



TCEQ Interoffice Memorandum

To: Kathryn Saucedo, Regional Director, Region 10, Beaumont

From: Allison Jenkins, MPH 
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Date: November 10, 2017

Subject: Health Effects Review of 2016 Ambient Air Network Monitoring Data in Region 10, Beaumont

Conclusions

- All reported annual average concentrations for all monitored volatile organic compounds (VOCs) were below their air monitoring comparison values (AMCVs) and would not be expected to cause long-term (chronic) adverse human health or vegetation effects.
- All hourly VOC concentrations gathered from automated gas chromatograph (autoGC) monitoring sites were below their respective short-term AMCVs (including odor thresholds) and would not be expected to cause adverse human health effects.
- All 24-hour concentrations for 1,3-butadiene, 2,2-dimethylbutane, 2,3-dimethylbutane, 2-methylpentane, 3-methylpentane, benzene, ethylene dichloride, and n-hexane in canister samples were below their 24-hour AMCVs and would not be expected to cause adverse health effects.

Background

This memorandum conveys the Toxicology Division's (TD's) evaluation of ambient air sampling conducted at a total of 16 monitoring locations in Region 10-Beaumont from January 1 through December 31, 2016. Information about the locations of the monitoring sites, monitored compounds, and hyperlinks to more information on the sites is provided in Table 1.

The Texas Commission on Environmental Quality (TCEQ) Monitoring Division, the South East Texas Regional Planning Commission (SETRPC), or Flint Hills Resources in Port Arthur reported the data for all chemicals evaluated in this memorandum. Lists of all target analytes at these monitoring locations are included in Attachment A.

Chemicals were evaluated individually by comparing the reported concentrations to their respective AMCVs. All 1-hour concentrations collected from the ambient air monitoring sites in Table 1 were evaluated for their potential to cause acute (short-term) adverse health and welfare (odor potential and vegetation) effects. The TD calculated annual averages of these 1-hour data to determine their potential to cause chronic (long-term) adverse health and vegetation effects.

VOC data from 24-hour canister samples taken every sixth- (TCEQ) or 12th-day (SETRPC) were also evaluated. Because short-term or peak concentrations are not necessarily captured by 24-hour samples, daily concentrations have limited use in evaluating the potential for acute health effects. In order to be able to evaluate 24-hour monitoring data more fully, TCEQ has developed 24-hour AMCVs for 1,3-butadiene, 2,2-dimethylbutane, 2,3-dimethylbutane, 2-methylpentane, 3-methylpentane, benzene, ethylene dichloride, and n-hexane. As such, 24-hour samples were compared to the available TCEQ 24-hour AMCVs for these chemicals. When averaged over at least one year, these 24-hour air samples are representative of long-term average concentrations in air. Therefore, the TD compared annual average concentrations calculated from 24-hour samples for each target analyte to their respective long-term AMCVs to evaluate the potential for chronic health and vegetation effects. More

information about AMCVs is available online at [TCEQ Air Toxics](#) or by contacting the TD (512-239-1795).

The majority of TCEQ, SETRPC, and Flint Hills monitoring data reviewed met or exceeded TCEQ's 75 percent annual data completeness objective. The following analytes did not meet this objective:

- Acetylene at Nederland High School (5205 1-hour measurements out of a possible 8784 measurements);
- 1,2,3-Trimethylbenzene at Beaumont Downtown (433 1-hour measurements out of a possible 8784 measurements) and Nederland High School (1390 1-hour measurements out of a possible 8784 measurements);
- 1,2,4-Trimethylbenzene at Nederland High School (5213 1-hour measurements out of a possible 8784 measurements);
- 1,3,5-Trimethylbenzene at Nederland High School (5259 1-hour measurements out of a possible 8784 measurements);
- n-Decane at Nederland High School (5262 1-hour measurements out of a possible 8784 measurements);
- n-Hexane at Nederland High School (5814 1-hour measurements out of a possible 8784 measurements); and
- Styrene at Port Arthur Memorial School (6433 1-hour measurements out of a possible 8784 measurements).

