2021 Q3 MOBILE MONITORING VAN COMMERCE CITY NORTH DENVER COMMUNITY AIR MONITORING NETWORK COMMERCE CITY, COLORADO

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EXECUTIVE SUMMARY

In response to feedback received by Suncor Energy (U.S.A.) Inc. (Suncor) through community engagement conducted in the fall of 2020, Suncor voluntarily committed to developing a continuous, near real-time air monitoring program to gain insight into air quality for neighborhoods in the vicinity of the Suncor refinery in Commerce City, Colorado. 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. Air monitoring was accomplished through three separate technical approaches: (1) providing continuous, near real-time monitoring for the following analytes[1]: carbon monoxide (CO), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), nitrogen oxide (NO), nitrogen dioxide (NO_2), particulate matter ($PM_{2.5}$), and total volatile organic compounds (VOCs); (2) periodic collection and laboratory analysis for the presence of specific VOCs from Summa canisters; and (3) periodic real-time air monitoring throughout neighborhoods using a mobile monitoring van to detect presence of specific VOCs. This report details approach number three, the periodic real-time air monitoring through six neighborhoods with the mobile monitoring van and a screening health risk analysis of the detected VOCs. Continuous real-time air monitoring and Summa canister monitoring data are presented in separate reports.

The mobile monitoring van contains the equipment necessary to identify and quantitate individual VOCs present in ambient air to ultra-low concentrations. This equipment measures and reports concentrations of select VOCs at sub-parts per billion (ppb) levels and as quickly as one measurement per second. The mobile monitoring van followed a dense route through each of the six Commerce City and North Denver residential neighborhoods that fall within a three-mile radius around the refinery. All accessible streets in the monitored neighborhoods were traversed at approximately 10 MPH while collecting a data point for each chemical every 1-2 seconds. During the third quarter 2021 sampling period (August 30 – September 3), the mobile monitoring van was in a total of six neighborhoods and collected 71,111 data points across five days of monitoring, resulting in calculation of approximately 28,000 1-hour average concentrations. Meteorological conditions were also reported in real time.

Health scientists from CTEH, LLC (a subsidiary company of Montrose Environmental Group) performed a screening-level human health risk assessment based on the data collected by Montrose. This evaluation was consistent with federal and state risk assessment guidelines and was conducted to determine whether measured concentrations of individual or cumulative VOCs could potentially pose acute (short-term) health hazards. The air monitoring data and health risk assessment indicate:

- All measured average and maximum 1-hour rolling average concentrations for each chemical were below their respective acute health guideline values in all neighborhoods.
- These results indicate the measured concentrations are likely to be without an appreciable risk of adverse acute health effects, even for sensitive sub-populations.

[1] An “analyte” is a material that a measuring device is designed to detect and measure. It may be a chemical gas, an airborne particle, or other type of material.

1.0 INTRODUCTION

In response to feedback received by Suncor Energy (U.S.A.) Inc. (Suncor) through community engagement conducted in the fall of 2020, Suncor voluntarily committed to developing a continuous, near real-time air monitoring program to gain insight into air quality for neighborhoods in the vicinity of the Suncor refinery in Commerce City, Colorado. 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. Air monitoring was accomplished through three separate technical approaches: (1) providing continuous, near real-time monitoring for the following analytes: carbon monoxide (CO), sulfur dioxide (SO2), hydrogen sulfide (H2S), nitrogen oxide (NO), nitrogen dioxide (NO2), particulate matter (PM2.5), and total volatile organic compounds (VOCs); (2) periodic collection and laboratory analysis for the presence of specific VOCs from Summa canisters; and (3) periodic real-time air monitoring throughout entire neighborhoods using a mobile monitoring van to detect presence of specific VOCs. An “analyte” is a material that a measuring device is designed to detect and measure. It may be a chemical gas, an airborne particle, or other type of material. This report details approach number three. The continuous real-time air monitoring and Summa canister monitoring data are presented in separate reports. Air monitoring, sampling, and analysis from all three phases that 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 Monitoring Van Air Sampling Description

The mobile monitoring van is a Mercedes 2500 Sprinter Van outfitted with equipment necessary to identify and quantitate individual analytes present in ambient air to ultra-low concentrations. The mobile monitoring van is equipped with an Ionicon Model 6000-X2 proton transfer time-of-flight mass spectrometer (PTR-TOF-MS). This instrument provides concentrations of select VOCs at sub-parts per billion (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 analyte molecules. The mobile monitoring van incorporates a high-precision global positioning system (GPS), a sonic anemometer to measure wind direction and wind velocity and a multitude of other incorporated meteorological (MET) sensors.

During the mobile monitoring program, the list of 64 analytes in Table 1-1 were measured to determine the instantaneous ambient concentrations. This list of analytes was compiled based on the typical analytes that are monitored in urban and industrial areas, and the mobile monitoring van analysis capabilities.

The mobile monitoring van followed a driving route through each of the six Commerce City and North Denver residential neighborhoods that fall within a three-mile radius around the refinery operations. Accessible streets in the neighborhoods were traversed at approximately 10 miles per hour (MPH) while collecting a data point every 1-2 seconds. The details of the monitored neighborhoods are listed in Table 1-2 and are shown in Figure 1-1.

TABLE 1-1
MOBILE MONITORING VAN PROGRAM ANALYTES[2]

Propane	2-Methylhexane	Ethane	Methyl-cyclopentane	o-Ethyltoluene (2-ethyltoluene)
1,3-Butadiene	2-Methylpentane	Ethylbenzene	m-Ethyltoluene	p-Diethylbenzene (1,4-diethylbenzene)
1-Butene	3-Methylheptane	Ethylcyclohexane	m/o/p-Xylenes	p-Ethyltoluene (4-ethyltoluene)
1-Hexene	3-Methylhexane	Ethylene	n-Butane	1,2,4-trimethylbenzene
1-Pentene	3-Methylpentane	Hydrogen Cyanide	n-Decane	Propylene (Propene)
Styrene	Acetylene	Hydrogen Sulfide	n-Dodecane	2,2,4-Trimethylpentane
2,2-Dimethylbutane	Benzene	i-Butane	n-Heptane	Tetrachloroethylene
Toluene	Carbon disulfide	i-Pentane	n-Hexane	2,3,4-Trimethylpentane
2,3-Dimethylbutane	trans-2-Butene	Isopentane	n-Nonane	trans-1,2-Dimethylcyclohexane
2,3-Dimethylpentane	cis-2-Butene	Isoprene	n-Octane	trans-1,3-Dimethylcyclohexane
2,4-Dimethylpentane	cis-2-Pentene	m-Diethylbenzene	n-Pentane	cis-1,3-dimethylcyclohexane
2-Methyl-2-butene	Cumene	Methanol	n-Propylbenzene	trans-2-Pentene
2-Methylheptane	Cyclohexane	Methyl-cyclohexane	n-Undecane	Cyclopentane

[2] See Appendix A for isomer analysis details

TABLE 1-2
NEIGHBORHOOD MONITORING PROGRAM DETAILS

Neighborhood	Area (square miles)	Sampling Date	Start Time	End Time	Total Data Points Collected	Total Hourly Averages Calculated
Western Hills	1.6	08/30/21	10:48	14:33	5,693	2,095
Adams City Middle School	--	08/30/21	14:42	16:10	2,620	821
Globeville	0.44	08/31/21	09:30	11:17	6,445	2,846
Elyria-Swansea	1.2	08/31/21	11:42	14:24	9,242	2,295
Dupont	1.4	09/01/21	09:31	14:04	14,713	7,515
Globeville	0.44	09/02/21	12:08	13:48	5,067	1,908
Adams City	0.41	09/02/21	13:48	15:06	4,702	1,103
Pioneer Park	1.7	09/03/21	10:15	17:42	16,725	9,527

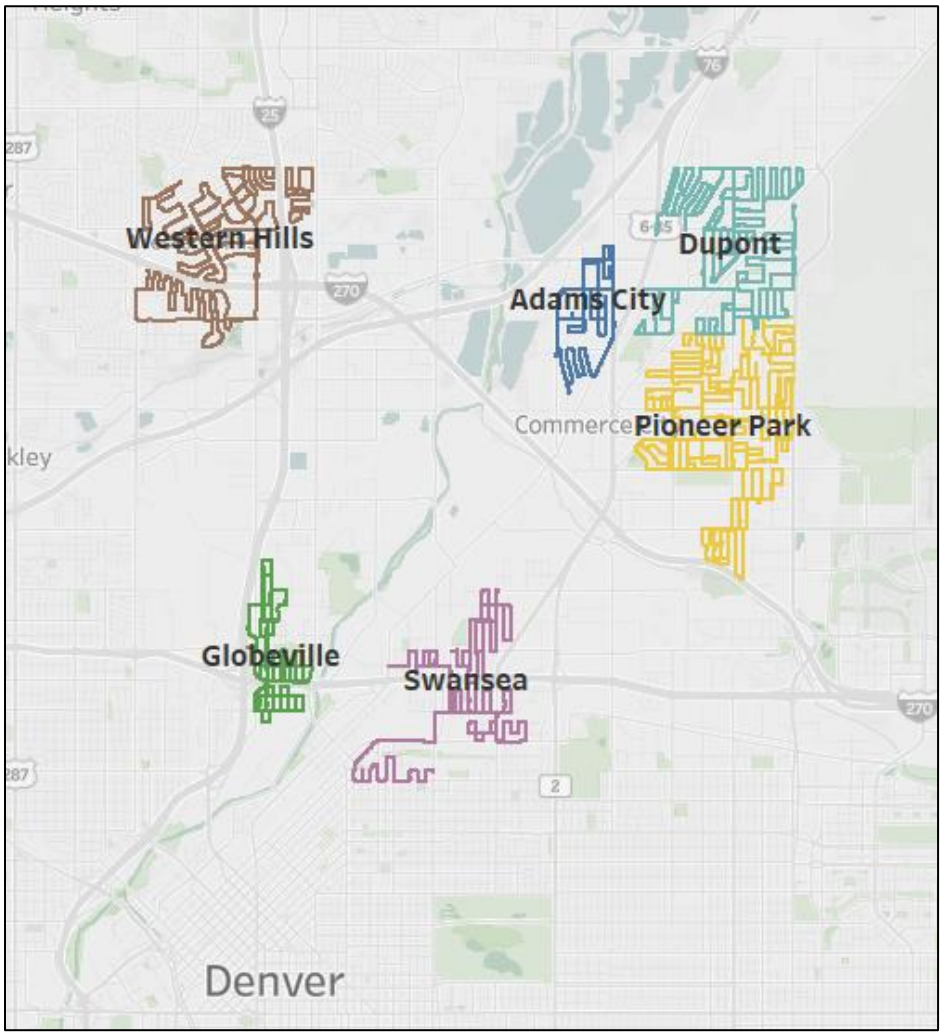
2.2 Mobile Monitoring Van Air Sampling Methods

The PTR-TOF-MS calibration was checked and the instrument was zeroed each day prior to collection of any ambient air data. The instrument was calibrated using United States Environmental Protection Agency (USEPA) protocol certified calibration gases. The multi-chemical cylinder standards were used to generate multiple point calibration curves for each commercially available analyte present in the standard. Note: Not all analytes listed in Table 1-1 are available as certified calibration gases. The chemical dilutions were made using an Environics Model 4040 gas dilution system. The gas dilution system was validated using the appropriate USEPA methodology (40 CFR 51 Appendix M, Method 205). Zero-count measurements were obtained to ensure proper baseline measurements were incorporated into the calculation of each analyte's concentration. Zero-count measurements were performed through the entire sampling system using ultra-high purity air. Post-testing calibration checks were performed on the instrument to ensure there was no significant drift during the course of the sampling event. Drift can cause an increase or decrease in the measured analyte concentrations, which can lead to both positive and negative biasing of the obtained results.

The mobile monitoring van collected continuous measurements throughout each neighborhood following the routes shown in Figure 1-1. Measurements that were collected from transition periods or from moving between neighborhoods were excluded in this assessment. Adams City had two sampling events occurring on different days. The initial sampling event at this location was on August 30, 2021, at a single point location, while the second event was throughout the neighborhood on September 2, 2021.

The measurements were collected from the ambient environment at a height of 15 feet above grade 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 either 1 or 2 second intervals. See the attached Appendix D for specific PTR-TOF-MS instrument operation conditions.

FIGURE 1-1
MOBILE MONITORING VAN PROGRAM ROUTE THROUGH SIX NEIGHBORHOOD AREAS



One-hour rolling average concentrations of each analyte were calculated for each neighborhood from data for the entire measurement time. These averages were used for the health risk assessment described below. Given the number of measurements collected, over 28,000, 1-hour rolling averages of chemical concentrations were calculated. The range between the average and maximum 1-hour rolling average values provides a robust estimate of plausible outdoor exposures of persons occupying the monitored neighborhood while the mobile monitoring van was present.

2.3 Screening Health Risk Assessment Methods

CTEH conducted a screening-level public health risk assessment, consistent with federal risk assessment guidelines, to determine whether exposure to the detected concentrations of individual or cumulative (combined) analytes in the air could potentially pose acute (short-term) health impacts. A tiered approach to the 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 use of exposure assumptions that are health-conservative. This means that data reflecting maximum exposure potential are plugged into the risk calculations. These are worst-case scenarios that typical represent exposure conditions higher than would be reasonably expected. Such calculations are very simple and assume a person is constantly exposed to the highest measured chemical level. If the resulting risk values indicate the lack of likely adverse health effects under these worst-case conditions, then the risk assessment is complete. However, if the risk values suggest a potential for adverse health effects, then a second tier of risk calculations are performed, but this time using more detailed assumptions about exposure that are still simple representations of the real world but are more realistic than the first-tier worst-case assumptions. Each successive tier represents a more complete characterization of exposure variability and/or uncertainty that requires a corresponding increase in calculation complexity and scientific level of effort.

The first tier of this risk assessment process is called a screening-level risk assessment. The conservative assumptions used for this level of risk calculation typically represent exposure conditions higher than would be reasonably expected. As such, an exceedance of an acceptable risk level (defined below) does not necessarily indicate that adverse health effects are likely. The Agency for Toxic Substances and Disease Registry (ATSDR) states, "*when health assessors find exposures higher than the MRLs (ATSDR's specific health-based reference levels), it means that they may want to look more closely at a site*"[3]. In other words, screening-level findings of an estimated exposure to a VOC being higher than a health-based reference level do NOT indicate an actual likelihood of adverse effects but do indicate a need to move to a second tier of analysis and refine the risk assessment process with more realistic detail to determine if an actual risk exists that needs to be mitigated.

The screening-level risk assessment reported here includes calculated risks from exposure to individually measured chemicals as well as exposure to all measured chemicals at once (cumulative). For individual chemicals, an acute health risk value was calculated as the exposure concentration (EC) divided by the chemical-specific federal or state established human health-based Reference Levels (RL) (Equation 1). The result is referred to as the hazard quotient (HQ). Estimates of EC were derived from 1-hour rolling average concentrations of each analyte for the entire measurement time in an individual CCND neighborhood. The health based RLs used to calculate the HQs are previously established exposure levels below which no adverse effect in humans is expected. If available, RLs adopted by the Colorado Department of Public Health and Environment (CDPHE) were selected for use within this assessment. If the analyte was not listed by CDPHE, CTEH followed a federal and state recommended hierarchy for selection of health-based reference levels[4].

[3] https://www.atsdr.cdc.gov/minimalrisklevels/#:~:text=The%20ATSDR%2C%20in%20response%20to,minimal%20risk%20levels%20(MRLs)

[4] https://drive.google.com/file/d/1P2KEvu0MFiyzQAOQtjQUclqR-WGh1bEX/view

Acute HQs were calculated as follows:

Eq. 1 – Hazard Quotient (HQ) Equation

HQ= EC/ RL

Where:

HQ= Hazard Quotient

EC= Maximum 1-hour rolling average air concentration

RL= Acute Health-based Reference Level (from USEPA, ATSDR, Cal EPA, and TCEQ)

Health risks from potential cumulative exposures to all detected analytes were calculated by adding together each individual analyte's HQ calculated for a given neighborhood. This sum of all the individual HQs is called a Hazard Index (HI). Adding together all the HQs is also a very health-conservative approach because it assumes that all the measured analytes exert an adverse effect on the body in a similar manner, which is rarely the case.

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 health effects, even for sensitive sub-populations. The potential for adverse health effects increases as HQ or HI increase above one, but it is not known by how much. Therefore, calculated risk values in this assessment that are equal to or less than one indicates an acceptable risk level. HQ or HI values of greater than one would prompt a second-tier risk assessment beyond the screening-level assessment.

According to the USEPA and ATSDR, the federal agencies that establish these reference levels, these values "*are set below levels that, based on current information, might cause adverse health effects in the people most sensitive*." This is because health-based RLs are based on observed toxicity in human or animal studies with an added safety factor to account for uncertainties in the toxicity data. For example, ATSDR identified the lowest observed adverse effect level (LOAEL) for acute exposure to benzene as 10,200 parts per billion (ppb), based on a study of mice exposed six hours per day for six days. ATSDR then applied a combined safety factor of 300 to derive the final health-based RL to account for several uncertainties, including differences between mice and humans and for sensitive individuals. Therefore, it is scientifically incorrect to assume that all real-world exposures to a chemical at levels higher than a health-based RL will likely result in an adverse effect.

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 detected concentration continuously for an hour up to multiple days (an acute exposure). A 1-hour average concentration is more appropriate than a 1-second or 1-minute concentration for use in an acute health risk assessment. This is because 1-second exposures to the chemicals measured in this study do not cause adverse effects unless the levels are extremely high (i.e., tens of thousands to millions of ppb). Guidance values for use in emergency situations with extremely elevated levels of these chemicals are available and are discussed below. More than 28,000 1-hour rolling averages of chemical concentrations were calculated to derive the estimated ECs (Table 1-1), depending on the neighborhood. The range between the average and maximum rolling 1-hour average values provides a robust estimate of plausible outdoor exposures of persons occupying the monitored neighborhood while the mobile monitoring van was present.

