

# TCEQ Interoffice Memorandum

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**To:** Lorinda Gardner, Regional Director

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

**Date:** August 5, 2015

**Subject:** Health Effects Review of 2014 Ambient Air Network Monitoring Data in Region 6, El Paso

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## Conclusions

- Reported short-term concentrations of volatile organic compounds (VOCs) as detected by 1-hour automated gas chromatography (autoGC) or 24-hour canister samplers were below their respective air monitoring comparison values (AMCV) values and would not be expected to cause adverse acute health effects, vegetation effects, or odors.
- Twenty-four hour concentrations of benzene and 1,3-butadiene were below their 24-hour AMCVs and would not be expected to cause adverse health effects.
- Twenty-four hour concentrations of lead, reported as total suspended particulate (TSP) or particulate matter with aerodynamic diameter of 2.5 microns or less (PM<sub>2.5</sub>), were below the comparison value of 0.15 µg/m<sup>3</sup>.
- Reported annual concentrations of VOCs, polycyclic aromatic hydrocarbons (PAHs), carbonyls, and metals reported as PM<sub>2.5</sub> 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 2014. 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 at Community Air Toxics Monitoring Network (CATMN) monitors, 24-hour metals samples (PM<sub>2.5</sub> or TSP), 24-hour carbonyl samples, and 24-hour PAH 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 PM<sub>2.5</sub> metals and 2 TSP metals, and 16 PAHs. 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 1,3-butadiene and benzene. As such, 24-hour samples were compared to the available TCEQ 24-hour AMCVs.

As PM<sub>10</sub> and lead are a criteria pollutants, applicable PM<sub>10</sub> 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<sup>3</sup> and 0.15 µg/m<sup>3</sup>, 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<sub>2</sub>S) 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                             |
|---|---------|-------------|---|
| <a href="#">650 R.E. Thomason Loop</a><br>(Ascarate Park SE)    | El Paso | 48-141-0055 | Carbonyls, Lead and Arsenic (TSP)               |
| <a href="#">800 S. San Marcial Street</a><br>(El Paso Chamizal) | El Paso | 48-141-0044 | VOCs <sup>b</sup> , Metals (PM <sub>2.5</sub> ) |
| <a href="#">250 Rim Road</a><br>(El Paso UTEP)                  | El Paso | 48-141-0037 | Lead (TSP)                                      |
| <a href="#">6767 Ojo De Agua</a><br>(Ojo De Agua)               | El Paso | 48-141-1021 | Lead (TSP)                                      |
| <a href="#">5050 A Yvette Drive</a><br>(Skyline Park)           | El Paso | 48-141-0058 | Lead (TSP)                                      |
| <a href="#">320 Old Hueco Tanks Road</a><br>(Socorro Hueco)     | El Paso | 48-141-0057 | VOCs <sup>a</sup> , PAHs                        |

| City and Site Location                                    | County  | Monitor ID  | Monitored Compounds |
|---|---------|-------------|---------------------|
| <a href="#">Clark &amp; Cleveland Streets</a><br>(Womble) | El Paso | 48-141-0047 | VOCs <sup>a</sup>   |

<sup>a</sup>24-hour canister only; <sup>b</sup>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 <sup>b</sup>           | Yes       |
| El Paso Chamizal | Metals (PM <sub>2.5</sub> ) | Yes       |
| El Paso UTEP     | Lead (TSP)                  | Yes       |
| Skyline Park     | Lead (TSP)                  | Yes       |
| Socorro Hueco    | VOCs <sup>a</sup>           | Yes       |
| Womble           | VOCs <sup>a</sup>           | Yes       |

<sup>a</sup>24-hour canister only; <sup>b</sup>one-hour autoGC

## Evaluation

### VOCs

Hourly average concentrations of the 46 VOCs collected at the Chamizal autoGC monitoring site were below their respective short-term health-, odor-, and vegetation-based 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 and 1, 3-butadiene were below their 24-hour AMCVs and would not be expected to cause adverse health effects.

The 2014 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 annual average concentrations of the 17 carbonyls measured at the Ascarate Park SE monitoring site were below their respective short- and long-term AMCVs and would not be expected to cause adverse human health effects.

### **Metals**

Reported annual average concentrations for all 15 metals (PM<sub>2.5</sub>) 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 (PM<sub>2.5</sub> or TSP), reported annual average concentrations collected at the Ascarate Park SE, Chamizal, and Skyline Park monitoring sites were below the applicable comparison value. Thus, none of the reported annual average concentrations for these 15 metals (PM<sub>2.5</sub> 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 2014 were well below their long-term AMCVs and would not be expected to cause adverse human health effects.

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](mailto: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 |                            |
| Butyraldehyde              | (MEK)/Methacrolein  |                            |
| Crotonaldehyde - 2-Butenal | m-Tolualdehyde      |                            |

### List 3. Target Metal Analytes

|                               |                                 |                                 |
|-------------------------------|---------------------------------|---------------------------------|
| Aluminum (PM <sub>2.5</sub> ) | Chromium (PM <sub>2.5</sub> )   | Molybdenum (PM <sub>2.5</sub> ) |
| Antimony (PM <sub>2.5</sub> ) | Cobalt (PM <sub>2.5</sub> )     | Nickel (PM <sub>2.5</sub> )     |
| Arsenic (PM <sub>2.5</sub> )  | Copper (PM <sub>2.5</sub> )     | Selenium (PM <sub>2.5</sub> )   |
| Barium (PM <sub>2.5</sub> )   | Lead (PM <sub>2.5</sub> or TSP) | Tin (PM <sub>2.5</sub> )        |
| Cadmium (PM <sub>2.5</sub> )  | Manganese (PM <sub>2.5</sub> )  | Zinc (PM <sub>2.5</sub> )       |

### 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                   |                     |