

TCEQ Interoffice Memorandum

To: Susan Clewis, Regional Director
David Kennebeck, Air Section Manager
Donna Phillips, Coastal and East Texas Area Director

From: Neeraja Erraguntla, Ph.D. *NKE*
Toxicology Division, Chief Engineer's Office

Date: August 25, 2011

Subject: Health Effects Review of 2010 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 2010 were either not detected or were below their respective long-term air monitoring comparison values (AMCVs). These reported concentrations would not be expected to cause chronic adverse health or vegetation effects.
- The reported annual average concentrations of 46 VOCs from the automated gas chromatographs (autoGCs) at 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 a link to more information on the sites. Figure 2 in Attachment A is a map indicating the specific locations of the TCEQ and CCAQP air monitoring sites. Lists of target analytes at these monitoring locations are also included in Attachment A.

From the TCEQ monitoring sites, 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. 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. 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.

A new autoGC (Palm) was added to the TCEQ ambient air monitoring network in Corpus Christi. However, because the site was activated on May 18, 2010, there were insufficient samples collected for 2010 to meet TCEQ's 75 percent annual data completeness objective. As a result, the TD did not evaluate the VOC data from the Palm autoGC from a chronic health and vegetation perspective. However, the hourly averages were evaluated from a short-term health and welfare perspective (i.e., odors and adverse effects on vegetation). The TCEQ staff identified reduced measurement performance for 1,2,4-trimethylbenzene at the Palm autoGC monitoring site. This resulted in the invalidation of data for three VOCs (i.e., 1,3,5-trimethylbenzene, n-decane, and 1,2,3-trimethylbenzene). The reduced measurement performance of 1,2,4-trimethylbenzene primarily occurred in late October through December 2010. The data for the other 43 VOCs met the quality measure criteria from a short-term health and welfare perspective.

The TD staff also evaluated the VOC data from two autoGCs (i.e., Oak Park and Solar Estates) in the CCAQP network. Data from these autoGC's met the TCEQ data completeness objective of 75 percent. Therefore, the TD evaluated the annual averages of the VOCs from both a long-term health and welfare perspective and the hourly averages from a short-term health and welfare perspective. 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.

For the short-term health and welfare evaluation, the TD compared the measured hourly 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 46 VOCs from the autoGCs at the CCAQP 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. 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)
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 only on May 18, 2010

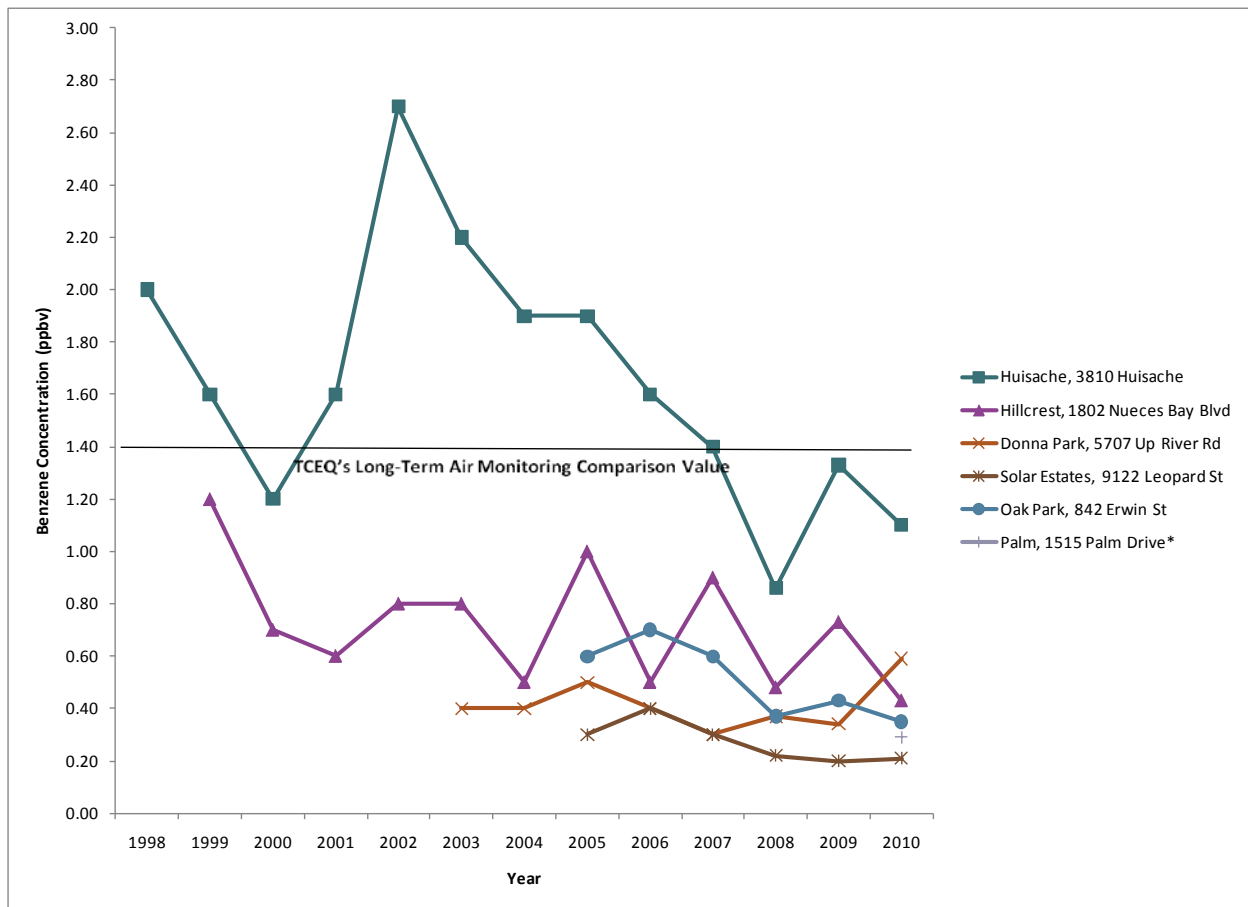
Evaluation

Short-Term Data

The reported hourly concentration of each of the 46 VOCs reviewed from both the CCAQP autoGC monitoring sites (i.e., Oak Park and Solar Estates) and the 43 VOCs from the TCEQ autoGC monitoring site (i.e., Palm) 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 exposure to the reported levels of these chemicals at these monitoring sites.

Long-Term Data

The reported annual average concentrations of the 46 VOCs evaluated at the CCAQP autoGC (i.e., Oak Park and Solar Estates) monitoring sites and the reported annual average concentrations of the 84 VOCs evaluated at the TCEQ canister monitoring sites were below their respective long-term AMCVs. Further, the annual average concentrations of the 15 metals were below their respective long-term AMCVs. Long-term exposures to the reported VOC and metal levels would not be expected to result in long-term adverse health or vegetation effects.



* Palm autoGC Monitoring Site was activated on May 18, 2010

Figure 1. Annual Average Benzene Levels at TCEQ and CCAQP Air Toxics Monitoring Sites in Corpus Christi, Texas, 1998-2010

Benzene Concentrations at the TCEQ and CCAQP Air Monitoring Sites

The 2010 reported annual average benzene concentration at the Huisache monitor (1.08 ppb_v) was below the TCEQ's long-term AMCV of 1.4 ppb_v and was below the 2009 annual average benzene concentration (1.33 ppb_v). The reported annual average benzene levels at other TCEQ and CCAQP air monitoring sites reported lower benzene concentrations than those at the Huisache site (0.43 ppb_v at Hillcrest, 0.59 ppb_v at Dona Park, 0.21 ppb_v at Solar Estates, and 0.35 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).

Regional Information

The regional staff has a heightened awareness to any matters involving benzene emissions through both scheduled and reactive compliance investigations which include hand held sampling and monitoring equipment. In addition, the regional staff regularly participates in cooperative and constructive efforts with local community and industry representatives through a

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

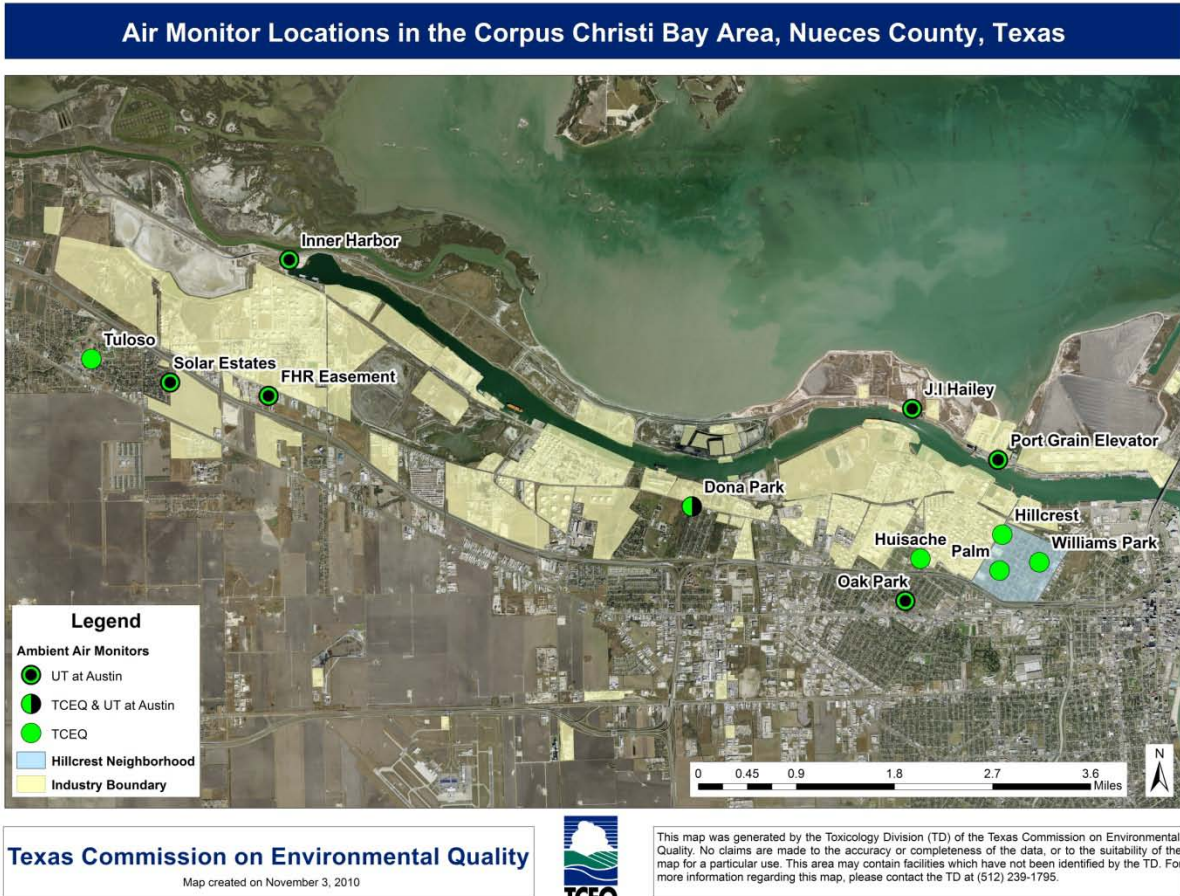


Figure 2. TCEQ and CCAQP Air Monitor Locations in the Corpus Christi Bay Area, Nueces County, Texas