The USEPA also has established values for use in emergency situations, termed Acute Exposure Guideline Levels (AEGLs). Unlike health-based reference levels 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. 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]." The AEGL-1 60-minute value, if available for the applicable compound, was also used for comparison purposes because it is more precautionary (than AEGL-2 or AEGL-3) as the AEGL-1 level reflects potential health impacts that are reversible upon cessation of exposure.

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 1-2. Over five days, six neighborhoods were monitored for 64 analytes, collecting more than 28,000 total data points. Individual neighborhood results are detailed in Figures 1-2 through 1-9. Each figure shows a map of the monitoring locations within each neighborhood, the analytes that resulted in the top five calculated risk values, and time profiles of the measured levels of these analytes. The time profiles show all the one-second data (orange) and calculated 1-hour rolling averages (green) of the one-second data. Each green 1-hour average data point shown in these profiles reflect all the one-second measurements collected over the previous hour. Thus, no 1-hour rolling average values were available to be shown in Figures 1-2 through 1-9 until at least one hour of data were collected. Gaps in the data plotted on the graphs in Figures 1-2 through 1-9 were due to field team breaks in the middle of the sampling day, typically for lunch or data review. 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 most local to the neighborhood being monitored on each day because the stationary source of MET data is more reliable than the MET station on the mobile monitoring van when the lab is moving.

3.2 Screening Health Risk Assessment Results

Acute health risks were calculated for each neighborhood for all measured VOCs both individually and combined. According to USEPA guidelines, an acute HQ or HI less than or equal to one indicates that exposures are likely to be without any appreciable risk of acute adverse health effects, even for sensitive sub-populations.

Maximum 1-hour rolling average concentrations for 64 VOCs measured in each neighborhood were compared to acute health RLs to derive HQs. Figures 1-2 through 1-9 contain summaries of results for the top five VOCs with the highest HQs by neighborhood. In this quarter, benzene, 1,3-butadiene, tetrachloroethylene, hydrogen sulfide, and toluene were consistently the VOCs with the highest HQ in each neighborhood and sampling period ranging from 83-97% of the total HI. Graphs of the VOC concentrations over time with the top five HQ values are also shown. Complete results for HQs for all VOCs detected in each neighborhood are available in Appendix C. The HI values shown in Figures 1-2 through 1-9 were calculated by summing the HQs of all detected analytes measured in a given neighborhood. The maps in these figures indicate whether a maximum HQ was ever greater than one (yellow dots) or less than one (green dots) for any measured VOC. If any measured analyte resulted in a HQ greater than 1, then a separate figure would be shown for that VOC alone.

In conclusion, the data collected during this study phase did not indicate a potential for adverse health effects from exposure to the measured VOCs, both individually and combined.

- All HQs were less than one for all detected VOCs, indicating that maximum 1-hour rolling average concentrations for each analyte were below their respective acute health guideline RLs in all neighborhoods. This is shown as all green dots on the maps in Figures 1-2 through 1-9.
- All calculated HI values for each neighborhood were below one as shown in Figures 1-2 through 1-9.

- These results indicate the measured concentrations are likely to be without an appreciable risk of acute adverse health effects, even for sensitive sub-populations.

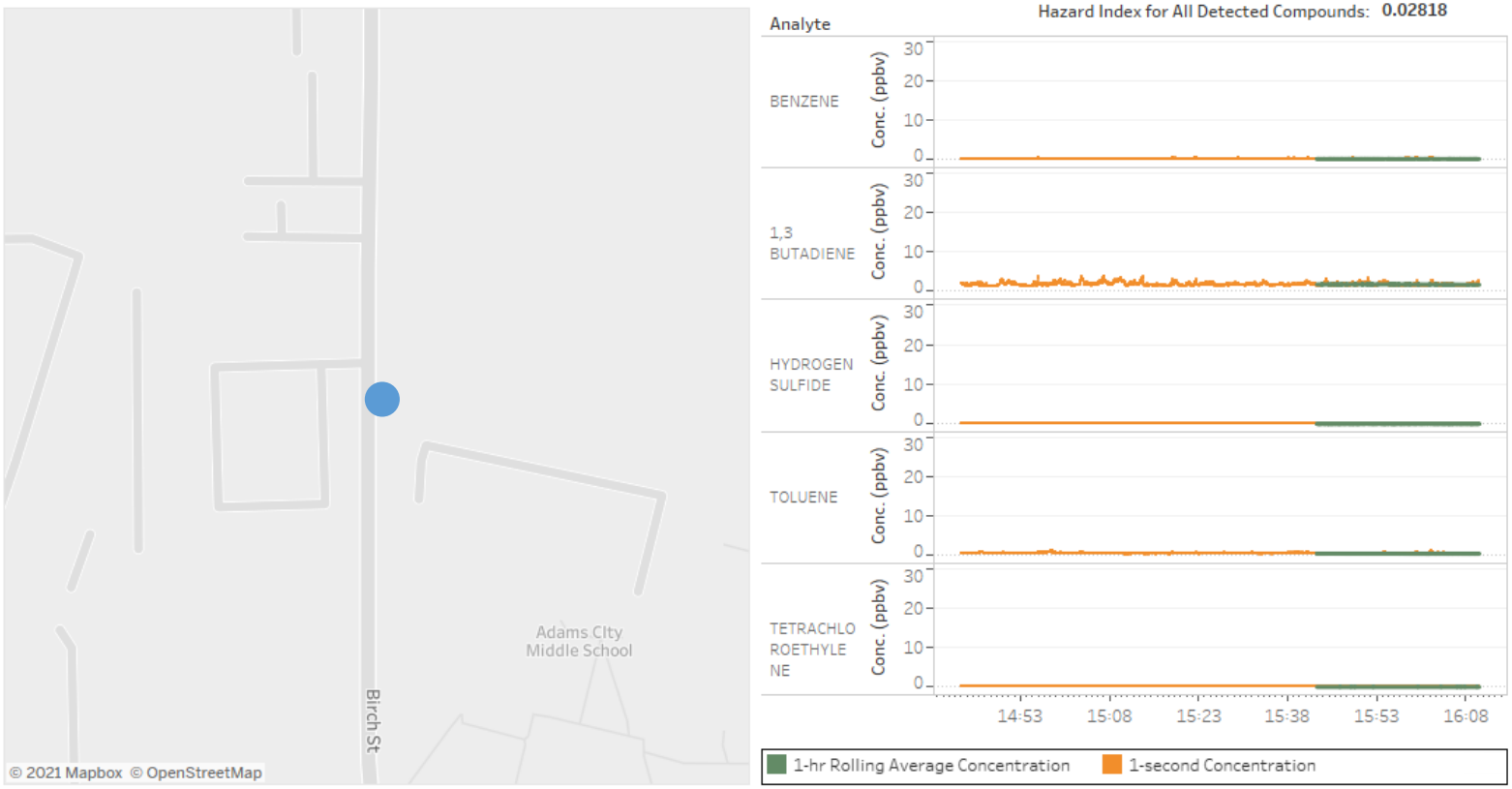
FIGURE 1-2
WESTERN HILLS NEIGHBORHOOD: AUGUST 30, 2021

Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
BENZENE	8.83	2,095	0.28	0.15	52,000	9	0.03083
1,3 BUTADIENE	12.91	2,095	7.47	4.23	670,000	298	0.02505
HYDROGEN SULFIDE	0.51	2,095	0.07	0.03	510	70	0.00105
TETRACHLOROETHYLENE	0.02	2,095	0.01	0.00	35,000	6	0.00088
TOLUENE	20.29	2,095	1.15	0.52	67,000	2,000	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.

FIGURE 1-3
ADAMS CITY MIDDLE SCHOOL (STATIONARY): AUGUST 30, 2021

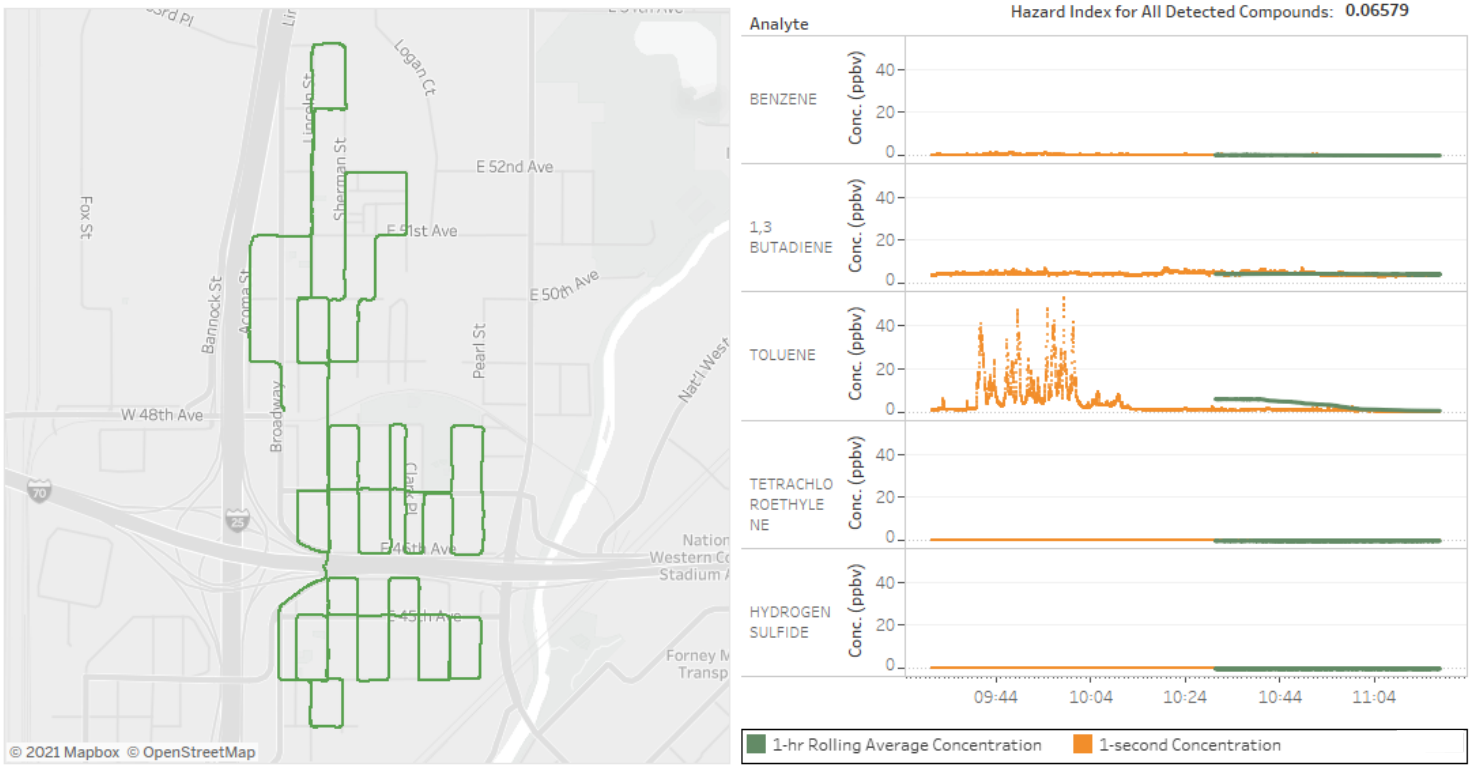
Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
BENZENE	0.56	821	0.18	0.18	52,000	9	0.02034
1,3 BUTADIENE	3.83	821	1.75	1.71	670,000	298	0.00586
HYDROGEN SULFIDE	0.25	821	0.03	0.03	510	70	0.00043
TOLUENE	1.14	821	0.48	0.47	67,000	2,000	0.00024
TETRACHLOROETHYLENE	0.01	821	0.00	0.00	35,000	6	0.00005



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.

FIGURE 1-4
GLOBEVILLE NEIGHBORHOOD: AUGUST 31, 2021

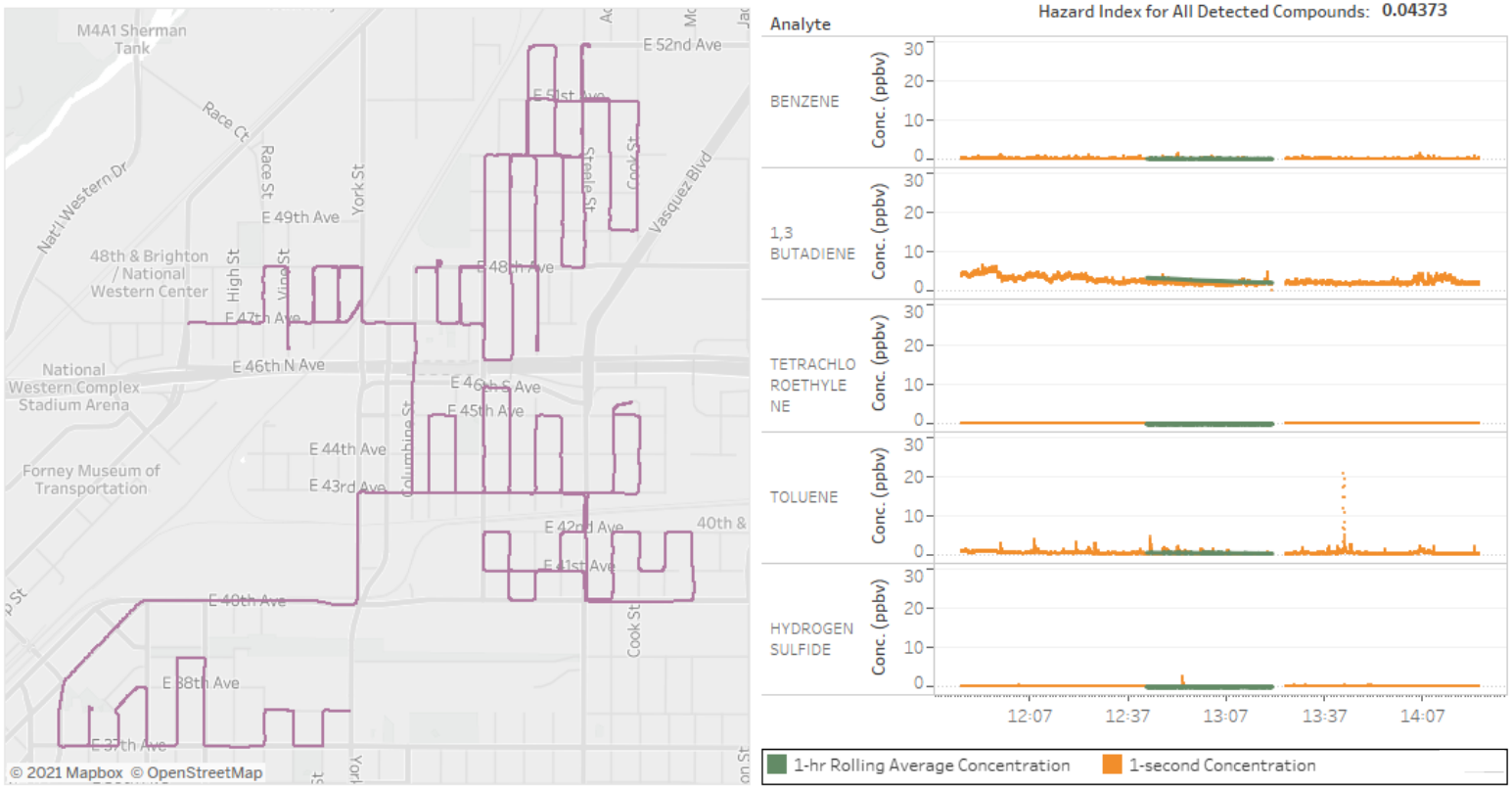
Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
BENZENE	1.72	2,846	0.38	0.29	52,000	9	0.04268
1,3 BUTADIENE	7.28	2,846	4.63	4.52	670,000	298	0.01550
TOLUENE	52.14	2,846	6.31	3.55	67,000	2,000	0.00316
TETRACHLOROETHYLENE	0.05	2,846	0.01	0.01	35,000	6	0.00195
HYDROGEN SULFIDE	0.30	2,846	0.02	0.01	510	70	0.00026



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.

FIGURE 1-5
SWANSEA NEIGHBORHOOD: AUGUST 31, 2021

Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
BENZENE	1.54	2,295	0.26	0.23	52,000	9	0.02878
1,3 BUTADIENE	6.40	2,295	3.42	2.73	670,000	298	0.01146
TETRACHLOROETHYLENE	0.03	2,295	0.01	0.01	35,000	6	0.00153
TOLUENE	20.77	2,295	0.71	0.61	67,000	2,000	0.00036
HYDROGEN SULFIDE	2.50	2,295	0.01	0.01	510	70	0.00020



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.

