



# Ozone Air Quality Standards: EPA's Proposed January 2010 Revisions

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## Summary

EPA Administrator Lisa Jackson signed proposed changes to the National Ambient Air Quality Standards (NAAQS) for ozone on January 6, 2010. The proposal appeared in the *Federal Register* on January 19. NAAQS are standards for outdoor (ambient) air that are intended to protect public health and welfare from harmful concentrations of pollution. By changing the standard, EPA would be concluding that protecting public health and welfare requires lower concentrations of ozone pollution than it previously judged to be safe. Under the proposed standards, as many as 96% of the counties that currently monitor ozone might need to take action to reduce emissions. The proposal would also, for the first time, set a separate standard for public welfare, the principal effect of which would be to call attention to the negative effects of ozone on forests and agricultural productivity.

The ozone standard affects a large percentage of the population: as of November 2009, 122 million people (about 40% of the U.S. population) lived in areas classified “nonattainment” for the primary ozone NAAQS. As a result of the standard’s strengthening, more areas will be affected, and those already considered nonattainment may have to impose more stringent emission controls.

The proposed revision would lower the primary (health-based) standard from 0.075 parts per million—75 parts per billion (ppb)—averaged over 8 hours to somewhere in the range of 70 to 60 ppb averaged over the same time. Using the most recent three years of monitoring data, 515 counties (76% of all counties with ozone monitors) would violate the new standard at 70 ppb; 650 counties (96% of those with monitors) would be in nonattainment if the standard is set at 60 ppb. By comparison, only 85 counties have monitors showing exceedance of the currently implemented 1997 standard. Thus, the change in standards will likely have widespread impacts in areas across the country. (The counties that might exceed the proposed standard are shown in **Figure 3** of this report.)

The proposed standards, when finalized in August 2010, 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 state and local governments. The first step, designation of nonattainment areas, is expected to take place in the summer of 2011, with the areas so designated then having 3 to 20 years to reach attainment.

The proposed standards raise a number of issues, including whether they should lead to stronger federal controls on the sources that contribute to ozone pollution. Current federal standards for cars, trucks, nonroad vehicles and engines, power plants, and other stationary pollution sources are not strong enough to bring many areas into attainment, thus requiring local pollution control measures in many cases.

EPA, the states, and Congress may also wish to consider whether the current monitoring network is adequate to detect violations of a more stringent standard. Only 675 of the nation’s 3,000 counties have ozone monitors in place.

This report discusses the standard-setting process, the specifics of the new standard, and issues raised by the Administrator’s choice; and it describes the steps that will follow EPA’s promulgation.

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## Introduction

On January 6, 2010, the EPA Administrator proposed revisions to the National Ambient Air Quality Standards (NAAQS) for ozone. The revisions appeared in the January 19, 2010, issue of the *Federal Register*.<sup>1</sup> Because they have widespread implications for public health and for the pollution control measures that will be imposed on sectors of the economy, the revisions are expected to stir congressional interest and cause a variety of reactions among state and local officials. EPA has scheduled three public hearings (in Arlington, VA, Houston, TX, and Sacramento, CA) during the first week of February, and will accept public comments in writing until March 22. Final standards will be issued by August 31, 2010.

This report provides background on NAAQS, the process used to establish them, the pre-existing ozone standards, and EPA's proposed revisions, as well as information regarding the revisions' potential effects.

## 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 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 up to 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

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<sup>1</sup> 75 *Federal Register* 2938.

<sup>2</sup> The Clean Air Act's definition of welfare is found in Section 302(h) of the act (42 U.S.C. 7602).

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 she determines that additional pollutants meet the act’s criteria, or delete them if she 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 lawsuits that force the agency to undertake a review. In the case of ozone, the American Lung Association filed suit over EPA’s failure to complete a review in 2003, and a consent decree established a schedule under which the Bush Administration’s EPA promulgated revisions to the NAAQS in March 2008.<sup>4</sup> Numerous parties petitioned the courts for a review of that standard,<sup>5</sup> and, with the change of Administrations, EPA itself concluded that it had concerns whether the 2008 standards “satisfy the requirements of the Clean Air Act.” Thus, in September 2009, the agency suspended implementation of the 2008 standards and set a schedule for their review under which the January 2010 proposal was released. EPA is also in the process of reviewing several other NAAQS. For more information, see the “Air Quality Standards” section of CRS Report R40145, *Clean Air Issues in the 111<sup>th</sup> Congress*.

