December 2005 Proposal to Revise the National Ambient Air Quality Standards for Particle Pollution

General Overview

3-2-06

Overview

- On December 20, 2005 the EPA proposed revisions to the National Ambient Air Quality Standards (NAAQS) for particle pollution.
- The proposed revisions would strengthen a fine particle standard important for both health and visibility, and would improve and refocus the coarse particle standards on those particles that are associated with public health concerns.
- The proposed revisions address two categories of particle pollution:
  - *fine particles* ($PM_{2.5}$), which are 2.5 micrometers in diameter and smaller; and
  - *inhalable coarse particles* ($PM_{10-2.5}$), which are smaller than 10 micrometers in diameter but larger than PM2.5.
- For more information go to http://www.epa.gov/air/particles/actions.html

Particulate Matter: What is It?

A complex mixture of extremely small particles and liquid droplets

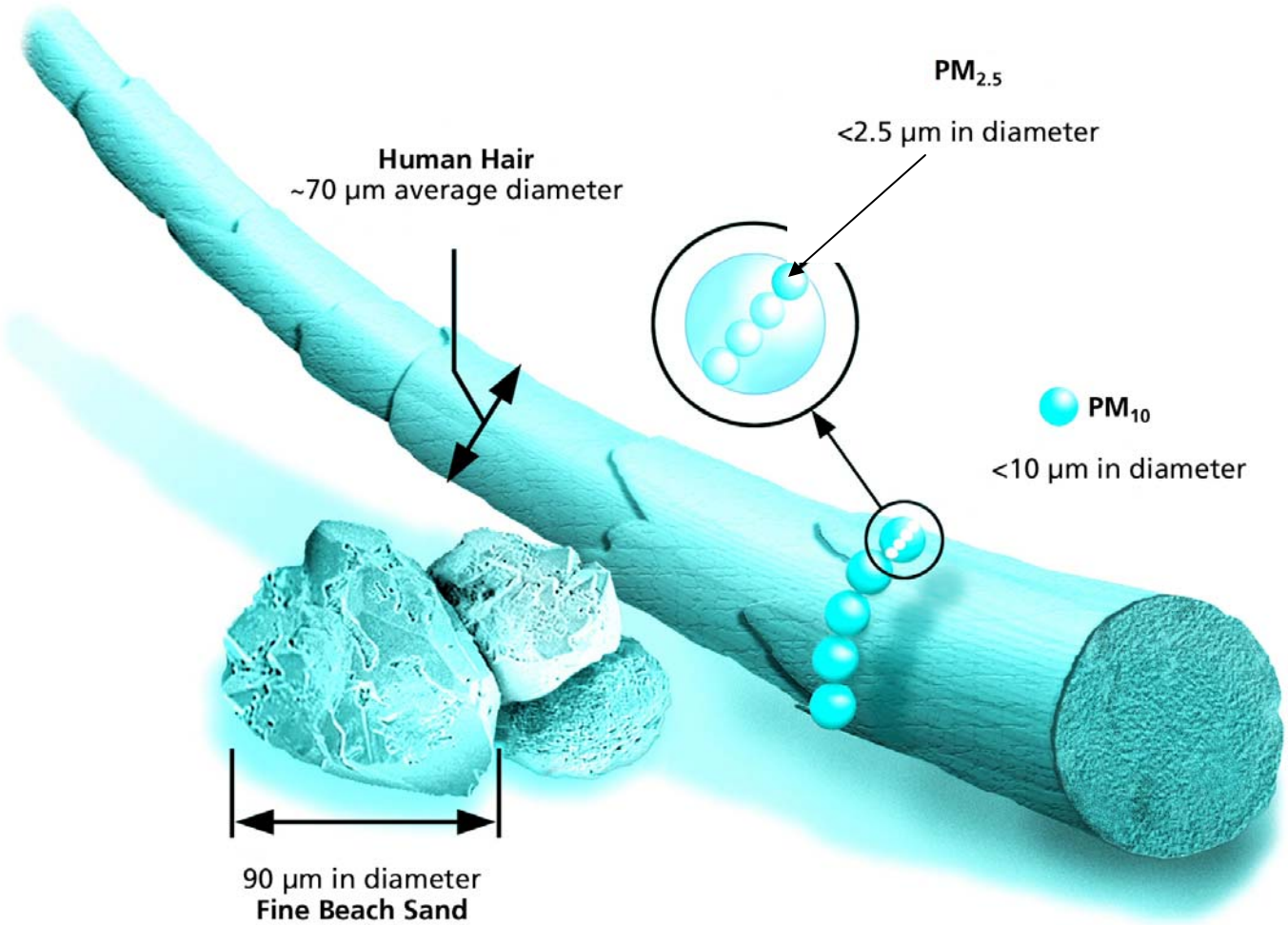


Image courtesy of EPA, Office of Research and Development

PM Components: fine and coarse

Fine Particles

Combustion, gases to particles

Sulfates/acids
Nitrate
Ammonium
Organics
Carbon
Metals
Water

Sources:

Coal, oil, gasoline, diesel, wood combustion
Transformation of SOx, NOx, organic gases including biogenics
High temperature industrial processes
(smelters, steel mills)
