Revisions to the Ambient Monitoring Regulations

Overview of the Final Rule
Overview of NAAQS Decision

- On September 21, 2006 EPA completed its review of the National Ambient Air Quality Standards (NAAQS) for particle pollution.

- The final rule addresses two categories of particle pollution:
  - fine particles (PM$_{2.5}$), which are 2.5 micrometers in diameter and smaller; and
  - inhalable coarse particles, which are larger than 2.5 micrometers and smaller than 10 micrometers in diameter.

- In the final rule EPA:
  - revised the fine particle standards to better protect public health and visibility, and
  - retained the 24-hour PM$_{10}$ standard to protect against exposure to inhalable coarse particles.

- For more information go to http://www.epa.gov/air/particles
# EPA’s PM Standards: Old and New

<table>
<thead>
<tr>
<th></th>
<th>Previous Standards</th>
<th>2006 Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual</td>
<td>24-hour</td>
</tr>
<tr>
<td>PM&lt;sub&gt;2.5&lt;/sub&gt;</td>
<td>15 µg/m&lt;sup&gt;3&lt;/sup&gt;</td>
<td>65 µg/m&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>(Fine Particles)</td>
<td>Annual arithmetic mean, averaged over 3 years</td>
<td>24- hour average, 98&lt;sup&gt;th&lt;/sup&gt; percentile, averaged over 3 years</td>
</tr>
<tr>
<td></td>
<td>(established in 1997)</td>
<td>(established in 1997)</td>
</tr>
<tr>
<td>PM&lt;sub&gt;10&lt;/sub&gt;</td>
<td>50 µg/m&lt;sup&gt;3&lt;/sup&gt;</td>
<td>150 µg/m&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>(Coarse Particles)</td>
<td>Annual average</td>
<td>24-hr average, not to be exceeded more than once per year on average over a three year period</td>
</tr>
<tr>
<td></td>
<td>(established in 1987)</td>
<td>(established in 1987)</td>
</tr>
</tbody>
</table>
The Monitoring Rule Team

- OAQPS (Tom Curran)
  - Phil Lorang
  - Tim Hanley
  - Lewis Weinstock
  - Mike Papp
  - Kevin Cavender
  - Brenda Millar
  - Mark Schmidt

- ORD
  - Bob Vanderpool
    - Frank McElroy (RTI)

- OGC

- Regional Input coordinated through Region 4.

- Interagency review through OPEI (EPA's Office of Policy, Economics, and Innovation).

- OMB
How the Pieces Fit Together

**PM NAAQS**

Part 50 – National Primary and Secondary Ambient Air Quality Standards

- Includes:
  - PM NAAQS
  - PM$_{2.5}$ Primary and Secondary
  - PM$_{10}$ Primary and Secondary
  - PM$_{2.5}$ FRM
  - PM$_{10}$ FRM
  - PM$_{10-2.5}$ FRM

Interpretation of NAAQS for PM$_{10}$
Interpretation of NAAQS for PM$_{2.5}$

**PM NAAQS and Ambient Air Monitoring Rules**

**Monitoring**

Part 53 – Ambient Air Monitoring Reference and Equivalent Methods

- Includes:
  - Approval of FRMs and FEMs
    - PM$_{2.5}$
    - PM$_{10-2.5}$

Part 58 – Ambient Air Quality Surveillance

- Includes:
  - Network Description
  - Periodic Assessments
  - Operating Schedule
  - Data Certification
  - Special Purpose Monitoring
  - Quality Assurance Methodology
  - Network Design
  - Probe and Siting Criteria

**How the Pieces Fit Together**
A Look at the Comment Response Effort

- Hundreds of individual citizen letters and several mass mailings.
- Detailed comment letters were received from State & Local Agency representatives (51), Tribes (53), Environmental, Health, and Public Interest groups (31), and Industry.
- All comment letters were read by staff.
- Discussions with management were held throughout the summer to consider comments and possible changes in the proposal.
- Draft responses were developed and reviewed by the Monitoring Rule Team, OGC, and OMB.

Virtually every part of the monitoring proposal received some comment.
Major Rule Changes Due to Comments (1 of 2)

- Strengthened field testing requirements for approval of Federal equivalent methods (tightened acceptance criteria, added fourth test site).
- NCore monitoring requirements (reduced PM$_{10-2.5}$ sampling frequency to 1-in-3 day from daily, NOy measurements can be waived).
- Eliminated PM$_{10-2.5}$ siting requirements (population based) and five-part suitability tests in support of qualified PM$_{10-2.5}$ indicator (PM$_{10-2.5}$ NAAQS not adopted).
- Additional PM$_{2.5}$ and ozone monitors required in more polluted areas, and more monitors in CSA’s (compared with proposed requirements).
- Required daily sampling frequency at about 50 design value PM$_{2.5}$ sites recording values near the 24-hour NAAQS (35 µg/m3).
Major Rule Changes Due to Comments (2 of 2)

- Reduced PM$_{10}$ high volume and TSP flowrate verification frequencies from monthly to quarterly.
- Waiver for SPM quality assurance requirements when logistically infeasible and not essential to meeting monitoring objectives.
- Delayed deadlines
- Increased roadway setback distance for ozone sites applies to new sites only.
- Reduced required elements of annual monitoring network plan.
Other Rule Changes

- Required PM$_{10-2.5}$ speciation at all NCore sites instead of in 25 areas with MSA populations over 500k and high estimated design values (Interagency Review).

