

**APRIL 6, 2024 SUMMA CANISTER REPORT
COMMERCE CITY NORTH DENVER
COMMUNITY AIR MONITORING NETWORK
COMMERCE CITY, COLORADO**

Prepared For:

Suncor Energy (U.S.A.) Inc.
5801 Brighton Boulevard
Commerce City, CO 80022

Prepared By:

Montrose Air Quality Services, LLC
990 W. 43rd Avenue
Denver, CO 80211

Document Number: **317AA-022561-RT-408**
Report Period: **April 6, 2024**
Report Date: **May 3, 2024**



TABLE OF CONTENTS

SECTION	PAGE
EXECUTIVE SUMMARY	3
1.0 INTRODUCTION	4
1.1 Air Monitoring Site Description	4
2.0 METHODS.....	7
2.1 Air Sampling Methods	7
2.2 Screening Health Risk Assessment Methods	9
3.0 RESULTS	9
3.1 Summary of Air Sampling Results.....	9
3.2 Screening Health Risk Assessment Results.....	12
4.0 Program Changes.....	13

LIST OF APPENDICES

A SAMPLE CHAIN OF CUSTODIES

LIST OF TABLES

1-1 CCND MONITORS AND SUMMA CANISTER SAMPLING LOCATIONS	6
1-2 SELECTED ANALYTES MEASURED IN SUMMA CANISTERS.....	8
1-3 CM7 – KEARNEY MIDDLE SCHOOL LOCATION PLANNED AND SENSOR - TRIGGERED EVENT SAMPLE CONCENTRATIONS (PPBV)	10
1-4 SUMMA CANISTER SCREENING HEALTH RISK ASSESSMENT: COMPOUND-SPECIFIC HAZARD QUOTIENTS AND HAZARD INDICES FOR CCND CM7 – KEARNEY MIDDLE SCHOOL MONITORING SITE.....	12

LIST OF FIGURES

1-1 MAP OF TEN CCND MONITOR LOCATIONS.....	5
1-2 CM7 – KEARNEY MIDDLE SCHOOL VOC AND WIND DIRECTION APRIL 6, 2024 11:58 A.M. TO 1:58 P.M.	11
1-3 CM7 – KEARNEY MIDDLE SCHOOL WIND ROSE APRIL 6, 2024 11:58 A.M. TO 1:58 P.M.	11

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 (SO₂), hydrogen sulfide (H₂S), nitrogen oxide or nitric oxide (NO), nitrogen dioxide (NO₂), 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 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.

Approach number two consists of collection of air data to measure the presence of specific VOCs. This approach has two parts: collection of planned air samples and collection of unplanned, VOC sensor-triggered air samples. This report analyzes the data from a VOC sensor-triggered air sample collected at CM7 – Kearney Middle School on April 6, 2024 during a nearby residential fire¹.

Health scientists from CTEH, LLC (CTEH[®]) (a subsidiary company of Montrose) reviewed the data collected by Montrose and determined that data were collected during a residential fire occurring in close proximity to the air quality monitor. Because this event was short lived and does not represent a recurring influence on local air quality, a modified air quality assessment was conducted to determine potential public health hazards during this residential fire. The results demonstrated that concentrations measured were all below the EPA’s Acute Exposure Guideline Levels which are protective of the general population, including susceptible persons, from notable discomfort, irritation or asymptomatic, non-sensory effects.

¹ <https://5280fire.com/2024-incidents/south-adams-county-structure-fire>

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 (SO₂), hydrogen sulfide (H₂S), nitrogen oxide or nitric oxide (NO), nitrogen dioxide (NO₂), particulate matter (PM_{2.5}) and total volatile organic compounds (tVOCs); (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.

The objective of this report is to provide results from a sensor-triggered canister sample collected on April 6, 2024 at the CM7 – Kearney Middle School. The sample was triggered due to a nearby residential fire, which likely emitted VOCs resulting in the triggered sample collection (Attachment). The residential fire occurred near E. 62nd Ave and Kearney St, Commerce City, which was across the street and to the north of the CM7 sample location at Kearney Middle School. As this was a short-term, single instance event, the measured concentrations for this sample were compared to one-hour acute emergency guideline values rather than acute health guideline values meant to protect against potential effects from exposures lasting days.

1.1 Air Monitoring Site Description

Ten monitors and Summa canister sampling locations were positioned throughout 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

FIGURE 1-1
MAP OF TEN CCND MONITOR LOCATIONS



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. 58 th Ave. & Oneida St., Commerce City
CM2	Suncor Refinery Business Center	39.79623, -104.95727	0.70	Brighton Blvd. & York St., Commerce City
CM3	Adams City High School	39.82736, -104.90193	2.9	E. 72 nd Ave. & Quebec Pkwy, Commerce City
CM4	Adams City Middle School	39.82893, -104.93499	1.9	Birch St. & E. 72 nd Ave., Commerce City
CM5	Central Elementary School	39.81365, -104.92191	1.7	Holly St. & E 64 th Ave., Commerce City
CM6	Focus Points Family Resource Center	39.78436, -104.95663	1.4	Columbine St. & 48 th Ave., Denver
CM7	Kearney Middle School	39.80888, -104.91545	1.7	E. 62 nd Ave. & Kearney St., Commerce City
CM8	Monroe	39.81560, -104.94503	0.85	Monroe St. & E. 64 th Ave., Denver
CM9	48 th and Race	39.78455, -104.96264	1.7	East 48 th Ave. & Race St., Denver
CM10	Alsup Elementary School	39.82026, -104.93663	1.3	East 68 th Ave. & Birch St., Commerce City

2.0 METHODS

2.1 Air Sampling Methods

A VOC sensor-triggered air sample collection occurred at 12:58 p.m. at the CM7 – Kearney Middle School location on April 6, 2024.

Air sample collection is triggered by the tVOC monitors upon detection of 1 ppm or greater total VOCs for a 1-minute average. A triggered sample is collected over a 1-hour period by an Entech Instruments Silonite™ CS1200E Passive Canister Sampler connected to 6-liter chemically inert stainless steel (“Summa”) canister. Prior to deployment, the Summa canister was cleaned and blanked for use according to laboratory Standard Operating Procedures (SOP). Air sampling and analysis was conducted in accordance with the Quality Assurance Project Plan (QAPP) available online at www.ccnd-air.com/documents. The triggered canister sample was 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)*” was 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 analytes monitored for in urban and industrial areas and accounting for laboratory analysis capabilities (Table 1-2).

TABLE 1-2
 SELECTED ANALYTES 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 Assessment Methods

CTEH[®] conducted an assessment to determine whether the detected concentrations of individual analytes in the triggered air sample could potentially pose a risk of acute (short-term for an hour or less) health impacts from exposure due to this non-recurring event. The USEPA has established values for use in short-term emergency situations, termed Acute Exposure Guideline Levels (AEGs). Unlike health-based reference levels that can be thousands of times below exposure levels where adverse effects are observed, AEG values are levels at which different acute adverse health effects may be anticipated to occur. According to USEPA, “*AEG-1 represents 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 AEG, there is a progressive increase in the likelihood of occurrence and the severity of effects described for each corresponding AEG [i.e., AEG-2 or AEG-3].*” AEG-1s (both final and interim values) for the duration of 60 minutes were compared to results from the sample which was collected for 60 minutes. In the case where an AEG-1 was not available, an AEG-2 was selected for comparison.

3.0 RESULTS

3.1 Summary of Air Sampling Results

The total VOC reading on the CM7 – Kearney Middle School monitor was part of an event (total VOCs measured above 1 ppm) that occurred at 12:58 p.m. on April 6, 2024. The total VOC reading was observed above 1 ppm for several minutes and resulted in triggering a 1-hour Summa canister collection. The total VOC concentration reached a maximum concentration of 1.25 ppm, and total VOC concentrations decreased after approximately one hour.

The Summa canister’s compound-specific concentration results are shown in Table 1-3. Prior to, during and after the total VOC reading above 1 ppm the winds were primarily coming from the West South West (WSW) (Figures 1-2 and 1-3). Figure 1-2 provides the 1-minute total VOC concentrations and the wind direction data prior to, during and after this event period. Figure 1-3 displays a wind rose of data collected at the CM7 – Kearney Middle School location from 11:58 a.m. to 1:58 p.m. on April 6, 2024.

