# 2025 Q1 MOBILE MONITORING VAN REPORT COMMERCE CITY NORTH DENVER COMMUNITY AIR MONITORING NETWORK COMMERCE CITY, COLORADO

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## EXECUTIVE SUMMARY

In response to community feedback Suncor Energy (U.S.A.) Inc. (Suncor) voluntarily developed an air monitoring program to gain insight into air quality for neighborhoods in the vicinity of Suncor's operations in Commerce City, Colorado in 2021. On December 31, 2024, Suncor became required to conduct community monitoring pursuant to CRS § 25-7-146(3)(a). Suncor, however, voluntarily engaged a third-party consultant to perform health risk assessments and publish reports of its monitoring results online. Montrose Environmental Group - Air Quality Services, LLC (Montrose) operates the air monitoring network in the Commerce City and North Denver (CCND) neighborhoods, and health scientists from CTEH, LLC (CTEH®) perform a screening-level human health risk assessment. A screening-level assessment compares exposure concentrations (ECs) to reference levels (RLs) set by state and/or federal guidance that represent exposure levels that protect public health and the environment.

Air monitoring under the program is continuous and near real-time, and uses three separate technical approaches:

(1) Continuous, near real-time air monitoring for the following compounds using sensor technology: carbon monoxide (CO), sulfur dioxide ($SO_2$), hydrogen sulfide ($H_2S$), nitrogen dioxide ($NO_2$), particulate matter ($PM_{2.5}$), total volatile organic compounds (tVOCs), benzene, toluene, ethylbenzene, and xylenes;

(2) Periodic (planned and triggered) air sample collection and laboratory analysis for the presence of 59 VOCs from evacuated canisters (colloquially referred to as "Summa" canisters); and

(3) Periodic real-time air monitoring throughout six neighborhoods using a mobile monitoring van to detect the presence of 65 chemicals that are evaluated as 18 individual chemicals with the remaining 47 chemicals being combined into 12 chemical groups known as isomer groups.

This report details the third approach: the real-time mobile monitoring approach. This report conducts a screening health risk assessment of the detected compounds. The mobile monitoring van contains equipment to measure air concentrations of chemical compounds at ultra-low concentrations. Specifically, the equipment measures sub-parts per billion (ppb) levels at an interval of one reading a second.

To collect this data, the van drove a route through six CCND residential neighborhoods within a three-mile radius of Suncor operations. For each neighborhood, the route was traversed at approximately 10 miles per hour (mph), and data was collected every one second for each of the 65 chemicals. During the first quarter of 2025, the mobile monitoring van collected 52,001 readings and meteorological data for every chemical across the six CCND neighborhoods. A risk assessment was subsequently conducted to determine if the maximum 1-hour average concentrations of individual or cumulative (combined) VOCs could potentially increase the risk of

acute (short-term) adverse health effects. The risk assessment followed federal and state guidelines. The air monitoring data and health risk assessment results for this reporting period indicate the following overall findings:

- All HQs were less than one for all detected chemicals and chemical groups, indicating that the maximum 1-hour rolling average concentration for each chemical was below its respective acute RL in all six neighborhoods (Figures 2 through 7).

- In this quarter, benzene, hydrogen cyanide, hydrogen sulfide, hexene group, toluene, trimethylbenzene group, and xylenes were the chemicals or isomer groupings resulting in the highest HQ in each neighborhood, accounting for over 94% of the total calculated HI values. However, all HI values calculated in all six neighborhoods were below one (Figures 2 through 7).

- These results indicate that the measured concentrations of chemicals, both individually and cumulative (combined), are not expected to be associated with an increased risk of adverse acute health effects, even for sensitive sub-populations.

# 1.0 INTRODUCTION

In response to community feedback received by Suncor Energy (U.S.A.) Inc. (Suncor) during community engagement that was conducted in the fall of 2020, Suncor voluntarily developed a continuous, near real-time air monitoring program to gain insight into the air quality for neighborhoods in the vicinity of Suncor's operations in Commerce City, Colorado in 2021. On December 31, 2024, Suncor became required to conduct community monitoring pursuant to CRS § 25-7-146(3)(a). Suncor, however, voluntarily engaged a third-party consultant to perform health risk assessments and publish reports of its air monitoring results online. Montrose Environmental Group - Air Quality Services, LLC (Montrose) was contracted by Suncor to deploy, operate, and maintain the network in the Commerce City and North Denver (CCND) neighborhoods, perform screening-level health risk assessments, and publish reports on the air monitoring results online.

Air monitoring was accomplished through three separate technical approaches:

(1) Continuous, near real-time air monitoring for the following compounds using sensor technology: carbon monoxide (CO), sulfur dioxide ($SO_2$), hydrogen sulfide ($H_2S$), nitrogen dioxide ($NO_2$), particulate matter ($PM_{2.5}$), total volatile organic compounds (tVOCs), benzene, toluene, ethylbenzene, and xylenes;

(2) Periodic (planned and triggered) air sample collection and laboratory analysis for the presence of 59 VOCs from Summa canisters; and,

(3) Periodic real-time air monitoring throughout six neighborhoods using a mobile monitoring van to detect the presence of 65 chemicals that are evaluated as 18 individual chemicals with the remaining 47 chemicals being combined into 12 chemical groups known as isomer groups.

This report details the third approach: the real-time mobile monitoring approach. Air monitoring, sampling and analysis from the first two approaches were conducted in accordance with the Quality Assurance Project Plan (QAPP) that can be found online at ccnd-air.com/documents.

# 2.0 MOBILE SAMPLING PROGRAM

## 2.1 Mobile Van Air Sampling Description

The mobile monitoring van is a Mercedes 2500 Sprinter Van, which is outfitted with equipment necessary to identify and quantify individual chemical compounds present in ambient air to sub-part per billion (ppb). Specifically, the mobile monitoring van is equipped with an Ionicon Model 6000-X2 proton transfer reaction time-of-flight mass spectrometer (PTR-TOF-MS). This instrument provides concentrations of select chemicals at ppb levels and as quickly as one measurement per second. The mobile monitoring van is outfitted with an external sampling system, which transports ambient air from outside of the van into the PTR-TOF-MS sample inlet for immediate real-time analysis. The entire sampling system is comprised of Teflon or Teflon-coated materials, which ensures the lowest amount of sample loss due to surface absorption of

chemical molecules. The mobile monitoring van incorporates a high-precision global positioning system (GPS), a sonic anemometer to measure wind direction and wind velocity. Specifically, an Ionicon Model 4000 PTR-TOF-MS was used for the March 10-12, 2025 testing.

During the mobile monitoring program, the van's instrumentation measured the 18 chemicals and 12 chemical groups, that cover the 65 chemicals listed in Table 1. The groupings consist of compounds with the same chemical composition but different chemical structure (called isomers). Table 1 and Appendix A provide more detail on the usefulness of isomer grouping. Grouped compounds are assessed together as a single chemical group rather than as an individual chemical. Compounds selected for analysis are typical chemicals monitored in urban and industrial areas that are within the analytical capabilities of the mobile monitoring van.

The details of the monitored neighborhoods are listed in Table 2 and are shown in Figure 1.

## TABLE 1 MOBILE MONITORING VAN PROGRAM 30 INDIVIDUAL CHEMICALS AND CHEMICAL GROUPS MONITORED[1]

**Individual Chemicals**

| | | | |
|---|---|---|---|
| 1,3-Butadiene | Dodecanes | Methanol | Tetrachloroethylene |
| Acetylene | Ethylene | Methylcyclohexane | Toluene |
| Benzene | Hydrogen Cyanide | Nonanes | Undecanes |
| Carbon disulfide | Hydrogen Sulfide | Propylene | |
| Decanes | Isoprene | Styrene | |

**Grouped Chemicals**

| Group Name | Specific Isomers | Group Name | Specific Isomers |
|---|---|---|---|
| ***Butenes*** | 1-Butene | ***Xylenes*** | Ethyl Benzene |
| | cis-2-Butene | | o-Xylene |
| | trans-2-Butene | | m-Xylene |
| | | | p-Xylene |
| ***Butanes*** | iso-Butane | | |
| | n-Butane | ***Dimethylcyclohexanes*** | Ethylcyclohexane |
| | | | cis-1,3-Dimethylcyclohexane |
| ***Cyclopentanes*** | Cyclopentane | | trans-1,2-Dimethylcyclohexane |
| | 1-Pentene | | |
| | 2-Methyl-2-butene | | trans-1,3-Dimethylcyclohexane |
| | cis-2-Pentene | | |
| | trans-2-Pentene | ***Octanes*** | n-Octane |
| | | | 2-Methylheptane |
| ***Pentanes*** | iso-Pentane | | 3-Methylheptane |
| | n-Pentane | | 2,2,4-Trimethylpentane |
| | neo-Pentane | | 2,3,4-Trimethylpentane |
| ***Hexenes*** | 1-Hexene | ***Trimethylbenzenes*** | Cumene |
| | Cyclohexane | | 1,2,4-Trimethylbenzene |
| | Methylcyclopentane | | o-Ethyltoluene |
| | | | m-Ethyltoluene |
| ***Hexanes*** | n-Hexane | | p-Ethyltoluene |
| | 2-Methylpentane | | n-Propylbenzene |
| | 3-Methylpentane | | 1,3,5-Trimethylbenzene |
| | 2,2-Dimethylbutane | | |
| | 2,3-Dimethylbutane | ***Diethylbenzenes*** | o-Diethylbenzene |
| | | | m-Diethylbenzene |
| ***Heptanes*** | n-Heptane | | p-Diethylbenzene |
| | 2-Methylhexane | | All other $C_{10}H_{14}$ Isomers |
| | 3-Methylhexane | | |
| | 2,3-Dimethylpentane | | |
| | 2,4-Dimethylpentane | | |

[1] See Appendix A for isomer analysis details.

**TABLE 2** NEIGHBORHOOD MONITORING PROGRAM DETAILS

| Neighborhood | Area (square miles) | Sampling Date | Start Time | End Time | Total Data Points Collected | Total Hourly Rolling Averages Calculated* |
|---|---|---|---|---|---|---|
| Adams City | 0.41 | 3/11/2025 | 12:51 | 15:06 | 8,052 | 4,525 |
| Dupont | 1.4 | 3/11/2025 | 9:39 | 12:08 | 8,915 | 5,388 |
| Elyria-Swansea | 1.2 | 3/10/2025 | 14:20 | 16:32 | 7,906 | 4,379 |
| Globeville | 0.44 | 3/12/2025 | 12:52 | 15:08 | 8,110 | 4,583 |
| Pioneer Park | 1.7 | 3/10/2025 | 10:50 | 13:43 | 10,399 | 6,872 |
| Western Hills | 1.6 | 3/12/2025 | 10:06 | 12:30 | 8,619 | 5,092 |

*Data completeness threshold set at 98%

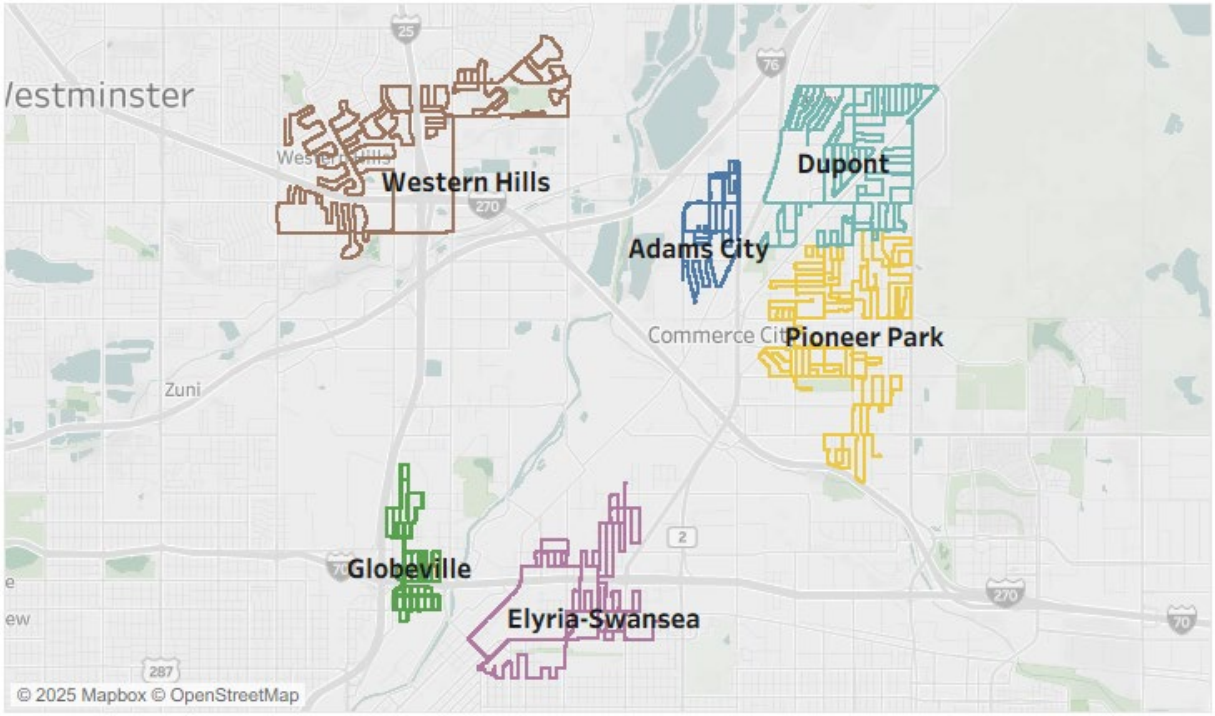
## 2.2 Mobile Monitoring Van Air Sampling Methods

The mobile van is equipped with a Proton-Transfer-Reaction Time-of-Flight Mass Spectrometry (PTR-TOF-MS) to measure VOCs in the air. To ensure the accuracy of the PTR-TOF-MS system, calibration was performed, and the instrument was zeroed each day prior to the collection of any ambient air data. The instrument was calibrated using United States Environmental Protection Agency (USEPA) protocol certified calibration gases. Not all chemicals listed in Table 1 are available as certified calibration gases. For chemicals with commercially available standards, the multi-chemical cylinder standards were used to perform a multiple-point calibration. For the chemicals without commercially available standards, dilutions were made using an Environics Model 4040 gas dilution system. The gas dilution system was validated using the appropriate USEPA methodology (40 Code of Federal Regulation Part 51 Appendix M, Method 205). Next, zero-count measurements were obtained to ensure proper baseline measurements and were incorporated into the calculation of each chemical's concentration.

To ensure accuracy was maintained through the sampling process, zero-count measurements were performed through the entire sampling system using ultra-high purity air, and post-testing calibration checks were performed on the instrument to ensure there was no significant drift during the course of the sampling event. Instrument drift can cause an increase or decrease in the measured chemical concentrations, which can lead to either positive or negative biasing of the results.

The mobile monitoring van collected continuous measurements throughout each neighborhood following the routes shown in Figure 1. The ambient air measurements were collected from the ambient environment at a height of 15 feet above ground at approximately 8 liters per minute, using a Teflon-coated sampling boom and pump. The PTR-TOF-MS sampled a slip stream of this flow at approximately 100 ml/min. The sample was introduced into the reaction tube of the PTR-TOF-MS and results were collected in 1-second intervals. For specific PTR-TOF-MS instrument operation conditions, see Appendix D attached.

**FIGURE 1** MOBILE MONITORING VAN PROGRAM ROUTE TROUGH SIX NEIGHBORHOOD AREAS




## 2.3 Reference Level Selection for Health Screening Risk Assessment

To perform a risk-based assessment, exposure concentrations must be compared to reference levels (RLs). Reference levels are established by state and federal agencies following extensive review and assume that, if the exposure levels fall below the RL, then no acute or chronic adverse effect is expected in human health and/or the environment, even for sensitive populations.

The RLs used in this report are from the Colorado Department of Public Health and Environment's (CDPHE) Fall 2019 Health Guideline Values.[2] The CDPHE's Fall 2019 Health Guideline Values adopted levels from other state and federal programs including:

[2] Colorado Department of Public Health and Environment, Oil and Gas Health Information Response Program, Toxicology and Risk Assessment Section, "Updated acute and chronic health guidance values for use in preliminary risk assessment" (September 20, 2019).

- Agency for Toxic Substances and Disease Registry (ATSDR) acute minimum risk levels (MRL);
- California EPA Office of Environmental Health Hazard Assessment (OEHHA) Acute Reference Exposure Levels (REL); and
- Texas Commission on Environmental Quality (TCEQ) Air Monitoring Comparison Values (AMCVs).

CDPHE also derives some of its own Health Guideline Values.[3] If the chemical was not listed by CDPHE, CTEH® followed a federal- and state-recommended hierarchy for selection of RLs (Appendix C).

By definition, the RLs used in this report are values that "*are set below levels that, based on current information, might cause adverse health effects in the people most sensitive*." [4] This is because RLs are based on observed toxicity in human or animal studies with an added safety factor to account for uncertainties and variabilities in the toxicity data. Therefore, these values are intended to represent the level at which there is no potential increased risk of adverse health effects being observed in a population, accounting for susceptible individuals. As such, if exposure is found to be above the RLs during the screening-level risk assessment, additional steps, including a more nuanced exposure characterization, are required before determining if the population will experience changes in risk of adverse health effects.

In addition to RLs, the USEPA also has established values for use in emergency situations, termed Acute Exposure Guideline Levels (AEGLs) that are also presented. Unlike RLs that can be thousands of times below exposure levels where adverse effects are observed, AEGL values are levels at which different acute adverse health effects may be anticipated to occur. However, a concentration above an AEGL-1 value does not necessarily mean that health effects will occur. According to USEPA, "*AEGL-1 represent exposure levels that could produce mild and progressively increasing but transient and non-disabling odor, taste and sensory irritation or certain asymptomatic, non-sensory effects. With increasing airborne concentration above each AEGL, there is a progressive increase in the likelihood of occurrence and the severity of effects described for each corresponding AEGL [i.e., AEGL-2 or AEGL-3].*"[5] The AEGL-1 60-minute value, if available for the applicable chemical, was also used for comparison purposes because it is more precautionary (than AEGL-2 or AEGL-3) as the AEGL-1 level reflects protecting against acute health effects that are reversible upon cessation of exposure.

[3] Colorado Department of Public Health and Environment, Oil and Gas Health Information Response Program, Toxicology and Risk Assessment Section, "Updated acute and chronic health guidance values for use in preliminary risk assessment" (September 20, 2019).
[4] https://www.atsdr.cdc.gov/minimal-risk-levels/php/about/index.html
[5] https://www.epa.gov/aegl/about-acute-exposure-guideline-levels-aegls

## 2.4 Screening Health Risk Assessment Methods

To determine whether exposure to the detected concentrations of individual or cumulative (combined) chemicals in the air could potentially alter the risk of acute (short-term) health effects, CTEH® conducted a screening-level public health risk assessment, consistent with federal and state risk assessment guidelines. A tiered approach to this risk assessment was used. This approach involves one or more iterative steps (or tiers) being performed in which health risks are calculated and evaluated multiple times. In most cases, risk assessors cannot know exactly the level of chemical exposure experienced by individuals or communities. Therefore, the first tier involves the use of exposure assumptions that are health-conservative.

During this process, data reflecting the maximum exposure potential are assumed during the risk calculations. If this screening-level risk assessment indicates that the estimated community exposure is above the RL, this does not indicate that adverse health effects are occurring or will occur, but rather a more detailed exposure characterization is required to determine whether the exposure is higher than the RL.

For this assessment, CTEH performed a screening-level risk assessment that used the maximum 1-hour rolling average as the exposure concentration (EC) and the RLs provided by the CDPHE or other state/federal agencies to generate a hazard quotient (HQ). The HQ is a measure of risk that is calculated by dividing the EC by the corresponding RL for each compound individually (Eq. 1). In this assessment, HQs were generated for the individual chemicals (18 total) and chemical groups (12 total; Table 2) with the lowest available risk level. Where the EC was determined to be below the detection limit, one half of the method detection limit was assigned.

**Eq. 1 – Hazard Quotient (HQ) Equation**

$$Hazard\ Quotient\ (HQ) = \frac{Exposure\ Concentration\ (EC)}{Reference\ Level\ (RL)}$$

The assumptions used in this assessment were chosen to be protective of human health. The first assumption was the grouping of chemicals into isomer groups. In a real-time PTR-TOF analysis, it is not possible to speciate isomers, or chemical compounds that have the same molecular weight. For example, n-hexane, 2-methyl pentane and 2,2-dimethyl butane all have a molecular mass of 86.178 g/mol. In order to provide the most health-protective determination of concentration during this mapping program, each isomer's concentration is reported by summing all the concentrations of isomers with the same molecular weight in the isomer group. Because of this, the screening-level risk assessment was undertaken for the individual chemicals and chemical groups (Table 2). One of the individual chemicals (propylene) did not have health-based RLs, resulting in its exclusion from the assessment, but its concentrations were reported. Thus, the screening-level risk assessment includes acute risks from exposure to 17 (out of the 18 chemicals) and to 12 chemical groups, for a total of 29. In addition, the assessment includes acute risks from exposure to all the 29 measured compounds at once (cumulative).

The next assumption was to set the EC to the maximum 1-hour rolling average concentrations of each chemical in each of the six CCND neighborhoods. These were calculated by averaging a 1-hour time window of the 1-second air concentrations, and the time window moved (rolled) one second forward in time to calculate the next average. The window required 98% of 1-second readings (or 3,528 1-second concentrations) to calculate the average. If the window was below 98%, it continued moving forward one second at a time until the 1-hour window contained 98% of 1-second readings. Using the maximum 1-hour rolling average for the EC conservatively assumes that a hypothetical, maximally-exposed individual occupies the monitored neighborhood and breathes the maximum 1-hour rolling average concentration continuously for an hour up to multiple days (an acute exposure). Averaging the 1-second concentrations to 1-hour reduces the variability in the data that is due to both measurement accuracy and potential transient sources which the monitoring van may encounter and sample, such as emissions from an idle truck (see notes in Appendix D). Averaging the concentrations provides an estimate that is closer to the real-world ambient air concentrations that the majority of individuals may be breathing in the CCND area. Across all neighborhoods, 30,839 1-hour rolling averages of air concentrations for each individual chemical and chemical group were calculated to derive the estimated ECs (Table 2). The range between the average and maximum 1-hour rolling averages provides a robust estimate of plausible outdoor ambient air concentrations in the monitored neighborhood while the mobile monitoring van was present (Figures 2-7).

The last assumption was to use the RLs in the HQ calculation that are based on exposures that occur for an hour up to 14 days (i.e., acute exposure). The AEGL-1 values, or the guidance values used in emergency situations that assume a single hour of exposure, are higher than the RL counterparts used in this analysis. Overall, this set of assumptions uses a higher-than-likely exposure concentration and a lower threshold level of concern for health effects, making this more health-protective than other approaches.

To determine the impact of cumulative chemical exposure, a Hazard Index (HI) was generated. This is a process by which HQs are summed across chemicals (Eq. 2). This is a health-protective approach because it assumes that all the measured chemicals exert an adverse effect on the body in a similar manner, which is rarely the case. In this assessment, HIs were calculated by summing HQs across all individual chemicals and chemical groups in Table 2.

**Eq. 2 – Hazard Quotient (HI) Equation**

$$Hazard\ Index\ (HI) = \sum_{i} HQ_i$$

An HQ or HI of less than or equal to one is an indication that the estimated exposure is likely to be without an appreciable risk of adverse acute health effects, even for sensitive sub-populations[6]. As such, an exceedance of an acceptable risk level (defined below) does not indicate that adverse health effects are likely but rather that "*[h]ealth assessors may want to look*

[6] USEPA. 2004. Air Toxics Risk Assessment Reference Library. Volume 1. U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Research Triangle Park, NC. EPA-453-K-04-001A

*more closely at a site where they find exposures higher than the MRLs*"[7]. In other words, an HQ or HI greater than one suggests a need to refine the risk assessment process with more realistic details of potential exposure to determine if risk exists.

# 3.0 SUMMARY AND DISCUSSION OF RESULTS

## 3.1 Summary of Mobile Monitoring Van Results

A summary of mobile monitoring van results by neighborhood can be found in Table 2. Over three days, six neighborhoods were monitored for 65 chemicals total (that are evaluated as 18 individual chemicals with the remaining 47 chemicals being combined into 12 chemical groups known as isomer groups), resulting in more than 52,001 total 1-second air measurement for each chemical. Individual neighborhood results are detailed in Figures 2-7. Each figure shows a map of the monitoring route within each neighborhood, the chemicals that resulted in the five highest calculated acute HQs, and the trends of the chemical concentration trends over time. The trend graphs show all the 1-second readings (orange) and calculated 1-hour rolling averages (green) of the ambient air concentrations. Each green 1-hour average concentration reflects the average of 1-second measurements collected over the previous hour. Thus, 1-hour rolling average concentrations are shown on the graphs after one hour of data collection (Figures 2-7).

Wind roses for each sampling day are provided in Appendix B. The data used to derive the wind roses were collected from the CCND community sensor location nearest to the neighborhood being monitored as the fixed meteorological station is more reliable than the station on the mobile monitoring van when the van is moving.

## 3.2 Screening Health Risk Assessment Results

Acute health risks were calculated for each neighborhood. According to USEPA guidelines, an acute HQ or HI less than or equal to one indicates that exposures are likely to be without any acute adverse health effects, even for sensitive sub-populations.

Figures 2 through 7 show concentrations of chemicals over the sampling time and summaries of results for compounds (or groups) resulting in the five highest HQs by neighborhood. The estimated HI shown in Figures 2 through 7 were calculated by summing the HQs of all detected chemicals measured in a given neighborhood. If any measured chemical resulted in a HQ greater than one, then a separate figure would be shown for that chemical alone. Complete results for HQs for all chemicals detected in each neighborhood are available in Appendix C.

In conclusion, the air concentrations collected during this study phase did not indicate a potential for acute adverse health effects, both individually and combined.

[7] https://www.atsdr.cdc.gov/minimal-risk-levels/about/index.html

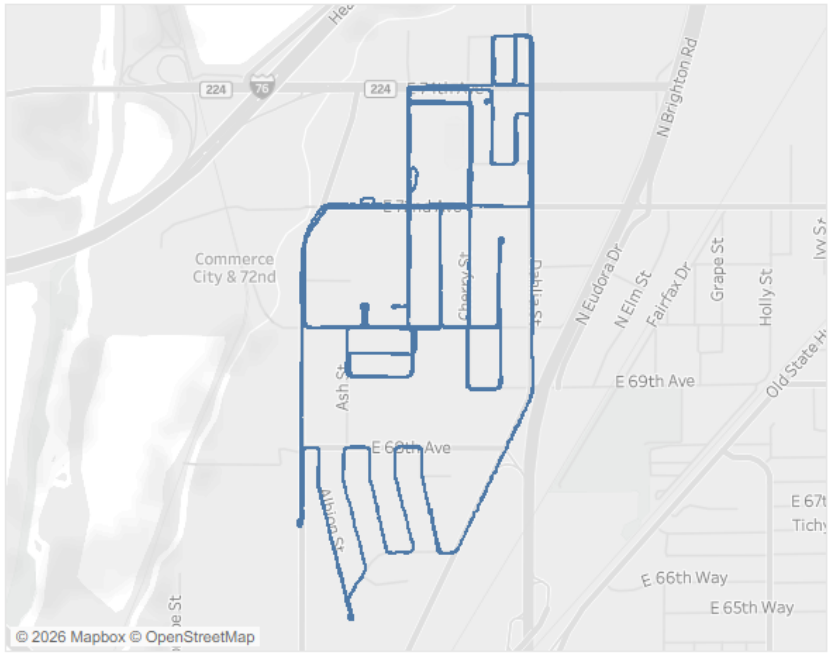
- All HQs were less than one for all detected chemicals and chemical groups, indicating that the maximum 1-hour rolling average concentration for each chemical was below its respective acute RL in all six neighborhoods (Figures 2 through 7).

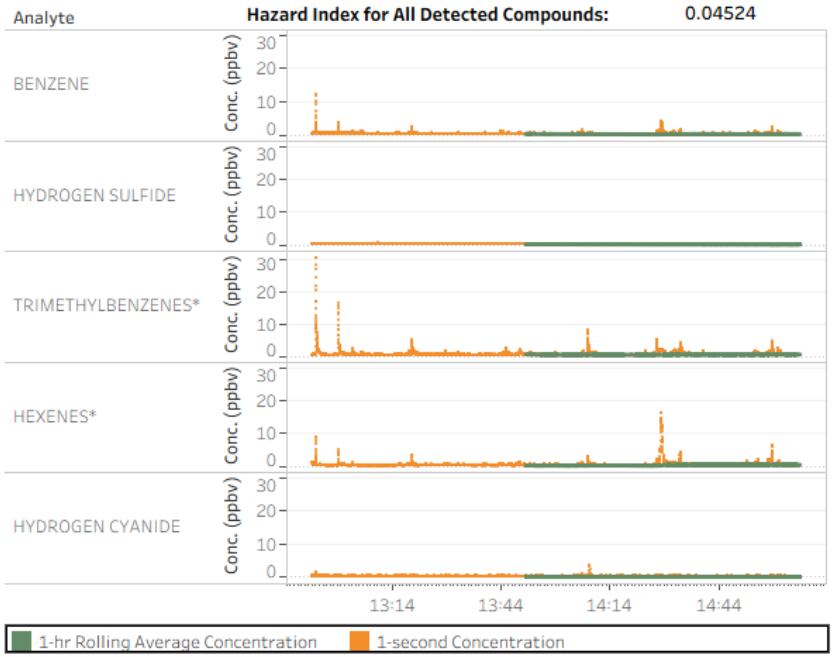
- In this quarter, benzene, hydrogen cyanide, hydrogen sulfide, hexene group, toluene, trimethylbenzene group, and xylenes were the chemicals or isomer groupings resulting in the highest HQ in each neighborhood, accounting for over 94% of the total calculated HI values. However, all HI values calculated in all six neighborhoods were below one (Figures 2 through 7).

- These results indicate that the measured concentrations of chemicals, both individually and cumulative (combined), are not expected to be associated with an increased risk of adverse acute health effects, even for sensitive sub-populations.

**FIGURE 2** ADAMS CITY NEIGHBORHOOD: March 11, 2025

| Analyte | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value (ppbv) | Health Reference Level (ppbv) | Hazard Quotient |
|---|---|---|---|---|---|---|---|
| BENZENE | 11.85 | 4,525 | 0.25 | 0.32 | 52,000 | 9 | 0.03597 |
| HYDROGEN SULFIDE | 0.46 | 4,525 | 0.21 | 0.23 | 510 | 70 | 0.00326 |
| TRIMETHYLBENZENES* | 30.50 | 4,525 | 0.48 | 0.61 | NR | 250 | 0.00242 |
| HEXENES* | 16.28 | 4,525 | 0.30 | 0.43 | NR | 500 | 0.00085 |
| HYDROGEN CYANIDE | 3.43 | 4,525 | 0.16 | 0.17 | 2,000 | 308 | 0.00057 |

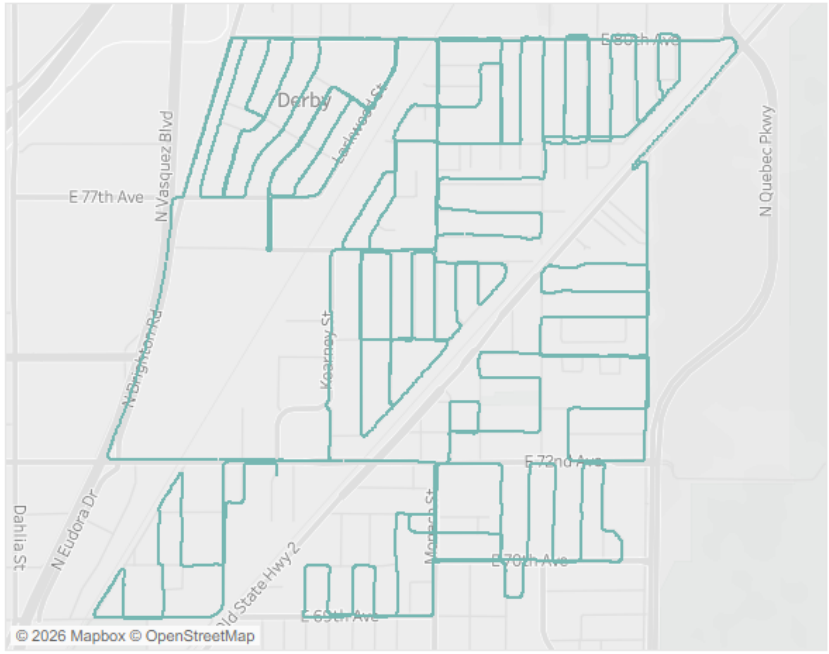


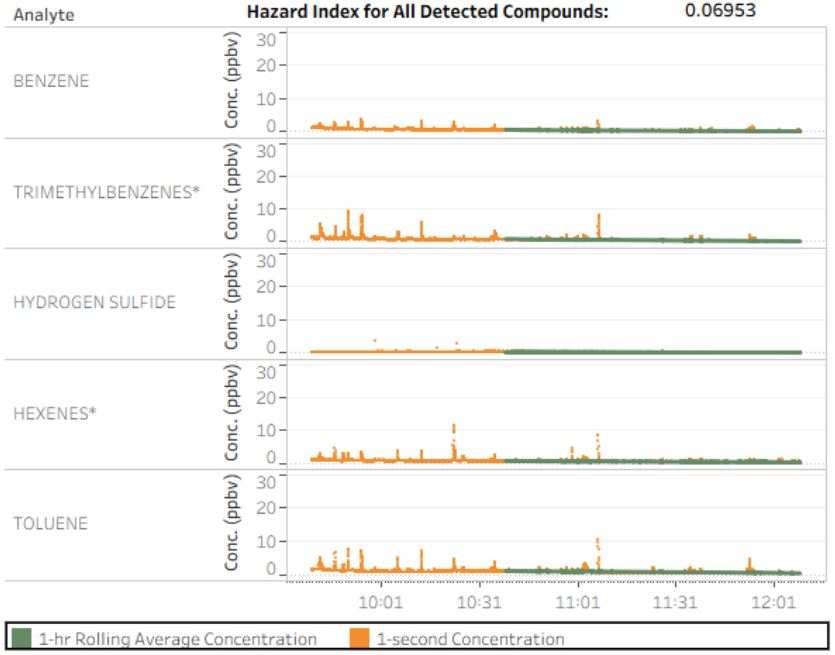




*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison purposes. NR = According to EPA, the AEGL value is "not recommended due to insufficient data". *For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the group was selected for use in this assessment (Appendix A).*

**FIGURE 3** DUPONT NEIGHBORHOOD: March 11, 2025

| Analyte | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value (ppbv) | Health Reference Level (ppbv) | Hazard Quotient |
|---|---|---|---|---|---|---|---|
| BENZENE | 3.68 | 5,388 | 0.26 | 0.53 | 52,000 | 9 | 0.05916 |
| TRIMETHYLBENZENES* | 8.99 | 5,388 | 0.39 | 0.77 | NR | 250 | 0.00309 |
| HYDROGEN SULFIDE | 3.63 | 5,388 | 0.12 | 0.16 | 510 | 70 | 0.00222 |
| HEXENES* | 11.57 | 5,388 | 0.59 | 0.82 | NR | 500 | 0.00164 |
| TOLUENE | 10.55 | 5,388 | 0.81 | 1.11 | 67,000 | 2,000 | 0.00056 |

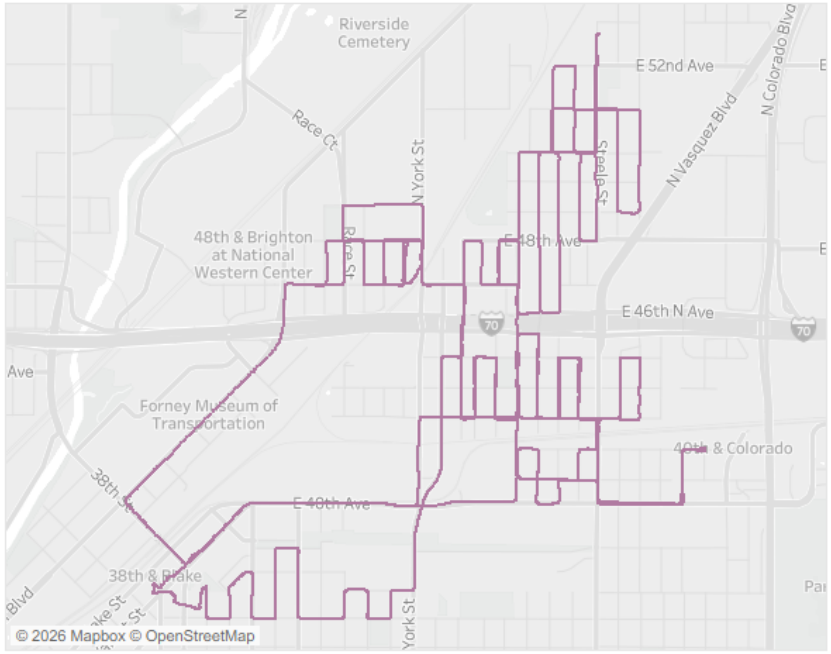


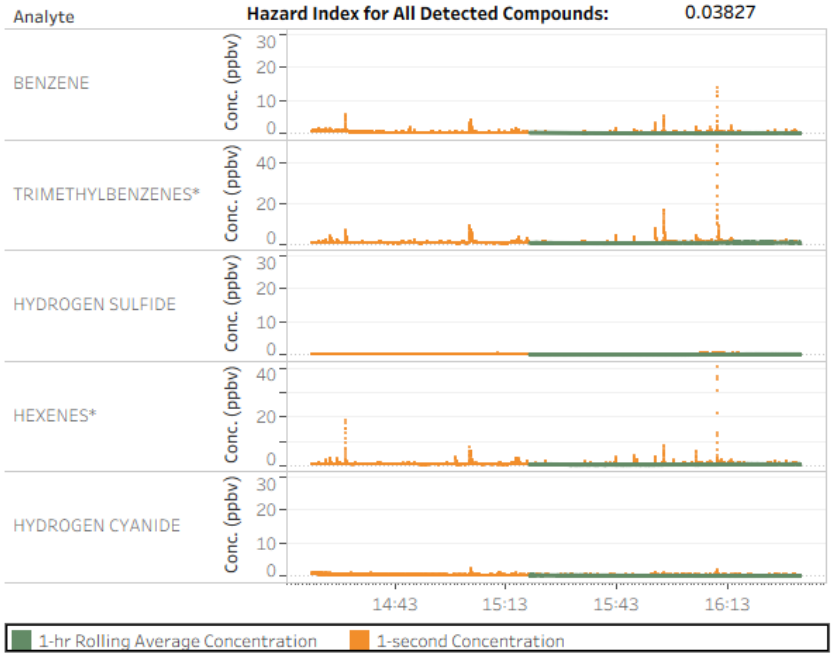




*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison purposes. NR = According to EPA, the AEGL value is "not recommended due to insufficient data". *For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the group was selected for use in this assessment (Appendix A).*

**FIGURE 4** ELYRIA-SWANSEA NEIGHBORHOOD: March 10, 2025

| Analyte | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value (ppbv) | Health Reference Level (ppbv) | Hazard Quotient |
|---|---|---|---|---|---|---|---|
| BENZENE | 13.48 | 4,379 | 0.12 | 0.26 | 52,000 | 9 | 0.02873 |
| TRIMETHYLBENZENES* | 48.09 | 4,379 | 0.47 | 0.65 | NR | 250 | 0.00259 |
| HYDROGEN SULFIDE | 0.58 | 4,379 | 0.14 | 0.16 | 510 | 70 | 0.00227 |
| HEXENES* | 40.12 | 4,379 | 0.58 | 0.65 | NR | 500 | 0.00130 |
| HYDROGEN CYANIDE | 2.27 | 4,379 | 0.12 | 0.23 | 2,000 | 308 | 0.00074 |

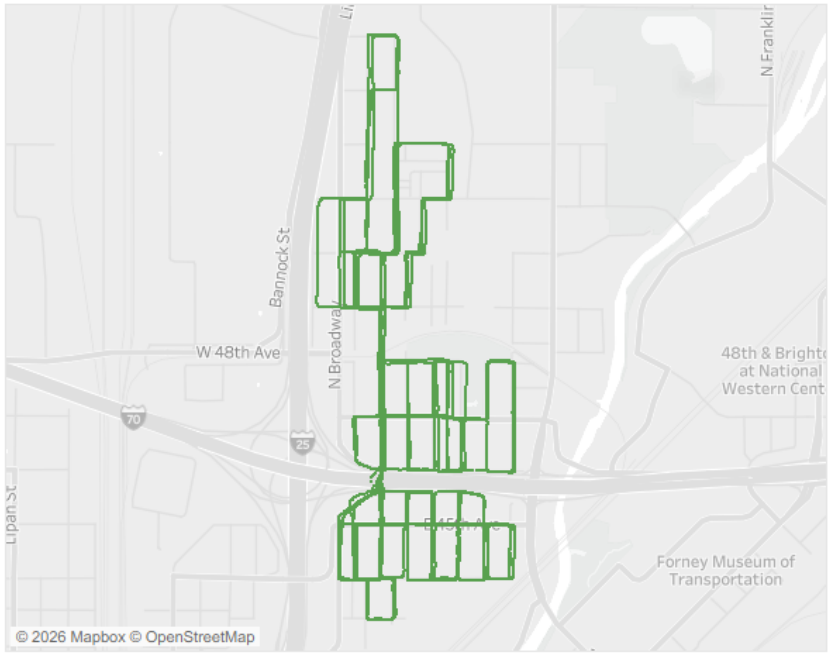


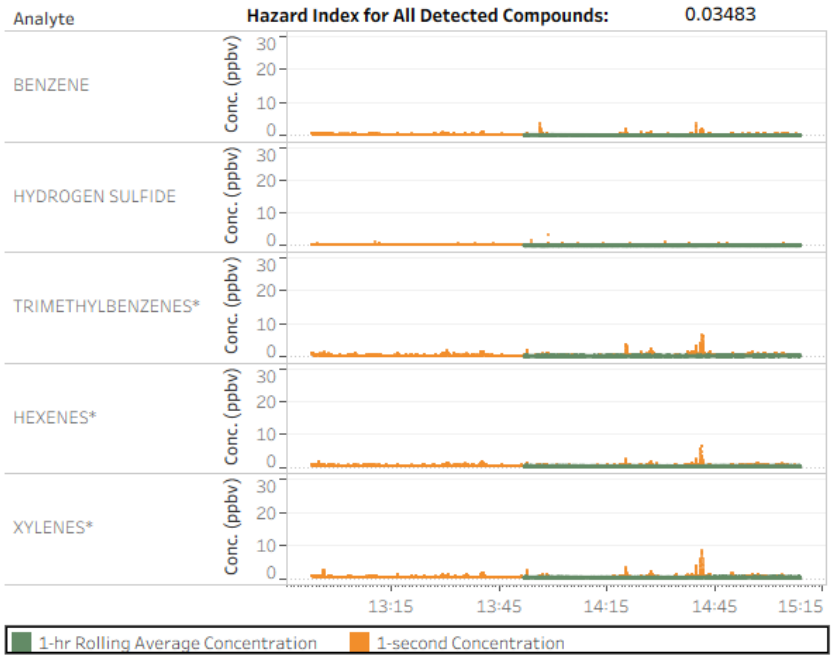




*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison purposes. NR = According to EPA, the AEGL value is "not recommended due to insufficient data". *For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the group was selected for use in this assessment (Appendix A).*

**FIGURE 5** GLOBEVILLE NEIGHBORHOOD: March 12, 2025

| Analyte | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value (ppbv) | Health Reference Level (ppbv) | Hazard Quotient |
|---|---|---|---|---|---|---|---|
| BENZENE | 3.69 | 4,583 | 0.20 | 0.25 | 52,000 | 9 | 0.02748 |
| HYDROGEN SULFIDE | 3.17 | 4,583 | 0.14 | 0.15 | 510 | 70 | 0.00215 |
| TRIMETHYLBENZENES* | 6.49 | 4,583 | 0.36 | 0.47 | NR | 250 | 0.00187 |
| HEXENES* | 6.53 | 4,583 | 0.44 | 0.47 | NR | 500 | 0.00093 |
| XYLENES* | 8.71 | 4,583 | 0.63 | 0.69 | 130,000 | 2,000 | 0.00034 |

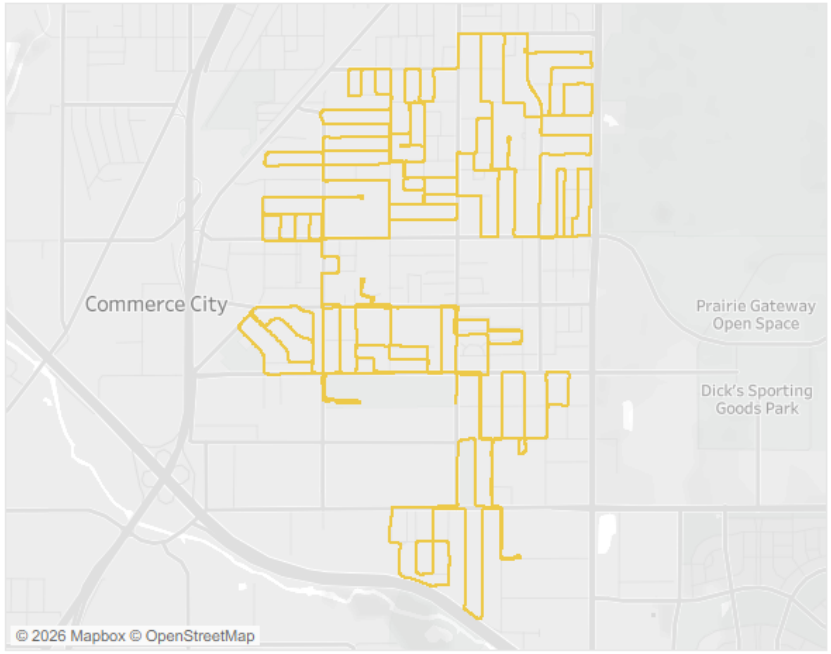


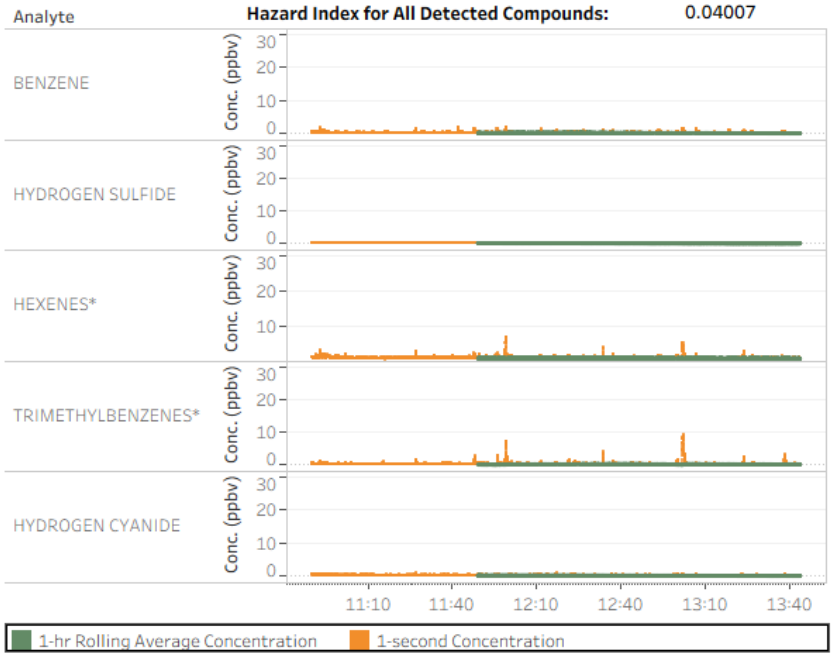




*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison purposes. NR = According to EPA, the AEGL value is "not recommended due to insufficient data". *For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the group was selected for use in this assessment (Appendix A).*

**FIGURE 6** PIONEER PARK NEIGHBORHOOD: March 10, 2025

| Analyte | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value (ppbv) | Health Reference Level (ppbv) | Hazard Quotient |
|---|---|---|---|---|---|---|---|
| BENZENE | 1.97 | 6,872 | 0.25 | 0.29 | 52,000 | 9 | 0.03229 |
| HYDROGEN SULFIDE | 0.35 | 6,872 | 0.13 | 0.15 | 510 | 70 | 0.00218 |
| HEXENES* | 6.92 | 6,872 | 0.94 | 0.99 | NR | 500 | 0.00199 |
| TRIMETHYLBENZENES* | 9.01 | 6,872 | 0.14 | 0.17 | NR | 250 | 0.00068 |
| HYDROGEN CYANIDE | 0.82 | 6,872 | 0.11 | 0.15 | 2,000 | 308 | 0.00049 |

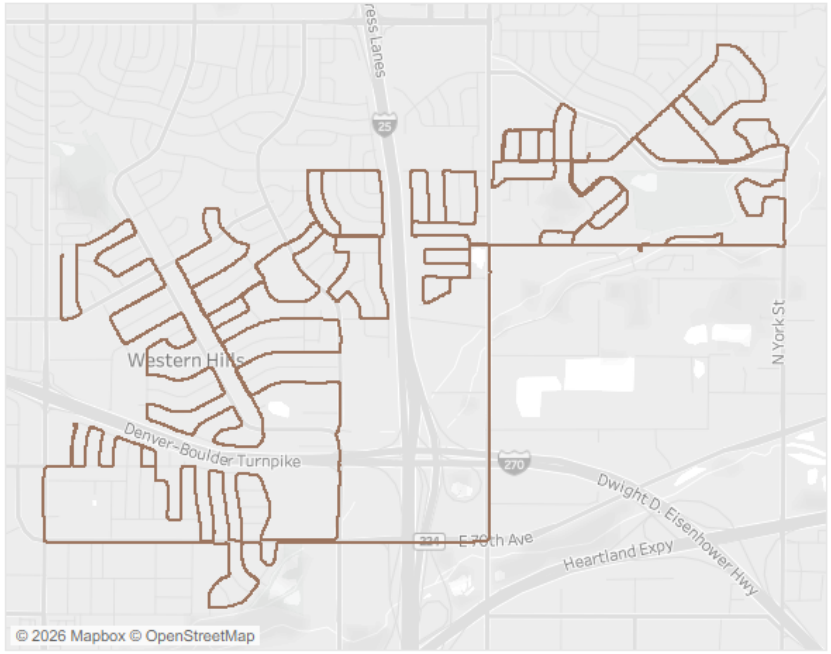


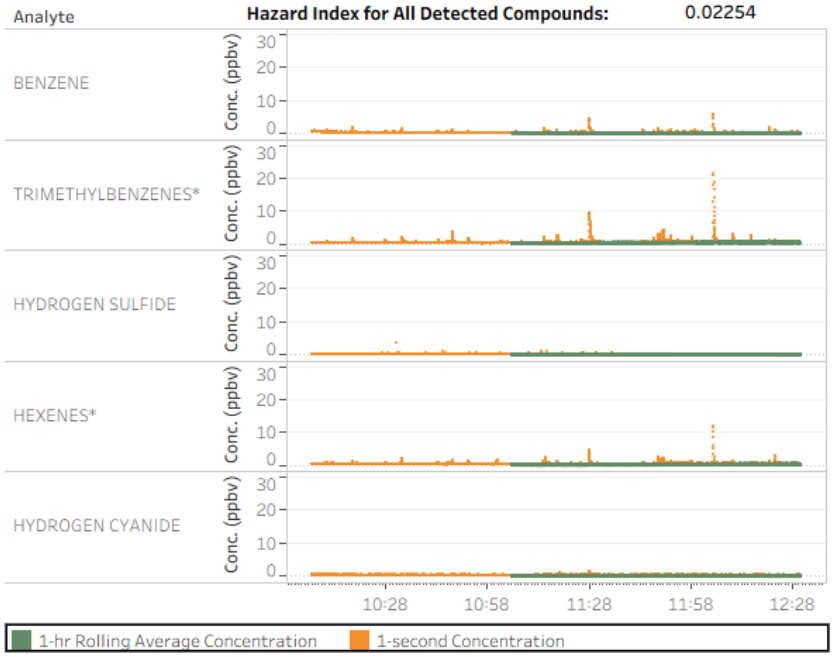




*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison purposes. NR = According to EPA, the AEGL value is "not recommended due to insufficient data". *For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the group was selected for use in this assessment (Appendix A).*

**FIGURE 7** WESTERN HILLS NEIGHBORHOOD: March 12, 2025

| Analyte | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value (ppbv) | Health Reference Level (ppbv) | Hazard Quotient |
|---|---|---|---|---|---|---|---|
| BENZENE | 5.67 | 5,092 | 0.10 | 0.14 | 52,000 | 9 | 0.01514 |
| TRIMETHYLBENZENES* | 21.42 | 5,092 | 0.40 | 0.54 | NR | 250 | 0.00216 |
| HYDROGEN SULFIDE | 3.70 | 5,092 | 0.12 | 0.13 | 510 | 70 | 0.00186 |
| HEXENES* | 11.89 | 5,092 | 0.36 | 0.45 | NR | 500 | 0.00089 |
| HYDROGEN CYANIDE | 1.44 | 5,092 | 0.18 | 0.18 | 2,000 | 308 | 0.00060 |




*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison purposes. NR = According to EPA, the AEGL value is "not recommended due to insufficient data". *For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the group was selected for use in this assessment (Appendix A).*

### 3.3 Strengths and Limitations

Scientific uncertainty is inherent in each step of the risk assessment process because all risk assessments incorporate a variety of assumptions and professional judgments[8,9]. Therefore, the acute health hazard estimates presented in this assessment are conditional estimates given a considerable number of assumptions about exposure and toxicity.

This screening-level inhalation risk assessment relied on a combination of health-protective exposure scenarios and input values (i.e., high-end exposures and health-protective selection of acute reference levels intended to reflect up to 14 days of exposure). Because of these assumptions, the estimates of acute hazards are likely to be over-estimates of actual risk. However, this risk assessment did not address past or present health outcomes associated with current or past exposures. As such, this risk assessment cannot be used to make realistic predictions of biological effects and/or used to determine whether someone is ill (cancer or other adverse health effects) due to past or current exposures. This risk assessment was limited to inhalation exposures from outdoor exposures to all potential sources. It can be used to inform on air quality in the CCND and guide decision-making.

## 4.0 PROGRAM CHANGES

No program changes.

Respectfully Submitted:

Steven Yuchs, PhD.
Vice President, Technical
Ambient & Emerging Technology
Montrose Air Quality Services

[8] USEPA.1989. Risk Assessment Guidance for Superfund, Vol. I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002, Interim Final, Office of Emergency and Remedial Response, Washington DC
[9] USEPA. 2004. Air Toxics Risk Assessment Reference Library. Volume 1. U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Research Triangle Park, NC. EPA-453-K-04-001A

# APPENDIX A ISOMER CHEMICAL SAMPLING DETAILS

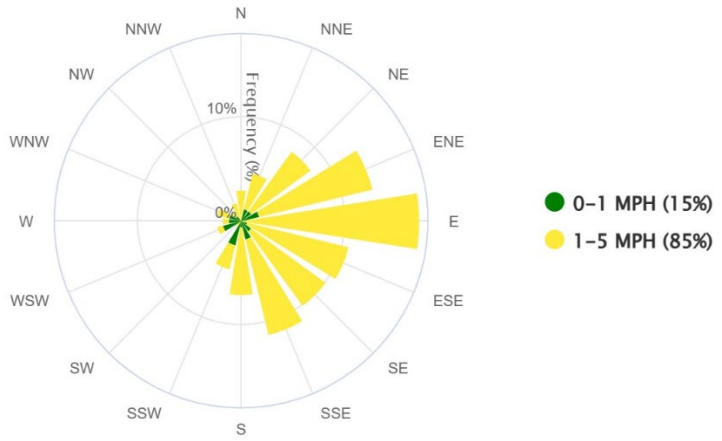
In a real-time PTR-TOF analysis, it is not possible to speciate isomers, or chemical compounds that have the same molecular weight. For example, n-hexane, 2-methyl pentane and 2,2-dimethyl butane all have a molecular mass of 86.178 g/mol. In order to provide the most conservative determination of concentration during this mapping program, each isomer's concentration is reported as the sum of all isomers with the same molecular weight. For the sake of simplicity, the calculations in the report refer to generic names for a group of specific isomers. The following table defines a simplified list of the many isomers that may comprise the generic groups reported.

| Group Name | Specific Isomers |
|---|---|
| ***Butenes*** | 1-Butene |
| | cis-2-Butene |
| | trans-2-Butene |
| ***Butanes*** | iso-Butane |
| | n-Butane |
| ***Cyclopentanes*** | Cyclopentane |
| | 1-Pentene |
| | 2-Methyl-2-butene |
| | cis-2-Pentene |
| | trans-2-Pentene |
| ***Pentanes*** | iso-Pentane |
| | n-Pentane |
| | neo-Pentane |
| ***Hexenes*** | 1-Hexene |
| | Cyclohexane |
| | Methylcyclopentane |
| ***Hexanes*** | n-Hexane |
| | 2-Methylpentane |
| | 3-Methylpentane |
| | 2,2-Dimethylbutane |
| | 2,3-Dimethylbutane |
| ***Heptanes*** | n-Heptane |
| | 2-Methylhexane |
| | 3-Methylhexane |
| | 2,3-Dimethylpentane |
| | 2,4-Dimethylpentane |

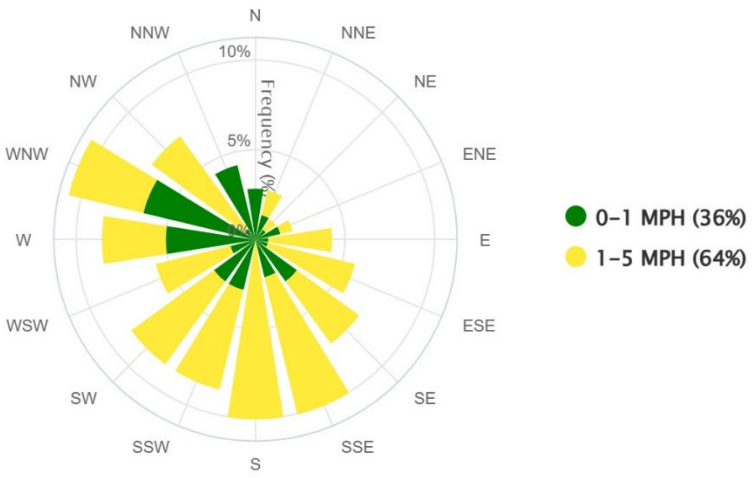
| Group Name | Specific Isomers |
|---|---|
| ***Xylenes*** | Ethyl Benzene |
| | o-Xylene |
| | m-Xylene |
| | p-Xylene |
| ***Dimethylcyclohexanes*** | Ethylcyclohexane |
| | cis-1,3-Dimethylcyclohexane |
| | trans-1,2-Dimethylcyclohexane |
| | trans-1,3-Dimethylcyclohexane |
| ***Octanes*** | n-Octane |
| | 2-Methylheptane |
| | 3-Methylheptane |
| | 2,2,4-Trimethylpentane |
| | 2,3,4-Trimethylpentane |
| ***Trimethylbenzenes*** | Cumene |
| | 1,2,4-Trimethylbenzene |
| | o-Ethyltoluene |
| | m-Ethyltoluene |
| | p-Ethyltoluene |
| | n-Propylbenzene |
| | 1,3,5-Trimethylbenzene |
| ***Diethylbenzenes*** | o-Diethylbenzene |
| | m-Diethylbenzene |
| | p-Diethylbenzene |
| | All other $C_{10}H_{14}$ Isomers |

# APPENDIX B DAILY WIND ROSES

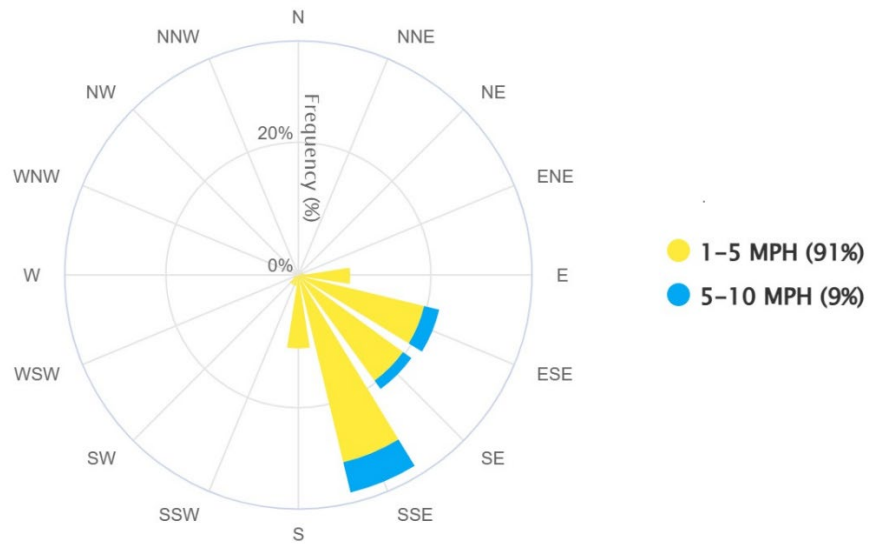
Wind Rose | Pioneer Park (CM7) 10:50am – 1:43pm, March 10, 2025



