O_3/$PM_{2.5}$/Regional Haze Modeling Guidance Update

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Region 4 Modeler's Workshop

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Ozone/PM$_{2.5}$/Regional Haze Modeling Guidance

- **Current:** "Guidance on the use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM$_{2.5}$, and Regional Haze" April 2007
  - http://www.epa.gov/scram001/guidance/guide/final-03-pm-rh-guidance.pdf

- **Updated:** [Draft] Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM$_{2.5}$, and Regional Haze" November 2014

Revised Guidance

- Updated draft will be released publically in November 2014

- External comments will be accepted for ~3 months

- Release of "Final" guidance depends on timing of ozone and $PM_{2.5}$ implementation rules

  - Some details in the modeling guidance depend on final decisions in the implementation rules

Ozone/PM2.5 Modeling Guidance Authors

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- Heather Simon
- Chris Misenis
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Recommended Attainment Demonstration Modeling Process

- Develop conceptual model
  - What is the nature of the air quality problem?
- Develop a modeling protocol
  - Outline the types of modeling and data analysis that is deemed appropriate for the situation
    - This may vary, especially for $PM_{2.5}$, due to the different types of PM problems
- Goal of attainment demonstration modeling is to adequately demonstrate that the NAAQS will be attained in the future
  - May not be a one size fits all solution
- Weight of evidence will often be part of the attainment demonstration process
  - Balance of modeling and data analysis should be considered as part of the protocol development process

Modeled Attainment Tests

- All O3/PM$_{2.5}$/RH modeled attainment tests use model estimates in a "relative" sense
  - Models are better at predicting relative changes in concentrations than absolute concentrations
- Relative Response Factors (RRFs) are calculated by taking the ratio of the model's future to current predictions of PM$_{2.5}$ or ozone
- RRFs are calculated for ozone and for each component of PM$_{2.5}$ and regional haze

Guidance Changes and Updates

- Major reorganization of format and chapters
- Updates to all language and references
- No major updates to:
  - ☐ Conceptual model
  - ☐ Modeling protocol
  - ☐ Choosing a model

Changes and Updates

- **No major updates to:**
  - Modeling resolution
    - Horizontal resolution recommendation: 12km or finer
  - Calculation of base year design values in the relative attainment test
    - Continue to recommend use of a 5 year "weighted" average design values (average of 3 design value periods)
  - Annual average $PM_{2.5}$ attainment test
  - 24-hr average $PM_{2.5}$ attainment test
    - Incorporated updated 24-hr test from June 2011 guidance memo

Major Update

- **Ozone attainment test**
  - Relative test revised to focus on 10 highest base year modeled days (at each monitor location)
    - Avoids averaging too many days into the RRF calculation
      - NAAQS based on 4th high; RRF should also be based on highest days
      - With lower NAAQS (75 ppb or lower), some sites could have 50 or more modeled days above the NAAQS
  - Revised RRF calculation
    - 10 highest base year modeled days from episodes/season
    - Select highest modeled cell from 3X3 matrix of cells surrounding the monitor
      - High base year grid cell; pair in space with same grid cell in future (old test could be unpaired in space)
    - 60 ppb minimum threshold
  - Revised test can be easily applied to any level of the NAAQS

Other Updates

- Emissions modeling and inputs
  - □ Emissions modeling section revised to account for new and improved emissions models and tools
  - □ Language revised to be consistent with recently released (April 2014) draft SIP emissions inventory guidance: http://www.epa.gov/ttn/chief/eidocs/eiguid/2014revisedeiguidance.pdf

Other Updates

- **Weight of Evidence (WOE)**
  - Added additional information on analyses that were not previously covered (e.g. voluntary measures)
    - Attempted to account for types of information contained in an Ozone Transport Commission WOE white paper
  - Three main WOE categories
    - Additional modeling analyses
    - Trends in ambient air quality and emissions
    - Additional emissions controls/reductions
  - Removed previously recommended quantitative concentration WOE ranges
    - Ranges were not well supported and subject to misuse

Coordination with the Ozone and PM$_{2.5}$ Implementation Rules and Appendix W

- Language was changed and removed in some sections to reflect decisions that should be mandated by rule (not guidance)
  - Placeholders for language to be added after the ozone and PM2.5 implementation rules are finalized
    - What future year to model?
    - What modeling analysis is required for a RACM analysis?
    - Is an unmonitored area analysis (UAA) required?
      - How are results from an UAA used?
    - Requirements for modeling in near-road areas
  - Appendix W issues
    - Actual vs. allowable emissions
    - Models for single source assessments for ozone and/or secondary PM
      - Details on single source secondary pollutant modeling will be contained in a separate guidance document

Model Attainment Test Software (MATS)

- Software to apply the recommended modeled attainment tests
  http://www.epa.gov/scram001/modelingapps_mats.htm
  - ☐ Performs ozone, $PM_{2.5}$, and regional haze tests
  - ☐ Interpolates ambient data (where necessary) for ozone and $PM_{2.5}$ tests
  - ☐ Creates "fused" spatial fields for unmonitored area analysis
    - Fused fields using ambient data and model output
- MATS version 2.6.1 will be released at the same time as the revised draft guidance
  - ☐ Incorporates revisions to the ozone attainment test
  - ☐ Updated ambient datasets (through 2012)

Next Steps

- **Final touch-ups on modeling guidance**
    - ☐ Release for external review in November
    - ☐ Outreach in December/January
- **Release updated version of MATS**
    - ☐ Version 2.6.1