EPA Air Quality Modeling Updates

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Presentation for

Association of Air Pollution Control Agencies

2015 Annual Meeting

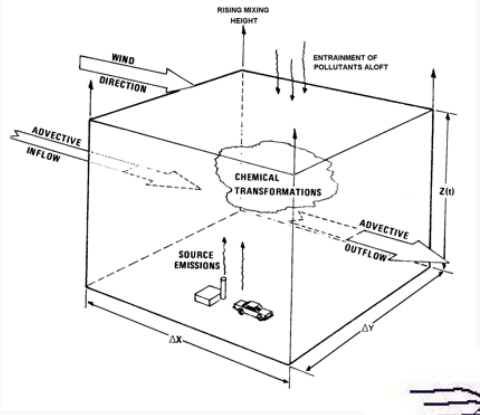
September 17, 2015

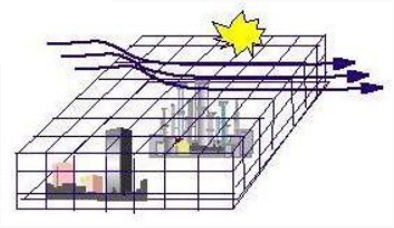
Presentation Overview

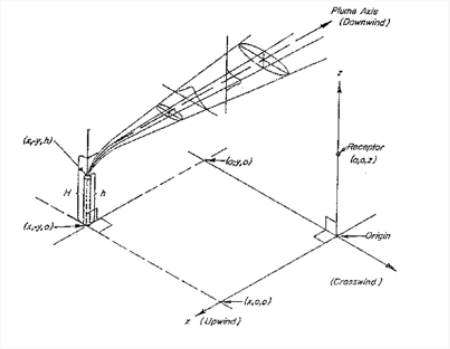
- Proposed Revisions to EPA's *Guideline on Air Quality Models*
- Data Requirements Rule: SO2 Modeling
- Notice of Data Availability: Ozone Transport Modeling Data

OAR - OAQPS - AQAD
Air Quality Modeling Group

- Conducts air quality modeling for Agency regulatory and policy assessments
  - e.g., NOx SIP Call, Heavy Duty Diesel, Nonroad Rule, CAIR, CAMR, NAAQS RIAs
- Provides guidance for the use of air quality models for SIP demonstrations and NSR/PSD permitting
  - O_3/PM/RH Guidance
  - Guideline on Air Quality Models (aka Appendix W)
- Partners and coordinates w/ others (e.g, ORD, NOAA, scientific community, etc) on model evaluations and development efforts







Proposal to Revise to the *Guideline on Air Quality Models*

(Appendix W to 40 CFR Part 51)

