

# Texas Commission on Environmental Quality

## INTEROFFICE MEMORANDUM

<b>To:</b>	Georgie Volz, Regional Director, R10 Beaumont Heather Ross, Air Section Manager, R10 Beaumont David Bower, Coastal & East Texas Area Director	<b>Date:</b>	August 25, 2008
<b>From:</b>	Vincent A. Leopold, M.S., Toxicology Section, Chief Engineer's Office		
<b>Subject:</b>	Health Effects Review of Air Monitoring Data Collected in Region 10 – Beaumont during 2007		

### Conclusions

- Exposure to the reported hourly volatile organic compound (VOC) concentrations would not be expected to cause acute health effects or nuisance odors.
- Exposure to the reported annual average concentrations for all monitored VOCs and all 14 metals measured in particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>) would not be expected to cause chronic adverse health effects.
- Long-term average benzene levels at the Port Arthur City Service Center and Beaumont Carroll Street Park monitoring sites are acceptable. Benzene monitoring data at these sites will be considered when associated Air Pollutant Watch List (APWL) listings are re-evaluated.
- The long-term average 1,3-butadiene level at the Port Neches Merriman Street site is acceptable based on the most current assessment of 1,3-butadiene toxicity. 1,3-Butadiene monitoring data at this site will be considered when the associated APWL listing is re-evaluated.

### Background Information

This memorandum conveys the Toxicology Section's evaluation of ambient air sampling conducted at nine sites in Region 10-Beaumont during 2007. 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<sub>2.5</sub> 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. Annual average concentrations were reported from the following: autoGC hourly VOC samples; every-6<sup>th</sup>-day 24-hour canister VOC samples; and every-3<sup>rd</sup>-day 24-hour PM<sub>2.5</sub> metal samples. All data exceeded the 75% 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.

Information about the monitoring sites is summarized below. Chemicals that were reviewed for this evaluation are listed in Attachment 1.

**Region 10 Sites that Provided Air Toxics Monitoring Data Evaluated in this Memorandum**

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

**Evaluation**

VOCs

All hourly VOC concentrations were below applicable health-based comparison levels and odor thresholds and would not be expected to cause acute health effects or nuisance odors.

Annual average VOC concentrations, whether based on hourly or 24-hour measurements, would not be expected to cause chronic health effects.

Metals in PM<sub>2.5</sub>

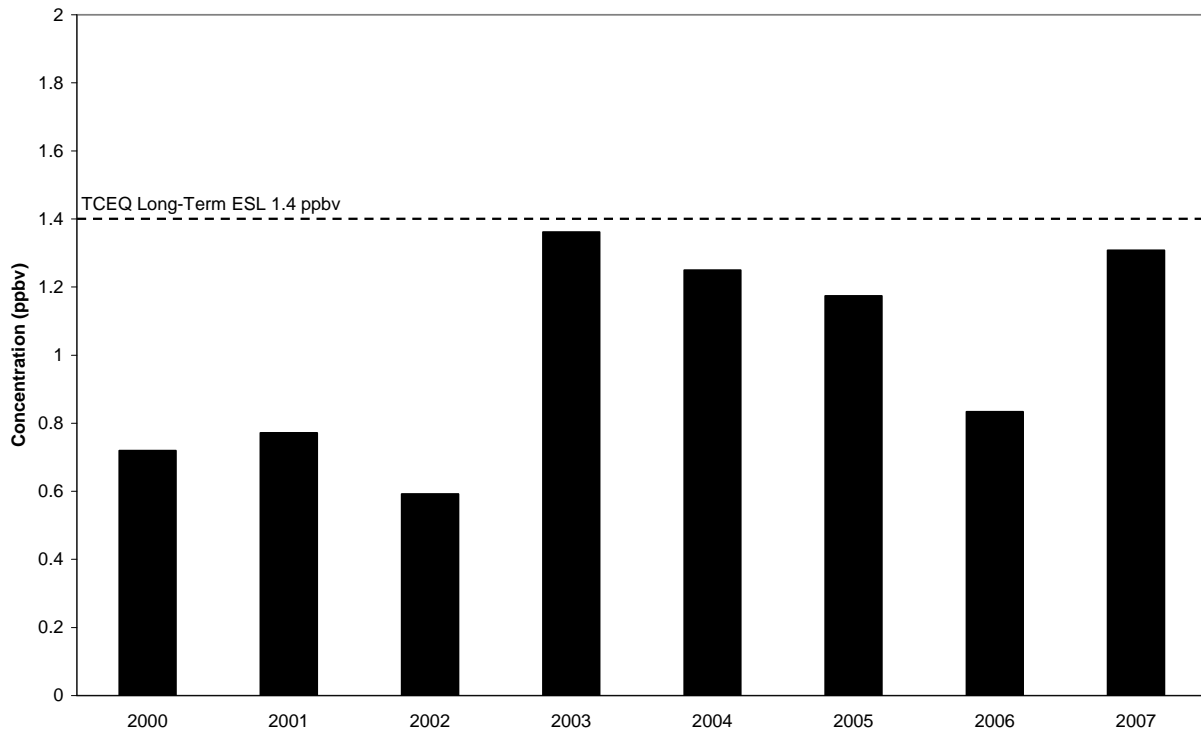
Annual average metal concentrations in PM<sub>2.5</sub> samples were below applicable health-based comparison levels and would not be expected to cause chronic health effects.

