

# Developing and Reviewing a Modeling Protocol

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# Goals for Interactive Session I

- Clarify the modeling protocol development and review process for NAAQS, Increment, and PSD Class I AQRV analyses, including a clear definition of roles and responsibilities of all parties.
- Discuss the proper procedures for communication and documentation of the process.
  - Between applicant and reviewing authority
  - Between reviewing authority, EPA RO, and OAQPS Model Clearinghouse

# What is a Protocol?

*The Merriam-Webster dictionary defines a protocol as ...*

- 2 a : a preliminary memorandum often formulated and signed by diplomatic negotiators as a basis for a final convention or treaty b : the records or minutes of a diplomatic conference or congress that show officially the agreements arrived at by the negotiators
- 3 a : a code prescribing strict adherence to correct etiquette and precedence (as in diplomatic exchange and in the military services) <a breach of protocol> b : a set of conventions governing the treatment and especially the formatting of data in an electronic communications system <network protocols> c : convention 3a,b
- 4 : a detailed plan of a scientific or medical experiment, treatment, or procedure

# What a Protocol is Not...

- The protocol is NOT a living document once all parties have agreed to the protocol.
  - It is intended to outline mutually agreeable procedures on how the air quality modeling analysis will be conducted and should constitute a binding agreement among all parties involved in the modeling process.
- The protocol is NOT an after the fact document which describes how the modeling has already been conducted for the permit action.

# Protocol Process

- Pre-Application Meeting
- Protocol Development
- Protocol Review
- Protocol Acceptance
- Final Modeling Review

# The Pre-Application Meeting

- The purpose of the meeting is to establish open communication between applicants and the relevant reviewing authority. This facilitates the submittal of a complete and accurate application and minimizes the time it takes the reviewing authority to prepare a permit for public notice.
  - In most cases, reviewing authority will be the state or local air quality agency.
  - Recommend inclusion of modeling and permitting staff from EPA Regional Office to help identify regulatory and modeling issues early in process. Especially important due to promulgation of new national ambient air quality standards.

# What Should the Pre-Application Address?

- Application forms – Which forms are necessary, format of application materials, number of copies required
- Clarify the permitting process for company and public, discuss project schedule and permit timeline
- Location of the new or modified facility
- Discuss control technologies that are anticipated (preliminary Best Available Control Technology (BACT) analysis)
- Local air quality concerns (ambient air quality, PSD increment, nearby sources)
- Pre-construction monitoring and dispersion modeling (modeling protocol)
- Anticipated controls and emission rates
- Applicability of federal and state rules/standards (i.e. MACT, NSPS)
- Modeling Protocol (not applicable if modeling is not required)
- Applicant's plan to address pre-construction monitoring (One year of pre-construction monitoring may be required if existing air quality data does not exist or is not representative.)

# Elements of the Protocol

- Project Description
- Model Selection Discussion and Rationale
- Model Control Option Selection
- Model Emission Inventory
- Background Monitoring Data
- Downwash Characterization
- Receptor Selection
- Meteorological Data
- Post Processing of Modeling Results
- Documentation of Results
- Special Modeling Considerations

# Project Description

- Description of the project
  - Industry type and generic process description
  - Location
  - Emission sources
  - Control Technologies

# Model Selection

- Documentation/justification for alternative model, if proposed
- Model control options selection
  - Urban/rural
  - Downwash/No-downwash
  - Terrain effects
  - Averaging periods
  - Deposition
  - Chemistry

# Emission Inventory

- Documentation of emission quantification procedures, including control efficiencies
- Nearby background sources, to be explicitly modeled
- Detailed source characterization for all modeled sources

# Monitored Background Data

- Site selection/representativeness
- Data handling procedures
  - Missing data
  - Exclusion of data

# Meteorological Data

- Description of available surface and upper air data, including data completeness assessment
- Documentation of representativeness of proposed data (surface and upper air)
- Data processing procedures

# Post Processing of Model Results

- How must modeling results be extracted and averaged for NAAQS and increment?
- How must one conduct the significant impact analysis?
- How must one combine the modeled results with the background data to calculate the total air quality concentration to compare to the NAAQS?

