

## FACT SHEET



### INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

## Criteria Pollutants: Nitrogen Dioxide (NO<sub>2</sub>)

Office of Air Quality – Air Programs Branch

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### **Description:**

- Nitrogen dioxide (NO<sub>2</sub>) is one of a group of highly reactive gases known as nitrogen oxides (NO<sub>x</sub>). Highly reactive gases are those that have a high potential to change in composition under certain conditions of pressure, temperature or light, or upon contact with another chemical. For example, when nitrogen oxides come into contact with volatile organic compounds (also a group of highly reactive gases) in conditions of sunlight and warm temperatures, the two gasses react to form ground-level ozone pollution.
- NO<sub>x</sub> also contributes to the formation of other air pollutants, most notably fine particle pollution.
- Of all of the gasses known as nitrogen oxides, NO<sub>2</sub> is the component of greatest interest. NO<sub>2</sub> is emitted from a number of different sources when fuel is burned at high temperatures. These sources include industrial, commercial and residential combustion units, motor vehicles, and electric utilities.
- NO<sub>x</sub> can be carried on the wind and impact downwind areas that are far away from the source. This is known as regional transport.
- Federal and state programs, such as emission standards for motor vehicles and electric utilities and regulations on the regional transport of NO<sub>x</sub>, have resulted in substantial reductions in NO<sub>2</sub> over the past 30 years.

### **National Ambient Air Quality Standards (NAAQS) for Nitrogen Dioxide:**

- The federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (U.S. EPA) to set National Ambient Air Quality Standards (NAAQS) for six “criteria” pollutants that are considered harmful to public health and the environment. The six criteria pollutants are: particulate matter, carbon monoxide, ground-level ozone, NO<sub>2</sub>, sulfur dioxide, and lead.
- The NAAQS set limits for the criteria pollutants in the ambient air. Limits established to protect human health are referred to as “primary standards”; limits established to prevent environmental damage are referred to as “secondary standards”.
- The CAA requires periodic review of the science upon which the NAAQS are based, as well as the standards themselves. Annual primary and secondary NAAQS were first established for NO<sub>2</sub> in 1971. The most recent revision occurred in January 2010 when U.S. EPA established a 1-hour primary standard in addition to the annual primary and secondary standards.
- The primary NAAQS for NO<sub>2</sub> measured over a 1-hour period is set at 100 parts per billion parts of air. To attain this standard, the three-year average of the 98<sup>th</sup> percentile of the daily maximum 1-hour concentrations cannot exceed 100 parts per billion.
- The primary and secondary NAAQS for NO<sub>2</sub> measured as an annual mean is set at 53 parts of air per billion. To attain the standard, the annual mean concentration cannot exceed 53 parts per billion.

### **Environmental Impacts:**

- Breathing NO<sub>2</sub> has been linked to adverse respiratory effects, including:
  - Increased asthma symptoms.
  - Worsened control of asthma.
  - Increases in respiratory illnesses and symptoms.
  - Increased emergency department visits and hospital admissions for all respiratory illnesses and asthma.
- NO<sub>2</sub> is one of the primary contributors to acid rain, along with sulfur dioxide, which causes acidification of lakes and streams, damage to trees at high elevations, and damage to sensitive forest soils.
- NO<sub>2</sub> contributes to acceleration in the decay of building materials and paint throughout the country.

### **IDEM's Role:**

- The Indiana Department of Environmental Management (IDEM) is responsible for protecting human health and the environment while providing for safe industrial, agricultural, commercial, and governmental operations vital to a prosperous economy.
- IDEM is responsible for protecting air quality in Indiana through the implementation of federal, regional, and state control measures, regulations, and ambient air monitoring.
- IDEM works to protect and improve air quality by monitoring air quality, issuing advisories for the public when air quality may be unhealthy, and educating citizens and businesses about their roles in improving air quality.
- Indiana operates an extensive monitoring network to gather data on levels of criteria pollutants in the ambient air. The data is used to determine if Indiana's air meets the NAAQS. Areas within Indiana which meet air quality standards are classified as "attainment" or, if they do not meet the air quality standards, they are classified as "nonattainment".
- For areas not achieving (attaining) air quality standards, IDEM will work to help communities implement programs to achieve the standards as quickly as possible.
- Data from Indiana's air monitoring network is also used to identify trends in Indiana's air quality and to provide information for U.S. EPA's AIRNow website and the National Air Quality Index (AQI), a daily air quality report.

### **Citizen's Role:**

There are a number of actions citizens can take to reduce their contribution or exposure to NO<sub>2</sub>:

- Buy vehicles with low NO<sub>x</sub> emissions and keep vehicles properly maintained, including tire pressure.
- Use energy efficient appliances, such as those recommended by the Energy Star® program ([www.energystar.gov](http://www.energystar.gov)).
- Reduce home energy consumption by turning off lights, televisions, and other appliances when not in use to reduce emissions from energy production.
- Insulate homes as much as possible.
- Set thermostats lower in the winter and higher in the summer, especially when away from home.
- Carpool, use public transit, bike, or walk whenever possible.

### **Additional Information:**

- For more information on NO<sub>2</sub>, please visit these IDEM websites:
  - [www.IN.gov/idem/airquality/2343.htm](http://www.IN.gov/idem/airquality/2343.htm) for NO<sub>2</sub>-specific information and information for other criteria pollutants for Indiana.
  - [www.IN.gov/idem/airquality/2489.htm](http://www.IN.gov/idem/airquality/2489.htm) for air quality monitoring data for NO<sub>2</sub> and other pollutants.
  - [www.IN.gov/idem/airquality/pages/monitoring\\_data/nox.html](http://www.IN.gov/idem/airquality/pages/monitoring_data/nox.html) for a map of NO<sub>2</sub> monitors and for the most recent NO<sub>2</sub> emission readings.
  - [www.IN.gov/idem/airquality/2424.htm](http://www.IN.gov/idem/airquality/2424.htm) for the nonattainment status for Indiana counties or townships.
- For further information on the NAAQS, visit U.S. EPA's website at <https://www.epa.gov/naaqs>.
- For questions and concerns, feel free to call IDEM's Office of Air Quality at (317) 233-0178 or (800) 451-6027.