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Air Quality: EPA's Proposed Changes to the Particulate Matter (PM) Standard

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Summary

On December 20, 2005, EPA Administrator Stephen Johnson signed a proposed revision to the National Ambient Air Quality Standards (NAAQS) for particulate matter (PM). In developing the revision, EPA reviewed 2,000 scientific studies and found associations between particulates in ambient air and numerous significant health problems, including aggravated asthma, chronic bronchitis, reduced lung function, irregular heart beat, heart attacks, and premature death in people with heart or lung disease. In the nine cities EPA analyzed, particulates would cause an estimated 4,729 premature deaths unless current standards are strengthened, according to agency data.

The proposal would strengthen the existing standard for "fine" particulate matter 2.5 micrometers or less in diameter ($PM_{2.5}$) and for larger, but still inhalable, coarse particles ($PM_{10-2.5}$). The existing PM standard promulgated in 1997 is only now beginning to be implemented. The proposal would cut almost in half the allowable concentration of $PM_{2.5}$ in the air, averaged over 24-hour periods, from 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$. Eighty-eight million people live in the 208 counties designated as "nonattainment" areas for the current $PM_{2.5}$ NAAQS. The proposal is expected to nearly double the number of counties where monitored PM pollution exceeds the standard. The proposal would eliminate some, but not most, of the premature mortality. Data compiled by the American Lung Association from EPA risk assessments indicate the proposed standard would eliminate only 22% of estimated $PM_{2.5}$-related premature deaths in the nine cities studied.

In addition to the 24-hour standard for $PM_{2.5}$, an *annual* $PM_{2.5}$ NAAQS addresses human health effects from chronic exposures to the pollutants. The Administrator proposed to leave the annual standard unchanged at 15 $\mu g/m^3$, counter to the recommendations of the Clean Air Scientific Advisory Committee (CASAC), an independent scientific body that advises the Administrator. CASAC recommended that this standard be reduced to a range of 13 to 14 $\mu g/m,^3$ a step that might have required more stringent controls in additional nonattainment areas. The December 20 proposal also would set a 24-hour standard for slightly larger, but still inhalable, particles in the range of 10 to 2.5 micrometers ($PM_{10-2.5}$). The Administrator proposes to focus this standard on urban, industrial, and construction sources, excluding any mix of particles "dominated by rural windblown dust and soils and PM generated by agricultural and mining sources."

In addition to the divergence from the CASAC's recommendation, several elements of the proposed PM standard may prove controversial, including the exclusion of rural sources from the coarse particle standard. Some may also question the EPA's strengthening of the standard for *all* fine particles, without distinguishing their source or chemical composition. Establishment of PM NAAQS in 1997 proved controversial and included extensive Congressional oversight. Congress may conduct oversight of the December 2005 proposal, given its potential for public health and economic impacts. Under a consent agreement, the Administrator is to promulgate final revisions to the standard by September 27, 2006. This report will be updated.

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Introduction

To provide increased protection against potential health effects associated with short- and long-term exposure to particulate matter (including chronic respiratory disease and premature mortality), the Environmental Protection Agency (EPA) announced a proposal to change the National Ambient Air Quality Standards (NAAQS)[1] for particulate matter (PM) on December 20, 2005 (71 *Federal Register* 2620, January 17, 2006). The proposal includes changes to standards for fine and coarse particles and is expected to generate controversy and national debate, as well as oversight in Congress, as did the previous changes leading up to the existing PM standard promulgated in 1997. By consent agreement,[2] EPA is to finalize its decision regarding the PM NAAQS by September 27, 2006.

The proposal is the culmination of EPA's statutorily required[3] review of the NAAQS and the scientific criteria for setting the standards, which the agency initiated not long after their 1997 promulgation. Based on its review and analysis of numerous scientific studies available between 1997 and 2002, and on determinations made by the Administrator, EPA's proposal would tighten the current standards primarily by lowering the daily (24-hour) standard for fine particles smaller than 2.5 microns ($PM_{2.5}$). The proposal would also modify the standards for inhalable coarse particles smaller than 10 microns but larger than 2.5 microns ($PM_{10-2.5}$). Several public interest groups and scientists, including an EPA independent advisory committee, advocated tightening the standards further than proposed. Others contend that data do not support the need for stricter standards or, in some cases, the 1997 standards.

EPA has estimated that current air quality regulations for reducing PM will annually prevent "tens of thousands of premature deaths and reduce hospitalizations for cardiovascular and respiratory illness by tens of thousands more..." resulting in $100's of billions in benefits.[4] Although EPA has not yet released a regulatory

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[1] Sections 108-109 of the Clean Air Act (CAA).

[2] Consent Agreement, July 2003, C.A. No. 03-778 (ESH). *American Lung Association, et al. v. EPA et al*, U.S. District Court for the District of Columbia, as modified.

[3] Section 109(d)(1)) of the CAA.

[4] EPA Press release: *EPA Particulate Matter Research Report Released*, September 9, 2004 [http://www.epa.gov/pmresearch/pm_research_accomplishments/].

impact analysis (RIA) assessing the costs and benefits of its PM NAAQS proposal,[5] preliminary estimates of risk reductions and areas affected by EPA and others suggest the changes will add further similar benefits. On the other hand, tighter standards will impose additional compliance requirements on communities, states, industry, and others, at what some stakeholders contend will be a substantial economic cost. At the time of the 1997 promulgation, EPA estimated the costs to partially attain the 1997 $PM_{2.5}$ standard by 2010 at $8.6 billion annually,[6] whereas industry estimates were several times higher.

This report summarizes EPA's proposed changes to the PM NAAQS and the range of alternative NAAQS recommended by staff and the independent advisory committee, followed by highlights of potential issues and concerns associated with the proposal and other PM NAAQS alternatives more stringent than the current standards. For a detailed discussion of the NAAQS process, see CRS Report 97-722 ENR, *Air Quality Standards: The Decisionmaking Process*, by John E. Blodgett and Larry B. Parker; for more information on the implementation of the current $PM_{2.5}$ NAAQS promulgated in 1997, see CRS Report RL32431, *Particulate Matter ($PM_{2.5}$): National Ambient Air Quality Standards (NAAQS) Implementation*, by Robert Esworthy.

EPA's Proposed Changes to the PM NAAQS

Under Sections 108-109 of the Clean Air Act (CAA), EPA sets NAAQS for pollutants whose emissions "may reasonably be anticipated to endanger public health (primary standards) or welfare (secondary)" and "the presence of which in the ambient air results from numerous or diverse mobile or stationary sources" (42 U.S.C. 7408(a)(1)).[7] EPA's 1997 revisions to the PM NAAQS (62 *Federal Register* 38652-38896, July 18, 1997) revised the standards established in 1987[8] that focused on particles smaller than 10 microns (PM_{10} or coarse particles) and introduced standards for "fine" particles smaller than 2.5 microns ($PM_{2.5}$) for the first time.

The current primary (health protection) NAAQS for both $PM_{2.5}$ and PM_{10} include an annual and a daily (24-hour) limit. To attain the annual standard, the three-year average of the weighted annual arithmetic mean PM concentration at each

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[5] The results of analyses that EPA conducted in the process of developing a regulatory impacts analysis (RIA) to accompany the proposed PM NAAQS are summarized in *EPA White Paper Preliminary Analyses of Proposed PM2.5 NAAQS Alternatives* (Office of Air Quality Planning and Standards Office of Air and Radiation, December 21, 2005), which can be accessed at [http://www.epa.gov/air/particles/pdfs/whitepaper20051220.pdf].

[6] EPA, *Regulatory Impact Analysis for the Particulate Matter and Ozone National Ambient Air Quality Standards and Proposed Regional Haze Rule*, July 1997, p. ES-18. Available at [http://www.epa.gov/ttn/oarpg/naaqsfin/ria.html]. Table 13-1.

[7] EPA has promulgated NAAQS for six principal pollutants classified by the agency as "criteria pollutants": sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), ozone, lead, and particulate matter (PM).

[8] PM_{10} NAAQS were promulgated in 1987 (52 *Federal Register* 24640, July 1, 1987).

monitor within an area must not exceed the maximum limit set by the agency. The 24-hour standards are a concentration-based percentile form, indicating the percent of the time that a monitoring station can exceed the standard. For example, a 99th percentile 24-hour standard indicates that a monitoring station can exceed the standard 1% of the time during the year. For $PM_{2.5}$ and PM_{10}, the secondary NAAQS, which are set at a level "requisite to protect the public welfare" (42 U.S.C. 7409(b)(2)),[9] are the same as the primary standards.

As proposed, the $PM_{2.5}$ and PM_{10} standards would be as follows:

- **$PM_{2.5}$:** strengthen the *daily* standard, which currently allows no more than 65 micrograms per cubic meter ($\mu g/m^3$), by setting a new lower limit of 35 $\mu g/m^3$, based on the current three-year average of the 98th percentile of 24-hour $PM_{2.5}$ concentrations.

- **PM_{10}:** replace the current particle size indicator of PM_{10} with a range of 10 to 2.5 micrometers ($PM_{10-2.5}$), referred to as inhalable (or thoracic) coarse particles; set a $PM_{10-2.5}$ *daily* standard of 70 $\mu g/m^3$ rather than the current PM_{10} daily standard of 150 $\mu g/m^3$; narrow the focus of the $PM_{10-2.5}$ standard on "urban and industrial" sources, and exclude particles typical to rural areas, including "windblown dust and soils and PM generated by agricultural and mining sources"; eliminate the current *annual* maximum concentration standard for PM_{10} (50 $\mu g/m^3$) and do not propose an *annual* standard for $PM_{10-2.5}$.[10]

The proposal to change the indicator of the standard for coarse particles is in response to a 1999 U.S. Court of Appeals for the D.C. Circuit decision[11] directing EPA to ensure that the standard did not duplicate the regulation of fine particles. EPA's standard for PM_{10}, as modified by the 1997 changes to the PM NAAQS, was challenged shortly after promulgation. Concluding that PM_{10} was a "poorly matched indicator" for thoracic coarse particles because it included the smaller $PM_{2.5}$ category as well as the larger particles, the Court of Appeals remanded the standard to EPA.

The proposed $PM_{2.5}$ daily standard is among the less stringent within the range of alternative levels recommended by EPA staff, and the annual standard is not as stringent as the standard recommended by the independent Clean Air Science Advisory Committee (CASAC) mandated under Section 109(d)(2) of the CAA (see

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[9] The use of public welfare in the CAA "includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants" (42 U.S.C. 7602(h)).

[10] Based on the findings in the EPA Criteria Document and Staff Paper, and the CASAC's concurrence, that studies reviewed do not provide sufficient evidence regarding *long-term* exposure to warrant continuation of an annual standard, see 71 *Federal Register* 2653, *Section III. Rationale for Proposed Decision on Primary PM10 Standards*, July 17, 2006.

[11] *American Trucking Associations v. EPA*, 175 F.3d 1027, 1053-55 (D.C. Cir. 1999).

discussion in the next section of this report). The $PM_{10-2.5}$ standards, as proposed, are similar to the recommendations of the staff and the CASAC.

In response to the discrepancies between the proposal and the recommendations, the EPA Administrator emphasized that the standard is a proposal subject to public comment and that the agency planned to assess information contained in more recent studies.[12] The Administrator indicated that his decision required consideration of a number of factors and "judgment based upon an interpretation of the evidence." The Administrator relied on the evidence of long-term exposure studies as the principal basis for retaining the annual $PM_{2.5}$ standard.[13] EPA has asked for broad public comment on the proposed standards for fine and coarse particles, as well as comment on a range of alternative standards, including no changes to the current 1997 annual and daily standards and more stringent standards than proposed — similar to those recommended by EPA staff and the CASAC.

Alternative PM Standards

Section 109(d)(1)) of the CAA requires EPA to review the criteria that serve as the basis for the NAAQS for each covered pollutant every five years, to either reaffirm or modify established NAAQS. The process for setting and revising NAAQS consists of the statutory steps incorporated in the CAA over a series of amendments. Several other steps have also been added by the EPA, by executive orders, and by subsequent regulatory reform enactments by the Congress.

The CAA is quite specific on certain steps of the process — in particular, on the preparation of a "criteria document" summarizing the scientific information, on the review of that document by an independent scientific committee, on the criteria to be used by the Administrator in deciding on the final standard, and on the procedural process for promulgating the standard. In addition, EPA has administratively added a key step, the preparation of a "staff paper" that summarizes the criteria document and lays out policy options. Supplemental to public comment, the CASAC reviews each criteria document and staff paper as it is prepared, recommends improvements, and, after further meetings and reviews, signs off *only* when the CASAC panel of members is convinced that each accurately reflects the status of the science. The CASAC closure letter indicates that the majority of the CASAC panel members agree that the criteria document and the staff paper provide an adequate scientific basis for regulatory decisionmaking.

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[12] Transcript of December 20, 2005, media conference call with EPA Administrator Johnson, available at [http://www.epa.gov/air/particles/actions.html], visited January 4, 2005.

[13] For the EPA Administrator's rationale for proposing to retain the current level for the annual $PM_{2.5}$ standard and recognition of the CASAC's recommendation not endorsing this approach, see 71 *Federal Register* 2650-2653.

EPA released the report *Air Quality Criteria for Particulate Matter* on October 29, 2004, following sign-off by the CASAC.[14] The criteria document is the result of a rigorous evaluation of research information relevant to PM NAAQS criteria development from pertinent literature available between early 1996 through April 2002, and a few relevant studies published through 2003. In July 2005, EPA published its final "staff paper," prepared by EPA's Office of Air Quality Planning and Standards (OAQPS) staff.[15] The staff paper presents the staff conclusions and recommendations on the elements of the PM standard based on evaluation of the policy implications of the scientific evidence contained in the criteria document and the results of quantitative analyses (e.g., air quality analyses, human health risk assessments, and visibility analyses) of that evidence.

The staff paper concluded, and most of the CASAC panel concurred, that the scientific evidence supported modifying the PM standard.[16] Recognizing certain limitations of the data, a range of alternatives were presented for consideration for modifying the current PM NAAQS. The staff paper and CASAC recommendations for PM_{10} were similar to those included in the December 2005 proposal, but those for $PM_{2.5}$ included a range of more stringent levels than those proposed. In addition, the majority of the CASAC panel "did not endorse the option of keeping the annual standard at its present value."[17] Recommendations were based on the primary or "health based" standards; as is the case with the current and proposed PM NAAQS, secondary standards were recommended to be the same as the associated primary standards. **Table 1** summarizes the recommendations for $PM_{2.5}$ NAAQS.

