

# PM Hot-spot Analyses: Frequently Asked Questions

GENERAL.....	2
1. What is transportation conformity? .....	2
2. What is a hot-spot analysis? .....	2
3. For what other purposes can EPA’s quantitative PM hot-spot guidance be used? .....	2
PROJECTS REQUIRING A HOT-SPOT ANALYSIS .....	2
4. What projects require a PM hot-spot analysis?.....	2
5. What are some examples of projects that require a PM hot-spot analysis? .....	3
6. What are some examples of projects that do not require a PM hot-spot analysis? .....	4
DETERMINING THE ANALYSIS APPROACH, MODELS, AND DATA .....	4
7. How do I determine the geographic area I need to include in my modeling?.....	4
8. If I’m analyzing a very large project, what modeling options are available?.....	5
9. What PM NAAQS are considered in PM hot-spot analyses? .....	5
SELECTING AN AIR QUALITY MODEL .....	6
10. What versions of air quality models are currently approved for PM hot-spot analyses?.....	6
CONSIDERING MITIGATION AND CONTROL MEASURES .....	6
11. What mitigation or control measures can be considered in PM hot-spot analyses?.....	6

**These FAQs will be updated periodically as new content is developed. Topics for future FAQs may include:**

- Modeling multiple off-network links in MOVES
- Selecting representative background data
- Modeling different source types using AERMOD

## General

### 1. What is transportation conformity?

Transportation conformity is required under Clean Air Act (CAA) section 176(c) (42 U.S.C. 7506(c)) to ensure that federally supported highway and transit project activities are consistent with (conform to) the purpose of a state air quality implementation plan (SIP). Conformity to the purpose of the SIP means that transportation activities will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the relevant national ambient air quality standards (NAAQS) or required interim milestones. EPA's transportation conformity rule (40 CFR 51.390 and Part 93) establishes the criteria and procedures for determining whether transportation activities conform to the SIP. Conformity applies to transportation activities in nonattainment and maintenance areas for transportation-related pollutants, including PM<sub>2.5</sub> and PM<sub>10</sub>.

### 2. What is a hot-spot analysis?

A hot-spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant NAAQS. A hot-spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, including, for example, congested highways or transit terminals. Such an analysis of the area substantially affected by the project demonstrates that CAA conformity requirements are met for the relevant NAAQS in the "project area." When a hot-spot analysis is required, it is included within a project-level conformity determination.

### 3. For what other purposes can EPA's quantitative PM hot-spot guidance be used?

Section 1.5 of the Quantitative PM Hot-spot Guidance states:

EPA's Quantitative PM Hot-spot Guidance addresses how to complete a quantitative PM hot-spot analysis for transportation conformity purposes. However, certain sections of this technical guidance may also be applicable when completing analyses of transportation projects for general conformity determinations and for other purposes. For example, Sections 4 or 5 can be used to estimate transportation project emissions using MOVES or EMFAC, and Sections 7 and 8 can be used to conduct PM air quality analyses of transportation projects.

## Projects Requiring a Hot-Spot Analysis

### 4. What projects require a PM hot-spot analysis?

Section 93.123(b)(1) of the conformity rule defines the projects that require a PM<sub>2.5</sub> or PM<sub>10</sub> hot-spot analysis as:

- (i) New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;

- (ii) Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- (iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- (iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- (v) Projects in or affecting locations, areas, or categories of sites which are identified in the  $PM_{2.5}$  or  $PM_{10}$  applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

See the following questions for examples of projects that would require or not require a PM hot-spot analysis.

## 5. What are some examples of projects that require a PM hot-spot analysis?

EPA noted in the March 2006 final rule that the examples below are considered to be the most likely projects that would be covered by 40 CFR 93.123(b)(1) and require a  $PM_{2.5}$  or  $PM_{10}$  hot-spot analysis (71 FR 12491).<sup>1</sup>

Some examples of projects of local air quality concern that would be covered by 40 CFR 93.123(b)(1)(i) and (ii) are:

- A project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 annual average daily traffic (AADT) and 8% or more of such AADT is diesel truck traffic;
- New exit ramps and other highway facility improvements to connect a highway or expressway to a major freight, bus, or intermodal terminal;
- Expansion of an existing highway or other facility that affects a congested intersection (operated at Level-of-Service D, E, or F) that has a significant increase in the number of diesel trucks; and,
- Similar highway projects that involve a significant increase in the number of diesel transit busses and/or diesel trucks.

Some examples of projects of local air quality concern that would be covered by 40 CFR 93.123(b)(1)(iii) and (iv) are:

- A major new bus or intermodal terminal that is considered to be a “regionally significant project” under 40 CFR 93.101<sup>2</sup>; and,
- An existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses increases by 50% or more, as measured by bus arrivals.

<sup>1</sup> EPA also clarified 93.123(b)(1)(i) in the January 24, 2008 final rule (73 FR 4435-4436).

<sup>2</sup> 40 CFR 93.101 defines a “regionally significant project” as “a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area’s transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel.”

A project of local air quality concern covered under 40 CFR 93.123(b)(1)(v) could be any of the above listed project examples.

## 6. What are some examples of projects that do not require a PM hot-spot analysis?

The March 2006 final rule also provided examples of projects that would not be covered by 40 CFR 93.123(b)(1) and would not require a PM<sub>2.5</sub> or PM<sub>10</sub> hot-spot analysis (71 FR 12491).

The following are examples of projects that are not a local air quality concern under 40 CFR 93.123(b)(1)(i) and (ii):

- Any new or expanded highway project that primarily services gasoline vehicle traffic (i.e., does not involve a significant number or increase in the number of diesel vehicles), including such projects involving congested intersections operating at Level-of-Service D, E, or F;
- An intersection channelization project or interchange configuration project that involves either turn lanes or slots, or lanes or movements that are physically separated. These kinds of projects improve freeway operations by smoothing traffic flow and vehicle speeds by improving weave and merge operations, which would not be expected to create or worsen PM NAAQS violations; and,
- Intersection channelization projects, traffic circles or roundabouts, intersection signalization projects at individual intersections, and interchange reconfiguration projects that are designed to improve traffic flow and vehicle speeds, and do not involve any increases in idling. Thus, they would be expected to have a neutral or positive influence on PM emissions.

Examples of projects that are not a local air quality concern under 40 CFR 93.123(b)(1)(iii) and (iv) would be:

- A new or expanded bus terminal that is serviced by non-diesel vehicles (e.g., compressed natural gas) or hybrid-electric vehicles; and,
- A 50% increase in daily arrivals at a small terminal (e.g., a facility with 10 buses in the peak hour).

## Determining the Analysis Approach, Models, and Data

### 7. How do I determine the geographic area I need to include in my modeling?

Section 3.2.2. of the Quantitative PM Hot-spot Guidance states:

The geographic area to be covered by a PM hot-spot analysis (the “project area”) is to be determined on a case-by-case basis.<sup>3</sup> PM hot-spot analyses must examine the air quality impacts for the relevant PM NAAQS in the area substantially affected by the project (40 CFR 93.123(c)(1)). To meet this and other conformity requirements, it is necessary to define the project, determine where it is to be located, and ascertain what other emission sources are

<sup>3</sup> Given the variety of potential projects that may require a PM hot-spot analysis, it is not possible to provide one definition or set of parameters that can be used in all cases to determine the area covered by the PM hot-spot analysis.

located in the project area.<sup>4</sup> In addition to emissions from the proposed highway or transit project,<sup>5</sup> there may be nearby sources of emissions that need to be estimated and included in air quality modeling (e.g., a freight rail terminal that is affected by the project).

The interagency consultation process should be used to determine the project area for a specific project. See Section 3.3.2 of the Quantitative PM Hot-spot Guidance for more information.

