

LIFE AFTER THE PM₁₀ SURROGATE POLICY

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PROVIDENCE

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Overview

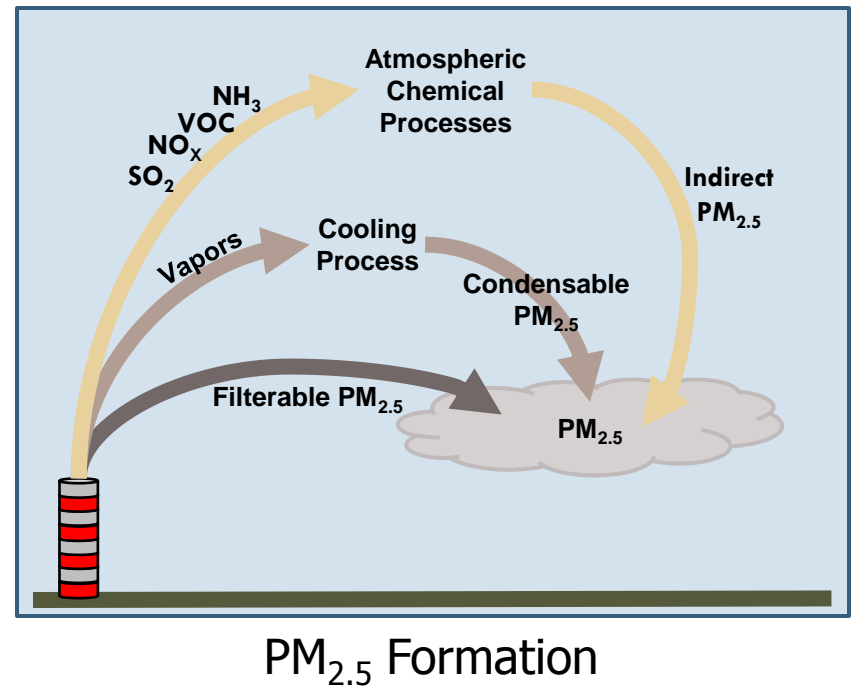
- History of the PM_{2.5} NAAQS and PM₁₀ surrogate policy
- What are we supposed to do now?
- PM₁₀ surrogate demonstration requirements
- PM_{2.5} PSD analysis – steps, challenges, and potential solutions

History of the PM_{2.5} NAAQS

- 4/30/1971 – First PM NAAQS (TSP based indicator)
 - ▣ 260 µg/m³ (24-hour arithmetic average)
 - ▣ 75 µg/m³ (annual geometric average)
- 7/1/1987 – New PM NAAQS (PM₁₀ based indicator)
 - ▣ Why change from TSP to PM₁₀?
 - ▣ 150 µg/m³ (24-hour average not to be exceeded more than once per year)
 - ▣ 50 µg/m³ (annual arithmetic average)

History of the PM_{2.5} NAAQS

- 10/1993 – American Lung Assoc. sues EPA
- 7/18/1997 – PM NAAQS Revised (PM₁₀ *and* PM_{2.5} based indicators)
 - ▣ Over 50,000 written and oral comments
 - ▣ What's so special about PM_{2.5}?



History of the PM_{2.5} NAAQS

- 10/23/1997 – PM₁₀ Surrogate Policy
 - ▣ Addressed difficulties with PM_{2.5} NSR Implementation
 - ▣ Emission calculations
 - ▣ Modeling difficulties
 - ▣ Insufficient network of PM_{2.5} monitors
- 7/30/2004 – 1997 PM₁₀ standard removed, back to 1987 standard
- 10/17/2006 – PM NAAQS Revised
 - ▣ PM_{2.5} 24-hour standard was lowered to 35 µg/m³
 - ▣ Revoked the PM₁₀ annual standard

History of the PM_{2.5} NAAQS

PM NAAQS Revision	PM ₁₀		PM _{2.5}	
	Annual	24-Hour	Annual	24-Hour
1987	50 µg/m ³ (annual arithmetic average)	150 µg/m ³ (24-hour average, not to be exceeded more than once a year)	—	—
1997	No Change	150 µg/m³ (24-hour average, 98th percentile) Vacated	15 µg/m ³ (annual arithmetic mean averaged over 3 years)	65 µg/m ³ (24-hour average, 98 th percentile averaged over 3 years)
2006	Revoked	No Change	15 µg/m ³ (annual arithmetic mean averaged over 3 years)	35 µg/m ³ (24-hour average, 98 th percentile averaged over 3 years)

History of the PM_{2.5} NAAQS

- 4/25/2007 – “Clean Air Fine Particle Implementation Rule” – Non-NSR portion
 - ▣ Attainment demonstrations, designations, etc.
- PM_{2.5} NSR Implementation – Broken up into 2 parts
 - ▣ 5/16/2008 – “Implementation of NSR for PM_{2.5}”
 - Major source threshold, Significant Emission Rate (SER), precursor applicability, etc.