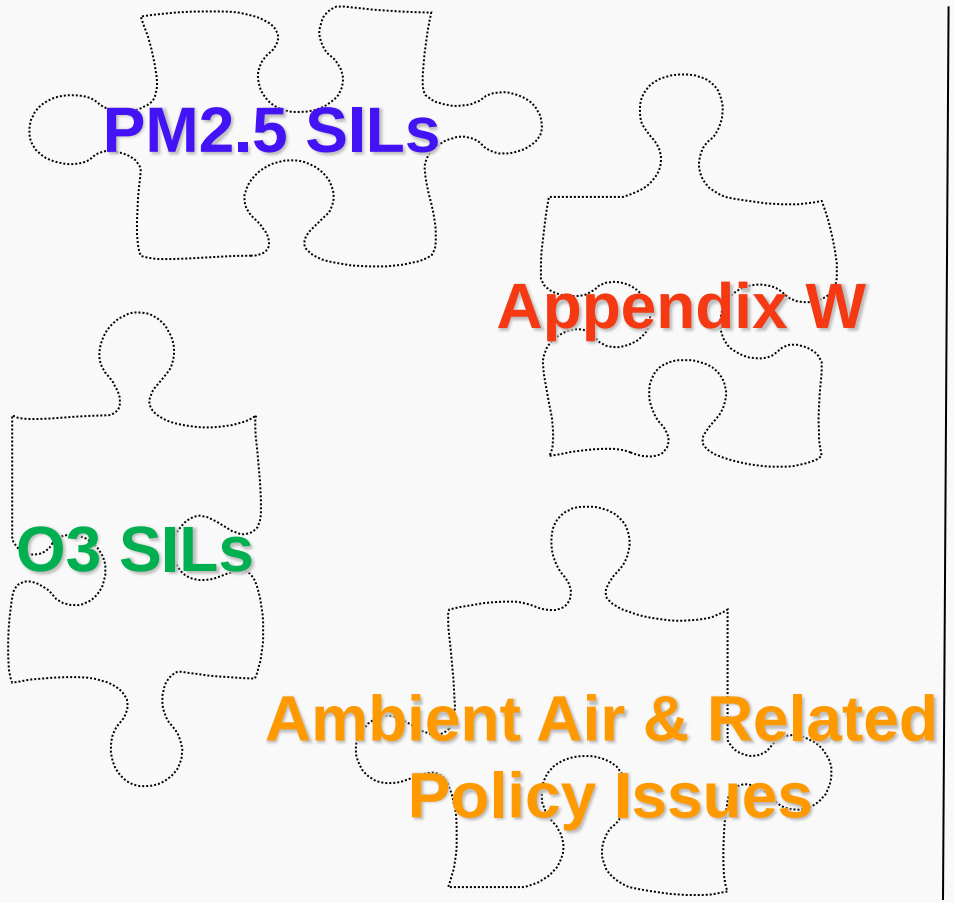
Background

- EPA's *Guideline on Air Quality Models* (*Guideline*) is published as Appendix W to 40 CFR Part 51.
- EPA developed the *Guideline* to help EPA, States, and industry prepare and review new source permits and State or Tribal Implementation Plan revisions.
- The *Guideline* is important because it specifies models for regulatory application and provides guidance for their use.
- The *Guideline* provides a common basis for estimating the air quality concentrations of criteria pollutants used in assessing control strategies and developing emissions limits.

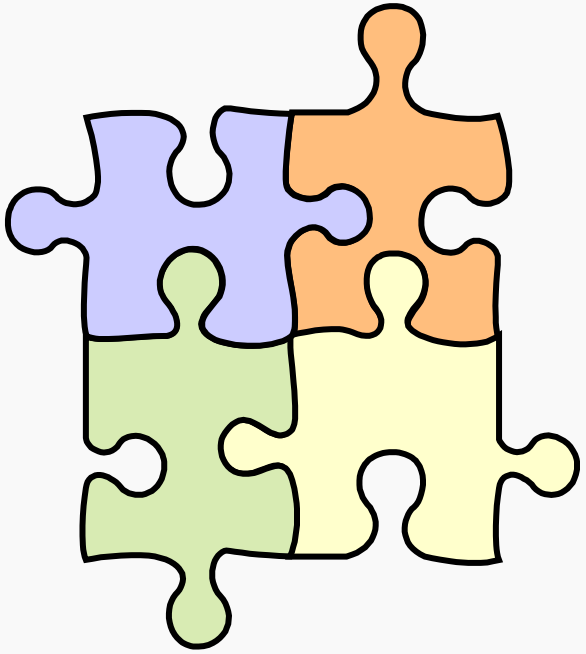
Proposed Rulemaking and 11th Conference on Air Quality Modeling

- On July 14, 2015, the EPA proposed to update to the *Guideline on Air Quality Models.*
  - Published in the Federal Register on July 29, 2015. (80 FR 45340)
  - Docket ID No. EPA-HQ-OAR-2015-0310
  - 90-day public comment window ending on **October, 27, 2015**.
- 11th Conference on Air Quality Modeling
  - August 12 and 13, 2015 at the EPA RTP, NC Campus.
  - Conference to focus on the proposed revisions to the *Guideline.*
  - Serves as public hearing for NPRM as part of public comment period. Transcripts and presentation will be posted to Docket and on the 11th Conference on Air Quality Modeling informational website.
- Final rulemaking anticipated in mid-2016.

