

DICHLORODIFLUOROMETHANE (CCl₂F₂)

also known as Freon 12

Chemical Abstracts Service (CAS) Number: 75-71-8

General Information

Dichlorodifluoromethane is a colorless, non-flammable gas that can affect you when breathed in. Acute (short-term) exposure to dichlorodifluoromethane can cause dizziness, lightheadedness, and trouble with concentration. Exposure to high concentrations of the gas can cause the heart to beat irregularly or to stop. The health effects of chronic (long-term) exposure to dichlorodifluoromethane are unknown at this time. There is no evidence of an increase in cancer risk due to exposure to dichlorodifluoromethane.

Sources

- Dichlorodifluoromethane is no longer manufactured in the United States due to its ozone depleting characteristics.
- Existing stocks of dichlorodifluoromethane are used as a refrigerant gas, an aerosol propellant, in plastics, and as a leak detecting agent.
- Exposure to higher levels of dichlorodifluoromethane is more likely to occur during industrial processes and confined space exposures.

Indiana Emissions

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

Measured Concentration Trends

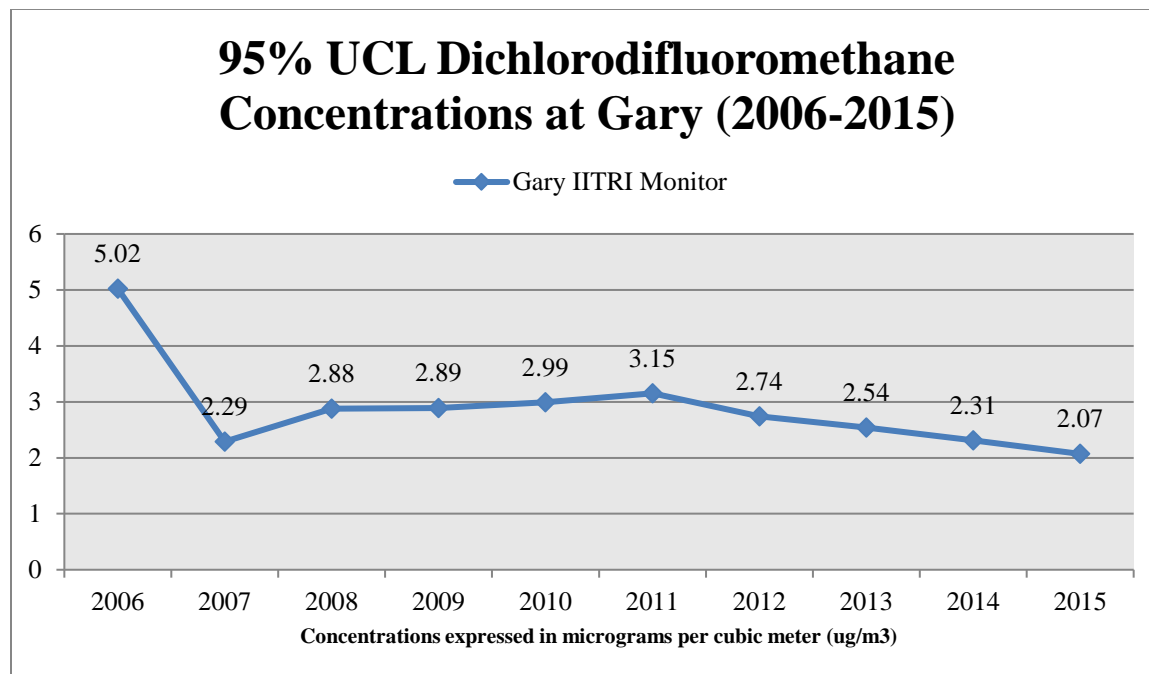
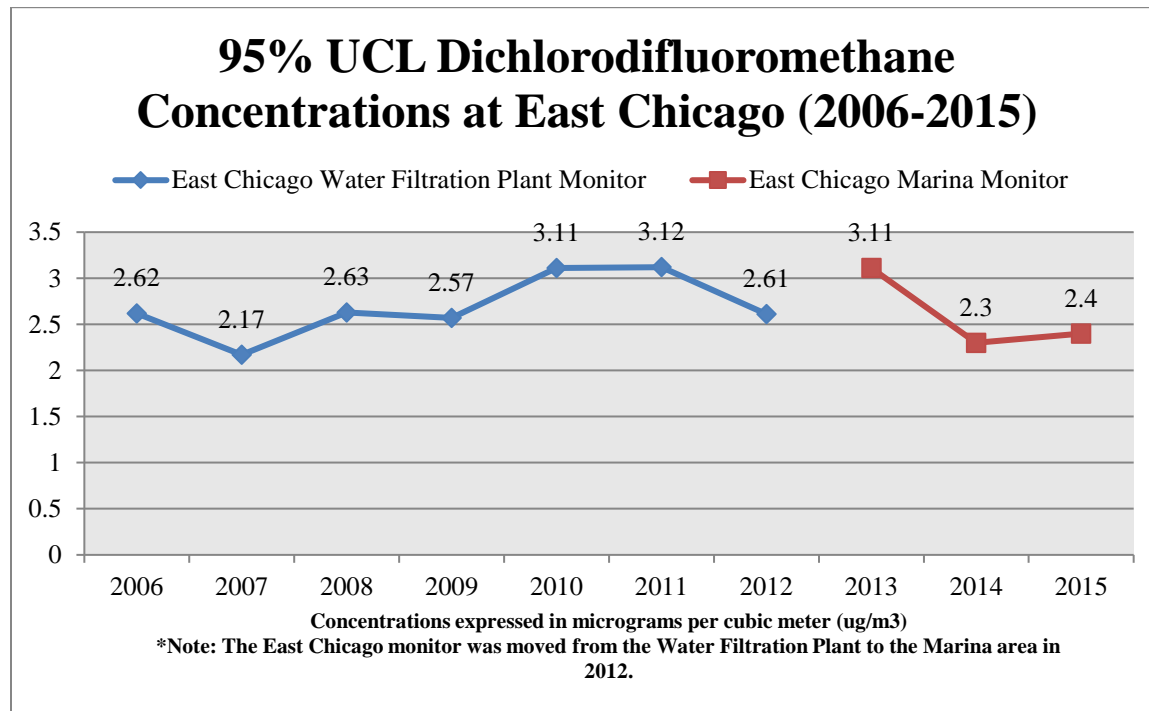
Ambient air monitoring data most accurately represents a limited area near the monitor location. All monitors for air toxics sample every sixth day. The monitoring locations by themselves are not sufficient to accurately characterize air toxic concentrations throughout the entire state, however, results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

