


# Texas Commission on Environmental Quality

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## INTEROFFICE MEMORANDUM

**To:** Tony Walker, Director  
TCEQ Region 4, Dallas/Fort Worth  
Alyssa Taylor, Air Section Manager  
TCEQ Region 4, Dallas/Fort Worth

**Date:** May 4, 2010

**From:** Lindsey Jones, MS   
Toxicology Division  
Chief Engineer's Office

**Subject:** Toxicological Evaluation of Results from an Ambient Air Sample for Volatile Organic Compounds Collected Approximately 0.5 Miles East of the Intersection of Pearson Road and FM 730 near Weatherford, Parker County, Texas  
Sample Collected on November 19, 2009, ACL No. 091121

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### Key Points

- Reported concentrations of target volatile organic compounds (VOCs) were either not detected or were detected below levels of short-term health and/or welfare concern.
- The detected concentration of benzene did not exceed the short-term, health-based air monitoring comparison value (AMCV), but could potentially contribute to an elevated long-term (i.e., lifetime) cumulative exposure. The TD recommends continued surveillance and characterization of emissions from this type of source to help determine if these concentrations are representative of typical ambient conditions.

### Background

On November 19, 2009, a Texas Commission on Environmental Quality (TCEQ) Region 4 Air Investigator collected a 30-minute canister sample approximately 0.5 miles east of the intersection of Pearson Road and FM 730 near Weatherford, Parker County as a follow-up to a mobile monitoring investigation. The investigator noted very light and intermittent natural gas odors while sampling. Sampling conditions were clear, with a temperature of 65 °F, a relative humidity of 56%, and southerly and southeasterly winds at 10 to 15 mph. The nearest residence was approximately 1,200 ft from the sampling location. The sampling site was approximately 70 feet downwind of four condensate tanks near the Crosstex North Texas Gathering - Kemp Compressor Station for the majority of the sampling period. The sample was sent to the TCEQ laboratory in Austin, Texas and analyzed for a range of VOCs. Table 1 contains a list of the target analytes that were evaluated in this review. The VOC concentrations were reported in parts per billion by volume (ppb<sub>v</sub>). Please note that the available canister technology can not capture all chemicals that may have an odor threshold value.

### Results

Due to high levels of ethane, the canister sample had to be diluted between four and 18 times (see dilution flags in Attachment A), so some of the chemical concentrations were reported as estimated. Reported VOC concentrations were compared to TCEQ short-term AMCVs. Short-

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term AMCVs are guidelines used to evaluate ambient concentrations of a chemical in air and determine its potential to result in adverse health effects, adverse vegetative effects, or odors. In general, AMCVs are set to provide a margin of safety, and are set well below levels at which adverse health effects are reported in the scientific literature. If a chemical concentration in ambient air is less than its AMCV, no adverse effects or odors are expected to occur. If a chemical concentration exceeds its AMCV it does not necessarily mean that adverse effects will occur, but rather that further evaluation is warranted.

## **Evaluation**

All of the 84 VOCs were either not detected or were detected below their respective short-term AMCVs. Exposure to levels of VOCs measured in this sample would not be expected to cause short-term adverse health effects, adverse vegetative effects, or odors.

The TD also recognizes that the detected concentration of benzene (12 ppb<sub>v</sub>) did not exceed the short-term, health-based AMCV and is below a level of short-term health concern. This concentration, however, is considered elevated. Elevated short-term levels could be of potential concern due to their contribution to long-term (i.e., lifetime) cumulative exposure levels because benzene is a known human carcinogen. The TD recommends continued surveillance and characterization of emissions from this type of source to help determine if these concentrations are representative of typical ambient conditions.

Please call me at (512) 239-1784 if you have any questions regarding this evaluation.

