

TCEQ Interoffice Memorandum

To: Ryan Slocum, Regional Director, Region 6
From: Tracie Phillips, Ph.D. *TP*
Toxicology, Risk Assessment, and Research Division
Office of the Executive Director
Date: July 24, 2023
Subject: Health Effects Review of 2021 Ambient Air Network Monitoring Data in Region 6, El Paso

Conclusions

- Reported 1-hour concentrations of volatile organic compounds (VOCs) were below their respective short-term air monitoring comparison values (AMCVs) and would not be expected to cause adverse acute health effects, vegetation effects, or odors.
- Reported twenty-four-hour concentrations of VOCs and metals were below their respective 24-hour AMCVs and would not be expected to cause adverse health effects.
- Reported long-term concentrations of lead, reported as particulate matter with an aerodynamic diameter of 2.5 microns or less (PM_{2.5}), were below the comparison value of 0.15 µg/m³.
- Reported annual average concentrations of VOCs and metals reported as PM_{2.5} were below their respective AMCVs and would not be expected to cause long-term adverse human health or vegetation effects.
- In 2021, the reported 30-minute concentrations of hydrogen sulfide (H₂S) were above the numerical value of the 30-minute state H₂S standard for residential areas (80 ppb) 1,285 times. This higher than usual volume corresponds to several sewage releases that occurred in the City of El Paso in August and continued through December 2021. These data indicate that H₂S levels at the El Paso Lower Valley monitor could have been odorous at times.

Background

This memorandum conveys the Toxicology, Risk Assessment, and Research Division's (TD) evaluation of ambient air sampling conducted at five monitoring sites in Region 6, El Paso during 2021. TCEQ Region 6 monitoring site information is presented in Table 1 along with hyperlinks to detailed information regarding the monitoring sites and their maps. List 1, List 2, and List 3, which can be found in Attachment A, display the target analytes for the monitoring sites. The TD reviewed air monitoring summary results from 1-hour automated gas chromatography (autoGC) VOC samples, VOC canister samples collected on a 24-hour every sixth-day schedule, 24-hour metals sampled on every sixth-day, and 30-minute hydrogen sulfide (H₂S) samples.

The TCEQ Monitoring Division reported the data for all chemicals evaluated in this memorandum. Data discussed in this evaluation for all monitoring sites include the following:

84 VOCs from canister samples, 46 VOCs from autoGC, 15 metals, and H₂S. For evaluation of the annual average, data must meet a 75 percent data completeness over the one-year evaluation period. All data, except for those analytes measured at El Paso Delta, met 75% completeness. El Paso Delta collects samples seasonally, for 2021 sampling was conducted May 24, 2021 through December 31, 2021, so none of the analytes at that site met an annual data completeness of 75% and cannot be evaluated from a long-term perspective.

Short-term samples collected over a 1- or 24-hour duration were compared to their respective chemical-specific AMCVs for the potential to adversely affect human health or welfare during an acute exposure duration. Because short-term or peak concentrations may be significantly different than 24-hour sample concentrations, daily (24-hour) concentrations have limited use in evaluating the potential for more acute (e.g., 30-60 minute) health effects, unlike the shorter-term data reviewed herein (e.g., 1-hour autoGC data, 30-minute H₂S data). In order to be able to evaluate 24-hour monitoring data more fully, TCEQ has developed 24-hour AMCVs for the following:

- 1,3-butadiene
- 2,2-dimethylbutane
- 2,3-dimethylbutane
- 2-methylpentane
- 3-methylpentane
- aluminum
- benzene
- cadmium
- chromium
- cobalt
- ethylene dibromide
- ethylene dichloride
- manganese
- nickel
- vanadium
- n-hexane

As such, 24-hour samples were compared to the available TCEQ 24-hour AMCVs.

Lead is a criteria pollutant and lead levels (i.e., 24-hour values) were compared to the appropriate National Ambient Air Quality Standards (NAAQS) comparison value (0.15 µg/m³). Annual average lead concentrations were also evaluated since they are more representative of long-term lead exposure from a health perspective.