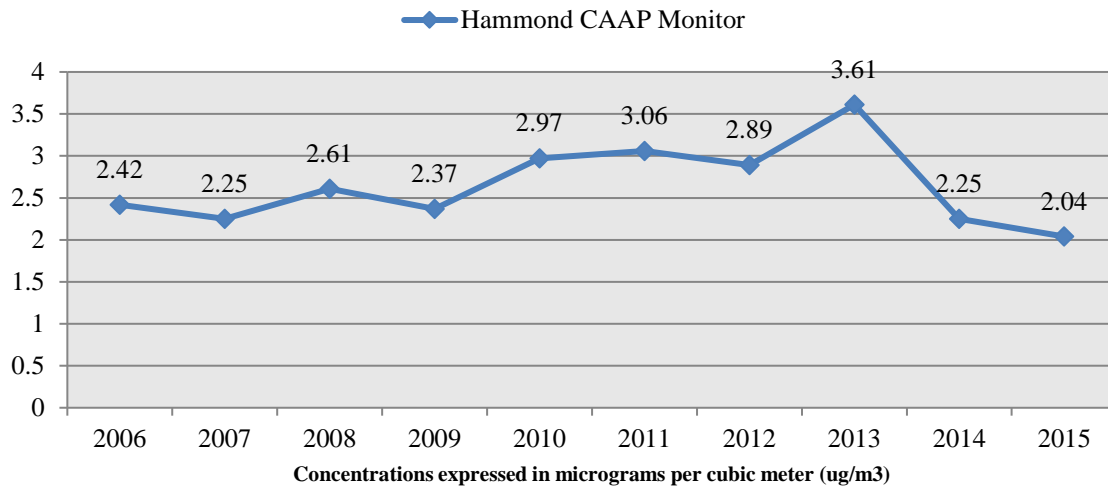
To learn more about the current monitoring locations, please visit IDEM's Air Toxics Monitor Siting webpage at: <http://www.in.gov/idem/toxic/2337.htm>