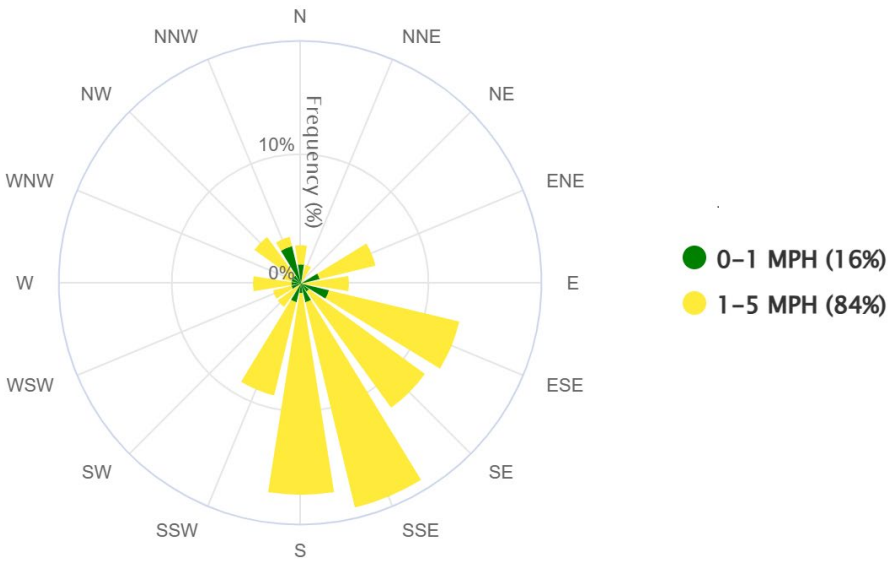

Wind Rose | Dupont (CM3) 9:39am – 12:08pm, March 10, 2025

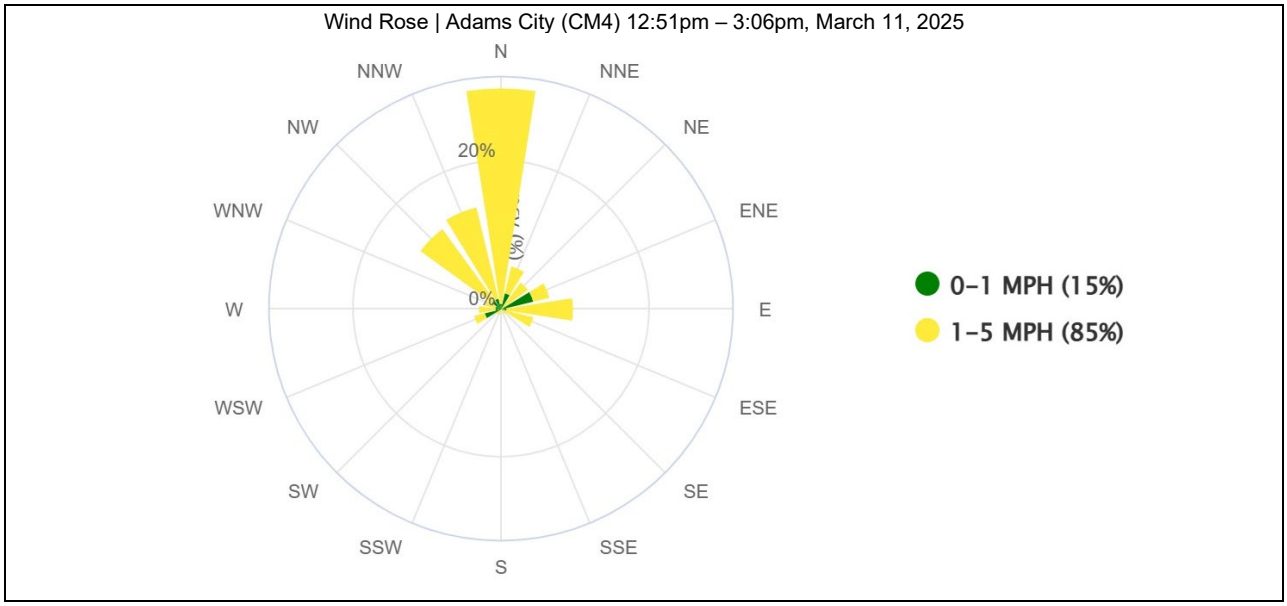


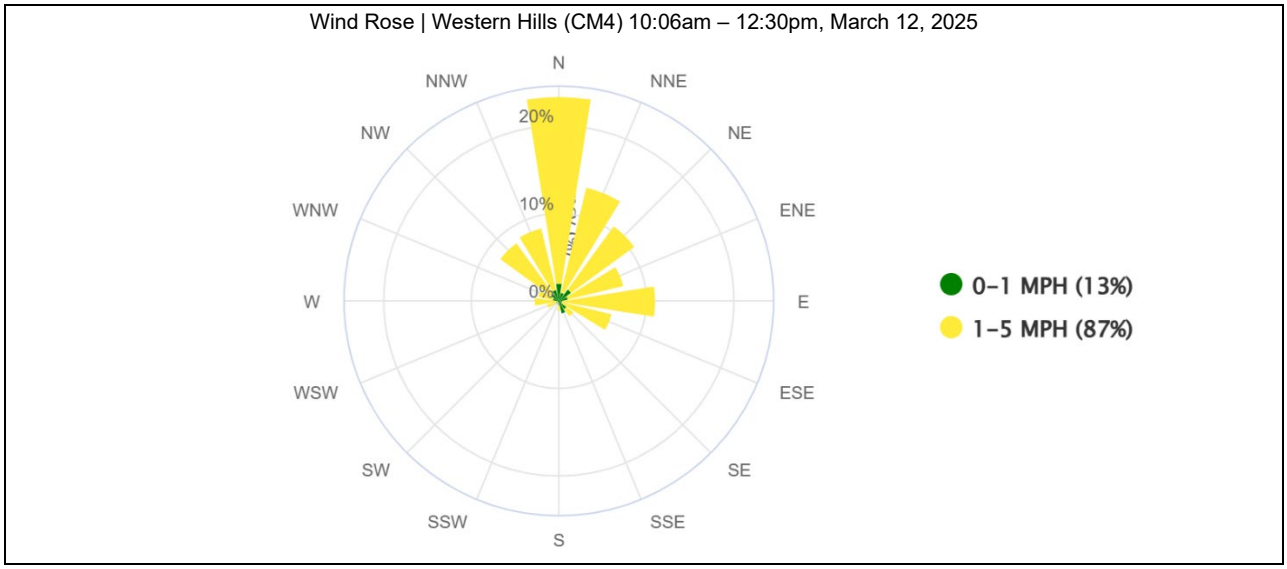
Wind Rose | Elyria-Swansea (CM6) 2:20pm – 4:32pm, March 10, 2025




Wind Rose | Globeville (CM6) 12:52pm – 3:08pm, March 12, 2025




Wind Rose | Adams City (CM4) 12:51pm – 3:06pm, March 11, 2025
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
20%
0%
0–1 MPH (15%)
1–5 MPH (85%)


Wind Rose | Western Hills (CM4) 10:06am – 12:30pm, March 12, 2025
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
20%
10%
0%
0–1 MPH (13%)
1–5 MPH (87%)

# APPENDIX C SCREENING RISK ASSESSMENT DETAILS (ALPHABETICAL ORDER BY NEIGHBORHOOD NAME)

## Mobile Laboratory Sampling Data Summary and Risk Assessment

### Adams City Neighborhood | March 11, 2025

| Analyte | Cas No | Method Detection Limit (ppbv) | Count of 1-second Concentrations (#) | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value | Health Reference Level (ppbv) | Screening Value Source | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3 BUTADIENE | 106-99-0 | 0.014 | 8,052 | 0.10 | 4,525 | 0.01 | 0.02 | 670,000 | 298 | OEHHA Acute REL | 0.00006 |
| ACETYLENE | 74-86-2 | 0.065 | 8,052 | 0.62 | 4,525 | 0.23 | 0.23 | NR | 25,000 | TCEQ Short-Term AMCV | 0.00001 |
| BENZENE | 71-43-2 | 0.038 | 8,052 | 11.85 | 4,525 | 0.25 | 0.32 | 52,000 | 9 | ATSDR Acute MRL | 0.03597 |
| BUTANES* | 75-28-5 | 0.303 | 8,052 | 199.89 | 4,525 | 3.24 | 3.75 | NR | 33000 | TCEQ Short-Term AMCV | 0.00011 |
| BUTENES* | 590-18-1 | 0.116 | 8,052 | 63.13 | 4,525 | 1.01 | 1.30 | NR | 15000 | TCEQ Short-Term AMCV | 0.00009 |
| CARBON DISULFIDE | 75-15-0 | 0.012 | 8,052 | 0.06 | 4,525 | 0.01 | 0.01 | 13,000 | 1,991 | OEHHA Acute REL | 0.00000 |
| CYCLOPENTANES* | 287-92-3 | 0.041 | 8,052 | 55.86 | 4,525 | 0.65 | 0.96 | NR | 5,900 | TCEQ Short-Term AMCV | 0.00016 |
| DECANES | 124-18-5 | 0.008 | 8,052 | 0.04 | 4,525 | 0.01 | 0.01 | NR | 1,000 | TCEQ Short-Term AMCV | 0.00001 |
| DIETHYLBENZENES* | 141-93-5 | 0.032 | 8,052 | 0.29 | 4,525 | 0.11 | 0.12 | NR | 450 | TCEQ Short-Term AMCV | 0.00027 |
| DIMETHYLCYCLOHEXANES* | 638-04-0 | 0.015 | 8,052 | 0.41 | 4,525 | 0.04 | 0.04 | NR | 4,000 | CDPHE | 0.00001 |
| DODECANES | 112-40-3 | 0.003 | 8,052 | 0.01 | 4,525 | 0.00 | 0.00 | NR | 1720 | CDPHE | 0.00000 |
| ETHYLENE | 74-85-1 | 0.058 | 8,052 | 45.05 | 4,525 | 6.84 | 6.98 | NR | 500,000 | TCEQ Short-Term AMCV | 0.00001 |
| HEPTANES* | 142-82-5 | 0.014 | 8,052 | 0.73 | 4,525 | 0.05 | 0.06 | NR | 8,300 | TCEQ Short-Term AMCV | 0.00001 |
| HEXANES* | 110-54-3 | 0.019 | 8,052 | 0.24 | 4,525 | 0.05 | 0.05 | NR | 5,400 | TCEQ Short-Term AMCV | 0.00001 |
| HEXENES* | 592-41-6 | 0.028 | 8,052 | 16.28 | 4,525 | 0.30 | 0.43 | NR | 500 | TCEQ Short-Term AMCV | 0.00085 |
| HYDROGEN CYANIDE | 74-90-8 | 0.032 | 8,052 | 3.43 | 4,525 | 0.16 | 0.17 | 2,000 | 308 | OEHHA Acute REL | 0.00057 |
| HYDROGEN SULFIDE | 7783-06-4 | 0.021 | 8,052 | 0.46 | 4,525 | 0.21 | 0.23 | 510 | 70 | ATSDR Acute MRL | 0.00326 |
| ISOPRENE | 78-79-5 | 0.052 | 8,052 | 2.22 | 4,525 | 0.19 | 0.21 | NR | 1,400 | TCEQ Short-Term AMCV | 0.00015 |
| METHANOL | 67-56-1 | 0.263 | 8,052 | 63.53 | 4,525 | 4.61 | 5.05 | 530,000 | 21,366 | OEHHA Acute REL | 0.00024 |
| METHYLCYCLOHEXANE | 108-87-2 | 0.01 | 8,052 | 0.35 | 4,525 | 0.03 | 0.04 | NR | 4,000 | TCEQ Short-Term AMCV | 0.00001 |
| NONANES | 111-84-2 | 0.006 | 8,052 | 0.02 | 4,525 | 0.00 | 0.00 | NR | 3,000 | TCEQ Short-Term AMCV | 0.00000 |
| OCTANES* | 111-65-9 | 0.015 | 8,052 | 0.68 | 4,525 | 0.06 | 0.08 | NR | 4,100 | TCEQ Short-Term AMCV | 0.00002 |
| PENTANES* | 109-66-0 | 0.011 | 8,052 | 0.38 | 4,525 | 0.16 | 0.16 | NR | 68,000 | TCEQ Short-Term AMCV | 0.00000 |
| PROPYLENE | 115-07-1 | 0.085 | 8,052 | 21.25 | 4,525 | 0.55 | 0.66 | NR | NA | NA | |
| STYRENE | 100-42-5 | 0.026 | 8,052 | 0.84 | 4,525 | 0.13 | 0.14 | 20,000 | 5,000 | ATSDR Acute MRL | 0.00003 |
| TETRACHLOROETHYLENE | 127-18-4 | 0.004 | 8,052 | 0.03 | 4,525 | 0.00 | 0.00 | 35,000 | 6 | ATSDR Acute MRL | 0.00035 |
| TOLUENE | 108-88-3 | 0.04 | 8,052 | 23.70 | 4,525 | 0.49 | 0.55 | 67,000 | 2,000 | ATSDR Acute MRL | 0.00028 |
| TRIMETHYLBENZENES* | 622-96-8 | 0.025 | 8,052 | 30.50 | 4,525 | 0.48 | 0.61 | 50,000 | 250 | TCEQ Short-Term AMCV | 0.00242 |
| UNDECANES | 1120-21-4 | 0.014 | 8,052 | 0.09 | 4,525 | 0.01 | 0.01 | NR | 550 | TCEQ Short-Term AMCV | 0.00002 |
| XYLENES* | 1330-20-7 | 0.035 | 8,052 | 27.81 | 4,525 | 0.47 | 0.63 | 130,000 | 2,000 | ATSDR Acute MRL | 0.00032 |
| | | | | | | | | | | Hazard Index | 0.04524 |

The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average.
*For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the isomer group was selected for use in this assessment.
**CDPHE** = Colorado Department of Public Health and Environment; **TCEQ** = Texas Commission on Environmental Quality; **ATSDR** = Agency for Toxic Substances and Disease Registry; **OEHHA** = California Office of Environmental Health Hazard Assessment
**MRL** = Minimal Risk Level; **REL** = Reference Exposure Level; **AMCV** = Air Monitoring Comparison Values; **AEGL** = Acute Exposure Guideline Levels
**ppbv** = parts per billion volume
**NA** = Not Available
**NR** = According to EPA, AEGL is "Not Recommended due to insufficient data."

## Mobile Laboratory Sampling Data Summary and Risk Assessment

**Dupont Neighborhood | March 11, 2025**

| Analyte | Cas No | Method Detection Limit (ppbv) | Count of 1-second Concentrations (#) | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value | Health Reference Level (ppbv) | Screening Value Source | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3 BUTADIENE | 106-99-0 | 0.014 | 8,915 | 0.10 | 5,388 | 0.01 | 0.01 | 670,000 | 298 | OEHHA Acute REL | 0.00004 |
| ACETYLENE | 74-86-2 | 0.065 | 8,915 | 3.66 | 5,388 | 0.10 | 0.11 | NR | 25,000 | TCEQ Short-Term AMCV | 0.00000 |
| BENZENE | 71-43-2 | 0.038 | 8,915 | 3.68 | 5,388 | 0.26 | 0.53 | 52,000 | 9 | ATSDR Acute MRL | 0.05916 |
| BUTANES* | 75-28-5 | 0.303 | 8,915 | 152.02 | 5,388 | 3.45 | 4.28 | NR | 33000 | TCEQ Short-Term AMCV | 0.00013 |
| BUTENES* | 590-18-1 | 0.116 | 8,915 | 25.87 | 5,388 | 1.32 | 1.93 | NR | 15000 | TCEQ Short-Term AMCV | 0.00013 |
| CARBON DISULFIDE | 75-15-0 | 0.012 | 8,915 | 0.09 | 5,388 | 0.01 | 0.01 | 13,000 | 1,991 | OEHHA Acute REL | 0.00000 |
| CYCLOPENTANES* | 287-92-3 | 0.041 | 8,915 | 39.30 | 5,388 | 0.94 | 1.32 | NR | 5,900 | TCEQ Short-Term AMCV | 0.00022 |
| DECANES | 124-18-5 | 0.008 | 8,915 | 0.09 | 5,388 | 0.02 | 0.02 | NR | 1,000 | TCEQ Short-Term AMCV | 0.00002 |
| DIETHYLBENZENES* | 141-93-5 | 0.032 | 8,915 | 0.37 | 5,388 | 0.11 | 0.13 | NR | 450 | TCEQ Short-Term AMCV | 0.00028 |
| DIMETHYLCYCLOHEXANES* | 638-04-0 | 0.015 | 8,915 | 0.43 | 5,388 | 0.04 | 0.05 | NR | 4,000 | CDPHE | 0.00001 |
| DODECANES | 112-40-3 | 0.003 | 8,915 | 0.04 | 5,388 | 0.00 | 0.00 | NR | 1720 | CDPHE | 0.00000 |
| ETHYLENE | 74-85-1 | 0.058 | 8,915 | 65.84 | 5,388 | 6.54 | 7.09 | NR | 500,000 | TCEQ Short-Term AMCV | 0.00001 |
| HEPTANES* | 142-82-5 | 0.014 | 8,915 | 0.28 | 5,388 | 0.04 | 0.05 | NR | 8,300 | TCEQ Short-Term AMCV | 0.00001 |
| HEXANES* | 110-54-3 | 0.019 | 8,915 | 0.23 | 5,388 | 0.06 | 0.07 | NR | 5,400 | TCEQ Short-Term AMCV | 0.00001 |
| HEXENES* | 592-41-6 | 0.028 | 8,915 | 11.57 | 5,388 | 0.59 | 0.82 | NR | 500 | TCEQ Short-Term AMCV | 0.00164 |
| HYDROGEN CYANIDE | 74-90-8 | 0.032 | 8,915 | 1.92 | 5,388 | 0.10 | 0.16 | 2,000 | 308 | OEHHA Acute REL | 0.00053 |
| HYDROGEN SULFIDE | 7783-06-4 | 0.021 | 8,915 | 3.63 | 5,388 | 0.12 | 0.16 | 510 | 70 | ATSDR Acute MRL | 0.00222 |
| ISOPRENE | 78-79-5 | 0.052 | 8,915 | 1.43 | 5,388 | 0.07 | 0.11 | NR | 1,400 | TCEQ Short-Term AMCV | 0.00008 |
| METHANOL | 67-56-1 | 0.263 | 8,915 | 152.37 | 5,388 | 5.08 | 10.40 | 530,000 | 21,366 | OEHHA Acute REL | 0.00049 |
| METHYLCYCLOHEXANE | 108-87-2 | 0.01 | 8,915 | 0.38 | 5,388 | 0.04 | 0.05 | NR | 4,000 | TCEQ Short-Term AMCV | 0.00001 |
| NONANES | 111-84-2 | 0.006 | 8,915 | 0.06 | 5,388 | 0.00 | 0.00 | NR | 3,000 | TCEQ Short-Term AMCV | 0.00000 |
| OCTANES* | 111-65-9 | 0.015 | 8,915 | 0.58 | 5,388 | 0.03 | 0.04 | NR | 4,100 | TCEQ Short-Term AMCV | 0.00001 |
| PENTANES* | 109-66-0 | 0.011 | 8,915 | 0.19 | 5,388 | 0.11 | 0.11 | NR | 68,000 | TCEQ Short-Term AMCV | 0.00000 |
| PROPYLENE | 115-07-1 | 0.085 | 8,915 | 16.93 | 5,388 | 0.62 | 0.99 | NR | NA | NA | |
| STYRENE | 100-42-5 | 0.026 | 8,915 | 0.47 | 5,388 | 0.09 | 0.12 | 20,000 | 5,000 | ATSDR Acute MRL | 0.00002 |
| TETRACHLOROETHYLENE | 127-18-4 | 0.004 | 8,915 | 0.06 | 5,388 | 0.00 | 0.00 | 35,000 | 6 | ATSDR Acute MRL | 0.00036 |
| TOLUENE | 108-88-3 | 0.04 | 8,915 | 10.55 | 5,388 | 0.81 | 1.11 | 67,000 | 2,000 | ATSDR Acute MRL | 0.00056 |
| TRIMETHYLBENZENES* | 622-96-8 | 0.025 | 8,915 | 8.99 | 5,388 | 0.39 | 0.77 | 50,000 | 250 | TCEQ Short-Term AMCV | 0.00309 |
| UNDECANES | 1120-21-4 | 0.014 | 8,915 | 0.16 | 5,388 | 0.03 | 0.03 | NR | 550 | TCEQ Short-Term AMCV | 0.00006 |
| XYLENES* | 1330-20-7 | 0.035 | 8,915 | 9.74 | 5,388 | 0.49 | 0.82 | 130,000 | 2,000 | ATSDR Acute MRL | 0.00041 |
| | | | | | | | | | | **Hazard Index** | **0.06953** |

The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average.
*For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the isomer group was selected for use in this assessment.
**CDPHE** = Colorado Department of Public Health and Environment; **TCEQ** = Texas Commission on Environmental Quality; **ATSDR** = Agency for Toxic Substances and Disease Registry; **OEHHA** = California Office of Environmental Health Hazard Assessment
**MRL** = Minimal Risk Level; **REL** = Reference Exposure Level; **AMCV** = Air Monitoring Comparison Values; **AEGL** = Acute Exposure Guideline Levels
**ppbv** = parts per billion volume
**NA** = Not Available
**NR** = According to EPA, AEGL is "Not Recommended due to insufficient data."

## Mobile Laboratory Sampling Data Summary and Risk Assessment

### Elyria-Swansea Neighborhood | March 10, 2025

| Analyte | Cas No | Method Detection Limit (ppbv) | Count of 1-second Concentrations (#) | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value | Health Reference Level (ppbv) | Screening Value Source | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3 BUTADIENE | 106-99-0 | 0.014 | 7,906 | 0.08 | 4,379 | 0.01 | 0.02 | 670,000 | 298 | OEHHA Acute REL | 0.00005 |
| ACETYLENE | 74-86-2 | 0.065 | 7,906 | 0.41 | 4,379 | 0.24 | 0.24 | NR | 25,000 | TCEQ Short-Term AMCV | 0.00001 |
| BENZENE | 71-43-2 | 0.038 | 7,906 | 13.48 | 4,379 | 0.12 | 0.26 | 52,000 | 9 | ATSDR Acute MRL | 0.02873 |
| BUTANES* | 75-28-5 | 0.303 | 7,906 | 20.13 | 4,379 | 2.66 | 3.02 | NR | 33000 | TCEQ Short-Term AMCV | 0.00009 |
| BUTENES* | 590-18-1 | 0.116 | 7,906 | 84.93 | 4,379 | 0.99 | 1.15 | NR | 15000 | TCEQ Short-Term AMCV | 0.00008 |
| CARBON DISULFIDE | 75-15-0 | 0.012 | 7,906 | 0.02 | 4,379 | 0.01 | 0.01 | 13,000 | 1,991 | OEHHA Acute REL | 0.00000 |
| CYCLOPENTANES* | 287-92-3 | 0.041 | 7,906 | 65.93 | 4,379 | 0.95 | 1.05 | NR | 5,900 | TCEQ Short-Term AMCV | 0.00018 |
| DECANES | 124-18-5 | 0.008 | 7,906 | 0.08 | 4,379 | 0.02 | 0.02 | NR | 1,000 | TCEQ Short-Term AMCV | 0.00002 |
| DIETHYLBENZENES* | 141-93-5 | 0.032 | 7,906 | 0.35 | 4,379 | 0.14 | 0.15 | NR | 450 | TCEQ Short-Term AMCV | 0.00034 |
| DIMETHYLCYCLOHEXANES* | 638-04-0 | 0.015 | 7,906 | 3.57 | 4,379 | 0.04 | 0.05 | NR | 4,000 | CDPHE | 0.00001 |
| DODECANES | 112-40-3 | 0.003 | 7,906 | 0.01 | 4,379 | 0.00 | 0.00 | NR | 1720 | CDPHE | 0.00000 |
| ETHYLENE | 74-85-1 | 0.058 | 7,906 | 52.91 | 4,379 | 8.73 | 8.81 | NR | 500,000 | TCEQ Short-Term AMCV | 0.00002 |
| HEPTANES* | 142-82-5 | 0.014 | 7,906 | 0.32 | 4,379 | 0.04 | 0.04 | NR | 8,300 | TCEQ Short-Term AMCV | 0.00000 |
| HEXANES* | 110-54-3 | 0.019 | 7,906 | 0.57 | 4,379 | 0.21 | 0.21 | NR | 5,400 | TCEQ Short-Term AMCV | 0.00004 |
| HEXENES* | 592-41-6 | 0.028 | 7,906 | 40.12 | 4,379 | 0.58 | 0.65 | NR | 500 | TCEQ Short-Term AMCV | 0.00130 |
| HYDROGEN CYANIDE | 74-90-8 | 0.032 | 7,906 | 2.27 | 4,379 | 0.12 | 0.23 | 2,000 | 308 | OEHHA Acute REL | 0.00074 |
| HYDROGEN SULFIDE | 7783-06-4 | 0.021 | 7,906 | 0.58 | 4,379 | 0.14 | 0.16 | 510 | 70 | ATSDR Acute MRL | 0.00227 |
| ISOPRENE | 78-79-5 | 0.052 | 7,906 | 4.51 | 4,379 | 0.18 | 0.20 | NR | 1,400 | TCEQ Short-Term AMCV | 0.00014 |
| METHANOL | 67-56-1 | 0.263 | 7,906 | 34.36 | 4,379 | 3.70 | 4.29 | 530,000 | 21,366 | OEHHA Acute REL | 0.00020 |
| METHYLCYCLOHEXANE | 108-87-2 | 0.01 | 7,906 | 2.53 | 4,379 | 0.15 | 0.15 | NR | 4,000 | TCEQ Short-Term AMCV | 0.00004 |
| NONANES | 111-84-2 | 0.006 | 7,906 | 0.06 | 4,379 | 0.05 | 0.06 | NR | 3,000 | TCEQ Short-Term AMCV | 0.00002 |
| OCTANES* | 111-65-9 | 0.015 | 7,906 | 0.40 | 4,379 | 0.05 | 0.06 | NR | 4,100 | TCEQ Short-Term AMCV | 0.00001 |
| PENTANES* | 109-66-0 | 0.011 | 7,906 | 0.59 | 4,379 | 0.57 | 0.57 | NR | 68,000 | TCEQ Short-Term AMCV | 0.00001 |
| PROPYLENE | 115-07-1 | 0.085 | 7,906 | 33.97 | 4,379 | 0.22 | 0.26 | NR | NA | NA | |
| STYRENE | 100-42-5 | 0.026 | 7,906 | 1.00 | 4,379 | 0.15 | 0.17 | 20,000 | 5,000 | ATSDR Acute MRL | 0.00003 |
| TETRACHLOROETHYLENE | 127-18-4 | 0.004 | 7,906 | 0.01 | 4,379 | 0.00 | 0.00 | 35,000 | 6 | ATSDR Acute MRL | 0.00034 |
| TOLUENE | 108-88-3 | 0.04 | 7,906 | 56.90 | 4,379 | 0.60 | 0.74 | 67,000 | 2,000 | ATSDR Acute MRL | 0.00037 |
| TRIMETHYLBENZENES* | 622-96-8 | 0.025 | 7,906 | 48.09 | 4,379 | 0.47 | 0.65 | 50,000 | 250 | TCEQ Short-Term AMCV | 0.00259 |
| UNDECANES | 1120-21-4 | 0.014 | 7,906 | 0.09 | 4,379 | 0.04 | 0.04 | NR | 550 | TCEQ Short-Term AMCV | 0.00007 |
| XYLENES* | 1330-20-7 | 0.035 | 7,906 | 55.84 | 4,379 | 0.90 | 1.13 | 130,000 | 2,000 | ATSDR Acute MRL | 0.00057 |
| | | | | | | | | | | **Hazard Index** | **0.03827** |

The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average.
*For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the isomer group was selected for use in this assessment.
**CDPHE** = Colorado Department of Public Health and Environment; **TCEQ** = Texas Commission on Environmental Quality; **ATSDR** = Agency for Toxic Substances and Disease Registry; **OEHHA** = California Office of Environmental Health Hazard Assessment
**MRL** = Minimal Risk Level; **REL** = Reference Exposure Level; **AMCV** = Air Monitoring Comparison Values; **AEGL** = Acute Exposure Guideline Levels
**ppbv** = parts per billion volume
**NA** = Not Available
**NR** = According to EPA, AEGL is "Not Recommended due to insufficient data."

