


TCEQ Interoffice Memorandum

To: Heather Feldman, Regional Director, Region 10 Beaumont
Kathryn Saucedo, Air Section Manager, Region 10 Beaumont
Donna Phillips, Coastal & East Texas Area Director

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

Date: June 21, 2011

Subject: Health Effects Review of 2010 Ambient Air Network Monitoring Data in
Region 10, Beaumont

Conclusions

- The annual average benzene concentration for 2010 at the Port Arthur City Service Center is below the long-term air monitoring comparison value (AMCV) for benzene and would not be expected to cause chronic adverse human health or vegetation effects.
- Exposure to the reported annual average concentrations for all other monitored volatile organic compounds (VOCs) and all 15 metals measured in particulate matter less than 2.5 microns in diameter (PM_{2.5}) would not be expected to cause chronic adverse human health or vegetation effects.
- The new Beaumont Mary site, located at 414 Mary Street in Beaumont, was activated on October 13, 2010.

Background

This memorandum conveys the Toxicology Division's (TD's) evaluation of ambient air sampling conducted at nine sites in Region 10-Beaumont from January 1 through December 31, 2010. Information about the locations of the monitoring sites, monitored compounds, and a hyperlink to more information on the sites is provided in Table 1.

The TCEQ Field Operations Support Division reported the data for all chemicals evaluated in this memorandum. The TD reviewed air monitoring summary results for 46 VOCs from two automated gas chromatograph (autoGC) sites, 84 VOCs from six canister samplers, and 15 metals from one PM_{2.5} filter sampler. All reviewed data met or exceeded TCEQ's 75 percent annual data completeness requirement, except for the recently activated Beaumont Mary site. Meeting this requirement helps to ensure the representativeness of calculated annual average concentrations. Lists of all target analytes at these monitoring locations are included in Attachment A.

On October 13, 2010, the Beaumont Mary site was activated. Although this is a newly constructed site, it is the relocation of the former Carroll Street Park site (deactivated in 2008).

This relocation was necessary to allow for the expansion of an adjacent industrial facility (See *Health Effects Review of 2008 Ambient Air Network Monitoring Data in Region 10, Beaumont* for more information).

The TD evaluated hourly VOC concentrations collected from the two autoGC samplers, Beaumont Downtown and the Nederland High School, for their potential to cause acute (short-term) adverse health effects and odors. In addition, the TD evaluated annual average VOC concentrations to determine their potential to cause chronic (long-term) adverse health and vegetation effects.

The TD also evaluated data collected from 24-hour samples taken every sixth day from seven sampling sites measuring 84 VOCs and/or 15 metals (PM_{2.5}). These 24-hour air samples are designed to provide representative long-term average concentrations of the aforementioned analytes in air. Thus, annual averages from 24-hour samples were evaluated for potential chronic health concerns. On the other hand, 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.

Chemicals were evaluated individually by comparing the reported concentrations to their respective AMCVs. TD compared the measured hourly concentrations for 46 VOCs from the two autoGC monitoring sites to their respective short-term AMCVs. TD compared annual average concentrations of all VOCs and metals (except lead) to their respective long-term AMCVs. More information about AMCVs is available online at: <http://www.tceq.state.tx.us/implementation/tox/AirToxics.html#amcv>. Lead values are compared to the National Ambient Air Quality Standards (NAAQS; <http://www.epa.gov/air/criteria.html>)

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

City and Site Location	County	EPA Site ID	Monitored Compounds
Beaumont, Downtown 1086 Vermont Avenue	Jefferson	48-245- 0009	VOCs (24-hour canister & hourly autoGC)
Port Arthur, West 800 El Vista Rd	Jefferson	48-245- 0011	VOCs (24-hour canister)
Port Neches, Groves 3355 Grandview Avenue & 32nd Street	Jefferson	48-245- 0014	VOCs (24-hour canister)
Port Neches 1225 Merriman Street	Jefferson	48-245- 0017	VOCs (24-hour canister)
Port Arthur, Jefferson County Airport	Jefferson	48-245- 0018	VOCs (24-hour canister)

City and Site Location	County	EPA Site ID	Monitored Compounds
90 th Street			
Port Arthur, City Service Center 201 H.O. Mills Blvd.	Jefferson	48-245-0019	VOCs (24-hour canister)
Port Arthur, Memorial School 2200 Jefferson Dr.	Jefferson	48-245-0021	PM _{2.5} Metals (24-hour filter)
Crosby, Nederland High School Seattle St	Jefferson	48-245-1035	VOCs (hourly autoGC)
Beaumont Mary 414 Mary St	Jefferson	48-245-1050	VOCs (24-hour canister)

Evaluation

VOCs

All hourly and annual VOC concentrations gathered from the autoGCs at the Beaumont, Downtown Lamar University and Nederland High School sites were below their respective short-term and long-term AMCVs (including odor thresholds) and would not be expected to cause acute or chronic health effects or odors.