# Special Modeling Considerations

- Special Issues Typically Not Encountered
  - Use of alternative models
  - Use of unconventional meteorological data sources (non-NWS, prognostic, etc.)
  - Complex Terrain (Intermediate Terrain Policy)
  - Increment expansion and chemical conversion (NO<sub>2</sub>)

# Description of Final Modeling Documentation

- Summary of results/comparison to relevant standards
  - Tabular/graphical reporting of results
  - Provision of model input/output files
    - Model control files
    - Building downwash input and output files
    - Meteorological data
      - » Raw and processed data
      - » Control files for meteorological processing, including surface characteristics data processing
    - Model output files, including any post-processing files

# Review of the Modeling Protocol

- The review of the modeling protocol is the formal process of reviewing the protocol to determine if the procedures outlined are acceptable to all parties involved in the modeling process.
- Once all parties formally agree to the protocol, it constitutes a binding agreement on how modeling will be conducted for this permit action. No party should deviate from the agreed upon approach unless there is sufficient regulatory justification and all parties agree to proposed modifications.

# Protocol Checklist

- The reviewing authority and the EPA Regional Office should adopt a checklist which identifies the necessary elements of the modeling protocol to more easily track the necessary elements of the protocol.
- Once each of the participating agencies has reviewed the protocol and concurs with the outlined procedures, a formal approval letter should be sent from the reviewing authority to the applicant documenting approval and reiterating binding nature of protocol agreement.

# Role of the EPA Model Clearinghouse

- Appendix W, 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.”
- The Clearinghouse provides technical and/or policy guidance on **specific issues** to promote a sound scientific basis and national consistency in regulatory modeling decisions.

# Role of the EPA Regional Office

- EPA Regional Office provides oversight of PSD permitting and modeling activities to delegated and SIP approved PSD programs.
- EPA Regional Office is the initial point of contact for state and local air quality agencies regarding regulatory modeling issues.
- The EPA Regional Office retains ultimate modeling authority under regulations (Appendix W, 40 CFR 51, Section 3.2.2(a)) - determination of acceptability of a model is a Regional Office responsibility.

# Role of OAQPS Modeling Staff

- Development of models and tools used for air quality impact analyses required under PSD/NSR program.
- Development of national regulations for modeling under PSD/NSR program.
- Development of implementing guidance in conjunction with OAQPS Air Quality Policy Division.
- Provision of technical support for OAR actions (NAAQS development, designations, etc.).

# Role of the Model Clearinghouse

- Provides national consistency in regulatory decisions
  - 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.”
- Timely interpretation of guidance (as issues arise)
- Minimizes bad precedents:
  - Get in early on issues
  - Memoranda provide essential support to regions, states and locals
- Guidance development through consensus building

# Formal Communication Process

- State contacts Region
- Region writes memo to 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)
  - Present summary at annual Regional/State/Local workshop
  - Write annual report
- OAQPS develops guidance as appropriate: Policy memo, EPA Report, Rule Making

# Important Items to Note

- The Model Clearinghouse does not review and approve modeling protocols
- The Model Clearinghouse does not review the technical adequacy of air quality analyses for PSD/NSR, this is a reviewing authority and EPA Regional Office responsibility.
- Conversation with OAQPS modeling staff does not constitute communication with Model Clearinghouse.
  - The Clearinghouse is a formal policy apparatus of the EPA.
  - Opinions of individuals of the OAQPS modeling staff do not necessarily represent the official policy of the EPA.
  - Do we need “structured” informal process?

# Group 1

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Mustafa	Sufi	New Mexico
Becker	Dennis	Minnesota
Sims	Joe	Alabama
Fleck	Andrew	Pennsylvania
Nall	Josh	Wyoming
Franzmann	Axel	NWCAA
Lacke	Matt	Jefferson County
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Mao	Feng	Arizona
Good	Gail	Wisconsin
Bacon	Leigh	Alabama
Woodman	Michael	Maryland
Cain	Cyra	Montana
Dewitt	Billy	Louisville
Majano	Rosano	Georgia
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Orth	Tom	Utah
Courtney	Pete	Georgia
Luther	Martin	Kentucky
Daugherty	Anthony	Linn County
Jung	Doris	Colorado
McGehee	Yvette	Louisiana
Menendez	Daniel	Texas
Dunn	Patrick	Alaska
Ferguson	Bruce	Mississippi
Lazarev	Svetlana	Oregon
Maranche	Jason	Allegheny County
Olsen	Kristen	Virginia

# Protocol Notes

- Models:
- Sources:
- Source Characterization:

# Protocol Notes

- Meteorological Data:
- Inventories (NAAQS & Increment):
- Receptors:

# Protocol Notes

- Additional Items to Consider: