

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Carlos Rubinstein, Director
Rose Luna-Pirtle, Air/Waste/Water
Section Manager
TCEQ Region 16 - Laredo

Date: December 14, 2005

From: Michael S. Aplin, M.S.
Toxicology Section, Chief Engineer's Office

Subject: Health Effects Review of 2004 Ambient Air Network Monitoring Data in
Region 16, Laredo

Conclusions

- Annual average concentrations for 95 of 98 volatile organic compounds (VOCs), 16 polycyclic aromatic hydrocarbons (PAHs), and 2 metals from total suspended particulate matter (TSP) were monitored at levels below health-based screening values, and would not be expected to cause adverse health effects.
- The annual average benzene concentration at the Zaragosa Street, Laredo Bridge site, which exceeded its long-term ESL, is within the acceptable risk range as defined by the U.S. Environmental Protection Agency (EPA).
- Two VOCs, 1,1-dichloroethane and 3-heptanone, could not be evaluated due to incomplete data return.

Background

This memorandum conveys the Toxicology Section's evaluation of ambient air sampling conducted at two Community Air Toxics Monitoring Network (CATMN) sites in Laredo during 2004. Table 1 contains information regarding the two sites located in Texas Commission on Environmental Quality (TCEQ) Region 16. We reviewed air monitoring summary results for VOCs from 24-hour canister samples collected every sixth day, PAHs from 24-hour canister samples collected every third day, and speciated metals from 24-hour TSP samples collected every sixth day from the West End Washington Street site in Laredo (Figure 1). In addition, we reviewed air monitoring summary results for VOCs from 24-hour canister samples collected every sixth day from the Laredo Bridge site (Figure 2). For a complete list of all examined chemicals, please see Table 2. This memorandum evaluates air monitoring data on a chemical-by-chemical basis.

The TCEQ Monitoring Operations Division reported the data for all chemicals evaluated. The Toxicology Section has evaluated the reported annual average concentrations for each constituent for potential chronic health concerns. TCEQ's objective for data completeness is 75 percent data return, or at least 11 valid samples per quarter or 45 valid samples per year for those

samples collected every sixth day. For samples collected every third day, this equates to 23 samples per quarter or 91 samples per year. All data collected for VOCs, PAHs, and TSP metals met the data completeness objective at both sites, except for the annual averages for 1,1-dichloroethane and 3-heptanone and the first quarter average for 3-pentanone. Although data completeness was not met for 3-pentanone in the first quarter of 2004, enough data was collected during the rest of 2004 to allow an annual average evaluation.

For all chemicals, except lead, the 24-hour maximum and annual average concentrations were compared to their respective short-term and long-term TCEQ Effects Screening Levels (ESLs). Lead is a criteria pollutant with a corresponding National Ambient Air Quality Standard (NAAQS) and was not evaluated in this memorandum. It should be noted that 24-hour air samples are designed to provide representative long-term average concentrations, and do not indicate short-term or peak concentrations. Therefore, annual averages from 24-hour samples were evaluated for potential chronic health concerns. Although short-term or peak concentrations are not captured by 24-hour samples, and daily maximum concentrations have limited use in evaluating the potential for acute health effects, individual sample results were compared to short-term health or odor based 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 health-based 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

The annual average concentrations for 95 of the 98 reported VOCs, all 16 PAHs, and TSP antimony and arsenic at the noted monitoring sites (see Table 1) 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. Two monitored VOCs, 1,1-dichloroethane and 3-heptanone, could not be evaluated due to incomplete data return. Benzene has an annual average that slightly exceeded its long-term ESL at the Laredo Bridge site and is discussed below. 24-hour concentrations of all VOCs, PAHs, and TSP antimony and arsenic 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, PAHs or metals in Laredo.

Benzene

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The annual average benzene concentration at the Laredo Bridge site, 1.07 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) and is within the acceptable risk range as defined by the EPA. Even though benzene is within the acceptable EPA risk range, it is a human carcinogen. Therefore, the TCEQ is continuing efforts to characterize ambient air quality and reduce potential public exposures.

If you have any questions about this evaluation, please call me at (512) 239-1792 or e-mail me at maplin@tceq.state.tx.us.

Table 1. Monitoring Site Information for TCEQ Region 16

County	City and Site Location	EPA Site ID	Monitored Compounds
Webb	Laredo, West End Washington Street	48-479-0016	VOCs, PAHs, Metals (TSP)
Webb	Laredo, 700 Zaragosa Street, Bridge	48-479-0017	VOCs

Table 2. VOCs, PAHs and TSP Metals Evaluated

CATMN VOCs		
1,1,1-Trichloroethane	3-Pentanone	Tetrachloroethylene, Perchloroethylene
1,1,2,2-Tetrachloroethane	4-Methyl-1-Pentene	Toluene
1,1,2-Trichloroethane	Acetylene	Trichloroethylene
1,1-Dichloroethylene	Benzene	Trichlorofluoromethane
1,2,3-Trimethylbenzene	Bromomethane	Vinyl Chloride
1,2,4-Trimethylbenzene	Butyl Acetate	c-2-Butene
1,2-Dibromoethane	Butyraldehyde	c-2-Hexene
1,2-Dichloroethane	cis 1,3-Dichloropropylene	c-2-Pentene
1,2-Dichloropropane	Carbon Tetrachloride	Dichlorodifluoromethane
1,3,5-Trimethylbenzene	Chlorobenzene	Isobutyraldehyde
1,3-Butadiene	Chloroform	m-Diethylbenzene
1-Butene	Chloroprene	m-Ethyltoluene
1-Hexene+2-methyl-1-pentene	Cyclohexane	Methyl Chloride
1-Pentene	Cyclopentane	n-Butane
2,2,4-Trimethylpentane	Cyclopentene	n-Decane
2,2-Dimethylbutane - Neohexane	Ethane	n-Heptane
2,3,4-Trimethylpentane	Ethyl Acetate	n-Hexane
2,3-Dimethylbutane	Ethyl Benzene	n-Nonane
2,3-Dimethylpentane	Ethylene	n-Octane
2,4-Dimethylpentane	Isobutane	n-Pentane
2-Butanone	Isopentane	n-Propyl Acetate
2-Chloropentane	Isoprene	n-Propylbenzene
2-Methyl-2-Butene	Isopropylbenzene	n-Undecane
2-Methylheptane	Methyl Butyl Ketone (MBK)	o-Ethyltoluene
2-Methylhexane	Methyl t-Butyl ether	o-Xylene
2-Methylpentane - Isohexane	Methylcyclohexane	p-Diethylbenzene
2-Methyl-3-Hexanone	Methylcyclopentane	p-Ethyltoluene
3-Methyl-1-Butene	Methylene Chloride	p-Xylene + m-Xylene
3-Methylheptane	Methylisobutylketone	t-2-Butene
3-Methylhexane	Propane	t-2-Hexene
3-Methylpentane	Propylene	t-2-Pentene
3-Hexanone	Styrene	trans-1-3-Dichloropropylene
PAHs		
Acenaphthene	Benzo (g,h,i) 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) fluoroanthene	Fluorene	
TSP Metals		
Antimony	Arsenic	Lead *

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

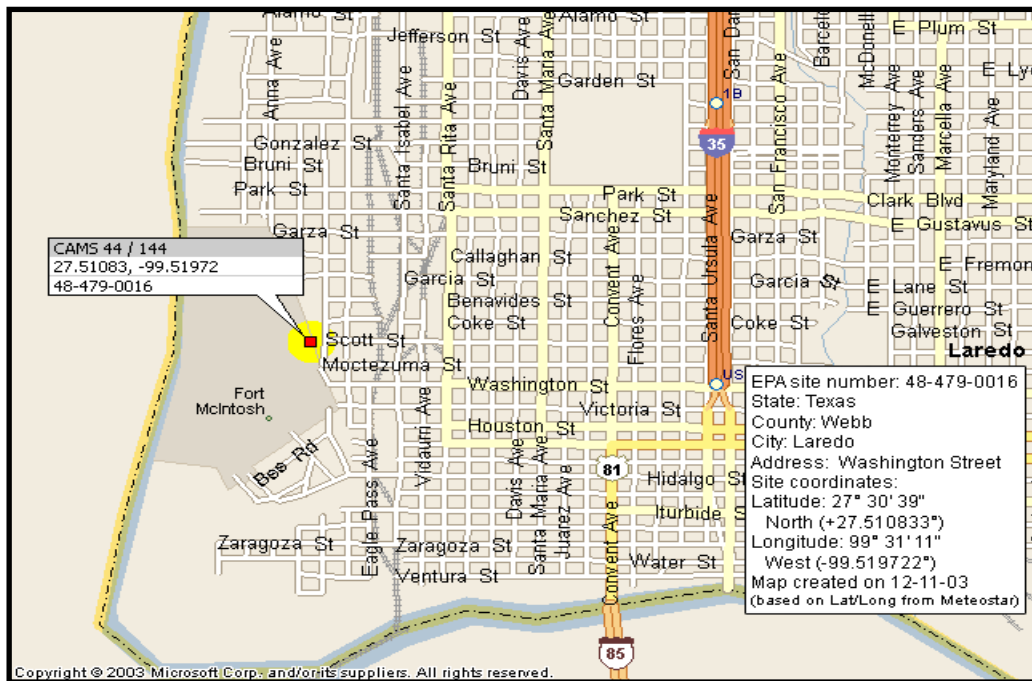


Figure 1. Location of West End Washington Street Monitor

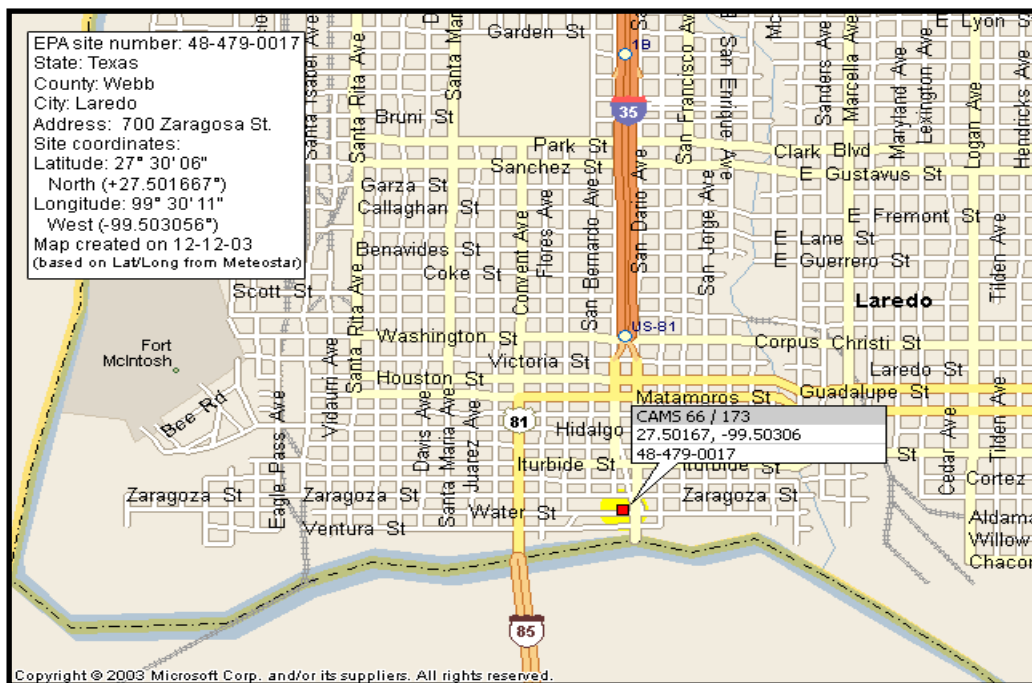


Figure 2. Location of Zaragosa Street, Laredo Bridge Monitor

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cc: Casso, Ruben – EPA Region 6, Dallas (via e-mail)