PROPENE (C_3H_6)

also known as Propylene

Chemical Abstracts Service (CAS) Number: 115-07-1

General Information

Propene is a colorless gas with a slight odor, or a liquid under pressure. Acute (short-term) exposure of humans to high levels of propene can cause you to feel dizzy, lightheaded and to pass out. Death may result from lack of oxygen. Chronic (long-term) exposure to propene may damage the liver, and may affect the heart causing an irregular heartbeat. Due to the lack of available data, U.S. EPA has classified methyl ethyl ketone as a Group D, not classifiable as to human carcinogenicity.

Sources

- The primary source of propene is as a byproduct of petroleum refining.
- Propene is also used in the production of many organic chemicals including resins, plastics, and synthetic rubber.
- Small amounts of propene are produced naturally by vegetation.

Indiana Emissions

Propene emissions totals are not available from the National Emission Inventory (NEI) for the 2014 calendar year.

Measured Concentration Trends

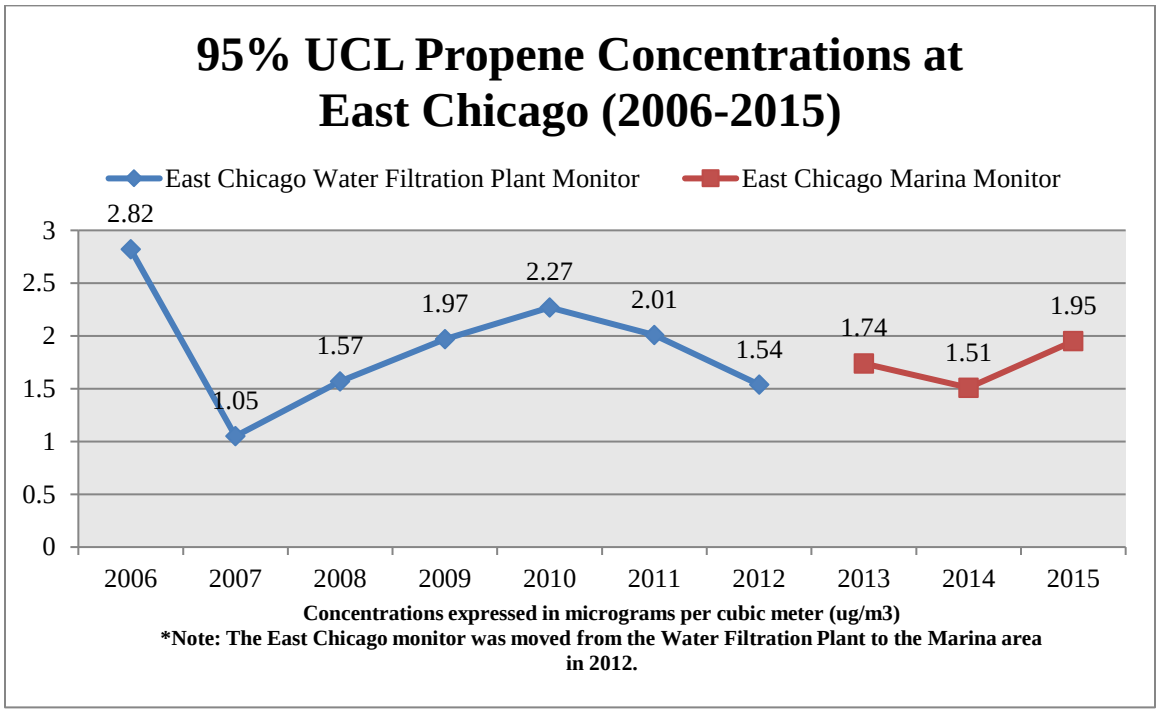
Ambient air monitoring data most accurately represents a limited area near the monitor location. All monitors for air toxics sample every sixth day. The monitoring locations by themselves are not sufficient to accurately characterize air toxic concentrations throughout the entire state, however, results from the monitors will provide exposure concentrations with a great deal of confidence at the monitoring locations.

