

ETHANOL (C₂H₆O)

also known as Ethyl Alcohol

Chemical Abstracts Service (CAS) Number: 64-17-5

General Information

Ethanol is a clear, colorless liquid with a wine-like odor. Inhaling ethanol can irritate the nose, throat and lungs causing coughing and/or shortness of breath. Acute (short-term) exposure to ethanol can cause headache, drowsiness, nausea and vomiting, and unconsciousness. It can also affect concentration and vision. Chronic (long-term) high exposure to ethanol may affect the liver and the nervous system. Ethanol is not classifiable as to its potential to cause cancer following occupational exposure.

Sources

- Ethanol is used in alcoholic beverages, as a solvent, and in making other chemicals.
- Ethanol is also used as a replacement, in whole or in part, for gasoline in automobiles and other internal combustion engines.

Indiana Emissions

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

Measured Concentration Trends

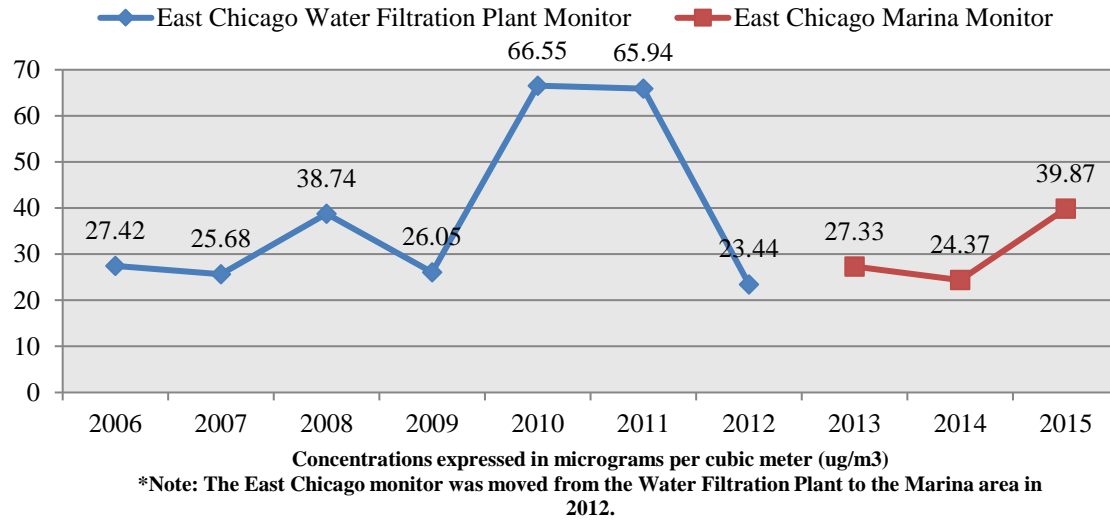
Ambient air monitoring data most accurately represents a limited area near the monitor location. All monitors for air toxics sample every sixth day. The monitoring locations by themselves are not sufficient to accurately characterize air toxic concentrations throughout the entire state, however, results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

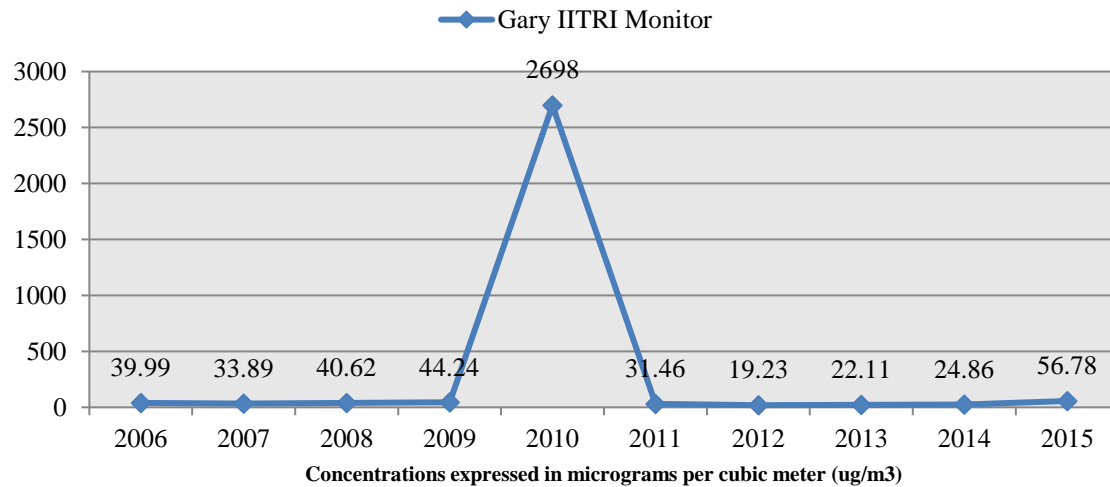
To learn more about the current monitoring locations, please visit IDEM's Air Toxics Monitor Siting webpage at: <http://www.in.gov/idem/toxic/2337.htm>

