Completing Quantitative PM Hot-spot Analyses: 3-Day Course

U.S. Environmental Protection Agency

U.S. Department of Transportation

Welcome!

- General introductions
- Purpose of this training
- Acknowledgements
- Breaks, lunch, and other logistics

Course Introduction

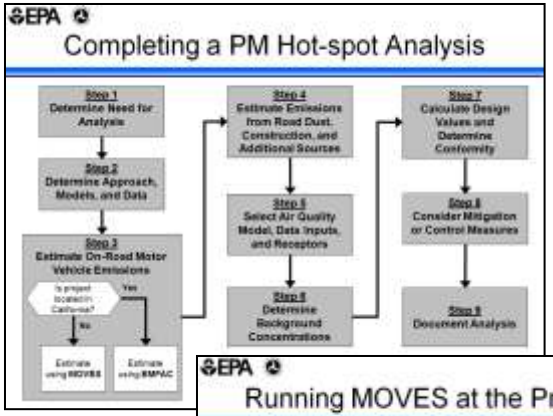
About this Course

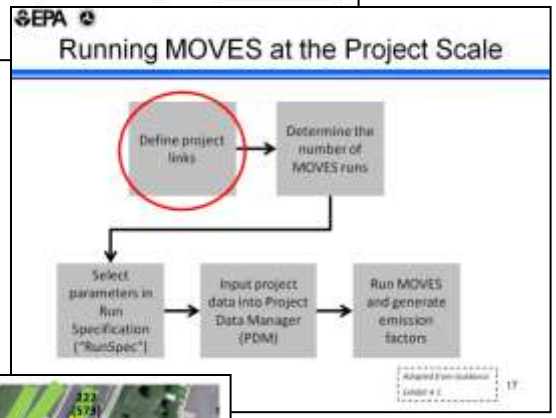
- Purpose of course is to describe how to complete a quantitative PM hot-spot analysis in accordance with EPA's guidance
  - » Relevant guidance sections noted on slides
  - » Includes references for appropriate model user guides and implementation guides
- Course includes both presentations and hands-on exercises
  - » Slides cover hands-on material, for later reference
- Course uses a hypothetical "example analysis" for many hands-on portions
  - » Same example continues through all analysis steps

Syllabus – Day 1

- *Module 1*: General PM Hot-spot Analysis Requirements and Overview

- *Module 2*: Using MOVES for PM Hot-spot Analyses
  - » Complete a “mini-MOVES run”
  - » Use MOVES to model the example analysis

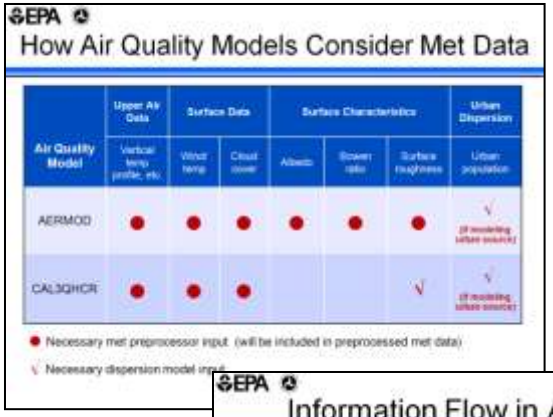


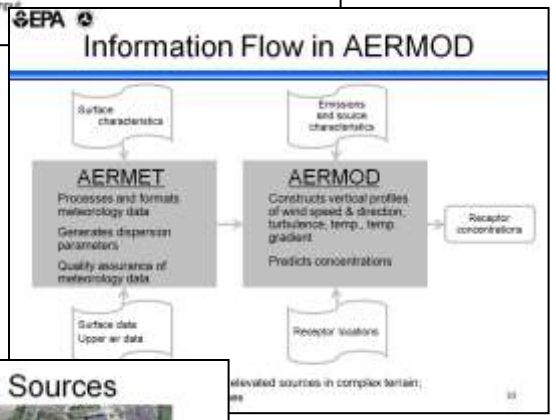


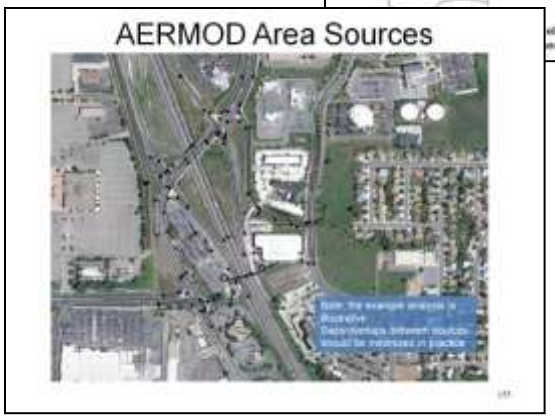
Syllabus – Day 2

- *Module 3*: Selecting an Air Quality Model, Data Inputs, and Receptors

- *Module 4*: Using AERMOD for PM Hot-spot Analyses
  - » Complete a “mini-AERMOD run”
  - » Use AERMOD to model the example analysis