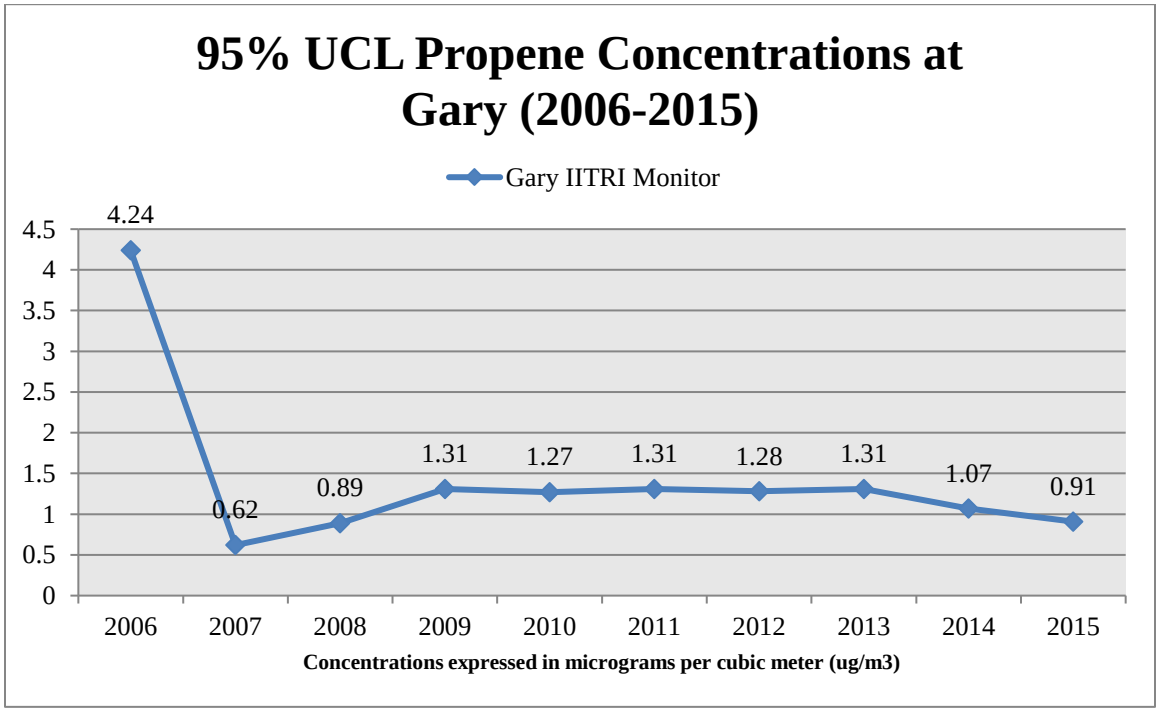
The ambient air monitoring results were analyzed using U.S. EPA recommended statistical methods. IDEM evaluated the data so that a 95% upper confidence limit of the mean (UCL) could be determined. A 95% UCL represents a value which one can be 95% confident that the true mean of the population is below that value.

