

Fine PM Test Method



Indiana AW&MA Conference
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OAQPS/SPPD/MPG
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Presentation Topics

- PM Implementation Rule
- Particulate Matter NAAQS (2006)
- Condensable PM Test Method
- Particle Sizing Test Method
- Implications of new test methods
- Schedule for PM Test Method



Promulgated Implementation Rule

- **April 25, 2007 in Federal Register**
 - Regulation of precursor pollutants
 - SO₂, NO_x
 - VOC, NH₄
 - RACT/RACM selected to attain NAAQS as expeditiously as practicable
 - Regulation of Condensable PM
 - Transition period from 2007 to 2011
 - CPM regulation encouraged but not required
 - Regulations developed after 2011 are required to address CPM

**Legal actions by Advocacy Groups,
Industry Groups, State Agencies**



Promulgated NAAQS Revision (2006)

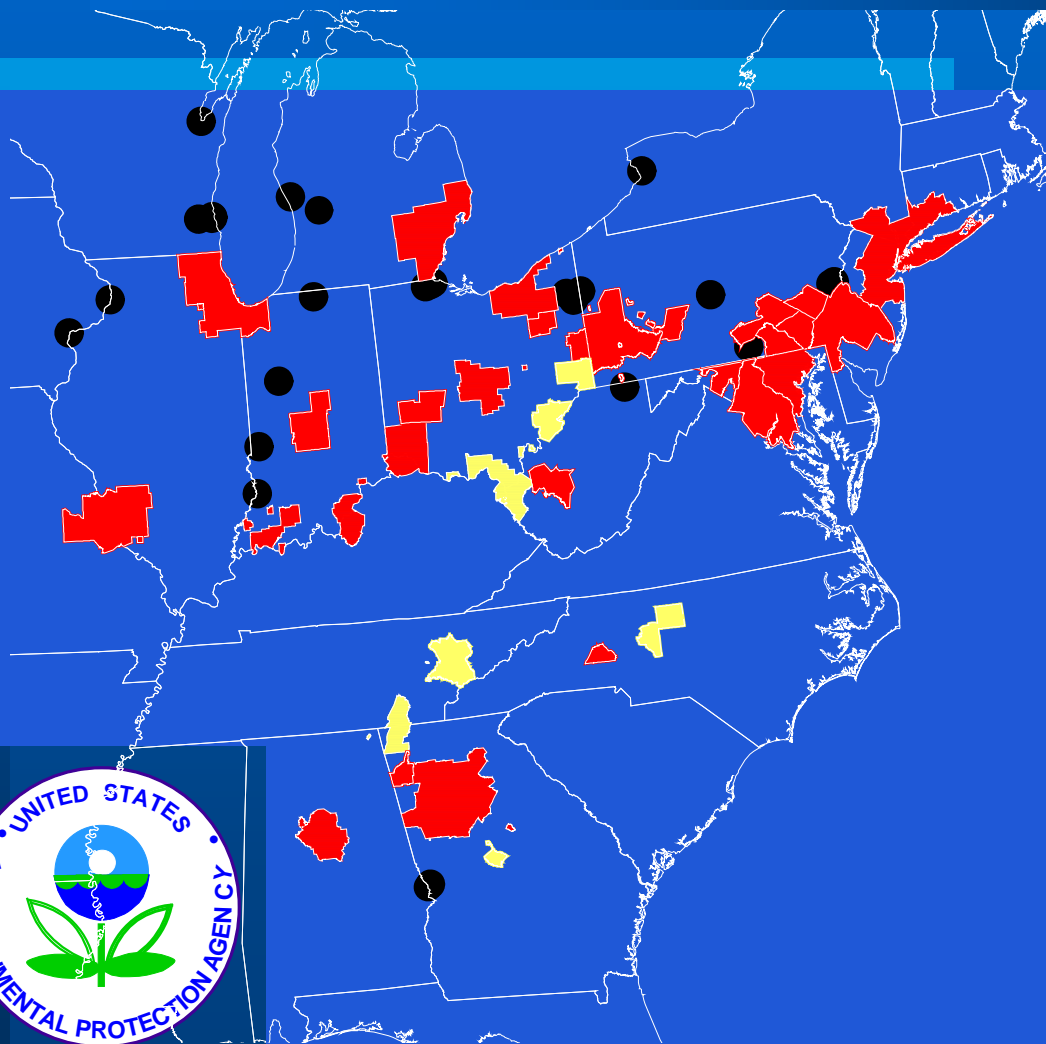
- Affirms 15 ug/M³ PM_{2.5} annual average
- Establishes 35 ug/M³ PM_{2.5} 24 hr average standard
 - Increases need for local controls
 - Short term emissions more important
 - Start up / shut down
 - Malfunction impacts
 - Performance degradation
 - Becomes air quality driver

● Establishes 150 ug/M PM₁₀ 24 hr average standard

DC circuit court remanded standard for better justification by EPA



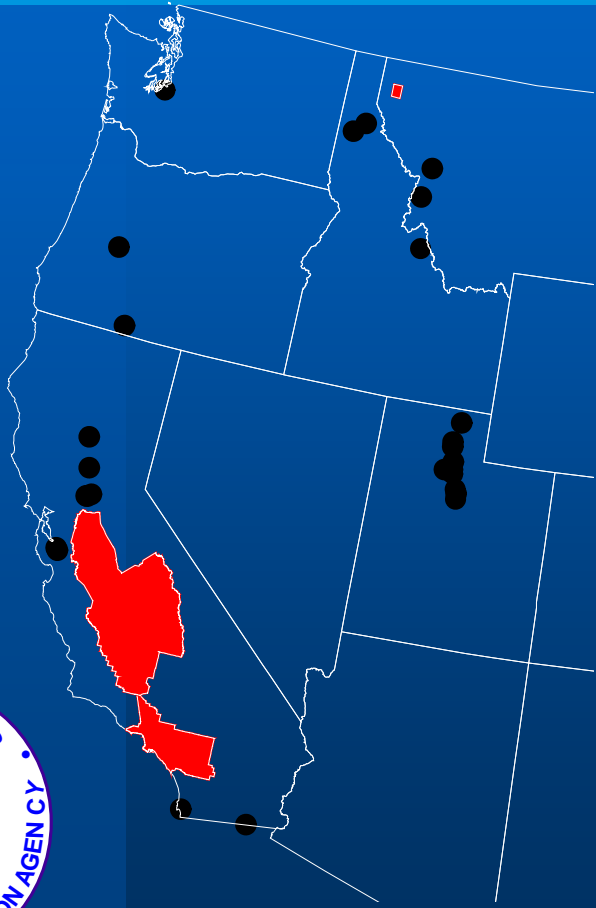
Potential 24-Hour PM_{2.5} NAAQS NA's



- Nonattainment areas (annual) expected to violate 24-hr NAAQS [32 areas]
- Nonattainment areas (annual) expected to meet 24-hr NAAQS [7 areas]
- Attainment areas that were expected to violate 24-hr NAAQS (59 sites)