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

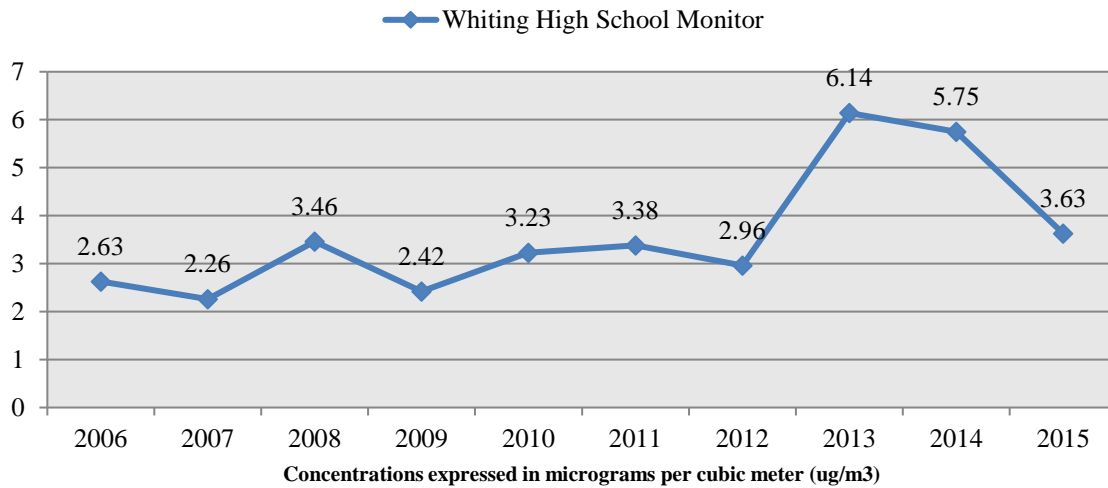
of valid samples taken statewide that had a quantifiable concentration of the pollutant. The statewide detection rate of dichlorodifluoromethane for the monitors analyzed from 2006-2015 was 98.3%. Trend graphs for each of these monitors are provided below.



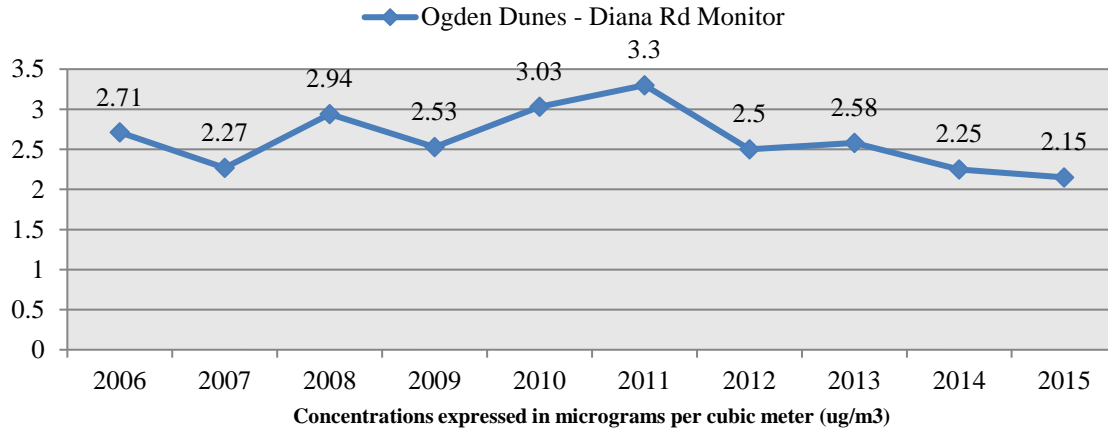
95% UCL Dichlorodifluoromethane Concentrations at Hammond (2006-2015)



