

Proposal to Revise the National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM)



August 9, 2012



Background



Clean Air Act Statutory Requirements

- EPA is required to set National Ambient Air Quality Standards (NAAQS) for widespread pollutants from numerous and diverse sources considered harmful to public health and the environment
- There are two types of NAAQS
 - **Primary** standards provide public health protection, including protection for at-risk populations
 - **Secondary** standards protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings
- EPA has set NAAQS for six common pollutants (particulate matter, ozone, carbon monoxide, lead, sulfur dioxide, and nitrogen dioxide)
- In setting NAAQS:
 - EPA is required to engage in “reasoned decision making” to translate scientific evidence into standards
 - In so doing, EPA may not consider cost in setting standards (this has been upheld by the Supreme Court)
 - Rather, cost can be – and is - considered in developing control strategies to meet the standards (implementation phase)
- EPA is required to periodically (every 5-years) review the science upon which the NAAQS are based and the standards themselves
- NAAQS form the foundation for air quality management across the US

History of PM NAAQS

Final Rule	Indicator	Ave. Time	Level	Form
1971	TSP - Total Suspended Particles ($\leq 25\text{-}45\ \mu\text{m}$)	24-hour	260 $\mu\text{g}/\text{m}^3$ (primary) 150 $\mu\text{g}/\text{m}^3$ (secondary)	Not to be exceeded more than once per year
		Annual	75 $\mu\text{g}/\text{m}^3$ (primary)	Annual average
1987	PM ₁₀	24-hour	150 $\mu\text{g}/\text{m}^3$ *	Not to be exceeded more than once per year
		Annual	50 $\mu\text{g}/\text{m}^3$	Annual average
1997	PM _{2.5}	24-hour	65 $\mu\text{g}/\text{m}^3$	98 th percentile
		Annual	15 $\mu\text{g}/\text{m}^3$	Annual arithmetic mean, ave. over 3 years
	PM ₁₀	24-hour	150 $\mu\text{g}/\text{m}^3$	Initially promulgated 99 th percentile form; when 1997 standards were vacated, form of 1987 standards remained in place (not to be exceeded more than once per year on ave. over a three year period)
		Annual	50 $\mu\text{g}/\text{m}^3$	Annual arithmetic mean, ave. over 3 years
2006	PM _{2.5}	24-hour	35 $\mu\text{g}/\text{m}^3$	98 th percentile, ave. over 3 years
		Annual	15 $\mu\text{g}/\text{m}^3$	Annual arithmetic mean, ave. over 3 years
	PM ₁₀	24-hour	150 $\mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year on ave. over a 3 year period



Overview of Proposed Rule

- On June 14, 2012, in accordance with a court deadline, EPA proposed to strengthen the primary and secondary National Ambient Air Quality Standards (NAAQS) for fine particles, or PM_{2.5}
 - Proposed rule was published in the *Federal Register* on June 29, 2012
- The proposed standards would be more protective of public health and welfare than the current standards
- Federal rules already issued will make tremendous progress toward meeting the stronger health and welfare standards
 - 99 percent of counties are projected to meet the proposed standards without the need for additional local measures
- This proposal reflects consideration of advice from the Clean Air Scientific Advisory Committee (CASAC), the agency's independent science advisors
- After consideration of public comments on the proposed rule, EPA plans to issue a final rule by December 14, 2012



THE PROPOSED STANDARDS



Summary of Proposed Standards

Fine Particles – Primary PM_{2.5} Standards (health-based)

- EPA is proposing to strengthen annual PM_{2.5} standard to address substantial public health impacts of fine particles
 - Revise annual standard level from 15.0 to within a range of 12.0 to 13.0 µg/m³
 - Retain 24-hour standard level at 35 µg/m³

Thoracic Coarse Particles - Primary PM₁₀ Standard (health-based)

- EPA is proposing to retain the current primary PM₁₀ standard at 150 µg/m³

Secondary PM_{2.5} Standards (welfare-based)

- EPA is proposing to add a distinct standard designed to address visibility impairment, primarily in urban areas
- EPA is proposing to retain the current PM_{2.5} and PM₁₀ standards to address non-visibility welfare effects

EPA is also proposing to:

- Update the Air Quality Index (AQI) for PM_{2.5}, to be consistent with the revised primary PM_{2.5} standards
- Update certain monitoring, data handling and permitting requirements for fine particles