Forest fires

Exposure/Lifetime:

Lifetime days to weeks, regional distribution over urban scale to 1000s of km

Inhalable Coarse Particles

Crushing, grinding, dust

Resuspended dusts
(soil, street dust)
Coal/oil fly ash
Aluminum, silica,
iron-oxides
Tire and brake wear
Inhalable Biological
Materials
(e.g., from soils,
plant fragments)

Sources:

Resuspension of dust tracked onto roads
Suspension from disturbed soil (farms, mines, unpaved roads)
Construction/demolition
Industrial fugitives
Biological sources

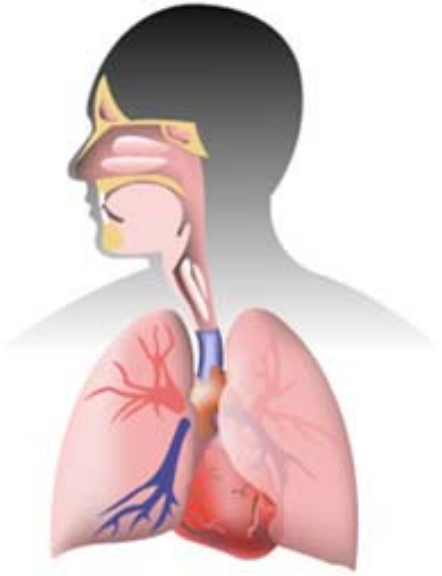
Exposure/Lifetime:

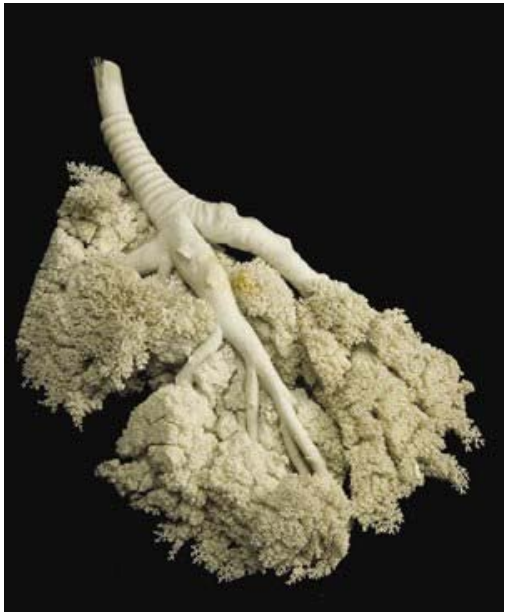
Coarse fraction (2.5-10) lifetime of hours to days, distribution up to 100s km

Particulate Matter

- Larger particles (> PM_{10}) deposit in the upper respiratory tract

- Smaller, inhalable particles (≤ PM_{10}) penetrate deep into the lungs





- Both coarse $PM_{10-2.5}$ and fine $PM_{2.5}$ can penetrate to lower lung

- Deposited particles may accumulate, react, be cleared or absorbed

Heath Effects of Particle Pollution

- Many scientific studies have linked breathing particle pollution to a series of significant health problems, including:
  - Aggravated asthma
  - Increases in respiratory symptoms like coughing and difficult or painful breathing
  - Chronic bronchitis
  - Decreased lung function
  - Premature death in people with heart and lung disease