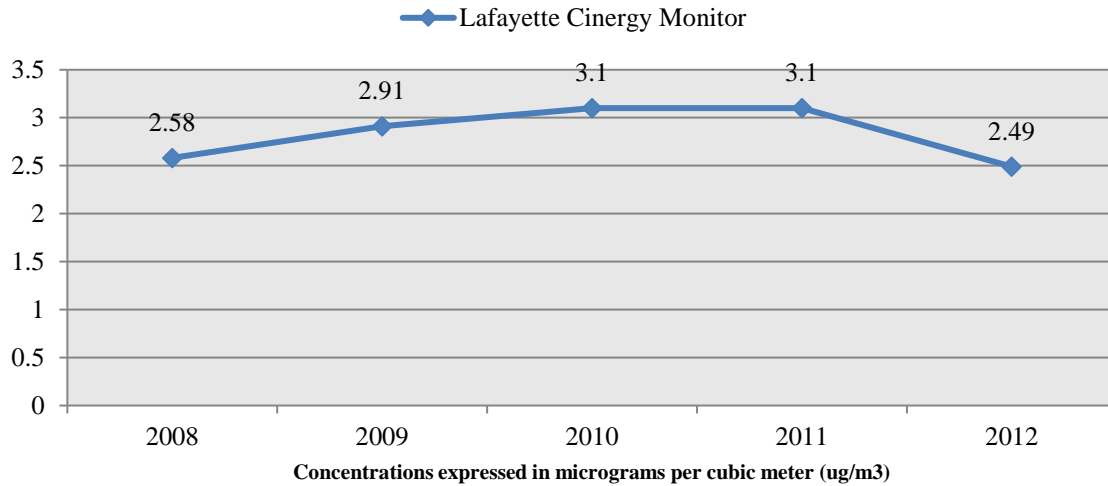
95% UCL Dichlorodifluoromethane Concentrations at Whiting (2006-2015)



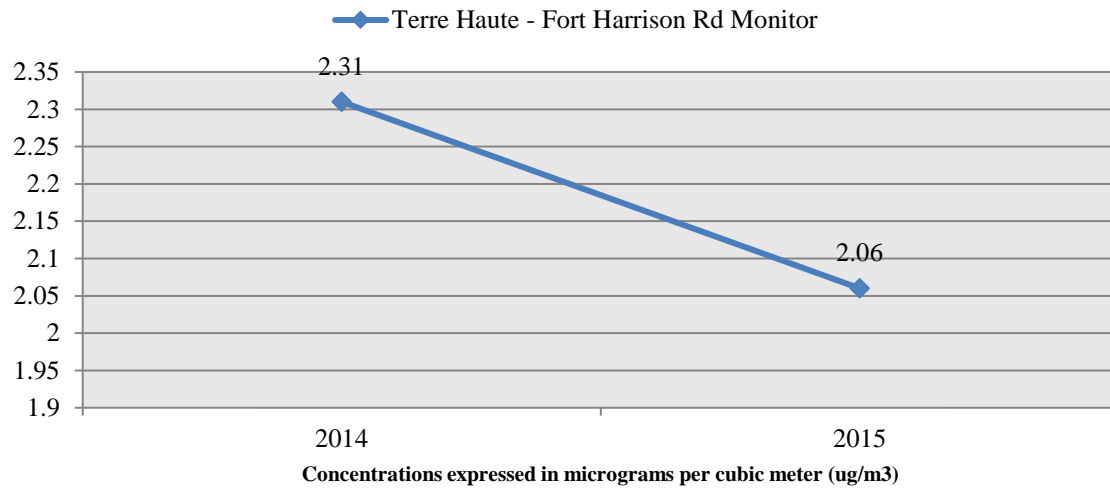
95% UCL Dichlorodifluoromethane Concentrations at Ogden Dunes (2006-2015)



