

to apportion sources of ozone precursors (e.g., VOC) in urban domains. EPA has issued guidance⁴¹ in selecting appropriate techniques.

c. *Estimating the Impact of Individual Sources.* Choice of methods used to assess the impact of an individual source depends on the nature of the source and its emissions. Thus, model users should consult with the Regional Office to determine the most suitable approach on a case-by-case basis (subsection 3.2.2).

6.2.2 Models for Particulate Matter

6.2.2.1 PM-2.5

a. *Choice of Models for Multi-source Applications.* Simulation of phenomena resulting in high ambient PM-2.5 can be a multi-faceted and complex problem resulting from PM-2.5's existence as an aerosol mixture. Treating secondary components of PM-2.5, such as sulfates and nitrates, can be a highly complex and resource-intensive exercise. Control agencies with jurisdiction over areas with secondary PM-2.5 problems are encouraged to use models which integrate chemical and physical processes important in the formation, decay and transport of these species (e.g., Models-3/CMAQ⁴⁷ or REMSAD⁵⁰). Primary components can be simulated using less resource-intensive techniques. Suitability of a modeling approach or mix of modeling approaches for a given application requires technical judgement⁴², as well as professional experience in choice of models, use of the model(s) in an attainment test, development of emissions and meteorological inputs to the model and selection of days to model.

b. *Choice of Analysis Techniques to Complement Air Quality Simulation Models.* Receptor models may be used to corroborate predictions obtained with one or more air quality simulation models. They may also be potentially useful in helping to define specific source categories contributing to major components of PM-2.5.⁴²

c. *Estimating the Impact of Individual Sources.* Choice of methods used to assess the impact of an individual source depends on the nature of the source and its emissions. Thus, model users should consult with the Regional Office to determine the most suitable approach on a case-by-case basis (subsection 3.2.2).

6.2.2.2 PM-10

a. Screening techniques like those identified in subsection 4.2.1 are applicable to PM-10. Conservative assumptions which do not allow removal or transformation are suggested for screening. Thus, it is recommended that subjectively determined values for "half-life" or pollutant decay not be used as a surrogate for particle removal. Proportional models (rollback/forward) may not be applied for screening analysis, unless such techniques are used in conjunction with receptor modeling.⁴³

b. Refined models such as those discussed in subsection 4.2.2 are recommended for PM-10. However, where possible, particle size, gas-to-particle formation, and their effect on ambient concentrations may be considered. For point sources of small particles and for source-specific analyses of complicated sources, use the appropriate recommended steady-state plume dispersion model (subsection 4.2.2). For guidance on determination of design concentrations, see paragraph 8.2.1.1(e).

c. Receptor models have proven useful for helping validate emission inventories and for corroborating source-specific impacts estimated by dispersion models. The Chemical Mass Balance (CMB) model is useful for apportioning impacts from localized sources.^{51,52,53} Other receptor models, e.g., the Positive Matrix Factorization (PMF) model⁵⁴ and Unmix⁵⁵, which don't share some of CMB's constraints, have also been applied. In regulatory applications, dispersion models have been used in conjunction with receptor models to attribute source (or source category) contributions. Guidance is available for PM-10 sampling and analysis applicable to receptor modeling.⁵⁶

d. Under certain conditions, recommended dispersion models may not be reliable. In such circumstances, the modeling approach should be approved by the Regional Office on a case-by-case basis. Analyses involving model calculations for stagnation conditions should also be justified on a case-by-case basis (subsection 8.2.8).

e. Fugitive dust usually refers to dust put into the atmosphere by the wind blowing over plowed fields, dirt roads or desert or sandy areas with little or no vegetation. Reentrained dust is that which is put into the air by reason of vehicles driving over dirt roads (or dirty roads) and dusty areas. Such

sources can be characterized as line, area or volume sources. Emission rates may be based on site specific data or values from the general literature. Fugitive emissions include the emissions resulting from the industrial process that are not captured and vented through a stack but may be released from various locations within the complex. In some unique cases a model developed specifically for the situation may be needed. Due to the difficult nature of characterizing and modeling fugitive dust and fugitive emissions, it is recommended that the proposed procedure be cleared by the Regional Office for each specific situation before the modeling exercise is begun.

6.2.3 Models for Carbon Monoxide

a. Guidance is available for analyzing CO impacts at roadway intersections.⁵⁷ The recommended screening model for such analyses is CAL3QHC.^{58,59} This model combines CALINE3 (listed in Appendix A) with a traffic model to calculate delays and queues that occur at signalized intersections. The screening approach is described in reference 57; a refined approach may be considered on a case-by-case basis with CAL3QHCR.⁶⁰ The latest version of the MOBILE (mobile source emission factor) model should be used for emissions input to intersection models.

b. For analyses of highways characterized by uninterrupted traffic flows, CALINE3 is recommended, with emissions input from the latest version of the MOBILE model.

c. For urban area wide analyses of CO, an Eulerian grid model should be used. Information on SIP development and requirements for using such models can be found in several references.^{57,61,62,63}

d. Where point sources of CO are of concern, they should be treated using the screening and refined techniques described in Section 4.

6.2.4 Models for Nitrogen Dioxide (Annual Average)

a. A tiered screening approach is recommended to obtain annual average estimates of NO₂ from point sources for New Source Review analysis, including PSD, and for SIP planning purposes. This multi-tiered approach is conceptually shown in Figure 6-1 and described in paragraphs b through d of this subsection: