2023 Q2 MOBILE MONITORING VAN COMMERCE CITY NORTH DENVER COMMUNITY AIR MONITORING NETWORK COMMERCE CITY, COLORADO

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MONTROSE AIR QUALITY SERVICES

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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) continuous, near real-time monitoring for the following analytes[1]: carbon monoxide (CO), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), nitric oxide or 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 the presence of specific VOCs and hydrogen sulfide (H_2S). 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 chemicals. Continuous real-time air monitoring and Summa canister sampling data are presented in separate reports.

The mobile monitoring van contains the equipment necessary to identify and quantitate individual chemicals present in ambient air at ultra-low concentrations. This equipment measures and reports concentrations of select chemicals at sub-parts per billion (ppb) levels and as quickly as one measurement per second. During the monitoring period, the mobile monitoring van followed a dense route through each of the six CCND residential neighborhoods that fall within a three-mile radius around the refinery. Accessible streets in the monitored neighborhoods were traversed at approximately 10 miles per hour (MPH) while collecting a data point for each chemical every 1 second. During the second quarter 2023 sampling period (June 12-16), the mobile monitoring van was in a total of six neighborhoods and collected more than 65,492 data points across five days of monitoring, resulting in approximately 44,330 1-hour rolling average concentrations. Meteorological conditions were also reported in real time.

Health scientists from CTEH, LLC (CTEH®) (a subsidiary company of Montrose) 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 the estimated 1-hour maximum measured concentrations of individual or cumulative (combined) VOCs could potentially pose acute (short-term) health hazards. The air monitoring data and health risk assessment indicate:

- Air monitoring data and health risk assessment indicate all measured individual and combined air concentrations were below their respective acute health reference levels in all neighborhoods.
- Results indicate the measured concentrations are likely to be without any 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, 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) continuous, near real-time stationary monitoring for the following analytes: carbon monoxide (CO), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), nitric oxide or 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 the presence of specific chemicals. 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 community air monitoring and Summa canister sampling data are presented in separate reports. Air monitoring, sampling and analysis from approaches (1) and (2) 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 outfitted with equipment necessary to identify and quantitate individual chemicals present in ambient air to ultra-low concentrations. 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 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 chemical molecules. The mobile monitoring van incorporates a high-precision global positioning system (GPS), a sonic anemometer to measure wind direction and wind velocity and other incorporated meteorological (MET) sensors.

During the mobile monitoring program, groups of structurally similar chemicals (called isomers) that include the list of 65 chemicals in Table 2-1 were measured to determine the instantaneous ambient concentrations. Appendix A provides more detail on the need for isomer grouping. This list of chemicals was compiled based on the typical chemicals 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 CCND residential neighborhoods that fall within a three-mile radius around the refinery operations. Accessible streets in the neighborhoods were traversed at approximately 10 MPH while collecting a data point every 1 second. The details of the monitored neighborhoods are listed in Table 2-2 and are shown in Figure 2-1.

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

o-Diethylbenzene	2-Methylhexane	Neopentane	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 2-2
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	6/14/23	16:47	19:22	9,318	5,791
Dupont	1.4	6/16/23	10:36	13:49	11,571	8,044
Elyria-Swansea	1.2	6/13/23	17:16	20:00	9,858	6,331
Globeville	0.44	6/15/23	13:57	16:23	8,809	5,282
Pioneer Park	1.7	6/12/23	11:22	15:31	14,914	11,387
Western Hills	1.6	6/15/23	10:13	13:17	11,022	7,495

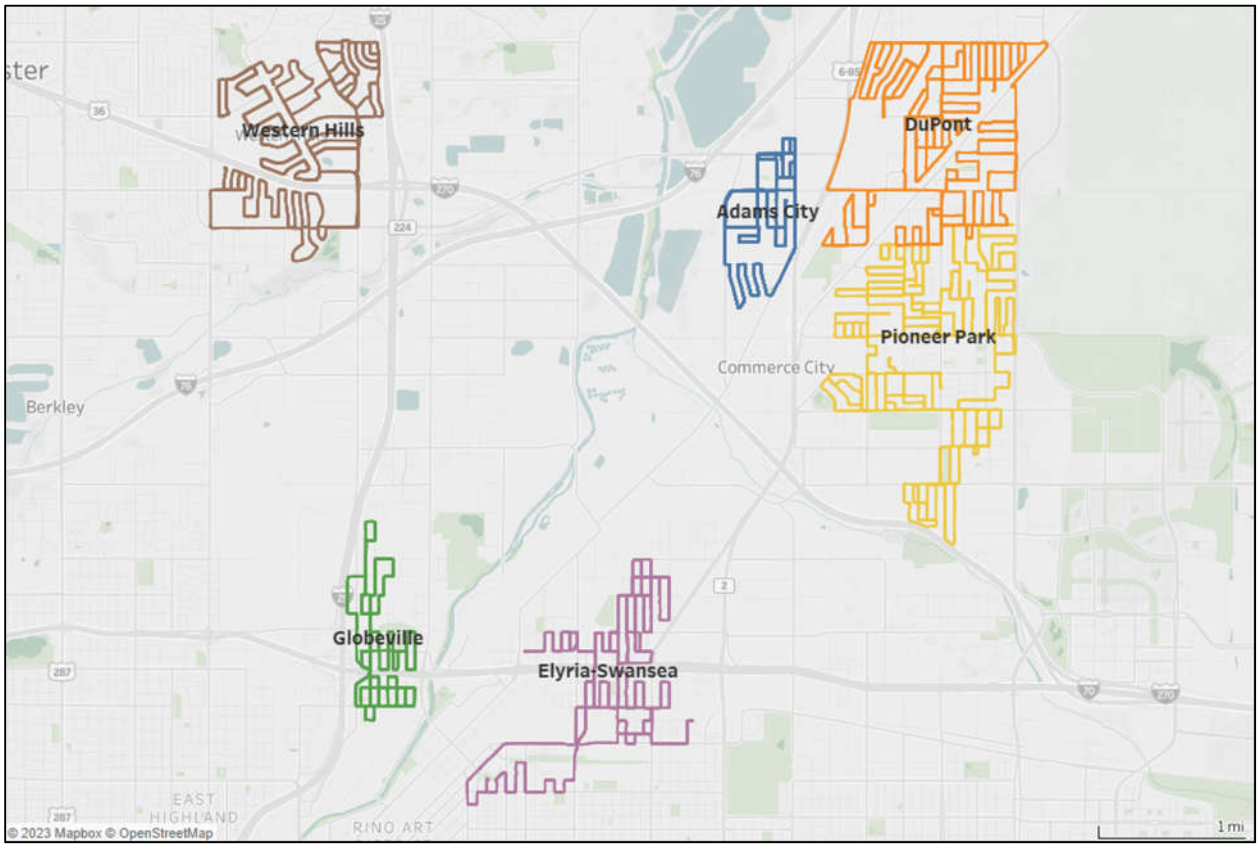
*Data completeness threshold set at 98%

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 chemical present in the standard. Note: Not all chemicals listed in Table 2-1 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 Code of Federal Regulation Part 51 Appendix M, Method 205). Zero-count measurements were obtained to ensure proper baseline measurements were incorporated into the calculation of each chemical'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 chemical 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 2-1. 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 1-second intervals. See the attached Appendix D for specific PTR-TOF-MS instrument operation conditions.

FIGURE 2-1
MOBILE MONITORING VAN PROGRAM ROUTE THROUGH SIX NEIGHBORHOOD AREAS



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) chemicals 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 typically represent exposure conditions higher than would be reasonably expected. Such calculations are very simple and assume a person is constantly exposed to the highest one hour rolling average concentration for each detected chemical. If the resulting risk values indicate the lack of likely acute adverse health effects under these worst-case conditions, then the risk assessment is complete. However, if the risk values suggest a potential for acute 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 specific or cumulative set of chemical(s) being higher than its reference level (RL) does NOT indicate an actual likelihood of adverse effects but does 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 acute 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 acute 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 chemical for the entire measurement time in an individual CCND neighborhood. The 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 and include ATSDR acute minimum risk levels (MRL), California EPA Office of Environmental Health Hazard Assessment (OEHHA) acute risk levels and Texas Commission on Environmental Quality (TCEQ) acute exposure guideline levels. If the chemical was not listed by CDPHE, a federal and state recommended hierarchy for selection of RLs was used[4]. For chemical isomer groups which were unable to be differentiated the lowest, most health-protective RL of the isomer group was selected for use in this assessment.

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 (ATSDR, Cal EPA OEHHA and TCEQ)

Health risks from potential cumulative exposures to all detected chemicals were calculated by adding together each individual chemical's HQ calculated for a given neighborhood. The sum of all the individual HQs is called a Hazard Index (HI). Adding together all the HQs is also a very

[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

health-conservative 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.

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. The potential for adverse health effects increases as HQ or HI increase above one, but it is not known by how much. 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 RLs, these values "*are set below levels that, based on current information, might cause adverse health effects in the people most sensitive*."[5] 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. 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 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 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. Across all neighborhoods, 44,330 1-hour rolling averages of chemical concentrations were calculated to derive the estimated ECs (Table 2-2). 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 (Figures 3-1 to 3-6).

The USEPA also has established values for use in emergency situations, termed Acute Exposure Guideline Levels (AEGLs). 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. 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].*"[6] 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.

[5] https://www.atsdr.cdc.gov/mrls/index.html#:~:text=ATSDR%20uses%20the%20no%20observed,to%20such%20substance%2Dinduced%20effects.

[6] https://www.epa.gov/aegl/about-acute-exposure-guideline-levels-aegls

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 2-2. Over five days, six neighborhoods were monitored for 65 chemicals, collecting more than 65,492 total data points. Individual neighborhood results are detailed in Figures 3-1 through 3-6. Each figure shows a map of the monitoring locations within each neighborhood, the chemicals that resulted in the top five calculated acute HQs and time profiles of the measured levels of these chemicals. The time profiles show all the 1-second data (orange) and calculated 1-hour rolling averages (green) of the monitoring data. Each green 1-hour average data point shown in these profiles reflects all the 1-second measurements collected over the previous hour. Thus, 1-hour rolling average values are shown on the time profiles only after one hour of data collection (Figure 3-1 through 3-6).

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. According to USEPA guidelines, an acute HQ or HI less than or equal to one (1) indicates that exposures are likely to be without any acute adverse health effects, even for sensitive sub-populations.

Maximum 1-hour rolling average concentrations for 65 chemicals measured in each neighborhood were compared to acute RLs to derive HQs. Figures 3-1 through 3-6 show concentrations of chemicals over the sampling time and summaries of results for chemicals resulting in the five highest HQs by neighborhood (if available). The estimated HI values (if available) shown in Figures 3-1 through 3-6 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 1, 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 data collected during this study phase did not indicate a potential for acute adverse health effects from exposure to the measured chemicals, both individually and combined.

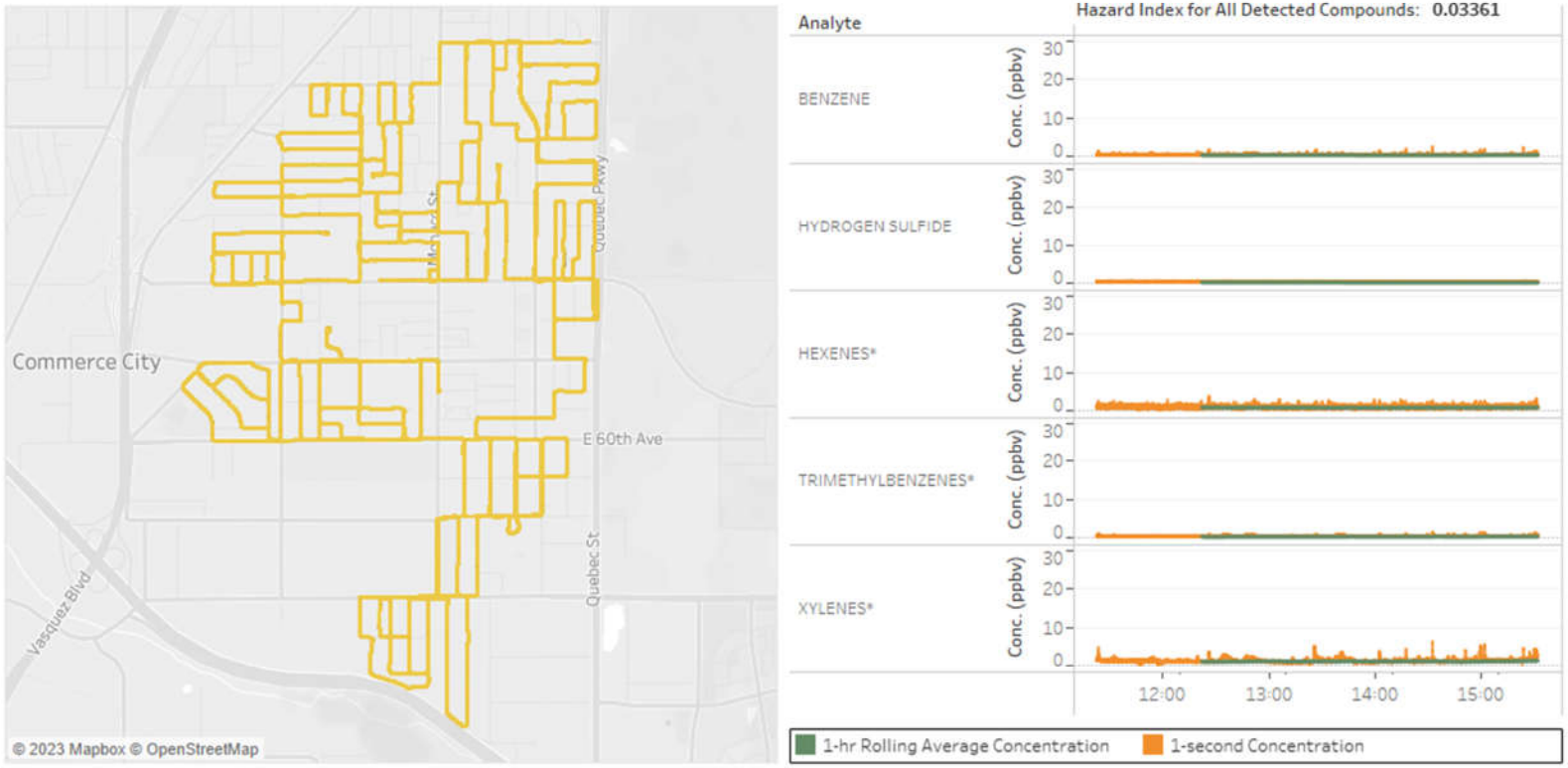
- All HQs were less than one for all detected chemicals, indicating that the maximum 1-hour rolling average concentration for each chemical was below its respective acute RL in all six neighborhoods (Figure 3-1 through 3-6).

- In this quarter, benzene, tetrachloroethylene, hydrogen sulfide, hexene group, hydrogen cyanide, xylenes, and trimethylbenzene group were the chemicals or isomer groupings resulting in the highest HQ in each neighborhood, accounting for over 80% of the total calculated HI values. However, all HI values calculated in all six neighborhoods were below one (Figures 3-1 through 3-6).

- These results indicate that the measured concentrations of chemicals, both individually and cumulative (combined), are likely to be without an appreciable risk of acute adverse health effects, even for sensitive sub-populations.

FIGURE 3-1
PIONEER PARK NEIGHBORHOOD: JUNE 12, 2023

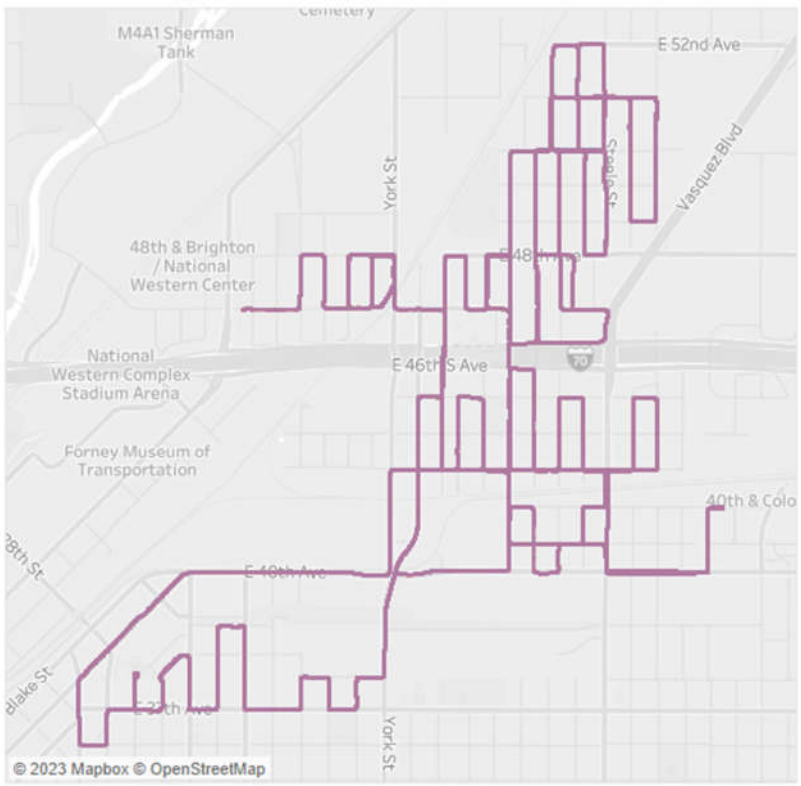
Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Average 1-hr Rolling Average (ppbv)	Maximum 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Health Reference Level (ppbv)	Hazard Quotient
BENZENE	2.27	11,387	0.21	0.23	52,000	9	0.02577
HYDROGEN SULFIDE	0.47	11,387	0.11	0.15	510	70	0.00213
HEXENES*	3.60	11,387	0.75	0.79	NR	500	0.00158
TRIMETHYLBENZENES*	1.18	11,387	0.20	0.23	NR	250	0.00090
XYLENES*	5.92	11,387	1.09	1.28	130,000	2,000	0.00064



*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 3-2
ELYRIA-SWANSEA NEIGHBORHOOD: JUNE 13, 2023

