


Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Heather Ross, Regional Director
Kathryn Saucedo, Air Section Manager, R10
Beaumont
Donna Phillips, Coastal & East Texas Area Director

Date: December 17,
2009

From: Carla Kinslow, Ph.D., Toxicology Division, Chief Engineer's Office 

Subject: Health Effects Review of Air Monitoring Data Collected in Region 10 – Beaumont during 2008

Conclusions

- The long-term average benzene level for 2008 at the Port Arthur City Service Center is above the appropriate comparison value for benzene. Actions are being taken to identify and address the source.
- Exposure to the reported annual average concentrations for all other monitored volatile organic compounds (VOCs) and all 14 metals measured in particulate matter less than 2.5 microns in diameter (PM_{2.5}) would not be expected to cause chronic adverse health effects.
- Long-term average benzene and hydrogen sulfide (H₂S) level at the Beaumont, Carroll Street Park monitoring site is below the appropriate comparison values. Thus, H₂S was removed from the Air Pollutant Watch List (APWL) Site 1002 in 2009 and benzene has been proposed to be removed from the APWL Site 1002 in 2009.
- The long-term average 1,3-butadiene level at the Port Neches Merriman Street site is below its long-term appropriate screening value based on the most current assessment of 1,3-butadiene toxicity and this chemical was removed from APWL Site 1002 in 2009.

Background Information

This memorandum conveys the Toxicology Division's (TD's) evaluation of ambient air sampling conducted at ten sites in Region 10-Beaumont during 2008. Information about the locations of the monitoring sites and monitored compounds is summarized in Table 1. We reviewed air monitoring summary results for 46 VOCs from two automated gas chromatograph (autoGC) sites, 95 VOCs from seven canister samplers, and 14 PM_{2.5} metals from one filter sampler. AutoGC samplers provided 40-minute samples each hour; we evaluated VOC concentrations that were reported in these hourly samples for their potential to cause acute (short-term) adverse health effects and odors.

Table 1 - Region 10 Sites that Provided Air Toxics Monitoring Data Evaluated in this Memorandum

County	Site Description	EPA Site ID	Monitored Compounds
Jefferson	Beaumont, Downtown Lamar Univ. 1086 Vermont Avenue	48-245-0009	VOCs (24-hour canister & hourly autoGC)
Jefferson	Port Arthur, West 800 El Vista Rd	48-245-0011	VOCs (24-hour canister)
Jefferson	Groves 3355 Grandview Avenue & 32nd Street	48-245-0014	VOCs (24-hour canister)
Jefferson	Port Neches 1225 Merriman Street	48-245-0017	VOCs (24-hour canister)
Jefferson	Port Arthur, Jefferson County Airport	48-245-0018	VOCs (24-hour canister)
Jefferson	Port Arthur, City Service Center 201 H.O. Mills Blvd.	48-245-0019	VOCs (24-hour canister)
Jefferson	Beaumont, Carroll Street Park Grant & Grove Streets	48-245-0020	VOCs (24-hour canister)
Jefferson	Port Arthur, Memorial School 2200 Jefferson Dr.	48-245-0021	PM _{2.5} Metals (24-hour filter)
Jefferson	Nederland, High School Seattle St.	48-245-1035	VOCs (hourly autoGC)

The TCEQ Monitoring Operations Division reported the data for all chemicals evaluated in this memorandum. For 24-hour canister samples the target analyte list of 95 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 asterisks on the target analyte table (Attachment 1). All other data collected (84 VOCs and 14 metals (PM_{2.5})) for the monitoring sites met the data completeness objective of 75 percent data return.

Annual average concentrations were reported from the following: autoGC hourly VOC samples; every-6th-day 24-hour canister VOC samples; and every-3rd-day 24-hour PM_{2.5} metal samples. All data highlighted met the 75 percent completion requirement to help ensure the representativeness of calculated annual average concentrations. We evaluated the annual average chemical concentrations for their potential to cause chronic (long-term) adverse health effects. Chemicals were evaluated individually by comparing reported concentrations to appropriate comparison values to their respective short- and long-term appropriate comparison values. Chemicals that were reviewed for this evaluation are listed in Attachment 1.

Evaluation

VOCs

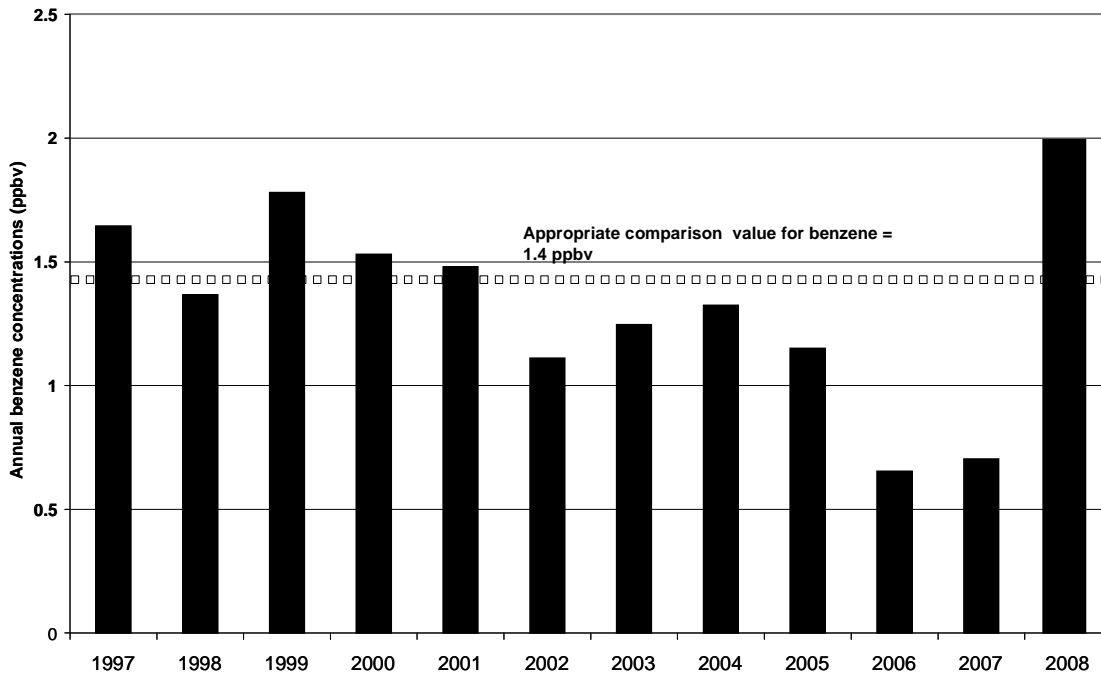
Hourly average concentrations were reported from the autoGC hourly VOC samples. All hourly and annual VOC concentrations gathered from the autoGC's at the Beaumont, Downtown Lamar University and Nederland High School sites were below their respective appropriate comparison values (including odor thresholds) and would not be expected to cause acute health effects or nuisance odors.

Except for benzene at the Prot Arthur City Service Center in Port Arthur, all reported annual average concentrations of VOC's from 24-hour canister samplers were below their respective long-term appropriate comparison values at all sites except for the City Service Center site. Thus, the annual average VOC concentrations at all sites except City Service Center were below a level of concern (benzene at the Port Arthur City Service Center in Port Arthur site is discussed below).

Port Arthur City Service Center

The reported 2008 average benzene concentration at the City Service Center site based on every sixth-day 24-hour canister samples was 2.0 ppb_v. This exceeds TCEQ's health-based comparison value of 1.4 ppb_v. Annual benzene concentrations at this site have decreased significantly from 2000 (1.5 ppb_v) to 2007 (0.7 ppb_v). However, the level in 2008 (2.0 ppb_v) has increased by 2.8 times over the 2007 (0.7 ppb_v) value and is above TCEQ's appropriate comparison value of 1.4 ppb. This is the highest annual value recorded at this site (see trends graph below) as well as the highest benzene value in the 2008 ambient air network. Investigations into the benzene sources are currently underway by Region 10 staff. A summary of the preliminary investigation, including wind roses, potential sources and action plan, is summarized in the August 31, 2008 memo, "Port Arthur City Service Center, Continuous Air Monitoring Station (CAMS) 131".

Annual benzene concentrations for the Port Arthur City Service Center monitor 1997-2008



Metals in PM_{2.5}

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Annual average metal concentrations in PM_{2.5} samples were below their respective appropriate comparison values and would not be expected to cause chronic health effects.

Air Pollutant Watch List (APWL) Areas

Following are brief discussions of monitoring data in four APWL areas (1001, 1002, 1003 and 1004) in Region 10. These discussions are included for the purpose of providing specific health effects evaluation of pollutants and areas that have been of concern or interest over the years. The information provided, while not intended to be a thorough review of the status of these APWL areas, is considered when the status of those watch list areas are re-evaluated.

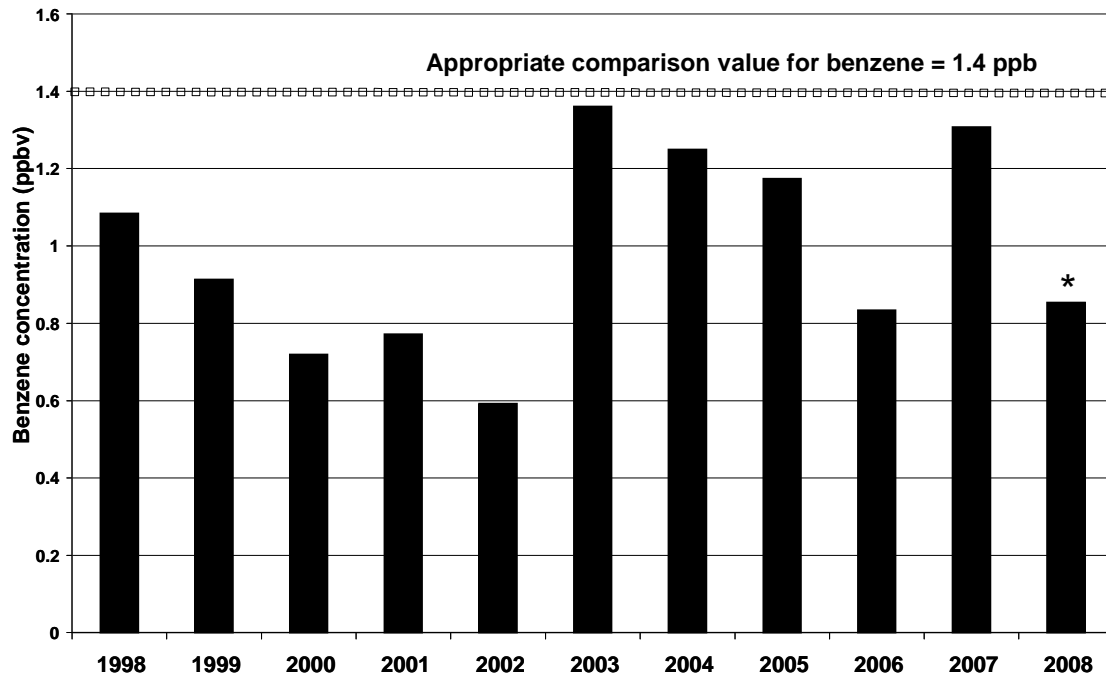
APWL 1001

Hydrogen sulfide (H₂S) is listed as a pollutant of interest for [APWL1001](#) because of elevated levels detected during mobile air monitoring trips conducted annually within TCEQ Region 10 from 2003 through 2007. Several measured H₂S levels measured downwind of Mead Westvaco in Evadale, TX were in excess of the 30-minute H₂S TCEQ regulation standard. This chemical will remain on the AWPL.

APWL1002

Benzene is listed as a pollutant of interest for [APWL1002](#) because prior to 2006, the annual average benzene levels at Beaumont Carroll Street Park, though trending downward, exceeded the long-term appropriate comparison value which was 1 ppb_v at that time. The annual average benzene level dropped to 0.8 ppb_v in 2006 but increased to 1.3 ppb_v in 2007. The long-term average benzene concentration at Carroll Street Park is less than the current annual appropriate comparison value of 1.4 ppb_v which is based on the most up-to-date review of benzene toxicity. In 2008, this monitoring site was in the process of being relocated to a nearby residential area to allow for the expansion of the adjacent industrial facility. However, historical benzene levels at the Beaumont Carroll Street Park site are not a health concern and the annual trend is shown on the chart below. This chemical has been proposed to be removed from the APWL in September 2009 and is expected to be removed soon.

