

# Ambient air monitoring data summary report

## Commerce City at Night

Air Toxics and Ozone Precursor Program  
[ATOPs]



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# 1. Executive Summary

## 1.1. Report Purpose

The purpose of this report is to describe measurements of hydrogen sulfide (H<sub>2</sub>S), methane (CH<sub>4</sub>), and other air toxics measured in ambient air by the CDPHE APCD Community Air Toxics (CAT) and Emissions Monitoring Utility (EMU) mobile laboratories in Commerce City on the nights of December 8, 2025 and March 9 2026.

## 1.2. Background Information

From February 2023 to December 2025, CDPHE APCD conducted three-hundred and thirty-nine (339) routine mobile laboratory deployments measuring benzene (C<sub>6</sub>H<sub>6</sub>), hydrogen sulfide (H<sub>2</sub>S), hydrogen cyanide (HCN), and other air toxics across disproportionately impacted (DI) communities in Commerce City, Henderson, and Pueblo. These mobile laboratory measurements are mandated by Colorado House Bill 21-1189, also known as the “Regulate Air Toxics” Act. Without exception, all 339 of these mobile laboratory deployments were conducted between the hours of 8 a.m. and 6 p.m. local time.

In early October 2025, CDPHE APCD began continuous, 24/7 measurements of hydrogen sulfide (H<sub>2</sub>S), benzene (C<sub>6</sub>H<sub>6</sub>), and meteorological parameters in ambient air at the Adams County Birch Street site (39.828106 N, 104.936467 W), which is a fixed stationary air quality monitoring site located directly across the street from Adams City Middle School (4451 E 72nd Ave, Commerce City, CO 80022). These were the first measurements conducted for the newly-established Municipality-Tied Ground-based Observations of Air Toxics (MT GOAT) network. The first two months of MT GOAT measurements at the Adams County Birch Street site reveal hydrogen sulfide (H<sub>2</sub>S) concentrations which are consistently elevated above the odor threshold (>10 ppbv) between the hours of 6 p.m. and 8 a.m. local time. The elevated hydrogen sulfide (H<sub>2</sub>S) concentrations observed overnight at the Adams County Birch Street site are corroborated by hydrogen sulfide (H<sub>2</sub>S) measurements conducted by Montrose Environmental Group, Inc. at Adams City Middle School as part of the Suncor Energy’s Commerce City - North Denver Air Monitoring (CCND) program ([ccnd-air.com](http://ccnd-air.com)).

On November 17, 2025, Adams County staff informed CDPHE APCD that numerous Commerce City residents had expressed concerns about the presence of foul odors overnight. Adams County staff requested that CDPHE APCD conduct a late-night mobile laboratory deployment to investigate the source of these odors. Based on measurements collected on the first nighttime deployment on December 8, 2025, CDPHE APCD plans to conduct nighttime mobile monitoring quarterly, beginning in the fourth quarter of 2025.

## 1.3. Key Findings

From December 8, 2025 to March 9, 2026, the CAT & EMU mobile laboratories were deployed to the area surrounding the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) and the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) a total of two times. Generally, the observed ambient hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) concentrations increased with proximity to the facilities of interest. However,

because these locations are in close proximity, it is difficult to ascertain which facility or facilities are the source of these elevated above typical background concentrations of hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>).

The highest observed 4-second hydrogen sulfide (H<sub>2</sub>S) concentration was 45 ppbv on March 9, 2026 while driving southwest on Brighton Blvd between Suncor oil refinery facilities and southeast of Robert W. Hite wastewater treatment facility.

The highest observed 4-second methane (CH<sub>4</sub>) concentration was 29.9 ppmv on March 9, 2026 while driving northwest of these two facilities. However, the modeled wind direction suggests that the source of this methane (CH<sub>4</sub>) plume was not from either Suncor oil refinery or Robert W. Hite wastewater treatment facility.

On December 8, 2025, between 6:45 p.m. and 9:45 p.m. MST, the EMU mobile laboratory consistently observed hydrogen sulfide (H<sub>2</sub>S) concentrations above the odor threshold of 10 ppbv while downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216). The EMU mobile laboratory also consistently observed methane (CH<sub>4</sub>) concentrations elevated above background levels (>2 ppmv) while downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022). The observed elevations in methane (CH<sub>4</sub>) were not correlated in time or location with the observed elevations in hydrogen sulfide (H<sub>2</sub>S).

On March 9, 2026, between 8:00 p.m. and 11:00 p.m. MST, the CAT mobile laboratory consistently observed hydrogen sulfide (H<sub>2</sub>S) concentrations above the odor threshold of 10 ppbv and methane (CH<sub>4</sub>) concentrations above typical background levels while driving along Brighton Blvd, downwind of Suncor oil refinery and/or Robert W. Hite wastewater treatment facility. Similar to findings from December 8, 2025, the observed elevations in methane (CH<sub>4</sub>) were not correlated in time or location with the observed elevations in hydrogen sulfide (H<sub>2</sub>S), suggesting unique origins of each species.

## 2. Introduction

The CAT or EMU mobile laboratories were deployed to an area surrounding the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) and the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) quarterly between 6:30 p.m. and 11:00 p.m. local time.

The EMU mobile laboratory was first deployed to the area on December 8, 2025. The CAT mobile laboratory was deployed to the area on March 9, 2026. Each mobile laboratory was operated by two scientists from the CDPHE APCD Air Toxics & Ozone Precursor (ATOPs) program.

## 3. Methods

### 3.1. The Community Air Toxics (CAT) Mobile Laboratory

The CAT mobile laboratory is a Mercedes Sprinter van equipped with five instruments for measuring air toxics: a ToFwerk Vocus Eiger Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer (PTR-ToF-MS), a ToFwerk Vocus B AIM Chemical Ionization Time-of-Flight Mass

Spectrometer (CI-ToF-MS), a Picarro Cavity Ringdown Spectroscopy (CRDS) instrument, a Gill Instruments MaxiMet meteorological station, and a VectorNav VN-200 high performance GNSS-Aided Inertial Navigation System. All but the Gill Instruments MaxiMet meteorological station were fully operational for the duration of the deployment to the area surrounding the Suncor oil refinery and the Robert W. Hite wastewater treatment facility on March 9, 2026, where the MaxiMet was damaged at 9:07 p.m. MDT and wind measurements ceased. The parameters measured by these five instruments are summarized in Table 1.

**Table 1.** CAT mobile laboratory instrumentation summary.

<b>Instrument</b>	<b>Measured parameters</b>	<b>Time resolution</b>
Tofwerk Vocus Eiger Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer (PTR-ToF-MS)	Benzene (C <sub>6</sub> H <sub>6</sub> ) Toluene (C <sub>7</sub> H <sub>8</sub> ) Xylenes (C <sub>8</sub> H <sub>10</sub> ) Methanethiol / Methyl mercaptan (CH <sub>3</sub> SH) Acetone (C <sub>3</sub> H <sub>6</sub> O) Acetonitrile (CH <sub>3</sub> CN) Acetaldehyde (CH <sub>3</sub> CHO) Methyl ethyl ketone / Butanone (C <sub>4</sub> H <sub>8</sub> O) Hexene (C <sub>6</sub> H <sub>12</sub> ) Tetrachloroethylene (C <sub>2</sub> Cl <sub>4</sub> ) Trimethylbenzene (C <sub>9</sub> H <sub>12</sub> )	1 second
Tofwerk Vocus B AIM Chemical Ionization Time-Of-Flight Mass Spectrometer (CI-ToF-MS)	Hydrogen cyanide (HCN) 1,3-Butadiene (C <sub>4</sub> H <sub>6</sub> )	2 seconds
Picarro Cavity Ring-Down Spectroscopy (CRDS) instrument	Hydrogen sulfide (H <sub>2</sub> S) Methane (CH <sub>4</sub> ) Water vapor (H <sub>2</sub> O)	4 seconds
Gill Instruments MaxiMet GMX500	Pressure Temperature Relative humidity Wind speed & direction GPS position (latitude, longitude), speed, heading	1 second
VectorNav VN-200 GNSS/INS	GPS position (latitude, longitude), velocity, altitude	0.5 seconds

### 3.2. The Emissions Monitoring Utility (EMU) Mobile Laboratory

The EMU mobile laboratory is a Mercedes Sprinter van equipped with five instruments for measuring air toxics: a Tofwerk Vocus Eiger Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer (PTR-ToF-MS), a Tofwerk Vocus B AIM Chemical Ionization Time-of-Flight Mass Spectrometer (CI-ToF-MS), a Picarro Cavity Ringdown Spectroscopy (CRDS) instrument, a Gill

Instruments MaxiMet meteorological station, and a VectorNav VN-200 high performance GNSS-Aided Inertial Navigation System. All five of these instruments were fully operational for the duration of the deployments to the area surrounding the Suncor oil refinery and the Robert W. Hite wastewater treatment facility. The parameters measured by these five instruments are summarized in Table 2.

**Table 2.** EMU mobile laboratory instrumentation summary.

<b>Instrument</b>	<b>Measured parameters</b>	<b>Time resolution</b>
Tofwerk Vocus Eiger Proton-Transfer-Reaction Time-of-Flight Mass Spectrometer (PTR-ToF-MS)	Benzene (C <sub>6</sub> H <sub>6</sub> ) Toluene (C <sub>7</sub> H <sub>8</sub> ) Xylenes (C <sub>8</sub> H <sub>10</sub> ) Methanethiol / Methyl mercaptan (CH <sub>3</sub> SH) Acetone (C <sub>3</sub> H <sub>6</sub> O) Acetonitrile (CH <sub>3</sub> CN) Acetaldehyde (CH <sub>3</sub> CHO) Methyl ethyl ketone / Butanone (C <sub>4</sub> H <sub>8</sub> O) Hexene (C <sub>6</sub> H <sub>12</sub> ) Tetrachloroethylene (C <sub>2</sub> Cl <sub>4</sub> ) Trimethylbenzene (C <sub>9</sub> H <sub>12</sub> )	1 second
Tofwerk Vocus B AIM Chemical Ionization Time-Of-Flight Mass Spectrometer (CI-ToF-MS)	Hydrogen cyanide (HCN) 1,3-Butadiene (C <sub>4</sub> H <sub>6</sub> )	2 seconds
Picarro Cavity Ring-Down Spectroscopy (CRDS) instrument	Hydrogen sulfide (H <sub>2</sub> S) Methane (CH <sub>4</sub> ) Water vapor (H <sub>2</sub> O)	4 seconds
Gill Instruments Maximet GMX500	Pressure Temperature Relative humidity Wind speed & direction GPS position (latitude, longitude), speed, heading	1 second
VectorNav VN-200 GNSS/INS	GPS position (latitude, longitude), velocity, altitude	0.5 seconds

### 3.3. Data Processing

All data analysis was performed using IGOR Pro 9.05 and Google Earth. Instrument background data and calibration data were excluded from the analysis. Statistics were calculated by substituting zero for non-detects and substituting 1/2 the method detection limit (MDL) for measurements below the MDL. For methane, all measurements were assumed to be above the MDL, since the regional background signal is ~2 ppmv.



### 3.4. Quality Control & Assurance

To ensure reliability and validity of field measurements, proper quality control (QC) and quality assurance (QA) must be carried out before, during, and after data collection. QC processes ensure instruments are operating under the same parameters throughout a measurement period to maintain consistency. QA processes implement checks and validation of the collected data to ensure completeness and accuracy. Carrying out proper QC and QA establishes confidence in the data.

Immediately prior to and hourly throughout each deployment, the CAT & EMU Vocus Eiger PTR-ToF-MS instruments were directly calibrated for benzene, toluene, xylenes, methanethiol, acetone, acetonitrile, acetaldehyde, methyl ethyl ketone, hexene, tetrachloroethylene, and trimethylbenzene using compressed gas cylinders containing known concentrations of these compounds. During each calibration, the CAT & EMU Vocus Eiger PTR-ToF-MS instrument background signals were characterized by overflowing the sample inlet with zero air from a zero air generator.

The CAT & EMU Vocus B AIM CI-ToF-MS instruments were directly calibrated for hydrogen cyanide weekly using compressed gas cylinders containing a known concentration of hydrogen cyanide. Immediately prior to and every 30 minutes throughout each deployment, the CAT & EMU Vocus B AIM CI-ToF-MS instrument background signals were characterized by overflowing the sample inlet with nitrogen from an ultrahigh purity nitrogen gas cylinder.

The CAT & EMU Picarro CRDS, Vocus Eiger PTR-ToF-MS, and Vocus B CI-ToF-MS instruments undergo quarterly audits to ensure that they are working as intended, and to quantify the instrument limit of detection for each measured compound using standard EPA methodology. These audits include the introduction of a test gas containing a known concentration of a given air toxic into the instrument sampling line. Percent recovery is calculated by dividing the measured concentration by the known concentration. The accepted percent recovery tolerance is  $\pm 30\%$ , or 70–130% recovery. Audit results for hydrogen sulfide in the CAT & EMU Picarro CRDS instruments are shown in Table 3 and Table 4. Audit results for methane in the CAT & EMU Picarro CRDS instruments are shown in Table 5 and Table 6. Audit results for benzene in the CAT & EMU Vocus Eiger PTR-ToF-MS instruments are shown in Table 7 and Table 8. Audit results for hydrogen cyanide in the CAT & EMU Vocus B AIM CI-ToF-MS instruments are shown in Table 9 and Table 10.

**Table 3.** CAT Picarro CRDS instrument H<sub>2</sub>S audit results.

Date [yyyy.mm.dd]	2-second method detection limit for hydrogen sulfide	Percent recovery
2025.09.22	8.3 ppbv	71.5% to 93.6%
2025.12.22	8.0 ppbv	78.4% to 102.7%

**Table 4.** EMU Picarro CRDS instrument H<sub>2</sub>S audit results.

Date [yyyy.mm.dd]	2-second method detection limit for hydrogen sulfide	Percent recovery
2025.09.25	3.19 ppbv	73.5% to 86.2%
2025.12.16	5.95 ppbv	63.4% to 84.7%

**Table 5.** CAT Picarro CRDS instrument methane audit results.

Date [yyyy.mm.dd]	2-second method detection limit for methane	Percent recovery
2025.12.22	9.0 ppbv	107.6% to 107.8%

**Table 6.** EMU Picarro CRDS instrument methane audit results.

Date [yyyy.mm.dd]	2-second method detection limit for methane	Percent recovery
2025.12.16	4.7 ppbv	108.0% to 108.2%

**Table 7.** CAT Vocus Eiger PTR-ToF-MS instrument benzene audit results.

Date [yyyy.mm.dd]	2-second method detection limit for benzene	Percent recovery
2025.09.22	0.36 ppbv	93.6% to 111.1%
2025.12.22	0.41 ppbv	95.6% to 112.8%

**Table 8.** EMU Vocus Eiger PTR-ToF-MS instrument benzene audit results.

Date [yyyy.mm.dd]	2-second method detection limit for benzene	Percent recovery
2025.09.25	0.79 ppbv	81.5% to 117.3%
2025.12.16	0.51 ppbv	83.0% to 104.0%

**Table 9.** CAT Vocus B AIM CI-ToF-MS instrument HCN audit results.

Date [yyyy.mm.dd]	2-second method detection limit for methane	Percent recovery
2025.10.08	0.48 ppbv	102.9% to 107.6%
2025.12.22	0.63 ppbv	60.7% to 79.5%

**Table 10.** EMU Vocus B AIM CI-ToF-MS instrument HCN audit results.

Date [yyyy.mm.dd]	2-second method detection limit for methane	Percent recovery
2025.09.25	0.67 ppbv	89.8% to 115.4%



Date [yyyy.mm.dd]	2-second method detection limit for methane	Percent recovery
2025.12.16	0.95 ppbv	108.7% to 140.8%

## 4. Deployment Summary

### 4.1. Overview

On December 8, 2025 and March 9, 2026, the CAT or EMU mobile laboratories were deployed to an area surrounding the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) and the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) between 6:30 p.m. and 11:00 p.m. local time. Measurement statistics for hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) observed during each deployment is shown in Table 11.

