TCEQ Interoffice Memorandum

To: Tony Walker

Director, TCEQ Region 4, Dallas/Fort Worth

Alyssa Taylor

Special Assistant to the Regional Director, TCEQ Region 4, Dallas/Fort Worth

From: Allison Jenkins, MPH

Toxicology Division, Office of the Executive Director

Date: April 2, 2014

Subject: Toxicological Evaluation of Results from an Ambient Air Sample for Volatile Organic Compounds Collected Downwind of Eagle Ridge, Furst Ranch J-1 JV2 Pad (Latitude 33.1700692, Longitude -97.1652745) near Argyle, Denton County, Texas

Sample Collected on January 24, 2014, Request Number 1402005 (Lab Sample 1402005-001)

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.

Background

On January 24, 2014, a Texas Commission on Environmental Quality (TCEQ) Region 4 air investigator collected a 30-minute canister sample (Lab Sample 1402005-001) downwind of Eagle Ridge, Furst Ranch J-1 JV2 Pad near Argyle, Denton County, Texas (Latitude 33.1700692, Longitude -97.1652745). The sample was collected in response to a complaint. The investigator experienced no health effects or odors while sampling. Meteorological conditions measured at the site or nearest stationary ambient air monitoring site indicated that the ambient temperature was 39.9°F with a relative humidity of 20%, and winds were from the southwest (230°) at 6 to 15 miles per hour. The sampling site was 100 feet or less from the possible emission source. The nearest location where the public could have access was greater than 501 feet from the possible emission source (tanks). The sample was sent to the TCEQ laboratory in Austin, Texas, and analyzed for a range of VOCs. The list of the target analytes that were evaluated in this review are provided in Attachment A. The VOC concentrations were reported in parts per billion by volume (ppbv) (Attachment B and Table 1). Please note that the available canister technology and analysis method cannot capture and/or analyze for all chemicals.

Results and Evaluation

Reported VOC concentrations were compared to TCEQ's short-term health- and/or welfare-based air monitoring comparison values (AMCVs) (Table 1). Short-term AMCVs are guidelines used to evaluate ambient concentrations of a chemical in air and to determine its potential to result in adverse health effects, adverse vegetative effects, or odors. Health 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 comparison value, no adverse health effects are expected to occur. If a chemical concentration exceeds its comparison value it does not necessarily mean that adverse effects will occur, but rather that further evaluation is warranted.

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.

Please call me at (512) 239-0656 if you have any questions regarding this evaluation.

Attachment A

List of 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 B

2/14/2014

Texas Commission on Environmental Quality

Laboratory and Quality Assurance Section
P.O. Box 13087, MC-165
Austin, Texas 78711-3087
(512) 239-1716

Laboratory Analysis Results

Request Number: 1402005

Request Lead: Region: T04 Date Received: 2/5/2014

Project(s): Barnett Shale

Facility(ies) Sampled	City	County	Facility Type
Eagle Ridge, Furst Ranch J1-J2V	Denton	Denton	

Sample(s) Received

Field ID Number: N3864-012414 Laboratory Sample Number: 1402005-001 Sampled by: Robin Pugh
Sampling Site: Date & Time Sampled: 01/24/14 13:34:00 Valid Sample: Yes
Comments: Canister N3864 was used to collect a 30-minute downwind sample using OFC-113.

Requested Laboratory Procedure(s):

Analysis: AP001VOC
Determination of VOC Canisters by GC/MS Using Modified Method TO-15

Please note that this analytical technique is not capable of measuring all compounds which might have adverse health effects. For questions on the analytical procedures please contact the laboratory manager at (512) 239-1716. For an update on the health effects evaluation of these data, please contact the Toxicology Division at (512) 239-1795.