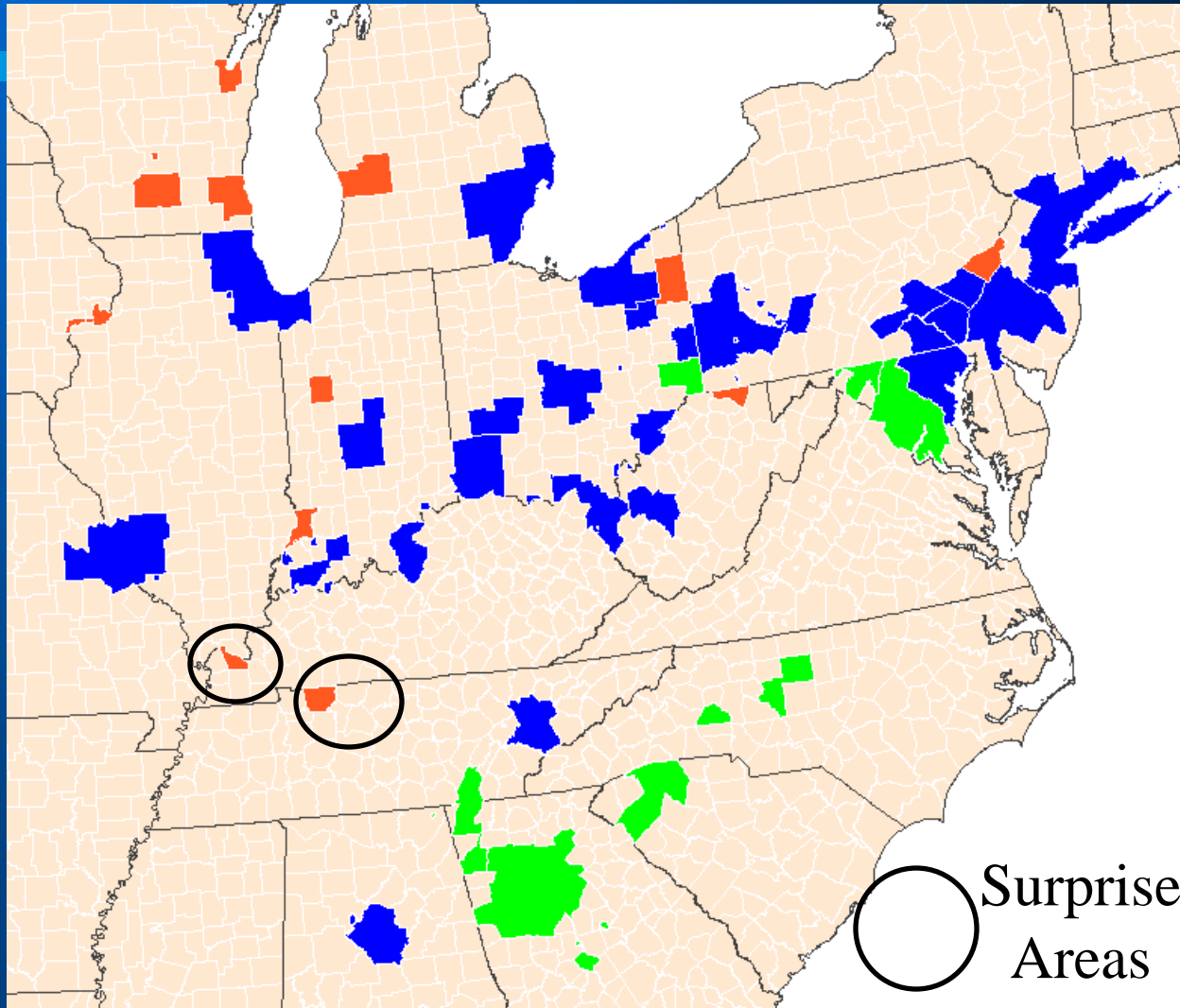
Potential 24-Hour PM_{2.5} NAAQS NA's



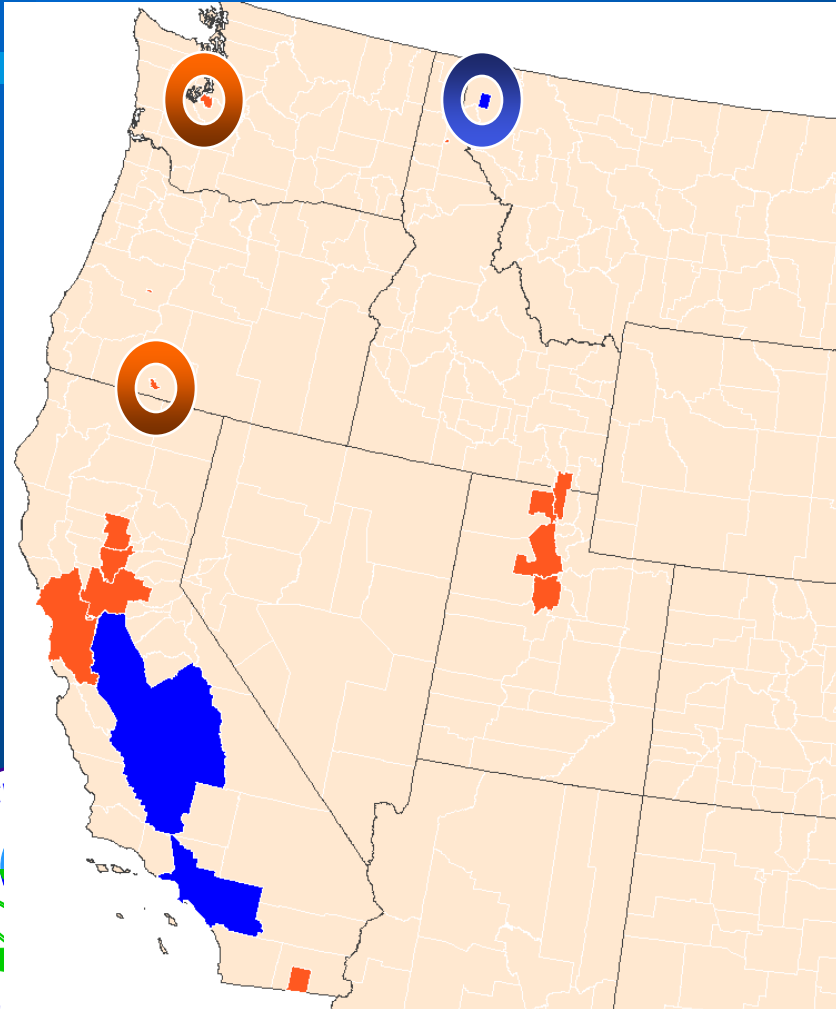
- Nonattainment areas (annual) expected to violate the 24-hr NAAQS [32 areas]
- Attainment areas (annual) expected to violate the 24-hr NAAQS (59 sites)



Eastern PM2.5 Non-attainment Areas



Western PM2.5 Non-attainment Areas



Method 202 (12//17/91)

- Intent - replicate ambient air emissions
- PM is defined by the conditions
- Each M202 option creates different mass
 - N₂ purge/Air purge/No purge
 - Water evaporation temperature
 - Multiple sulfate mass
 - Analysis of some components

No Referee Method available in 1990



Method 202 Assessment (2004)

- Conducted Laboratory Study
- 36 samples
- SO₂ bubbled through impingers
 - 300 ppm for 1 & 3 hours
 - 50 ppm for 6 hours
 - Nitrogen purge and no purge
 - Hold times from 1 to 20 hrs for initial analysis

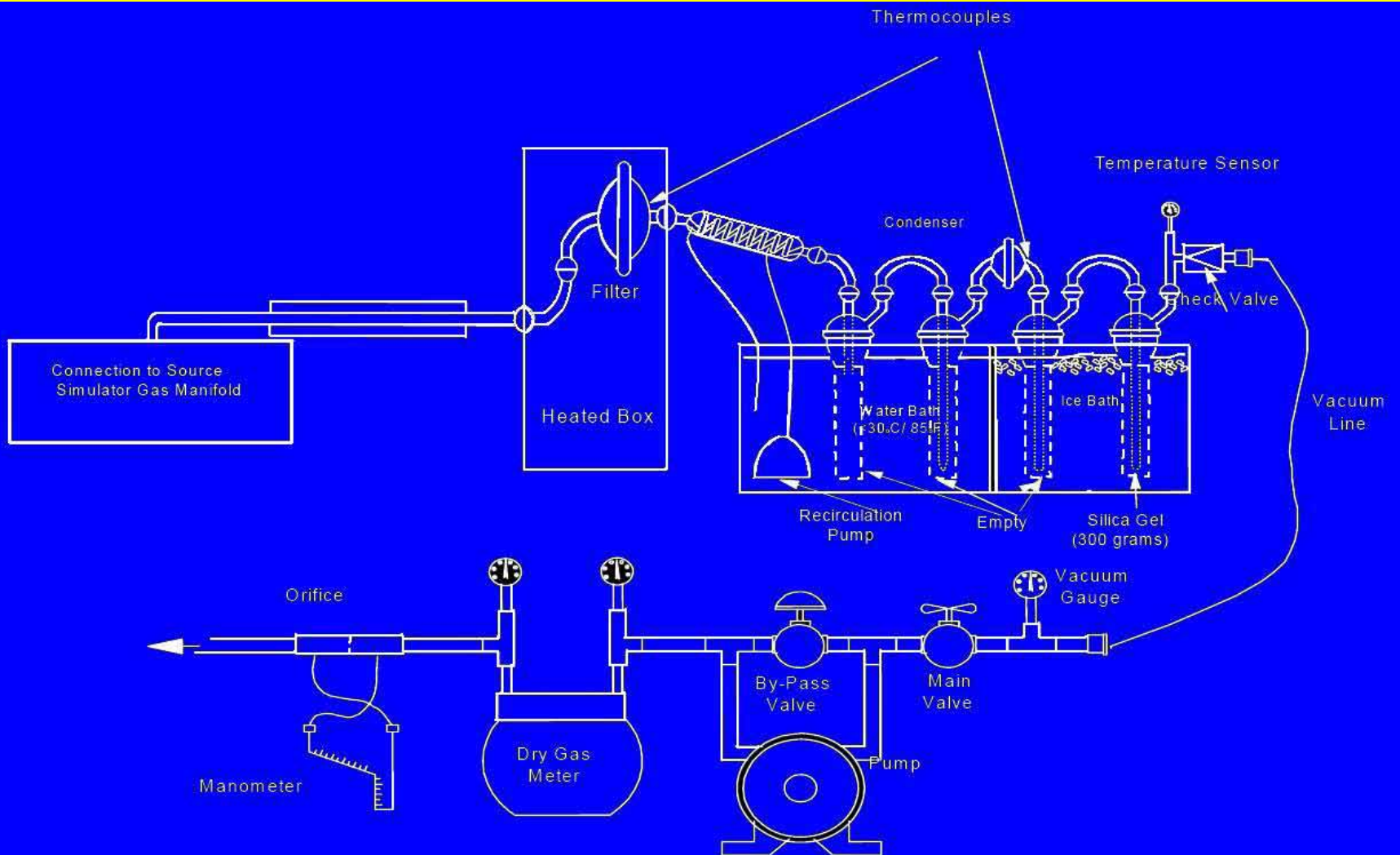


Method 202 Artifacts

SO ₂ ppm	Test duration	H ₂ O volume	Artifact Mass (mg)	
			No Purge	Purge
300	1 Hr	400 ml	180 ± 6	10 ± 0.5
300	3 Hr	800 ml	400 ± 25	20 ± 5
50	6 Hr	1400 ml	200 ± 10	20 ± ??



Dry Impinger Train Layout



Dry Impinger Method Performance

Run	Organic (mg)	Inorganic (mg)	Filter (mg)	Total
1	0.11	2.23	-0.34	2.34
2	0.15	2.88	-0.06	3.03
3	0.09	1.37	0.00	1.46
4	0.30	1.91	0.00	2.22
5	0.16	1.54	0.07	1.77
6	0.33	2.19	-0.17	2.52
7	0.08	1.18	0.30	1.56
8	0.02	1.87	0.17	2.06
Blank	-0.02	0.21	0.00	0.68
Average	0.16	1.90	0.00	2.12
Std Dev	0.1	0.51	0.17	0.45
MDL	0.31	1.54	0.49	1.36



