



AERMOD Improvements Overview

White Papers/Alpha and Beta Options

EPA RSL Workshop

U.S. EPA / OAQPS / Air Quality Modeling Group

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Procedure for AERMOD Improvements

EPA's established process for engagement with the AERMOD user community when formulation changes are suggested:

1. Discussion between EPA Model Development Team and community member
2. If there is a technical/scientific basis, EPA requests a white paper
 - Document should include relevant field data, modeling files, current literature, and any other key technical information
3. EPA and community member undergo an iterative process to produce a final white paper
4. Enhancement is added to AERMOD based on EPA's development priorities
 - Option added as an ALPHA or some cases BETA option

For more information on AERMOD development efforts and white papers:
<https://www.epa.gov/scram/aermod-modeling-system-development>

White Paper Standard Format:

- **Overview of issue** – provides description of the known issue in AERMOD that needs to be addressed
- **Current implementation in AERMOD** – a summary of the model formulation in AERMOD or other preferred models
- **Summary of current literature or research** – a synopsis of current literature including pertinent field study data
- **Considerations for updates to the model system** – summarize how the available information could be applied and implemented in the modeling system



AERMOD White Paper Topics

EPA continues to rely upon our series of "White Papers" that identify our priority areas of science updates to the AERMOD Modeling System:

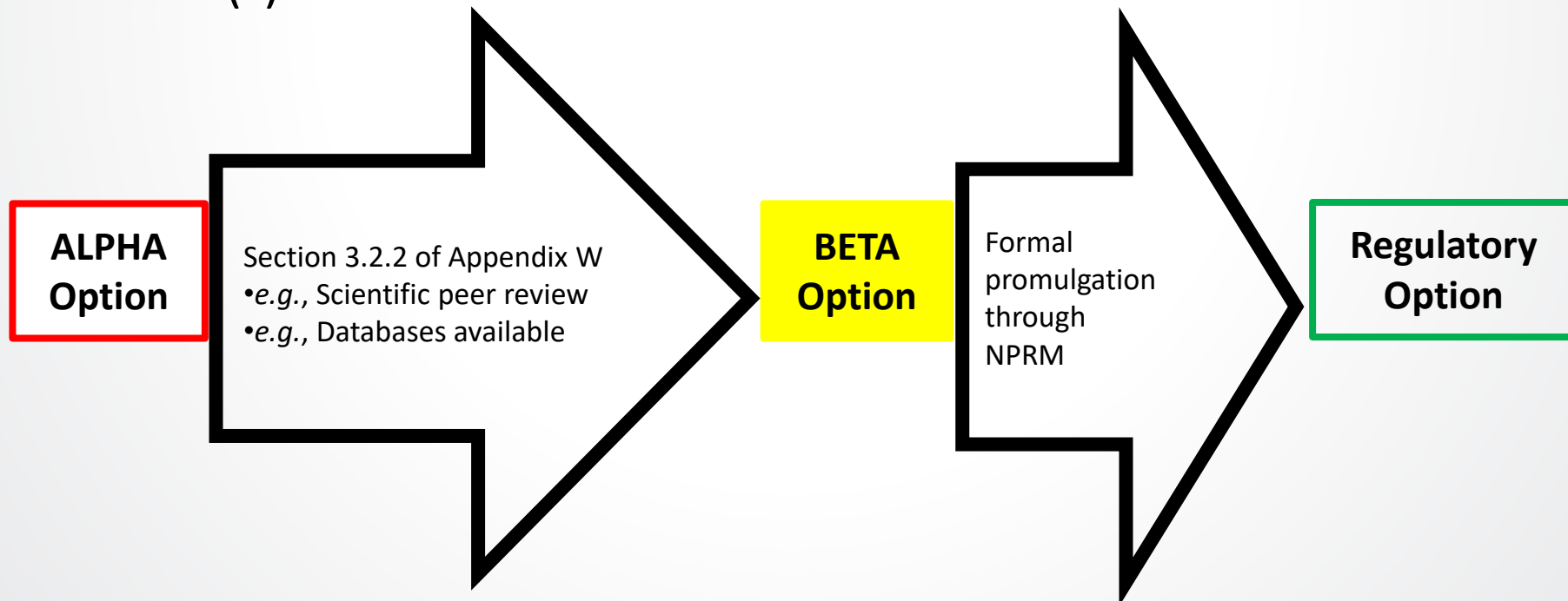
- **Building Downwash Algorithms** – *improved treatment of building downwash effects*
- **Overwater Modeling** – *replacement of OCD with AERMOD*
- **NO₂ Modeling Techniques** – *more accurate estimates of NO₂ concentrations due to NO₂ conversion*
- **Low Wind Options** – *improve model predictions under low wind conditions*
- **Mobile Source Modeling** – *improved estimate of roadway impacts – treat dispersion from barriers*
- **Saturated Plumes** – *improved treatment of plume rise of moist/saturated plumes*



AERMOD Improvement Priorities

- Plan to incorporate into a proposed regulatory update of the *Guideline* and AERMOD within next two years
- Success depends upon interactions (communication, coordination, and collaboration) with the stakeholder community to move these updates forward
- Additional areas of research and development
 - Other aspects of plume rise – *Buoyant Line and Point Source (BLP) and buoyancy applied to additional source types (area & volume)*
 - Deposition – *white paper to come*
 - URBAN Option – *for BUOYLINE, RLINE, and RLINEXT*
 - AERSURFACE – *white paper topic received by EPA for consideration*

- ALPHA options – “experimental”, i.e., developmental options not available for regulatory use; added in AERMOD version 18081
- BETA options – Peer-reviewed options that are potentially ready for consideration as alternative model(s)





Current Alpha and Beta Options

• New ALPHA options in AERMOD v.21112

- *AWMA Downwash (AWMAUTURBHX, AWMAENTRAIN)*
- *NO₂ Conversion Methods (GRSM, TTRM)*
- *Low Wind (SWMin, BigT)*
- *RLINEXT (RBARRIER)*

• Additional ALPHA options

- *ORD Downwash*
- *RLINEXT – RDEPRESS*
- *PSDCREDIT*
- *METHOD_2 particle deposition*
- *URBAN when combined with RLINE, RLINEXT, BUOYLINE*
- *Gas deposition*

RLINE is the only current BETA option in AERMOD v.21112