

Summary of Ambient Air Monitoring Topics in PM NAAQS Proposal

**Data Handling and Ambient Air Monitoring to support primary PM_{2.5}
standards and proposed new secondary standard for PM_{2.5}
to address PM-related Visibility Impairment**



FEDERAL REGISTER

Vol. 77 Friday,
No. 126 June 29, 2012

Part II

Environmental Protection Agency

40 CFR Parts 60, 61, 62, et al.
National Ambient Air Quality Standards for Particulate Matter; Proposed
Rule

July 12, 2012

Agenda

- PM NAAQS Proposal Overview
- Data Handling Issues
- Ambient Air Monitoring Topics addressed in the PM NAAQS proposal
- Additional Ambient Air Monitoring Topics addressed in the PM NAAQS proposal

PM NAAQS Proposal Overview

- On June 14, 2012, the U.S. Environmental Protection Agency (EPA) proposed to strengthen the National Ambient Air Quality Standards (NAAQS) for fine particle pollution, also known as fine particulate matter (PM_{2.5}).
- For fine particles, the proposal would:
 - **Strengthen the annual health standard for fine particles by setting the standard at a level within the range of 12 micrograms per cubic meter (µg/m³) to 13 µg/m³.** The current annual standard, 15 µg/m³, has been in place since 1997.
 - **Retain the existing 24-hour fine particle standard, at 35 µg/m³.** EPA set the 24-hour standard in 2006.
 - **Set a separate fine particle standard to improve visibility, primarily in urban areas.** EPA is proposing two options for this 24-hour standard, at 30 deciviews or 28 deciviews. (A deciview is a yardstick for measuring visibility.)
- For coarse particles, the proposal would:
 - **Retain the existing standards for coarse particle pollution (PM₁₀).** This standard, with a level of 150 µg/m³, has been in place since 1987.
- For existing secondary standards for PM_{2.5} and PM₁₀, the proposal would:
 - **Retain the existing secondary standards as identical to the existing primary standards** to provide protection against other effects, such as ecological effects, effects on materials, and climate impacts.
- The proposal was published in the Federal Register on June 29, 2012
 - Comment Period runs through August 31, 2012
 - Public hearings:
 - July 17, 2012, in Philadelphia, Pennsylvania.
 - July 19, 2012, in Sacramento, California.
- Proposal, fact sheets, and other materials are available at:
<http://www.epa.gov/air/particlepollution/actions.html#jun12>

PM_{2.5} Data Handling Issues

All pertain to 40CFR, Part 50, Appendix N (page 38999)

Recommendations:

- Changes needed to conform to the proposed NAAQS revisions
 - Change to level of primary PM_{2.5} annual standard
 - Change to form of primary/secondary PM_{2.5} annual standards (remove spatial averaging)
 - Addition of data handling procedures for proposed new PM_{2.5} visibility index standard
- Align language with proposed changes in ambient monitoring
 - Clarify sites eligible for comparison with the NAAQS
- Enhance consistency with recently codified changes for other pollutants
 - Use of complete and accurate, but non-certified data
 - Administrator option to validate incomplete data where justifiable
 - Consistent exceptional events language
- Codify certain existing practices to reflect standard operating procedures
 - Methodology for combining non-daily FRM and continuous FEM data
 - Additional diagnostic data substitution tests

Data Handling Procedures for the Proposed PM_{2.5} Visibility Index Standard (page 39002)

Recommendations:

- Proposed procedures are generally consistent with Regional Haze program (original IMPROVE equation)
 - Use 24-hour average speciated PM_{2.5} mass concentrations
 - Use climatological monthly average relative humidity data for $f(\text{RH})$
- Calculate PM_{2.5} light extinction values (Mm^{-1})
 - $3 \cdot f(\text{RH}) \cdot [\text{Sulfate}] + 3 \cdot f(\text{RH}) \cdot [\text{Nitrate}] + 4 \cdot [\text{Organic Mass}] + 10 \cdot [\text{Elemental Carbon}] + [\text{Fine Soil}]$
- Convert to deciviews (dv) and compare to standard level
 - 90th percentile form, averaged over 3 years, proposed level = 28dv
 - Data handling (rounding, lookup table, completeness, etc.) generally similar to primary 24-hour PM_{2.5} standard
- Solicit comments on all aspects of the calculation of PM_{2.5} visibility index, including whether there should be any data substitution tests