- Retention of existing PM$_{10}$ minimum monitoring requirements instead of proposed revocation of most requirements (PM$_{10}$ NAAQS decision).
Known Errata Issues the Monitoring Rule

• Due to the Federal Register print process
  – Missing merged cell in last row of Table C-4 to Subpart C of Part 53 (Test Specifications) – 71 FR 61286.
  – A few missing characters in appendix A of part 58.
• Editorial problems (need to consult with management and OGC).
  – §53.35 (c) – Test procedures for Class II and III methods for PM_{2.5} and PM_{10-2.5}. “All reference method samplers shall be of single-filter design (not multi-filter, sequential sample design).” May not reflect OAQPS position.
  – §58.20 (c) – “…or an approved alternative,…..” wording needs to be stricken from rule language on SPM’s. Inconsistent with preamble.

Please contact Lewis Weinstock with other known or suspected errata in the monitoring rule: Weinstock.lewis@epa.gov 919-541-3661 by November 17, 2006
PM Methods
Federal Reference Method Updates

• EPA has finalized PM$_{2.5}$ FRM improvements
  – Incorporation of changes to improve efficiency of monitoring network operations.

• EPA has finalized PM$_{10-2.5}$ FRM
  – Two concurrently operated low-volume samplers with one measuring PM$_{10}$ and the other PM$_{2.5}$.

§ 50.13 National primary and secondary ambient air quality standards for PM$_{2.5}$. (a) The national primary and secondary ambient air quality standards for particulate matter are 15.0 micrograms per cubic meter (µg/m$^3$) annual arithmetic mean concentration, and 35 µg/m$^3$ 24-hour average concentration measured in the ambient air as PM$_{2.5}$ (particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers) by either:

(1) A reference method based on appendix L of this part and designated in accordance with part 53 of this chapter; or (2) An equivalent method designated in accordance with part 53 of this chapter.
New Procedures for Approval of Federal Equivalent Methods (PM$_{2.5}$ and PM$_{10-2.5}$)

- Federal Equivalent Method’s for both PM$_{2.5}$ and PM$_{10-2.5}$
  - Defined three classes of equivalent methods with different testing requirements.
    - Class I - based on a sampler that is very similar to the sampler specified for reference methods in appendix L or appendix O (as applicable) of part 50 of this chapter, with only minor deviations or modifications, as determined by EPA.
    - Class II - utilizes a sampler in which integrated samples are obtained from the atmosphere by filtration and subjected to a subsequent filter conditioning process followed by a gravimetric mass determination, but which is not a Class I equivalent method because of substantial deviations from the design specifications of the sampler. (process for approving dichotomous samplers)
    - Class III - analyzer capable of providing ambient air measurements representative of one-hour or less integrated PM$_{2.5}$ or PM$_{10-2.5}$ concentrations as well as 24-hour measurements determined as, or equivalent to, the mean of 24 one-hour consecutive measurements. (process for approving continuous samplers)
  - Candidate Class II and III samplers must demonstrate statistical comparability with FRM samplers through field testing at a specified combination of test sites and seasons to be approved as FEM’s.
New Methodological Option: Approved Regional Methods (ARMs) for PM$_{2.5}$

- A PM$_{2.5}$ continuous method approved for use within a State, local, or Tribal agency used to meet multiple monitoring objectives such as NAAQS, Air Quality Index, and forecast validation.
- Allows agencies to optimize their PM$_{2.5}$ network with well performing (and currently deployed) continuous methods that may not perform well in all required FEM testing regions.
- Testing Criteria
  - Uses basically the same performance criteria as Class III methods.
  - Testing occurs at subset of sites in the network within which it’s intended to be used.
- Approvals
  - Initial ARM application approved through Office of Research & Development.
  - Subsequent applications for method in another agency’s network approved by EPA Regional Office.
  - All procedures (including proposed use of data transformations) must be fully described in Quality Assurance Program Plan accompanying ARM application.
Minimum Monitoring Network Requirements
## PM$_{2.5}$ Minimum Monitoring Network Requirements