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[14] 69 *Federal Register* 63111. The Criteria Document and information about the review process are available at [http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html].

[15] EPA. "*Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper*," Office of Air Quality Planning and Standards, EPA-452/R-05-005, July 2005. The staff paper can be accessed at [http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_cr_sp.html].

[16] Clean Air Scientific Advisory Committee (CASAC) Particulate Matter (PM) Review Panel's Peer Review of the Agency's *Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information (Second Draft PM Staff Paper, January 2005)*, EPA-SAB-CASAC-05-007, June 6, 2005, available at [http://www.epa.gov/sab/panels/casacpmpanel.html], visited January 6, 2005.

[17] *Ibid*, pg. 7. "Of the options presented by EPA staff for lowering the level of the PM standard, based on the above considerations and the predicted reductions in health impacts derived from the risk analyses, most Panel members favored the option of setting a 24-hour $PM_{2.5}$ NAAQS at concentrations in the range of 35 to 30 g/m^3 with the 98th percentile form, in concert with an annual NAAQS in the range of 14 to 13 g/m^3. The justification for not moving to the lowest staff-recommended levels within these ranges is that these were generally associated with only small additional predicted reductions in risk."

Table 1. Current, Proposed, and Alternative $PM_{2.5}$ Primary (Health) NAAQS

$PM_{2.5}$ NAAQS Options	24-hour Primary (98th percentile)	Annual Primary (arithmetic mean)
Current NAAQS (1997)	65 $\mu g/m^3$	15 $\mu g/m^3$
EPA Proposed Rule	35 $\mu g/m^3$	15 $\mu g/m^3$
EPA Staff Paper	35-25 $\mu g/m^3$	15 $\mu g/m^3$
	or	
	40-30 $\mu g/m^3$	14-12 $\mu g/m^3$
CASAC	35-30 $\mu g/m^3$	14-13 $\mu g/m^3$

Source: Prepared by the Congressional Research Service (CRS), with information from EPA's December 20, 2005, proposal and related technical documents,[18] available at [http://www.epa.gov/air/particles/actions.html].

Potential Impacts of More Stringent PM Standards

The Clean Air Act requires that NAAQS be set solely on the basis of public health and welfare protection, whereas costs and feasibility are generally taken into account in NAAQS implementation (a process that is primarily a state responsibility). When the December 2005 proposal was released, however, EPA announced that it is completing a regulatory impact analysis (RIA) assessing the costs and benefits of setting the standard at both the proposed and alternative levels. EPA hopes to publish the RIA in early 2006.[19] Preliminary estimates from EPA and others of risk reductions and affected areas provide some insight into potential impacts of the proposed PM NAAQS.

Health Effects

EPA's most recent review found that the data since 1997 reinforce the associations between exposure to PM and numerous cardiovascular and respiratory health problems, including aggravated asthma, chronic bronchitis, reduced lung function, irregular heartbeat, nonfatal heart attacks, and premature death. The CASAC commented that "numerous epidemiological studies that are reviewed in this chapter [chapter 2] have shown statistically significant associations between the concentrations of ambient air $PM_{2.5}$ and PM_{10} (including levels that are lower than the

[18] EPA's final staff paper and the CASAC review of the EPA staff paper (see references earlier in this report).

[19] Summary results of analyses EPA has conducted as part of the process of developing a regulatory impacts analysis (RIA), *EPA White Paper Preliminary Analyses of Proposed PM2.5 NAAQS Alternatives*, December 21, 2005, have been posted on the EPA website and can be accessed at [http://www.epa.gov/air/particles/pdfs/whitepaper20051220.pdf].

current PM NAAQS) and excess mortality and morbidity."[20] Although EPA and the CASAC recognize gaps in certain aspects of the data, they concurred that the evidence supported updating the PM NAAQS.

When promulgating the 1997 $PM_{2.5}$ NAAQS, EPA estimated that compliance would result in the annual prevention of 15,000 premature deaths, 75,000 cases of chronic bronchitis, and 10,000 hospital admissions for respiratory and cardiovascular disease, as well as other benefits. These estimates have been the subject of significant debate and reanalysis. Since 1998, with dedicated funding from Congress, EPA has accelerated its research and reanalysis on $PM_{2.5}$ to better understand the potential associated health effects and to develop ways to reduce risks.[21] The funding has supported numerous EPA intramural and extramural PM research projects and the establishment of five university-based PM research centers around the country. EPA's most recent review has increased its confidence in earlier findings associating exposure to $PM_{2.5}$ to increases in respiratory health problems, hospitalizations for heart and lung disease, and premature death, particularly for children, the elderly, and those with preexisting heart and lung disease.[22]