Appendix W: A Piece of the NSR Program Puzzle



Bringing it together . . .



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Proposed Actions: AERMOD

- The EPA is proposing enhancements to the scientific formulation of the preferred near-field dispersion model, AERMOD, to address technical concerns expressed by the stakeholder community and improve model performance in its regulatory applications.
  - 1. A proposed option incorporated in AERMET to adjust the surface friction velocity (u*) to address issues with AERMOD model overprediction under stable, low wind speed conditions. (ADJ_U*)
  - 2. A proposed low wind option in AERMOD to address issues with model overprediction under low wind speed conditions. (LOWWIND3)
  - 3. Modifications to AERMOD formulation to address issues with overprediction for applications involving relatively tall stacks located near relatively small urban areas.

Proposed Actions: AERMOD (*Cont.*)

- The EPA is proposing enhancements to the scientific formulation of the preferred near-field dispersion model, AERMOD, to address technical concerns expressed by the stakeholder community and improve model performance in its regulatory applications.
  - 4. Proposed regulatory default options in AERMOD to address plume rise for horizontal and capped stacks based on the July 9, 1993, Model Clearinghouse memorandum, with adjustments to account for the PRIME algorithm for sources subject to building downwash.
  - 5. A proposed buoyant line source option, based on the BLP model, has been incorporated in AERMOD.
  - 6. Proposed updates to the NO_2 Tier 2 and Tier 3 screening techniques coded within AERMOD, including the replacement of the Ambient Ratio Method (ARM) Tier 2 option with a revised ARM2 option and the replacement of the Plume Volume Molar Ratio Method (PVMRM) Tier 3 option with a revised PVMRM2 option.

AERMET/AERMOD (v15181) Release

- At the same time as the NPRM, the regulatory version of the AERMOD Modeling System was revised to version 15181.
  - Numerous bug fixes and limited enhancements were made to version 14134 as described in Model Change Bulletin #11.
  - Included new “beta” options for LOWWIND3 and PVMRM2.
  - Incorporated a buoyant line source option, based on BLP.
- Applicants with permits in process can still use AERMOD version 14134 but should review the MCB with the appropriate reviewing authority to determine if any of the changes would adversely impact concentration estimates and/or compliance status. Rerunning final results with version 15181 is preferred.
- The proposed status of any “beta” or “non-default” option in the NPRM does not infer that they can be used immediately without appropriate justification and approval by the Regional Office with concurrence from the Model Clearinghouse.

Proposed Actions: AERSCREEN & CALINE3

- The EPA is proposing AERSCREEN as the recommended screening model for simple and complex terrain for single sources and options for multi-source screening with AERMOD.
  - AERSCREEN now includes inversion break-up and coastal fumigation which were previously parts of SCREEN3.

- The EPA is proposing to replace the model known as CALINE3 for mobile source applications including fine particle pollution ($PM_{2.5}$, PM_{10}), and carbon monoxide (CO) hot-spot analyses based on evidence of a more scientifically sound basis for the use of AERMOD, improved model performance over CALINE3, and its ability to use more recent and representative meteorological input data.

Proposed Actions: Single-Source Impacts on Ozone and Secondary $PM_{2.5}$

- For this proposed revision to the *Guideline*, the EPA has determined that advances in photochemical modeling science indicate it is now reasonable to provide more specific, generally-applicable guidance that identifies particular models or analytical techniques that may be used under specific circumstances for assessing the impacts of an individual source on ozone and secondary $PM_{2.5}$.
- The EPA believes photochemical grid models are generally most appropriate for addressing ozone and secondary $PM_{2.5}$ because they provide a spatially and temporally dynamic realistic chemical and physical environment for plume growth and chemical transformation.
- The EPA is proposing a two-tiered demonstration approach for addressing single-source impacts on ozone and secondary $PM_{2.5}$ that will be used in concert with future demonstration tools (*e.g.*, MERPs).