Analyst: Jiann-ping Loh Date: 2/14/14
J.P. Loh

Laboratory Manager: Ken Lancaster Date: 2/16/14
Ken Lancaster

Laboratory Analysis Results

Request Number: 1402005

Analysis Code: AP001VOC

Note: Results are reported in units of ppbv

Lab ID	1402005-001									
Field ID	N3864-012414									
Canister ID	n3864									
Compound	Conc.	SDL	SQL	Analysis Date	Flags**	Conc.	SDL	SQL	Analysis Date	Flags**
ethane	13	1.0	2.4	2/11/2014	T,D1					
ethylene	ND	1.0	2.4	2/11/2014	T,D1					
acetylene	ND	1.0	2.4	2/11/2014	T,D1					
propane	6.0	1.0	2.4	2/11/2014	T,D1					
propylene	ND	1.0	2.4	2/11/2014	T,D1					
dichlorodifluoromethane	0.41	0.40	1.2	2/11/2014	L,D1					
methyl chloride	0.46	0.40	1.2	2/11/2014	L,D1					
isobutane	0.72	0.46	2.4	2/11/2014	L,D1					
vinyl chloride	ND	0.34	1.2	2/11/2014	D1					
1-butene	ND	0.40	1.2	2/11/2014	D1					
1,3-butadiene	ND	0.54	1.2	2/11/2014	D1					
n-butane	1.7	0.40	2.4	2/11/2014	L,D1					
t-2-butene	ND	0.36	1.2	2/11/2014	D1					
bromomethane	ND	0.54	1.2	2/11/2014	D1					
c-2-butene	ND	0.54	1.2	2/11/2014	D1					
3-methyl-1-butene	ND	0.46	1.2	2/11/2014	D1					
isopentane	0.41	0.54	4.8	2/11/2014	J,D1					
trichlorofluoromethane	0.22	0.58	1.2	2/11/2014	J,D1					
1-pentene	ND	0.54	1.2	2/11/2014	D1					
n-pentane	0.40	0.54	4.8	2/11/2014	J,D1					
isoprene	ND	0.54	1.2	2/11/2014	D1					
t-2-pentene	ND	0.54	2.4	2/11/2014	D1					
1,1-dichloroethylene	ND	0.36	1.2	2/11/2014	D1					
c-2-pentene	ND	0.50	2.4	2/11/2014	D1					
methylene chloride	0.07	0.28	1.2	2/11/2014	J,D1					
2-methyl-2-butene	ND	0.46	1.2	2/11/2014	D1					
2,2-dimethylbutane	ND	0.42	1.2	2/11/2014	D1					
cyclopentene	ND	0.40	1.2	2/11/2014	D1					
4-methyl-1-pentene	ND	0.44	2.4	2/11/2014	D1					
1,1-dichloroethane	ND	0.38	1.2	2/11/2014	D1					
cyclopentane	0.03	0.54	1.2	2/11/2014	J,D1					
2,3-dimethylbutane	ND	0.56	2.4	2/11/2014	D1					
2-methylpentane	0.11	0.54	1.2	2/11/2014	J,D1					
3-methylpentane	0.07	0.46	1.2	2/11/2014	J,D1					
2-methyl-1-pentene + 1-hexene	ND	0.40	4.8	2/11/2014	D1					
n-hexane	0.15	0.40	2.4	2/11/2014	J,D1					
chloroform	0.02	0.42	1.2	2/11/2014	J,D1					
t-2-hexene	ND	0.54	2.4	2/11/2014	D1					
c-2-hexene	ND	0.54	2.4	2/11/2014	D1					
1,2-dichloroethane	ND	0.54	1.2	2/11/2014	D1					
methylcyclopentane	0.06	0.54	2.4	2/11/2014	J,D1					
2,4-dimethylpentane	ND	0.54	2.4	2/11/2014	D1					
1,1,1-trichloroethane	ND	0.52	1.2	2/11/2014	D1					
benzene	0.18	0.54	1.2	2/11/2014	J,D1					
carbon tetrachloride	0.11	0.54	1.2	2/11/2014	J,D1					
cyclohexane	ND	0.48	1.2	2/11/2014	D1					
2-methylhexane	ND	0.54	1.2	2/11/2014	D1					
2,3-dimethylpentane	ND	0.52	1.2	2/11/2014	D1					

Laboratory Analysis Results

Request Number: 1402005

Analysis Code: AP001VOC

Note: Results are reported in units of ppbv

Lab ID	1402005-001									
Compound	Conc.	SDL	SQL	Analysis Date	Flags**	Conc.	SDL	SQL	Analysis Date	Flags**
3-methylhexane	ND	0.40	1.2	2/11/2014	D1					
1,2-dichloropropane	ND	0.34	1.2	2/11/2014	D1					
trichloroethylene	ND	0.58	1.2	2/11/2014	D1					
2,2,4-trimethylpentane	ND	0.48	1.2	2/11/2014	D1					
2-chloropentane	ND	0.54	1.2	2/11/2014	D1					
n-heptane	0.06	0.50	2.4	2/11/2014	J,D1					
c-1,3-dichloropropylene	ND	0.40	1.2	2/11/2014	D1					
methylcyclohexane	0.06	0.52	2.4	2/11/2014	J,D1					
t-1,3-dichloropropylene	ND	0.40	1.2	2/11/2014	D1					
1,1,2-trichloroethane	ND	0.42	1.2	2/11/2014	D1					
2,3,4-trimethylpentane	ND	0.48	2.4	2/11/2014	D1					
toluene	0.23	0.54	1.2	2/11/2014	J,D1					
2-methylheptane	ND	0.40	2.4	2/11/2014	D1					
3-methylheptane	ND	0.46	2.4	2/11/2014	D1					
1,2-dibromoethane	ND	0.40	1.2	2/11/2014	D1					
n-octane	0.03	0.38	2.4	2/11/2014	J,D1					
tetrachloroethylene	ND	0.48	1.2	2/11/2014	D1					
chlorobenzene	ND	0.54	1.2	2/11/2014	D1					
ethylbenzene	ND	0.54	2.4	2/11/2014	D1					
m & p-xylene	ND	0.54	4.8	2/11/2014	D1					
styrene	ND	0.54	2.4	2/11/2014	D1					
1,1,2,2-tetrachloroethane	ND	0.40	1.2	2/11/2014	D1					
o-xylene	ND	0.54	2.4	2/11/2014	D1					
n-nonane	ND	0.44	1.2	2/11/2014	D1					
isopropylbenzene	ND	0.48	1.2	2/11/2014	D1					
n-propylbenzene	ND	0.54	1.2	2/11/2014	D1					
m-ethyltoluene	ND	0.22	1.2	2/11/2014	D1					
p-ethyltoluene	ND	0.32	2.4	2/11/2014	D1					
1,3,5-trimethylbenzene	ND	0.50	2.4	2/11/2014	D1					
o-ethyltoluene	ND	0.26	2.4	2/11/2014	D1					
1,2,4-trimethylbenzene	ND	0.54	1.2	2/11/2014	D1					
n-decane	ND	0.54	2.4	2/11/2014	D1					
1,2,3-trimethylbenzene	ND	0.54	1.2	2/11/2014	D1					
m-diethylbenzene	ND	0.54	2.4	2/11/2014	D1					
p-diethylbenzene	ND	0.54	1.2	2/11/2014	D1					
n-undecane	ND	0.54	2.4	2/11/2014	D1					

Laboratory Analysis Results

Request Number: 1402005

Analysis Code: AP001VOC

Qualifier Notes:

ND - not detected
NQ - concentration can not be quantified due to possible interferences or coelutions.
SDL - Sample Detection Limit (Limit of Detection adjusted for dilutions).
SQL - Sample Quantitation Limit (Limit of Quantitation adjusted for dilution).
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.
T- Data was not confirmed by a confirmational analysis. Compound and/or results is tentatively identified.
F - Established acceptance criteria was not met due to factors outside the laboratory's control.
H - Not all associated hold time specifications were net. Data may be biased.
C - Sample received with a missing or broken custody seal.
R - Sample received with a missing or incomplete chain of custody.
I - Sample received without a legible unique identifier.
G - Sample received in an improper container.
U - Sample received with insufficient sample volume.
W - Sample recevied with insufficient preservation.

Quality control notes for AP001VOC samples.

D1-Sample concentration was calculated using a dilution factor of 4.

