

**FACT SHEET**  
**FINAL REVISIONS TO THE NATIONAL AMBIENT AIR QUALITY STANDARDS**  
**FOR OZONE**

**SUMMARY OF ACTION**

*Ozone standards*

- On March 12, 2008, EPA significantly strengthened its national ambient air quality standards (NAAQS) for ground-level ozone, the primary component of smog. These changes will improve both public health protection and the protection of sensitive trees and plants.
- EPA is revising the 8-hour “primary” ozone standard, designed to protect public health, to a level of 0.075 parts per million (ppm). The previous standard, set in 1997, was 0.08 ppm. Because ozone is measured out to three decimal places, the standard effectively became 0.084 ppm as a result of rounding.
- EPA is also strengthening the secondary 8-hour ozone standard to the level of 0.075 ppm making it identical to the revised primary standard. EPA decided to strengthen the secondary ozone standard after concluding that the 1997 secondary standard is not adequate to protect public welfare. Current ozone air quality concentrations in many areas of the country -- including some areas that meet the 1997 ozone standards -- are high enough to harm sensitive vegetation and ecosystems.
- EPA estimates that the revised standards will yield health benefits valued between \$2 billion and \$17 billion. Those benefits include preventing cases of bronchitis, aggravated asthma, hospital and emergency room visits, nonfatal heart attacks and premature death, among others.
- In addition, EPA is changing the Air Quality Index (AQI) to reflect the new primary standard. The AQI is EPA’s color-coded tool designed for use by state and local authorities to inform the public about daily air pollution levels in their communities.

*Scientific Review*

- Breathing air containing ozone can reduce lung function and increase respiratory symptoms, thereby aggravating asthma or other respiratory conditions. Ozone exposure also has been associated with increased susceptibility to respiratory infections, medication use by asthmatics, doctors visits, and emergency department visits and hospital admissions for individuals with respiratory disease. Ozone exposure may also contribute to premature death, especially in people with heart and lung disease.
- After evaluating the results of more than 1,700 new scientific studies available for this review, EPA concluded that ozone causes adverse health effects at the level of the 1997 standard and below. This newly available evidence strengthens EPA’s confidence in the findings of the 1997 review and identifies important new health endpoints associated with ozone exposure, including mortality, increased asthma medication use, school absenteeism, and cardiac-related effects. Furthermore, studies of asthmatics indicate that they experience larger and more serious responses to ozone that last longer than responses for healthy individuals.

- In addition, new scientific evidence since the last review of the ozone NAAQS continues to show that repeated exposure to ozone damages sensitive vegetation and trees, including those in forests and parks, leading to reduced growth and productivity, increased susceptibility to disease and pests, and damaged foliage.
- EPA selected levels for the final standards after completing an extensive review of thousands of scientific studies on the impact of ground level ozone on public health and the environment. The Agency also carefully reviewed and considered public comment as well as comment from its Clean Air Scientific Advisory Committee (CASAC) on the proposed standards. EPA held five public hearings and received thousands of written comments.

#### *Clean Air Rules*

- EPA has issued a number of rules that will help states make progress toward meeting the revised ozone standards. These rules will significantly reduce ground-level ozone pollution, both regionally and nationally, by reducing emissions of NOx. These rules include the Clean Air Interstate Rule to reduce ozone forming emissions from power plants in the eastern United States, and the Clean Diesel Program to reduce emissions from highway, nonroad and stationary diesel engines nationwide.

### **DETERMINING COMPLIANCE WITH THE STANDARDS**

- In addition to changing the level of the standards from 0.08 ppm to 0.075 ppm, EPA is now specifying the level of the standard to the third decimal. An area will meet the revised standards if the three-year average of the annual fourth-highest daily maximum 8-hour average at every ozone monitor is less than or equal to the level of the standard (i.e., 0.075 ppm).

