Issue Date: 10/28/2025

I certify that to the best of my knowledge all analytical data presented in this report have been checked for completeness, accuracy, errors and legibility in addition to having been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s). This report shall not be reproduced except in full without approval of the laboratory. This will provide assurance that parts of the report are not taken out of context.

Amendment(s):

Signature:

ENTHALPY ANALYTICAL

Matt Cavanaugh
Matthew.Cavanaugh@enthalpy.com / www.enthalpy.com
O: (919) 850-4392
Enthalpy Analytical
800 Capitola Drive Suite 1 Durham, NC 27713

Table of Contents

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	Montrose Air Quality Services, LLC - Denver
Job No.	2025ZZ103-1
Client ID.	PROJ-043819 Site: Phillips 66 Denver

1. Custody

The samples were received at Enthalpy Analytical on October 17, 2025 at 16.2 °C. The samples were received in good condition. Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, LLC

Table 1 - Sample Inventory

Sample ID	Tube ID	Sample Type
CUST-P66D-S-20251001	C69433	Sample

2. Analysis

The samples were analyzed for Benzene using EPA Method 325B – Volatile Organic Compounds from Fugitive and Area Sources by Thermal Desorption and GC/MS. A copy of the acquisition method M325B-MTD is not included in this report but may be available upon request.

The sample tube media used for this sampling period was CarbopackX. All calibration standards and laboratory QC were prepared using the same media.

3. Calibration

All BFB tune criteria have been met for this analysis.

The initial calibration (M082025A_CC185154) met all 30% RSD criteria. The initial calibration verification met ±30% recovery criteria. The continuing calibration verifications met 30% difference criteria. The initial and continuing calibration raw data are not included in this report but are available upon request.

5. QC Notes

No field blank or duplicate sample was submitted with this set of samples. All other quality control criteria required by the method and/or the laboratory SOP have been met unless noted otherwise below.

Enthalpy Analytical Narrative Summary

Company	Montrose Air Quality Services, LLC - Denver
Job No.	2025ZZ103-1
Client ID.	PROJ-043819 Site: Phillips 66 Denver

6. Reporting Notes

All tubes used for this sampling period met the method criteria for number of uses; no tube exceeded 50 field uses.

As specified in EPA Method 325B, the response factor of the daily continuing calibration standard was used to quantitate all field samples and blanks.

All samples were reported as amount in ng catch, and concentration in ug/m³ and ppbv.

The results presented in this report are representative of the samples as provided to the laboratory. These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

Enthalpy Analytical, located at 800 Capitola Drive, Suite 1, Durham NC, 27713 is accredited by the Louisiana Department of Environmental Quality (LDEQ) for EPA Method 325B for all analytes included in this report under **Certificate Number 04010**.

Results

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Denver
Job No.: 2025ZZ103-1 EPA Method 325B Analysis
Client No.: PROJ-043819 Site: Phillips 66 Denver

Summary

Sample Code	Tube ID	Benzene	
		(ug/m³)	Flag
CUST-P66D-S-20251001	C69433	1.09	

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Denver
Job No.: 2025ZZ103-1 EPA Method 325B Analysis
Client No.: PROJ-043819 Site: Phillips 66 Denver

Benzene

Sample Code	Tube ID	Conc (ug/m³)	Conc (ppbv)	Calc Amt (ng)	Temp (°F)	Uptake Rate (mL/min	Sample Time (min)	LOD (ug/m³)	LOQ (ug/m³)	LOD (ppbv)	LOQ (ppbv)	Flags	Data File	Inj DateTime	CCV RRF	Ret Time (min)	Target Area	ISTD Area	ISTD Amt	ISTD RT	ISTD Change
CUST-P66D-S-20251001	C69433	1.09	0.342	13.4	60.4	0.660	18645	0.203	0.482	0.0637	0.151		M2504292.d	2025-10-19 17:05	0.956	8.181	120537	519652	55.2	8.124	-1.6%

QC Data

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Denver
Job No.: 2025ZZ103-1 EPA Method 325B Analysis
Client No.: PROJ-043819 Site: Phillips 66 Denver

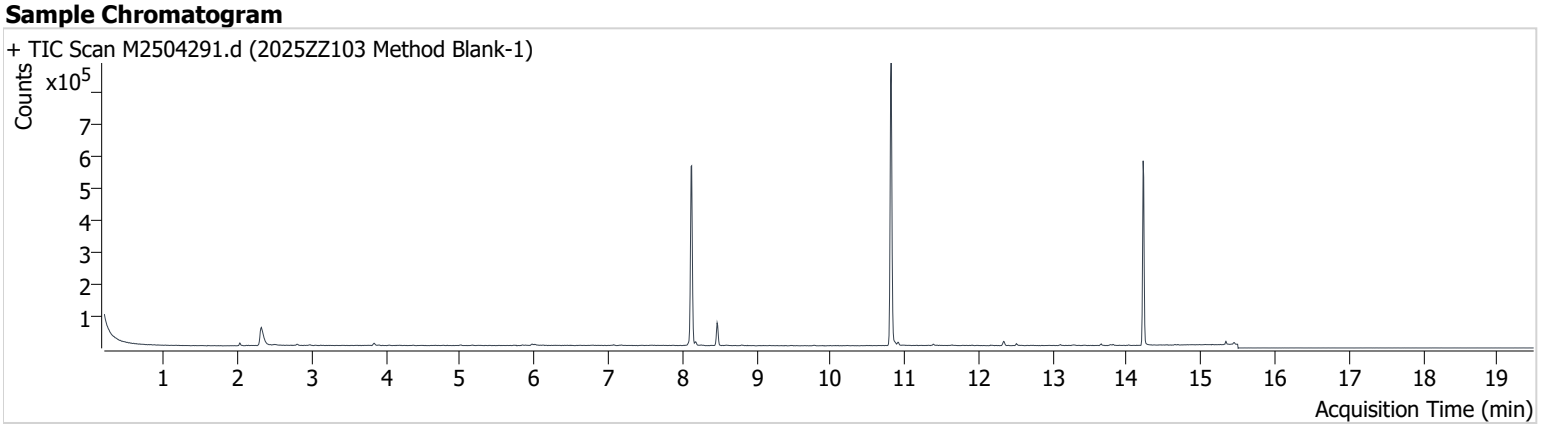
Benzene Calibration and Blanks

Sample Code	Data File	Tube ID	Type	RRF	ICAL RRF	Last CCV RRF	RRF Change	ISTD Change vs ICal	ISTD Change vs Concal	Pass/ Fail	Flags
M325B CCV 5	M2504290.d	C40114	Cal	0.956		0.956	-8.7%	-4.4%		Pass	
2025ZZ103 Method Blank-1	M2504291.d	B48135	Blank			0.956			-2.1%	Pass	ND
M325B CCV 5	M2504293.d	C39138	Check	0.960		0.956	-8.3%		-0.94%	Pass	

Chromatograms

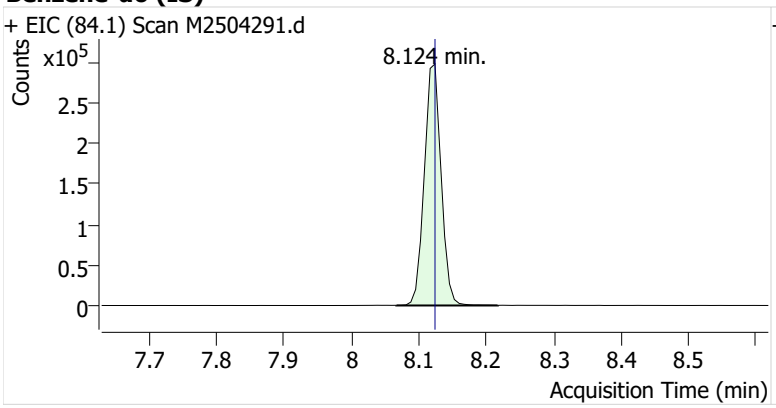
Name	2025ZZ103 Method Blank-1
Comment	B48135
Data File	M2504291.d
Acq. Date-Time	10/19/2025 4:38:37 PM
Acq. Method File	M325B-MTD
Tube Sorbent	Carbopack X
Analyze Quant Version	12.1
Report Quant Version	12.1

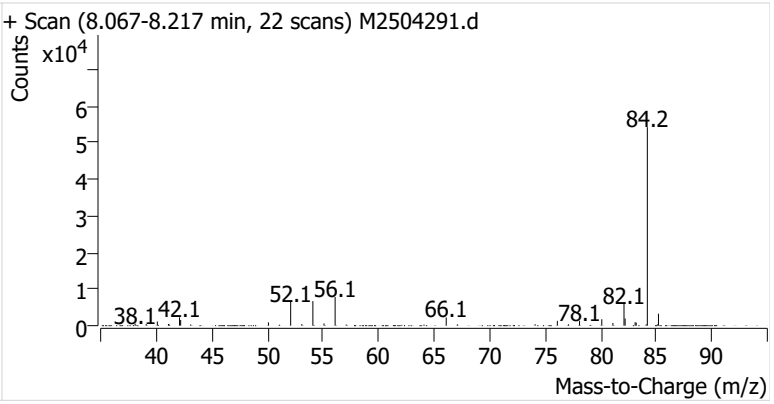
Sample Chromatogram



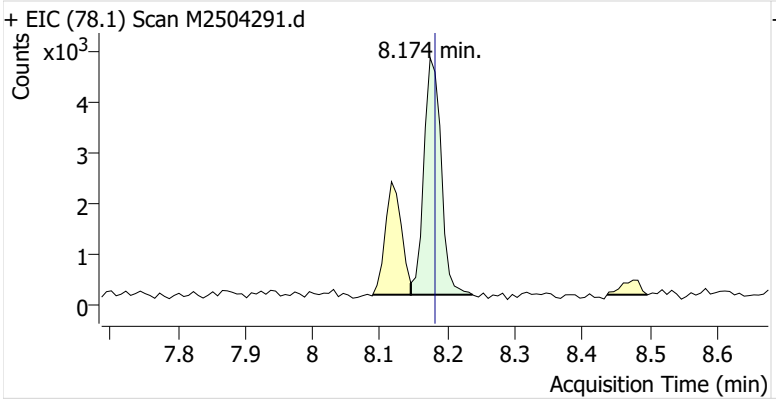
Name	ISTD	RT	ICAL RT	Resp.	Int. Flag
Benzene-d6 (IS)		8.124	8.124	516,786	
Benzene	Benzene-d6 (IS)	8.174	8.181	8,281	

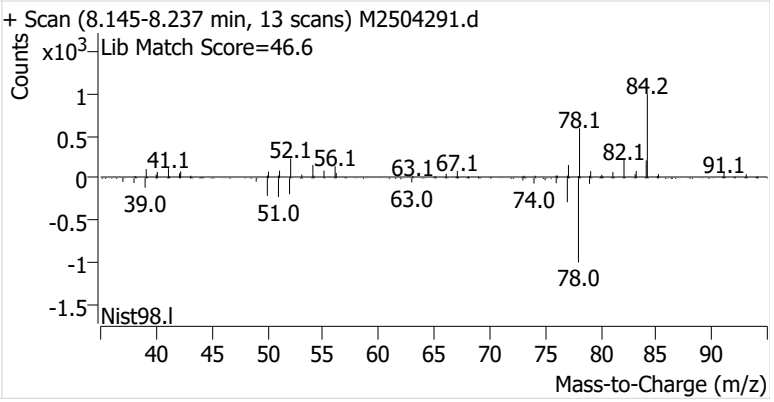
Benzene-d6 (IS)