Although EPA has not completed a national analysis of the proposed and alternative PM standards, it has assessed potential risk reduction for PM standards in several cities using modeling for assessing the effects of other EPA air quality regulations. Using data from the nine cities EPA studied, the American Lung Association (ALA) estimated fine particulates would result in 4,729 premature deaths under the current $PM_{2.5}$ standard. ALA developed a table consolidating the EPA data from the nine cities[23] to illustrate comparative risk reductions of several alternative PM standards. According to ALA's analysis, EPA's proposed $PM_{2.5}$ standard would reduce premature deaths by 22%, compared with the current standard; further, the ALA projected that a combination of the CASAC's most stringent recommendations for both the daily and annual levels (30 $\mu g/m^3$ daily with 13 $\mu g/m^3$ annual) would result in a potential 48% reduction. Opposing views suggest that EPA's proposed standard would provide limited, if any, tangible public health benefits and could result in significant costs to states and industry. Some opposed to more stringent PM NAAQS claim that more recent studies of health effects attributable to PM actually

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[20] Page 5 of the CASAC review. The Criteria Document and information about the review process are available at [http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html].

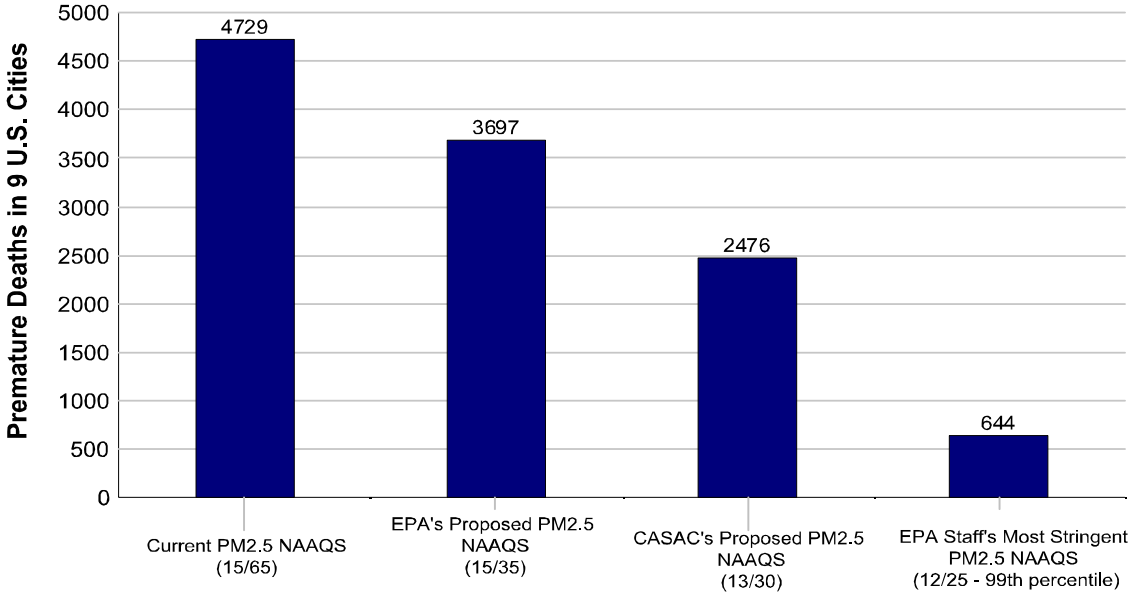
[21] Congress increased EPA's appropriations for particulate matter research from $18.8 million in FY1997 (H.Rept. 104-812) to $49.6 million in FY1998 (H.Rept. 105-297). PM research appropriations averaged more than $60 million per year from FY1999 through FY2004, and Congress provided $60.5 million for FY2005. Congress did not specify PM research funding in EPA's FY2006 appropriation but included $61.0 million for NAAQS research prior to a 0.476% across-the-board rescission (P.L. 109-54; H.Rept. 109-188).

[22] For EPA criteria and technical documents in support of the December 20, 2005, proposal and the 1997 NAAQS, see [http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html].

[23] Boston, Detroit, Los Angeles, Philadelphia, Phoenix, Pittsburgh, St. Louis, San Jose, and Seattle; see [http://www.cleanairstandards.org/article/articleview/402/1/41/].

demonstrate that risk estimates are lower and less statistically significant than they were in 1997, when the last standard was set.[24]

Figure 1. Number of Premature Deaths in Nine U.S. Cities, Estimated by the American Lung Association for Alternative $PM_{2.5}$ NAAQS



Source: The American Lung Association. Compiled with data from EPA, *Particulate Matter Health Risk Assessment for Selected Urban Areas*, Appendix A. The nine cities are Boston, Detroit, Los Angeles, Philadelphia, Phoenix, Pittsburgh, St. Louis, San Jose, and Seattle. All $PM_{2.5}$ NAAQS alternatives are shown as µg/m³ for the annual and 24-hour standards at the 98th percentile, except as noted; see [http://www.cleanairstandards.org/article/articleview/402/1/41/]).

