2022 Q4 SUMMA CANISTER REPORT
COMMERCE CITY NORTH DENVER COMMUNITY AIR MONITORING NETWORK
COMMERCE CITY, COLORADO

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TABLE OF CONTENTS

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: carbon monoxide (CO), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), nitrogen oxide or nitric 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 6-liter evacuated stainless steel ("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 two, the periodic collection and laboratory analysis of Summa canister air samples and a screening health risk analysis. Continuous, near real-time air monitoring and mobile monitoring van data are presented in separate reports.

Planned air samples were collected during the fourth quarter of 2022. A total of 13 planned air samples (1-hour) were collected by field technicians at ten locations within the CCND neighborhoods, and at an additional three non-CCND community monitoring reference sites (urban and rural background) that were chosen for the sampling campaign. All air samples were collected using Summa canisters and sent to an accredited laboratory for analysis of a broad suite of VOCs in accordance with the United States Environmental Protection Agency (USEPA) methods TO-15 and TO-14A.

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. A screening-level assessment uses the most health-conservative assumptions about exposure and chemical toxicity. This risk assessment was conducted to determine whether measured concentrations of individual or cumulative (combined risk) VOCs could potentially cause acute (short-term) adverse health effects. The health risk calculations described in this report were performed per federal and state guidance. The risk assessment resulted in the following overall findings:

- All measured individual and cumulative air concentrations of VOCs in planned air samples collected on November 3, 2022, at CCND and reference locations were below their respective acute health-based reference levels.

- All measured concentrations of VOCs are likely to be without an appreciable risk of adverse acute health effects, even for sensitive sub-populations.

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) continuous, near real-time monitoring for the following analytes: carbon monoxide (CO), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), nitrogen oxide or nitric 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. 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 two (Summa canister sampling and analysis). The continuous near real-time air monitoring and mobile monitoring van data are presented in separate reports. Air monitoring, sampling, and analysis from all three approaches were conducted in accordance with the Quality Assurance Project Plan (QAPP) and are available online at www.ccnd-air.com/documents.

1.1 Air Monitoring Site Description

Ten Summa canister samples were collected from the CCND neighborhoods within a three-mile radius of the refinery operations. The monitor locations are shown in Figure 1-1 and described in Table 1-1; they were selected based on the following criteria:

- Historical wind pattern data
- Proximity to the refinery and non-refinery sources
- Existing infrastructure, as well as site access and safety
- Community feedback

An additional three planned air samples were collected at non-CCND community monitoring sites (reference locations), in both urban and rural locations (Figure 1-2 and Table 1-2). These locations were at the E470-I25 Junction (JUNC), the Brighton Fire Department (BFD), and the Colorado Department of Health and Environment (CDPHE) CAMP air monitoring station (CAMP). The JUNC and BFD monitoring locations were chosen as rural background locations about 13 miles north of the CCND network. The CAMP location was selected as a representative urban location that has comparative data collected by CDPHE[1].

1 CDPHE describes CAMP as Urban in many reports. As an example, this description can be found on page 6 of the 2020 Ambient Air Monitoring Network Assessment:
https://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=2020_CO_5yr_Network_Assessment.pdf

FIGURE 1-1
MAP OF TEN CCND MONITOR LOCATIONS

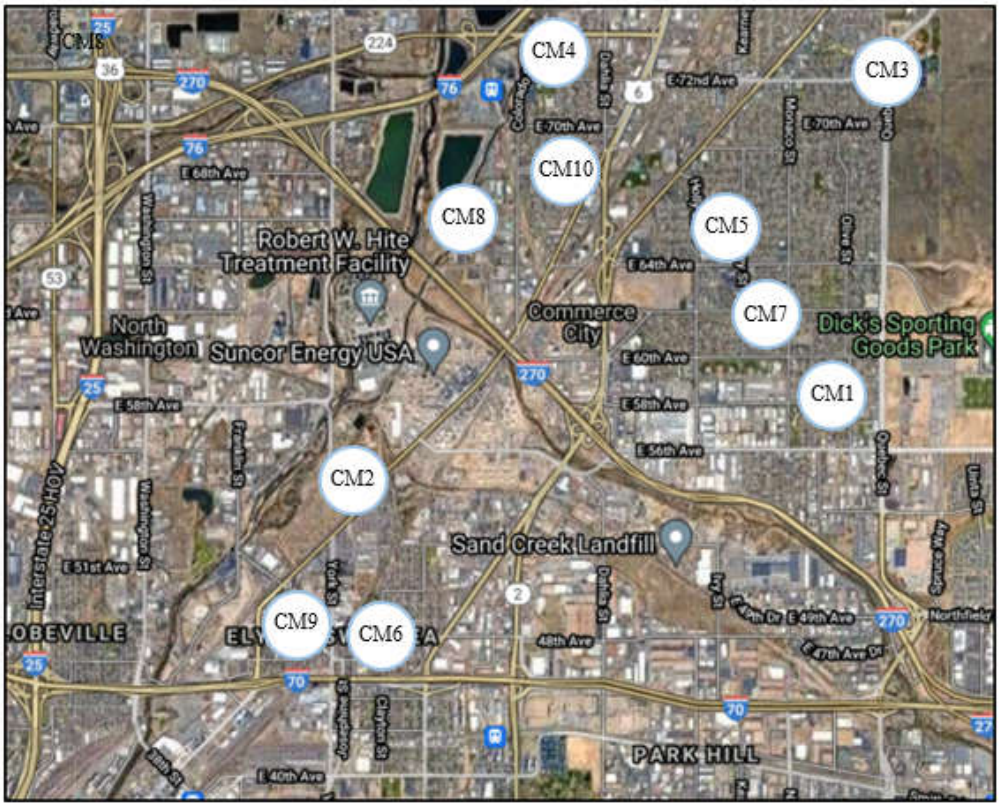


FIGURE 1-2
MAP OF THREE NON-CCND COMMUNITY MONITORING (URBAN AND RURAL BACKGROUND) SITES: E470/I25 (JUNC), BRIGHTON FIRE DEPARTMENT (BFD) AND COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) CAMP AIR MONITORING STATION (CAMP)

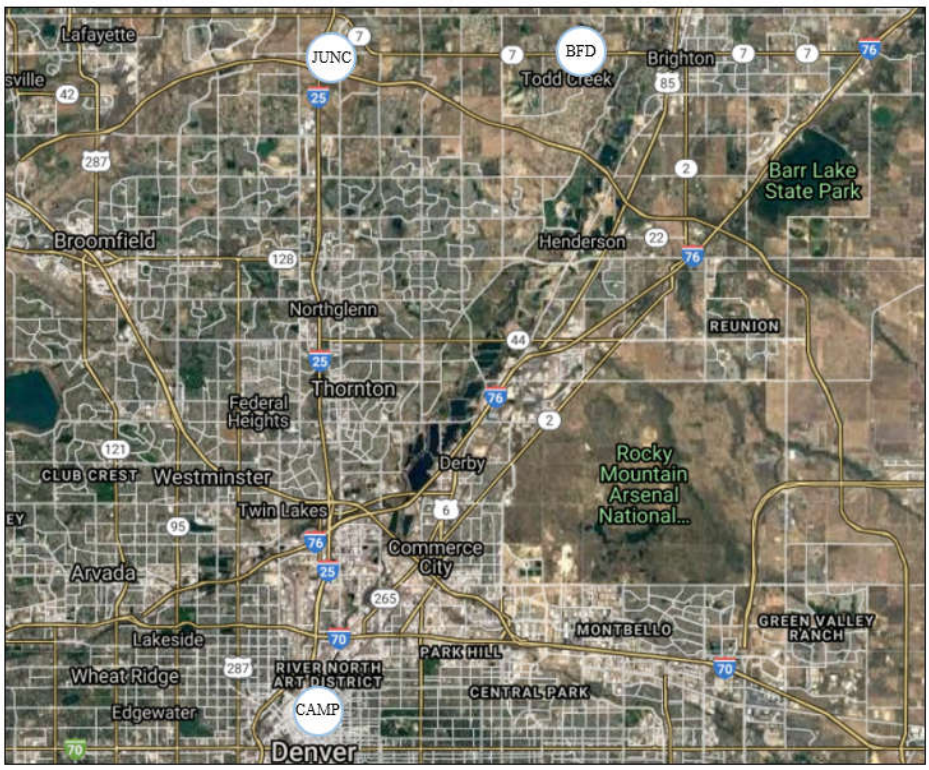


TABLE 1-1
CCND MONITORS AND SUMMA CANISTER SAMPLING LOCATIONS

Location ID	Secondary ID	GPS Coordinates	Distance from Refinery Center (miles)	Cross Streets
CM1	Rose Hill Elementary School	39.80164, -104.90882	2.0	E. 58th Ave. & Oneida St., Commerce City
CM2	Suncor Refinery Business Center	39.79619, -104.95732	0.70	Brighton Blvd. & York St., Commerce City
CM3	Adams City High School	39.82736, -104.90193	2.9	E. 72nd Ave. & Quebec Pkwy, Commerce City
CM4	Adams City Middle School	39.82893, -104.93499	1.9	Birch St. & E. 72nd Ave., Commerce City
CM5	Central Elementary School	39.81457, -104.91928	1.7	Holly St. & E. 64th Ave., Commerce City
CM6	Focus Points Family Resource Center	39.78436, -104.95663	1.4	Columbine St. & 48th Ave., Denver
CM7	Kearney Middle School	39.80888, -104.91545	1.7	E. 62nd Ave. & Kearney St., Commerce City
CM8	Monroe	39.8156, -104.94503	0.85	Monroe St. & E. 64th Ave., Denver
CM9	48th and Race	39.78455, -104.96264	1.7	East 48th Ave. & Race St., Denver
CM10	Alsup Elementary School	39.82026, -104.93663	1.3	East 68th Ave. & Birch St., Commerce City

TABLE 1-2
SUMMA CANISTER REFERENCE LOCATIONS

Location ID	Secondary ID	GPS Coordinates	Distance from Refinery Center (miles)	Cross Streets
CAMP	Denver CDPHE	39.75111, -104.98766	4.2	Champa St. & N. Broadway, Denver
JUNC	E470/I25	39.98614, -104.98468	12.8	E. 160th & Washington St., Thornton
BFD	Brighton	39.98512, -104.86665	13.1	Havana St. & Havana Way, Brighton

2.0 METHODS

2.1 Air Sampling Methods

Planned air samples were collected during the fourth quarter of 2022 on November 3, 2022. Entech Instruments Silonite™ CS1200E Passive Canister Samplers connected to 6-liter chemically inert stainless steel ("Summa") canisters were used to collect samples over a 1-hour period. The Summa canisters were cleaned and blanked for use according to laboratory standard operating procedures. Planned air samples were collected by a field technician by manually opening and closing the Summa canister's regulator valve during a time when real-time instruments indicated total VOC concentrations to be less than the 1-ppm trigger level. All sampling and quality assurance procedures were performed by Montrose. All Summa canister field sampling followed the Standard Operating Procedure (SOP) provided in the QAPP.

The canister samples were shipped to Enthalpy Analytical in Durham, North Carolina. The United States Environmental Protection Agency (USEPA) Compendium Method TO-14A "*Determination of Volatile Organic Compounds (VOCs) in Ambient Air using Specially Prepared Canisters with Subsequent Analysis by Gas Chromatography*" and TO-15 entitled "*Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)*" were followed for both sampling and analysis methodology. A total of 59 analytes were selected for analysis in this assessment, based on the typical suite of compounds monitored for in urban and industrial areas, accounting for laboratory analysis capabilities (Table 1-3).

TABLE 1-3
SELECTED COMPOUNDS MEASURED IN SUMMA CANISTERS

Ethylene	Isopentane	3-Methylpentane	3-Methylheptane	2,4-Dimethylpentane
Acetylene	1-Pentene	1-Hexene	Nonane	2,3-Dimethylpentane
Ethane	Pentane	1,3-Butadiene	3-Ethyltoluene	1,2,3-Trimethylbenzene
Propylene	Isoprene	Heptane	2-Ethyltoluene	1,3,5-Trimethylbenzene
Propane	Trans-2-Pentene	2-Methylhexane	Decane	2,2,4-Trimethylpentane
Isobutane	Cis-2-Pentene	Toluene	Ethylbenzene	Tetrachloroethene
1-Butene	2,2-Dimethylbutane	3-Methylhexane	m-Diethylbenzene	1,2,4-Trimethylbenzene
Butane	Cyclopentane	Methylcyclohexane	p-Diethylbenzene	Methylcyclopentane
Trans-2-Butene	Cyclohexane	Hexane	Undecane	2,3,4-Trimethylpentane
Cis-2-Butene	2-Methylpentane	2-Methylheptane	Dodecane	2,3-Dimethylbutane
m-/p-Xylenes	o-Xylene	4-Ethyltoluene	Benzene	Carbon disulfide
n-Octane	Isopropylbenzene	n-Propylbenzene	Naphthalene	

2.2 Screening Health Risk Assessment Methods

CTEH® conducted a screening-level public health risk assessment, consistent with federal and state 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 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 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*"[2]. 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 acute Reference Levels (RL) (Equation 1). The result is referred to as the hazard quotient (HQ). Estimates of EC were derived from the 1-hour average concentrations of each analyte. Using the average for the EC conservatively assumes that a hypothetical maximally exposed individual occupies the sampling location area and breathes the 1-hour detected concentration continuously for an hour up to multiple days (an acute exposure). 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 screening levels (acute ESL) or Reference Value (ReVs)[3]. If the analyte was not listed by CDPHE, CTEH® followed a federal and state recommended hierarchy for selection of health-based reference levels[4].

Acute HQs were calculated as follows:

Eq. 1 – Hazard Quotient (HQ) Equation

$$HQ = EC/RL$$

Where:

HQ= Hazard Quotient

EC= 1-hour average air concentration

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

[2]https://www.atsdr.cdc.gov/minimalrisklevels/#:~:text=The%20ATSDR%2C%20in%20response%20to,minimal%20risk%20levels%20(MRLs).
[3] https://drive.google.com/file/d/1P2KEvu0MFiyzQAOQtjQUclqR-WGh1bEX/view
[4] https://www.epa.gov/sites/default/files/2015-11/documents/hhmemo.pdf

Health risks from potential cumulative exposures to all detected analytes were calculated by adding together each individual analyte's HQ calculated for a given sampling location. 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. 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 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 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.