Filterable PM Sizing

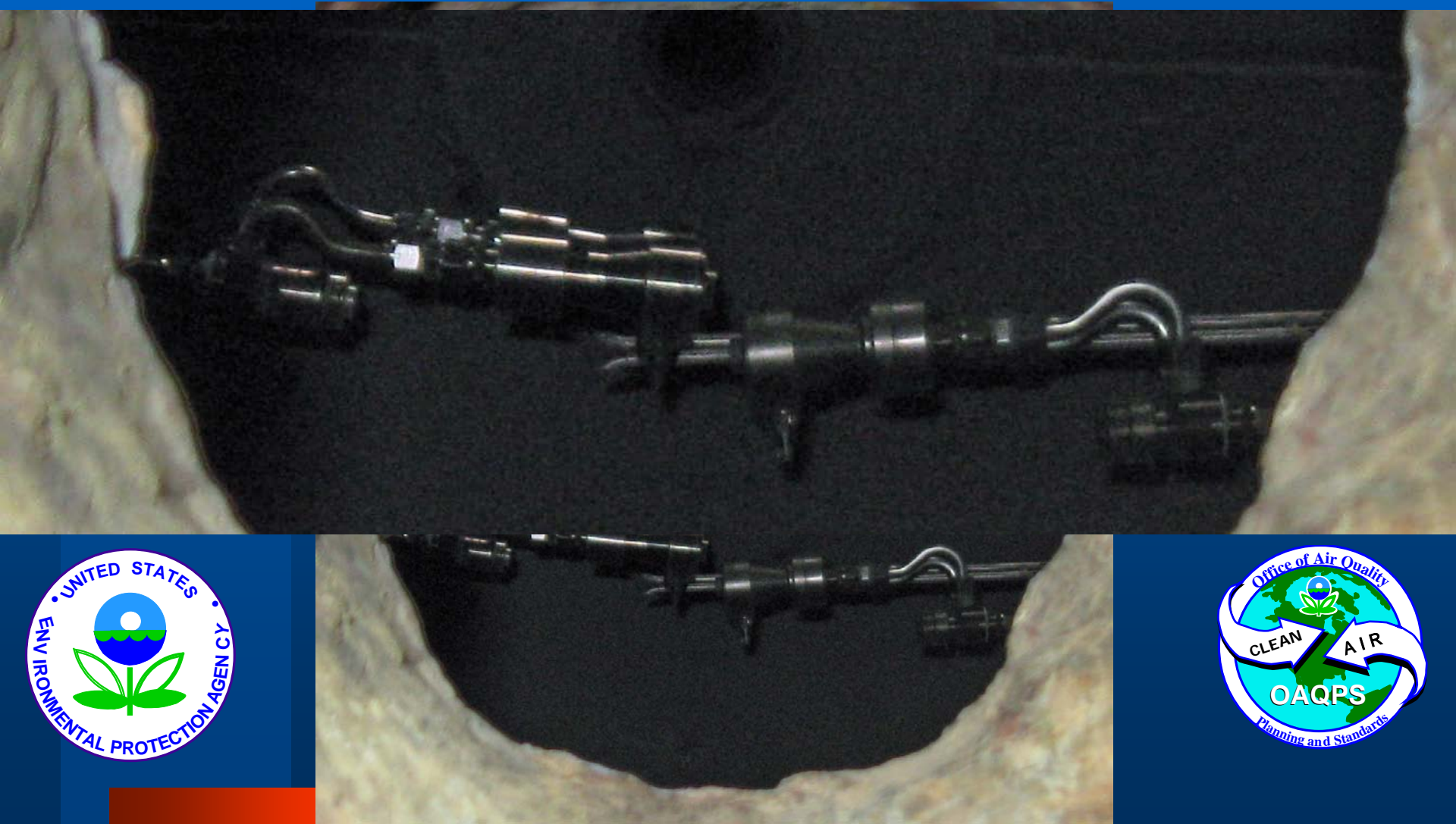
- Method 201A (1990)



- Method 201A
(2009/10)



PM₁₀ & PM_{2.5} Precision Testing



CPM Precision



Field Sampling Precision



Precision Testing Results

- Filterable PM_{2.5} precision ≈ 1 mg
- Total CPM precision ≈ 4 mg
 - Organic CPM precision ≈ 2 mg
 - Inorganic CPM precision ≈ 2 mg
- H₂SO₄ collection decreases with decreasing concentration
 - Once collected H₂SO₄ is retained
 - H₂SO₄ is good audit material



PM_{2.5} Regulatory Requirements

- **Clean Air Fine Particle Implementation Rule**
 - Promulgated April 25, 2007
 - January 1, 2011 is critical date for PM_{2.5}
 - New or revised SIP rules must consider PM_{2.5} in setting limits
 - NSR/PSD permits must also consider PM_{2.5} in limits
 - Transition period was for development of improved knowledge using improved test method



Existing use of CPM Methods

- **Most States do not address CPM**
- **Some States address CPM**
 - States test methods for CPM are inconsistent
- **Only rules that are new or revised need consider CPM**
- **States do not have to use EPA's test method for acceptance of SIP or NSR/PSD rules**



Implications of considering PM_{2.5}

- **States w/o CPM testing now**
 - PM_{2.5} will need to be addressed in new or revised emissions limits
 - Will likely adopt new test methods
 - Higher numerical limits do not mean higher emissions
 - State will need good information to know where they are and what revised limits will achieve



Implications of considering PM_{2.5}

- **States w/ CPM testing now**
 - May convince EPA that their rules comply with intent of implementation rule
 - May wish to adopt new test method
 - Numerical limits will require adjustment
 - Adjustment requires careful consideration
 - Risk of errors may be greater than for States that are just now adopting CPM testing



Schedule for PM Test Methods

- **Proposed on March 25, 2009**
 - Comment period closed May 26, 2009
 - Nucor Steel asked for extension
 - Over 50 commenters
- **Precision Evaluation was performed**
- **Expect promulgation by early summer**



Comments or Questions