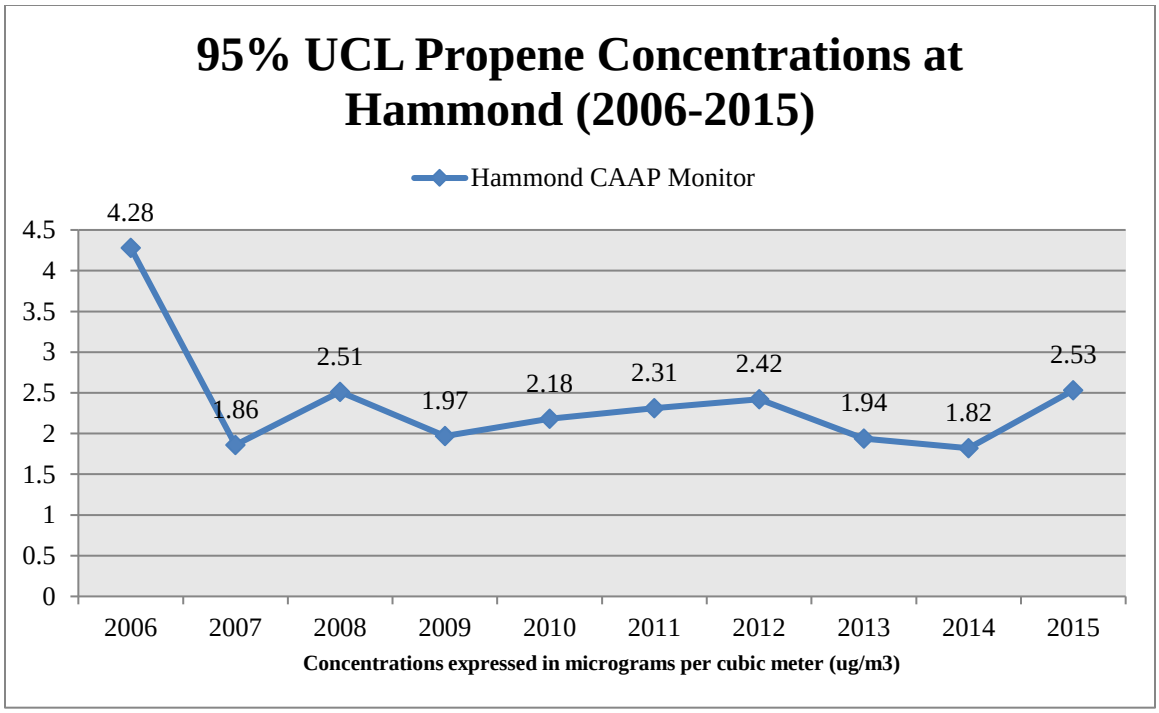
To learn more about the current monitoring locations, please visit IDEM's Air Toxics Monitor Siting webpage at: http://www.in.gov/idem/toxic/2337.htm

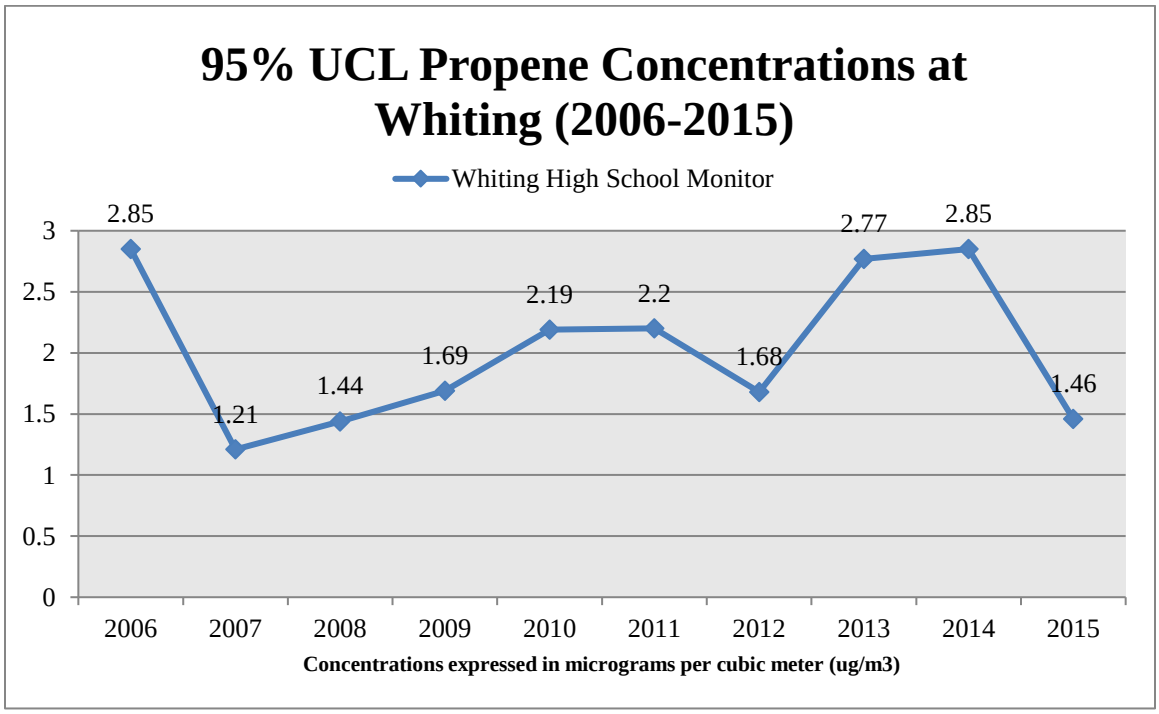
Data analysis was performed for each monitor that operated for a significant portion of the analysis period. This analysis determined the detection rate, which is defined as the percentage of valid samples taken statewide that had a quantifiable concentration of the pollutant. The

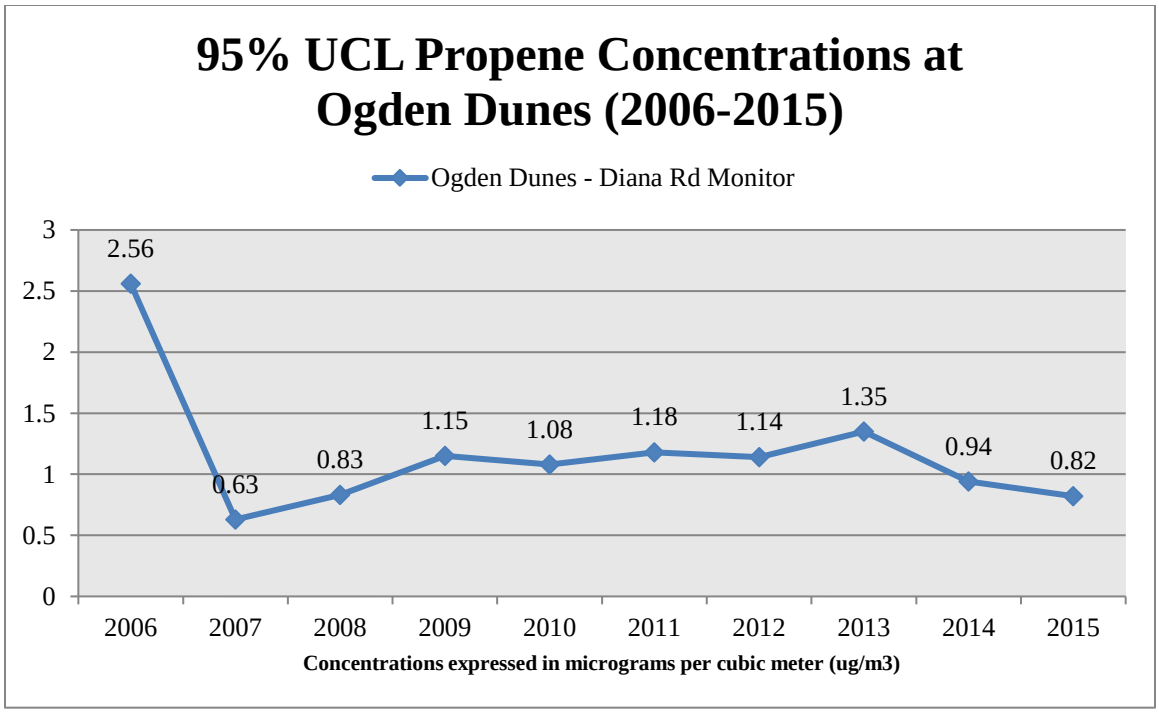
statewide detection rate of propene for the monitors analyzed from 2006-2015 was 93.2%. Trend graphs for each of these monitors are provided below.

