

TCEQ Interoffice Memorandum

To: Susan Clewis, Regional Director
Rosario Torres, Air Section Manager
Kelly Keel, Coastal and East Texas Area Director

From: Neeraja Erraguntla, Ph.D. *NKE*
Toxicology Division, Office of the Executive Director

Date: October 24, 2012

Subject: Health Effects Review of 2011 Ambient Air Network Monitoring Data in Region 14, Corpus Christi

Conclusions

- The reported annual average concentrations of 84 volatile organic compounds (VOCs) measured in 24-hour canisters collected every sixth day, and 15 metals measured in particulate matter with an aerodynamic diameter of 2.5 microns or less (PM_{2.5}) at Texas Commission on Environmental Quality (TCEQ) monitoring sites in 2011 were either not detected or were below their respective long-term air monitoring comparison values (AMCVs). Exposure to these reported concentrations would not be expected to cause chronic adverse health or vegetation effects.
- The reported annual average concentrations of VOCs evaluated from the automated gas chromatographs (autoGCs) from the TCEQ and the Corpus Christi Air Quality Project (CCAQP) monitoring sites were below their respective long-term AMCVs and would not be expected to cause chronic adverse health or vegetation effects.
- The reported hourly concentrations of the VOCs from the autoGCs at the TCEQ and the CCAQP sites were below their respective short-term AMCVs. Short-term exposures to these VOCs would not be expected to cause short-term adverse health or vegetation effects or odors.

Background

This memorandum conveys the Toxicology Division's (TD) evaluation of ambient air sampling measurements from TCEQ's Community Air Toxics Monitoring Network (CATMN) sites and CCAQP monitoring sites in Corpus Christi, Texas. Table 1 lists the sampling locations and provides links to more information on the sites. Lists of target analytes at these monitoring locations are also included in Attachment A. Figure 2 is a map indicating the specific locations of the TCEQ and CCAQP air monitoring sites. For additional information on other VOC canister sampling data from the CCAQP network, please see http://www.utexas.edu/research/ceer/ccaqp/canister_data.htm.

The TCEQ Monitoring Division reported the data for TCEQ sites evaluated in this memorandum. The TD reviewed air monitoring summary results for both CATMN and autoGC sites. From the CATMN sites, the TD reviewed data for 84 VOCs from three 24-hour every sixth-day canister samplers and 15 speciated metals (as PM_{2.5}) from 24-hour filter samples collected on an every sixth day schedule. Except for lead, data for criteria pollutants (i.e., compounds having National Ambient Air Quality Standards) were not evaluated for this memorandum. All VOC and PM_{2.5} data evaluated from the TCEQ CATMN monitoring sites met TCEQ's 75 percent annual data completeness objective; therefore, annual averages of these data are considered representative of long-term ambient air conditions and subsequent exposure. Because 24-hour air samples are designed to provide representative long-term average concentrations, annual averages from 24-hour samples were only evaluated for the potential to contribute to chronic health and welfare concerns. Thus, data that did not meet TCEQ's 75 percent data completeness objective were not evaluated from a long-term health and welfare perspective. Short-term or peak concentrations are not captured by 24-hour sample duration; therefore, daily maximum concentrations have limited use in evaluating the potential to cause acute health effects.

For the short-term health and welfare evaluations, the TD compared the hourly measured concentrations of the VOCs collected from three autoGC sites to their respective short-term AMCVs. The TD also compared the annual averages of the hourly concentrations for the VOCs from the autoGCs at the CCAQP and TCEQ sites and the annual average concentrations of the 84 VOCs and the 15 speciated metals from the TCEQ monitoring sites to their respective long-term AMCVs and/or other appropriate screening values as needed. More information about AMCVs is available online at:

<http://www.tceq.state.tx.us/implementation/tox/AirToxics.html#amcv>.

