

Comment on Performance Standards for Continuously Operating Emissions Detection Systems Required by California Senate Bill 1137 for Upstream Oil and Gas Production Facilities in Health Protection Zones

Submitted by:
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Biographical information on commenter: Dr. David Allen is the Norbert Dittrich-Welch Professor in Chemical Engineering and the co-Director of the Energy and Environmental Systems Analysis at the University of Texas at Austin. Dr. Allen has been a lead investigator for multiple air quality measurement studies, including studies that have made some of the most extensive measurements of emissions from oil and gas production. He has served on a variety of governmental advisory panels and from 2012 to 2015 chaired the U.S. Environmental Protection Agency's Science Advisory Board (SAB). In 2017, he was elected to the US National Academy of Engineering. These comments are made by Dr. Allen as an individual with expertise in emissions from oil and gas operations, and the comments do not necessarily reflect the views of any of the organizations he is affiliated with.

Comment

This comment addresses the California Air Resources Board's (CARB) draft performance standards for continuously operating Emissions Detection Systems (EDSs) required by California Senate Bill 1137 for upstream oil and gas production facilities in Health Protection Zones (HPZs). These comments have been submitted, prior to the published deadline, to the portal posted by CARB at <https://ww2.arb.ca.gov/public-comments/SB-1137-workshop-development-performance-standards-EDS>. This comment is divided into 6 sections with supporting appendices:

1. Overview of proposed performance standards addressed in this comment
2. Low wind speeds and mixing heights can lead to elevated concentrations of air toxics at sensitive receptors
3. Dispersion models for predicting concentrations of air toxics at sensitive receptors need to meet performance criteria, particularly at low wind speeds and low mixing heights
4. Many sensing technologies will be unable to consistently meet a one-hour time to detection performance standard for all sources
5. Alternative performance standards
6. Summary of findings and recommendations

1. Overview of proposed performance standards addressed in this comment

SB 1137 establishes a 3,200-foot health protection zone (HPZ) between oil and gas production facilities and sensitive receptors such as residences, schools, and hospitals. Operators are required to develop and implement leak detection and response plans (LDRP) that include a continuously operating emissions detection system (EDS) and an alarm system. The draft performance criteria specify that the EDS must operate continuously (measurement resolution of one hour or less), provide automated alerts when detection targets exceed an alert threshold, and monitor meteorological conditions. The EDS for a facility can measure the toxic of highest concern or measure methane as a surrogate in combination with site-specific chemical composition analysis. An EDS must be sited to detect leaks that could impact sensitive receptors within 1 hour, based on the system's detection method and the EDS may consider variability in background concentrations due to meteorology, permitted emissions of the production equipment monitored by the EDS, and upwind sources so long as its sensitivity to detecting leaks is maintained.

The draft performance criteria specify that operators must calculate smallest leak rates from the production equipment monitored by the EDS that could cause the acute reference exposure level (REL) of the toxic of highest concern to be exceeded at a sensitive receptor within the HPZ. For the purposes of this comment, benzene, with an acute REL of $27 \mu\text{g}/\text{m}^3$ (~8 ppb) specified in the State of California Office of Environmental Health Hazard Assessment (OEHHA) summary of acute RELs, will be used as a representative toxic of highest concern. Current guidance for operators is to use the dispersion model AERMOD to estimate concentrations at receptor sites.

As proposed, this guidance may lead to frequent concentration-based monitoring alerts due to meteorological conditions such as low wind speeds and low mixing heights. Under these meteorological conditions, dispersion models may either overpredict or underpredict receptor-site concentrations, depending on the model used and the specific conditions. This comment will describe the extent to which low wind speeds and mixing heights may influence concentrations at receptor sites and how the choice of dispersion model may influence predictions of receptor site concentrations. In addition, this comment will describe representative time to detection performance for commonly deployed emission detection systems, which are typically longer than the proposed performance standard.

2. Low wind speeds and mixing heights can lead to elevated concentrations of air toxics at sensitive receptors

Multiple years of monitoring data are available from Texas and other states, reporting hydrocarbon concentrations in oil and gas production regions. These data provide a preview of the type of data that might be generated by emission detection systems deployed in response to the requirements of SB 1137. These data show that, for benzene and other hydrocarbons, daily maxima consistently occur during nighttime hours, during periods with low wind speeds and mixing heights. Observed concentrations of benzene, above California RELs, at distances of approximately a kilometer from the sources, typically persist for short periods of time.

Appendix A provides data from the Texas Commission on Environmental Quality (TCEQ) from automated gas chromatography systems that report hourly concentrations of >40 hydrocarbon species. Data are provided in the Appendix for a site located near Midland, Texas. This site is

chosen as an example for this comment since it is approximately a kilometer from oil and gas sources and since extensive dispersion and chemical transport modeling has been performed for the emissions from oil and gas sources in this region. Data are available for other monitors from the TCEQ, and other sources.

The observational data show that daily maxima in benzene concentrations, which at times exceed California's REL for benzene, are almost exclusively observed at night (8 PM to 8 AM) and daily maxima that exceeded the REL almost exclusively occurred under relatively low hourly average wind speeds (<5 mph). Almost all periods, when the observed concentrations exceed the REL, persist for only one hourly measurement. In the Permian Basin and some other oil and gas production regions, most elevated concentrations of benzene are associated with elevated concentrations of multiple light alkanes. Analyses for light alkanes, reported by Graves et al. (2025), Chen et al. (2026a,b) and Graves, et al. (2026a) in the Eagle Ford and Permian Basin production regions, have demonstrated that most elevated concentrations of light alkanes also occur at night and at low wind speeds. Under these conditions, dispersion modeling predicts that routine emissions (excluding abnormal emission events) can periodically lead to elevated concentrations of hydrocarbons at sites a kilometer or more away from oil and gas sources. These analyses are described in more detail in Appendix B and in peer-reviewed scientific publications cited in this comment.

Finding: Low wind speeds and mixing heights have the potential to lead to concentrations exceeding the REL for benzene for short periods during overnight hours at sites ~3200 ft from sources in oil and gas production regions; these elevated nighttime concentrations are often attributed to routine emissions coupled with low wind speeds and mixing heights, rather than unintended emission events.

Recommendation: EDS alarm levels should account for meteorological conditions; the time period over which emission detection systems average concentrations, for comparison with the REL, could be adjusted for meteorological conditions.

3. Dispersion models for predicting concentrations of air toxics at sensitive receptors need to meet performance criteria, particularly at low wind speeds and low mixing heights

Dispersion models have different performance characteristics under different meteorological conditions. Since low wind speeds and low mixing heights are the meteorological conditions most likely to lead to EDS alarm levels, dispersion model performance under these conditions is particularly important in the implementation of SB 1137.

CARB's current guidance for operators is to use the dispersion model AERMOD to estimate concentrations at receptor sites. AERMOD is one of multiple dispersion modeling tools that could be used in this application. Standard configurations of AERMOD do not predict dispersion during calm hours (typically wind speeds ≤ 0.5 m/s) and under other conditions, the choice of dispersion model may influence predictions of receptor site concentrations. In one case study, Graves, et al. (2026b) reported, for the Eagle Ford production region, that AERMOD predicted higher maximum concentrations under conditions of low wind speeds and low mixing heights than the CALPUFF dispersion model. These differences between dispersion models will

have a complex dependence on meteorological conditions and the characteristics of the emission releases.

Finding: AERMOD is not recommended for use at low wind speeds, which are the conditions under which elevated concentrations are most likely to occur.

Recommendation: Dispersion models for predicting concentrations of air toxics at sensitive receptors need to meet performance criteria, particularly at low wind speeds and low mixing heights.

4. Many sensing technologies will be unable to consistently meet a one hour time to detection performance standard for all sources

CARB's current guidance for operators is an EDS must be sited to detect leaks that could impact sensitive receptors within 1 hour. This criterion significantly limits the choice of sensing system. Some of the lower cost systems deployed to detect emissions on oil and gas sites are fixed point monitoring systems and multiple analyses have been performed to assess times to detection as a function of the number of fixed point monitors on oil and gas sites and their performance characteristics (e.g., sensor detection limits). For case studies described in detail in Appendix C, fixed point EDSs can be designed to have average detection times of a few hours, but emission sources with buoyant plumes, such as flares or heaters, are challenging to detect quickly by any EDS that attempts to directly sample plumes. Imaging systems, such as permanently deployed infrared camera systems, that do not directly sample emission plumes, could have shorter detection times. These systems, however, typically require a line of sight to the plume and may have difficulty in imaging plumes under conditions of low wind speed. They also have higher costs.

Finding: Many sensing technologies will be unable to consistently meet a one hour time to detection performance standard for all sources.

Recommendation: For emission sources that are challenging to detect by directly measuring releases, operators could be given the option of monitoring process conditions to identify conditions that could lead to an emission event.

5. Alternative performance standards

Sections 2, 3 and 4 of this comment suggest that (1) EDS alarm levels should account for meteorological conditions and persistence of concentrations above RELs.; (2) dispersion models for predicting concentrations at sensitive receptors need to perform well under conditions relevant to the HPZ, and particularly at low wind speeds and low mixing heights; and (3) for emission sources that are challenging to detect by directly measuring releases, operators should be given the option of monitoring process conditions to identify conditions that could lead to an emission event. In addition, alternatives to methane as surrogates for toxics of concern, such as total hydrocarbon concentrations, should be considered.

Methane is not an ideal surrogate for air toxics concentrations for all sources. For example, emissions of benzene from tanks may occur due to working losses, breathing losses and flashing. Methane concentrations in working and breathing losses would be expected to be very low, since

any methane dissolved in liquids sent to tanks would be expected to rapidly flash out of the liquids. Even for flashing losses, methane fractions in the flash gas would be expected to be much lower than in the produced gas for a site. In the case of tank emissions, total hydrocarbon measurements could be a better surrogate than methane concentrations. Other sources, relevant to specific emission sources, might have other relevant surrogates. Operators should be given the option to use surrogates other than methane in designing EDS systems.

Recommendation: Operators should be given the option to use surrogates other than methane in designing EDS systems.

6. Summary of findings and recommendations

Finding: Low wind speeds and mixing heights have the potential to lead to concentrations exceeding the REL for benzene for short periods during overnight hours at sites ~3200 ft from sources in oil and gas production regions; these elevated nighttime concentrations are often attributed to routine emissions coupled with low wind speeds and mixing heights, rather than unintended emission events.

Recommendation: EDS alarm levels should account for meteorological conditions; the time period over which emission detection systems average concentrations, for comparison with the REL, could be adjusted for meteorological conditions.

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Recommendation: Dispersion models for predicting concentrations of air toxics at sensitive receptors need to meet performance criteria, particularly at low wind speeds and low mixing heights.

Finding: Many sensing technologies will be unable to consistently meet a one hour time to detection performance standard for all sources.

Recommendation: For emission sources that are challenging to detect by directly measuring releases, operators could be given the option of monitoring process conditions to identify conditions that could lead to an emission event.

Recommendation: Operators should be given the option to use surrogates other than methane in designing EDS systems.

References

Chen, Q., Kimura, Y., Allen, D.T., Determining large methane release event durations from oil and gas production sites using continuously operating methane sensing systems, ChemRxiv doi: 10.26434/chemrxiv-2023-p8lfk (2023a).

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Chen, Z., Graves, J.D., Chen, Q., Kimura, Y., Brown, V.N., Cardoso Saldaña, F., Allen, D.T., Source attribution of seasonal variations in light alkane emissions from oil and gas operations in the Permian Basin, preprint: <https://chemrxiv.org/doi/full/10.26434/chemrxiv.15000871/v1> (2026b).

Graves, J., Kimura, Y., Modi, M., Stokes, S., Meyer, M., Hildebrandt Ruiz, L., Allen, D., Source Attribution of Elevated Ethane Concentrations Detected by Regional Monitors in Oil and Gas Production Regions, *ACS ES&T Air*, 2, 2038–2046. doi: 10.1021/acsestair.5c00235 (2025).

Graves, J.D., Chen, Z., Chen, Q., Kimura, Y., Brown, V.N., Allen, D.T., Hybrid dispersion and chemical transport modeling frameworks for characterizing sources of ambient hydrocarbons in the Permian Basin, *Atmospheric Environment*, doi: <https://doi.org/10.1016/j.atmosenv.2026.122300> (2026a).

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Appendices

Appendix A: Observations of benzene concentrations in Texas oil and gas production regions

Appendix B: Dispersion modeling of emissions in oil and gas production regions

Appendix C: Times to emission detection for on-site fixed point monitors on oil and gas production sites

Appendix A: Observations of benzene concentrations in Texas oil and gas production regions

Data from an automated gas chromatography system, operated by the Texas Commission on Environmental Quality (TCEQ), are shown in Tables A1, A2 and A3 and are available online. Data on benzene concentrations and wind speeds are shown for the most recent three months of quality assured data. The data are for a site located near Midland, Texas. Satellite imagery of the area surrounding the site is shown in Figure A1.

The data in Tables A1, A2, and A3 show that daily maxima in benzene concentrations, which at times exceed California's REL for benzene, are almost exclusively observed at night (8 PM to 8 AM local time) and daily maxima that exceeded the REL almost exclusively occurred under relatively low hourly average wind speeds (<5 mph). Almost all periods when the observed concentrations exceed the REL persist for only one hourly measurement.

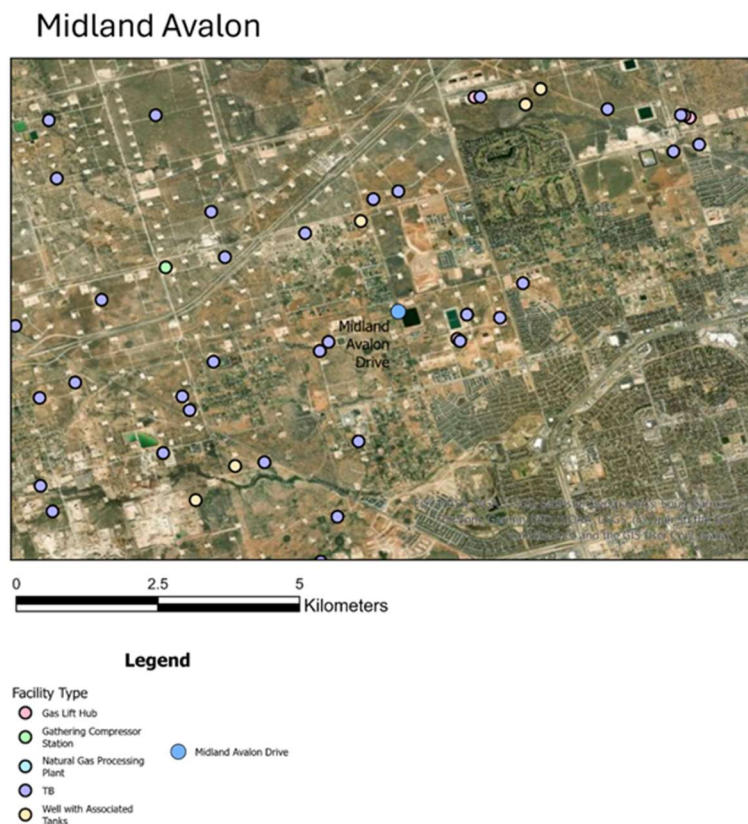


Figure A1. Infrastructure around the Midland Avalon auto-GC (Chen, et al., 2026b). Basemap provided by Esri [Esri. “World Imagery Hybrid” [Basemap]. “Imagery Hybrid.” <https://www.arcgis.com/home/item.html?id=86265e5a4bbb4187a59719cf134e0018> (accessed 2024-11-25)].

Table A1. Benzene concentrations (ppb_v) and windspeeds (miles per hour) from the Midland Avalon auto-GC for January 2026; daily maxima are indicated in bold font; data are collected by the TCEQ and available at: <https://www.tceq.texas.gov/airquality/monops/agc/auto-gc>

January 2026					Benzene (POC 1) measured in parts per billion - Volume																Local Standard Time					Statistics								
Day	Morning																Afternoon																Day	Max
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00										
x.xx Only green underlined data has been validated.																																		
1	1.39	ST	BL	0.48	0.41	0.45	0.27	0.35	0.58	0.61	0.81	0.86	0.77	0.59	0.75	0.21	0.18	0.24	0.25	0.24	0.18	0.24	0.29	0.39	1	1.39								
2	1.51	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	2									
3	1.51	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	3									
4	1.51	ST	ST	ST	BL	AOI	XX	XX	XX	XX	XX	ST	XX	XX	ST	ST	ST	ST	XX	XX	AOI	AOI	AOI	AOI	4									
5	AOI	ST	BL	CS	IO	0.57	0.69	0.61	XX	XX	XX	XX	XX	XX	BL	0.33	0.19	0.18	0.47	0.23	0.21	0.27	0.51	0.47	0.51	5	0.69							
6	0.67	0.50	0.74	1.13	1.19	1.27	1.17	1.13	0.93	1.19	0.83	0.31	0.10	0.22	0.07	0.07	0.05	0.12	0.21	0.47	0.66	0.68	ST	BL	6	1.27								
7	1.70	1.47	1.49	0.86	0.61	0.87	0.80	0.96	1.20	1.36	0.95	1.90	0.14	0.12	0.10	0.25	0.20	0.32	0.68	0.66	ST	BL	0.44	0.38	7	1.90								
8	0.16	0.32	ST	BL	AOI	AOI	AOI	AOI	AOI	AOI	AOI	AOI	0.07	0.06	0.07	0.06	0.07	0.06	0.11	0.09	0.12	0.13	0.33	0.68	8	0.68								
9	0.60	1.67	0.97	1.21	1.08	1.01	1.20	1.43	0.75	0.51	0.28	0.17	0.12	0.09	0.08	0.14	0.13	0.19	0.19	0.12	0.09	ST	BL	0.08	9	1.67								
10	0.09	0.08	ST	BL	0.12	0.09	0.13	0.19	0.21	0.19	0.12	0.14	0.09	0.08	0.07	0.07	0.07	0.09	0.13	0.25	0.84	CS	IO	2.90	10	2.90								
11	4.65	3.31	4.00	1.11	2.68	2.35	1.87	2.07	1.28	1.08	0.97	0.71	0.23	0.13	0.13	0.15	0.17	0.19	0.29	0.48	0.74	ST	ST	BL	11	4.65								
12	1.61	2.66	2.42	1.79	2.32	1.61	4.96	5.92	8.47	4.35	2.93	0.95	0.38	0.35	0.24	0.22	0.17	0.12	0.17	0.15	0.22	0.47	ST	BL	12	8.47								
13	0.58	0.94	0.92	0.24	0.18	0.08	0.09	0.11	0.16	0.25	0.19	0.15	0.11	0.16	0.16	0.11	0.19	0.17	0.25	0.39	0.55	0.60	ST	BL	13	0.94								
14	0.63	ST	BL	1.29	2.59	1.32	1.10	0.29	0.24	0.13	0.30	0.12	0.09	0.06	0.06	0.06	0.05	0.05	0.10	0.75	1.79	0.49	0.52	4.13	14	4.13								
15	3.48	ST	BL	1.05	1.40	1.05	1.31	1.40	0.82	0.85	0.60	0.26	0.19	0.18	0.22	0.20	0.17	0.19	0.20	0.26	0.28	0.21	0.35	0.17	15	3.48								
16	0.27	0.32	0.37	0.31	0.50	0.60	0.66	0.11	0.23	0.11	0.13	0.08	0.07	0.06	0.07	0.08	0.08	0.06	0.08	0.15	0.27	ST	BL	0.76	16	0.76								
17	1.12	0.68	ST	BL	0.31	0.29	0.38	0.42	0.52	0.25	0.15	0.15	AOI	0.09	0.09	0.09	0.08	0.12	0.41	0.19	0.33	CS	IO	0.62	17	1.12								
18	2.61	1.59	0.91	0.68	0.69	0.32	0.13	1.06	0.46	0.19	0.22	0.25	0.23	0.17	0.12	0.13	0.13	0.17	0.29	0.56	1.19	ST	ST	BL	18	2.61								
19	5.05	ST	BL	0.17	0.18	0.67	0.20	1.73	3.13	3.42	0.92	0.78	0.42	0.24	0.19	0.16	0.17	0.13	0.09	0.10	0.08	0.10	0.19	0.14	19	5.05								
20	0.16	1.23	ST	BL	0.44	0.92	0.67	1.17	3.28	1.94	0.55	0.38	0.20	0.20	0.21	0.24	0.41	0.26	0.26	0.42	2.66	1.19	3.31	1.45	20	3.31								
21	2.37	ST	BL	0.33	0.21	1.49	1.16	0.66	0.23	0.13	0.12	0.14	0.11	0.11	0.10	0.17	0.13	0.11	0.16	1.32	1.23	1.43	1.00	1.35	21	2.37								
22	1.44	1.65	ST	BL	1.09	0.86	0.86	0.73	1.14	0.56	0.67	0.35	0.40	0.84	0.33	0.23	0.24	0.19	0.27	0.32	0.86	2.22	1.98	2.14	22	2.22								
23	2.18	2.85	4.10	4.04	7.49	2.90	1.69	1.39	0.81	0.40	0.53	0.37	0.31	0.35	0.34	0.25	0.22	0.27	0.14	0.13	0.13	ST	BL	0.12	23	7.49								
24	0.19	0.16	ST	BL	0.16	0.15	0.13	0.15	0.21	0.18	0.19	0.16	0.18	0.19	0.25	0.43	0.17	0.19	0.15	0.13	0.12	CS	IO	0.14	24	0.43								
25	0.21	0.15	0.09	0.32	0.22	0.37	0.17	0.32	0.18	0.15	0.08	0.11	0.11	0.11	0.12	0.15	0.09	0.10	0.13	0.11	0.38	ST	BL	25	0.38									
26	4.97	8.79	3.69	17.95	17.02	8.51	5.43	3.29	1.94	1.45	2.02	1.96	0.73	0.98	0.28	0.42	0.32	0.28	0.40	0.51	0.64	0.75	0.79	0.73	26	17.95								
27	0.62	ST	BL	1.25	1.35	2.20	3.21	8.50	0.84	0.18	0.22	0.24	0.26	0.34	0.36	0.41	0.28	0.46	0.56	0.83	ST	ST	BL	2.23	27	8.50								
28	ST	BL	0.88	0.65	0.80	1.01	5.48	2.64	2.43	1.64	2.68	0.65	0.52	0.31	0.22	0.20	0.30	0.34	0.44	1.63	2.19	BL	ST	BL	28	5.48								
29	1.82	0.37	0.34	0.33	0.26	0.42	0.65	0.50	0.97	0.81	0.27	0.14	0.08	0.08	0.09	0.11	0.11	0.20	0.24	1.00	ST	BL	17.79	6.95	29	17.79								
30	1.92	1.77	ST	BL	2.38	2.84	4.15	6.57	4.76	2.42	2.08	2.65	0.78	0.48	0.21	0.13	0.14	0.22	0.28	0.35	0.81	0.93	1.22	1.18	30	6.57								
31	6.46	5.05	9.27	0.62	0.26	0.33	AOI	0.20	0.17	0.13	0.13	0.18	0.18	0.21	0.23	0.21	0.23	0.23	0.20	0.35	0.57	CS	IO	0.28	31	9.27								
Day	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Day	Max								
x.xx Only green underlined data has been validated.																																		
Currently, the Limit of Detection (LOD) applied to all AutoGC target compounds is 0.4 ppb-C. For Benzene, this equates to an LOD of 0.07 ppb-V.																																		
Maximum values for the day are bold within the table.																																		
There is no Odor Air Monitoring Comparison Value established for Benzene.																																		
There is no Short-Term Vegetation Air Monitoring Comparison Value established for Benzene.																																		
A Short-Term Health Air Monitoring Comparison Value of 180 parts per billion - Volume has been established for Benzene.																																		