TCEQ laboratory customer support may be reached at Ken.Lancaster@tceq.texas.gov

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Table 1. Comparison of Monitored Concentrations in Lab Sample 1402005-001 to TCEQ Short-Term AMCVs

Lab Sample ID	1402005-001					
Compound	**Odor AMCV (ppb_v)**	**Short-Term Health AMCV (ppb_v)**	**SQL (ppb_v)**	**Concentrations (ppb_v)**	**Flags**	**SDL (ppb_v)**
1,1,1-Trichloroethane	380,000	1,700	1.2	ND	D1	0.52
1,1,2,2-Tetrachloroethane	7,300	10	1.2	ND	D1	0.4
1,1,2-Trichloroethane	Not Available	100	1.2	ND	D1	0.42
1,1-Dichloroethane	Not Available	1,000	1.2	ND	D1	0.38
1,1-Dichloroethylene	Not Available	180	1.2	ND	D1	0.36
1,2,3-Trimethylbenzene	Not Available	250	1.2	ND	D1	0.54
1,2,4-Trimethylbenzene	140	250	1.2	ND	D1	0.54
1,2-Dibromoethane	Not Available	0.5	1.2	ND	D1	0.4
1,2-Dichloroethane	6,000	40	1.2	ND	D1	0.54
1,2-Dichloropropane	250	100	1.2	ND	D1	0.34
1,3,5-Trimethylbenzene	Not Available	250	2.4	ND	D1	0.5
1,3-Butadiene	230	1,700	1.2	ND	D1	0.54
1-Butene	360	27,000	1.2	ND	D1	0.4
1-Pentene	100	2,600	1.2	ND	D1	0.54
2,2,4-Trimethylpentane	670	750	1.2	ND	D1	0.48
2,2-Dimethylbutane (Neohexane)	Not Available	1,000	1.2	ND	D1	0.42
2,3,4-Trimethylpentane	Not Available	750	2.4	ND	D1	0.48
2,3-Dimethylbutane	420	990	2.4	ND	D1	0.56
2,3-Dimethylpentane	4,500	850	1.2	ND	D1	0.52
2,4-Dimethylpentane	940	850	2.4	ND	D1	0.54
2-Chloropentane (as chloroethane)	Not Available	240	1.2	ND	D1	0.54
2-Methyl-1-Pentene +1-Hexene	140	500	4.8	ND	D1	0.4
2-Methyl-2-Butene	Not Available	2,600	1.2	ND	D1	0.46
2-Methylheptane	110	750	2.4	ND	D1	0.4

Lab Sample ID	1402005-001					
Compound	**Odor AMCV (ppb_v)**	**Short-Term Health AMCV (ppb_v)**	**SQL (ppb_v)**	**Concentrations (ppb_v)**	**Flags**	**SDL (ppb_v)**
2-Methylhexane	420	750	1.2	ND	D1	0.54
2-Methylpentane (Isohexane)	7,000	850	1.2	0.11	J,D1	0.54
3-Methyl-1-Butene	250	8,000	1.2	ND	D1	0.46
3-Methylheptane	1,500	750	2.4	ND	D1	0.46
3-Methylhexane	840	750	1.2	ND	D1	0.4
3-Methylpentane	8,900	1,000	1.2	0.07	J,D1	0.46
4-Methyl-1-Pentene (as hexene)	140	500	2.4	ND	D1	0.44
Acetylene	Not Available	25,000	2.4	ND	T,D1	1
Benzene	2,700	180	1.2	0.18	J,D1	0.54
Bromomethane (methyl bromide)	Not Available	30	1.2	ND	D1	0.54
c-1,3-Dichloropropylene	Not Available	10	1.2	ND	D1	0.4
c-2-Butene	2,100	15,000	1.2	ND	D1	0.54
c-2-Hexene	140	500	2.4	ND	D1	0.54
c-2-Pentene	Not Available	2,600	2.4	ND	D1	0.5
Carbon Tetrachloride	4,600	20	1.2	0.11	J,D1	0.54
Chlorobenzene (phenyl chloride)	1,300	100	1.2	ND	D1	0.54
Chloroform (trichloromethane)	3,800	20	1.2	0.02	J,D1	0.42
Cyclohexane	2,500	1,000	1.2	ND	D1	0.48
Cyclopentane	Not Available	1,200	1.2	0.03	J,D1	0.54
Cyclopentene	Not Available	2,900	1.2	ND	D1	0.4
Dichlorodifluoromethane	Not Available	10,000	1.2	0.41	L,D1	0.4
Ethane	Not Available	Simple Asphyxiant*	2.4	13	T,D1	1
Ethylbenzene	170	20,000	2.4	ND	D1	0.54
Ethylene	270,000	500,000	2.4	ND	T,D1	1
Isobutane	Not Available	33,000	2.4	0.72	L,D1	0.46
Isopentane (2-methylbutane)	1,300	68,000	4.8	0.41	J,D1	0.54