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 provided 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 RESULTS

3.1 Summary of Air Sampling Results

A total of 13, one-hour planned air samples were collected during the fourth quarter of 2022. Ten samples were collected from CCND sampling locations and three were collected from reference locations. Summary details are presented in Tables 1-4 and 1-5, and additional details are available in Appendix A.

TABLE 1-4
NOVEMBER 3, 2022 (Q4) PLANNED AIR SAMPLE DETECTION SUMMARY – CCND MONITORING LOCATIONS (ALL RESULTS IN PARTS PER BILLION BY VOLUME)

Compound Name	Cas No	# Samples	# Detections	Range of Detections (ppb)
1-Butene	106-98-9	10	3	0.0621 - 0.1130
1-Hexene	592-41-6	10	1	0.0949
1-Pentene	109-67-1	10	1	0.0982
1,2,3-Trimethylbenzene	526-73-8	10	6	0.0644 - 0.0889
1,2,4-Trimethylbenzene	95-63-6	10	3	0.0629 - 0.1470
1,3-Butadiene	106-99-0	10	2	0.0640 - 0.0851
1,3,5-Trimethylbenzene	108-67-8	10	0	< 0.0614 - < 0.0635
2-Ethyltoluene	611-14-3	10	0	< 0.0614 - < 0.0635
2-Methylheptane	592-27-8	10	4	0.0637 - 0.2340
2-Methylhexane	591-76-4	10	8	0.0734 - 0.5790
2-Methylpentane	107-83-5	10	10	0.1970 - 1.5800
2,2-Dimethylbutane	75-83-2	10	5	0.0659 - 0.6200
2,2,4-Trimethylpentane	540-84-1	10	1	0.3800
2,3-Dimethylbutane	79-29-8	10	5	0.0684 - 0.3810
2,3-Dimethylpentane	565-59-3	10	3	0.0637 - 0.3260
2,3,4-Trimethylpentane	565-75-3	10	2	0.1410 - 0.2590
2,4-Dimethylpentane	108-08-7	10	4	0.0727 - 0.2280
3-Ethyltoluene	620-14-4	10	3	0.0634 - 0.1310
3-Methylheptane	589-81-1	10	2	0.2220 - 0.6720
3-Methylhexane	589-34-4	10	10	0.0660 - 0.6410
3-Methylpentane	96-14-0	10	10	0.1440 - 0.9720
4-Ethyltoluene	622-96-8	10	0	< 0.0614 - < 0.0635
Acetylene	74-86-2	10	10	0.3440 - 0.5800
Benzene	71-43-2	10	10	0.1260 - 0.4990
Butane	106-97-8	10	10	1.6900 - 4.5100
Carbon disulfide	75-15-0	10	2	0.1700 - 0.3080
Cis-2-Butene	590-18-1	10	2	0.1230 - 0.1650
Cis-2-Pentene	627-20-3	10	1	0.1290
Cyclohexane	110-82-7	10	10	0.1140 - 1.1100
Cyclopentane	287-92-3	10	8	0.0624 - 0.5840
Decane	124-18-5	10	4	0.0775 - 0.0941
Dodecane	112-40-3	10	5	0.0628 - 0.0753
Ethane	74-84-0	10	10	4.7800 - 9.7500
Ethylbenzene	100-41-4	10	2	0.0748 - 0.2040
Ethylene	74-85-1	10	10	0.4700 - 1.0800
Heptane	142-82-5	10	10	0.1030 - 0.7240
Hexane	110-54-3	10	10	0.3720 - 1.6100
Isobutane	75-28-5	10	9	0.5790 - 1.8100
Isopentane	78-78-4	10	10	0.5560 - 4.7800
Isoprene	78-79-5	10	1	0.0874
Isopropylbenzene	98-82-8	10	0	< 0.0614 - < 0.0635
m-/p-Xylenes	179601-23-1	10	10	0.0920 - 0.6920
m-Diethylbenzene	141-93-5	10	0	< 0.0614 - < 0.0635
Methylcyclohexane	108-87-2	10	10	0.0983 - 0.5430
Methylcyclopentane	96-37-7	10	10	0.1580 - 0.9970
n-Octane	111-65-9	10	5	0.0625 - 0.2090
n-Propylbenzene	103-65-1	10	0	< 0.0614 - < 0.0635
Naphthalene	91-20-3	10	1	0.1980
Nonane	111-84-2	10	3	0.0653 - 0.3320
o-Xylene	95-47-6	10	3	0.0738 - 0.2290
p-Diethylbenzene	105-05-5	10	0	< 0.0614 - < 0.0635
Pentane	109-66-0	10	10	0.5330 - 3.3300
Propane	74-98-6	10	10	3.0800 - 6.8300
Propylene	115-07-1	10	9	0.1150 - 0.3360
Tetrachloroethene	127-18-4	10	0	< 0.0614 - < 0.0635
Toluene	108-88-3	10	10	0.2020 - 1.6400
Trans-2-Butene	624-64-6	10	2	0.1400 - 0.1790
Trans-2-Pentene	646-04-8	10	3	0.2100 - 0.5090
Undecane	1120-21-4	10	5	0.0616 - 0.0768

Laboratory non-detections are reported as less than ("<") the method detection limit.

TABLE 1-5
NOVEMBER 3, 2022 (Q4) PLANNED AIR SAMPLE DETECTION SUMMARY – REFERENCE LOCATIONS (ALL RESULTS IN PARTS PER BILLION BY VOLUME)

Compound Name	Cas No	# Samples	# Detections	Range of Detections (ppb)
1-Butene	106-98-9	3	1	0.0736
1-Hexene	592-41-6	3	0	< 0.0614 - < 0.0625
1-Pentene	109-67-1	3	0	< 0.0614 - < 0.0625
1,2,3-Trimethylbenzene	526-73-8	3	0	< 0.0614 - < 0.0625
1,2,4-Trimethylbenzene	95-63-6	3	1	0.0738
1,3-Butadiene	106-99-0	3	1	0.0703
1,3,5-Trimethylbenzene	108-67-8	3	0	< 0.0614 - < 0.0625
2-Ethyltoluene	611-14-3	3	0	< 0.0614 - < 0.0625
2-Methylheptane	592-27-8	3	1	0.0680
2-Methylhexane	591-76-4	3	1	0.1310
2-Methylpentane	107-83-5	3	3	0.1390 - 0.3710
2,2-Dimethylbutane	75-83-2	3	0	< 0.0614 - < 0.0625
2,2,4-Trimethylpentane	540-84-1	3	1	0.0637
2,3-Dimethylbutane	79-29-8	3	1	0.0861
2,3-Dimethylpentane	565-59-3	3	1	0.0700
2,3,4-Trimethylpentane	565-75-3	3	0	< 0.0614 - < 0.0625
2,4-Dimethylpentane	108-08-7	3	1	0.0667
3-Ethyltoluene	620-14-4	3	2	0.0629 - 0.0794
3-Methylheptane	589-81-1	3	0	< 0.0614 - < 0.0625
3-Methylhexane	589-34-4	3	2	0.0661 - 0.1550
3-Methylpentane	96-14-0	3	3	0.1080 - 0.2960
4-Ethyltoluene	622-96-8	3	0	< 0.0614 - < 0.0625
Acetylene	74-86-2	3	3	0.2470 - 0.7060
Benzene	71-43-2	3	3	0.0990 - 0.2590
Butane	106-97-8	3	3	1.7200 - 2.8700
Carbon disulfide	75-15-0	3	1	0.0945
Cis-2-Butene	590-18-1	3	0	< 0.0614 - < 0.0625
Cis-2-Pentene	627-20-3	3	0	< 0.0614 - < 0.0625
Cyclohexane	110-82-7	3	3	0.1080 - 0.2770
Cyclopentane	287-92-3	3	1	0.0828
Decane	124-18-5	3	1	0.0620
Dodecane	112-40-3	3	1	0.0664
Ethane	74-84-0	3	3	4.3600 - 7.4600
Ethylbenzene	100-41-4	3	1	0.0741
Ethylene	74-85-1	3	3	0.3500 - 1.3600
Heptane	142-82-5	3	3	0.0760 - 0.1860
Hexane	110-54-3	3	3	0.2530 - 0.6690
Isobutane	75-28-5	3	3	0.5620 - 1.3000
Isopentane	78-78-4	3	3	0.5030 - 1.3400
Isoprene	78-79-5	3	0	< 0.0614 - < 0.0625
Isopropylbenzene	98-82-8	3	0	< 0.0614 - < 0.0625
m-/p-Xylenes	179601-23-1	3	3	0.0628 - 0.2270
m-Diethylbenzene	141-93-5	3	0	< 0.0614 - < 0.0625
Methylcyclohexane	108-87-2	3	3	0.0738 - 0.1380
Methylcyclopentane	96-37-7	3	3	0.1140 - 0.2900
n-Octane	111-65-9	3	1	0.0626
n-Propylbenzene	103-65-1	3	0	< 0.0614 - < 0.0625
Naphthalene	91-20-3	3	0	< 0.0614 - < 0.0625
Nonane	111-84-2	3	0	< 0.0614 - < 0.0625
o-Xylene	95-47-6	3	1	0.0754
p-Diethylbenzene	105-05-5	3	0	< 0.0614 - < 0.0625
Pentane	109-66-0	3	3	0.4620 - 1.1200
Propane	74-98-6	3	3	2.8100 - 4.2100
Propylene	115-07-1	3	3	0.0762 - 0.3410
Tetrachloroethene	127-18-4	3	0	< 0.0614 - < 0.0625
Toluene	108-88-3	3	3	0.1600 - 0.6600
Trans-2-Butene	624-64-6	3	0	< 0.0614 - < 0.0625
Trans-2-Pentene	646-04-8	3	0	< 0.0614 - < 0.0625
Undecane	1120-21-4	3	2	0.0661 - 0.0815

Laboratory non-detections are reported as less than ("<") the method detection limit.

3.2 Screening Health Risk Assessment Results

The purpose of this screening health risk assessment was to determine whether exposure to the concentrations of individual or cumulative VOCs could potentially pose acute (short-term) health hazards. Acute health risks were estimated for each location for each substance both individually and combined. According to USEPA guidelines (USEPA 1989, 2004), a HQ or HI less than or equal to one indicates that exposures are likely to be without any appreciable risk of adverse acute health effects, even for sensitive subpopulations. The calculated acute HQ and HI are summarized in Table 1-6, Table 1-7 and Figure 1-3 and all data are presented in Appendix B. In general, the air sampling data and health risk assessment indicate:

- All measured individual and cumulative air concentrations of detected VOCs in the planned air samples taken on November 3, 2022, at CCND sampling locations were below their respective acute health-based reference levels.
    - Table 1-6 shows all HQs for individual VOCs to be well below one. An HQ of less than one indicates unlikely risk of acute adverse health effects from that VOC.
    - Cumulative health risks (as indicated by HI) for all VOCs are shown in Figure 1-3. The calculated HI for all sampled sites were well below one, indicating unlikely risk of acute adverse health effects from cumulative exposure to measured analytes.
- All measured individual and combined air concentrations of detected VOCs in the planned air samples taken on November 3, 2022, at the three additional reference sample locations were below their respective acute health-based reference levels (Table 1-7, Figure 1-3).
- These risk results for samples taken from both CCND and reference locations indicate the measured concentrations are likely to be without an appreciable risk of adverse acute health effects, even for sensitive sub-populations.

TABLE 1-6

NOVEMBER 3, 2022 (Q4) CCND SUMMA CANISTER SCREENING RISK ANALYSIS: COMPOUND-SPECIFIC HAZARD QUOTIENTS FOR PLANNED AIR SAMPLES – CCND MONITORING SITES