January 2026					Wind Speed (POC 1) measured in																Local Standard Time					Statistics								
Day	Morning																Afternoon																Day	Max
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00										
x.xx Only green underlined data has been validated.																																		
1	8.1	6.9	5.3	6.7	6.4	4.0	4.4	5.7	5.8	7.1	6.9	7.2	11.5	12.3	17.1	19.8	15.8	12.6	11.7	13.4	14.8	13.8	14.4	12.8	1	19.8								
2	11.2	11.6	10.7	12.8	13.2	13.3	11.5	11.8	10.9	14.0	14.4	16.9	19.1	20.0	20.1	19.2	17.5	15.2	10.1	7.3	9.3	10.8	9.4	10.0	2	20.1								
3	8.7	9.0	10.7	12.1	9.2	8.2	7.5	8.3	6.8	9.0	5.7	5.3	7.1	5.7	6.7	6.1	5.6	5.2	4.0	3.2	3.5	5.4	7.0	6.8	3	12.1								
4	5.2	6.7	8.2	6.0	6.9	5.4	5.9	9.3	10.8	14.2	16.1	15.6	14.9	13.7	13.7	12.9	11.8	8.5	7.9	11.7	12.0	12.1	12.0	8.1	4	16.1								
5	7.3	7.6	8.2	7.5	6.4	5.9	3.1	4.1	5.5	12.3	15.9	15.7	15.2	16.1	15.6	14.7	12.0	9.7	8.7	8.5	9.9	7.5	8.5	4.0	5	16.1								
6	8.6	6.9	7.7	4.8	4.2	3.6	4.4	6.0	4.8	6.4	6.3	5.5	5.8	6.8	8.4	8.4	8.3	7.0	5.0	5.0	4.8	4.7	5.0	5.1	6	8.6								
7	6.3	6.8	5.4	4.1	5.7	4.8	4.1	3.3	2.2	3.7	7.4	13.0	12.3	11.2	10.7	9.5	6.3	5.1	5.4	8.6	10.1	11.0	11.4	12.8	7	13.0								
8	14.3	7.3	8.7	14.9	18.2	22.6	24.7	23.1	20.6	23.9	25.7	23.4	22.2	23.3	24.0	22.8	20.3	20.5	16.4	10.8	8.2	7.2	3.9	3.5	8	25.7								
9	5.0	4.8	7.1	5.5	6.7	4.7	3.8	7.2	9.7	13.5	18.1	19.4	20.7	24.1	24.5	19.0	16.4	11.0	7.4	15.5	20.5	20.1	20.2	17.5	9	24.5								
10	17.2	18.2	13.8	11.0	11.9	10.3	7.8	6.7	7.8	11.2	13.5	12.9	11.5	10.5	10.9	11.8	11.5	8.1	4.1	3.0	3.7	6.0	4.9	5.9	10	18.2								
11	5.8	6.4	6.9	6.3	6.0	6.6	6.1	6.8	6.5	4.5	3.5	5.4	5.9	5.4	5.2	3.9	4.4	4.6	3.8	3.7	4.6	5.0	5.3	4.7	11	6.9								
12	4.7	4.9	5.5	4.3	4.0	4.8	3.7	4.0	3.6	3.0	1.7	4.1	7.3	6.4	7.3	8.3	8.2	9.1	6.7	5.0	2.8	3.0	4.0	4.6	12	9.1								
13	5.2	4.1	5.3	8.9	9.4	11.3	6.7	2.9	2.7	3.5	2.9	4.0	6.3	9.0	9.1	10.6	10.1	8.3	6.9	6.9	5.8	5.9	6.3	6.9	13	11.3								
14	7.8	7.5	6.9	6.7	8.4	13.1	10.4	9.1	9.9	12.9	14.4	15.6	13.9	17.9	17.1	17.9	14.5	12.0	7.2	6.4	5.5	4.4	3.8	4.6	14	17.9								
15	3.9	4.5	4.4	5.8	6.2	6.7	4.6	6.6	7.9	9.7	14.1	17.4	17.3	16.3	16.4	17.2	15.8	12.2	8.5	8.2	9.5	12.2	9.5	13.3	15	17.4								
16	12.3	11.6	11.8	11.0	11.1	8.9	12.5	21.6	20.0	21.0	22.0	20.5	15.4	13.7	12.3	10.5	7.0	5.6	4.5	4.7	5.9	5.8	6.1	6.2	16	22.0								
17	5.5	4.8	9.3	12.6	10.1	8.0	4.8	5.6	6.7	10.4	15.2	17.7	18.2	19.1	18.6	16.0	12.3	8.8	4.2	2.6	2.7	3.6	4.3	4.6	17	19.1								
18	6.6	6.7	4.5	4.6	4.9	7.1	5.0	4.4	6.7	7.9	8.0	8.9	9.6	10.9	12.6	11.2	10.5	8.4	6.4	5.1	5.0	5.1	6.8	6.7	18	12.6								
19	7.9	7.5	8.5	8.9	8.8	7.4	5.7	6.1	4.9	4.3	11.4																							

January 2026					Wind Speed (POC 1) measured in												Local Standard Time								Statistics		
Day	Morning											Afternoon											Day	Max			
	Mid 1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00				11:00	
x.xx Only green underlined data has been validated.																											
1	8.1	6.9	5.3	6.7	6.4	4.0	4.4	5.7	5.8	7.1	6.9	7.2	11.5	12.3	17.1	19.8	15.8	12.6	11.7	13.4	14.8	13.8	14.4	12.8	1	19.8	
2	11.2	11.2	10.9	12.8	13.2	13.3	11.5	11.8	10.9	14.0	14.4	16.9	19.1	20.0	20.1	19.2	17.5	15.2	10.1	7.3	9.3	10.8	9.4	10.0	2	20.1	
3	8.7	9.0	10.7	12.1	9.2	8.2	7.5	8.3	6.8	9.0	5.7	5.3	7.1	5.7	6.7	6.1	5.6	5.2	4.0	3.2	3.5	5.4	7.0	6.8	3	12.1	
4	5.2	6.7	4.8	6.0	6.9	5.4	5.9	9.3	10.8	14.2	16.1	15.6	14.9	13.7	13.7	12.9	11.8	8.5	7.9	11.7	12.0	12.1	12.0	8.1	4	16.1	
5	7.3	7.6	8.2	7.5	6.4	5.9	3.1	4.1	5.5	12.3	15.9	15.7	15.2	16.1	15.6	14.7	12.0	9.7	8.7	8.5	9.9	7.5	8.5	4.0	5	16.1	
6	8.6	6.9	7.7	4.8	4.2	3.6	4.4	6.0	4.8	6.4	6.3	5.5	5.8	6.8	8.4	8.4	8.3	7.0	5.0	5.0	4.8	4.7	5.0	5.1	6	8.6	
7	6.3	6.8	5.4	4.1	5.7	4.8	4.1	3.3	2.2	3.7	7.4	13.0	12.3	11.2	10.7	9.5	6.3	5.1	5.4	8.6	10.1	11.0	11.4	12.8	7	13.0	
8	14.2	7.3	8.7	14.9	18.2	22.6	24.7	23.1	20.6	23.9	25.7	23.4	22.2	23.3	24.0	22.8	20.3	20.5	16.4	10.8	8.2	7.2	3.9	3.5	8	25.7	
9	5.0	4.8	7.1	5.5	6.7	4.7	3.8	7.2	9.7	13.5	18.1	19.4	20.7	24.1	24.5	19.0	16.4	11.0	7.4	15.5	20.5	20.1	20.2	17.5	9	24.5	
10	17.2	18.2	13.8	11.0	11.9	10.3	7.8	6.7	7.8	11.2	13.5	12.9	11.5	10.5	10.9	11.8	11.5	8.1	4.1	3.0	3.7	6.0	4.9	5.9	10	18.2	
11	5.8	6.4	6.9	6.3	6.0	6.6	6.1	6.8	6.5	4.5	3.5	5.4	5.9	5.4	5.2	3.9	4.4	4.6	3.8	3.7	4.6	5.0	5.3	4.7	11	6.9	
12	4.7	4.9	5.5	4.3	4.0	4.8	3.7	4.0	3.6	3.0	1.7	4.1	7.3	6.4	7.7	8.3	9.2	9.1	6.7	5.0	2.8	3.0	4.6	4.6	12	9.1	
13	5.2	4.1	5.3	8.9	9.4	11.3	6.7	2.9	2.7	3.5	2.9	4.0	6.3	9.0	9.1	10.6	10.1	8.3	6.9	6.9	5.8	5.9	6.3	6.9	13	11.3	
14	7.8	7.5	6.9	6.7	8.4	13.1	10.4	9.1	9.9	12.9	14.4	15.6	13.9	17.9	17.1	17.9	14.5	12.0	7.2	6.4	5.5	4.4	3.8	4.6	14	17.9	
15	3.9	4.5	4.4	5.8	6.2	6.7	4.6	6.6	7.9	9.7	14.1	17.4	17.3	16.3	16.4	17.2	15.8	12.2	8.5	8.2	9.5	12.2	9.5	13.3	15	17.4	
16	12.3	11.6	11.8	11.0	11.1	8.9	12.5	21.6	20.0	21.0	22.0	20.5	15.4	13.7	12.3	10.5	7.0	5.6	4.5	4.7	5.9	5.8	6.1	6.2	16	22.0	
17	5.5	4.8	9.3	12.6	10.1	8.0	4.8	5.6	6.7	10.4	15.2	17.7	18.2	19.1	18.1	16.0	12.3	8.8	4.2	2.6	2.7	3.6	4.3	4.6	17	19.1	
18	6.6	6.7	4.5	4.6	4.9	7.1	5.0	4.4	6.7	7.9	8.0	8.9	9.6	10.9	12.6	11.2	10.5	8.4	6.4	5.1	5.0	5.1	6.8	6.7	18	12.6	
19	7.5	7.5	8.5	8.9	8.8	7.4	5.7	6.1	4.9	4.3	11.4	14.3	16.7	17.3	18.0	19.9	19.3	16.9	15.1	14.9	12.1	7.9	5.8	6.7	19	19.9	
20	5.2	4.7	4.0	4.3	4.5	4.7	2.2	2.0	2.1	1.8	5.1	6.2	5.1	5.5	7.5	10.9	10.4	6.6	6.7	8.4	9.8	10.5	9.8	20	10.9		
21	5.9	5.6	6.4	7.2	5.8	6.0	8.6	10.2	12.0	16.3	16.9	15.4	10.4	8.2	8.1	7.5	6.5	5.8	3.7	1.9	1.1	2.4	4.5	5.7	21	16.9	
22	6.1	6.5	6.1	4.4	2.9	4.3	4.6	6.3	5.5	9.5	9.1	9.9	7.4	5.3	5.0	6.0	5.6	4.3	4.5	4.5	5.0	3.7	4.7	5.6	22	9.9	
23	4.7	3.9	5.5	4.4	4.1	5.3	5.2	7.4	8.9	10.4	12.5	12.1	12.1	15.7	16.4	19.8	16.6	LIM	LIM	LIM	LIM	LIM	LIM	LIM	23	19.8	
24	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	24		
25	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	25		
26	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	LIM	6.9	8.7	8.4	5.3	3.2	4.4	5.7	6.3	5.8	5.3	26	8.7
27	6.1	5.4	4.5	3.1	4.5	4.6	4.4	4.0	7.0	8.7	9.0	10.2	10.0	8.6	7.5	7.5	6.7	5.2	4.9	4.2	6.9	6.8	6.0	6.4	27	10.2	
28	7.4	6.4	7.6	5.8	5.3	6.0	4.9	6.0	6.4	4.4	4.6	7.3	8.5	8.7	7.2	4.9	4.5	6.0	6.9	6.8	5.3	6.1	8.3	10.1	28	10.1	
29	9.1	12.3	8.8	8.8	8.6	8.7	7.5	8.5	9.3	12.8	18.1	21.0	19.7	18.6	17.7	17.1	12.7	9.1	6.2	4.8	4.1	4.0	4.6	5.7	29	21.0	
30	7.0	5.4	4.7	3.3	5.8	3.0	2.7	3.3	5.3	3.4	3.1	2.3	2.6	4.4	5.0	4.0	2.9	3.8	2.7	4.6	5.3	4.2	3.0	2.8	30	7.0	
31	1.6	1.7	4.0	19.5	16.8	15.5	16.4	14.3	15.3	14.9	13.5	11.7	8.7	5.9	5.7	5.6	6.4	8.4	7.6	5.8	4.2	6.4	6.4	6.3	31	19.5	
Day	Mid 1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Day	Max		
x.xx Only green underlined data has been validated.																											
Currently, the Limit of Detection (LOD) applied to all AutoGC target compounds is 0.4 ppb-C.																											
Maximum values for the day are bold within the table.																											
																									Statistics		

Table A2. Benzene concentrations (ppb_v) and windspeeds (miles per hour) from the Midland Avalon auto-GC for February 2026; daily maxima are indicated in bold font; data are collected by the TCEQ and available at:

<https://www.tceq.texas.gov/airquality/monops/agc/auto-gc>

February 2026				Benzene (POC 1) measured in parts per billion - Volume												Local Standard Time						Statistics					
Day	Morning												Afternoon												Day	Max	
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00			
x.xx Only green underlined data has been validated.																											
1	1.02	ST	ST	BL	1.35	2.18	3.48	1.40	1.68	2.97	1.15	0.59	0.83	0.48	0.36	0.41	0.45	0.45	0.42	0.81	0.84	0.69	0.85	0.88	1	3.48	
2	0.73	0.55	ST	BL	0.22	0.51	1.03	0.87	0.88	0.73	2.06	0.41	0.21	0.14	0.11	0.10	0.08	0.10	1.11	1.76	2.73	0.38	0.34	0.50	2	2.73	
3	0.26	0.24	0.56	0.50	0.24	0.11	0.09	0.09	0.11	0.13	0.14	0.09	0.10	0.08	0.08	0.09	0.09	0.09	0.11	0.22	0.41	ST	BL	1.89	3	1.89	
4	0.53	0.67	2.10	0.98	1.89	1.71	1.11	0.50	0.62	LST	LST	LST	LST	LST	AOI	AOI	ST	BL	0.07	0.15	0.69	0.45	ST	BL	4	2.10	
5	0.73	0.94	ST	BL	1.57	1.15	0.94	1.37	1.31	0.73	0.32	0.19	0.19	0.25	0.19	0.25	0.21	0.23	0.42	0.37	0.36	0.34	0.60	0.95	5	1.57	
6	0.50	0.69	0.86	0.99	0.89	1.24	2.30	1.80	4.01	1.84	2.00	0.66	0.53	0.32	0.23	0.21	0.20	0.19	0.31	0.41	ST	BL	1.08	1.08	6	4.01	
7	1.44	3.00	11.94	3.11	3.64	2.69	4.73	7.40	7.50	8.76	3.33	2.29	1.23	0.38	0.41	0.24	0.32	0.30	0.22	0.24	2.22	CS	IO	0.94	7	11.94	
8	0.97	0.44	0.64	0.80	0.70	0.56	0.74	1.34	0.96	0.81	0.43	0.43	0.22	0.10	0.06	0.12	0.22	0.36	0.34	0.35	1.85	ST	ST	BL	8	1.85	
9	1.29	ST	BL	3.95	2.82	3.05	1.70	2.43	2.38	3.45	2.50	0.86	0.63	0.57	0.60	0.34	0.23	0.18	0.31	0.62	2.21	2.52	2.06	1.33	9	3.95	
10	2.29	1.36	2.00	2.33	0.91	1.40	0.92	1.50	1.93	1.80	1.86	1.20	1.00	1.89	0.22	0.34	0.47	0.23	0.27	0.23	0.26	ST	BL	0.22	10	2.33	
11	0.20	0.38	ST	BL	1.84	0.64	1.59	1.28	1.48	0.34	0.18	0.24	0.25	0.22	0.25	0.26	0.24	0.21	0.32	0.40	0.61	1.67	1.60	0.64	11	1.84	
12	0.82	0.94	0.87	0.71	0.71	0.82	0.95	1.62	1.60	0.93	0.77	0.67	AOI	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	12	1.62	
13	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	13	0.52	
14	0.71	XX	XX	XX	XX	XX	XX	BL	0.54	0.62	ST	BL	0.28	0.40	0.23	0.12	0.16	0.07	0.06	0.06	0.09	0.18	CS	IO	0.10	14	0.71
15	0.74	ST	ST	BL	0.43	0.53	1.20	0.96	1.00	0.54	0.32	0.28	0.20	0.13	0.11	0.11	0.14	0.14	0.21	0.32	0.50	0.39	0.71	0.68	15	1.20	
16	0.41	0.48	ST	BL	1.10	2.47	2.22	2.18	1.21	0.73	0.29	0.21	0.08	0.09	0.09	0.08	0.08	0.15	0.10	0.21	0.34	0.36	0.69	0.72	16	2.47	
17	0.63	0.47	0.46	0.36	0.57	1.01	0.91	0.72	0.77	0.42	0.15	0.15	0.12	0.09	0.09	0.06	0.09	0.21	0.10	0.67	0.16	ST	BL	0.32	17	1.01	
18	0.10	0.40	0.54	0.29	0.32	0.76	0.47	0.71	0.83	0.52	0.19	0.18	0.10	0.08	0.12	0.06	0.06	0.07	0.24	0.11	0.17	0.44	ST	BL	18	0.83	
19	0.20	0.26	ST	BL	0.19	0.51	0.56	0.66	0.63	0.43	0.43	0.25	0.22	0.17	0.17	0.10	0.08	0.05	0.06	0.13	0.14	0.42	0.15	0.22	19	0.66	
20	0.23	0.65	2.01	7.69	2.24	0.96	0.42	0.24	0.25	0.39	0.34	0.25	0.26	0.22	0.15	0.21	0.16	0.08	0.07	0.26	ST	BL	0.75	0.50	20	7.69	
21	0.18	0.23	0.25	0.26	0.16	0.22	0.20	0.36	0.15	0.23	0.11	0.09	0.19	0.10	0.08	0.08	0.07	0.13	0.08	0.11	0.20	CS	IO	0.41	21	0.41	
22	0.69	0.46	0.47	0.46	0.66	0.80	0.89	0.77	14.02	0.75	0.21	0.13	0.17	0.20	0.17	0.09	0.09	0.08	0.09	0.15	0.24	ST	ST	BL	22	14.02	
23	0.59	ST	BL	0.30	0.36	0.34	0.31	0.36	0.30	0.15	0.16	0.10	0.08	0.08	0.09	0.09	0.11	0.10	0.12	0.15	0.14	0.22	0.20	0.22	23	0.59	
24	0.53	0.44	0.25	0.33	0.33	0.55	0.46	0.50	0.41	0.45	0.19	0.15	0.13	0.12	0.11	0.12	0.22	0.10	0.09	0.26	0.39	ST	BL	0.32	24	0.55	
25	0.18	0.25	ST	BL	0.56	0.61	0.58	0.25	0.32	0.26	0.27	0.45	0.32	0.19	0.14	0.26	0.27	0.19	0.18	0.17	0.50	0.51	0.46	0.41	25	0.61	
26	0.56	0.66	0.94	0.60	0.42	0.68	0.22	0.15	0.19	0.11	0.21	0.12	0.17	0.12	0.15	0.16	0.17	0.18	0.18	0.18	0.90	0.68	ST	BL	26	0.94	
27	3.59	0.73	ST	BL	0.55	0.43	0.70	0.75	0.65	0.47	0.23	0.16	0.11	0.11	0.08	0.12	0.08	0.09	0.15	0.38	1.03	0.79	0.98	1.65	27	3.59	
28	0.49	0.46	0.58	0.49	0.57	0.81	1.27	1.35	1.71	0.71	0.61	0.25	0.27	0.18	0.13	0.16	0.14	0.18	0.25	0.41	0.51	CS	IO	1.69	28	1.71	
Day	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Day	Max	
x.xx Only green underlined data has been validated.																											
Currently, the Limit of Detection (LOD) applied to all AutoGC target compounds is 0.4 ppb-C. For Benzene, this equates to an LOD of 0.07 ppb-V.																											
Maximum values for the day are bold within the table.																											
There is no Odor Air Monitoring Comparison Value established for Benzene.																											
There is no Short-Term Vegetation Air Monitoring Comparison Value established for Benzene.																											
A Short-Term Health Air Monitoring Comparison Value of 180 parts per billion - Volume has been established for Benzene.																											
Statistics																											