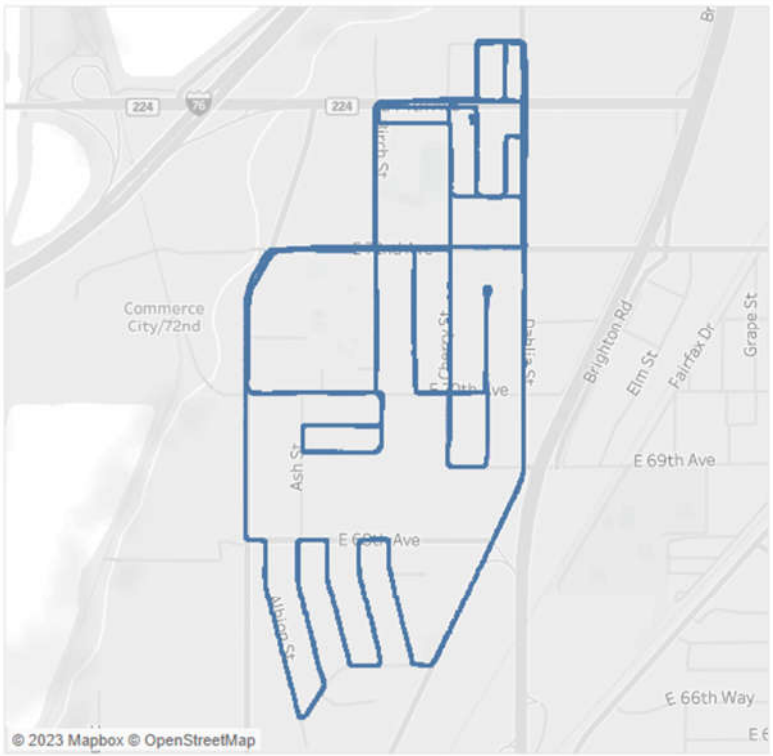
Analyte	Maximum 1-second Concentration (ppbv)	Count of 1-hr Rolling Averages Derived (#)	Average 1-hr Rolling Average (ppbv)	Maximum 1-hr Rolling Average (ppbv)	AEGL 1 60-min Value (ppbv)	Health Reference Level (ppbv)	Hazard Quotient
BENZENE	1.66	6,331	0.21	0.26	52,000	9	0.02843
HYDROGEN SULFIDE	1.44	6,331	0.18	0.21	510	70	0.00303
HEXENES*	3.73	6,331	0.61	0.70	NR	500	0.00141
TRIMETHYLBENZENES*	1.95	6,331	0.19	0.25	NR	250	0.00101
XYLENES*	7.69	6,331	1.01	1.23	130,000	2,000	0.00062

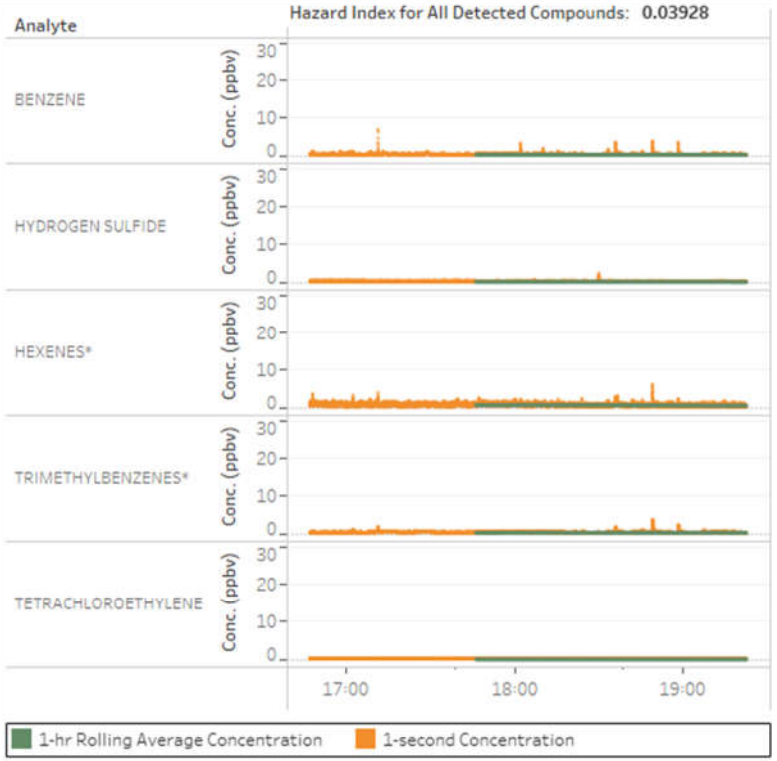


*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison 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 3-3
ADAMS CITY NEIGHBORHOOD: JUNE 14, 2023

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	6.76	5,791	0.25	0.27	52,000	9	0.02988
HYDROGEN SULFIDE	2.26	5,791	0.14	0.16	510	70	0.00226
HEXENES*	6.10	5,791	0.64	0.71	NR	500	0.00142
TRIMETHYLBENZENES*	3.56	5,791	0.29	0.32	NR	250	0.00126
TETRACHLOROETHYLENE	0.05	5,791	0.00	0.01	35,000	6	0.00114

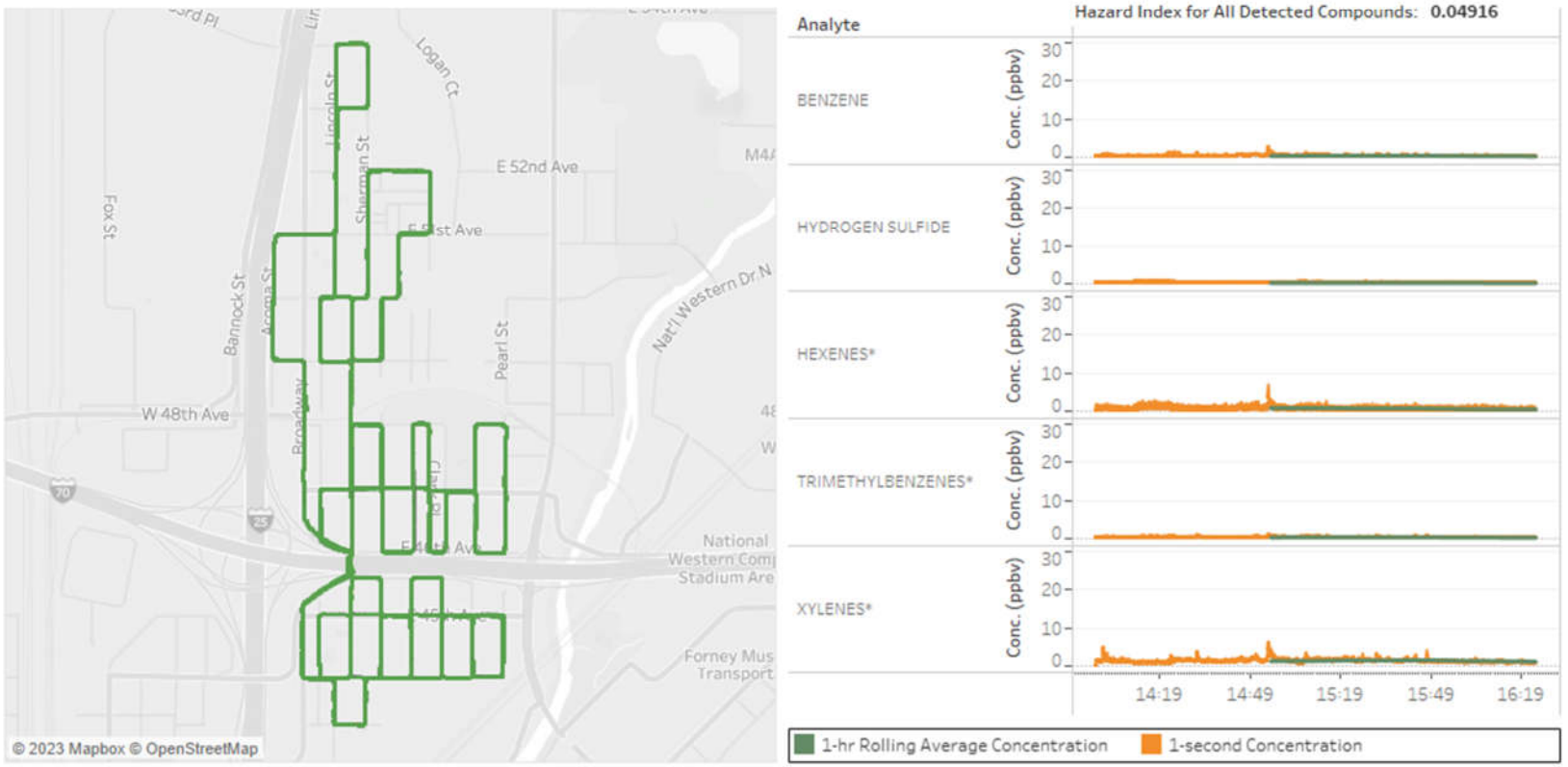




*The top 5 hazard quotients are reported in this dashboard. The hazard index represents cumulative risks including all unlisted analytes. The hazard quotient was calculated by comparing the acute health reference level to the maximum 1-hour rolling average. The comparative AEGL value is shown for comparison 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 3-4
GLOBEVILLE NEIGHBORHOOD: JUNE 15, 2023

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	2.55	5,282	0.31	0.36	52,000	9	0.03963
HYDROGEN SULFIDE	0.69	5,282	0.15	0.18	510	70	0.00254
HEXENES*	6.63	5,282	0.63	0.80	NR	500	0.00159
TRIMETHYLBENZENES*	0.88	5,282	0.27	0.30	NR	250	0.00119
XYLENES*	6.05	5,282	1.36	1.50	130,000	2,000	0.00075



*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 3-5
WESTERN HILLS NEIGHBORHOOD: JUNE 15, 2023

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	3.08	7,495	0.23	0.29	52,000	9	0.03199
TETRACHLOROETHYLENE	0.06	7,495	0.01	0.01	35,000	6	0.00243
HEXENES*	5.27	7,495	0.89	1.11	NR	500	0.00221
HYDROGEN SULFIDE	0.40	7,495	0.11	0.14	510	70	0.00197
TRIMETHYLBENZENES*	1.94	7,495	0.23	0.31	NR	250	0.00124

*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 3-6
DUPONT NEIGHBORHOOD: JUNE 16, 2023

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	14.30	8,044	0.18	0.22	52,000	9	0.02438
HYDROGEN SULFIDE	1.70	8,044	0.05	0.47	510	70	0.00668
HEXENES*	27.25	8,044	0.88	1.03	NR	500	0.00206
TRIMETHYLBENZENES*	13.97	8,044	0.15	0.21	NR	250	0.00084
HYDROGEN CYANIDE	0.85	8,044	0.19	0.26	2,000	308	0.00083

*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 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 and conservative selection of lowest reference value per isomer). 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
Ambient & Emerging Technology
Montrose Air Quality Services

Michael Lumpkin, PhD, DABT
Senior Toxicologist
CTEH®, LLC

APPENDIX A
ISOMER CHEMICAL SAMPLING DETAILS

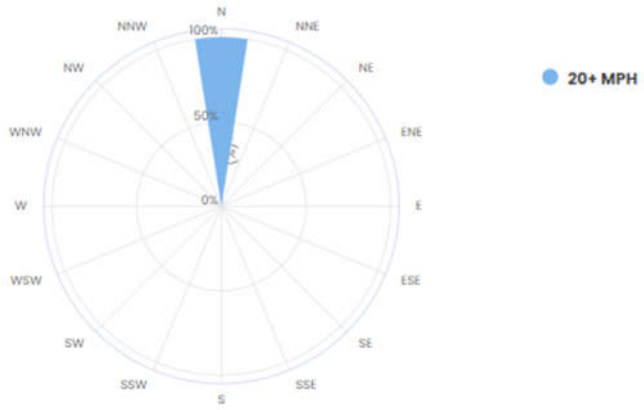
In a real-time PTR-TOF analysis, it is not possible to speciate isomers, or chemical compounds that have the same molecular weight. For example, n-hexane, 2-methyl pentane and 2,2-dimethyl butane all have a molecular mass of 86.178 g/mol. In order to provide the most conservative determination of concentration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

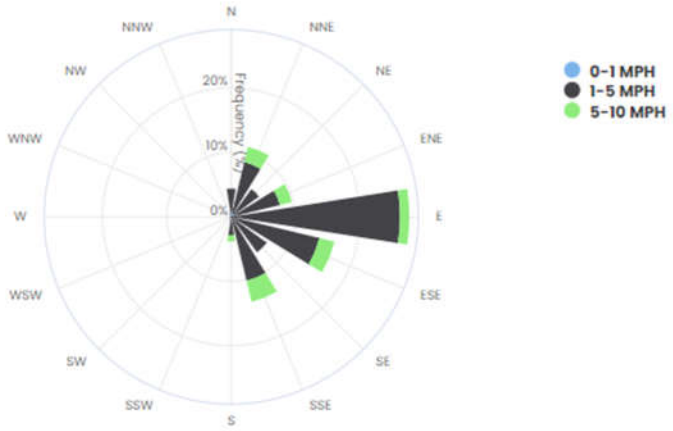
Group Name	Specific Isomers
Xylenes	Ethyl Benzene
	o-Xylene
	m-Xylene
	p-Xylene
Dimethylcyclohexanes	Ethylcyclohexane
	cis-1,3-Dimethylcyclohexane
	trans-1,2-Dimethylcyclohexane
	trans-1,3-Dimethylcyclohexane
Octanes	n-Octane
	2-Methylheptane
	3-Methylheptane
	2,2,4-Trimethylpentane
	2,3,4-Trimethylpentane
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

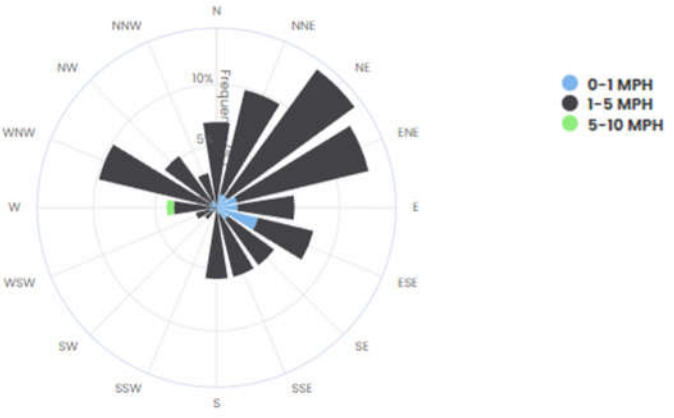
Wind Rose | CM7 (Kearney Middle School) 11:00am – 4:00pm, June 12, 2023



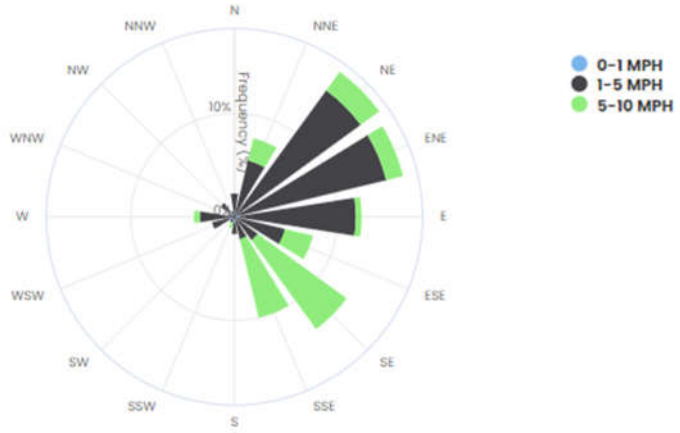
Wind Rose | CM3 (Adams City High School) 10:30am – 2:00pm, June 16, 2023



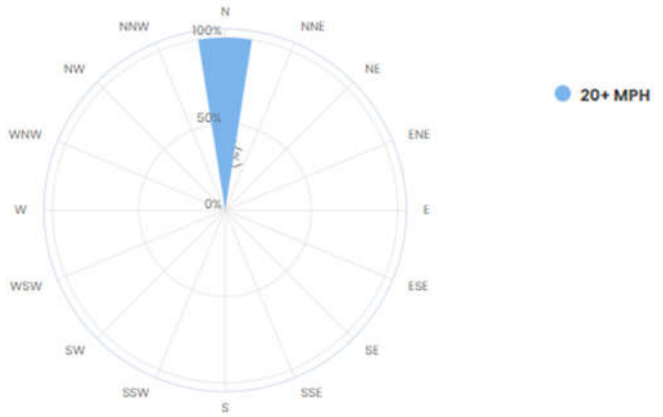
Wind Rose | CM7 (Kearney Middle School) 5:00pm – 8:00pm, June 13, 2023



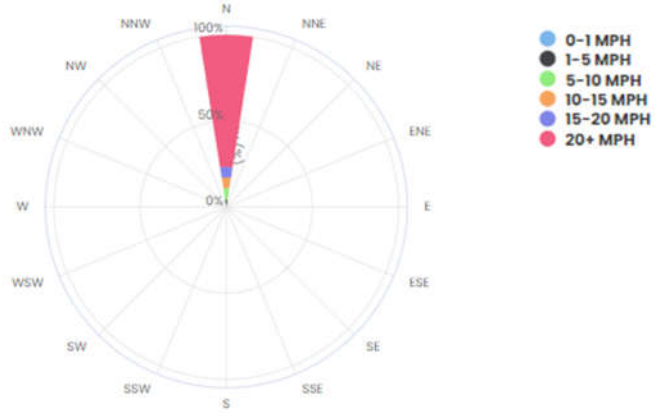
Wind Rose | CM6 (Focus Points Family Resource Center) 1:30pm – 4:30pm, June 15, 2023