Ambient Air Monitoring Topics addressed in the PM NAAQS proposal

Section VIII - Proposed Amendments to Ambient Monitoring and Reporting Requirements
begins on page 39005

Proposed Terminology Changes (page 39007)

Community – Oriented

- Issue: The term “community-oriented” is used in network design criteria for PM_{2.5}, but is not well defined
- Recommend: Replace this term with “**area-wide**” monitoring sites as this is the language recently adopted in the NO₂ monitoring requirements.
- Background:
 - Current monitoring rules require PM_{2.5} monitoring sites to be “community-oriented” or represent “community-wide” air quality to count towards EPA requirements. 40 CFR 58 App. D section 4.7.1(b)
 - “Community oriented” is not a concept used for any other NAAQS pollutant.

Community Monitoring Zone

- Issue: The term “community monitoring zone” is associated with spatial averaging which is being proposed to be revoked elsewhere in the proposal.
- Recommend: Revoke this term as it is no longer needed.

Population-Oriented (page 39008)

Issue: Current PM_{2.5} monitoring language requires sites be “Population-Oriented” for comparison to NAAQS

- Inconsistent with other NAAQS and central concept that NAAQS apply everywhere in ambient air
- Concept can’t be quantitatively defined; complicates implementation

Recommendation:

- Remove provisions that reference “population-oriented” in regulatory text

Background:

- This restriction is in §58.30 and Appendix D (Network Design). Language originated in the 1997 PM_{2.5} NAAQS and accompanying monitoring rule
- With no easily understood way to define receptors that are affirmatively population oriented or not, this is causing problems in supporting SIP modeling.

Propose Requiring Near-Roadway Monitoring

(page 39009)

Issue: Adding PM_{2.5} as a required measurement to the emerging near-road monitoring stations

Context:

- Placement of monitors near major roadways (or other large sources) has been optional and states, with a few exceptions, have not sited in near-road environments
- Many stakeholders are interested in near road monitoring, as are environmentalists interested in requiring that attainment be demonstrated at all modeling receptors throughout the nonattainment area especially very near roads
- Potential EJ issue
- Supports multi-pollutant objectives articulated in 2010 primary NO₂ NAAQS
 - “the EPA recognizes that the establishment of near-road monitoring sites will produce certain other advantages, by providing a new data source for public health studies that will support future NAAQS reviews, allowing for the tracking of mobile source emission reductions progress, providing monitoring infrastructure that may be of use for mixtures of pollutants in a multi-pollutant paradigm, and supporting scientific studies of other mobile source pollutants like CO₂, ultrafine particulate matter, black carbon, and air toxics.” – NO₂ NPRM

***Continued* – Propose Requiring Near-Roadway Monitoring**

Recommendations:

- Specifically require near-roadway monitors that would count toward minimum network requirements for PM_{2.5}.
 - Focus on relocation of existing sites (other than design value monitors) to meet new requirement in cost-effective manner (requires R.A. approval).
 - Implement PM_{2.5} monitors at near-road stations by January 1, 2015.

- Network design:
 - Consistent with previously stated desire for multi-pollutant monitoring at near road stations as part of other rules (i.e., NO₂, CO)
 - Consider using population threshold of 1M
 - Would result in near-road monitoring at 52 locations
 - Provides collocation with NO₂ and CO in near-road environments.
 - Solicit comment on alternative thresholds and/or requirement itself

Clarify language used to determine when PM_{2.5} monitoring sites at micro- and middle-scale locations are comparable to the Annual PM_{2.5} NAAQS (page 39008)

Issue:

- Absence of consistent language across monitoring rule and appendices on the applicability of micro- and middle-scale locations to the annual PM_{2.5} NAAQS.