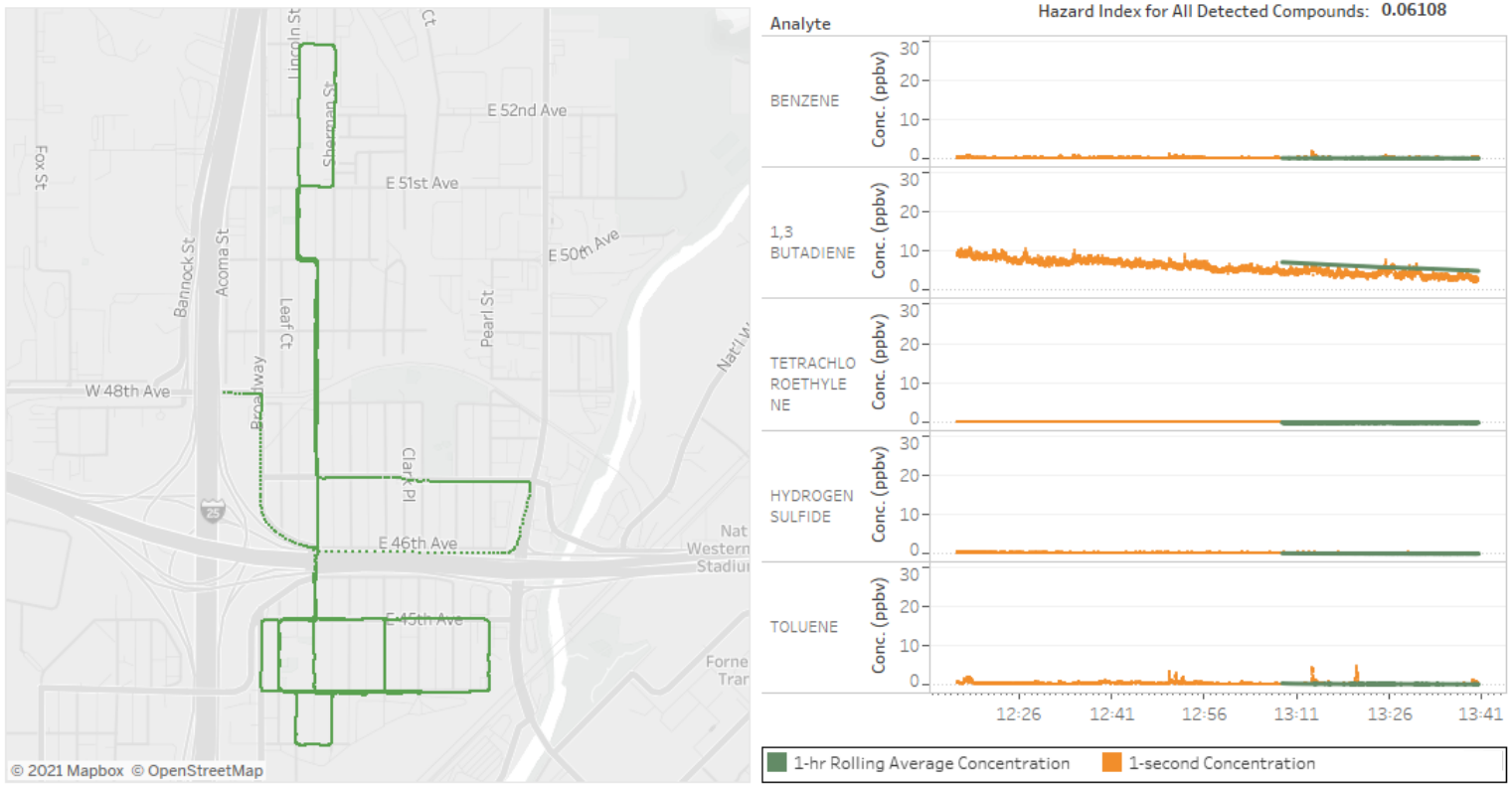
FIGURE 1-6
DUPONT NEIGHBORHOOD: SEPTEMBER 1, 2021

Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
1,3 BUTADIENE	12.78	7,515	8.73	5.35	670,000	298	0.02927
BENZENE	6.11	7,515	0.26	0.22	52,000	9	0.02861
HYDROGEN SULFIDE	0.64	7,515	0.16	0.13	510	70	0.00232
TETRACHLOROETHYLENE	0.05	7,515	0.01	0.01	35,000	6	0.00218
TOLUENE	27.41	7,515	0.64	0.45	67,000	2,000	0.00032

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.

FIGURE 1-7
GLOBEVILLE NEIGHBORHOOD 2nd EVENT: SEPTEMBER 2, 2021

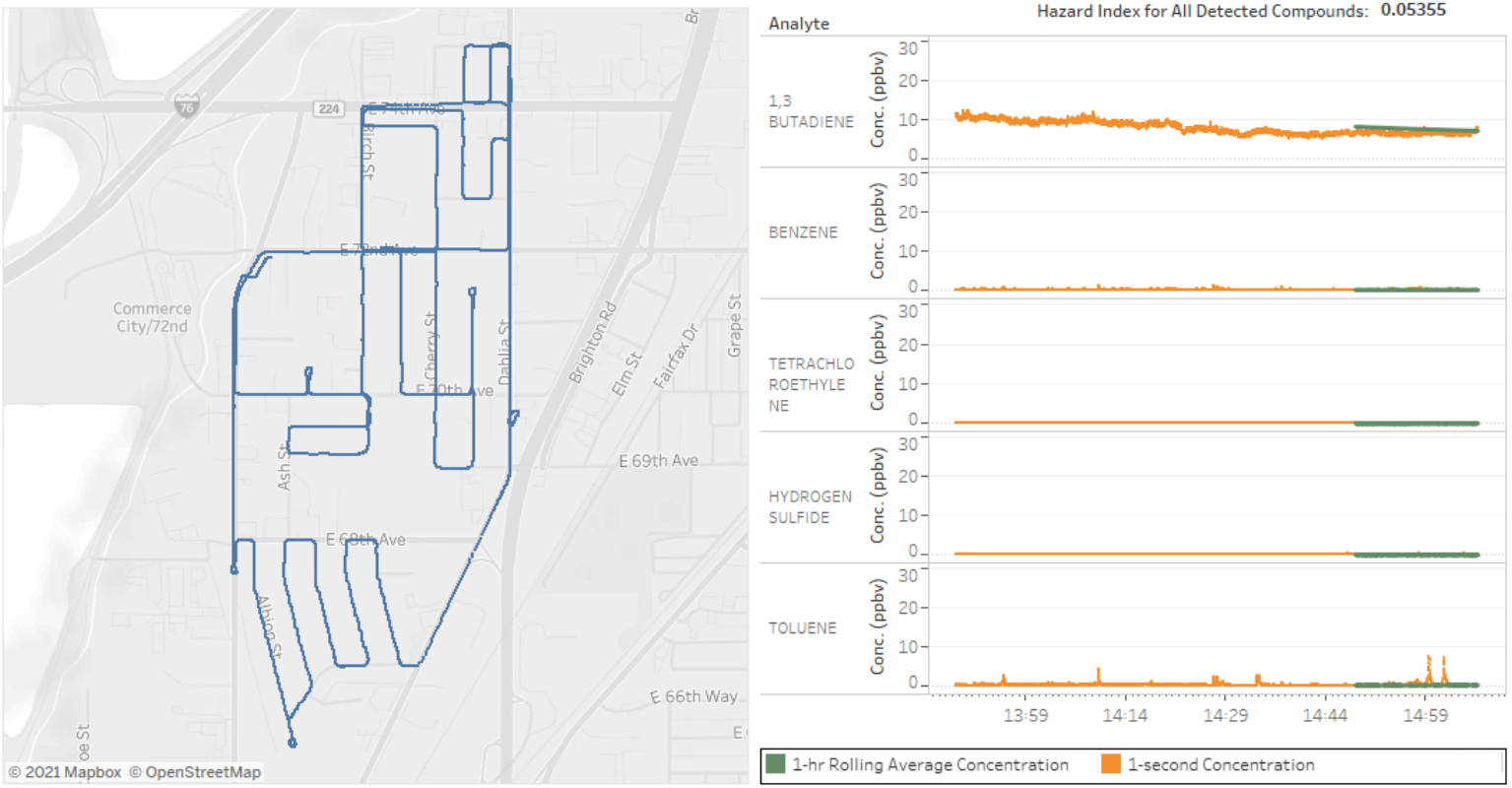
Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
BENZENE	1.95	1,908	0.26	0.23	52,000	9	0.02937
1,3 BUTADIENE	10.71	1,908	7.17	6.00	670,000	298	0.02402
TETRACHLOROETHYLENE	0.05	1,908	0.02	0.02	35,000	6	0.00355
HYDROGEN SULFIDE	0.58	1,908	0.18	0.12	510	70	0.00258
TOLUENE	4.67	1,908	0.49	0.31	67,000	2,000	0.00024



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.

FIGURE 1-8
ADAMS CITY NEIGHBORHOOD: SEPTEMBER 2, 2021

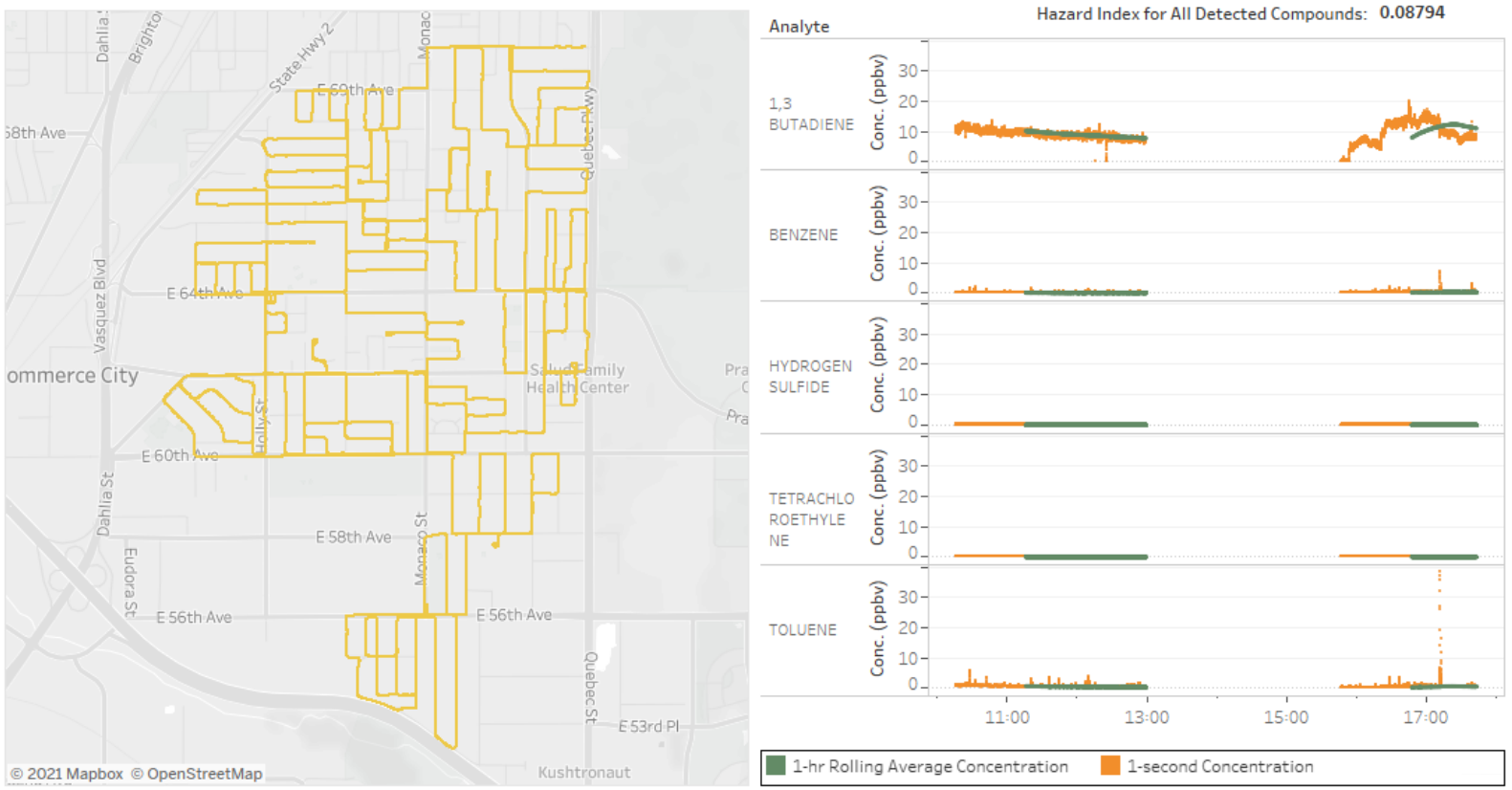
Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
1,3 BUTADIENE	12.39	1,103	8.29	7.74	670,000	298	0.02780
BENZENE	1.35	1,103	0.20	0.20	52,000	9	0.02247
TETRACHLOROETHYLENE	0.04	1,103	0.01	0.01	35,000	6	0.00116
HYDROGEN SULFIDE	0.35	1,103	0.04	0.04	510	70	0.00060
TOLUENE	7.53	1,103	0.34	0.30	67,000	2,000	0.00017



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.

FIGURE 1-9
PIONEER PARK NEIGHBORHOOD: SEPTEMBER 3, 2021

Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Acute Health Reference Level (ppbv)	Hazard Quotient
1,3 BUTADIENE	20.06	9,527	12.46	9.69	670,000	298	0.04176
BENZENE	7.10	9,527	0.32	0.18	52,000	9	0.03572
HYDROGEN SULFIDE	0.82	9,527	0.30	0.26	510	70	0.00435
TETRACHLOROETHYLENE	0.06	9,527	0.02	0.01	35,000	6	0.00331
TOLUENE	38.37	9,527	0.71	0.49	67,000	2,000	0.00036



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.

3.3 Uncertainty Evaluation

Scientific uncertainty is inherent in each step of the risk assessment process because all risk assessments incorporate a variety of assumptions and professional judgments. Therefore, the acute hazard estimates presented in this assessment are estimates of risk due to a number of assumptions about exposure and toxicity. This screening-level risk assessment relied on a combination of health-protective exposure scenarios and input values (i.e., high-end exposures). Because of these assumptions, the estimates of acute hazards are themselves uncertain but likely to be over-estimates of actual risk.

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.

3.4 Program Changes

No program changes occurred during this reporting period.

Respectfully Submitted:

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

Michael Lumpkin, PhD, DABT
Senior Toxicologist
CTEH, LLC

APPENDIX A
ISOMER ANALYTE SAMPLING DETAILS

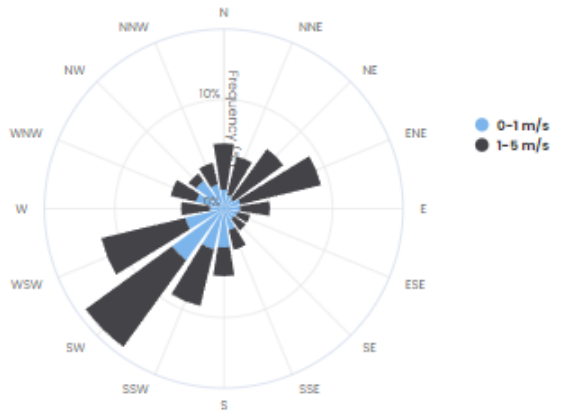
In a real-time PTR-TOF analysis, it is not possible to speciate isomers, or chemical compounds that have the same molecular weight. For example, n-Hexane, 2-Methyl pentane, and 2,2-Dimethyl butane all have a molecular mass of 86.178 g/mol. In order to provide the most conservative determination of concentration 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 which isomers comprise each generic group.

Group Name	Specific Isomers
Butenes	1-Butene
	cis-2-Butene
	trans-2-Butene
Butanes	iso-Butane
	n-Butane
Pentenes	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

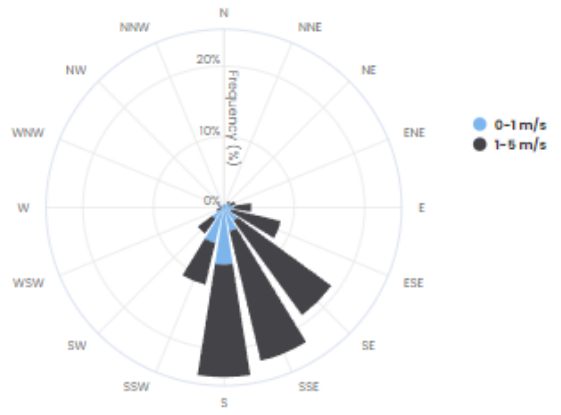
Group Name	Specific Isomers
Xylenes	Ethyl Benzene
	o-Xylene
	m-Xylene
	p-Xylene
Dimethylcyclohexanes	Ethylcyclohexane
	cis-1,3-Dimethylcyclohexane
	trans-1,2-Dimethylcyclohexane
	trans-1,3-Dimethylcyclohexane
Octanes	n-Octane
	2-Methylheptane
	3-Methylheptane
	2,2,4-Trimethylpentane
	2,3,4-Trimethylpentane
Trimethylbenzenes	Cumene
	1,2,4-Trimethylbenzene
	o-Ethyltoluene
	m-Ethyltoluene
	p-Ethyltoluene
	n-Propylbenzene
Diethylbenzenes	o-Diethylbenzene
	m-Diethylbenzene
	p-Diethylbenzene

APPENDIX B
DAILY WIND ROSES

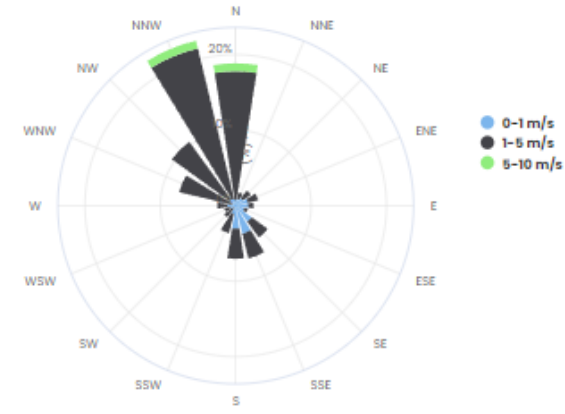
Wind Rose | CM4 (Adams City Middle School) -August 30, 2021



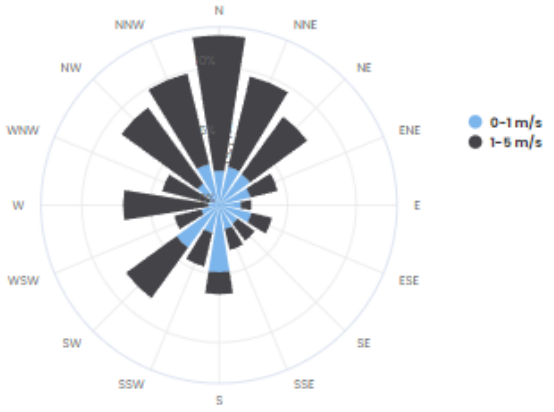
Wind Rose | CM6 (Focus Point Family Resource Center)-August 31, 2021



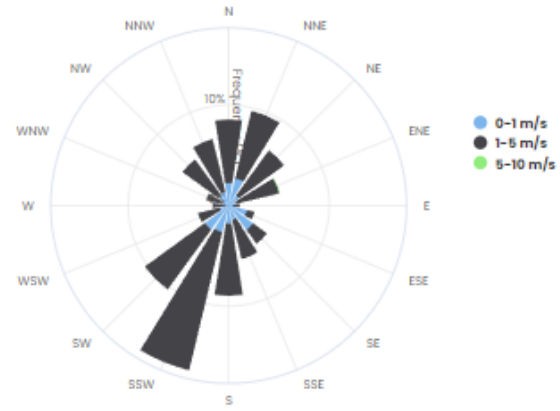
Wind Rose | CM3 (Adams City High School)-September 1, 2021



Wind Rose | CM4 (Adams City Middle School)-September 2, 2021



Wind Rose | CM7 (Kearney Middle School)-September 3, 2021



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

Mobile Laboratory Sampling Risk Scale (Hazard Quotient)
Adams City Neighborhood | August 30, 2021

Analyte	Cas No	Count of 1-second Concentrations (#)	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value	Acute Health Reference Level (ppbv)	Screening Value Source	Hazard Quotient
1,3 BUTADIENE	106-99-0	2,620	3.83	821	1.75	1.71	670,000	298	OEHHA Acute REL	0.00586
ACETYLENE	74-86-2	2,620	0.85	821	0.47	0.46	NR	25,000	TCEQ Short-Term AMCV Health	0.00002
BENZENE	71-43-2	2,620	0.56	821	0.18	0.18	52,000	9	ATSDR Acute MRL	0.02034
BUTANES	106-97-8	2,620	2.05	821	1.06	1.03	5,500,000	92,000	TCEQ Short-Term AMCV Health	0.00001
BUTENES	106-98-9	2,620	1.12	821	0.05	0.04	NR	27,000	TCEQ Short-Term AMCV Health	0.00000
CARBON DISULFIDE	75-15-0	2,620	0.03	821	0.00	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANE	287-92-3	2,620	0.50	821	0.04	0.04	NR	5,900	TCEQ Short-Term AMCV Health	0.00001
DECANES	124-18-5	2,620	0.01	821	0.00	0.00	NR	1,000	TCEQ Short-Term AMCV Health	0.00000
DIETHYLBENZENES	141-93-5	2,620	0.03	821	0.01	0.01	NR	450	TCEQ Short-Term AMCV Health	0.00002
DIMETHYLCYCLOHEXANES	590-66-9	2,620	0.02	821	0.00	0.00	NR	NA	NE	
DODECANES	112-40-3	2,620	0.00	821	0.00	0.00	NR	NA	NE	
ETHYLENE	74-85-1	2,620	92.30	821	10.40	9.99	NR	500,000	TCEQ Short-Term AMCV Health	0.00002
HEPTANES	142-82-5	2,620	0.05	821	0.00	0.00	NR	8,300	TCEQ Short-Term AMCV Health	0.00000
HEXANES	110-54-3	2,620	0.07	821	0.01	0.01	NR	5,400	TCEQ Short-Term AMCV Health	0.00000
HEXENES	592-41-6	2,620	0.09	821	0.00	0.00	NR	500	TCEQ Short-Term AMCV Health	0.00001
HYDROGEN CYANIDE	74-90-8	2,620	0.45	821	0.23	0.22	2,000	308	OEHHA Acute REL	0.00074
HYDROGEN SULFIDE	7783-06-4	2,620	0.25	821	0.03	0.03	510	70	ATSDR Acute MRL	0.00043
ISOPRENE	78-79-5	2,620	0.20	821	0.02	0.02	NR	1,400	TCEQ Short-Term AMCV Health	0.00002
METHANOL	67-56-1	2,620	59.86	821	6.19	5.82	530,000	21,366	OEHHA Acute REL	0.00029
METHYLCYCLOHEXANE	108-87-2	2,620	0.03	821	0.00	0.00	NR	4,000	TCEQ Short-Term AMCV Health	0.00000
NONANES	111-84-2	2,620	0.02	821	0.00	0.00	NR	3,000	TCEQ Short-Term AMCV Health	0.00000
OCTANES	111-65-9	2,620	0.03	821	0.01	0.01	NR	4,100	TCEQ Short-Term AMCV Health	0.00000
PENTANES	109-66-0	2,620	0.02	821	0.00	0.00	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	2,620	0.32	821	0.03	0.03	NR	NA	NE	
STYRENE	100-42-5	2,620	0.15	821	0.00	0.00	20,000	5,000	ATSDR Acute MRL	0.00000
TETRACHLOROETHYLENE	127-18-4	2,620	0.01	821	0.00	0.00	35,000	6	ATSDR Acute MRL	0.00005
TOLUENE	108-88-3	2,620	1.14	821	0.48	0.47	67,000	2,000	ATSDR Acute MRL	0.00024
TRIMETHYLBENZENES	526-73-8	2,620	0.13	821	0.07	0.07	NR	3,000	TCEQ Short-Term AMCV Health	0.00002
UNDECANES	1120-21-4	2,620	0.02	821	0.00	0.00	NR	550	TCEQ Short-Term AMCV Health	0.00000
XYLENES	1330-20-7	2,620	1.51	821	0.17	0.17	130,000	2,000	ATSDR Acute MRL	0.00008
									Hazard Index	0.02818

NR = "Not recommended due to insufficient data"
NA = "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"

CCND Community Monitoring
2021 Q3

Mobile Laboratory Sampling Risk Scale (Hazard Quotient)
Adams City Neighborhood | September 2, 2021

Analyte	Cas No	Count of 1-second Concentrations (#)	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value	Acute Health Reference Level (ppbv)	Screening Value Source	Hazard Quotient
1,3 BUTADIENE	106-99-0	4,702	12.39	1,103	8.29	7.74	670,000	298	OEHHA Acute REL	0.02780
ACETYLENE	74-86-2	4,702	0.74	1,103	0.13	0.12	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	4,702	1.35	1,103	0.20	0.20	52,000	9	ATSDR Acute MRL	0.02247
BUTANES	106-97-8	4,702	31.38	1,103	2.87	2.79	5,500,000	92,000	TCEQ Short-Term AMCV Health	0.00003
BUTENES	106-98-9	4,702	1.56	1,103	0.36	0.34	NR	27,000	TCEQ Short-Term AMCV Health	0.00001
CARBON DISULFIDE	75-15-0	4,702	0.03	1,103	0.00	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANE	287-92-3	4,702	0.44	1,103	0.02	0.01	NR	5,900	TCEQ Short-Term AMCV Health	0.00000
DECANES	124-18-5	4,702	0.08	1,103	0.04	0.03	NR	1,000	TCEQ Short-Term AMCV Health	0.00004
DIETHYLBENZENES	141-93-5	4,702	0.06	1,103	0.02	0.02	NR	450	TCEQ Short-Term AMCV Health	0.00005
DIMETHYLCYCLOHEXANES	590-66-9	4,702	0.06	1,103	0.02	0.02	NR	NA	NE	
DODECANES	112-40-3	4,702	0.01	1,103	0.00	0.00	NR	NA	NE	
ETHYLENE	74-85-1	4,702	15.85	1,103	7.22	7.11	NR	500,000	TCEQ Short-Term AMCV Health	0.00001
HEPTANES	142-82-5	4,702	0.08	1,103	0.02	0.01	NR	8,300	TCEQ Short-Term AMCV Health	0.00000
HEXANES	110-54-3	4,702	0.09	1,103	0.03	0.03	NR	5,400	TCEQ Short-Term AMCV Health	0.00001
HEXENES	592-41-6	4,702	0.20	1,103	0.08	0.08	NR	500	TCEQ Short-Term AMCV Health	0.00017
HYDROGEN CYANIDE	74-90-8	4,702	0.51	1,103	0.12	0.12	2,000	308	OEHHA Acute REL	0.00040
HYDROGEN SULFIDE	7783-06-4	4,702	0.35	1,103	0.04	0.04	510	70	ATSDR Acute MRL	0.00060
ISOPRENE	78-79-5	4,702	0.37	1,103	0.12	0.11	NR	1,400	TCEQ Short-Term AMCV Health	0.00008
METHANOL	67-56-1	4,702	61.31	1,103	6.20	5.87	530,000	21,366	OEHHA Acute REL	0.00029
METHYLCYCLOHEXANE	108-87-2	4,702	0.04	1,103	0.00	0.00	NR	4,000	TCEQ Short-Term AMCV Health	0.00000
NONANES	111-84-2	4,702	0.03	1,103	0.00	0.00	NR	3,000	TCEQ Short-Term AMCV Health	0.00000
OCTANES	111-65-9	4,702	0.18	1,103	0.04	0.04	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES	109-66-0	4,702	0.02	1,103	0.00	0.00	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	4,702	7.11	1,103	0.03	0.03	NR	NA	NE	
STYRENE	100-42-5	4,702	0.14	1,103	0.05	0.05	20,000	5,000	ATSDR Acute MRL	0.00001
TETRACHLOROETHYLENE	127-18-4	4,702	0.04	1,103	0.01	0.01	35,000	6	ATSDR Acute MRL	0.00116
TOLUENE	108-88-3	4,702	7.53	1,103	0.34	0.30	67,000	2,000	ATSDR Acute MRL	0.00017
TRIMETHYLBENZENES	526-73-8	4,702	0.59	1,103	0.08	0.08	NR	3,000	TCEQ Short-Term AMCV Health	0.00003
UNDECANES	1120-21-4	4,702	0.08	1,103	0.03	0.02	NR	550	TCEQ Short-Term AMCV Health	0.00005
XYLENES	1330-20-7	4,702	4.53	1,103	0.31	0.30	130,000	2,000	ATSDR Acute MRL	0.00015
									Hazard Index	0.05355

NR = "Not recommended due to insufficient data"
NA = "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"

MONTROSE AIR QUALITY SERVICES

Mobile Laboratory Sampling Risk Scale (Hazard Quotient)
Dupont Neighborhood | September 1, 2021

Analyte	Cas No	Count of 1-second Concentrations (#)	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value	Acute Health Reference Level (ppbv)	Screening Value Source	Hazard Quotient
1,3 BUTADIENE	106-99-0	14,713	12.78	7,515	8.73	5.35	670,000	298	OEHHA Acute REL	0.02927
ACETYLENE	74-86-2	14,713	0.85	7,515	0.16	0.10	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	14,713	6.11	7,515	0.26	0.22	52,000	9	ATSDR Acute MRL	0.02861
BUTANES	106-97-8	14,713	17.42	7,515	3.17	2.67	5,500,000	92,000	TCEQ Short-Term AMCV Health	0.00003
BUTENES	106-98-9	14,713	6.31	7,515	0.34	0.26	NR	27,000	TCEQ Short-Term AMCV Health	0.00001
CARBON DISULFIDE	75-15-0	14,713	0.05	7,515	0.01	0.01	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANE	287-92-3	14,713	1.73	7,515	0.19	0.15	NR	5,900	TCEQ Short-Term AMCV Health	0.00003
DECANES	124-18-5	14,713	0.06	7,515	0.01	0.01	NR	1,000	TCEQ Short-Term AMCV Health	0.00001
DIETHYLBENZENES	141-93-5	14,713	0.07	7,515	0.01	0.00	NR	450	TCEQ Short-Term AMCV Health	0.00001
DIMETHYLCYCLOHEXANES	590-66-9	14,713	0.12	7,515	0.01	0.01	NR	NA	NE	
DODECANES	112-40-3	14,713	0.01	7,515	0.00	0.00	NR	NA	NE	
ETHYLENE	74-85-1	14,713	40.57	7,515	8.26	7.30	NR	500,000	TCEQ Short-Term AMCV Health	0.00002
HEPTANES	142-82-5	14,713	0.14	7,515	0.05	0.04	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES	110-54-3	14,713	0.11	7,515	0.05	0.04	NR	5,400	TCEQ Short-Term AMCV Health	0.00001
HEXENES	592-41-6	14,713	1.02	7,515	0.05	0.04	NR	500	TCEQ Short-Term AMCV Health	0.00010
HYDROGEN CYANIDE	74-90-8	14,713	0.71	7,515	0.13	0.12	2,000	308	OEHHA Acute REL	0.00043
HYDROGEN SULFIDE	7783-06-4	14,713	0.64	7,515	0.16	0.13	510	70	ATSDR Acute MRL	0.00232
ISOPRENE	78-79-5	14,713	1.01	7,515	0.16	0.13	NR	1,400	TCEQ Short-Term AMCV Health	0.00012
METHANOL	67-56-1	14,713	73.81	7,515	11.51	10.31	530,000	21,366	OEHHA Acute REL	0.00054
METHYLCYCLOHEXANE	108-87-2	14,713	0.28	7,515	0.03	0.03	NR	4,000	TCEQ Short-Term AMCV Health	0.00001
NONANES	111-84-2	14,713	0.06	7,515	0.01	0.01	NR	3,000	TCEQ Short-Term AMCV Health	0.00000
OCTANES	111-65-9	14,713	1.20	7,515	0.04	0.03	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES	109-66-0	14,713	0.08	7,515	0.00	0.00	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	14,713	1.37	7,515	0.13	0.10	NR	NA	NE	
STYRENE	100-42-5	14,713	0.16	7,515	0.02	0.01	20,000	5,000	ATSDR Acute MRL	0.00000
TETRACHLOROETHYLENE	127-18-4	14,713	0.05	7,515	0.01	0.01	35,000	6	ATSDR Acute MRL	0.00218
TOLUENE	108-88-3	14,713	27.41	7,515	0.64	0.45	67,000	2,000	ATSDR Acute MRL	0.00032
TRIMETHYLBENZENES	526-73-8	14,713	1.29	7,515	0.03	0.01	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
UNDECANES	1120-21-4	14,713	0.05	7,515	0.01	0.00	NR	550	TCEQ Short-Term AMCV Health	0.00001
XYLENES	1330-20-7	14,713	14.83	7,515	0.34	0.23	130,000	2,000	ATSDR Acute MRL	0.00017
									Hazard Index	0.06425

NR = "Not recommended due to insufficient data"
NA = "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"

CCND Community Monitoring
2021 Q3

Mobile Laboratory Sampling Risk Scale (Hazard Quotient)
Globeville Neighborhood | August 31, 2021

Analyte	Cas No	Count of 1-second Concentrations (#)	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value	Acute Health Reference Level (ppbv)	Screening Value Source	Hazard Quotient
1,3 BUTADIENE	106-99-0	6,445	7.28	2,846	4.63	4.52	670,000	298	OEHHA Acute REL	0.01550
ACETYLENE	74-86-2	6,445	0.76	2,846	0.14	0.13	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	6,445	1.72	2,846	0.38	0.29	52,000	9	ATSDR Acute MRL	0.04268
BUTANES	106-97-8	6,445	45.81	2,846	6.63	4.42	5,500,000	92,000	TCEQ Short-Term AMCV Health	0.00007
BUTENES	106-98-9	6,445	4.09	2,846	0.53	0.38	NR	27,000	TCEQ Short-Term AMCV Health	0.00002
CARBON DISULFIDE	75-15-0	6,445	0.05	2,846	0.01	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANE	287-92-3	6,445	1.50	2,846	0.32	0.30	NR	5,900	TCEQ Short-Term AMCV Health	0.00005
DECANES	124-18-5	6,445	0.05	2,846	0.01	0.01	NR	1,000	TCEQ Short-Term AMCV Health	0.00001
DIETHYLBENZENES	141-93-5	6,445	0.09	2,846	0.02	0.02	NR	450	TCEQ Short-Term AMCV Health	0.00005
DIMETHYLCYCLOHEXANES	590-66-9	6,445	0.06	2,846	0.01	0.01	NR	NA	NE	
DODECANES	112-40-3	6,445	0.01	2,846	0.00	0.00	NR	NA	NE	
ETHYLENE	74-85-1	6,445	22.43	2,846	11.60	10.53	NR	500,000	TCEQ Short-Term AMCV Health	0.00002
HEPTANES	142-82-5	6,445	0.07	2,846	0.02	0.01	NR	8,300	TCEQ Short-Term AMCV Health	0.00000
HEXANES	110-54-3	6,445	0.11	2,846	0.04	0.03	NR	5,400	TCEQ Short-Term AMCV Health	0.00001
HEXENES	592-41-6	6,445	0.33	2,846	0.06	0.05	NR	500	TCEQ Short-Term AMCV Health	0.00013
HYDROGEN CYANIDE	74-90-8	6,445	0.64	2,846	0.12	0.08	2,000	308	OEHHA Acute REL	0.00040
HYDROGEN SULFIDE	7783-06-4	6,445	0.30	2,846	0.02	0.01	510	70	ATSDR Acute MRL	0.00026
ISOPRENE	78-79-5	6,445	0.94	2,846	0.31	0.27	NR	1,400	TCEQ Short-Term AMCV Health	0.00022
METHANOL	67-56-1	6,445	50.60	2,846	9.42	9.00	530,000	21,366	OEHHA Acute REL	0.00044
METHYLCYCLOHEXANE	108-87-2	6,445	0.13	2,846	0.03	0.03	NR	4,000	TCEQ Short-Term AMCV Health	0.00001
NONANES	111-84-2	6,445	0.04	2,846	0.01	0.01	NR	3,000	TCEQ Short-Term AMCV Health	0.00000
OCTANES	111-65-9	6,445	0.17	2,846	0.04	0.03	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES	109-66-0	6,445	0.03	2,846	0.00	0.00	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	6,445	0.88	2,846	0.22	0.17	NR	NA	NE	
STYRENE	100-42-5	6,445	0.34	2,846	0.04	0.02	20,000	5,000	ATSDR Acute MRL	0.00001
TETRACHLOROETHYLENE	127-18-4	6,445	0.05	2,846	0.01	0.01	35,000	6	ATSDR Acute MRL	0.00195
TOLUENE	108-88-3	6,445	52.14	2,846	6.31	3.55	67,000	2,000	ATSDR Acute MRL	0.00316
TRIMETHYLBENZENES	526-73-8	6,445	0.56	2,846	0.30	0.28	NR	3,000	TCEQ Short-Term AMCV Health	0.00010
UNDECANES	1120-21-4	6,445	0.04	2,846	0.01	0.01	NR	550	TCEQ Short-Term AMCV Health	0.00002
XYLENES	1330-20-7	6,445	6.68	2,846	1.32	0.82	130,000	2,000	ATSDR Acute MRL	0.00066
									Hazard Index	0.06579

NR = "Not recommended due to insufficient data"
NA = "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"

MONTROSE AIR QUALITY SERVICES

CCND Community Monitoring
2021 Q3

Mobile Laboratory Sampling Risk Scale (Hazard Quotient)
Pioneer Park Neighborhood | September 3, 2021

Analyte	Cas No	Count of 1-second Concentrations (#)	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value	Acute Health Reference Level (ppbv)	Screening Value Source	Hazard Quotient
1,3 BUTADIENE	106-99-0	16,725	20.06	9,527	12.46	9.69	670,000	298	OEHHA Acute REL	0.04176
ACETYLENE	74-86-2	16,725	0.94	9,527	0.26	0.22	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	16,725	7.10	9,527	0.32	0.18	52,000	9	ATSDR Acute MRL	0.03572
BUTANES	106-97-8	16,725	64.56	9,527	2.56	2.25	5,500,000	92,000	TCEQ Short-Term AMCV Health	0.00003
BUTENES	106-98-9	16,725	9.32	9,527	0.47	0.38	NR	27,000	TCEQ Short-Term AMCV Health	0.00002
CARBON DISULFIDE	75-15-0	16,725	0.05	9,527	0.01	0.01	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANE	287-92-3	16,725	2.90	9,527	0.20	0.15	NR	5,900	TCEQ Short-Term AMCV Health	0.00003
DECANES	124-18-5	16,725	0.08	9,527	0.03	0.02	NR	1,000	TCEQ Short-Term AMCV Health	0.00003
DIETHYLBENZENES	141-93-5	16,725	0.09	9,527	0.02	0.02	NR	450	TCEQ Short-Term AMCV Health	0.00005
DIMETHYLCYCLOHEXANES	590-66-9	16,725	0.28	9,527	0.01	0.01	NR	NA	NE	
DODECANES	112-40-3	16,725	0.01	9,527	0.00	0.00	NR	NA	NE	
ETHYLENE	74-85-1	16,725	40.87	9,527	8.61	7.44	NR	500,000	TCEQ Short-Term AMCV Health	0.00002
HEPTANES	142-82-5	16,725	0.17	9,527	0.06	0.05	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES	110-54-3	16,725	0.21	9,527	0.04	0.03	NR	5,400	TCEQ Short-Term AMCV Health	0.00001
HEXENES	592-41-6	16,725	1.04	9,527	0.06	0.04	NR	500	TCEQ Short-Term AMCV Health	0.00011
HYDROGEN CYANIDE	74-90-8	16,725	0.61	9,527	0.22	0.16	2,000	308	OEHHA Acute REL	0.00072
HYDROGEN SULFIDE	7783-06-4	16,725	0.82	9,527	0.30	0.26	510	70	ATSDR Acute MRL	0.00435
ISOPRENE	78-79-5	16,725	1.86	9,527	0.24	0.19	NR	1,400	TCEQ Short-Term AMCV Health	0.00017
METHANOL	67-56-1	16,725	170.30	9,527	11.42	8.71	530,000	21,366	OEHHA Acute REL	0.00053
METHYLCYCLOHEXANE	108-87-2	16,725	0.28	9,527	0.04	0.03	NR	4,000	TCEQ Short-Term AMCV Health	0.00001
NONANES	111-84-2	16,725	0.05	9,527	0.02	0.01	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
OCTANES	111-65-9	16,725	0.10	9,527	0.04	0.03	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES	109-66-0	16,725	0.06	9,527	0.00	0.00	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	16,725	2.29	9,527	0.15	0.12	NR	NA	NE	
STYRENE	100-42-5	16,725	180.46	9,527	1.57	0.20	20,000	5,000	ATSDR Acute MRL	0.00031
TETRACHLOROETHYLENE	127-18-4	16,725	0.06	9,527	0.02	0.01	35,000	6	ATSDR Acute MRL	0.00331
TOLUENE	108-88-3	16,725	38.37	9,527	0.71	0.49	67,000	2,000	ATSDR Acute MRL	0.00036
TRIMETHYLBENZENES	526-73-8	16,725	2.15	9,527	0.07	0.04	NR	3,000	TCEQ Short-Term AMCV Health	0.00002
UNDECANES	1120-21-4	16,725	0.07	9,527	0.03	0.02	NR	550	TCEQ Short-Term AMCV Health	0.00006
XYLENES	1330-20-7	16,725	31.00	9,527	0.52	0.22	130,000	2,000	ATSDR Acute MRL	0.00026
									Hazard Index	0.08794

NR = "Not recommended due to insufficient data"
NA = "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"

CCND Community Monitoring
2021 Q3

Mobile Laboratory Sampling Risk Scale (Hazard Quotient)
Swansea Neighborhood | August 31, 2021

Analyte	Cas No	Count of 1-second Concentrations (#)	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value	Acute Health Reference Level (ppbv)	Screening Value Source	Hazard Quotient
1,3 BUTADIENE	106-99-0	9,242	6.40	2,295	3.42	2.73	670,000	298	OEHHA Acute REL	0.01146
ACETYLENE	74-86-2	9,242	0.72	2,295	0.10	0.08	NR	25,000	TCEQ Short-Term AMCV Health	0.00000
BENZENE	71-43-2	9,242	1.54	2,295	0.26	0.23	52,000	9	ATSDR Acute MRL	0.02878
BUTANES	106-97-8	9,242	165.40	2,295	1.36	1.07	5,500,000	92,000	TCEQ Short-Term AMCV Health	0.00001
BUTENES	106-98-9	9,242	2.64	2,295	0.23	0.18	NR	27,000	TCEQ Short-Term AMCV Health	0.00001
CARBON DISULFIDE	75-15-0	9,242	0.04	2,295	0.00	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANE	287-92-3	9,242	1.16	2,295	0.30	0.21	NR	5,900	TCEQ Short-Term AMCV Health	0.00005
DECANES	124-18-5	9,242	0.05	2,295	0.01	0.01	NR	1,000	TCEQ Short-Term AMCV Health	0.00001
DIETHYLBENZENES	141-93-5	9,242	0.06	2,295	0.01	0.01	NR	450	TCEQ Short-Term AMCV Health	0.00002
DIMETHYLCYCLOHEXANES	590-66-9	9,242	0.05	2,295	0.00	0.00	NR	NA	NE	
DODECANES	112-40-3	9,242	0.01	2,295	0.00	0.00	NR	NA	NE	
ETHYLENE	74-85-1	9,242	22.13	2,295	10.19	9.08	NR	500,000	TCEQ Short-Term AMCV Health	0.00002
HEPTANES	142-82-5	9,242	0.14	2,295	0.01	0.01	NR	8,300	TCEQ Short-Term AMCV Health	0.00000
HEXANES	110-54-3	9,242	0.08	2,295	0.01	0.01	NR	5,400	TCEQ Short-Term AMCV Health	0.00000
HEXENES	592-41-6	9,242	0.28	2,295	0.03	0.02	NR	500	TCEQ Short-Term AMCV Health	0.00005
HYDROGEN CYANIDE	74-90-8	9,242	4.01	2,295	0.14	0.12	2,000	308	OEHHA Acute REL	0.00046
HYDROGEN SULFIDE	7783-06-4	9,242	2.50	2,295	0.01	0.01	510	70	ATSDR Acute MRL	0.00020
ISOPRENE	78-79-5	9,242	0.77	2,295	0.16	0.13	NR	1,400	TCEQ Short-Term AMCV Health	0.00011
METHANOL	67-56-1	9,242	702.66	2,295	11.62	10.26	530,000	21,366	OEHHA Acute REL	0.00054
METHYLCYCLOHEXANE	108-87-2	9,242	0.08	2,295	0.02	0.01	NR	4,000	TCEQ Short-Term AMCV Health	0.00000
NONANES	111-84-2	9,242	0.03	2,295	0.01	0.01	NR	3,000	TCEQ Short-Term AMCV Health	0.00000
OCTANES	111-65-9	9,242	0.07	2,295	0.02	0.01	NR	4,100	TCEQ Short-Term AMCV Health	0.00000
PENTANES	109-66-0	9,242	0.03	2,295	0.00	0.00	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	9,242	1.62	2,295	0.09	0.08	NR	NA	NE	
STYRENE	100-42-5	9,242	0.09	2,295	0.01	0.00	20,000	5,000	ATSDR Acute MRL	0.00000
TETRACHLOROETHYLENE	127-18-4	9,242	0.03	2,295	0.01	0.01	35,000	6	ATSDR Acute MRL	0.00153
TOLUENE	108-88-3	9,242	20.77	2,295	0.71	0.61	67,000	2,000	ATSDR Acute MRL	0.00036
TRIMETHYLBENZENES	526-73-8	9,242	0.35	2,295	0.06	0.03	NR	3,000	TCEQ Short-Term AMCV Health	0.00002
UNDECANES	1120-21-4	9,242	0.04	2,295	0.01	0.01	NR	550	TCEQ Short-Term AMCV Health	0.00002
XYLENES	1330-20-7	9,242	4.21	2,295	0.09	0.04	130,000	2,000	ATSDR Acute MRL	0.00004
									Hazard Index	0.04373

NR = "Not recommended due to insufficient data"
NA = "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"

Mobile Laboratory Sampling Risk Scale (Hazard Quotient)
Western Hills Neighborhood | August 30, 2021

Analyte	Cas No	Count of 1-second Concentrations (#)	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Maximum 1-hr Rolling Average (ppbv)	Average 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value	Acute Health Reference Level (ppbv)	Screening Value Source	Hazard Quotient
1,3 BUTADIENE	106-99-0	5,693	12.91	2,095	7.47	4.23	670,000	298	OEHHA Acute REL	0.02505
ACETYLENE	74-86-2	5,693	0.50	2,095	0.12	0.05	NR	25,000	TCEQ Short-Term AMCV Health	0.00000
BENZENE	71-43-2	5,693	8.83	2,095	0.28	0.15	52,000	9	ATSDR Acute MRL	0.03083
BUTANES	106-97-8	5,693	18.21	2,095	3.59	2.22	5,500,000	92,000	TCEQ Short-Term AMCV Health	0.00004
BUTENES	106-98-9	5,693	7.46	2,095	0.40	0.19	NR	27,000	TCEQ Short-Term AMCV Health	0.00001
CARBON DISULFIDE	75-15-0	5,693	0.33	2,095	0.01	0.01	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANE	287-92-3	5,693	1.42	2,095	0.27	0.16	NR	5,900	TCEQ Short-Term AMCV Health	0.00005
DECANES	124-18-5	5,693	0.26	2,095	0.01	0.00	NR	1,000	TCEQ Short-Term AMCV Health	0.00001
DIETHYLBENZENES	141-93-5	5,693	0.61	2,095	0.01	0.00	NR	450	TCEQ Short-Term AMCV Health	0.00002
DIMETHYLCYCLOHEXANES	590-66-9	5,693	0.06	2,095	0.01	0.01	NR	NA	NE	
DODECANES	112-40-3	5,693	0.00	2,095	0.00	0.00	NR	NA	NE	
ETHYLENE	74-85-1	5,693	95.61	2,095	11.12	8.86	NR	500,000	TCEQ Short-Term AMCV Health	0.00002
HEPTANES	142-82-5	5,693	0.11	2,095	0.03	0.02	NR	8,300	TCEQ Short-Term AMCV Health	0.00000
HEXANES	110-54-3	5,693	0.14	2,095	0.03	0.02	NR	5,400	TCEQ Short-Term AMCV Health	0.00001
HEXENES	592-41-6	5,693	0.49	2,095	0.05	0.02	NR	500	TCEQ Short-Term AMCV Health	0.00009
HYDROGEN CYANIDE	74-90-8	5,693	0.76	2,095	0.37	0.25	2,000	308	OEHHA Acute REL	0.00121
HYDROGEN SULFIDE	7783-06-4	5,693	0.51	2,095	0.07	0.03	510	70	ATSDR Acute MRL	0.00105
ISOPRENE	78-79-5	5,693	1.49	2,095	0.18	0.12	NR	1,400	TCEQ Short-Term AMCV Health	0.00013
METHANOL	67-56-1	5,693	74.32	2,095	8.96	7.54	530,000	21,366	OEHHA Acute REL	0.00042
METHYLCYCLOHEXANE	108-87-2	5,693	0.13	2,095	0.03	0.02	NR	4,000	TCEQ Short-Term AMCV Health	0.00001
NONANES	111-84-2	5,693	0.13	2,095	0.01	0.01	NR	3,000	TCEQ Short-Term AMCV Health	0.00000
OCTANES	111-65-9	5,693	0.12	2,095	0.05	0.02	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES	109-66-0	5,693	0.23	2,095	0.00	0.00	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	5,693	2.56	2,095	0.16	0.09	NR	NA	NE	
STYRENE	100-42-5	5,693	0.30	2,095	0.00	0.00	20,000	5,000	ATSDR Acute MRL	0.00000
TETRACHLOROETHYLENE	127-18-4	5,693	0.02	2,095	0.01	0.00	35,000	6	ATSDR Acute MRL	0.00088
TOLUENE	108-88-3	5,693	20.29	2,095	1.15	0.52	67,000	2,000	ATSDR Acute MRL	0.00057
TRIMETHYLBENZENES	526-73-8	5,693	5.61	2,095	0.08	0.03	NR	3,000	TCEQ Short-Term AMCV Health	0.00003
UNDECANES	1120-21-4	5,693	0.03	2,095	0.01	0.00	NR	550	TCEQ Short-Term AMCV Health	0.00001
XYLENES	1330-20-7	5,693	12.43	2,095	0.39	0.14	130,000	2,000	ATSDR Acute MRL	0.00019
									Hazard Index	0.06065

NR = "Not recommended due to insufficient data"
NA = "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"

APPENDIX D
CALIBRATION AND QA/QC DATA

Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Instrument Calibration Response (ppb v)	Difference (% of value)	Pass/Fail
8/30/2021	12:17	Benzene	25	26	4.0	Pass
		Toluene	25	24.5	-2.0	Pass
		Xylenes	50	44.4	-11.2	Pass
		HCN	10	8.9	-11.0	Pass
	16:36	Benzene	125	124	-0.8	Pass
		Toluene	125	120	-4	Pass
		Xylenes	250	246	-1.6	Pass
	16:57	Benzene	5	5.17	3.4	Pass
		Toluene	5	5.03	0.6	Pass
		Xylenes	10	10.5	5.0	Pass
		HCN	5	5.27	5.4	Pass

Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Instrument Calibration Response (ppb v)	Difference (% of value)	Pass/Fail
8/31/2021	7:34	Benzene	50	51.5	3.0	Pass
		Toluene	50	49.9	-0.2	Pass
		Xylenes	100	99.6	-0.4	Pass
	8:15	HCN	100	98.7	-1.3	Pass
			5	5.17	3.4	Pass
	8:43	Ethylene	10	11.2	12.0	Pass
		Propylene	10	9.2	-8.0	Pass
		1-Butene	10	10.7	7.0	Pass
		1-Pentene	10	8.9	-11.0	Pass
		1-Hexene	10	9.3	-7.0	Pass
		1,3-Butadiene	10	9.8	-2.0	Pass
	15:01	Benzene	50	50.7	1.4	Pass
		Toluene	50	48.5	-3.0	Pass
		Xylenes	100	96.2	-3.8	Pass
	15:16	HCN	5	4.87	-2.6	Pass
	15:31	Propane	50	53.7	7.4	Pass
		Butane	50	47.8	-4.4	Pass
		Pentane	50	55.9	11.8	Pass
		Hexane	50	44.8	-10.4	Pass
		Heptane	50	42.9	-14.2	Pass
	15:39	Propane	5	5.9	18.0	Pass
		Butane	5	4.2	-16.0	Pass
		Pentane	5	4.7	-6.0	Pass
		Hexane	5	4.1	-18.0	Pass
		Heptane	5	5.6	12.0	Pass

Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Instrument Calibration Response (ppb v)	Difference (% of value)	Pass/Fail
9/1/2021	7:49	Ethylene	10	11.8	18.0	Pass
		Propylene	10	10.3	3.0	Pass
		1-Butene	10	11.9	19.0	Pass
		1-Pentene	10	10.6	6.0	Pass
		1-Hexene	10	9.4	-6.0	Pass
		1,3-Butadiene	10	10.2	2.0	Pass
	8:08	Benzene	50	50.6	1.2	Pass
		Toluene	50	56.8	13.6	Pass
		Xylenes	100	94.8	-5.2	Pass
	8:21	Benzene	2.5	2.4	-4.0	Pass
		Toluene	2.5	2.3	-8.0	Pass
		Xylenes	5	4.7	-6.0	Pass
	8:49	HCN	10	10.54	5.4	Pass
	8:55		2	1.8	-10.0	Pass
	14:56	HCN	10	9.7	-3.0	Pass
	15:06	Propane	10	9.85	-1.5	Pass
		Butane	10	11.4	14.0	Pass
		Pentane	10	8.95	-10.5	Pass
		Hexane	10	9.05	-9.5	Pass
		Heptane	10	10.2	2.0	Pass
	15:27	Benzene	50	50.1	0.2	Pass
		Toluene	50	49.8	-0.4	Pass
		Xylenes	100	98.9	-1.1	Pass

Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Instrument Calibration Response (ppb v)	Difference (% of value)	Pass/Fail
9/2/2021	8:13	Benzene	50	49.7	-0.6	Pass
		Toluene	50	48.9	-2.2	Pass
		Xylenes	100	98.4	-1.6	Pass
	8:17	HCN	50	50.2	0.4	Pass
	8:22	Ethylene	50	57.6	15.2	Pass
		Propylene	50	49.5	-1.0	Pass
		1-Butene	50	48.4	-3.2	Pass
		1-Pentene	50	49.2	-1.6	Pass
		1-Hexene	50	51.5	3.0	Pass
		1,3-Butadiene	50	50.4	0.8	Pass
	No Post Checks					

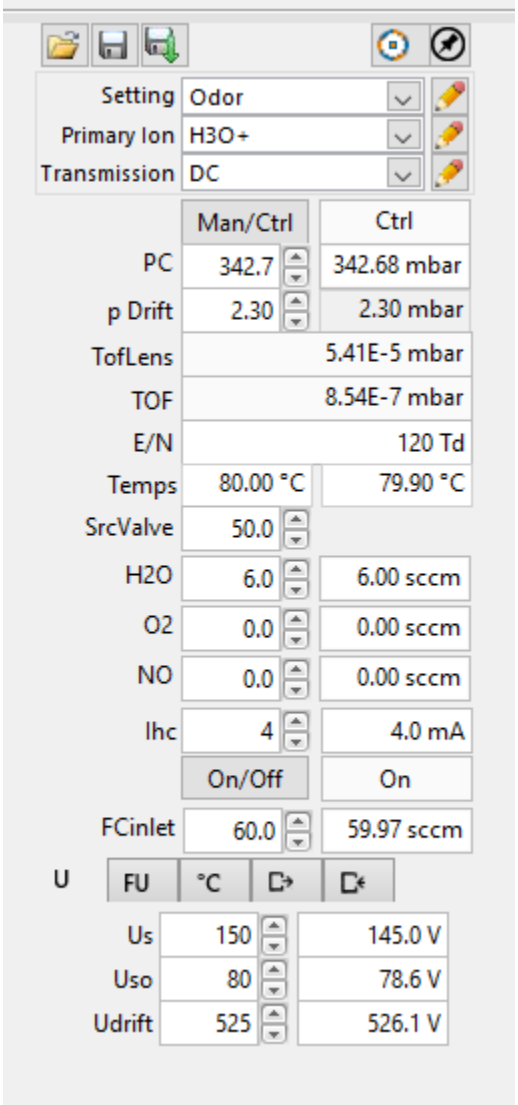
Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Instrument Calibration Response (ppb v)	Difference (% of value)	Pass/Fail
9/3/2021	7:49	Benzene	50	49.8	-0.4	Pass
		Toluene	50	48.5	-3.0	Pass
		Xylenes	100	95.9	-4.1	Pass
	7:56	HCN	50	49.8	-0.4	Pass
	8:02	Ethylene	50	44.8	-10.4	Pass
		Propylene	50	49.6	-0.8	Pass
		1-Butene	50	48.3	-3.4	Pass
		1-Pentene	50	51.4	2.8	Pass
		1-Hexene	50	49	-2.0	Pass
		1,3-Butadiene	50	53.7	7.4	Pass
	17:52	Benzene	50	50.1	0.2	Pass
		Toluene	50	46.5	-7.0	Pass
		Xylenes	100	93.0	-7.0	Pass
	18:02	HCN	50	51.9	3.8	Pass

Suncor Refining

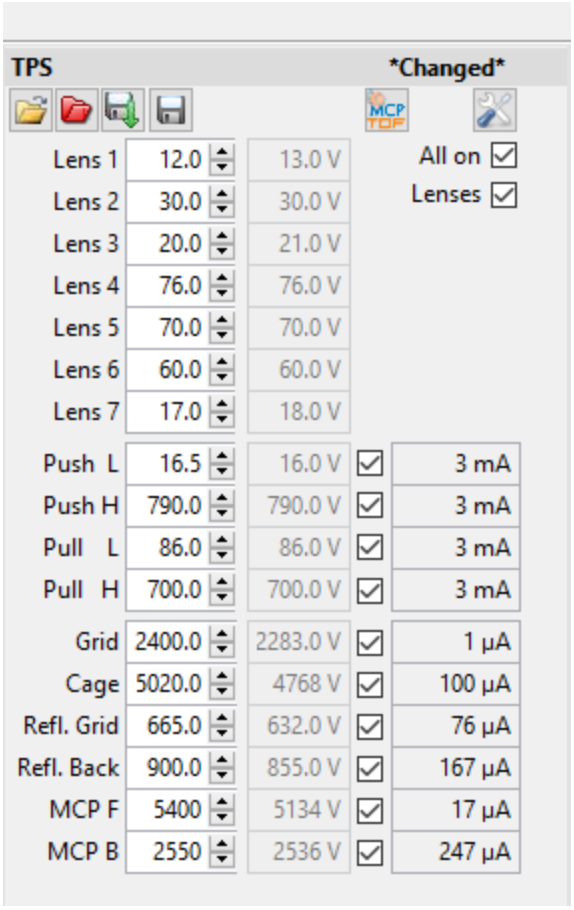
Mode Calibrations

“Odor Profile”

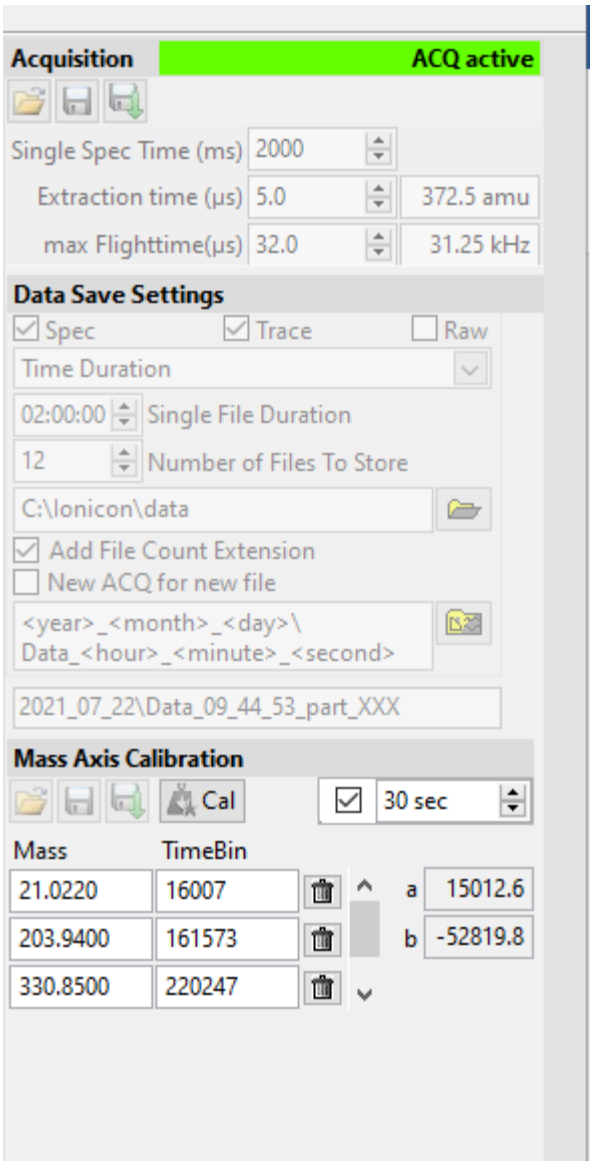
PTR Parameters



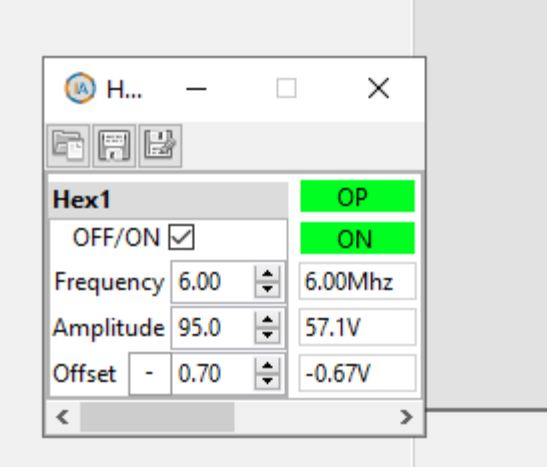
Ion Production Settings



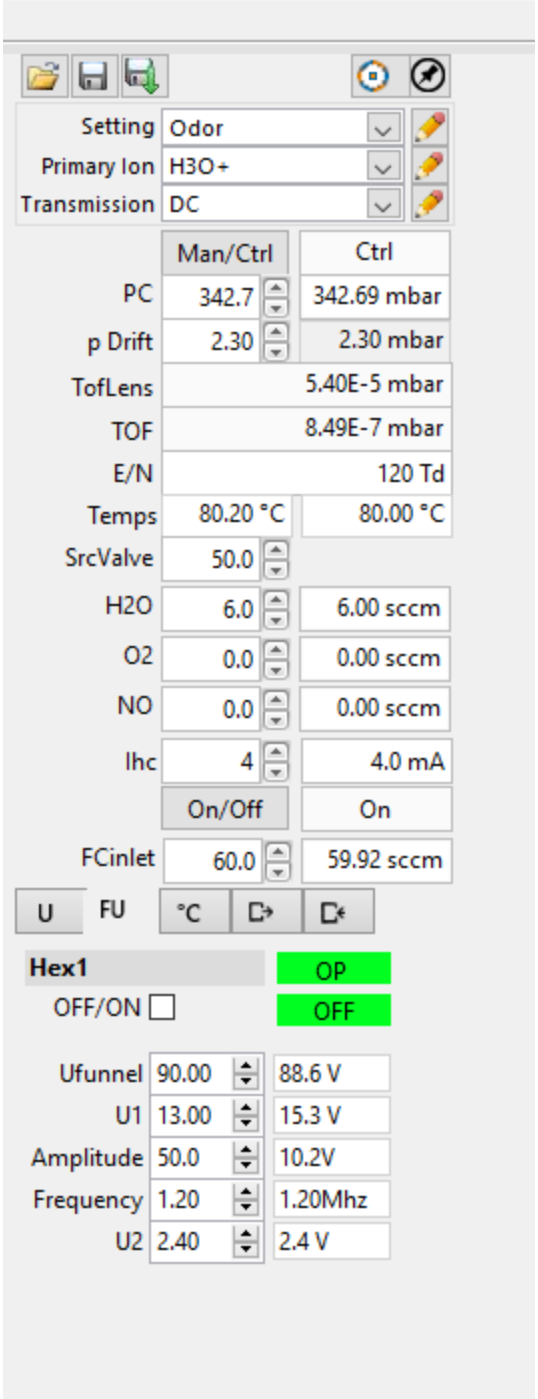
Lens Settings



Acquisition Settings



Hex Settings

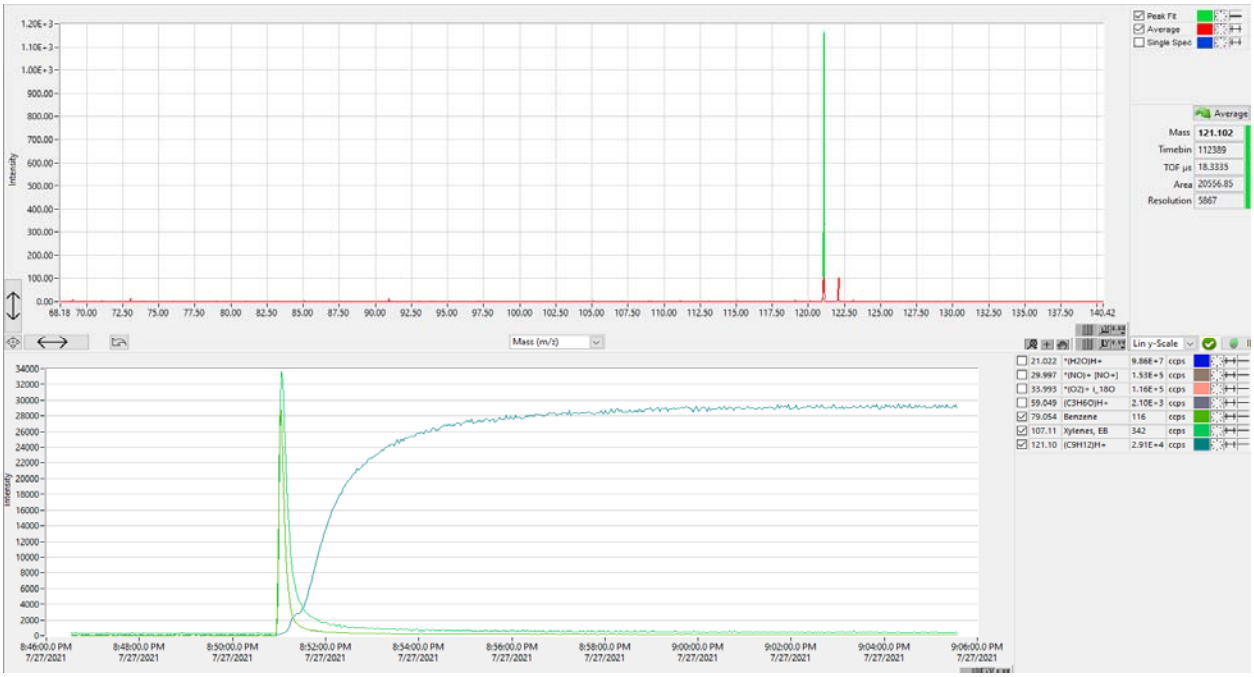


Funnel Settings

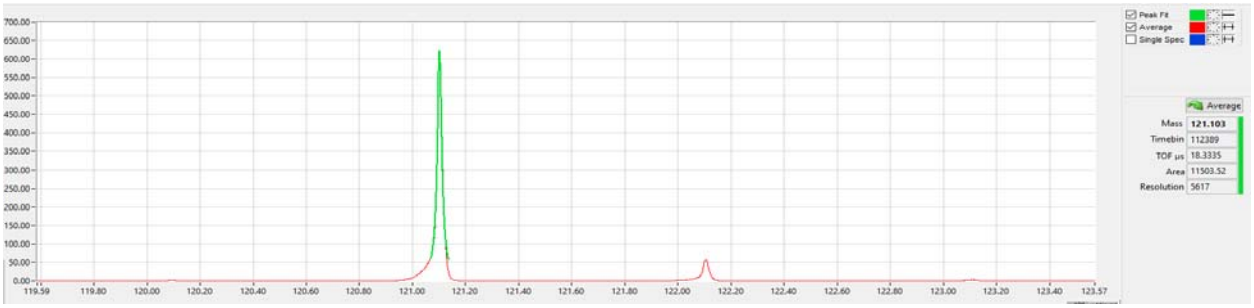
Calibrations 1,2,4 Trimethylbenzene

1.070 ppm

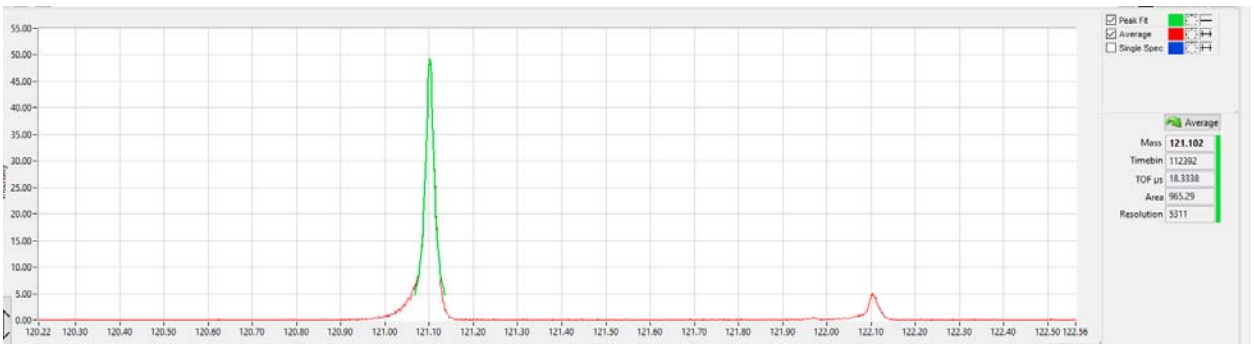
Zero and 100 ppb cal. Notice there are no fragmentations to form Benzene or Xylenes