- ▣ 10/20/2010 – “PM_{2.5} Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC)”
 - Proposed 9/21/2007

History of the PM_{2.5} NAAQS

- 8/12/2009 – Louisville Gas & Electric Trimble Generating Station Administrative Order
 - Policy change – must now demonstrate PM₁₀ is a reasonable surrogate for PM_{2.5}
 - Nucor Corporation proposed plant (11/12/2009)
- 2/11/2009 – Proposed rule to repeal grandfathering and end the PM₁₀ surrogate policy
- 3/23/2010 – EPA modeling procedures memo
 - PM₁₀ surrogacy demonstration
 - PM_{2.5} modeling analyses

What Are We Supposed to do Now?

- PM_{2.5} NSR Implementation Rule transition period ends 1/1/2011
- PSD projects (Now – 1/1/2011)
 - ▣ Demonstrate PM₁₀ is a reasonable surrogate for PM_{2.5}
or
 - ▣ PM_{2.5} PSD Analysis

Demonstrating PM₁₀ as a Surrogate

- Is PM₁₀ a reasonable surrogate for PM_{2.5}?
- EPA's suggested guidance
 - ▣ Control technology
 - Does the control technology control PM_{2.5} as well as it controls PM₁₀?
 - Separate BACT analysis for PM_{2.5} and PM₁₀
 - Is the selected BACT the same for both?
 - Or does the selected BACT for PM₁₀ control PM_{2.5} as well or better than the BACT selected for PM_{2.5}?
 - ▣ Long range transport of PM_{2.5} compared to PM₁₀

Demonstrating PM₁₀ as a Surrogate

- EPA's suggested guidance (continued)
 - ▣ Modeling analyses
 - A PM₁₀ analysis should include the annual standard since PM_{2.5} has an annual standard
 - The ratio of Background:PM₁₀ is lower than Background:PM_{2.5}
 - Compensate by comparing to the PM_{2.5} NAAQS instead of PM₁₀ NAAQS
 - The form of the PM_{2.5} NAAQS is different than the PM₁₀ NAAQS
 - PM_{2.5}: 24-hour average, 98th percentile averaged of 3 years
 - PM₁₀: 24-hour average not to be exceeded more than once per year using the H6H

Are any of EPA's suggested comparisons possible?

PM_{2.5} PSD Analysis

- PM_{2.5} PSD Elements (Now – 1/1/2011)
 - ▣ Only look at filterable PM – condensable is not required (unless required by your state already)
 - ▣ Indirect PM_{2.5} is not required
 - ▣ Applicability:
 - Major Source: 100/250 tons/yr (Direct Filterable PM_{2.5} Only)
 - SER: 10 tons/yr (Direct Filterable PM_{2.5} Only)
 - ▣ BACT: Analysis based on direct filterable PM_{2.5}

PM_{2.5} PSD Analysis

- PM_{2.5} PSD Elements (Now – 1/1/2011)
 - ▣ Modeling:
 - NAAQS = 15 µg/m³ (annual) and 35 µg/m³ (24-hour)
 - SIL, SMC, and PSD Increment (discussed later)
- After 1/1/2011
 - ▣ Indirect still not required
 - ▣ Condensable PM_{2.5} will be required in
 - Applicability determinations
 - BACT analysis
 - Modeling analysis

PM_{2.5} PSD Analysis

- By May 16, 2011
 - ▣ Indirect PM_{2.5} will be included (precursors will be assessed for each area)
 - SO₂ – Always a precursor
 - NO_x – Precursor by default with the option to prove that it is not a precursor
 - VOC and NH₃ – By default are not precursors
 - ▣ Applicability
 - SER: SO₂, NO_x, and VOC have the same SER as existing
 - PM_{2.5} PSD review can be triggered by a precursor emission increase > the SER, but precursors are not triggered by an increase in direct PM_{2.5} > than the SER

PM_{2.5} PSD Analysis

- Do states have the authority to administer a PM_{2.5} PSD program?
 - ▣ Is PM_{2.5} listed as a regulated pollutant in your states' regulations?
 - ▣ Does your state define "regulated NSR pollutant" the same as 40 CFR 51 and 52?
- Has your state established an SER for PM_{2.5}?
 - ▣ If not, any increase in PM_{2.5} could trigger PSD review
 - ▣ Will this really happen?

PM_{2.5} PSD Analysis

- Emission calculations
 - ▣ Insufficient commonly accepted emission factors for PM_{2.5} quantification
 - ▣ AP-42
 - Use the most closely related emission factor for PM_{2.5}
 - Representative average to establish a PM_{2.5}:PM₁₀ ratio
 - ▣ SCAQMD PM_{2.5} Emission Calculation Guidance
 - ▣ Particle size distribution
 - Anderson impactor
 - Computer controlled scanning electron microscope (CCSEM) or other microscopic analysis of particles
 - Other research type instruments

PM_{2.5} PSD Analysis

- Emission calculations (continued)
 - Vendor supplied data
 - Stack test results from similar units
 - Site specific stack testing
 - Modified Methods 201 and 201A – Filterable PM
 - Method 202 – Condensable PM
- BACT
 - Filterable and condensable PM control devices
 - Indirect PM_{2.5} BACT analysis

PM_{2.5} PSD Analysis

□ Air Quality Analysis

□ Significant Impact Levels (SIL)

