Update on PM2.5, SO2 and NO2 Modeling Guidance

NACAA 2011 Spring Membership Meeting
Chicago, IL

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Overview

- PM2.5 permit modeling now required with end of PM10 surrogacy policy
- Recent 1-hour SO2 and NO2 NAAQS have necessitated new permit modeling guidance
- Implementation of 1-hour SO2 NAAQS has necessitated modeling guidance for designations and SIP demonstrations

PM2.5

- On February 11, 2010, EPA published its proposal to repeal the grandfathering provision in the Federal Register at 75 FR 6827. This action cites the fact that the technical difficulties which necessitated the 1997 PM_{10} Surrogate Policy have been largely, although not entirely, resolved.
- Under the PSD programs for $PM_{2.5}$ currently in effect for SIP-approved states, states would be allowed to continue using the PM_{10} surrogate policy until May 2011, or until EPA approves the revised SIP for $PM_{2.5}$, whichever occurs first.
- Page memorandum of March 23, 2010 provides recommendations on two aspects of the modeling procedures for demonstrating compliance with the $PM_{2.5}$ NAAQS.
  - technical issues that must be addressed by any applicant or permitting authority that is seeking to rely on the 1997 PM_{10} Surrogate Policy
  - additional information on modeling procedures to demonstrate compliance with $PM_{2.5}$ NAAQS without relying upon the PM_{10} surrogate policy

PM2.5 Permit Modeling Guidance

- OTAQ released transportation conformity guidance on quantitative hot-spot analyses *(December 2010)*
- OAQPS received recommendations from the NACAA PM2.5 Modeling Implementation Workgroup *(January 2011)*
- PM2.5 Modeling Guidance Workgroup is developing modeling guidance this summer and fall (*Next Slide*)
- Current and future PM2.5 permit modeling issues should be addressed by appropriate EPA Regional Office, including review of modeling protocols
- EPA Regional Offices can elevate issues through the Model Clearinghouse for concurrence or further resolution

PM2.5 Modeling Guidance Workgroup

- EPA OAQPS and Regional Office and partnering federal agency participation
- Discuss development status with state and local agency modelers at the 2011 R/S/L Modelers' Workshop (*June 2011*)
- NACAA PM2.5 Modeling Implementation Workgroup recommendations being considered along with other guidance and permit experiences
- Public discussion on the guidance document at the 10th Conference of Air Quality Models (*October 2011*)
- Review and comment process prior to finalizing guidance document (*December 2011*)

NO_2 NAAQS

- NO_2 NAAQS revised January 2010
- Standard is 100 ppb based on 3-year average of the 98th percentile of daily maximum 1-hour concentrations
- Calculation of design values based on monitoring data is detailed in Appendix S to 40 CFR Part 50
- The 3 year averaging time for the NAAQS does not preempt or alter Appendix W requirement for use of 5 years of National Weather Service (NWS) meteorological data or at least 1 year of site-specific data

Modeling Guidance for NO_2

- New 1-hour (and existing annual) NAAQS are based on ambient concentrations of NO_2, whereas majority of NO_x emissions are in the form of NO rather than NO_2
- Modeling guidance in Appendix W (40 CFR Part 51) acknowledges that a source's impact on ambient NO_2 depends in part "on the chemical environment into which the source's plume is to be emitted" (see Section 5.1.j)

Modeling Guidance for NO_2

- Clarification memo on applicability of Appendix W guidance for new 1-hour NAAQS issued in June 2010
  - AERMOD is the preferred model for estimating NO_2 impacts in near-field applications (out to 50 km)
    - Alternative models would need approval by EPA pursuant to Appendix W of 40 CFR 51
  - Three-tiered screening approach in Section 5.2.4 is generally applicable for 1-hour NO_2 modeling, with additional/different considerations:
    - Tier 1 assumes full conversion of NO to NO2;
    - Tier 2 applies ambient ratio to Tier 1 result (annual default ratio = 0.75);
    - Tier 3 “detailed screening methods” on a case-by-case basis, including OLM and PVMRM options implemented in AERMOD

Modeling Guidance for NO_2*

- Additional guidance issued March 1, 2011
  - Clarifies procedures for analyzing results given form of NAAQS
  - Recommends default 1-hour Tier 2 ambient ratio of 0.80, and default in-stack NO_2/NO_x ratio for OLM and PVMRM Tier 3 options of 0.50, in the absence of more appropriate information
  - Addresses treatment of intermittent emissions (e.g., emergency generators) in PSD modeling demonstrations, a key issue with implementation of the 1-hour NO_2 NAAQS
  - Discussion/recommendations regarding nearby background sources to include in modeling and combining modeled + monitored contributions for cumulative analysis

**Please note elements of this NO2 guidance are applicable to SO2*

SO_2 NAAQS

- SO_2 NAAQS revised June 2010
- Standard is 75 ppb based on 3-year average of the 99th percentile of 1-hour daily maximum concentration