<table>
<thead>
<tr>
<th>MSA Population$^{1,2}$</th>
<th>Most recent 3-year design value $\geq$ 85% of any PM$_{2.5}$ NAAQS$^3$</th>
<th>Most recent 3-year design value $&lt;$ 85% of any PM$_{2.5}$ NAAQS$^{3,4}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&gt;$ 1M</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>500K – 1M</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>50K – 500K$^5$</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

---

1. Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
2. Population based on latest available census figures.
3. The PM$_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
4. These minimum monitoring requirements apply in the absence of a design value.
5. Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

- At least one population oriented site in an area of maximum concentration and one site in an area of poor air quality (where more than 1 site required)
- Regional background and transport monitors required in each State – with flexibility to use IMPROVE or nearby States monitor
- Exemptions from monitoring requirements by Regional Administrator
- One half (rounded up) of required FRM/FEM samplers need continuous monitors (do not have to be collocated with FRM’s)
Preamble: 71 FR 61240

“EPA does not intend to encourage net reductions in the number of O₃ and PM₂.₅ monitoring sites in the U.S. as a whole. The surplus in the existing networks relative to minimum requirements gives States more flexibility to choose where to apply monitoring resources for O₃ and PM₂.₅.”


Retain Existing $\text{PM}_{10}$ Minimum Monitoring Requirements*

<table>
<thead>
<tr>
<th>MSA population</th>
<th>High Concentration$^2$</th>
<th>Medium Concentration$^3$</th>
<th>Low Concentration$^4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;1,000,000</td>
<td>6-10</td>
<td>4-8</td>
<td>2-4</td>
</tr>
<tr>
<td>500k – 1,000,000</td>
<td>4-8</td>
<td>2-4</td>
<td>1-2</td>
</tr>
<tr>
<td>250k – 500k</td>
<td>3-4</td>
<td>1-2</td>
<td>0-1</td>
</tr>
<tr>
<td>100k – 250k</td>
<td>1-2</td>
<td>0-1</td>
<td>0</td>
</tr>
</tbody>
</table>

1. Selection of urban areas and actual number of stations per area will be jointly determined by EPA and the State agency.
2. High concentration areas are those for which ambient $\text{PM}_{10}$ data show ambient concentrations exceeding either $\text{PM}_{10}$ NAAQS by 20 percent or more.
3. Medium concentration areas are those for which ambient $\text{PM}_{10}$ data show ambient concentrations exceeding 80 percent of the $\text{PM}_{10}$ NAAQS.
4. Low concentration areas are those for which ambient $\text{PM}_{10}$ data show ambient concentrations less than 80 percent of the $\text{PM}_{10}$ NAAQS.

* $\text{PM}_{10}$ concentrations corrected to standard temperature and pressure (STP)
Ozone Minimum Monitoring Network Requirements

<table>
<thead>
<tr>
<th>MSA Population(^1,2)</th>
<th>Most recent 3-year design value ≥ 85% of any (O_3) NAAQS(^3)</th>
<th>Most recent 3-year design value &lt; 85% of any (O_3) NAAQS(^3,4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 10M</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>4 - 10M</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>350K – 4M</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>50K – 350K(^5)</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^1\) Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
\(^2\) Population based on latest available census figures.
\(^3\) The ozone (\(O_3\)) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
\(^4\) These minimum monitoring requirements apply in the absence of a design value.
\(^5\) Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

- At least one ozone site in each area’s network must be designed to record the maximum concentration for that particular area.
- Deviations allowed by the Regional Administrator.
Revocation of Minimum Monitoring Requirements: CO, SO$_2$, NO$_2$, Pb

- Generally, for all of these pollutants the EPA Region can approve the shutdown of a monitor as part of the annual network review.
  - See 58.14 for specific provisions on discontinuing monitors.
  - Watch out for SIP commitments for specific monitors and/or contingency measures tied to monitoring triggers.

- No minimums apply for CO, SO$_2$, NO$_2$.

- Pb – required in areas where levels are still a concern.
  - 2 sites required in areas above the NAAQS.
    - 1 maximum exposure site
  - 10 Pb sites at NCore or urban air toxics sites for long-term trends; one per Region in most populated MSA/CSA.
New Monitoring Requirements: NCore Multi-Pollutant Network

- Collocation of multiple pollutant and supporting measurements to meet many different objectives.
- Robust suite of filter-based PM samplers.
- Emphasis on continuous operating instruments.
- Use of high-sensitivity precursor gas monitors.
- Diversity of representative site locations.
- Leverage with existing multipollutant networks.
- Between 62 and 71 stations must be operational by January 1, 2011.

Candidate NCore Site 361010003
Pinnacle Park, New York
Minimum NCore Network Requirements

(All fifty States, District of Columbia, Puerto Rico, Virgin Islands)
Status Of NCore Pilot Program

• We have information on approximately 70 existing and potential NCore site locations. Some of these sites have equipment in varying stages of installation and operation.

• Regions are negotiating with States about some of these locations. Final proposed NCore sites must be included in July 1, 2009 plan but earlier approvals would be optimal.

• OAQPS is developing an AMTIC-based web tool to help organize information about NCore sites and serve as an outreach tool for potential data users. How you can help:
  – Insure that all fields in AQS are completed for candidate sites.
  – Follow-up on data request sent through Regions last summer for GPS-obtained coordinates, site and cardinal direction photographs (8 sectors), currently operating parameters.
  – Please forward information to Kevin Cavender at: (cavender.kevin@epa.gov) – (919)-541-2364.
  – Web tool should become available December 2006.
Candidate NCore Site Locations

November 1, 2006
Other Monitoring Requirements
AQS Data Submittal, Certification, and Archiving

- Quarterly ambient data reporting remains the same – within 90 days past the end of the quarter.
  - SO$_2$, CO, O$_3$, NO$_2$, NO, NO$_X$, NO$_Y$, Pb, PM$_{10}$, PM$_{2.5}$, PM$_{10-2.5}$, chemical speciation, meteorological data for NCore and PAMS.
  - Reduced requirements for supplemental PM$_{2.5}$ records – only sampler-generated average temperature and barometric pressure.
  - More explicit reference to reporting of precision and accuracy data in §58.16.
- 6-month Data Reporting – past the end of the quarter.
  - VOC, and if collected, carbonyl, NH$_3$, and HNO$_3$
- New requirement for reporting field blank mass (micrograms) for PM$_{2.5}$ filter based FRM/FEMs
- Data certification deadline moved up from July 1st to May 1st, beginning in 2010 (for data collected in calendar year 2009).
- New requirement for archiving filters from low-volume PM$_{10}$ or PM$_{10-2.5}$ samplers (in addition to existing PM$_{2.5}$ requirement).
Special Purpose Monitors (SPM)

• What is it/isn’t it?
  – Site can be used for up to 24 months without being compared to NAAQS, (except violating monitors may be used for CO, SO$_2$, NO$_2$, and Pb when States request an existing non-attainment area be designated to attainment).
  – Designated in annual network plan and AQS.
  – Cannot be a monitor used to meet the minimum monitoring requirements.
  – Cannot be an existing SLAMS monitor, unless EPA approves the change.

• What applies to it?
  – Flexibility for network design, and probe and siting criteria.
  – QA and methods apply for FRM/FEM/ARM if site meets probe siting criteria; however, some QA requirements can be waived when logistically infeasible due to unusual site conditions and not essential to the monitoring objective.
  – Data submitted to AQS for FRM/FEM/ARM.

• Other
  – No prior approval needed to shut down an SPM.
Network Plans and Assessments

• Annual Monitoring Network Plans
  – First one due July 1, 2007
    • “...must be made available for public inspection at least 30 days prior to submission to EPA.”
    • Approved by the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove within 120 days (can be waived based on certain conditions).

• Air Quality Assessments every five years
  – Comprehensive in scope, more complete evaluation of monitoring objectives, new technologies.
  – First one due July 1, 2010.
  – Draft guidance available at:
    • http://www.epa.gov/ttn/amtic/files/ambient/criteria/nettech.pdf
Other Monitoring Rule Changes

• PAMS Monitoring Program
  – Currently 109 stations in 25 Ozone non-attainment areas.
  – New requirements represent a reduction to about half the existing requirements.
  – Allows PAMS programs to be more customized to local data needs.
    • Recommend keeping air toxics data users in mind if there are any reductions.

• Probe Siting
  – Increased set-back distances from roadways for new ozone sites.
  – Finalized middle-scale PM$_{10-2.5}$ height requirement.
Important Dates in the Monitoring Rule
Effective in 60 Days from Federal Register Printing - (December 18, 2006)

- New criteria for approval of Federal Equivalent Methods for PM$_{2.5}$ and PM$_{10-2.5}$, and Approved Regional Methods.
- New QA requirements for SLAMS.
- New required numbers of PM$_{2.5}$, PM$_{10}$, Pb, and ozone monitors by MSA, if lower than old.
- Removal of required numbers for CO, SO$_2$, and NO$_2$ (except if in SIP).
- Criteria for removal of monitors above required number.
- Conditions on use of SPM data.
- Removal of required reporting of certain PM$_{2.5}$ monitoring parameters.
- PM$_{10-2.5}$ probe heights.
- Increased distance between roadways and NEW ozone monitors.
Effective January 1, 2007

- Every day PM$_{2.5}$ samples at about 50 stations reading close to the new 24-hour standard.
- Retention of low-volume PM$_{10}$ and PM$_{10-2.5}$ filters.
- Reporting of blank filter data to AQS.
- Last chance to convert excess SLAMS to SPM status, without first meeting criteria for discontinuation.
Effective July 1, 2007

• Precision and accuracy data for Q1 of 2007 must be submitted to AQS.
  – Not an explicit requirement in old rule, not all monitoring organizations have been reporting it.