Meeting the data completeness objective helps to ensure the representativeness of calculated annual average concentrations. Because these analytes did not meet the completeness objective, they were excluded from evaluation of the potential for long-term effects.

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

Site Location	Type of Monitor	EPA Site Number	Network	Monitored Compounds
Beaumont Downtown 1086 Vermont Ave, Beaumont	24-hour every 6 th - day canister & hourly autoGC	48-245-0009	TCEQ	84 VOCs (canister); 46 VOCs (autoGC)
Port Arthur West 623 Ellias St, Port Arthur	24-hour, every 6 th - day canister	48-245-0011	TCEQ	84 VOCs
Groves 3355 Grandview Ave & 32 nd St, Port Neches	24-hour, every 6 th - day canister	48-245-0014	TCEQ	84 VOCs
Port Neches Avenue L 605 Avenue L, Port Neches	24-hour, every 6 th - day canister	48-245-0017	TCEQ	84 VOCs
Jefferson County Airport 90 th St, Port Arthur	24-hour, every 6 th - day canister	48-245-0018	TCEQ	84 VOCs

Site Location	Type of Monitor	EPA Site Number	Network	Monitored Compounds
City Service Center/PA 201 H.O. Mills Blvd, Port Arthur	24-hour, every 6 th -day canister	48-245-0019	TCEQ	84 VOCs
Nederland High School 1800 N. 18 th St, Nederland	hourly autoGC	48-245-1035	TCEQ	46 VOCs
SETRPC West Orange (30.084, -93.764)	24-hour, every 12 th -day canister	--	SETRPC	53 VOCs
SETRPC 42 Mauriceville , Intersection of Texas Highways 62 and 12, Port Arthur	24-hour, every 12 th -day canister	48-361-1100	SETRPC	53 VOCs
SETRPC 43 Jefferson Co Airport (29.943, -94.001)	24-hour, every 12 th -day canister	48-245-0102	SETRPC	53 VOCs
SETRPC Beaumont (30.080, -94.094)	24-hour, every 12 th -day canister	--	SETRPC	53 VOCs
SETRPC Port Neches (29.991, -93.953)	24-hour, every 12 th -day canister	--	SETRPC	53 VOCs
SETRPC Cove School (30.071, -93.739)	24-hour, every 12 th -day canister	--	SETRPC	53 VOCs
SETRPC Port Arthur (29.868, -93.951)	hourly H ₂ S and carbon disulfide	48-245-0628	SETRPC	H ₂ S, carbon disulfide
Port Arthur Memorial School , 220 Jefferson Dr, Port Arthur (29.923, -93.909)	hourly autoGC	48-245-0021	SETRPC	benzene, 1,3-butadiene, styrene
Flint Hills Resources , Levee Rd Monitor	hourly autoGC	--	Flint Hills Resources	benzene, 1,3-butadiene

Evaluation

VOCs

All hourly and annual average VOC concentrations from the Beaumont Downtown, Port Arthur Memorial School, Nederland High School, and Flint Hills Resources autoGCs were below their respective short-term and long-term AMCVs (including odor thresholds) and would not be expected to cause adverse health or welfare effects. Twenty four-hour concentrations of 1,3-butadiene, benzene, and ethylene dichloride were below their 24-hour AMCVs and would not be expected to cause adverse health effects.

All annual average VOC concentrations from 24-hour canister samplers were below their respective long-term AMCVs at all sites and were below a level of potential long-term health or vegetation concern. Twenty four-hour concentrations of 1,3-butadiene, 2,2-dimethylbutane, 2,3-dimethylbutane, 2-methylpentane, 3-methylpentane, benzene, ethylene dichloride, and n-hexane were below their 24-hour AMCVs and would not be expected to cause adverse health effects.

Sulfur Compounds

H₂S

There were no exceedances of the state regulatory standard for H₂S at the SETRPC Port Arthur site in 2016.