SO_2 NAAQS

- EPA anticipates an analytic approach that uses both air quality monitoring and modeling for determining compliance with the new SO2 NAAQS
  - Consistent with EPA's historic practices for SO_2 NAAQS implementation
  - Single monitor may generally not be adequate to fully characterize ambient SO_2 concentrations around SO_2 stationary sources
- Refined dispersion modeling is able to fully characterize SO_2 air quality impact from modeled sources
  - Overcomes limitations of an approach based solely on monitoring
- In a few, exceptional circumstances, monitoring data alone might be determined a reliable indicator of compliance with the 1-hour SO2 NAAQS. Examples include:
  - (1) non-point or 'area sources' such as shipping ports, and
  - (2) a source situated in an area of complex terrain and/or situated in a complex meteorological regime. may be more technically appropriate for determining compliance

AERMOD Implementation Workgroup (AIWG)

- Re-aligned our AIWG to better understanding and address the permit modeling issues that we face under the new 1-hour NO2 and SO2
  - Workgroup composed of over 30 state/local/tribal agency modelers across 5 subgroups by Regional Office(s)
  - Based on workgroup input, modeling example scenarios of NO_2 and SO_2 to understand issues within existing EPA guidance
- Report out initial findings at upcoming 2011 R/S/L modelers workshop and share at public session (June 2011)
- Continue efforts and provide findings and potential updates to guidance at 10th Modeling Conference (October 2011)

AERMOD Implementation Workgroup (AIWG)

Co-chairs: Erik Snyder, EPA-R6 and James Thurman, EPA-OAQPS

States / Locals:

Lisa Landry, NH	Eric McCann, TN	Lisa Alam, NE
Todd Moore, NH	Haidar Al-Rawi, TN	Doris Jung, CO
Alan Dresser, NJ	Jeff Sprague, IL	Cyra Cain, MT
Margaret Valis, NY	Ken Ritter, IN	Jess Keller, ND
Elianeth Rivera, PR	Dennis Becker, MN	Josh Nall, WY
Lucia Fernandez, PR	Margaret McCourtney, MN	Glenn Reed, CA- SJV
Michael Kiss, VA	Ben Dutcher, OH-Dayton	Leland Villalvazo, CA- SJV
Robert Lute, VA	Gail Good, WI	Ralph DeSiena, CA-San Diego
Jim Owen, AL Yvette	McGehee, LA	Steve Moore, CA-San Diego
Leigh Bacon, AL	Eric Peters, NM	Krystin Bablinskas, AK
Cleve Holladay, FL	Eric Milligan, OK	Kevin Schilling, ID
Melody Lovin, FL	Jennifer Krzak, IA	Clint Bowman, WA
Pete Courtney, GA	Assem Abdul, MO	Ranil Dhammapala, WA
Bruce Ferguson, MS	Bern Johnson, MO	Jim Hodina, NACAA
Tracy Price, SC	Dawn Froning, MO	Misti Duvall, NACAA

EPA Regional Offices & OAQPS:

Ian Cohen, EPA-R1	Ashley Mohr, EPA-R6	Tyer Fox, EPA-OAQPS
Annamaria Coulter, EPA-R2	Andy Hawkins, EPA-R7	Roger Brode, EPA-OAQPS
Stan Krivo, EPA-R4	Gail Tonnesen, EPA-R8	George Bridgers, EPA-OAQPS
Mary Portanova, EPA-R5	Carol Bohnenkamp, EPA-R9	
Randy Robinson, EPA-R5	Scott Bohning, EPA-R9	

2011 R/S/L Modelers' Workshop

- June 6th through 9th, 2011
- Open to federal, state, and local government agencies
- Interactive forum for presenting and discussing current issues impacting the permit modeling community
- The 2011 Workshop has a specific focus on the short-term NO_2, SO_2, and $PM_{2.5}$ NAAQS
- Special Thursday (June 9th) Technical Session with invited presentations and participation
- http://www.cleanairinfo.com/regionalstatelocalmodelingworkshop

Model Clearinghouse

- *http://www.epa.gov/ttn/scram/guidance_clearinghouse.htm*

- New Director of Model Clearinghouse
  - George Bridgers
  - OAQPS/AQAD/AQMG
  - bridgers.george@epa.gov
  - (919) 541-5563

Referenced Documents

- http://www.epa.gov/ttn/scram/ClarificationMemo_AppendixW_Hourly-NO2-NAAQS_FINAL_06-28-2010.pdf
- http://www.epa.gov/ttn/scram/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf
- http://www.epa.gov/ttn/scram/ClarificationMemo_AppendixW_Hourly-SO2-NAAQS_FINAL_08-23-2010.pdf
- http://www.epa.gov/airquality/sulfurdioxide/pdfs/20110411so2designationsguidance.pdf