



Criteria Pollutants: Carbon Monoxide (CO)

Office of Air Quality - Air Programs Branch

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Description:

- Carbon monoxide (CO) is a colorless, odorless gas formed when carbon in fuels is not burned completely. It is a product of motor vehicle exhaust, which contributes the most CO emissions to the outside (ambient) air nationwide. High concentrations of CO in the ambient air generally occur in areas with heavy traffic congestion.
- Other sources of CO emissions include industrial processes such as carbon black manufacturing, non-transportation fuel combustion, and natural sources like wildfires.
- Peak CO concentrations in the ambient air typically occur during the colder months of the year, when there is an increase in emissions from home heating and idling vehicles and more frequent nighttime temperature inversions that prevent pollutants from dispersing in the atmosphere.
- CO, in the presence of solar radiation, reacts with other chemical compounds to form ground-level ozone.

National Ambient Air Quality Standards (NAAQS) for CO:

- The federal Clean Air Act (CAA) requires 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. These include CO, as well as lead, nitrogen dioxide, particulate matter, ozone at ground level, and sulfur dioxide.
- 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. Primary and secondary NAAQS for CO were first established in April 1971 and included eight-hour and one-hour standards. The most recent revision to the standards was in 1985 when U.S. EPA revoked the secondary standards because there was a lack of evidence of adverse environmental damage.
- To attain the CO NAAQS, air quality must meet both the primary eight-hour and one-hour standards.
 - The primary eight-hour CO standard is set at 9 parts per million parts (ppm) of air, not to be exceeded more than once per year.
 - The primary one-hour CO standard is set at 35 ppm of air, not to be exceeded more than once per year.
- U.S. EPA designates areas that meet the standards as "attainment" and areas that violate the standards as "nonattainment." Nonattainment areas must take steps to attain the standards.

Environmental Impacts:

- CO can cause harmful health effects by reducing oxygen delivery to the body's organs (including the heart and brain) and tissues. For people with heart disease, short-term exposure to CO can further affect their body's ability to respond to the increased oxygen demands of exercise or exertion. CO can be deadly in indoor environments or other closed spaces.
- CO is one of several pollutants that can interact in the presence of sunlight to produce ground-level ozone, or "smog," particularly on hot summer days.

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 works in many ways to improve air quality and protect public health:

- Implements federal, regional, and state control measures and regulations.

- Operates an extensive air quality monitoring network to gather data on pollutants in the ambient air, identify air quality trends, and provide quality assured data to U.S. EPA for air quality designations.
- Issues permits to regulated sources that detail restrictions on CO emissions.
- Works with communities in nonattainment areas to implement programs to achieve the standards as quickly as possible.
- Educates citizens and businesses about their roles in improving air quality.

Citizen's Role:

There are many actions every citizen can take to reduce their contribution or exposure to CO in the outdoor air:

- Carpool, walk, bike, or use public transportation when possible.
- Avoid idling by turning off the engine while waiting in drive-thru lanes (banks or restaurants) or picking up children from school. Combine errands when possible and avoid fast-starts.
- Postpone mowing the lawn or using gasoline-powered garden equipment until 7 p.m.
- Recycle to reduce emissions related to producing paper, plastic, glass bottles, aluminum cans, and cardboard.

Additional Information:

- IDEM's website provides more information concerning air quality including:
 - Overviews for the criteria pollutants including CO, and state implementation plans for attaining the NAAQS: www.in.gov/idem/sips/common-criteria-pollutants/.
 - Air quality monitoring data and reports: www.in.gov/idem/airmonitoring/air-quality-data/.
 - The nonattainment status for Indiana counties and townships: www.in.gov/idem/sips/nonattainment-status-of-counties/.
- U.S. EPA provides further information concerning the NAAQS process on its website at: www.epa.gov/naaqs.
- IDEM regulations do not address CO as it relates to indoor air quality. For information about CO and indoor air quality, visit U.S.EPA's website at www.epa.gov/indoor-air-quality-iaq/carbon-monoxides-impact-indoor-air-quality.
- For questions and concerns, feel free to call IDEM's Office of Air Quality at 317-233-0178 or 800-451-6027, option 4.