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 ethanol for the monitors analyzed from 2006-2015 was 97.8%. Trend graphs for each of these monitors are provided below.

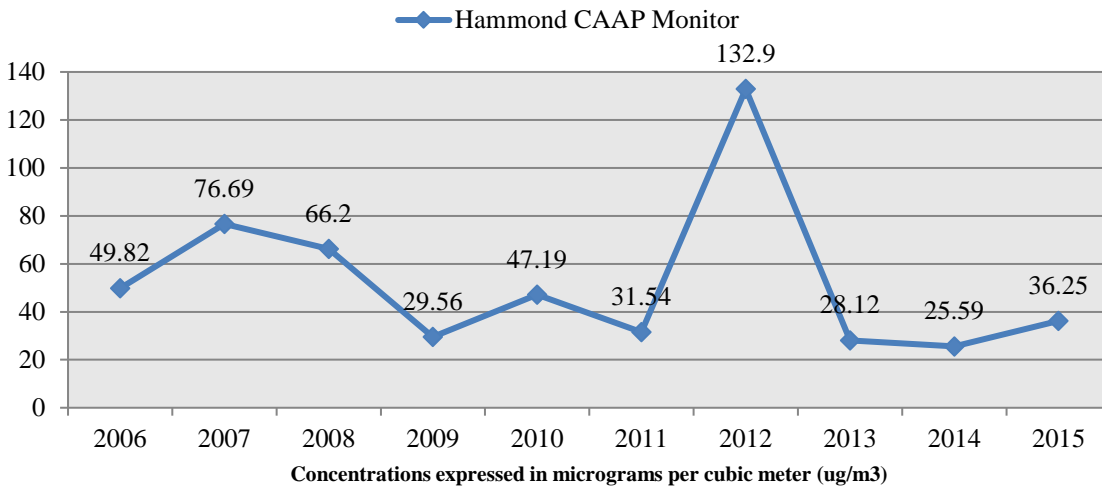
95% UCL Ethanol Concentrations at East Chicago (2006-2015)



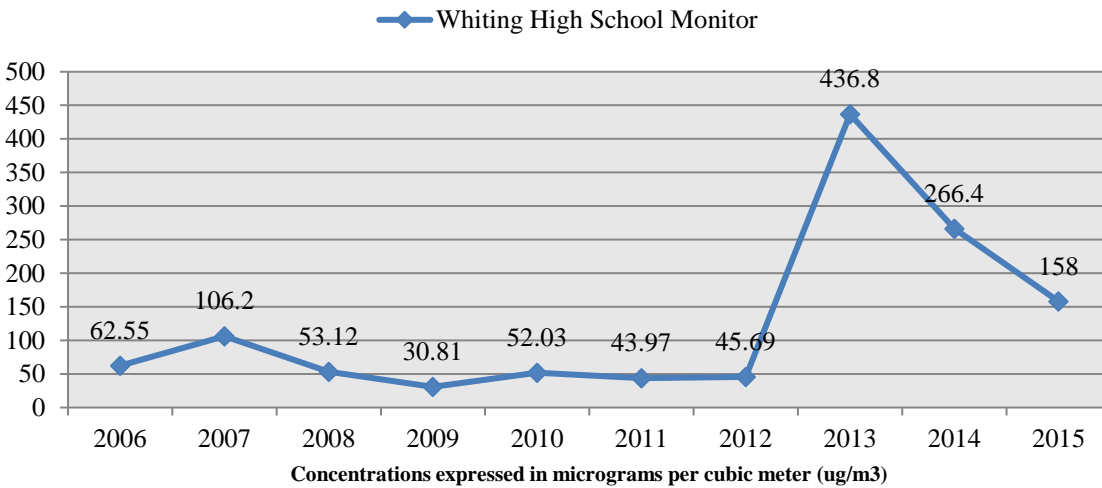
95% UCL Ethanol Concentrations at Gary (2006-2015)



