

# Advancing the Technology and Use of Continuous PM Monitoring Methods: State and Local Agency Perspectives

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to the  
CASAC Technical Subcommittee for Fine Particle Monitoring

on behalf of  
The State and Territorial Air Pollution Program Administrators (STAPPA) and  
The Association of Local Air Pollution Control Officials (ALAPCO)

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# Main Themes

- Don't limit discussion to "equivalency of continuous  $PM_{2.5}$  methods for regulatory purposes"
- Designation of continuous  $PM_{2.5}$  method is largely moot without concurrent designation of continuous  $PM_C$  method
- Delineate what's really needed for nonattainment designation purposes from characterization/reporting goals
- Consider implementation up front

# Background

- Primary advantages of continuous monitoring to state and local agencies
  - » Public notification, including forecasts
  - » Reduced operational costs, staffing, mgmt, & field operations
  - » Temporal resolution
    - Support health studies, short-term standard(s)
    - Identify role of sources and transport
    - Understand atmospheric processes
    - Develop/evaluate atmospheric models

# Background

(continued)

- Secondary advantages
  - » Greater data capture
  - » Stronger attainment statistic for short-term standard
  - » Less operational data to validate
  - » May actually be less prone to some biases
  - » Co-development of speciated continuous methods
- Disadvantages / challenges
  - » No sample preserved for analysis (via most methods)
  - » More ambient data to validate and manage
  - » Some methods may require environmental controls
  - » Capital costs, parts, maintenance, and training could be a deterrent to wider use
  - » Precision and/or accuracy?

# Background

(continued)

- Some relevant characteristics of current network
  - » 1,100 PM<sub>2.5</sub> filter sites operating
  - » 212 PM<sub>2.5</sub> continuous sites operating or planned
  - » At least 42% of sites reading <80% of annual NAAQS based on 1999 AIRS data
  - » Some agencies may have more difficulty disinvesting from filter-based systems than others
    - An Aug 98 survey by STAPPA/ALAPCO found that 16 of 39 responding agencies planned on out-sourcing their lab services.

# Formulating an Approach

- Don't limit discussion strictly to “equivalency of continuous  $PM_{2.5}$  methods for regulatory purposes”
  - » Other means are available to promote the use and development of continuous methods (see next slide)
  - » Changing the equivalency requirements does not guarantee greater or timely use of continuous methods
  - » Designation of continuous  $PM_{2.5}$  method is largely moot without designation of continuous  $PM_C$
  - » Designation procedures/requirements should anticipate “packages” of filter-based and continuous speciation methods

# Formulating an Approach

(continued)

- Some options (not mutually exclusive)
  - » Do nothing -- our worst option
  - » Rewrite FRM to be more performance-based (40 CFR 50)
  - » Rewrite FEM procedures/requirements for Class III (40 CFR 53)
  - » Amend surveillance strategy/guidance (40 CFR 58)
- In balancing efforts among activities above, consider:
  - » Long-term potential to spur and accommodate tech. advances
  - » Short-term practicality and resource benefits to S/Ls
  - » Possible future changes to the PM standards

# Rewrite FRM / FEM

- Stop the pendulum from swinging -- find a workable performance standard
  - » Would provide greater incentive for technological development
  - » Should be less problematic with  $PM_{2.5}$  than it was with  $PM_{10}$
  - » Why is it we have an FEM for continuous  $PM_{10}$ , but not  $PM_{2.5}$ ?
- Keep performance requirements in perspective
  - » Health studies based on methods of variable procedures/quality
  - » EPA exercises broad discretion setting stds relative to method A
  - » Consider network DQOs in setting performance requirements
- Partnership-based program would benefit this option
- Magnitude and timing of benefits to S/Ls are uncertain

# Amend Surveillance Strategy / Guidance

- Allow broader approval of continuous methods for regulatory purposes, as stated in EPA discussion paper
  - » Continuous methods approved for use at multiple sites based on performance at subset of sites
- Alternatively, only require filter methods at highest sites
  - » Given 3 years of data, can we eliminate many FRM sites?
  - » How many att. designation sites are appropriate per planning area?
  - » Allow remaining characterization and reporting sites to be continuous, regardless of concentrations
- These options may provide more (and sooner) benefits to S/Ls than changes to FRM / FEM