**Table 11.** Overview of CAT & EMU mobile laboratory deployments to the area surrounding the Suncor oil refinery and the Robert W. Hite wastewater treatment facility. Minimum concentration values below the method detection limit (MDL) are marked as < MDL.

Date	Asset	Maximum 4-second H <sub>2</sub> S	Average 4-second H <sub>2</sub> S	Maximum 4-second CH <sub>4</sub>	Average 4-second CH <sub>4</sub>
2025.12.08	EMU	15 ppbv	< 6 ppbv	9.2 ppmv	2.1 ppmv
2026.03.09	CAT	45 ppbv	< 8 ppbv	29.9 ppmv	2.2 ppmv

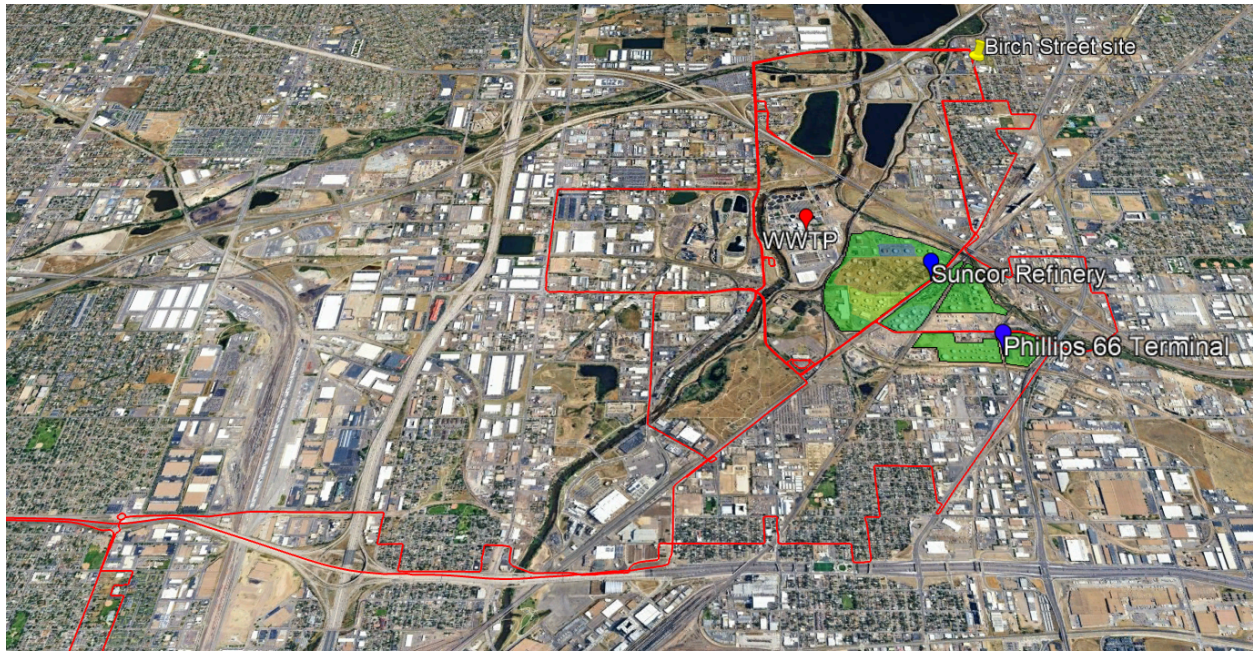
### 4.2. EMU mobile laboratory deployment on December 8, 2026

The CDPHE APCD Emissions Monitoring Utility (EMU) mobile laboratory was deployed to an area surrounding the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) and the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) on December 8, 2026. The EMU mobile laboratory arrived at the target area at approximately 6:30 p.m. MST and measured continuously until approximately 9:45 p.m. MST. The complete EMU mobile laboratory drive path is shown in Figure 1.

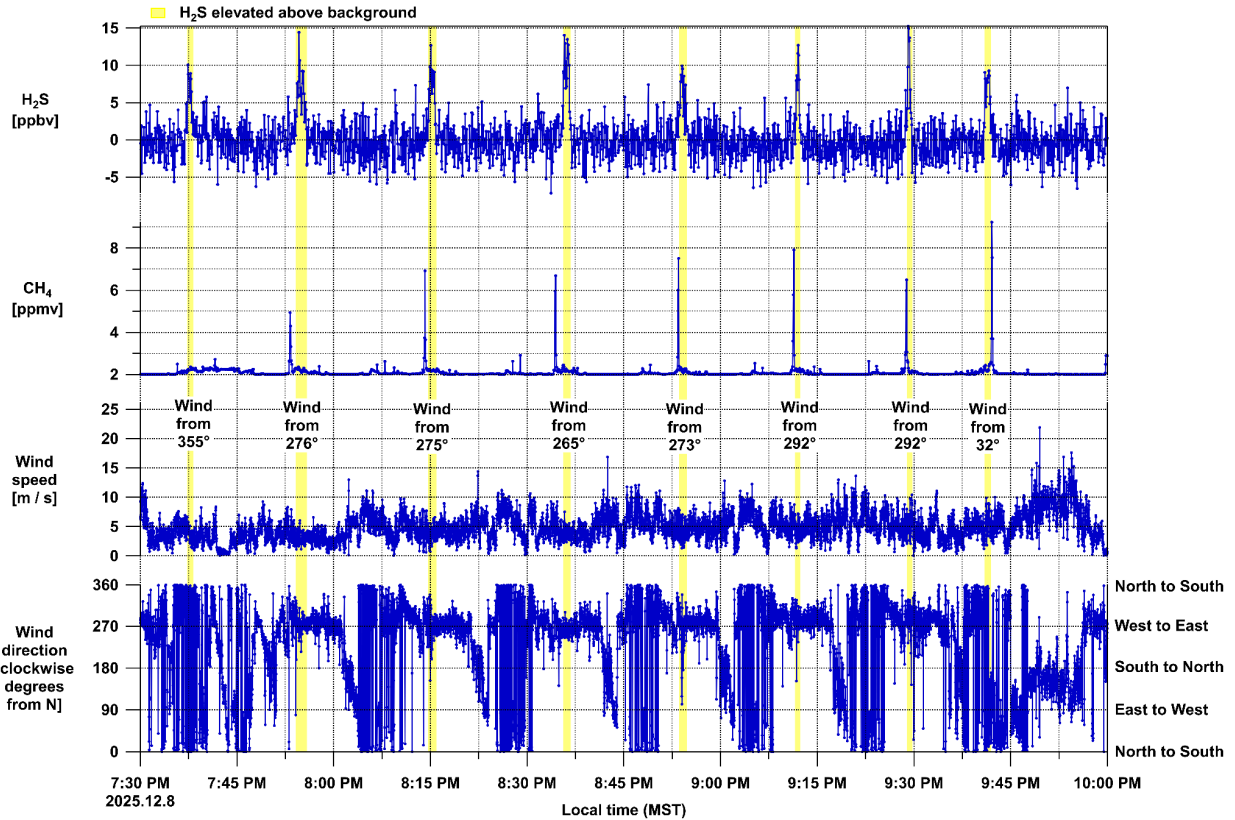
While continuously measuring, the EMU mobile laboratory consistently observed hydrogen sulfide (H<sub>2</sub>S) concentrations above the odor threshold of 10 ppbv while downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216). The maximum four-second hydrogen sulfide (H<sub>2</sub>S) concentration observed downwind of the Robert W. Hite wastewater treatment plant was 15 ppbv.

The EMU mobile laboratory also consistently observed methane (CH<sub>4</sub>) concentrations elevated above background levels (>2 ppmv) while downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022). The maximum four-second methane (CH<sub>4</sub>) concentration observed downwind of the Suncor oil refinery was 9.2 ppbv. The observed elevations in methane (CH<sub>4</sub>) were not correlated in time or location with the observed elevations in hydrogen sulfide (H<sub>2</sub>S). Due to bacterial decomposition in wastewater, the wastewater treatment facility could be a source of hydrogen sulfide (H<sub>2</sub>S).

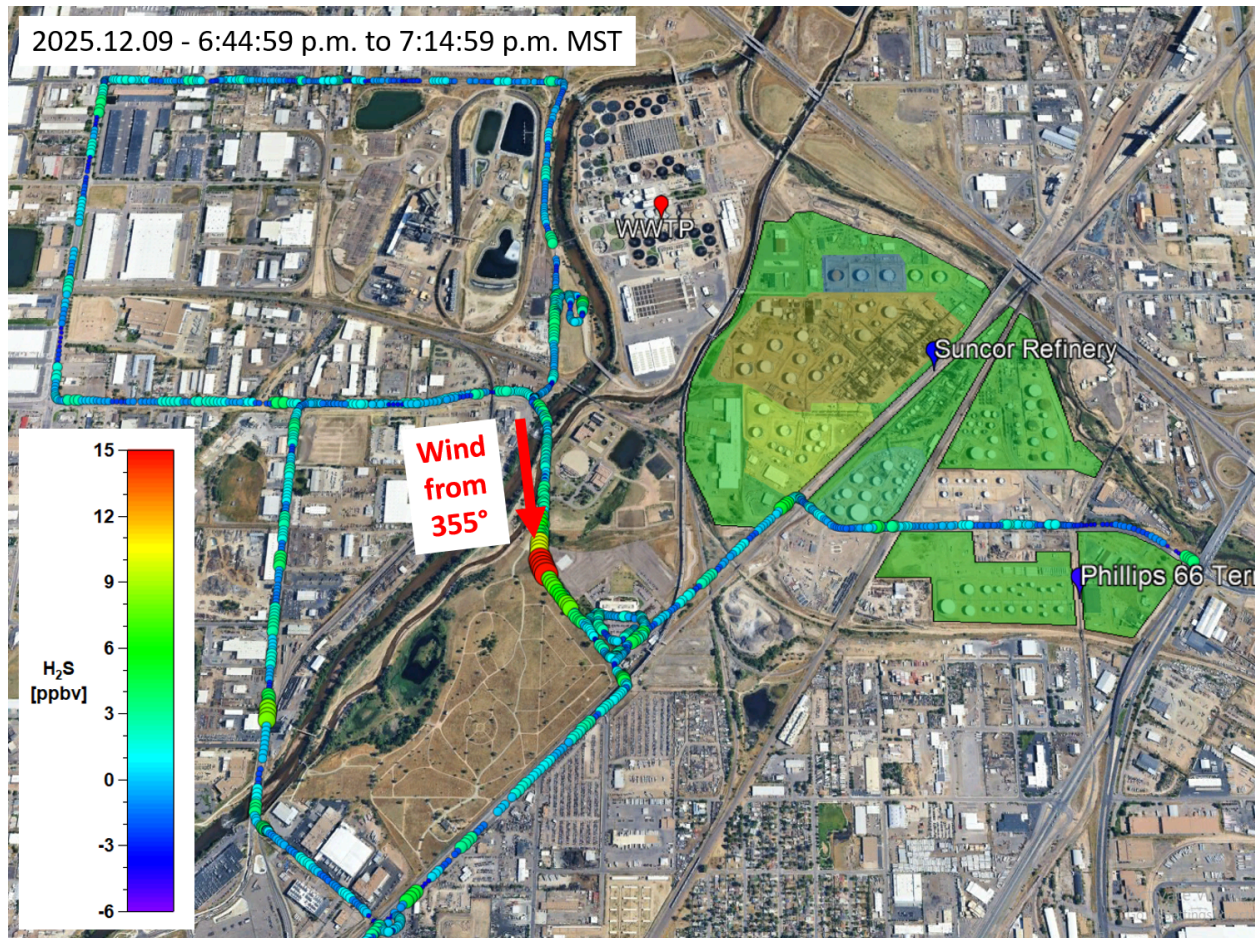
Table 11 shows measurement statistics for hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) observed on December 8, 2025. Figure 2 shows a time series of hydrogen sulfide, methane, wind speed, and wind direction. Figures 3–17 show the hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) concentrations observed downwind of the two facilities.



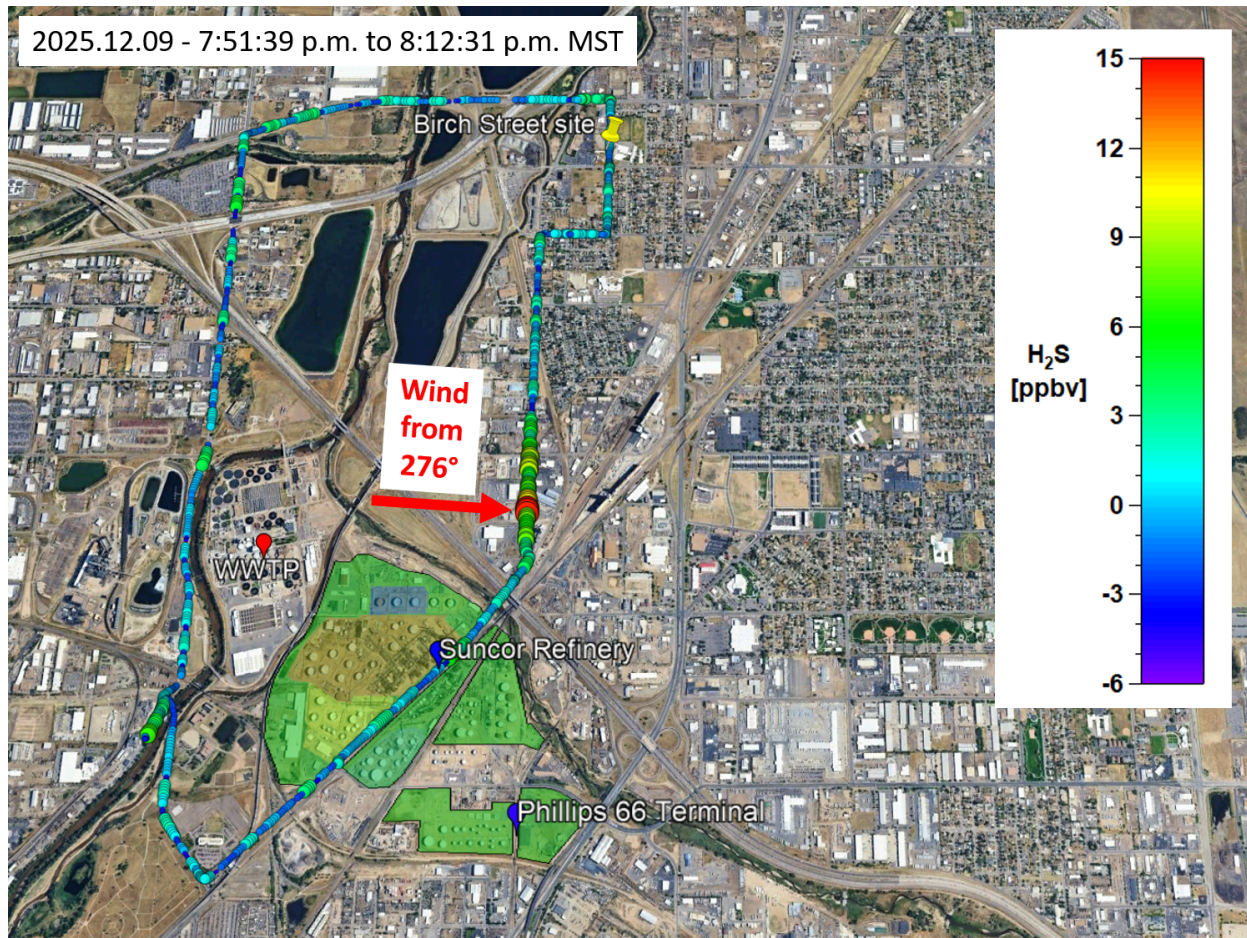
**Figure 1.** Map showing the complete EMU mobile laboratory drive path on December 8, 2025. The red line indicates the EMU drive path. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



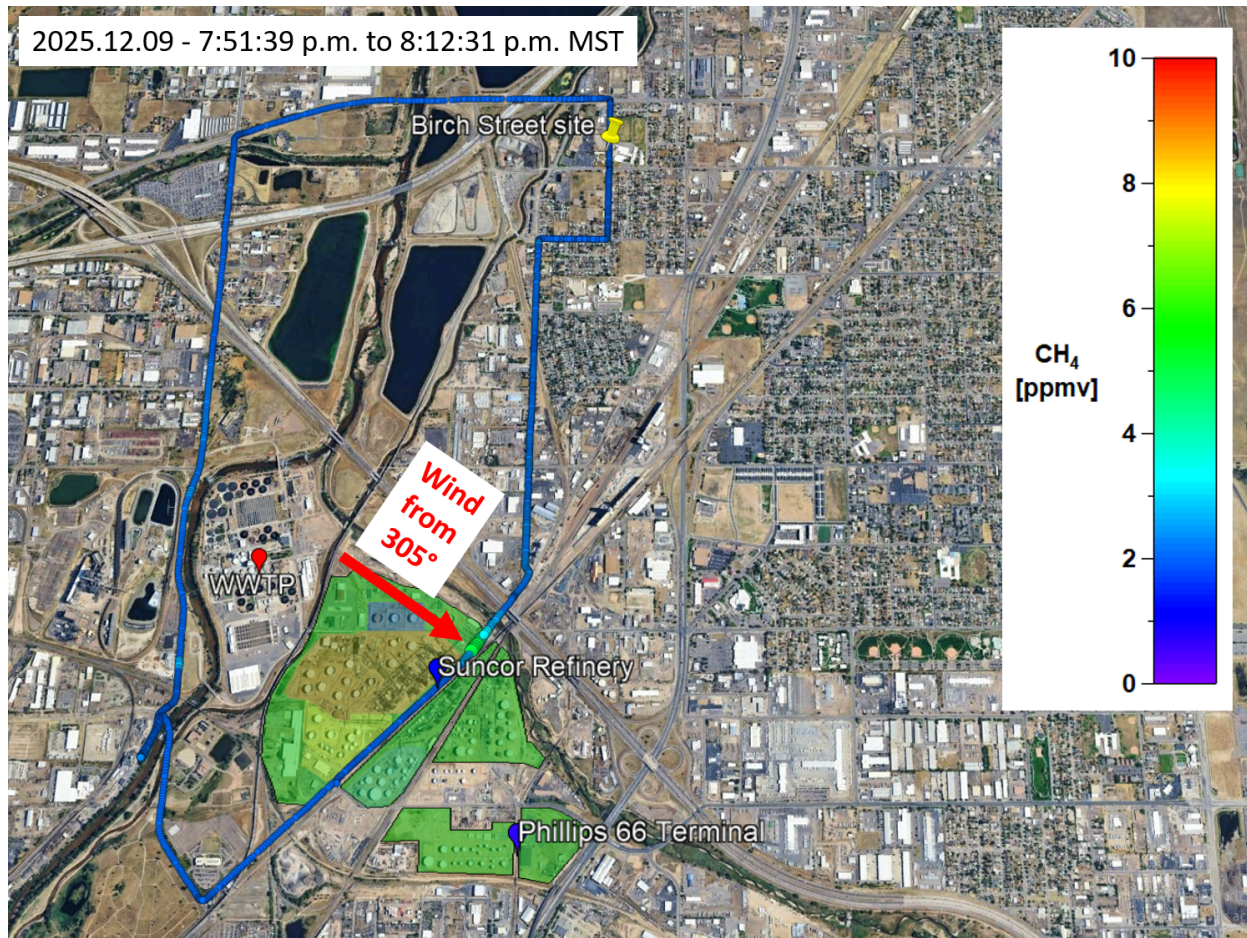
**Figure 2.** Time series of hydrogen sulfide (H<sub>2</sub>S) concentrations, methane (CH<sub>4</sub>) concentrations, wind speed, and wind direction measured by the EMU mobile laboratory in the area surrounding the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) and the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 7:30 p.m. to 10:00 p.m. on December 8, 2025. The yellow shading indicates periods when hydrogen sulfide (H<sub>2</sub>S) concentrations elevated above background were observed downwind of the Robert W. Hite wastewater treatment facility. The vector-averaged wind direction during the yellow shaded periods is indicated by text labels.



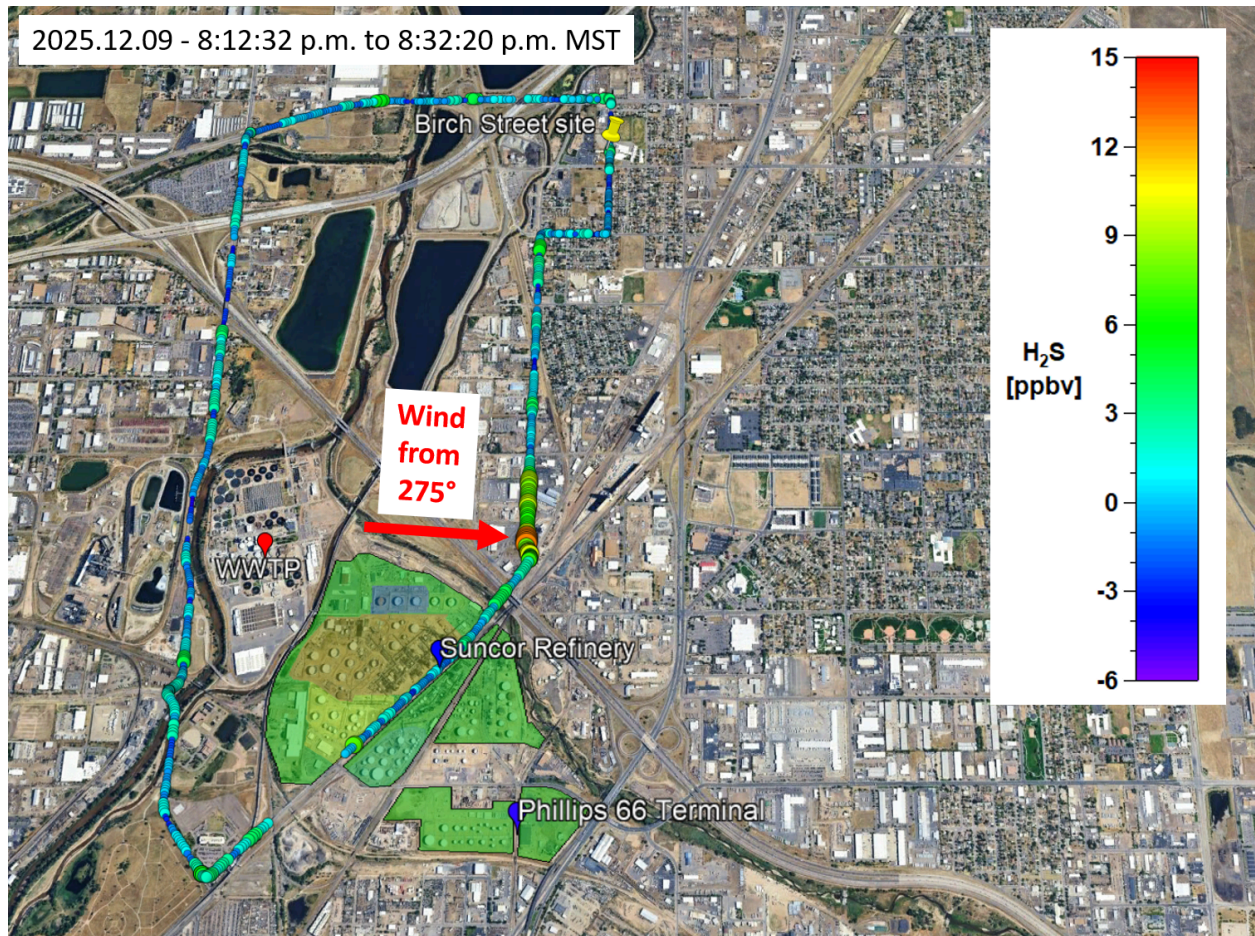
**Figure 3.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 6:45 p.m. to 7:15 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



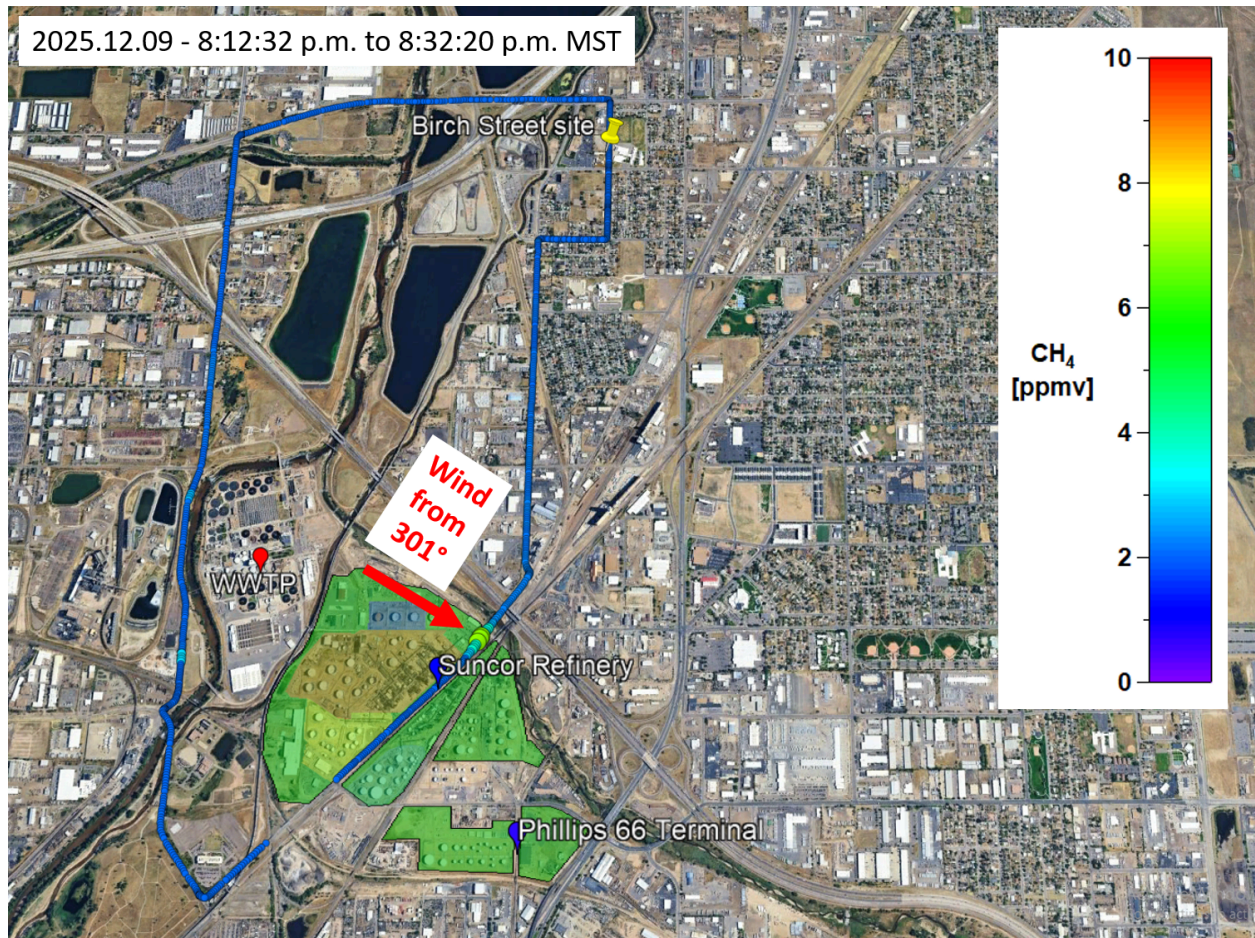
**Figure 4.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 7:52 p.m. to 8:13 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



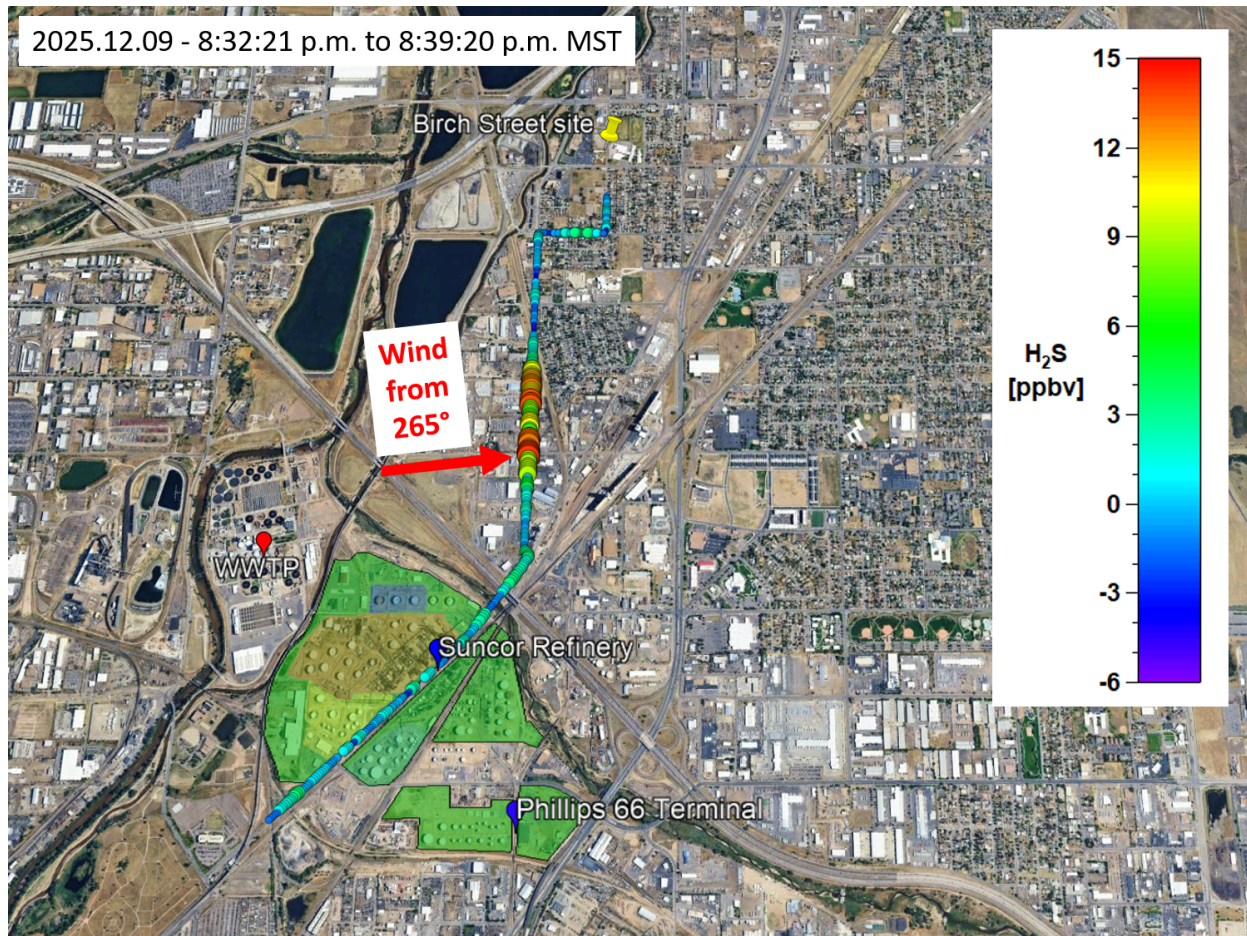
**Figure 5.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 7:52 p.m. to 8:13 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