Regulating Particle Pollution

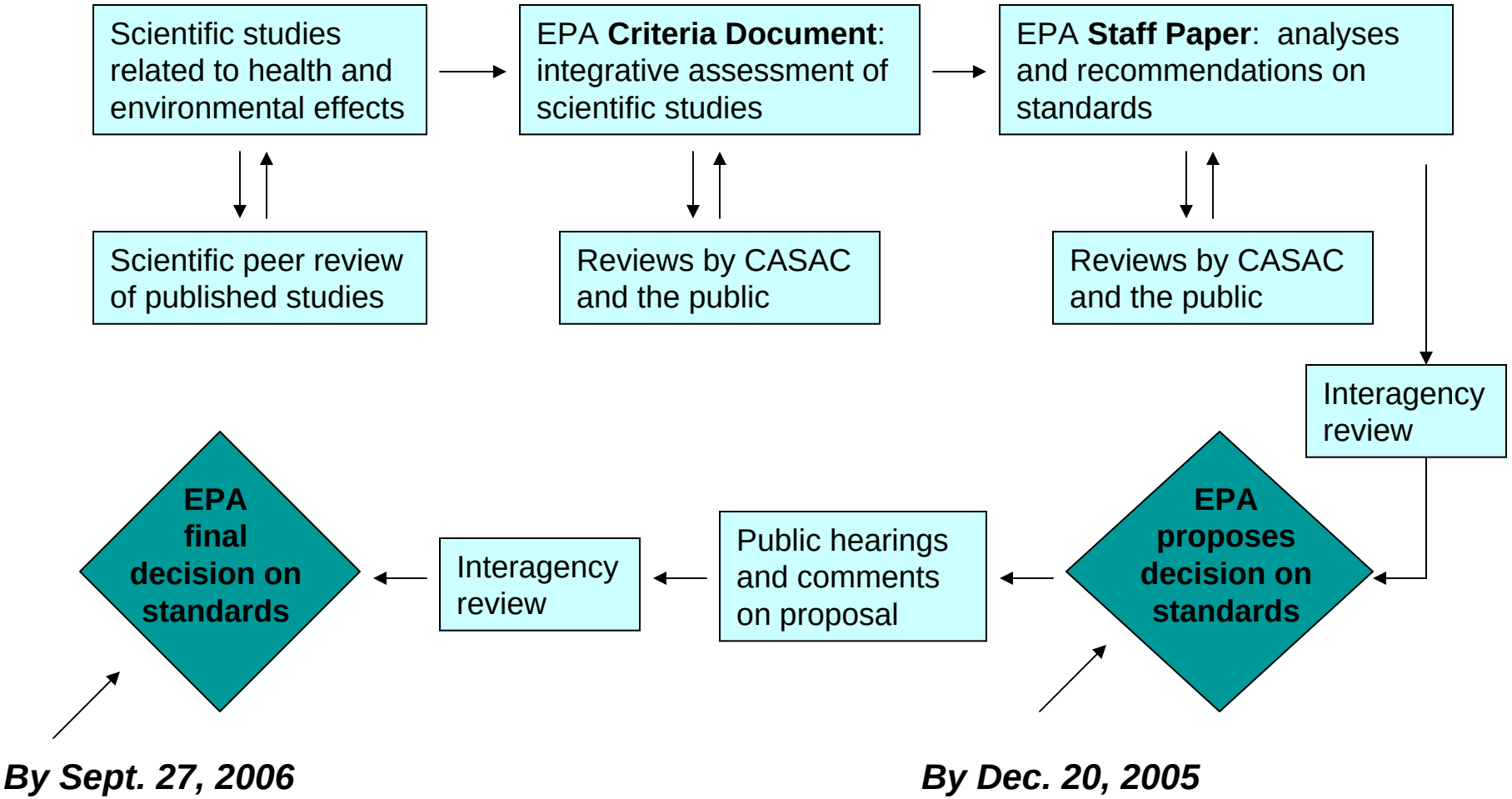
- The Clean Air Act requires EPA to set two types of national ambient air quality standards (NAAQS) for 'criteria' air pollutants
  - ***Primary standards*** to protect public health with an adequate margin of safety
  - ***Secondary standards*** to protect public welfare and the environment (visibility, wildlife, crops, vegetation, national monuments and buildings)

- EPA has set NAAQS for six common air pollutants:
  - Particulate matter - Ground level ozone (smog)
  - Carbon monoxide - Lead
  - Nitrogen dioxide - Sulfur dioxide

- The law requires EPA to review the scientific information and the standards for each pollutant ***every five years***

- The law also requires EPA obtain advice from the Clean Air Scientific Advisory Committee (CASAC) on each review

PM NAAQS Review – Extensive Peer Review and Public Input



Current PM NAAQS Review – Schedule

- Rulemaking on PM NAAQS:
  - ***Proposal*** signed on December 20, 2005 (as required by consent agreement)
  - ***Public comment*** period: 90 days, ends April 17, 2006
  - ***Public Hearings*** to be held March 8 in Philadelphia, Chicago and San Francisco
  - ***Final Rule*** to be signed by September 27, 2006 (required by consent agreement)

  - Proposal includes simultaneous rulemakings
    - PM NAAQS, Federal Reference Method, & Data Handling (Part 50)
    - Air Monitoring Regulations: Requirements for Reference and Equivalent Methods, Network Design Requirements (Parts 53 & 58)
  - Upcoming and related rulemakings:
    - Advance Notice of Proposed Rulemaking on Transition Issues (published 2/9/06)
    - Exceptional & Natural Events (signed March 1, 2006)

What are EPA's Current PM Standards?

- $PM_{2.5}$
  - Annual standard set at 15 µg/m^3
    - Annual arithmetic mean, averaged over 3 years
  - 24 hr standard set at 65 µg/m^3
    - Annual 98th percentile, averaged over 3 years

- PM_{10} (between 2.5 and 10 µm)
  - 50 µg/m^3
    - annual average
  - 150 µg/m^3
    - 24-hr average (99th percentile)

$PM_{2.5}$ – Primary 24-hour Standard

- Under the proposal, EPA would revise the level of the **24-hour standard** from the current level of ***65 µg/m³*** to ***35 µg/m³***.
  - EPA is proposing this change based on its assessment of a significantly expanded body of scientific information.
    - Studies show health effects at and below the level of the current standard

- EPA also is considering alternative levels for the 24-hour standard, between the range of 35 and 30 µg/m3 and is soliciting public comment on these levels.

- In addition, the Agency will take comment on alternative approaches for selecting the level of the standard, and on levels as high as the current level of 65 µg/m3 and as low as 25 µg/m3.

$PM_{2.5}$ – Primary Annual Standard

- EPA is proposing to retain the current **annual standard** at ***15 µg/m³***
  - EPA is proposing to retain this standard based on its assessment of several expanded, re-analyzed and new studies that have increased the Agency's confidence in associations between long-term $PM_{2.5}$ exposure and serious health effects, including heart and lung-related death.
- EPA is considering and is seeking public comment on lower alternatives for the annual standard including 14 and 13 µg/m³.
- In addition, the Agency will take comment on alternative views including a standard as low as 12 µg/m³.

$PM_{2.5}$ – Secondary Standards

- The proposal would set the **secondary standards** for both the annual and 24-hour standards at levels identical to the primary standards

- EPA also is taking comment on whether to set a separate $PM_{2.5}$ standard, designed to address visibility (principally in urban areas)
  - At levels within a range of 20 to 30 µg/m^3, and
  - On averaging times within a range of four to eight daylight hours

Potential Timeline if $PM_{2.5}$ NAAQS are Revised

Milestone	1997 $PM_{2.5}$ Primary NAAQS	2006 $PM_{2.5}$ Primary NAAQS
Promulgation of Standard	July 1997	Dec. 2006
State Recommendations to EPA	Feb. 2004 (based on 2001-2003 monitoring data)	Dec. 2007 (based on 2004-2006 monitoring data)
Final Designations Signature	Dec. 2004	Dec. 2009
Effective Date of Designations	April 2005	April 2010
SIPs Due	April 2008	April 2013
Attainment Date	April 2010 (based on 2007-2009 monitoring data)	April 2015 (based on 2012-2104 monitoring data)
Attainment Date with Extension	Up to April 2015	April 2020

Inhalable Coarse PM – Moving from PM_{10} to $PM_{10-2.5}$

- EPA's current standards for coarse particles (PM_{10}) were set in 1987.

- These standards – a 24-hour standard of 150 µg/m^3, and an annual standard of 50 µg/m^3 -- apply to particles 10 micrometers in diameter and smaller.

- The proposed revisions would change the definition of standard so that it covers only particles between 10 and 2.5 micrometers in diameter also known as $PM_{10-2.5}$, and "inhalable coarse particles."

Inhalable Coarse PM – Moving from PM_{10} to $PM_{10-2.5}$

- Furthermore, EPA proposes to qualify the coarse PM indicator to include:
  - Any ambient mix of $PM_{10-2.5}$ that is dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources.
  - This definition ***excludes*** any ambient mix of $PM_{10-2.5}$ that is dominated by rural windblown dust and soils and PM generated by ***agricultural*** and ***mining*** sources.
  - Agricultural sources, mining sources, and other similar sources of crustal material shall not be subject to control in meeting this standard

- The indicator is not defined or limited to any specific geographic area, but includes a mix of $PM_{10-2.5}$ in any location that is dominated by these sources.

Inhalable Coarse PM – Moving from PM_{10} to $PM_{10-2.5}$

- With the proposed indicator, each area in the country would fall into one of these two categories:
  (1) the majority of the ambient mix of $PM_{10-2.5}$ in an area is resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources; or
  (2) the majority of the ambient mix is rural windblown dust and soils and PM generated by agricultural and mining sources.
- Monitoring only required in MSAs with urbanized areas of 100,000 people or more.
  – Zero to 5 required monitors per MSA based on population and estimated historical concentrations.
  – Total of about 225-250 monitors required in approximately 150 MSAs.

$PM_{10-2.5}$ Standards

- The proposed **new $PM_{10-2.5}$ standard** would be a **24-hour standard**, at 70 µg/m^3.

- EPA is not proposing an annual standard for $PM_{10-2.5}$.
  - There is not sufficient scientific evidence to support a long-term standard for coarse particles

- Under the proposal, the **secondary** 24-hour standard for $PM_{10-2.5}$ would be identical to the primary standard.

Revoking the Current PM_{10} Standard

- EPA is proposing to revoke the **current <u>24-hour</u> PM_{10} standard**, except in urbanized areas that have both:
  1) one or more violating PM_{10} monitors; and
  2) a population of 100,000 or more.
  - This standard would remain in place in these areas until the Agency has completed attainment and nonattainment designations for $PM_{10-2.5}$.
  - EPA is taking comment on whether the 24-hour PM_{10} standard should be retained in areas with a population less than 100,000 but where the majority of the ambient mix of $PM_{10-2.5}$ is generated by high density traffic on paved roads, industrial sources, and construction sources.

- The Agency is proposing to immediately revoke the **current <u>annual</u> PM_{10} standard** in all areas.
  - Current scientific evidence does not show significant public health risks associated with long-term exposure to coarse particles.

Timeline if $PM_{10-2.5}$ Standard is finalized

Milestone	2006 $PM_{10-2.5}$ NAAQS
Effective date of Standard	Nov. 2006
State Recommendations to EPA	July 2012 (based on 2009-2011 monitoring data)
Final Designations	May 2013
Effective Date of Designations	**July 2013**
SIPs Due	**July 2016**
Attainment Date	July 2018 (based on 2015-2017 monitoring data)
Attainment Date with Extension	**Up to July 2023**