					November 3, 2022									
Compound Name	Cas No	AEGL 1 60 min Value (ppb)	Health Based Reference Level (ppb)	Source	CM1 - Rose	CM2 - Suncor RBC	CM3 - Adams High School	CM4 - Adams Middle School	CM5 - Central	CM6 - Focus	CM7 - Kearney	CM8 - Monroe	CM9 - 48th and Race	CM10 - Alsup Elementary School
1-Butene	106-98-9	NR	27,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1-Hexene	592-41-6	NR	500	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001
1-Pentene	109-67-1	NR	12,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1,2,3-Trimethylbenzene	526-73-8	140,000	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1,2,4-Trimethylbenzene	95-63-6	140,000	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1,3-Butadiene	106-99-0	670,000	298	OEHHA Acute REL	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003
1,3,5-Trimethylbenzene	108-67-8	140,000	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2-Ethyltoluene	611-14-3	NR	250	TCEQ Short-Term AMCV	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
2-Methylheptane	592-27-8	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
2-Methylhexane	591-76-4	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
2-Methylpentane	107-83-5	NR	5,400	TCEQ Short-Term AMCV	0.0001	0.0001	0.0000	0.0001	0.0000	0.0001	0.0001	0.0000	0.0003	0.0001
2,2-Dimethylbutane	75-83-2	NR	5,400	TCEQ Short-Term AMCV	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2,2,4-Trimethylpentane	540-84-1	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
2,3-Dimethylbutane	79-29-8	NR	5,400	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
2,3-Dimethylpentane	565-59-3	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2,3,4-Trimethylpentane	565-75-3	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2,4-Dimethylpentane	108-08-7	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3-Ethyltoluene	620-14-4	NR	250	TCEQ Short-Term AMCV	0.0003	0.0002	0.0002	0.0004	0.0002	0.0003	0.0002	0.0002	0.0005	0.0002
3-Methylheptane	589-81-1	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001	0.0000
3-Methylhexane	589-34-4	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
3-Methylpentane	96-14-0	NR	5,400	TCEQ Short-Term AMCV	0.0001	0.0000	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0002	0.0001
4-Ethyltoluene	622-96-8	NR	250	TCEQ Short-Term AMCV	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
Acetylene	74-86-2	NR	25,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	71-43-2	52,000	9	ATSDR Acute MRL	0.0319	0.0189	0.0143	0.0187	0.0194	0.0184	0.0231	0.0140	0.0554	0.0216
Butane	106-97-8	5,500,000	92,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Carbon disulfide	75-15-0	13,000	1,990	OEHHA Acute REL	0.0001	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cis-2-Butene	590-18-1	NR	15,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cis-2-Pentene	627-20-3	NR	12,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclohexane	110 82 7	NR	1,000	TCEQ Short Term AMCV	0.0003	0.0002	0.0001	0.0003	0.0002	0.0003	0.0002	0.0001	0.0011	0.0002
Cyclopentane	287-92-3	NR	5,900	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
Decane	124-18-5	NR	1,000	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Dodecane	112-40-3	NR	1,720	CDPHE Acute	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	74-84-0	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	33,000	5,000	ATSDR Acute MRL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethylene	74-85-1	NR	500,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heptane	142-82-5	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
Hexane	110-54-3	NR	5,400	TCEQ Short-Term AMCV	0.0002	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0003	0.0001
Isobutane	75-28-5	NR	33,000	TCEQ Short-Term AMCV	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0001	0.0000
Isopentane	78-78-4	NR	68,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
Isoprene	78-79-5	NR	1,400	TCEQ Short-Term AMCV	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Isopropylbenzene	98-82-8	50,000	510	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
m-/p-Xylenes	179601-23-1	130,000	1,700	ATSDR Acute MRL	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0004	0.0001
m-Diethylbenzene	141-93-5	NR	450	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Methylcyclohexane	108-87-2	NR	4,000	TCEQ Short-Term AMCV	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003	0.0001
Methylcyclopentane	96-37-7	NR	750	TCEQ Short-Term AMCV	0.0005	0.0003	0.0002	0.0005	0.0003	0.0004	0.0003	0.0002	0.0013	0.0003
n-Octane	111-65-9	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
n-Propylbenzene	103-65-1	NR	510	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Naphthalene	91-20-3	NR	95	TCEQ Short-Term AMCV	0.0006	0.0006	0.0006	0.0006	0.0021	0.0007	0.0007	0.0006	0.0007	0.0006
Nonane	111-84-2	NR	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
o-Xylene	95-47-6	130,000	1,700	ATSDR Acute MRL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
p-Diethylbenzene	105-05-5	NR	450	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Pentane	109-66-0	NR	68,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	74-98-6	5,500,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Propylene	115-07-1	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	35,000	6	ATSDR Acute MRL	0.0103	0.0102	0.0102	0.0103	0.0102	0.0106	0.0103	0.0103	0.0103	0.0102
Toluene	108-88-3	67,000	2,000	ATSDR Acute MRL	0.0008	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0001	0.0008	0.0002
Trans-2-Butene	624-64-6	NR	15,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Trans-2-Pentene	646-04-8	NR	12,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Undecane	1120-21-4	NR	550	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
				Hazard Index	**0.0476**	**0.0332**	**0.0281**	**0.0340**	**0.0350**	**0.0336**	**0.0374**	**0.0281**	**0.0748**	**0.0359**

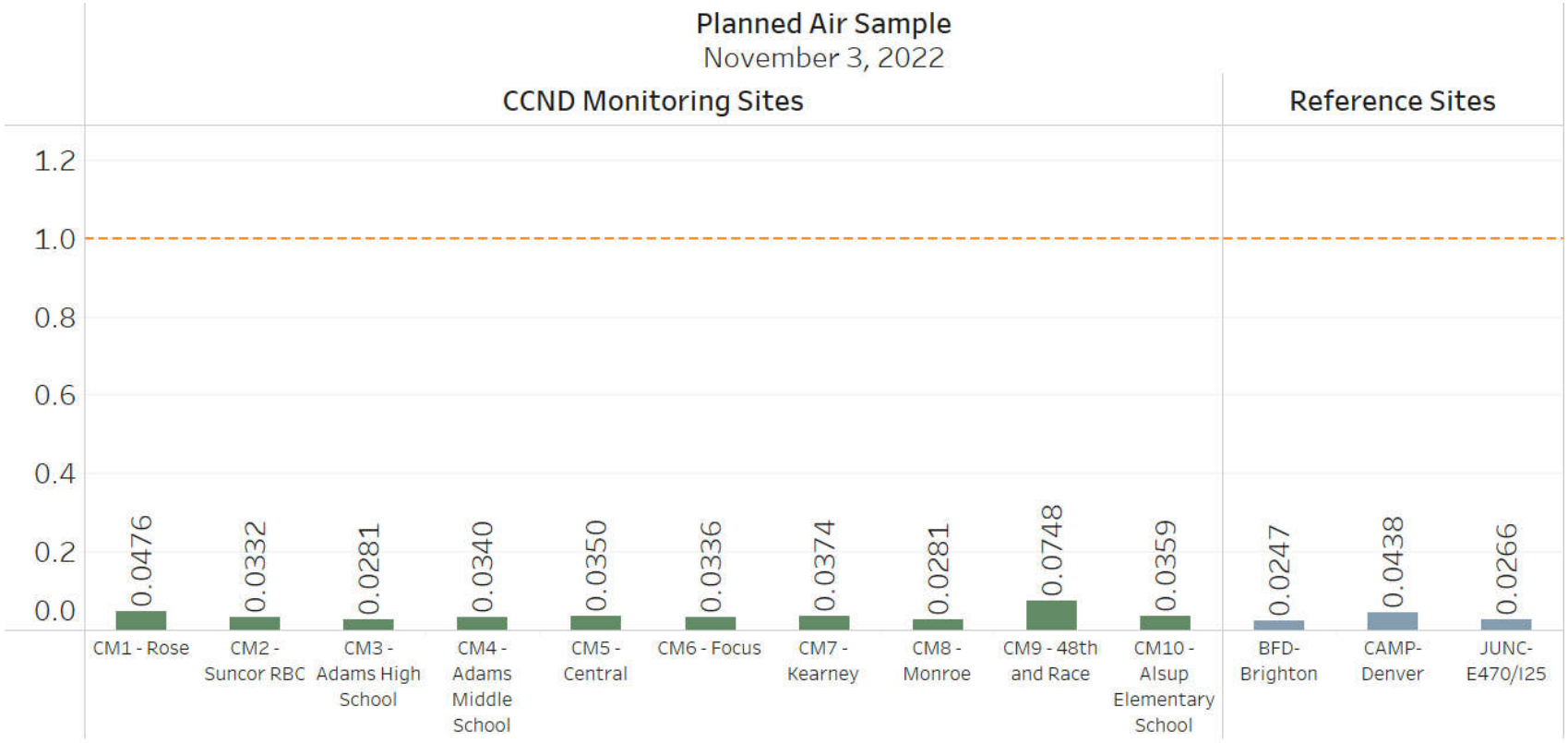
NA = Not Available
NR = According to EPA, AEGL is "Not Recommended due to insufficient data"

TABLE 1-7
NOVEMBER 3, 2022 (Q4) CCND SUMMA CANISTER SCREENING RISK ANALYSIS: COMPOUND-SPECIFIC HAZARD QUOTIENTS FOR PLANNED AIR SAMPLES – REFERENCE SITES