Table 1. TCEQ and CCAQP Air Monitoring Sites in Region 14, Corpus Christi

Site	Monitor ID	TCEQ/CCAQP Monitoring Sites	Monitored Chemicals
Huisache 3810 Huisache St	48-355-0032	TCEQ	VOCs (every 6th-day 24-hr canister)
Hillcrest 1802 Nueces Bay Blvd	48-355-0029	TCEQ	VOCs (every 6th-day 24-hr canister)
Dona Park 5707 Up River Rd	48-355-0034	TCEQ	VOCs (every 6th-day 24-hr canister) Metals (every 6th-day 24-hr PM _{2.5})
Palm 1515 Palm Drive	483550083*	TCEQ	VOCs (hourly autoGC)

Site	Monitor ID	TCEQ/CCAQP Monitoring Sites	Monitored Chemicals
Solar Estates 9122 Leopard St	48-355-0041	CCAQP	VOCs (hourly autoGC)
Oak Park 842 Erwin St	48-355-0035	CCAQP	VOCs (hourly autoGC)

*Palm autoGC site activated on May 18, 2010

Evaluation

Short-Term Data

The reported hourly concentrations of each of the 46 VOCs reviewed from both the CCAQP (Oak Park and Solar Estates) and the TCEQ (Palm) autoGC monitoring sites were below their respective short-term AMCVs. Therefore, acute adverse health or vegetation effects and odors are not expected to occur as a result of short-term exposure to the reported levels of these chemicals.

Long-Term Data

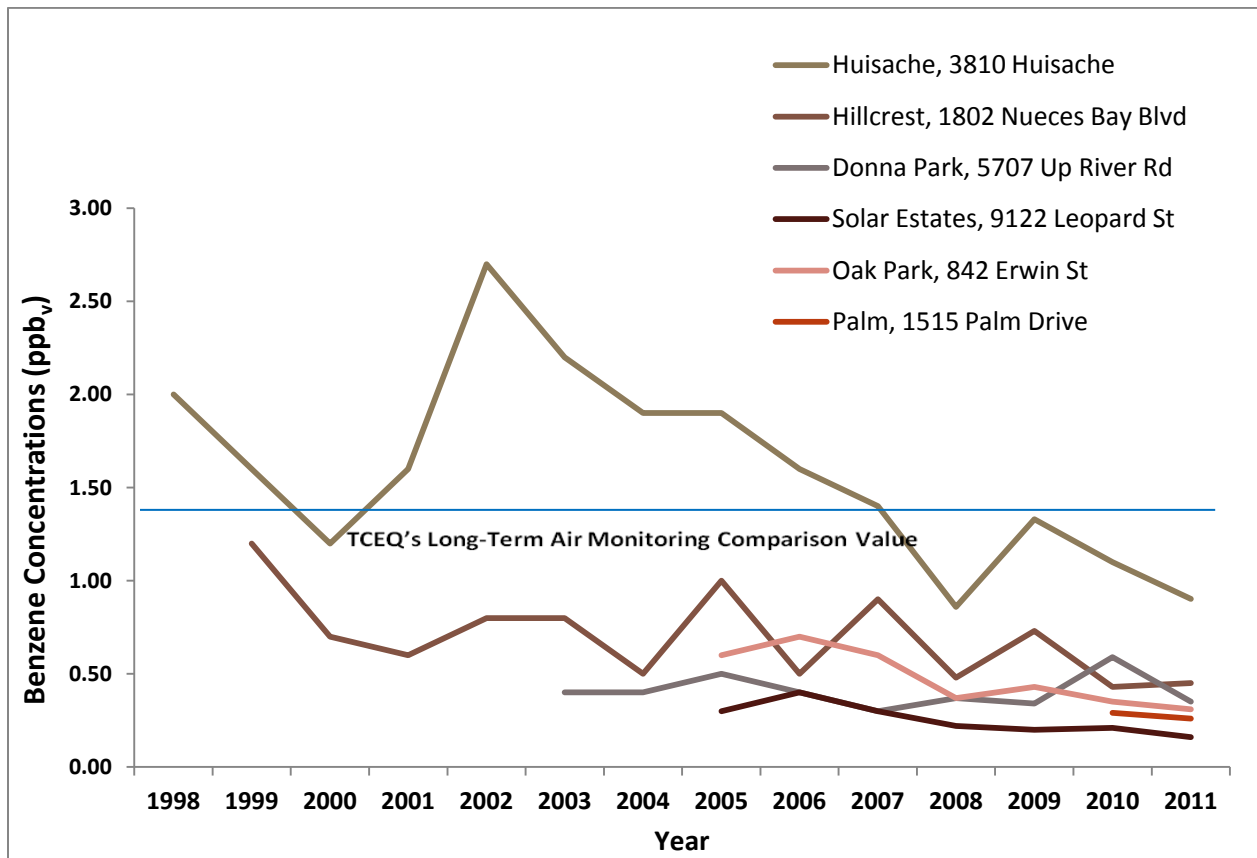
The reported annual average concentrations of the VOCs that met the TCEQ's 75 percent data completeness objectives were evaluated from a health and welfare perspective. Data for the VOCs that did not meet TCEQ 75 Percent data quality completeness objective were not evaluated from a long-term health and welfare perspective and are indicated in List 3. Based on these criteria, 45 VOCs at the Oak Park and Solar Estates CCAQP autoGC monitoring sites and 42 VOCs at the Palm TCEQ autoGC monitoring site were reported to be below their respective long-term AMCVs.

