Single Source Modeling for Ozone and $PM_{2.5}$

Single-Source Modeling of Ozone and $PM_{2.5}$ - Overview

- This modeling issue is very challenging, and we recognize EPA's hard work to date in the proposal package.
- The proposed approach, while having merit and being a good start, is preliminary and needs more development before becoming part of this rulemaking.
- Currently, there is no clear modeling approach, which is a significant departure from the very specific default options specified by EPA for AERMOD and CALPUFF modeling.
- Has EPA considered the interaction of secondary formation and Class I increments?

3-Tiered Approach

1. Qualitative waiver of modeling requirement if new emissions are less than “Model Emissions Rates for Precursors” (MERP), which is not available.
2. The next tier is a screening approach based upon relationships between emissions and impacts, maybe “reduced-form” models. This tier is proposed to “be appropriate for most permit applicants”. How does EPA know that?
3. The final tier is use of a “more sophisticated case-specific photochemical modeling analysis”, necessary only in “special situations”.

Recommendations for the 3-Tier Approach

- The MERPs need to be specified through proposal and public comment (future rulemaking). This will help the user community to understand what this tier covers.
- The IWAQM-3 near-field document states: "*At this time, it is not clear that a robust reduced-form model exists for either O_3 or secondary $PM_{2.5}$ for the purposes of assessing single source downwind impacts of these pollutants*".
- The second tier's "workhorse" modeling approaches need to be further defined in future rulemaking.

Advanced Lagrangian and Eulerian Models

- More specifics are needed on the application of Eulerian photochemical grid models (PGMs) or advanced Lagrangian models in future rulemaking.
- "Single-source secondary impacts are…usually highest in proximity to the source".
- The cited evaluation studies are few in number and generally do not have data within, say, 10 km of the source, where peak primary $PM_{2.5}$ impacts occur.
- A focus on near-field evaluations would be helpful.

Near-Field Plume Dynamics

- If peak impacts occur near the source, careful attention needs to be paid to modeling near-source impacts and plume-in-grid treatment.
- Plume rise and source-related effects are important.
- Lagrangian models avoid this problem, so such models should be seriously considered for ozone and secondary $PM_{2.5}$ modeling.

Relative vs. Absolute Predictions for PGMs

- EPA recommends that the “absolute” PGM predictions should be compared to SILs. How can the public evaluate this Guideline without the SILs?
- In many PGM applications, a “relative reduction factor” is applied to minimize model uncertainty and to cancel model bias errors, but that is currently not recommended in the Guideline.
- The fact that the emissions are well known does not cancel the model biases due to unknown meteorology and model formulation biases which should be correctable.

Who Will Determine How to Run the Advanced Models?