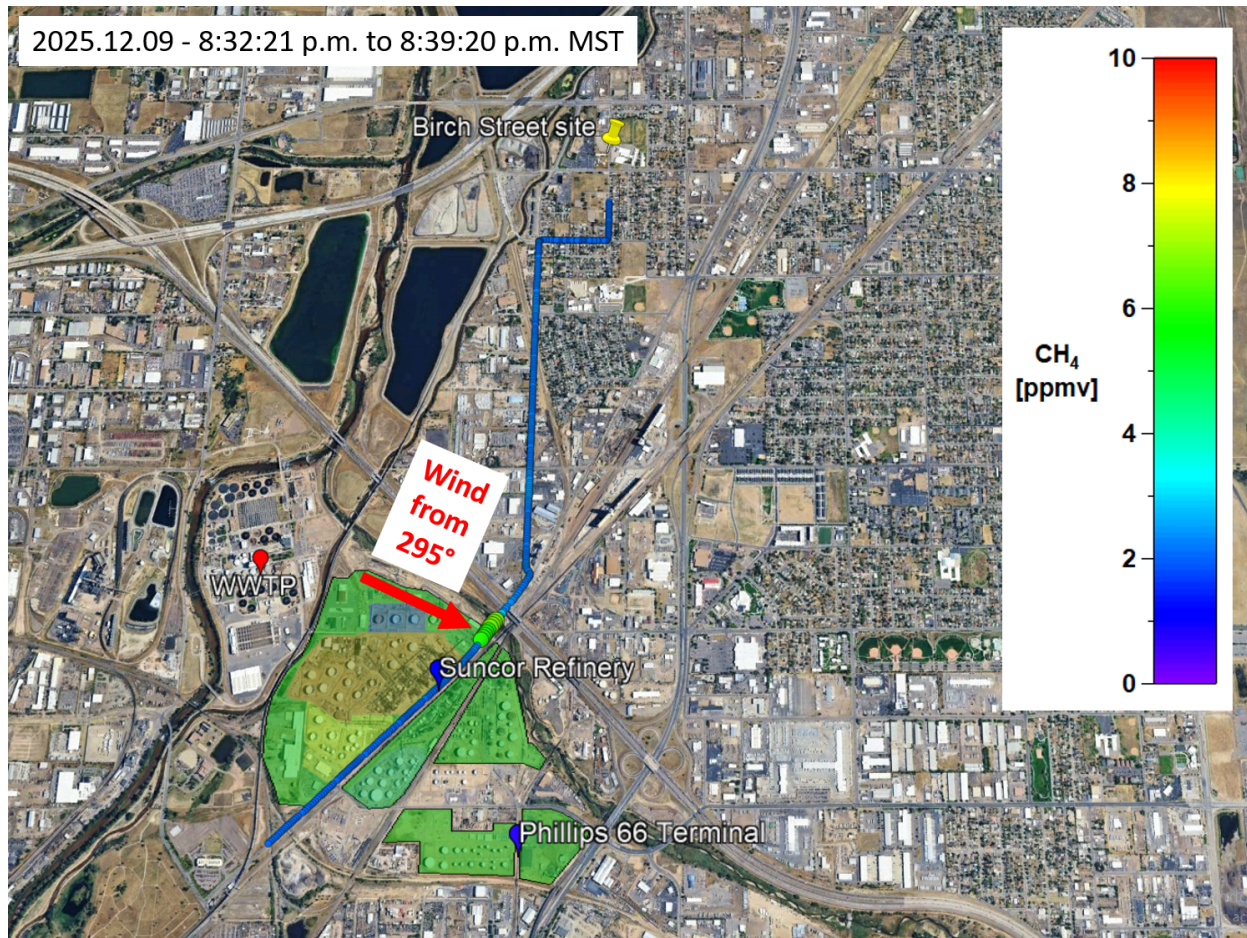
**Figure 6.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:13 p.m. to 8:32 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



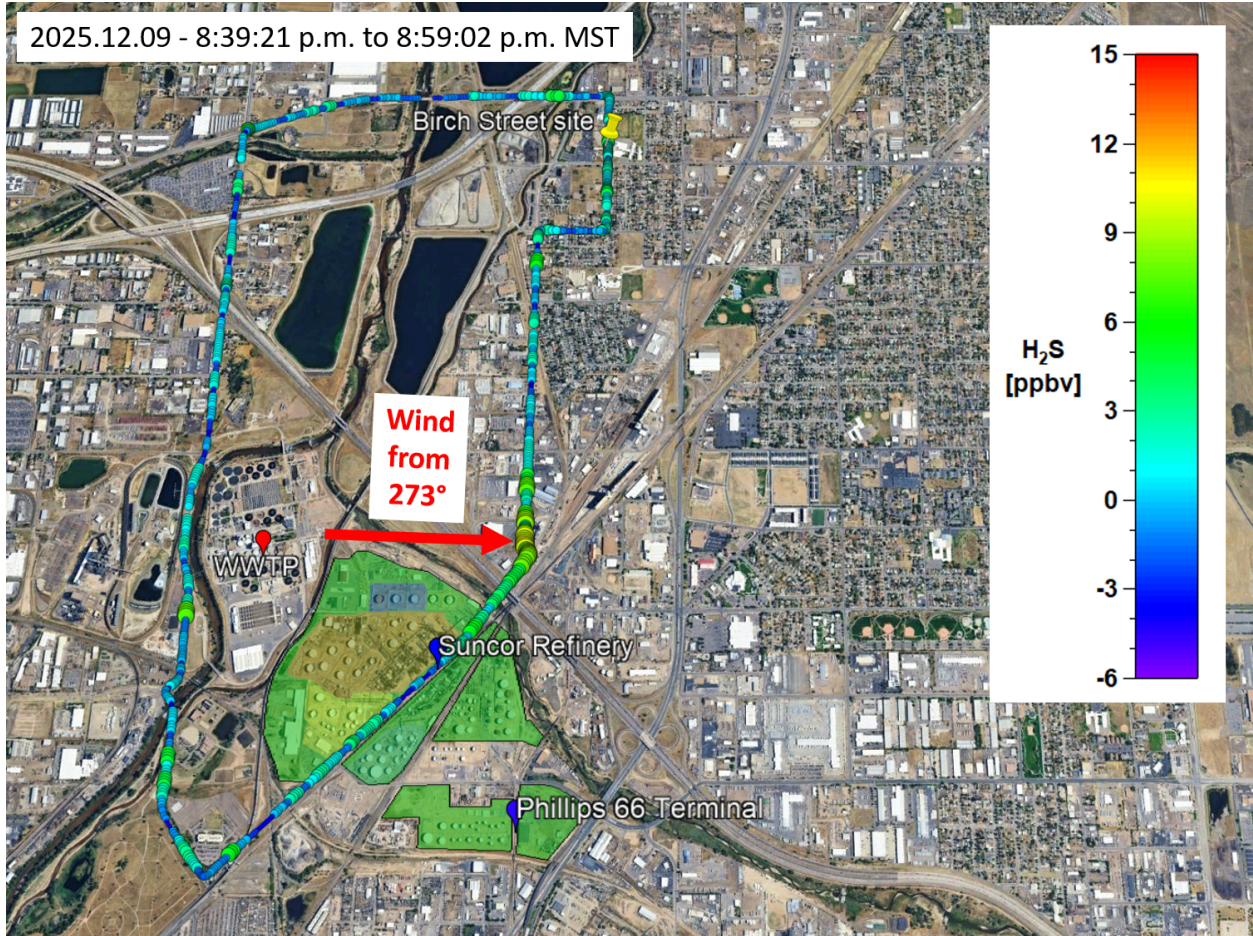
**Figure 7.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:13 p.m. to 8:32 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



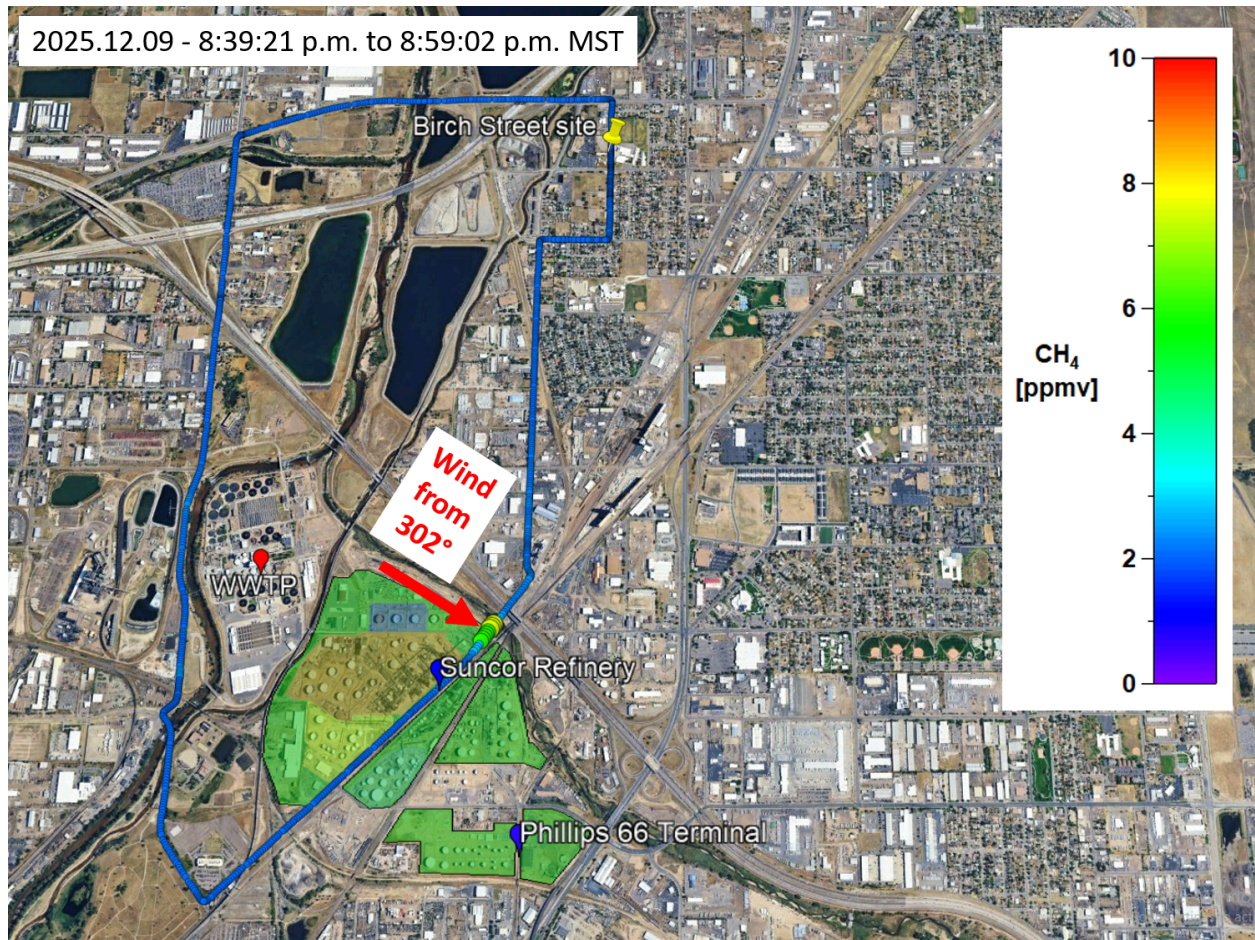
**Figure 8.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:32 p.m. to 8:39 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



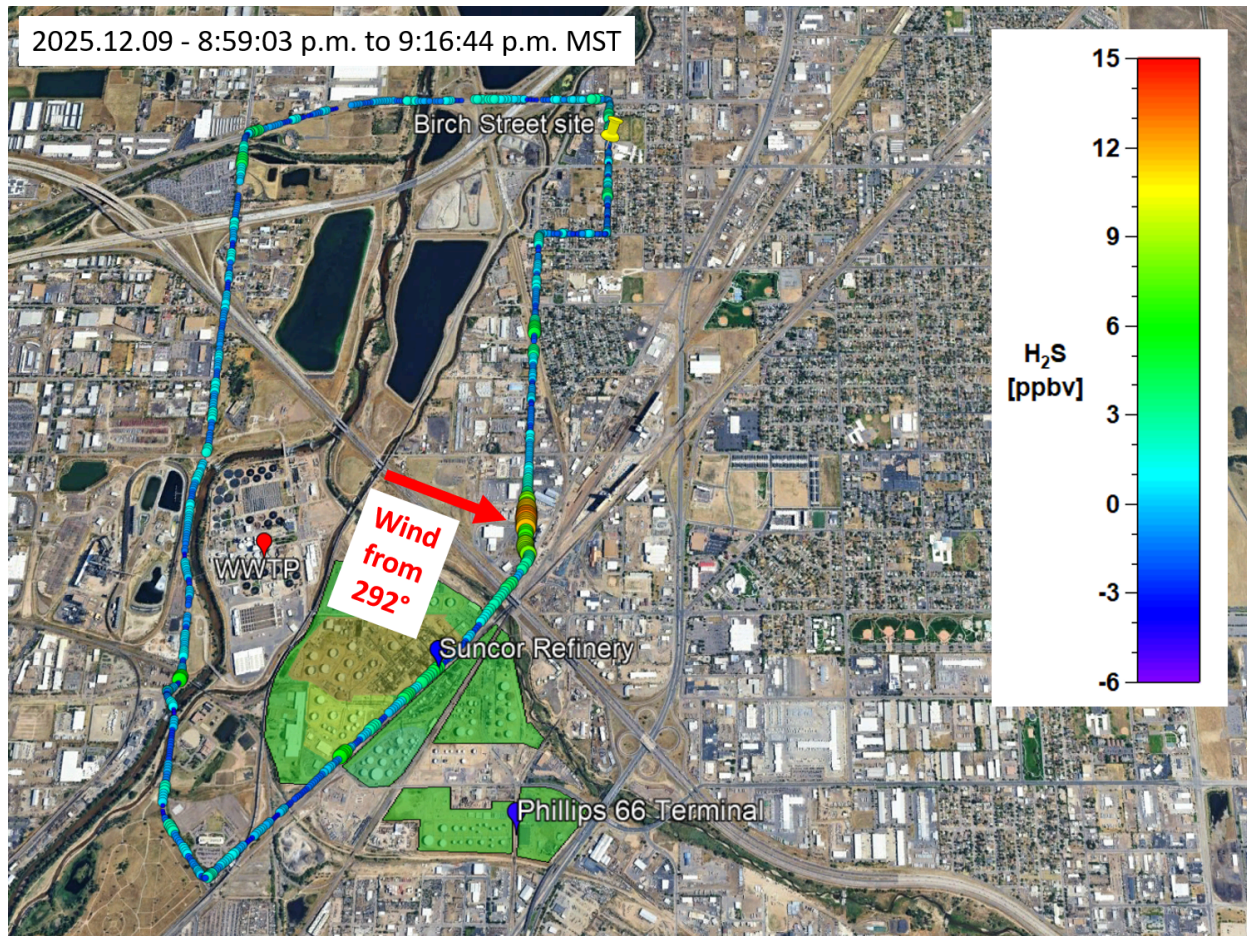
**Figure 9.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:32 p.m. to 8:39 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



