

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Archie Clouse, Director
Kevin Smith, Air Section Manager
TCEQ Region 6--El Paso

Date: February 2, 2006

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

Subject: Health Effects Review of 2004 Data Collected from Ambient Air Network Monitoring Sites in Region 6, El Paso

Conclusions

- Annual average concentrations for 110 of the 113 volatile organic compounds (VOCs) and 16 metals from particulate matter less than 2.5 microns in diameter (PM_{2.5}) were monitored at levels below health-based screening values, and would not be expected to cause adverse health effects.
- The annual average concentrations for all speciated metals (Table 2) from the 24-hour PM_{2.5} metal samples collected were less than their respective annual (long-term) health-based ESLs.
- Elevated hydrogen sulfide (H₂S) concentrations have been frequently measured at the TCEQ CAMS 36 air monitoring site (8470 Plant Rd.) since H₂S monitoring began at this site in August 2004.

Background Information

This memorandum conveys the Toxicology Section's evaluation of ambient air sampling conducted at monitoring network sites in Region 6--El Paso during 2004. We reviewed annual summary results for 24- and/or 1-hour VOCs including Carbonyls, and PAHs. In addition, we reviewed summary results for speciated metals from 24-hour PM_{2.5} samples collected every third a/or sixth day and hourly H₂S samples. Please see Tables 1 and 2 which list the El Paso ambient air monitoring sites referred to in this memorandum.

It is noted that 24-hour air samples are designed to provide representative long-term average concentrations and 1-hour autoGC as well as carbonyl air samples are designed to provide representative short-term concentrations. Therefore, annual averages from 24-hour samples were evaluated for potential chronic health concern and 1-hour for potential acute health effects or odors.

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 does not indicate that adverse effects will necessarily occur; however, a further evaluation may be warranted.

Table 1. Monitoring Site Locations in TCEQ Region 6			
County	City and Site Location	EPA Site ID	Monitored Compounds
El Paso	El Paso, 650 R E Thomason Loop (Ascarte Park)	48-141-0055	VOCs
	El Paso, 800 S. San Marcial Street (Chazimal)	48-141-0044	VOCs
	El Paso, 700 San Francisco Ave (Sun Metro)	48-141-0053	VOCs, PAHs
	El Paso, 250 Rim Rd. (UTEP)	48-141-0037	VOCs
	El Paso, Clark & Cleveland Streets (Womble)	48-141-0047	VOCs
	El Paso, 8470 Plant Road	48-141-0054	H ₂ S

Table 2. Monitoring Site Locations in TCEQ Region 6 - Metals			
County	City and Site Location	EPA Site ID	Monitored Compounds
El Paso	El Paso, 800 S. San Marcial Street (Chazimal)	48-141-0044	PM _{2.5}
	El Paso, 700 San Francisco Ave (Sun Metro)	48-141-0053	PM _{2.5}
Brewster	Alpine, 222 South Campbell St. (Tillman)	48-141-0002	PM _{2.5}
	Big Ben, Rt. 12 and K-Bar Rd.	48-043-0101	PM _{2.5}
Jeff Davis	Fort Davis, HC 75 Box 1337-MCD (McDonalds Observatory)	48-243-0004	PM _{2.5}

Evaluation

The annual average concentrations for 110 of the 113 reported VOCs (including 17 Carbonyls), 15 of the 16 PAHs, and all 16 metals at the noted monitoring sites (see Tables 1 & 2) for the year 2004 were less than their respective annual (long-term) health-based ESLs. Therefore, they do not present a health concern and no adverse health effects would be expected. Benzene, formaldehyde, MEK/methacrolein, and phenanthrene had annual averages that exceeded their respective long-term ESLs and are discussed below. In addition, elevated hourly H₂S levels that have the potential for acute health effects and odors are also discussed below.

All reported Twenty four- and/or one-hour concentrations of VOCs (including carbonyls), PAHs, and metals were measured below levels that would cause acute health effects or odors. However, the potential for acute health effects or odors could not be fully evaluated because 24-hour composite samples do not provide information about shorter term or peak concentrations. We do not anticipate any health concerns from monitored levels of VOCs (including carbonyls), PAHs or metals in El Paso.

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Benzene
Womble

The annual average benzene concentration at the Womble site, 1.1 parts per billion by volume (ppbv), exceeded its long-term ESL (1.0 ppbv); however the annual average is down from 2003 (1.3 ppbv). These benzene levels are not expected to cause immediate adverse health effects. Because benzene is a human carcinogen, TCEQ is continuing efforts to characterize ambient air quality and reduce potential public exposures.