Lab Sample ID	1402005-001					
Compound	**Odor AMCV (ppb_v)**	**Short-Term Health AMCV (ppb_v)**	**SQL (ppb_v)**	**Concentrations (ppb_v)**	**Flags**	**SDL (ppb_v)**
Isoprene	48	20	1.2	ND	D1	0.54
Isopropylbenzene (cumene)	48	500	1.2	ND	D1	0.48
m & p-Xylene (as mixed isomers)	80	1,700	4.8	ND	D1	0.54
m-Diethylbenzene	70	460	2.4	ND	D1	0.54
Methyl Chloride (chloromethane)	Not Available	500	1.2	0.46	L,D1	0.4
Methylcyclohexane	150	4,000	2.4	0.06	J,D1	0.52
Methylcyclopentane	1,700	750	2.4	0.06	J,D1	0.54
Methylene Chloride (dichloromethane)	160,000	3,500	1.2	0.07	J,D1	0.28
m-Ethyltoluene	18	250	1.2	ND	D1	0.22
n-Butane	1,200,000	92,000	2.4	1.7	L,D1	0.4
n-Decane	620	1,750	2.4	ND	D1	0.54
n-Heptane	670	850	2.4	0.06	J,D1	0.5
n-Hexane	1,500	1,800	2.4	0.15	J,D1	0.4
n-Nonane	Not Available	2,000	1.2	ND	D1	0.44
n-Octane	1,700	750	2.4	0.03	J,D1	0.38
n-Pentane	1,400	68,000	4.8	0.4	J,D1	0.54
n-Propylbenzene	48	500	1.2	ND	D1	0.54
n-Undecane	870	550	2.4	ND	D1	0.54
o-Ethyltoluene	74	250	2.4	ND	D1	0.26
o-Xylene	380	1,700	2.4	ND	D1	0.54
p-Diethylbenzene	70	460	1.2	ND	D1	0.54
p-Ethyltoluene	8.1	250	2.4	ND	D1	0.32
Propane	1,500,000	Simple Asphyxiant*	2.4	6	T,D1	1
Propylene	13,000	Simple Asphyxiant*	2.4	ND	T,D1	1
Styrene	25	5,100	2.4	ND	D1	0.54
t-1,3-Dichloropropylene	Not Available	10	1.2	ND	D1	0.4

Lab Sample ID	1402005-001					
Compound	**Odor AMCV (ppb_v)**	**Short-Term Health AMCV (ppb_v)**	**SQL (ppb_v)**	**Concentrations (ppb_v)**	**Flags**	**SDL (ppb_v)**
t-2-Butene	2,100	15,000	1.2	ND	D1	0.36
t-2-Hexene	140	500	2.4	ND	D1	0.54
t-2-Pentene	Not Available	2,600	2.4	ND	D1	0.54
Tetrachloroethylene	770	1,000	1.2	ND	D1	0.48
Toluene	920	4,000	1.2	0.23	J,D1	0.54
Trichloroethylene	3,900	100	1.2	ND	D1	0.58
Trichlorofluoromethane	5,000	10,000	1.2	0.22	J,D1	0.58
Vinyl Chloride	Not Available	26,000	1.2	ND	D1	0.34

*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.
ppbv - Parts per billion by volume.
ND - Not detected.
NQ - Concentration can not be quantified due to possible interferences or coelutions.
SDL - Sample Detection Limit (Limit of Detection adjusted for dilution).
SQL – Sample Quantitation Limit (Limit of Quantitation adjusted for dilution).
INV - Invalid.
J - Reported concentration is below SDL.
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C - Sample received with a missing or broken custody seal.
R - Sample received with a missing or incomplete chain of custody.
I - Sample received without a legible unique identifier.
G - Sample received in an improper container.
U - Sample received with insufficient sample volume.

W - Sample received with insufficient preservation.
D1 - Sample concentration was calculated using a dilution factor of 4.

Table 2. TCEQ Long-Term Air Monitoring Comparison Values (AMCVs)

Please Note: The long-term AMCVs are provided for informational purposes only because it is scientifically inappropriate to compare short-term monitored values to the long-term AMCV.

Compound	Long-Term Health AMCV (ppb_v)	Compound	Long-Term Health AMCV (ppb_v)
1,1,1-Trichloroethane	940	Cyclopentane	120
1,1,2,2-Tetrachloroethane	1	Cyclopentene	290
1,1,2-Trichloroethane	10	Dichlorodifluoromethane	1,000
1,1-Dichloroethane	100	Ethane	Simple Asphyxiant*
1,1-Dichloroethylene	86	Ethylbenzene	450
1,2,3-Trimethylbenzene	25	Ethylene**	5,300
1,2,4-Trimethylbenzene	25	Isobutane	2,400
1,2-Dibromoethane	0.05	Isopentane (2-methylbutane)	8,000
1,2-Dichloroethane	1	Isoprene	2
1,2-Dichloropropane	10	Isopropylbenzene (cumene)	50
1,3,5-Trimethylbenzene	25	m & p-Xylene (as mixed isomers)	140
1,3-Butadiene	9.1	m-Diethylbenzene	46
1-Butene	2,300	Methyl Chloride (chloromethane)	50
1-Pentene	Not Available	Methylcyclohexane	400
2,2,4-Trimethylpentane	75	Methylcyclopentane	75
2,2-Dimethylbutane (Neohexane)	100	Methylene Chloride (dichloromethane)	100
2,3,4-Trimethylpentane	75	m-Ethyltoluene	25
2,3-Dimethylbutane	99	n-Butane	2,400
2,3-Dimethylpentane	85	n-Decane	175
2,4-Dimethylpentane	85	n-Heptane	85
2-Chloropentane (as chloroethane)	24	n-Hexane	190
2-Methyl-1-Pentene +1-Hexene	50	n-Nonane	200

Compound	Long-Term Health AMCV (ppb_v)	Compound	Long-Term Health AMCV (ppb_v)
2-Methyl-2-Butene	Not Available	n-Octane	75
2-Methylheptane	75	n-Pentane	8,000
2-Methylhexane	75	n-Propylbenzene	50
2-Methylpentane (Isohexane)	85	n-Undecane	55
3-Methyl-1-Butene	800	o-Ethyltoluene	25
3-Methylheptane	75	o-Xylene	140
3-Methylhexane	75	p-Diethylbenzene	46
3-Methylpentane	100	p-Ethyltoluene	25
4-Methyl-1-Pentene (as hexene)	50	Propane	Simple Asphyxiant*
Acetylene	2,500	Propylene	Simple Asphyxiant*
Benzene	1.4	Styrene	110
Bromomethane (methyl bromide)	3	t-1,3-Dichloropropylene	1
c-1,3-Dichloropropylene	1	t-2-Butene	690
c-2-Butene	690	t-2-Hexene	50
c-2-Hexene	50	t-2-Pentene	Not Available
c-2-Pentene	Not Available	Tetrachloroethylene***	3.8
Carbon Tetrachloride	2	Toluene	1,100
Chlorobenzene (phenyl chloride)	10	Trichloroethylene	10
Chloroform (trichloromethane)	2	Trichlorofluoromethane	1,000
Cyclohexane	100	Vinyl Chloride	0.45

*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.
**Long-term vegetation AMCV for Ethylene is 30 ppb.
***Long-term vegetation AMCV for Tetrachloroethylene is 12 ppb.