Fine Particles: Significant Impacts on Public Health

Estimated National PM _{2.5} Annual Impacts (based on 2005 air quality)	
Excess mortalities (adults)	130,000 to 320,000
Percentage of all deaths due to PM _{2.5}	5.4%
<i>Impacts among Children</i>	
Emergency department visits for asthma	110,000
Acute bronchitis	200,000
Exacerbation of asthma	2,500,000
<i>Impacts among Adults</i>	
Loss work days	18,000,000
Heart attacks	180,000
Hospitalizations	
-cardiovascular effects	62,000
-respiratory effects	30,000

- In addition, recent research provides evidence that decreases in long-term PM_{2.5} exposures have been associated with an estimated increase in mean life expectancy
- At-risk populations include:
 - Children
 - Older adults
 - Persons with pre-existing heart or lung disease
 - Persons with lower socio-economic status

Source: Fann et al., 2012, Estimating the National Public Health Burden Associated with Exposure to Ambient PM_{2.5} and Ozone, Risk Analysis 32(1) 81-95.



Particles and Public Welfare

- Fine particles are linked to effects on visibility, climate impacts, effects on ecosystems, and damage to materials, such as public buildings and monuments
- Visibility
 - Some particles absorb sunlight, while others scatter it, reducing both the clarity and color of what people can see
 - Some types of particles such as sulfates and nitrates, scatter more light during humid conditions
 - Fine particles are the main contributors to haze in the air, including in many of our urban areas and national parks
- Climate
 - Aerosol (PM) alters climate processes directly (radiative forcing) and indirectly (effects on clouds and precipitation)
 - Some components contribute to warming, while others contribute to cooling
 - Relative mix and sources of warming and cooling components vary in areas across the US





Rationale for Proposed Primary PM_{2.5} Standards

- Current review includes consideration of a significantly expanded body of scientific information, air quality information, quantitative health risk assessment, conclusions of EPA experts, and CASAC advice
- Health effects observed at lower PM_{2.5} concentrations than had been observed in the last review, including evidence of effects in areas that likely met the current standards
- Compelling evidence supports conclusion that PM_{2.5} causes premature mortality and cardiovascular effects and is linked to respiratory effects
 - Effects have been observed in areas with ambient concentrations below the current annual standard level of 15.0 µg/m³
- EPA is proposing to revise the annual standard level from 15.0 to a level within a range of 12.0 to 13.0 µg/m³ in conjunction with retaining the 24-hour standard level at 35 µg/m³
 - Lowering annual standard level (rather than the 24-hour standard level) provides most effective and efficient way to reduce total population risk and so provide appropriate protection
 - Soliciting comment on alternative annual standard level down to 11 µg/m³ and alternative combinations of annual and 24-hour standards, along with the approaches and rationales to support such levels



Rationale for Proposed Retention of Primary PM₁₀ Standard

- Current 24-hour PM₁₀ standard provides protection for effects associated with short-term exposure to thoracic coarse particles (PM_{10-2.5})
- Current review considered the available scientific evidence, air quality information, and the uncertainties and limitations in that evidence and information, conclusions of EPA experts, and advice from CASAC
 - Available health evidence is much more limited for coarse particles than for fine particles
 - EPA and CASAC agree that it is appropriate to maintain a standard to protect against exposures to thoracic coarse particles
- EPA is proposing to retain the current 24-hour PM₁₀ standard
 - Averaging time: 24-hours
 - Form: One-expected-exceedance
 - Level: 150 µg/m³



Rationale for Proposed Secondary Standards

- Current review includes consideration of available scientific evidence, urban visibility preference survey studies, air quality information, and the uncertainties and limitations in that evidence and information, conclusions of EPA experts, and advice from CASAC
- Visibility impairment continues to be one of the best understood effects of PM, especially fine particles
- EPA is proposing a distinct secondary standard to provide protection against visibility impairment, primarily in urban areas, to complement the Regional Haze Program (addresses visibility impairment in national parks and wilderness areas)
 - Indicator: calculated $PM_{2.5}$ light extinction indicator
 - Averaging time: 24-hours
 - Form: 90th percentile
 - Level: 30 or 28 deciviews (dv)
 - A deciview is a yardstick for measuring visibility: the higher the deciview level, the hazier the air appears
- EPA is also proposing to retain the current secondary PM standards to address non-visibility welfare effects (e.g., climate-related impacts, materials damage, ecological effects)
 - EPA and CASAC agree that it is important to maintain standards to address these effects
 - However, there is insufficient scientific information to support revisions of the current standards to protect against these other welfare effects