Since 24-hour samples collected using every sixth-day schedules are designed to provide a representative long-term, ambient concentration for chemicals of concern, annual averages from all 24-hour samples were evaluated using appropriate long-term AMCVs for the potential to adversely impact long-term human health and vegetation effects. Thus, annual average concentrations of metals and VOCs (collected via canister samples), were compared to their respective long-term AMCVs. Annual average concentrations of VOCs collected via autoGC were also compared to their respective long-term AMCV. Additional information regarding the derivation and application of AMCVs is available here:

<https://www.tceq.texas.gov/toxicology/amcv/about>.

The El Paso Lower Valley monitor measures ambient concentrations of hydrogen sulfide (H₂S) and elevated levels of this chemical have been reported at this monitoring site since 2004.

Further information regarding historical data collected at this monitoring site and subsequent evaluations of collected data are available from the Air Pollutant Watch List here:
<https://www.tceq.texas.gov/toxicology/apwl/apwl.html>.

Table 1. Monitoring Sites Located in TCEQ Region 6

Monitor Name and Site Location	County	Monitor ID	Monitored Compounds
El Paso Chamizal 800 S. San Marcial Street	El Paso	48-141-0044	VOCs (autoGC), Metals (PM _{2.5})
El Paso Delta ^a 6700 Delta Drive	El Paso	48-141-1011	VOCs (autoGC)
El Paso Lower Valley 8470 Plant Rd	El Paso	48-141-0054	H ₂ S
Socorro Hueco 320 Old Hueco Tanks Road	El Paso	48-141-0057	VOCs (canister)
Womble Cleveland Ave at Clark Dr	El Paso	48-141-0047	VOCs (canister)

^a In 2020, this monitoring site switched to collecting samples seasonally, for 2021 the site collected samples 4/25/2021 through 12/31/2021.

Lead (TSP) was deactivated at El Paso UTEP and Ojo De Agua October 31, 2020.

Evaluation

VOCs

Hourly average concentrations of the 46 VOCs were below their respective short-term AMCVs. Thus, exposure to the reported hourly average concentrations would not be expected to cause adverse human health or welfare effects.

All 24-hour VOC concentrations were below their respective 24-hour AMCVs and would not be expected to cause adverse health effects.

The annual average concentrations for all 84 VOCs collected as 24-hour canister samples and 46 VOCs collected as 1-hr autoGC samples were well below their respective long-term AMCVs. Thus, adverse human health or vegetation effects would not be expected to occur as a result of long-term exposure to the reported levels of these chemicals at these monitoring sites.

Metals

Reported 24-hour- and annual average concentrations for all 15 metals (PM_{2.5}) measured at the El Paso Chamizal monitoring site were below their respective short- and long-term AMCVs and would not be considered of concern to human health.

H₂S

In 2021, there were 1,285 individual 30-minute samples collected at the El Paso Lower Valley site that exceeded the numerical value of the 30-minute H₂S state regulatory standard (80 ppb). This is about 3.8 times more individual exceedances than the previous year, which had 341. To help explain this increase in the number of individual H₂S samples that were above the value of the state standard, the El Paso Region provided TD with information on several sewage releases that occurred in the City of El Paso in August and lasted through December 2021. When looking at the samples that exceeded the value of the state standard, 84% (or 1,086 30-minute averages) of the 1,285 30-minute averages that were above the value of the state standard were collected from August – December 2021.

The highest measured 30-minute average concentration of H₂S at this monitor in 2021 was 420 ppb. Since the odor threshold range for H₂S is 0.5-300 ppb, the measured levels of H₂S were likely odorous. Overall, the exceedances of the value of the state regulatory standard do not represent an immediate threat to human health or wellness as the lowest concentration that has shown H₂S-specific health effects in people (mild respiratory effects in 2 out of 10 asthmatic individuals exposed for 30-minutes) is 2,000 ppb. It is our understanding that, outside of the sewage releases that occurred in the City of El Paso in 2021, the primary source of H₂S detections is a wastewater treatment plant located in Ciudad Juarez, which is a city in Chihuahua, Mexico. The TD encourages H₂S reductions in the area, if possible.