## Mobile Laboratory Sampling Data Summary and Risk Assessment

### Globeville Neighborhood | March 12, 2025

| Analyte | Cas No | Method Detection Limit (ppbv) | Count of 1-second Concentrations (#) | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value | Health Reference Level (ppbv) | Screening Value Source | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3 BUTADIENE | 106-99-0 | 0.014 | 8,110 | 0.19 | 4,583 | 0.01 | 0.01 | 670,000 | 298 | OEHHA Acute REL | 0.00005 |
| ACETYLENE | 74-86-2 | 0.065 | 8,110 | 4.14 | 4,583 | 0.23 | 0.24 | NR | 25,000 | TCEQ Short-Term AMCV | 0.00001 |
| BENZENE | 71-43-2 | 0.038 | 8,110 | 3.69 | 4,583 | 0.20 | 0.25 | 52,000 | 9 | ATSDR Acute MRL | 0.02748 |
| BUTANES* | 75-28-5 | 0.303 | 8,110 | 19.87 | 4,583 | 2.43 | 2.64 | NR | 33000 | TCEQ Short-Term AMCV | 0.00008 |
| BUTENES* | 590-18-1 | 0.116 | 8,110 | 9.44 | 4,583 | 0.82 | 1.02 | NR | 15000 | TCEQ Short-Term AMCV | 0.00007 |
| CARBON DISULFIDE | 75-15-0 | 0.012 | 8,110 | 0.02 | 4,583 | 0.01 | 0.01 | 13,000 | 1,991 | OEHHA Acute REL | 0.00000 |
| CYCLOPENTANES* | 287-92-3 | 0.041 | 8,110 | 9.60 | 4,583 | 0.71 | 0.75 | NR | 5,900 | TCEQ Short-Term AMCV | 0.00013 |
| DECANES | 124-18-5 | 0.008 | 8,110 | 0.06 | 4,583 | 0.03 | 0.03 | NR | 1,000 | TCEQ Short-Term AMCV | 0.00003 |
| DIETHYLBENZENES* | 141-93-5 | 0.032 | 8,110 | 0.19 | 4,583 | 0.11 | 0.12 | NR | 450 | TCEQ Short-Term AMCV | 0.00028 |
| DIMETHYLCYCLOHEXANES* | 638-04-0 | 0.015 | 8,110 | 0.29 | 4,583 | 0.04 | 0.04 | NR | 4,000 | CDPHE | 0.00001 |
| DODECANES | 112-40-3 | 0.003 | 8,110 | 0.01 | 4,583 | 0.00 | 0.00 | NR | 1720 | CDPHE | 0.00000 |
| ETHYLENE | 74-85-1 | 0.058 | 8,110 | 44.97 | 4,583 | 5.41 | 5.54 | NR | 500,000 | TCEQ Short-Term AMCV | 0.00001 |
| HEPTANES* | 142-82-5 | 0.014 | 8,110 | 0.11 | 4,583 | 0.03 | 0.04 | NR | 8,300 | TCEQ Short-Term AMCV | 0.00000 |
| HEXANES* | 110-54-3 | 0.019 | 8,110 | 0.10 | 4,583 | 0.05 | 0.05 | NR | 5,400 | TCEQ Short-Term AMCV | 0.00001 |
| HEXENES* | 592-41-6 | 0.028 | 8,110 | 6.53 | 4,583 | 0.44 | 0.47 | NR | 500 | TCEQ Short-Term AMCV | 0.00093 |
| HYDROGEN CYANIDE | 74-90-8 | 0.032 | 8,110 | 0.97 | 4,583 | 0.08 | 0.09 | 2,000 | 308 | OEHHA Acute REL | 0.00028 |
| HYDROGEN SULFIDE | 7783-06-4 | 0.021 | 8,110 | 3.17 | 4,583 | 0.14 | 0.15 | 510 | 70 | ATSDR Acute MRL | 0.00215 |
| ISOPRENE | 78-79-5 | 0.052 | 8,110 | 1.46 | 4,583 | 0.19 | 0.21 | NR | 1,400 | TCEQ Short-Term AMCV | 0.00015 |
| METHANOL | 67-56-1 | 0.263 | 8,110 | 144.79 | 4,583 | 3.94 | 4.62 | 530,000 | 21,366 | OEHHA Acute REL | 0.00022 |
| METHYLCYCLOHEXANE | 108-87-2 | 0.01 | 8,110 | 0.29 | 4,583 | 0.03 | 0.03 | NR | 4,000 | TCEQ Short-Term AMCV | 0.00001 |
| NONANES | 111-84-2 | 0.006 | 8,110 | 0.01 | 4,583 | 0.00 | 0.00 | NR | 3,000 | TCEQ Short-Term AMCV | 0.00000 |
| OCTANES* | 111-65-9 | 0.015 | 8,110 | 0.14 | 4,583 | 0.06 | 0.06 | NR | 4,100 | TCEQ Short-Term AMCV | 0.00002 |
| PENTANES* | 109-66-0 | 0.011 | 8,110 | 0.26 | 4,583 | 0.24 | 0.24 | NR | 68,000 | TCEQ Short-Term AMCV | 0.00000 |
| PROPYLENE | 115-07-1 | 0.085 | 8,110 | 34.57 | 4,583 | 0.72 | 0.80 | NR | NA | NA | |
| STYRENE | 100-42-5 | 0.026 | 8,110 | 1.75 | 4,583 | 0.05 | 0.06 | 20,000 | 5,000 | ATSDR Acute MRL | 0.00001 |
| TETRACHLOROETHYLENE | 127-18-4 | 0.004 | 8,110 | 0.01 | 4,583 | 0.00 | 0.00 | 35,000 | 6 | ATSDR Acute MRL | 0.00034 |
| TOLUENE | 108-88-3 | 0.04 | 8,110 | 8.19 | 4,583 | 0.56 | 0.63 | 67,000 | 2,000 | ATSDR Acute MRL | 0.00031 |
| TRIMETHYLBENZENES* | 622-96-8 | 0.025 | 8,110 | 6.49 | 4,583 | 0.36 | 0.47 | 50,000 | 250 | TCEQ Short-Term AMCV | 0.00187 |
| UNDECANES | 1120-21-4 | 0.014 | 8,110 | 0.05 | 4,583 | 0.01 | 0.01 | NR | 550 | TCEQ Short-Term AMCV | 0.00002 |
| XYLENES* | 1330-20-7 | 0.035 | 8,110 | 8.71 | 4,583 | 0.63 | 0.69 | 130,000 | 2,000 | ATSDR Acute MRL | 0.00034 |
| | | | | | | | | | | **Hazard Index** | **0.03483** |

The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average.
*For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the isomer group was selected for use in this assessment.
**CDPHE** = Colorado Department of Public Health and Environment; **TCEQ** = Texas Commission on Environmental Quality; **ATSDR** = Agency for Toxic Substances and Disease Registry; **OEHHA** = California Office of Environmental Health Hazard Assessment
**MRL** = Minimal Risk Level; **REL** = Reference Exposure Level; **AMCV** = Air Monitoring Comparison Values; **AEGL** = Acute Exposure Guideline Levels
**ppbv** = parts per billion volume
**NA** = Not Available
**NR** = According to EPA, AEGL is "Not Recommended due to insufficient data."

## Mobile Laboratory Sampling Data Summary and Risk Assessment

### Pioneer Park Neighborhood | March 10, 2025

| Analyte | Cas No | Method Detection Limit (ppbv) | Count of 1-second Concentrations (#) | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value | Health Reference Level (ppbv) | Screening Value Source | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3 BUTADIENE | 106-99-0 | 0.014 | 10,399 | 0.11 | 6,872 | 0.03 | 0.04 | 670,000 | 298 | OEHHA Acute REL | 0.00013 |
| ACETYLENE | 74-86-2 | 0.065 | 10,399 | 0.31 | 6,872 | 0.13 | 0.14 | NR | 25,000 | TCEQ Short-Term AMCV | 0.00001 |
| BENZENE | 71-43-2 | 0.038 | 10,399 | 1.97 | 6,872 | 0.25 | 0.29 | 52,000 | 9 | ATSDR Acute MRL | 0.03229 |
| BUTANES* | 75-28-5 | 0.303 | 10,399 | 121.57 | 6,872 | 2.42 | 2.62 | NR | 33000 | TCEQ Short-Term AMCV | 0.00008 |
| BUTENES* | 590-18-1 | 0.116 | 10,399 | 10.37 | 6,872 | 2.19 | 2.44 | NR | 15000 | TCEQ Short-Term AMCV | 0.00016 |
| CARBON DISULFIDE | 75-15-0 | 0.012 | 10,399 | 0.02 | 6,872 | 0.01 | 0.01 | 13,000 | 1,991 | OEHHA Acute REL | 0.00000 |
| CYCLOPENTANES* | 287-92-3 | 0.041 | 10,399 | 11.04 | 6,872 | 1.49 | 1.56 | NR | 5,900 | TCEQ Short-Term AMCV | 0.00026 |
| DECANES | 124-18-5 | 0.008 | 10,399 | 0.09 | 6,872 | 0.02 | 0.03 | NR | 1,000 | TCEQ Short-Term AMCV | 0.00003 |
| DIETHYLBENZENES* | 141-93-5 | 0.032 | 10,399 | 0.22 | 6,872 | 0.02 | 0.04 | NR | 450 | TCEQ Short-Term AMCV | 0.00008 |
| DIMETHYLCYCLOHEXANES* | 638-04-0 | 0.015 | 10,399 | 0.37 | 6,872 | 0.07 | 0.08 | NR | 4,000 | CDPHE | 0.00002 |
| DODECANES | 112-40-3 | 0.003 | 10,399 | 0.01 | 6,872 | 0.00 | 0.00 | NR | 1720 | CDPHE | 0.00000 |
| ETHYLENE | 74-85-1 | 0.058 | 10,399 | 25.15 | 6,872 | 5.44 | 6.06 | NR | 500,000 | TCEQ Short-Term AMCV | 0.00001 |
| HEPTANES* | 142-82-5 | 0.014 | 10,399 | 0.34 | 6,872 | 0.29 | 0.29 | NR | 8,300 | TCEQ Short-Term AMCV | 0.00004 |
| HEXANES* | 110-54-3 | 0.019 | 10,399 | 0.69 | 6,872 | 0.57 | 0.57 | NR | 5,400 | TCEQ Short-Term AMCV | 0.00011 |
| HEXENES* | 592-41-6 | 0.028 | 10,399 | 6.92 | 6,872 | 0.94 | 0.99 | NR | 500 | TCEQ Short-Term AMCV | 0.00199 |
| HYDROGEN CYANIDE | 74-90-8 | 0.032 | 10,399 | 0.82 | 6,872 | 0.11 | 0.15 | 2,000 | 308 | OEHHA Acute REL | 0.00049 |
| HYDROGEN SULFIDE | 7783-06-4 | 0.021 | 10,399 | 0.35 | 6,872 | 0.13 | 0.15 | 510 | 70 | ATSDR Acute MRL | 0.00218 |
| ISOPRENE | 78-79-5 | 0.052 | 10,399 | 1.34 | 6,872 | 0.13 | 0.17 | NR | 1,400 | TCEQ Short-Term AMCV | 0.00012 |
| METHANOL | 67-56-1 | 0.263 | 10,399 | 32.94 | 6,872 | 3.62 | 4.52 | 530,000 | 21,366 | OEHHA Acute REL | 0.00021 |
| METHYLCYCLOHEXANE | 108-87-2 | 0.01 | 10,399 | 0.33 | 6,872 | 0.07 | 0.07 | NR | 4,000 | TCEQ Short-Term AMCV | 0.00002 |
| NONANES | 111-84-2 | 0.006 | 10,399 | 0.02 | 6,872 | 0.01 | 0.01 | NR | 3,000 | TCEQ Short-Term AMCV | 0.00000 |
| OCTANES* | 111-65-9 | 0.015 | 10,399 | 0.17 | 6,872 | 0.08 | 0.09 | NR | 4,100 | TCEQ Short-Term AMCV | 0.00002 |
| PENTANES* | 109-66-0 | 0.011 | 10,399 | 0.27 | 6,872 | 0.25 | 0.25 | NR | 68,000 | TCEQ Short-Term AMCV | 0.00000 |
| PROPYLENE | 115-07-1 | 0.085 | 10,399 | 4.38 | 6,872 | 0.56 | 0.64 | NR | NA | NA | |
| STYRENE | 100-42-5 | 0.026 | 10,399 | 0.55 | 6,872 | 0.07 | 0.08 | 20,000 | 5,000 | ATSDR Acute MRL | 0.00002 |
| TETRACHLOROETHYLENE | 127-18-4 | 0.004 | 10,399 | 0.01 | 6,872 | 0.00 | 0.00 | 35,000 | 6 | ATSDR Acute MRL | 0.00037 |
| TOLUENE | 108-88-3 | 0.04 | 10,399 | 6.51 | 6,872 | 0.63 | 0.70 | 67,000 | 2,000 | ATSDR Acute MRL | 0.00035 |
| TRIMETHYLBENZENES* | 622-96-8 | 0.025 | 10,399 | 9.01 | 6,872 | 0.14 | 0.17 | 50,000 | 250 | TCEQ Short-Term AMCV | 0.00068 |
| UNDECANES | 1120-21-4 | 0.014 | 10,399 | 0.10 | 6,872 | 0.04 | 0.05 | NR | 550 | TCEQ Short-Term AMCV | 0.00008 |
| XYLENES* | 1330-20-7 | 0.035 | 10,399 | 56.77 | 6,872 | 0.47 | 0.65 | 130,000 | 2,000 | ATSDR Acute MRL | 0.00032 |
| | | | | | | | | | | **Hazard Index** | **0.04007** |

The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average.
*For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the isomer group was selected for use in this assessment.
**CDPHE** = Colorado Department of Public Health and Environment; **TCEQ** = Texas Commission on Environmental Quality; **ATSDR** = Agency for Toxic Substances and Disease Registry; **OEHHA** = California Office of Environmental Health Hazard Assessment
**MRL** = Minimal Risk Level; **REL** = Reference Exposure Level; **AMCV** = Air Monitoring Comparison Values; **AEGL** = Acute Exposure Guideline Levels
**ppbv** = parts per billion volume
**NA** = Not Available
**NR** = According to EPA, AEGL is "Not Recommended due to insufficient data."

## Mobile Laboratory Sampling Data Summary and Risk Assessment

**Western Hills Neighborhood | March 12, 2025**

| Analyte | Cas No | Method Detection Limit (ppbv) | Count of 1-second Concentrations (#) | Maximum 1-second Concentration (ppbv) | Count of 1-hr Rolling Averages Derived (#) | Average 1-hr Rolling Average (ppbv) | Maximum 1-hr Rolling Average (ppbv) | AEGL 1 60-min Value | Health Reference Level (ppbv) | Screening Value Source | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3 BUTADIENE | 106-99-0 | 0.014 | 8,619 | 0.09 | 5,092 | 0.01 | 0.01 | 670,000 | 298 | OEHHA Acute REL | 0.00004 |
| ACETYLENE | 74-86-2 | 0.065 | 8,619 | 1.71 | 5,092 | 0.13 | 0.14 | NR | 25,000 | TCEQ Short-Term AMCV | 0.00001 |
| BENZENE | 71-43-2 | 0.038 | 8,619 | 5.67 | 5,092 | 0.10 | 0.14 | 52,000 | 9 | ATSDR Acute MRL | 0.01514 |
| BUTANES* | 75-28-5 | 0.303 | 8,619 | 151.51 | 5,092 | 1.90 | 2.13 | NR | 33000 | TCEQ Short-Term AMCV | 0.00006 |
| BUTENES* | 590-18-1 | 0.116 | 8,619 | 24.44 | 5,092 | 1.45 | 1.70 | NR | 15000 | TCEQ Short-Term AMCV | 0.00011 |
| CARBON DISULFIDE | 75-15-0 | 0.012 | 8,619 | 0.02 | 5,092 | 0.01 | 0.01 | 13,000 | 1,991 | OEHHA Acute REL | 0.00000 |
| CYCLOPENTANES* | 287-92-3 | 0.041 | 8,619 | 18.55 | 5,092 | 0.57 | 0.69 | NR | 5,900 | TCEQ Short-Term AMCV | 0.00012 |
| DECANES | 124-18-5 | 0.008 | 8,619 | 0.03 | 5,092 | 0.00 | 0.01 | NR | 1,000 | TCEQ Short-Term AMCV | 0.00001 |
| DIETHYLBENZENES* | 141-93-5 | 0.032 | 8,619 | 0.24 | 5,092 | 0.10 | 0.11 | NR | 450 | TCEQ Short-Term AMCV | 0.00024 |
| DIMETHYLCYCLOHEXANES* | 638-04-0 | 0.015 | 8,619 | 0.56 | 5,092 | 0.03 | 0.04 | NR | 4,000 | CDPHE | 0.00001 |
| DODECANES | 112-40-3 | 0.003 | 8,619 | 0.01 | 5,092 | 0.00 | 0.00 | NR | 1720 | CDPHE | 0.00000 |
| ETHYLENE | 74-85-1 | 0.058 | 8,619 | 29.45 | 5,092 | 4.81 | 4.92 | NR | 500,000 | TCEQ Short-Term AMCV | 0.00001 |
| HEPTANES* | 142-82-5 | 0.014 | 8,619 | 0.23 | 5,092 | 0.03 | 0.03 | NR | 8,300 | TCEQ Short-Term AMCV | 0.00000 |
| HEXANES* | 110-54-3 | 0.019 | 8,619 | 0.22 | 5,092 | 0.04 | 0.05 | NR | 5,400 | TCEQ Short-Term AMCV | 0.00001 |
| HEXENES* | 592-41-6 | 0.028 | 8,619 | 11.89 | 5,092 | 0.36 | 0.45 | NR | 500 | TCEQ Short-Term AMCV | 0.00089 |
| HYDROGEN CYANIDE | 74-90-8 | 0.032 | 8,619 | 1.44 | 5,092 | 0.18 | 0.18 | 2,000 | 308 | OEHHA Acute REL | 0.00060 |
| HYDROGEN SULFIDE | 7783-06-4 | 0.021 | 8,619 | 3.70 | 5,092 | 0.12 | 0.13 | 510 | 70 | ATSDR Acute MRL | 0.00186 |
| ISOPRENE | 78-79-5 | 0.052 | 8,619 | 1.69 | 5,092 | 0.05 | 0.09 | NR | 1,400 | TCEQ Short-Term AMCV | 0.00006 |
| METHANOL | 67-56-1 | 0.263 | 8,619 | 24.51 | 5,092 | 3.67 | 3.82 | 530,000 | 21,366 | OEHHA Acute REL | 0.00018 |
| METHYLCYCLOHEXANE | 108-87-2 | 0.01 | 8,619 | 0.53 | 5,092 | 0.03 | 0.03 | NR | 4,000 | TCEQ Short-Term AMCV | 0.00001 |
| NONANES | 111-84-2 | 0.006 | 8,619 | 0.01 | 5,092 | 0.00 | 0.00 | NR | 3,000 | TCEQ Short-Term AMCV | 0.00000 |
| OCTANES* | 111-65-9 | 0.015 | 8,619 | 0.12 | 5,092 | 0.03 | 0.03 | NR | 4,100 | TCEQ Short-Term AMCV | 0.00001 |
| PENTANES* | 109-66-0 | 0.011 | 8,619 | 0.18 | 5,092 | 0.16 | 0.16 | NR | 68,000 | TCEQ Short-Term AMCV | 0.00000 |
| PROPYLENE | 115-07-1 | 0.085 | 8,619 | 10.30 | 5,092 | 0.28 | 0.35 | NR | NA | NA | |
| STYRENE | 100-42-5 | 0.026 | 8,619 | 0.58 | 5,092 | 0.11 | 0.13 | 20,000 | 5,000 | ATSDR Acute MRL | 0.00003 |
| TETRACHLOROETHYLENE | 127-18-4 | 0.004 | 8,619 | 0.01 | 5,092 | 0.00 | 0.00 | 35,000 | 6 | ATSDR Acute MRL | 0.00034 |
| TOLUENE | 108-88-3 | 0.04 | 8,619 | 19.32 | 5,092 | 0.53 | 0.60 | 67,000 | 2,000 | ATSDR Acute MRL | 0.00030 |
| TRIMETHYLBENZENES* | 622-96-8 | 0.025 | 8,619 | 21.42 | 5,092 | 0.40 | 0.54 | 50,000 | 250 | TCEQ Short-Term AMCV | 0.00216 |
| UNDECANES | 1120-21-4 | 0.014 | 8,619 | 0.04 | 5,092 | 0.01 | 0.01 | NR | 550 | TCEQ Short-Term AMCV | 0.00002 |
| XYLENES* | 1330-20-7 | 0.035 | 8,619 | 22.40 | 5,092 | 0.54 | 0.66 | 130,000 | 2,000 | ATSDR Acute MRL | 0.00033 |
| | | | | | | | | | | **Hazard Index** | **0.02254** |

The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average.
*For analyte isomer groups which were unable to be differentiated, the lowest health reference value of the isomer group was selected for use in this assessment.
**CDPHE** = Colorado Department of Public Health and Environment; **TCEQ** = Texas Commission on Environmental Quality; **ATSDR** = Agency for Toxic Substances and Disease Registry; **OEHHA** = California Office of Environmental Health Hazard Assessment
**MRL** = Minimal Risk Level; **REL** = Reference Exposure Level; **AMCV** = Air Monitoring Comparison Values; **AEGL** = Acute Exposure Guideline Levels
**ppbv** = parts per billion volume
**NA** = Not Available
**NR** = According to EPA, AEGL is "Not Recommended due to insufficient data."

# APPENDIX D PTR CALIBRATION AND QA/QC DATA

# Observations During Mobile Van Monitoring

3-10-25 Pioneer Park Neighborhood

- 11:27 66th and Monaco: Benzene, toluene and xylene( BTEX) road intersection
- 11:42 Leyden and Small: Xylenes, alkenes
- 12:00 68th and Kearney: BTEX road intersection
- 12:34 61st and Niagara: BTEX unknown
- 13:02 62nd and Parkway: BTEX, hexenes, traffic

3-10-25 Elyria-Swansea Neighborhoods

- 14:30 46th and Columbia, I-70 Overpass: BTEX, alkenes, trimethylbenzenes intersection traffic
- 15:04 37th and Marion: BTEX, alkenes, alkanes, trimethylbenzenes traffic exhaust
- 15:48 46th and Clayton: BTEX, unknown
- 15:53 46th and Columbia, I-70 Overpass: BTEX, alkenes, trimethylbenzenes intersection traffic
- 15:56 Semi-truck lot on 40th: BTEX truck exhaust
- 16:10 48th and York: BTEX, hexenes, vehicle exhaust

3-11-25 Dupont Neighborhood

- 09:51 77th and Idlewilde: BTEX, alkenes, trimethyl benzenes traffic intersection
- 09:55 80th and Kimberly: BTEX alkenes, intersection traffic
- 10:13 76th and Kearney: BTEX, unknown
- 10:23 80th and Niagara: BTEX alkenes, construction traffic
- 10:36 79th and Quince: BTEX, alkenes, trimethyl benzenes traffic intersection
- 11:06 80th and Rosyln: BTEX, alkenes, construction traffic

3-11-25 Adams City Neighborhood

- 12:54 E 72nd Ave and Birch: BTEX, alkenes intersection
- 13:19 74th and Dahlia: BTEX, alkenes, trimethylbenzenes, and alkanes road intersection
- 14:08 73rd and Dahlia: BTEX road intersection
- 14:28 74th at Circle K Station: BTEX
- 14:59 74th and Cahlia: BTEX, alkenes, and trimethylbenzenes road intersection

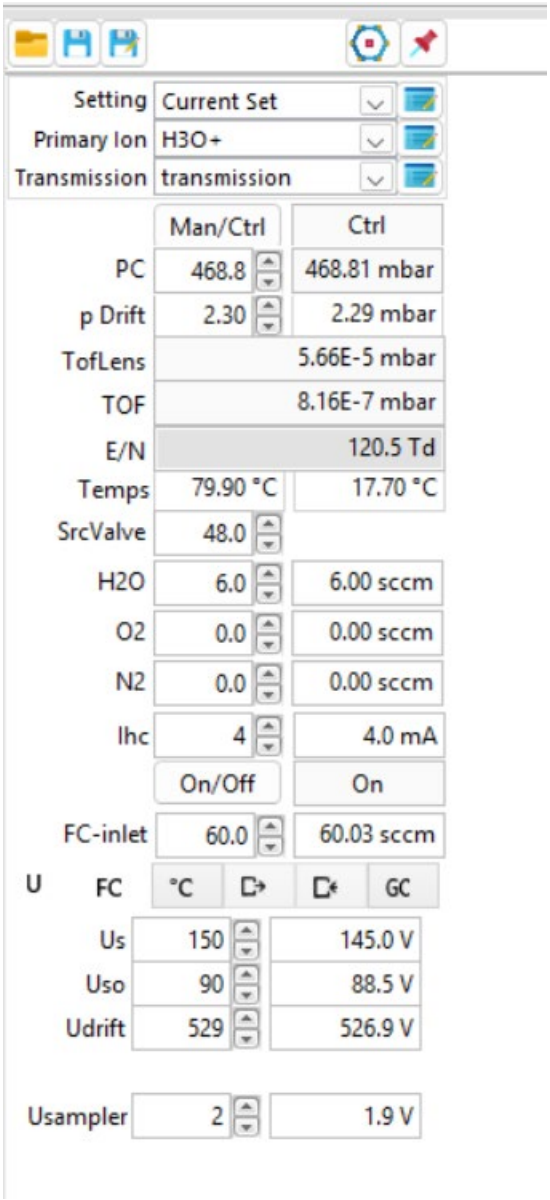
3-12-25 Western Hills Neighborhood

- 10:32 78th and Erie: BTEX, alkenes car exhaust
- 10:43 Grace and Lincoln: BTEX unknown
- 10:47 79th and Joan: BTEX unknown
- 11:28 71st and Washington: BTEX, , alkenes and trimethylbenzenes, road traffic
- 12:05 Coronado Parkway: BTEX unknown

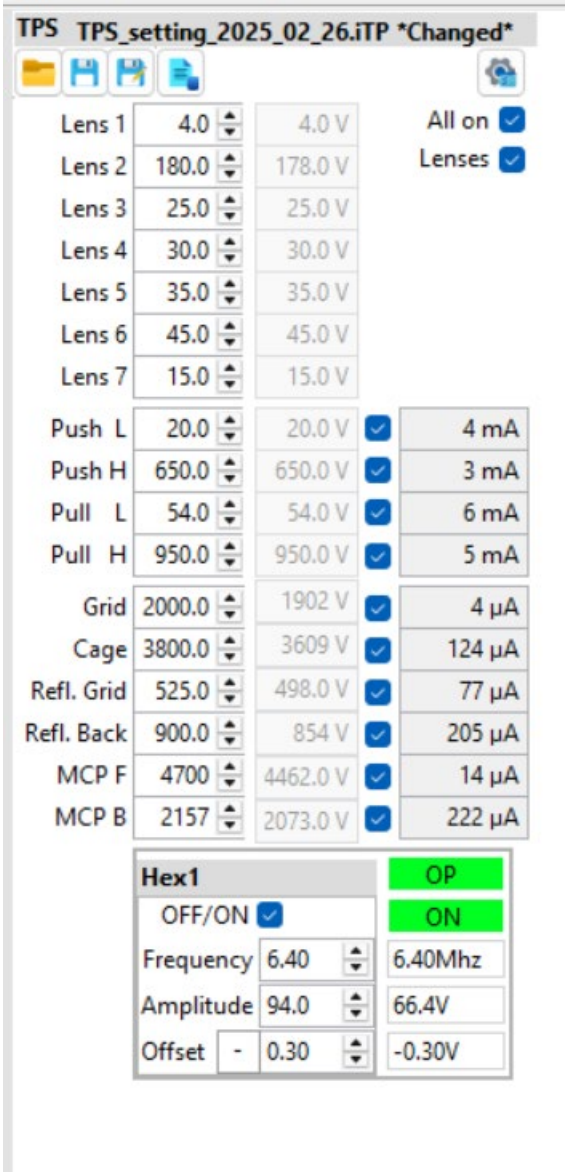
3-12-25 Globeville Neighborhood

- 14:20 45th and Lincoln: BTEX car exhaust
- 14:36 44th and Pennsylvania: TEX, train engine exhaust from railyard
- 14:41 54th and Sherman: BTEX, unknown industrial area

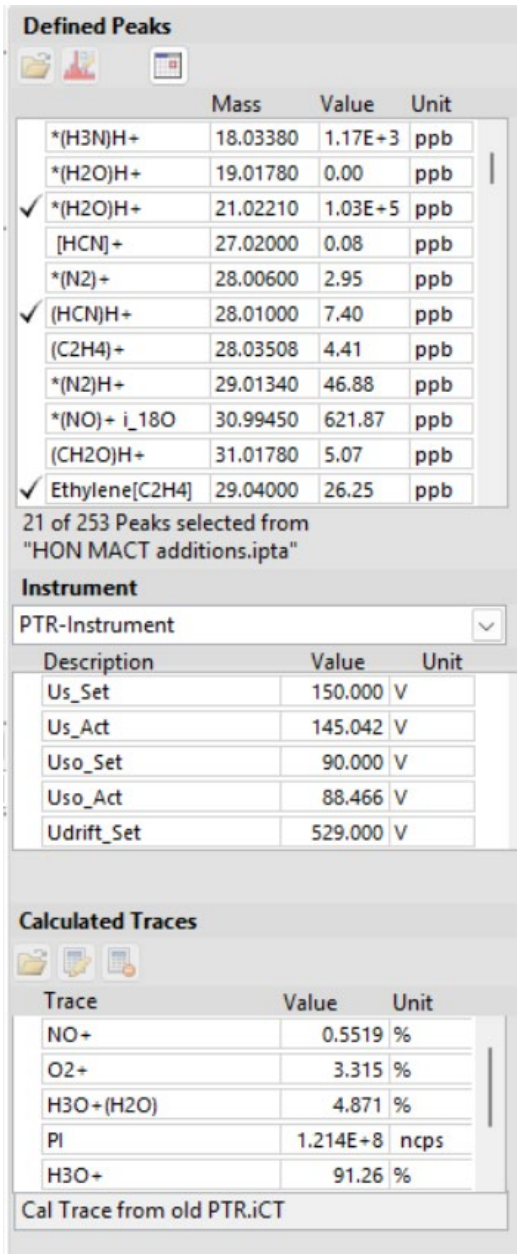
CCND Community Monitoring
First Quarter 2025 Initial Calibration
PTR Screenshots 3-9-2025
IONICON Model 4000 PTR
H3O+ 2.3 Production Method