Wind Rose | CM4 (Adams City Middle School) 4:30pm – 7:30pm, June 14, 2023



Wind Rose | CM4 (Adams City Middle School) 10:00pm – 1:30pm, June 15, 2023



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

CCND Mobile Monitoring Van
2023 Q2

Mobile Laboratory Sampling Data Summary and Risk Assessment

Adams City Neighborhood | June 14, 2023

Analyte	Cas No	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	9,318	0.14	5,791	0.01	0.01	670,000	298	OEHHA Acute REL	0.00004
ACETYLENE	74-86-2	9,318	0.77	5,791	0.16	0.19	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	9,318	6.76	5,791	0.25	0.27	52,000	9	ATSDR Acute MRL	0.02988
BUTANES*	75-28-5	9,318	8.28	5,791	2.11	2.45	NR	33000	TCEQ Short-Term AMCV Health	0.00007
BUTENES*	590-18-1	9,318	19.30	5,791	1.94	2.11	NR	15000	TCEQ Short-Term AMCV Health	0.00014
CARBON DISULFIDE	75-15-0	9,318	0.06	5,791	0.01	0.01	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANES*	287-92-3	9,318	17.48	5,791	2.32	2.54	NR	5,900	TCEQ Short-Term AMCV Health	0.00043
DECANES	124-18-5	9,318	0.09	5,791	0.04	0.05	NR	1,000	TCEQ Short-Term AMCV Health	0.00005
DIETHYLBENZENES*	141-93-5	9,318	0.16	5,791	0.08	0.08	NR	450	TCEQ Short-Term AMCV Health	0.00017
DIMETHYLCYCLOHEXANES*	638-04-0	9,318	0.22	5,791	0.12	0.12	NR	4,000	CDPHE	0.00003
DODECANES	112-40-3	9,318	0.01	5,791	0.00	0.00	NR	1720	CDPHE	0.00000
ETHYLENE	74-85-1	9,318	53.14	5,791	6.73	6.91	NR	500,000	TCEQ Short-Term AMCV Health	0.00001
HEPTANES*	142-82-5	9,318	0.21	5,791	0.09	0.09	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES*	110-54-3	9,318	0.21	5,791	0.07	0.08	NR	5,400	TCEQ Short-Term AMCV Health	0.00001
HEXENES*	592-41-6	9,318	6.10	5,791	0.64	0.71	NR	500	TCEQ Short-Term AMCV Health	0.00142
HYDROGEN CYANIDE	74-90-8	9,318	0.69	5,791	0.13	0.20	2,000	308	OEHHA Acute REL	0.00066
HYDROGEN SULFIDE	7783-06-4	9,318	2.26	5,791	0.14	0.16	510	70	ATSDR Acute MRL	0.00226
ISOPRENE	78-79-5	9,318	0.82	5,791	0.22	0.24	NR	1,400	TCEQ Short-Term AMCV Health	0.00017
METHANOL	67-56-1	9,318	53.23	5,791	5.54	5.96	530,000	21,366	OEHHA Acute REL	0.00028
METHYLCYCLOHEXANE	108-87-2	9,318	0.27	5,791	0.06	0.07	NR	4,000	TCEQ Short-Term AMCV Health	0.00002
NONANES	111-84-2	9,318	0.08	5,791	0.02	0.02	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
OCTANES*	111-65-9	9,318	0.12	5,791	0.05	0.05	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES*	109-66-0	9,318	0.68	5,791	0.19	0.20	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	9,318	9.35	5,791	0.30	0.33	NR	NA	NE	
STYRENE	100-42-5	9,318	0.24	5,791	0.06	0.06	20,000	5,000	ATSDR Acute MRL	0.00001
TETRACHLOROETHYLENE	127-18-4	9,318	0.05	5,791	0.00	0.01	35,000	6	ATSDR Acute MRL	0.00114
TOLUENE	108-88-3	9,318	13.49	5,791	0.78	0.89	67,000	2,000	ATSDR Acute MRL	0.00044
TRIMETHYLBENZENES*	622-96-8	9,318	3.56	5,791	0.29	0.32	50,000	250	TCEQ Short-Term AMCV Health	0.00126
UNDECANES	1120-21-4	9,318	0.08	5,791	0.03	0.04	NR	550	TCEQ Short-Term AMCV Health	0.00007
XYLENES*	1330-20-7	9,318	16.49	5,791	1.20	1.29	130,000	2,000	ATSDR Acute MRL	0.00065
									Hazard Index	0.03928

NR= According to EPA, AEGL is "not recommended due to insufficient data"
NA= Not Available
NC= Not Calculated

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 (See Appendix A)

CCND Mobile Monitoring Van
2023 Q2

Mobile Laboratory Sampling Data Summary and Risk Assessment

DuPont Neighborhood | June 16, 2023

Analyte	Cas No	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	11,571	0.18	8,044	0.00	0.01	670,000	298	OEHHA Acute REL	0.00003
ACETYLENE	74-86-2	11,571	1.09	8,044	0.16	0.22	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	11,571	14.30	8,044	0.18	0.22	52,000	9	ATSDR Acute MRL	0.02438
BUTANES*	75-28-5	11,571	134.48	8,044	2.59	2.91	NR	33000	TCEQ Short-Term AMCV Health	0.00009
BUTENES*	590-18-1	11,571	90.95	8,044	1.69	3.75	NR	15000	TCEQ Short-Term AMCV Health	0.00025
CARBON DISULFIDE	75-15-0	11,571	0.04	8,044	0.00	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANES*	287-92-3	11,571	82.84	8,044	0.66	1.91	NR	5,900	TCEQ Short-Term AMCV Health	0.00032
DECANES	124-18-5	11,571	0.08	8,044	0.04	0.04	NR	1,000	TCEQ Short-Term AMCV Health	0.00004
DIETHYLBENZENES*	141-93-5	11,571	0.16	8,044	0.06	0.06	NR	450	TCEQ Short-Term AMCV Health	0.00014
DIMETHYLCYCLOHEXANES*	638-04-0	11,571	0.40	8,044	0.03	0.04	NR	4,000	CDPHE	0.00001
DODECANES	112-40-3	11,571	0.01	8,044	0.00	0.00	NR	1720	CDPHE	0.00000
ETHYLENE	74-85-1	11,571	14.73	8,044	5.61	5.64	NR	500,000	TCEQ Short-Term AMCV Health	0.00001
HEPTANES*	142-82-5	11,571	0.24	8,044	0.07	0.08	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES*	110-54-3	11,571	0.25	8,044	0.08	0.09	NR	5,400	TCEQ Short-Term AMCV Health	0.00002
HEXENES*	592-41-6	11,571	27.25	8,044	0.88	1.03	NR	500	TCEQ Short-Term AMCV Health	0.00206
HYDROGEN CYANIDE	74-90-8	11,571	0.85	8,044	0.19	0.26	2,000	308	OEHHA Acute REL	0.00083
HYDROGEN SULFIDE	7783-06-4	11,571	1.70	8,044	0.05	0.47	510	70	ATSDR Acute MRL	0.00668
ISOPRENE	78-79-5	11,571	2.75	8,044	0.06	0.09	NR	1,400	TCEQ Short-Term AMCV Health	0.00006
METHANOL	67-56-1	11,571	41.92	8,044	4.96	5.18	530,000	21,366	OEHHA Acute REL	0.00024
METHYLCYCLOHEXANE	108-87-2	11,571	0.65	8,044	0.06	0.07	NR	4,000	TCEQ Short-Term AMCV Health	0.00002
NONANES	111-84-2	11,571	0.10	8,044	0.02	0.03	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
OCTANES*	111-65-9	11,571	0.14	8,044	0.04	0.05	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES*	109-66-0	11,571	2.87	8,044	1.08	1.10	NR	68,000	TCEQ Short-Term AMCV Health	0.00002
PROPYLENE	115-07-1	11,571	30.51	8,044	0.17	0.48	NR	NA	NE	
STYRENE	100-42-5	11,571	0.45	8,044	0.04	0.05	20,000	5,000	ATSDR Acute MRL	0.00001
TETRACHLOROETHYLENE	127-18-4	11,571	0.04	8,044	0.00	0.00	35,000	6	ATSDR Acute MRL	0.00047
TOLUENE	108-88-3	11,571	70.85	8,044	0.52	0.68	67,000	2,000	ATSDR Acute MRL	0.00034
TRIMETHYLBENZENES*	622-96-8	11,571	13.97	8,044	0.15	0.21	50,000	250	TCEQ Short-Term AMCV Health	0.00084
UNDECANES	1120-21-4	11,571	0.10	8,044	0.04	0.04	NR	550	TCEQ Short-Term AMCV Health	0.00008
XYLENES*	1330-20-7	11,571	82.44	8,044	0.73	0.93	130,000	2,000	ATSDR Acute MRL	0.00046
									Hazard Index	0.03744

NR= According to EPA, AEGL is "not recommended due to insufficient data"
NA= Not Available
NC= Not Calculated

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 (See Appendix A)

Mobile Laboratory Sampling Data Summary and Risk Assessment

Elyria-Swansea Neighborhood | June 13, 2023

Analyte	Cas No	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	9,858	0.12	6,331	0.01	0.01	670,000	298	OEHHA Acute REL	0.00004
ACETYLENE	74-86-2	9,858	0.92	6,331	0.25	0.30	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	9,858	1.66	6,331	0.21	0.26	52,000	9	ATSDR Acute MRL	0.02843
BUTANES*	75-28-5	9,858	10.17	6,331	1.78	2.17	NR	33000	TCEQ Short-Term AMCV Health	0.00007
BUTENES*	590-18-1	9,858	13.08	6,331	2.29	2.51	NR	15000	TCEQ Short-Term AMCV Health	0.00017
CARBON DISULFIDE	75-15-0	9,858	0.04	6,331	0.00	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANES*	287-92-3	9,858	16.06	6,331	1.21	1.46	NR	5,900	TCEQ Short-Term AMCV Health	0.00025
DECANES	124-18-5	9,858	0.08	6,331	0.03	0.04	NR	1,000	TCEQ Short-Term AMCV Health	0.00004
DIETHYLBENZENES*	141-93-5	9,858	0.33	6,331	0.08	0.09	NR	450	TCEQ Short-Term AMCV Health	0.00020
DIMETHYLCYCLOHEXANES*	638-04-0	9,858	0.11	6,331	0.02	0.03	NR	4,000	CDPHE	0.00001
DODECANES	112-40-3	9,858	0.01	6,331	0.00	0.00	NR	1720	CDPHE	0.00000
ETHYLENE	74-85-1	9,858	58.08	6,331	6.49	6.57	NR	500,000	TCEQ Short-Term AMCV Health	0.00001
HEPTANES*	142-82-5	9,858	0.19	6,331	0.03	0.05	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES*	110-54-3	9,858	0.35	6,331	0.17	0.18	NR	5,400	TCEQ Short-Term AMCV Health	0.00003
HEXENES*	592-41-6	9,858	3.73	6,331	0.61	0.70	NR	500	TCEQ Short-Term AMCV Health	0.00141
HYDROGEN CYANIDE	74-90-8	9,858	0.60	6,331	0.16	0.19	2,000	308	OEHHA Acute REL	0.00061
HYDROGEN SULFIDE	7783-06-4	9,858	1.44	6,331	0.18	0.21	510	70	ATSDR Acute MRL	0.00303
ISOPRENE	78-79-5	9,858	0.56	6,331	0.18	0.20	NR	1,400	TCEQ Short-Term AMCV Health	0.00014
METHANOL	67-56-1	9,858	20.54	6,331	3.67	3.75	530,000	21,366	OEHHA Acute REL	0.00018
METHYLCYCLOHEXANE	108-87-2	9,858	0.26	6,331	0.06	0.07	NR	4,000	TCEQ Short-Term AMCV Health	0.00002
NONANES	111-84-2	9,858	0.06	6,331	0.02	0.02	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
OCTANES*	111-65-9	9,858	0.13	6,331	0.04	0.05	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES*	109-66-0	9,858	0.71	6,331	0.25	0.26	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	9,858	4.16	6,331	0.28	0.34	NR	NA	NE	
STYRENE	100-42-5	9,858	0.34	6,331	0.05	0.06	20,000	5,000	ATSDR Acute MRL	0.00001
TETRACHLOROETHYLENE	127-18-4	9,858	0.04	6,331	0.00	0.00	35,000	6	ATSDR Acute MRL	0.00051
TOLUENE	108-88-3	9,858	8.72	6,331	0.59	0.86	67,000	2,000	ATSDR Acute MRL	0.00043
TRIMETHYLBENZENES*	622-96-8	9,858	1.95	6,331	0.19	0.25	50,000	250	TCEQ Short-Term AMCV Health	0.00101
UNDECANES	1120-21-4	9,858	0.08	6,331	0.03	0.03	NR	550	TCEQ Short-Term AMCV Health	0.00006
XYLENES*	1330-20-7	9,858	7.69	6,331	1.01	1.23	130,000	2,000	ATSDR Acute MRL	0.00062
									Hazard Index	0.03730

NR= According to EPA, AEGL is "not recommended due to insufficient data"
NA= Not Available
NC= Not Calculated

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 (See Appendix A)

CCND Mobile Monitoring Van
2023 Q2

Mobile Laboratory Sampling Data Summary and Risk Assessment

Globeville Neighborhood | June 15, 2023

Analyte	Cas No	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	8,809	0.28	5,282	0.01	0.03	670,000	298	OEHHA Acute REL	0.00009
ACETYLENE	74-86-2	8,809	0.98	5,282	0.19	0.24	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	8,809	2.55	5,282	0.31	0.36	52,000	9	ATSDR Acute MRL	0.03963
BUTANES*	75-28-5	8,809	20.91	5,282	3.93	4.35	NR	33000	TCEQ Short-Term AMCV Health	0.00013
BUTENES*	590-18-1	8,809	11.54	5,282	2.10	2.51	NR	15000	TCEQ Short-Term AMCV Health	0.00017
CARBON DISULFIDE	75-15-0	8,809	0.07	5,282	0.00	0.01	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANES*	287-92-3	8,809	14.07	5,282	2.27	2.73	NR	5,900	TCEQ Short-Term AMCV Health	0.00046
DECANES	124-18-5	8,809	0.37	5,282	0.05	0.10	NR	1,000	TCEQ Short-Term AMCV Health	0.00010
DIETHYLBENZENES*	141-93-5	8,809	0.12	5,282	0.06	0.07	NR	450	TCEQ Short-Term AMCV Health	0.00014
DIMETHYLCYCLOHEXANES*	638-04-0	8,809	0.10	5,282	0.03	0.03	NR	4,000	CDPHE	0.00001
DODECANES	112-40-3	8,809	0.01	5,282	0.00	0.00	NR	1720	CDPHE	0.00000
ETHYLENE	74-85-1	8,809	8.60	5,282	6.61	6.64	NR	500,000	TCEQ Short-Term AMCV Health	0.00001
HEPTANES*	142-82-5	8,809	0.33	5,282	0.07	0.08	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES*	110-54-3	8,809	0.19	5,282	0.08	0.08	NR	5,400	TCEQ Short-Term AMCV Health	0.00001
HEXENES*	592-41-6	8,809	6.63	5,282	0.63	0.80	NR	500	TCEQ Short-Term AMCV Health	0.00159
HYDROGEN CYANIDE	74-90-8	8,809	0.60	5,282	0.16	0.22	2,000	308	OEHHA Acute REL	0.00070
HYDROGEN SULFIDE	7783-06-4	8,809	0.69	5,282	0.15	0.18	510	70	ATSDR Acute MRL	0.00254
ISOPRENE	78-79-5	8,809	2.15	5,282	0.12	0.33	NR	1,400	TCEQ Short-Term AMCV Health	0.00024
METHANOL	67-56-1	8,809	83.76	5,282	5.83	5.96	530,000	21,366	OEHHA Acute REL	0.00028
METHYLCYCLOHEXANE	108-87-2	8,809	0.20	5,282	0.07	0.08	NR	4,000	TCEQ Short-Term AMCV Health	0.00002
NONANES	111-84-2	8,809	0.14	5,282	0.03	0.04	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
OCTANES*	111-65-9	8,809	0.17	5,282	0.06	0.07	NR	4,100	TCEQ Short-Term AMCV Health	0.00002
PENTANES*	109-66-0	8,809	0.72	5,282	0.21	0.21	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	8,809	6.44	5,282	0.43	0.53	NR	NA	NE	
STYRENE	100-42-5	8,809	0.30	5,282	0.07	0.07	20,000	5,000	ATSDR Acute MRL	0.00001
TETRACHLOROETHYLENE	127-18-4	8,809	0.04	5,282	0.00	0.00	35,000	6	ATSDR Acute MRL	0.00033
TOLUENE	108-88-3	8,809	8.40	5,282	1.08	1.22	67,000	2,000	ATSDR Acute MRL	0.00061
TRIMETHYLBENZENES*	622-96-8	8,809	0.88	5,282	0.27	0.30	50,000	250	TCEQ Short-Term AMCV Health	0.00119
UNDECANES	1120-21-4	8,809	0.15	5,282	0.03	0.04	NR	550	TCEQ Short-Term AMCV Health	0.00008
XYLENES*	1330-20-7	8,809	6.05	5,282	1.36	1.50	130,000	2,000	ATSDR Acute MRL	0.00075
									Hazard Index	0.04916

NR= According to EPA, AEGL is "not recommended due to insufficient data"
NA= Not Available
NC= Not Calculated

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 (See Appendix A)

Mobile Laboratory Sampling Data Summary and Risk Assessment

Pioneer Park Neighborhood | June 12, 2023

Analyte	Cas No	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	14,914	0.18	11,387	0.01	0.02	670,000	298	OEHHA Acute REL	0.00005
ACETYLENE	74-86-2	14,914	0.86	11,387	0.08	0.14	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	14,914	2.27	11,387	0.21	0.23	52,000	9	ATSDR Acute MRL	0.02577
BUTANES*	75-28-5	14,914	9.96	11,387	1.51	1.74	NR	33000	TCEQ Short-Term AMCV Health	0.00005
BUTENES*	590-18-1	14,914	10.81	11,387	0.95	1.08	NR	15000	TCEQ Short-Term AMCV Health	0.00007
CARBON DISULFIDE	75-15-0	14,914	0.07	11,387	0.00	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANES*	287-92-3	14,914	14.15	11,387	1.20	1.36	NR	5,900	TCEQ Short-Term AMCV Health	0.00023
DECANES	124-18-5	14,914	0.07	11,387	0.03	0.03	NR	1,000	TCEQ Short-Term AMCV Health	0.00003
DIETHYLBENZENES*	141-93-5	14,914	0.22	11,387	0.08	0.09	NR	450	TCEQ Short-Term AMCV Health	0.00020
DIMETHYLCYCLOHEXANES*	638-04-0	14,914	0.07	11,387	0.02	0.02	NR	4,000	CDPHE	0.00001
DODECANES	112-40-3	14,914	0.01	11,387	0.00	0.00	NR	1720	CDPHE	0.00000
ETHYLENE	74-85-1	14,914	41.88	11,387	7.57	7.72	NR	500,000	TCEQ Short-Term AMCV Health	0.00002
HEPTANES*	142-82-5	14,914	0.21	11,387	0.06	0.07	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES*	110-54-3	14,914	0.35	11,387	0.15	0.16	NR	5,400	TCEQ Short-Term AMCV Health	0.00003
HEXENES*	592-41-6	14,914	3.60	11,387	0.75	0.79	NR	500	TCEQ Short-Term AMCV Health	0.00158
HYDROGEN CYANIDE	74-90-8	14,914	0.49	11,387	0.10	0.16	2,000	308	OEHHA Acute REL	0.00052
HYDROGEN SULFIDE	7783-06-4	14,914	0.47	11,387	0.11	0.15	510	70	ATSDR Acute MRL	0.00213
ISOPRENE	78-79-5	14,914	0.40	11,387	0.08	0.10	NR	1,400	TCEQ Short-Term AMCV Health	0.00007
METHANOL	67-56-1	14,914	9.65	11,387	5.75	5.85	530,000	21,366	OEHHA Acute REL	0.00027
METHYLCYCLOHEXANE	108-87-2	14,914	0.14	11,387	0.05	0.06	NR	4,000	TCEQ Short-Term AMCV Health	0.00002
NONANES	111-84-2	14,914	0.06	11,387	0.02	0.02	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
OCTANES*	111-65-9	14,914	0.10	11,387	0.04	0.04	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES*	109-66-0	14,914	0.65	11,387	0.26	0.27	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	14,914	2.87	11,387	0.24	0.35	NR	NA	NE	
STYRENE	100-42-5	14,914	0.15	11,387	0.05	0.05	20,000	5,000	ATSDR Acute MRL	0.00001
TETRACHLOROETHYLENE	127-18-4	14,914	0.06	11,387	0.00	0.00	35,000	6	ATSDR Acute MRL	0.00051
TOLUENE	108-88-3	14,914	5.75	11,387	0.66	0.77	67,000	2,000	ATSDR Acute MRL	0.00039
TRIMETHYLBENZENES*	622-96-8	14,914	1.18	11,387	0.20	0.23	50,000	250	TCEQ Short-Term AMCV Health	0.00090
UNDECANES	1120-21-4	14,914	0.07	11,387	0.03	0.04	NR	550	TCEQ Short-Term AMCV Health	0.00007
XYLENES*	1330-20-7	14,914	5.92	11,387	1.09	1.28	130,000	2,000	ATSDR Acute MRL	0.00064
									Hazard Index	0.03361

NR= According to EPA, AEGL is "not recommended due to insufficient data"
NA= Not Available
NC= Not Calculated

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 (See Appendix A)

Mobile Laboratory Sampling Data Summary and Risk Assessment

Western Hills Neighborhood | June 15, 2023

Analyte	Cas No	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	11,022	0.17	7,495	0.01	0.01	670,000	298	OEHHA Acute REL	0.00005
ACETYLENE	74-86-2	11,022	0.99	7,495	0.15	0.20	NR	25,000	TCEQ Short-Term AMCV Health	0.00001
BENZENE	71-43-2	11,022	3.08	7,495	0.23	0.29	52,000	9	ATSDR Acute MRL	0.03199
BUTANES*	75-28-5	11,022	54.12	7,495	2.86	3.02	NR	33000	TCEQ Short-Term AMCV Health	0.00009
BUTENES*	590-18-1	11,022	20.08	7,495	2.48	2.84	NR	15000	TCEQ Short-Term AMCV Health	0.00019
CARBON DISULFIDE	75-15-0	11,022	0.05	7,495	0.00	0.00	13,000	1,991	OEHHA Acute REL	0.00000
CYCLOPENTANES*	287-92-3	11,022	25.33	7,495	2.99	3.49	NR	5,900	TCEQ Short-Term AMCV Health	0.00059
DECANES	124-18-5	11,022	0.10	7,495	0.05	0.05	NR	1,000	TCEQ Short-Term AMCV Health	0.00005
DIETHYLBENZENES*	141-93-5	11,022	0.19	7,495	0.10	0.11	NR	450	TCEQ Short-Term AMCV Health	0.00024
DIMETHYLCYCLOHEXANES*	638-04-0	11,022	0.10	7,495	0.04	0.04	NR	4,000	CDPHE	0.00001
DODECANES	112-40-3	11,022	0.01	7,495	0.00	0.00	NR	1720	CDPHE	0.00000
ETHYLENE	74-85-1	11,022	72.09	7,495	6.78	7.24	NR	500,000	TCEQ Short-Term AMCV Health	0.00001
HEPTANES*	142-82-5	11,022	0.22	7,495	0.07	0.08	NR	8,300	TCEQ Short-Term AMCV Health	0.00001
HEXANES*	110-54-3	11,022	0.25	7,495	0.08	0.08	NR	5,400	TCEQ Short-Term AMCV Health	0.00002
HEXENES*	592-41-6	11,022	5.27	7,495	0.89	1.11	NR	500	TCEQ Short-Term AMCV Health	0.00221
HYDROGEN CYANIDE	74-90-8	11,022	0.53	7,495	0.13	0.20	2,000	308	OEHHA Acute REL	0.00064
HYDROGEN SULFIDE	7783-06-4	11,022	0.40	7,495	0.11	0.14	510	70	ATSDR Acute MRL	0.00197
ISOPRENE	78-79-5	11,022	0.77	7,495	0.11	0.13	NR	1,400	TCEQ Short-Term AMCV Health	0.00009
METHANOL	67-56-1	11,022	24.98	7,495	5.07	5.24	530,000	21,366	OEHHA Acute REL	0.00025
METHYLCYCLOHEXANE	108-87-2	11,022	0.58	7,495	0.08	0.09	NR	4,000	TCEQ Short-Term AMCV Health	0.00002
NONANES	111-84-2	11,022	0.09	7,495	0.02	0.02	NR	3,000	TCEQ Short-Term AMCV Health	0.00001
OCTANES*	111-65-9	11,022	0.11	7,495	0.05	0.05	NR	4,100	TCEQ Short-Term AMCV Health	0.00001
PENTANES*	109-66-0	11,022	0.66	7,495	0.21	0.22	NR	68,000	TCEQ Short-Term AMCV Health	0.00000
PROPYLENE	115-07-1	11,022	6.31	7,495	0.42	0.51	NR	NA	NE	
STYRENE	100-42-5	11,022	0.19	7,495	0.08	0.09	20,000	5,000	ATSDR Acute MRL	0.00002
TETRACHLOROETHYLENE	127-18-4	11,022	0.06	7,495	0.01	0.01	35,000	6	ATSDR Acute MRL	0.00243
TOLUENE	108-88-3	11,022	12.60	7,495	0.67	0.93	67,000	2,000	ATSDR Acute MRL	0.00047
TRIMETHYLBENZENES*	622-96-8	11,022	1.94	7,495	0.23	0.31	50,000	250	TCEQ Short-Term AMCV Health	0.00124
UNDECANES	1120-21-4	11,022	0.09	7,495	0.04	0.05	NR	550	TCEQ Short-Term AMCV Health	0.00009
XYLENES*	1330-20-7	11,022	43.93	7,495	1.29	1.61	130,000	2,000	ATSDR Acute MRL	0.00081
									Hazard Index	0.04351

NR= According to EPA, AEGL is "not recommended due to insufficient data"
NA= Not Available
NC= Not Calculated

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 (See Appendix A)

APPENDIX D
PTR CALIBRATION AND QA/QC DATA

Notable Sampling Events During Test Program

6-12-23 Pioneer Park Neighborhood
12:27 pm. Monaco and 70th Ave: Benzene, toluene spike, wastewater truck
13:26 pm. 67th and Parkway: Toluene spike, intersection traffic
14:32 pm. 56th and Monaco: BTEX spike, Diesel truck exhaust
15:00 pm. 60th and Niagara: BTEX spike, Diesel truck exhaust
15:30 p.m. 64th and Magnolia: Benzene, xylene spike, intersection traffic

6-13-23 Elyria-Swansea Neighborhood
17:78 pm. York and 48th: Small BTEX spike, Traffic intersection
18:39 pm. 46th and I-70 intersection: Pentene, hexene spike, traffic
18:43 pm. 50th Ave and Clayton: H_2S spike, unknown origin

6-14-23 Adams City Neighborhood
17:11 pm. 72nd and Dahlia: BTEX spike, truck exhaust
18:29 pm. Savarini Blvd and Brighton Road, H2S Spike, unknown
18:35 pm. 74th and Brighton: BTEX spike, car exhaust
18:49 pm. Cherry and I-70: Toluene spike, car exhaust

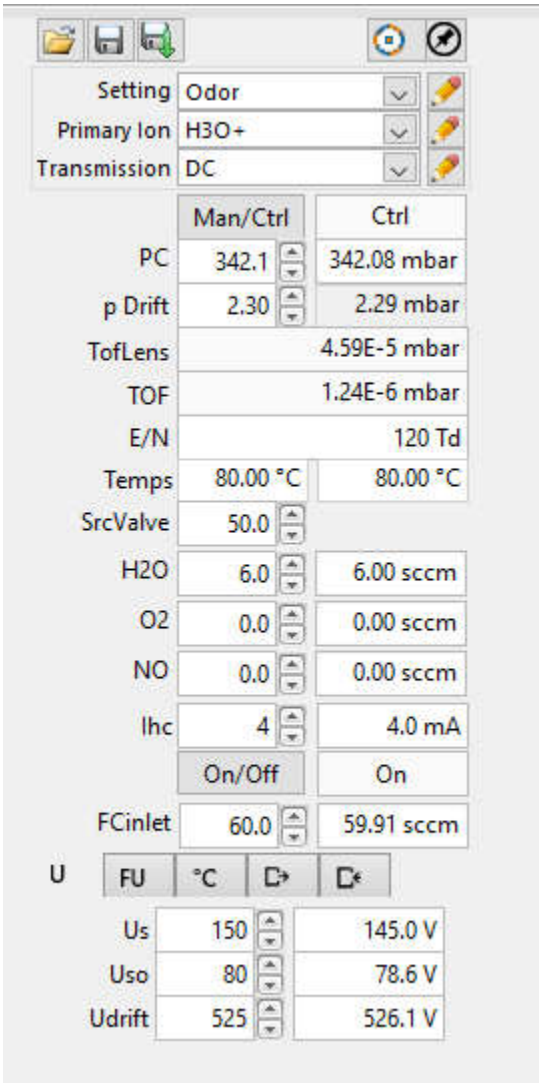
6-15-23 Western Hills Neighborhood
10:39 am. Campo and Greenwood Blvd: BTEX spike, truck exhaust
10:59 am. 70th and Joan Drive: BTEX spike, unknown

6-15-23 Globeville Neighborhood
14:55 pm. N. Pennes and 45th: BTEX spike, intersection
15:14 pm. 46th and Lincoln: BTEX spike, near highway

6-16-23 Dupont Neighborhood
11:03 am. Ladore and E. 79th Place: BTEX spike, open gasoline can with open car hood, repair
11:12 am. 80th and Monaco: BTEX truck exhaust
13:03 pm. 73rd and Magnolia: BTEX and alkene spike, truck traffice

Commerce City North Denver Neighborhood Monitoring
Second Quarter 2023
PTR Screen Shots

Initial Operating Parameters - Initial Calibration Check 6-11-23



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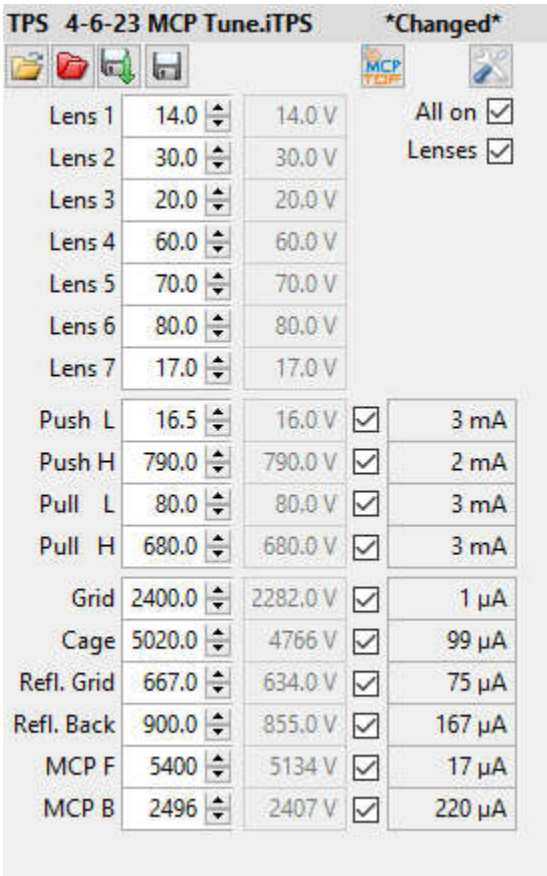

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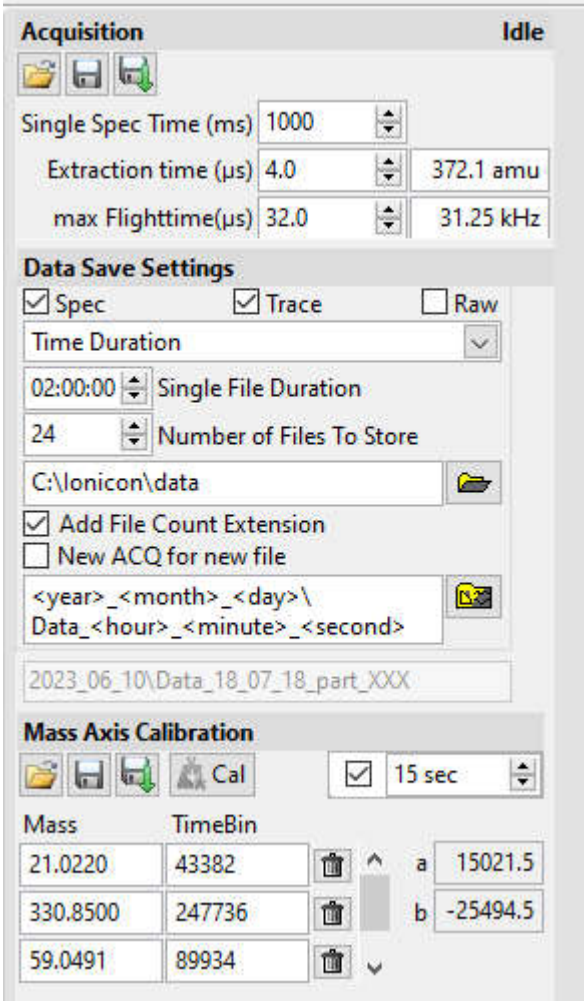

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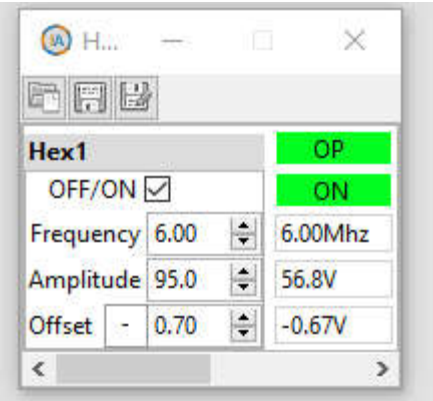

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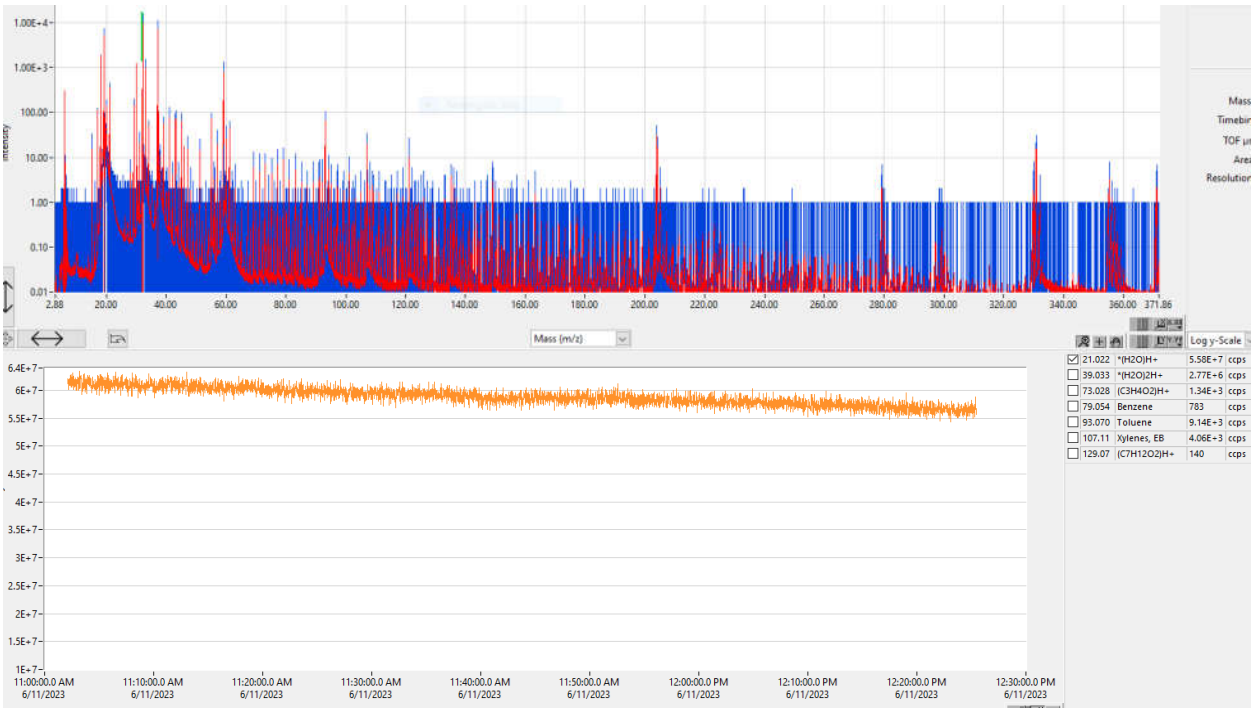