## 8. If I'm analyzing a very large project, what modeling options are available?

Section 3.3.2 of the Quantitative PM Hot-spot Guidance states:

Hot-spot analyses must include the entire project (40 CFR 93.123(c)(2)). However, it may be appropriate in some cases to focus the PM hot-spot analysis only on the locations of highest air quality concentrations. For large projects, it may be necessary to analyze multiple locations that are expected to have the highest air quality concentrations and, consequently, the most likely new or worsened PM NAAQS violations. If conformity is demonstrated at such locations, then it can be assumed that conformity is met in the entire project area. For example, if a highway project involves several lane miles with similar travel activity (and no nearby sources that need to be modeled), the scope of the PM hot-spot analysis could involve only the point(s) of highest expected PM concentrations. If conformity requirements are met at such locations, then it can be assumed that conformity is met throughout the project area. Such an approach would be preferable to modeling the entire length of the highway project, which would involve additional time and resources.

The interagency consultation process should be used to determine the project area for a specific project. See Section 3.3.2 of the Quantitative PM Hot-spot Guidance for more information.

## 9. What PM NAAQS are considered in PM hot-spot analyses?

Section 2.6 of the Quantitative PM Hot-spot Guidance states:

The CAA and transportation conformity regulations require that conformity be met for all transportation-related NAAQS for which an area has been designated nonattainment or maintenance. Therefore, a project-level conformity determination must address all applicable NAAQS for a given pollutant.<sup>6</sup>

Accordingly, results from a quantitative hot-spot analysis will need to be compared to all relevant  $PM_{2.5}$  and  $PM_{10}$  NAAQS in effect for the area undertaking the analysis. For example, in an area designated nonattainment or maintenance for only the annual  $PM_{2.5}$  NAAQS or only the 24-hour  $PM_{2.5}$  NAAQS, the hot-spot analysis would have to address only that respective  $PM_{2.5}$  NAAQS. If an area is designated nonattainment or maintenance for the annual and 24-hour  $PM_{2.5}$  NAAQS, the hot-spot analysis would have to address both NAAQS for conformity purposes.

<sup>4</sup> See more in the March 24, 2010 final conformity rule entitled "Transportation Conformity Rule PM2.5 and PM10 amendments," 75 FR 14281; found online at: [www.epa.gov/otaq/stateresources/transconf/conf-regs.htm](http://www.epa.gov/otaq/stateresources/transconf/conf-regs.htm).

<sup>5</sup> 40 CFR 93.101 defines "highway project" and "transit project" for transportation conformity purposes.

<sup>6</sup> See EPA's March 2006 final rule (71 FR 12468-12511).

## Selecting an Air Quality Model

### 10. What versions of air quality models are currently approved for PM hot-spot analyses?

The latest EPA-approved versions of the air quality models are listed on the project-level conformity website: [www.epa.gov/otaq/stateresources/transconf/projectlevel-hotspot.htm](http://www.epa.gov/otaq/stateresources/transconf/projectlevel-hotspot.htm).

## Considering Mitigation and Control Measures

### 11. What mitigation or control measures can be considered in PM hot-spot analyses?

Section 10 of the Quantitative PM Hot-spot Guidance describes mitigation and control measures that could be considered by project sponsors to reduce emissions and any predicted new or worsened PM NAAQS violations. These measures can be applied to the transportation project itself or other PM sources in the project area. Written commitments for mitigation or control measures must be obtained from the project sponsor and/or operator, or other emission source's owner and/or operator, as appropriate, prior to making a project-level conformity determination (40 CFR 93.123(c)(4) and 93.125(a)). If measures are selected, additional emissions and air quality modeling will need to be completed and new design values calculated to ensure that conformity requirements are met.

Evaluating and choosing any models and associated methods and assumptions for any measures that are relied upon in the PM hot-spot analysis must be completed through the process established by each area's interagency consultation procedures (40 CFR 93.105(c)(1)(i)). The models, methods, and assumptions used to quantify reductions should be documented in the final project-level conformity determination.

General categories of mitigation and control measures that could be considered include:

- Retrofitting, replacing vehicles/engines, and using cleaner fuels;
- Reducing idling;
- Redesigning the transportation project itself;
- Controlling fugitive dust; and
- Controlling other sources of emissions.

See Section 10 of this guidance for further details on each of these categories.