## The NAAQS Process

Reviewing an existing NAAQS is generally a long process. To begin the process, 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 that culminated in the 2008 ozone revision identified 1,700 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 rather large. The review panel for the 2008 ozone standard, for example, had 23 members. CASAC and the public make suggestions regarding the

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<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> 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.

<sup>5</sup> *Mississippi v. EPA*, D.C. Cir., No. 08-1200, notice filed 9/16/09.

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 40% of the U.S. population currently lives in areas designated nonattainment under the 1997 standard for ozone, 122 million people in all.<sup>6</sup> Since the standard has been strengthened as a result of a review completed in 2008 and the Administrator is now proposing a further strengthening, more areas will be affected, and those already considered nonattainment may have to impose more stringent emission controls.

### The Primary Standard

The primary (health-based) standard promulgated in 1997 was set at 0.08 parts per million (ppm), averaged over an 8-hour period. Allowing for rounding, EPA considered areas with readings as high as 0.084 ppm (84 parts per billion) to have attained the standard.

The review completed in 2008 found evidence of health effects, including mortality, at levels of exposure below the 0.08 ppm standard. As a result, both EPA staff and the Clean Air Scientific Advisory Committee (CASAC) recommended strengthening the standard. According to CASAC, "There is no scientific justification for retaining the current [0.08 ppm] primary 8-hr NAAQS."<sup>7</sup> The panel unanimously recommended a range of 0.060 to 0.070 ppm (60 to 70 parts per billion) 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>

Based on these recommendations, and his own judgment regarding the strength of the science, Stephen Johnson, the Bush Administration's last EPA Administrator, chose to finalize the standard at 0.075 ppm (75 parts per billion).<sup>9</sup> That revision has not yet been implemented, however: the designation of nonattainment areas has not been completed, and the Obama Administration's EPA

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<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>.

<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://yosemite.epa.gov/sab/sabproduct.nsf/AB290E0DB8B72A33852572120055858F/\\$File/casac-07-001.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/AB290E0DB8B72A33852572120055858F/$File/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> All of EPA's references to the standard are expressed as parts per million (e.g., 0.075 ppm), but many references in the press convert this to a more readable parts per billion (i.e., 75 parts per billion). In order to avoid confusion when quoting from EPA sources, this report generally uses the more cumbersome parts-per-million form.

announced in September 2009 that it would undertake a further review of the NAAQS before completing the designations.<sup>10</sup>

As shown in **Figure 1**, using 2004-2006 data, 85 counties had monitors showing violation of the old 0.08 ppm primary standard. **Figure 2** shows what happens when the standard is strengthened to 0.075 ppm (75 ppb), again using 2004-2006 data: under the 0.075 ppm standard, 345 counties, more than four times as many, show violations. **Figure 3**, using more recent monitoring data, shows the number of counties that would exceed a standard in the range of 0.060 to 0.070 ppm. At 0.070 ppm, 515 counties (76% of those with monitors) exceeded the standard. At 0.060 ppm, 650 counties—virtually every county with a monitor—exceeded the proposed standard.

EPA notes that nonattainment designations will not actually be made until 2011, and will likely use data for the period 2008-2010. Given the trend toward cleaner air in recent years, and regulations on both mobile and stationary sources that will continue taking effect in the next few years, the agency expects the number of counties exceeding the standard to be less than indicated by these projections. Nevertheless, because a strengthening of the standard will result in some (perhaps a substantial number of) additional areas being designated nonattainment, and will mean that current nonattainment areas may have to adopt additional pollution control measures in order to reach attainment, numerous industry groups were reported to have challenged the scientific conclusions in meetings with Bush Administration officials before the 2008 review was completed.<sup>11</sup> Some of the same concerns may surface in the public comment period on the 2010 revision.

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<sup>10</sup> See “Fact Sheet: EPA to Reconsider Ozone Pollution Standards,” September 16, 2009, at [http://www.epa.gov/groundlevelozone/pdfs/O3\\_Reconsideration\\_FACT%20SHEET\\_091609.pdf](http://www.epa.gov/groundlevelozone/pdfs/O3_Reconsideration_FACT%20SHEET_091609.pdf).

<sup>11</sup> “EPA Target of Intensive Lobbying Over Forthcoming Ozone Decision,” *Daily Environment Report*, March 10, 2008, p. A-3, and “Energy Industry Presents Case to Preserve Existing Air Quality Standard for Ozone,” *Daily Environment Report*, February 6, 2008, p. A-9.

**Figure I. Counties with Monitors Violating the 1997 Eight-Hour Ozone Standard (0.08 parts per million)**  
(Based on 2004-2006 Air Quality Data)

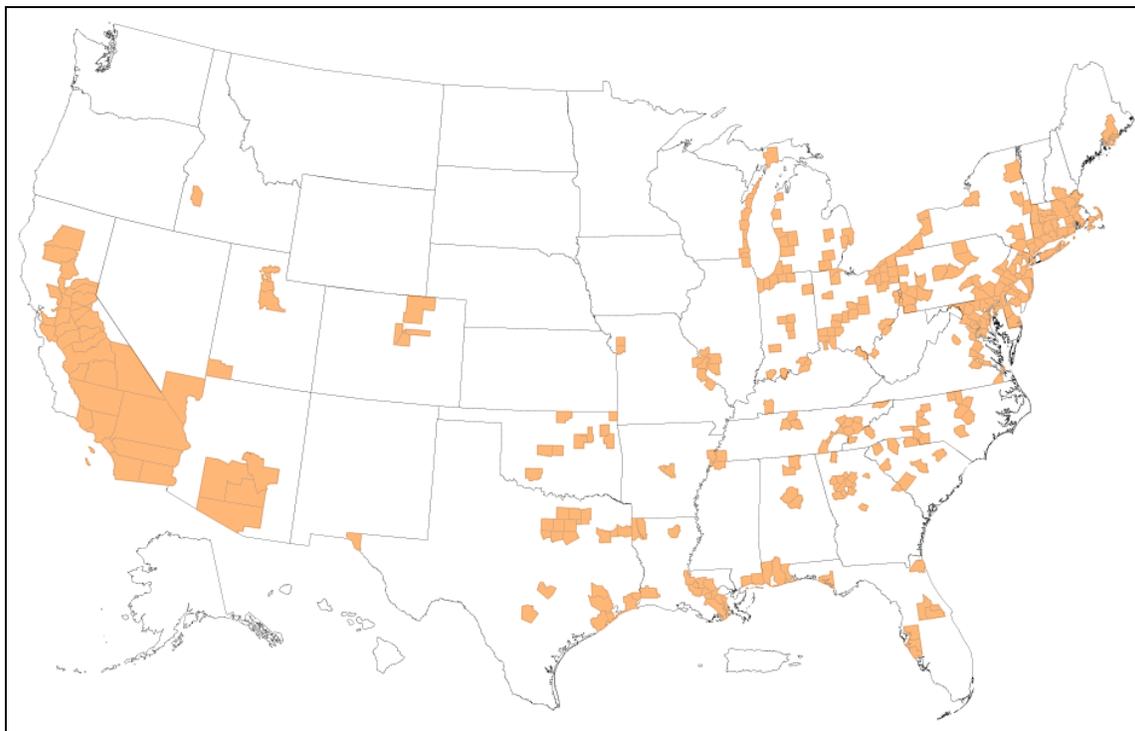


**Source:** U.S. EPA.

**Notes:** (1) 85 monitored counties violate. (2) Monitored air quality data can be obtained from the AQS system at <http://www.epa.gov/ttn/airsaq/>. (3) The 1997 national ambient air quality standard (NAAQS) for ozone of 0.08 ppm is effectively expressed as 0.084 ppm when data handling conventions are applied.

