



## **CRS Report for Congress**

# **Ozone Air Quality Standards: EPA's Proposed Changes**

James E. McCarthy  
Specialist in Environmental Policy  
Resources, Science, and Industry Division

### **Summary**

EPA is expected to propose changes to the National Ambient Air Quality Standard for ozone on June 20, 2007. The proposal follows a multi-year review of the science regarding ozone's effects on public health and welfare. If the agency decides to strengthen the standard, it will set in motion a long and complicated implementation process that has far-reaching impacts for public health, for sources of pollution in numerous economic sectors, and for states and local governments. This report discusses the standard-setting process and the specifics of the ozone standard, and describes the steps that will follow EPA's proposal.

On June 20, 2007, EPA is expected to propose revisions to the National Ambient Air Quality Standard (NAAQS) for ozone, with final action expected in March 2008.<sup>1</sup> The proposal will set in motion a public comment period, including public hearings in several locations around the country. Because it has widespread implications for public health and for the pollution control measures that will be imposed on sectors of the economy, the proposal is likely to stir congressional interest.

This report provides background on NAAQS, the process used to establish them, the existing ozone standard, and EPA's proposal, as well as information regarding the potential effects of any revision to the standard.

### **What Are NAAQS?**

As defined in Section 109 of the Clean Air Act, NAAQS are standards that apply to ambient (outdoor) air. The act directs EPA to set both primary and secondary standards. Primary NAAQS are standards, "the attainment and maintenance of which in the

---

<sup>1</sup> The schedule was set by a consent decree that settled a lawsuit filed by the American Lung Association (American Lung Association v. Leavitt, D.D.C., No. 03-778, modified consent decree approved 12/16/04). EPA agreed that it would propose whether to retain or revise the ozone standard by June 20, 2007, and take final action by March 12, 2008.

judgment of the [EPA] Administrator ... are requisite to protect the public health,” with “an adequate margin of safety.” Secondary NAAQS are standards necessary to protect public welfare, a broad term that includes damage to crops, vegetation, property, building materials, etc.<sup>2</sup>

NAAQS are at the core of the Clean Air Act, even though they do not directly regulate emissions. In essence, they are standards that define what EPA considers to be clean air. Once a NAAQS has been set, the agency, using monitoring data and other information submitted by the states, identifies areas that exceed the standard and must, therefore, reduce pollutant concentrations to achieve it. After these “nonattainment” areas are identified, state and local governments have three years to produce State Implementation Plans which outline the measures they will implement to reduce the pollution levels and attain the standards. Depending on the severity of the pollution, ozone nonattainment areas have anywhere from 3 to 20 years to actually attain the standard.

EPA also acts to control many of the NAAQS pollutants wherever they are emitted, through national standards for products that emit them (particularly mobile sources, such as automobiles) and emission standards for new stationary sources, such as power plants. Thus, establishment or revision of a NAAQS sets in motion a long and complicated implementation process that has far-reaching impacts for public health, for sources of pollution in numerous economic sectors, and for states and local governments.

The pollutants to which NAAQS apply are generally referred to as “criteria” pollutants. The act defines them as pollutants that “endanger public health or welfare,” and whose presence in ambient air “results from numerous or diverse mobile or stationary sources.”<sup>3</sup> Six pollutants are currently identified as criteria pollutants: ozone, particulates, carbon monoxide, sulfur dioxide, nitrogen oxides, and lead. The EPA Administrator can add to this list if he determines that additional pollutants meet the act’s criteria, or delete them if he concludes that they no longer do so.

The act requires the agency to review each NAAQS every five years. That schedule is rarely met, but it often triggers law suits that force the agency to undertake a review. In the case of ozone, the last review of the NAAQS was completed in 1997. As noted earlier, the American Lung Association filed suit over EPA’s failure to complete a review in 2003, and a consent decree established the schedule EPA is following.<sup>4</sup>

---

<sup>2</sup> The Clean Air Act’s definition of welfare is found in Section 302(h) of the act.

<sup>3</sup> Authority to establish NAAQS comes from both Sections 108 and 109 of the act; this definition of criteria pollutants is found in Section 108. The authority and procedures for controlling the sources of criteria pollutants are found throughout Titles I, II, and IV of the act. Pollutants that are less widely emitted are generally classified as “hazardous air pollutants” and are regulated under a different section of the act (Section 112).

<sup>4</sup> See note 1.

