TCEQ Interoffice Memorandum

To: Lorinda Gardner, Regional Director, Region 6

From: Tiffany Bredfeldt, Ph.D. TB

Toxicology, Risk Assessment, and Research Division
Office of the Executive Director

Date: March 29, 2021

Subject: Health Effects Review of 2017, 2018, and 2019 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.
- Twenty-four-hour concentrations of VOCs, carbonyls, 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 total suspended particulate (TSP) or particulate matter with aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), were below the comparison value of 0.15 µg/m^3.
- Reported annual and 3-year average concentrations of VOCs, polycyclic aromatic hydrocarbons (PAHs), carbonyls, 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 2017, 2018, and 2019, the reported concentrations of hydrogen sulfide (H_2S) were above the value of the 30-minute state H_2S standard for residential areas (80 ppb) 714 times. This data, discussed in detail below, indicates that H_2S 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 eight monitoring sites in Region 6, El Paso during 2017, 2018, and 2019. TCEQ Region 6 monitoring site information is presented in Table 1 along with hyperlinks to detailed information regarding the monitoring sites and their maps. Lists 1-5, which can be found in Attachment A, display the target analytes for seven 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 carbonyl samples, every sixth-day lead TSP (Total Suspended

Particles) samples, 24-hour metals sampled on every sixth-day, 24-hour PAH samples, and 30-minute hydrogen sulfide (H_2S) samples.

The TCEQ Monitoring Division reported the data for all chemicals evaluated in this memorandum. Data discussed in this evaluation for all monitoring sites includes the following: 84 VOCs from canister samples, 46 VOCs from autoGC, 17 carbonyls, 15 metals,16 PAHs and H_2S. Table 2 summarizes the site data completeness, an objective that is met when there is 75 percent data return over the three-year evaluation period.

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. 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
- acrolein
- benzene
- cadmium
- chromium
- cobalt
- crotonaldehyde
- ethylene dibromide
- ethylene dichloride
- formaldehyde
- manganese
- n-hexane

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

As PM_{10} and lead are criteria pollutants, applicable PM_{10} and lead levels (i.e., 24-hour values and rolling three-month averages, respectively) were compared to the appropriate National Ambient Air Quality Standards (NAAQS) comparison values (i.e., 150 ug/m^3 and 0.15 µg/m^3, respectively). However, 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 the every sixth day schedule 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 and 3-year average concentrations of carbonyls, metals, PAHs, and VOCs (collected via canister samples), were compared to their respective long-term AMCVs. Annual and 3-year 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 online.

The El Paso Lower Valley monitor measures ambient concentrations of hydrogen sulfide (H_2S) and elevated levels of this chemical have been reported annually 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 website.

Table 1. Monitoring Sites Located in TCEQ Region 6

City and Site Location	County	Monitor ID	Monitored Compounds
650 R.E. Thomason Loop (Ascarate Park SE)	El Paso	48-141-0055	Carbonyls[1]
800 S. San Marcial Street (El Paso Chamizal)	El Paso	48-141-0044	VOCs (autoGC), Metals ($PM_{2.5}$)
6700 Delta Drive (El Paso Delta)	El Paso	48-141-1011	VOCs (autoGC)[2]
250 Rim Road (El Paso UTEP)	El Paso	48-141-0037	Lead (TSP)
8470 Plant Rd (El Paso Lower Valley)	El Paso	48-141-0054	H_2S
6767 Ojo De Agua (Ojo De Agua)	El Paso	48-141-1021	Lead (TSP) (one is 1/6 day and one is 1/12 day)[3]
320 Old Hueco Tanks Road (Socorro Hueco)	El Paso	48-141-0057	VOCs (canister), PAHs[4]
Clark & Cleveland Streets (Womble)	El Paso	48-141-0047	VOCs (canister)

Table 2. Data Completeness TCEQ Region 6

Site Name	Parameter	Notes
Ascarate Park SE	Carbonyl	Data did not meet completeness goal for 2018 or 2019.
El Paso Chamizal	VOCs (autoGC)	The following analytes did not meet data completeness objective of 75% return in 2018: acetylene and n-nonane.

[1] Monitor was deactivated 10/30/18.

[2] Monitor was activated 12/22/17.

[3] Two monitors are co-located at this site. One monitor is collecting lead (TSP) data on a 1/6th day schedule and one monitor is collecting lead (TSP) data on a 1/12th day schedule. The monitor operating on the 1/12th day schedule was deactivated 11/05/18.

