

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Leroy Biggers, Regional Director
Michelle Baetz, Air Section Manager
Donna G. Phillips, Coastal and East
Texas Area Director

Date: December 7, 2009

From: Roberta L. Grant, Ph.D. *RLG*
Toxicology Division, Chief Engineer's Office

Subject: Health Effects Review of 2008 Ambient Air Network Monitoring Data in
Region 5, Tyler

Conclusions

- Annual average concentrations of all volatile organic compounds (VOCs) at the Gregg County Airport in Longview, Texas, were below their long-term appropriate comparison values and are not a health concern.
- In 2007, the annual average for benzene at the Gregg County Airport was 1.54 ppbv, which was slightly above the long-term comparison value of 1.4 ppbv. For 2008, the benzene annual average concentration decreased to 1.11 ppbv, which is below the long-term comparison value. However, the Toxicology Division (TD) recommends benzene reductions and supports all efforts to control benzene emissions in the area based on the results of the January 4-8, 2009 mobile monitoring project, discussed below.
- Annual average concentrations of arsenic and chromium from particulate matter less than 10 microns in diameter (PM₁₀) and all carbonyls at the Karnack monitoring site were below their long-term appropriate comparison values and are not a health concern.
- Except for acrolein, annual average concentrations of all VOCs at the Karnack monitoring site were below their long-term appropriate comparison values. All VOC concentrations, including acrolein, are not a health concern.

Background

This memorandum conveys the TD's evaluation of ambient air sampling conducted at two monitoring network sites in Region 5-Tyler during 2008. Summary results for 24-hour VOCs and carbonyls collected every sixth day and two speciated metals, arsenic and chromium, from 24-hour PM₁₀ filter samples collected every third day from a site located at Highway 143 and Spur 449 in Karnack, Texas, as well as 24-hour VOCs collected every sixth day from a site located at Gregg County Airport in Longview, Texas, were evaluated on a chemical-by-chemical basis. Information about the Region 5 monitoring sites is presented in Table 1 and the locations of the sites are shown in Figures 1 and 2.

Table 1. Monitoring Sites Located in TCEQ Region 5				
City and Site Location	County	EPA Monitor ID	Monitored Compounds	Begin Date
Longview, Gregg County Airport	Gregg	48-183-0001	VOCs	November 5, 1997
Karnack, Highway 143 and Spur 449	Harrison	48-203-0002	VOCs, carbonyls, and metals (PM ₁₀)	August 28, 2001

The Texas Commission on Environmental Quality (TCEQ) Monitoring Operations Division reported data for all chemicals evaluated in this memorandum. The specific chemicals evaluated are listed in Table 2. The data return for the Longview monitor met data completeness requirements for estimating annual average concentrations for 84 of the 95 VOCs. The data return for the Karnack monitor met data completeness requirements for estimating annual average concentrations for 85 of the 96 VOCs.

The TCEQ Monitoring Operations Division reported the data for all chemicals evaluated in this memorandum. The target analyte list of VOCs was changed in the third quarter of 2008. Eleven oxygenated compounds were dropped from the list due to water issues in the laboratory analysis. Therefore, those compounds did not meet the data completeness objective of 75 percent data return, or 45 valid samples per year. Those eleven compounds are identified by an asterisk on the target analyte table (Table 2). All other data collected (84 VOCs for the Longview monitor and 85 VOCs for the Karnack monitor) met the data completeness objective of 75 percent data return. The data return for the Karnack monitor met data completeness requirements for estimating annual average concentrations for the two speciated metals, chromium and arsenic, and for all carbonyls except for acetone and MEK/methacrolein.

For all VOCs, carbonyls, and speciated metals that met data completeness requirements, annual average concentrations were compared to their respective long-term appropriate comparison values. Because 24-hour air samples are designed to provide representative long-term average concentrations, annual averages from 24-hour samples were evaluated for potential chronic health concerns. Short-term or peak concentrations are not captured by 24-hour samples; therefore, daily maximum concentrations have limited use in evaluating the potential for acute health effects.

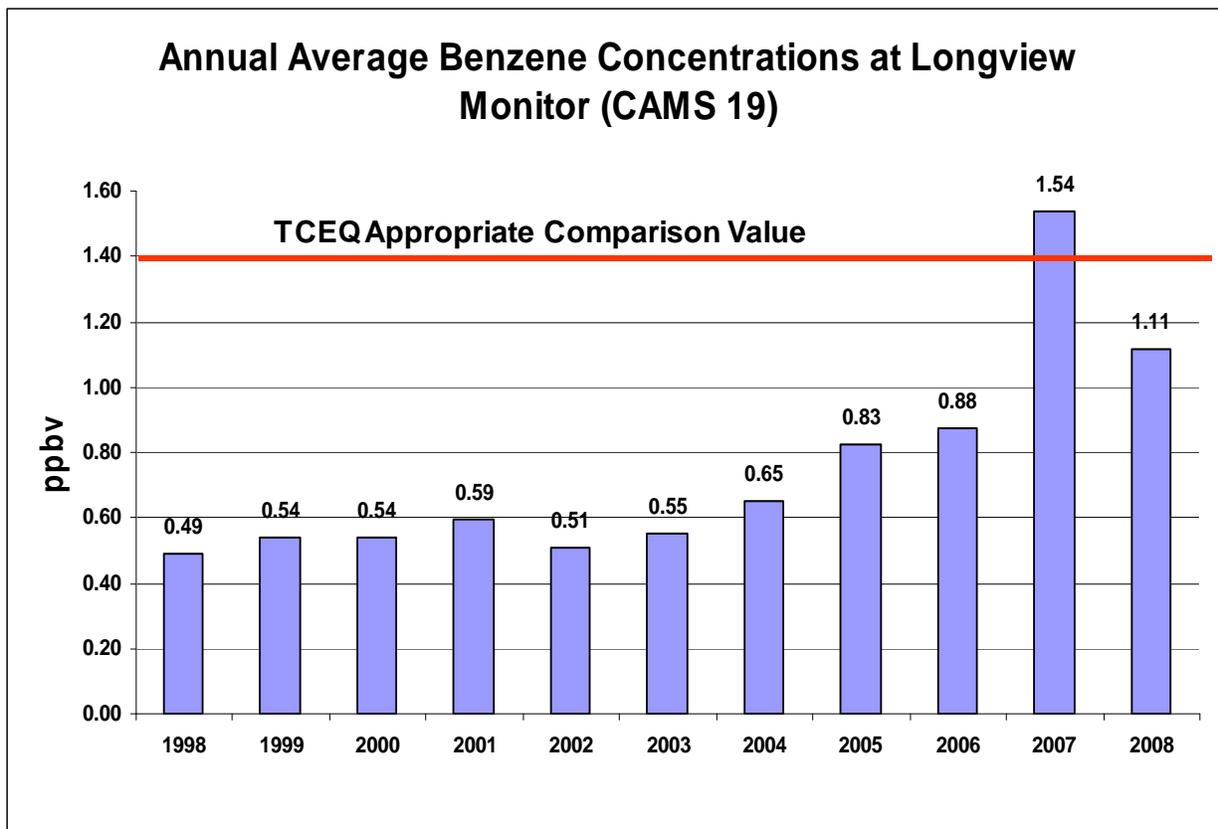
Evaluation at the Longview, Gregg County Airport Site

2008 Annual Average VOC Concentrations

Of the 84 reported VOCs that met data completeness requirements, 59 were not detected at the Longview site. All annual average concentrations of VOCs were below their appropriate comparison values and would not be expected to cause adverse long-term health effects.

2008 Annual Average Benzene Concentrations and Health Effects Evaluation of Mobile Monitoring in Longview, Texas, January 4 - 8, 2009

In 2007, the annual average for benzene at the Gregg County Airport in Longview, Texas (CAMS 19) was 1.54 ppbv, which was slightly above the long-term comparison value of 1.4 ppbv. For 2008, the benzene annual average concentration decreased to 1.11 ppbv, which is below the long-term comparison value.



In response to elevated benzene concentrations in 2007, a mobile monitoring project was conducted in multiple oil and gas gathering facilities in the Longview, Texas area January 4 - 8, 2009, upwind of the Longview monitoring site. Refer to the June 26, 2009 memorandum entitled *Health Effects Evaluation of Mobile Monitoring in Longview, Texas, January 4 - 8, 2009* for complete details. The key findings from the mobile monitoring trip are as follows:

- The GasFindIR camera provided documentation of VOC emissions/or leaks from multiple oil and gas gathering facilities in Longview, Texas upwind of TCEQ's Longview monitoring site (CAMS 19). In some cases, the storage tanks were reportedly located near residential areas.

- An elevated benzene concentration was reported from a downwind instantaneous canister sample collected on-site near sources of emissions of Chinn Exploration Company, Longview, Texas. Elevated short-term levels are of potential concern due to their contribution to long-term levels.

Although the 2008 benzene annual average concentrations were below the appropriate comparison values, the TD recommends benzene reductions and supports all efforts to control benzene emissions in these areas based on the results of the January 4 - 8, 2009 mobile monitoring project.

Evaluation at the Karnack, Highway 143 and Spur 449 Site

2008 Annual Average VOC, Carbonyl, and Metal Concentrations

For the 85 reported VOCs that met data completeness requirements, 66 were not detected at the Karnack site. Except for acrolein, which is discussed below, all reported annual average concentrations of VOCs and chromium and arsenic were below their appropriate comparison values and would not be expected to cause long-term adverse health effects. Of the 15 reported carbonyls that met data completeness requirements, four were not detected. All annual average concentrations of carbonyls were below their appropriate comparison values and would not be expected to cause adverse long-term health effects.

2008 Annual Average Acrolein Concentrations

Prior to 2008, acrolein was a target analyte in carbonyl samples only. However, beginning in 2008, acrolein was included as a target analyte in both VOC (CATMN) and carbonyl samples at the Karnack monitor. The acrolein annual average concentration of 0.034 ppbv measured in carbonyl samples was below the appropriate comparison value of 0.1 ppbv. However, the acrolein annual average concentration of 0.28 ppbv measured in VOC (CATMN) samples was above the appropriate comparison value. The results from the two analyses are significantly different because of the difficulties in sample collection and analyses of acrolein, a highly reactive chemical. Despite the analytical limitations, the TD would not expect adverse long-term health effects to occur at the acrolein annual average concentration of 0.28 ppbv, based on available human and animal health effects data.

Air Pollutant Watch List (APWL) Area

From April 1998 to March 1999, air concentrations of hydrogen sulfide (H₂S), measured as total reduced sulfur, frequently exceeded the odor threshold and the 30-minute state regulatory standard at the former special purpose Jones and Solley air monitoring sites located approximately four miles north and south, respectively, of the International Paper Company near Domino, Texas. These H₂S levels were measured as part of an air monitoring study which included the two Texas sites and four Arkansas sites. A TCEQ mobile monitoring trip conducted near International Paper Company on August 4 - 9, 2001 measured persistent odorous concentrations of H₂S, and staff reported rotten egg odors which are characteristic of H₂S. This area is currently being reassessed based on recent surveys and investigations of H₂S.

Leroy Biggers et al.
Page 5
December 7, 2009

Information on appropriate comparison values for air monitoring can be obtained by contacting the TCEQ TD (512-239-1795). If you have any questions about this evaluation, please call me at (512) 239-4115 or e-mail me at rgrant@tceq.state.tx.us.

cc (via email):

Casso, Ruben- EPA Region 6, Dallas
Prosperie, Susan- Department of State Health Services

Table 2 Target Analyte List

VOCs (CATMN)	cis 1,3-Dichloropropylene Carbon Tetrachloride Chlorobenzene Chloroform Cyclohexane Cyclopentane Cyclopentene Ethane Ethyl Acetate * Ethyl Benzene Ethylene Isobutane Isopentane Isoprene Isopropylbenzene Methyl Butyl Ketone (MBK) * Methyl Isobutyl Ketone * Methyl t-Butyl Ether (MTBE) * Methylcyclohexane Methylcyclopentane Methylene Chloride Propane Propylene Styrene Tetrachloroethylene Toluene Trichloroethylene Trichlorofluoromethane Vinyl Chloride c-2-Butene c-2-Hexene c-2-Pentene Dichlorodifluoromethane Isobutyraldehyde * m-Diethylbenzene m-Ethyltoluene Methyl Chloride n-Butane n-Decane n-Heptane n-Hexane n-Nonane n-Octane	n-Pentane n-Propyl Acetate * n-Propylbenzene n-Undecane o-Ethyltoluene o-Xylene p-Diethylbenzene p-Ethyltoluene p-Xylene + m-Xylene t-2-Butene t-2-Hexene t-2-Pentene trans-1-3-Dichloropropylene Carbonyls 2,5-Dimethylbenzaldehyde Acetaldehyde Acetone * Acrolein ** Benzaldehyde Butyraldehyde Crotonaldehyde – 2-Butenal Formaldehyde Heptaldehyde Hexanaldehyde Isovaleraldehyde MEK/methacrolein * m-Tolualdehyde Propanal – Propionaldehyde Valeraldehyde o-Tolualdehyde p-Tolualdehyde Metals (PM₁₀) Arsenic Chromium
---------------------	--	---

* Chemicals that did not meet data completeness requirements

** At the Karnack monitor, acrolein was a target analyte in both VOC (CATMN) and carbonyl sample analyses. At the Longview monitor, acrolein was a target analyte in carbonyl sample analyses only.

**Figure 1. Longview Monitoring Site, Gregg County
Gregg County Airport**



**Figure 2. Karnack Monitoring Site, Harrison County
Highway 143 and Spur 449**