# State and Local Implementation Issues

- S/Ls heavily vested in a functioning filter system
  - » Will upper management support a revamp?
  - » Precisely what are the net benefits?
  - » What is the payback period on capital costs?
  - » Are benefits offset by challenges of more diverse, hybrid network?
- Capital funds needed for new equipment
  - » Amount will depend on extent of switching, perceived benefits
  - » Consider a national contract in which EPA leases equipment, as opposed to purchasing on S/L behalf, especially if technology is relatively new and not extensively field-tested
- If/where switching occurs, how many filter sites should be retained (for how long) to relate the two data sets?

## Finally ...

- Think ahead -- e.g., S/L implementation
- Give weight to options that would actually result in changes in the field
- Consider the following activities to guide the process:
  - » Survey S/Ls on options for moving forward
  - » Estimate capital costs of additional continuous monitors
  - » Identify source and method of capital funding
  - » Estimate operational savings (financial and other)
  - » Identify means of relating continuous and filter data sets
- STAPPA/ALAPCO can help collect these data

# Related Material

# Hypothetical PM<sub>C</sub> Scenarios

	<u># of Samplers</u>	
	<u>Filter</u>	<u>Continuous</u>
Current Network (15 sites, 25 samplers)		
6 PM <sub>10</sub> sites (half colo w/ PM <sub>2.5</sub> )	8	
12 PM <sub>2.5</sub> sites	15	2 (for AQI)
<hr/>		
New Network (12 sites, 35 samplers)		
FEM for continuous PM <sub>2.5</sub> only		
3 PM <sub>10</sub> sites (all colo w/ PM <sub>C/2.5</sub> )	4	
10 PM <sub>C/2.5</sub> sites	26	2 (for AQI)
2 PM <sub>2.5</sub> sites		3
<hr/>		
New Network (12 sites, 24 samplers)		
FEM for continuous PM <sub>2.5</sub> and PM <sub>C</sub>		
3 PM <sub>10</sub> sites (all colo w/ PM <sub>C/2.5</sub> )	4	
10 PM <sub>C/2.5</sub> sites		13
2 PM <sub>2.5</sub> sites	2	5

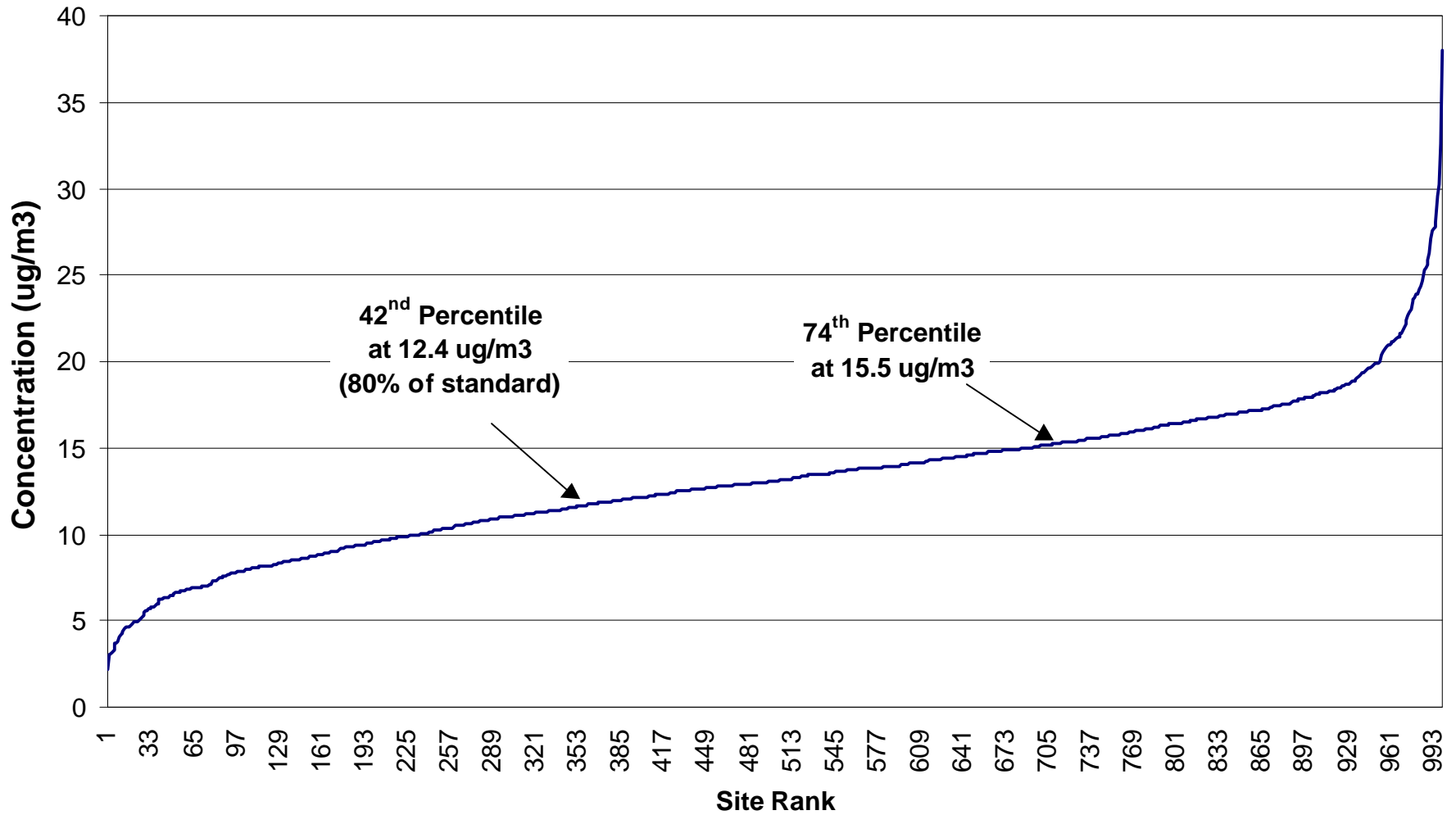
No FEM for continuous PM<sub>C</sub> could result in 50% more samplers and a network that was filter-based rather than continuous-based.

## Hypothetical PMc Scenario

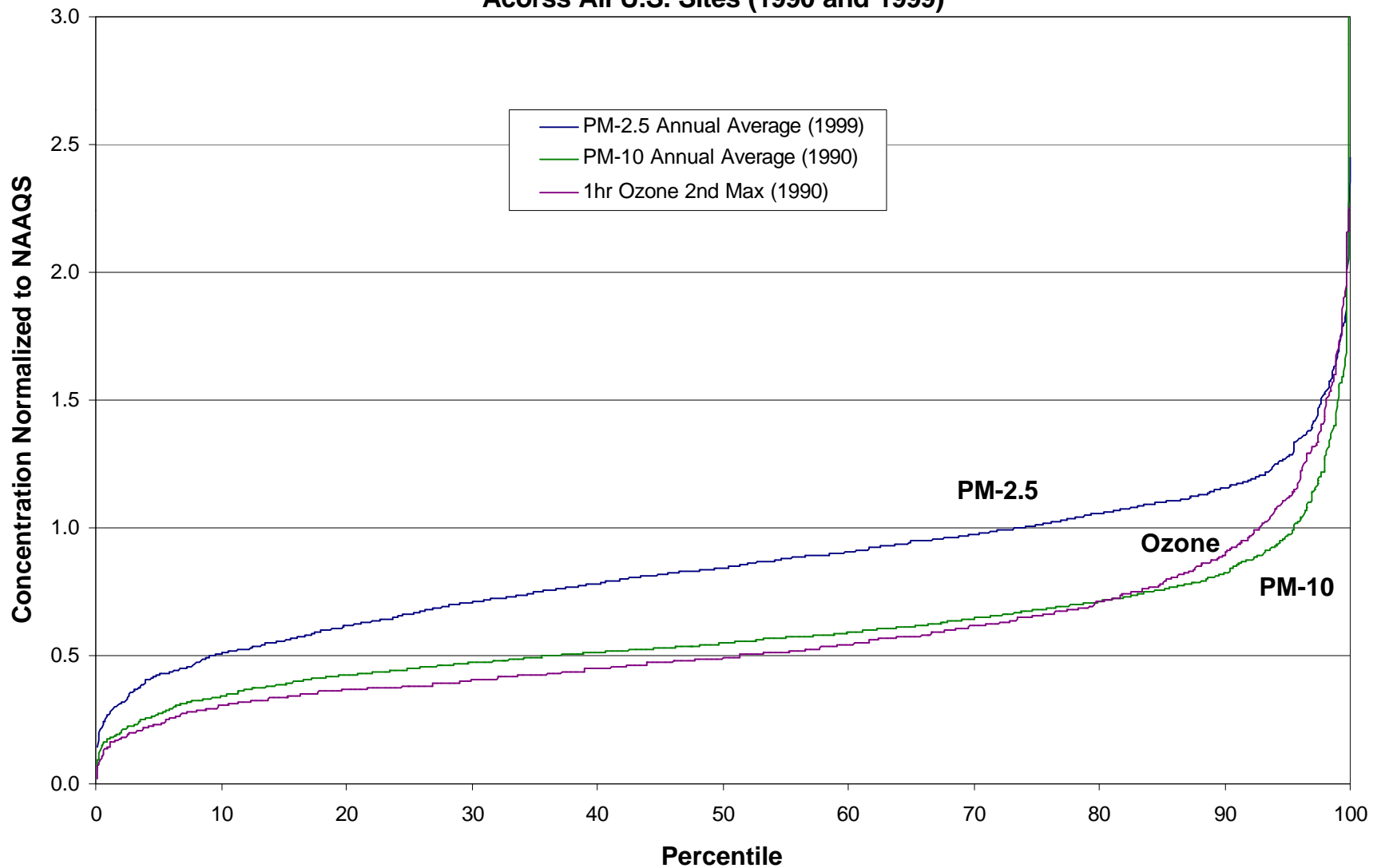
10 = PM <sub>10</sub> FRM
2.5 = PM <sub>2.5</sub> FRM
-10- = PM <sub>c</sub> FRM
2.5

Current Network (15 sites, 25 samplers)	New Network <sup>±±</sup> FEM for Continuous PM <sub>2.5</sub> Only <sup>±±</sup> (12 sites, 35 samplers)
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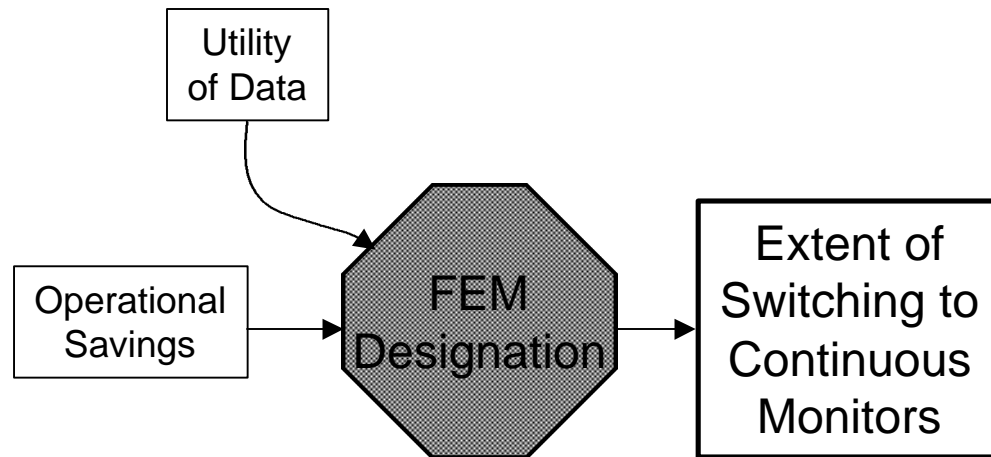
**Annual Average PM<sub>2.5</sub> Concentrations from 1,000 Samplers in 1999  
(includes colocated samplers)**



**Frequency Distribution of Pollutant Concentrations Normalized to Their NAAQS  
Across All U.S. Sites (1990 and 1999)**



# Simplified Implementation Model



# More Accurate Implementation Model

(assuming a continuous method(s) is designated)