					November 3, 2022		
Compound Name	Cas No	AEGL 1 60 min Value (ppb)	Health Based Reference Level (ppb)	Source	BFD-Brighton	CAMP-Denver	JUNC-E470/I25
1-Butene	106-98-9	NR	27,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
1-Hexene	592-41-6	NR	500	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001
1-Pentene	109-67-1	NR	12,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
1,2,3-Trimethylbenzene	526-73-8	140,000	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
1,2,4-Trimethylbenzene	95-63-6	140,000	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
1,3-Butadiene	106-99-0	670,000	298	OEHHA Acute REL	0.0002	0.0002	0.0002
1,3,5-Trimethylbenzene	108-67-8	140,000	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2-Ethyltoluene	611-14-3	NR	250	TCEQ Short-Term AMCV	0.0002	0.0003	0.0002
2-Methylheptane	592-27-8	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2-Methylhexane	591-76-4	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2-Methylpentane	107-83-5	NR	5,400	TCEQ Short-Term AMCV	0.0000	0.0001	0.0000
2,2-Dimethylbutane	75-83-2	NR	5,400	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2,2,4-Trimethylpentane	540-84-1	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2,3-Dimethylbutane	79-29-8	NR	5,400	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2,3-Dimethylpentane	565-59-3	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2,3,4-Trimethylpentane	565-75-3	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
2,4-Dimethylpentane	108-08-7	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
3-Ethyltoluene	620-14-4	NR	250	TCEQ Short-Term AMCV	0.0002	0.0003	0.0003
3-Methylheptane	589-81-1	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
3-Methylhexane	589-34-4	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
3-Methylpentane	96-14-0	NR	5,400	TCEQ Short-Term AMCV	0.0000	0.0001	0.0000
4-Ethyltoluene	622-96-8	NR	250	TCEQ Short-Term AMCV	0.0002	0.0003	0.0002
Acetylene	74-86-2	NR	25,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Benzene	71-43-2	52,000	9	ATSDR Acute MRL	0.0110	0.0288	0.0128
Butane	106-97-8	5,500,000	92,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Carbon disulfide	75-15-0	13,000	1,990	OEHHA Acute REL	0.0000	0.0000	0.0000
Cis-2-Butene	590-18-1	NR	15,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Cis-2-Pentene	627-20-3	NR	12,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Cyclohexane	110-82-7	NR	1,000	TCEQ Short-Term AMCV	0.0001	0.0003	0.0001
Cyclopentane	287-92-3	NR	5,900	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Decane	124-18-5	NR	1,000	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001
Dodecane	112-40-3	NR	1,720	CDPHE Acute	0.0000	0.0000	0.0000
Ethane	74-84-0	NR	NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	33,000	5,000	ATSDR Acute MRL	0.0000	0.0000	0.0000
Ethylene	74-85-1	NR	500,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Heptane	142-82-5	NR	8,300	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Hexane	110-54-3	NR	5,400	TCEQ Short-Term AMCV	0.0000	0.0001	0.0001
Isobutane	75-28-5	NR	33,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Isopentane	78-78-4	NR	68,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Isoprene	78-79-5	NR	1,400	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Isopropylbenzene	98-82-8	50,000	510	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001
m-/p-Xylenes	179601-23-1	130,000	1,700	ATSDR Acute MRL	0.0000	0.0001	0.0001
m-Diethylbenzene	141-93-5	NR	450	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001
Methylcyclohexane	108-87-2	NR	4,000	TCEQ Short-Term AMCV	0.0000	0.0001	0.0000
Methylcyclopentane	96-37-7	NR	750	TCEQ Short-Term AMCV	0.0002	0.0004	0.0002
n-Octane	111-65-9	NR	4,100	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
n-Propylbenzene	103-65-1	NR	510	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001
Naphthalene	91-20-3	NR	95	TCEQ Short-Term AMCV	0.0006	0.0007	0.0006
Nonane	111-84-2	NR	3,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
o-Xylene	95-47-6	130,000	1,700	ATSDR Acute MRL	0.0000	0.0000	0.0000
p-Diethylbenzene	105-05-5	NR	450	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001
Pentane	109-66-0	NR	68,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Propane	74-98-6	5,500,000	NA	NA	NA	NA	NA
Propylene	115-07-1	NR	NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	35,000	6	ATSDR Acute MRL	0.0103	0.0104	0.0102
Toluene	108-88-3	67,000	2,000	ATSDR Acute MRL	0.0001	0.0003	0.0001
Trans-2-Butene	624-64-6	NR	15,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Trans-2-Pentene	646-04-8	NR	12,000	TCEQ Short-Term AMCV	0.0000	0.0000	0.0000
Undecane	1120-21-4	NR	550	TCEQ Short-Term AMCV	0.0001	0.0001	0.0001
				Hazard Index	0.0247	0.0438	0.0266

NA = Not Available
NR = According to EPA, AEGL is "Not Recommended due to insufficient data"

FIGURE 1-3
NOVEMBER 3, 2022 (Q4) - HAZARD INDEX BY AIR SAMPLING LOCATION FOR ALL PLANNED AIR SAMPLES



Hazard Index (HI) is the sum of all combined hazard quotients (HQ). According to EPA, a HI less than or equal to one (orange line) indicates that exposures are likely to be without any appreciable risk of adverse acute health effects, even for sensitive sub-populations.

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 (USEPA 1989, 2004). Therefore, the acute health hazard estimates presented in this assessment are conditional estimates given a considerable number of assumptions about exposure and toxicity.

This screening-level risk assessment relied on a combination of health-protective exposure scenarios and input values (i.e., high-end exposures). This approach was selected to help risk management decision making. Because of these assumptions, the estimates of acute hazards are themselves uncertain.

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.

4.0 PROGRAM CHANGES

No program changes occurred during this reporting period.

Prepared by:

Austin Heitmann
Director of Emerging Technology
Montrose Air Quality Services

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Senior Toxicologist
CTEH®, LLC

APPENDIX A
SAMPLE CHAIN OF CUSTODIES

ENTHALPY ANALYTICAL

Air Chain of Custody Record

Lab No:

Page: 1 of 1

Turn Around Time (rush by advanced notice only)

10 Day:	X	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	MAQS	Name:	Suncor
Report To:	Riley Kloss	Number:	PROJ-013370
Email:	rkloss@montrose-env.com	P.O. #:	PO-023647
Address:	990 W 43rd Ave, Denver, CO 80211	Address:	N/A
Phone:	303-670-0530	Global ID:	N/A
Fax:	N/A	Sampled By:	MAQS - Denver

Special Instructions:

**Canister pressure may increase as samples are shipping to a different elevation

	Sample ID (Location ID)	Type	Equipment Information			Sampling Information						Analysis Requested
		(I) Indoor (A) Ambient (SV) Soil Vapor (S) Source	Canister ID	Size (1L, 3L, 6L, 15L)	Flow Controller ID	Sample Start Date	Sample Start Time	Vacuum Start ("Hg)	Sample End Date	Sample End Time	Vacuum End ("Hg)	Suncor List
1	RBC (CM2)	A	77	6	16723	11/3/22	6:35 AM	24	11/3/22	7:35 AM	4	x
2	48th & Race (CM9)	A	44318	6	16717	11/3/22	7:01 AM	24	11/3/22	8:01 AM	2	x
3	Focus Points (CM6)	A	44314	6	16729	11/3/22	7:18 AM	24	11/3/22	8:18 AM	2	x
4	Adams City High School (CM3)	A	1841	6	16724	11/3/22	6:32 AM	25	11/3/22	7:30 AM	2	x
5	Central Elementary School (CM5)	A	44321	6	16722	11/3/22	7:03 AM	24	11/3/22	8:00 AM	5	x
6	Rose Hill Elementary School (CM1)	A	1785	6	16720	11/3/22	6:42 AM	24	11/3/22	7:40 AM	1	x
7	Kearney Middle School (CM7)	A	44312	6	16719	11/3/22	6:50 AM	26	11/3/22	7:46 AM	5	x
8	Alsup Elementary School (CM10)	A	1803	6	16727	11/3/22	7:40 AM	25	11/3/22	8:40 AM	0	x
9	Adams City Middle School (CM4)	A	44315	6	16726	11/3/22	7:03 AM	25	11/3/22	8:03 AM	0	x
10	Monroe Street (CM8)	A	858	6	16718	11/3/22	7:05 AM	25	11/3/22	8:55 AM	4	x
11	Brighton Fire Deparment (BFD)	A	1766	6	16721	11/3/22	7:00 AM	24	11/3/22	8:00 AM	1	x
12	E470/I25 (JUNC)	A	1728	6	16725	11/3/22	6:35 AM	25	11/3/22	7:35 AM	0	x
13	Denver CDPHE (CAMP)	A	44317	6	16728	11/3/22	7:59 AM	25	11/3/22	8:59 AM	3	x

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:	Riley Kloss	Riley Kloss	MAQS / Client Project Manager	11/3/2022 10:00
[1] Received By:		Matt Lofts	EA / Ops Mgr	11-04-22 14:50
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				