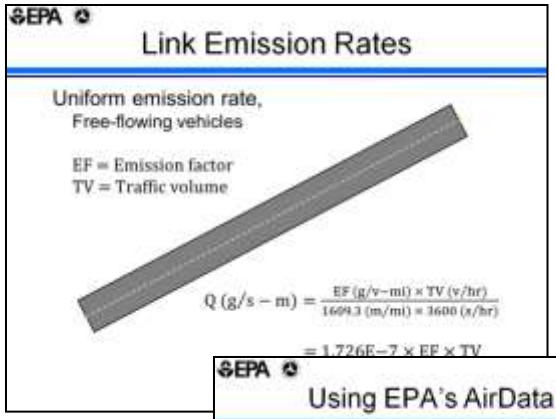


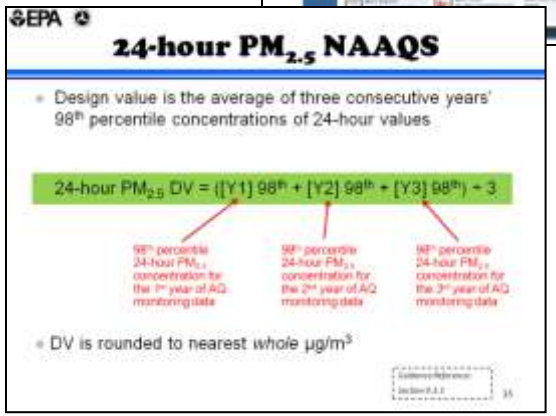




Syllabus – Day 3

- *Module 5*: Using CAL3QHCR for PM Hot-spot Analyses
  - » Complete an exercise using CAL3QHCR
  - » Use CAL3QHCR to model the example analysis
- *Module 6*: Determining Background Concentrations
- *Module 7*: Calculating Design Values and Determining Conformity
  - » Complete example analysis





This Course Does Not Cover…

- Carbon monoxide (CO) hot-spot analyses or other types of project-level analyses

- Everything that is in the guidance – you still need to read it and reference it when completing analyses in the field
  - » Example: Specific information on when interagency consultation is required or suggested

- General overviews of MOVES or other models, air quality modeling, etc.
  - » Visit EPA's conformity website for more information and training opportunities

Background on Quantitative PM Hot-spot Conformity Guidance

New Guidance and Models

- EPA announced release of two technical guidance documents in the *Federal Register* on December 20, 2010
  - » *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*
    - – "PM Hot-spot Guidance" in this course
  - » *Using MOVES in Project-Level Carbon Monoxide Analyses*
    - – Not covered in this course

- EPA also approved MOVES2010a for use in PM and CO hot-spot analyses
  - » 2-year conformity grace period ended December 20, 2012
  - » Grace period also applies to MOVES2010b

PM Hot-spot Guidance

- Describes how to complete a quantitative hot-spot analysis in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas for transportation conformity

- ***Does not change the conformity requirements*** (such as what projects require PM hot-spot analyses)

- Is consistent with existing regulations and guidance for conformity, the PM national ambient air quality standards (NAAQS), state implementation plans (SIPs), and other regulatory programs

- Was developed in coordination with the Department of Transportation (DOT)

Guidance Reference:

Section 1.1

Who Would Use The Guidance?

- Agencies performing hot-spot analyses:
  - » State DOTs, transit agencies
- Agencies providing data/technical support:
  - » State and local AQ agencies, MPOs, EPA and DOT field offices
- Agencies reviewing and commenting on PM hot-spot analyses:
  - » EPA and DOT field offices
  - » Other state and local agencies
  - » General public

Guidance Reference:

Section 1.1

When Are Quantitative PM Hot-spot Analyses Required?

- ***Quantitative*** PM hot-spot analyses are now required for all new analyses started after December 20, 2012
- ***Qualitative*** PM hot-spot analysis begun before December 20, 2012 can be completed
- Use consultation process if you have questions
- Hot-spot analysis grace period is separate from MOVES2010 grace period for regional conformity analyses

Guidance Reference:

Section 1.2

For More Information

- See EPA's conformity website for:
  - Regulations, policy guidance, FR notices, training
  - www.epa.gov/otaq/stateresources/transconf/policy.htm#project
- See EPA's MOVES website for:
  - Model software, technical documentation, and other helpful background materials
  - www.epa.gov/otaq/models/moves/
- Questions?
  - Specific questions on a particular project analysis
    - Contact appropriate EPA Region or DOT field office
  - General questions on PM Hot-spot Guidance
    - patulski.meg@epa.gov
  - Technical questions about guidance document
    - conformity-hotspot@epa.gov

Module 1

General PM Hot-spot Analysis Requirements and Overview

Module Overview

- Transportation conformity basics for PM hot-spot analyses
- Quantitative PM hot-spot analysis process
- Class Exercise: Selecting the Analysis Year(s)

Key References

- Clean Air Act section 176(c)
- Transportation conformity rule (40 CFR Part 93)
- PM Hot-spot Guidance, Sections 1-3

Transportation Conformity: Hot-spot Analysis Basics

Statutory and Regulatory Requirements

- CAA section 176(c) requires that federally supported transportation projects in nonattainment and maintenance areas cannot:
  - Cause or contribute to new air quality violations,
  - Worsen existing violations, or
  - Delay timely attainment of the NAAQS or interim milestones
- Conformity rule section 93.123(b)(1) requires a PM hot-spot analysis only for projects of local air quality concern
  - Example: new or expanded highway/transit projects with a significant number/significant increase in diesel vehicles (details later in this module)
  - PM hot-spot analyses are ***not*** required for other projects
- PM Hot-spot Guidance does not change existing PM hot-spot requirements

Guidance Reference:

Section 2.2

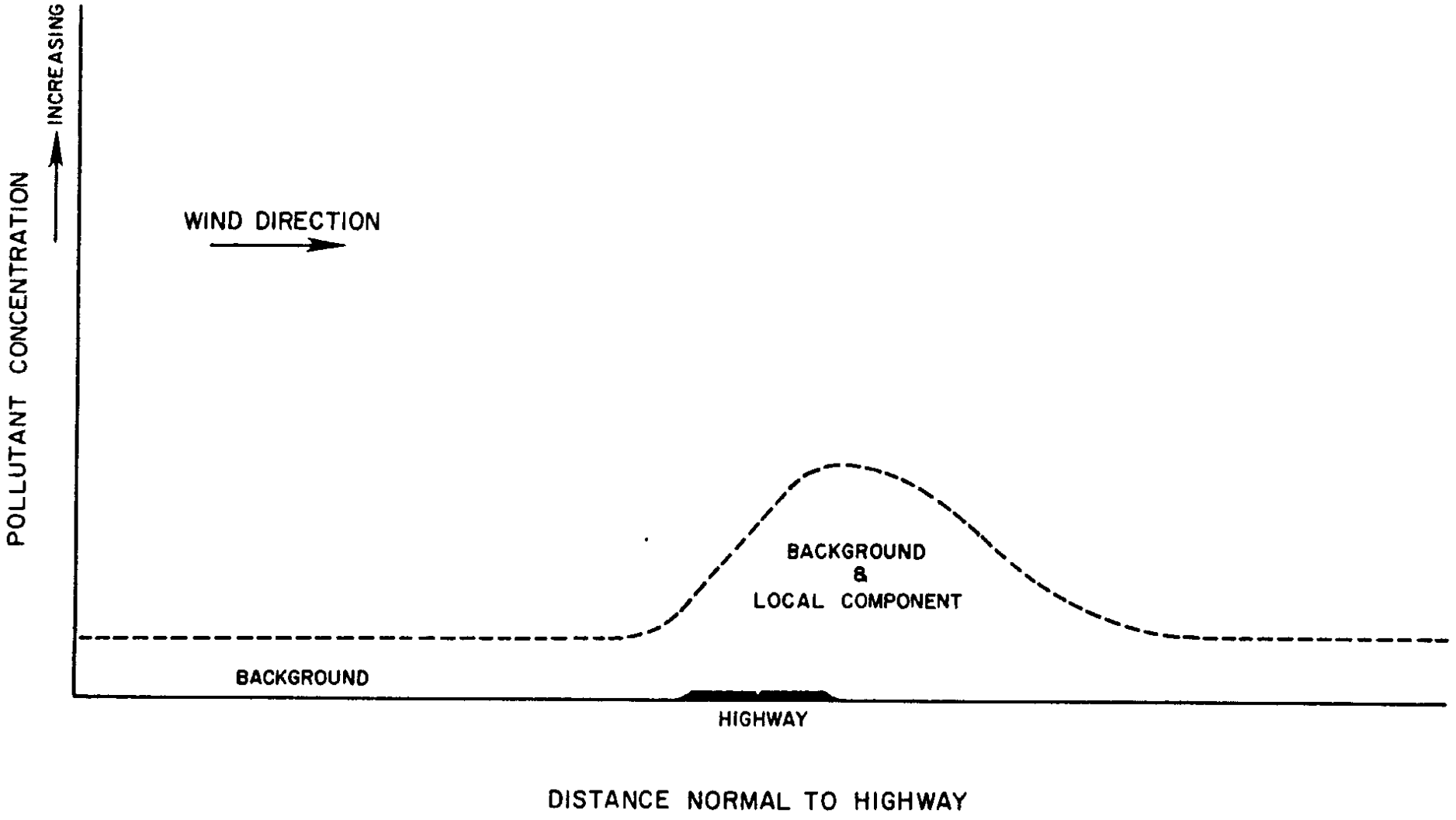
What Is a Hot-spot Analysis?

- Section 93.101 defines as an estimation of likely future localized pollutant concentrations and a comparison to the relevant NAAQS
  - » This is smaller than an entire nonattainment or maintenance area
- Assesses air quality impacts in the area substantially affected by the project
- When required, included within a project-level conformity determination

Guidance Reference:

Section 1.3

Focus of PM Hot-spot Analysis



Key Hot-spot Analysis Requirements

- Section 93.116(a) requires that project cannot cause new NAAQS violations, worsen existing violations, or delay timely attainment of the NAAQS or required interim milestone(s)
- Section 93.110 requires hot-spot analyses to be based on latest planning assumptions
- Section 93.123(c) includes general requirements for PM hot-spot analyses
- Section 93.105(c)(1)(i) requires interagency consultation to "evaluate and choose models and associated methods and assumptions"

Guidance Reference:

Section 2.4

General Regulatory Requirements

Section 93.123(c) requires that PM hot-spot analyses must:

- Estimate the ***total emissions*** burden of direct PM emissions: project and background
- Include the ***entire transportation project***, after identifying the major design features that will significantly impact local concentrations
- Use ***assumptions consistent with*** those used in regional emissions analyses for inputs required in both analyses (e.g., temperature, humidity)
- Assume mitigation or control measures only where ***written commitments*** have been obtained
- Consider emissions increases from ***construction-related activities only*** if they occur during the construction phase and last more than five years at any individual site
  - » PM hot-spot analyses are not required to consider ***temporary*** increases

Guidance Reference:

Section 2.2

Interagency Consultation

- Consultation is an important tool for PM hot-spot analyses
- Interagency consultation procedures must be used to determine models and associated methods and assumptions for things like:
  - The geographic area covered by the analysis
  - The emissions models used in the analysis
  - Whether/how to estimate road and construction dust emissions
  - The nearby sources considered, background data used, and air quality model chosen, including the background monitors/ concentrations selected, and any interpolation methods used
  - The appropriateness of receptors to be compared to the annual $PM_{2.5}$ NAAQS
- See guidance for details

Guidance Reference:

Section 2.3

Public Participation

- Section 93.105(e) requires agencies completing project-level conformity determinations to provide opportunity for public review and comment
- NEPA public involvement process typically used to satisfy this requirement
- If hot-spot analysis is performed after NEPA completed, public review requirement still needs to be met
  - » Agencies have flexibility to decide on specific procedures
  - » Consult with EPA/DOT for additional guidance

Guidance Reference:
Section 2.3

More Details on Hot-spot Analyses

- As noted earlier, a project cannot cause new NAAQS violations, worsen existing violations, or delay timely attainment of the NAAQS or required interim milestone(s)

- A hot-spot analysis is a build/no-build analysis:
  - » Compares AQ concentrations *with the project (build scenario)* to either the NAAQS or to AQ concentrations *without the project (no-build scenario)*

Guidance Reference:

Section 2.4

How is Conformity Met in a Hot-spot Analysis?

Project meets conformity requirements, if at each appropriate receptor:

PM concentration of build ≤ NAAQS, *or*

PM concentration of build ≤ PM concentration of no-build

Example:

Conformity is met at a receptor in a 2006 $PM_{2.5}$ NAAQS area in either of these cases:

Build (with project)	34 µg/m^3
NAAQS:	35 µg/m^3

or, if:

Build (with project)	36 µg/m^3 (above the NAAQS)
No-build (without project)	37 µg/m^3

Guidance Reference: Section 2.4

Suggested Approach for Analyses

- Start with build scenario...follow steps to run models & calculate design values
  - » If build DVs ≤ NAAQS, conformity is met

- If build DVs > NAAQS, then:
  - » Add mitigation/control measures and redo analysis, or
  - » Calculate no-build scenario DVs
    - – If build DVs ≤ no-build DVs, conformity is met
    - – If not, add mitigation/control measures and redo analysis until meets conformity requirements

- Measures can be added at any point in the process

Guidance Reference:

Sections 2.4 & 3.3.3

Refined PM Hot-spot Analyses

- PM Hot-spot Guidance focuses on **refined** PM hot-spot analyses, rather than **screening** analyses
  - » Refined analyses rely on detailed local information for build and no-build scenarios
  - » Screening analyses are based on worst case conditions for build scenario only

- Refined PM hot-spot analyses necessary due to complex nature of PM emissions, statistical form of each NAAQS, and temperature variability over a year
  - » Much different than air quality modeling for CO NAAQS

Guidance Reference:
Section 2.4.3

More on Refined Analyses

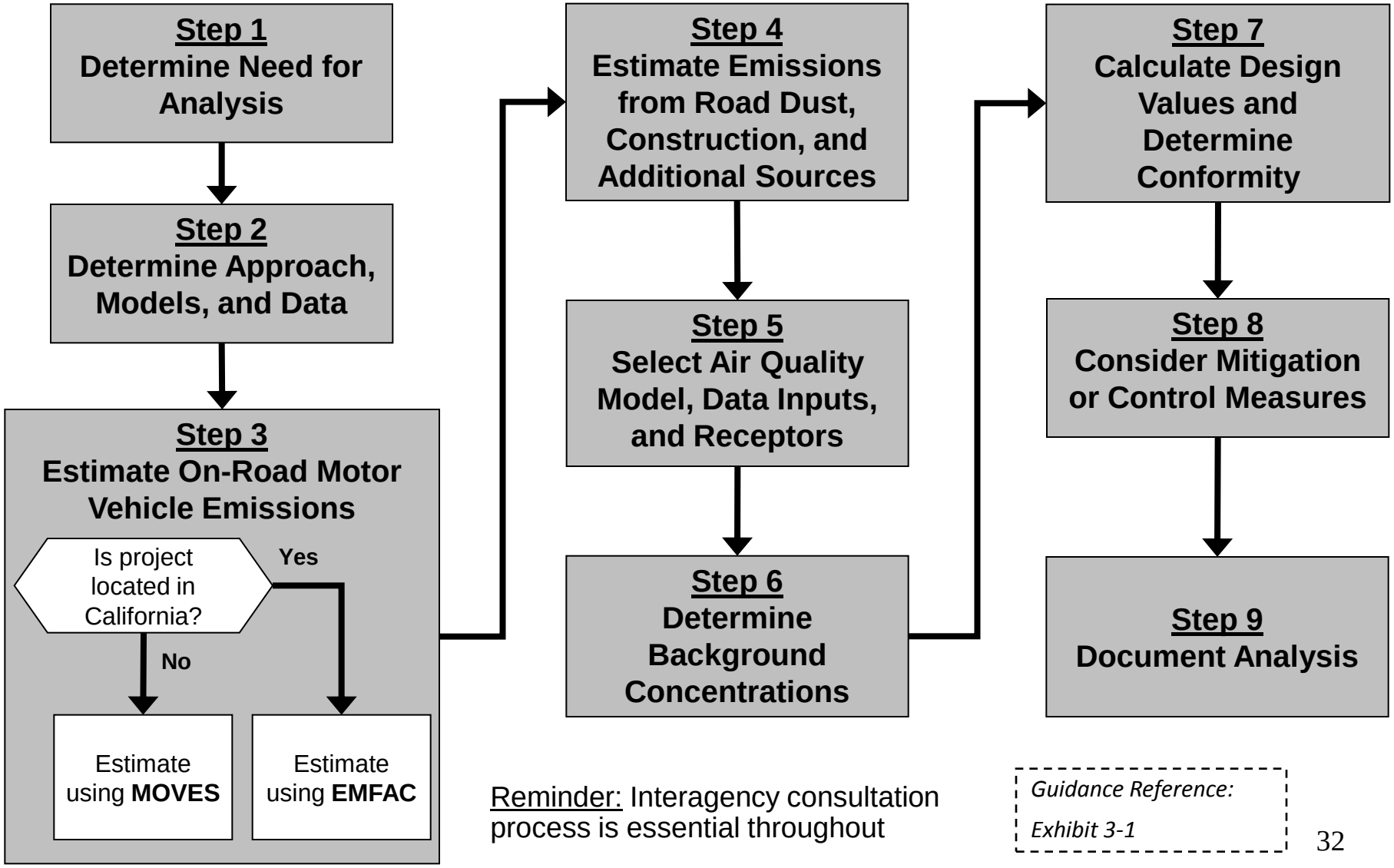
- Note that emissions modeling, air quality modeling, and representative background are all necessary
  - » Cannot compare only build to no-build emissions
- Some flexibilities and tools simplify the process, e.g.,
  - » Calculating design values for the highest receptor (covered later)
  - » Design value MySQL script
- See guidance for examples of cases where a screening analysis or components may be appropriate
  - » Consult with EPA Region, OTAQ, & OAQPS if screening analysis option considered