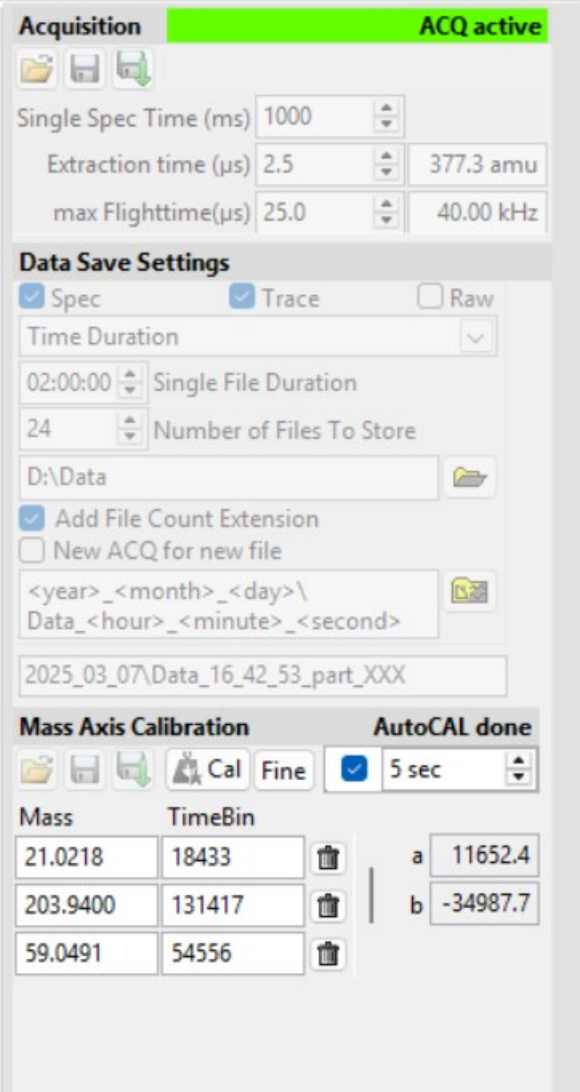

Production Parameters



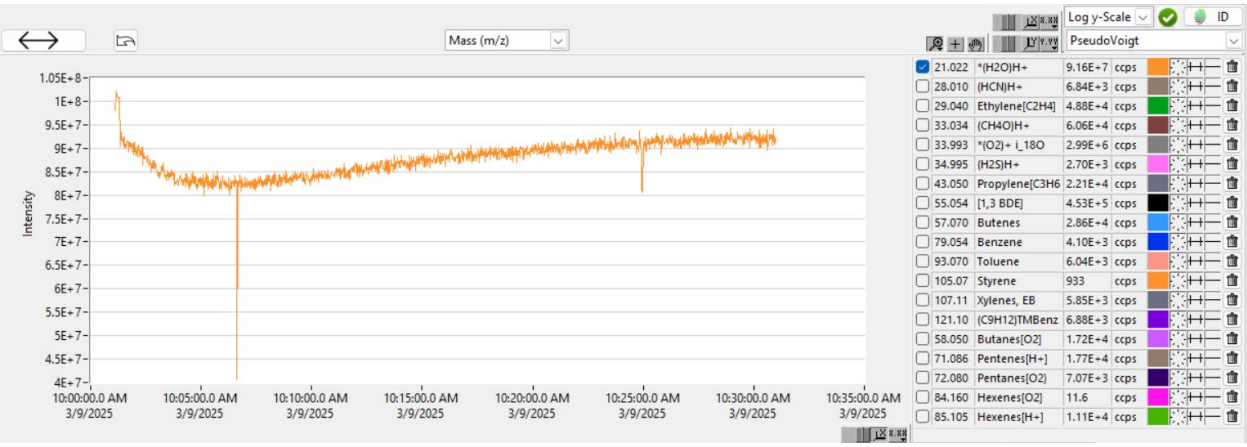

TOF and Lens Settings



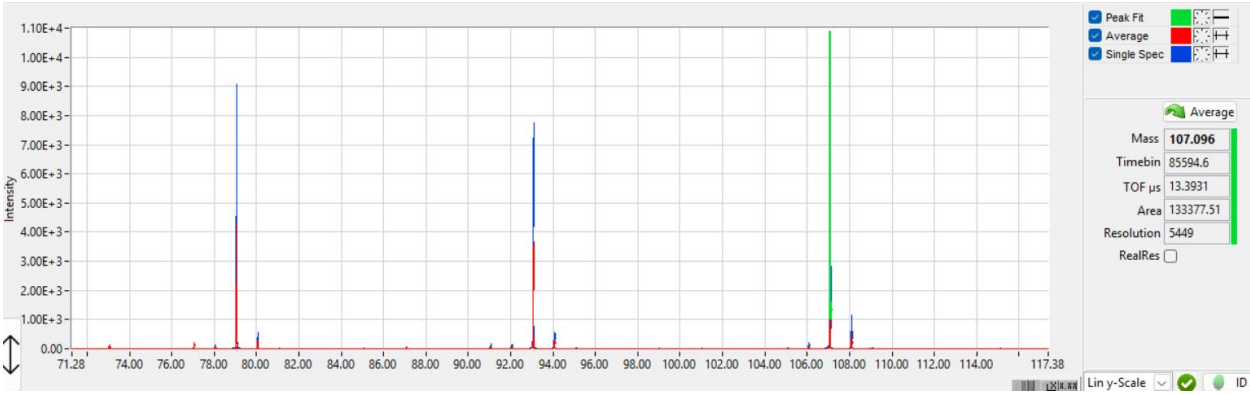

Peak Table and Calc Traces



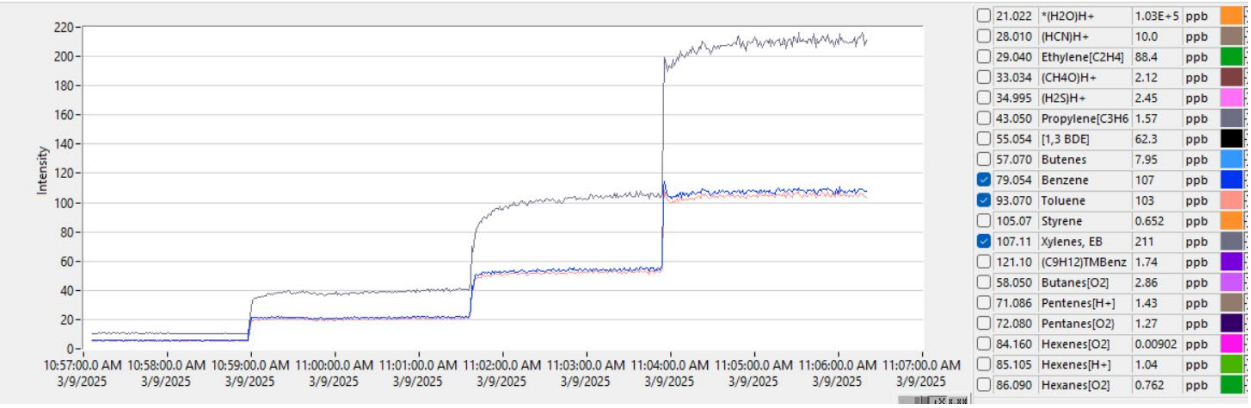

Acquisition Parameters



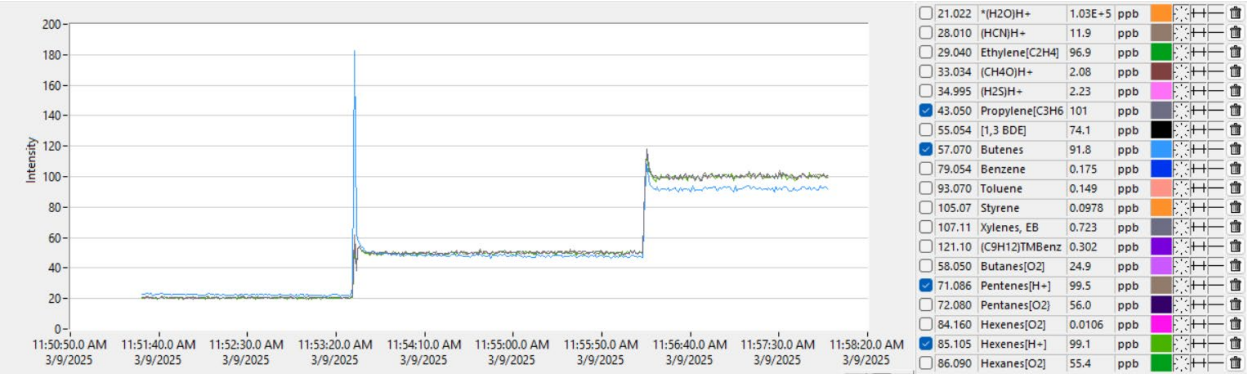

Hydronium Check



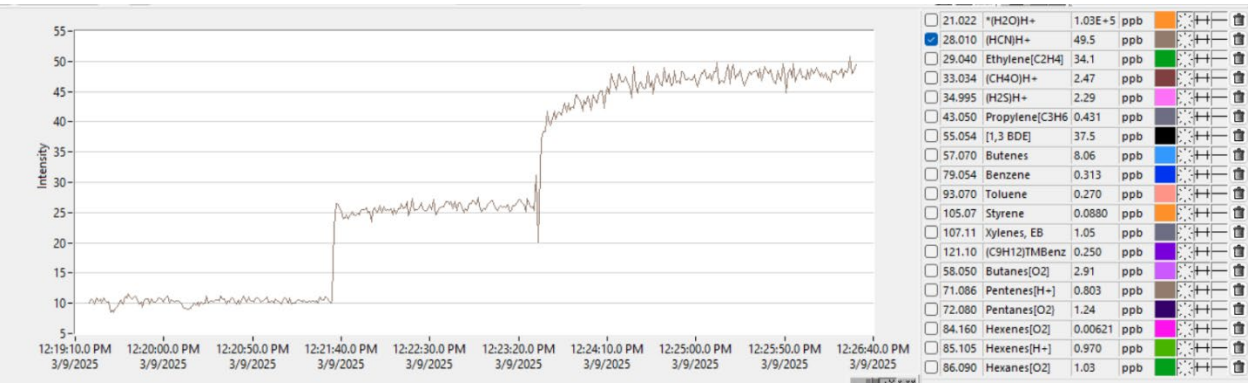

BTEX Mass Spectrum



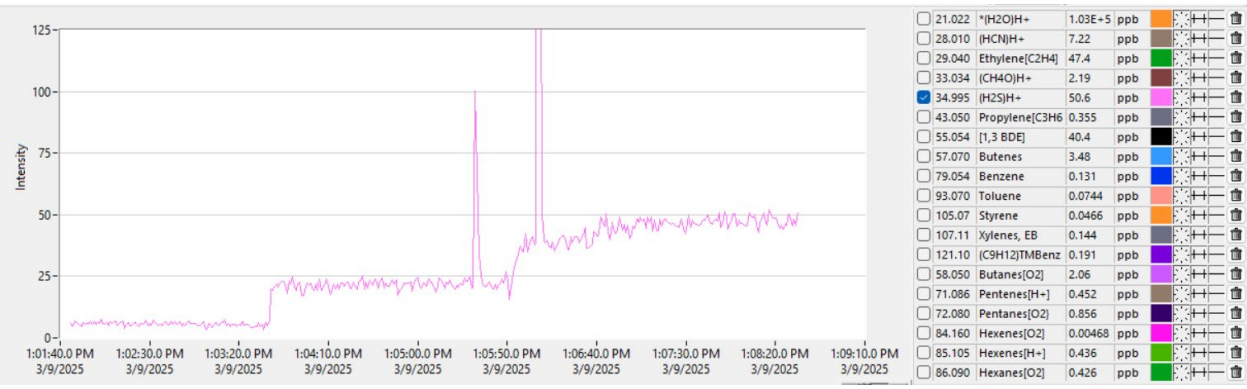

BTEX Initial Cal 5,20,50,100 ppb



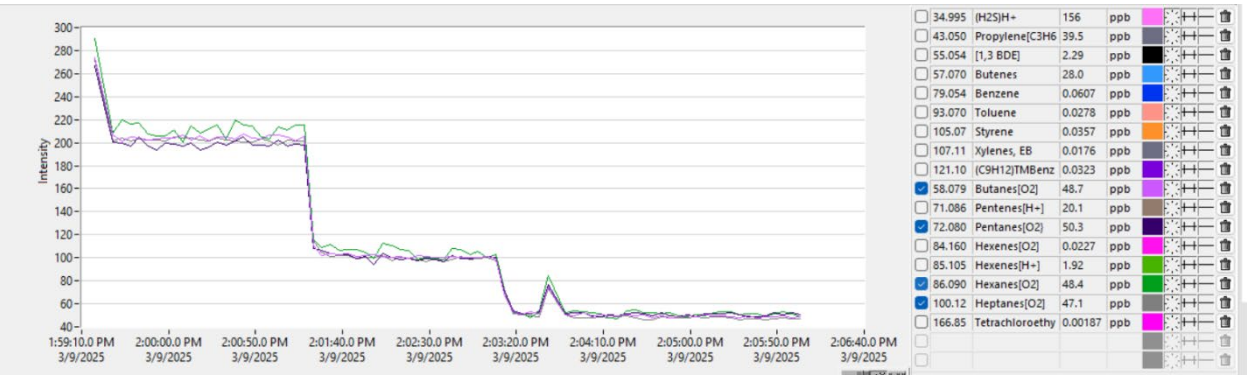

Alkenes Initial Cal 20, 50,100 ppb




HCN Initial Calibration 10, 25, 50 ppb

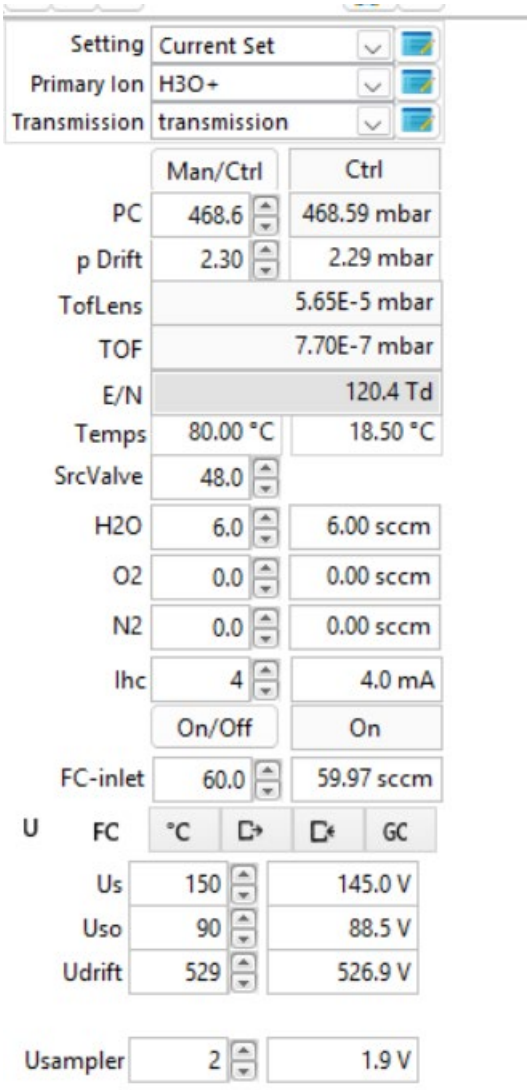



$H_2S$ Initial Calibration 5, 20, 50 ppb

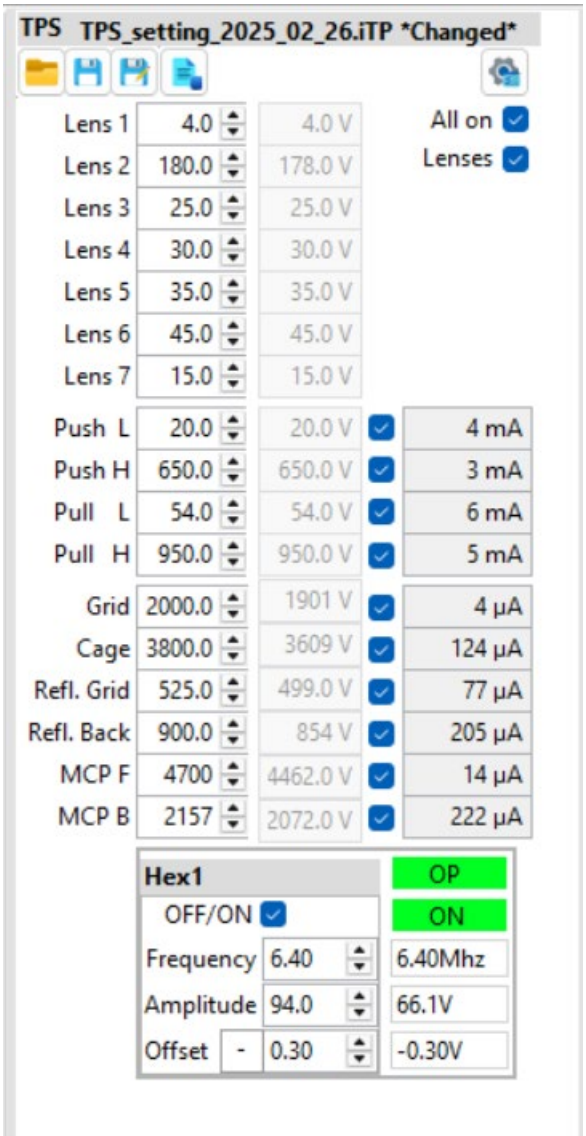


Alkanes Initial Calibration 200, 100, 50 ppb

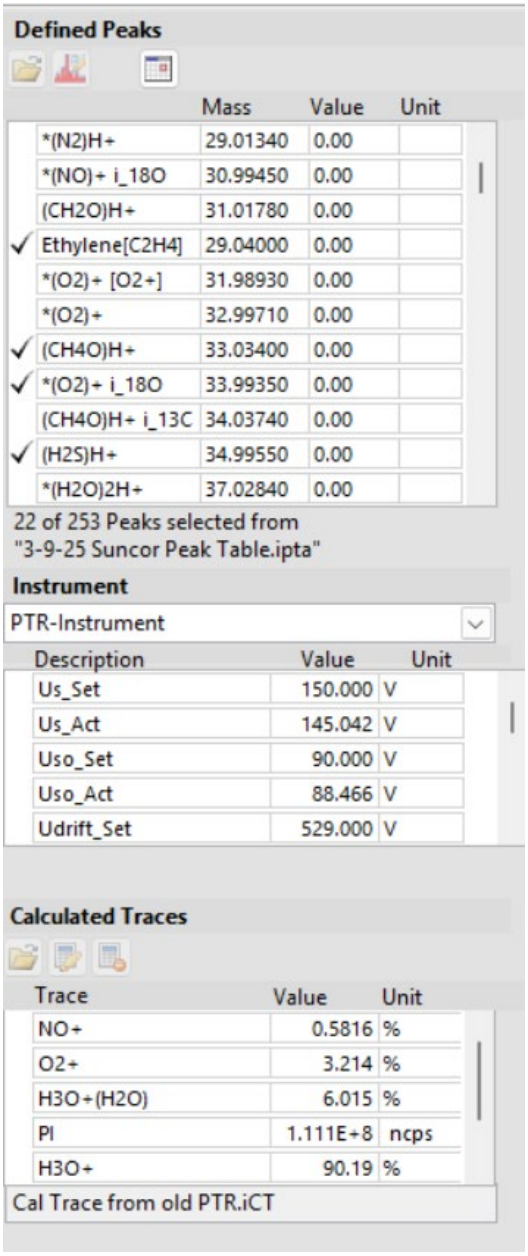
3-10-2025 CCND Testing
Pioneer Park and Elyria-Swansea
PTR Screenshots



