September 2006 Final Amendments to the National Air Quality Monitoring Requirements

Particulate Matter

10-06

$PM_{2.5}$ Federal Reference Method Update

- EPA has finalized $PM_{2.5}$ FRM improvements
  - Very Sharp Cut Cyclone (VSCC) as an approved second stage separator for $PM_{2.5}$ in addition to current WINS
  - Use of Dioctyl Sebacate (DOS) oil as an alternative oil in the WINS
  - Extend filter recovery extension time; 96 hours → 177 hours (7 days, 9 hours)
  - Modify filter transport temperature and post-sampling time requirements for final laboratory analysis; filter transport temperature maintained at or below average ambient temperature during sampling allows up to 30 days for post sampling conditioning and weighing.

VSCC

$PM_{10-2.5}$ Federal Reference Method Update

- EPA has finalized $PM_{10-2.5}$ FRM
  - Two concurrently operated low-volume samplers with one measuring PM_{10} and the other $PM_{2.5}$
  - Peer Reviewed by Clean Air Scientific Advisory Committee (CASAC)
    - Consensus support for $PM_{10-2.5}$ difference method as the most appropriate choice for an FRM to:
      - Approve continuous FEMs for use in the actual network
      - Quality assurance of network (via collocation)

BGI PM_{10} FRM

BGI $PM_{2.5}$ FRM

R&P PM_{10} FRM Sequential Sampler

R&P $PM_{2.5}$ FRM Sequential Sampler

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 $PM_{10-2.5}$
  - Three classes of equivalent methods ranging from method with minor deviations from the FRM as Class I to continuous methods as Class III
    - A filter-based dichotomous method would be categorized as a Class II method
- Testing for both $PM_{2.5}$ and $PM_{10-2.5}$
  - Class II - Two sites from list below, one east and one west in one season each
  - Class III – required at four sites (two seasons at test site A, winter season only at test sites B and C, summer season only at test site D)
- Test Sites
  - Site A – Los Angeles basin or California Central Valley - characterized by high nitrates and semi-volatile organic pollutants – winter and summer.
  - Site B – Higher elevation Western U.S. city – characterized by cold weather, winds and dust. – winter only.
  - Site C – Mid-western city – characterized by substantial temperature variation and high nitrates – winter only.
  - Site D – Northeastern to Mid-Atlantic – characterized by high sulfate and high relative humidity – summer only.

New Procedures for Approval of Federal Equivalent Methods ($PM_{2.5}$ and $PM_{10-2.5}$)

- New performance criteria are proposed
  - Based on Data Quality Objective Process
    - Considers tradeoffs between several inputs
    - Advantage of continuous methods (Class III) in this process is that they provide higher sample frequency and completeness
  - Criteria
    - Linear regression slope and intercept
    - Sampler precision
      - 10% for $PM_{2.5}$ Class II
      - 15% for $PM_{2.5}$ Class III and $PM_{10-2.5}$ Class II and III
    - Correlation, >0.93 or >0.95 based on sample population

Approved Regional Methods (ARMs) for $PM_{2.5}$

- $PM_{2.5}$ 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.
- Would allow monitoring agencies to optimize their $PM_{2.5}$ network with well performing continuous methods.
- Testing Criteria
  - Uses same performance criteria as Class III methods; however, flexibility to demonstrate sample precision
  - Testing occurs at subset of sites in 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 geographic region 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.

$PM_{2.5}$ Minimum Monitoring Network Requirements

MSA Population[1,2]	Most recent 3-year design value ≥ 85% of any $PM_{2.5}$ NAAQS[3]	Most recent 3-year design value < 85% of any $PM_{2.5}$ NAAQS[3,4]
> 1M	3	2
500K – 1M	2	1
50K – 500K	1	0

