Appendix W Refresher: Clarification Memoranda

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Outline

- Role of Clarification Memoranda
- Clarification Memo Process
- Appendix W References to “Clarification” and “Consistency”
- Issued Clarification Memos
- Pending/Potential Issues for Clarification Memos

Role of Clarification Memos

- Clarification memos address issues that may arise with broad implications, i.e., not focused on specific permit modeling applications, which should be addressed through Model Clearinghouse process
- Serve as reminders/clarifications in response to new issues that may arise or concerns that Appendix W not being adequately followed
- Intended to foster consistency in the application of Appendix W guidance

Clarification Memo Process

- Issues may arise through ongoing OAQPS assessments or through regular interaction with EPA Regional Office modeling contacts
- OAQPS internal review of memos through Air Quality Assessment Division (AQAD) Director and, as needed, through Air Quality Policy Division (AQPD) and Office of General Council (OGC)
- Memos also reviewed by EPA Regional Office modeling contacts
- Memos issued to EPA Regional Offices through modeling contacts or ADD's as appropriate, with distribution based on scope or focus of memo

Clarification Memo Process

- Finalized memos distributed to community through SCRAM website, identified under “Recent Additions”
- Clarification memos archived on separate SCRAM webpage, with link from “Permit Modeling Guidance” page

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Permit Modeling Guidance

This section provides recommendations on modeling techniques and guidance for estimating pollutant concentrations in order to assess control strategies and determine emission limits. These recommendations were originally published in April 1978 as the "Guideline on Air Quality Models" and were incorporated by reference in the regulations for the Prevention of Significant Deterioration of Air Quality, Title 40, Code of Federal Regulations (CFR) sections 51.166 and 52.21 in June 1978 [Federal Register, 43 (118), 26 382-26 388]. The purpose of these guidelines is to promote consistency in the use of modeling within the air quality management process. These guidelines are periodically revised to ensure that new model developments or expanded regulatory requirements are incorporated. This section provides guidance associated with permit modeling and is divided into three components: Appendix W Guidance, Screening Guidance, and Other Permit Modeling Guidance.

Appendix W Guidance

Appendix W (803KB,pdf) - 40 CFR Part 51 Appendix W (November 2005)

Preferred/Recommended Models listed in Appendix W - a list of preferred and recommended models as provided in Appendix W.

Use of Alternative Models - A list of dispersion models for use on a case-by-case basis with approval by reviewing authority.

Example Air Quality Analysis Checklist - An example checklist as it formerly appeared as Appendix C of the "Guideline on Air Quality Models" as explained in the Explanatory Note.

Clarification Memos - Provides access to memoranda issued by EPA as clarifications of Appendix W and technical aspects of dispersion modeling in general.

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Clarification Memos

Provides access to memoranda issued by EPA as general clarifications for issues related to Appendix W and technical aspects of dispersion models, when necessary.

Clarification on Regulatory Status of Proprietary Versions of AERMOD (12-11-2007)

Clarification on Regulatory Status of Calpuff for Nearfield Applications (8-14-2008)

Questions concerning the memos should be directed to Tyler Fox, Group Leader, Air Quality Modeling Group, at fox.tyler@epa.gov.

Appendix W on Clarification

- Appendix W includes the following references to the need for consistency and clarification:
  - “Industry and control agencies have long expressed a need for **consistency** in the application of air quality models for regulatory purposes.” [Preface, paragraph (a)]
  - “Historically, three primary activities have provided direct input to revisions of the *Guideline*. The first is a series of annual EPA workshops conducted for the purpose of **ensuring consistency** and **providing clarification** in the application of models.” [Preface, paragraph (b)]

Appendix W on Clarification

- Appendix W references (cont.):
  - "From time to time situations arise requiring **clarification of the intent of the guidance** on a specific topic. Periodic workshops are held with the headquarters, Regional Office, State, and local agency modeling representatives to **ensure consistency** in modeling guidance and to promote the use of more accurate air quality models and data bases. The workshops serve to provide further explanations of Guideline requirements to the Regional Offices and workshop reports are issued with this **clarifying information**." [Paragraph 1.0(f)]
  - "The model that most accurately estimates concentrations in the area of interest is always sought. However, it is clear from the needs expressed by the States and EPA Regional Offices, by many industries and trade associations, and also by the deliberations of Congress, that **consistency in the selection and application of models** and data bases should also be sought, even in case-by-case analyses. **Consistency ensures** that air quality control agencies and the general public have a common basis for estimating pollutant concentrations, assessing control strategies and specifying emission limits." [Paragraph 1.0(f)]

Issued Clarification Memos

- Regulatory status of proprietary versions of AERMOD – December 12, 2007
  - Motivated in response to frequent questions regarding “parallelized” versions of AERMOD
- Regulatory status of CALPUFF for near-field applications – August 14, 2008
  - Motivated by concerns that Appendix W guidance not being followed, and technical issues and concerns

CALPUFF Near-field Clarification

- EPA-preferred model for near-field regulatory applications is AERMOD
- CALPUFF may be considered on a case-by-case basis as an alternative model for near-field applications involving complex winds
  - Subject to approval by reviewing authority
  - Subject to requirements in paragraph 3.2.2(e) of Appendix W, when there is no preferred model
- Staff memorandum regarding technical issues related to CALPUFF near-field applications posted on SCRAM on Sept. 26, 2008

Pending/Potential Issues for Clarification Memos

- Use of ASOS vs. observer-based National Weather Service (NWS) data and treatment of missing NWS data in AERMOD
- Implementation of EPA formula for Good Engineering Practice (GEP) stack height in AERMOD (with PRIME downwash)

Pending Clarification Memo – NWS Met Data Issues in AERMOD

- AERMOD requirements for data completeness differ from ISCST3, which required 100% completeness under regulatory default option
- AERMOD sensitivity to ASOS vs. observer-based data has been assessed; generally less of an issue with AERMOD than ISCST3 (AERMOD ASOS study documentation to be provided)
- Missing NWS data more extensive with advent of ASOS and METAR, with data gaps biased toward low wind speeds, raising concerns regarding representativeness for some applications
- Potential use of 1-minute ASOS data to supplement standard NCDC archived data with hourly averaged winds; could significantly reduce number of calm and missing hours

Pending Clarification Memo – GEP Formula Height in AERMOD

- AERMOD currently turns off building downwash effects if stack height is greater than or equal to EPA formula for GEP stack height, H_{gep}:
  - $H_{gep} = H_b + 1.5L$, where

    H_b = building height above stack base

    L = lesser of building height and projected width
- AERMOD implementation is consistent with all previous versions of AERMOD and ISC
- Significant discontinuities in AERMOD impacts have been noted for stacks that straddle the GEP formula height; orders of magnitude in some cases

Pending Clarification Memo – GEP Formula Height in AERMOD

- Comments at 7th Modeling Conference in 2000 recommended that EPA consider changing ISC-PRIME to eliminate discontinuity at GEP height
- EPA response was that current implementation is a requirement imposed by GEP Stack Height Regulations in Section 123 of CAA
- Magnitude of discontinuities found in some cases has prompted reexamination of this position
- Current assessment is that AERMOD should be modified to remove this criterion for turning off downwash influences

Pending Clarification Memo – GEP Formula Height in AERMOD

- GEP Stack Height regulations define GEP stack height as the <u>greater</u> of:
  - 65 meters (de minimis GEP height);
  - EPA formula height; or
  - height determined by field study or fluid modeling demonstration
- Based on the definition, EPA formula height does not apply below 65 meters
- Discontinuities are primarily a concern for shorter stacks, usually with squat buildings

Pending Clarification Memo – GEP Formula Height in AERMOD

- Pre-PRIME downwash algorithms defined vertical extent of wake influence generally consistent with EPA formula height, resulting in little, if any, discontinuity
- Vertical extent of wake influence in PRIME formulation can extend well above the EPA formula height
- Wind tunnel studies clearly support wake influences above EPA formula height for some stack/building geometries

Questions?