Annual benzene concentrations at Carroll Street Part monitoring site 1998-2008



* denotes only 60% complete data

Hydrogen sulfide was listed as a pollutant of interest for [APWL1002](#) at the TCEQ former Carroll Street Park monitoring site because H₂S was measured at levels that exceeded the TCEQ regulatory standard. The number of days on which H₂S exceeded the 30-minute state regulatory standard decreased from 2 days in 2002 to 1 day in 2003. No exceedances were measured during 2005 through 2007, or through June 19, 2008. The TD determined that H₂S concentrations monitored at the former Carroll Street Park site were no longer a concern and it was removed from the APWL in June 2009.

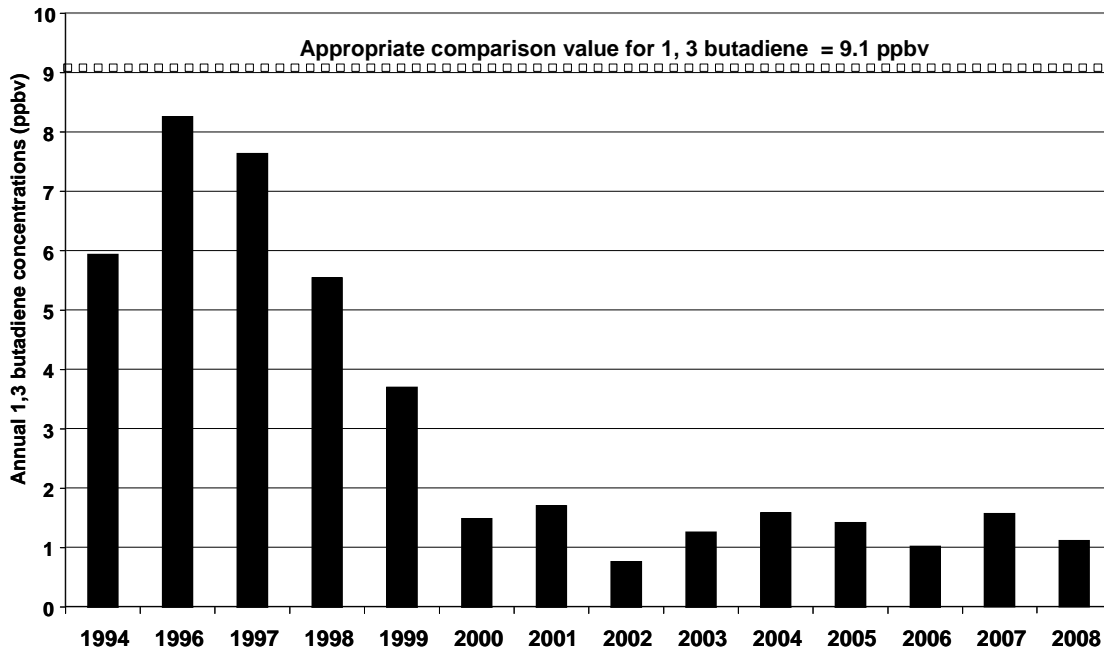
APWL1002 and 1003

Sulfur dioxide (SO₂) is listed as a pollutant of interest for [APWL1002](#) because levels at the former Carroll Street Park monitoring site exceeded the TCEQ regulatory standard on 2 days in 2002, 0 days in 2003-2005, and 1 day in 2006. In addition, SO₂ levels were reported above the TCEQ regulation standard during annual mobile monitoring trips from 2003 through 2007. A member of the monitoring staff required medical attention for a burning sensation in the lungs while monitoring downwind of Chemtrade Logistics (formerly Peak Sulfur, Incorporated) during the 2003 mobile monitoring trip. This chemical will remain on the APWL and will be reassessed once the monitoring site is relocated. Benzene is listed as a pollutant of interest for [APWL1003](#) because prior to 2006 the annual average benzene levels at the Port Arthur City Service Center exceeded the long-term screening value which was 1 ppb_v at that time. Average benzene levels in 2006 and 2007 dropped to 0.7 ppb_v, and annual average levels from 2002 to 2007 were below the current ESL of 1.4 ppb_v. In 2008, the annual benzene level for this site was 2.0 (discussed above) and is considered a concern. This chemical and site will remain on the APWL until benzene concentrations have sustained a level below our screening value of 1.4ppbv.

