

FACT SHEET
FINAL REVISIONS TO THE SECONDARY NATIONAL AMBIENT AIR QUALITY
STANDARDS FOR OXIDES OF NITROGEN AND SULFUR

ACTION

- On March 20, 2012, the U.S. Environmental Protection Agency (EPA) took final action to retain the current secondary National Ambient Air Quality Standards (NAAQS) for oxides of nitrogen (NO_x) and oxides of sulfur (SO_x).
- Since 1980, levels of NO_x and SO_x in the air have fallen by more than 50 percent and more than 80 percent, respectively.
- EPA sets secondary (welfare-based) standards to protect against environmental damage caused by certain air pollutants.
- Consistent with the scientific evidence pointing to the interrelated impacts of NO_x and SO_x on plants, soils, lakes and streams, EPA assessed the environmental effects of these pollutants together.
- This is the first time EPA has reviewed the environmental impacts separately from the health impacts of these pollutants. It is also the first time the Agency has examined the effects of multiple pollutants in one NAAQS review.
- NO_x and SO_x in the air can damage the leaves of plants, decrease their ability to produce food – photosynthesis – and decrease their growth.
- Based on its review of the currently available scientific information and the current secondary NAAQS for NO_x and SO_x, EPA is retaining the existing NO_x and SO_x secondary standards to address the direct effects on vegetation of exposure to gaseous oxides of nitrogen and sulfur in the air (e.g., decreased growth and foliar injury). The existing secondary standards are:
 - For NO₂: 0.053 ppm (parts per million) averaged over a year; and
 - For SO₂: 0.5 ppm averaged over three hours, not to be exceeded more than once per year
- In addition to directly affecting plants, NO_x and SO_x when deposited on land and in estuaries, lakes and streams, can acidify and over fertilize sensitive ecosystems resulting in a range of harmful deposition-related effects on plants, soils, water quality, and fish and wildlife (e.g., changes in biodiversity and loss of habitat, reduced tree growth, loss of fish species, and harmful algal blooms).
 - This final rule recognizes that the existing secondary NO_x and SO_x standards do not provide adequate protection from these harmful deposition-related effects.
- In the review, EPA explored the possibility of developing a multi-pollutant standard to address deposition-related effects of NO_x and SO_x, including aquatic and terrestrial acidification and nutrient enrichment.

- The agency concluded that there is strong scientific support for developing a standard to limit acidifying deposition of these pollutants to sensitive aquatic ecosystems around the country.
 - Because different ecosystems vary in the amount of acid deposition they can tolerate, EPA developed a formula called the “Aquatic Acidification Index” (AAI) that could be used to relate levels of NO_x and SO_x in the air to water quality.
 - EPA is not adding a new, multi-pollutant standard for NO_x and SO_x to address deposition-related effects at this time but will continue to study the impacts these pollutants have on sensitive ecosystems to aid in considering an appropriate multi-pollutant standard.
- The Clean Air Scientific Advisory Committee (CASAC), which provides independent advice to the EPA Administrator on the technical basis for EPA's NAAQS, provided an extensive review of the relevant science. As part of the review, CASAC:
 - Recommended retaining the existing secondary standards to protect against the direct effects on vegetation from NO_x and SO_x.
 - Supported the development of a new, multi-pollutant standard to address effects associated with the acidifying deposition of NO_x and SO_x to help protect lakes and streams as well as fish and wildlife.
 - Noted important uncertainties with a multi-pollutant standard should be considered in this review and addressed in future analyses and reviews.
- While there is strong scientific support for developing a multi-pollutant standard to address these deposition-related effects, EPA does not yet have enough information to set a multi-pollutant standard that would adequately protect the diverse ecosystems across the country.
- To aid in considering an appropriate multi-pollutant standard, EPA, with stakeholder involvement, is planning to collect and analyze data to enhance our understanding of the degree of protectiveness that would likely be afforded by a multi-pollutant standard, specifically to address deposition-related acidification of sensitive aquatic ecosystems. Information from this study will be used to inform the next review of the secondary NAAQS for NO_x and SO_x. Data generated from the study would also inform the development of an appropriate monitoring network to support a multi-pollutant standard.
 - EPA will work with states to address additional implementation-related issues in parallel with the study.