Proposed Changes to the Air Quality Index (AQI)

- EPA is proposing updates to the Air Quality Index (AQI), consistent with the proposed $PM_{2.5}$ standards
 - The AQI is EPA's color-coded tool used by state and local governments to help inform the public about how clean or polluted the air is and steps they can take to reduce their daily exposure to pollution
 - The AQI converts concentrations for fine particles to a number on a scale from 0 to 500
- EPA is proposing to change the upper end of the range for the "Good" AQI category (an index value of 50) by setting it at the level of the annual $PM_{2.5}$ standard
- EPA is proposing to base the 100 level of the AQI (i.e., upper end of "moderate" range) on the level of the 24-hour $PM_{2.5}$ standard
- EPA is proposing to retain the upper end of the "Hazardous" category (AQI of 500) at the existing level of $500 \mu g/m^3$





MONITORING, PERMITTING AND IMPLEMENTATION



Ambient Air Monitoring

- EPA and the states will continue to run a robust network for monitoring $PM_{2.5}$ levels
- The proposed rule includes several updates to monitoring requirements, including a proposed requirement for monitoring $PM_{2.5}$ along heavily traveled roads
 - These near-roadway $PM_{2.5}$ monitors would be required at one location in each urban area (a core-based statistical area, or CBSA) with a population greater than 1 million
 - EPA estimates 52 $PM_{2.5}$ monitors would be needed and that states could meet this requirement by relocating some monitors
- EPA is not proposing any changes to monitoring requirements for PM_{10}



Proposed Changes to PSD Permitting Provisions

- EPA is proposing certain changes to the Prevention of Significant Deterioration (PSD) regulations and associated requirements to:
 - Ensure that changes to the PM standards will not delay pending permits, and
 - Reduce potential burdens on permit applicants
- EPA is proposing to grandfather PSD permit applications if a draft permit or preliminary determination has been issued for public comment by the date the revised PM standards become effective
- For purposes of the proposed distinct secondary standard, EPA is proposing to implement a “surrogate approach”
 - PSD permit applicants would be able to rely on their analysis demonstrating that they will not cause or contribute to a violation of the 24-hour mass-based PM_{2.5} standards to also demonstrate that they will not cause or contribute to a violation of the proposed secondary standard



Implementing the Standards

- Improving air quality is a partnership between the federal government, states and tribes
 - EPA will work closely with states and tribes to implement PM standards
- Once EPA sets a new air quality standard, or revises an existing standard, it then must designate areas as attaining or not attaining the standards
 - States with nonattainment areas must develop implementation plans showing how they will meet the standards
- The Clean Air Act requires states to meet the primary $PM_{2.5}$ standards within five years (2020)
 - For certain areas, EPA can approve attainment dates of up to 10 years (2025), depending on the severity of the fine particle pollution problem and the availability of control measures
- The Clean Air Act requires states to meet secondary standards, such as the proposed 24-hour $PM_{2.5}$ secondary standard for visibility, as “expeditiously as practicable” but does not provide specific timeframes
 - Most areas that would meet the proposed primary $PM_{2.5}$ standards are anticipated to also meet the proposed distinct secondary standard to address PM-related visibility impairment as well as the current secondary standards to address non-visibility welfare effects



Opportunities to Comment

- Before issuing final standards, EPA will take comment and hold 2 public hearings
 - Public comments due by **August 31, 2012**
 - Public hearings were held in Philadelphia (July 17) and in Sacramento, Calif. (July 19)
- Comments may be submitted by one of the following methods - **comments should be labeled with Docket ID number EPA-HQ-OAR-2007-0492**
 - Via U.S. Postal Service: EPA, Mail Code 6102T, 1200 Pennsylvania Ave., NW, Washington, DC 20460 (send 2 copies)
 - Via fax: 202-566-1741
 - Via email: a-and-r-docket@epa.gov
 - In person: EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington DC 20460
 - Online: www.regulations.gov – Enter the docket ID number EPA-HQ-OAR-2007-0492; select "Comment Now"
- You may comment on any aspect of the proposal. However, EPA has specifically requested comments on a number of issues associated with the proposed rule (<http://www.epa.gov/air/particlepollution/pdfs/PMNAAQSSummaryofRequestsforComment.pdf>)
- EPA will consider public comments and issue final standards by the court-ordered deadline of December 14, 2012
- For more information on the rule and how to comment, go to <http://www.epa.gov/pm>



Contact Information

- For additional information on the PM NAAQS review, please contact:
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