EPA and most of the CASAC panel members concluded that there was a lack of evidence (often a lack of studies) on long-term effects of specific $PM_{10-2.5}$ measurements. The proposal would revoke the current *annual* PM_{10} standard and would not include an annual standard for newly defined $PM_{10-2.5.}$ The proposal to redefine coarse particles $PM_{10-2.5}$ to include only those particles typically found in urban areas is primarily based on the finding, as defined by the CASAC, that "the evidence for the toxicity of $PM_{10-2.5}$ comes from studies conducted primarily in urban areas and is related, in large part, to the re-entrainment of urban and suburban road dusts as well as primary combustion products."[25] The proposed $PM_{10-2.5}$ standard would exempt sources such as windblown dust and soils and agricultural and mining operations, which are believed to be largely composed of less-toxic components for which evidence of health issues is either limited or nonexistent. This approach, and how EPA will distinguish the sources during its implementation, raises a number of questions, and the agency has solicited detailed comments on this issue.

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[24] Communication with Mr. Frank Maisano, Media Contact for the Electric Reliability Coordinating Council, January 17, 2006.

[25] Pages 7-8 of the CASAC review. The Criteria Document and information about the review process are available at [http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html].

EPA's most recent report on air quality trends[26] reported that nationally, in 2003, fine particle concentrations were the lowest since monitoring began in 1999, and coarse particle concentrations were the second lowest since 1988 (concentrations were lower in 2002). Despite the decline, the EPA reports that there were 62 million people in 97 counties with monitors measuring fine and coarse particles above the current NAAQS in 2003.

Promulgation of a NAAQS sets in motion a process under which the states and EPA first identify geographic nonattainment areas — those areas failing to comply with the NAAQS, based on monitoring and analysis of relevant air quality data. The proposed PM NAAQS are expected to increase the number of areas (typically defined by counties or portions of counties) in nonattainment.

Impacts of NAAQS Implementation

Implementation of the 1997 PM standard, delayed several years by litigation, the lack of monitoring capability, and other factors, is ongoing. EPA's recent final designation of 39 geographical areas, composed of 208 counties in 20 states and the District of Columbia, in nonattainment (those areas with or contributing to air quality levels exceeding the annual and 24-hour standards) with the $PM_{2.5}$ NAAQS became effective on April 5, 2005. A direct comparison of nonattainment with the current standard and the proposal is not available. However, EPA projected that the numbers of counties with monitors that would not attain the $PM_{2.5}$ NAAQS could increase from 116 counties (those with monitors within the total 208 counties), based on the current standard, to 191, with the proposed $PM_{2.5}$ NAAQS, by 2010. Taking into account those areas without monitors but contributing to air quality levels exceeding the standard, and other factors considered by the Agency when determining the designations, the total number of a counties likely to be in nonattainment with the proposed standard would be even larger.

Table 2 below summarizes the EPA's comparative nonattainment designation projections of counties with monitors for 2010 and 2015, based on the current $PM_{2.5}$ standard, the proposed standard, and other alternative $PM_{2.5}$ standards that EPA considered. EPA notes that its projections are based on 2001-2003 monitoring data, whereas the actual nonattinment designations would be based on 2004-2006 monitoring data.[27] EPA's projections also take into account those PM reductions that the agency expects will occur as the result of air quality regulations promulgated in

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[26] EPA, *The Particle Pollution Report: Current Understanding of Air Quality and Emissions through 2003* EPA 454-R-04-002, December 2004 [http://www.epa.gov/airtrends/aqtrnd04/pm.html].

[27] In a separate but related action, EPA proposed to amend its national air quality monitoring requirements, including those for monitoring particle pollution, to help federal, state, and local air quality agencies "improve public health protection and inform the public about air quality in their communities" by taking advantage of improvements in monitoring technology. Like the proposed PM NAAQS, this proposal had not been published in the *Federal Register* as of the writing of this CRS report. Information on the proposed changes are available at [http://www.epa.gov/air/particlepollution/actions.html].

2005,[28] including the Clean Air Interstate Rule (CAIR), the Clean Air Mercury Rule (CAMR), and the Clean Air Visibility Rule (CAVR).

Table 2. Counties with Monitors Projected To Be in Nonattainment for Current, Proposed, and Alternative $PM_{2.5}$ NAAQS

	2010			2015 with CAIR/CAVR/CAMR		
$PM_{2.5}$ NAAQS Options (24-hour and annual $\mu g/m^3$	National	East	West	National	East	West
15/65 — current	116	102	14	32	18	14
15/35 — proposed	191	141	50	76	30	46
14/35	235	185	50	96	50	46
15/30	326	264	62	178	116	62

Source: *EPA White Paper Preliminary Analyses of Proposed PM2.5 NAAQS Alternatives, Office of Air Quality Planning and Standards*, Office of Air and Radiation, December 21, 2005.