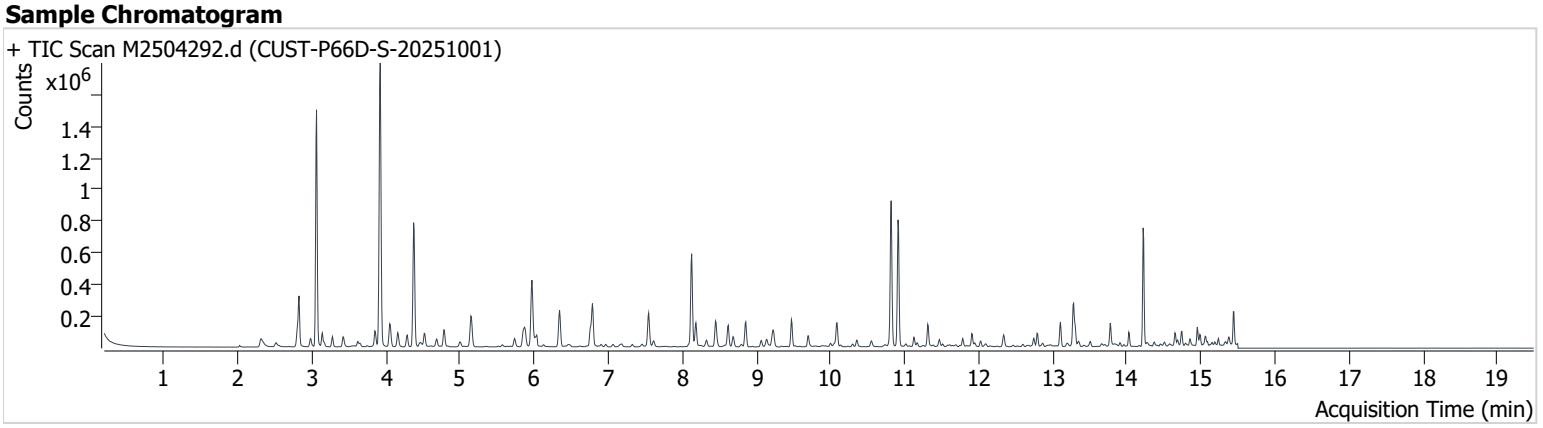
Benzene





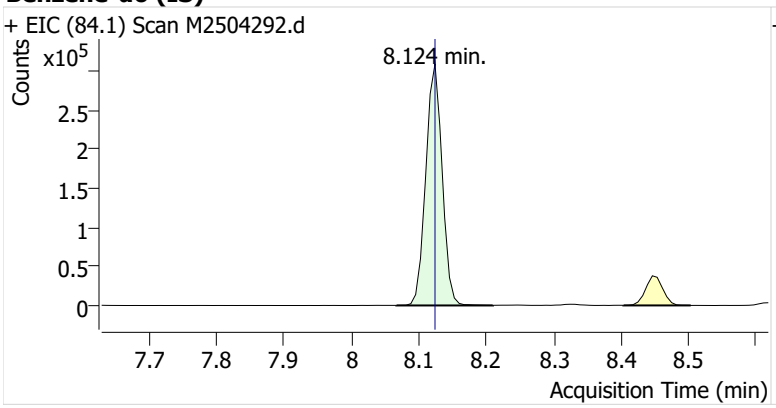
Name	CUST-P66D-S-20251001
Comment	C69433
Data File	M2504292.d
Acq. Date-Time	10/19/2025 5:05:12 PM
Acq. Method File	M325B-MTD
Tube Sorbent	Carbopack X
Analyze Quant Version	12.1
Report Quant Version	12.1

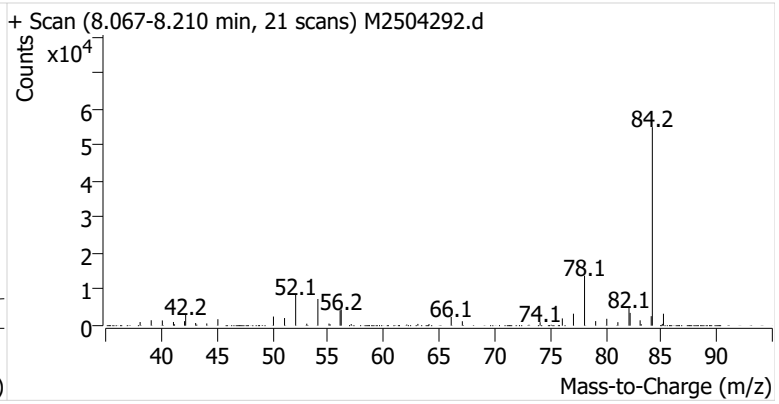
Sample Chromatogram



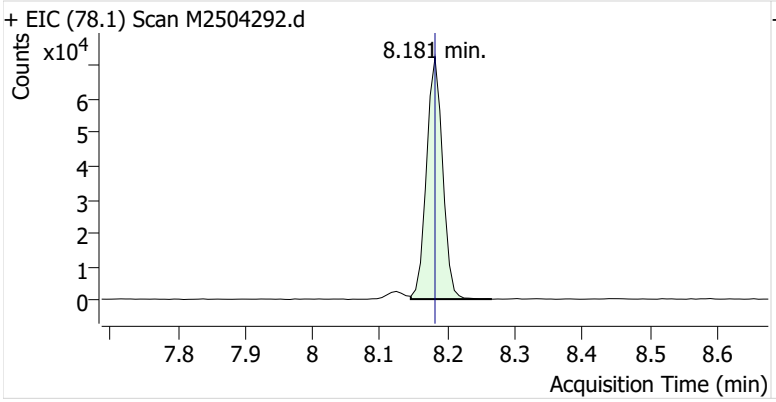
Name	ISTD	RT	ICAL RT	Resp.	Int. Flag
Benzene-d6 (IS)		8.124	8.124	519,652	
Benzene	Benzene-d6 (IS)	8.181	8.181	120,537	

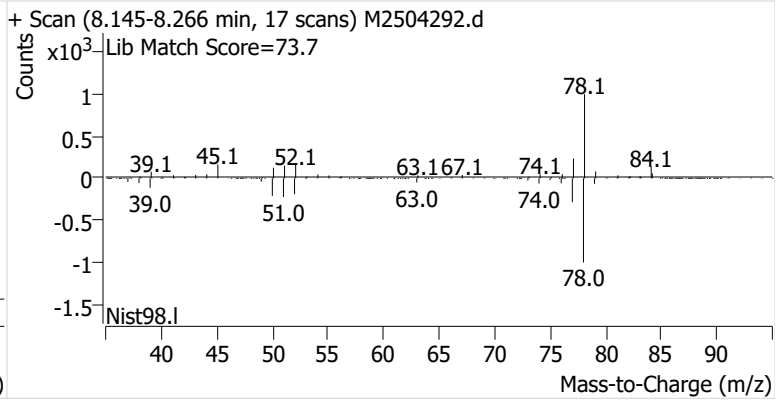
Benzene-d6 (IS)





Benzene





Initial Calibration

Enthalpy Analytical

Company: Montrose Air Quality Services, LLC - Denver
Job No.: 2025ZZ103-1 EPA Method 325B Analysis
Client No.: PROJ-043819 Site: Phillips 66 Denver

Calibration Curves

Method	Compound	Level	Cal File	Amount (ng)	Area	ISTD Amt (ng)	ISTD Area	RRF	Dev
M082025A_CC185154	Benzene	1	M2502696.d	5.92	75684	55.2	561222	1.258	0.2
M082025A_CC185154	Benzene	2	M2502697.d	11.85	130422	55.2	554079	1.098	0.048
M082025A_CC185154	Benzene	3	M2502698.d	23.69	252996	55.2	547539	1.077	0.029
M082025A_CC185154	Benzene	4	M2502699.d	47.38	478157	55.2	558431	0.998	-0.047
M082025A_CC185154	Benzene	5	M2502700.d	118.45	1160774	55.2	550881	0.983	-0.062
M082025A_CC185154	Benzene	6	M2502701.d	236.90	2358143	55.2	552162	0.996	-0.049
M082025A_CC185154	Benzene	7	M2502702.d	710.71	6445351	55.2	544275	0.920	-0.12
						Avg:	552656	1.047	
						%RSD:	1.1%	10.5%	

Calibration Curves

Method	Compound	Level	Cal File	Amount (ng)	Area	ISTD Amt (ng)	ISTD Area	RRF	Dev
M082025A_CC185154	Benzene	ICV	M2502706.d	62.78	542642	55.2	563908	0.847	-19.0%

M325B PDF Report ver.20250917

Sample Custody

ENTHALPY

Field Test Data Sheet and Chain of Custody Record

2025ZZ103 Page # of #

Standard Turn Around Time (7 business days)

Rush Turn Around Time

All TATs Subject to Approval by Enthalpy Analytical, Inc.

• Unless otherwise specified, sample tubes will be conditioned for re-use 3 business days after submission of results

Site Name:	Phillips 66 Denver	Client Name:	Phillips 66	PO#:	92738
Site Address:	N/A	Project Number:	PROJ-043819	Sample Event #	1
City:	N/A	Project Manager:	Katia Liangou	Sorbent:	CarbopackX
State	N/A	Email Address:	ailiangou@montrose-env.com		
Zip:	N/A	Telephone #:	412-425-0609		

Location	Sample ID (Tube ID)	Sample, Blank or Duplicate	Start Date	Start Time	Stop Date	Stop Time	Deployed/ Collected by	Ave. Pressure (inHg)	Avg. Ambient Temp. (°F)
Phillips 66 Denver	C69433	S	10/1/2025	12:36 PM	10/14/25	11:21am	Katia Liangou	24.87	60.44

Relinquished By (printed):	Relinquished By (signature):	Relinquished Date:	Relinquished Time:
Katia Liangou		10/16/2025	10:00 AM
Recieved By (printed):	**Recieved By (signature):**	**Receipt Date:**	**Receipt Time:**
David Taylor		10/17/25	1:00
Sample Condition Upon Receipt:	**Compound List:**	**Custody Seal intact? Y/N:**	**Delivery tracking #**
Good	Benzene	Y	4539 4956 8342
Ice Temp: / **Blank Temp:**		Add Custody Seal # below:	
16.2 / FedEx		25E1258.8	

Comments:

800-1 Capitola Drive • Durham, NC 27713 • (919) 850-4392 • FAX (919) 850-9012 • www.enthalpy.com

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