Modeling Under PSD

- Air quality models (screening and refined) are used in various ways under the PSD program.
- Step 1: Significant Impact Analysis
  - Use of either screening or refined model to determine if emissions from PSD project alone are significant through use of Significant Impact Levels (SILs)
- Step 2: Cumulative Impact Analysis
  - Use of refined models to determine cumulative impacts from PSD project in conjunction with nearby sources does not cause or contribute to violations of applicable NAAQS and increments.

Modeling Guidance for 1-Hour NO_2 NAAQS Under PSD

- PSD regulations require that modeling be conducted in accordance the "Guideline on Air Quality Models"
- AERMOD is the EPA 'Preferred' Model for PSD modeling for all criteria pollutants (except O_3).
- Appendix W outlines 3-tiered screening level procedures to address conversion of NO_2 from NO_x emissions.
  - We believe that sources will benefit significantly from use of the conversion guidance (Tier 3 options) rather than conservative assumptions that all or most NOx is NO2 (Tier 1 & 2 options)
  - Fully expect more "Tier 3" uses of AERMOD with detailed screening methods (Ozone Limiting Method and Plume Volume Molar Ratio Method) that will need to be approved by Regional Offices and may need to be vetted through Model Clearinghouse

Preliminary Assessment: Source Impacts for the 1-Hour NO_2 NAAQS

- New major sources with lower level releases (short stacks) may show modeled violations of the NAAQS
- Some states (e.g., in Regions 4, 6,and 7) are reporting preliminary "permitting challenges" with respect to new 1-hour NO_2 NAAQS.
- Minor sources that have not historically been required to model may have trouble meeting the new NAAQS
- In order to better understand the extent of the problem, OAQPS is compiling details of the preliminary data being reported to identify emissions input assumptions, form of hourly impacts relative to standard, NO_X chemistry options

Upcoming Modeling Guidance for NO2 NAAQS

- EPA's current regulatory permit model, AERMOD will be used for modeling compliance with the NO_2 1-hr NAAQS, with additional guidance and tools to be provided to facilitate its use
- Provide clarification memo on how Appendix W's 3-tiered screening level procedures, involving the conversion of NOx to NO2, apply to new hourly standard
  - Tier 1 = 100% conversion
  - Tier 2 = 75% conversion based on ambient ratio method
  - Tier 3 = Case-by-case methods requiring more detailed inputs (stack ratios, background O3, etc).
  - Also will provide background on inventory development methods to generate hourly emissions for purposes of modeling NO2
- Provide post-processing capability within AERMOD to generate appropriate modeling results for comparison to new hourly standard
- Date for issuing guidance and providing processing tool: May 28, 2010
- Once nonattainment designations are completed for NO_2, modeling and technical guidance needed to S/L/T to support nonattainment SIP demonstrations

$PM_{2.5}$ Permit Modeling Guidance: Background

- August 2009 Administrative Order on LG&E essentially established two paths forward in addressing PM2.5 for permits
  - Demonstrate adequacy of PM10 surrogacy policy for PM2.5
  - Conduct PM2.5 permit modeling
- March 23, 2010 Page Memorandum provides:
  - Clarifications on demonstrating the appropriateness of PM10 surrogacy policy to comply with PM2.5 NAAQS
  - Provides recommended modeling procedures for two main stages in PSD ambient impact analysis, i.e., Significant Impact Analysis and Cumulative Impact Analysis
- Differences in nature of PM2.5 from other criteria pollutants and the form of the daily NAAQS standard means that standard modeling practices may not be appropriate
- Recognizing this and associated technical difficulties, PSD modeling for PM2.5 should be viewed as screening-level analysis similar to Appendix W approach for NO2 (Section 5.2.4)

Technical Elements of $PM_{2.5}$ Permit Modeling

- Modeling Inventory
  - Develop an emissions inventory of background sources to be included in modeling analysis using traditional guidance
- Dispersion Modeling
  - Use AERMOD as the EPA 'Preferred' Model for permit modeling to account for primary emissions from project sources & nearby sources, as appropriate
- Background Concentrations
  - Determine "representative" background concentration and use DV metrics for annual and daily PM2.5 stds
  - Accounts for majority of secondarily formed PM2.5 (to be determined extent to which account for project's contribution by its precursor emissions)

Comparison to $PM_{2.5}$ SIL and NAAQS

- Significant Impact Analysis
  - For 5 years of NWS met data, use highest average of modeled annual averages and average of first highest 24-hr average
- Cumulative Impact Analysis
  - NAAQS 1st Tier: Combine background as DV metric with modeled result (based on same modeling metric for SIL comparison)
  - NAAQS 2nd Tier (for daily): where modeled PM2.5 emissions are not temporally correlated with background PM2.5 levels then combine on a seasonal or quarterly basis
  - NAAQS 3rd Tier (for daily): consider more temporal and spatial pairing to determine better basis

$PM_{2.5}$ Permit Modeling Activities and Plans

- EPA-NACAA PM2.5 Modeling Workgroup to gain State/local agency input by October 2010 on:
  - Development of emissions inventories
  - Determination of 'Representative" background
  - Accounting for secondary formation from project source
- Issue PM2.5 permit modeling guidance
  - Compile experiences and recommendations into draft guidance by Fall 2010
  - Host workshop to discuss and gain public input on draft guidance
  - Issue "final" PM2.5 permit modeling guidance by end of year or early 2011

PLEASE NOTE: PM2.5 modeling for permits will continue in interim so seek technical input from Regional Offices and vet technical issues with OAQPS through the Model Clearinghouse