Notes: CAIR = Clean Air Interstate Rule, CAMR= Clean Air Mercury Rule, and CAVR = the Clean Air Visibility Rule, promulgated in 2005.

Following formal designation (a process that EPA estimates will not be completed before April 2010 for the proposed PM NAAQS), the states have three years to submit State Implementation Plans (SIPs) that identify specific regulations and emission control requirements that will bring an area into compliance. If new or revised SIPs for attainment establish or revise a transportation-related emissions allowance ("budget"), or add or delete transportation control measures (TCMs), they will trigger "conformity" determinations. Transportation conformity is required by the CAA, Section 176(c) (42 U.S.C. 7506(c)), to prohibit federal funding and approval for highway and transit projects unless they are consistent with ("conform to") the air quality goals established by a SIP and will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards.[29]

EPA has not yet released an analysis of the potential economic impacts associated with designating areas as nonattainment for particulate matter based on the proposed PM NAAQS. [30] Implementation of the proposed PM NAAQS is further complicated by the

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[28] For more information on these and other recent EPA's air quality regulations, see [http://www.epa.gov/cleanair2004/].

[29] For additional information on conformity, see CRS Report RL32106, *Transportation Conformity Under the Clean Air Act: In Need of Reform?*, by James E. McCarthy.

[30] Illustrating the complexity of such analyses is the divergence of projected impacts of the ozone NAAQS. A 2002 EPA analysis (U.S. EPA, Office of Air and Radiation, "The Historical Record: Nonattainment Status and Economic Growth," February 26, 2002) found that ozone nonattainment designations had no net negative impact on those areas. In

(continued...)

change in definition for coarse particles. Changing the indicator from PM_{10} to $PM_{10-2.5}$ requires establishing new monitoring and measurement protocols. In addition, EPA has solicited comments on options but has not determined how it will distinguish between the "urban" sources of coarse particles covered by the proposal and the exempted "rural" sources.

Impacts on specific areas would be speculative at best because implementation of any revised PM NAAQS would be several years off. For example, states would not be required to meet the proposed $PM_{2.5}$ standard until April 2015 (April 2020 if qualified for extension). With regard to the current NAAQS, states are required to submit "implementation" plans for how they will meet the $PM_{2.5}$ NAAQS by April 2008 and must be in compliance by 2010, unless they are granted a five-year extension.

Reaction to the Proposed PM NAAQS

Well before the EPA formally proposed revising the NAAQS, stakeholders were providing evidence and arguments at public hearings and other forums for their preferred recommendations — in general, business and industry oppose more stringent standards, and public health and environmental interest groups advocate tighter standards. EPA received thousands of comments during various stages of development of the criteria document and in response to drafts of the EPA staff paper. Many of the public interest groups, as well as the association representing state air quality regulators,[31] felt that the December 2005 proposal should have been more stringent — at a minimum, at the lower levels within the range of EPA staff/CASAC recommendations. Based on several media articles and available press releases:

Proponents of more stringent standards generally assert that

- the standards should be at least as stringent as the more stringent combined daily and annual levels recommended in the EPA staff paper and those recommended by the CASAC based on its review of the criteria and the EPA staff analysis;
- scientific evidence of adverse health effects are more compelling than when the standards were revised in 1997;

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[30] (...continued)
contrast, a study conducted by NERA Economic Consulting for the American Petroleum Institute (API), found that meeting the 2010 ozone attainment deadline will lead to a $3 billion reduction in economic output in the Philadelphia region in 2011 (*Economic Impact of 8-Hour Ozone Attainment Deadlines on Philadelphia Region*, September 2005; [http://api-ec.api.org/filelibrary/NERA_API_Philadelphia_Report.pdf]). An API summary of the report indicates that delaying the eight-hour ozone NAAQS attainment deadline to 2015 would lower the cost to the local economy to $100 million per year ([http://api-ep.api.org/economics/index.cfm?bitmask=002003002000000000]).

[31] Personal communication with Mr. William Becker, Executive Director, State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), January 5, 2006.

- exclusion of rural sources from the coarse particle (PM_{10}) standard is not sufficiently protective of human health and would be difficult to distinguish and implement;
- more stringent standards ensure continued progress toward protection of public health with an adequate margin of safety as required by the CAA, in addition to avoidance of other adverse health effects;
- welfare effects, such as visibility, crop yield and forest health, will be enhanced.

Critics of more stringent PM NAAQS contend that

- more stringent (and in some cases the existing) standards are not justified by the scientific evidence; the proposal does not take into account hundreds of studies completed since the 2002 cut-off;
- requiring the same level of stringency for all fine particles without distinguishing sources is unfounded;
- costs and adverse impacts on regions and sectors of the economy are excessive; some of those identified as "urban" sources contend exemption of rural particles may result in a disproportional compliance burden;
- revising the standards could impede implementation of the existing PM NAAQS and the process of bringing areas into compliance, given the current status of this process; revisions could also impede efforts to meet air quality regulations promulgated in 2005, such as the Clean Air Interstate Rule (CAIR);[32]
- the benefits (and costs) associated with implementation of the 1997 PM standard, as well as compliance with recent EPA air quality regulations, have not yet been realized.

