

## **1,2,4-TRIMETHYLBENZENE (C<sub>9</sub>H<sub>12</sub>)**

Chemical Abstracts Service (CAS) Number: 95-63-6

### **General Information**

1,2,4-Trimethylbenzene is a clear, colorless, flammable liquid with a sweet odor.

### **Sources**

- 1,2,4-Trimethylbenzene is a naturally occurring chemical found in coal tar and petroleum crude oil. It is a byproduct of the production of gasoline.
- The majority of 1,2,4-trimethylbenzene is used as a gasoline additive.

### **Indiana Emissions**

1,2,4-Trimethylbenzene 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.

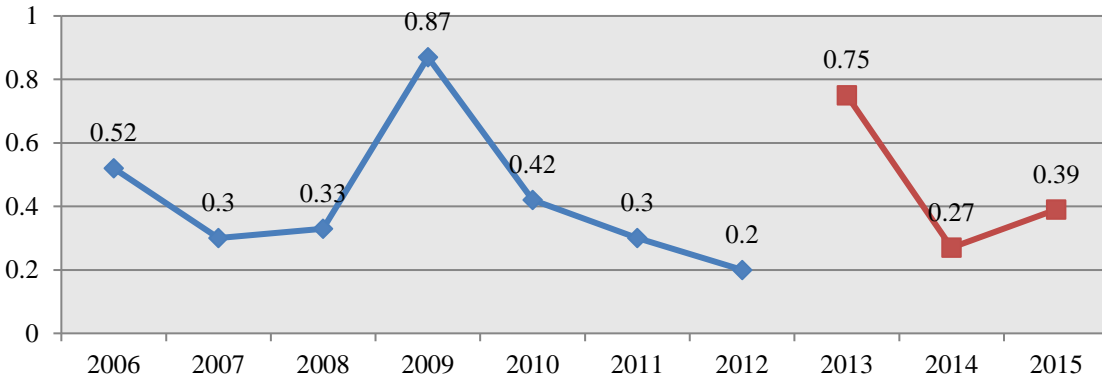
The ambient air monitoring results were analyzed using U.S. EPA recommended statistical methods. IDEM evaluated the data so that a 95% upper confidence limit of the mean (UCL) could be determined. A 95% UCL represents a value which one can be 95% confident that the true mean of the population is below 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 1,2,4-trimethylbenzene for the monitors analyzed from 2006-2015 was 67.4%. Trend graphs for each of these monitors are provided below.

## 95% UCL 1,2,4-Trimethylbenzene Concentrations at East Chicago (2006-2015)

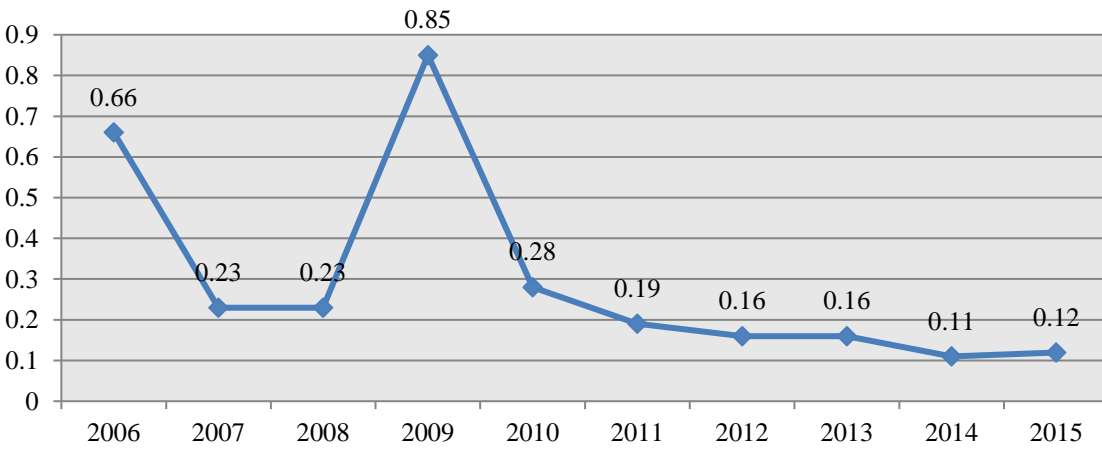
◆ East Chicago Water Filtration Plant Monitor    
 ■ East Chicago Marina Monitor



Concentrations expressed in micrograms per cubic meter (ug/m3)  
 \*Note: The East Chicago monitor was moved from the Water Filtration Plant to the Marina area in 2012.

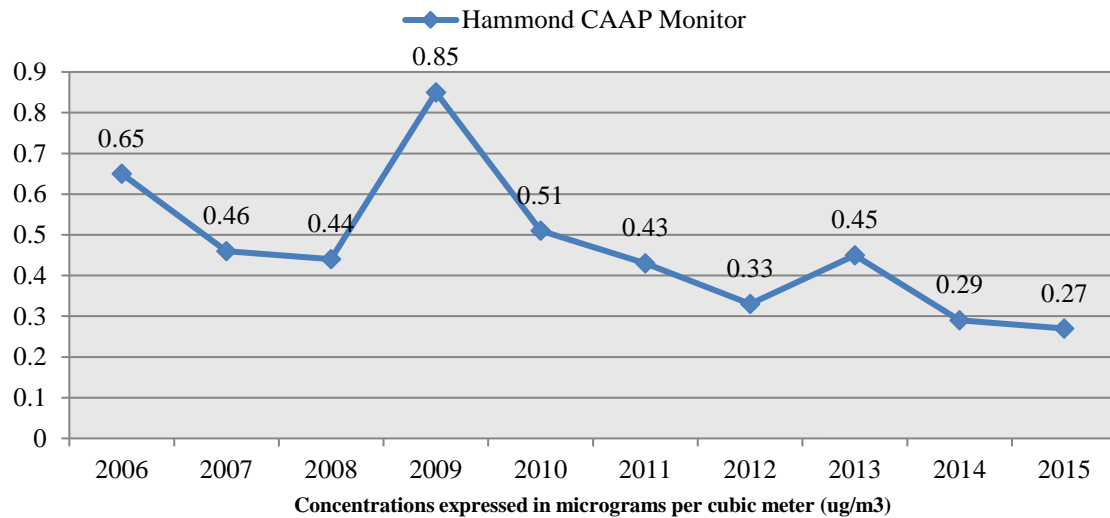
## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Gary (2006-2015)

◆ Gary IITRI Monitor

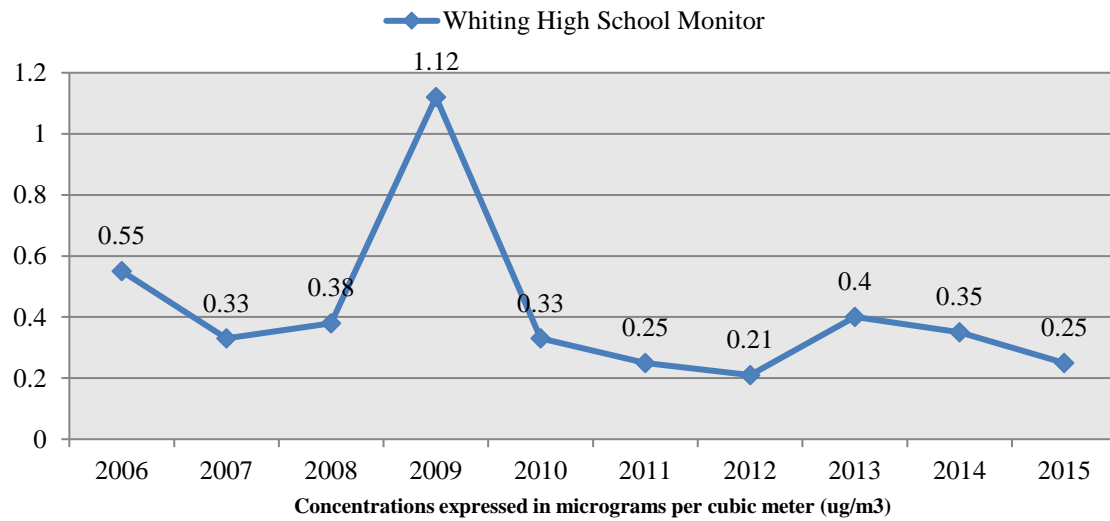


Concentrations expressed in micrograms per cubic meter (ug/m3)

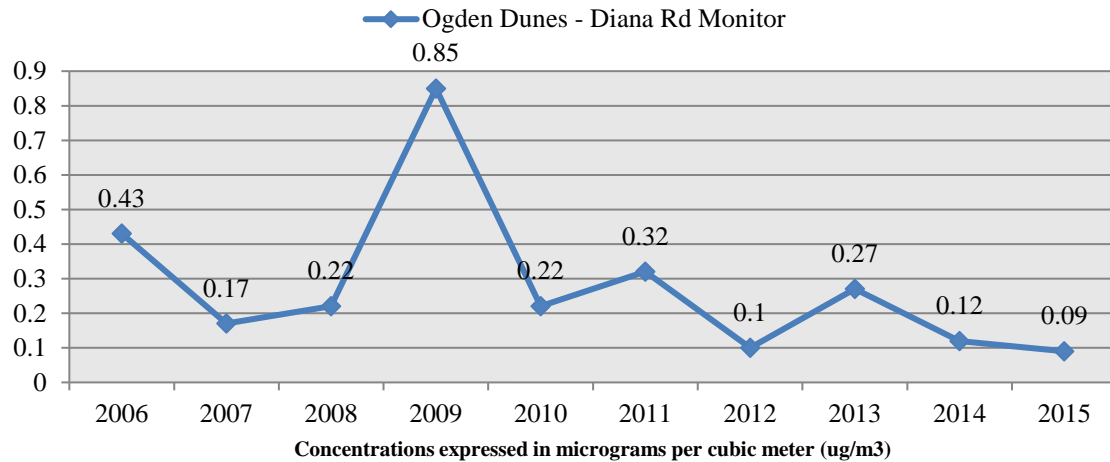
## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Hammond (2006-2015)



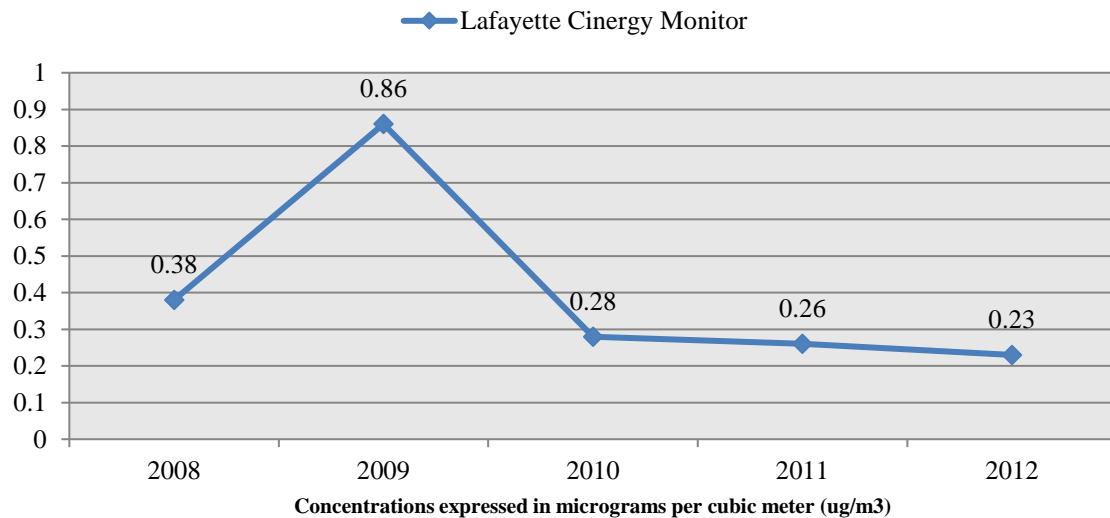
## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Whiting (2006-2015)



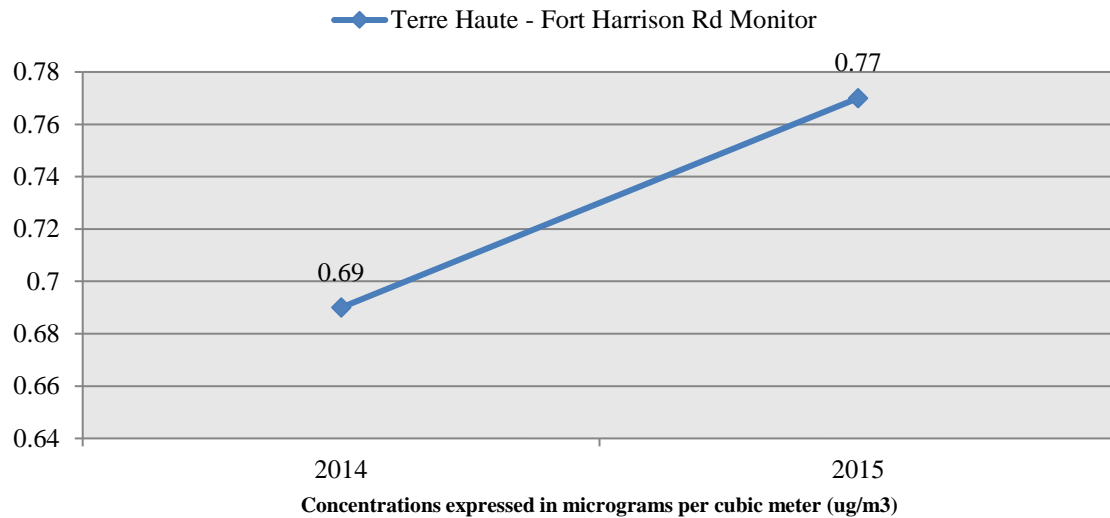
## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Ogden Dunes (2006-2015)