**Table 1: Target Analytes for Canister Samples**

ethane	4-methyl-1-pentene	t-1,3-dichloropropylene
ethylene	1,1-dichloroethane	1,1,2-trichloroethane
acetylene	cyclopentane	2,3,4-trimethylpentane
propane	2,3-dimethylbutane	toluene
propylene	2-methylpentane	2-methylheptane
dichlorodifluoromethane	3-methylpentane	3-methylheptane
methyl chloride	2-methyl-1-pentene + 1-hexene	1,2-dibromoethane
isobutane	n-hexane	n-octane
vinyl chloride	chloroform	tetrachloroethylene
1-butene	t-2-hexene	chlorobenzene
1,3-butadiene	c-2-hexene	ethylbenzene
n-butane	1,2-dichloroethane	m & p-xylene
t-2-butene	methylcyclopentane	styrene
bromomethane	2,4-dimethylpentane	1,1,2,2-tetrachloroethane
c-2-butene	1,1,1-trichloroethane	o-xylene
3-methyl-1-butene	benzene	n-nonane
isopentane	carbon tetrachloride	isopropylbenzene
trichlorofluoromethane	cyclohexane	n-propylbenzene
1-pentene	2-methylhexane	m-ethyltoluene
n-pentane	2,3-dimethylpentane	p-ethyltoluene
isoprene	3-methylhexane	1,3,5-trimethylbenzene
t-2-pentene	1,2-dichloropropane	o-ethyltoluene
1,1-dichloroethylene	trichloroethylene	1,2,4-trimethylbenzene
c-2-pentene	2,2,4-trimethylpentane	n-decane
methylene chloride	2-chloropentane	1,2,3-trimethylbenzene
2-methyl-2-butene	n-heptane	m-diethylbenzene
2,2-dimethylbutane	c-1,3-dichloropropylene	p-diethylbenzene
cyclopentene	methylcyclohexane	n-undecane

## Attachment A

1/25/2010

### Texas Commission on Environmental Quality

Laboratory and Quality Assurance Section

P.O. Box 13087

Austin, Texas 78711

(512) 239-1716

### Laboratory Analysis Results

ACL Number: 091121

ACL Lead: Karen Bachtel

Region: T04

Date Received: 11/23/2009

Facility(ies) Sampled	City	County	Facility Type
Crosstex North Texas Gathering - Kemp	Weatherford	Parker	Natural Gas

#### Laboratory Procedure(s) Performed:

Analysis: AMOR006

Determination of VOC Canisters by GC/MS Using Modified Method TO-15

#### Procedure:

Prior to analysis, subatmospheric samples are pressurized to twice the collected volume using a sample dilution system. For analysis, a known volume of a sample is directed from the canister into a multitrapp cryogenic concentrator. Internal standards are added to the sample stream prior to the trap. The concentrated sample is thermally desorbed and carried onto a GC column for separation. The analytical strategy involves using a GC with dual columns that are coupled to a mass selective detector (MSD) and a flame ionization detector (FID). Mass spectra for individual peaks in the total ion chromatogram are then used for target compound identification and quantitation. The fragmentation pattern is compared with stored spectra taken under similar conditions in order to identify the compound. For any given compound, the intensity of the quantitation fragment is compared with the system response to the fragment for known amounts of the compound. This establishes the compound concentration in the sample. For non-target compound peaks which are at least one-half the height of the internal standard, a library search is performed in an attempt to identify the compound solely upon fracture patterns. These tentatively identified compounds (TIC's) are reported as a sample specific footnote. Accurate quantitation of TICs is not possible. The FID is used for the quantitation of ethane, ethylene, acetylene, propylene and propane and identification is based on matching retention times of standards containing known analytes.

#### Sample(s) Received

Field ID Number: 20368

Laboratory Sample Number: 091121-0001

Sampled by: Luke Jones

Sampling Site: Northeast of Weatherford, TX. 1/4 mile East of Date & Time Sampled: 11/19/09 11:36:00 Valid Sample: Yes

#### Comments:

Canister #20368 was used to collect a 30 minute sample using critical orifice (FO-75). Sample was taken on northern property of Kemp Compressor Station. Winds were South at 10-15 mph with gusts to 20 mph. Temperature was 65° F.

#### Sample(s) Screening

1/25/2010

**Texas Commission on Environmental Quality**

Laboratory and Quality Assurance Section

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**Laboratory Analysis Results**

ACL Number: 091121

Sample(s) Screening

*Jy* ~~As a routine procedure, the data from this (these) sample(s) have been screened. No target compounds were detected at or above the Appropriate Comparison Value. Therefore, the TCEQ's Toxicology Division expects no adverse health effects or odors and will not review the data further.~~ Please note that this analytical technique is not capable of measuring all compounds which might have the potential to cause adverse health effects or odors. For questions on the analytical procedures please contact the laboratory manager at (512)-239-5853. If further health effects evaluation is desired please contact the Toxicology Division at (512)-239-1795.