TABLE 1-3
CM7 – KEARNEY MIDDLE SCHOOL LOCATION SENSOR -TRIGGERED EVENT SAMPLE
CONCENTRATIONS (PPBV)

Compound Name	Cas No	Sensor Triggered Event Sample
		4/6/2024
1-Butene	106-98-9	4.5 (J)
1-Hexene	592-41-6	0.98
1-Pentene	109-67-1	0.96
1,2,3-Trimethylbenzene	526-73-8	0.2 (J)
1,2,4-Trimethylbenzene	95-63-6	0.18 (J)
1,3-Butadiene	106-99-0	8.2
1,3-Diethylbenzene	141-93-5	< 0.043
1,3,5-Trimethylbenzene	108-67-8	0.072 (J)
1,4-Diethylbenzene	105-05-5	0.12 (J)
2-Ethyltoluene	611-14-3	0.099 (J)
2-Methylheptane	592-27-8	0.067 (J)
2-Methylhexane	591-76-4	0.19 (J)
2-Methylpentane	107-83-5	1.5
2,2-Dimethylbutane	75-83-2	0.32 (J)
2,2,4-Trimethylpentane	540-84-1	< 0.04
2,3-Dimethylbutane	79-29-8	< 0.049
2,3-Dimethylpentane	565-59-3	< 0.047
2,3,4-Trimethylpentane	565-75-3	0.067 (J)
2,4-Dimethylpentane	108-08-7	0.14 (J)
3-Ethyltoluene	620-14-4	0.19 (B,J)
3-Methylheptane	589-81-1	0.08 (J)
3-Methylhexane	589-34-4	0.31 (J)
3-Methylpentane	96-14-0	0.07 (J)
4-Ethyltoluene	622-96-8	0.091 (J)
Acetylene	74-86-2	83
Benzene	71-43-2	56
Butane	106-97-8	1.4
Carbon disulfide	75-15-0	0.067 (J)
Cis-2-Butene	590-18-1	0.91
Cis-2-Pentene	627-20-3	0.38 (J)
Cyclohexane	110-82-7	0.053 (J)
Cyclopentane	287-92-3	0.051 (J)
Decane	124-18-5	0.1 (J)
Dodecane	112-40-3	0.2 (B,J,b)
Ethane	74-84-0	46
Ethylbenzene	100-41-4	0.98
Ethylene	74-85-1	290
Heptane	142-82-5	0.27 (J)
Hexane	110-54-3	0.38 (J)
Isobutane	75-28-5	0.44 (J)
Isopentane	78-78-4	0.27 (J)
Isoprene	78-79-5	1.6
Isopropylbenzene	98-82-8	0.077 (J)
m,p-Xylenes	179601-23-1	1.4
Methylcyclohexane	108-87-2	0.11 (J)
Methylcyclopentane	96-37-7	0.52
n-Octane	111-65-9	0.17 (J)
Naphthalene	91-20-3	9.4
Nonane	111-84-2	0.14 (J)
o-Xylene	95-47-6	0.54
Pentane	109-66-0	1.1
Propane	74-98-6	6.5
Propylbenzene	103-65-1	0.066 (J)
Propylene	115-07-1	36
Tetrachloroethene	127-18-4	< 0.043
Toluene	108-88-3	11
Trans-2-Butene	624-64-6	1.4
Trans-2-Pentene	646-04-8	0.55
Undecane	1120-21-4	0.13 (J,b)

All results presented in parts per billion (ppb)

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

Result qualifiers: (J) flag indicates the reported value is an estimate and was detected below the reporting limit; (B) flag indicates that contamination was found in associated Method Blank; (b).

FIGURE 1-2
CM7 – KEARNEY MIDDLE SCHOOL TOTAL VOC AND WIND DIRECTION | APRIL 6,
2024 11:58 A.M. TO 1:58 P.M.