Proposed Actions: CALPUFF & Met Data

- For long-range air quality assessments, the EPA is proposing to remove CALPUFF as a preferred model and recommending its use as a screening technique along with other Lagrangian models for addressing PSD increment beyond 50 km from a new or modifying source. (*This proposed change does not affect the EPA's recommendation in the 2005 BART Guidelines to use CALPUFF in the BART determination process.*)

- To provide more flexibility and improve the meteorological inputs used for regulatory modeling, the EPA is proposing to allow the use of prognostic meteorological data in AERMOD where there is no representative National Weather Service (NWS) station, and it is prohibitive or not feasible to collect adequately representative site-specific data.
  - Mesoscale Model Interface Program (MMIF)

Proposed Actions: Revisions to the Appendix W Reg Text

- The EPA is proposing to make modifications to section 8 of the Guideline regarding model inputs and background concentrations to provide much needed clarity associated with input and database selection for use in PSD and SIP modeling.
  - More definitive definition of the appropriate modeling domain and how to best characterize the various contributions to air quality concentrations within that domain.
  - Revised requirements on how to characterize emissions from nearby sources to be explicitly modeled for purposes of a cumulative impact assessment under PSD and new language regarding how to characterize direct and precursor emissions from modeled sources for SIP attainment demonstrations for ozone, PM2.5, and regional haze.
  - Revised recommendations on how to determine background concentrations in constructing the design concentration, or total air quality concentration, as part of a cumulative impact analysis for NAAQS and PSD increments.

Proposed Actions: Revisions to the Appendix W Reg Text (*Cont.*)

- The EPA proposes to revise the discussion portion of section 9 to more clearly summarize the general concepts presented in earlier sections of the Guideline and to set the stage for the appropriate regulatory application of models and/or, in rare circumstances, air quality monitoring data.
  - Strongly encourage adherence to the recommendations in section 9.2.1 of the proposed Guideline regarding development of a modeling protocol.

- The EPA is proposing to make additional editorial changes to update and reorganize information throughout the Guideline. These revisions are not intended to meaningfully change the substance of the Guideline, but rather to make the Guideline easier to use.

For More Information

- 11th Conference on Air Quality Modeling informational website: http://www.epa.gov/ttn/scram/11thmodconf.htm
- Proposed Rulemaking Docket (ID No. EPA-HQ-OAQ-2015-0310): http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2015-0310-0001
- Conference Registration (*Not required but recommended*): http://www.cleanairinfo.com/regionalstatelocalmodelingworkshop/
- Additional Questions About the Proposed Rulemaking: Bridgers.George@epa.gov

1-Hour SO_2 NAAQS Implementation: Final Data Requirements Rule

SO_2 NAAQS Data Requirements Rule (DRR)

- Final rule was signed on August 10, 2015
  - Information available on: http://www.epa.gov/oaqps001/sulfurdioxide/implement.html
- The DRR was developed to address the need for additional air quality data to be used for implementing the 2010 1-hour SO_2 NAAQS.
  - The existing SO_2 monitoring network characterizes localized SO_2 source impacts in a limited set of areas.
  - Under the DRR, air agencies will provide additional air quality data characterizing 1-hour peak concentrations and source-oriented impacts.

