

Long Range Transport Assessments for NAAQS and PSD Increment

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Background

- The 2003 Guideline recommended CALPUFF as the preferred model for long-range transport (i.e., source receptor distances of 50 km to several hundred km) for primary criteria pollutants.
 - Largely applied to address PSD increment.
- CALPUFF also considered on case-by-case basis as an alternative model subject to approval under Section 3.2 for near-field applications where complex winds or terrain warranted use of a puff model.



Long-Range Transport Assessments: Section 4

- EPA is proposing to remove CALPUFF as a preferred model for long-range transport and recommending its use as a screening technique along with other Lagrangian models for addressing PSD increment beyond 50 km from a new or modifying source.
- For NAAQS demonstrations: Near-field modeling is sufficient to address whether a source will cause or contribute to a NAAQS violation so EPA does not consider a LRT assessment beyond 50 km necessary for inert pollutants.
 - CALPUFF or other Lagrangian models still available for use in near-field as an alternative model subject to approval under Section 3.2



Screening Approach for PSD Increment: Section 4

- EPA recognizes that LRT assessments may be necessary in limited situations for PSD increment so recommending screening approach.
- First step: Based on near-field application of appropriate model, determine significance of ambient impact at or about 50 km from new/modifying source.
- Second step: In consultation with EPA Regional Office, determine appropriate screening approach using CALPUFF or other Lagrangian model to determine significance of impacts at specific Class I areas of concern.
- For very limited situations where a cumulative impact assessment is necessary, then selection and use of an alternative model by applicant with appropriate approval under Section 3.2.2(e)



Addressing secondary pollutant impacts: Section 5

- Provides flexibility to the user community in estimating single-source secondary pollutant impacts with more appropriate modeling techniques, such as photochemical models, that address science issues of models like CALPUFF (see next slide).
- Based on IWAQM Phase 3 reports & published literature, EPA has placed emphasis on using chemical transport models or techniques that reflect state of science atmospheric chemistry.
- Preamble discusses future considerations for visibility modeling with full chemistry photochemical models in regulatory applications consistent with proposed changes for O₃ and secondary PM_{2.5}.



CALPUFF Modeling System has Several Limitations and Issues (USEPA, 2009)

- Chemical conversion algorithm in the regulatory versions is almost three decades old and inconsistent with our current knowledge on secondary PM_{2.5} formation chemistry
- Recent chemistry algorithm updates still do not contain photochemical reactions, which are important to simulate secondary PM formation
- CALPUFF does not estimate ozone formation from single emissions sources
- CALPUFF sensitivity modeling using alternative CALMET meteorological inputs found wide variations₆ in model estimates.



EPA Concerns about Management & Maintenance of CALPUFF

- Interactions between EPA and the model developer have been complicated by the changes in ownership and the related uncertainties of the development process as evident during the update to the VISTAS version of CALPUFF (summarized by EPA presentations at the 9th Modeling Conference).
- There have been a number of updates to the CALPUFF modeling system both in the EPA approved series 5 versions and in the model developer's series 6 versions with a lag in the ability for EPA to adequately understand, review and approve changes largely due to the lack of an open development process.
- EPA believes that regulatory application of this modeling system has been unduly complicated by these changes in ownership and the related uncertainties of the development process for this modeling system.



Regional Haze Program

- In 2005, EPA issued guidelines for implementing BART requirements under Regional Haze Rule and recommended the use of CALPUFF for single-source assessments despite the lack of full evaluation for secondary pollutant formation.
- States could use alternative approaches, including photochemical model, if done in consultation with EPA Regional Office.
- Proposed changes do not affect the EPA's recommendation in the 2005 BART Guidelines to use CALPUFF in the BART determination process.



Summary

- EPA is proposing to remove CALPUFF as a preferred model for long-range transport and recommending its use as a screening technique along with other Lagrangian models for addressing PSD increment beyond 50 km from a new or modifying source.
- For NAAQS demonstrations, EPA does not consider a LRT assessment necessary beyond 50 km for inert pollutants.
- No change in ability to use CALPUFF in the near-field as an alternative model if appropriately approved under Section 3.2.
- Flexibility to the user community in estimating single-source secondary pollutant impacts with emphasis on chemical transport models that include Lagrangian puff models and Eulerian grid (e.g. photochemical transport) models.