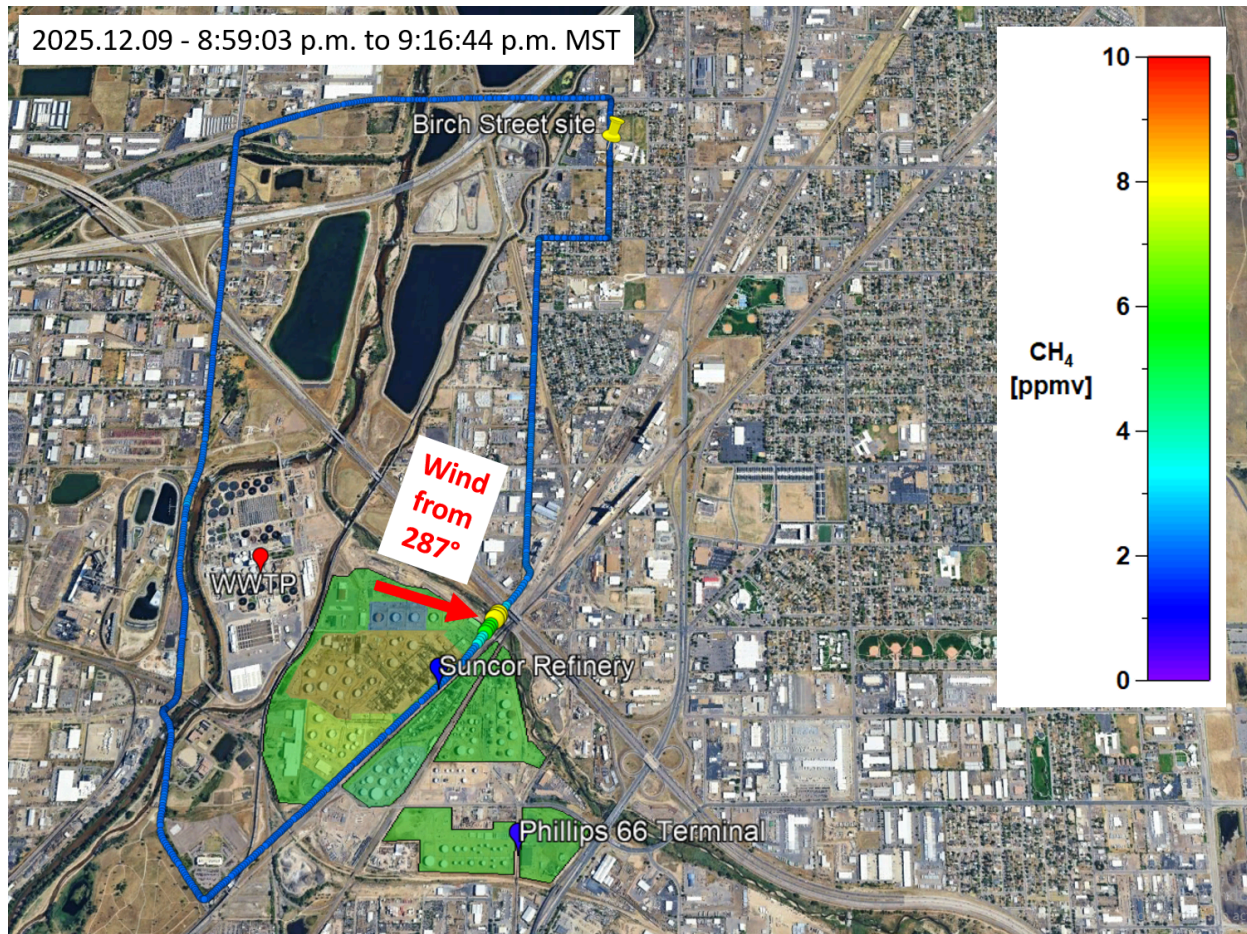
**Figure 10.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:39 p.m. to 8:59 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



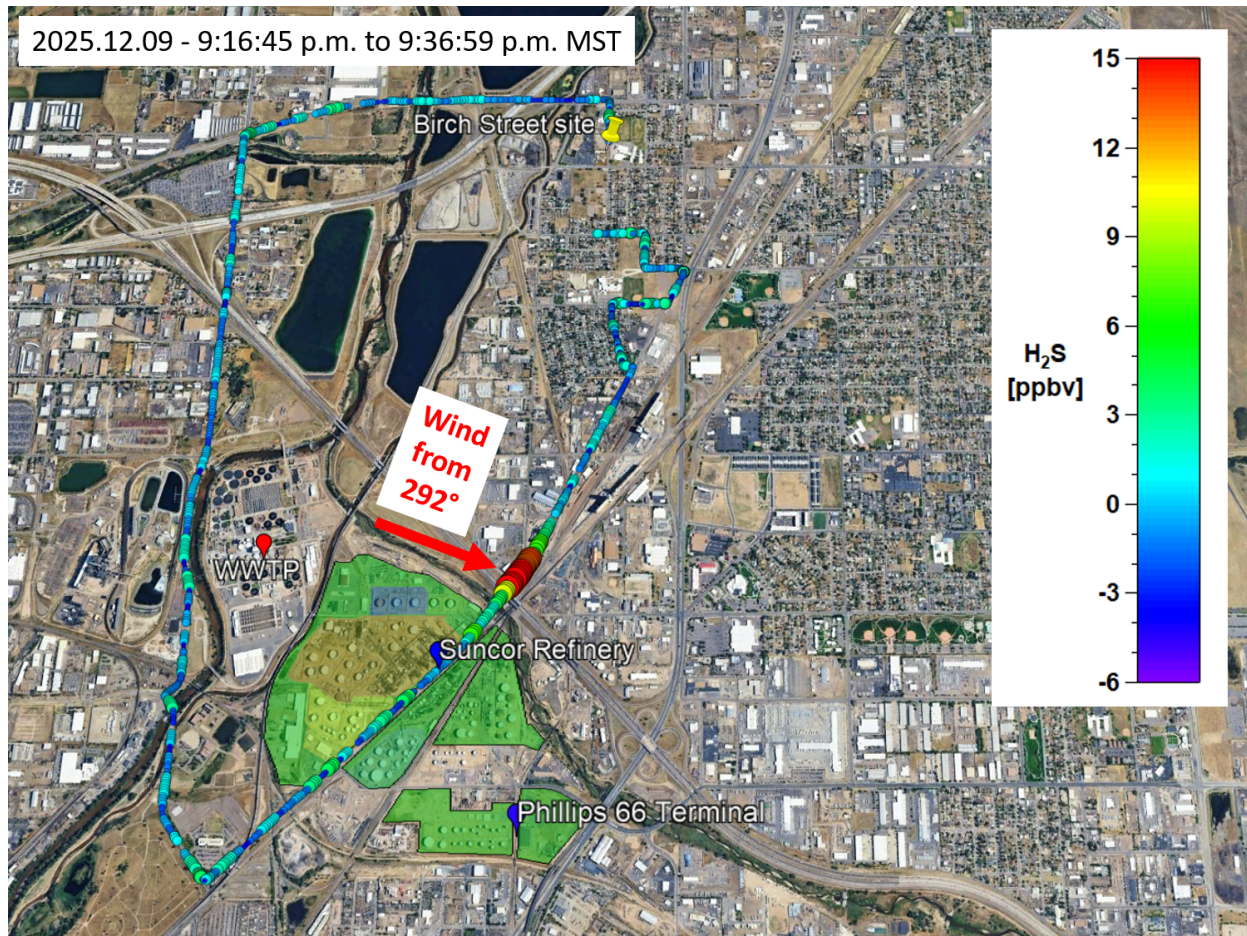
**Figure 11.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:39 p.m. to 8:59 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



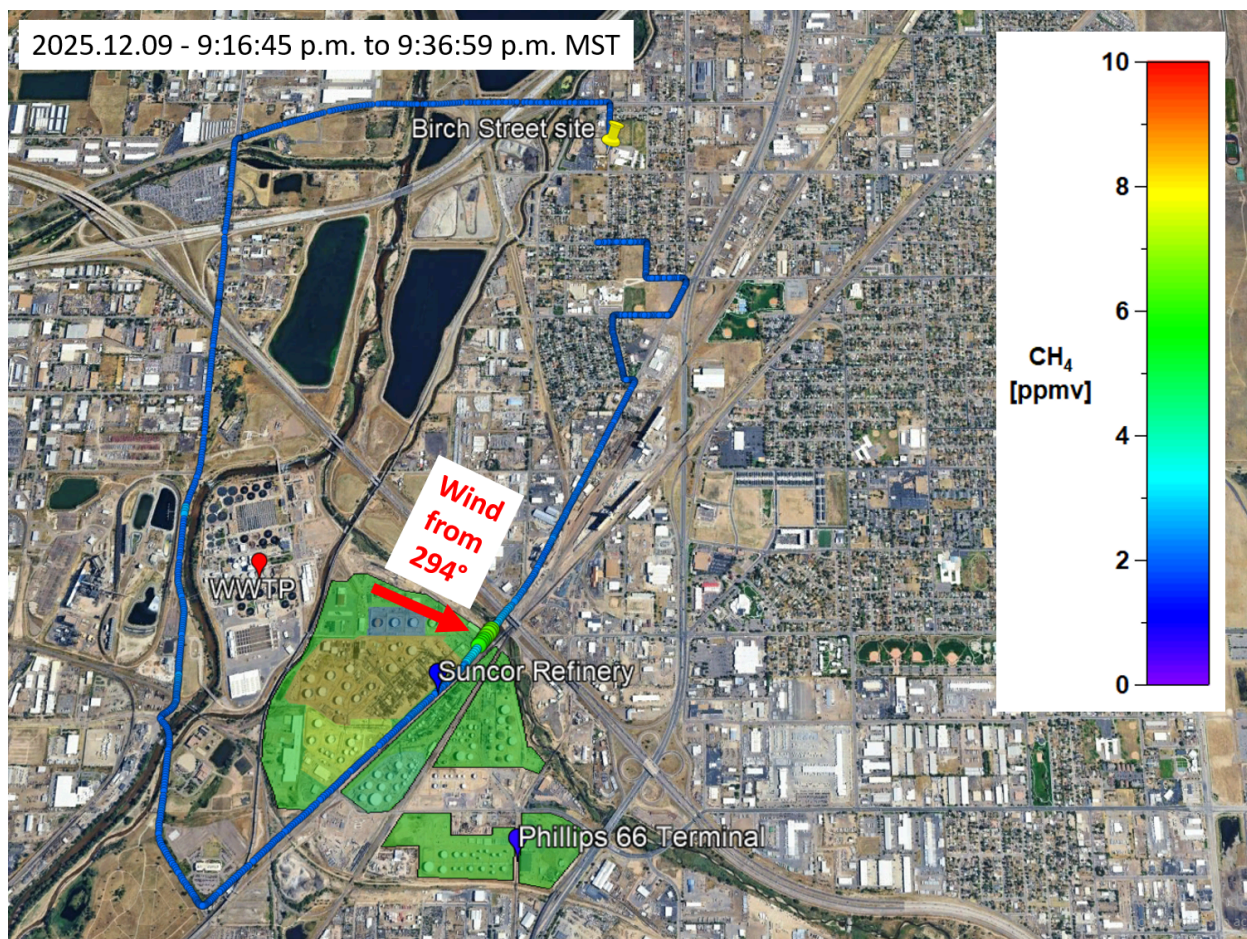
**Figure 12.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 8:59 p.m. to 9:17 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



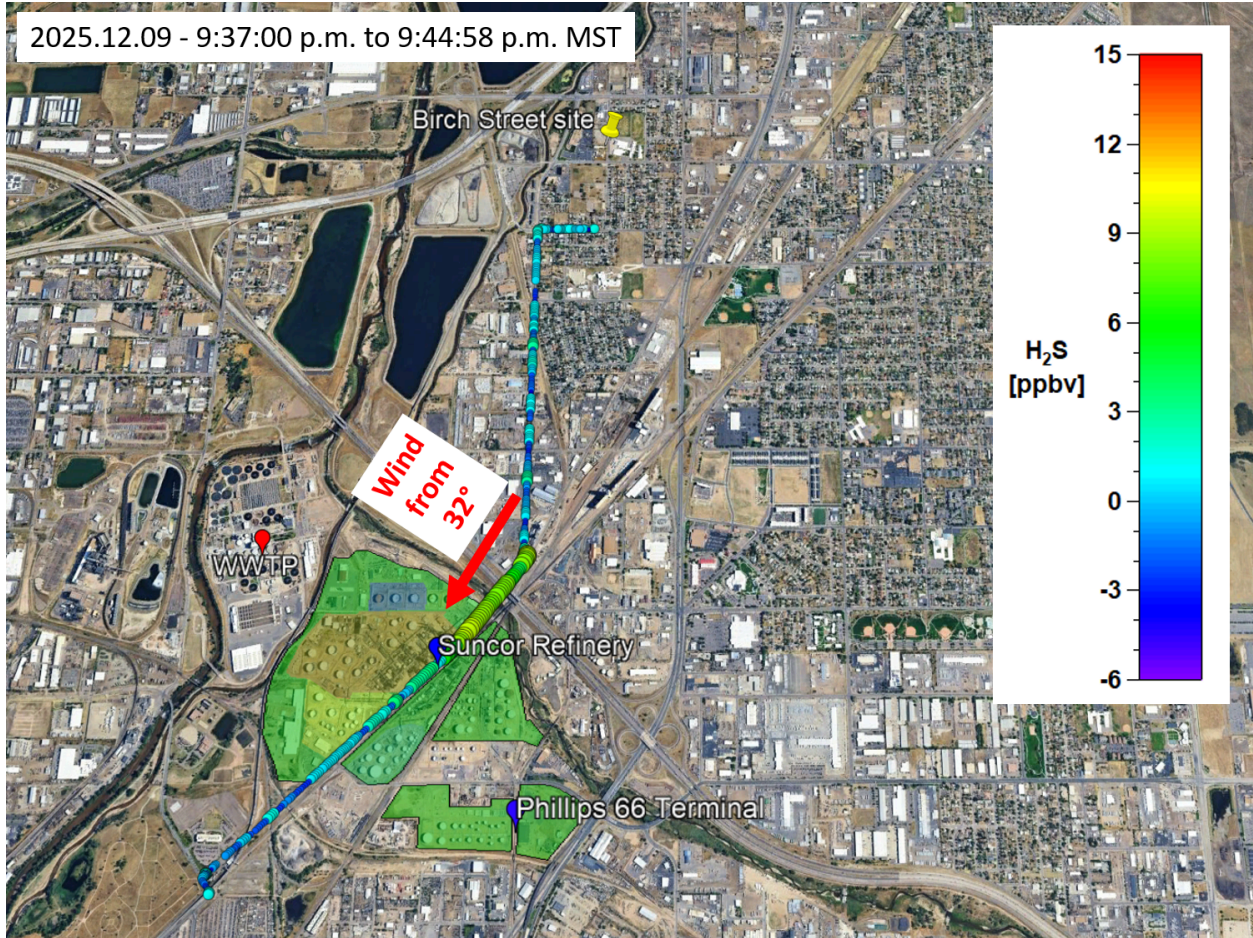
**Figure 13.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 8:59 p.m. to 9:17 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



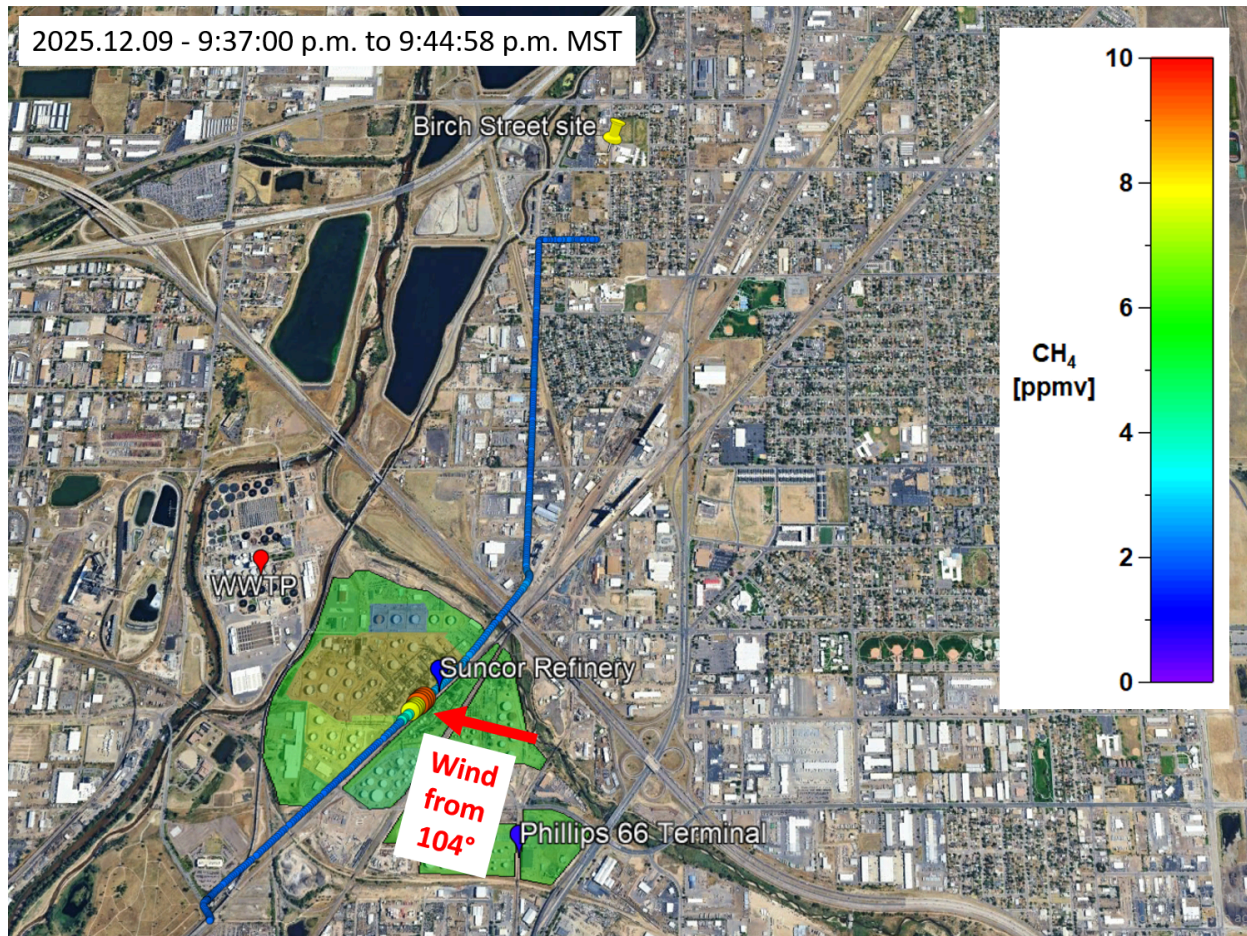
**Figure 14.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 9:17 p.m. to 9:37 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



**Figure 15.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 9:17 p.m. to 9:37 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



**Figure 16.** Map of hydrogen sulfide (H<sub>2</sub>S) concentrations observed downwind of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) from 9:37 p.m. to 9:45 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed hydrogen sulfide (H<sub>2</sub>S) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the hydrogen sulfide (H<sub>2</sub>S) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



**Figure 17.** Map of methane (CH<sub>4</sub>) concentrations observed downwind of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 9:37 p.m. to 9:45 p.m. MST on December 8, 2025 by the EMU mobile laboratory. The observed methane (CH<sub>4</sub>) concentrations are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while the methane (CH<sub>4</sub>) concentration was elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.

### 4.3. CAT mobile laboratory deployment on March 9, 2026

The CDPHE APCD Community Air Toxics (CAT) mobile laboratory was deployed to an area surrounding the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) and the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) on March 9, 2026. The CAT mobile laboratory arrived at the target area at approximately 8:15 p.m. MDT and measured continuously until approximately 11:00 p.m. MDT. The complete CAT mobile laboratory drive path is shown in Figure 18. All but one of the five instruments listed in Table 1 were fully operational. The Gill Instruments MaxiMet meteorological station, which measures wind data, was damaged at approximately 9:07 p.m. MDT. No measured wind data is available after that time. Following 9:07 p.m. MDT, winds are approximated using spatially interpolated (kriged) data collected from Automated Surface Observing System (ASOS) stations around the state of Colorado. Data from ASOS stations recording an observation every 5 minutes were used as the basis to model both the wind speed and wind direction. These observations were then joined with the mobile laboratory data at its native collection frequency. Although this process represents a likely estimate of the wind speed and wind direction, these data should be assumed to only approximate the values that would have been recorded during these times.

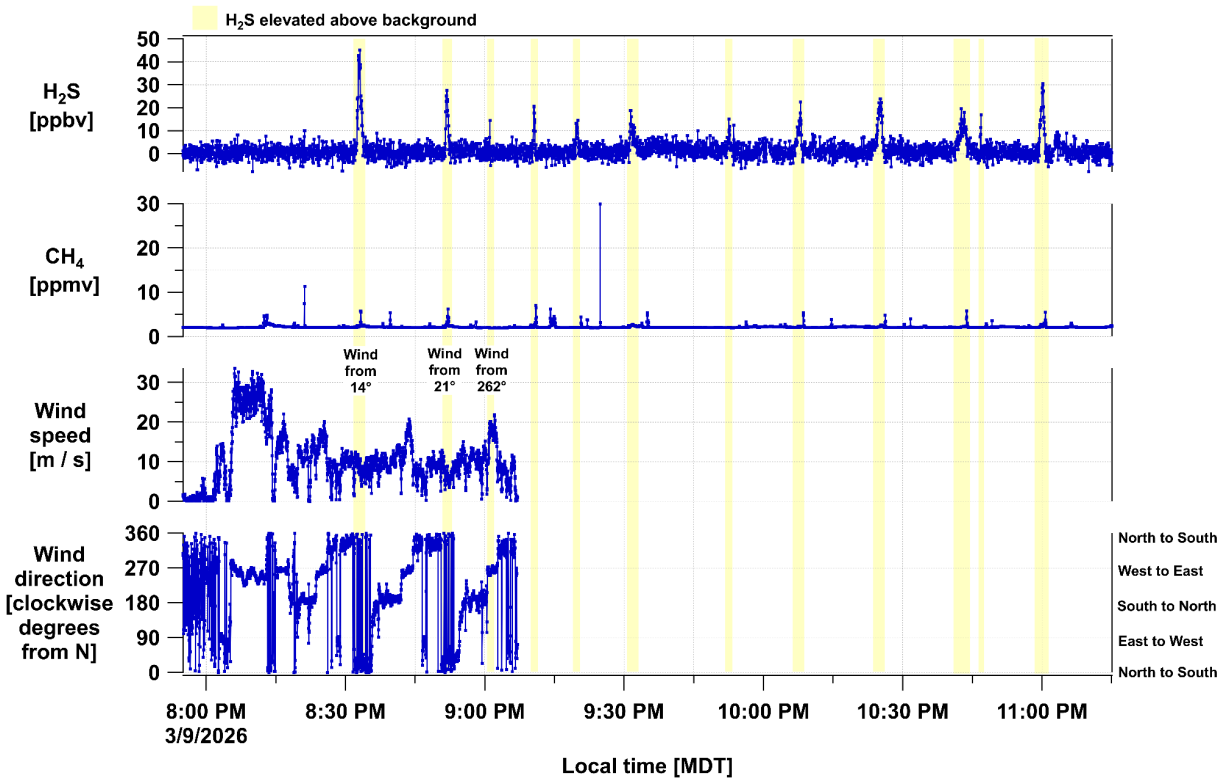
While continuously measuring, the CAT mobile laboratory consistently observed hydrogen sulfide ( $H_2S$ ) concentrations above the odor threshold of 10 ppbv while driving southeast on Brighton Blvd, just southwest of both Suncor oil refinery and Robert W. Hite wastewater treatment facility. The maximum four-second hydrogen sulfide ( $H_2S$ ) concentration observed was 45 ppbv. Due to bacterial decomposition in wastewater, the wastewater treatment facility could be a source of hydrogen sulfide ( $H_2S$ ).

The CAT mobile laboratory also consistently observed methane ( $CH_4$ ) concentrations elevated above background levels ( $>2$  ppmv) while driving southeast on Brighton Blvd, just southwest of both Suncor oil refinery and Robert W. Hite wastewater treatment facility. The maximum four-second methane ( $CH_4$ ) concentration observed was 29.9 ppmv approximately 1.5 miles northwest of both facilities. However, the modeled wind direction suggests that the source of this methane ( $CH_4$ ) plume was from neither Suncor oil refinery nor Robert W. Hite wastewater treatment facility. The observed elevations in methane ( $CH_4$ ) were not clearly correlated in time or location with the observed elevations in hydrogen sulfide ( $H_2S$ ).

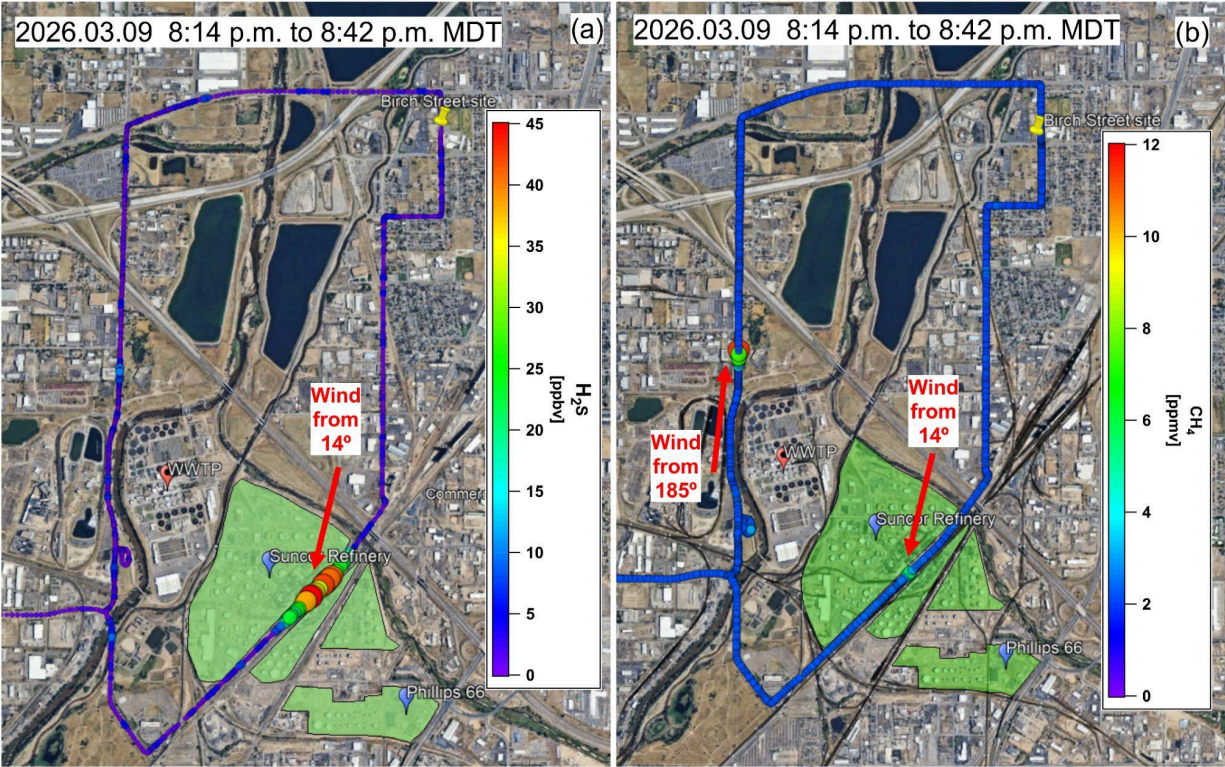
Table 11 shows measurement statistics for hydrogen sulfide ( $H_2S$ ) and methane ( $CH_4$ ) observed on March 9, 2026. Figure 19 shows a time series of hydrogen sulfide ( $H_2S$ ), methane ( $CH_4$ ), wind speed, and wind direction on March 9, 2026. Figures 20–28 show the hydrogen sulfide ( $H_2S$ ) and methane ( $CH_4$ ) concentrations observed surrounding the two facilities on March 9, 2026.



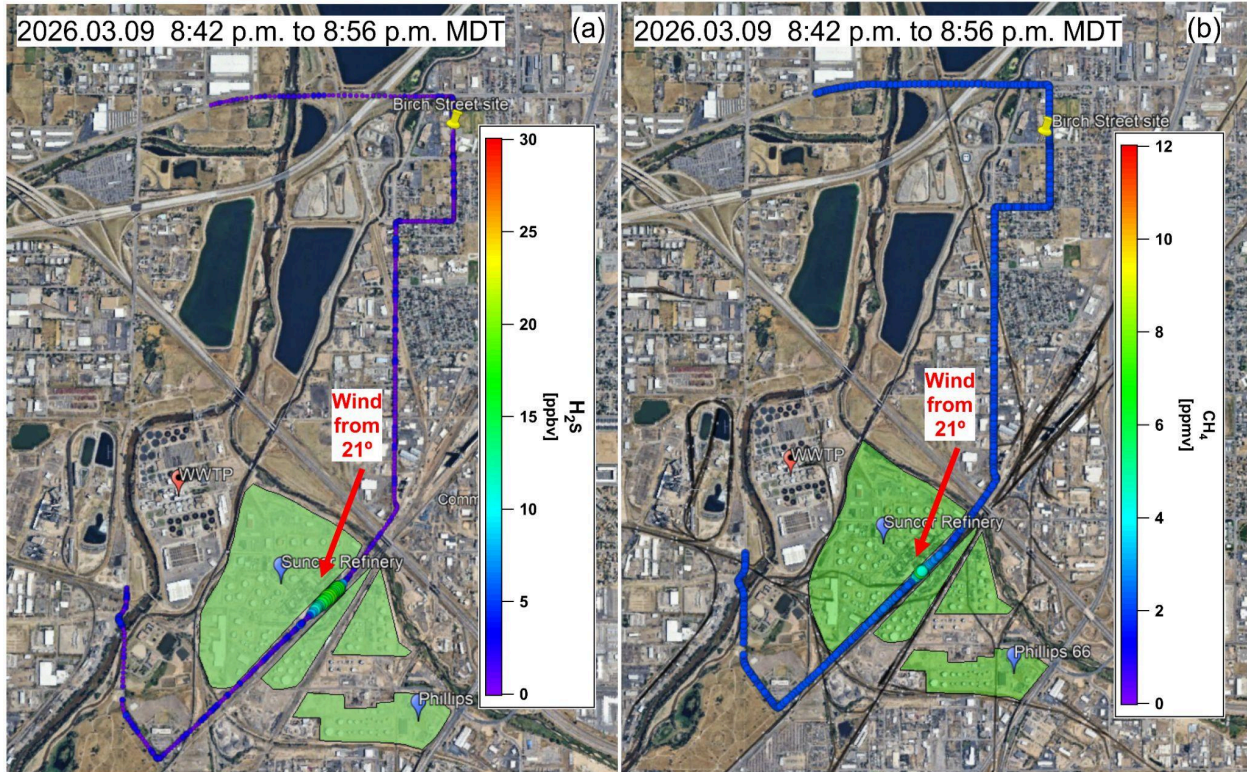
**Figure 18.** Map showing the complete CAT mobile laboratory drive path on March 9, 2026. The red line indicates the CAT drive path. The location of the Robert W. Hite wastewater treatment facility (WWTP, 6450 York St, Denver, CO 80216) is indicated by the red pin marker. The location of the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the MT GOAT Adams County Birch Street site (39.828106 N, 104.936467 W) is indicated by the labeled yellow pushpin marker.