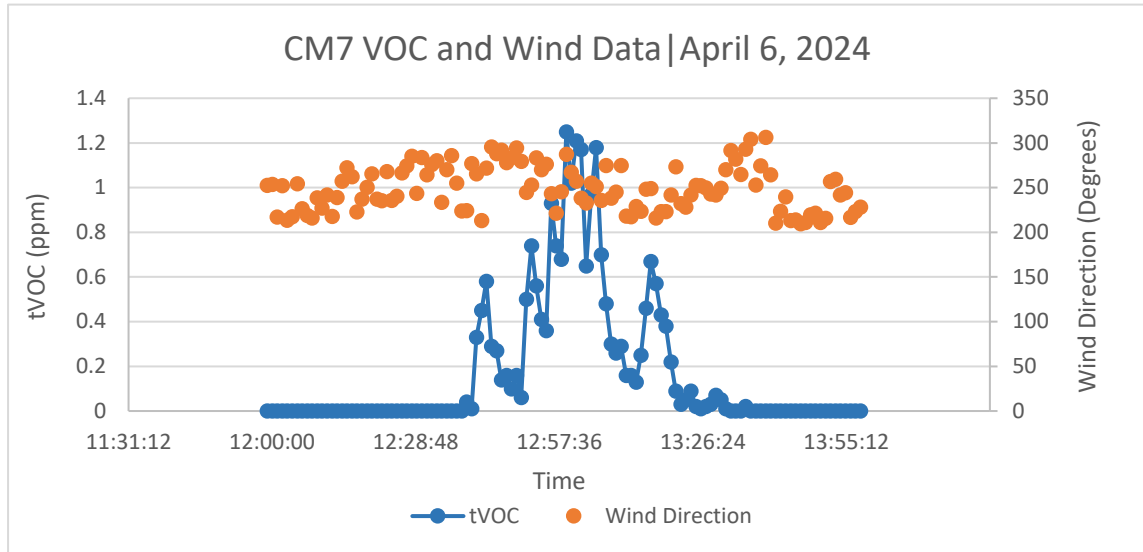
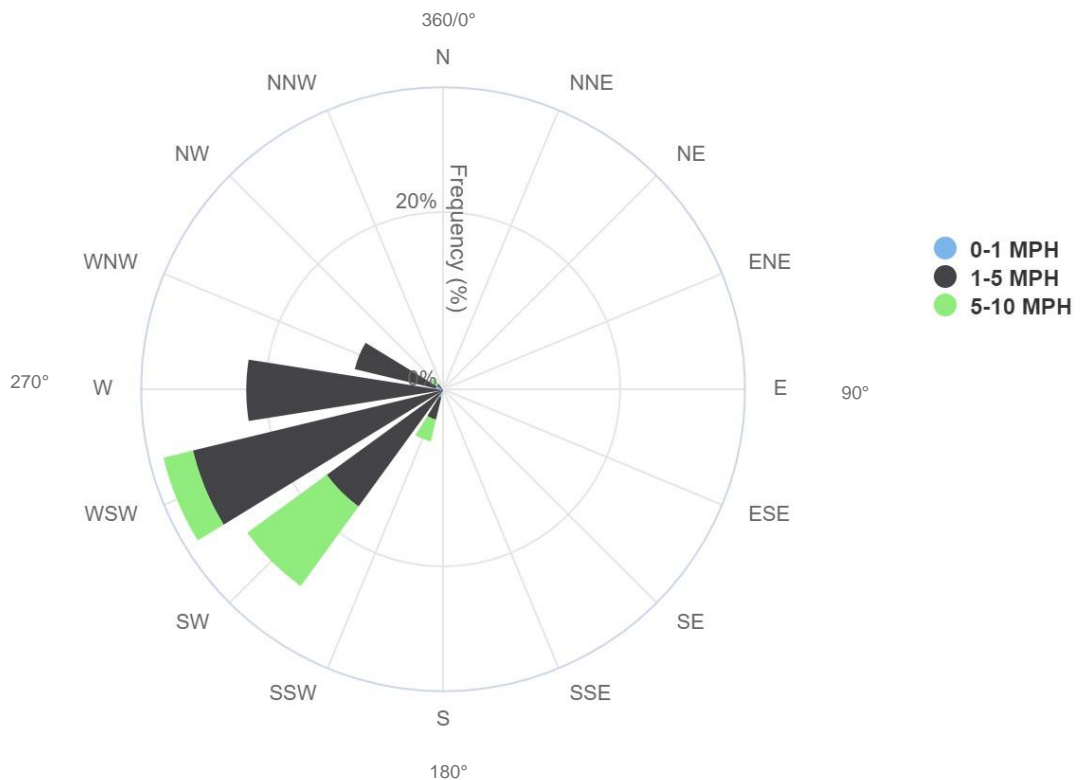


FIGURE 1-3
CM7 – KEARNEY MIDDLE SCHOOL WIND ROSE | APRIL 6, 2024 11:58 A.M. TO 1:58 P.M.