**Figure 2. Counties with Monitors Violating the Eight-Hour Ozone Standard Promulgated in 2008 (0.075 parts per million)**

(Based on 2004-2006 Air Quality Data)

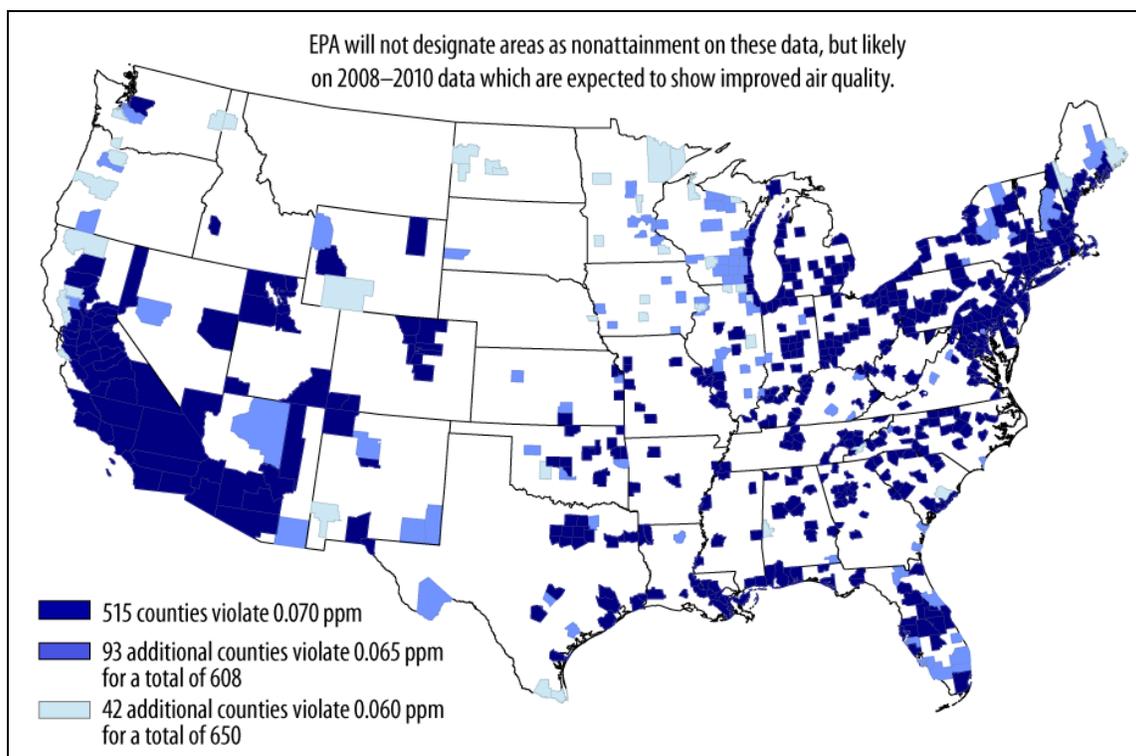


**Source:** U.S. EPA.

**Note:** Estimates were based on the most recent data at the time of promulgation (2004-2006). 345 monitored counties violate the 2008 8-hour ozone standard of 0.075 parts per million (ppm), based on those data. Monitored air quality data can be obtained from the AQS system at <http://www.epa.gov/ttn/airsaqs/>

**Figure 3. Counties With Monitors Violating Proposed Primary 8-hour Ground-level Ozone Standards, 0.060-0.070 parts per million**

(Based on 2006–2008 Air Quality Data)



**Source:** U.S. EPA

**Notes:** (1) No monitored counties outside the continental U.S. violate. (2) EPA is proposing to determine compliance with a revised primary ozone standard by rounding the three-year average to three decimal places.