### **BENEFITS AND COSTS**

- The Clean Air Act prohibits EPA from considering costs in setting or revising National Ambient Air Quality Standards. To inform the public, the Agency analyzes the benefits and costs of meeting the standards as required by Executive Order 12866 and guidance from the White House Office of Management and Budget.
- To estimate the benefits of meeting a standard, EPA uses a sophisticated peer-reviewed approach to model the relationship between air quality and health and welfare effects, the air quality impacts of implementing future pollution control technologies, and the dollar values of resulting public health improvements.
- EPA's Regulatory Impact Analysis presents a range of benefits for meeting the revised ozone standards:
  - o Based on the largest multi-city study used in EPA's risk analysis, an estimated 260 to 2,000 premature deaths would be avoided annually in 2020. When added to the other projected benefits from reduced ozone, these avoided deaths lead to an estimated total ozone-related benefit of \$3 to \$17 billion per year.

- Using three studies that synthesize data across a large number of individual studies, an estimated 420 to 2,300 premature deaths would be avoided annually in 2020, leading to total monetized ozone-related benefits of between \$4 and \$17 billion per year.
- Alternatively, if there is no causal relationship between ozone and mortality, avoided premature deaths associated with reduced ozone exposure would be zero, and the total monetized ozone-related benefits would range between \$2 billion and \$17 billion per year (including 190 to 2,000 deaths per year avoided due to reduced particle pollution).
- The benefits estimates also include the value of an estimated reduction in the following adverse health effects in 2020:
  - 380 cases of chronic bronchitis,
  - 890 nonfatal heart attacks,
  - 1,900 hospital and emergency room visits,
  - 1,000 cases of acute bronchitis,
  - 11,600 cases of upper and lower respiratory symptoms,
  - 6,100 cases of aggravated asthma,
  - 243,000 days when people miss work or school, and
  - 750,000 days when people must restrict their activities because of ozone-related illnesses

*Note: These benefits estimates reflect both the ozone and particle pollution reductions that would result from a revised ozone standard.*
- To estimate the costs of meeting a standard, EPA uses several peer-reviewed approaches for modeling the cost of using both existing controls and controls that may be developed in the future for reducing NO<sub>x</sub> and VOCs .

EPA estimates that costs of implementing a standard of 0.075 ppm would range from a low of \$7.6 billion to a high of \$8.8 billion annually in 2020.

## **IMPLEMENTING THE STANDARDS**

- These revised standards will lead to substantially improved air quality in urban and rural areas throughout the United States.
- The Clean Air Act requires EPA to designate areas as attainment (meeting the standards), nonattainment (not meeting the standards), or unclassifiable (insufficient data to classify) after the Agency sets a new standard, or revises an existing standard. The following schedule will apply to the revised ozone standards:
  - States must make recommendations to EPA no later than March 2009 for areas to be designated attainment, nonattainment and unclassifiable.

- o EPA will issue final designations of attainment, nonattainment and unclassifiable areas no later than March 2010 unless there is insufficient information to make these designation decisions. In that case, EPA will issue designations no later than March 2011.
- o States must submit State Implementation Plans outlining how they will reduce pollution to meet the standards by a date that EPA will establish in a separate rule. That date will be no later than three years after EPA's final designations. If EPA issues designations in 2010, then these plans would be due no later than 2013.
- o States are required to meet the standards by deadlines that may vary based on the severity of the problem in the area.
- EPA will issue a separate rule to address monitoring requirements necessary to implement the new standards. EPA intends to propose a monitoring rule in June 2008 and issue a final rule by March 2009.

## **BACKGROUND:**

### **WHAT IS OZONE?**

- Ozone is found in two regions of the Earth's atmosphere – at ground level and in the upper regions of the atmosphere. Both types of ozone have the same chemical composition (O<sub>3</sub>). While upper atmospheric ozone forms a protective layer from the sun's harmful rays, ground level ozone is the primary component of smog.
- Ground-level ozone is not emitted directly into the air, but forms through a reaction of nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight.
- Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are the major man-made sources of NO<sub>x</sub> and VOCs.
- Because sunlight and hot weather accelerate its formation, ozone is mainly a summertime air pollutant. Both urban and rural areas can have high ozone levels, often due to transport of ozone or its precursors (NO<sub>x</sub> and VOCs) from hundreds of miles away.

### **OZONE AND PUBLIC HEALTH**

- Health effects associated with exposure to ground-level ozone include:
  - o Reduced lung function, making it more difficult for people to breathe as deeply and vigorously as normal;
  - o Irritated airways, causing coughing, sore or scratchy throat, pain when taking a deep breath and shortness of breath;
  - o Increased frequency of asthma attacks;
  - o Inflammation of and damage to the lining of the lung;
  - o Increased susceptibility to respiratory infection; and
  - o Aggravation of chronic lung diseases such as asthma, emphysema and bronchitis.

- In some people, these effects can lead to:
  - o Increased medication use among asthmatics;
  - o More frequent doctors visits;
  - o School absences; and
  - o Increased emergency room visits and hospital admissions.
- Ozone may continue to cause lung damage even when the symptoms have disappeared.
- Breathing ozone may contribute to premature death, especially in people with heart and lung disease.

## **OZONE AND THE ENVIRONMENT**

- Ground-level ozone can have harmful effects on various plants and ecosystems. When sufficient ozone enters the leaves of a plant, it can:
  - o Interfere with the ability of sensitive plants to produce and store food, making them more susceptible to certain diseases, insects, other pollutants, competition and harsh weather
  - o Visibly damage the leaves of trees and other plants, harming the appearance of urban vegetation, national parks, and recreation areas; and
  - o Reduce forest growth and crop yields.

## **REVIEW OF THE OZONE STANDARDS**

- The Clean Air Act directs EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. National standards exist for six pollutants: ozone, particulate matter, carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide.
- For each of these pollutants, the Clean Air Act requires EPA to set the health-based or “primary” standards at a level judged to be “requisite to protect the public health with an adequate margin of safety” and establish secondary standards that are “requisite” to protect public welfare from “any known or anticipated effects associated with the pollutant in the ambient air” including effects on crops, vegetation, wildlife, buildings and national monuments, and visibility.
- The law requires EPA to review the standards once every five years to determine whether revisions to the standards are appropriate.
- EPA last updated the ozone standards in 1997. The decision to revise the standards was challenged in court by a number of parties and ultimately reached the U.S. Supreme Court. In 2001, the Court unanimously upheld the constitutionality of the 1970 Clean Air Act provision that authorizes EPA to set NAAQS to protect public health and welfare. The Court also affirmed that the Clean Air Act requires EPA to set ambient air quality standards, at levels sufficient but not more than necessary, to protect the public health with an adequate margin of safety, and to protect the public welfare, without considering the economic costs of implementing the standards.

- Under terms of a consent decree, EPA agreed to issue a proposal on the ozone standards by June 20, 2007 and a final rule by March 12, 2008.
- The ozone review process began with an assessment of scientific studies on ozone by EPA's National Center for Environmental Assessment. This assessment was published as an Air Quality Criteria Document for Ozone, which explored the scientific data pertaining to the health and environmental effects associated with ozone. EPA's Office of Air Quality Planning & Standards then prepared a "Staff Paper" document which presented key policy-relevant scientific information, the results of quantitative exposure and risk assessments with associated uncertainties, and a policy assessment that identified policy options, including ranges of standards, for consideration by the Administrator.
- The Criteria Document and Staff Paper underwent extensive scientific and public review, including review by the Clean Air Scientific Advisory Committee (CASAC), EPA's independent scientific advisory body established by the Clean Air Act. As part of its mandate, CASAC makes recommendations to EPA on the adequacy of the existing standards and revisions it believes would be appropriate. Based on the scientific assessments, and taking into account the recommendations of CASAC and public comments, the EPA Administrator must judge whether it is appropriate to revise the standards.
- Before making a final decision on whether to revise the ozone NAAQS, EPA undertook an extensive public review and comment process on its proposed decision of June 20, 2007. The Agency carefully considered and analyzed issues raised in public comments during the public comment period on the proposed rule, which ended October 9, 2007.

#### **FOR MORE INFORMATION**

- Interested parties can download the notice from EPA's Web site at:  
<http://www.epa.gov/groundlevelozone>