In addition, only a 73 percent data return was reported for the 15 metals measured as PM_{2.5} at the Dona Park site. Because the data for the metals fell slightly short of the 75 percent data completeness objective, the TD evaluated the reported annual average concentrations of 15 metals to their respective long-term AMCVs. Lead (being a criteria pollutant) was evaluated by comparing the rolling three-month averages of lead PM_{2.5} to the lead NAAQS and was found to be below the NAAQS (0.15 µg/m³). In addition, the reported annual average concentrations of the 84 VOCs evaluated at the TCEQ canister monitoring sites (i.e., Huisache, Hillcrest, and Dona Park) were also below their respective long-term AMCVs. Long-term exposures to the reported VOCs and metal levels would not be expected to result in long-term adverse health or vegetation effects.

Benzene Concentrations at the TCEQ and CCAQP Air Monitoring Sites

The 2011 reported annual average benzene concentration at the Huisache monitor (0.90 ppb_v) was not only below the TCEQ's long-term AMCV of 1.4 ppb_v but was also below the 2010 (1.08 ppb_v) and 2009 (1.33 ppb_v) annual average benzene concentrations at the same site. The annual average benzene levels at other TCEQ and CCAQP air monitoring sites reported lower benzene concentrations than those at the Huisache site (0.45 ppb_v at Hillcrest, 0.35 ppb_v at Dona Park, 0.16 ppb_v at Solar Estates, and 0.31 ppb_v at Oak Park). Long-term exposure to these reported levels would not be expected to cause chronic adverse health effects or vegetation effects (Figure 1).

Figure 1. Annual Average Benzene Levels at TCEQ and CCAQP Air Toxics Monitoring Sites in Corpus Christi, Texas, 1998-2011



Regional Information

The regional staff has heightened awareness on matters involving benzene emissions through both scheduled and reactive compliance investigations. These investigations include hand held

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sampling and other monitoring equipment. In addition, the regional staff regularly participates in cooperative and constructive efforts with local community and industry representatives through a monthly forum which actively focuses on the potential sources and reductions of localized benzene emissions.

If you have any questions regarding the contents of this review, please do not hesitate to contact me at (512) 239-2492 or via email at neeraja.erraguntla@tceq.texas.gov.

cc (via email): Casso, Ruben- EPA Region 6, Dallas; Prosperie, Susan- Department of State Health Services

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 Metal Analytes

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

Note: Data for all the metals at Dona Park site only meet a 73 Percent Data Quality Completeness.

List 3. Target VOC Analytes in AutoGC

1-Butene	Benzene	n-Heptane
1-Pentene	c-2-Butene	n-Hexane
1,2,3-Trimethylbenzene ¹	c-2-Pentene	n-Nonane
1,2,4-Trimethylbenzene ¹	Cyclohexane	n-Octane
1,3-Butadiene	Cyclopentane	n-Pentane
1,3,5-Trimethylbenzene ¹	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 ²	n-Decane ¹	

1-Did not meet TCEQ 75 Percent Data Quality Completeness Objective at Palm AutoGC and were not evaluated from a long-term health and welfare perspective.

2 Did not meet TCEQ 75 Percent Data Quality Completeness Objective at Oak Park and Solar Estates AutoGC and were not evaluated from a long-term health and welfare perspective.

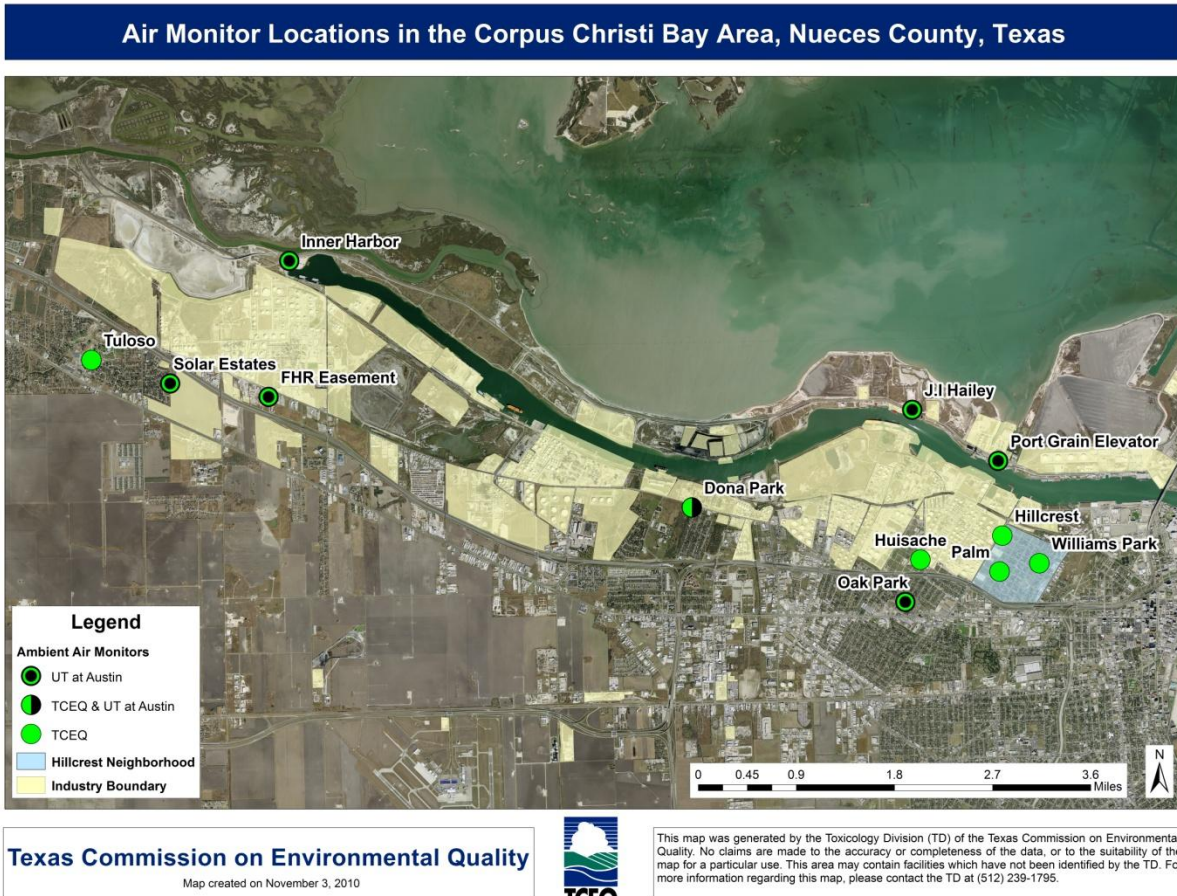


Figure 2. TCEQ and CCAQP Air Monitor Locations in the Corpus Christi Bay Area, Nueces County, Texas