February 2026					Wind Speed (POC 1) measured in												Local Standard Time						Statistics				
Day	Mid	Morning								Afternoon								Day	Max								
		1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00			5:00	6:00	7:00	8:00	9:00	10:00	11:00	
	x.xx	Only green underlined data has been validated.																									
1	4.8	3.3	4.7	5.6	5.1	3.1	3.2	3.0	4.1	2.2	2.4	5.1	4.9	4.6	4.6	5.6	5.3	7.1	7.3	6.6	6.2	4.8	<u>7.6</u>	6.2	1	7.6	
2	6.9	5.4	6.2	6.0	4.5	5.5	5.9	6.6	5.2	7.6	10.2	11.0	10.0	12.4	12.4	12.5	<u>13.6</u>	12.4	10.5	11.9	12.1	11.2	11.4	11.2	2	13.6	
3	11.0	8.1	8.4	10.6	12.1	15.7	14.4	11.2	11.7	15.4	13.6	16.0	15.0	13.9	12.7	8.5	6.8	4.3	4.9	5.3	6.2	8.3	9.2	8.9	3	16.0	
4	8.8	5.4	6.8	6.0	3.0	4.5	7.5	7.1	6.7	9.8	PMA	PMA	14.2	13.2	14.2	<u>18.7</u>	16.8	15.6	9.9	6.2	6.1	3.4	3.1	4.9	4	18.7	
5	5.1	3.8	2.9	5.1	5.7	6.0	5.0	5.6	4.6	8.8	13.4	15.4	<u>15.4</u>	14.6	12.4	11.1	9.6	9.4	7.9	7.8	9.2	8.8	6.8	7.4	5	15.4	
6	<u>7.7</u>	7.2	5.8	<u>6.0</u>	7.3	7.2	6.7	4.2	3.6	4.4	3.6	2.4	2.0	2.1	3.4	3.7	3.1	4.2	4.9	3.8	4.2	4.7	<u>4.3</u>	<u>4.1</u>	6	7.7	
7	4.6	5.1	4.6	3.7	3.1	2.2	3.4	4.3	2.4	2.6	3.5	3.8	8.2	<u>11.6</u>	10.5	11.1	10.8	10.2	6.7	8.4	9.4	7.6	5.4	5.1	7	11.6	
8	5.9	8.8	6.3	4.9	4.9	5.3	6.5	7.4	9.6	10.7	12.8	11.1	12.7	14.0	<u>16.2</u>	15.7	11.7	8.9	6.1	5.9	7.2	7.9	7.4	6.4	8	16.2	
9	5.3	5.5	5.0	4.6	5.3	4.9	4.9	3.3	2.2	3.3	2.9	0.8	3.9	7.5	7.9	7.9	<u>8.0</u>	6.5	4.2	3.9	4.2	5.3	6.0	4.4	9	8.0	
10	4.2	5.4	5.4	5.9	5.2	5.5	5.7	4.8	3.8	5.8	4.6	3.8	6.6	7.2	6.4	2.7	8.9	<u>11.9</u>	10.2	10.2	7.6	7.8	8.6	<u>9.7</u>	10	11.9	
11	<u>8.3</u>	7.1	6.3	4.6	5.4	7.0	7.2	5.9	5.0	7.1	5.9	4.9	3.1	3.5	3.1	2.9	2.4	2.6	2.8	4.4	4.9	5.5	5.8	5.3	11	8.3	
12	4.9	4.8	6.4	7.1	5.5	4.9	6.5	2.5	2.5	3.6	6.4	8.3	8.3	7.8	<u>10.0</u>	7.7	6.0	6.0	3.7	2.7	3.2	2.5	5.0	6.8	12	10.0	
13	9.1	7.0	6.4	6.1	6.0	5.0	2.9	3.0	2.8	6.1	10.0	11.1	11.6	13.1	13.6	14.6	<u>15.1</u>	12.9	6.8	6.7	5.5	8.6	10.3	5.6	13	15.1	
14	4.4	4.4	3.5	5.2	7.6	5.9	6.2	7.6	9.4	11.9	13.2	16.3	16.5	19.9	18.8	19.3	<u>20.8</u>	16.4	12.9	9.2	8.9	12.5	12.8	9.5	14	20.8	
15	6.9	6.2	6.5	6.7	<u>8.2</u>	7.8	6.2	6.1	6.7	6.7	6.9	7.0	5.1	4.1	3.7	4.6	4.8	6.0	7.7	7.8	7.8	7.3	6.9	7.0	15	8.2	
16	6.6	7.6	5.6	6.6	9.8	7.2	7.5	7.7	11.8	14.3	14.8	<u>14.9</u>	14.5	12.6	12.3	12.8	12.1	11.5	8.6	8.8	10.4	9.7	10.3	8.7	16	14.9	
17	8.6	7.8	8.7	8.2	8.3	8.5	9.8	4.5	5.7	12.7	15.2	13.0	13.0	14.4	17.8	<u>27.7</u>	24.8	24.4	17.1	16.0	15.8	17.0	12.4	7.2	17	27.7	
18	9.7	8.1	8.5	8.6	7.8	5.1	6.0	5.2	4.6	8.1	9.5	12.5	17.0	21.3	21.8	<u>23.6</u>	22.4	21.0	16.0	9.5	6.9	8.9	9.7	12.1	18	23.6	
19	13.1	10.6	10.0	11.9	7.9	9.0	8.6	4.5	7.1	10.3	13.4	10.2	7.0	4.4	8.6	16.1	<u>21.4</u>	19.2	17.7	12.3	8.4	8.5	7.3	6.1	19	21.4	
20	6.1	3.5	5.8	6.3	5.6	9.4	11.8	10.1	11.9	10.5	9.5	8.0	10.5	11.3	14.0	15.1	<u>18.1</u>	<u>18.7</u>	13.9	8.6	9.8	7.9	9.9	9.9	20	18.1	
21	11.7	8.3	6.3	6.1	5.0	4.3	7.2	10.6	14.6	15.5	<u>16.1</u>	15.3	14.1	13.5	12.2	12.2	12.9	11.3	10.0	8.2	8.7	9.7	9.1	7.7	21	16.1	
22	6.2	5.4	5.3	4.5	3.8	2.4	1.4	2.5	2.1	5.2	9.6	<u>12.4</u>	11.9	10.5	9.7	10.2	11.6	10.6	9.0	7.0	6.9	9.8	9.1	7.6	22	12.4	
23	6.8	6.9	6.3	7.9	8.1	10.2	9.5	7.2	10.6	17.4	<u>18.8</u>	17.7	17.4	16.1	14.3	12.6	13.7	13.2	11.2	10.3	12.2	11.3	10.6	9.5	23	18.8	
24	11.4	11.3	12.1	11.4	11.4	9.5	10.7	9.8	9.3	13.5	13.3	14.5	16.2	16.4	16.8	<u>17.3</u>	16.6	16.5	9.3	7.7	12.5	11.6	10.0	10.2	24	17.3	
25	7.8	8.1	6.6	11.0	9.5	10.9	13.4	13.6	11.1	11.2	12.3	13.3	13.3	PMA	PMA	20.5	<u>21.9</u>	20.0	16.1	13.2	11.7	8.5	8.6	9.3	11.3	25	21.9
26	9.1	7.8	8.8	10.2	8.6	8.5	13.1	12.7	12.9	<u>13.3</u>	10.0	10.1	9.2	6.9	4.6	3.1	3.1	3.2	6.6	6.7	6.7	9.5	10.7	9.6	26	13.3	
27	10.1	6.8	5.8	6.5	4.1	4.4	6.3	8.5	8.7	13.5	<u>17.0</u>	14.6	14.6	11.2	10.2	10.2	10.4	10.3	5.7	5.0	5.1	6.3	7.7	9.8	27	17.0	
28	11.1	10.1	9.5	9.8	5.2	5.1	4.9	5.1	6.7	8.8	8.7	8.3	5.4	4.6	5.8	5.9	5.6	4.7	4.4	4.9	4.5	3.7	6.2	5.6	28	11.1	
Day	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Day	Max	
x.xx Only green underlined data has been validated.																											
Currently, the Limit of Detection (LOD) applied to all AutoGC target compounds is 0.4 ppb-C.																											
Maximum values for the day are bold within the table.																											
Statistics																											

Table A3. Benzene concentrations (ppb_v) and windspeeds (miles per hour) from the Midland Avalon auto-GC for March 2026; daily maxima are indicated in bold font; data are collected by the TCEQ and available at: <https://www.tceq.texas.gov/airquality/monops/agc/auto-gc>