[4] Monitor was deactivated 09/01/19.

Site Name	Parameter	Notes
		The following analytes did not meet data completeness goal for 2019: 1,2,3-triemethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,3-butadiene, 1-butene, 1-pentene, 2,2-dimethylbutane, acetylene, cis-2-butene, cis-2-pentene, cyclopentane, ethane, ethylene, isobutane, isopentane, isoprene, propane, propene, n-butane, n-decane, n-octane, n-pentane, n-propylbenzene, trans-2-butene, and trans-2-pentene.
El Paso Delta	VOCs (autoGC)	The following analytes did not meet data completeness of 75% return in 2019: 1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, acetylene, and n-decane.
Ojo De Agua	Lead (TSP)	1-in-12th day monitor data return from 2017 and 2018 met completeness goal. This monitor was deactivated 11/05/18.

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- and 3-year 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.

Carbonyls

Reported 24-hour concentrations of the 17 carbonyls measured were below their respective short-term AMCVs. Thus, observed short-term carbonyl concentrations would not be expected to cause adverse human health effects.

Annual average concentrations of carbonyls measured in 2017 and 2018 were below their respective long-term AMCVs. Thus, adverse human health or welfare effects would not be

expected to occur because of long-term exposure to the reported annual levels of these chemicals at this monitoring site.

Metals

Reported 24-hour-, annual average-, and 3-year average concentrations for all 15 metals ($PM_{2.5}$) measured at the Chamizal monitoring site were below their respective short- and long-term AMCVs and would not be considered of concern to human health. In the case of lead (TSP), reported annual average concentrations collected at the El Paso UTEP and Ojo De Agua sites were below the applicable comparison value. Thus, none of the reported long-term, average concentrations for these 15 metals ($PM_{2.5}$ or TSP) would be of concern to human health.

PAHs

The reported annual average concentrations for the 16 PAHs reported at the Socorro Hueco monitoring site in 2017-2019 were well below their long-term AMCVs and would not be expected to cause adverse human health or welfare effects.

H_2S

Of the H_2S samples collected at the El Paso Lower Valley site from 2017-2019, 714 individual samples exceeded value of the 30-minute state regulatory standard for H_2S (see Table 3). Since the odor range for H_2S is 0.5-300 ppb, the measured levels of H_2S 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 H_2S-specific health effects in people (mild respiratory effects in 2/10 asthmatic individuals exposed for 30-minutes) is 2,000 ppb. It is our understanding that the primary source of H_2S detections is a wastewater treatment plant located in Ciudad Juarez, which is a city in Chihuahua, Mexico. The Toxicology Division encourages H_2S reductions in the area, if possible.

Table 3. Exceedances of the value of the 30-minute H_2S State Standard, 2017-2019.

Year	Number of Exceedances	Max (ppb)	Min (ppb)
2017	365	365	80
2018	157	295	80
2019	192	322	80
Total (2017-19)	714	365	80

If you have any questions or comments regarding this evaluation, please feel free to contact me at (512) 239-1799 or tiffany.bredfeldt@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 Carbonyl Analytes

2,5-Dimethylbenzaldehyde	Crotonaldehyde - 2-Butenal	Methyl Ethyl Ketone (MEK)/Methacrolein
Acetaldehyde	Formaldehyde	m-Tolualdehyde
Acetone	Heptaldehyde	o-Tolualdehyde
Acrolein	Hexanaldehyde	Propanal - Propionaldehyde
Benzaldehyde	Isovaleraldehyde	p-Tolualdehyde
Butyraldehyde		

Valeraldehyde

List 3. 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 ($PM_{2.5}$ or TSP)	Copper ($PM_{2.5}$)	Selenium ($PM_{2.5}$)
Barium ($PM_{2.5}$)	Lead ($PM_{2.5}$ or TSP)	Tin ($PM_{2.5}$)
Cadmium ($PM_{2.5}$)	Manganese ($PM_{2.5}$)	Zinc ($PM_{2.5}$)

List 4. Target PAH Analytes

Acenaphthene	Benzo (ghi) perylene	Indeno (1,2,3-cd) pyrene
Acenaphthylene	Benzo (k) fluoranthene	Naphthalene
Anthracene	Chrysene	Phenanthrene
Benzo (a) anthracene	Dibenzo (a,h) anthracene	Pyrene
Benzo (a) pyrene	Fluoranthene	
Benzo (b) fluoranthene	Fluorene	

List 5. 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	