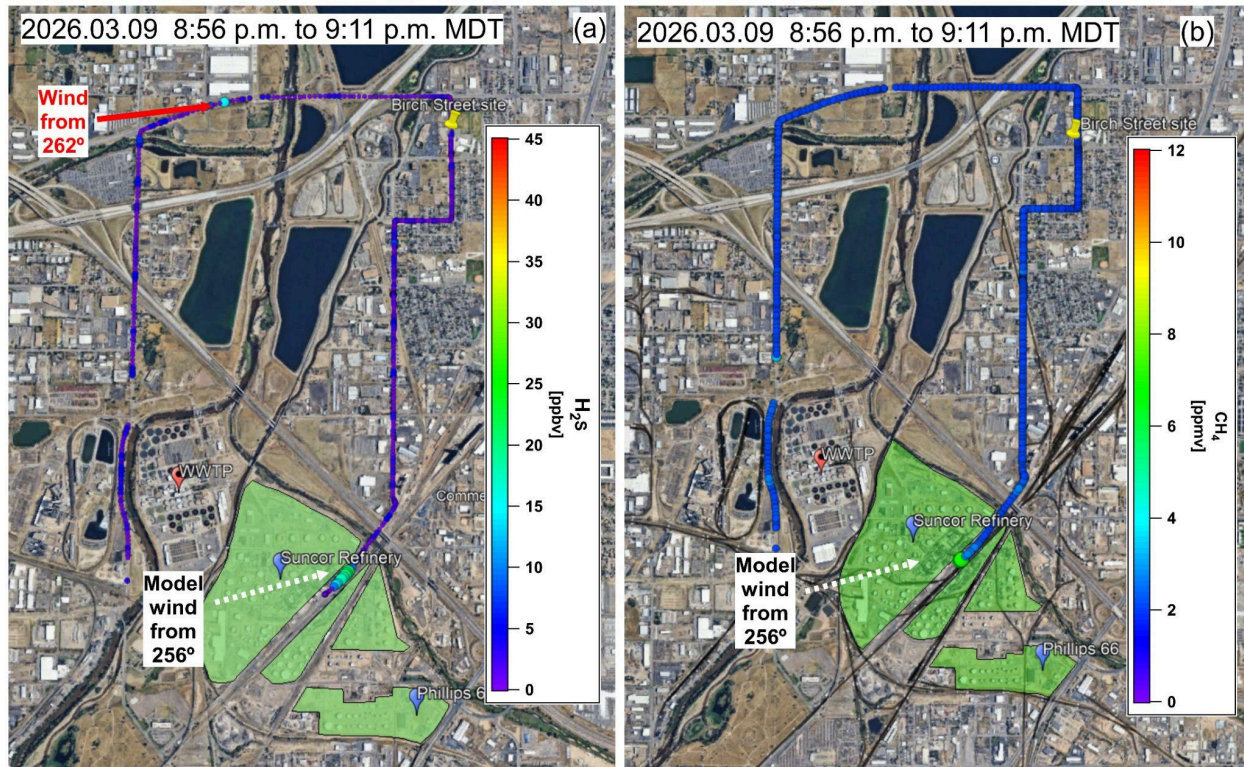
**Figure 19.** Time series of hydrogen sulfide (H<sub>2</sub>S) concentrations, methane (CH<sub>4</sub>) concentrations, wind speed, and wind direction measured by the CAT mobile laboratory in the area surrounding the Robert W. Hite wastewater treatment facility (6450 York St, Denver, CO 80216) and the Suncor oil refinery (5801 Brighton Blvd, Commerce City, CO 80022) from 7:55 p.m. to 11:15 p.m. on March 9, 2026. The yellow shading indicates periods when hydrogen sulfide (H<sub>2</sub>S) concentrations elevated above background were observed downwind of the Robert W. Hite wastewater treatment facility. Due to damage to the MaxiMet weather station, wind measurements ceased after 9:07 p.m. MDT. The vector-averaged wind direction during the yellow shaded periods is indicated by text labels.



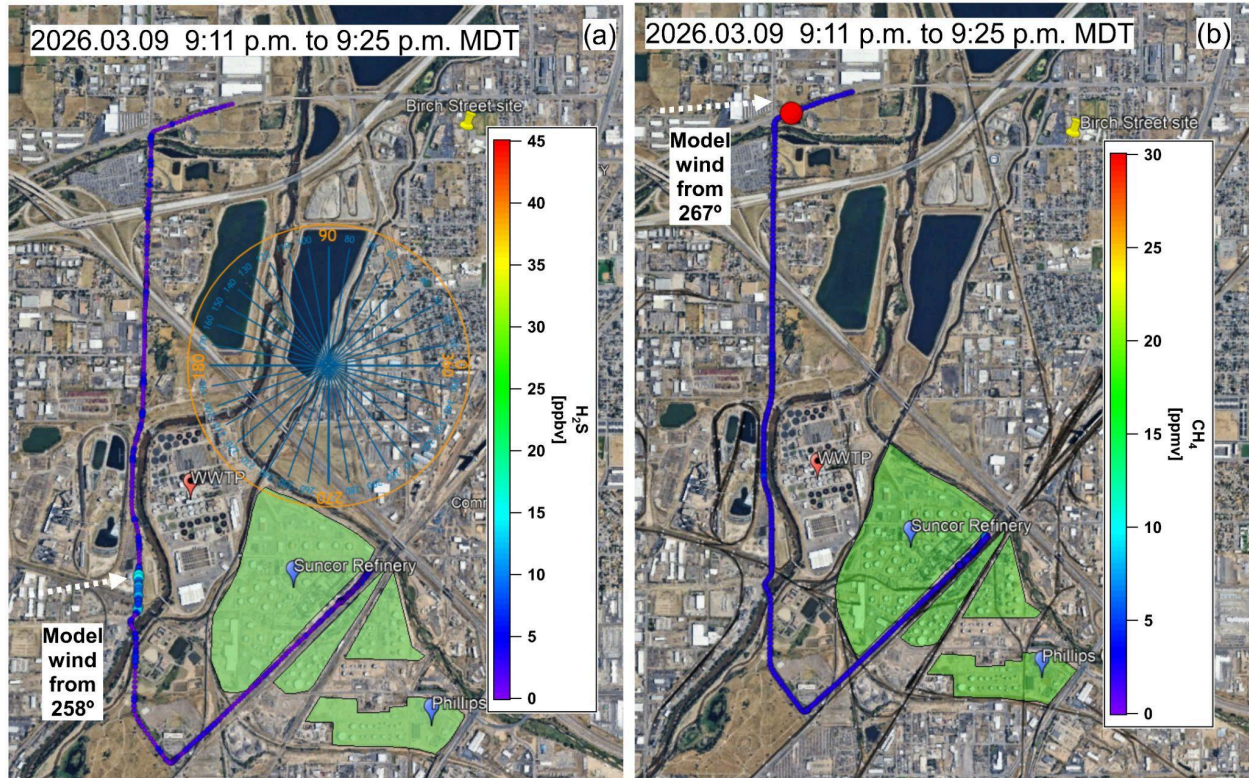
**Figure 20.** Map of (a) hydrogen sulfide ( $H_2S$ ) concentrations and (b) methane ( $CH_4$ ) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 8:14 p.m. to 8:42 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of  $H_2S$  and  $CH_4$  are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while  $H_2S$  and  $CH_4$  were elevated above background is indicated by the red arrows. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



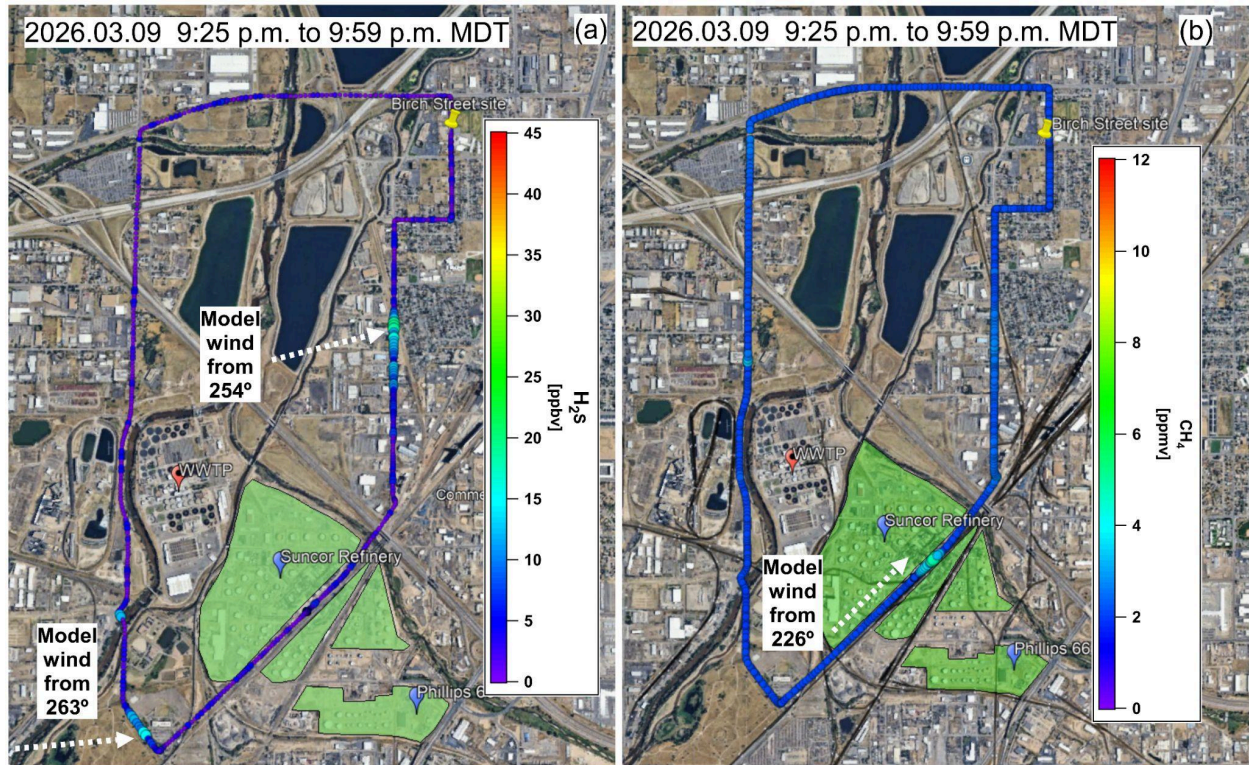
**Figure 21.** Map of (a) hydrogen sulfide ( $H_2S$ ) concentrations and (b) methane ( $CH_4$ ) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 8:42 p.m. to 8:56 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of  $H_2S$  and  $CH_4$  are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while  $H_2S$  and  $CH_4$  were elevated above background is indicated by the red arrow. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



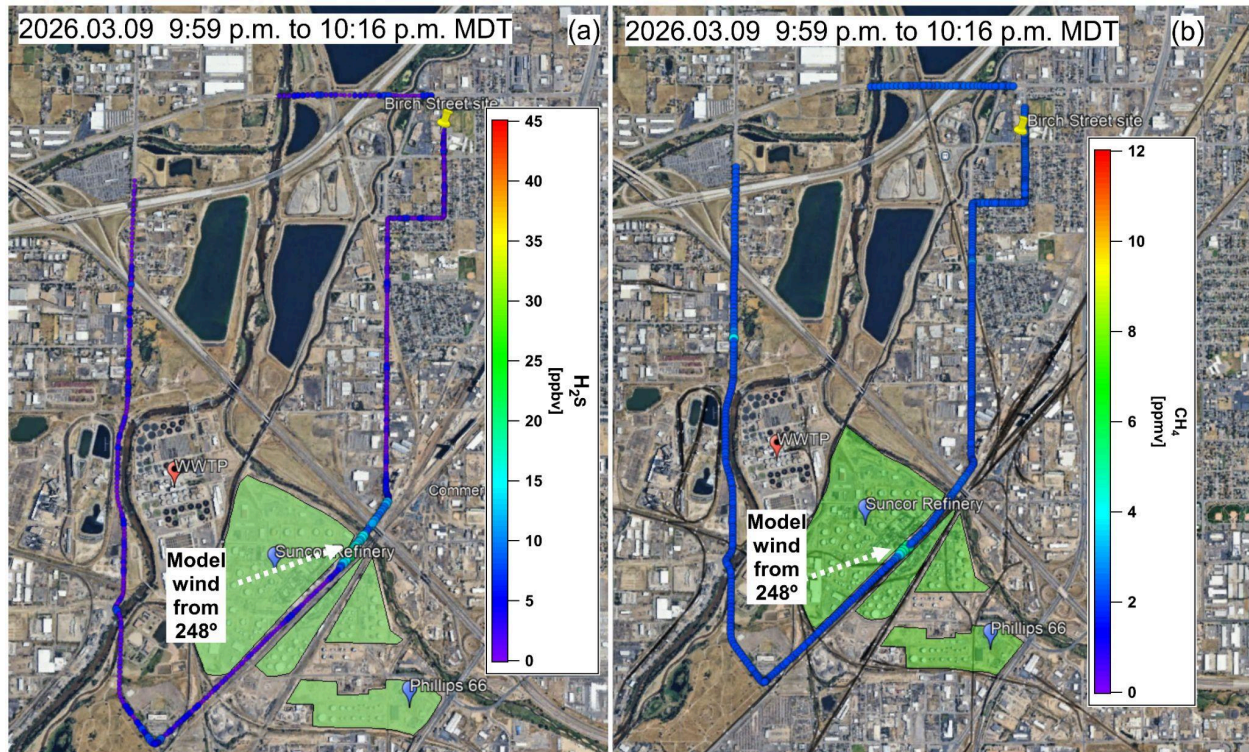
**Figure 22.** Map of (a) hydrogen sulfide ( $H_2S$ ) concentrations and (b) methane ( $CH_4$ ) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 8:56 p.m. to 9:11 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of  $H_2S$  and  $CH_4$  are indicated by the color and size of the circular markers. The vector-averaged wind direction observed while  $H_2S$  and  $CH_4$  were elevated above background is indicated by the red arrow. The 5-minute spatially interpolated wind direction while  $H_2S$  and  $CH_4$  were elevated above background is indicated by the white dashed arrow. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



