

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Susan Clewis, Director
David Turner, Air Section Manager
TCEQ Region 14–Corpus Christi

Date: February 2, 2006

From: Angela Curry, Toxicology Section, Chief Engineer’s Office

Subject: Health Effects Review of Air Monitoring Data Collected in TCEQ Region 14
Corpus Christi during 2004

Conclusions

- All reported concentrations of 96 volatile organic compounds (VOCs) and 16 metals are not expected to cause adverse health effects or odors.
- The annual average benzene concentration exceeded the long-term screening level at one of the three monitoring locations (Huisache).

Background

This memorandum conveys the Toxicology Section’s evaluation of ambient air sampling conducted at monitoring network sites in Region 14–Corpus Christi during 2004. We reviewed summary results for VOCs from 24-hour canister samples collected in Region 14 (Table 1). In addition, we reviewed summary results for speciated metals from 24-hour PM_{2.5} samples collected every sixth day (Table 2).

It should be noted that 24-hour air samples are designed to provide representative long-term average concentrations. Therefore, annual averages from 24-hour samples were evaluated for potential chronic health concern. Twenty-four-hour samples do not show short-term or peak concentrations, and therefore, have limited use in evaluating the potential for acute health effects or odors.

Table 1. Monitoring Site Locations in TCEQ Region 14

City and Site Location	County	Monitor ID	Monitored Compounds
3810 Huisache St.	Nueces	483550032	VOCs
1804/1807 Nueces Bay Blvd.	Nueces	483550029/483559029 (co-located)	VOCs
5707 Up River Rd.	Nueces	483550034	VOCs

Table 2. Monitoring Site Locations in TCEQ Region 14(Metals)			
City and Site Location	County	Monitor ID	Monitored Compounds
5707 Up River Rd.	Nueces	483550034	PM _{2.5}
20420 Park Rd.	Kleberg	482730314	PM _{2.5}

The measured chemical concentrations were compared to TCEQ health-based Effects Screening Levels (ESLs). An ESL is a guideline concentration which is protective of the general public including sensitive members of the population, such as the elderly, children, and persons with pre-existing health conditions. Health-based ESLs are guideline comparison levels set well below levels at which adverse health effects have been reported in the scientific literature. If an air concentration of a pollutant is below the ESL, we do not expect adverse health effects to occur. If an air concentration of a pollutant is above the health-based ESL, it is not indicative that adverse effects will necessarily occur, but rather, that further evaluation may be warranted.

Evaluation

All reported annual average concentrations of 96 VOCs and 16 PM_{2.5} metals were below their long-term ESLs except benzene at Huisache. All annual average concentrations, including benzene, would not be expected to cause chronic health effects. In addition, 24-hour concentrations for all reported VOCs and metals were below levels that would cause acute health effects or odors. However, because 24-hour composite samples do not provide information about shorter-term and peak concentrations, potential for acute health effects and odors could not be fully evaluated. Benzene at Huisache is discussed further below.

Benzene *Huisache*

An annual average benzene level of 2.15 ppbv was reported for Huisache. At this site, 24-hour samples were collected daily during months when north winds typically occur and every sixth day otherwise. A weighted annual average (i.e., average of the monthly averages) of 2.2 ppbv, which may be calculated to better accommodate the irregular sampling schedule, differs only slightly from the reported simple average. As shown in the figure below, the annual average benzene concentration in 2004 again exceeded the long-term ESL of 1 ppbv and the no significant risk level of 1.4 ppbv. Benzene is on the [Air Pollutant Watch List](#) for this area and emissions reductions are encouraged. However, it should be noted that given the proximity of the Huisache monitor to industrial sources of benzene, it is expected that potential benzene exposures in the community would be significantly less than the monitored levels. Additional monitoring sites are in place for Corpus Christi and will provide better information about VOC

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(including benzene) levels in residential areas.

Please contact me at 512-239-1306 or acurry@tceq.state.tx.us if you have any questions regarding this memorandum.

cc(via email): Rueben Casso

Table 3: VOCs, PAHs, and Metals (PM_{2.5}) Analyte List

CATMN VOC		AutoGC VOC		Metals (PM _{2.5})
1,1,1-Trichloroethane	Ethyl Benzene	1,2,3-Trimethylbenzene	n-Heptane	Aluminum
1,1,2,2-Tetrachloroethane	Ethylene	1,2,4-Trimethylbenzene	n-Hexane	Antimony
1,1,2-Trichloroethane	Isobutane	1,3,5-Trimethylbenzene	n-Nonane	Arsenic
1,1-Dichloroethylene	Isopentane	1,3-Butadiene	n-Octane	Barium
1,2,3-Trimethylbenzene	Isoprene	1-Butene	n-Pentane	Beryllium
1,2,4-Trimethylbenzene	Isopropylbenzene	1-Hexene	n-Propylbenzene	Cadmium
1,2-Dibromoethane	Methyl Butyl Ketone (MBK)	1-Pentene	n-Undecane	Chromium
1,2-Dichloroethane	Methyl t-Butyl ether	2,2,4-Trimethylpentane	o-Ethyltoluene	Cobalt
1,2-Dichloropropane	Methylcyclohexane	2,2-Dimethylbutane	o-Xylene	Copper
1,3,5-Trimethylbenzene	Methylcyclopentane	2,3,4-Trimethylpentane	p-Diethylbenzene	Lead*
1,3-Butadiene	Methylchloride	2,3-Dimethylbutane	p-Ethyltoluene	Manganese
1-Butene	Methylene Chloride	2,3-Dimethylpentane	p-Xylene + m-Xylene	Molybdenum
1-Hexene+2-methyl-1-pentene	Methylisobutylketone	2,4-Dimethylpentane	t-2-Butene	Nickel
1-Pentene	Propane	2-Methyl-1-Pentene	t-2-Hexene	Selenium
2,2,4-Trimethylpentane	Propylene	2-Methyl-2-Butene	t-2-Pentene	Tin
2,2-Dimethylbutane - Neohexane	Styrene	2-Methylheptane		Zinc
2,3,4-Trimethylpentane	Tetrachloroethylene	2-Methylhexane		
2,3-Dimethylbutane	Perchloroethylene	2-Methylpentane		*Lead is a criteria pollutant with a corresponding NAAQS and was not evaluated in this memorandum.
2,3-Dimethylpentane	Toluene	3-Methyl-1-Butene		
2,4-Dimethylpentane	Trichloroethylene	3-Methyl-1-Butene+Cyclopentene		
2-Butanone	Trichlorofluoromethane	3-Methylheptane		
2-Chloropentane	Vinyl Chloride	3-Methylhexane		
2-Methyl-2-Butene	c-2-Butene	3-Methylpentane		
2-Methylheptane	c-2-Hexene	4-Methyl-1-Pentene		
2-Methylhexane	c-2-Pentene	Acetylene		
2-Methylpentane - Isohexane	Dichlorodifluoromethane	Benzene		
2-Methyl-3-Hexanone	Isobutyraldehyde	Cyclohexane		
3-Methyl-1-Butene	m-Diethylbenzene	Cyclopentane		
3-Methylheptane	m-Ethyltoluene	Cyclopentene		
3-Methylhexane	Methyl Chloride	Ethane		
3-Methylpentane	n-Butane	Ethyl Benzene		
3-Hexanone	n-Decane	Ethylene		
3-Pentanone	n-Heptane	Isobutane		
4-Methyl-1-Pentene	n-Hexane	Isobutene		
Acetylene	n-Nonane	Isopentane		
Benzene	n-Octane	Isoprene		
Bromomethane	n-Pentane	Isopropyl Benzene - Cumene		
Butyl Acetate	n-Propyl Acetate	Methylcyclohexane		
Butyraldehyde	n-Propylbenzene	Methylcyclopentane		
cis 1,3-Dichloropropylene	n-Undecane	Propane		
Carbon Tetrachloride	o-Ethyltoluene	Propylene		
Chlorobenzene	o-Xylene	Styrene		
Chloroform	p-Diethylbenzene	Toluene		
Chloroprene	p-Ethyltoluene	a-Pinene		
Cyclohexane	p-Xylene + m-Xylene	b-Pinene		
Cyclopentane	t-2-Butene	c-2-Butene		
Cyclopentene	t-2-Hexene	c-2-Hexene		
Ethane	t-2-Pentene	c-2-Pentene		
Ethyl Acetate	trans-1-3-Dichloropropylene	m-Diethylbenzene		
		m-Ethyltoluene		
		n-Butane		
		n-Decane		

Annual Average Benzene Concentrations (ppbv) at TCEQ Air Toxics Monitoring Sites in Corpus Christi