Averaging Period	Class I	Class II	Class III
Annual	0.06 µg/m ³	0.3 µg/m ³	0.3 µg/m ³
24-hour	0.07 µg/m ³	1.2 µg/m ³	1.2 µg/m ³

□ PSD Increments

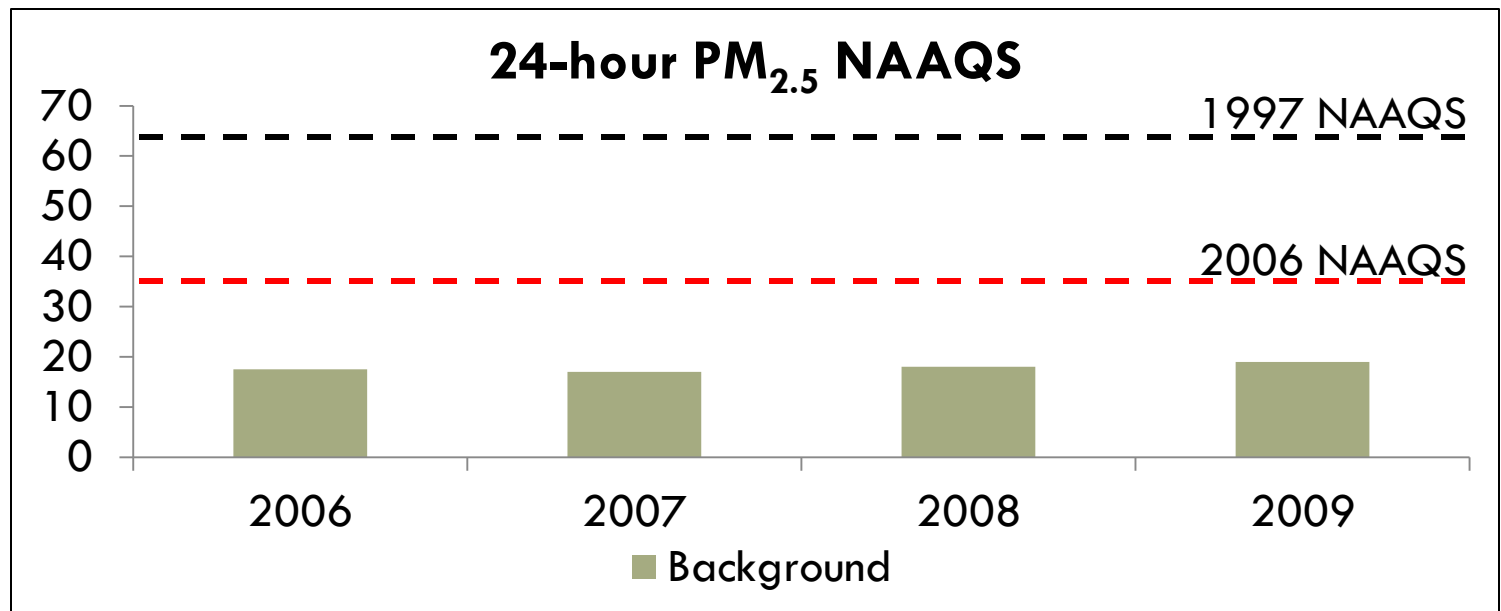
Averaging Period	Class I	Class II	Class III
Annual	1 µg/m ³	4 µg/m ³	8 µg/m ³
24-hour	2 µg/m ³	9 µg/m ³	18 µg/m ³

□ Significant Monitoring Concentrations (SMC)

- 24-hour = 4 µg/m³

PM_{2.5} PSD Analysis

- Air Quality Analysis (continued)
 - ▣ Emission inventories – poor quality PM_{2.5} data
 - ▣ 24-hour PM_{2.5} NAAQS is very low (35 µg/m³)
 - Background concentration in many areas is 50% or more of the standard



PM_{2.5} PSD Analysis

- Air Quality Analysis (continued)
 - ▣ Emission inventories – poor quality PM_{2.5} data
 - ▣ 24-hour PM_{2.5} NAAQS is very low (35 µg/m³)
 - Background concentration in many areas is 50% or more of the standard
 - EPA NAAQS comparison approach – seasonal or quarterly monitoring results in combination with modeled impact
 - MPCA NAAQS comparison – paired sums approach takes advantage of the form of the NAAQS to pair monitoring data with modeling data in space and time for comparison
 - ▣ Air quality models and the PM_{2.5} NAAQS form
 - 24-hour PM_{2.5} NAAQS form – 98th percentile daily value averaged over 3 years (8th highest based on 365 day year, top 2% corresponds to approximately 7 days)

Conclusion

- PM₁₀ Surrogate Policy grace period is over
 - ▣ Demonstrate PM₁₀ is a reasonable surrogate for PM_{2.5}
- PM_{2.5} PSD Analysis
 - ▣ Direct PM_{2.5} – Filterable and Condensable
 - ▣ Indirect PM_{2.5} – Precursor (SO₂, NO_x, VOC, NH₃)
 - ▣ Significant challenges
 - Emission rate quantification
 - PM_{2.5} modeling

QUESTIONS?