If you have any questions or comments regarding this evaluation, please feel free to contact Tracie Phillips at (512)239-2269 or tracie.phillips@tceq.texas.gov.

Attachment A

List 1. Target VOC Analytes in Canister Samples

1,1,2,2-Tetrachloroethane	Bromomethane	M/P Xylene
1,1,2-Trichloroethane	Carbon Tetrachloride	Methyl Chloroform (1,1,1-Trichloroethane)
1,1-Dichloroethane	Chlorobenzene	Methylcyclohexane
1,1-Dichloroethylene	Chloroform	Methylcyclopentane
1,2,3-Trimethylbenzene	Chloromethane (Methyl Chloride)	N-Butane
1,2,4-Trimethylbenzene	Cis 1,3-Dichloropropene	N-Decane
1,2-Dichloropropane	Cis-2-Butene	N-Heptane
1,3,5-Trimethylbenzene	Cis-2-Hexene	N-Hexane
1,3-Butadiene	Cis-2-Pentene	N-Nonane
1-Butene	Cyclohexane	N-Octane
1-Hexene+2-Methyl-1-Pentene	Cyclopentane	N-Pentane
1-Pentene	Cyclopentene	N-Propylbenzene
2,2,4-Trimethylpentane	Dichlorodifluoromethane	N-Undecane
2,2-Dimethylbutane (Neohexane)	Dichloromethane (Methylene Chloride)	O-Ethyltoluene
2,3,4-Trimethylpentane	Ethane	O-Xylene
2,3-Dimethylbutane	Ethylbenzene	P-Diethylbenzene
2,3-Dimethylpentane	Ethylene	P-Ethyltoluene
2,4-Dimethylpentane	Ethylene Dibromide (1,2-Dibromoethane)	Propane
2-Chloropentane	Ethylene Dichloride (1,2-Dichloroethane)	Propylene
2-Methyl-2-Butene	Isobutane	Styrene
2-Methylheptane	Isopentane (2-Methylbutane)	Tetrachloroethylene
2-Methylhexane	Isoprene	Toluene
2-Methylpentane (Isohexane)	Isopropylbenzene (Cumene)	Trans-1-3-Dichloropropylene
3-Methyl-1-Butene	M-Diethylbenzene	Trans-2-Butene
3-Methylheptane	M-Ethyltoluene	Trans-2-Hexene
3-Methylhexane		Trans-2-Pentene
3-Methylpentane		Trichloroethylene
4-Methyl-1-Pentene		Trichlorofluoromethane
Acetylene		Vinyl Chloride
Benzene		

List 2. Target Metal Analytes

Aluminum (PM _{2.5})	Chromium (PM _{2.5})	Molybdenum (PM _{2.5})
Antimony (PM _{2.5})	Cobalt (PM _{2.5})	Nickel (PM _{2.5})
Arsenic (PM _{2.5})	Copper (PM _{2.5})	Selenium (PM _{2.5})
Barium (PM _{2.5})	Lead (PM _{2.5})	Tin (PM _{2.5})
Cadmium (PM _{2.5})	Manganese (PM _{2.5})	Zinc (PM _{2.5})

List 3. Target VOC Analytes in AutoGC

1-Butene	Benzene	n-Heptane
1-Pentene	c-2-Butene	n-Hexane
1,2,3-Trimethylbenzene	c-2-Pentene	n-Nonane
1,2,4-Trimethylbenzene	Cyclohexane	n-Octane
1,3-Butadiene	Cyclopentane	n-Pentane
1,3,5-Trimethylbenzene	Ethane	n-Propylbenzene
2-Methylheptane	Ethyl Benzene	o-Xylene
2-Methylhexane	Ethylene	p-Xylene + m-Xylene
2,2-Dimethylbutane	Isobutane	Propane
2,2,4-Trimethylpentane	Isopentane	Propylene
2,3-Dimethylpentane	Isoprene	Styrene
2,3,4-Trimethylpentane	Isopropyl Benzene - Cumene	t-2-Butene
2,4-Dimethylpentane	Methylcyclohexane	t-2-Pentene
3-Methylheptane	Methylcyclopentane	Toluene
3-Methylhexane	n-Butane	
Acetylene	n-Decane	