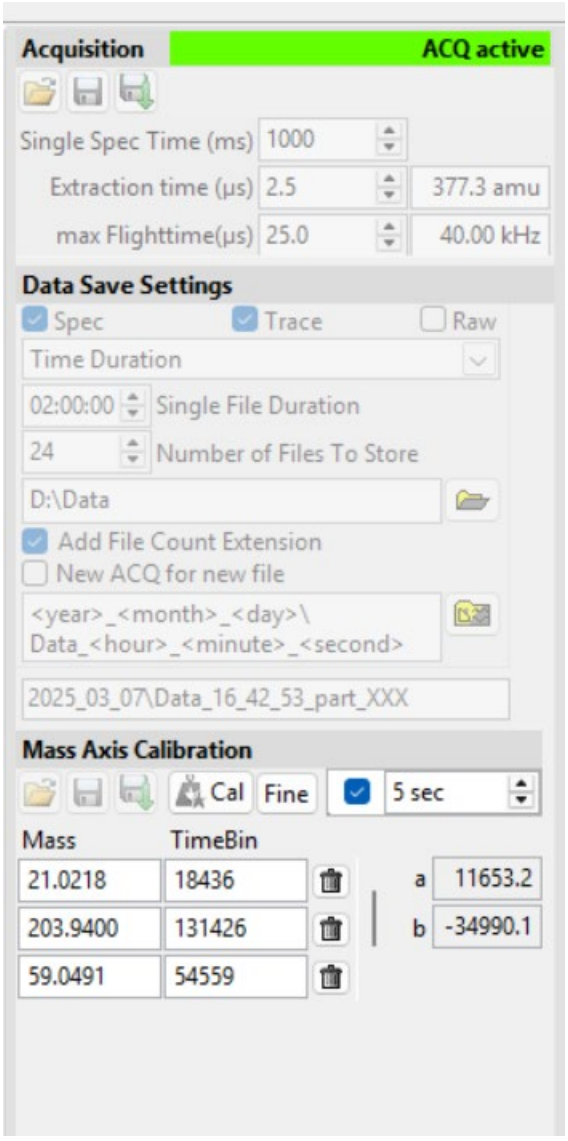

Production Settings



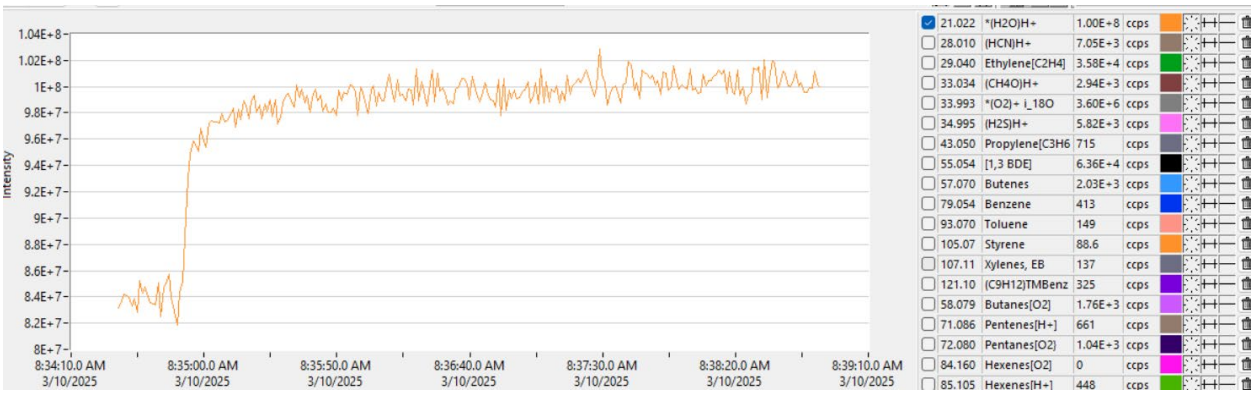

TPS Voltages and Hex Settings



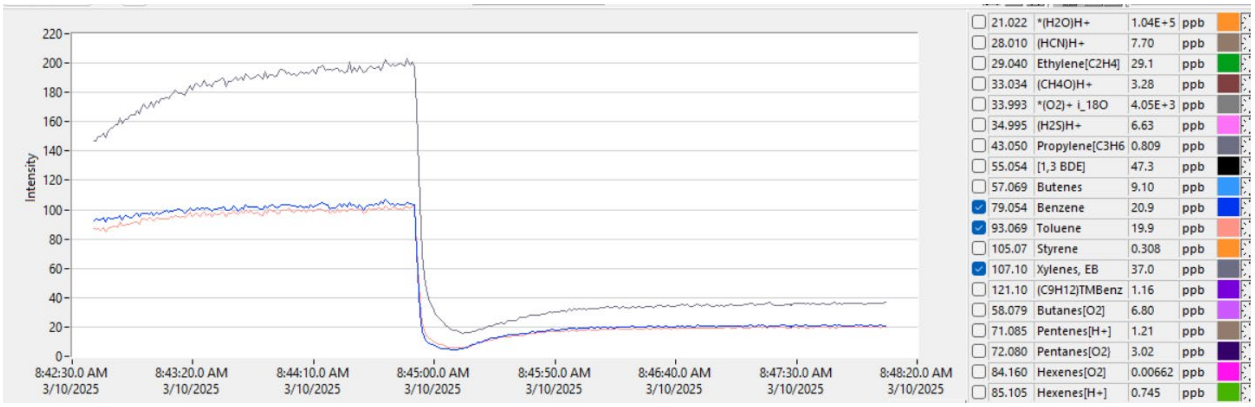

Peaks and Traces



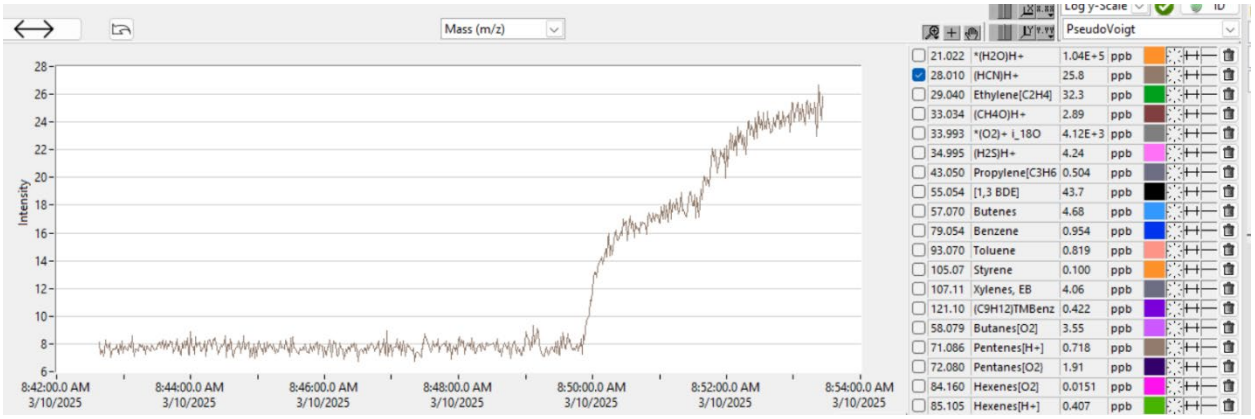

Acquisition Parameters



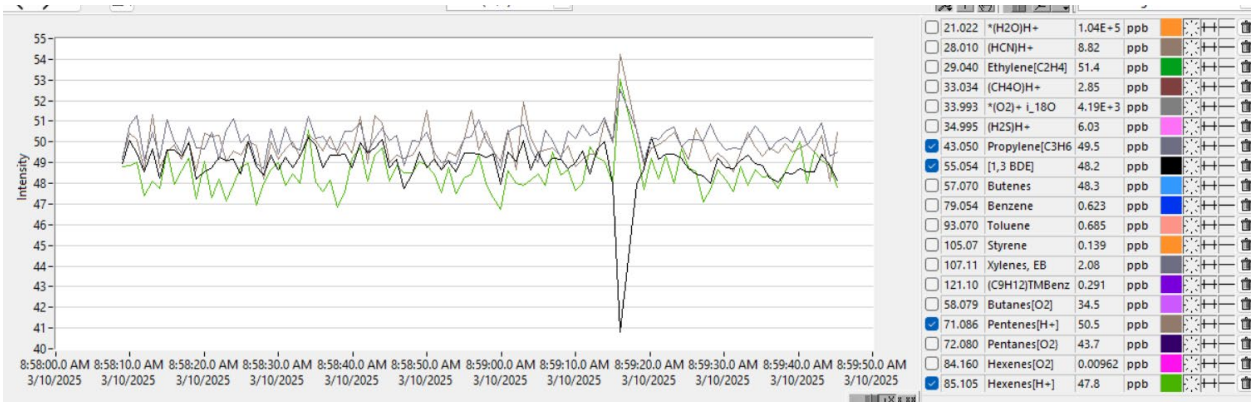

Hydronium Check



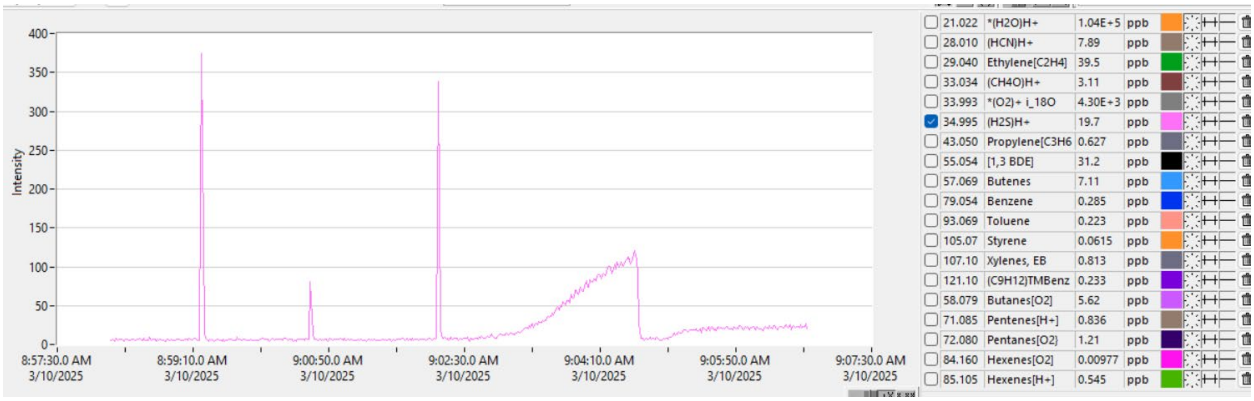

BTEX Cal Check 100 and 20 ppb



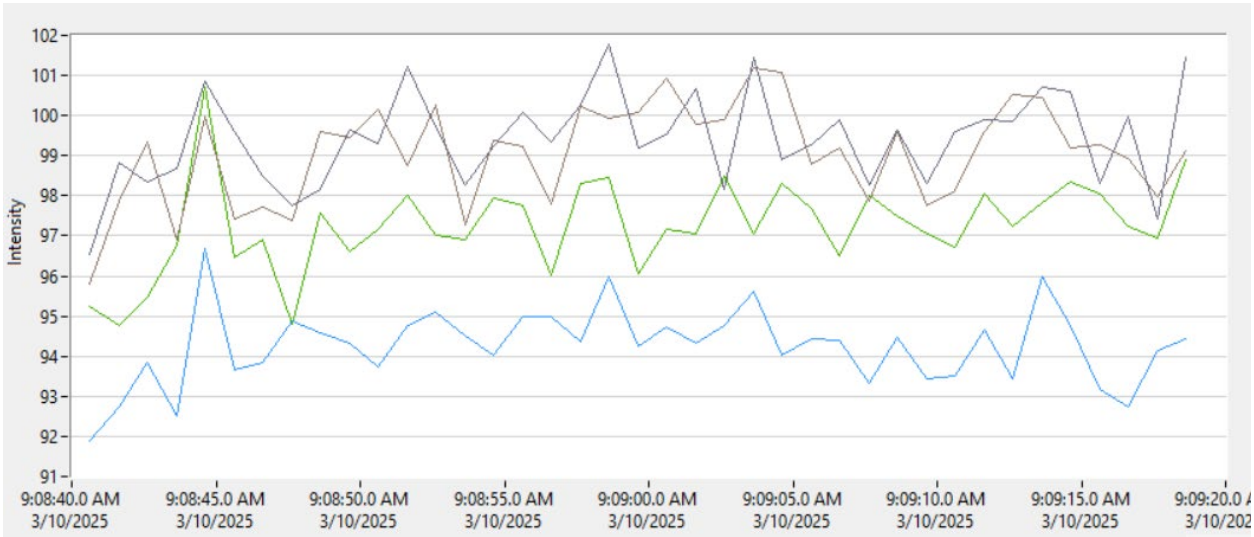

HCN 25 ppb Check



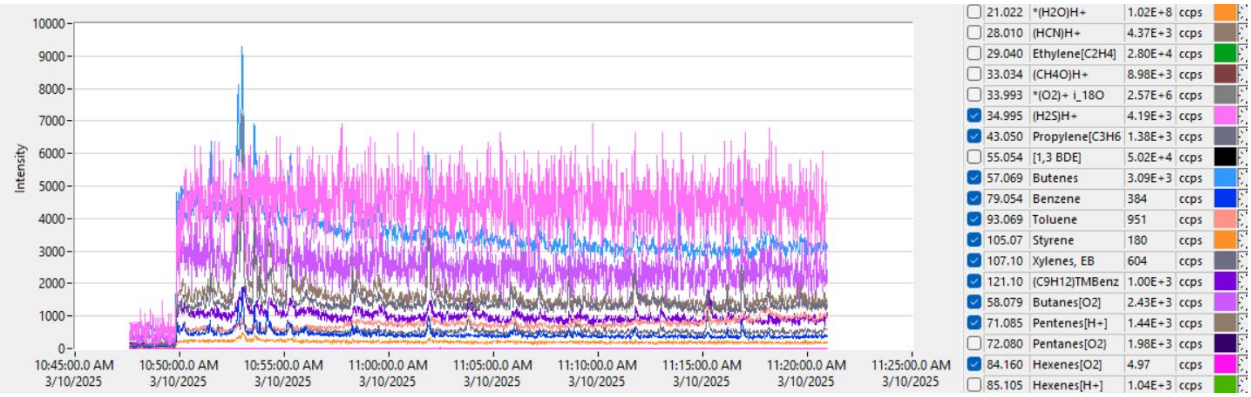

Alkenes Check 50 ppb



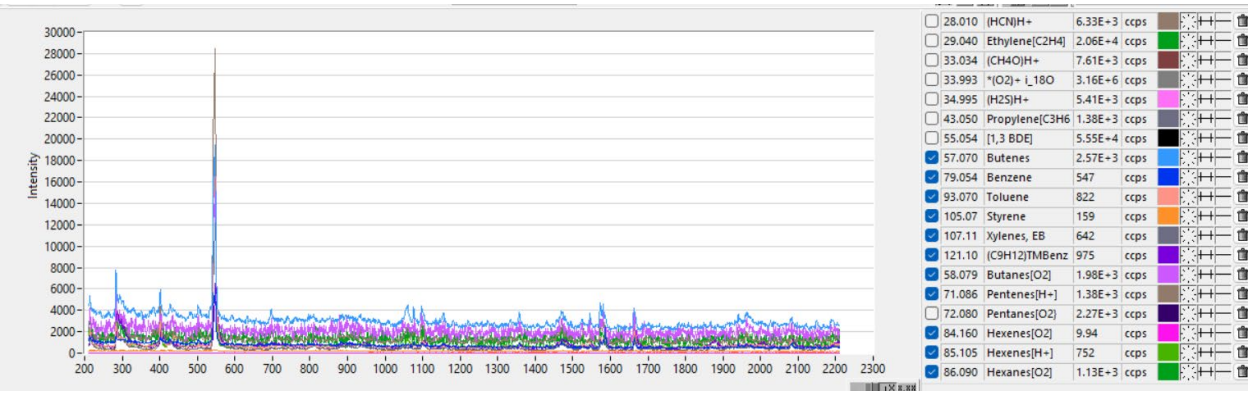

20 ppb H2S Check




Alkanes Check 100 ppb

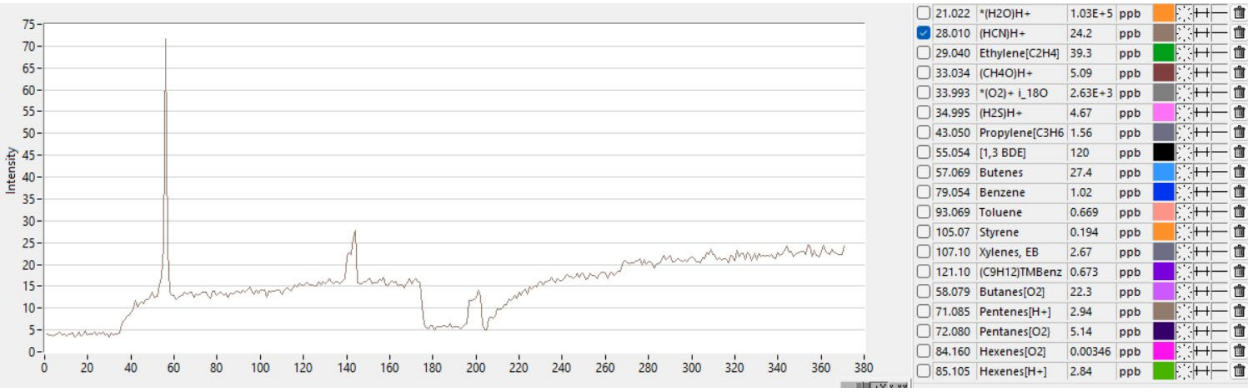



Pioneer Park Raw Data

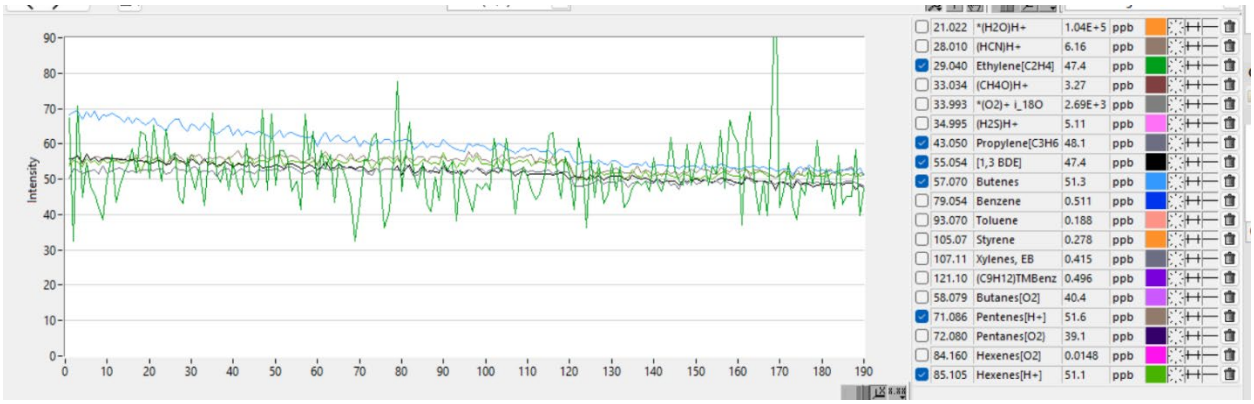



Elyria-Swansea Raw Data

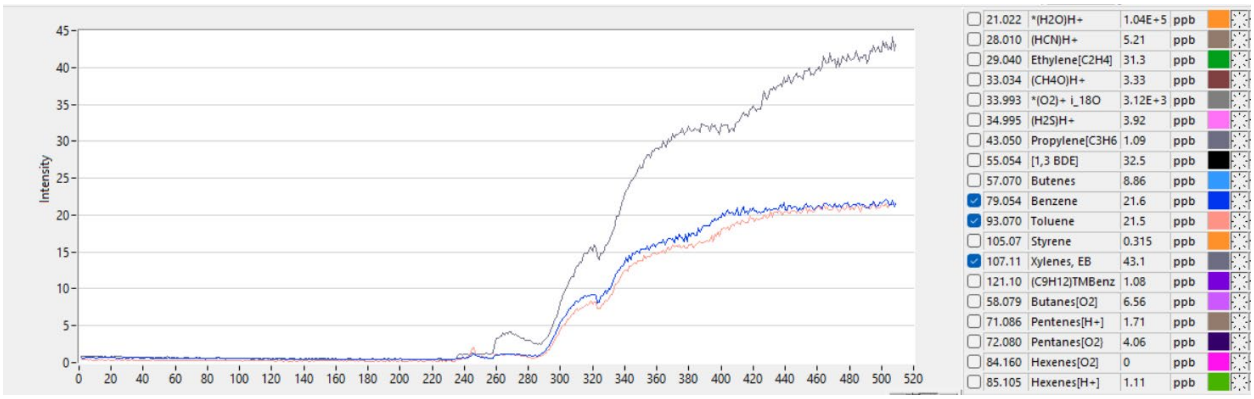
## Post Calibration Checks



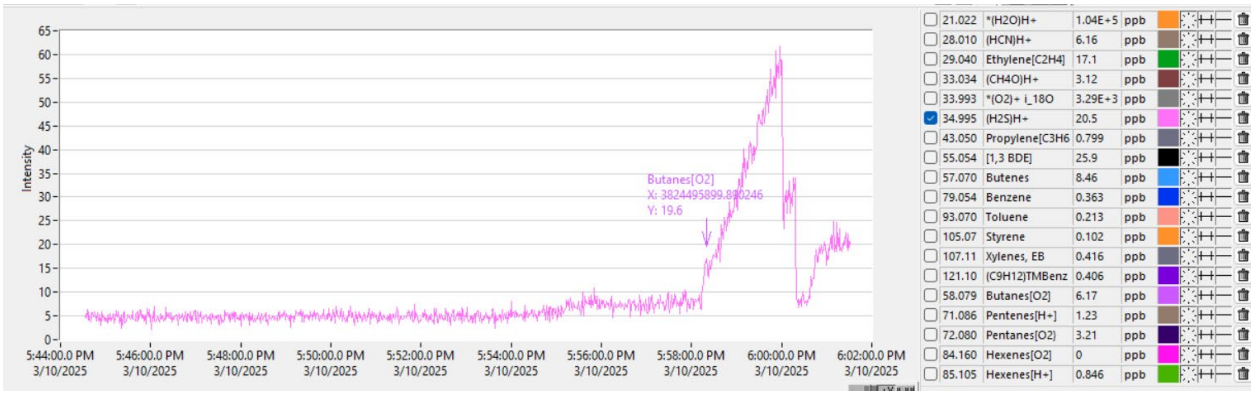

25 ppb HCN



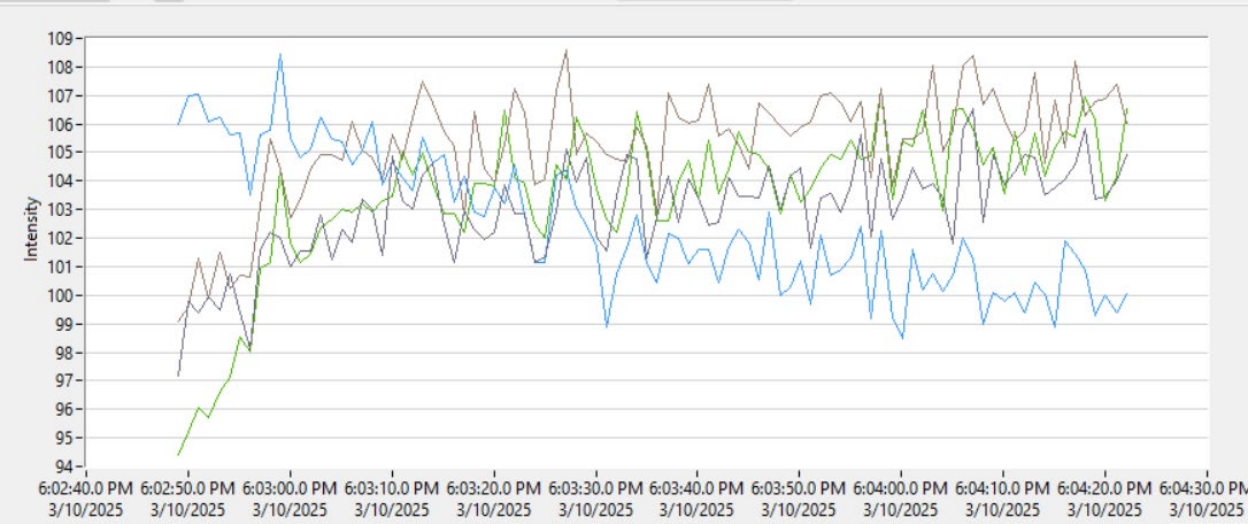

50 ppb Alkenes




20 ppb BTEX Check

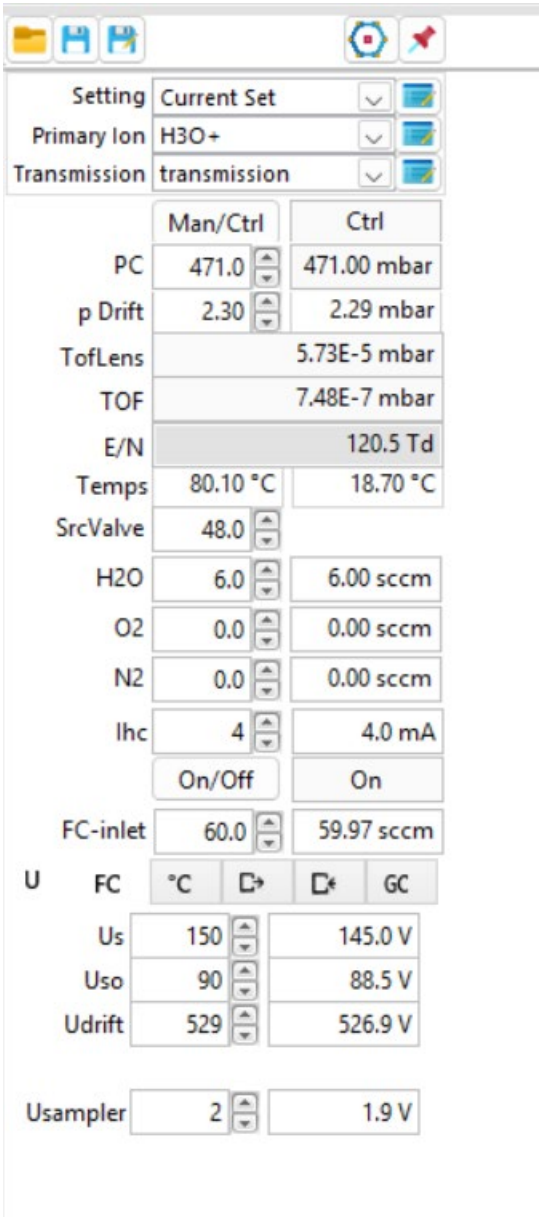



20 ppb $H_2S$ Check

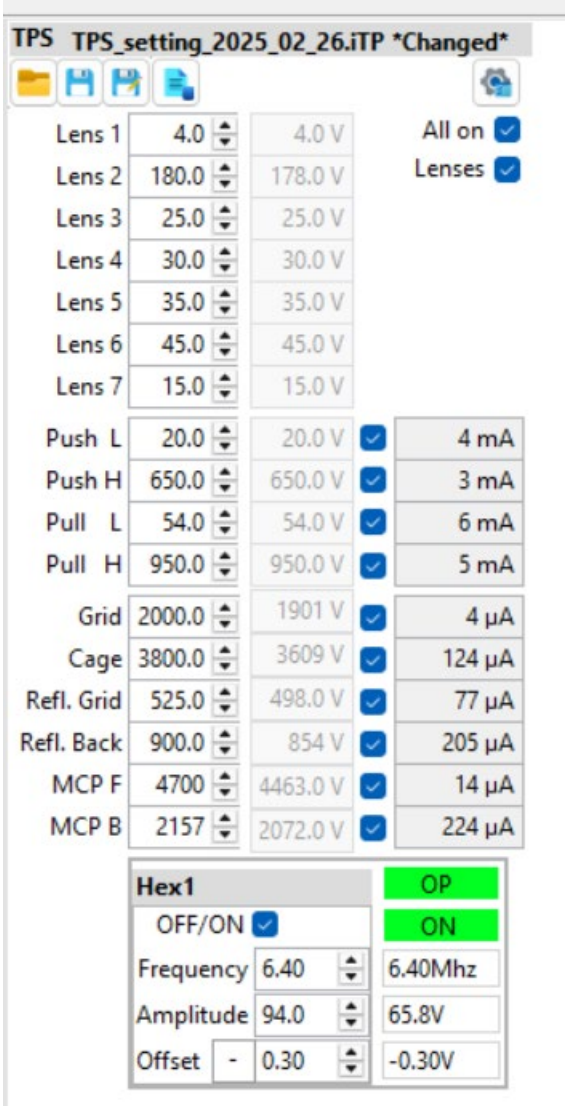



100 ppb Alkanes

3-11-2025 CCND Testing
Dupont and Adams City
PTR Screenshots




Production Settings




TPS Voltages and Hex Settings

**Defined Peaks**

| | Mass | Value | Unit |
|---|---|---|---|
| *(O2)+ [O2+] | 31.98930 | 1.21E+6 | ccps |
| *(O2)+ | 32.99710 | 4.84E+3 | ccps |
| ✓ (CH4O)H+ | 33.03400 | 4.34E+4 | ccps |
| ✓ *(O2)+ i_18O | 33.99350 | 3.09E+6 | ccps |
| (CH4O)H+ i_13C | 34.03740 | 901.49 | ccps |
| ✓ (H2S)H+ | 34.99550 | 6.77E+3 | ccps |
| *(H2O)2H+ | 37.02840 | 5.72E+4 | ccps |
| *b38.low | 37.93300 | 6.38E+6 | ccps |
| *(H2O)2H+ | 38.03260 | 2.34E+7 | ccps |
| [HCl]H+ | 37.41000 | 6.42E+5 | ccps |
| *b38.high | 38.13300 | 4.41E+6 | ccps |

22 of 253 Peaks selected from
"3-9-25 Suncor Peak Table.ipta"

**Instrument**

PTR-Instrument

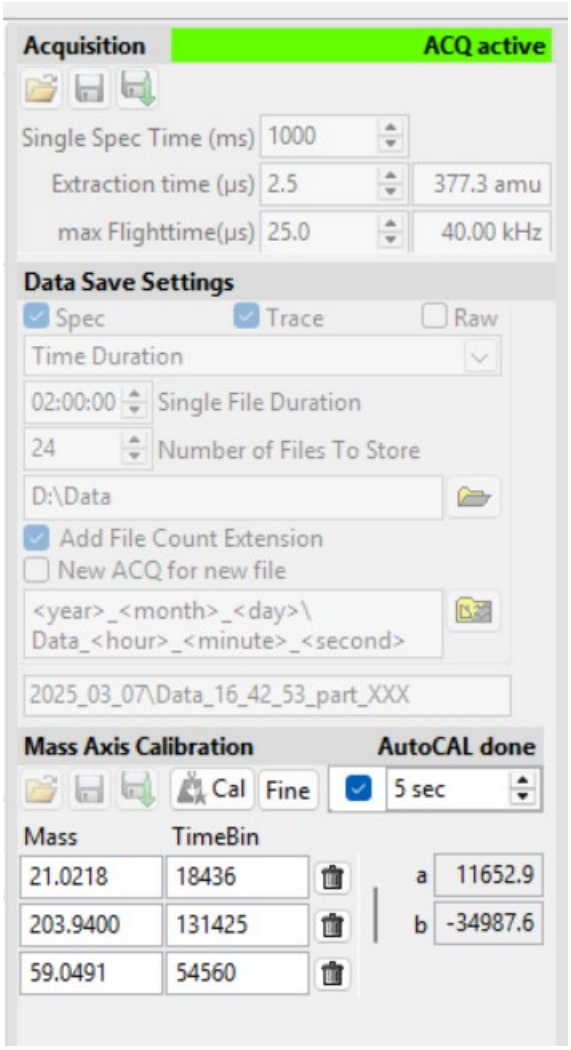
| Description | Value | Unit |
|---|---|---|
| Us_Set | 150.000 | V |
| Us_Act | 145.042 | V |
| Uso_Set | 90.000 | V |
| Uso_Act | 88.466 | V |
| Udrift_Set | 529.000 | V |

**Calculated Traces**

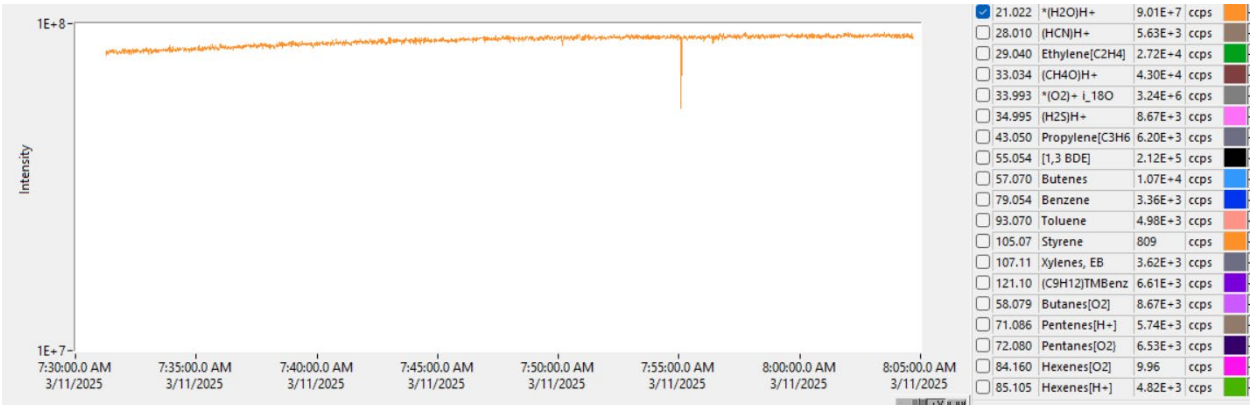
| Trace | Value | Unit |
|---|---|---|
| NO+ | 0.6242 | % |
| O2+ | 2.743 | % |
| H3O+(H2O) | 15.04 | % |
| PI | 1.128E+8 | ncps |
| H3O+ | 81.60 | % |

Cal Trace from old PTR.iCT

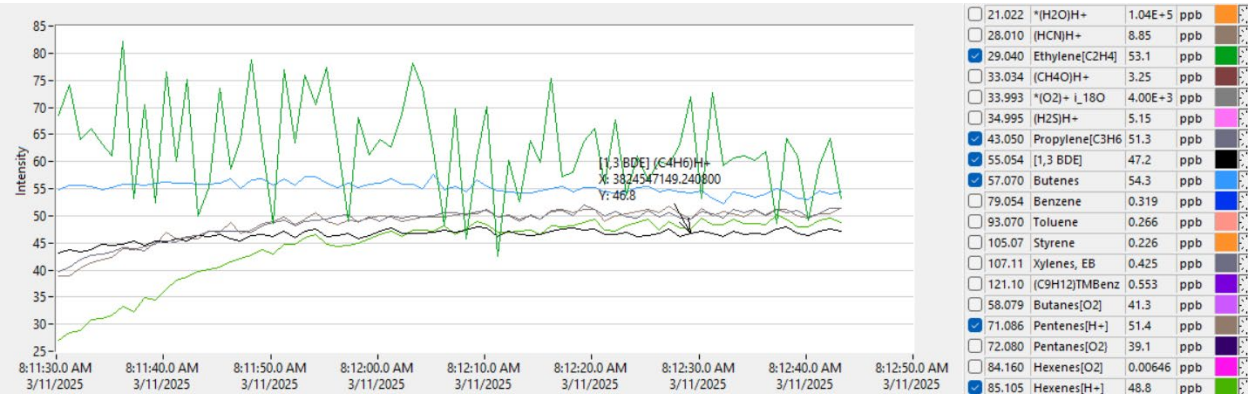
Defined Peaks and Traces



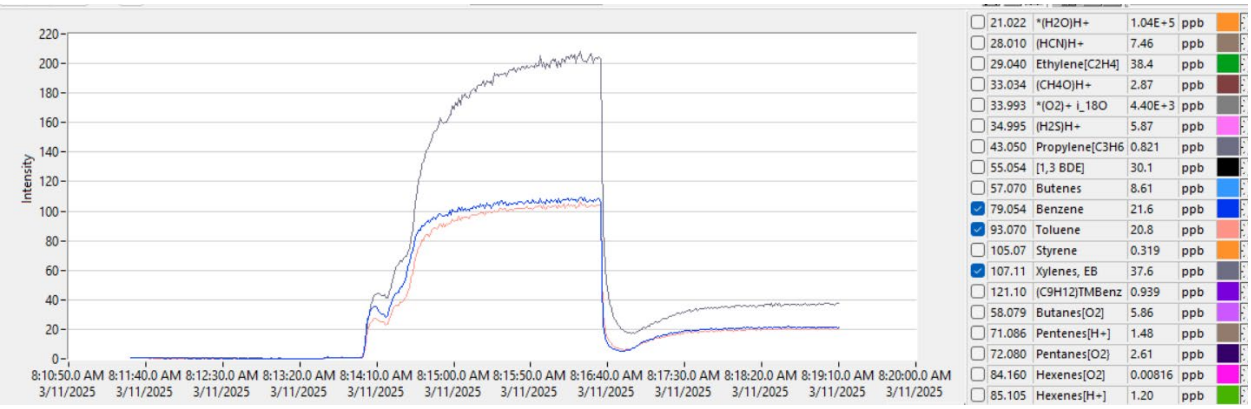

Acquisition Parameters



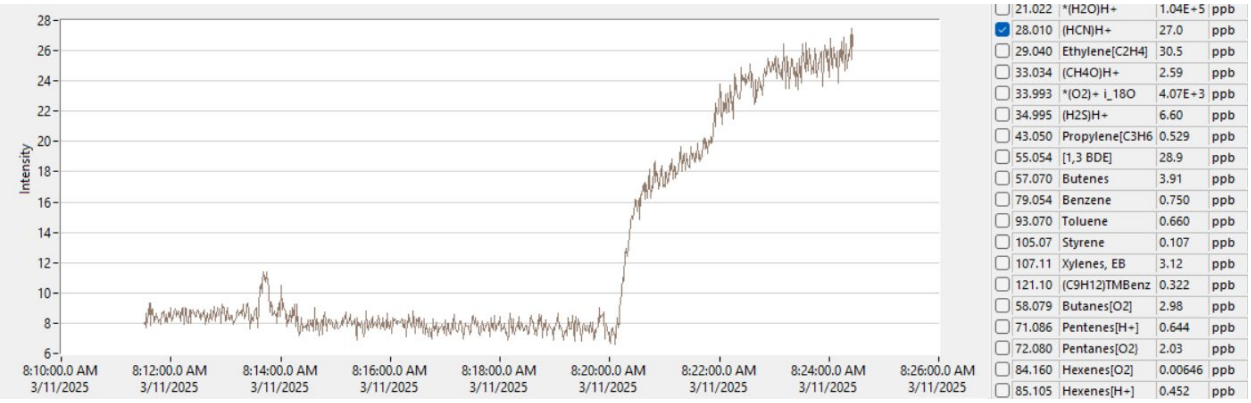

Hydronium Check



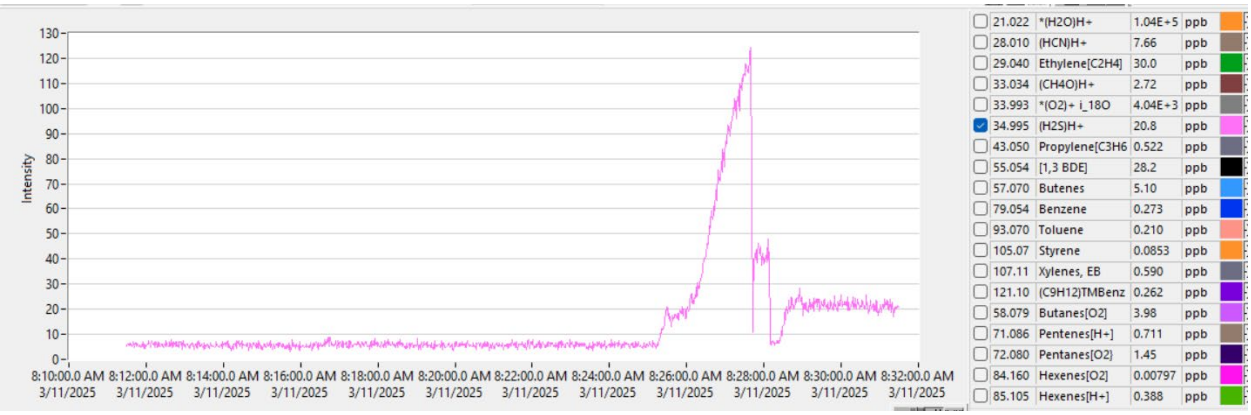

50 ppb Alkenes Pre-Check



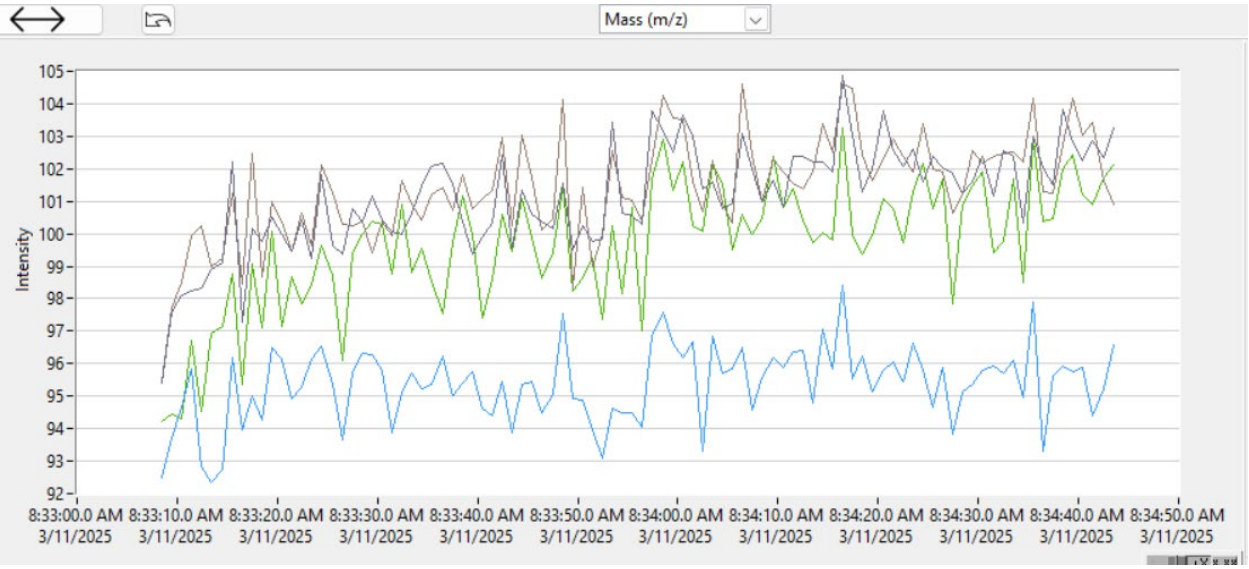

100 ppb and 20 ppb Pre-check



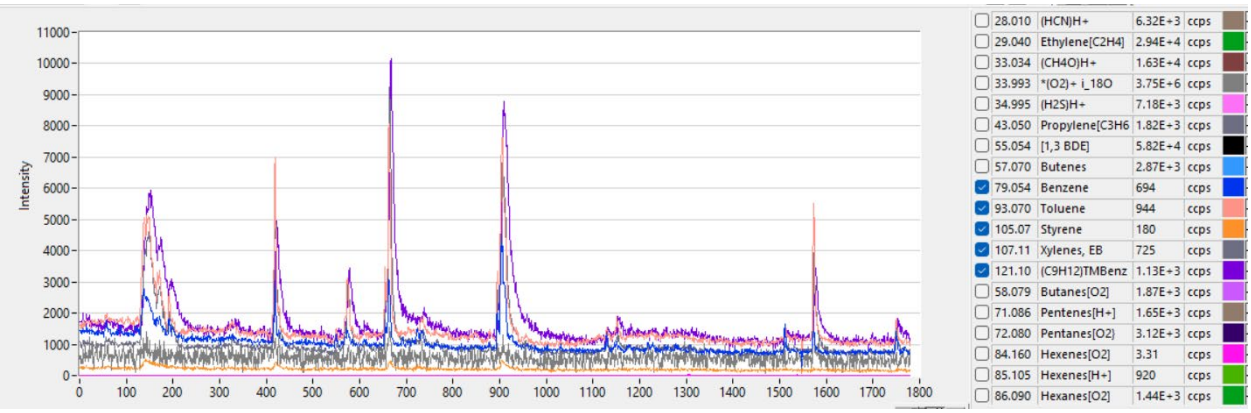

25 ppb HCN Pre-check



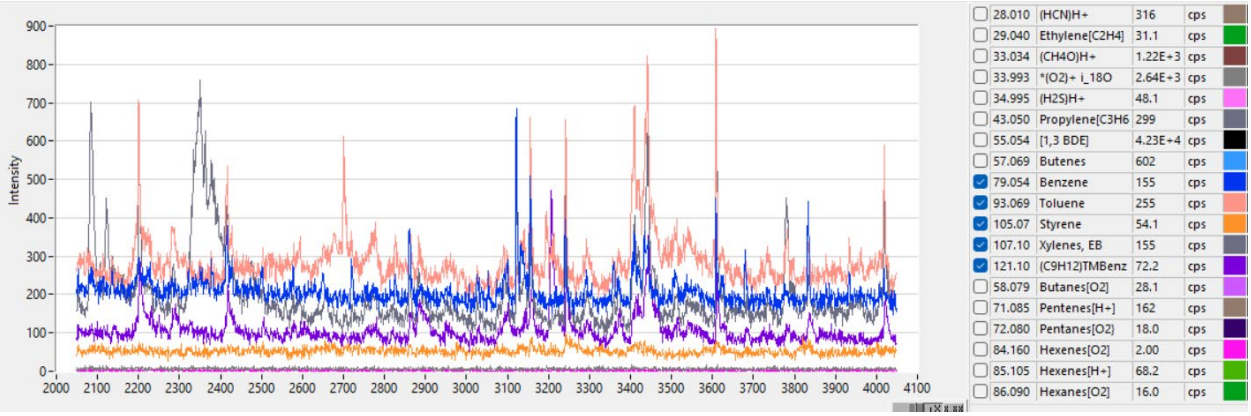

20 ppb $H_2S$ Pre-check




Alkanes 100 ppb Pre-check

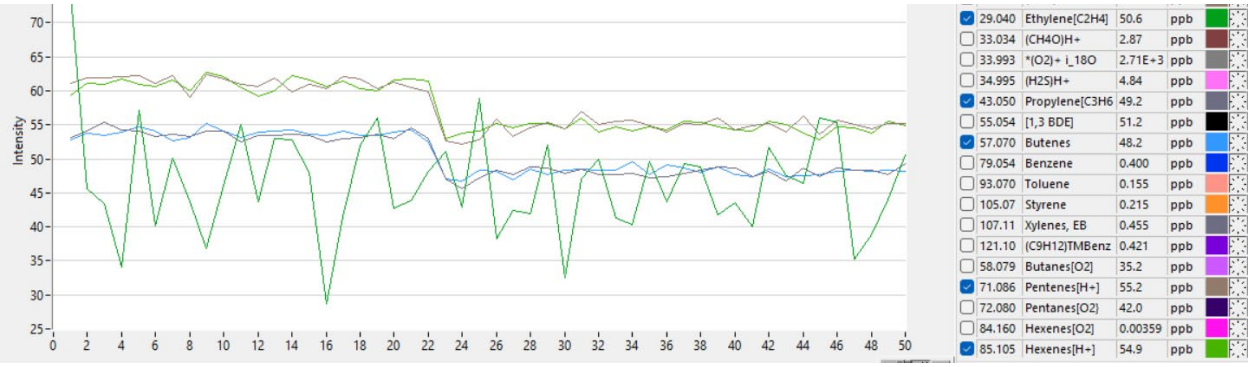



Dupont Raw Data

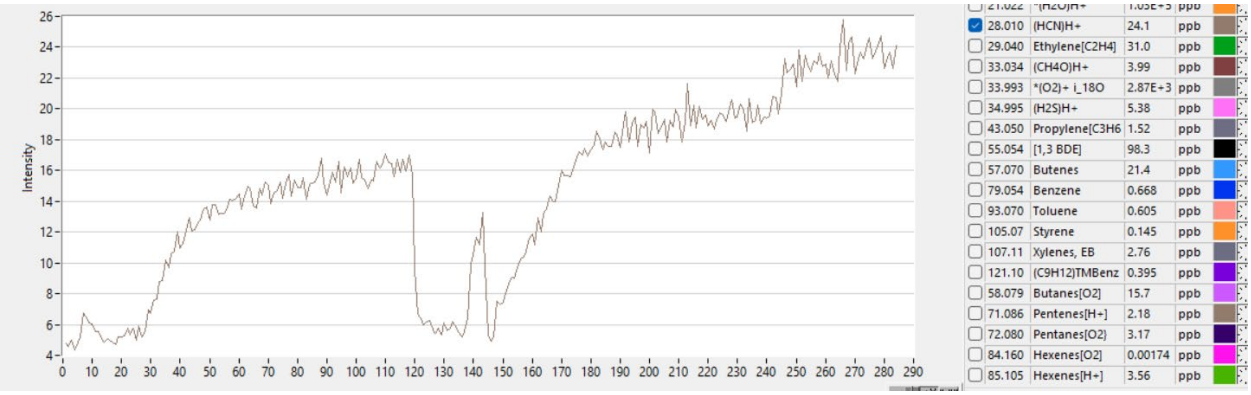



Adams City Raw Data

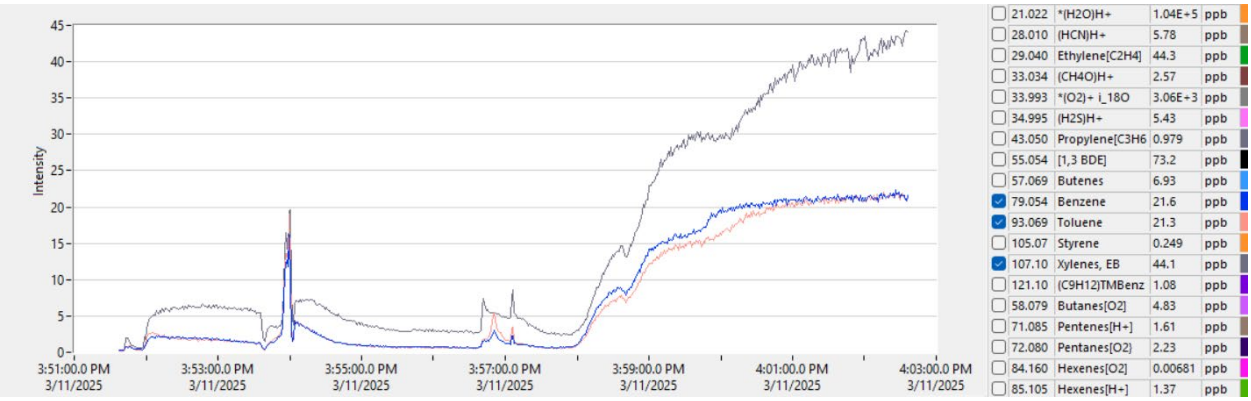
## Post Calibration Checks



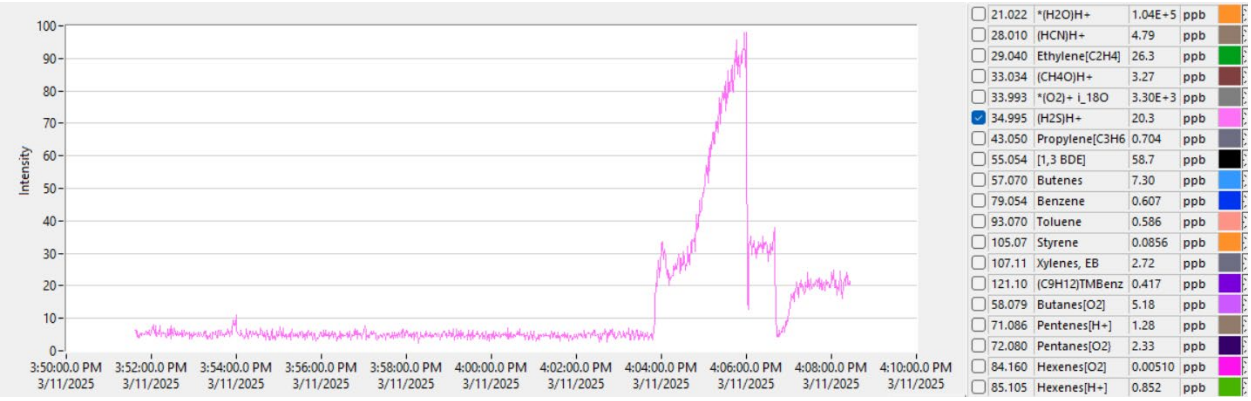

50 ppb Alkenes Post-check



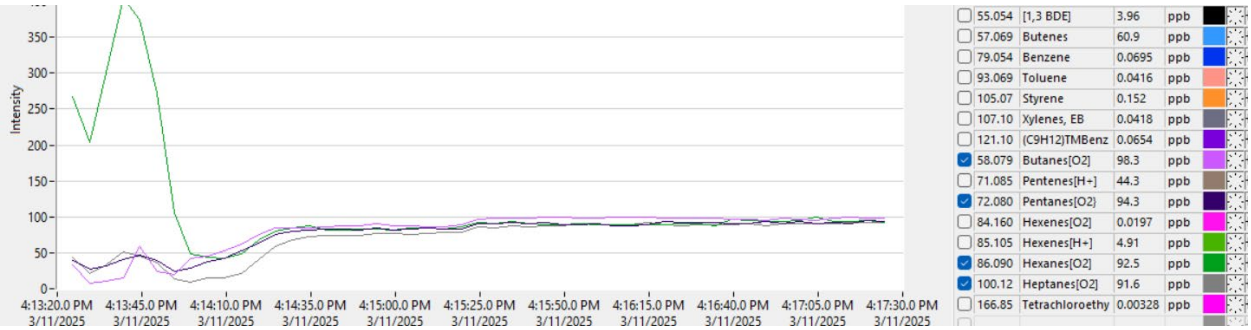

25 ppb HCN Post-check




20 ppb BTEX Post-check

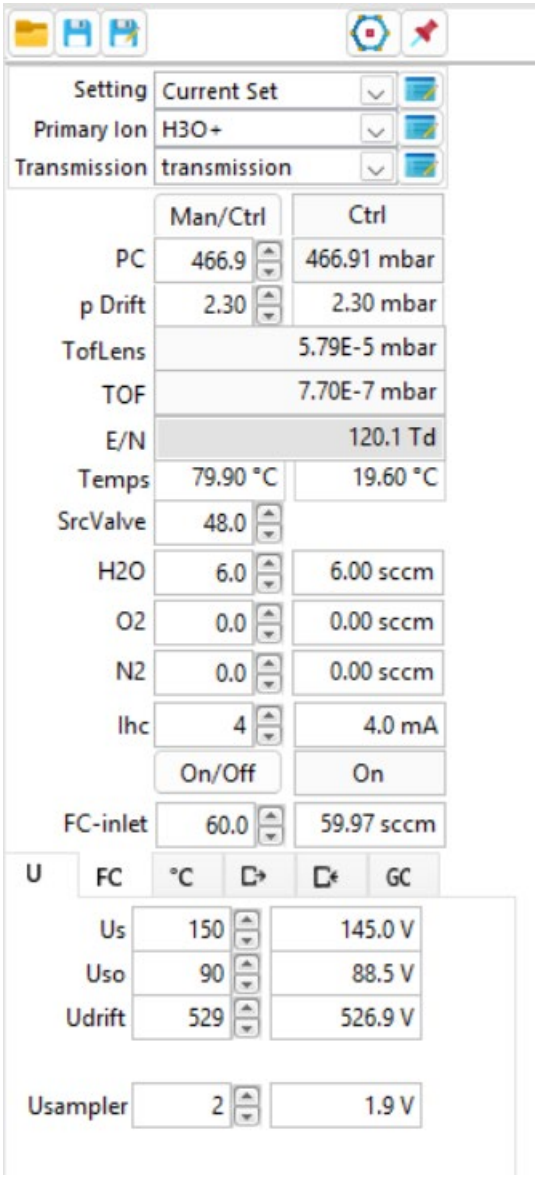



20 ppb $H_2S$ Post-check

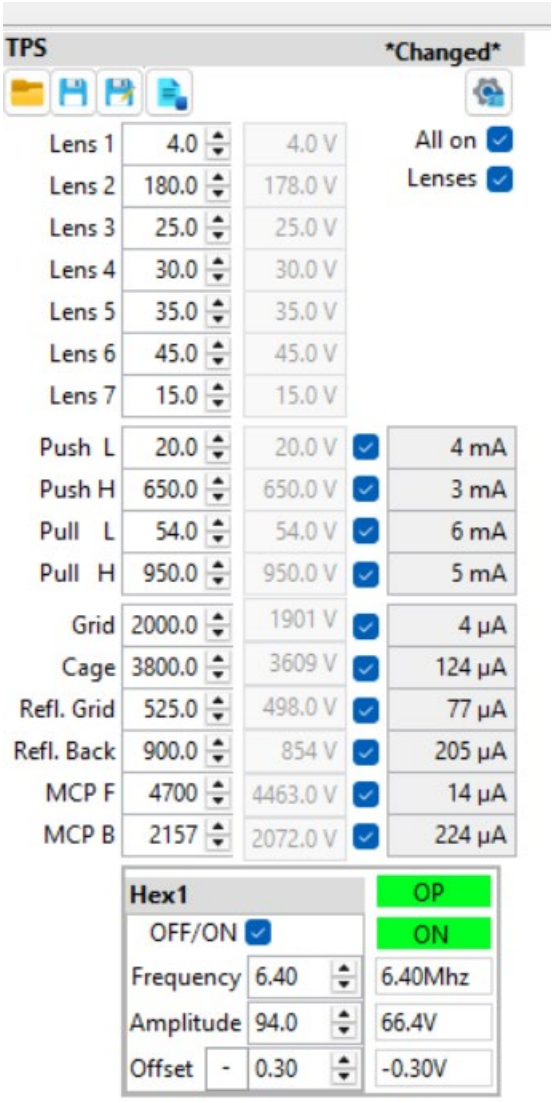



100 ppb Alkanes Post-check

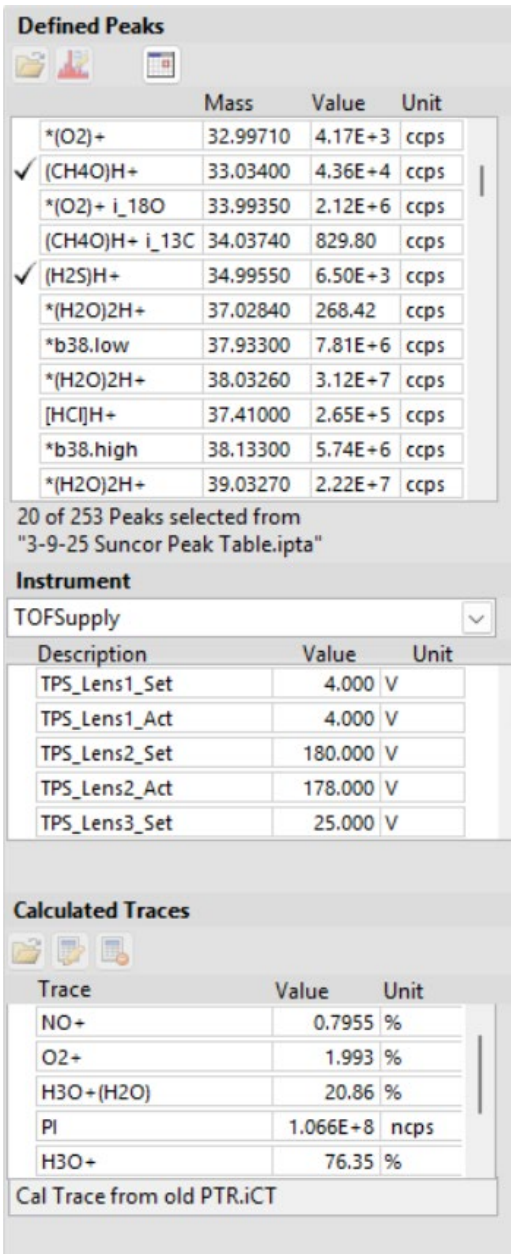
3-12-2025 CCND Testing
Western Hills and Globeville
PTR Screenshots



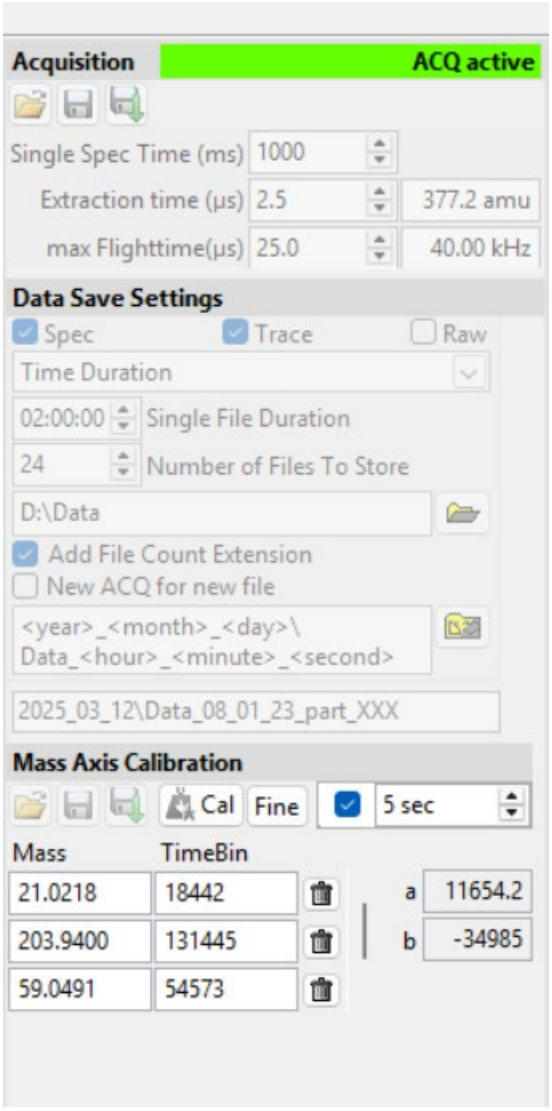

Production Parameters



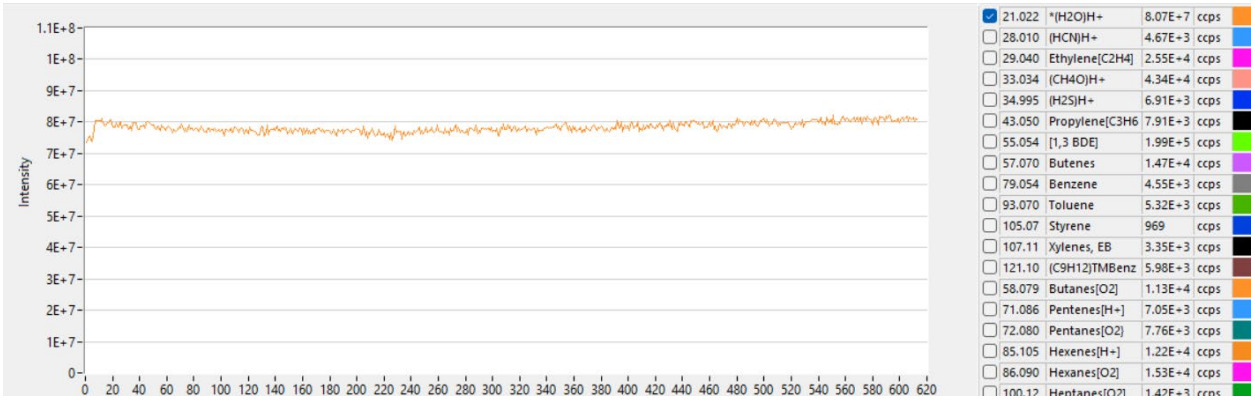

TOF and Lenses and Hex Settings



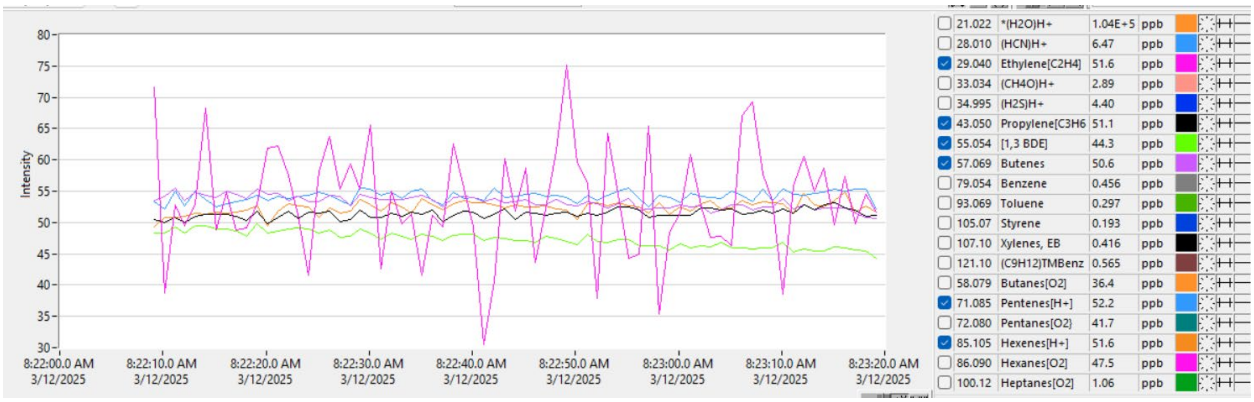

Peaks and Traces



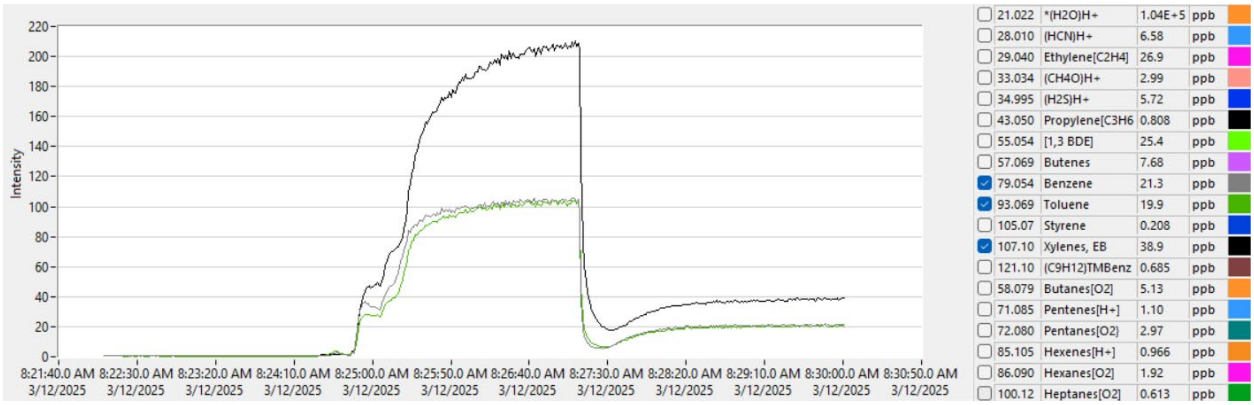

Acquisition Settings



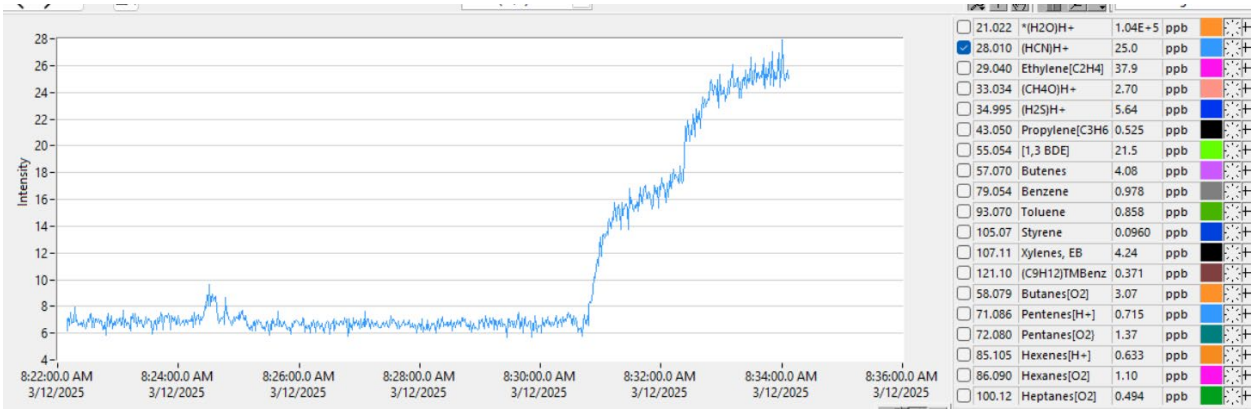

Hydronium Stability Check



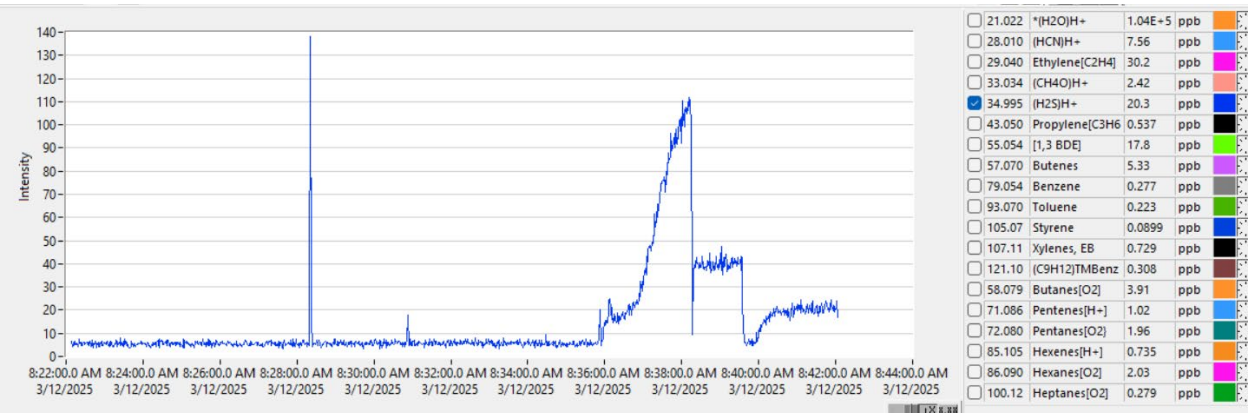

Alkenes 50 ppb Pre-check



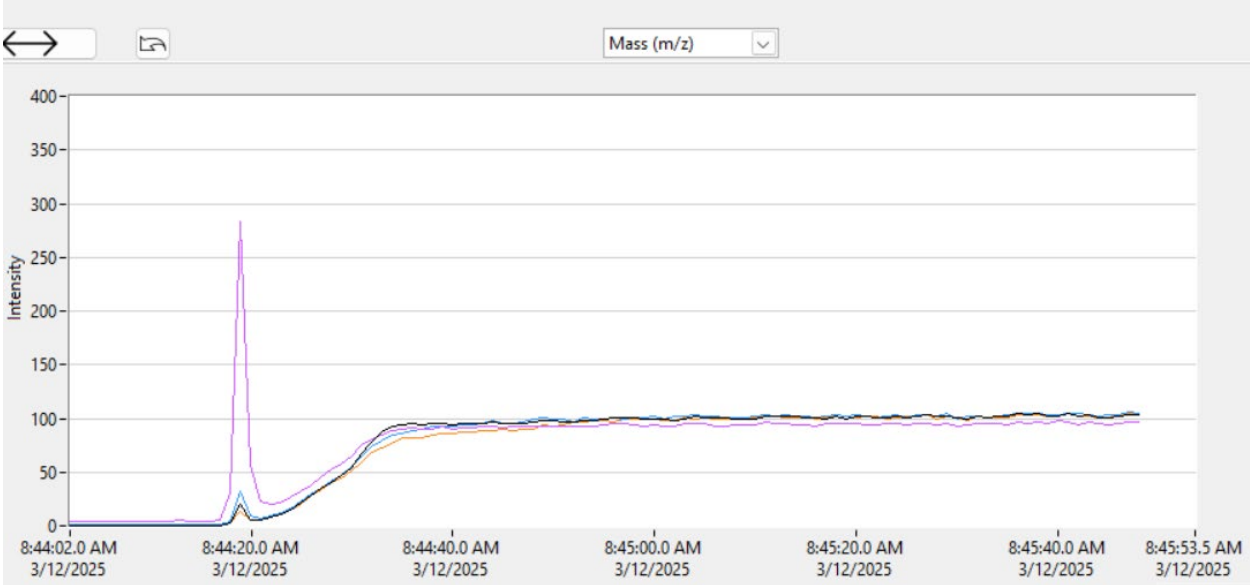

BTEX 100, 20 ppb Pre-check



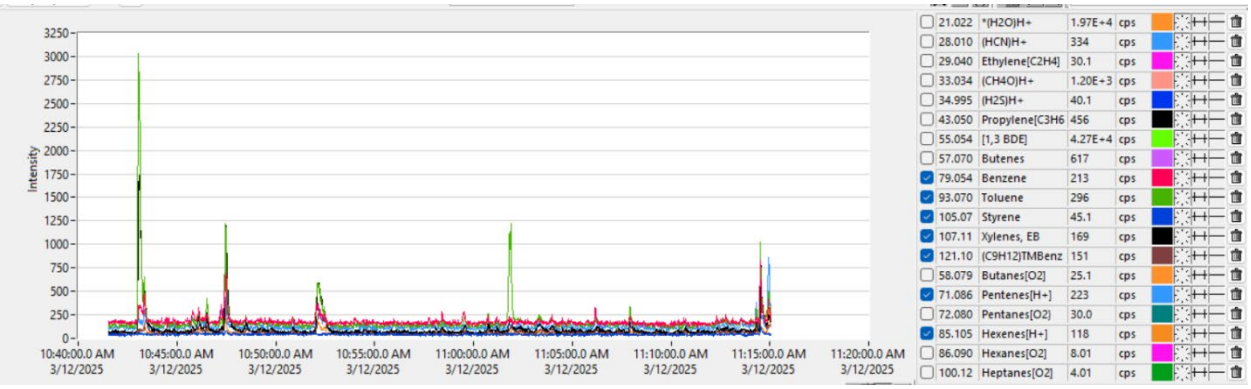

HCN 25 ppb Pre-check



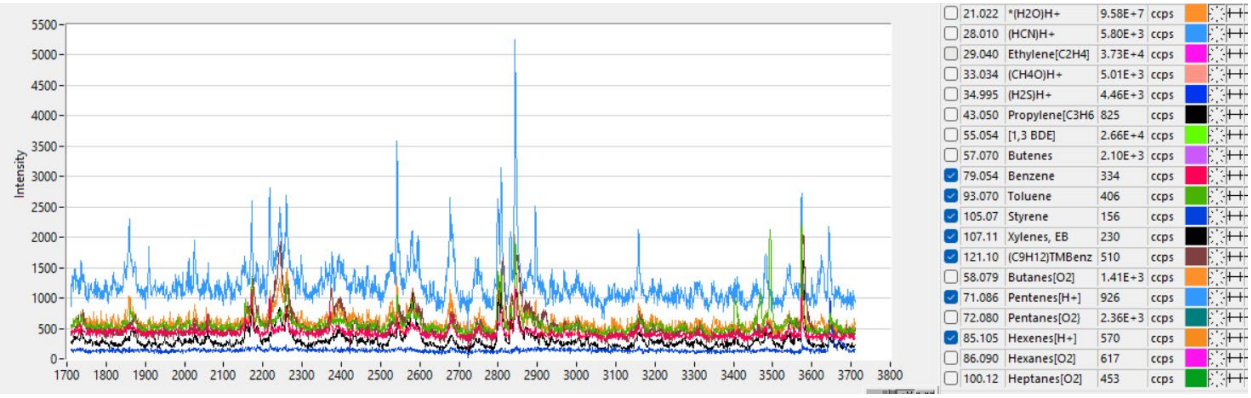

20 ppb $H_2S$ Pre-check




100 ppm Alkanes Pre-check

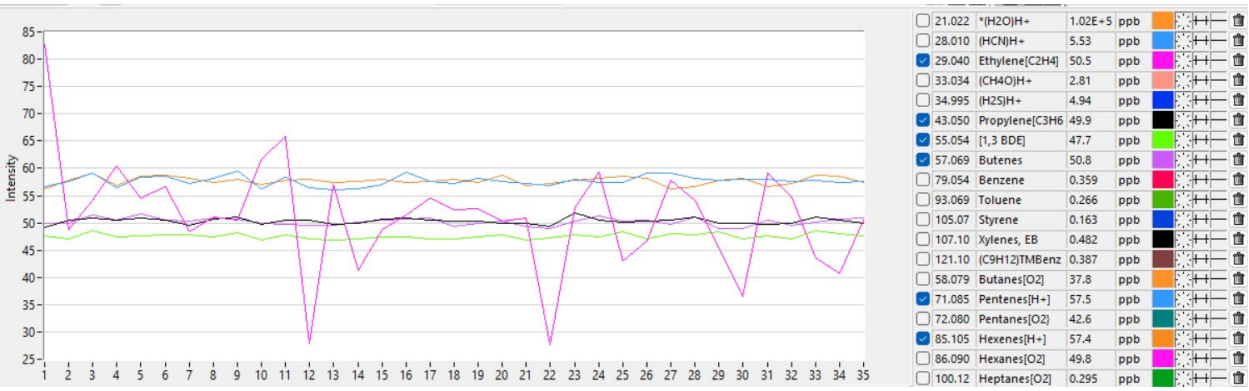



Western Hills Raw Data

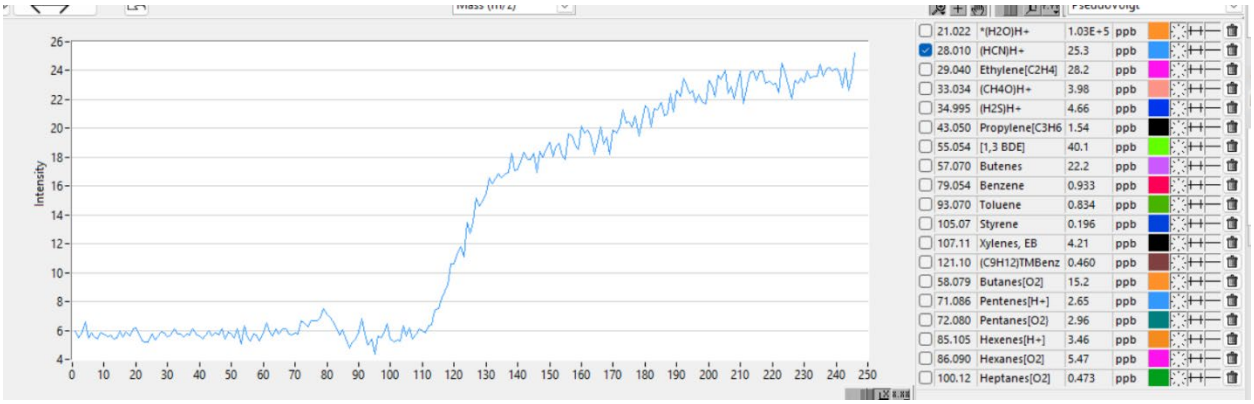



Globeville Raw Data

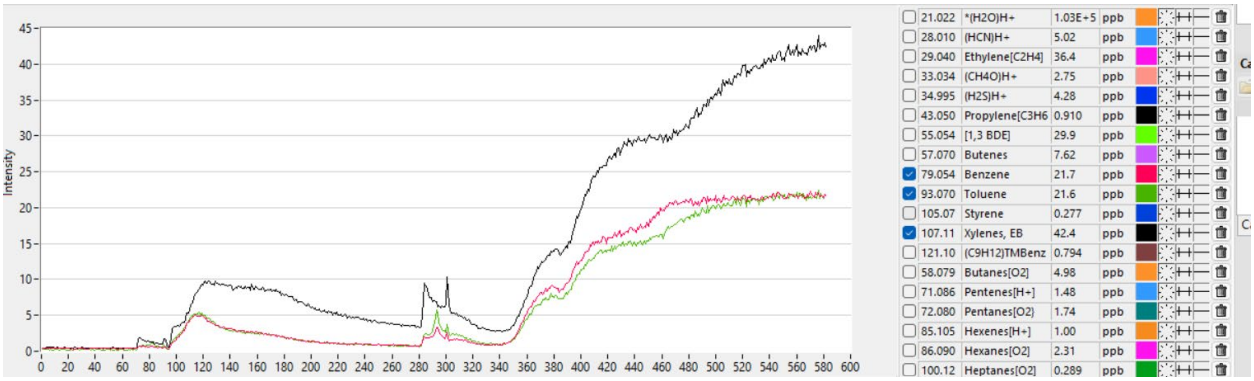
## Post Calibration Checks



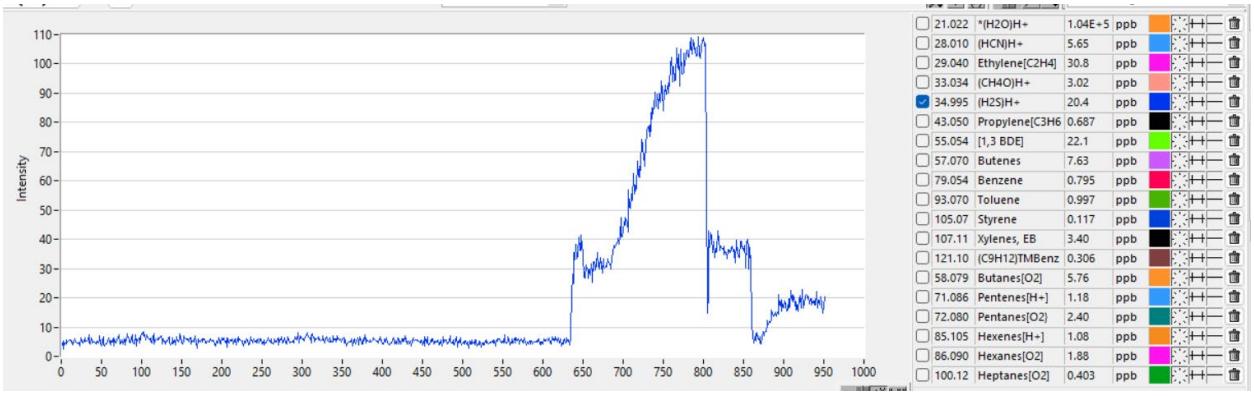

Alkenes 50 ppb post-check



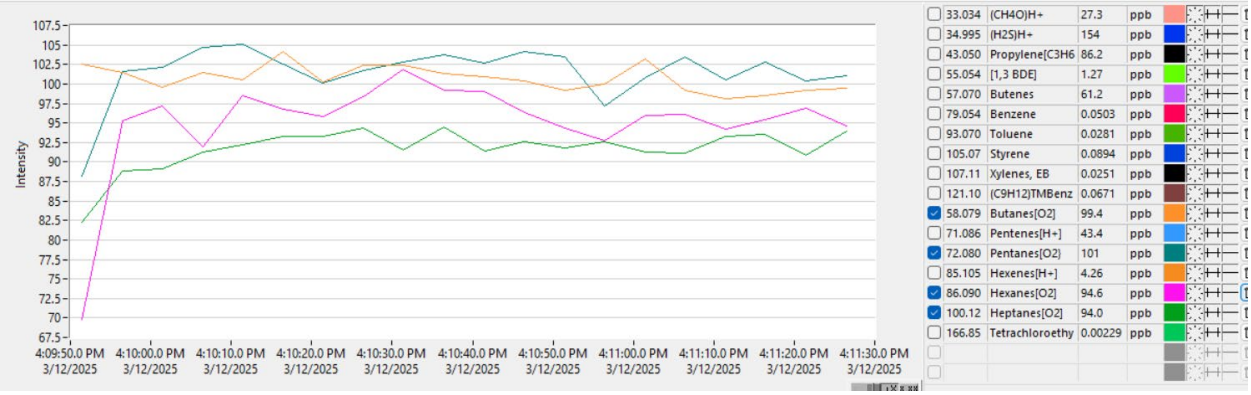

25 ppb HCN post-check




20 ppb BTEX post-check




20 ppb $H_2S$ post-check




100 ppb Alkanes post-check

CCND Community Monitoring Program
PTR-TOF-MS Detection Limits
Signal to Noise Method (3X Standard Deviation)

| Compound DL (ppb v) | 3/10/2025 DL (ppb v) |
|---|---|
| Acetylene | 0.065 |
| Hydrogen Cyanide | 0.032 |
| Ethylene | 0.058 |
| Methanol | 0.263 |
| Hydrogen Sulfide | 0.021 |
| Propylene | 0.085 |
| 1,3 Butadiene | 0.014 |
| Butenes | 0.116 |
| Butanes | 0.303 |
| Isoprene | 0.052 |
| Cyclopentane | 0.041 |
| Pentanes | 0.011 |
| Carbon Disulfide | 0.012 |
| Benzene | 0.038 |
| Hexenes | 0.028 |
| Hexanes | 0.019 |
| Toluene | 0.040 |
| Methylcyclohexanes | 0.010 |
| Heptanes | 0.014 |
| Styrene | 0.026 |
| Xylenes | 0.035 |
| Dimethylcyclohexanes | 0.015 |
| Octanes | 0.015 |
| Trimethylbenzenes | 0.025 |
| Nonanes | 0.006 |
| Diethylbenzenes | 0.032 |
| Decanes | 0.008 |
| Undecanes | 0.014 |
| Tetrachloroethylene | 0.004 |
| Dodecanes | 0.003 |

| Initial Instrument Calibration | | | | | | |
|---|---|---|---|---|---|---|
| Date | Time | Calibration Gas Component | Calibration Value (ppb v) | Response (ppb v) | Difference (% of value) | Pass/Fail |
| 3/9/2025 | 11:05 | Benzene | 100 | 105 | 5.0 | Pass |
| | | Toluene | 100 | 105 | 5.0 | Pass |
| | | Xylenes | 200 | 210 | 5.0 | Pass |
| | 11:03 | Benzene | 50 | 55.1 | 10.2 | Pass |
| | | Toluene | 50 | 52.6 | 5.2 | Pass |
| | | Xylenes | 100 | 106 | 6.0 | Pass |
| | 11:00 | Benzene | 20 | 21.5 | 7.5 | Pass |
| | | Toluene | 20 | 20.6 | 3.0 | Pass |
| | | Xylenes | 40 | 39.9 | -0.3 | Pass |
| | 10:58 | Benzene | 5 | 5.59 | 11.8 | Pass |
| | | Toluene | 5 | 5.35 | 7.0 | Pass |
| | | Xylenes | 10 | 10.3 | 3.0 | Pass |
| | 11:57 | Ethylene | 100 | 96.9 | -3.1 | Pass |
| | | Propylene | 100 | 101 | 1.0 | Pass |
| | | 1-Butene | 100 | 91.8 | -8.2 | Pass |
| | | 1-Pentene | 100 | 99.5 | -0.5 | Pass |
| | | 1-Hexene | 100 | 99.1 | -0.9 | Pass |
| | | 1,3-Butadiene | 100 | 106.4 | 6.4 | Pass |
| | 11:55 | Ethylene | 50 | 51.2 | 2.4 | Pass |
| | | Propylene | 50 | 50.1 | 0.2 | Pass |
| | | 1-Butene | 50 | 48.6 | -2.8 | Pass |
| | | 1-Pentene | 50 | 49.7 | -0.6 | Pass |
| | | 1-Hexene | 50 | 49.2 | -1.6 | Pass |
| | | 1,3-Butadiene | 50 | 54.9 | 9.8 | Pass |
| | 11:53 | Ethylene | 20 | 21.2 | 6.0 | Pass |
| | | Propylene | 20 | 20.4 | 2.0 | Pass |
| | | 1-Butene | 20 | 21.6 | 8.0 | Pass |
| | | 1-Pentene | 20 | 20.3 | 1.5 | Pass |
| | | 1-Hexene | 20 | 20.2 | 1.0 | Pass |
| | | 1,3-Butadiene | 20 | 21.4 | 7 | Pass |
| | 12:26 | HCN | 50 | 48.2 | -3.6 | Pass |
| | 12:23 | HCN | 25 | 25.2 | 0.8 | Pass |
| | 12:21 | HCN | 10 | 10.3 | 3.0 | Pass |
| | 13:08 | $H_2S$ | 50 | 50.6 | 1.2 | Pass |
| | 13:05 | $H_2S$ | 20 | 21.2 | 6.0 | Pass |
| | 13:03 | $H_2S$ | 5 | 4.95 | -1.0 | Pass |
| | 14:00 | Butane | 200 | 201 | 0.5 | Pass |
| | | Pentane | 200 | 200 | 0.0 | Pass |
| | | Hexane | 200 | 203 | 1.5 | Pass |
| | | Heptane | 200 | 203 | 1.5 | Pass |
| | 14:02 | Butane | 100 | 101 | 1.0 | Pass |
| | | Pentane | 100 | 99.3 | -0.7 | Pass |
| | | Hexane | 100 | 103 | 3.0 | Pass |
| | | Heptane | 100 | 98.2 | -1.8 | Pass |
| | 14:05 | Butane | 50 | 49.1 | -1.8 | Pass |
| | | Pentane | 50 | 50.6 | 1.2 | Pass |
| | | Hexane | 50 | 51.6 | 3.2 | Pass |
| | | Heptane | 50 | 47.2 | -5.6 | Pass |

| Instrument Calibration Check | | | | | | |
|---|---|---|---|---|---|---|
| Date | Time | Calibration Gas Component | Calibration Value (ppb v) | Response (ppb v) | Difference (% of value) | Pass/Fail |
| 3/10/2025 | 9:00 | Ethylene | 50 | 51.4 | 2.8 | Pass |
| Pioneer | | Propylene | 50 | 49.5 | -1.0 | Pass |
| Park | | 1-Butene | 50 | 48.3 | -3.4 | Pass |
| Swansea | | 1-Pentene | 50 | 50.5 | 1.0 | Pass |
| | | 1-Hexene | 50 | 47.8 | -4.4 | Pass |
| | | 1,3-Butadiene | 50 | 48.2 | -3.6 | Pass |
| | 8:44 | Benzene | 100 | 101 | 1.0 | Pass |
| | | Toluene | 100 | 100 | 0.0 | Pass |
| | | Xylenes | 200 | 197 | -1.5 | Pass |
| | 8:48 | Benzene | 20 | 20.1 | 0.5 | Pass |
| | | Toluene | 20 | 19.8 | -1.0 | Pass |
| | | Xylenes | 40 | 37.4 | -6.5 | Pass |
| | 8:53 | HCN | 25 | 25.2 | 0.8 | Pass |
| | 9:07 | $H_2S$ | 20 | 20.1 | 0.5 | Pass |
| | 9:09 | Butane | 100 | 96.8 | -3.2 | Pass |
| | | Pentane | 100 | 98.8 | -1.2 | Pass |
| | | Hexane | 100 | 94.3 | -5.7 | Pass |
| | | Heptane | 100 | 97.3 | -2.7 | Pass |
| | 17:41 | HCN | 25 | 24.5 | -2.0 | Pass |
| | 18:01 | $H_2S$ | 20 | 20.5 | 2.5 | Pass |
| | 18:03 | Butane | 100 | 103 | 3.0 | Pass |
| | | Pentane | 100 | 101 | 1.0 | Pass |
| | | Hexane | 100 | 107 | 7.0 | Pass |
| | | Heptane | 100 | 105 | 5.0 | Pass |
| | 17:53 | Benzene | 20 | 21.6 | 8.0 | Pass |
| | | Toluene | 20 | 21.5 | 7.5 | Pass |
| | | Xylenes | 40 | 43.1 | 7.8 | Pass |
| | 17:48 | Ethylene | 50 | 47.4 | -5.2 | Pass |
| | | Propylene | 50 | 48.1 | -3.8 | Pass |
| | | 1-Butene | 50 | 51.3 | 2.6 | Pass |
| | | 1-Pentene | 50 | 51.6 | 3.2 | Pass |
| | | 1-Hexene | 50 | 51.1 | 2.2 | Pass |
| | | 1,3-Butadiene | 50 | 47.4 | -5.2 | Pass |

| Instrument Calibration Check | | | | | | |
|---|---|---|---|---|---|---|
| Date | Time | Calibration Gas Component | Calibration Value (ppb v) | Response (ppb v) | Difference (% of value) | Pass/Fail |
| 3/11/2025 | 8:12 | Ethylene | 50 | 53.1 | 6.2 | Pass |
| Dupont | | Propylene | 50 | 51.3 | 2.6 | Pass |
| Adams City | | 1-Butene | 50 | 54.3 | 8.6 | Pass |
| | | 1-Pentene | 50 | 51.4 | 2.8 | Pass |
| | | 1-Hexene | 50 | 48.8 | -2.4 | Pass |
| | | 1,3-Butadiene | 50 | 47.2 | -5.6 | Pass |
| | 8:16 | Benzene | 100 | 107 | 7.0 | Pass |
| | | Toluene | 100 | 104 | 4.0 | Pass |
| | | Xylenes | 200 | 204 | 2.0 | Pass |
| | 8:19 | Benzene | 20 | 21.6 | 8.0 | Pass |
| | | Toluene | 20 | 20.8 | 4.0 | Pass |
| | | Xylenes | 40 | 37.6 | -6.0 | Pass |
| | 8:23 | HCN | 25 | 25.1 | 0.4 | Pass |
| | 8:30 | $H_2S$ | 20 | 19.8 | -1.0 | Pass |
| | 8:35 | Butane | 100 | 103 | 3.0 | Pass |
| | | Pentane | 100 | 95.6 | -4.4 | Pass |
| | | Hexane | 100 | 104 | 4.0 | Pass |
| | | Heptane | 100 | 101 | 1.0 | Pass |
| | 15:55 | HCN | 25 | 24.1 | -3.6 | Pass |
| | 16:08 | $H_2S$ | 20 | 20.3 | 1.5 | Pass |
| | 16:17 | Butane | 100 | 98.3 | -1.7 | Pass |
| | | Pentane | 100 | 94.3 | -5.7 | Pass |
| | | Hexane | 100 | 92.5 | -7.5 | Pass |
| | | Heptane | 100 | 91.6 | -8.4 | Pass |
| | 16:03 | Benzene | 20 | 21.6 | 8.0 | Pass |
| | | Toluene | 20 | 21.3 | 6.5 | Pass |
| | | Xylenes | 40 | 44.1 | 10.3 | Pass |
| | 15:50 | Ethylene | 50 | 50.6 | 1.2 | Pass |
| | | Propylene | 50 | 49.2 | -1.6 | Pass |
| | | 1-Butene | 50 | 48.2 | -3.6 | Pass |
| | | 1-Pentene | 50 | 55.2 | 10.4 | Pass |
| | | 1-Hexene | 50 | 54.9 | 9.8 | Pass |
| | | 1,3-Butadiene | 50 | 51.2 | 2.4 | Pass |

| Instrument Calibration Check | | | | | | |
|---|---|---|---|---|---|---|
| Date | Time | Calibration Gas Component | Calibration Value (ppb v) | Response (ppb v) | Difference (% of value) | Pass/Fail |
| 3/12/2025 | 8:23 | Ethylene | 50 | 51.6 | 3.2 | Pass |
| Western Hills | | Propylene | 50 | 51.1 | 2.2 | Pass |
| Globeville | | 1-Butene | 50 | 50.6 | 1.2 | Pass |
| | | 1-Pentene | 50 | 52.2 | 4.4 | Pass |
| | | 1-Hexene | 50 | 51.6 | 3.2 | Pass |
| | | 1,3-Butadiene | 50 | 44.3 | -11.4 | Pass |
| | 8:26 | Benzene | 100 | 105 | 5.0 | Pass |
| | | Toluene | 100 | 103 | 3.0 | Pass |
| | | Xylenes | 200 | 207 | 3.5 | Pass |
| | 8:30 | Benzene | 20 | 21.3 | 6.5 | Pass |
| | | Toluene | 20 | 19.9 | -0.5 | Pass |
| | | Xylenes | 40 | 38.9 | -2.8 | Pass |
| | 8:34 | HCN | 25 | 25 | 0.0 | Pass |
| | 8:42 | $H_2S$ | 20 | 20.3 | 1.5 | Pass |
| | 8:45 | Butane | 100 | 102 | 2.0 | Pass |
| | | Pentane | 100 | 101 | 1.0 | Pass |
| | | Hexane | 100 | 104 | 4.0 | Pass |
| | | Heptane | 100 | 103 | 3.0 | Pass |
| | 15:55 | HCN | 25 | 25.3 | 1.2 | Pass |
| | 14:07 | $H_2S$ | 20 | 20.4 | 2.0 | Pass |
| | 14:11 | Butane | 100 | 99.4 | -0.6 | Pass |
| | | Pentane | 100 | 101 | 1.0 | Pass |
| | | Hexane | 100 | 94.6 | -5.4 | Pass |
| | | Heptane | 100 | 94 | -6.0 | Pass |
| | 16:01 | Benzene | 20 | 21.7 | 8.5 | Pass |
| | | Toluene | 20 | 21.6 | 8.0 | Pass |
| | | Xylenes | 40 | 42.4 | 6.0 | Pass |
| | 15:31 | Ethylene | 50 | 50.5 | 1.0 | Pass |
| | | Propylene | 50 | 49.9 | -0.2 | Pass |
| | | 1-Butene | 50 | 50.8 | 1.6 | Pass |
| | | 1-Pentene | 50 | 57.5 | 15.0 | Pass |
| | | 1-Hexene | 50 | 57.4 | 14.8 | Pass |
| | | 1,3-Butadiene | 50 | 47.7 | -4.6 | Pass |

# APPENDIX E  CALIBRATION GAS CERTIFICATION SHEETS

Airgas
an Air Liquide company

**Airgas Specialty Gases**
Airgas USA LLC
6141 Easton Road
Plumsteadville, PA 18949
Airgas.com

# CERTIFICATE OF ANALYSIS

## Grade of Product: CERTIFIED STANDARD-SPEC

| | | | |
|---|---|---|---|
| Customer: | MONTROSE AIR QUALITY SERVICES LLC | | |
| Part Number: | X05NI99C15AC028 | Reference Number: | 160-402805384-1 |
| Cylinder Number: | ALM-044156 | Cylinder Volume: | 144.0 CF |
| Laboratory: | 124 - Plumsteadville - PA | Cylinder Pressure: | 2015 PSIG |
| Analysis Date: | Aug 10, 2023 | Valve Outlet: | 350 |
| Lot Number: | 160-402805384-1 | | |

**Expiration Date: Aug 10, 2026**

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

## ANALYTICAL RESULTS

| Component | Req Conc | Actual Concentration (Mole %) | Analytical Uncertainty |
|---|---|---|---|
| BENZENE | 1.000 PPM | 1.033 PPM | +/- 5% |
| ETHYL BENZENE | 1.000 PPM | 0.9830 PPM | +/- 5% |
| O XYLENE | 1.000 PPM | 1.016 PPM | +/- 5% |
| TOLUENE | 1.000 PPM | 1.021 PPM | +/- 5% |
| NITROGEN | 99.9996 % | 99.999595 % | |

**Notes:**PO Number: PO-049252

Signature on file
**Approved for Release**

APEL-RIEMER ENVIRONMENTAL, INC
REFERENCE GASES AND ATMOSPHERIC CHEMISTRY

**Certificate of Analysis**

**Gas-phase Calibration Standard**

*This gas-phase standard is intended to be used as a reference material for the calibration of instruments.*

Statement about preparation and traceability:

Standards are gravimetrically prepared in high-pressure aluminum cylinders (Luxfer, Inc., Riverside, California). Cylinders are cleaned and treated to eliminate contamination and ensure inertness. Standards are prepared in N150 cylinders (~4000 Liters calibration gas), N033 cylinders (~800 Liters calibration gas) or N006 cylinders (~125 Liters calibration gas) at a pressure of 2000 psia UHP nitrogen. Valves are high purity stainless steel (Ceodeux, Lintgen, Luxembourg) with a CGA-350 or CGA-180 outlet fitting. Pure compounds as liquids and gases are obtained from a number of sources. All lot numbers are cataloged. The gravimetric preparation is performed using calibrated microbalances (Mettler-Toledo, Columbus, Ohio) and microsyringes (Hamilton, Reno, Nevada and SGE, Austin, Texas) for measuring the compounds and cylinder balances (Mettler-Toledo, Columbus, Ohio) for the balance gas. Balances are calibrated with NIST traceable weights.

We prepare each cylinder individually. Accuracy is better than +/- 5%. Analysis confirms the accuracy of the gravimetric preparation. We use a series of NIST, NIST-traceable, NPL, and in-house gravimetric standards to perform the instrument calibrations.

Stability varies depending on the compound, concentration, and cylinder size. Many compounds are stable for several years.

The calibration gas mixture in cylinder RR05620 is certified from the analysis date for 24 months.

Daniel D. Riemer, Ph.D.

March 1, 2025
Date

1295 NW 163rd Street, Miami, Florida 33169 USA
Telephone: 786-925-6201 / Fax: 786-364-1591
Email: info@apelriemerenvironmental.com

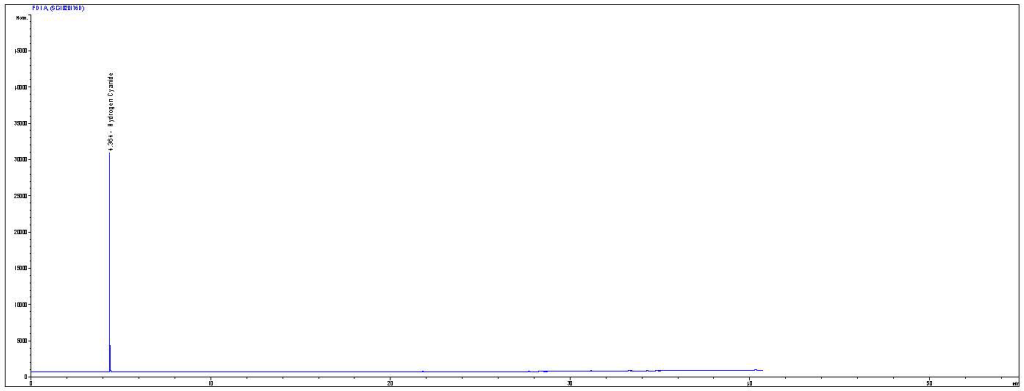
Cylinder: RR05620
Cylinder Date: 2023/12
Valve: SS CGA350 23D364888
Lot No.: 25049.1
Cylinder Pressure: 2000 psia
Analysis Date: March 1, 2025

Single-component calibration mixture in ultra-pure nitrogen

| Compound | CAS# | Concentration (ppb) | Uncertainty |
|---|---|---|---|
| Hydrogen Cyanide | 74-90-8 | 960.7 | ±5% |

Uncertainty is a conservative estimate of the combination of the uncertainties of the gravimetric preparation and analysis.

Chromatogram
100-meter DB-1, 0.25 mm id, 3.1 mL min-1 Helium carrier gas – constant flow
Temperature Program: 35°C, 3.5 min → 4.5°C min-1 → 180 °C, 6 min



Airgas
an Air Liquide company

**Airgas Specialty Gases**
Airgas USA LLC
616 Miller Cut Off Road
La Porte, TX 77571
Airgas.com

# CERTIFICATE OF ANALYSIS

## Grade of Product: CERTIFIED STANDARD-SPEC

| | | | |
|---|---|---|---|
| Customer: | ANALYTICAL SYSTEMS INT - C196 LA PORTE, TX | | |
| Part Number: | X02NI99C15A3821 | Reference Number: | 126-402998567-1A |
| Cylinder Number: | EB0145152 | Cylinder Volume: | 144.3 CF |
| Laboratory: | 124 - La Porte Mix - TX | Cylinder Pressure: | 2015 PSIG |
| Analysis Date: | May 22, 2024 | Valve Outlet: | 330 |
| Lot Number: | 126-402998567-1A | | |

**Expiration Date: May 22, 2027**

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

## ANALYTICAL RESULTS

| Component | Req Conc | Actual Concentration (Mole %) | Analytical Uncertainty |
|---|---|---|---|
| HYDROGEN SULFIDE | 1.000 PPM | 0.8760 PPM | ± 5% |
| NITROGEN | Balance | | |

**Notes:**.
PO NUMBER: PO-1421

Signature on file
**Approved for Release**

Airgas
an Air Liquide company

**Airgas Specialty Gases**
Airgas USA LLC
9810 BAY AREA BLVD
Pasadena, TX 77507
Airgas.com

# CERTIFICATE OF ANALYSIS

## Grade of Product: CERTIFIED STANDARD-SPEC

| | | | |
|---|---|---|---|
| Customer: | MONTROSE AIR QUALITY SERVICES LLC | | |
| Part Number: | X05NI99C15A00U7 | Reference Number: | 163-403259014-1 |
| Cylinder Number: | ALM015719 | Cylinder Volume: | 144.3 CF |
| Laboratory: | 124 - Pasadena (SG06) - TX | Cylinder Pressure: | 2015 PSIG |
| Analysis Date: | Feb 25, 2025 | Valve Outlet: | 350 |
| Lot Number: | 163-403259014-1 | | |

**Expiration Date: Feb 25, 2028**

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

## ANALYTICAL RESULTS

| Component | Req Conc | Actual Concentration (Mole %) | Analytical Uncertainty |
|---|---|---|---|
| N BUTANE | 1.000 PPM | 1.010 PPM | +/- 2% |
| N PENTANE | 1.000 PPM | 1.020 PPM | +/- 2% |
| HEXANE | 1.000 PPM | 1.000 PPM | +/- 2% |
| N HEPTANE | 1.000 PPM | 1.010 PPM | +/- 2% |
| NITROGEN | Balance | | |

Signature on file
**Approved for Release**

Airgas
an Air Liquide company

**Airgas Specialty Gases**
Airgas USA LLC
616 Miller Cut Off Road
La Porte, TX 77571
Airgas.com

# CERTIFICATE OF ANALYSIS

## Grade of Product: CERTIFIED STANDARD-SPEC

| | | | |
|---|---|---|---|
| Customer: | MONTROSE AIR QUALITY SERVICES LLC - HENDERSON , CA | | |
| Part Number: | X07NI99C15A00A9 | Reference Number: | 126-403259013-1A |
| Cylinder Number: | ALM050476 | Cylinder Volume: | 144.0 CF |
| Laboratory: | 124 - La Porte Mix - TX | Cylinder Pressure: | 2015 PSIG |
| Analysis Date: | Apr 25, 2025 | Valve Outlet: | 350 |
| Lot Number: | 126-403259013-1A | | |

**Expiration Date: Apr 25, 2026**

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

## ANALYTICAL RESULTS

| Component | Req Conc | Actual Concentration (Mole %) | Analytical Uncertainty |
|---|---|---|---|
| 1 BUTENE | 1.000 PPM | 1.134 PPM | +/- 10% |
| 1 HEXENE | 1.000 PPM | 1.094 PPM | +/- 10% |
| 1 PENTENE | 1.000 PPM | 1.125 PPM | +/- 10% |
| 1,3 BUTADIENE | 1.000 PPM | 1.200 PPM | +/- 10% |
| ETHYLENE | 1.000 PPM | 1.198 PPM | +/- 10% |
| PROPYLENE | 1.000 PPM | 1.147 PPM | +/- 10% |
| NITROGEN | Balance | | |

**Notes**:MONTROSE AIR QUALITY SERVICES LLC
PO#: 62293

Signature on file
**Approved for Release**

Page 1 of 1

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