Analyst: Jaydeep Patel  
Jaydeep Patel

Date: 01/25/10

Reviewed By: Karen Bachtel  
Karen Bachtel

Date: 1/25/10

Section Manager: Steve Stubbs for SS  
Steve Stubbs

Date: 1/25/10

**Laboratory Analysis Results**

ACL Number: 091121

Analysis Code: AMOR006

Note: Results are reported in units of parts per billion by volume (ppbv)

Lab ID	091121-0001								
Field ID	20368								
Canister ID	20368								
Analysis Date	11/24/09								
Compound	AMCV	<del>Est.</del>	LOD	Concentration	SDL	Flags**	Concentration	SDL	Flags**
ethane			0.50	1100	1.0	D3			
ethylene			0.50	2.7	1.0	D1			
acetylene			0.50	0.26	1.0	J,D1			
propane			0.50	360	1.0	D1			
propylene	5000	<del>60000</del>	0.50	0.37	1.0	J,D1			
dichlorodifluoromethane			0.20	0.54	0.41	L,D1			
methyl chloride			0.20	0.57	0.41	L,D1			
isobutane	2040	<del>2000</del>	0.23	54	0.47	D1,A1			
vinyl chloride	26,000	<del>50</del>	0.17	ND	0.35	D1			
1-butene			0.20	0.43	0.41	L,D1			
1,3-butadiene	230	<del>50</del>	0.27	ND	0.55	D1			
n-butane			0.20	110	0.41	D2			
t-2-butene			0.18	ND	0.37	D1			
bromomethane			0.27	ND	0.55	D1			
c-2-butene			0.27	0.06	0.55	J,D1			
3-methyl-1-butene			0.23	ND	0.47	D1			
isopentane			0.27	42	0.55	D1			
trichlorofluoromethane			0.29	0.24	0.39	J,D1			
1-pentene			0.27	ND	0.55	D1			
n-pentane			0.27	46	0.55	D1			
isoprene			0.27	ND	0.55	D1			
t-2-pentene			0.27	0.04	0.55	J,D1			
1,1-dichloroethylene			0.18	ND	0.37	D1			
c-2-pentene			0.25	ND	0.51	D1			
methylene chloride			0.14	0.06	0.28	J,D1			
2-methyl-2-butene			0.23	0.03	0.47	J,D1			
2,2-dimethylbutane			0.21	0.88	0.43	L,D1			
cyclopentane			0.20	ND	0.41	D1			
4-methyl-1-pentene			0.22	ND	0.45	D1			
1,1-dichloroethane			0.19	ND	0.39	D1			
cyclopentane			0.27	1.1	0.55	L,D1			
2,3-dimethylbutane	490	<del>1000</del>	0.28	1.3	0.57	D1			
2-methylpentane			0.27	14	0.55	D1			
3-methylpentane			0.23	8.0	0.47	D1			
2-methyl-1-pentene + 1-hexene			0.20	ND	0.41	D1			
n-hexane			0.20	20	0.41	D1			
chloroform			0.21	ND	0.43	D1			
t-2-hexene	500	<del>20</del>	0.27	ND	0.55	D1			
c-2-hexene	500	<del>20</del>	0.27	ND	0.55	D1			
1,2-dichloroethane			0.27	ND	0.55	D1			
methylcyclopentane			0.27	4.3	0.55	D1			
2,4-dimethylpentane	850	<del>910</del>	0.27	0.80	0.55	L,D1			
1,1,1-trichloroethane			0.26	ND	0.53	D1			
benzene			0.27	12	0.55	D1			
carbon tetrachloride			0.27	0.10	0.55	J,D1			
cyclohexane			0.24	7.9	0.49	D1			
2-methylhexane			0.27	7.2	0.55	D1			
2,3-dimethylpentane	850	<del>910</del>	0.26	1.3	0.53	D1			

**Laboratory Analysis Results**

ACL Number: 091121

Analysis Code: AMOR006

Note: Results are reported in units of parts per billion by volume (ppbv)