BACKGROUND

- Nitrogen and sulfur oxides include:
 - Sulfur dioxide (SO₂) and nitrogen dioxide (NO₂); these pollutants are used as indicators for the current secondary standards.
 - Particulate sulfate (SO₄)
 - NO_y – includes the transformation products from emissions of oxides of nitrogen (e.g., nitric acid and particulate nitrate)

- Other forms of nitrogen (NH_x), including ammonia, contribute to nitrogen deposition. However, these pollutants are not criteria pollutants.
- Nitrogen oxides come from an array of sources, including emissions from cars, trucks and buses, power plants, off-road equipment, and agricultural sources.
- Sulfur oxides come from fossil fuel combustion by power plants, large industries, and mobile sources, and from some industrial processes.
- In addition to their ecological effects, both NO_x and SO_x contribute to adverse health effects and to the formation of ground-level ozone and fine particle pollution.
 - NO₂ and SO₂ are both linked with a number of adverse effects on the respiratory system.
 - In addition, NO_x and SO_x contribute to an array of adverse respiratory and cardiovascular effects associated with exposure to ozone and fine particles.
- The Clean Air Act requires EPA to set NAAQS for “criteria pollutants.” Currently, six major pollutants are criteria pollutants. In addition to sulfur oxides and nitrogen oxides, the criteria pollutants include ozone, lead, carbon monoxide, and particulate matter. The law also requires EPA to review the standards periodically and revise them if appropriate to ensure that they provide the requisite amount of health and environmental protection and to update those standards as necessary.
- EPA first established standards for NO₂ in 1971, setting both a primary (health-based) standard and a secondary standard at 0.053 ppm, averaged annually.
 - The last review of the primary NO₂ standard was completed in 2010. At that time, EPA established a new *1-hour* NO₂ standard at the level of 100 ppb and retained the *annual average* NO₂ standard of 0.053 ppm.
- EPA first set NAAQS for SO₂ in 1971, establishing a primary *24-hour* standard at 140 ppb and an *annual* average standard at 30 ppb (to protect public health). EPA also set a 3-hour average secondary standard at 0.5 ppm (to protect public welfare).
 - In 2010, EPA revised the primary SO₂ standard by establishing a new *1-hour* standard at a level of 75 ppb. At that time, EPA also revoked the two existing primary standards (the 24-hour and annual) because they would not add additional public health protection.
- The Clean Air Act Acid Rain Program (Title IV) has reduced emissions of SO₂ and NO_x from utilities, but was not designed to fully address aquatic acidification in sensitive ecosystems across the country. Despite observed improvement in many lakes and streams, studies have found evidence of continuing adverse effects in many acid-sensitive areas.
 - The new primary NO₂ and SO₂ 1-hour standards set in 2010, while not specifically designed to protect ecosystems, will result in reductions in NO_x and SO_x emissions that will likely result in some environment benefit for some acid-sensitive areas by reducing acidic deposition to sensitive lakes and streams.

- In addition, other federal rules, such as the final Cross-State Air Pollution Rule and the Mercury and Air Toxics Standards, will substantially reduce emissions of SO_x and NO_x from utilities in the United States.

FOR MORE INFORMATION

- To download a copy of the final rules, go to EPA's Web site at:
<http://www.epa.gov/air/nitrogenoxides/actions.html> or
<http://www.epa.gov/air/sulfurdioxide/actions.html>
- Today's final rule and other background information are also available either electronically at <http://www.regulations.gov>, EPA's electronic public docket and comment system, or in hardcopy at the EPA Docket Center's Public Reading Room.
 - The Public Reading Room is located in the EPA Headquarters, Room Number 3334 in the EPA West Building, located at 1301 Constitution Avenue, NW, Washington, DC. Hours of operation are 8:30 a.m. to 4:30 p.m. eastern standard time, Monday through Friday, excluding Federal holidays.
 - Visitors are required to show photographic identification, pass through a metal detector, and sign the EPA visitor log. All visitor materials will be processed through an X-ray machine as well. Visitors will be provided a badge that must be visible at all times. Materials for this final action can be accessed using Docket ID No. EPA-HQ-OAR-2007-1145.