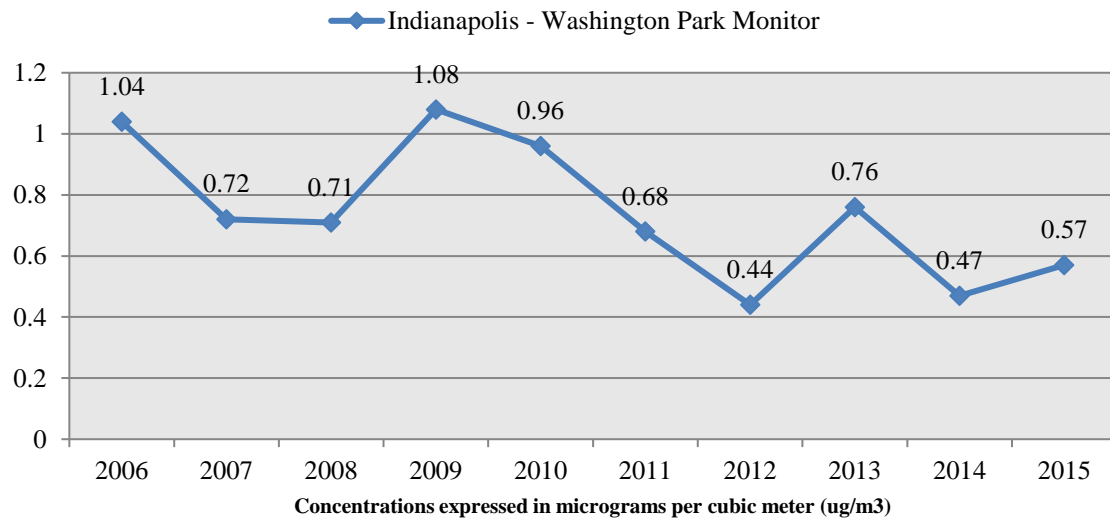
## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Lafayette (2008-2012)



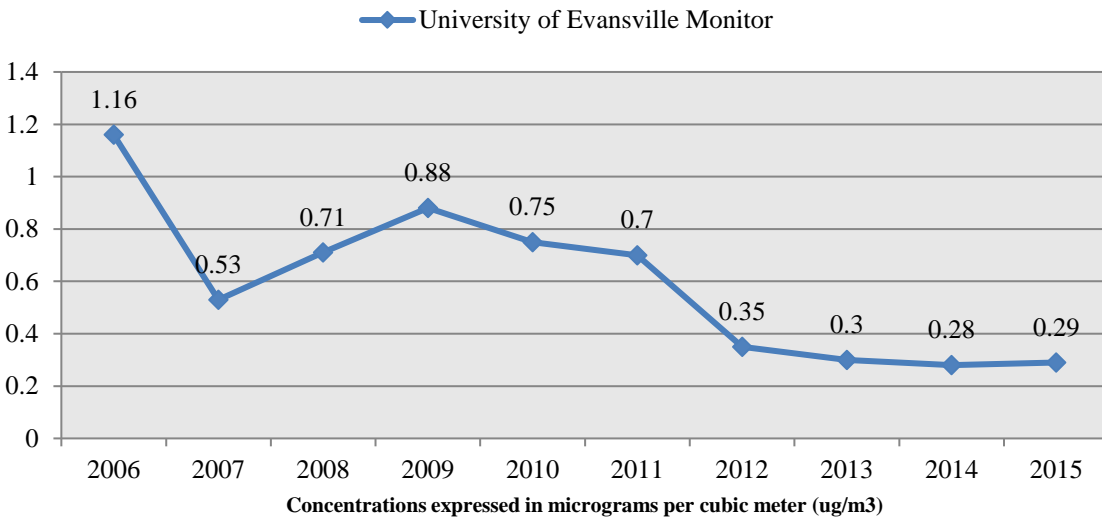
## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Terre Haute (2014-2015)