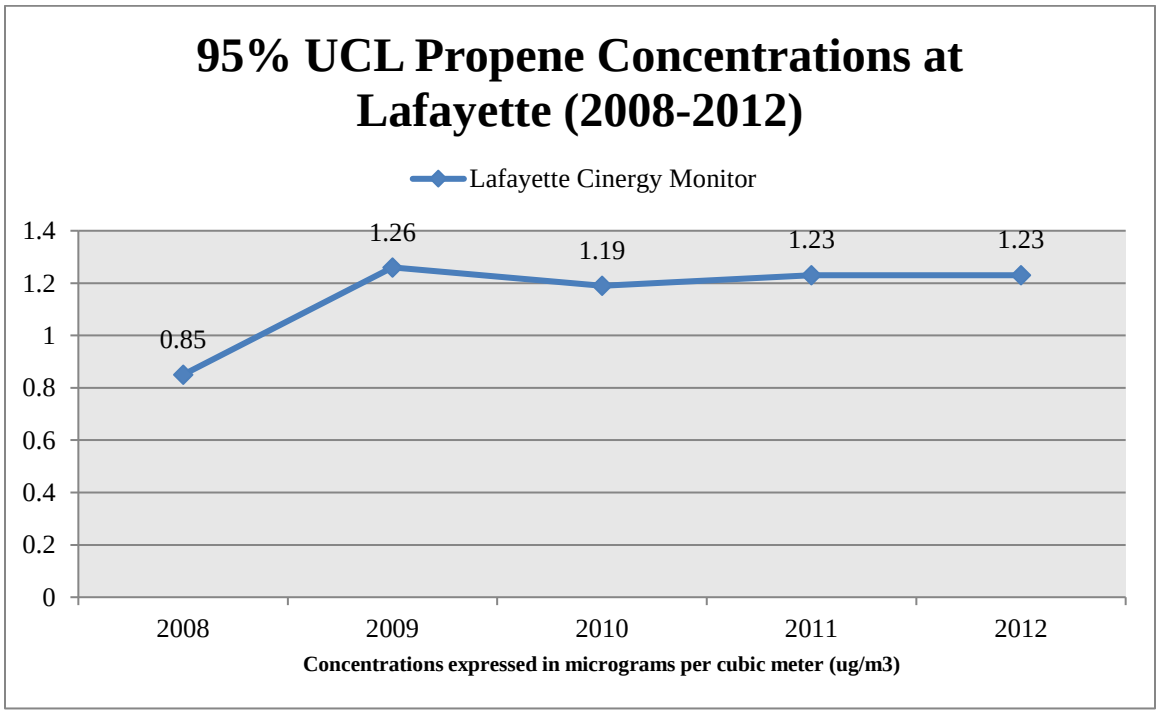


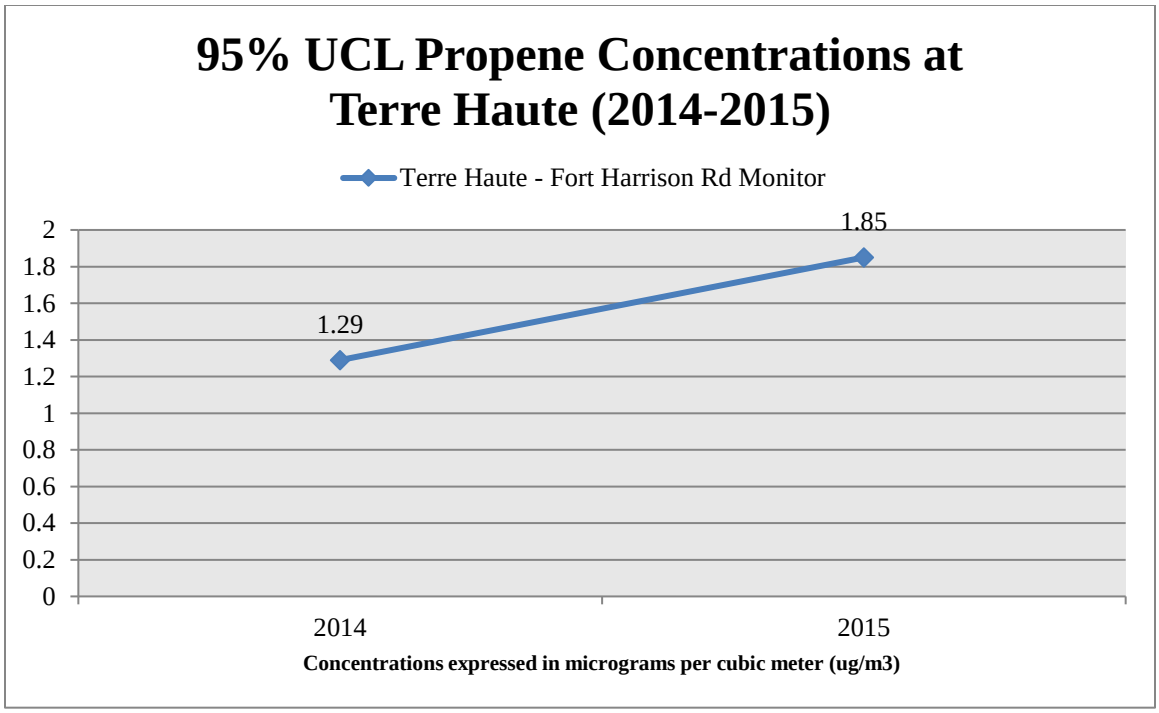


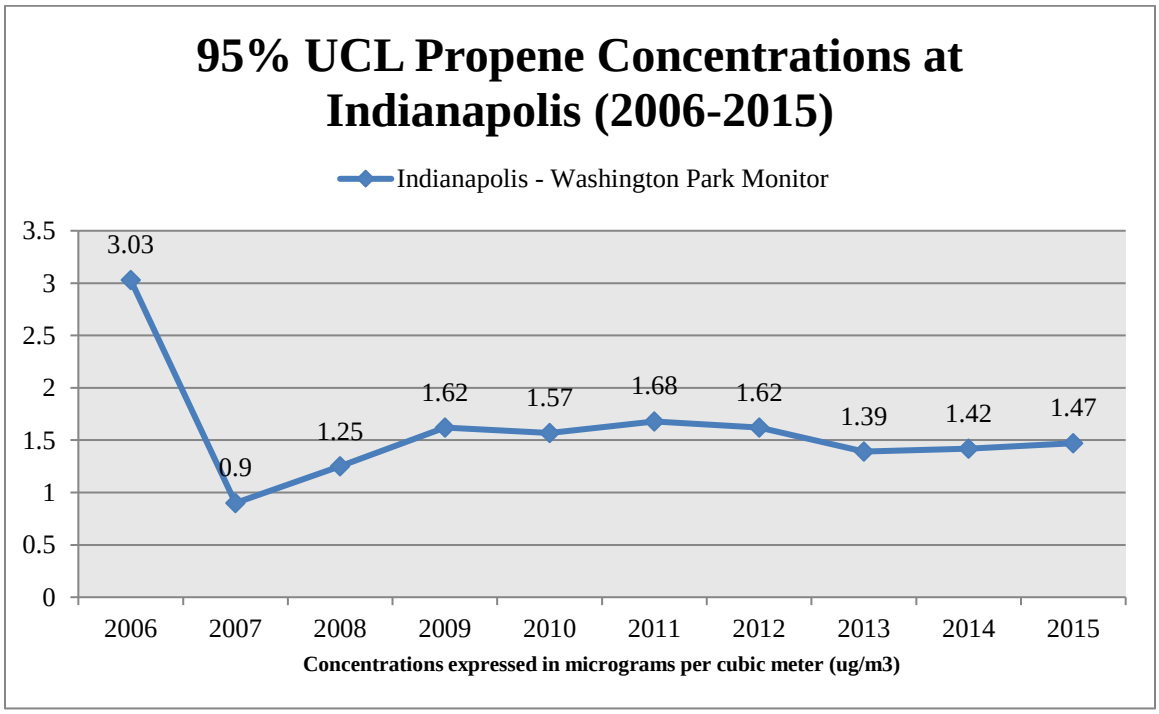

95% UCL Propene Concentrations at Hammond (2006-2015)
Hammond CAAP Monitor
4.28
1.86
2.51
1.97
2.18
2.31
2.42
1.94
1.82
2.53
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Concentrations expressed in micrograms per cubic meter (ug/m3)