Ambient Temp Good Condition MDL 11-04-22

APPENDIX B
AIR SAMPLING RESULTS AND SCREENING RISK ASSESSMENT

Community Air Monitoring Network Summa Canister Results

					CCND Monitoring Sites									Reference Sites		
					CM1 - Rose	CM2 - Suncor RBC	CM3 - Adams High School	CM4 - Adams Middle School	CM5 - Central	CM6 - Focus	CM7 - Kearney	CM8 - Monroe	CM9 - 48th and Race	CM10 - Alsup Elementary School	BFD- Brighton	CAMP- Denver	JUNC- E470/I25
Compound Name	Cas No.	AEGL 1 60 min Value (ppb)	Health Based Reference Level (ppb)	Source	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22	11/3/22
1-Butene	106-98-9	NR	27,000	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	0.0621 (J)	0.113	< 0.0618	< 0.0617	0.109	< 0.0614	< 0.0617	0.0736 (J)	< 0.0614
1-Hexene	592-41-6	NR	500	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.0949	< 0.0614	< 0.0617	< 0.0625	< 0.0614
1-Pentene	109-67-1	NR	12,000	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.0982	< 0.0614	< 0.0617	< 0.0625	< 0.0614
1,2,3-Trimethylbenzene	526-73-8	140,000	3,000	TCEQ Short-Term AMCV	0.0644 (J)	0.0708	< 0.0614	0.07	< 0.0614	< 0.0635	< 0.0618	0.0771	0.0889	0.0654 (J)	< 0.0617	< 0.0625	< 0.0614
1,2,4-Trimethylbenzene	95-63-6	140,000	3,000	TCEQ Short-Term AMCV	0.0629 (J)	< 0.0614	< 0.0614	0.0753	< 0.0614	< 0.0635	< 0.0619	< 0.0617	0.147	< 0.0614	< 0.0617	0.0738	< 0.0614
1,3-Butadiene	106-99-0	670,000	298	OEHHA Acute REL	0.064 (J)	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	< 0.0619	0.0851	< 0.0617	0.0703	< 0.0614
1,3,5-Trimethylbenzene	108-67-8	140,000	3,000	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
2-Ethyltoluene	611-14-3	NR	250	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
2-Methylheptane	592-27-8	NR	4,100	TCEQ Short-Term AMCV	0.073	< 0.0614	< 0.0614	0.0637 (J)	< 0.0614	0.0666 (J)	< 0.0618	< 0.0617	0.234	< 0.0614	< 0.0617	0.068 (J)	< 0.0614
2-Methylhexane	591-76-4	NR	8,300	TCEQ Short-Term AMCV	0.115	0.0753	< 0.0614	0.143	0.0734	0.124	0.0943	< 0.0617	0.579	0.0814	< 0.0617	0.131	< 0.0614
2-Methylpentane	107-83-5	NR	5,400	TCEQ Short-Term AMCV	0.341	0.278	0.197	0.338	0.249	0.524	0.298	0.201	1.58	0.347	0.139	0.371	0.18
2,2-Dimethylbutane	75-83-2	NR	5,400	TCEQ Short-Term AMCV	0.62	0.37	< 0.0614	0.194	< 0.0614	0.0659 (J)	< 0.0618	< 0.0617	0.211	< 0.0614	< 0.0617	< 0.0625	< 0.0614
2,2,4-Trimethylpentane	540-84-1	NR	4,100	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	0.38	< 0.0614	< 0.0617	0.0637 (J)	< 0.0614
2,3-Dimethylbutane	79-29-8	NR	5,400	TCEQ Short-Term AMCV	0.0694 (J)	< 0.0614	< 0.0614	0.0693 (J)	< 0.0614	0.106	< 0.0618	< 0.0617	0.381	0.0684 (J)	< 0.0617	0.0861	< 0.0614
2,3-Dimethylpentane	565-59-3	NR	8,300	TCEQ Short-Term AMCV	0.0638 (J)	< 0.0614	< 0.0614	0.0637 (J)	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.326	< 0.0614	< 0.0617	0.07 (J)	< 0.0614
2,3,4-Trimethylpentane	565-75-3	NR	4,100	TCEQ Short-Term AMCV	< 0.0616	0.259	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.141	< 0.0614	< 0.0617	< 0.0625	< 0.0614
2,4-Dimethylpentane	108-08-7	NR	8,300	TCEQ Short-Term AMCV	0.129	< 0.0614	< 0.0614	0.0727	< 0.0614	0.137	< 0.0618	< 0.0617	0.228	< 0.0614	< 0.0617	0.0667 (J)	< 0.0614
3-Ethyltoluene	620-14-4	NR	250	TCEQ Short-Term AMCV	0.0634 (J)	< 0.0614	< 0.0614	0.0899	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.131	< 0.0614	< 0.0617	0.0794	0.0629 (J)
3-Methylheptane	589-81-1	NR	4,100	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	0.672	0.222	< 0.0614	< 0.0617	< 0.0625	< 0.0614
3-Methylhexane	589-34-4	NR	8,300	TCEQ Short-Term AMCV	0.148	0.0828	0.066 (J)	0.196	0.0881	0.138	0.0994	0.0715	0.641	0.0976	< 0.0617	0.155	0.0661 (J)
3-Methylpentane	96-14-0	NR	5,400	TCEQ Short-Term AMCV	0.308	0.179	0.144	0.318	0.174	0.337	0.217	0.16	0.972	0.324	0.108	0.296	0.148
4-Ethyltoluene	622-96-8	NR	250	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Acetylene	74-86-2	NR	25,000	TCEQ Short-Term AMCV	0.521	0.444	0.359	0.402	0.524	0.426	0.438	0.344	0.572	0.58	0.247	0.706	0.329
Benzene	71-43-2	52,000	9	ATSDR Acute MRL	0.287	0.17	0.129	0.168	0.175	0.166	0.208	0.126	0.499	0.194	0.099	0.259	0.115
Butane	106-97-8	5,500,000	92,000	TCEQ Short-Term AMCV	2.54	2.6	1.92	2.13	2.08	4.51	2.53	1.69	4.12	1.88	1.72	2.87	1.82
Carbon disulfide	75-15-0	13,000	1,990	OEHHA Acute REL	0.17	< 0.0614	< 0.0614	0.308	< 0.0614	< 0.0635	< 0.0619	< 0.0617	< 0.0619	< 0.0614	< 0.0617	0.0945	< 0.0614
Cis-2-Butene	590-18-1	NR	15,000	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	0.123	< 0.0618	< 0.0617	0.165	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Cis-2-Pentene	627-20-3	NR	12,000	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.129	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Cyclohexane	110-82-7	NR	1,000	TCEQ Short-Term AMCV	0.286	0.174	0.138	0.264	0.192	0.315	0.2	0.114	1.11	0.189	0.108	0.277	0.135
Cyclopentane	287-92-3	NR	5,900	TCEQ Short-Term AMCV	0.125	0.0982	< 0.0614	0.584	0.0624 (J)	0.128	0.0753	0.0876	0.303	< 0.0614	< 0.0617	0.0828	< 0.0614
Decane	124-18-5	NR	1,000	TCEQ Short-Term AMCV	0.09	0.0775	< 0.0614	0.0941	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.0828	< 0.0614	< 0.0617	< 0.0625	0.062 (J)
Dodecane	112-40-3	NR	1,720	CDPHE Acute	0.07	0.0718	< 0.0614	0.0711	< 0.0614	0.0753	< 0.0618	< 0.0617	0.0628 (J)	< 0.0614	< 0.0617	< 0.0625	0.0664 (J)
Ethane	74-84-0	NR	NA	NA	7.87	9.6	7.33	6.93	6.7	6.54	7.98	4.78	9.75	5.63	4.36	7.46	7.08
Ethylbenzene	100-41-4	33,000	5,000	ATSDR Acute MRL	0.0748	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	0.204	< 0.0614	< 0.0617	0.0741	< 0.0614
Ethylene	74-85-1	NR	500,000	TCEQ Short-Term AMCV	1.08	0.607	0.47	0.718	0.772	0.879	0.838	0.61	1.02	0.948	0.35	1.36	0.434
Heptane	142-82-5	NR	8,300	TCEQ Short-Term AMCV	0.29	0.199	0.103	0.171	0.156	0.2	0.149	0.108	0.724	0.116	0.076	0.186	0.0996
Hexane	110-54-3	NR	5,400	TCEQ Short-Term AMCV	0.999	0.517	0.372	0.929	0.424	0.633	0.446	0.376	1.61	0.722	0.253	0.669	0.31
Isobutane	75-28-5	NR	33,000	TCEQ Short-Term AMCV	1.81	1.02	0.735	1.06	0.747	1.72	1.02	0.579	1.69	0.723	0.562	1.3	0.754
Isopentane	78-78-4	NR	68,000	TCEQ Short-Term AMCV	1.77	0.992	0.642	1.06	0.762	2.28	0.979	0.556	4.78	0.766	0.503	1.34	0.628
Isoprene	78-79-5	NR	1,400	TCEQ Short-Term AMCV	0.0874	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Isopropylbenzene	98-82-8	50,000	510	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
m-/p-Xylenes	108-38-3 &..	130,000	1,700	ATSDR Acute MRL	0.205	0.108	0.0945	0.18	0.172	0.133	0.155	0.092	0.692	0.138	0.0628 (J)	0.227	0.1
m-Diethylbenzene	141-93-5	NR	450	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Methylcyclohexane	108-87-2	NR	4,000	TCEQ Short-Term AMCV	0.246	0.176	0.0983	0.139	0.11	0.166	0.138	0.115	0.543	0.124	0.0738	0.138	0.0875
Methylcyclopentane	96-37-7	NR	750	TCEQ Short-Term AMCV	0.354	0.239	0.158	0.362	0.191	0.304	0.218	0.162	0.997	0.262	0.114	0.29	0.128
n-Octane	111-65-9	NR	4,100	TCEQ Short-Term AMCV	0.0846	0.0733	< 0.0614	0.0625 (J)	< 0.0614	0.0646 (J)	< 0.0619	< 0.0617	0.209	< 0.0614	< 0.0617	0.0626 (J)	< 0.0614
n-Propylbenzene	103-65-1	NR	510	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Naphthalene	91-20-3	NR	95	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	0.198	< 0.0635	< 0.0619	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Nonane	111-84-2	NR	3,000	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	0.0653 (J)	< 0.0618	0.332	0.099	< 0.0614	< 0.0617	< 0.0625	< 0.0614
o-Xylene	95-47-6	130,000	1,700	ATSDR Acute MRL	0.0746	< 0.0614	< 0.0614	0.0738	< 0.0614	< 0.0635	< 0.0619	< 0.0617	0.229	< 0.0614	< 0.0617	0.0754	< 0.0614
p-Diethylbenzene	105-05-5	NR	450	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0618	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Pentane	109-66-0	NR	68,000	TCEQ Short-Term AMCV	2.46	1.18	0.773	0.929	0.749	1.77	0.904	0.533	3.33	0.702	0.462	1.12	0.644
Propane	74-98-6	5,500,000	NA	NA	4.53	5.65	4.45	4.02	3.9	6.83	4.44	3.08	5.3	3.39	2.81	4.21	4.13
Propylene	115-07-1	NR	NA	NA	0.249	0.134	0.115	0.184	0.21	0.336	0.229	0.131	0.271	0.229	0.0762	0.341	0.102
Tetrachloroethene	127-18-4	35,000	6	ATSDR Acute MRL	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	< 0.0635	< 0.0619	< 0.0617	< 0.0619	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Toluene	108-88-3	67,000	2,000	ATSDR Acute MRL	1.56	0.282	0.202	0.838	0.331	0.378	0.328	0.222	1.64	0.306	0.16	0.66	0.195
Trans-2-Butene	624-64-6	NR	15,000	TCEQ Short-Term AMCV	< 0.0616	< 0.0614	< 0.0614	< 0.0615	< 0.0614	0.14	< 0.0618	< 0.0617	0.179	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Trans-2-Pentene	646-04-8	NR	12,000	TCEQ Short-Term AMCV	0.21	< 0.0614	< 0.0614	0.388	< 0.0614	< 0.0635	< 0.0618	< 0.0617	0.509	< 0.0614	< 0.0617	< 0.0625	< 0.0614
Undecane	1120-21-4	NR	550	TCEQ Short-Term AMCV	0.0745	0.0616 (J)	< 0.0614	0.0768	< 0.0614	0.0692 (J)	< 0.0618	< 0.0617	0.0725	0.0616 (J)	0.0661 (J)	< 0.0625	0.0815

Screening Legend
- Detection (No Screening Value Established)
- Detection < Screening Value
- Non-Detection < Screening Value

Laboratory non-detections are reported as less than ("<") the MDL.
Result qualifiers are reported to the right of corresponding detections (in parentheses).
(J) flag indicates an estimated value when the concentration is below the reporting limit but above the method detection limit.
NA = Not Available
NR = According to EPA, AEGL is "Not Recommended due to insufficient data"

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