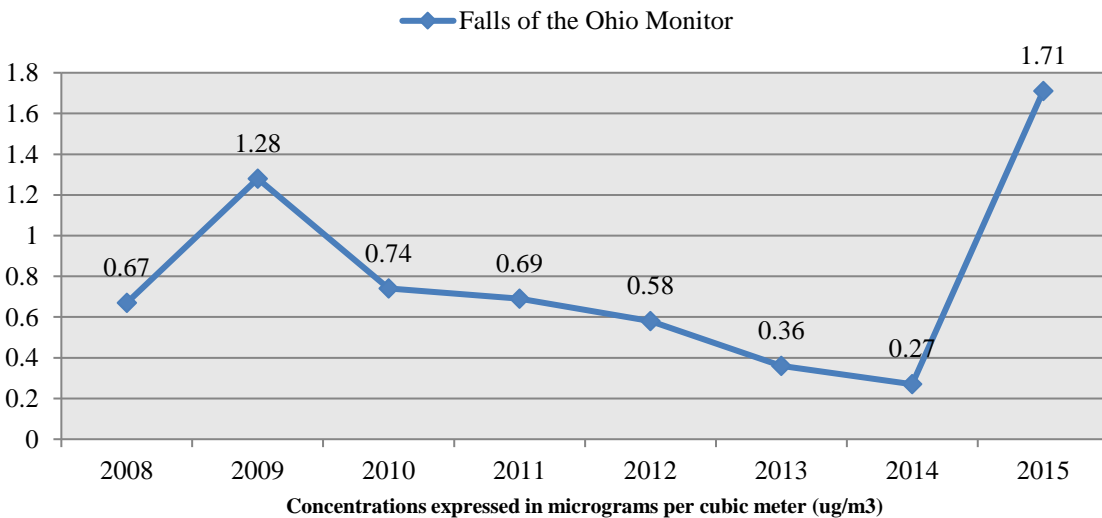
## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Indianapolis (2006-2015)



## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Evansville (2006-2015)



## 95% UCL 1,2,4-Trimethylbenzene Concentrations at Clarksville (2008-2015)



The analysis of monitoring data from 2006 to 2015 indicates that concentrations of 1,2,4-trimethylbenzene have generally declined or held steady since 2009. But there are some notable exceptions to this pattern. While the graphs indicate a spike in measured concentrations at East Chicago and Indianapolis in 2013, further analysis did not reveal any sustained pattern of high concentrations. The 2013 value for East Chicago was heavily influenced by a single high reading of 9.40 micrograms per cubic meter recorded on 5/22/2013. Removing this value from

the dataset dropped the 2013 95% UCL value to 0.33 micrograms per cubic meter, placing it within the range of values observed for 2010-2012 and 2014-2015. The 2013 value for Indianapolis was heavily influenced by a single high reading of 8.76 micrograms per cubic meter recorded on 5/22/2013. Removing this value from the dataset dropped the 2013 95% UCL value to 0.45 micrograms per cubic meter, placing it within the range of values observed from 2011-2012 and 2014-2015. The graphs also indicate a more pronounced spike in concentrations of 1,2,4-trimethylbenzene at Clarksville in 2015. This spike cannot be attributed to any single reading, and warrants careful attention in coming years. But it should still be noted that the calculated value of 1.71 micrograms per cubic meter is well below the reference concentration of 6.0 micrograms per cubic meter, which indicates the measured concentration is still considered safe. Please see the Hazard Quotient section below for a more detailed explanation of the reference concentration and how it relates to health risks.

### 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 1,2,4-trimethylbenzene 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 well below 1.0 at all monitors, which indicates that the measured concentrations of 1,2,4-trimethylbenzene do not present a risk for non-cancer health effects.

**Table 1. 1,2,4-Trimethylbenzene 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	0.41	6.0	0.068
East Chicago Marina	2013-2015	0.46	6.0	0.077
Gary IITRI	2006-2015	0.29	6.0	0.048
Hammond CAAP	2006-2015	0.43	6.0	0.072
Whiting High School	2006-2015	0.38	6.0	0.063
Ogden Dunes – Diana	2006-2015	0.27	6.0	0.045

Rd				
Lafayette Cinergy	2008-2012	0.40	6.0	0.067
Terre Haute – Fort Harrison Rd	2014-2015	0.70	6.0	0.117
Indianapolis – Washington Park	2006-2015	0.64	6.0	0.107
University of Evansville	2006-2015	0.50	6.0	0.083
Clarksville – Falls of the Ohio	2008-2015	0.68	6.0	0.113

\* Reference Concentration Source: U.S. EPA Region 9.

### **Cancer Risk**

U.S. EPA has not classified 1,2,4-trimethylbenzene as to its carcinogenicity.