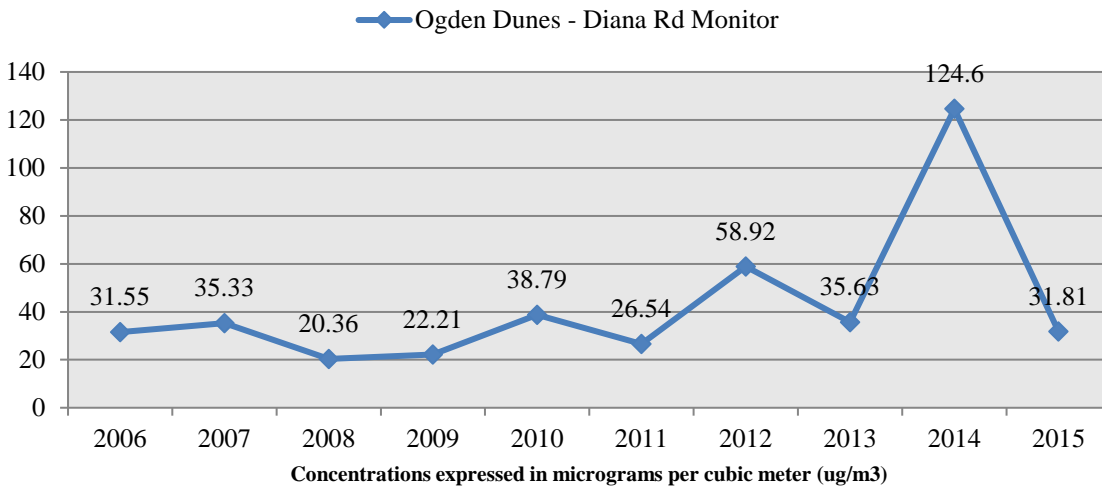
95% UCL Ethanol Concentrations at Hammond (2006-2015)



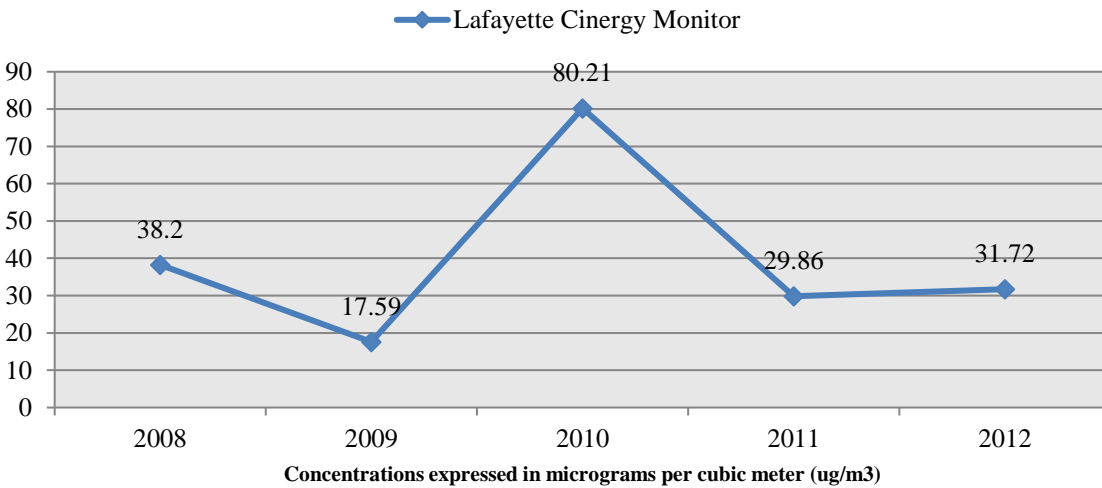
95% UCL Ethanol Concentrations at Whiting (2006-2015)



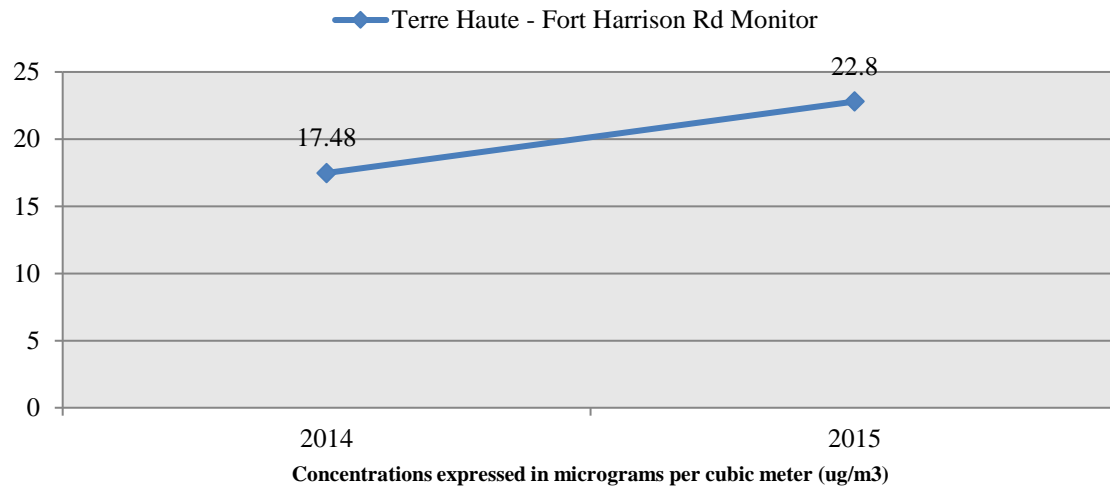
95% UCL Ethanol Concentrations at Ogden Dunes (2006-2015)



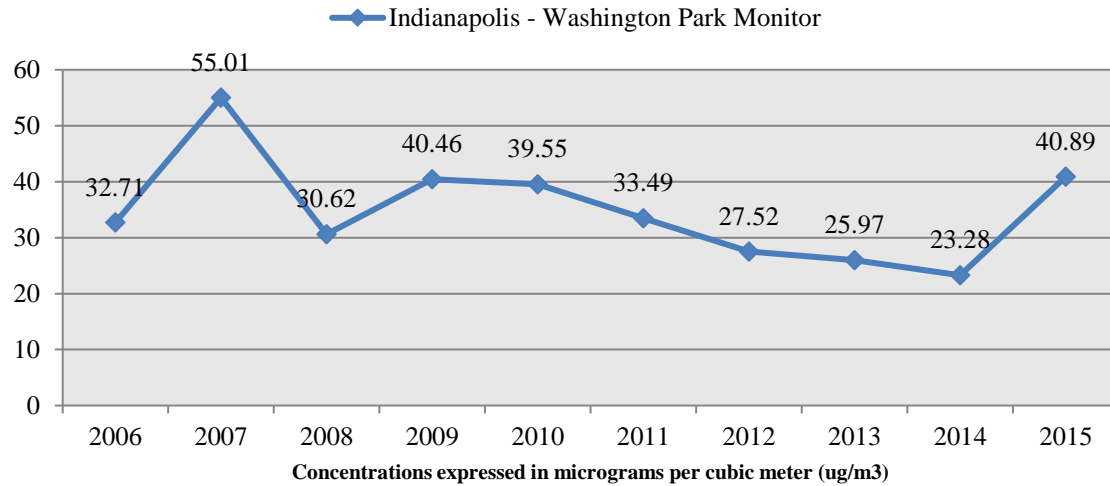
95% UCL Ethanol Concentrations at Lafayette (2008-2012)



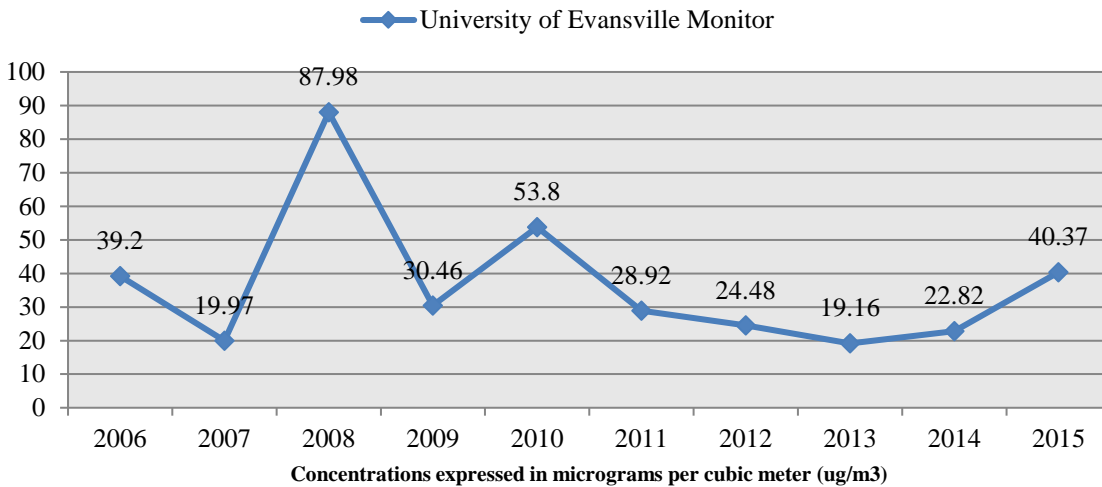
95% UCL Ethanol Concentrations at Terre Haute (2014-2015)



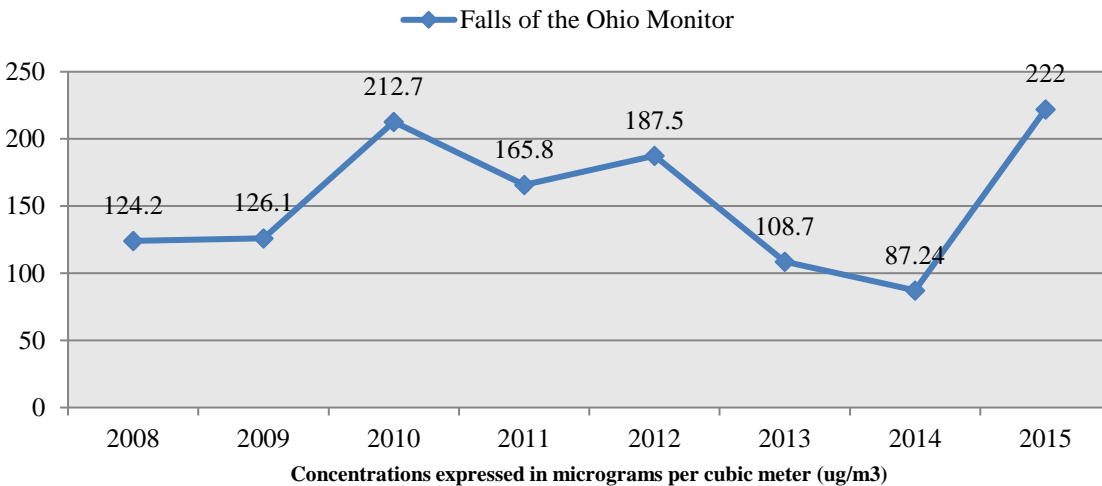
95% UCL Ethanol Concentrations at Indianapolis (2006-2015)



95% UCL Ethanol Concentrations at Evansville (2006-2015)



95% UCL Ethanol Concentrations at Clarksville (2008-2015)



The analysis of monitoring data from 2006 to 2015 indicates that concentration patterns of ethanol have shown a significant degree of variance from monitor to monitor. Monitors in northwest Indiana showed spikes of one to two years at variable points between 2010 and 2014. Monitors in Indianapolis, Evansville, and Clarksville indicated declining concentrations before increasing in 2015. The most significant observation is the 95% UCL value of 2698 ug/m³ calculated at the Gary monitor in 2010. This value is above the reference concentration of 2200 ug/m³ and was highly influenced by a string of unusually high readings from August – October of that year. Overall, 14 of 55 readings at Gary in 2010 were above the reference concentration.

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 ethanol 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 ethanol do not present a risk for non-cancer health effects.

Table 1. Ethanol 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	37.93	2200.00	0.0172
East Chicago Marina	2013-2015	27.97	2200.00	0.0127
Gary IITRI	2006-2015	306.40	2200.00	0.1393
Hammond CAAP	2006-2015	44.50	2200.00	0.0202
Whiting High School	2006-2015	113.40	2200.00	0.0515
Ogden Dunes – Diana Rd	2006-2015	36.92	2200.00	0.0168
Lafayette Cinergy	2008-2012	34.84	2200.00	0.0158
Terre Haute – Fort Harrison Rd	2014-2015	19.53	2200.00	0.0089
Indianapolis – Washington Park	2006-2015	30.42	2200.00	0.0138
University of Evansville	2006-2015	33.06	2200.00	0.0150
Clarksville – Falls of the Ohio	2008-2015	135.40	2200.00	0.0615

* Reference Concentration Source: American Council of Governmental Industrial Hygienists (ACGIH)

Cancer Risk

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