Air Pollutant Watch List (APWL) Areas

Following are brief discussions of monitoring data in three APWL areas: benzene in APWL1002 in Beaumont; benzene in APWL1003 in Port Arthur; and for 1,3-butadiene in an APWL area in Port Neches. 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, should be considered the status of those watch list areas are re-evaluated.

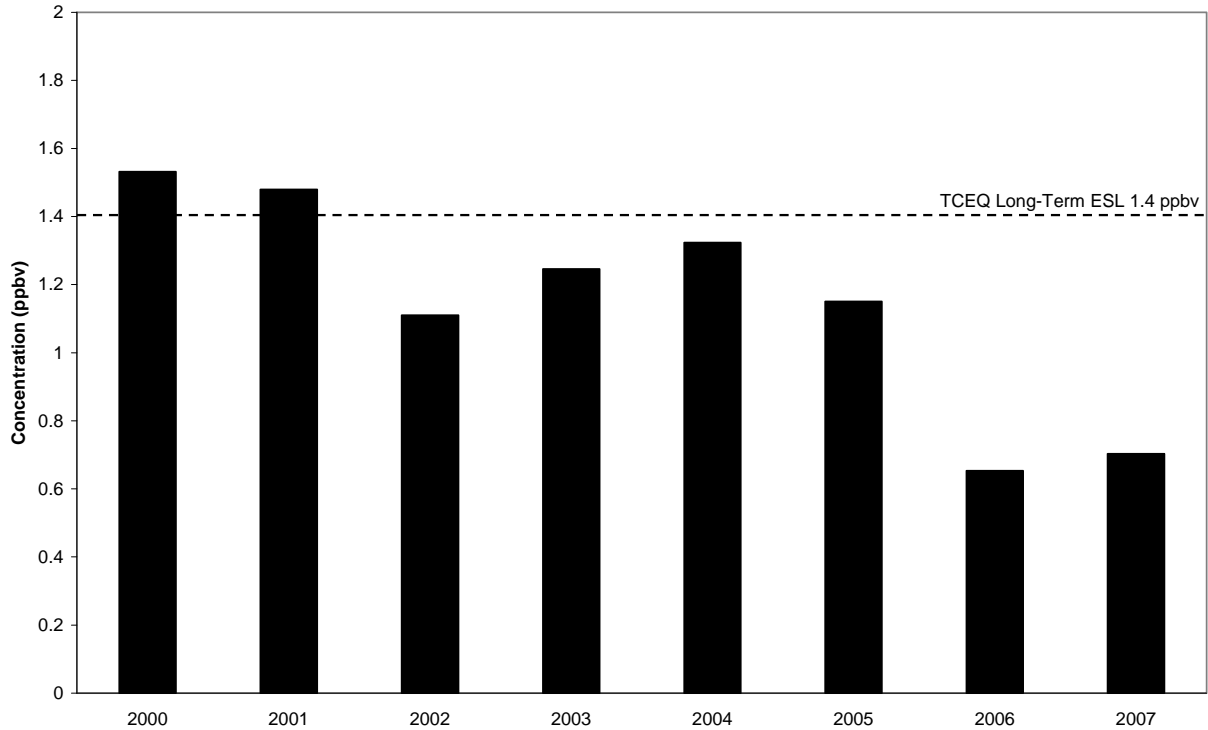
Benzene is listed as a pollutant of interest for [APWL1002](#) because prior to 2006 the annual average benzene levels at Beaumont Carroll Street Park, though trending downward, exceeded the long-term Effects Screening Level (ESL) which was 1 part per billion by volume (ppb<sub>v</sub>) at that time. The annual average benzene level dropped to 0.8 ppb<sub>v</sub> in 2006 but increased to 1.3 ppb<sub>v</sub> in 2007. The long-term average benzene concentration at Carroll Street Park is less than the current ESL of 1.4 ppb<sub>v</sub> which is based on the most up-to-date review of benzene toxicity. Benzene levels at the Beaumont Carroll Street Park site are not a health concern; they are shown on the chart below and will be considered when this APWL listing is re-evaluated.

**Annual Average Benzene Levels (ppbv) at Beaumont Carroll Street Park**



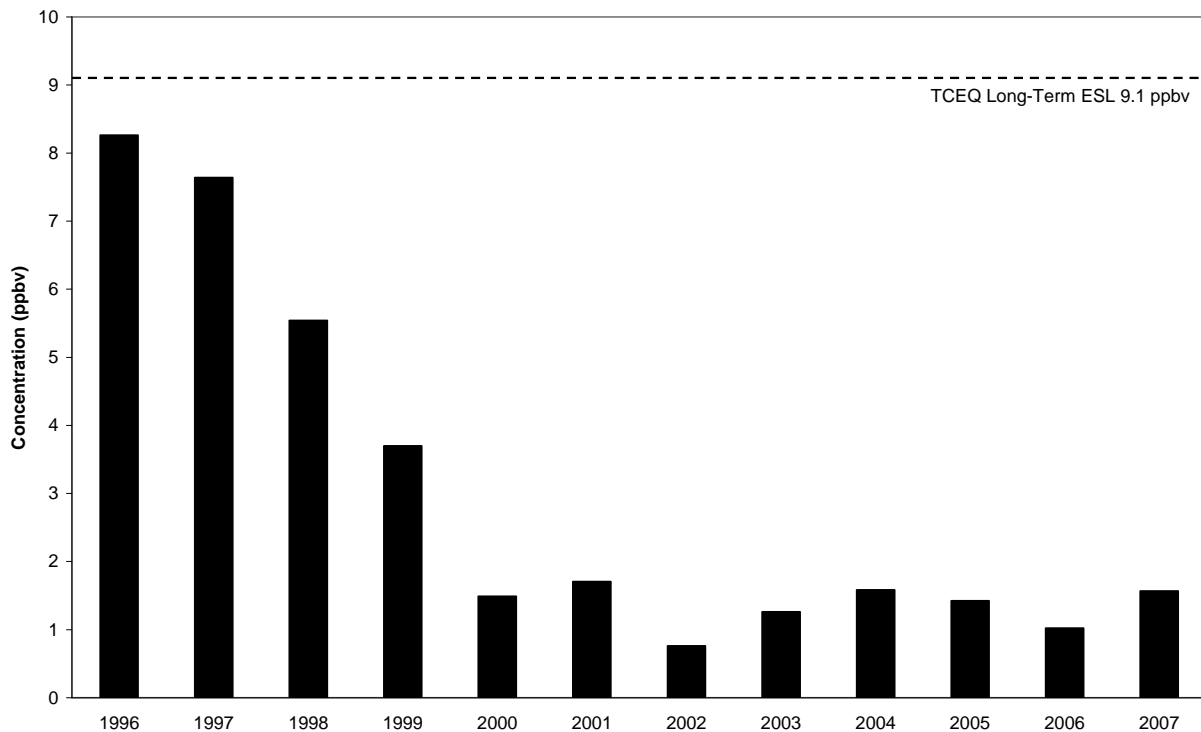
Benzene is listed as a pollutant of interest for [APWL1003](#) because prior to 2006 the annual average benzene levels at the Port Arthur City Service Center exceeded the long-term ESL which was 1 ppb<sub>v</sub> at that time. Average benzene level in 2006 and 2007 dropped to 0.7 ppb<sub>v</sub>, and annual average levels since 2002 have been below the current ESL of 1.4 ppb<sub>v</sub> and are not a health concern. These benzene concentrations are shown on the chart below and should be considered when this APWL listing is re-evaluated.

**Annual Average Benzene Levels (ppbv) at Port Arthur City Service Center**



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 ESL of 5 ppb<sub>v</sub>, and a then-current review of 1,3-butadiene toxicity suggested that levels at this site may not be health protective. The long-term average 1,3-butadiene concentration at the Merriman Street site is less than the current ESL of 9.1 ppb<sub>v</sub>, which is based on the most up-to-date assessment of 1,3-butadiene toxicity (see the [1,3-Butadiene Development Support Document](#)). Annual average 1,3-butadiene levels which are shown on the chart below are not a health concern and will be considered when this APWL listing is re-evaluated.