Guidance Reference:

Section 2.4.3

Overview of the PM Hot-spot Analysis Process

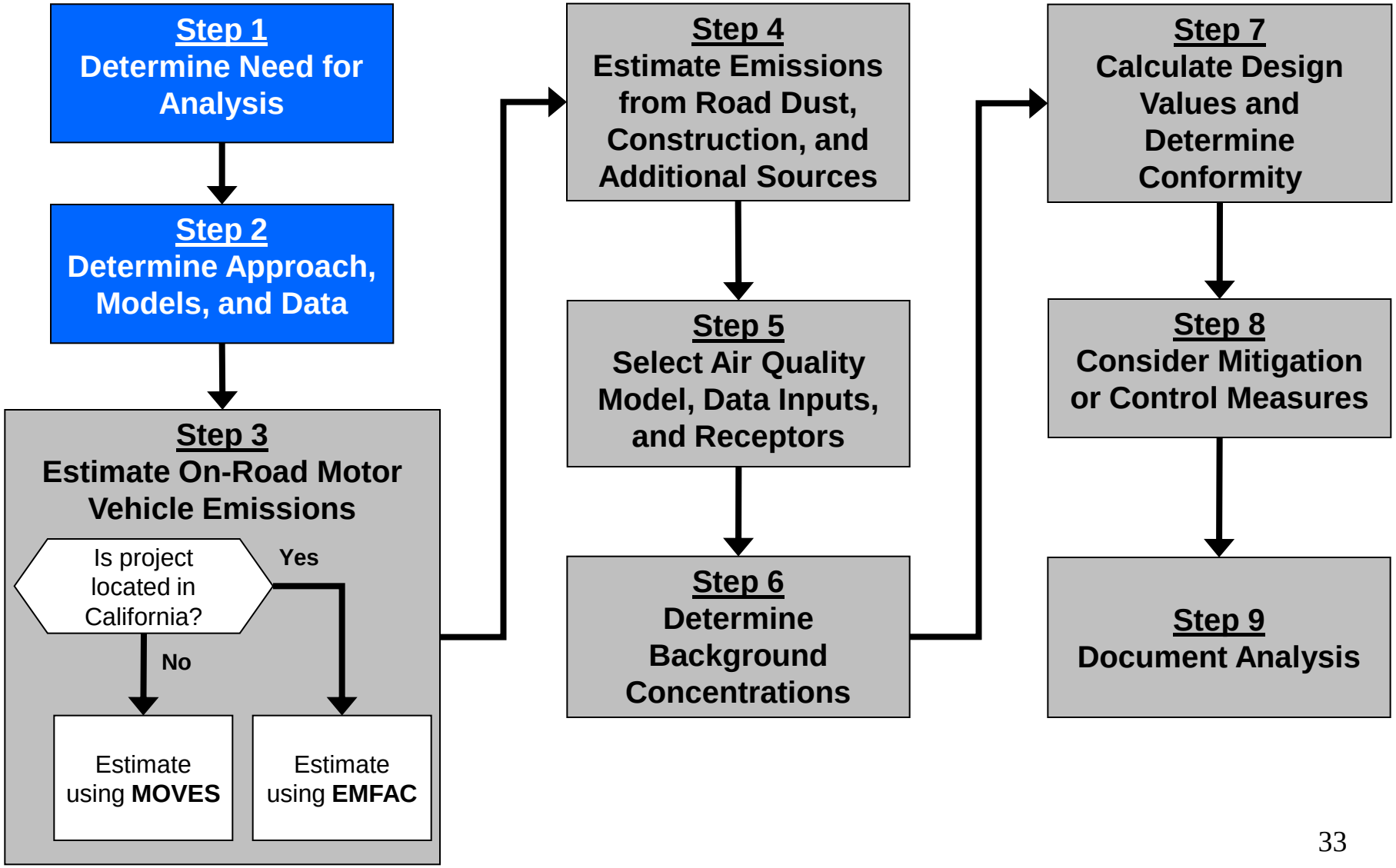
Completing a PM Hot-spot Analysis



Reminder: Interagency consultation process is essential throughout

Guidance Reference: Exhibit 3-1

Completing a PM Hot-spot Analysis



Step 1: Determining Need for Analysis

- PM hot-spot analyses required only for projects of local air quality concern (40 CFR 93.123(b)(1))
  - » Details next slides
  - » Hot-spot analyses are *not* required for other projects