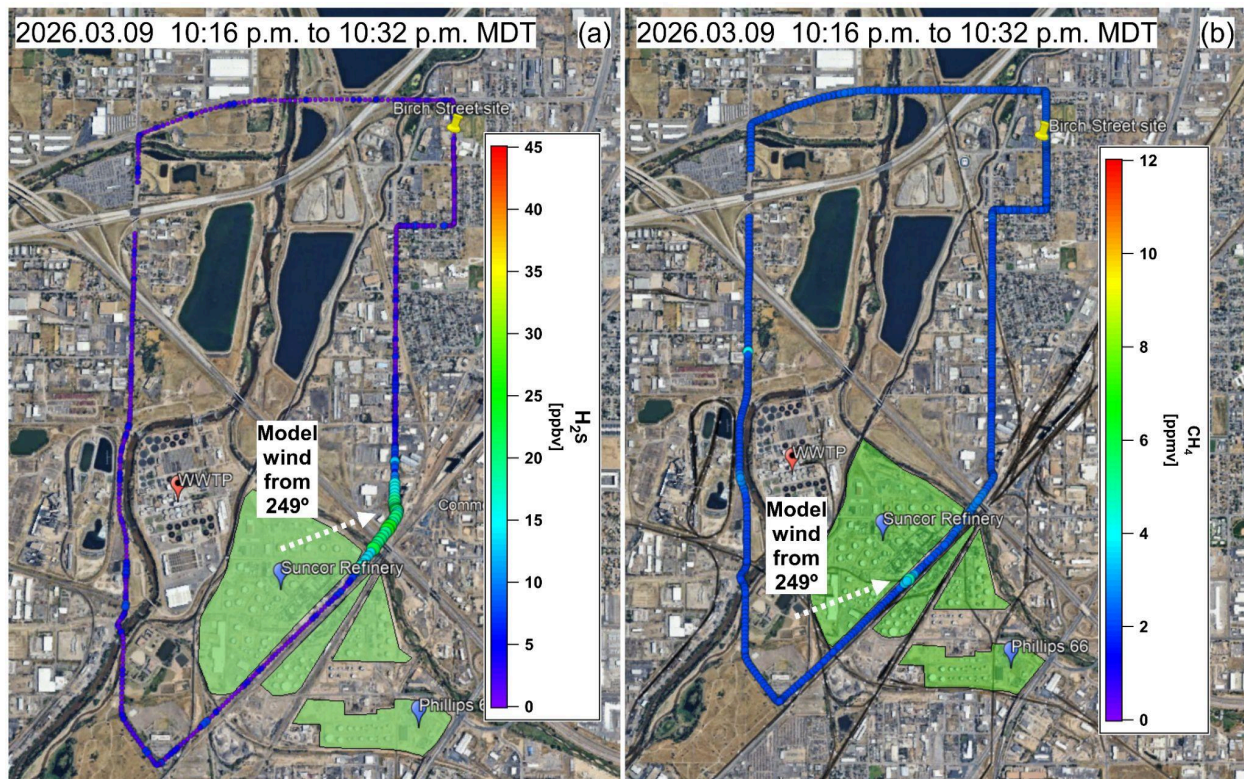
**Figure 23.** Map of (a) hydrogen sulfide (H<sub>2</sub>S) concentrations and (b) methane (CH<sub>4</sub>) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 9:11 p.m. to 9:25 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of H<sub>2</sub>S and CH<sub>4</sub> are indicated by the color and size of the circular markers. The 5-minute spatially interpolated wind direction while H<sub>2</sub>S and CH<sub>4</sub> were elevated above background is indicated by the white dashed arrows. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



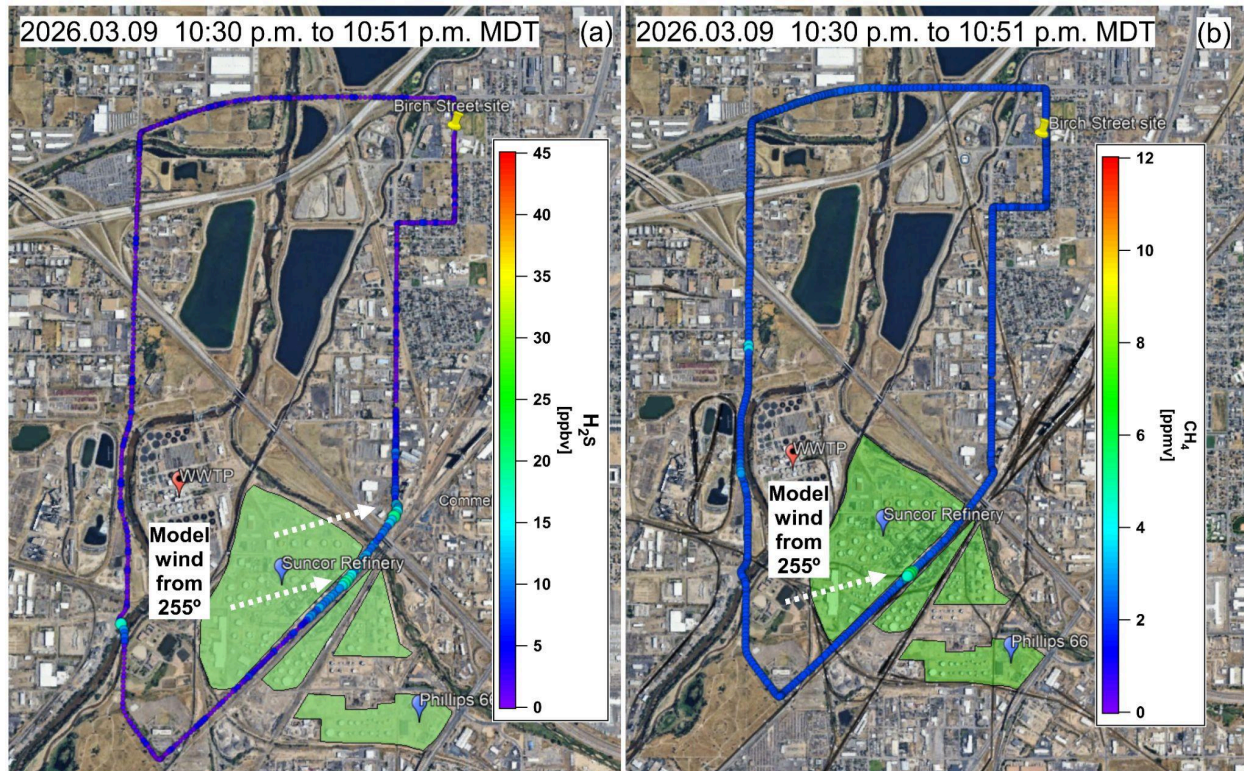
**Figure 24.** Map of (a) hydrogen sulfide (H<sub>2</sub>S) concentrations and (b) methane (CH<sub>4</sub>) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 9:25 p.m. to 9:59 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of H<sub>2</sub>S and CH<sub>4</sub> are indicated by the color and size of the circular markers. The 5-minute spatially interpolated wind direction while H<sub>2</sub>S and CH<sub>4</sub> were elevated above background is indicated by the white dashed arrows. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



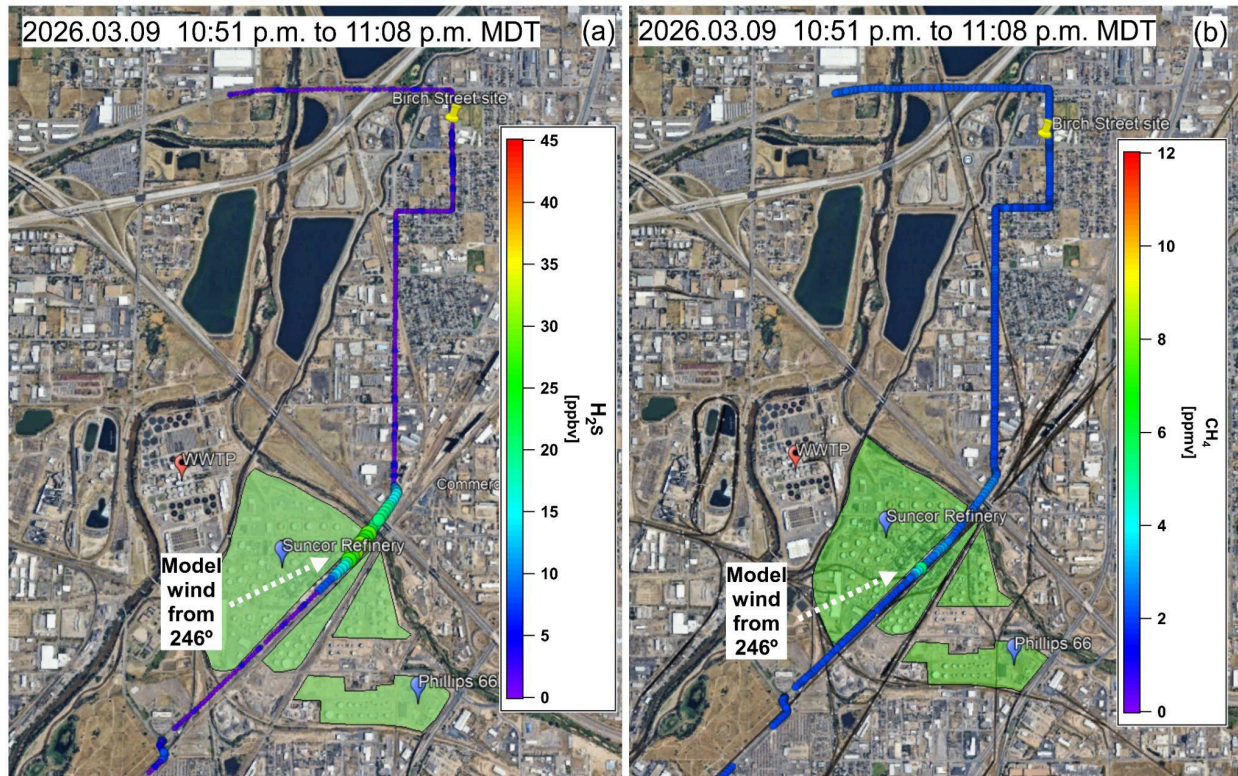
**Figure 25.** Map of (a) hydrogen sulfide (H<sub>2</sub>S) concentrations and (b) methane (CH<sub>4</sub>) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 9:59 p.m. to 10:16 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of H<sub>2</sub>S and CH<sub>4</sub> are indicated by the color and size of the circular markers. The 5-minute spatially interpolated wind direction while H<sub>2</sub>S and CH<sub>4</sub> were elevated above background is indicated by the white dashed arrows. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



**Figure 26.** Map of (a) hydrogen sulfide (H<sub>2</sub>S) concentrations and (b) methane (CH<sub>4</sub>) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 10:16 p.m. to 10:32 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of H<sub>2</sub>S and CH<sub>4</sub> are indicated by the color and size of the circular markers. The 5-minute spatially interpolated wind direction while H<sub>2</sub>S and CH<sub>4</sub> were elevated above background is indicated by the white dashed arrows. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



**Figure 27.** Map of (a) hydrogen sulfide (H<sub>2</sub>S) concentrations and (b) methane (CH<sub>4</sub>) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 10:30 p.m. to 10:51 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of H<sub>2</sub>S and CH<sub>4</sub> are indicated by the color and size of the circular markers. The 5-minute spatially interpolated wind direction while H<sub>2</sub>S and CH<sub>4</sub> were elevated above background is indicated by the white dashed arrows. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.



**Figure 28.** Map of (a) hydrogen sulfide (H<sub>2</sub>S) concentrations and (b) methane (CH<sub>4</sub>) concentrations observed southeast of the Robert W. Hite wastewater treatment facility (WWTP) and Suncor oil refinery from 10:51 p.m. to 11:08 p.m. MDT on March 9, 2026 by the CAT mobile laboratory. The concentrations of H<sub>2</sub>S and CH<sub>4</sub> are indicated by the color and size of the circular markers. The 5-minute spatially interpolated wind direction while H<sub>2</sub>S and CH<sub>4</sub> were elevated above background is indicated by the white dashed arrows. The location of the Robert W. Hite wastewater treatment facility (WWTP) is indicated by the red pin marker. The location of Suncor oil refinery is indicated by a labeled blue pin marker and the accompanying green shaded region. The location of the Phillips 66 terminal is indicated by a labeled blue pin marker and the accompanying green shaded region.

## 5. Comparative Summary

The CAT and EMU mobile monitoring laboratories have each deployed to the Commerce City area surrounding Suncor oil refinery and Robert W. Hite wastewater treatment facility to measure air toxics, specifically hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>), during the evening hours.

One of the significant differences between these two deployments was the ambient air temperature. On December 8, 2025, the EMU mobile laboratory measured an average ambient air temperature of 13.4°C (56.1°F). On March 9, 2026, the CAT mobile laboratory measured an average ambient air temperature of 18.1°C (64.6°F), nearly 5°C (8.5°F) warmer than that on December 8, 2025. However, ambient air temperature data from the March 9, 2026 deployment was only measured for approximately the first 1 hour of the deployment and is not representative of the entire deployment due to damage to the MaxiMet weather station mid-deployment.

Another notable difference between the two deployments is the maximum hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) concentrations detected, where the maximum values were 3 times higher on Mar 9, 2026 than Dec 8, 2025. As listed in Tables 11 and 12, the maximum hydrogen sulfide (H<sub>2</sub>S) concentration detected on Dec 8, 2025 and Mar 9, 2026 was 15.0 ppbv and 45.0 ppbv, respectively. The maximum methane (CH<sub>4</sub>) concentration detected on Dec 8, 2025 and Mar 9, 2026 was 9.2 ppmv and 29.9 ppmv, respectively. However, the maximum methane (CH<sub>4</sub>) concentration was not detected within the Brighton Blvd corridor where hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) were routinely detected above typical ambient conditions. Instead, it was observed northwest of the facilities at the intersection of York Street and 74th Avenue with no obvious source, as shown in Figure 23. Measured wind data was not available at this point during the deployment. Thus, it is difficult to determine a source with confidence.

One similarity between these two deployments is the separation of the hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) plumes while driving along the Brighton Blvd corridor that bisects Suncor oil refinery and is southeast of Robert W. Hite wastewater treatment facility, as shown most obviously in Figures 25–27. The unique detection location of the plumes suggest that hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>) sources are also unique. Due to the lack of wind data after 9:07 p.m., it is difficult to determine the source of these plumes without further investigation.

**Table 12.** Comparison between four-second measurements of hydrogen sulfide (H<sub>2</sub>S) and methane (CH<sub>4</sub>), air temperature, and measured wind speed in the area surrounding Suncor oil refinery and Robert W. Hite wastewater treatment facility on December 8, 2025 (6:30 p.m. to 9:45 p.m. MST) and March 9, 2026 (8:15 p.m. to 11:00 p.m. MDT). Minimum concentration values below the method detection limit (MDL) are marked as < MDL.

Parameter	Average	Standard deviation	Minimum	Maximum
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Date	Dec 8	Mar 9	Dec 8	Mar 9	Dec 8	Mar 9	Dec 8	Mar 9
H <sub>2</sub> S [ppbv]	< 6	< 8	< 6	< 8	< 6	< 8	15.0	45.0
CH <sub>4</sub> [ppmv]	2.1	2.2	0.3	0.5	2.0	2.0	9.2	29.9
Air temperature [°C]	13.4	18.1*	5.0	2.8*	7.8	15.7*	22.6	25.6*
Wind speed [m/s]	4.9	10.6*	5.5	7.1*	0.0	0.0*	34.0	33.5*

\*The reported values are only representative of measured air temperature and wind speed data from 8:15 p.m. to 9:07 p.m. MDT on March 9, 2026 due to a damaged MaxiMet meteorological station.

