Model Clearinghouse Status and Updates

10th Conference on Air Quality Modeling

RTP, NC

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OAQPS-AQAD-Air Quality Modeling Group

Model Clearinghouse

- Revitalization of the Clearinghouse
  - OAQPS recognized the significant need for improved coordination with the Regional Offices on the myriad of ongoing NSR/PSD permit modeling issues.
  - A dedicated Model Clearinghouse Director would focus attention on the needs of the Regional Offices as well as keep OAQPS informed on developing permit modeling issues in a timely fashion… reducing the surprises.
  - Previously, the Model Clearinghouse had served in a central permit modeling role for the Agency.
  - Significant desire to reestablish / revitalize the Model Clearinghouse.

Model Clearinghouse

- George Bridgers
  - Model Clearinghouse Director “effective” January 3, 2011.
  - Memo introducing the new MC Director was sent out to the Regional Offices (ADD, APM, RO Modeling Contacts) and OAQPS management on April 27, 2011.
  - Spent over 12 years working with the NC Division of Air Quality in a variety of roles:

    Ambient monitoring, SIP AQ & met modeling, significant involvement in the VISTAS / SEMAP regional modeling, SIP documentation & submittal, nonattainment boundary recommendation packages, public meetings & hearings, AQ forecasting & outreach, principle developer of NC’s AQ forecasting program, and architect & sys admin for NCDAQ’s Linux Cluster.

Model Clearinghouse

- What is it?
  - A process and mechanism by which an EPA Regional Office can obtain EPA Headquarters concurrence on implementation issues related to air quality modeling.
- Statutory authority?
  - Appendix W to 40 CFR51, Section 3.3(b): “As appropriate, Regional Office may request assistance from the Model Clearinghouse after an initial evaluation and decision has been reached concerning the application of a model, analytical technique or data base in a particular regulatory action.

Model Clearinghouse Goals

- Provides national consistency in regulatory decisions.
- Timely interpretation of guidance (as issues arise).
- Minimizes bad precedents:
  - Proactive approach to issues.
  - Memoranda provide essential support to regions, states and locals.
- Clarification memorandum and guidance development through consensus building.

Model Clearinghouse Operation

- Technical issues:
  - Response provided by OAQPS/AQMG and other technical experts with review by policy staff.
- Policy issues (if submitted to MC):
  - Referred to New Source Review Group.
  - Response provided by OAQPS/Air Quality Policy Division with technical input as appropriate.
- As appropriate, Model Clearinghouse responses may be reviewed by OGC.

Formal Clearinghouse Process

- State contacts Region.
- Regional Office writes memo to the Clearinghouse:
  - Statement of Issue.
  - Desired approach.
  - Justification.
- Clearinghouse facilitates solutions and writes formal response.
- Clearinghouse summarizes & archives decisions:
  - Searchable database (MCHISRS) via web access (SCRAM).
  - Presents summary at annual Regional/State/Local workshop.
  - Writes annual report.

Formal Clearinghouse Process *(Continued)*

- OAQPS develops guidance as appropriate:
  - Policy memo, EPA Report, Rule Making.

Importance of Process

- Importance of Model Clearinghouse process has been stressed in the recent past, especially with promulgation of CALPUFF and AERMOD:
  - Emphasis on formal process of Regional Office presenting issue to Model Clearinghouse, perhaps initiated at State level, with full background information and Regional Office position.
  - Informal contacts with OAQPS staff do not constitute "consulting with the Model Clearinghouse."
- Importance of "Modeling Protocols" to get review and input early in the process (EPA & FLMs).

Importance of Process

- Respecting the roles of various parties/stakeholders:
  - Applicant.
  - Reviewing authority (RO or State).
  - OAQPS as needed, with both technical (AQMG) and policy (AQPD) perspectives.
  - Public.
- Importance of consistency is stressed several places in Appendix W, including the very first sentence:
  - “Industry and control agencies have long expressed a need for consistency in the application of air quality models for regulatory purposes.”

Importance of Process

- Clarify distinction between regulatory modeling applications, which fall under purview of Appendix W, and non-regulatory applications, such as risk assessments:
  - "The Guideline recommends air quality modeling techniques that should be applied to State Implementation Plan (SIP) revisions for existing sources and to new source reviews (NSR), including prevention of significant deterioration (PSD). Applicable only to criteria air pollutants, it is intended for use by EPA Regional Offices in judging the adequacy of modeling analyses performed by EPA, State, and local agencies and by industry."

Model Clearinghouse Activities

- Region 8 – CALPUFF Modeling Protocol for BART
  (Record No: 09-VIII-01)
  - Requested concurrence with certain aspects of a BART analysis proposed by Otter Tail Power for the Big Stone Unit 1 EGU in South Dakota.
  - We concurred on two aspects of the request and deferred on a third aspect on May 15, 2009:

    1) Concurred that the use of 1km grid resolution in CALMET/CALPUFF was not adequately justified.

    2) Concurred that "blending" NWS observations with prognostic model data is the most technically-sound approach to developing meteorological fields for application of the CALPUFF model when prognostic model data are incorporated.

    3) Deferred the decision on the appropriateness of the proposed concentration post -processing procedures to the Regional Office and the FLMs.

Model Clearinghouse Activities

- Region 8 – CALPUFF Modeling Protocol for BART
  (Record No: 09-VIII-01)
  - We also proposed revisions to the IWAQM Phase 2 recommendations that were responsive to the issues and concerns raised through this MC request:

    Reassessment of the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report: Revisions to Phase 2 Recommendations (USEPA, 2009) is available on the SCRAM website.