## The NAAQS Process

Reviewing an existing NAAQS is a long process that is described elsewhere in more detail.<sup>5</sup> To summarize briefly, EPA scientists review the scientific literature published since the last NAAQS revision, and summarize it in a report known as a Criteria Document. The review process frequently identifies more than a thousand scientific studies on topics as wide-ranging as the physics and chemistry of ozone in the atmosphere; environmental concentrations, patterns, and exposure; dosimetry and animal-to-human extrapolation; toxicology; interactions with co-occurring pollutants; controlled human exposure studies; epidemiology; effects on vegetation and ecosystems; effects on UVB exposures and climate; and effects on man-made materials. A second document that EPA prepares, the Staff Paper, summarizes the information compiled in the Criteria Document and provides the Administrator with options regarding the indicators, averaging times, statistical form, and numerical level (concentration) of the NAAQS.

To ensure that these reviews meet the highest scientific standards, the 1977 amendments to the Clean Air Act required the Administrator to appoint an independent Clean Air Scientific Advisory Committee (CASAC). CASAC has seven members, largely from academia and from private research institutions. In conducting NAAQS reviews, their expertise is supplemented by panels of the nation's leading experts on the health and environmental effects of the specific pollutants that are under review. These panels can be quite large. The current ozone review panel, for example, has 23 members. CASAC and the public make suggestions regarding the membership of the panels on specific pollutants, with the final selections made by EPA. The panels review the agency's work during NAAQS-setting and NAAQS-revision, rather than conducting their own independent reviews.

## The Ozone Standard

The ozone standard affects a larger percentage of the population than any of the other NAAQS. About half the U.S. population lives in ozone nonattainment areas, 156 million people in all.<sup>6</sup> If the standard is strengthened as a result of the current review, as many expect, more areas would likely be affected, and those already considered nonattainment might have to impose more stringent emission controls.

**The Primary Standard.** The current primary (health-based) standard, promulgated in 1997, is set at 0.08 parts per million (ppm), averaged over an 8-hour period. Allowing for rounding, EPA considers areas with readings as high as 0.084 to have attained the standard.

The current review has found evidence of health effects, including mortality, at levels of exposure below the current standard. As a result, both EPA staff and the Clean

---

<sup>5</sup> For a discussion of the process, and of changes to it that EPA is now implementing, see CRS Report RL33807, *Air Quality Standards and Sound Science: What Role for CASAC?*, by James E. McCarthy.

<sup>6</sup> For information on the nonattainment areas, including maps and population data, see EPA's "Green Book" at [<http://www.epa.gov/oar/oaqps/greenbk/index.html>].

Air Scientific Advisory Committee have recommended strengthening the standard. According to CASAC, “There is no scientific justification for retaining the current primary 8-hr NAAQS ....”<sup>7</sup> The panel unanimously recommended a range of 0.060 to 0.070 ppm for the primary 8-hour standard.

EPA staff also recommended strengthening the standard, in wording not quite so direct. The staff stated, “The overall body of evidence on ozone health effects clearly calls into question the adequacy of the current standard.” They recommended “considering a standard level within the range of somewhat below 0.080 parts per million (ppm) to 0.060 ppm.”<sup>8</sup>

Because a strengthening of the standard would result in additional areas being designated nonattainment, and would mean that current nonattainment areas might have to adopt additional pollution control measures in order to reach attainment, numerous industry groups are reported to have challenged the scientific conclusions in meetings with Administration officials.<sup>9</sup>

**The Secondary Standard.** As part of its current review, EPA has also assessed the secondary NAAQS for ozone, which is currently identical to the primary standard. Ozone affects both tree growth and crop yields, and the damage from exposure is cumulative over the growing season. In order to provide protection against ozone’s adverse impacts, EPA staff recommended a new seasonal (3-month) average for the standard that would cumulate hourly ozone exposures for the daily 12-hour daylight window (termed a “W126 index”). The staff recommended a standard in a range of 7 - 21 parts per million-hours (ppm-hrs). CASAC’s ozone panel agreed unanimously that the form of the secondary standard should be changed as the staff suggested, but it did not agree that the upper bound of the range should be as high as 21 ppm-hours. The panel recommended that the upper bound be no higher than 15 ppm-hours.<sup>10</sup>

## Controlling Ozone Pollution

Controlling ozone pollution is more complicated than controlling many other pollutants, because ozone is not emitted directly by pollution sources. Rather, it forms in the atmosphere when volatile organic compounds (VOCs) react with nitrogen oxides (NOx) in the presence of sunlight. The ozone concentration is as dependent on the temperature and amount of sunshine as it is on the presence of the precursor gases. Ozone

---

<sup>7</sup> Letter of Rogene Henderson, Chair, Clean Air Scientific Advisory Committee, to Hon. Stephen L. Johnson, EPA Administrator, October 24, 2006, available at [<http://www.epa.gov/sab/pdf/casac-07-001.pdf>].

