TCEQ Interoffice Memorandum

To: Lorinda Gardner, Regional Director

From: Tiffany Bredfeldt, Ph.D. TB
Toxicology Division, Office of the Executive Director

Date: November 29, 2017

Subject: Health Effects Review of 2016 Ambient Air Network Monitoring Data in Region 6, El Paso

Conclusions

- Reported short-term concentrations of volatile organic compounds (VOCs) were below their respective 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 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 $\mu g/m^3$ at monitors that met data completeness requirements.

- Reported annual concentrations of VOCs, PAHs, carbonyls, and metals reported as $PM_{2.5}$ and for arsenic that is measured also in TSP would also not be expected to cause long-term adverse human health or vegetation effects.

Background

This memorandum conveys the Toxicology Division's (TD) evaluation of ambient air sampling conducted at seven monitoring sites in Region 6, El Paso during 2016. 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, 24-hour PAH samples, and 1-hour 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, 16 PAHs and H_2S. Table 2 summarizes the site data completeness, an objective that is met when there is 75 percent data return. 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 dichloride
- formaldehyde
- n-hexane

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

As PM_{10} and lead are a criteria pollutants, applicable PM_{10} and lead levels (i.e., 24-hour values and rolling three-month averages, respectively) were compared to the appropriate 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 average concentrations of carbonyls, metals, PAHs, 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 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, Lead and Arsenic (TSP)
800 S. San Marcial Street (El Paso Chamizal)	El Paso	48-141-0044	VOCs[b], Metals ($PM_{2.5}$)
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)
320 Old Hueco Tanks Road (Socorro Hueco)	El Paso	48-141-0057	VOCs[a], PAHs

City and Site Location	County	Monitor ID	Monitored Compounds
Clark & Cleveland Streets (Womble)	El Paso	48-141-0047	VOCs[a]

[a]24-hour canister only; [b]one-hour autoGC

Table 2. Data Completeness TCEQ Region 6

Site Name	Parameter	Complete?
Ascarate Park SE	Carbonyl	Yes
Ascarate Park SE	Lead and Arsenic (TSP)	Yes
El Paso Chamizal	VOCs[a, b]	Yes[a], No[b]*
El Paso Chamizal	Metals ($PM_{2.5}$)	Yes
El Paso Lower Valley	H_2S	Yes
El Paso UTEP	Lead (TSP)	Yes
Ojo De Agua	Lead (TSP)	Yes
Socorro Hueco	VOCs[a]	Yes
Womble	VOCs[a]	Yes

- [a] 24-hour canister only; [b]one-hour autoGC
- *Specific compounds did not meet data completeness goals: 1,2,4-trimethylbenzene, 1,3-butadiene, and n-propylbenzene)

Evaluation

VOCs

Hourly average concentrations of the 46 VOCs collected at the Chamizal autoGC monitoring site 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 of benzene, 1,3-butadiene, 2,2-dimethylbutane, 2,3-dimethylbutane, 2-methylpentane, 3-methylpentane, benzene, ethylene dichloride, and n-hexane were below their 24-hour AMCVs and would not be expected to cause adverse health effects.

The 2016 annual average concentrations for all 84 VOCs collected as 24-hour canister samples at the Socorro Hueco and Womble monitoring sites were well below their respective long-term AMCVs. Annual average concentrations for the 46 VOCs collected at the Chamizal autoGC

monitoring site were also below their 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 and annual average concentrations of the 17 carbonyls measured at the Ascarate Park SE monitoring site were below their respective short- and long-term AMCVs. Furthermore, measured acrolein and formaldehyde concentrations did not exceed their respective 24-hour AMCV. Thus, observed carbonyl concentrations would not be expected to cause adverse human health effects.

Metals

Reported 24-hour and annual 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 and arsenic (TSP), reported annual average concentrations collected at the Ascarate Park SE, El Paso UTEP, and Ojo De Agua sites were below the applicable comparison value. Measured 24-h concentrations of cadmium, chromium, and cobalt were below their respective 24-h AMCVs. Thus, none of the reported annual 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 Ascarate Park monitoring site in 2016 were well below their long-term AMCVs and would not be expected to cause adverse human health or welfare effects.

H_2S

Of the 1-h H_2S samples collected at the El Paso Lower Valley site, 12 individual samples exceeded the state regulatory standard for H_2S in 2016. The measured levels of H_2S were likely odorous. Overall, the exceedances of the state regulatory standard do not represent an immediate threat to human health or wellness. 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.

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

List 2. Target Carbonyl Analytes

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

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	