Recommendations:

- Clarify language to explicitly state that measuring PM_{2.5} in micro- and middle-scale environments near emissions of mobile sources, such as a highway, does not constitute being impacted by a “unique” source.
- PM_{2.5} monitoring sites in micro- and middle-scale environments near roadways that are representative of many such locations in the same CBSA would be considered “area-wide” locations and therefore, eligible for comparison to the annual NAAQS.

***Continued* – Clarifying language used to determine when PM_{2.5} monitoring sites at micro- and middle-scale locations are comparable to the Annual PM_{2.5} NAAQS**

Background:

- Unlike all other NAAQS, a subset of PM_{2.5} monitors can only be compared to the 24-hour PM_{2.5} standard and not the annual standard. Language originated in the 1997 PM_{2.5} NAAQS and accompanying monitoring rule.
- Lack of clarity regarding the concept of a “unique source” has plagued implementation efforts with regard to modeling activities supporting SIPs and conformity analyses
- EJ issue; large numbers of people live in areas along highways, especially in larger CBSAs.
- Provides consistency with existing middle-scale definition in Appendix D:
Middle scale—People moving through downtown areas, or living near major roadways, encounter particle concentrations that would be adequately characterized by this spatial scale. Thus, measurements of this type would be appropriate for the evaluation of possible short-term exposure public health effects of particulate matter pollution. In many situations, monitoring sites that are representative of micro- or middle-scale impacts are not unique and are representative of many similar situations. This can occur along traffic corridors or other locations in a residential district. In this case, one location is representative of a number of small scale sites and is appropriate for evaluation of long-term or chronic effects. This scale also includes the characteristic concentrations for other areas with dimensions of a few hundred meters such as the parking lot and feeder streets associated with shopping centers, stadia, and office buildings.”
- With the reference to “traffic corridors” and related text, the EPA emphasizes that this type of location, which is referred to as near-road, should not be considered “unique.”

Use of Continuous FEMs at SLAMS (page 39011)

Issue: PM_{2.5} continuous FEMs with poor comparability to collocated FRMs and the 24 month window for not using continuous PM_{2.5} FEM data in design value calculations has expired (identified in AQS as monitor types “non-regulatory” and “SPM”).

Recommendations:

- Provide flexibility for monitoring agencies to declare in their annual monitoring network plans when data from PM_{2.5} continuous FEMs are of insufficient comparability to collocated FRMs such that they should not be used in design value calculations, even if operating for more than 24 months.
- In first year, address all existing data and data expected for length of plan (i.e., next 18 months)
- In subsequent years prospective only; that is only new data could be excluded.
 - This was proposed so that monitoring agencies are not caught in the middle of picking data that is liked or not liked after it has been collected.

Continued - Use of Continuous FEMs at SLAMS

(page 39011)

Recommendations:

- Use performance criteria used to approve methods as described in Part 53; however, accommodate how monitoring agencies run networks (e.g., routine programs typically do not have two or more continuous FEMs at the same site)
- Provide flexibility for excluding continuous FEMs at locations that are not collocated with an FRM to be grouped with a similar location that is collocated with an FRM.
- Require that SLAMS would still need an operating FRM (or other continuous FEM with acceptable data comparability) to ensure a design value is still calculated for required stations.
- PM_{2.5} continuous FEM data not to be used in design value calculations will be stored separately in AQS (i.e., not under parameter code 88101), but could be used in AQI reports.

Context:

- While progress is being made on improvements to data comparability of PM_{2.5} continuous FEMs, such progress is slow and even when improvements are made, at least a full year is¹⁴ needed to re-assess the new data set.

Use of CSN/IMPROVE Data to Support a New Secondary Standard for PM_{2.5} to Address PM-related Visibility Impairment

(page 39013)

Overarching Goal:

- If a new, distinct secondary standard to address PM-related visibility impairment is finalized, utilize as much of the existing CSN, and where appropriate, IMPROVE networks as possible; do not to add new requirements that would burden the State/local monitoring programs

Methods - Focus on use of existing speciation networks:

- IMPROVE and CSN provide eligible data; QAPPs and SOPs cited
- Relative Humidity (RH) – EPA is proposing to publish 10 year monthly averaged RH on web for use in calculating PM_{2.5} light extinction values; local site RH would not apply.

Quality Assurance – utilize all existing practices, so no new burden to States/locals

***Continued* - Use of CSN/IMPROVE data to support a secondary standard for visibility impairment**

Network Design Criteria:

- Can be either of the following:
 - Area-wide location of expected maximum concentration, or
 - Representative area-wide location for the CBSA

Minimum site requirements – no new sites expected.

- NCore applies as CSN/IMPROVE is already required at these locations
- States with CBSAs over 1M in population are required to have at least one site in one of the CBSA's; however, multiple CBSAs would not apply in the same State unless:
 - Multiple CBSA's over 2.5M population in the same State
- Flexible option - Downwind CBSA's with higher expected concentration, but smaller populations can be used instead of upwind CBSA.

Quality Assurance Requirements (page 39014)

Quality Assurance Weight of Evidence

Issue: Should monitoring data that has *not* met “all quality assurance requirements” necessarily be considered *ineligible* for comparison to the NAAQS?

Recommend: Propose regulatory weight of evidence provisions for all pollutants by adding clarifying text to QA regulations in CFR

Background: Historically, EPA has used qualitative terms (e.g., “all quality assured data”) to describe data eligible for comparison to the NAAQS.

- Some attempt to disqualify data when a QA requirement (Appendix A to Part 58) is not met yet other information indicates data are valid.
- Others attempt to use data when a significant lack of QA requirements put data into question.

Continued - Quality Assurance

Quality Assurance Requirements for the Chemical Speciation Network (CSN)

Recommendations:

- Propose requirements for flow rate verifications and flow rate audits that are consistent with existing procedures (no new implementation activities are needed).
- Utilize existing six collocated sites for national precision estimates.
 - No PQA level precision requirements
 - No PSD precision requirements

Continued - Quality Assurance

Waivers for Maximum Allowable Separation of Collocated PM_{2.5} samplers and Monitors

Issue:

- Difficulty meeting collocated siting requirements for PM_{2.5} continuous FEMs that may need to be inside a shelter with FRMs that are located on platform or roof.

Recommendations:

- Maintain 1 – 4 meters where practical
- Allow flexibility where the air drawn through the collocated samplers is well within the operational precision of the instruments.
 - e.g., neighborhood and larger scales
 - Existing network design guidance already describes “collocated scale” as 1 to 10 meters
- Allow monitoring agencies to request waivers for up to 10 meters at neighborhood and larger scales.

Probe and Monitoring Path Siting Criteria (page 39015)

Near – Road PM_{2.5} Monitoring

- Recommendation
 - Follow the same probe and siting criteria as NO₂ near-road requirement:
 - “as near as practicable to the outside nearest edge of the traffic lanes of the target road segments; but shall not be located at a distance greater than 50 meters, in the horizontal, from the outside nearest edge of the traffic lanes of the target road segments”

Chemical Speciation Network (CSN)

- Recommendation
 - Follow the same probe and siting criteria as PM_{2.5} FRMs and FEMs.

Additional Ambient Air Monitoring Topics being addressed in the PM NAAQS proposal

Additional Ambient Air Monitoring Issues

- Administrative change to 53.9 – Conditions of Designations
 - Section includes description of what must be met by a manufacturer as a condition of maintaining designation of an FRM or FEM.
 - Existing language includes $PM_{2.5}$, but does not specify where to find the performance criteria that must be met.
 - Proposal links performance criteria from Table C-4 to subpart C of Part 53.
- Propose to revoke requirement for $PM_{10-2.5}$ speciation at NCore stations; method research is on-going and per CASAC Subcommittee advice, more flexibility in network design is needed to support health studies and research.

***Continued* - Additional Ambient Air Monitoring Issues**

- Longer filter archive (current requirement is one year); filters very important to support health and epi studies, source apportionment.
 - Proposal is for total of five years of storage with at least the first year in cold storage
- Reconsider required sampling schedules in general – may not be necessary if annual is driver
 - Proposing some additional flexibility for sampling frequency
- Revise content/format requirements for network assessments, using lessons learned on first cycle