March 2026					Benzene (POC 1) measured in parts per billion - Volume																Local Standard Time						Statistics
Day	Morning											Afternoon											Day	Max			
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00			10:00	11:00	
x.xx Only green underlined data has been validated.																											
1	0.96	ST	ST	BL	2.26	2.50	3.42	1.16	0.59	0.52	0.35	0.23	0.13	0.12	0.12	0.08	0.08	0.10	0.11	0.16	0.15	0.18	0.21	0.45	1	3.42	
2	0.43	0.34	ST	BL	0.52	0.69	0.82	0.51	0.42	0.37	0.31	0.35	0.29	0.26	0.22	0.15	0.11	0.41	0.22	0.15	0.16	0.20	0.16	0.67	2	0.82	
3	0.43	ST	BL	0.25	0.13	0.19	0.39	0.54	0.37	0.39	0.16	0.11	0.10	0.11	0.09	0.08	0.06	0.05	0.07	0.35	0.32	0.35	0.31	0.29	3	0.54	
4	0.50	0.33	ST	BL	0.28	0.78	0.37	0.25	0.41	0.64	0.30	0.31	0.23	0.22	0.23	0.20	0.23	0.25	0.26	0.30	0.34	0.36	0.48	0.30	4	0.78	
5	0.51	0.55	0.64	0.33	0.19	0.21	0.27	0.27	0.27	0.21	LST	LST	AOI	0.14	0.04	0.05	0.05	0.07	0.09	0.09	0.11	0.10	0.17	0.08	5	0.64	
6	0.17	ST	BL	0.11	0.13	0.06	0.06	0.09	0.09	0.10	0.07	0.07	0.05	0.07	IQ	0.04	0.03	0.03	0.06	1.26	0.12	0.33	0.51	0.84	6	1.26	
7	1.25	0.65	1.27	0.34	0.48	0.93	0.21	0.77	0.40	0.08	0.16	0.07	0.09	0.09	0.07	0.08	0.07	0.07	0.07	0.08	0.15	CS	IQ	0.40	7	1.27	
8	0.58	0.96	1.97	6.22	2.98	3.50	8.08	5.40	3.15	1.89	0.70	0.31	0.27	0.18	0.13	0.18	0.13	0.20	0.12	0.15	ST	ST	BL	0.22	8	8.08	
9	0.26	0.11	ST	BL	0.13	0.09	0.13	0.12	0.24	0.62	0.61	0.33	0.19	0.15	0.11	0.10	0.10	0.18	0.17	0.31	0.37	0.63	0.45	0.13	9	0.63	
10	0.15	0.38	0.16	0.51	0.36	0.46	0.20	0.23	0.29	0.13	0.08	0.04	0.00	0.00	0.00	0.04	0.10	0.08	0.08	0.06	0.09	ST	BL	0.07	10	0.51	
11	0.10	0.09	ST	BL	0.18	0.29	0.30	0.66	0.19	0.17	0.19	0.11	0.16	0.10	0.08	0.13	0.08	0.06	0.08	0.05	0.09	0.18	0.14	0.15	11	0.66	
12	0.32	0.33	0.25	0.18	0.21	0.30	0.37	0.30	0.37	0.20	0.14	0.26	0.18	0.07	0.06	0.05	0.04	0.03	0.05	0.10	0.56	0.70	ST	BL	12	0.70	
13	0.09	0.10	0.20	0.10	0.15	0.22	LST	LST	LST	LST	LST	LST	LST	XX	XX	XX	AOI	AOI	AOI	ST	BL	0.33	0.70	0.91	13	0.91	
14	0.09	ST	BL	CS	IQ	0.24	XX	XX	XX	XX	XX	BL	0.16	0.10	0.08	0.10	0.15	0.07	0.09	0.10	0.16	0.23	0.20	0.23	14	0.23	
15	0.14	ST	ST	BL	0.22	0.32	0.30	0.34	0.41	0.31	0.16	0.11	0.03	0.06	0.09	0.08	0.09	0.06	0.09	0.14	0.12	0.09	0.09	0.11	15	0.41	
16	0.11	0.12	ST	BL	0.11	0.13	0.18	0.25	0.27	0.14	0.13	0.13	0.13	0.11	0.13	0.12	0.16	0.12	0.13	0.12	0.14	0.28	0.24	0.26	16	0.28	
17	0.39	0.25	0.38	0.34	0.43	0.41	0.44	0.32	0.16	0.13	0.11	0.11	0.12	0.10	0.08	0.12	0.09	0.14	0.17	0.13	0.24	ST	BL	0.10	17	0.44	
18	0.10	0.16	0.15	0.12	0.13	0.18	0.22	0.21	0.21	0.32	0.29	0.22	0.23	0.22	0.20	0.15	0.13	0.12	0.11	0.13	0.13	0.39	ST	BL	18	0.39	
19	0.37	0.52	ST	BL	0.57	0.49	0.61	0.73	0.30	0.27	0.24	0.26	0.12	0.10	0.07	0.08	0.08	0.07	0.07	0.42	0.58	0.35	0.54	0.17	19	0.73	
20	0.24	0.14	0.52	0.17	0.20	0.90	0.67	0.50	0.45	0.16	0.13	0.10	0.08	0.07	0.10	0.04	0.00	0.05	0.06	0.17	ST	BL	0.27	0.62	20	0.90	
21	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	AOI	AOI	LST	LST	LST	LST	21	
22	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	22	
23	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	23	
24	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	LST	24	
25	0.90	ST	BL	0.39	XX	XX	XX	XX	XX	XX	BL	0.21	0.14	0.15	0.15	0.12	0.09	0.08	0.09	0.08	0.13	0.16	0.13	0.14	25	0.90	
26	0.14	0.37	0.38	0.53	0.40	0.30	0.27	0.20	0.18	0.18	0.22	0.19	0.18	0.15	0.13	0.12	0.13	0.12	0.09	0.08	0.12	0.12	ST	BL	26	0.53	
27	0.44	0.72	0.23	0.30	0.23	0.57	0.89	1.08	0.10	0.08	0.09	0.11	0.08	0.12	0.11	0.08	0.08	0.07	0.07	0.10	ST	BL	0.08	0.13	27	1.08	
28	0.13	0.09	ST	BL	0.10	0.13	0.11	0.09	0.10	0.10	0.10	0.14	0.13	0.10	0.16	0.12	0.14	0.17	0.15	0.16	0.17	CS	IQ	0.28	28	0.28	
29	0.20	0.28	0.29	0.36	0.20	0.11	0.14	0.28	0.20	0.21	0.16	0.12	0.08	0.10	0.10	0.07	0.09	0.11	0.11	0.11	0.16	ST	ST	BL	29	0.36	
30	0.12	0.14	ST	BL	0.26	0.59	0.59	0.14	0.15	0.20	0.27	0.26	0.19	0.13	0.16	0.15	0.09	0.06	0.07	0.09	0.10	0.12	0.17	0.14	30	0.59	
31	0.13	0.15	0.18	0.26	0.24	0.17	0.23	0.31	0.21	0.16	0.10	0.10	0.12	0.12	0.10	0.11	0.12	0.13	0.14	0.14	0.20	0.20	ST	BL	31	0.31	
Day	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Day	Max	
x.xx Only green underlined data has been validated.																											
Currently, the Limit of Detection (LOD) applied to all AutoGC target compounds is 0.4 ppb-C. For Benzene, this equates to an LOD of 0.07 ppb-V.																											
Maximum values for the day are bold within the table.																											
There is no Odor Air Monitoring Comparison Value established for Benzene.																											
There is no Short Term Vegetation Air Monitoring Comparison Value established for Benzene.																											
A Short-Term Health Air Monitoring Comparison Value of 180 parts per billion - Volume has been established for Benzene.																											

March 2026					Wind Speed (POC 1) measured in																Local Standard Time						Statistics
Day	Morning											Afternoon											Day	Max			
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00			10:00	11:00	
x.xx Only green underlined data has been validated.																											
1	5.5	3.7	4.0	3.8	3.5	4.2	6.0	8.0	8.2	12.1	13.1	12.6	12.9	12.3	12.8	12.3	11.0	9.8	9.9	12.6	12.9	14.1	13.3	12.8	1	14.1	
2	11.8	10.6	8.8	7.8	8.8	7.5	10.9	11.0	12.8	11.9	10.3	8.2	4.9	3.6	6.9	8.9	12.1	12.6	12.3	10.6	11.6	13.7	14.5	12.5	2	14.5	
3	14.5	15.0	10.1	9.2	7.9	10.9	10.1	7.1	5.6	11.9	14.6	14.4	13.0	12.0	12.5	10.6	9.4	7.8	5.8	7.8	10.9	12.5	11.9	12.3	3	15.0	
4	12.6	8.1	9.5	9.3	10.3	8.6	13.9	16.3	17.2	15.1	11.9	8.4	6.3	3.4	4.3	5.2	5.3	5.9	5.2	4.7	7.5	9.3	10.4	8.8	4	17.2	
5	3.7	2.9	3.7	9.6	10.8	7.1	7.6	8.0	15.1	19.3	20.3	20.3	17.9	16.5	16.0	14.6	13.6	15.6	14.4	11.3	12.5	17.1	13.8	13.7	5	20.3	
6	11.6	13.2	16.6	16.9	17.3	22.1	17.9	14.2	14.5	14.4	13.3	17.9	18.9	19.2	18.5	17.7	16.4	15.7	11.4	9.2	8.4	5.9	5.4	2.1	6	22.1	
7	6.3	9.0	7.6	15.2	16.8	19.7	18.1	20.5	22.5	23.5	20.6	17.8	15.7	13.1	11.5	11.1	11.4	10.3	8.1	5.6	6.0	5.5	5.2	5.9	7	23.5	
8	3.2	4.8	4.8	3.8	3.2	5.8	3.8	4.1	2.9	5.8	3.5	3.4	4.2	6.0	7.9	10.3	11.5	12.2	9.5	6.3	10.0	11.7	12.7	8	12.7		
9	13.7	18.0	15.8	16.9	13.6	10.1	7.7	9.2	9.5	7.8	8.4	7.3	6.7	6.5	6.7	5.5	5.2	5.6	3.4	4.0	4.9	6.5	11.8	15.2	9	18.0	
10	15.5	15.3	9.9	6.3	9.1	15.6	13.2	13.0	15.2	18.3	17.0	20.0	22.8	20.0	16.9	23.8	24.5	22.6	23.9	18.3	17.3	22.5	24.7	21.3	10	24.7	
11	10.7	8.7	10.8	14.1	13.3	11.0	10.1	11.5	26.1	27.2	28.7	30.0	28.0	26.4	23.8	20.1	18.4	17.0	14.2	11.8	11.5	11.7	13.8	9.7	11	30.0	
12	9.9	9.0	7.4	7.3	9.0	8.0	5.3	2.4	7.8	12.3	16.1	14.0	15.7	16.9	19.4	21.4	20.1	18.0	15.7	11.4	13.1	14.4	14.7	17.4	12	21.4	
13	16.1	16.0	11.9	9.1	9.0	8.8	9.3	11.0	12.5	12.4	16.8	14.1	13.4	12.5	14.2	16.4	17.3	14.1	9.5	5.1	4.8	6.0	9.7	16.6	13	17.3	
14	17.8	14.4	9.7	10.5	8.9	6.4	5.8	6.8	7.9	9.2	9.4	12.1	11.5	12.7	13.1	13.7	15.0	15.3	16.4	13.9	13.1	12.3	13.7	13.3	14	17.8	
15	13.4	16.0	15.2	16.0	13.9	11.9	12.4	12.1	13.3	14.3	22.3	23.0	23.6	27.0	26.0	27.4	26.7	28.9	27.3	25.8	24.9	20.9	19.4	18.8	15	28.9	
16	16.0	16.2	12.4	11.4	10.8	7.5	5.8	5.2	7.1	6.9	7.4	7.5	7.3	6.5	6.8	7.0	6.2	7.0	6.8	6.7	5.0	5.4	6.2	8.1	16	16.2	
17	10.8	9.7	8.4	7.3	7.4	9.3	11.6	11.6	14.8	17.0	15.7	15.1	14.4	15.4	18.0	18.8	19.2	16.5	16.1	18.3	18.7	17.5	18.1	17.9	17	19.2	
18	16.9	14.7	15.9	14.9	10.3	7.6	6.0	5.2	7.4	5.5	3.6	3.1	5.4	8.2	9												