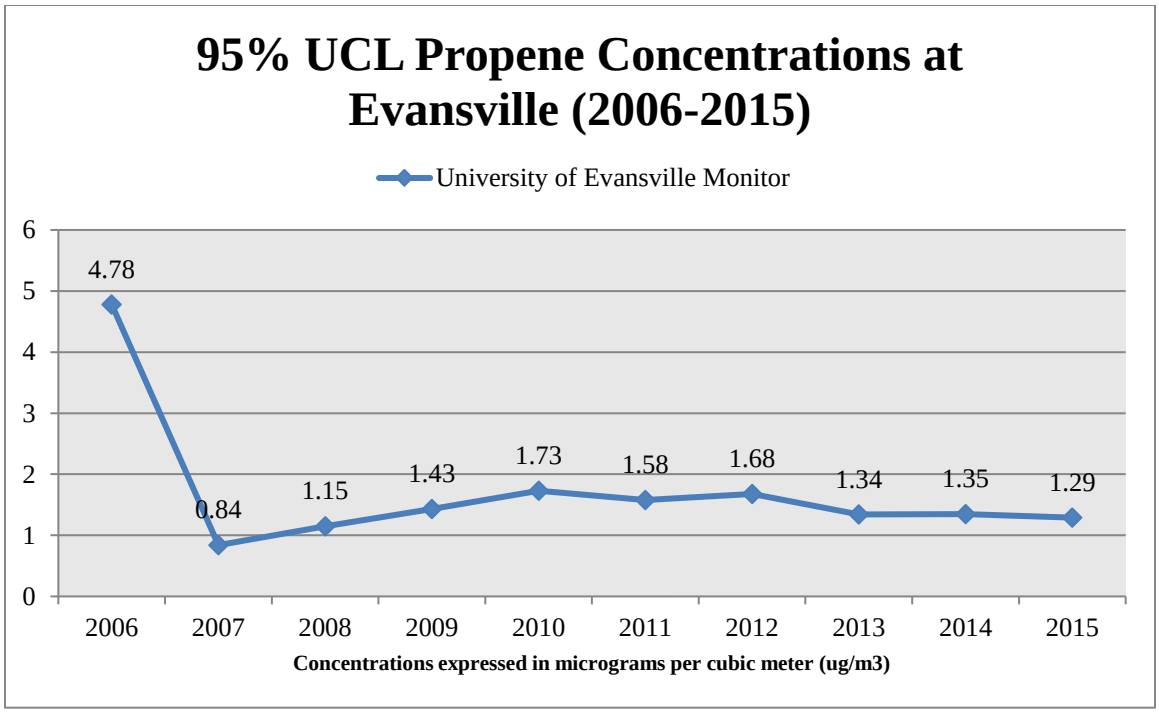

95% UCL Propene Concentrations at Whiting (2006-2015)
Whiting High School Monitor
2.85
1.21
1.44
1.69
2.19
2.2
1.68
2.77
2.85
1.46
3
2.5
2
1.5
1
0.5
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Concentrations expressed in micrograms per cubic meter (ug/m3)