Carbon Disulfide

All hourly and annual average carbon disulfide concentrations at the SETRPC Port Arthur and the six SETRPC canister sites were below the short- and long-term effects screening level for carbon disulfide and would not be expected to cause adverse health or welfare effects.

If you have any questions regarding the contents of this review, please do not hesitate to contact Allison Jenkins (512-239-0656; Allison.Jenkins@tceq.texas.gov) or Lindsey Jones (512-239-1784; Lindsey.Jones@tceq.texas.gov).

Attachment A

List 1 - Target VOC Analytes in TCEQ Canister Samples

1,1,2,2-Tetrachloroethane	Bromomethane	m/p Xylene
1,1,2-Trichloroethane	Carbon tetrachloride	Methyl chloroform (1,1,1-Trichloroethane)
1,1-Dichloroethane	Chlorobenzene	Methylcyclohexane
1,1-Dichloroethylene	Chloroform	Methylcyclopentane
1,2,3-Trimethylbenzene	Chloromethane (Methyl chloride)	n-Butane
1,2,4-Trimethylbenzene	c-1,3-Dichloropropene	n-Decane
1,2-Dichloropropane	c-2-Butene	n-Heptane
1,3,5-Trimethylbenzene	c-2-Hexene	n-Hexane
1,3-Butadiene	c-2-Pentene	n-Nonane
1-Butene	Cyclohexane	n-Octane
1-Hexene+2-Methyl-1-pentene	Cyclopentane	n-Pentane
1-Pentene	Cyclopentene	n-Propylbenzene
2,2,4-Trimethylpentane	Dichlorodifluoromethane	n-Undecane
2,2-Dimethylbutane (Neohexane)	Dichloromethane (Methylene chloride)	o-Ethyltoluene
2,3,4-Trimethylpentane	Ethane	o-Xylene
2,3-Dimethylbutane	Ethylbenzene	p-Diethylbenzene
2,3-Dimethylpentane	Ethylene	p-Ethyltoluene
2,4-Dimethylpentane	Ethylene dibromide (1,2-Dibromoethane)	Propane
2-Chloropentane	Ethylene dichloride (1,2-Dichloroethane)	Propylene
2-Methyl-2-butene	Isobutane	Styrene
2-Methylheptane	Isopentane (2-Methylbutane)	Tetrachloroethylene
2-Methylhexane	Isoprene	Toluene
2-Methylpentane (Isohexane)	Isopropylbenzene (Cumene)	t-1-3-Dichloropropene
3-Methyl-1-butene	m-Diethylbenzene	t-2-Butene
3-Methylheptane	m-Ethyltoluene	t-2-Hexene
3-Methylhexane		t-2-Pentene
3-Methylpentane		Trichloroethylene
4-Methyl-1-pentene		Trichlorofluoromethane
Acetylene		Vinyl chloride
Benzene		

List 2 - Target VOC Analytes in AutoGC

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

List 3 - Target VOC Analytes in SETRPC Canister Samples

1,1,1-Trichloroethane	Carbon disulfide	Naphthalene
1,2,4-Trimethylbenzene	Carbon tetrachloride	n-Butane
1,2-Dichloroethane	Chlorobenzene	n-Decane
1,3-Butadiene	Chloroform	n-Hexane
1-Butanol	Cumene	n-Octane
1-Hexene	Cyclohexane	n-Pentane
1-Octene	Ethane	o-Xylene
1-Pentene	Ethylbenzene	Propane
2,2,4-Trimethylpentane	Ethylene	Propylene
2-Butanone	Hexanal	p-Xylene + m-Xylene
3-Methylpentane	Isobutene + 1-Butene	Styrene
Acetaldehyde	Isohexane	t-Butylbenzene
Acetone (+)	Isopentane	Toluene
Acetonitrile	Isoprene	Trichloroethylene
a-Pinene	Methanol (+)	Trichlorofluoromethane
Benzene	Methyl-t-butylether	Vinyl acetate
b-Pinene	Methylcyclohexane	Vinyl chloride
Butyl acrylate	Methylene chloride	