APWL 1004

1,3-Butadiene is listed as a pollutant of interest for [APWL1004](#) because annual average 1,3-butadiene levels at the Port Neches Merriman Street site have exceeded the former long-term screening value of 5 ppb_v, and a then-current review of 1,3-butadiene toxicity suggested that levels at this site may not be health protective. However, annual long-term averages 1,3-butadiene concentration at the Merriman Street site is less than the current appropriate comparison value of 9.1 ppb_v which is based on the most up-to-date assessment of 1,3-butadiene toxicity (see the [1,3-Butadiene Development Support Document](#)). 1,3-Butadiene levels at the Port Neches Merriman Street site are not a health concern was demonstrated by the annual trend data shown on the chart below. Thus, this chemical was removed from the APWL in June 2009.

Annual 1,3 butadiene concentrations at the Port Neches Merrium Street monitor from 1994-2008



If you have any questions regarding this evaluation, please contact me at 512-239-1075 or ckinslow@tceq.state.tx.us.

cc (via email): Casso, Reuben – EPA Region 6
Prosperie, Susan – Department of State Health Services

Attachment 1

Chemicals Reviewed for this Evaluation

VOCs in Every-6 th -Day 24-Hour Canister Samples			
1,1,1-Trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane
1,1-Dichloroethylene	1,2,3-Trimethylbenzene	1,2,4-Trimethylbenzene	1,2-Dibromoethane
1,2-Dichloroethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Butadiene
1-Butene	1-Hexene And 2-Methyl-1-Pentene	1-Pentene	2,2,4-Trimethylpentane
2,2-Dimethylbutane - Neohexane	2,3,4-Trimethylpentane	2,3-Dimethylbutane	2,3-Dimethylpentane
2,4-Dimethylpentane	2-Chloropentane	2-Methyl-2-Butene	2-Methylheptane
2-Methylhexane	2-Methylpentane - Isohexane	3-Methyl-1-Butene	3-Methylheptane
3-Methylhexane	3-Methylpentane	4-Methyl-1-Pentene	Acetylene
Benzene	Bromomethane	CIS 1,3-dichloropropylene	Carbon Tetrachloride
Chlorobenzene	Chloroform	Cyclohexane	Cyclopentane
Cyclopentene	Ethane	Ethylbenzene	Isobutane
Isopentane	Isoprene	Isopropylbenzene	Methylcyclohexane
Methylcyclopentane	Methylene Chloride	Propane	Propylene
Styrene	Tetrachloroethylene	Toluene	Trichloroethylene
Trichlorofluoromethane	Vinyl Chloride	c-2-Butene	c-2-Hexene
c-2-Pentene	dichlorodifluoromethane	m-Diethylbenzene	m-Ethyltoluene
methyl chloride	n-Butane	n-Decane	n-Heptane
n-Hexane	n-Nonane	n-Octane	n-Pentane
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	Ethylene
2-Butanone*	2-methyl-3-hexanone*	3-hexanone*	3-pentanone*
Butyl Acetate*	Ethyl Acetate*	Methyl Butyl Ketone (MBK)*	Methyl Isobutyl Ketone*
Methyl t-Butyl ether*	Isobutyraldehyde*	n-Propyl Acetate*	
VOCs in Hourly AutoGC Samples			
1-Butene 1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene 1,3-Butadiene 1-Pentene	3-Methylheptane 3-Methylhexane Acetylene Benzene c-2-Butene c-2-Pentene	Isopentane Isoprene Isopropyl Benzene - Cumene Methylcyclohexane Methylcyclopentane	n-Pentane n-Propylbenzene o-Xylene Propane Propylene p-Xylene + m-Xylene

2,2,4-Trimethylpentane 2,2-Dimethylbutane 2,3,4-Trimethylpentane 2,3-Dimethylpentane 2,4-Dimethylpentane 2-Methylheptane 2-Methylhexane	Cyclohexane Cyclopentane Ethane Ethyl Benzene Ethylene Isobutane	n-Butane n-Decane n-Heptane n-Hexane n-Nonane n-Octane	Styrene t-2-Butene t-2-Pentene Toluene
PM_{2.5} Metals on Every-3rd-Day Filter Samples			
Aluminum PM2.5 Antimony PM2.5 Arsenic PM2.5 Barium PM2.5	Cadmium PM2.5 Chromium (total) PM2.5 Cobalt PM2.5	Copper PM2.5 Manganese PM2.5 Molybdenum PM2.5 Nickel PM2.5	Selenium PM2.5 Tin PM2.5 Zinc PM2.5