DRR Summary

- The DRR directs state and tribal air agencies to characterize current air quality in areas with large SO_2 sources (2,000 tons per year or greater). (See section 51.1202)
- The final rule sets a process and timetable for air agencies to either establish ambient monitoring sites or conduct air quality modeling, and to submit air quality data to the EPA.
  - Air agencies have flexibility to choose the most appropriate technical approach for each source.
  - The resulting air quality data may be used by EPA in future actions related to implementing the 2010 1-hr SO_2 NAAQS.
- Alternatively, an air agency can avoid the air quality characterization requirement for a source by establishing federally enforceable emission limit(s) and providing documentation of limit and compliance to EPA by January 2017.

DRR Timeline

- **August 2015:** EPA issues final rule.
- **Jan. 15, 2016:** Air agency identifies sources exceeding threshold and other sources for which air quality will be characterized.
- **July 1, 2016:** Air agency specifies for each source whether it will monitor air quality, model air quality, or establish an enforceable limit.
  - Air agency also submits a revised monitoring plan, modeling protocols, or descriptions of planned limits on emissions to less than 2,000 tpy.
- **January 2017**
  - New monitoring sites must be operational by Jan. 1, 2017.
  - Modeling analyses must be submitted by Jan. 13, 2017.
  - Documentation of federally enforceable emission limits and compliance must be submitted by Jan. 13, 2017.
- **Early 2020:** Monitoring sites have 3 years of quality-assured data.

Monitoring and Modeling Technical Assistance Documents

Monitoring TAD

- Describes several analytical approaches to help identify appropriate monitoring locations to characterize peak SO_2 concentrations around an SO_2 emissions source.
- Approaches include the use of air quality modeling, exploratory monitoring, and weight of evidence

Modeling TAD

- Suggests details on modeling with actual emissions data for one or more sources to characterize air quality
- Provides recommendations on including other nearby sources, use of three years of meteorological data, and accounting for background concentrations

Links

http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf

http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/SO2ModelingTAD.pdf

For more information

- SO_2 NAAQS Implementation Website: http://www.epa.gov/oaqps001/sulfurdioxide/implement.html

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Notice of Data Availability: EPA's Updated Ozone Transport Modeling Data for the 2008 Ozone NAAQS

Overview

- EPA has issued a Notice of Data Availability (NODA) that requests comment on interstate ozone transport modeling and associated data and methodologies [NODA Docket # EPA-HQ-OAR-2015-0500]
- EPA plans to use these data to inform a rulemaking proposal later this year to address interstate ozone transport for the 2008 ozone NAAQS
  - This notice provides an opportunity to review and comment on the Agency's ozone transport modeling data that EPA intends to use in this forthcoming proposal
- The comment period for the NODA closes on September 23, 2015
  - This NODA does not preclude the public from submitting comments during the comment period for the proposed rule
- The 2017 ozone contribution data in the NODA are an update to the preliminary data for 2018 released in the memo from Stephan Page, EPA/OAQPS on January 22, 2015
  - The analytic year was changed from 2018 to 2017 to be consistent with the attainment deadline for Moderate nonattainment areas, as specified in the final 2008 Ozone NAAQS Requirements Rule
  - The 2017 contribution data are intended for use by states in developing 110 SIPs for the 2008 ozone NAAQS

Accessing the Data

- Emissions summaries, guidelines for reviewing emissions data, and the Emissions Inventory TSD are in the e-docket.
- Emissions data files are available for download from the CHIEF website
- Files with 2009-2013 and 2017 projected average and maximum design values and 2017 projected ozone contributions and the Air Quality Modeling TSD are in the e-docket
- Air quality model inputs and outputs are on a data drive in the docket office
- Electronic copies of these data can also be obtained upon request from Norm Possiel (possiel.norm@epa.gov) or Alison Eyth (eyth.alison@epa.gov)

Other Considerations

- This NODA is not the proposed ozone transport rule.
  - We are not taking comment on the form and application of contribution thresholds or other policy matters and factors which might be part of a proposed rule
- Comments on the data provided with this NODA will be used to inform a *final* transport rule, not the *proposed* rule
- We encourage all states to review the information in this NODA