Model Clearinghouse Activities

- Region 4 – Surface Roughness
  (Record No: 09-IV-01)
  - Regional Office was seeking review and concurrence with their determination that the use of a non-default radius for surface roughness determination was justified for the Kentucky NewGas project facility.
  - On September 17, 2009, we responded with a disagreement on the Regional Office's determination given the lack of any technical rationale from the applicant based on the physics of boundary layer modeling to justify use of a non-default radius for determining surface roughness.
  - We provided collaborative information on the comparison of AERSURFACE roughness estimates to values derived independently from observed wind data using a "gust factor method" (GFM) *(Wieringa, 1980; Wieringa, 1993; Verkaik and Holtslag, 2007)* with 1-minute ASOS wind data.
  - The AERSURFACE – GFM comparison provided objective support for the appropriateness of the current recommended default radius of 1km.

Model Clearinghouse Activities

- Region 6 – Modeling Procedures for $PM_{2.5}$ Compliance Demo.
  (Record No: 10-VI-01)
  - Requested concurrence regarding the Region's position on a proposed modeling compliance demonstration with the $PM_{2.5}$ NAAQS by Nucor Corporation for the proposed pig iron plant in St. James Parish, LA.
  - The Regional Office had already approved the modeling protocol submitted by Nucor prior to soliciting Modeling Clearinghouse.
  - We concurred on one aspect of the request and disagreed on a second aspect on February 26, 2010:

    1) Concurred on the selection of the Bayou Plaquemine monitoring site for determining background $PM_{2.5}$ concentrations, and on the requirement to include 2006 monitoring data.

    2) Disagreed with the use of the highest of the 8th highest (98th percentile) modeled 24-hour impacts from the 5-year meteorological record for the modeled component of the cumulative impact assessment.

Model Clearinghouse Activities

- Region 6 – Modeling Procedures for $PM_{2.5}$ Compliance Demo.
  (Record No: 10-VI-01)
  - Combining the 98th percentile monitored value with the 98th percentile modeled concentrations for a cumulative impact assessment would result in a value that is below the 98th percentile of the combined cumulative distribution and would not have been protective of the NAAQS.
  - In our response, we recommended the use of the average of the 1st highest modeled 24-hour impacts over 5 years as the modeled contribution to the cumulative NAAQS compliance analysis.

    It should be noted that the use of a 3-year average for monitored design values to determine attainment of the NAAQS does not preempt the Appendix W requirement for use of 5-years of NWS data, and the 5-year average of modeled impacts serves as an unbiased estimate of the 3-year average for purposes of modeling demonstrations of compliance with the NAAQS.

Model Clearinghouse Activities

- Region 10 – AERMOD-COARE Application
  (Record No: 11-X-01)
  - Regional Office was seeking concurrence with their approval of AERMOD -COARE as an alternative model. *(Section 3.2.2.a – Appendix W to 40 CFR51)*
  - Application of AERMOD in specific parts of the Arctic Ocean (Beaufort and Chukchi Seas) to account for influences of overwater transport on plume dispersion from offshore operations by Shell Oil Company.
  - Coupled Ocean-Atmospheric Response Experiment (COARE) bulk flux algorithm replaced AERMET.
  - We concurred with Region 10 on the use of AERMOD-COARE in the Beaufort and Chukchi Seas on May 6, 2011.
  - This is not a generic approval of AERMOD-COARE but can serve as a good basis for additional application with the appropriate level of coordination and documentation with the Regional Office.

Model Clearinghouse Activities

- Region 7 – Fluid Modeling Derived EBDs & AERMOD
  (Record No: 11-VII-01)
  - Requested review and concurrence with concerns of the use of a wind tunnel fluid modeling study to develop "equivalent building dimension" (EBD) parameters to replace building parameters generated by BPIPPRM for use in AERMOD specific to the Alcoa Davenport Works facility.
  - On October 24, 2011, we responded with concurrence on the Regional Office's determinations:

    1) Insufficient technical justification had been provided to support the use of the EBD parameters determined in the wind tunnel study.

    2) There were significant flaws with the design of the wind tunnel study for this facility through the inclusion of additional roughness elements to simulate the surface roughness of the actual facility along with the EBD structure for the tests intended to demonstrate that the downwash effect of the EBD structure was "equivalent" to the downwash effect of the actual facility. These surface roughness elements were larger than the EBD structure in some cases.

Model Clearinghouse Activities

- Region 7 – Fluid Modeling Derived EBDs & AERMOD
  (Record No: 11-VII-01)
  - We also agreed with the Regional Office that additional technical challenges with the approach to determine alternative building parameters had been introduced with the promulgation of the AERMOD model, with PRIME downwash algorithms, replacing ISCST3 as the preferred near-field dispersion model.
  - Through this MC action, we also suspended until further notice all past EPA guidance related to determining EBDs through wind tunnel modeling to allow for a reassessment of past guidance and practices with respect to application with the AERMOD model.

    Please note that this should not be taken to imply that all such studies will be summarily rejected until the process of reassessing the guidance has been completed, but rather to indicate that any EBD studies being considered should be discussed with the appropriate reviewing authority as early in the process as possible.

Model Clearinghouse Information Storage and Retrieval System (MCHISRS)

- Searchable online database of Model Clearinghouse actions, requests, and responses.
- On-going effort to update MCHISRS to include original *(or as near original as possible)* signed copies of all formal material:
  - 1445 total records (formal & informal).
  - 267 formal records.
  - 147 formal records still need original form of documentation.
- MCHISRS Updates:
  - Case InSeNsitiVE search capability was added in 2011.

Model Clearinghouse

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

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