100 ppb and Zero, with benzene and xylene

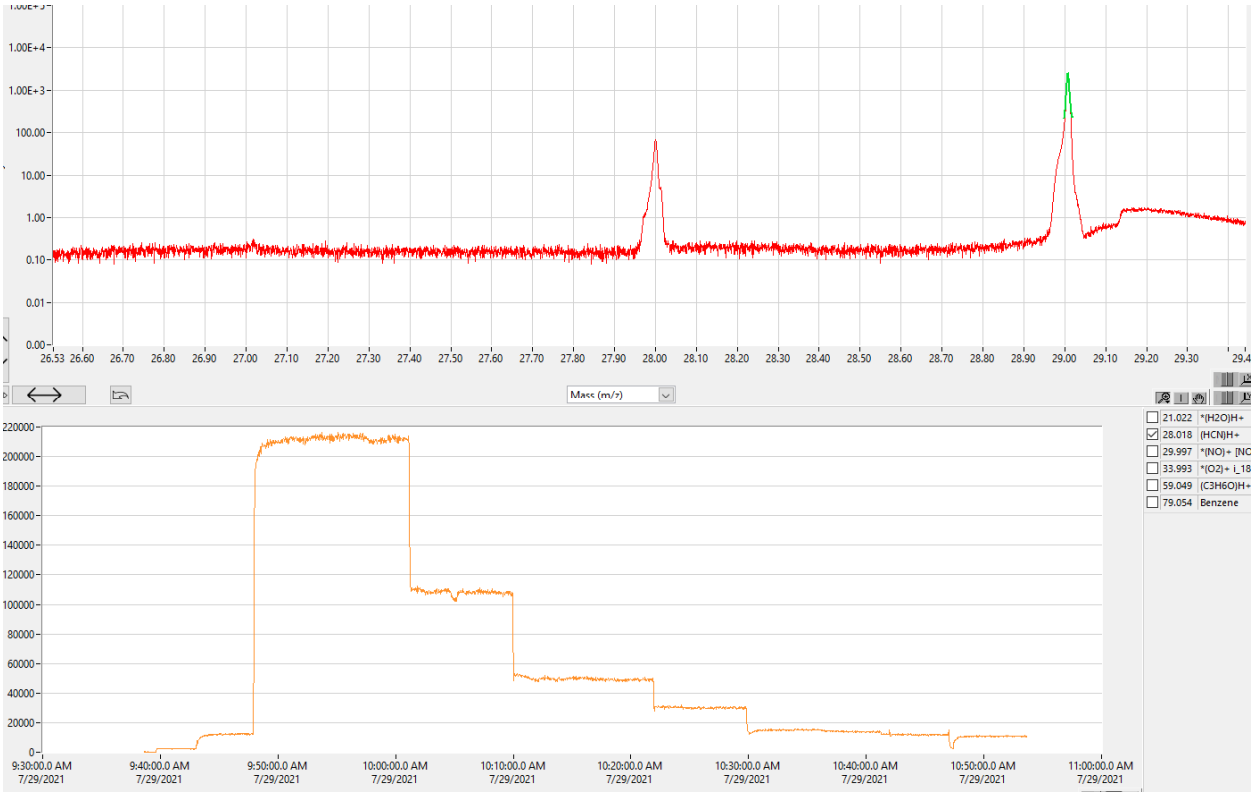


Linear mass scale, 50 ppb

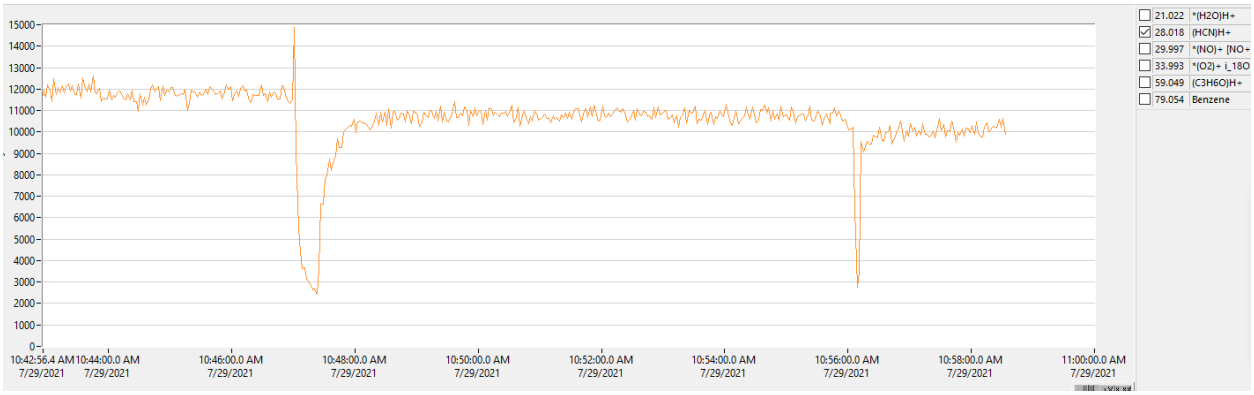


5 ppb cal

7-29-21 HCN calibrations



500, 250, 100, 50, 10, 5, 2 ppb HCN results. Top peak is the response for 2 ppb HCN at mass 28.02.

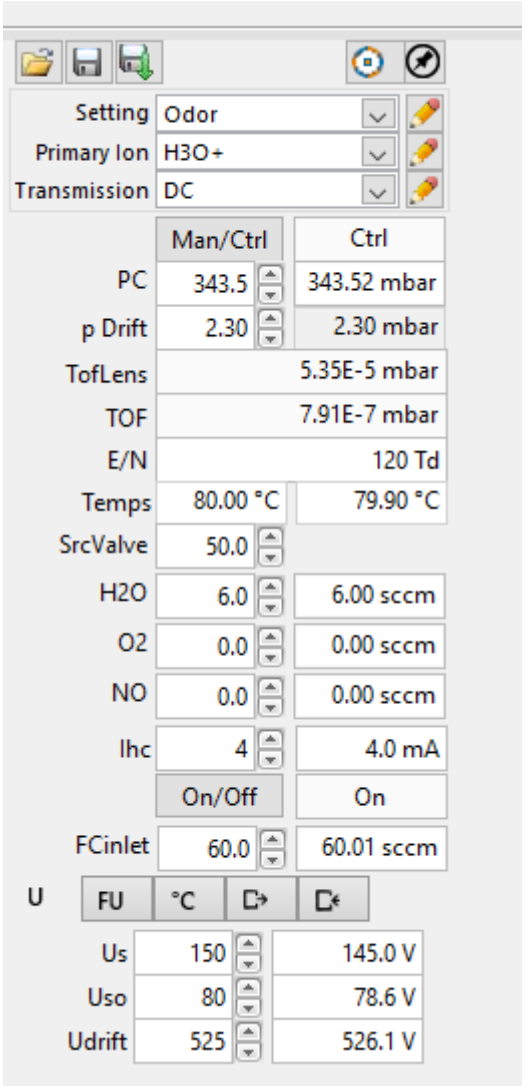


5, 2, and 0 ppb blow up of counts

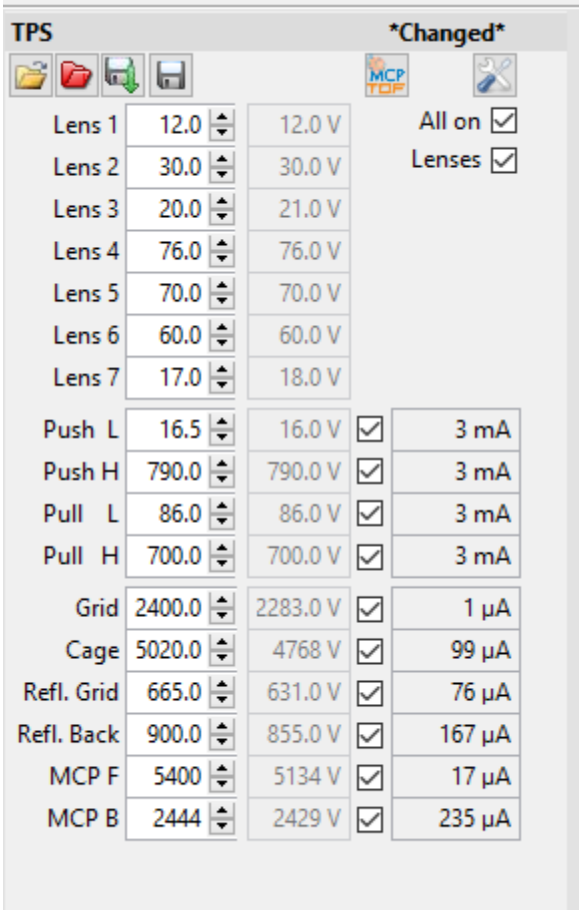
8-8-21 Benzene, Toluene, Ethyl Benzene, p-Xylene Calibration