March 2026					Wind Speed (POC 1) measured in														Local Standard Time						Statistics	
Day	Morning											Afternoon											Day	Max		
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00			10:00	11:00
x.xx Only green underlined data has been validated.																										
1	5.5	3.7	4.0	3.8	3.5	4.2	6.0	8.0	8.2	12.1	13.1	12.6	12.9	12.3	12.8	12.3	11.0	9.8	9.9	12.6	12.9	14.1	13.3	12.8	1	14.1
2	11.8	10.6	8.8	7.8	8.8	7.5	10.9	11.0	12.8	11.9	10.3	8.2	4.9	3.6	6.9	8.9	12.1	12.6	12.3	10.6	11.6	13.7	14.5	12.5	2	14.5
3	14.5	15.0	10.1	9.2	7.9	10.9	10.0	7.1	5.6	11.9	14.6	14.4	13.0	12.0	12.5	10.6	9.4	7.8	5.8	7.8	10.9	12.5	11.9	12.3	3	15.0
4	12.6	8.1	9.5	9.3	10.3	8.6	13.9	16.3	17.2	15.1	11.9	8.4	6.3	3.4	4.3	5.2	5.3	5.9	5.2	4.7	7.5	9.3	10.4	8.8	4	17.2
5	3.7	2.9	3.7	9.6	10.8	7.1	7.6	8.0	15.1	19.3	20.3	20.3	17.9	16.5	16.0	14.6	13.6	15.6	14.4	11.3	12.5	17.1	13.8	13.7	5	20.3
6	11.6	13.2	16.6	16.9	17.3	22.1	17.9	14.2	14.5	14.4	13.3	17.9	18.9	19.2	18.5	17.7	16.4	15.7	11.4	9.2	8.4	5.9	5.4	2.1	6	22.1
7	6.3	9.0	7.6	15.2	16.8	19.7	18.1	20.5	22.5	23.5	20.6	17.8	15.7	13.1	11.5	11.1	11.4	10.3	8.1	5.6	6.0	5.5	5.2	5.9	7	23.5
8	3.2	4.8	4.8	3.8	3.2	5.8	3.8	2.9	5.8	5.5	5.3	3.4	4.2	6.0	7.9	10.3	11.5	12.2	9.5	6.3	10.0	11.7	12.7	8	12.7	
9	13.7	18.0	15.8	16.9	13.6	10.1	7.7	9.2	9.5	7.8	8.4	7.3	6.7	6.5	6.7	5.5	5.2	5.6	3.4	4.0	4.9	6.5	11.8	15.2	9	18.0
10	15.5	15.3	9.9	6.3	9.1	15.6	13.2	13.0	15.2	18.3	17.0	20.0	22.8	20.0	16.9	23.8	24.5	22.6	23.9	18.3	17.3	22.5	24.7	21.3	10	24.7
11	10.7	8.7	10.8	14.1	13.3	11.0	10.1	11.5	26.1	27.2	28.7	30.0	28.0	26.4	23.8	20.1	18.4	17.0	14.2	11.8	11.5	11.7	13.8	9.7	11	30.0
12	9.9	9.0	7.4	7.3	9.0	8.0	5.3	2.4	7.8	12.3	16.1	14.0	15.7	16.9	19.4	21.4	20.1	18.0	15.7	11.4	13.1	14.4	14.7	17.4	12	21.4
13	16.1	16.0	11.9	9.1	9.0	8.8	9.3	11.0	12.5	14.2	16.8	14.1	13.4	12.5	14.2	16.4	17.3	14.1	9.5	5.1	4.8	6.0	9.7	16.6	13	17.3
14	17.8	14.4	9.7	10.5	8.9	6.4	5.8	6.8	7.9	9.2	9.4	12.1	11.5	12.7	13.1	13.7	15.0	15.3	16.4	13.9	13.1	12.3	13.7	13.3	14	17.8
15	13.4	16.0	15.2	16.0	13.9	11.9	12.4	12.1	13.3	14.3	22.3	23.0	23.6	27.0	26.0	27.4	26.7	28.9	27.3	25.8	24.9	20.9	19.4	18.8	15	28.9
16	16.0	16.2	12.4	11.4	10.8	7.5	5.8	5.2	7.1	6.9	7.4	7.5	7.3	6.5	6.8	7.0	6.2	7.0	6.8	6.7	5.0	5.4	6.2	8.1	16	16.2
17	10.8	9.7	8.4	7.3	7.4	9.3	11.4	11.6	14.8	17.0	15.7	15.1	14.4	15.4	18.0	18.8	19.2	16.5	16.1	18.3	18.7	17.5	18.1	17.9	17	19.2
18	16.9	14.7	15.9	14.9	10.3	7.6	6.0	5.2	7.4	5.5	3.6	3.1	5.0	8.2	9.2	9.7	8.6	6.9	4.9	5.7	7.7	8.2	11.0	11.4	18	16.9
19	11.0	9.5	8.0	8.2	9.0	6.5	7.4	6.7	11.5	10.5	8.8	7.8	7.9	9.2	8.7	8.6	9.2	9.7	8.3	7.3	11.4	14.2	14.3	13.8	19	14.3
20	15.3	11.9	10.8	10.1	9.3	9.4	9.7	7.8	9.1	11.4	13.1	12.0	12.3	PMA	11.4	9.2	8.8	6.9	3.9	8.2	11.1	10.9	10.6	11.8	20	15.3
21	12.7	12.5	10.6	10.6	6.7	7.9	8.8	4.1	4.1	7.6	10.0	9.4	9.0	8.6	9.0	7.5	8.7	9.3	8.9	7.0	8.8	14.0	16.1	14.2	21	16.1
22	14.1	12.5	11.8	12.2	12.9	12.5	10.0	9.3	12.1	14.2	13.1	13.7	11.8	12.3	11.3	11.1	10.6	10.5	8.8	19.5	23.7	20.2	23.2	21.7	22	23.7
23	20.2	18.2	16.9	16.0	11.8	11.5	11.0	10.1	14.6	13.1	10.4	7.6	4.7	4.3	4.5	3.4	3.2	6.1	6.3	4.9	4.4	3.2	2.5	5.3	23	20.2
24	4.2	4.2	4.8	5.3	6.1	6.0	6.5	6.0	6.1	9.5	6.9	6.1	4.8	4.3	4.4	5.0	6.5	7.9	8.8	7.6	10.2	13.0	12.5	11.9	24	13.0
25	10.1	9.0	10.4	11.4	11.1	11.0	11.0	11.4	12.6	11.9	12.1	10.7	10.6	12.1	14.0	14.9	16.3	14.3	10.7	10.1	13.0	14.0	14.6	12.3	25	16.3
26	8.6	7.4	9.1	9.7	10.9	8.2	11.8	16.3	19.0	17.4	16.5	16.3	16.7	15.7	15.6	16.1	17.7	18.6	18.9	17.5	17.8	15.3	14.0	14.4	26	19.0
27	12.5	10.1	7.5	7.8	22.9	30.0	31.1	29.8	28.1	23.5	23.9	23.8	24.9	25.8	24.0	21.3	20.6	23.0	20.8	17.1	18.1	18.9	17.1	14.2	27	31.1
28	14.0	12.9	11.7	10.9	10.0	13.5	15.7	15.8	11.0	9.0	5.8	5.6	4.2	5.7	6.8	7.7	7.8	9.8	11.8	10.2	7.4	5.5	9.1	12.3	28	15.8
29	9.9	9.5	12.0	13.0	15.8	15.3	14.5	16.0	18.2	17.7	16.3	15.5	14.6	14.2	13.4	13.3	14.2	15.6	15.2	13.0	13.1	11.9	13.7	13.3	29	18.2
30	13.1	13.8	13.2	10.3	12.5	14.2	15.9	17.4	18.2	17.8	17.2	17.1	15.2	13.8	12.8	13.6	16.1	16.7	15.2	15.0	16.4	12.6	12.6	12.9	30	18.2
31	11.1	12.7	13.3	13.5	13.6	12.7	12.8	13.2	15.5	13.8	10.3	4.9	4.2	7.0	8.5	10.1	8.6	9.1	9.2	8.4	13.8	16.2	16.0	13.5	31	16.2
Day	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Day	Max
x.xx Only green underlined data has been validated.																										
Currently, the Limit of Detection (LOD) applied to all AutoGC target compounds is 0.4 ppb-C.																										
Maximum values for the day are bold within the table.																										
Statistics																										

Appendix B: Dispersion modeling of emissions in oil and gas production regions

Analyses for light alkanes, reported by Graves et al. (2025) and Chen et al. (2026a,b) in the Eagle Ford and Permian Basin production regions, have demonstrated that most elevated concentrations of light alkanes occur at night and at low wind speeds. Figure B1 shows a year-long time series for hourly averaged ethane concentrations observed at a monitoring site in the Eagle Ford (Graves, et al., 2025), with the time of day of the hours in the top 1% of observed concentrations identified. Almost all of the highest observed light alkane concentrations occur at night.