EPA has responded to both sides by emphasizing that the Agency's conclusions and decisions are provisional and proposed in nature, and the agency is soliciting comment (90-day comment period from the date of publication in the *Federal Register*) regarding its supporting analysis and a variety of alternative PM NAAQS. In addition to written comments, EPA intends to hold public hearings at the end of February in Philadelphia, Chicago, and San Francisco. EPA also declares its intention to review and evaluate significant new studies developed since 2002 and those published since the close of the criteria document.[33]

Congressional Activity

Because of health and cost implications, NAAQS decisions have often been the source of significant concern to many in Congress. The evolution and development of the PM (and ozone) NAAQS, in particular, have been the subject of extensive oversight.

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[32] EPA, Clean Air Interstate Rule, Clean Air Mercury Rule, and Clean Air Nonroad Diesel Rule. [http://www.epa.gov/cleanair2004/]

[33] 71 *Federal Register* 2625, July 17, 2006.

Congress enacted legislation specifying deadlines for implementation of the 1997 standard, funding for monitoring and research of potential health effects, and the coordination of the PM (and ozone) standard with other air quality regulations. Most recently, during the first session of the 109th Congress, the Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Climate Change, and Nuclear Safety, held a hearing on November 10, 2005, regarding implementation and review of the PM NAAQS.[34]

In 1997, when the current standard was promulgated, Congress held 28 days of hearings on the EPA rule. Since FY1998, in an effort to expedite research and strengthen the science underlying EPA's review of the standard, Congress has appropriated funding specifically for PM research annually ($60.5 million for FY2005)[35]. The research, including reanalysis of key studies underlying the 1997 standard, has largely confirmed EPA's earlier conclusions, although new questions have been raised regarding the methodology used in some of the studies.

Because of the potential impacts PM NAAQS could have on public health and the economy, EPA's reassessment of and proposed modifications to these standards will likely be of continued interest to Congress.

Conclusions

EPA's December 20, 2005, announcement of its proposal to modify the existing PM NAAQS following completion of its statutorily required review has sparked interest and conflicting concerns among a diverse array of stakeholders, and in Congress. As evidenced by the history of the PM NAAQS, the level of scrutiny and oversight will likely increase as the agency proceeds toward its final decision regarding the PM NAAQS by September 2006. Because the health and economic consequences of particulate matter standards are so potentially significant, the PM NAAQS are likely to remain a prominent issue of interest during the second session of the 109th Congress.

Tightening the PM NAAQS, as proposed, will result in more areas classified as nonattainment and needing to implement new controls on particulate matter. States and local governments would be required to develop and implement new plans for addressing emissions in those areas that do not meet any new standards. A stricter standard may mean more costs for the transportation and industrial sectors, including utilities, refineries, and the trucking industry, affected by particulate matter controls. In terms of public health, a stricter standard may mean fewer adverse health effects for the general

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[34] U.S. Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Climate Change, and Nuclear Safety, *Implementation of the Existing Particulate Matter and Ozone Air Quality Standards*, November 10, 2005.

[35] Congress increased EPA's appropriations for particulate matter research from $18.8 million in FY1997 (H.Rept. 104-812) to $49.6 million in FY1998 (H.Rept. 105-297). PM research appropriations averaged more than $60 million per year from FY1999 through FY2004, and Congress provided $60.5 million for FY2005. Congress did not specify PM research funding in EPA's FY2006 appropriation but included $61.0 million for NAAQS research prior to a 0.476% across-the-board rescission (P.L. 109-54; H.Rept. 109-188).

population and particularly sensitive populations such as children, asthmatics, and the elderly.

The EPA's previous review and establishment of PM NAAQS was the subject of litigation and challenges, including a Supreme Court decision in 2001.[36] EPA's 1997 promulgation of standards for both coarse and fine particulate matter prompted critics to charge EPA with overregulation and spurred environmental groups to claim that EPA had not gone far enough. Not only was the science behind the PM NAAQS challenged, but EPA was also accused of unconstitutional behavior. More than 100 plaintiffs sued to overturn the standard. Although EPA's decision to issue the standards was upheld, for the most part, stakeholders on both sides of the issue continued to advocate their recommendations for more stringent and less stringent (in some cases no) PM standard.

It would not be surprising if interested parties return to the courts or initiate challenges after the agency completes its review and promulgates final standards. Thus, the final form of the current efforts to revise PM NAAQS may not be known for some time.

[36] *Whitman v. American Trucking Associations*, 531 U.S. 457 (2001). Along with deciding issues specific to PM and ozone, the Court ruled unanimously that costs could not be considered in setting primary (health-based) NAAQS.