All reported annual average concentrations of VOC's from 24-hour canister samplers were below their respective long-term AMCVs at all sites. Thus, the annual average VOC concentrations at all sites were below a level of potential long-term health or vegetation concern.

Port Arthur City Service Center

The reported 2010 average benzene concentration at the City Service Center site, based on every sixth-day 24-hour canister samples, was 0.97 ppb_v. Annual average benzene concentrations at this site have decreased significantly from 2000 (1.5 ppb_v) to 2007 (0.7 ppb_v). Despite the net decrease in benzene concentration over the past seven years, the average benzene concentration in 2008 (2.0 ppb_v) showed an increase of 2.8 times over the 2007 (0.7 ppb_v) average concentration and was above TCEQ's long-term AMCV of 1.4 ppb_v (Figure 1). In 2009 and 2010, annual average concentrations decreased to concentrations similar to those observed in 2007 and are no longer considered of potential health concern.

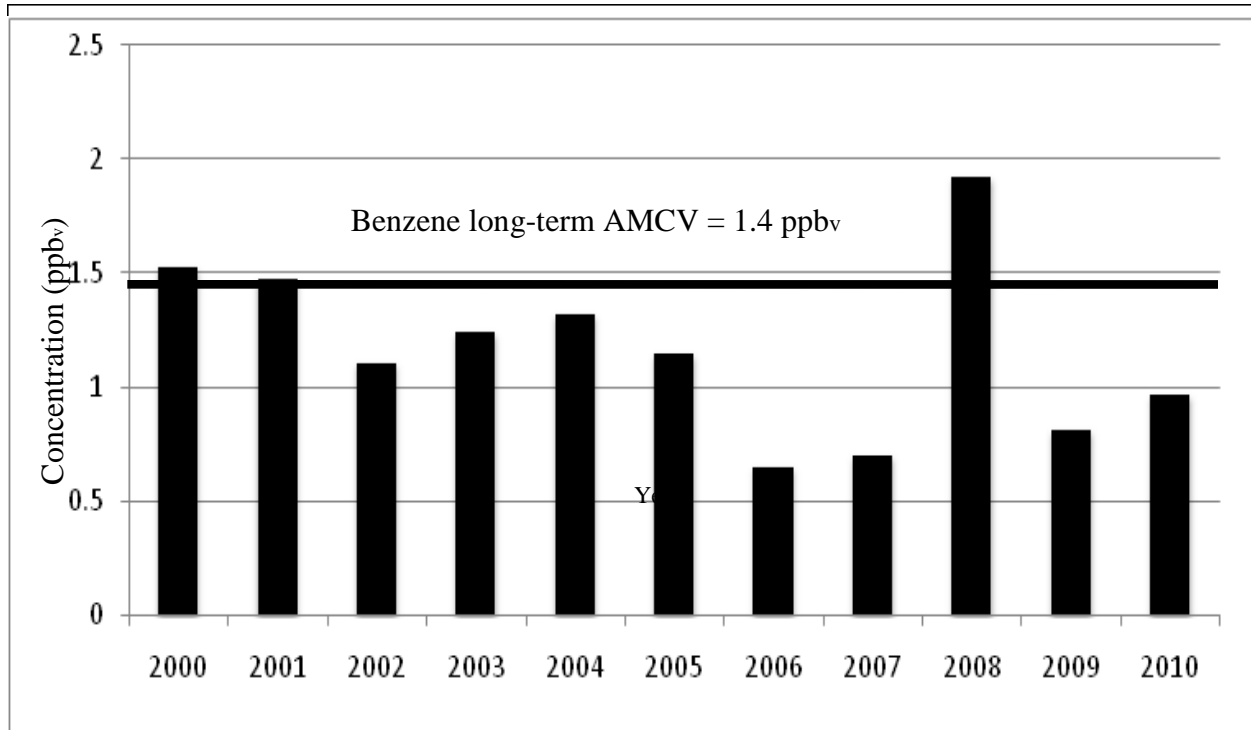


Figure 1. Annual Average Benzene Concentrations – Port Arthur, City Service Center.

Metals

Annual average metal concentrations in PM_{2.5} samples were below their respective long-term AMCVs and would not be expected to cause chronic health effects.