- PM Hot-spot Guidance does not affect existing consultation procedures for determining which projects require a PM hot-spot analysis

Guidance Reference:

Sections 2.2 & 3.2

Projects of Local Air Quality Concern

(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

Guidance Reference:

Sections 1.4 & 2.2

Projects of Local Air Quality Concern

(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

(v) Projects in or affecting locations, areas, or categories of sites which are identified in the $PM_{2.5}$ or PM_{10} SIP (approved or adequate submitted SIP) as sites of violation or possible violation

Guidance Reference:

Sections 1.4 & 2.2

Step 2: Determining the Approach, Models, and Data Requirements

- Geographic area
- Analysis year(s)
- Relevant PM NAAQS
- Type of PM emissions
- Models and methods
- Project-specific data

Guidance Reference:
Section 3.3

Determining the Geographic Area

- PM hot-spot analyses must examine "area substantially affected by the project"
  - » Referred to in guidance as "the project area"
- Determined on a case-by-case basis
- Must include entire project
  - » For large projects, may be appropriate to focus on locations of highest AQ concentrations
- Need to also consider what other emission sources are located near the project
- Questions regarding the scope of the analysis can be determined through interagency consultation
- Class exercise at end of **Module 3**

Guidance Reference:

Section 3.3.2

Selecting the Analysis Year(s)

- Project must conform over full time of area's transportation plan (in rural areas, 20 years)
- Need to choose an analysis year(s) during when:
  - Peak emissions from project are expected, and
  - New or worsened violation would most likely occur due to cumulative impacts of project and background concentrations
- Need to consider the following factors:
  - Changes in vehicle fleets
  - Changes in traffic volumes, speeds, and VMT
  - Expected trends in background concentrations in project area and impacts of any nearby sources (e.g., those affected by project)
- Class exercise at end of **Module 1**

Guidance Reference:
Sections 2.8 & 3.3.3

Determining Relevant PM NAAQS

- PM hot-spot analyses are only done for the PM NAAQS for which the area is designated nonattainment or maintenance:
  - 1997 Annual $PM_{2.5}$ NAAQS – 15.0 µg/m^3
  - 1997 24-hour $PM_{2.5}$ NAAQS – 65 µg/m^3
  - 2006 24-hour $PM_{2.5}$ NAAQS – 35 µg/m^3
  - 1987 24-hour PM_{10} NAAQS – 150 µg/m^3

- Areas may be designated for more than one PM NAAQS

- EPA's "Green Book" web page lists nonattainment and maintenance areas: www.epa.gov/oar/oaqps/greenbk/

Guidance Reference:
Sections 2.6 & 3.3.4

Determining Quarters to Be Evaluated

- A hot-spot analysis for the **annual PM NAAQS** would cover all 4 quarters of the analysis year
  - Q1 (January-March)
  - Q2 (April-June)
  - Q3 (July-September)
  - Q4 (October-December)

- Hot-spot analyses for the **24-hour PM NAAQS** would typically cover all 4 quarters of the analysis year
  - Except when future NAAQS violations and peak emissions in project area expected in only one quarter (use interagency consultation process to determine when appropriate)

Guidance Reference: Section 3.3.4

Determining Type of PM Emissions to Include in Analysis

Emissions Type*	Included in PM Hot-spot Analysis?
Exhaust, Brake Wear, Tire Wear	Always included
Re-entrained Road Dust	$PM_{2.5}$ areas without SIP budgets – Included only if EPA or state determines it's a significant contributor $PM_{2.5}$ areas with SIP budgets – Included only if in budgets PM_{10} areas – Always included
Construction-related Emissions	Included only if the occur during the construction phase and last more than 5 years at any individual site

* Only directly emitted PM emissions are included in analyses, not precursors

Guidance Reference:

Sections 2.5, 3.3.5 & 6.3

Determining Models and Methods

- Section 93.111 requires latest emissions models to be used (pending conformity grace period)
  - MOVES2010a or MOVES2010b
  - EMFAC2011 in California
- Important to select AQ model early in process (needed to prepare emissions modeling)
  - AERMOD
  - CAL3QHCR
- Other models and methods (e.g., AP-42)

Guidance Reference: Section 3.3.6

Obtaining Project-Specific Data

- Section 93.111(a) requires the latest planning assumptions available at time analysis begins