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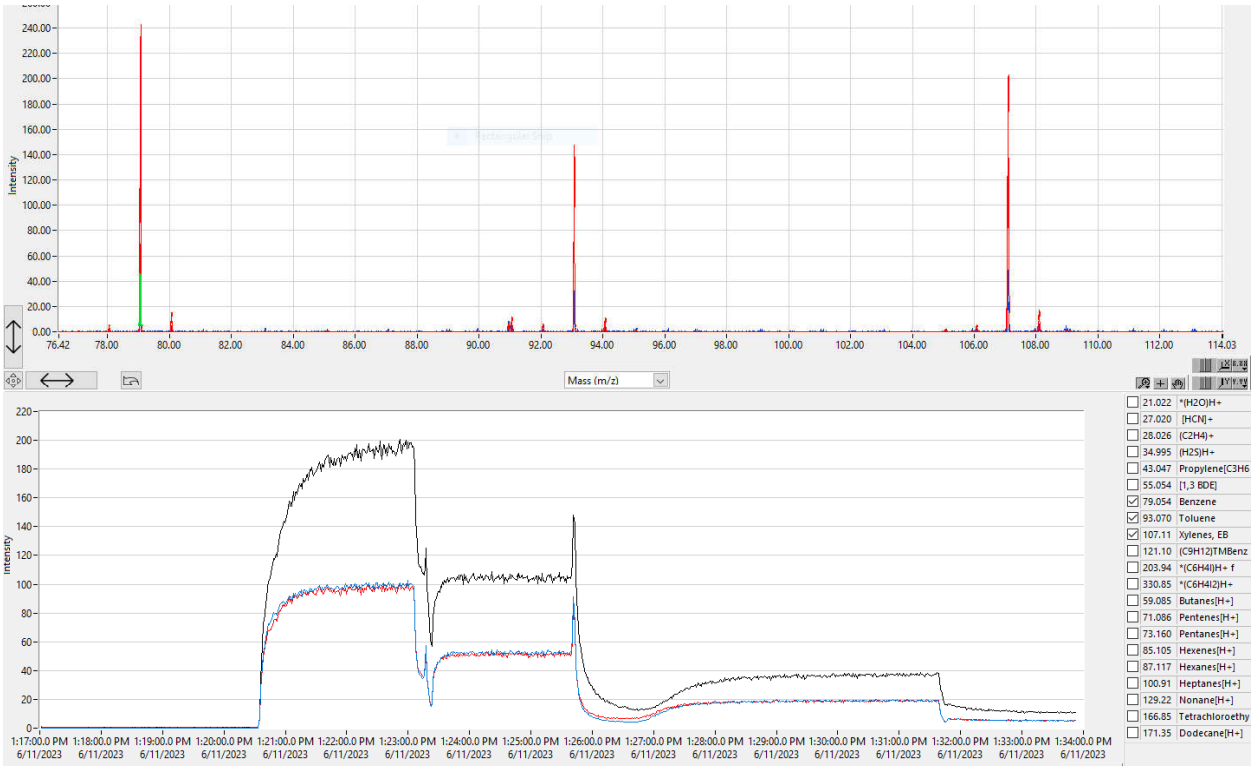
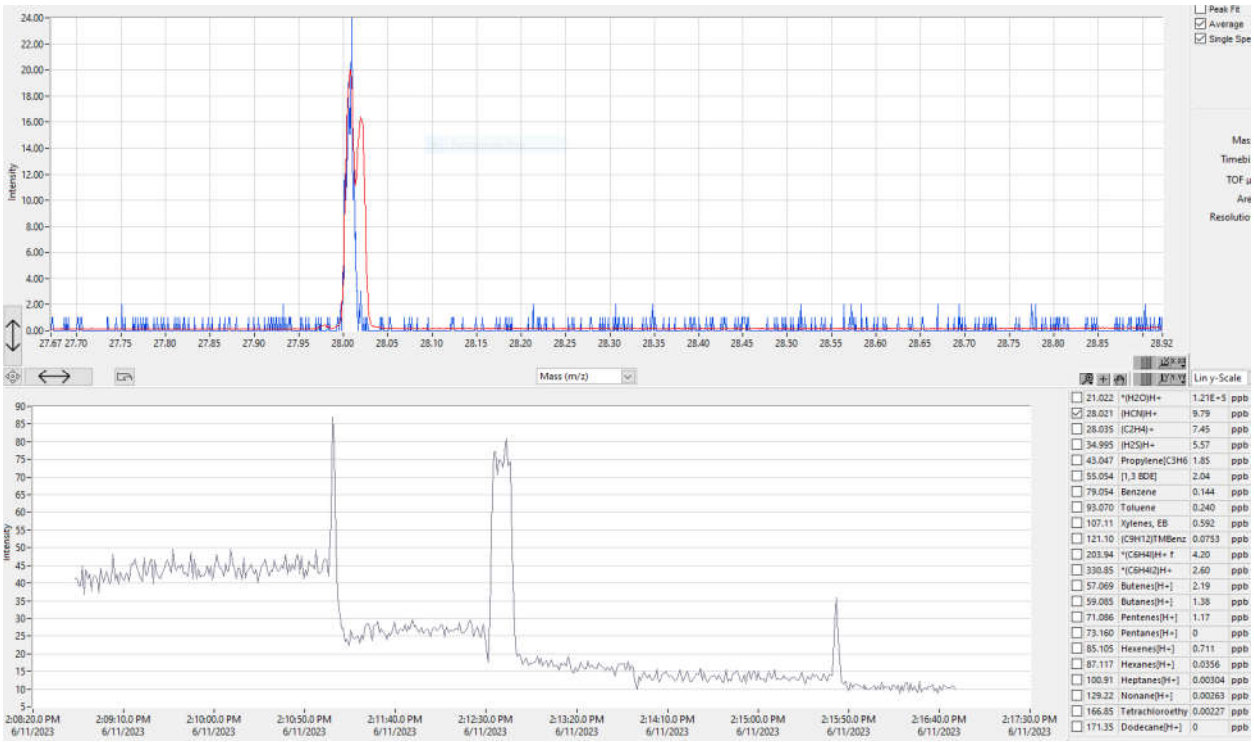
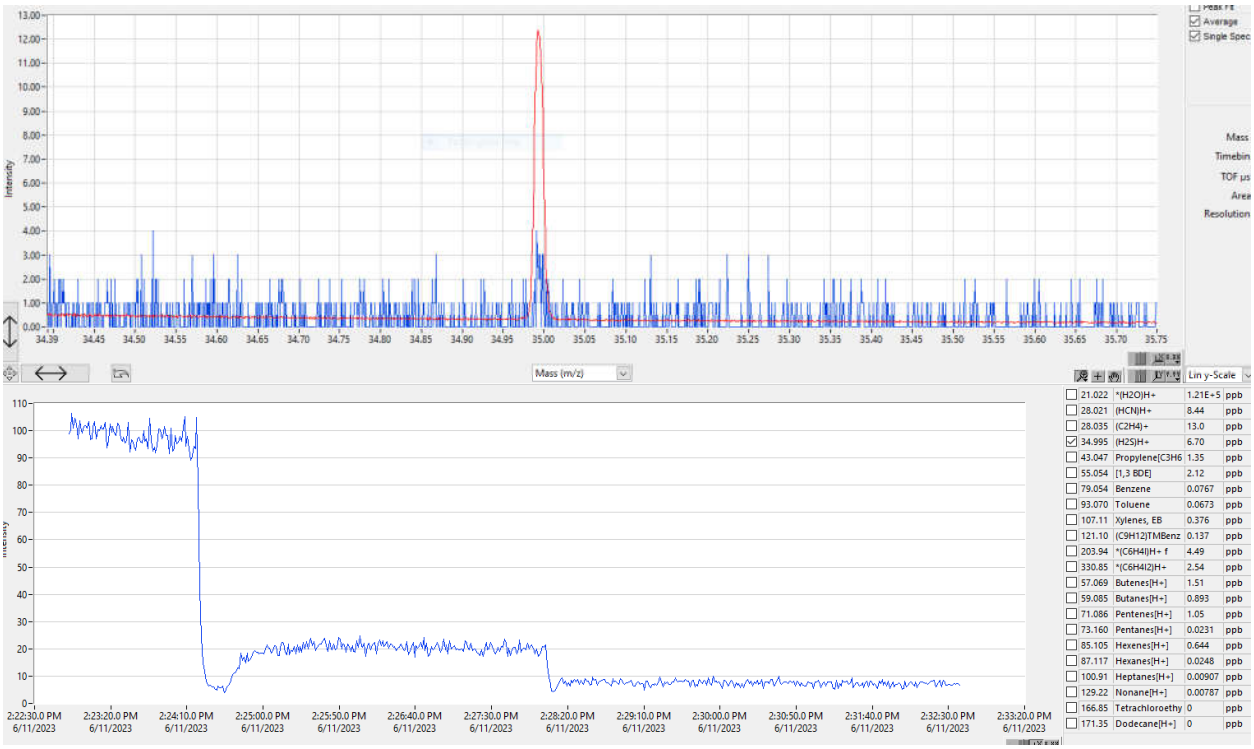


BTEX Calibration 100, 50, 20 and 5 ppb

Alkenes 100, 50 and 10 ppb



HCN 50, 20 and 10 ppb



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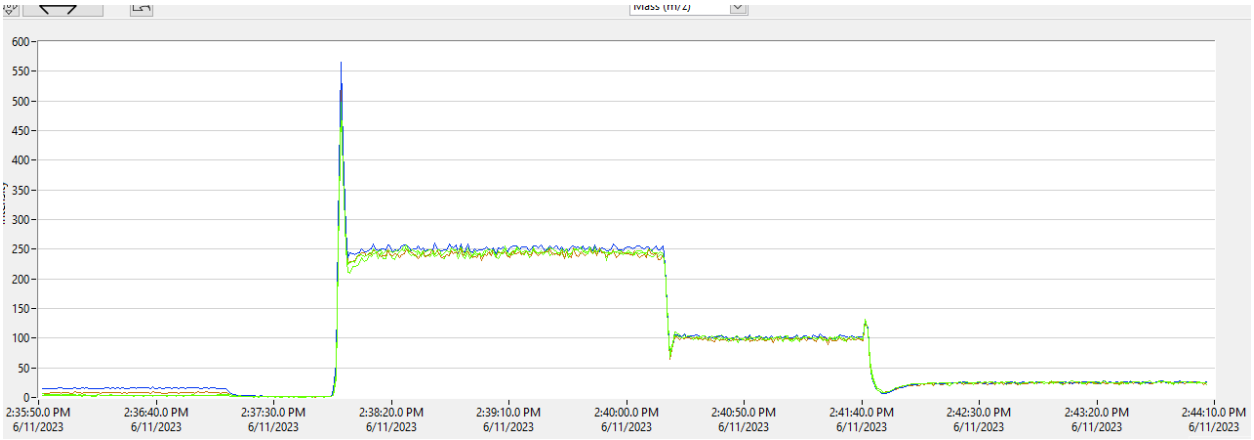
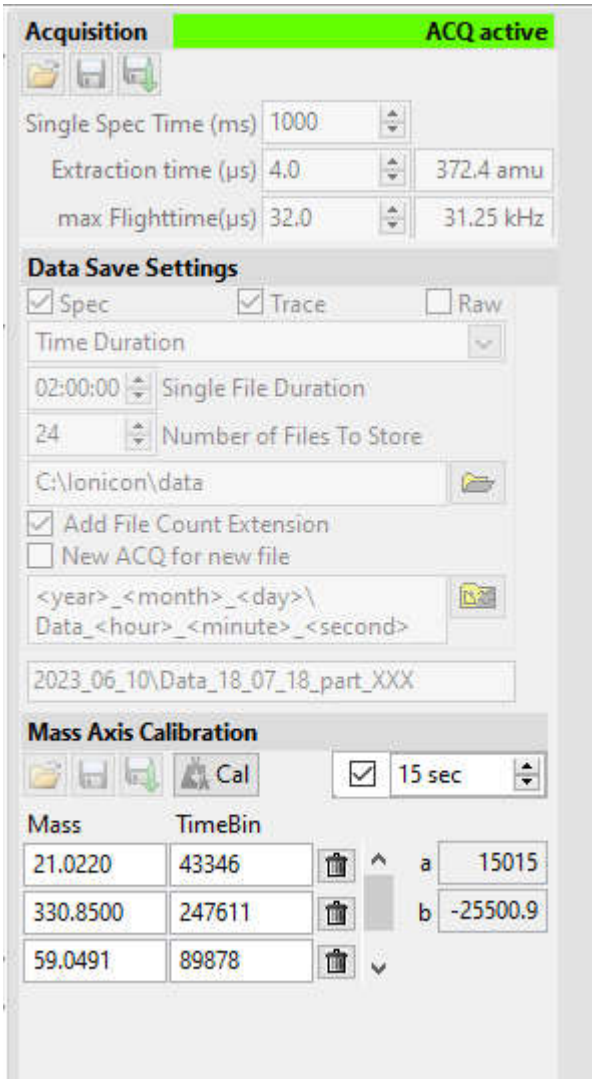


Alkanes Calibration 250, 100 and 25 ppb

6-12-23 Pioneer Park



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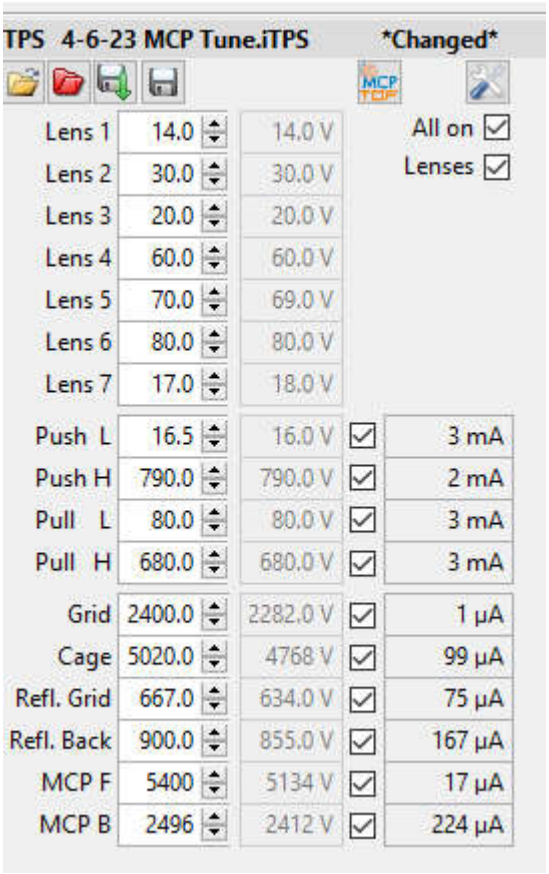

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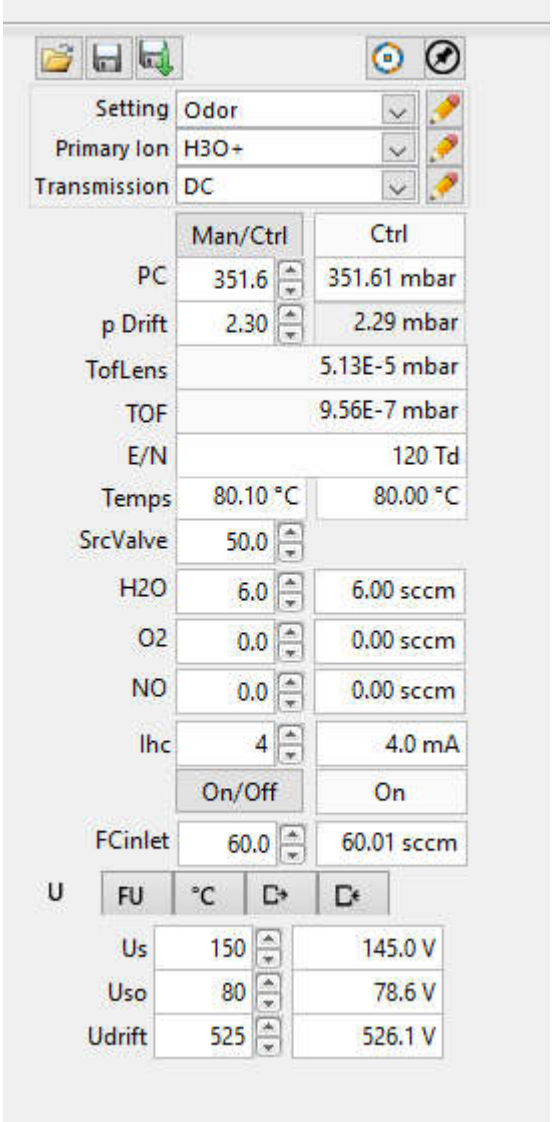

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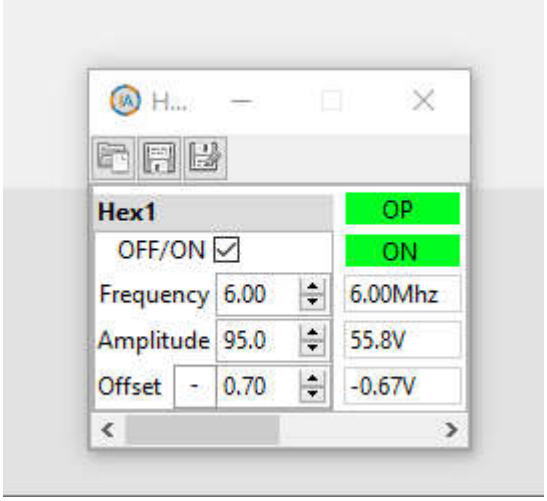