Lab ID	091121-0001			Concentration	SDL	Flags**	Concentration	SDL	Flags**
Compound	ESL	LOD							
3-methylhexane	750	0.20	7.3	0.41	D1				
1,2-dichloropropane	100	0.17	ND	0.35	D1				
trichloroethylene	100	0.29	ND	0.59	D1				
2,2,4-trimethylpentane	750	0.24	ND	0.49	D1				
2-chloropentane	190	0.27	ND	0.55	D1				
n-heptane	670	0.25	12	0.51	D1				
c-1,3-dichloropropylene	10	0.20	ND	0.41	D1				
methylcyclohexane	150	0.26	11	0.53	D1				
t-1,3-dichloropropylene	10	0.20	ND	0.41	D1				
1,1,2-trichloroethane	100	0.21	ND	0.43	D1				
2,3,4-trimethylpentane	750	0.24	0.04	0.49	J,D1				
toluene	170	0.27	26	0.55	D2				
2-methylheptane	750	0.20	3.4	0.41	D1				
3-methylheptane	750	0.23	2.4	0.47	D1				
1,2-dibromoethane	0.50	0.20	0.02	0.41	J,D1				
n-octane	750	0.19	3.4	0.39	D1				
tetrachloroethylene	770	0.24	ND	0.49	D1				
chlorobenzene	100	0.27	ND	0.55	D1				
ethylbenzene	460	0.27	0.66	0.55	L,D1				
m & p-xylene	80	0.27	7.4	0.55	D1				
styrene	25	0.27	ND	0.55	D1				
1,1,2,2-tetrachloroethane	10	0.20	ND	0.41	D1				
o-xylene	380	0.27	1.3	0.55	D1				
n-nonane	2000	0.22	0.98	0.45	L,D1				
isopropylbenzene	100	0.24	0.04	0.49	J,D1				
n-propylbenzene	3.8	0.27	0.05	0.55	J,D1				
m-ethyltoluene	18	0.11	0.15	0.22	J,D1				
p-ethyltoluene	8.3	0.16	0.05	0.32	J,D1				
1,3,5-trimethylbenzene	250	0.25	0.17	0.51	J,D1				
o-ethyltoluene	250	0.13	0.04	0.26	J,D1				
1,2,4-trimethylbenzene	250	0.27	0.24	0.55	J,D1				
n-decane	680	0.27	0.16	0.55	J,D1				
1,2,3-trimethylbenzene	250	0.27	0.04	0.55	J,D1				
m-diethylbenzene	70	0.27	ND	0.55	D1				
p-diethylbenzene	0.39	0.27	ND	0.55	D1				
n-undecane	550	0.27	0.05	0.55	J,D1				

### Laboratory Analysis Results

ACL Number: 091121

Analysis Code: AMOR006

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Note: Results are reported in units of parts per billion by volume (ppbv)

~~ESL - Effects Screening Level:~~ *AMCV - Air Monitoring Comparison Value. <sup>pp</sup>*

(Short-term Health and Odor Based in units of ppbv)

LOD - Limit of Detection.

ND - not detected

NQ - concentration can not be quantified.

SDL - Sample Detection Limit (MDL adjusted for dilutions).

INV - Invalid.

J - Reported concentration is below SDL.

L - Reported concentration is at or above the SDL and is below the lower limit of quantitation.

E - Reported concentration exceeds the upper limit of instrument calibration.

M - Result modified from previous result.

\* SDL is equal to LOD

\*\* Quality control flags explanations are listed on the last page of this report.

# Compound concentration is equal to or greater than the ~~Effects Screening Level~~ *AMCV. <sup>pp</sup>*

TCEQ laboratory customer support may be reached at [kbachtel@tceq.state.tx.us](mailto:kbachtel@tceq.state.tx.us)

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## Laboratory Analysis Results

ACL Number: 091121

Analysis Code: AMOR006

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### Quality Control Notes:

Quality control notes for samples 091121-0001,

A1-Not all associated QC data met accuracy specification. Data may be an average 17 percent high with a range of +5 to +31 percent.

- D1 - sample was diluted 4.06 times to determine the compound concentrations.
- D2 - sample was diluted 8.16 times to determine the compound concentrations.
- D3 - sample was diluted 18.28 times to determine the compound concentrations.

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