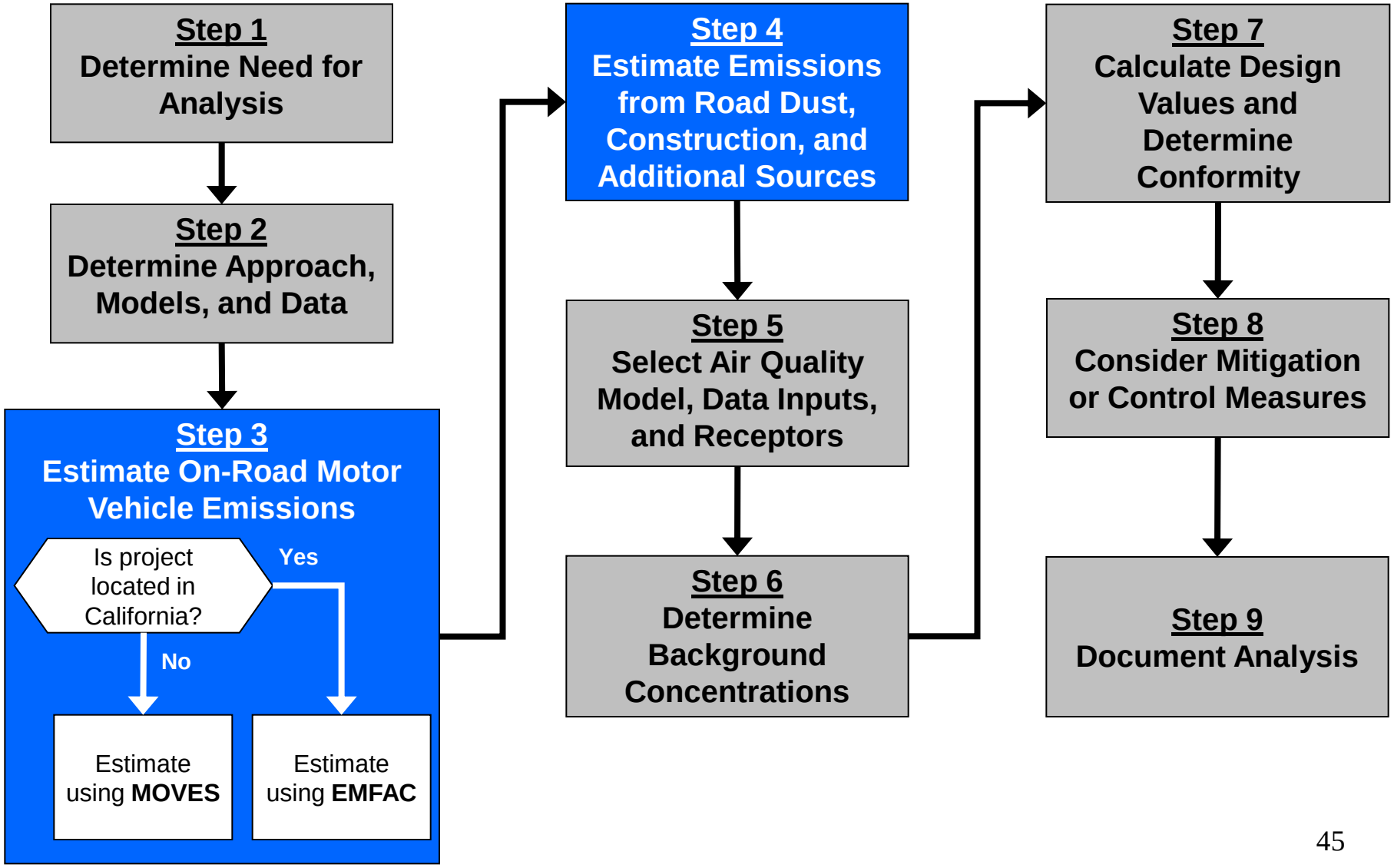
- Use project-specific data for emissions and AQ modeling, whenever possible
  - » See guidance for examples
  - » Defaults may be appropriate in some cases

- Areas will also need representative data on background concentrations in the project area
  - » We will cover in **Module 6**

Guidance Reference:

Section 3.3.7

Completing a PM Hot-spot Analysis



Estimating Emissions

- Step 3: Estimating the project's PM emissions from exhaust, brake wear, and tire wear (direct PM only)
  - » We will cover how to use the MOVES2010b model for a PM hot-spot analysis in detail in **Module 2**
  - » Result from this step: emissions factors for each "link" of the project for the analysis year(s)

- Step 4: Estimating emissions from road dust, construction, and additional sources
  - » Course does not cover this step in detail
  - » Some basic information on following slides

Guidance Reference:

Sections 3.4 & 3.5

Using AP-42

- EPA's compilation of data and methods for estimating emission rates from a variety of activities and sources

- AP-42, Chapter 13 includes:
  - Section 13.2: Introduction to Fugitive Dust Sources
  - Section 13.2.1: Paved Roads
  - Section 13.2.2: Unpaved Roads
  - Section 13.2.3: Heavy Construction Operations (includes road construction)

- Use latest approved version of AP-42 from EPA's website: www.epa.gov/ttn/chief/ap42/index.html

Guidance Reference:

Sections 6, 8, & App I

Estimating Re-entrained Road Dust

- Use AP-42 *or* alternative local approach
  - » Areas may already have a locally-developed method or may develop one specific to local conditions

- Dust from paved roads
  - » AP-42 can be used where silt loading, mean vehicle weight, and mean vehicle speeds fall within ranges in AP-42
    - – Site-specific silt load data must be consistent with regional emissions analysis (per 93.123(c)(3))
    - – If factors not in ranges, then use locally-developed method