• Annual monitoring plan.
  – A current requirement, but double check required content.
  – Including plans for any additional required PM$_{2.5}$, PM$_{10}$, or ozone monitors under new required numbers of monitors by MSA.
120 Days After Annual Plan Submittal

• Regional Administrator must approve/disapprove the annual plan.
  – Requires public comment, if the State did not provide a comment process.
  – Some changes, if in plan, require Administrator approval.

• OAQPS will make recommendations on possible delegation of some of these decisions to headquarters staff-level.
Effective January 1, 2008

- Start operation of any new required PM$_{2.5}$, PM$_{10}$, or ozone monitors.
  - About 13 new PM$_{2.5}$ monitors.
  - Any additional ozone monitors.
  - PM$_{10}$ monitors in approximately 8 MSAs.
Effective January 1, 2009

- New QA requirements apply to Special Purpose Monitoring stations using FRM, FEM, or ARM monitors.
  - Regional Administrator can approve an alternative for practicality reasons, if full QA not essential to monitoring objective.
  - Alternative QA plan means data not comparable to the NAAQS.
Effective July 1, 2009

• Plan for required NCore stations.

Effective May 1, 2010

• Revised deadline for annual certification of data submitted to AQS.

Effective July 1, 2010

• First 5-year network assessment.

Effective January 1, 2011

• Operation of NCore stations.
Important Quality Assurance Aspects and Related Guidance of the Monitoring Rule

Mike Papp
November, 2006  National Ambient Air Monitoring Conference
Las Vegas, NV
Changes in the QA Regulations (40 CFR Part 58 Appendix A)

• Ensured regs reflected current EPA QA policy and requirements
• Combined Appendix A and B (PSD)
• Removed SO2/NO2 manual audit checks (development of audit solutions)
• Established DQOs for PM_{10-2.5} and O_3
  – Measurement quality objectives (MQOs) changing for gaseous pollutants
MQOs for Gaseous Pollutants Will Change

- Ozone to 7% CV +/- 7% Bias
- Other gases will be changed to 10% in Guidance

97% monitors meeting this requirement now for ozone!
Changed Term “Reporting Organization” to “Primary Quality Assurance Organization”

- Can reduce PM QA Implementation Burdens
- Will retain “reporting organization” role for another use
- In most cases RO will equal PQAO
- NADG will work to reduce burdens of adding this new role in AQS

<table>
<thead>
<tr>
<th>Old Rule (before 9/27/06)</th>
<th>New Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0.3 Each reporting organization shall be defined such that measurement uncertainty among all stations in the organization can be expected to be reasonably homogeneous, as a result of common factors. (a) Common factors that should be considered by in defining reporting organizations include: (1) Operation by a common team of field operators (2) Common calibration facilities. (3) Oversight by a common quality assurance organization. (4) Support by a common laboratory or headquarters.</td>
<td>3.1.1 Each primary quality assurance organization shall be defined such that measurement uncertainty among all stations in the organization can be expected to be reasonably homogeneous, as a result of common factors. Common factors that should be considered by monitoring organizations in defining primary quality assurance organizations include: (a) Operation by a common team of field operators according to a common set of procedures; (b) Use of a common QAPP or standard operating procedures; (c) Common calibration facilities and standards; (d) Oversight by a common quality assurance organization; and (e) Support by a common management, laboratory or headquarters.</td>
</tr>
</tbody>
</table>
Expanded audit concentration levels for precursor gas monitoring

"The evaluation is made by challenging the analyzer with audit gas standard of known concentration (effective concentration for open path analyzers) from at least three consecutive audit levels. The audit levels selected should represent or bracket 80 percent of ambient concentrations that are measured by the analyzer being evaluated. An additional 4th level is encouraged for those monitors that have the potential for exceeding the concentration ranges described by the initial three selected."

