

AERMOD Updates: Refinements and Challenges

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Missouri Air Compliance Seminar

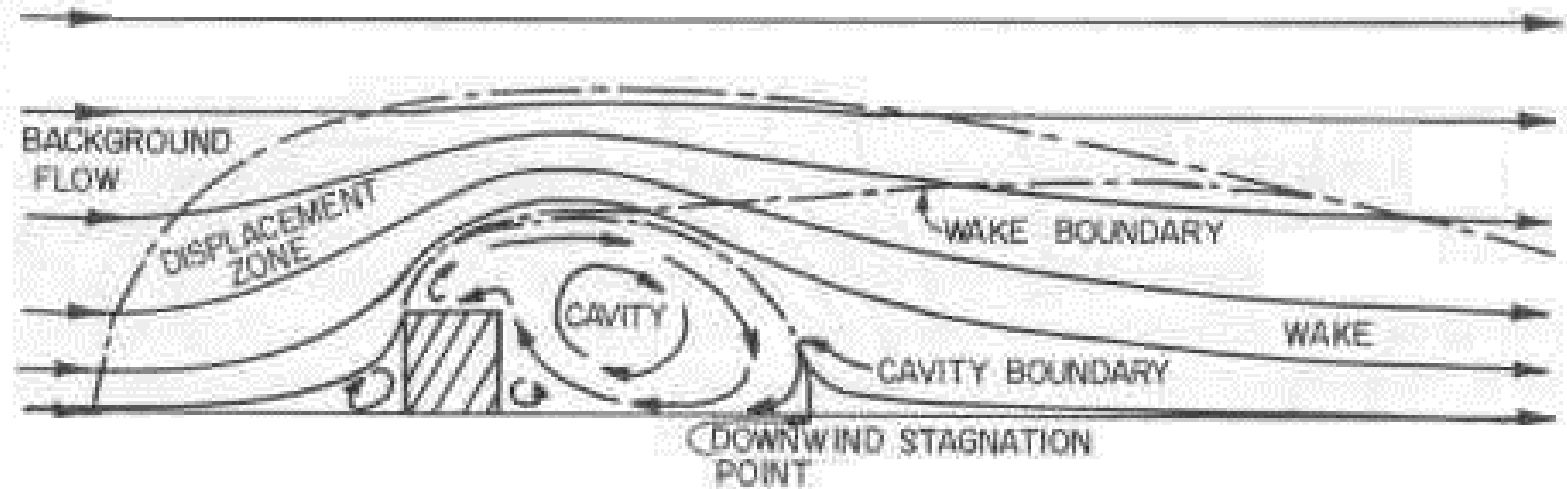
November 4, 2020

Presentation Summary

- AERMOD “changes”
 - v19191
 - Planned – white papers
- Air modeling policy changes
- Other on-going challenges with modeling
 - Tightening of air quality standards
 - Conservative estimates of PM_{2.5} primary emissions
 - Ozone and PM_{2.5} secondary formation analysis conservatism

Air quality modeling

- Predicting where pollutants go...



- George E.P. Box – 1987
 - *Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful.**
 - *Essentially, all models are wrong, but some are useful.*

* Midwest Environmental Compliance Conference – December 1-2, 2020

AERMOD History

- AERMOD was first proposed as EPA's regulatory default air quality model in 2000 after nearly 10 years of development -- approved in 2005
- 15 official versions subsequently provided
 - 06341, 07026, 09292, 11059, 11103, 11353, 12060, 12345, 13350, 14134, 15181, 16216, 18081, 19191
- v19191 included bug fixes and some refinements that were characterized as "Alpha" and "Beta" options
 - No regulatory formulation updates

Planned
AERMOD
changes

In early 2017, EPA proposed developing a plan for updating AERMOD that:

“documents the EPA’s best practices for model development, and outlines a path for future development to maximize transparency and feedback from the stakeholder community.”

<https://www.epa.gov/scram/aermod-modeling-system-development>

AERMOD Modeling System Development and Update Plan (To be released as soon as possible)



White papers

- The current iteration of the unpublished plan contains white papers provided by the modeling community that look to solve:
 - Overestimation of building downwash impacts on predicted concentrations
 - Low wind speed case over-prediction
 - Other technical difficulties

Déjà vu – all over again.

EPA policy changes that have made a difference in modeling analyses

- Revised policy on exclusions from “Ambient Air”
December 2, 2019
 - Allows for other methods to preclude public access beyond fencing or physical barriers
 - Signs, routine security patrols, video surveillance (cameras), and use of drones/advanced video surveillance were highlighted



EPA policy changes that have made a difference in modeling analyses

- Additional Methods, Determinations, and Analyses to Modify Air Quality Data Beyond Exceptional Events – April 4, 2019



- Exclusion of high concentration days from wildfires have helped several clients to lower background monitored concentrations

On-going challenges

- Lowering air quality standards puts more pressure on pre-construction modeling
 - PM_{2.5} Annual NAAQS
 - 15 µg/m³ → 12 µg/m³ → maybe 9-10 µg/m³
- Conservative estimates of PM_{2.5} primary emissions continue to make it difficult to pass air quality analysis
 - Some states have stopped doing air quality analysis for primary PM_{2.5} altogether – except for PSD
 - Some states are using facility specific ambient monitoring when “problems” are identified

On-going challenges

- Ozone and PM_{2.5} secondary formation analysis has not been identified by EPA or state regulatory agencies as an issue
 - No specific photochemical modeling required
- Numerous projects have gone through the PSD permit screening analysis
 - Modeled Emission Rates for Precursors - MERPs
- Projects were re-considered due to inability to “screen out”
 - EPA continues to add VOC and NOx screening results together



Summary

- AERMOD continues to change at a slow pace, but EPA does have a process to make technical improvements
- Recent air modeling policy changes have provided less conservative outcomes
- On-going challenges
 - Tightening of air quality standards???
 - Air modeling is wrong, but is still required
 - Conservative(!) and representative(?) to support permits and SIPs
- Quickest option is still to avoid air quality analysis

Questions

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