<sup>8</sup> “Review of National Ambient Air Quality Standards for Ozone Final Staff Paper, Human Exposure and Risk Assessments and Environmental Report,” Fact Sheet, at [[http://www.epa.gov/ttn/naaqs/standards/ozone/data/2007\\_01\\_finalsp\\_factsheet.pdf](http://www.epa.gov/ttn/naaqs/standards/ozone/data/2007_01_finalsp_factsheet.pdf)].

<sup>9</sup> “Activists, Industry Offer Competing Data as EPA Ozone Deadline Nears,” *InsideEPA Clean Air Report*, June 14, 2007.

<sup>10</sup> Letter of Rogene Henderson, Chair, Clean Air Scientific Advisory Committee, to Hon. Stephen L. Johnson, EPA Administrator, March 26, 2007, p. 3, available at [<http://www.epa.gov/sab/pdf/casac-07-002.pdf>].

is a summertime pollutant, in general. Other factors being equal, a cool, cloudy summer will produce fewer high ozone readings than a warm, sunny summer.

There are also complicated reactions that affect ozone formation. In general, lower emissions lead to less ozone, particularly lower emissions of VOCs. But under some conditions, *higher* emissions of NO<sub>x</sub> lead to lower ozone readings. This makes modeling ozone air quality and predicting attainment more difficult and contentious than the modeling of other air pollutants.

Most stationary and mobile sources are considered to be contributors to ozone pollution. Thus, there are literally hundreds of millions of sources of the pollutants of concern and control strategies require implementation of a wide array of measures. Among the sources of VOCs are motor vehicles (about 40% of total emissions); industrial processes, particularly the chemical and petroleum industries, and any use of paints, coatings, and solvents (about 40% for these sources combined). Service stations, pesticide application, dry cleaning, fuel combustion, and open burning are other significant sources of VOCs. Nitrogen oxides come overwhelmingly from motor vehicles and fuel combustion by electric utilities and other industrial sources.

## Costs and Benefits of Control

EPA is prohibited from taking cost into account in setting NAAQS, but to comply with an executive order, the agency generally produces a Regulatory Impact Analysis (RIA) analyzing in detail the costs and benefits of new or revised NAAQS standards. In preparation for proposing the ozone NAAQS, EPA is reported to have analyzed three alternatives: 0.074 ppm, 0.070 ppm, and 0.064 ppm.<sup>11</sup> Until a standard is proposed, it is unclear how much detail the agency will make available from its analyses.

## Next Steps

After the Administrator signs a proposed regulation, the proposal goes to the *Federal Register* for publication, a process that may take several weeks. Section 307(d) of the Clean Air Act sets out the procedures for proposal and promulgation. It requires the establishment of a rulemaking docket; it requires that the notice of proposed rulemaking in the *Federal Register* be accompanied by a statement of the proposal's basis and purpose, including a summary of the factual data on which the proposed rule is based, the methodology used in obtaining and analyzing the data, and the major legal interpretations and policy considerations underlying the proposed rule. The statement is required to set forth or summarize and provide a reference to any pertinent findings, recommendations, and comments by CASAC and the National Academy of Sciences, and, if the proposal differs in any important respect from any of these recommendations, provide an explanation of the reasons for such differences. The act also requires that any drafts of proposed and final rules submitted by the Administrator to the Office of Management and Budget (OMB) prior to proposal or promulgation, all documents accompanying those drafts, and all written comments thereon and EPA responses to such comments, be placed in the docket no later than the date of proposal.

---

<sup>11</sup> "With June Deadline Looming, EPA Sends Revisions of Ozone Standard to White House," *Daily Environment Report*, May 30, 2007, p. A-11.

Publication in the *Federal Register* will set in motion a public comment period (generally 60 or 90 days), which is likely to include public hearings at several locations around the country. Upon completion of the public comment period, the agency reviews and summarizes the public comments and the Administrator makes a final choice regarding the standard. Under the consent agreement between EPA and the American Lung Association, the Administrator is required to do so by March 12, 2008.