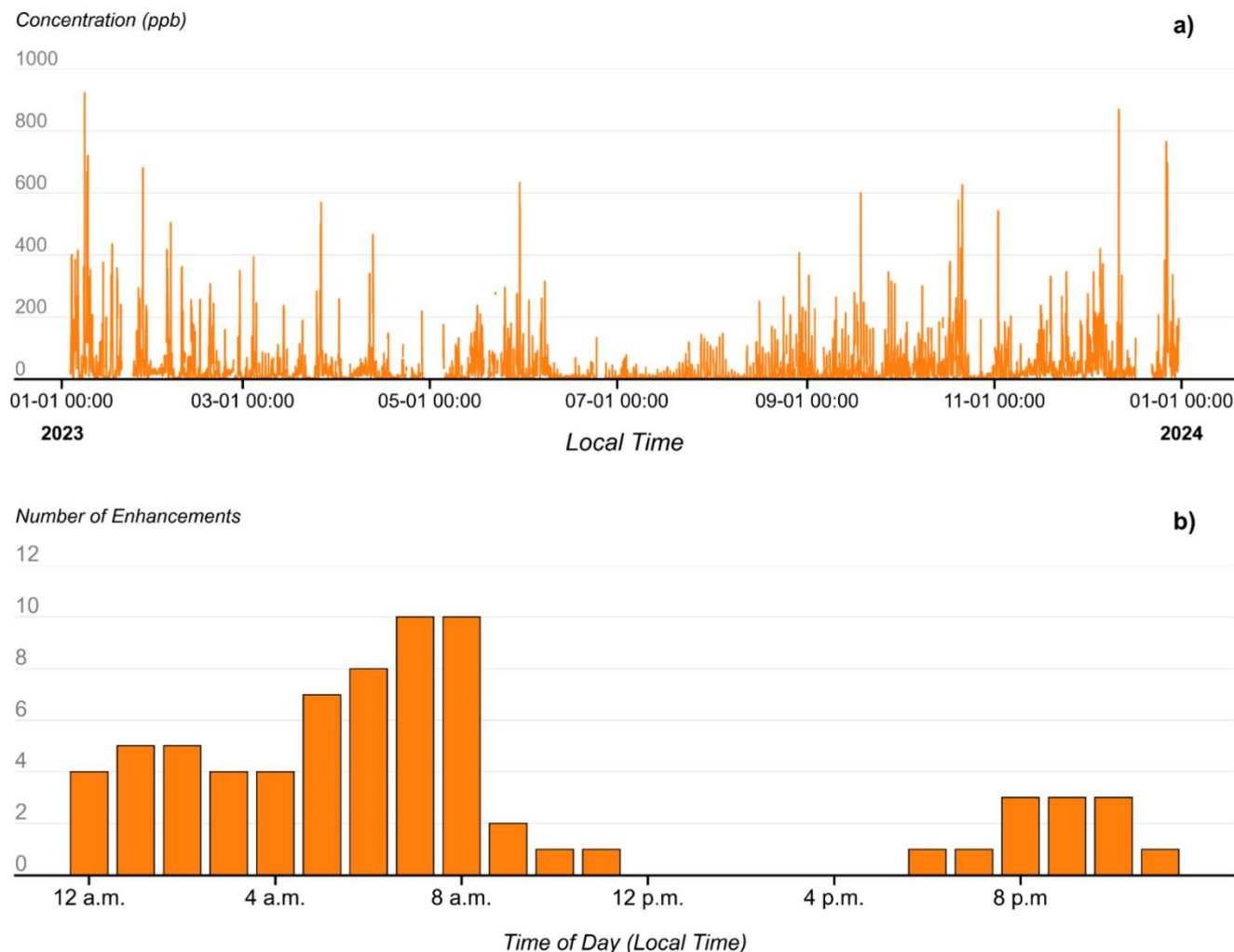


Figure B1. (a) Year-long time series for ethane at a ground site measuring hydrocarbons with hourly time resolution in the Eagle Ford oil and gas production region; (b) Counts of concentrations above the 99th percentile of all hourly averaged concentrations observed at the measurement site in 2023 binned by hour of day. (Graves, et al., 2025)

For the data shown in Figure B1, dispersion modeling using CALPUFF predicts that routine emissions account for most of the highest observed concentrations. Comparisons between observed and predicted ethane concentrations are shown in Figure B2. Method descriptions and additional analyses are reported by Graves, et al. (2025).

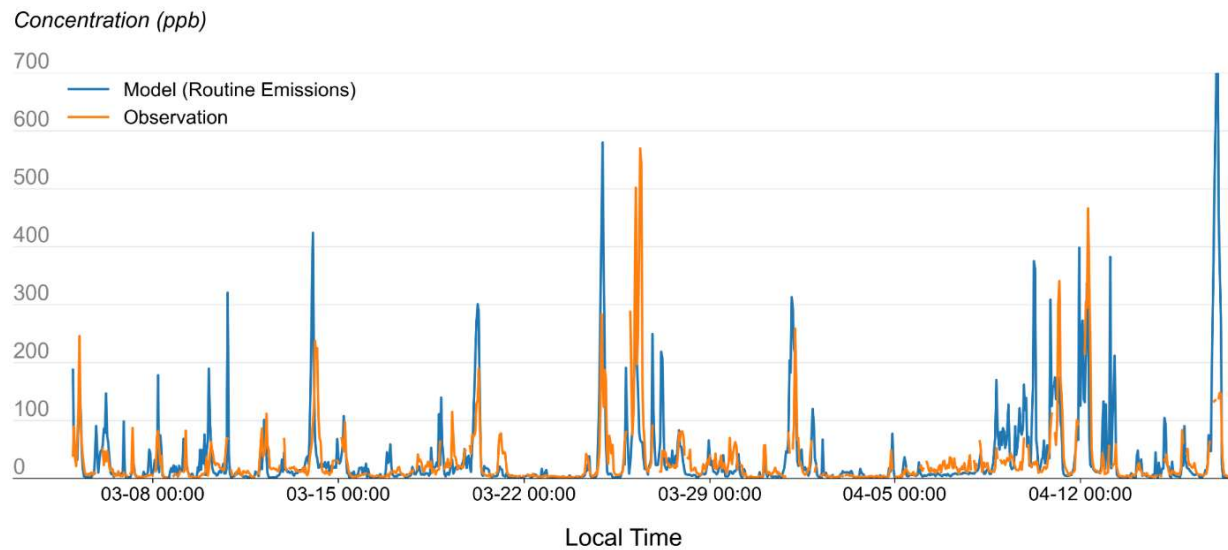


Figure B2. Dispersion modeling using CALPUFF based on routine emissions coupled with local meteorological data; routine emissions are predicted to account for most of the highest observed concentrations (Graves, et al., 2025)

Appendix C: Times to emission detection for on-site fixed point monitors on oil and gas production sites

An approach to assess the effectiveness of continuously operating methane monitoring systems in detecting emission events has been reported by Chen, et al. (2023a,b), and is demonstrated using a case study of a group of 9 different sources at varying heights and locations on a single oil and gas production pad, representative of a tank battery. Using site specific meteorological data and dispersion modeling, the time periods when a sensing system is able to detect emission events was determined. Figure C-1 shows the prototypical site configuration used in the analysis. This configuration includes compression and liquid handling and processing equipment for multiple production wells. The sources include tanks, compressors, a flare, dehydrators, pumps, separators (including associated pneumatic devices), and other equipment. A detailed description of the sources on this prototypical site is provided by Chen, et al. (2023a). Of the 9 sources, some are non-buoyant and release emissions near ground level. Other sources (tanks) have non-buoyant emissions that are released at ~5 m above ground level (AGL). Still other sources (compressor exhaust and flares) release emissions at higher elevations and the releases are buoyant. Also shown in Figure C-1 are four potential sensor locations. The placements were restricted to the periphery of the site. This is often a practical constraint encountered in the field, so that the sensing systems do not interfere with operator access to equipment. The sensor locations selected were the placements that led to the highest averaged probability of detection across the 9 sources at the site.

Dispersion modeling was performed using the methodologies reported by Chen, et al. (2023a). Briefly, CALPUFF v7.2.17 was used to estimate concentrations at sensor sites with a 1 min time resolution. The primary meteorological data set was 1-minute wind speed and direction data collected by six meteorological stations in a sampling network. Meteorological data from March 26th to April 8th 2022 (local standard time, LST) was selected as the primary data set, as the wind directions across this 2-week period are broadly representative of annual weather patterns (Chen, et al., 2023a). Dispersion of sources emitting methane at a rate of 100 kg/hr were modeled. If the dispersion modeling results indicated that a sensor would be exposed to a background-corrected methane enhancement of 10 ppm or more for at least 1 min, the emission was assumed to be detected. The detection threshold of 10 ppm was based on the performance of multiple types of sensors deployed in field testing in the Permian Basin. The primary event detection threshold of a methane enhancement of 10 ppm over a one-minute period could also be supplemented with a persistence criterion. Chen, et al. (2023b) present an analysis that combines a detection criterion of a 10 ppm methane enhancement for one minute with an average 5 ppm enhancement over a 15 minute period. Table D-1 shows the average time to detection for each source in Figure C-1, if one (S1 in Figure C-1), two (S1, S2 in Figure C-1), three (S1, S2, S3 in Figure C-1) or four sensors are deployed. Table C-1 reports average times until detection for 100 kg/hr release events starting at a random time. Sources with emissions that are buoyant (e.g., compressor exhaust and flares) have longer times to detection than non-buoyant emissions. The average time to detection averaged over all sources is 12 hours. The full range of times until detection range from 0 minutes, if the sensor is able to detect the emission at the moment it starts, to a maximum of ~83 hours (3.5 days), for the compressor if only one sensor is on the site. More details are provided by Chen, et al., 2023b.

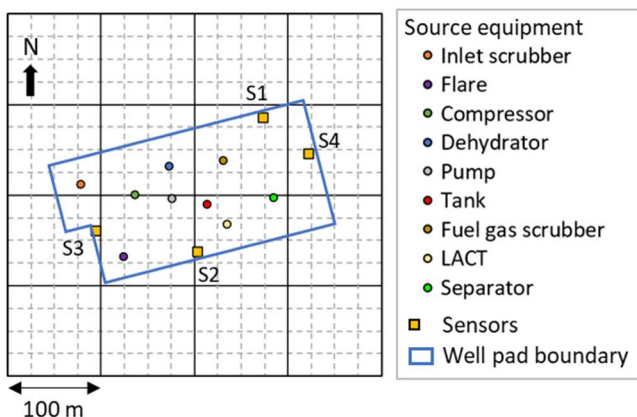


Figure C-1. A typical tank battery site configuration with multiple emission source locations and four sensor locations arrayed around the perimeter of the pad.

Table C-1. Average time to detection for a large emission event at a tank battery site

Source	Time (hours) until detection for different numbers of sensors on the model site			
	1 Sensor	2 Sensors	3 Sensors	4 Sensors
Compressor	25	16	13	13
Dehydrator	7.9	4.3	3.0	2.7
Flare	19	16	11	7.4
Fuel gas scrubber	5.6	3.2	2.4	1.6
Inlet scrubber	12	7.3	5.8	5.8
LACT	9.6	3.1	2.9	2.2
Separator	9.7	3.2	3.1	2.0
Tank	9.2	3.6	2.8	1.9
Pump	7.2	4.0	2.7	2.2
Average over all sources	12	6.8	5.2	4.3
Minimum	5.6	3.1	2.4	1.6
Maximum	25	16	13	13

The average values of time to detection of a large release event for this prototypical site provide guidance on how effective continuous monitoring systems could be in achieving a specified time to detection for release events. The analysis shows that deployment of continuous sensors will shorten the time to detection compared to monthly or quarterly monitoring, but that detecting emission events within one hour using fixed sensors will be difficult for many sources. Sensitivity analyses have been done on sensor characteristics, such as detection limits, and similar analyses could be done for other types of EDS sensors, such systems that integrate measurements along a measurement path.