<table>
<thead>
<tr>
<th>Audit level</th>
<th>Concentration range, ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O$_3$</td>
</tr>
<tr>
<td>1........</td>
<td>0.02-0.05</td>
</tr>
<tr>
<td>2........</td>
<td>0.06-0.10</td>
</tr>
<tr>
<td>3........</td>
<td>0.11-0.20</td>
</tr>
<tr>
<td>4........</td>
<td>0.21-0.30</td>
</tr>
<tr>
<td>5........</td>
<td>0.31-0.90</td>
</tr>
</tbody>
</table>
# PM QA Regulation Changes and Related Burdens

<table>
<thead>
<tr>
<th>Method</th>
<th>Coverage</th>
<th>Minimum Frequency</th>
<th>Net Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Automated Methods</strong></td>
<td></td>
<td><strong>Old Rule</strong></td>
<td></td>
</tr>
<tr>
<td>Flow rate verification</td>
<td>Each sampler</td>
<td>Once every 2 weeks</td>
<td>Decrease 12/unit</td>
</tr>
<tr>
<td>PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;10-2.5&lt;/sub&gt;</td>
<td>Each sampler</td>
<td>Once every 2 weeks</td>
<td>Decrease by 12/unit</td>
</tr>
<tr>
<td>PM&lt;sub&gt;10&lt;/sub&gt;</td>
<td>Each sampler</td>
<td>Once every month</td>
<td></td>
</tr>
<tr>
<td>Flow rate audit</td>
<td>Each sampler</td>
<td>Once every Quarter</td>
<td>Decrease by 2 per unit</td>
</tr>
<tr>
<td>PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;10-2.5&lt;/sub&gt;</td>
<td>Each sampler</td>
<td>Once every year</td>
<td>Increase by 1 per unit</td>
</tr>
<tr>
<td>PM&lt;sub&gt;10&lt;/sub&gt;</td>
<td>Each sampler</td>
<td>Once every 6 months</td>
<td></td>
</tr>
<tr>
<td>Collocated Sampling</td>
<td>15%</td>
<td>Every 6 days</td>
<td>Decrease by 30 per collocated unit</td>
</tr>
<tr>
<td>Performance Evaluation Program (PEP)</td>
<td>See rule</td>
<td>25% of method designations 4 times per year</td>
<td>Decrease in overall national audits by ~25%</td>
</tr>
<tr>
<td>PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;10-2.5&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Instruments</td>
<td></td>
<td><strong>New Rule</strong></td>
<td></td>
</tr>
<tr>
<td>Collocated Sampling</td>
<td>15%</td>
<td>Every 6 days</td>
<td>Decrease by 30 per collocated unit</td>
</tr>
<tr>
<td>PM&lt;sub&gt;10-2.5&lt;/sub&gt;, PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;10&lt;/sub&gt;, TSP</td>
<td></td>
<td>Every 12 days</td>
<td></td>
</tr>
<tr>
<td>Flow rate verification</td>
<td>Each sampler</td>
<td>Once every month</td>
<td>No Change</td>
</tr>
<tr>
<td>PM&lt;sub&gt;10-2.5&lt;/sub&gt;, PM&lt;sub&gt;2.5&lt;/sub&gt;</td>
<td>Each sampler</td>
<td>Once every month</td>
<td></td>
</tr>
<tr>
<td>PM&lt;sub&gt;10&lt;/sub&gt;, TSP</td>
<td>Each sampler</td>
<td>No verification</td>
<td>Increase of 4 per unit</td>
</tr>
<tr>
<td>Flow rate audit</td>
<td>Each sampler</td>
<td>Once every Quarter</td>
<td>Decrease by 2 per unit</td>
</tr>
<tr>
<td>PM&lt;sub&gt;10-2.5&lt;/sub&gt;, PM&lt;sub&gt;2.5&lt;/sub&gt;</td>
<td>Each sampler</td>
<td>Once every 6 months</td>
<td></td>
</tr>
<tr>
<td>PM&lt;sub&gt;10&lt;/sub&gt;, TSP</td>
<td>Each sampler</td>
<td>Once every year</td>
<td>Increase by 1 per unit</td>
</tr>
<tr>
<td>Manual Methods</td>
<td>1. Each sampler</td>
<td>1. Include with TSP</td>
<td>No Change</td>
</tr>
<tr>
<td>Lead</td>
<td></td>
<td>2. Analytical system</td>
<td></td>
</tr>
<tr>
<td>1. Each sampler</td>
<td></td>
<td>2. Each quarter</td>
<td></td>
</tr>
<tr>
<td>Performance Evaluation Program</td>
<td>See rule</td>
<td>25% of method designations 4 times per year</td>
<td>Decrease in overall national audits by ~25%</td>
</tr>
<tr>
<td>PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;10-2.5&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PM$_{2.5}$ Performance Evaluation Program (PEP) Reduction

- From 25% of sites 4 times a year to:
  - 5 audits for PQAOs with $\leq$ 5 sites (15 over 3 years)
  - 8 audits for PQAOs with $>$ 5 sites (24 over 3 years)
PM Collocation Reductions/Changes

- Number of sites 25% to 15%
- Sampling frequency 1-in-6 days to 1-in-12 days
- Reduced cutoff values
  - From 20 ug/m$^3$ to 15 ug/m$^3$ for PM$_{10}$
  - From 6 ug/m$^3$ to 3 ug/m$^3$ for PM$_{2.5}$
- Modified PM$_{10-2.5}$ requirement since fewer sites are expected
Revised PM$_{10-2.5}$ Collocation Requirements