## The Secondary Standard

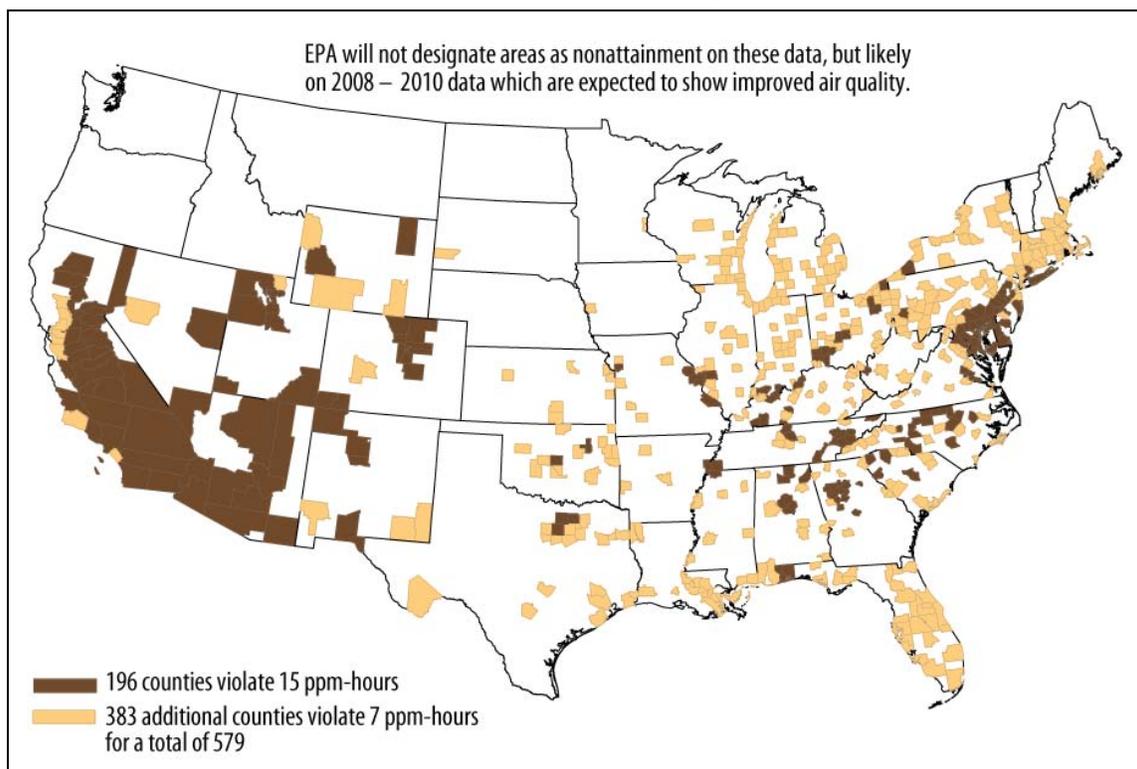
As part of the review completed in 2008, EPA also assessed the secondary (public welfare) NAAQS for ozone, which was identical to the previous 0.08 ppm primary standard. Ozone affects both tree growth and crop yields, and the damage from exposure is cumulative over the growing season. In order to provide protection against ozone's adverse impacts, EPA staff recommended a new seasonal (3-month) average for the secondary 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-hours). 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, suggesting that the upper bound be no higher than 15 ppm-hours.<sup>12</sup> The Administrator's June 2007 proposal was in line with the staff recommendation, 7-21 ppm-hours, but his final March 2008 choice was to duplicate the primary standard he promulgated at that time. He set a

<sup>12</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://yosemite.epa.gov/sab/sabproduct.nsf/FE915E916333D776852572AC007397B5/\\$File/casac-07-002.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/FE915E916333D776852572AC007397B5/$File/casac-07-002.pdf).

secondary standard at 0.075 ppm averaged over 8 hours, rejecting the advice of both CASAC and his staff.

**Figure 4. Counties With Monitors Violating Proposed Secondary Seasonal Ground-Level Ozone Standards, 7–15 parts per million-hours**

(Based on 2006–2008 Air Quality Data)



**Source:** U.S. EPA

**Notes:** No monitored counties outside the continental U.S. violate.

The secondary standard carries no deadline for attainment and has never been the subject of penalties or sanctions for areas that failed to meet it (unless they also violated a primary standard), but there was substantial disagreement between the Bush Administration EPA and the White House over the form in which this standard should be set. (For a discussion, see archived CRS Report RL34057, *Ozone Air Quality Standards: EPA's March 2008 Revision*.)