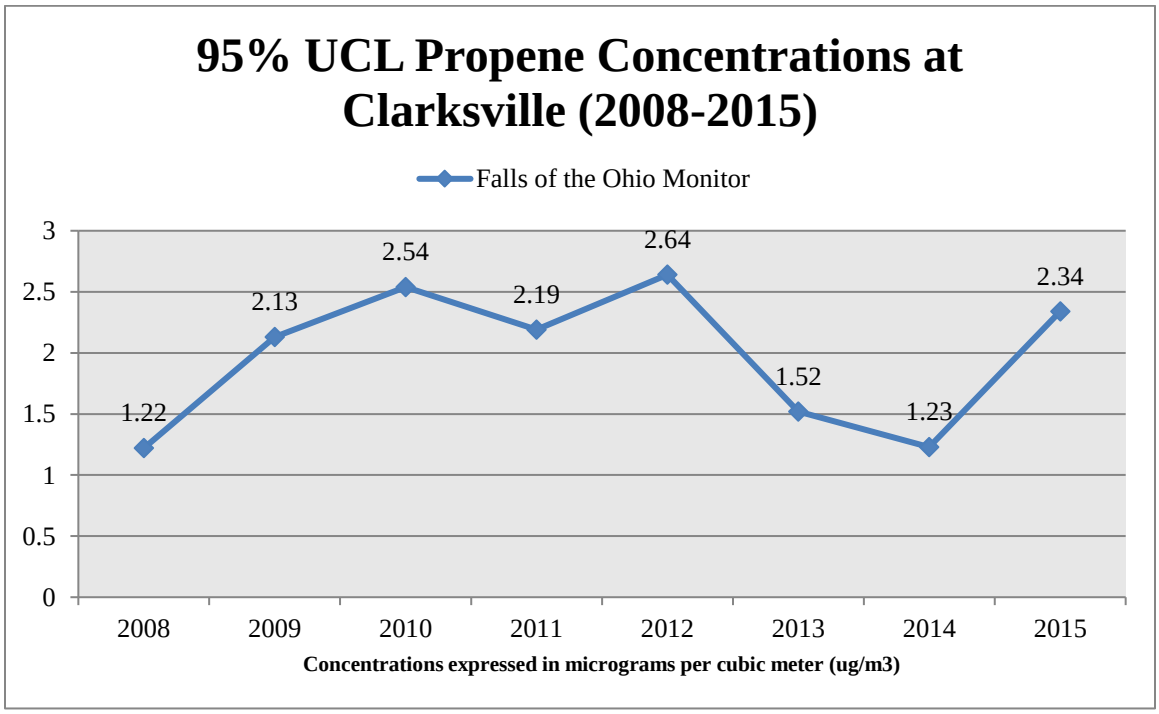

95% UCL Propene Concentrations at Ogden Dunes (2006-2015)
Ogden Dunes - Diana Rd Monitor
3
2.5
2
1.5
1
0.5
0
2.56
0.63
0.83
1.15
1.08
1.18
1.14
1.35
0.94
0.82
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Concentrations expressed in micrograms per cubic meter (ug/m3)


95% UCL Propene Concentrations at Lafayette (2008-2012)
Lafayette Cinergy Monitor
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.85
1.26
1.19
1.23
1.23
2008
2009
2010
2011
2012
Concentrations expressed in micrograms per cubic meter (ug/m3)


95% UCL Propene Concentrations at Terre Haute (2014-2015)
Terre Haute - Fort Harrison Rd Monitor
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1.29
1.85
2014
2015
Concentrations expressed in micrograms per cubic meter (ug/m3)


95% UCL Propene Concentrations at Indianapolis (2006-2015)
Indianapolis - Washington Park Monitor
3.5
3
2.5
2
1.5
1
0.5
0
3.03
0.9
1.25
1.62
1.57
1.68
1.62
1.39
1.42
1.47
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Concentrations expressed in micrograms per cubic meter (ug/m3)





The analysis of monitoring data from 2006 to 2015 indicates that concentration patterns of propene have declined or held steady at most monitors around the state. The single highest reading in this study was 36.57 ug/m3 recorded in Gary on 1/22/2006. This reading is well below the reference concentration for propene. More information about the reference concentration can be found in the hazard quotient section below.

Hazard Quotient

IDEM evaluates chronic (lifetime) non-cancer hazard assuming a threshold for each pollutant at which a health effect can be observed. That is, it assumes safe exposure to the pollutant up to a certain level before it is possible to experience a health effect from breathing the pollutant. IDEM uses health protective assumptions by taking into account people who might be more sensitive to the pollutants. The hazard quotient is a ratio that divides the measured concentration of a pollutant by the reference concentration (RfC). A hazard quotient under 1.0 is commonly recognized to be below the health-protective level. Hazard quotients over 1.0 indicate that further investigation may be necessary and does not necessarily mean that health effects are expected. Given the many health-protective assumptions used in the evaluation, most non-cancer hazards over 1.0 are still unlikely to be associated with observable adverse health effects.

The average concentration of propene was evaluated for each air pollutant monitor over the span of this study. The results for each monitor are displayed in the table below. The calculated hazard quotient is below 1.0 at all monitors, which indicates that the measured concentrations of propene do not present a risk for non-cancer health effects.

Table 1. Propene Hazard Quotients (concentrations expressed in micrograms per cubic meter)

Monitor	Years	Average Concentration	Reference Concentration (RfC)*	Hazard Quotient
East Chicago Water Filtration Plant	2006-2012	1.79	3000.00	0.0006
East Chicago Marina	2013-2015	1.61	3000.00	0.0005
Gary IITRI	2006-2015	1.32	3000.00	0.0004
Hammond CAAP	2006-2015	2.15	3000.00	0.0007
Whiting High School	2006-2015	1.85	3000.00	0.0006
Ogden Dunes – Diana Rd	2006-2015	1.11	3000.00	0.0004
Lafayette Cinergy	2008-2012	1.07	3000.00	0.0004
Terre Haute – Fort Harrison Rd	2014-2015	1.52	3000.00	0.0005
Indianapolis – Washington Park	2006-2015	1.47	3000.00	0.0005
University of Evansville	2006-2015	1.51	3000.00	0.0005
Clarksville – Falls of the Ohio	2008-2015	1.82	3000.00	0.0006

* Reference Concentration Source: The California Environmental Protection Agency

Cancer Risk

Propene is not classifiable as to its potential to cause cancer.