3.2 Assessment

The purpose of this assessment was to determine whether exposure to the concentrations of individual VOCs measured in the April 6, 2024, sensor-triggered event sample, collected at CM7 – Kearney Middle School, could potentially pose acute (short-term) health impacts from a single, nonrecurring event, for an hour or less duration.

A total of 15 compounds for which the laboratory analyzed had AEGL-1 or AEGL-2 for a duration of 60 minutes and are presented below in Table 1-4. All measured concentrations were below their respective AEGL values which demonstrate it is unlikely that the general population at this location, including susceptible persons, could experience notable discomfort, irritation or asymptomatic, non-sensory effects from exposure to these compounds.

Importantly, the compounds measured in this triggered sample may not include additional combustion related emissions from the fire and therefore health risks may be underrepresented. Additionally, it is important to follow all health and safety guidelines during a residential fire.

TABLE 1-4
 AEGL 60 MINUTE COMPARISON FOR CCND CM7 – KEARNEY MIDDLE SCHOOL
 MONITORING SITE

Compound Name	Cas No	AEGL 60-min Level	AEGL 60-min Value (ppb)	Concentration (ppb)
1,2,3-Trimethylbenzene	526-73-8	AEGL-1	140,000	0.2 (J)
1,2,4-Trimethylbenzene	95-63-6	AEGL-1	140,000	0.18 (J)
1,3-Butadiene	106-99-0	AEGL-1	670,000	8.2
1,3,5-Trimethylbenzene	108-67-8	AEGL-1	140,000	0.072 (J)
Benzene	71-43-2	AEGL-1	52,000	56
Butane	106-97-8	AEGL-1	5,500,000	1.4
Carbon disulfide	75-15-0	AEGL-1	13,000	0.067 (J)
Ethylbenzene	100-41-4	AEGL-1	33,000	0.98
Hexane	110-54-3	AEGL-2	2,900,000	0.38 (J)
Isopropylbenzene	98-82-8	AEGL-1	50,000	0.077 (J)
m,p-Xylenes	179601-23-1	AEGL-1	130,000	1.4
o-Xylene	95-47-6	AEGL-1	130,000	0.54
Propane	74-98-6	AEGL-1	5,500,000	6.5
Tetrachloroethene	127-18-4	AEGL-1	35,000	< 0.043
Toluene	108-88-3	AEGL-1	67,000	11

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.

4.0 Program Changes

None at this time.

Prepared by:



David Smith,
Client Project Manager
Montrose Air Quality Services

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

APPENDIX A SAMPLE CHAIN OF CUSTODIES



ENTHALPY ANALYTICAL

Air Chain of Custody Record
 Lab No: 0424 - 936 - 100612
 Page: 1 of 1

Turn Around Time (rush by advanced notice only)				
7 Day:		5 Day:	X	3 Day:
2 Day:		1 Day:		Custom TAT:

Special Instructions:

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	MAQS	Name:	Suncor
Report To:	James Garrett	Number:	PROJ-022555
Email:	jagarrett@gmail.com	P.O. #:	PO-012395
Address:	990 W 43rd Ave, Denver, CO 80211	Address:	N/A
Phone:	719-466-9447	Global ID:	N/A
Fax:	N/A	Sampled By:	MAQS

**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)	TO-15 (BTEX)	Suncor List	
1 Kearney Middle School (CM-7) 4.6.24	A	40117	6L	14881	4/6/24	12:58PM	25	4/6/24	1:55PM	4	X	X	
2													
3													
4													
5													
6													
7													
8													
9													
10													

APR 11 '24 PM 2:56
 24.1°C FUE BW

	Signature	Print Name	Company / Title	Date / Time
¹ Relinquished By:		Curtis Neuhring	Montrose / Technician	4/9/2024 9:00
¹ Received By:		ERIKA GARCIA	ENTHALPY / PM	04-11-24 14:56
² Relinquished By:				
² Received By:				
³ Relinquished By:				
³ Received By:				

THIS IS THE LAST PAGE OF THIS DOCUMENT