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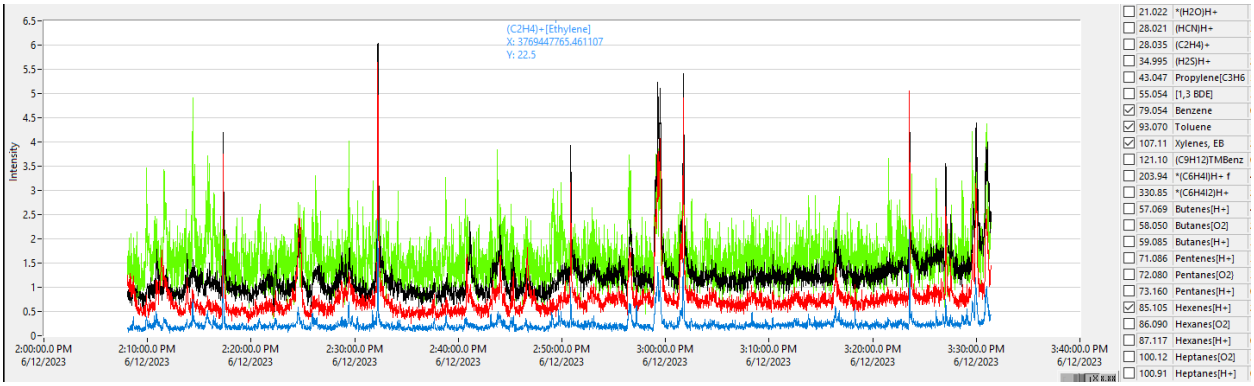
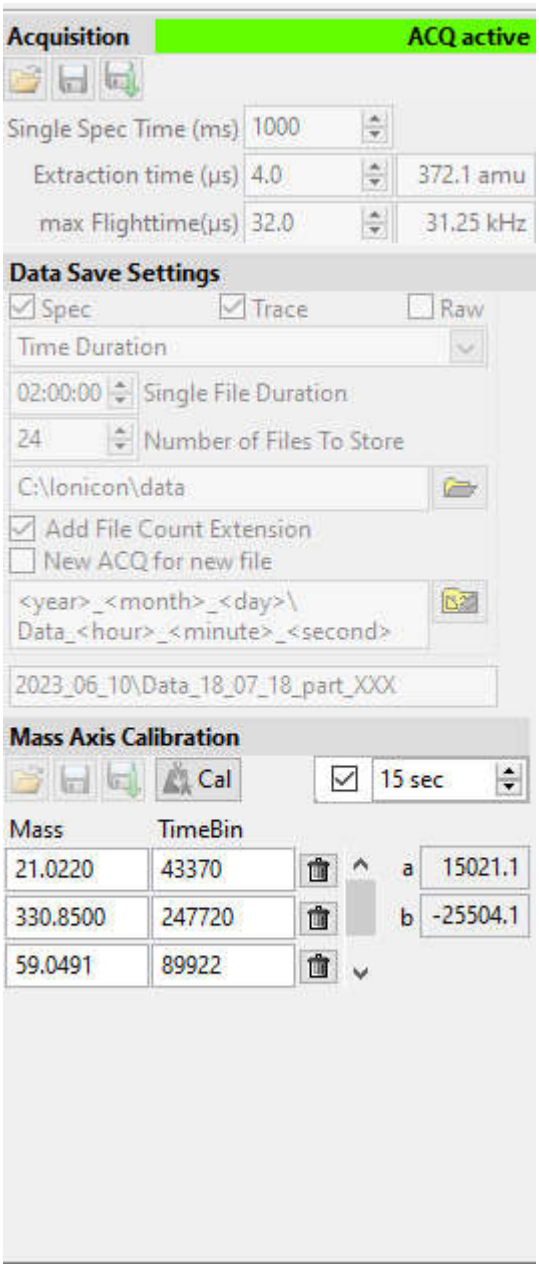


Pioneer Park Afternoon Sampling

6-13-23 Elyria-Swansea



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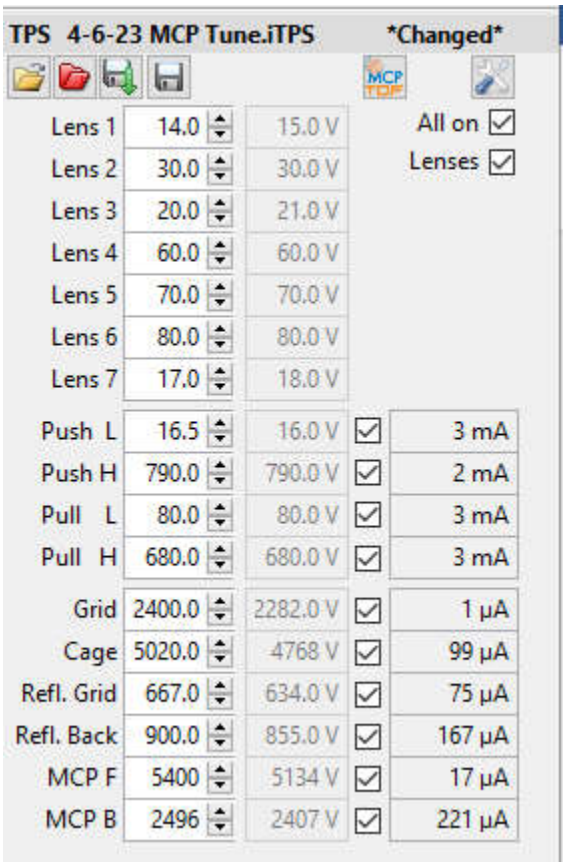
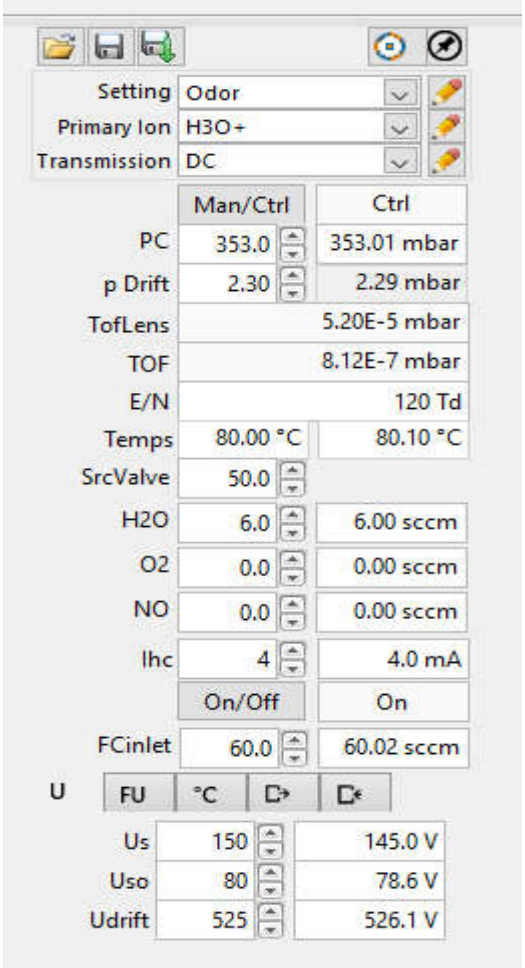


TOF Voltages



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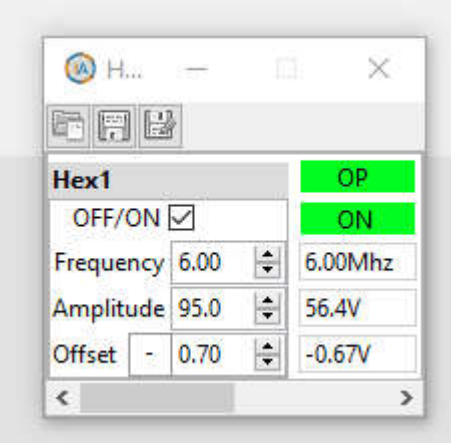
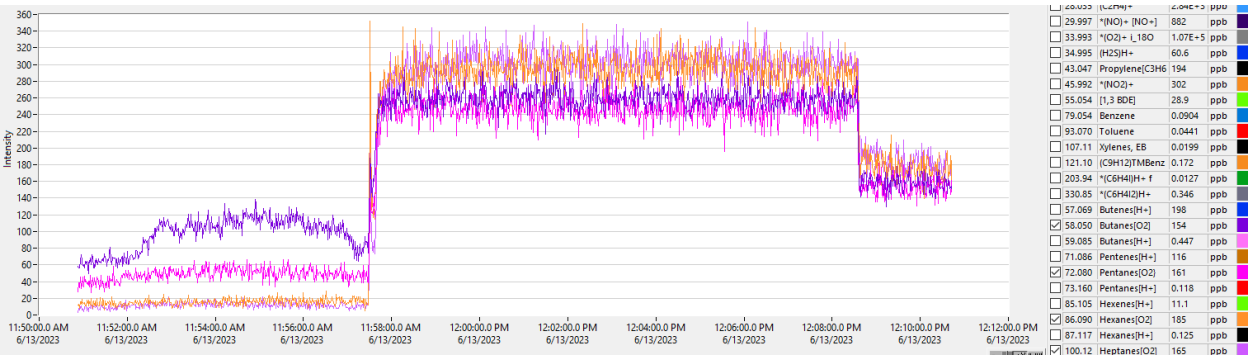
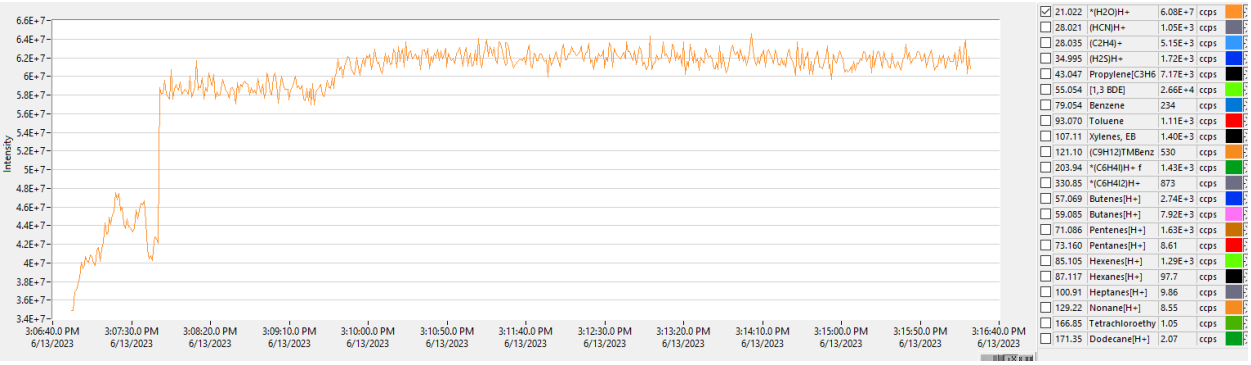


Hex Settings

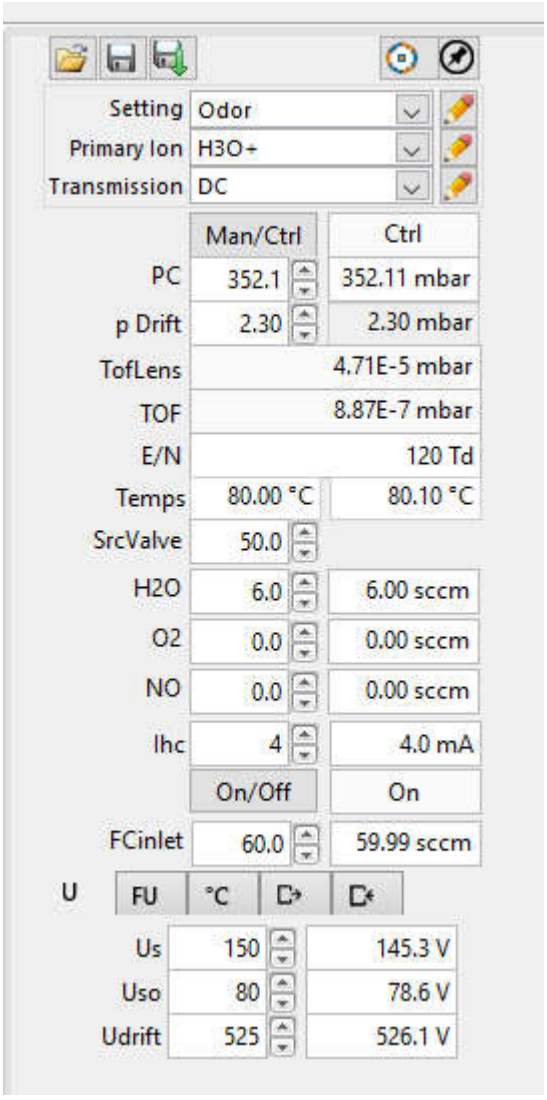


Alkanes Cal Check

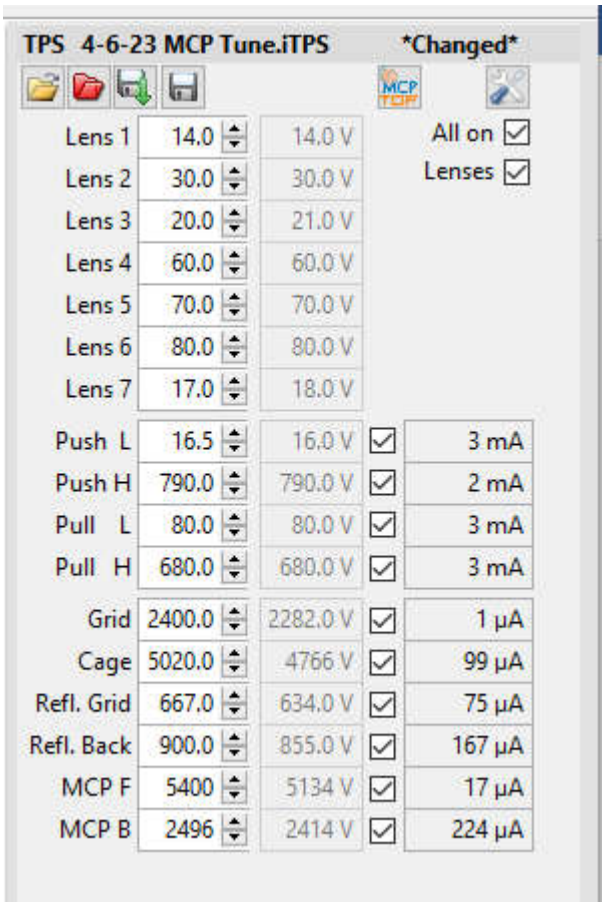


Hydronium Stability Check

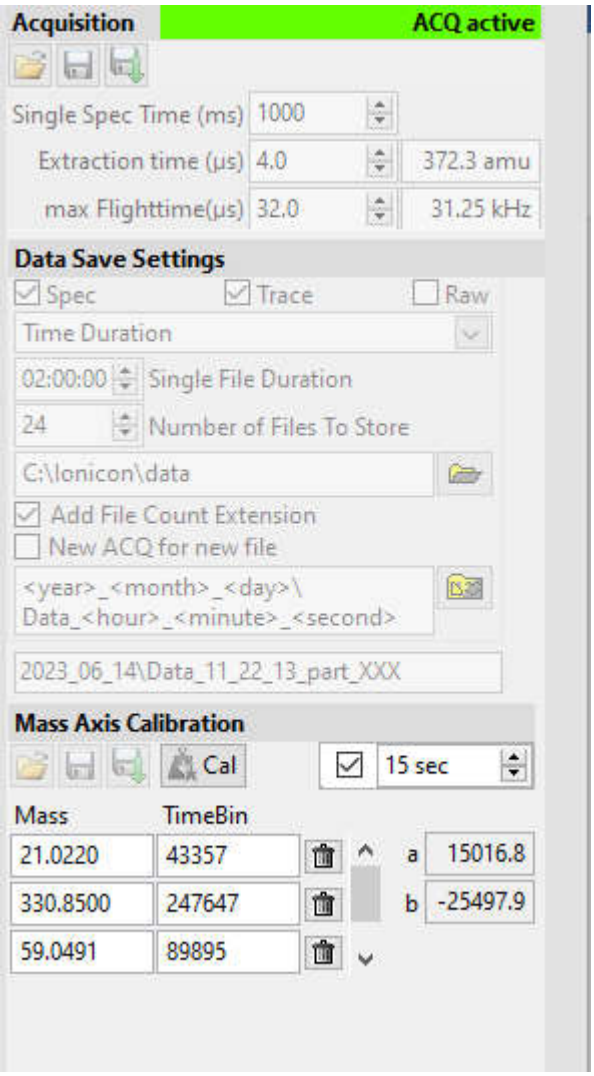
6-14-23 Adams City Testing



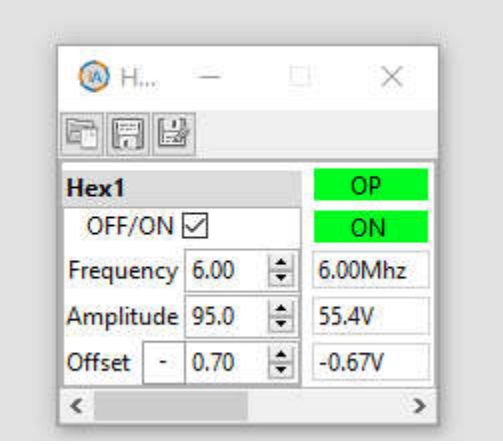
Production Settings



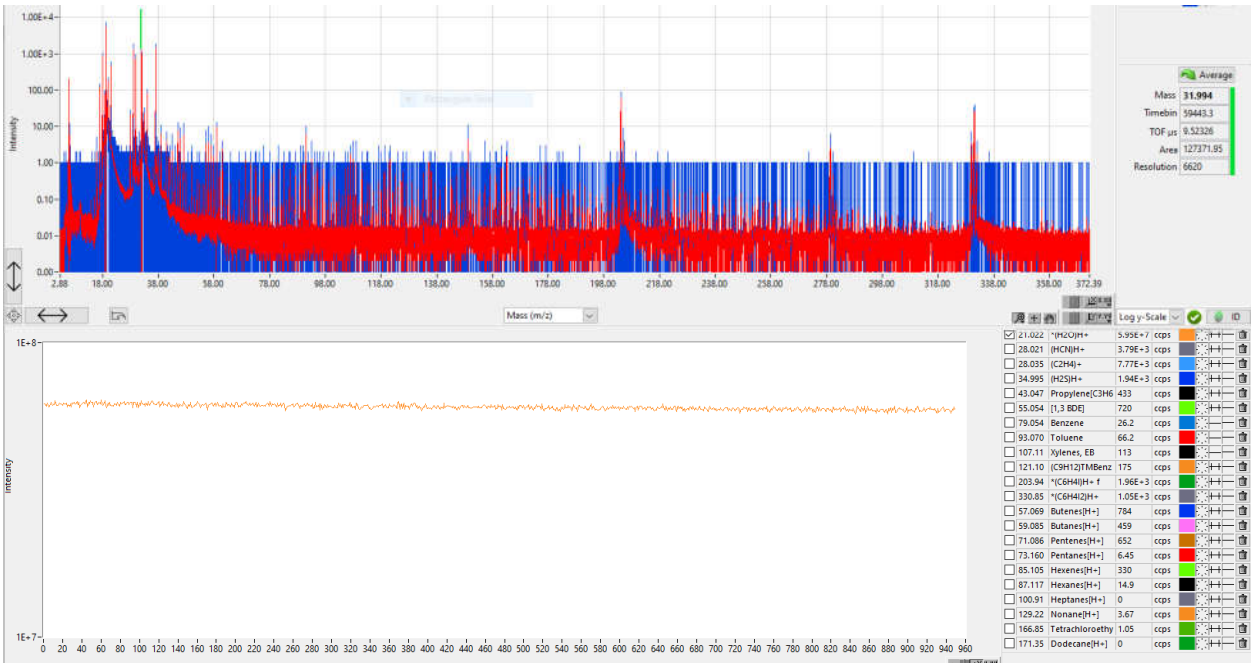
TOF Voltages



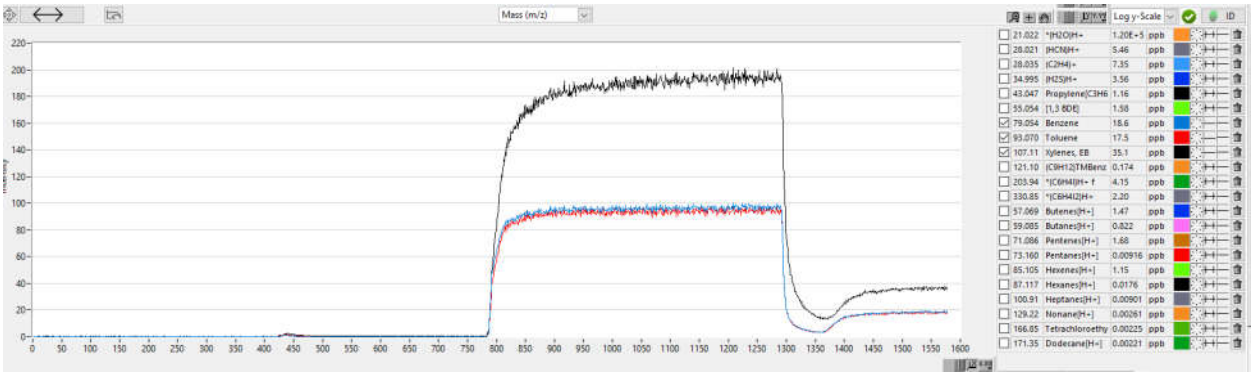
Acquisition Settings



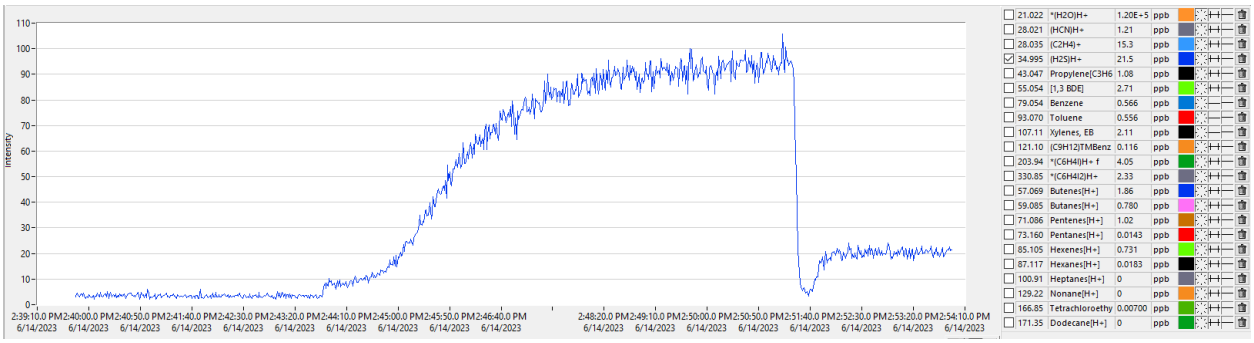
Hex Settings



Stability Check

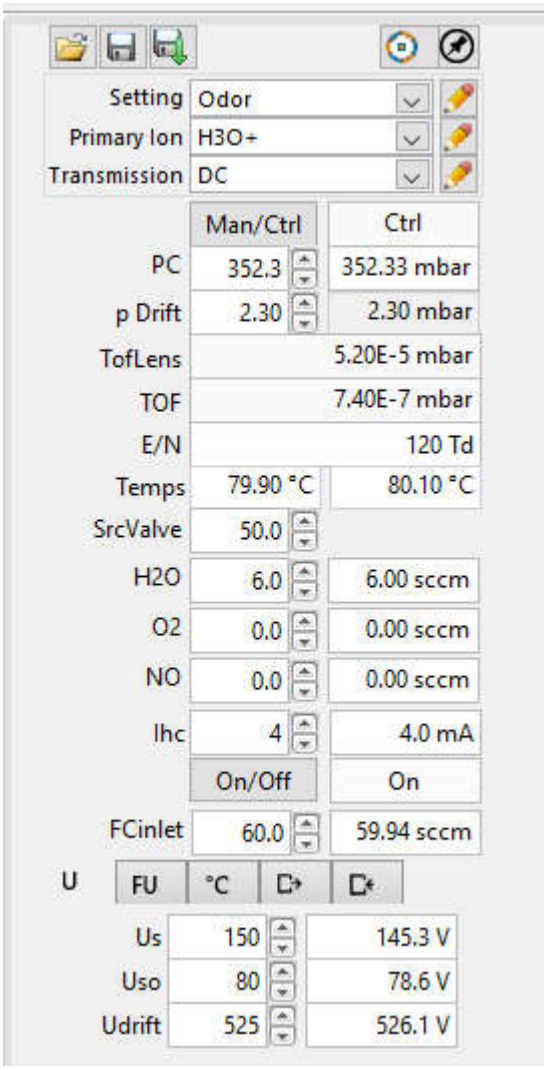


BTEX Cal Checks

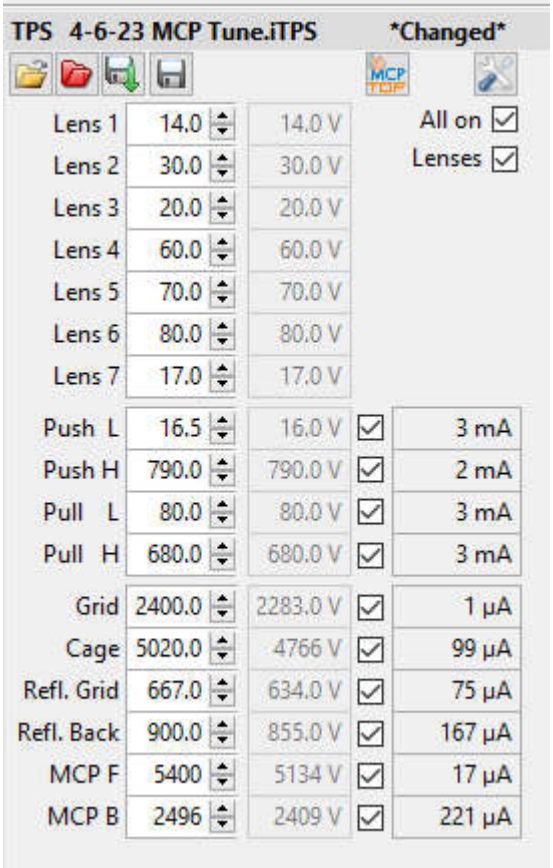


H_2S Cal Checks

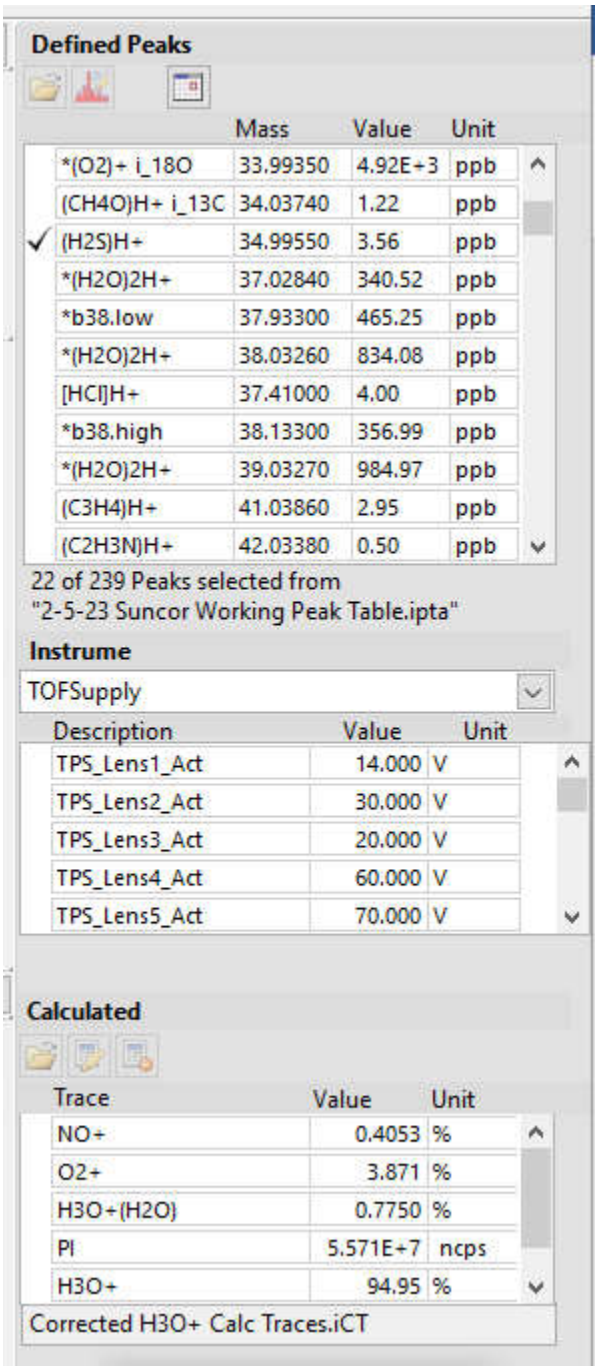
6-15-23 Western Hills and Globeville



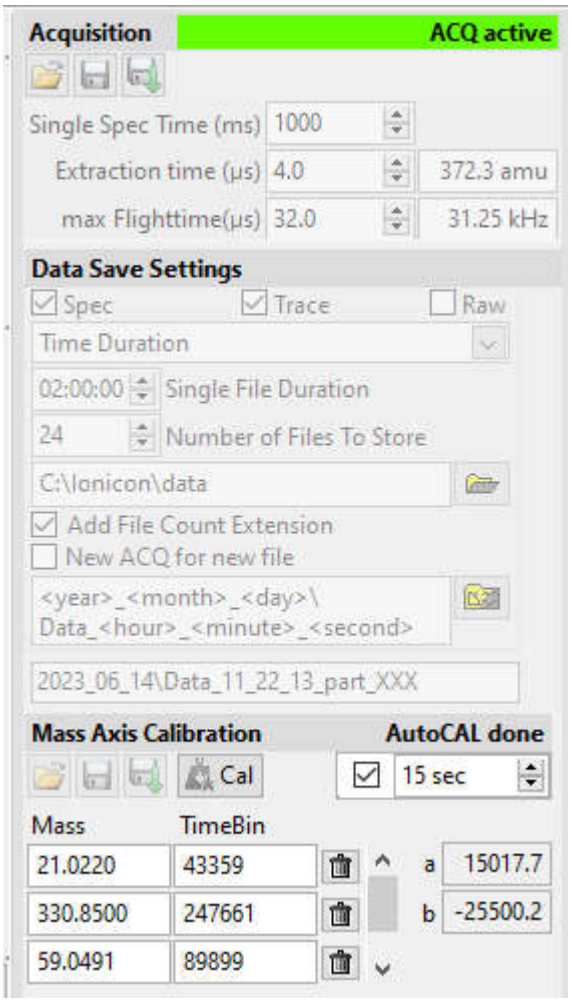
Production Settings



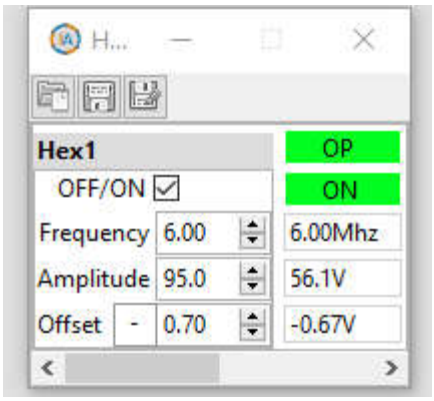
TOF Voltages



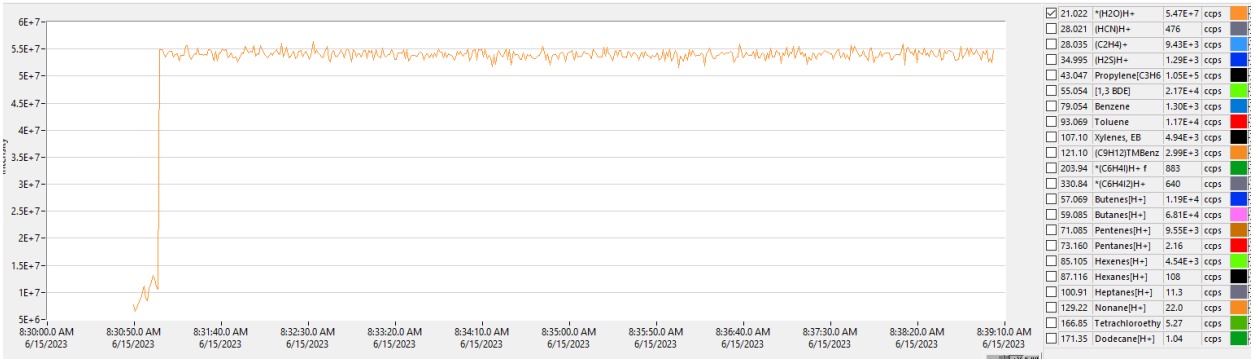
Peak Table and Calc Traces



Acquisition Settings

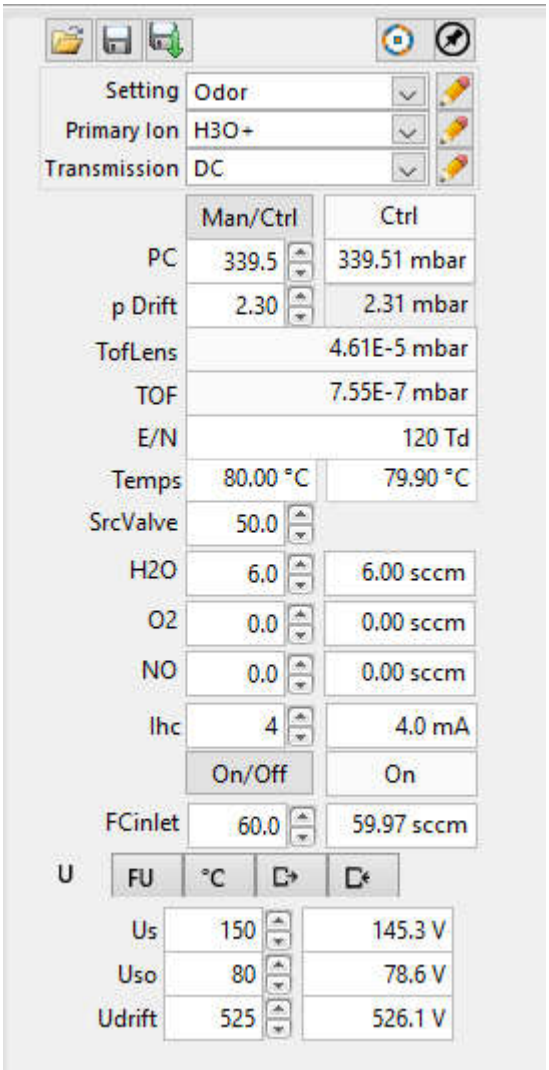


Hexapole Settings

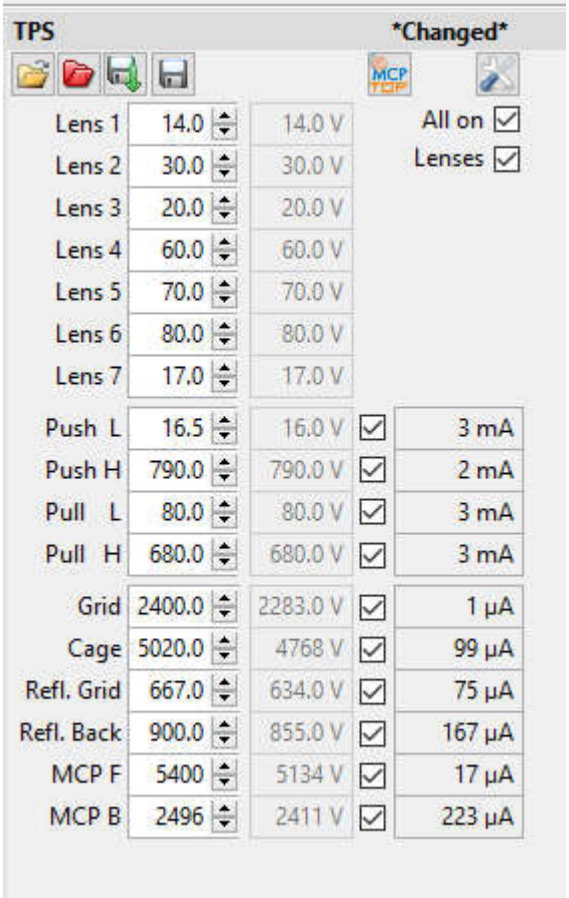


Hydronium Stability

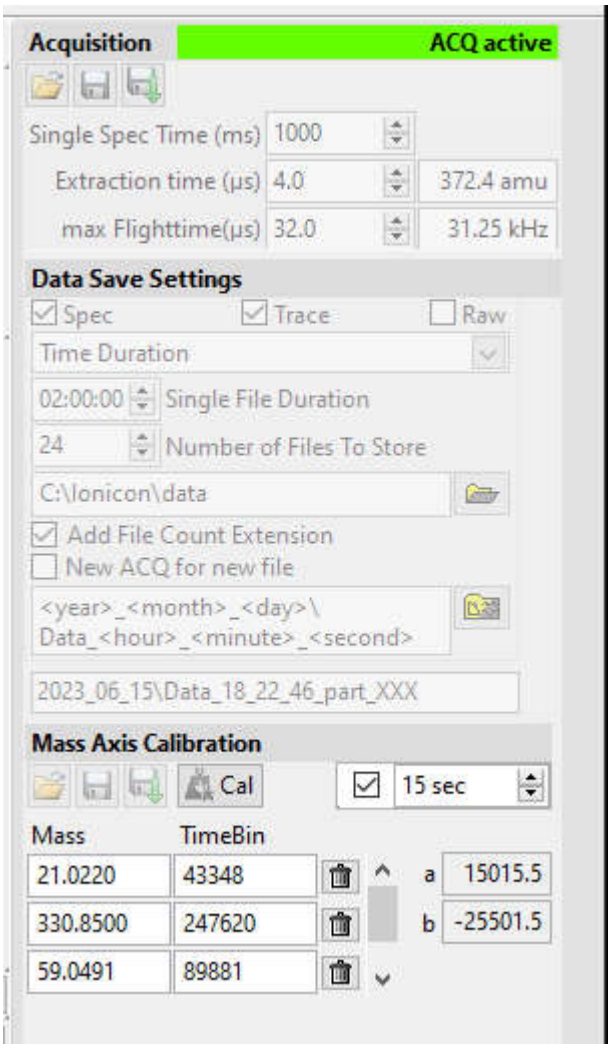
6-16-23 Dupont Testing



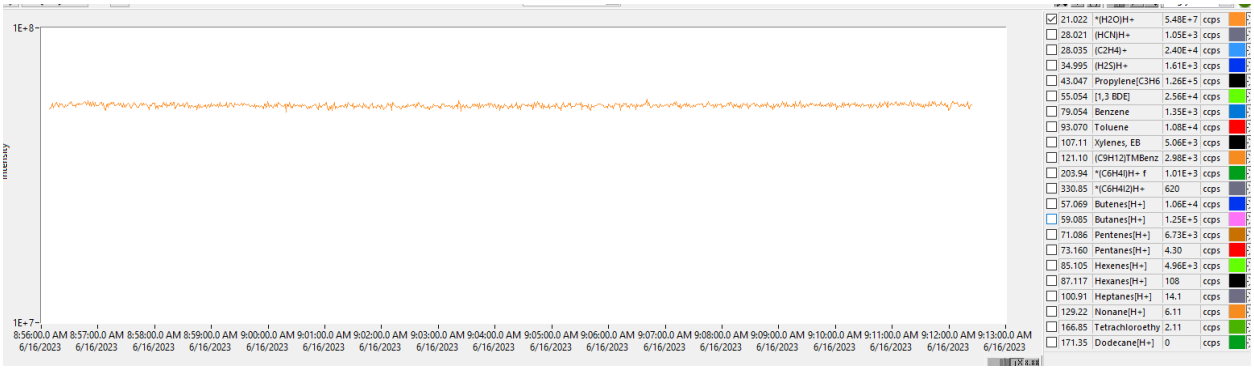
Production Settings



TOF Settings

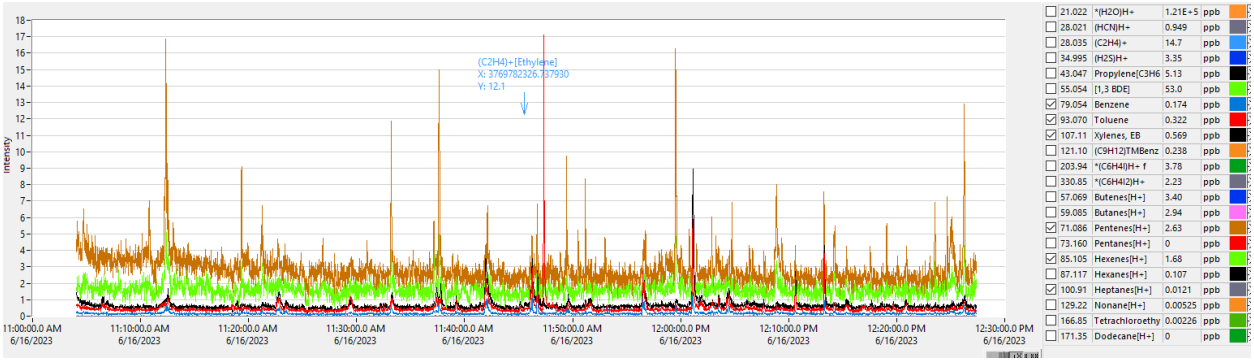


Acquisition Settings



Hydronium Stability

CCND Mobile Monitoring Van
2023 Q2



Dupont Field Data

PTR Calibration Checks

Date	Time	Initial Instrument Calibration Calibration Gas Component	Calibration Value (ppb v)	Response (ppb v)	Difference (% of value)	Pass/Fail
6/11/2023	13:22	Benzene	100	99.5	-0.5	Pass
		Toluene	100	98.9	-1.1	Pass
		Xylenes	200	201	0.5	Pass
	13:25	Benzene	50	51.2	2.4	Pass
		Toluene	50	50.7	1.4	Pass
		Xylenes	100	101	1.0	Pass
	13:31	Benzene	20	19.3	-3.5	Pass
		Toluene	20	19.2	-4.0	Pass
		Xylenes	40	38.4	-4.0	Pass
	13:33	Benzene	5	5.1	2.0	Pass
		Toluene	5	4.9	-2.0	Pass
		Xylenes	10	9.7	-3.0	Pass
	13:45	Ethylene	100	102	2.0	Pass
		Propylene	100	95.7	-4.3	Pass
		1-Butene	100	104	4.0	Pass
		1-Pentene	100	99.3	-0.7	Pass
		1-Hexene	100	98.3	-1.7	Pass
		1,3-Butadiene	100	99.2	-0.8	Pass
	13:48	Ethylene	50	45.5	-9.0	Pass
		Propylene	50	50.2	0.4	Pass
		1-Butene	50	51.8	3.6	Pass
		1-Pentene	50	48.3	-3.4	Pass
		1-Hexene	50	50.2	0.4	Pass
		1,3-Butadiene	50	50.1	0.2	Pass
	13:50	Ethylene	10	11.5	15.0	Pass
		Propylene	10	9.48	-5.2	Pass
		1-Butene	10	9.97	-0.3	Pass
		1-Pentene	10	9.31	-6.9	Pass
		1-Hexene	10	9.77	-2.3	Pass
		1,3-Butadiene	10	10.9	9	Pass
	14:10	HCN	50	45.7	-8.6	Pass
	14:12	HCN	25	25.7	2.8	Pass
	14:16	HCN	10	9.63	-3.7	Pass
	14:23	H_2S	100	98.6	-1.4	Pass
	14:27	H_2S	20	19.8	-1.0	Pass
	14:31	H_2S	5	5.84	16.8	Pass
	14:39	Butane	250	254	1.6	Pass
		Pentane	250	249	-0.4	Pass
		Hexane	250	246	-1.6	Pass
		Heptane	250	242	-3.2	Pass
	14:41	Butane	100	101	1.0	Pass
		Pentane	100	102	2.0	Pass
		Hexane	100	102	2.0	Pass
		Heptane	100	101	1.0	Pass
	14:43	Butane	25	24.9	-0.4	Pass
		Pentane	25	25.3	1.2	Pass
		Hexane	25	24.6	-1.6	Pass
		Heptane	25	25.1	0.4	Pass

Instrument Calibration Check						
Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Response (ppb v)	Difference (% of value)	Pass/Fail
6/12/2023 Pioneer Park	9:36	Ethylene	50	54.9	9.8	Pass
		Propylene	50	50.5	1.0	Pass
		1-Butene	50	51	2.0	Pass
		1-Pentene	50	50.6	1.2	Pass
		1-Hexene	50	49.9	-0.2	Pass
		1,3-Butadiene	50	52	4.0	Pass
	9:47	Benzene	100	98.4	-1.6	Pass
		Toluene	100	99.7	-0.3	Pass
		Xylenes	200	202	1.0	Pass
	9:52	Benzene	20	19	-5.0	Pass
		Toluene	20	18.9	-5.5	Pass
		Xylenes	40	39.3	-1.8	Pass
	10:08	HCN	25	24.9	-0.4	Pass
	9:59	H_2S	100	101	1.0	Pass
	10:01	H_2S	20	20.3	1.5	Pass
	10:13	Butane	150	144	-4.0	Pass
		Pentane	150	148	-1.3	Pass
		Hexane	150	140	-6.7	Pass
		Heptane	150	144	-4.0	Pass
		HCN	25	26.4	5.6	Pass
	16:40	H_2S	50	47.4	-5.2	Pass
	16:24	Butane	150	144	-4.0	Pass
		Pentane	150	136	-9.3	Pass
		Hexane	150	141	-6.0	Pass
		Heptane	150	144	-4.0	Pass
	16:30	Benzene	20	18.9	-5.5	Pass
		Toluene	20	18.4	-8.0	Pass
		Xylenes	40	36.8	-8.0	Pass
	16:52	Ethylene	50	54.1	8.2	Pass
		Propylene	50	47.9	-4.2	Pass
		1-Butene	50	51.3	2.6	Pass
		1-Pentene	50	46.1	-7.8	Pass
		1-Hexene	50	46.6	-6.8	Pass
		1,3-Butadiene	50	49.8	-0.4	Pass

Instrument Calibration Check						
Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Response (ppb v)	Difference (% of value)	Pass/Fail
6/13/2023 Swansea Evening	14:42	Ethylene	50	50.4	0.8	Pass
		Propylene	50	48.2	-3.6	Pass
		1-Butene	50	50.1	0.2	Pass
		1-Pentene	50	52.2	4.4	Pass
		1-Hexene	50	48	-4.0	Pass
		1,3-Butadiene	50	50.8	1.6	Pass
	14:33	Benzene	100	98.5	-1.5	Pass
		Toluene	100	100.1	0.1	Pass
		Xylenes	200	197	-1.5	Pass
	14:42	Benzene	20	19.1	-4.5	Pass
		Toluene	20	18.8	-6.0	Pass
		Xylenes	40	36.8	-8.0	Pass
	15:03	HCN	25	26.8	7.2	Pass
	15:49	H_2S	100	99.5	-0.5	Pass
	14:50	H_2S	20	21.4	7.0	Pass
	12:08	Butane	150	161	7.3	Pass
		Pentane	150	154	2.7	Pass
		Hexane	150	162	8.0	Pass
		Heptane	150	165	10.0	Pass
	20:28	HCN	25	27.5	10.0	Pass
	20:35	H_2S	20	19	-5.0	Pass
	20:47	Butane	150	142	-5.3	Pass
		Pentane	150	139	-7.3	Pass
		Hexane	150	137	-8.7	Pass
		Heptane	150	142	-5.3	Pass
	20:42	Benzene	20	20.8	4.0	Pass
		Toluene	20	19.7	-1.5	Pass
		Xylenes	40	37.6	-6.0	Pass
	20:44	Ethylene	50	54.7	9.4	Pass
		Propylene	50	46.9	-6.2	Pass
		1-Butene	50	49.2	-1.6	Pass
		1-Pentene	50	46.5	-7.0	Pass
		1-Hexene	50	45.5	-9.0	Pass
		1,3-Butadiene	50	48.4	-3.2	Pass

Instrument Calibration Check						
Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Response (ppb v)	Difference (% of value)	Pass/Fail
6/14/2023	14:16	Ethylene	50	49.2	-1.6	Pass
Adams City		Propylene	50	49.5	-1.0	Pass
Evening		1-Butene	50	52.1	4.2	Pass
		1-Pentene	50	46.9	-6.2	Pass
		1-Hexene	50	48.3	-3.4	Pass
		1,3-Butadiene	50	49.9	-0.2	Pass
	14:28	Benzene	100	98.9	-1.1	Pass
		Toluene	100	96.4	-3.6	Pass
		Xylenes	200	191	-4.5	Pass
		Benzene	20	18.6	-7.0	Pass
		Toluene	20	18.4	-8.0	Pass
		Xylenes	40	38.4	-4.0	Pass
	14:43	HCN	25	23.7	-5.2	Pass
	14:50	H_2S	100	95.5	-4.5	Pass
	14:53		20	19.6	-2.0	Pass
	14:58	Butane	150	148	-1.3	Pass
		Pentane	150	135	-10.0	Pass
		Hexane	150	139	-7.3	Pass
		Heptane	150	139	-7.3	Pass
	19:50	HCN	25	24.7	-1.2	Pass
	19:56	H_2S	50	46.3	-7.4	Pass
	19:59	Butane	150	147	-2.0	Pass
		Pentane	150	142	-5.3	Pass
		Hexane	150	143	-4.7	Pass
		Heptane	150	146	-2.7	Pass
	20:04	Benzene	20	21.1	5.5	Pass
		Toluene	20	20	0.0	Pass
		Xylenes	40	38.5	-3.8	Pass
	20:06	Ethylene	50	50.2	0.4	Pass
		Propylene	50	50.5	1.0	Pass
		1-Butene	50	54	8.0	Pass
		1-Pentene	50	49.2	-1.6	Pass
		1-Hexene	50	48.9	-2.2	Pass
		1,3-Butadiene	50	52.1	4.2	Pass

Instrument Calibration Check						
Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Response (ppb v)	Difference (% of value)	Pass/Fail
6/15/2023	8:42	Ethylene	50	56.1	12.2	Pass
		Propylene	50	49.3	-1.4	Pass
		1-Butene	50	53.2	6.4	Pass
		1-Pentene	50	48.9	-2.2	Pass
		1-Hexene	50	49.3	-1.4	Pass
		1,3-Butadiene	50	52.2	4.4	Pass
	8:45	Benzene	100	97.8	-2.2	Pass
		Toluene	100	96.9	-3.1	Pass
		Xylenes	200	199	-0.5	Pass
	8:47	Benzene	20	19.8	-1.0	Pass
		Toluene	20	18.9	-5.5	Pass
		Xylenes	40	40.5	1.3	Pass
	8:50	HCN	25	24.6	-1.6	Pass
	8:53	H_2S	100	99.3	-0.7	Pass
	8:55		20	21.1	5.5	Pass
	8:58	Butane	150	146	-2.7	Pass
		Pentane	150	145	-3.3	Pass
		Hexane	150	146	-2.7	Pass
		Heptane	150	143	-4.7	Pass
	16:44	HCN	25	24.9	-0.4	Pass
	16:44	H_2S	50	45.6	-8.8	Pass
	16:53	Butane	150	143	-4.7	Pass
		Pentane	150	128	-14.7	Pass
		Hexane	150	135	-10.0	Pass
		Heptane	150	141	-6.0	Pass
	16:49	Benzene	20	21.5	7.5	Pass
		Toluene	20	21	5.0	Pass
		Xylenes	40	39.1	-2.3	Pass
	16:55	Ethylene	50	52.9	5.8	Pass
		Propylene	50	50.9	1.8	Pass
		1-Butene	50	54.7	9.4	Pass
		1-Pentene	50	47.9	-4.2	Pass
		1-Hexene	50	48.4	-3.2	Pass
		1,3-Butadiene	50	53.3	6.6	Pass

Instrument Calibration Check						
Date	Time	Calibration Gas Component	Calibration Value (ppb v)	Response (ppb v)	Difference (% of value)	Pass/Fail
6/16/2023	9:25	Ethylene	50	46.8	-6.4	Pass
		Propylene	50	58.1	16.2	Pass
		1-Butene	50	54.7	9.4	Pass
		1-Pentene	50	57	14.0	Pass
		1-Hexene	50	54.6	9.2	Pass
		1,3-Butadiene	50	55.2	10.4	Pass
	9:18	Benzene	100	93.9	-6.1	Pass
		Toluene	100	92.9	-7.1	Pass
		Xylenes	200	182	-9.0	Pass
	9:23	Benzene	20	18.3	-8.5	Pass
		Toluene	20	18.2	-9.0	Pass
		Xylenes	40	39.9	-0.3	Pass
	9:29	HCN	25	23.8	-4.8	Pass
	9:33	H_2S	100	104	4.0	Pass
	9:34		20	22.8	14.0	Pass
	9:37	Butane	150	163	8.7	Pass
		Pentane	150	157	4.7	Pass
		Hexane	150	162	8.0	Pass
		Heptane	150	149	-0.7	Pass
	14:40	HCN	25	26.1	4.4	Pass
	14:49	H_2S	50	48.4	-3.2	Pass
	14:36	Butane	150	150	0.0	Pass
		Pentane	150	146	-2.7	Pass
		Hexane	150	139	-7.3	Pass
		Heptane	150	139	-7.3	Pass
	14:47	Benzene	20	19.7	-1.5	Pass
		Toluene	20	19	-5.0	Pass
		Xylenes	40	37.2	-7.0	Pass
	14:38	Ethylene	50	52.6	5.2	Pass
		Propylene	50	50.5	1.0	Pass
		1-Butene	50	55.4	10.8	Pass
		1-Pentene	50	56.1	12.2	Pass
		1-Hexene	50	50.1	0.2	Pass
		1,3-Butadiene	50	54.2	8.4	Pass

APPENDIX E
CALIBRATION GAS CERTIFICATION SHEETS

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Customer:	MONTROSE AIR QUALITY SERVICES LLC		
Part Number:	X02NI99C15W0061	Reference Number:	126-402278540-1
Cylinder Number:	CC519990	Cylinder Volume:	144.3 CF
Laboratory:	124 - La Porte Mix - TX	Cylinder Pressure:	2015 PSIG
Analysis Date:	Dec 14, 2021	Valve Outlet:	330
Lot Number:	126-402278540-1		

Expiration Date: Dec 14, 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
HYDROGEN SULFIDE	1.000 PPM	1.084 PPM	+/-5%
NITROGEN	Balance		

Notes:MONTROSE AIR QUALITY SERVICES LLC
PO3: PO018078

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: *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
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
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		

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