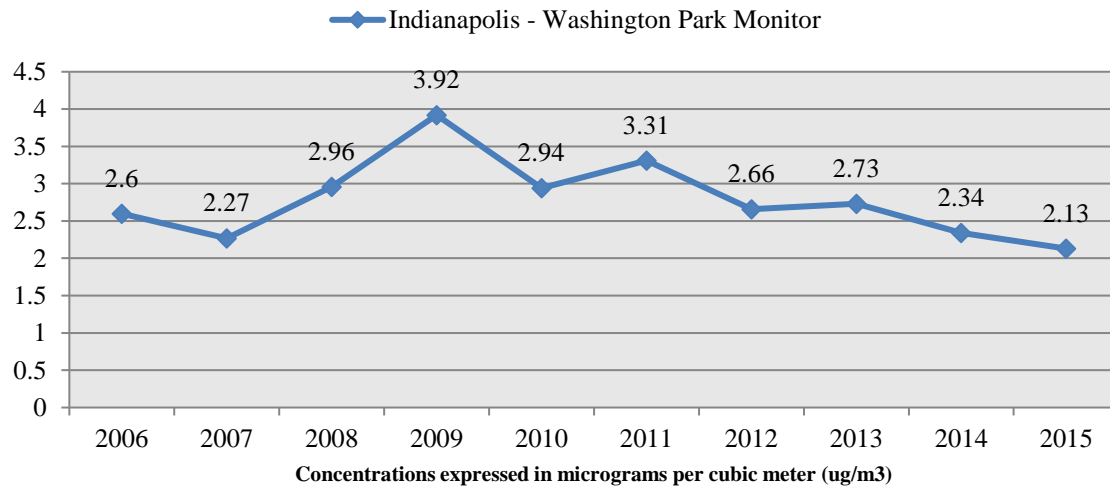
95% UCL Dichlorodifluoromethane Concentrations at Lafayette (2008-2012)



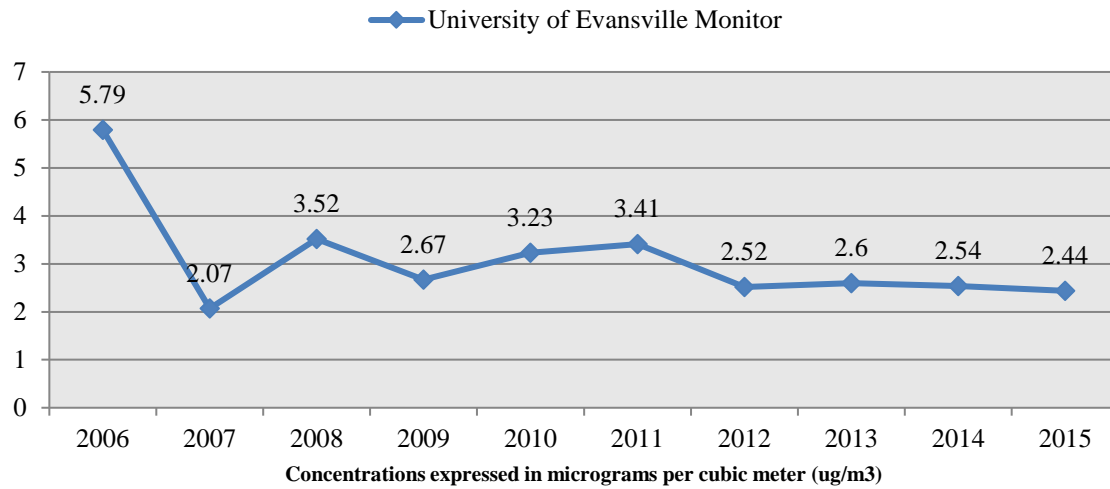
95% UCL Dichlorodifluoromethane Concentrations at Terre Haute (2014-2015)



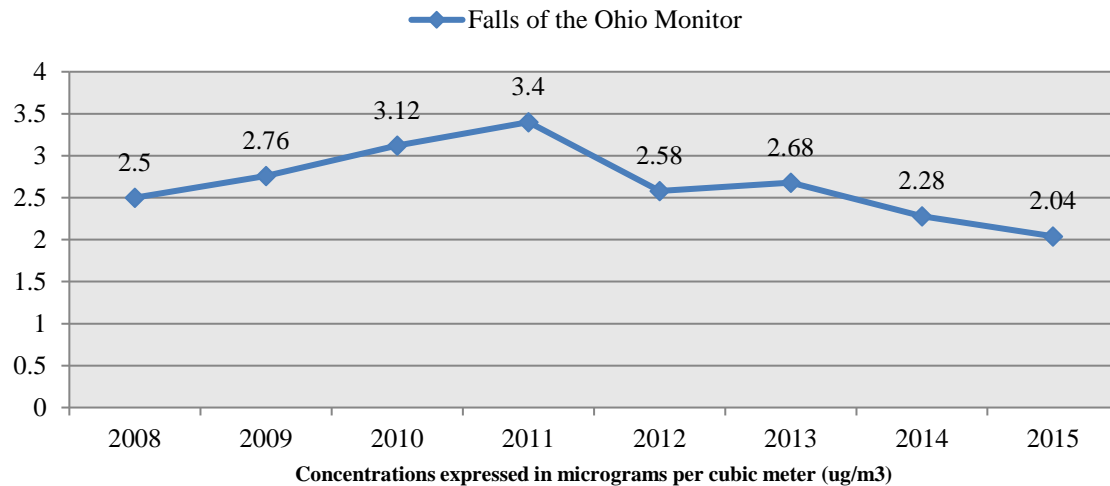
95% UCL Dichlorodifluoromethane Concentrations at Indianapolis (2006-2015)



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



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



The analysis of monitoring data from 2006 to 2015 indicates that concentrations of dichlorodifluoromethane have decreased or held steady at most monitors. The most notable exception is the Whiting monitor where concentrations spiked in 2013 before declining in 2014 and 2015. The 95% UCL value in 2013 was heavily influenced by a string of abnormally high readings during the months of August and September. The highest single reading recorded at Whiting was 25.44 ug/m³ on 6/16/2014. This reading is still well below the Reference Concentration of 200.00. 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 dichlorodifluoromethane 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 dichlorodifluoromethane do not present a risk for non-cancer health effects.

Table 1. Dichlorodifluoromethane 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	2.61	200.00	0.0131
East Chicago Marina	2013-2015	2.59	200.00	0.0130
Gary IITRI	2006-2015	2.73	200.00	0.0137
Hammond CAAP	2006-2015	2.55	200.00	0.0128
Whiting High School	2006-2015	3.36	200.00	0.0168
Ogden Dunes – Diana Rd	2006-2015	2.51	200.00	0.0126
Lafayette Cinergy	2008-2012	2.72	200.00	0.0136
Terre Haute – Fort Harrison Rd	2014-2015	2.15	200.00	0.0108
Indianapolis – Washington Park	2006-2015	2.66	200.00	0.0133
University of Evansville	2006-2015	2.84	200.00	0.0142
Clarksville – Falls of the Ohio	2008-2015	2.60	200.00	0.0130

* Reference Concentration Source: Health Effects Assessment Summary Tables (HEAST)

Cancer Risk

There is no known cancer risk due to exposure to dichlorodifluoromethane.