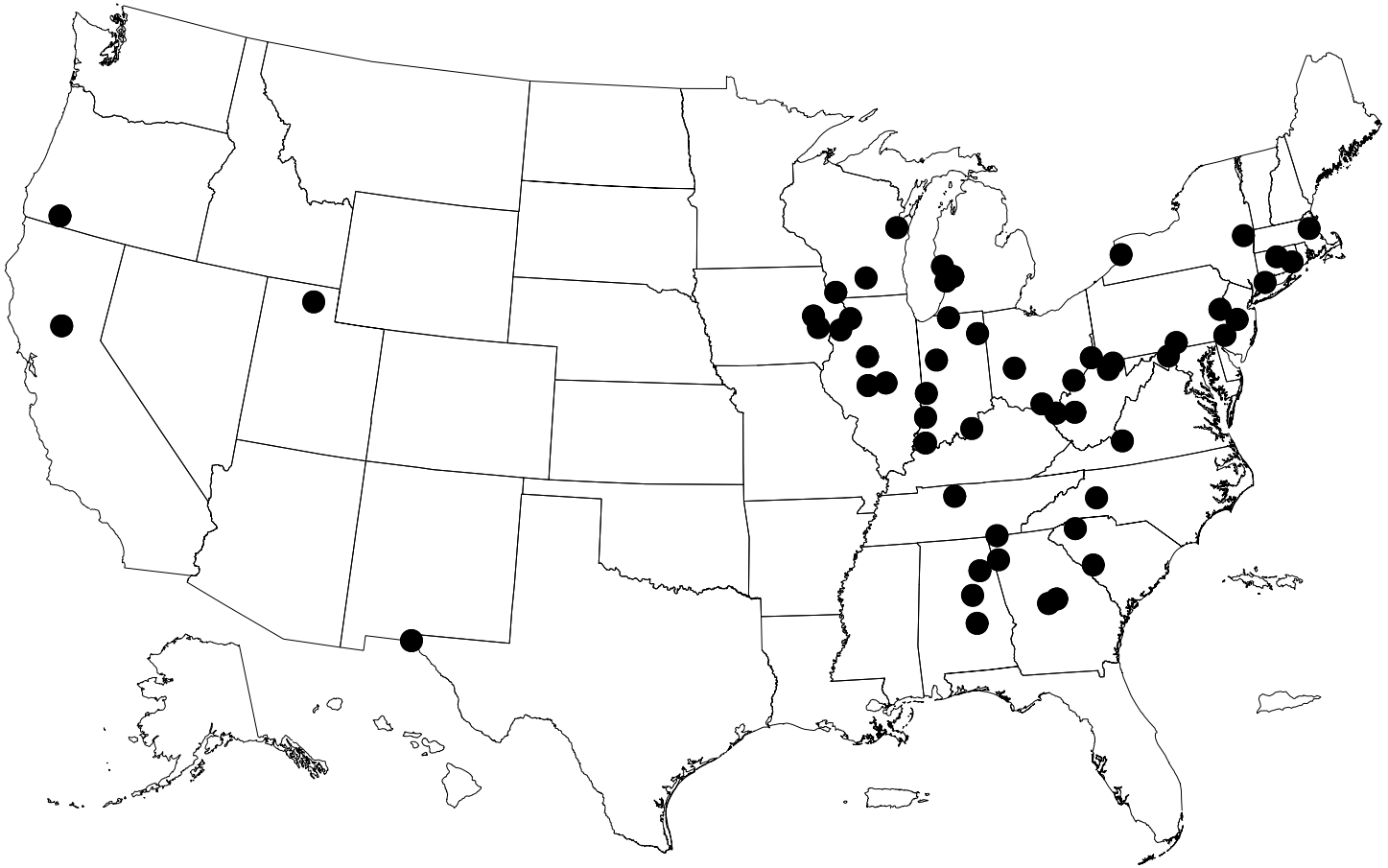
[1] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2] Population based on latest available census figures.
[3] The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[4] These minimum monitoring requirements apply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

- 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 (does not have to be collocated with FRM's)

$PM_{2.5}$ FRM/FEM Sample Frequency

- Final rule allows most sites to utilize no more than 1-in-3 day sampling frequency
- Some sites allowed to be 1-in-6 day if collocated with continuous samplers and not within +/-10 percent of NAAQS or exceed daily for 3 years
- NCore and background/transport stay on 1-in-3 day
- Issue with negative bias for daily NAAQS when not sampling daily
  - Final rule requires daily sampling for design value site when +/- 5 percent of tightened daily NAAQS
  - Affects approximately 50 sites (see map on following slide)
  - EPA will notify States which sites need to increase $PM_{2.5}$ sampling frequency. Change to daily sampling must be made by January 1, 2007

$PM_{2.5}$ 24-hour Design Value Sites Affected by Daily Sampling Frequency Requirement



Change to daily sampling must be made by January 1, 2007

$PM_{10-2.5}$ Monitoring Network Requirements

- $PM_{10-2.5}$ monitoring a required component of NCore multipollutant monitoring network.
  - Network plans due July 1, 2009
  - Full network operational by January 1, 2011
- NCore network description
  - ~75 Sites nationally (1-3 sites per State plus, DC, VI, and PR)
  - States with 2-3 sites – CA, FL, IL, MI, NY, NC, OH, PA, TX.
    - ~55 Urban Sites at Neighborhood to Urban Scale
    - ~20 Rural Sites at Regional Scale
- Additional rural sites negotiated with States, National Park Service, Tribes, CASTNET

NCore Monitoring Network Requirements

- Required particle measurements at NCore stations:
- $PM_{2.5}$ mass (FRM/FEM) and speciation at 1-in-3 day frequency, continuous sampling.
- $PM_{10-2.5}$ mass (FRM/FEM) and speciation at 1-in-3 day frequency
- Other measurements
  - O_3; high-sensitivity - CO, SO_2, NO/NOy
  - Waivers for NO_y in urban areas until NO_2 method improves so that NO_y and NO_y differences are meaningful
  - Meteorology

Working Draft of NCore Multi-pollutant Sites