The new (January 2010) proposal would adopt the W126 index and would set the secondary standard at 7-15 ppm-hours, in line with CASAC's recommendations. As shown in **Figure 4**, nonattainment with the proposed secondary standard could be widespread: based on the latest available (2006-2008) data, 196 counties would be nonattainment if the secondary standard were set at 15 ppm-hours, and 579 counties (86% of all counties with monitors) would be nonattainment under a 7 ppm-hours standard. As discussed further below, however, few rural counties have ozone monitors, so the true extent of nonattainment with the secondary standard is unknowable. EPA has proposed additional ozone monitoring requirements for both urban and

non-urban areas and expects to issue a final monitoring rule in coordination with the final ozone standards in August 2010.<sup>13</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 (NO<sub>x</sub>) 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. In general, ozone is a summertime pollutant. 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 (E.O. 12866) and guidance from the Office of Management and Budget, the agency generally produces a Regulatory Impact Analysis (RIA) analyzing in detail the costs and benefits of new or revised NAAQS standards. The agency produced an RIA for its 2008 ozone NAAQS, and it released an 89-page supplement to that RIA in conjunction with the January 2010 proposal. The major conclusions regarding benefits and costs were also included in a Fact Sheet posted on the agency's website.<sup>14</sup> The analysis shows a wide range of estimates for benefits, from a low of \$13 billion annually to a high of \$100 billion annually in 2020. Estimates of the costs of implementing the standard also range widely, from \$19 billion to \$90 billion annually in 2020.

The public health benefits of setting a more stringent ozone standard are the monetized value of such effects as fewer premature deaths, fewer hospital admissions, fewer emergency room visits, fewer asthma attacks, less time lost at work and school, and fewer restricted activity days.<sup>15</sup> The

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<sup>13</sup> See "Fact Sheet: Proposal to Revise the National Ambient Air Quality Standards for Ozone," p. 4, at <http://www.epa.gov/air/ozonepollution/pdfs/fs201001106std.pdf>.

<sup>14</sup> The supplement and the Fact Sheet can be accessed at <http://www.epa.gov/air/ozonepollution/actions.html#jan10s>.

<sup>15</sup> For a full discussion of these variables and their monetized values, see Chapter 6 of the RIA at <http://www.epa.gov/> (continued...)

Fact Sheet accompanying the proposed standards states that the benefits of a 0.070 ppm primary standard would include the avoidance of 1,500 to 4,300 premature deaths annually in 2020, whereas the more stringent 0.060 ppm standard would avoid 4,000 to 12,000 premature deaths annually.<sup>16</sup> Other benefits in 2020 would include preventing the following, annually<sup>17</sup>:

- 880 to 2,200 cases of chronic bronchitis
- 2,200 to 5,300 nonfatal heart attacks
- 6,700 to 21,000 hospital and emergency room visits
- 2,100 to 5,300 cases of acute bronchitis
- 44,000 to 111,000 cases of upper and lower respiratory symptoms
- 23,000 to 58,000 cases of aggravated asthma
- 770,000 to 2.5 million days when people miss work or school
- 2.6 million to 8.1 million days when people must restrict their activities.

In the supplement, the agency notes that “there are significant uncertainties in both cost and benefit estimates for the full range of standard alternatives.” Among the uncertainties are unquantified benefits (the effects of reduced ozone on forest health and agricultural productivity, for example) and unquantified disbenefits (reduced screening of UVB radiation and reduced nitrogen fertilization of forests and cropland). The benefits will also vary, depending on which of the precursor pollutants nonattainment areas choose to control.

The RIA also states, “Of critical importance to understanding these estimates of future costs and benefits is that they are not intended to be forecasts of the actual costs and benefits of implementing revised standards.”<sup>18</sup> If past experience is any guide, this is likely to mean that costs will not be as great as they are projected to be. In the agency’s words, “Technological advances over time will tend to increase the economic feasibility of reducing emissions, and will tend to reduce the costs of reducing emissions.”<sup>19</sup> Benefits, meanwhile, will remain difficult to quantify, in part because of the difficulty of quantifying and valuing lives lost prematurely and other adverse health effects due to exposure to pollution.

## Issues

The major issues raised by the proposed standards concern whether the Administrator has made appropriate choices (i.e., whether her choices for the primary and secondary standards are backed by the scientific studies). Unlike the choices made by Administrator Johnson in 2008, both the

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(...continued)

ttn/ecas/regdata/RIAs/6-ozoneriachapter6.pdf.

<sup>16</sup> “Fact Sheet: Supplement to the Regulatory Impact Analysis for Ozone,” at <http://www.epa.gov/air/ozonepollution/pdfs/fs20100106ria.pdf>.

<sup>17</sup> In each case, the low end of the range represents EPA’s estimate of the benefit from a 0.070 ppm standard; the high end of the range represents the benefit of a 0.060 ppm standard.

<sup>18</sup> Supplement to the RIA for Ozone, p. S-9.

<sup>19</sup> *Ibid.*, p. S-12.

primary and secondary standards proposed by Administrator Jackson reflect the range of values and the statistical form recommended by the agency's independent science advisers, CASAC.

Other issues will undoubtedly be raised as affected industries, state environmental agencies, public interest and environmental groups, and Members of Congress review what EPA has promulgated, including the potential impacts of the new standards on public health and on the economy. In looking at potential impacts, EPA projected air quality to the year 2020, incorporating the expected reductions in emissions from a slew of federal regulations, including the Clean Air Interstate Rule (CAIR), the Clean Air Mercury Rule, the Clean Air Visibility Rule, the Tier 2 auto and light truck emission standards, several rules affecting diesel engines, and some state and local measures. Even with these controls, the agency projects that 99 counties in 19 states (counties that include some of the nation's biggest cities) would violate the 70 ppb standard in 2020. If the final standard is set at 60 ppb, 451 counties in 44 states are projected to be in nonattainment.<sup>20</sup> Furthermore, most nonattainment areas will not be given until 2020 to attain the standards: for most, the deadline will be 2014 or 2017 (based on the degree to which pollutant concentrations exceed the new standard). This suggests a mismatch between the full impact of federal regulations on specific categories of emission sources and the requirement that local areas demonstrate attainment. This mismatch could support a case for stronger federal controls on the sources of ozone precursors or a reexamination of the attainment deadlines.

Another issue arises from a close inspection of EPA's maps: whether the current monitoring network is adequate to detect violations of a more stringent standard. Only 675 of the nation's 3,000 counties have ozone monitors in place. With as many as 650 of them (96%) showing violations of the most stringent proposed standard, using current data, how confident is the agency that the 2,350 counties without monitors would all be in attainment? The current monitors are generally found in urban areas, because of the larger population potentially affected, and because most of the sources of ozone precursor emissions are located in such areas. But, as noted earlier, ozone is not emitted directly by polluters. It forms in the atmosphere downwind of emission sources. Thus, rural areas can have high ozone concentrations, unless they are located a substantial distance from any urban area. In addition to the potential health impacts of ozone in rural areas, the new form of the secondary NAAQS proposed by EPA suggests a need for additional monitoring in rural areas to detect impacts on forests and agricultural production.

The agency has, in a separate rulemaking, proposed changing the minimum monitoring requirements for both urban and non-urban areas.<sup>21</sup> That proposal would require that each state operate at least three ozone monitors in non-urban areas. It would also require at least one ozone monitor in each urban area with a population between 50,000 and 350,000.

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<sup>20</sup> For a map showing the 2020 projections, see map 4 in EPA's briefing materials at <http://www.epa.gov/air/ozonepollution/pdfs/20100104maps.pdf>.

<sup>21</sup> 74 *Federal Register* 34525, July 16, 2009.

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