Draft Modeling Protocol for PM2.5

Regional/State/Local
Modeler's Workshop
Philadelphia
May 2009

Disclaimer

This presentation is for discussion purposes for this workshop. It does not represent EPA guidance or policy. Rather it may be used to identify areas that need guidance/policy and perhaps make recommendations to OAQPS.

Outline

- Background
- Tee up technical issues
- Interactions to discuss options and identify gaps

- GOAL: Establish workgroup to flesh out a draft protocol for broader consideration and application

Main Objectives of Protocol

- Address preamble language regarding receptor placement
- Address issues associated with high background concentrations
- Net Air Quality Benefit and Contribution Test under 40 CFR Part 51, Appendix S
- Revisit FAQs
- Other issues?

Refresher on Modeling Aspects Under the PM2.5 NSR Rule

- PM2.5 in Attainment Areas
  - Delegated or EPA issued permits – use § 52.21 (PM10 Policy does not apply)
  - SIP approved States – use PM10 Surrogate Policy in the interim before the revised SIP is approved. (Remember, EPA agreed to reconsider its position on PM10 surrogate policy: reconsideration in progress.)

Refresher on Modeling Aspects Under the PM2.5 NSR Rule

- New Modeling Considerations with PM2.5 in PSD (under 52.21)
  - Precursors
    - Include SO2 and NOx. (State may submit demonstration to opt out of NOx)
    - Presumed out: VOC and Ammonia.
  - Secondary formation not currently considered for NAAQS or Increment (when adopted) for compliance.
  - SIL, SMC, how to handle these for the time being.
  - State discretion on modeling condensibles.

Refresher on Modeling Aspects Under the PM2.5 NSR Rule

- PM2.5 in Nonattainment Areas
  - 40 CFR § 51, Appendix S applies until States Adopts an Approved SIP

Refresher on Modeling Aspects Under the PM2.5 NSR Rule

- New Modeling Considerations for PM2.5 under Appendix S
  - Only SO2 is regulated as a precursor under Appendix S.
  - NOx is presumed in after the state program is approved.
  - VOC and Ammonia require a State demonstration, public comment to include these as precursors as part of SIP-approved program.
  - Interprecursor trading is allowed only between SO2 and PM2.5. State must request approval of EPA-preferred ratio prior to use.
  - Other precursors may be allowed only in a SIP-approved program that has undergone public notice and comment.
  - Trading ratios are not specified under Appendix S. States need to either use EPA's default 40:1ratio (following notice and comment approval) for SO2 or develop their own.
  - Offsets may come from the same NAA or another provided it "contributes" to the NAA.

FAQs that have been raised by States or EPA over the last year: Under PSD

- Preamble language on receptor placement?
- Background values close to NAAQS?
- Preconstruction monitoring for precursors?
- Emission inventory for PM2.5? (esp. allowables)
- Do we still need to model PM10 annual and 24 hour NAAQS and Increments?
- Size of SIA?
- What if there is a violation, cause or contributes?
- For EPA issued OCS source permits where the closest coast has a SIP approved PSD program, does the federal permit use PM2.5 or the PM10 surrogate policy?
- Should precursor impacts be considered for Class I analyses that use Calpuff (since Calpuff has some “chemistry” in it?)

FAQs that have been raised by States or EPA over the last year: Under NAA

- If Major for PM2.5, when is SO2 regulated? (Ans: SO2 must also be major first, then 40tpy)
- If Minor for PM2.5, when is SO2 regulated? (Ans: same as above)
- Are NOx, VOC or Ammonia regulated under Appendix S? (Ans: No. The State must first demonstrate that these are (un)important precursors and undergo public review for SIP.)
- May NOx, VOC or Ammonia be traded? (Ans: not under AppS.)
- May offset of precursors come from PM2.5 attainment areas? (Ans: no).
- What offset trading ratios are allowed?