- Since PM$_{10-2.5}$ NAAQS not promulgated, only NCore stations have to measure PM$_{10-2.5}$
  - Too few per PQAO to require collocation at PQAO level of aggregation
- Goal is 15% of each method (FRM/FEM) in network
  - Regional Administrator makes decision
  - Start with PQAOs with more then one PM$_{10-2.5}$ site
  - PM$_{10-2.5}$ collocation can count towards PM$_{10}$ and PM$_{2.5}$ collocation requirements.
Flow Rates

• Standardized PM monitoring flow rate audit and verification frequencies
  – Automated Methods
    • Reduced PM2.5 audit requirements but increased PM10
    • Reduced PM10 and PM2.5 verification requirements
  – Manual Methods
    • Decreased PM2.5 audit requirement but increased PM10
    • No Change to PM2.5 verifications but increased PM10
PM QA Regulation and Related Burdens

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Method</th>
<th># Sites</th>
<th>Flow Verification Decrease /Increase</th>
<th>Flow Audit Decrease /Increase</th>
<th>Collocated Sampling Decrease /Increase</th>
<th>PEP Decrease /Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM10</td>
<td>Continuous</td>
<td>123</td>
<td>-1722</td>
<td>123</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>PM10</td>
<td>Manual</td>
<td>642</td>
<td>2568</td>
<td>642</td>
<td>-4080</td>
<td>NA</td>
</tr>
<tr>
<td>PM2.5</td>
<td>Continuous</td>
<td>180</td>
<td>-2520</td>
<td>-360</td>
<td>-1680</td>
<td>0</td>
</tr>
<tr>
<td>PM2.5</td>
<td>Manual</td>
<td>937</td>
<td>NC</td>
<td>-1874</td>
<td>-5220</td>
<td>-314</td>
</tr>
<tr>
<td>TSP/Pb</td>
<td>Manual</td>
<td>100</td>
<td>400</td>
<td>100</td>
<td>-1050</td>
<td>NA</td>
</tr>
<tr>
<td>Total</td>
<td>(w/o 2.5 continuous)</td>
<td>1802</td>
<td>1246</td>
<td>-1009</td>
<td>-10410</td>
<td>-314</td>
</tr>
<tr>
<td>Total</td>
<td>(with 2.5 continuous)</td>
<td>1982</td>
<td>-1274</td>
<td>-1369</td>
<td>-12090</td>
<td>-314</td>
</tr>
</tbody>
</table>

If monitoring organizations discontinue some PM10 stations as envisioned in the draft monitoring strategy, additional QC reductions would be expected.
Revised Performance Evaluation
Language of PEP and NPAP

• Monitoring organization responsible for implementing adequate and independent audit
  – Allows for continued Federal implementation with STAG Funds
  – Regions/OAQPS will agree on adequacy and independence criteria
  – Regions will accept monitoring organizations programs based on criteria
Adequate NPAP/PEP (abridged version)

**NPAP**
- Performing audits at a risk-targeted 20% of monitoring sites/instruments
- Data submission to AQS
- TTP Delivery system
- Follow NPAP field/lab SOP critical performance criteria
- Use of audit gasses that are NIST certified and validated at least once a year
- Validation/certification with the EPA NPAP program
- Incorporated in QAPP

**PEP**
- Valid audits of 5 or 8 per PQAO per year
- Data submission to AQS
- Use of independent personnel, sampling devices (FRMs) weighing laboratory and standards
- Follow PEP field/lab SOPs critical performance criteria
- Follow PEP validation criteria
- Validation/certification with the EPA PEP program
- Incorporated into QAPP
Independence PEP/NPAP

• Not part of the organization directly performing and accountable for the work being assessed.
• A management structure that allow for the separation of its routine sampling personnel from its auditing personnel by two levels of management
• Submission of a plan demonstrating independence to the EPA Regional Office.

For PEP, labs must also be independent.

Region 4 contractor Operated PEP Lab is available (STAG Funds required) as well as others.
NPAP/PEP Implementation Scenario

• May 17, 2006- FY07 PEP/NPAP Implementation Memo to SLTs
  – Provided options for FY07 and requested statement of intentions by July 15, 2006.
    • 1 new monitoring organization (NY) opting for PEP
    • 3 new monitoring organizations opting for NPAP (NY, TX, FL)
  – Those demonstrating capabilities by Sept. 30, would have STAG funds returned ASAP

• Similar memo generated each year (Jan) for monitoring organization decision
New Statistics

• Changed Statistics (forms and levels of aggregation)
  – Confidence limits
    • PQAO for PM
    • Site level for gaseous pollutants
  – AMP255 Report performs new statistics
    • Performing in-depth review of Stats this year
    • OAQP will run annually
    • Box-and-whisker plots included in annual summary
  – Guidance document in development
    • Rationale and excel spreadsheet

http://www.epa.gov/ttn/amtic/parslist.html
DASC (Data Assessment Statistical Calculator)

Site: (Enter Site ID or Name Here)

Step 1
Pick a Pollutant
- SO2
- NO2
- O3
- CO
- PM 2.5
- PM10
- PM 10-2.5

Step 2
Pick a Statistic to Calculate
- Precision Estimate
- Bias Estimate
- Absolute Bias Estimate
- Semi-Annual Flow Rate
- One-Point Flow Rate

Step 3

P&B Guidance and Data Assessment Statistical Calculator (DASC) Software

Gaseous Assessments

<table>
<thead>
<tr>
<th>Site ID: Burbans</th>
<th>Pollutant type: NOy API</th>
<th>CV ub (%)</th>
<th>Bias (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meas Val</td>
<td>Audit Val</td>
<td>d (Eqn. 1)</td>
<td>25th Percentile</td>
</tr>
<tr>
<td>(Y)</td>
<td>(X)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.9</td>
<td>20</td>
<td>-0.500</td>
<td>-6.500</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>19.8</td>
<td>20</td>
<td>-1.000</td>
<td>-4.000</td>
</tr>
<tr>
<td>19.9</td>
<td>20</td>
<td>-0.500</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>19.9</td>
<td>20</td>
<td>-0.500</td>
<td></td>
</tr>
<tr>
<td>20.1</td>
<td>20</td>
<td>0.500</td>
<td></td>
</tr>
<tr>
<td>19.9</td>
<td>20</td>
<td>-0.500</td>
<td></td>
</tr>
<tr>
<td>19.6</td>
<td>20</td>
<td>-2.000</td>
<td></td>
</tr>
<tr>
<td>19.6</td>
<td>20</td>
<td>-2.000</td>
<td></td>
</tr>
<tr>
<td>19.7</td>
<td>20</td>
<td>-1.500</td>
<td></td>
</tr>
<tr>
<td>19.8</td>
<td>20</td>
<td>-1.000</td>
<td></td>
</tr>
<tr>
<td>19.6</td>
<td>20</td>
<td>-2.000</td>
<td></td>
</tr>
<tr>
<td>19.6</td>
<td>20</td>
<td>-2.000</td>
<td></td>
</tr>
<tr>
<td>19.1</td>
<td>20</td>
<td>-4.500</td>
<td></td>
</tr>
<tr>
<td>19.5</td>
<td>20</td>
<td>-2.500</td>
<td></td>
</tr>
<tr>
<td>19.4</td>
<td>20</td>
<td>-3.000</td>
<td></td>
</tr>
<tr>
<td>19.6</td>
<td>20</td>
<td>-2.000</td>
<td></td>
</tr>
<tr>
<td>19.5</td>
<td>20</td>
<td>-2.500</td>
<td></td>
</tr>
<tr>
<td>19.5</td>
<td>20</td>
<td>-2.500</td>
<td></td>
</tr>
<tr>
<td>19.4</td>
<td>20</td>
<td>-3.000</td>
<td></td>
</tr>
<tr>
<td>19.5</td>
<td>20</td>
<td>-2.500</td>
<td></td>
</tr>
<tr>
<td>19.3</td>
<td>20</td>
<td>-3.500</td>
<td></td>
</tr>
<tr>
<td>19.1</td>
<td>20</td>
<td>-4.500</td>
<td></td>
</tr>
<tr>
<td>19.1</td>
<td>20</td>
<td>-4.500</td>
<td></td>
</tr>
<tr>
<td>19.3</td>
<td>20</td>
<td>-3.500</td>
<td></td>
</tr>
<tr>
<td>19.2</td>
<td>20</td>
<td>-4.000</td>
<td></td>
</tr>
<tr>
<td>19.2</td>
<td>20</td>
<td>-4.000</td>
<td></td>
</tr>
<tr>
<td>19.1</td>
<td>20</td>
<td>-4.500</td>
<td></td>
</tr>
<tr>
<td>19.2</td>
<td>20</td>
<td>-4.000</td>
<td></td>
</tr>
</tbody>
</table>

Bias (%) (Eqn 3a): Both Signs Positive
Bias (%) (Eqn 3b): Both Signs Negative

CV (%) (Eqn 2): 5.64
Signed Bias (%): 5.64

Upper Probability Limit: -0.26
Lower Probability Limit: 10.24

NOy API Percent Difference

Observations
Box-&-Whisker O3 Data from Two States

http://www.epa.gov/ttn/amtic/parslist.html