



# O<sub>3</sub>/PM<sub>2.5</sub>/Regional Haze Modeling Guidance Update

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# Ozone/PM<sub>2.5</sub>/Regional Haze Modeling Guidance

- **Old:** “Guidance on the use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM<sub>2.5</sub>, 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<sub>2.5</sub>, and Regional Haze” December 2014



# Revised Guidance

- Updated draft released on December 3, 2014
  - External comments will be accepted until March 13, 2015
- The guidance reflects EPA's recommendations for how air agencies should conduct air quality modeling to satisfy model attainment demonstration requirements for the ozone and PM<sub>2.5</sub> NAAQS, as well as regional haze reasonable progress analyses.
  - The document is guidance and thus does not impose any binding or enforceable requirements.
  - Modeling (and related) requirements are contained in the respective ozone and PM<sub>2.5</sub> implementation rules, and the regional haze rule.



# 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<sub>2.5</sub>, 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 O<sub>3</sub>/PM<sub>2.5</sub>/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<sub>2.5</sub> or ozone
- RRFs are calculated for ozone and for each component of PM<sub>2.5</sub> and regional haze



# Revised Guidance Contents

## Section 2- Model Setup

- Conceptual description
- Modeling protocol
- Episode selection
- Modeling domain
- Air quality model
- Meteorological inputs
- Emissions inputs
- Initial and boundary conditions



# Guidance Contents

## Section 3- Model Performance

- Operational evaluation
- Ambient measurement networks
- Diagnostic evaluation
  - Dynamic evaluation



# Guidance Contents

## Section 4- Attainment Tests

- Ozone attainment test
- Annual PM<sub>2.5</sub> attainment test
- 24-hr PM<sub>2.5</sub> attainment test
- Local area analysis
- Estimating design values in unmonitored areas
- Regional haze uniform rate of progress analysis
- Weight of Evidence





# 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<sub>2.5</sub> attainment test

- 24-hr average PM<sub>2.5</sub> attainment test

- Incorporated updated 24-hr test from June 2011 guidance memo



# Updates

## ■ 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 4<sup>th</sup> 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

- Model performance evaluation
  - Updated recommended analyses and performance statistics (and references)
    - No recommended quantitative performance goals
- 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/2014revisedguidance.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<sub>2.5</sub> 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 PM<sub>2.5</sub> 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
    - Appropriate models and techniques 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](http://www.epa.gov/scram001/modelingapps_mats.htm)
  - Performs ozone, PM<sub>2.5</sub>, and regional haze tests
  - Interpolates ambient data (where necessary) for ozone and PM<sub>2.5</sub> tests
  - Creates “fused” spatial fields for unmonitored area analysis
    - Fused fields using ambient data and model output
- MATS version 2.6.1 was released at the same time as the revised draft guidance
  - Incorporates revisions to the ozone attainment test
  - Updated ambient datasets (through 2012)



# Next Steps

- Outreach to state/local agencies
- Comments due March 13, 2015
- The release of “Final” or updated draft guidance depends on the timing of the ozone and PM implementation rules and the nature of the comments.
  - EPA encourages states to follow the recommendations in the draft guidance until an updated version is released.
  - States with upcoming attainment demonstration deadlines should consult with their EPA Regional Office to determine the appropriate course of action.