Air Pollutant Watch List (APWL) Areas

There are three APWL areas ([1001](#), [1002](#), and [1003](#)) in Region 10. These areas will be discussed in the annual APWL [report](#). Information provided in this annual evaluation will be considered when status/updates to these watch list areas are re-evaluated.

If you have any questions regarding the contents of this review, please do not hesitate to contact me at (713-422-8976) or via email at carla.kinslow@tceq.texas.gov.

cc (via email):

Casso, Ruben- EPA Region 6, Dallas

Prosperie, Susan- Department of State Health Services

Attachment A

List 1. Target VOC Analytes in Canister Samples

1,1,2,2-Tetrachloroethane	Bromomethane	Methyl Chloroform (1,1,1-
1,1,2-Trichloroethane	Carbon Tetrachloride	Trichloroethane)
1,1-Dichloroethane	Chlorobenzene	Methylcyclohexane
1,1-Dichloroethylene	Chloroform	Methylcyclopentane
1,2,3-Trimethylbenzene	Chloromethane (Methyl	N-Butane
1,2,4-Trimethylbenzene	Chloride)	N-Decane
1,2-Dichloropropane	cis 1,3-Dichloropropene	N-Heptane
1,3,5-Trimethylbenzene	Cis-2-Butene	N-Hexane
1,3-Butadiene	Cis-2-Hexene	N-Nonane
1-Butene	Cis-2-Pentene	N-Octane
1-Hexene+2-Methyl-1-Pentene	Cyclohexane	N-Pentane
1-Pentene	Cyclopentane	N-Propylbenzene
2,2,4-Trimethylpentane	Cyclopentene	N-Undecane
2,2-Dimethylbutane (Neohexane)	Dichlorodifluoromethane	O-Ethyltoluene
2,3,4-Trimethylpentane	Dichloromethane (Methylene	O-Xylene
2,3-Dimethylbutane	Chloride)	P-Diethylbenzene
2,3-Dimethylpentane	Ethane	P-Ethyltoluene
2,4-Dimethylpentane	Ethylbenzene	Propane
2-Chloropentane	Ethylene	Propylene
2-Methyl-2-Butene	Ethylene Dibromide (1,2-	Styrene
2-Methylheptane	Dibromoethane)	Tetrachloroethylene
2-Methylhexane	Ethylene Dichloride (1,2-	Toluene
2-Methylpentane (Isohexane)	Dichloroethane)	Trans-1-3-Dichloropropylene
3-Methyl-1-Butene	Isobutane	Trans-2-Butene
3-Methylheptane	Isopentane (2-Methylbutane)	Trans-2-Hexene
3-Methylhexane	Isoprene	Trans-2-Pentene
3-Methylpentane	Isopropylbenzene (Cumene)	Trichloroethylene
4-Methyl-1-Pentene	M-Diethylbenzene	Trichlorofluoromethane
Acetylene	M-Ethyltoluene	Vinyl Chloride
Benzene	M/P Xylene	

List 2. Target Metal Analytes

Aluminum (PM _{2.5})	Chromium (PM _{2.5})	Molybdenum (PM _{2.5})
Antimony (PM _{2.5})	Cobalt (PM _{2.5})	Nickel (PM _{2.5})
Arsenic (PM _{2.5})	Copper (PM _{2.5})	Selenium (PM _{2.5})
Barium (PM _{2.5})	Lead (PM _{2.5})	Tin (PM _{2.5})
Cadmium (PM _{2.5})	Manganese (PM _{2.5})	Zinc (PM _{2.5})

List 3. Target VOC Analytes in AutoGC

1-Butene	Benzene	n-Heptane
1-Pentene	c-2-Butene	n-Hexane
1,2,3-Trimethylbenzene	c-2-Pentene	n-Nonane
1,2,4-Trimethylbenzene	Cyclohexane	n-Octane
1,3-Butadiene	Cyclopentane	n-Pentane
1,3,5-Trimethylbenzene	Ethane	n-Propylbenzene
2-Methylheptane	Ethyl Benzene	o-Xylene
2-Methylhexane	Ethylene	p-Xylene + m-Xylene
2,2-Dimethylbutane	Isobutane	Propane
2,2,4-Trimethylpentane	Isopentane	Propylene
2,3-Dimethylpentane	Isoprene	Styrene
2,3,4-Trimethylpentane	Isopropyl Benzene - Cumene	t-2-Butene
2,4-Dimethylpentane	Methylcyclohexane	t-2-Pentene
3-Methylheptane	Methylcyclopentane	Toluene
3-Methylhexane	n-Butane	
Acetylene	n-Decane	