Annual Average 1,3-Butadiene Levels (ppbv) at the Port Neches Merriman Street Site



If you have any questions regarding this evaluation, please contact me at 512-239-1784 or [vleopold@tceq.state.tx.us](mailto: vleopold@tceq.state.tx.us).

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cc (via email): Casso, Reuben – EPA Region 6

Prosperie, Susan – Department of State Health Services

**Attachment 1**  
**Chemicals Reviewed for this Evaluation**

<b>VOCs in Every-6<sup>th</sup>-Day 24-Hour Canister Samples</b>			
1,1,1-Trichloroethane	2-Methylheptane	Ethylbenzene	isobutyraldehyde
1,1,2,2-tetrachloroethane	2-Methylhexane	Ethylene	m-Diethylbenzene
1,1,2-Trichloroethane	2-Methylpentane	Isobutane	m-Ethyltoluene
1,1-Dichloroethane	2-methyl-3-hexanone	Isopentane	methyl chloride
1,1-Dichloroethylene	3-Methyl-1-Butene	Isoprene	n-Butane
1,2,3-Trimethylbenzene	3-Methylheptane	Isopropylbenzene	n-Decane
1,2,4-Trimethylbenzene	3-Methylhexane	Methyl Butyl Ketone	n-Heptane
1,2-Dibromoethane	3-Methylpentane	Methyl Isobutyl Ketone	n-Hexane
1,2-Dichloroethane	3-hexanone	Methyl t-Butyl Ether	n-Nonane
1,2-Dichloropropane	3-pentanone	Methylcyclohexane	n-Octane
1,3,5-Trimethylbenzene	4-Methyl-1-Pentene	Methylcyclopentane	n-Pentane
1,3-Butadiene	Acetylene	Methylene Chloride	n-Propyl Acetate
1-Butene	Benzene	Propane	n-Propylbenzene
1-Hexene & 2-Methyl-1-Pentene	Bromomethane	Propylene	n-Undecane
1-Pentene	Butyl Acetate	Styrene	o-Ethyltoluene
2,2,4-Trimethylpentane	cis-1,3-dichloropropylene	Tetrachloroethylene	o-Xylene
2,2-Dimethylbutane	Carbon Tetrachloride	Toluene	p-Diethylbenzene
2,3,4-Trimethylpentane	Chlorobenzene	Trichloroethylene	p-Ethyltoluene
2,3-Dimethylbutane	Chloroform	Trichlorofluoromethane	p-Xylene & m-Xylene
2,3-Dimethylpentane	Cyclohexane	Vinyl Chloride	t-2-Butene
2,4-Dimethylpentane	Cyclopentane	c-2-Butene	t-2-Hexene
2-Butanone	Cyclopentene	c-2-Hexene	t-2-Pentene
2-Chloropentane	Ethane	c-2-Pentene	trans-1-3-Dichloropropylene
2-Methyl-2-Butene	Ethyl Acetate	dichlorodifluoromethane	
<b>VOCs in Hourly AutoGC Samples</b>			
1-Butene	2,4-Dimethylpentane	Isobutane	n-Pentane
1-Pentene	3-Methylheptane	Isopentane	n-Propylbenzene
1,2,3-Trimethylbenzene	3-Methylhexane	Isoprene	o-Xylene
1,2,4-Trimethylbenzene	Acetylene	Isopropyl Benzene	p-Xylene & m-Xylene
1,3-Butadiene	Benzene	Methylcyclohexane	Propane
1,3,5-Trimethylbenzene	c-2-Butene	Methylcyclopentane	Propylene
2-Methylheptane	c-2-Pentene	n-Butane	Styrene
2-Methylhexane	Cyclohexane	n-Decane	t-2-Butene
2,2-Dimethylbutane	Cyclopentane	n-Heptane	t-2-Pentene
2,2,4-Trimethylpentane	Ethane	n-Hexane	Toluene
2,3-Dimethylpentane	Ethyl Benzene	n-Nonane	
2,3,4-Trimethylpentane	Ethylene	n-Octane	
<b>PM<sub>2.5</sub> Metals on Every-3<sup>rd</sup>-Day Filter Samples</b>			
Aluminum PM2.5	Cadmium PM2.5	Copper PM2.5	Selenium PM2.5
Antimony PM2.5	Chromium (total) PM2.5	Manganese PM2.5	Tin PM2.5
Arsenic PM2.5	Cobalt PM2.5	Molybdenum PM2.5	Zinc PM2.5
Barium PM2.5		Nickel PM2.5	