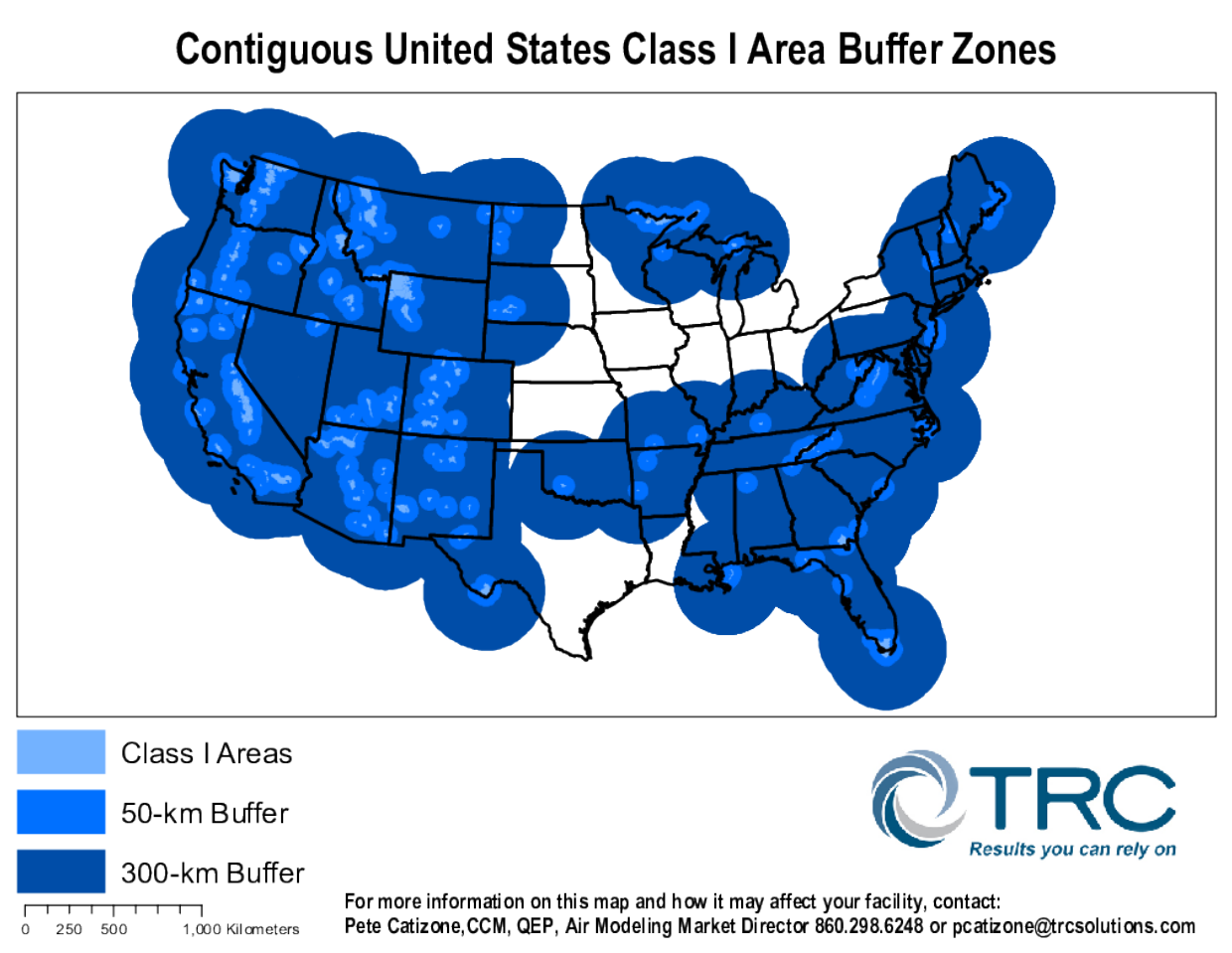
- The widespread use of the top modeling tier may be because the scope of the tiers is not yet clearly defined.
- Model users need more specification of which top tier model and which technical options should be used.
- What group of experts is available to determine how to run the designated model?
- Will regional modeling platforms including existing source data bases be set up and designated for use? If so, this process will need to be planned carefully.

Independent Peer Review is Recommended

- Promulgation of previous major Guideline model changes were preceded by an independent peer review.
- These important modeling development changes warrant the same level of peer review, which would be subjected to public review and comment.
- This process can be conducted in association with a future rulemaking.
- Additional evaluation databases should also be used in the review.
- This 3 tier approach is not ready for the Guideline.

Long Range Transport Models: CALPUFF & Others

Prevalence of Class I Issues



Comments on CALPUFF

- CALPUFF was recommended by IWAQM II in 1998, used then for LRT modeling, and adopted by EPA as a guideline model in 2003.
- EPA proposes to not have an Long Range Transport (LRT) guideline model.
- Reasons for this are appear to be more focused upon CALPUFF management than CALPUFF performance.
- However, we are hopeful that the management of CALPUFF can be worked out with EPA.

Comments on CALPUFF

- CALPUFF is used widely throughout the world, and the USA should continue to use it.
- Limited chemistry in the approved version 5.8. Version 6.42 has improved aerosol thermodynamics and aqueous-phase chemistry which should be considered by EPA.
- States and the user community are familiar with CALPUFF, and its use could be retained at least as an “advanced screening model”.
  - Use of CALPUFF in this capacity will also formally support the recommendations in the FLAG 2010 FLM guidance and use for BART regional haze implementation plans

Comments on CALPUFF

- Running CALPUFF is likely much easier than running PGMs for single sources, saving applicants and States time and money.
- We need an advanced screening model for stringent Class I SILs and recommend that EPA retain use of CALPUFF.
- Failing that, if the nearest Class I area is well beyond 50 km, but less than 300 km – could AERMOD be run beyond 50 km as a screening model?
- Could the FLAG 2010 Q/d<10 waiver for modeling of AQRVs also be applied to PSD increment for each pollutant?

Conclusion

- The AWMA would welcome the opportunity to work with EPA on resolving any of the issues addressed.
- Details and discussion of our comments will be submitted to the docket to supplement our presentations.
- AWMA appreciates the opportunity and EPA's effort to accomodate our request to present these comments.

Thank you