Federal Air Quality Standards

Cheryl Newton – U.S. EPA Region 5
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Review of National Ambient Air Quality Standards (NAAQS)

- 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 (visibility, wildlife, crops, vegetation, national monuments and buildings)

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

- The law requires EPA to review the scientific information and the standards for each pollutant every five years, and to obtain advice from the Clean Air Scientific Advisory Committee (CASAC) on each review

- Different considerations apply to setting NAAQS than to achieving them:
  - **Setting NAAQS**: based on scientific evidence of health and environmental effects
  - **Achieving NAAQS**: account for cost, technical feasibility, time needed to attain
### Ongoing NAAQS Reviews: Current Schedule

**revised 3 15 2010**

<table>
<thead>
<tr>
<th>MILESTONE</th>
<th>Pollutant</th>
<th>Lead</th>
<th>NO₂ Primary</th>
<th>SO₂ Primary</th>
<th>Ozone</th>
<th>CO</th>
<th>PM</th>
<th>NO₂/SO₂ Secondary</th>
</tr>
</thead>
</table>

**NOTE:**

Underlined dates indicate court-ordered or settlement agreement deadlines.
## Ongoing NAAQS Reviews: Comparison of Standards

**revised 3 15 2010**

<table>
<thead>
<tr>
<th>POLLUTANT</th>
<th>Lead  (µg/m³)</th>
<th>NO₂ (ppm)</th>
<th>SO₂ (ppb)</th>
<th>Ozone (ppm)</th>
<th>CO (ppm)</th>
<th>PM (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Standard</td>
<td>1.5 (calendar quarterly)</td>
<td>0.053 (annual basis)</td>
<td>140 (daily)</td>
<td>0.08 (8-hr avg) (aka 84 ppb)</td>
<td>9 (8-hour avg)</td>
<td>65 (daily)</td>
</tr>
<tr>
<td>New Standard</td>
<td>0.15 (rolling 3-mon. avg)</td>
<td>0.100 (hourly basis)</td>
<td>75 (hourly)</td>
<td>0.060 – 0.070 (8 hr avg) (aka 60-70 ppb) and (7-15 ppm-hours)</td>
<td>To be proposed</td>
<td>35 (daily)</td>
</tr>
</tbody>
</table>

**NOTE:**

Underlined dates indicate proposed levels that have not yet been finalized.
Some Nonattainment and SIP Basics
What is a “nonattainment” (NA) area?

Nonattainment Area …

- any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
What is a State Implementation Plan (SIP)?

It’s a plan for “clean air!”

• CAA requires a general plan to achieve the NAAQS in all areas of the country and a specific plan for each nonattainment area.

• These plans, State Implementation Plans (SIPs) are developed by States (and locals) and submitted to US EPA for approval through Federal rulemaking.

• After US EPA approval, these SIPs and associated control measures are enforceable at both the state and national levels.
Region 5 Air Quality

1997 8-Hour Ozone Standard
(.08 ppm aka 84 ppb)
Where does ozone come from?

HOW VOCs AND NO\textsubscript{x} FORM GROUNDLEVEL OZONE

\textit{VOC + NO\textsubscript{x} + SUNLIGHT = OZONE}
Redesignation Status - Region 5 and Adjoining Areas

8-hour Ozone Areas (0.08 ppm standard)

- Expecting Request
- Redesignation Submitted
- Redesignated to Maintenance area

June 2, 2010
2010 8-Hour Ozone Standard

Proposed Range:
Primary (.060 ppm to 0.070 ppm)
Secondary (7-15 ppm-hours)
Potential 8-hour Ozone (.070 ppm)
Nonattainment Areas (2007-2009 data)
Preliminary Data

County with Violating Monitor

Counties Designated Nonattainment in 2004 not currently showing a violation*

County with Violating Monitor That Has Never Been 8-Hour Nonattainment

*Could be due to clean data or no monitor
Potential 8-hour Ozone (.065 ppm) Nonattainment Areas (2007-2009 data)

Preliminary Data

- **Red**: County with Violating Monitor
- **Yellow**: Counties Designated Nonattainment in 2004 not currently showing a violation*
- **Purple**: County with Violating Monitor That Has Never Been 8-Hour Nonattainment

*Could be due to clean data or no monitor
Potential 8-hour Ozone (.060 ppm)
Nonattainment Areas (2007-2009 data)
Preliminary Data

County with Violating Monitor

Counties Designated Nonattainment in 2004 not currently showing a violation*

County with Violating Monitor That Has Never Been 8-Hour Nonattainment

*Could be due to clean data or no monitor
1997 PM2.5 Standard

(15μg/m³ annual standard)
Where does particulate matter come from?

- Wood-Burning Stoves
- Power Plants
- Heavy Duty Diesel Engines
- Natural Sources
- Cars and Trucks
- Non-Road Vehicles
- Forest Fires
- Industrial Sources
PM 2.5
(Annual std. 15 ug/m³)
Nonattainment Areas

51 Full Counties
12 Partial Counties
2006 PM2.5 Standard

(35μg/m³ daily standard)
Air Quality for the 24-hour PM$_{2.5}$ Standard

Designations Based on 2006-2008 Air Quality Data

5/19/10
Final NO$_2$ Standards

- EPA determined that the existing primary annual average NO$_2$ standard of 53 ppb alone is not sufficient to protect public health with an adequate margin of safety.

- EPA is setting a new 1-hour NO$_2$ that defines the maximum allowable concentration anywhere in an area – primarily near major roads:
  - Set at a level of 100 ppb
  - Expressed as the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.

- EPA is retaining the current annual average NO$_2$ standard of 53 ppb.

- This suite of primary standards will:
  - Limit short-term exposures to peak NO$_2$ concentrations, which often occur near major roads and could worsen asthma symptoms.
  - Maintain community-wide NO$_2$ concentrations below levels associated with respiratory-related emergency department visits and hospital admissions.
Updating the Monitoring Network

- The monitoring networks for NAAQS pollutants focus on monitoring in locations of maximum concentrations.
- EPA is requiring changes to the monitoring network that will capture short-term NO2 concentrations such as those that occur near roads, community-wide NO2 concentrations, and low income or minority at-risk communities.
  - **Near Road**
    - At least one monitor would be located near a major road in any urban area with a population greater than or equal to 500,000 people.
  - **Community-Wide**
    - A minimum of one monitor would be placed in any urban area with a population greater than or equal to 1 million people to assess community-wide concentrations.
    - A second monitor would be required near a major road in areas with either:
      - population greater than or equal to 2.5 million people, or
      - one or more road segments with an annual average daily traffic count greater than or equal to 250,000 vehicles.
  - **Susceptible and Vulnerable Communities**
    - Working with the states, EPA Regional Administrators will site at least 40 additional NO2 monitors to help protect communities that are susceptible and vulnerable to NO2-related health effects.
EPA is requiring all new NO2 monitors to begin operating no later than January 1, 2013.

EPA estimates the revised NO$_2$ monitoring requirements will lead to:

- 126 NO$_2$ monitoring sites near major roads in 102 urban areas.
- 53 additional monitoring sites to assess community-wide levels across wider urban areas.
- 40 monitors in low income or minority at-risk communities.
Sources of NO$_x$ Pollution

- Mobile Sources (58%)
- Utilities (22%)
- Industrial/commercial/residential combustion (12%)
- Other (8%)

Based on 2002 National Emissions Inventory data
Chicago NO$_2$ Problem

CTA bus staging area during afternoon rush hour
Near Roadway Studies

- Continued future emphasis on near roadway impacts:
  - EPA/University of Michigan
    - (1) investigating a diverse range of respiratory outcomes in children with asthma that are associated with near-road exposures to air pollutants, and
    - (2) characterizing the pollutants and exposures associated with these outcomes.
  - Future Plans?