Cylinder

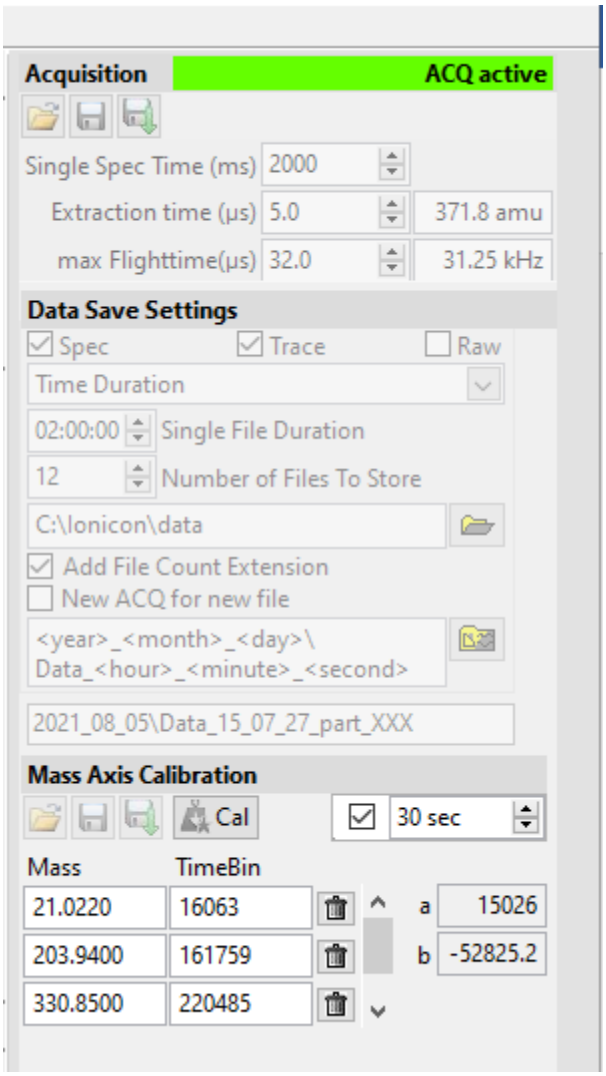
Operating Parameters



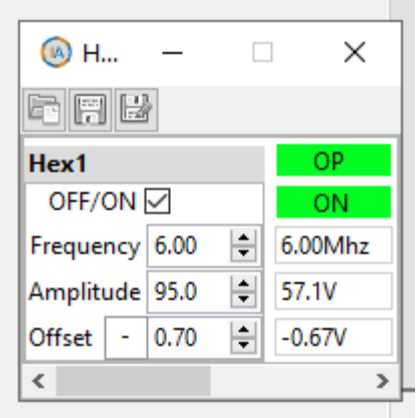
Production Settings



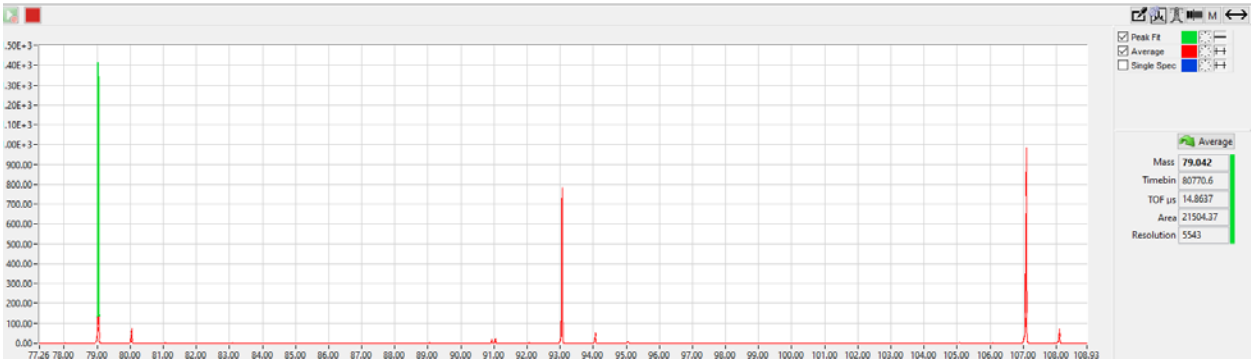
TOF Voltages



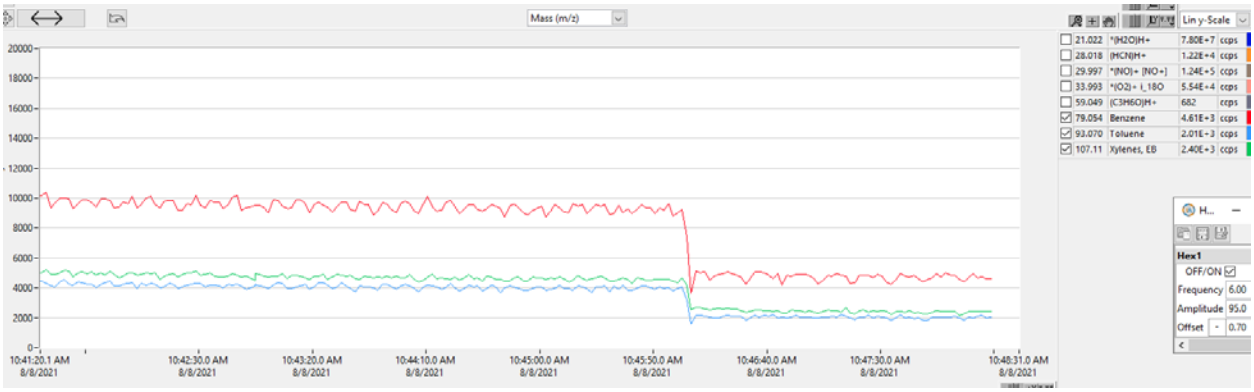
Acquisition Settings



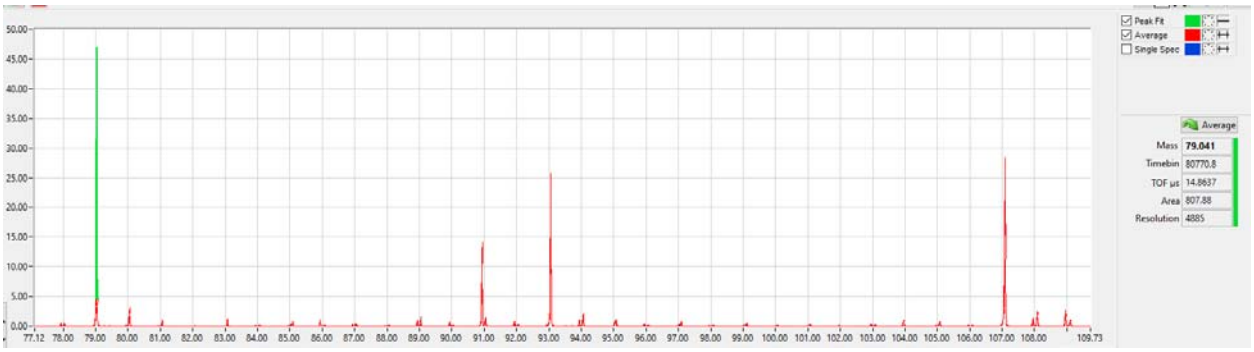
Hex Settings



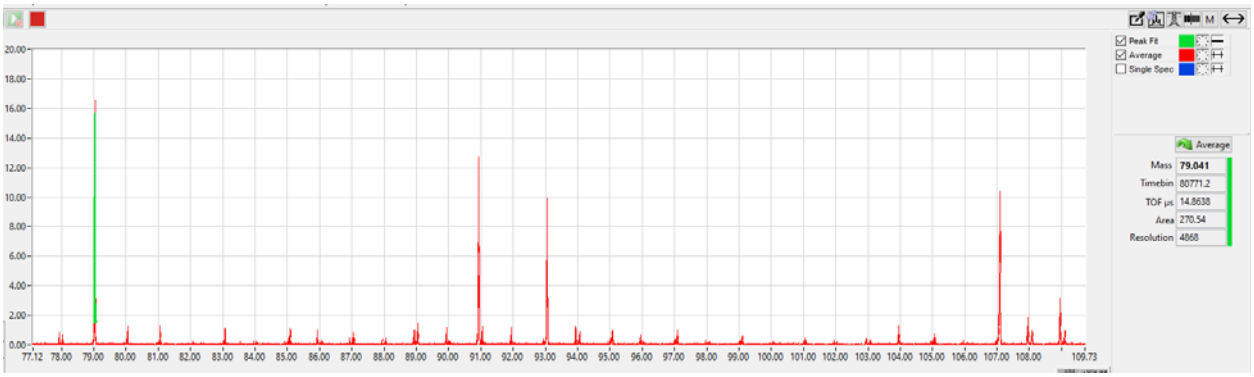
BTEpX linear scale



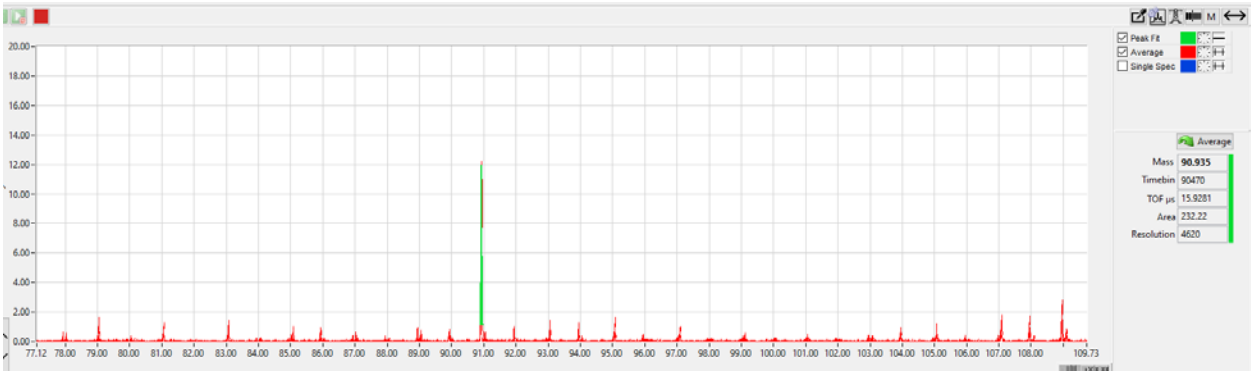
5 ppb area counts expanded



5 ppb linear

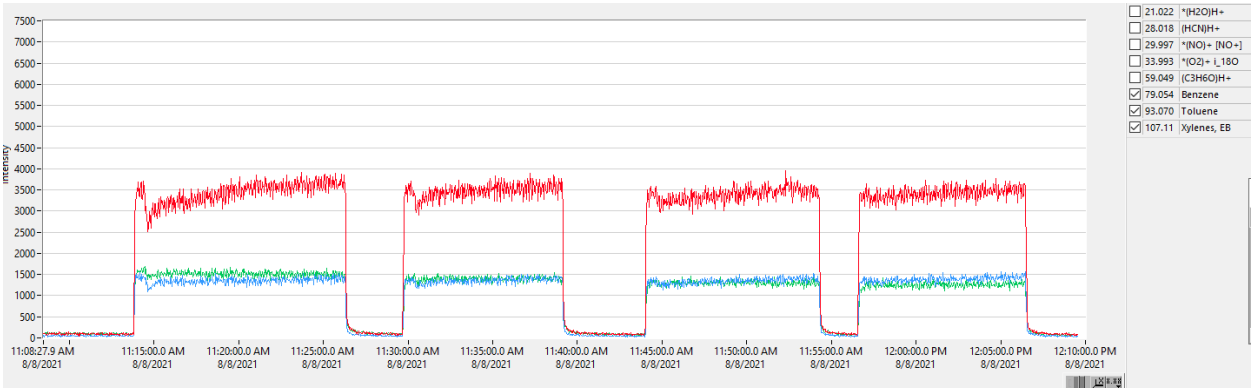


2 ppb linear signal



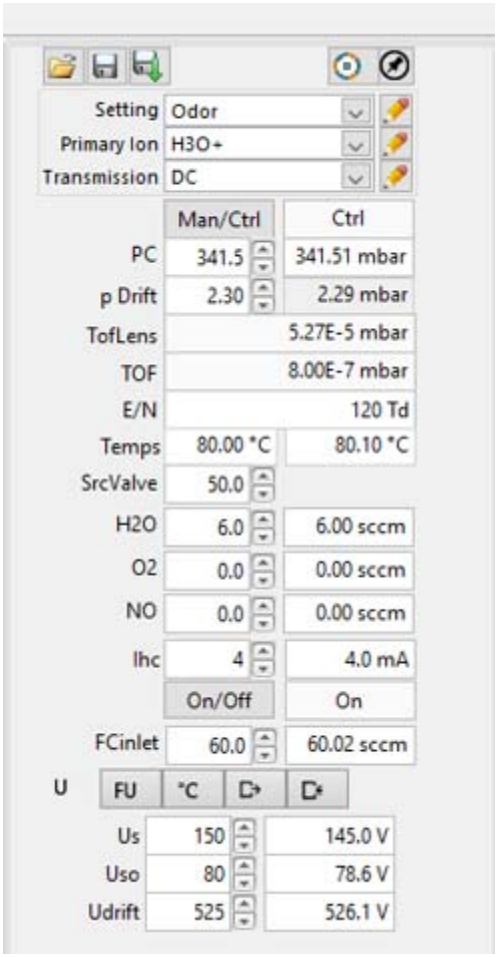
0 ppb Linear Signal

5 ppb Detection Limit testing

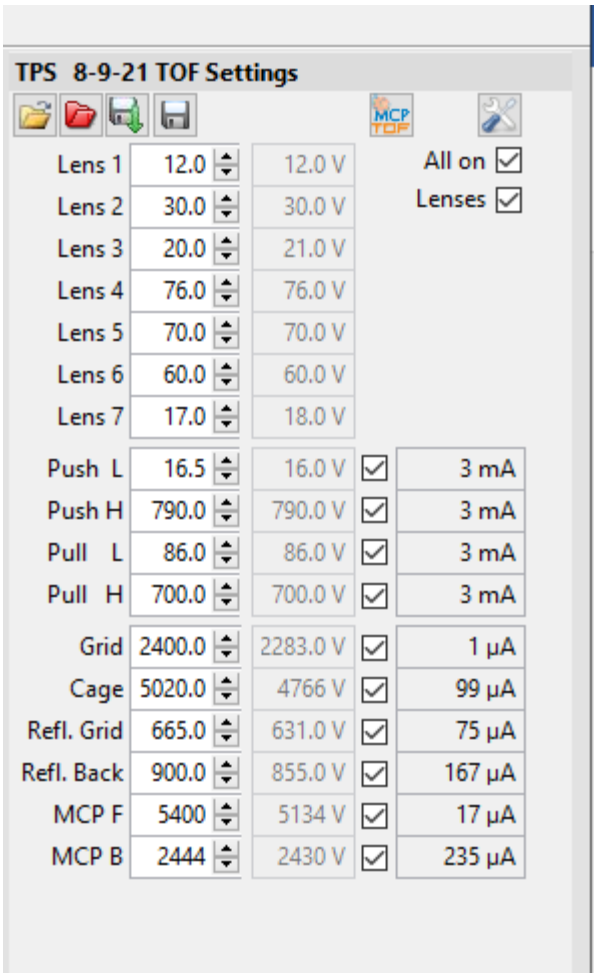


5 ppb Detection Limit testing complete series

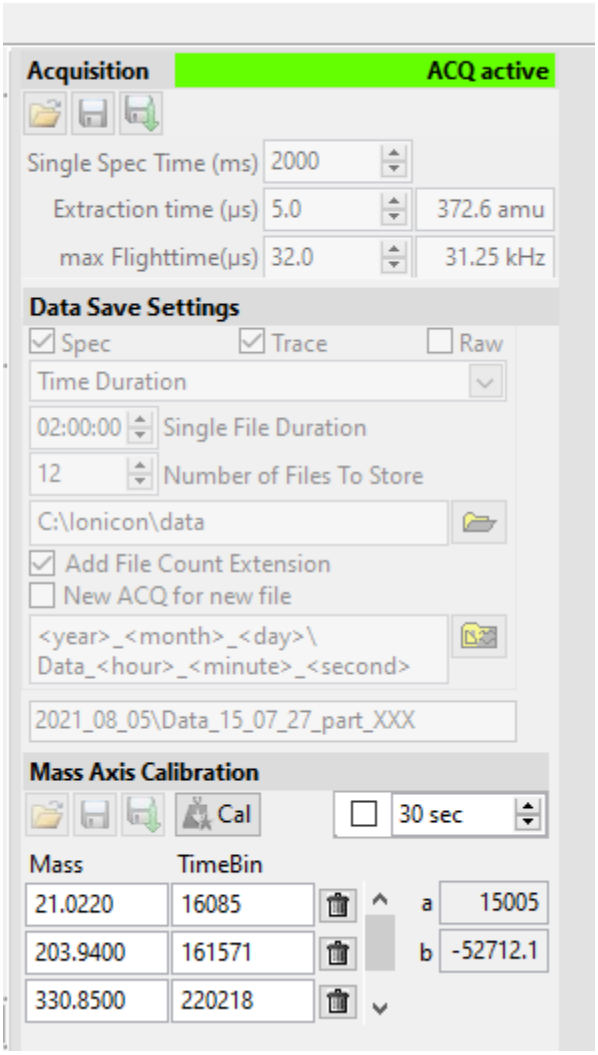
Alkenes Calibrations 8-9-21 H3O+ Mode



Production Settings

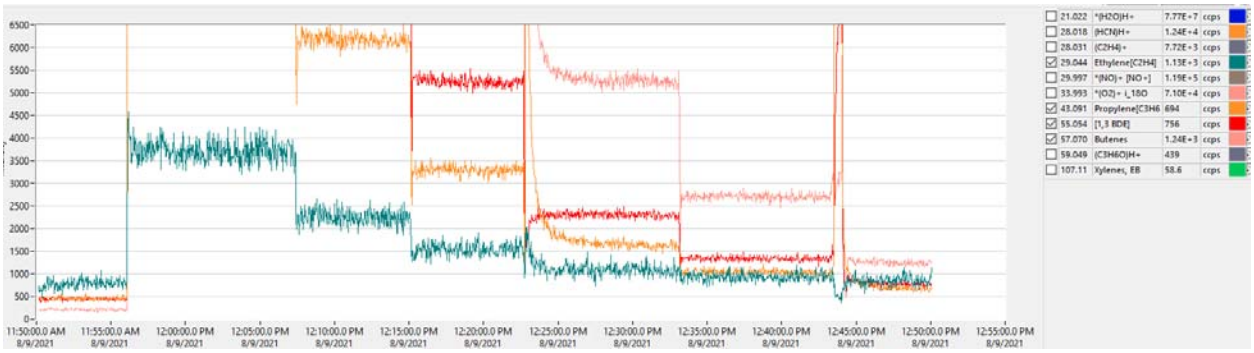

TPS 8-9-21 TOF Settings
MCP TOF
All on
Lenses
Lens 1 12.0 12.0 V
Lens 2 30.0 30.0 V
Lens 3 20.0 21.0 V
Lens 4 76.0 76.0 V
Lens 5 70.0 70.0 V
Lens 6 60.0 60.0 V
Lens 7 17.0 18.0 V
Push L 16.5 16.0 V 3 mA
Push H 790.0 790.0 V 3 mA
Pull L 86.0 86.0 V 3 mA
Pull H 700.0 700.0 V 3 mA
Grid 2400.0 2283.0 V 1 µA
Cage 5020.0 4766 V 99 µA
Refl. Grid 665.0 631.0 V 75 µA
Refl. Back 900.0 855.0 V 167 µA
MCP F 5400 5134 V 17 µA
MCP B 2444 2430 V 235 µA

Lenses

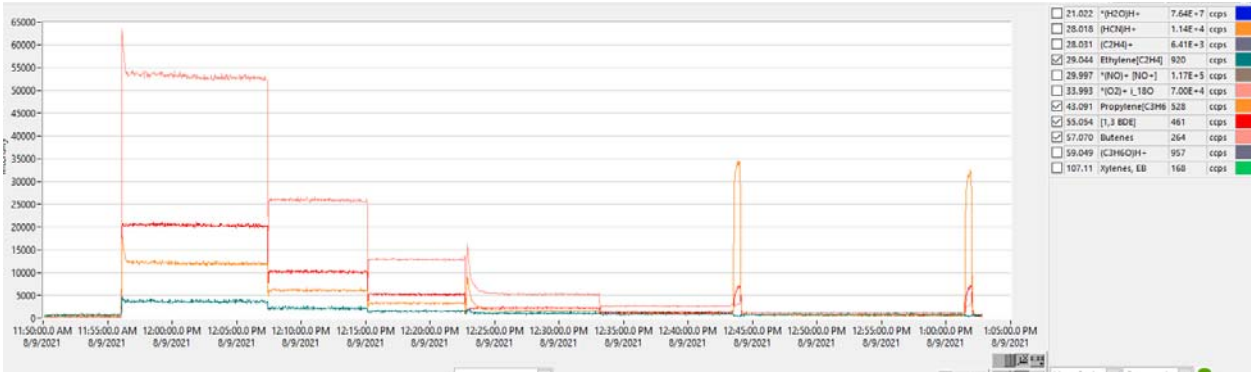


Acquisition Mode

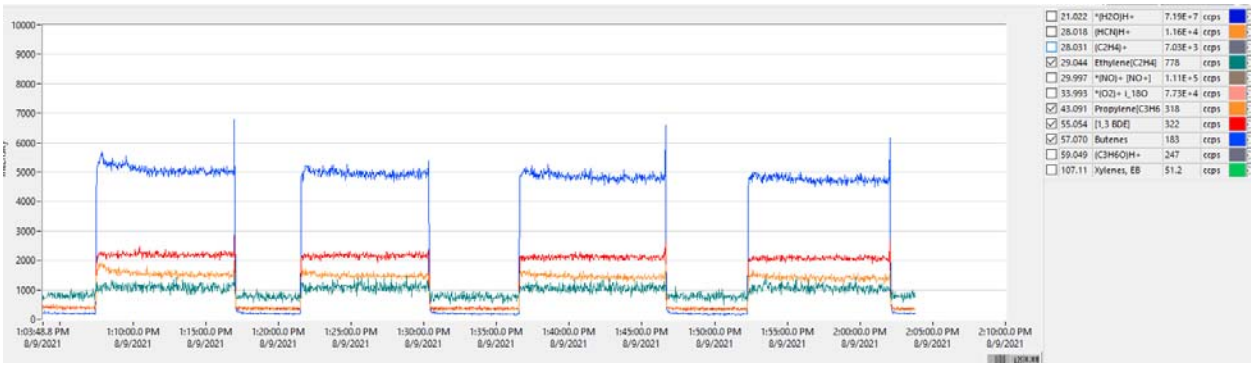
Same hex settings



Screen shots 100-2 ppb Alkenes cylinder with 1,3BDE



Full Calibration



Detection Limit Determination 10 ppb

APPENDIX E
CALIBRATION GAS CERTIFICATION SHEETS

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: *CRYSTAL LAKE , IL* MONTROSE AIR QUALITY SERVICES
Part Number: X06NI99C15A00A3
Cylinder Number: CC344804
Laboratory: 124 - La Porte Mix - TX
Analysis Date: Jul 30, 2021
Lot Number: 126-402159020-1

Reference Number: 126-402159020-1
Cylinder Volume: 144.3 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 350

Expiration Date: Jul 30, 2024

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
HEXANE	1.000 PPM	0.9950 PPM	+/- 5%
N BUTANE	1.000 PPM	1.002 PPM	+/- 5%
N HEPTANE	1.000 PPM	1.000 PPM	+/- 5%
N PENTANE	1.000 PPM	1.000 PPM	+/- 5%
PROPANE	1.000 PPM	1.009 PPM	+/- 5%
NITROGEN	Balance		

Notes:.

PO # PO-011307

Approved for Release

Airgas
an Air Liquide company

Airgas USA, LLC
4646 Linden Rd
Rockford, IL 61109
Airgas.com

CERTIFICATE OF BATCH ANALYSIS

Grade of Product: ZERO

Part Number:	Al Z15A	Reference Number:	152-402047887-1
Cylinder Analyzed:	CC235228	Cylinder Volume:	146.0 CF
Laboratory:	192 - Rockford IL Fill Plant (N513) - IL	Cylinder Pressure:	2000 PSIG
Analysis Date:	Mar 03, 2021	Valve Outlet:	590
Lot Number:	152-402047887-1		

ANALYTICAL RESULTS

Component	Requested Purity	Certified Concentration
AIR		
THC	< 1.0 PPM	0.043 PPM
Percent Oxygen	20-22 %	20.82 %
Moisture	< 3.0 PPM	0.07 PPM

Cylinders in Batch:

CC235228, XC002876B

Impurities verified against analytical standards traceable to NIST by weight and/or analysis.

Signature on file

Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 2
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number:	X02NI99C15A0A19	Reference Number:	SG02-IC000020641-1
Cylinder Number:	CC286616	Cylinder Volume:	143.25 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2000.0 PSIG
Analysis Date:	Jul 08, 2021	Valve Outlet:	350SS
Lot Number:	SG02-IC000020641-1		

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 CYANIDE	1.000 PPM	1.020 PPM	+/- 5%
NITROGEN	Balance		

Permanent Notes:-NA-

Notes:
Analysis Date: 7/6/2021
Expiration Date: 7/6/2022
Blend +/- 20% Analytical +/- 5%

Approved for Release

Airgas
an Air Liquide company

Airgas USA, LLC
6141 Easton Road
Bldg 1
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Customer:	MONTROSE ENVIRONMENTAL GROUP		
Part Number:	X02AI99C15AH586	Reference Number:	160-401735121-1
Cylinder Number:	ALM060589	Cylinder Volume:	129.3 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2016 PSIG
Analysis Date:	Feb 19, 2020	Valve Outlet:	590
Lot Number:	160-401735121-1		

Expiration Date: Feb 19, 2023

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	1.055 PPM	+/- 5%
AIR	Balance		

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 - CRYSTAL LAKE ,		
Part Number:	X07NI99C15A00A9	Reference Number:	126-402159021-1
Cylinder Number:	CC164840	Cylinder Volume:	144.3 CF
Laboratory:	124 - La Porte Mix - TX	Cylinder Pressure:	2015 PSIG
Analysis Date:	Aug 09, 2021	Valve Outlet:	350
Lot Number:	126-402159021-1		

Expiration Date: Aug 09, 2023

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	0.9918 PPM	+/- 5%
1 HEXENE	1.000 PPM	1.003 PPM	+/- 5%
1 PENTENE	1.000 PPM	1.005 PPM	+/- 5%
1,3 BUTADIENE	1.000 PPM	1.005 PPM	+/- 5%
ETHYLENE	1.000 PPM	1.087 PPM	+/- 5%
PROPYLENE	1.000 PPM	1.006 PPM	+/- 5%
NITROGEN	Balance		

Notes:
MONTROSE AIR QUALITY SERVICES LLC
PO#: PO-011307
NITROGEN BALANCE : 99.99939022%

Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 2
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number:	X02NI99C15A09L1	Reference Number:	160-402152149-1
Cylinder Number:	ALM063769	Cylinder Volume:	144.3 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jul 08, 2021	Valve Outlet:	350
Lot Number:	160-402152149-1		

Expiration Date: Jul 08, 2024

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
1,2,4 TRIMETHYLBENZENE	1.000 PPM	1.071 PPM	+/- 5%
NITROGEN	Balance		

Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 2
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Customer:	MONTROSE AIR QUALITY SERVICES LLC		
Part Number:	X05NI99C15A00N2	Reference Number:	160-402146852-1
Cylinder Number:	EB0115843	Cylinder Volume:	144.3 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jul 03, 2021	Valve Outlet:	350SS
Lot Number:	160-402146852-1		

Expiration Date: Jul 03, 2024

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	1.136 PPM	+/- 5%
ETHYL BENZENE	1.000 PPM	1.134 PPM	+/- 5%
P XYLENE	1.000 PPM	1.124 PPM	+/- 5%
TOLUENE	1.000 PPM	1.137 PPM	+/- 5%
NITROGEN	Balance		

Approved for Release

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