FAQs that have been raised by States or EPA over the last year: Under NAA

- IV A. lists 4 requirements for NAA permit: LAER, Offsets, Source Compliance, and Net Air Quality Benefit. What is a Net Air Quality Benefit Test?
- IV D. Contribution Test. What is a Contribution Test?
- Does the area have to contribute or the offset source?
- What is the baseline date for eligible offsets?
- Remember, model must be unbiased in order to model negative emissions.
- Language for NAQB test differs with preamble, “alternative siting” as 4th criteria.
- May a new source in a NAA have a significant impact in its NAA?

Remember PM2.5 Minor Source Program!

110(a)(2)(C) of the Act requires...regulation of...any stationary source to assure compliance with the NAAQS.

Address preamble language regarding receptor placement.

"Such analyses must consider how a source, in combination with other sources in the area, will impact air quality at existing PM2.5 monitor locations, as well as at other locations that are appropriate for comparing predicted PM2.5 concentrations to the NAAQS based on PM2.5 monitor siting requirements and recommendations."

- **How can this be reconciled with definition of Ambient Air?**

Address issues associated with high background concentrations.

- Does guidance Section 8.2 of the GAQM suffice to address this?
- Issue: Past methods to account for background in NAAQS modeling demonstrations lack space/time “pairing” of facility impacts with monitored background.
- Approaches: Ambient data
  - Connecticut’s automated procedure for obtaining background concentrations based on ambient data
- Approaches: Modeled data
  - MN Dennis Becker, "PM2.5 NAAQS Modeling -- Challenges and Possible Solutions -- Nov.2008”
    - MPCA website (http://www.pca.state.mn.us/air/modeling.html)

IV. A. Sources That Would Locate in a Designated Nonattainment Area

"Conditions for approval ... 1. LAER, 2. Compliance…

Condition 3 . Emission reductions (*offsets)* from existing sources in the area of the proposed source (whether or not under the same ownership) are required such that there will be reasonable progress toward attainment of the applicable NAAQS.

Condition 4. The emission offsets will provide a positive *net air quality benefit* in the affected area. Atmospheric simulation modeling is not necessary for volatile organic compounds and NOX. Fulfillment of Condition 3 and Section IV.D. will be considered adequate to meet this condition."

IV.D. Location of offsetting emissions.

"The owner or operator of a new or modified major stationary source may comply with any offset requirement in effect under this Ruling for increased emissions of any air pollutant only by obtaining emissions reductions of such air pollutant from the same source or other sources in the same nonattainment area, except that the reviewing authority may allow the owner or operator of a source to obtain such emissions reductions in another nonattainment area if the conditions in IV.D.1 and 2 are met.

1. The other area has an equal or higher nonattainment classification than the area in which the source is located.

2. Emissions from such other area contribute to a violation of the national ambient air quality standard in the nonattainment area in which the source is located."

Net Air Quality Benefit and Contribution Test Under Appendix S

- The requirement is that if the offset comes from the same nonattainment area, it is sufficient to assume that the area experiences a net air quality benefit. If the offset comes from another area, CAA and Appendix S says it must contribute.

  - Does this mean the area contributes or the emission decrease was a contributor?
  - How is “contribute” defined?
  - Does “contribution” mean a “significant impact”?
  - Which model is acceptable to demonstrate “contribution”?

Excerpt from Preamble on Contribution

"We are clarifying that the use in this NSR implementation rule of the term ''significant contribution'' to the area's PM2.5 concentration means that a significant change in emissions of the precursor from sources in the area would be projected to provide significant change in PM2.5 concentrations in the area. For example, if modeling indicates that a reduction in an area's NOx emissions would reduce ambient PM2.5 levels in the area, but that a reduction in ammonia emissions would result in virtually no change in ambient PM2.5 levels, this would suggest that NOx is a significant contributor but that ammonia is not. We are not establishing in this rule a quantitative test for determining whether PM2.5 levels in an area change significantly in response to reductions in precursor emissions in the area. However, in considering this question, it is relevant to consider that relatively small reductions in PM2.5 levels are estimated to result in worthwhile public health benefits."

Other issues?

- (Make note of other issues raised by audience that would like to discuss…)

Next Steps ?

- Summarize Discussion/Issues raised
- Volunteers for workshop to . . .
  - Develop draft protocol
  - Identify gaps to determine need for add'l technical information or clarification
  - Request Guidance on Issues
- Anything else?