Formaldehyde and MEK/Methacrolein
Chamizal

The annual average formaldehyde concentration (3.9 ppbv) exceeded the long-term ESL of 1.2 ppbv. This annual average is not expected to pose unacceptable long-term health risks. The reported MEK/methacrolein annual average concentration (0.19 ppbv) was slightly above the methacrolein long-term ESL of 0.13 ppbv and would not be expected to cause long-term health effects.

Phenanthrene
Sun Metro

Reported phenanthrene annual average concentration (106.7 ppbv) exceeded the long-term ESL of 50 ppbv. However, this annual average concentration would not be expected to cause long-term health effects.

H₂S
CAMS 36

Numerous H₂S levels exceeded the state regulatory standard, would be expected to cause odors, and had the potential to cause health effects (e.g., eye irritation, decreased lung function, headache) in sensitive individuals. Monitoring data indicate that the primary H₂S sources impacting CAMS 36 are southeast and west-northwest of the monitoring site, and it is our understanding that the TCEQ Region 6 office has determined that those sources are in Mexico.

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

cc(via email): Rueben Casso

Table 2: VOCs, PAHs, and Metals (PM_{2.5})

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	Methylene Chloride	2,3-Dimethylbutane	p-Ethyltoluene	Manganese
1-Butene	Methylisobutylketone	2,3-Dimethylpentane	p-Xylene + m-Xylene	Molybdenum
1-Hexene+2-methyl-1-pentene	Propane	2,4-Dimethylpentane	t-2-Butene	Nickel
1-Pentene	Propylene	2-Methyl-1-Pentene	t-2-Hexene	Selenium
2,2,4-Trimethylpentane	Styrene	2-Methyl-2-Butene	t-2-Pentene	Tin
2,2-Dimethylbutane - Neohexane	Tetrachloroethylene	2-Methylheptane		Zinc
2,3,4-Trimethylpentane	Perchloroethylene	2-Methylhexane		
2,3-Dimethylbutane	Toluene	2-Methylpentane		
2,3-Dimethylpentane	Trichloroethylene	3-Methyl-1-Butene		
2,4-Dimethylpentane	Trichlorofluoromethane	3-Methyl-1-Butene		
2-Butanone	Vinyl Chloride	Butene+Cyclopentene		
2-Chloropentane	c-2-Butene	3-Methylheptane		
2-Methyl-2-Butene	c-2-Hexene	3-Methylhexane		
2-Methylheptane	c-2-Pentene	3-Methylpentane		
2-Methylhexane	Dichlorodifluoromethane	4-Methyl-1-Pentene		
2-Methylpentane - Isohexane	Isobutyraldehyde	Acetylene		
2-Methyl-3-Hexanone	m-Diethylbenzene	Benzene		
3-Methyl-1-Butene	m-Ethyltoluene	Cyclohexane		
3-Methylheptane	Methyl Chloride	Cyclopentane		
3-Methylhexane	n-Butane	Cyclopentene		
3-Methylpentane	n-Decane	Ethane		
3-Hexanone	n-Decane	Ethyl Benzene		
3-Pentanone	n-Heptane	Ethylene		
4-Methyl-1-Pentene	n-Hexane	Isobutane		
Acetylene	n-Nonane	Isobutene		
Benzene	n-Octane	Isopentane		
Bromomethane	n-Pentane	Isoprene		
Butyl Acetate	n-Propyl Acetate	Isopropyl Benzene - Cumene		
Butyraldehyde	n-Propylbenzene	Methylcyclohexane		
cis 1,3-Dichloropropylene	n-Undecane	Methylcyclopentane		
Carbon Tetrachloride	o-Ethyltoluene	Propane		
Chlorobenzene	o-Xylene	Propylene		
Chloroform	p-Diethylbenzene	Styrene		
Chloroprene	p-Ethyltoluene	Toluene		
Cyclohexane	p-Xylene + m-Xylene	a-Pinene		
Cyclopentane	t-2-Butene	b-Pinene		
Cyclopentene	t-2-Hexene	c-2-Butene		
Ethane	t-2-Pentene	c-2-Hexene		
Ethyl Acetate	trans-1-3-Dichloropropylene	c-2-Pentene		
		m-Diethylbenzene		
		m-Ethyltoluene		
		n-Butane		
		n-Decane		

*Lead is a criteria pollutant with a corresponding NAAQS and was not evaluated in this memorandum.