- Dust from unpaved roads
  - » If using AP-42, use appropriate equation (AP-42 dust equations differ for industrial sites vs. publicly accessible roads)
    - – Surface material moisture content moisture percentage, if used, must be consistent with regional emissions analysis (per 93.123(c)(3))

Guidance Reference:

Sections 3.5 & 6.3

Estimating Construction-Related Dust

- Required only if not temporary
- Use AP-42, Section 13.2.3
  or alternative local approach
- If using AP-42, note potential for material to be tracked out from the site; may need also to include dust from paved roads (see AP-42, Section 13.2.1)
- In some cases, an alternative approach may be more appropriate than AP-42 (e.g., if project conditions are not within the ranges used to develop AP-42 equations)

Guidance Reference:

Sections 2.5.5, 6.4, 6.6.1

Adding Dust to an Analysis

- Add emission factor(s) for road and construction dust to MOVES emission factors for each project link

- Example:

$$MOVES\ EF_{Link\ 1} + Road\ Dust\ EF = Total\ Emissions_{Link\ 1}$$

$$MOVES\ EF_{Link\ 2} + Road\ Dust\ EF = Total\ Emissions_{Link\ 2}$$

…etc….

Guidance Reference:

Section 6.5

Estimating Other Emissions

- Construction vehicles and equipment
  - » Required only if not temporary
  - » May have been quantified for SIP non-road inventory
  - » Choose model/method using interagency consultation process
    - – Example: EPA's NONROAD model

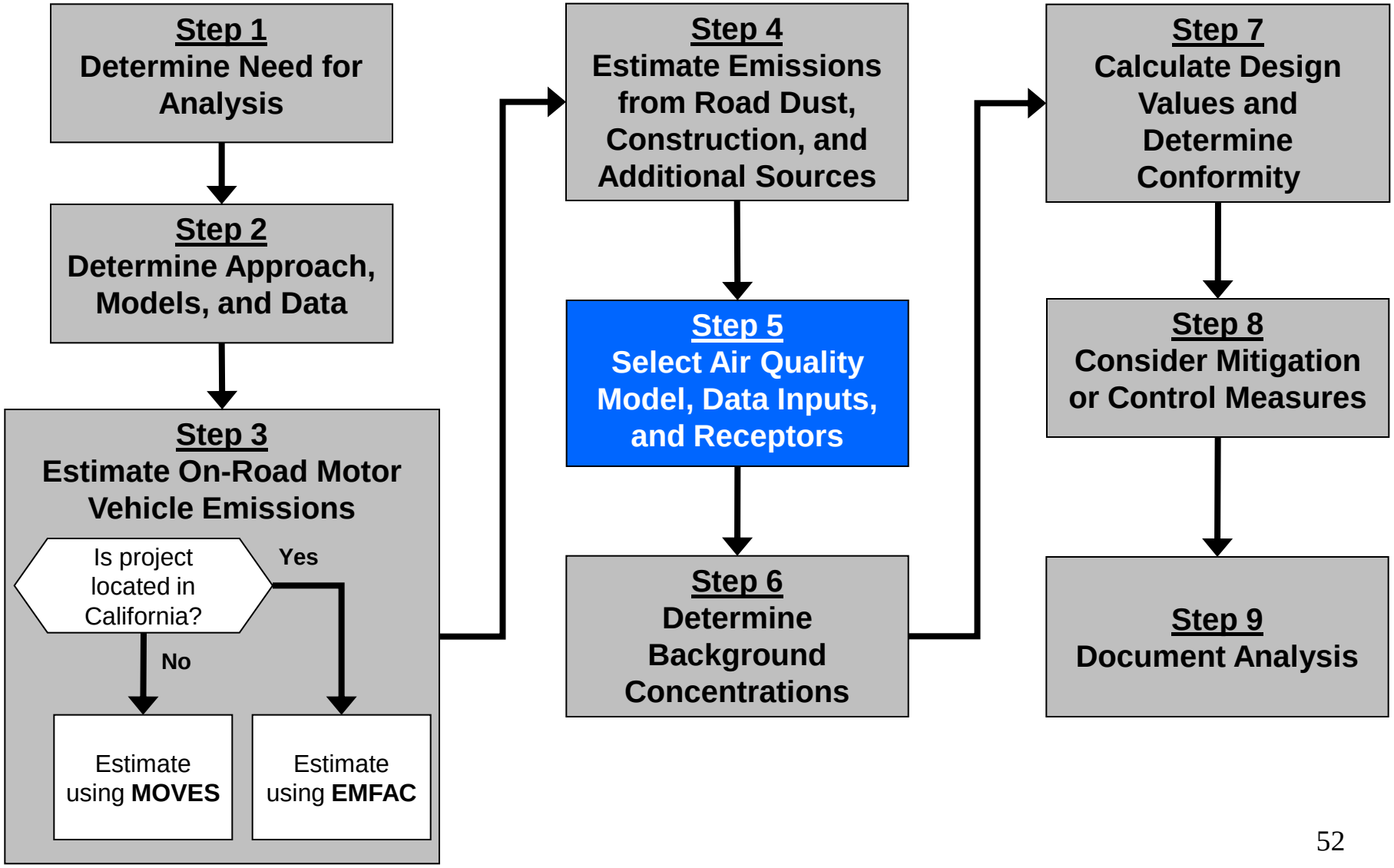
- Locomotive emissions
  - » See Appendix I for step-by-step guidance

- Additional sources, such as nearby sources affected by the project

Guidance Reference:

Section 6.6

Completing a PM Hot-spot Analysis

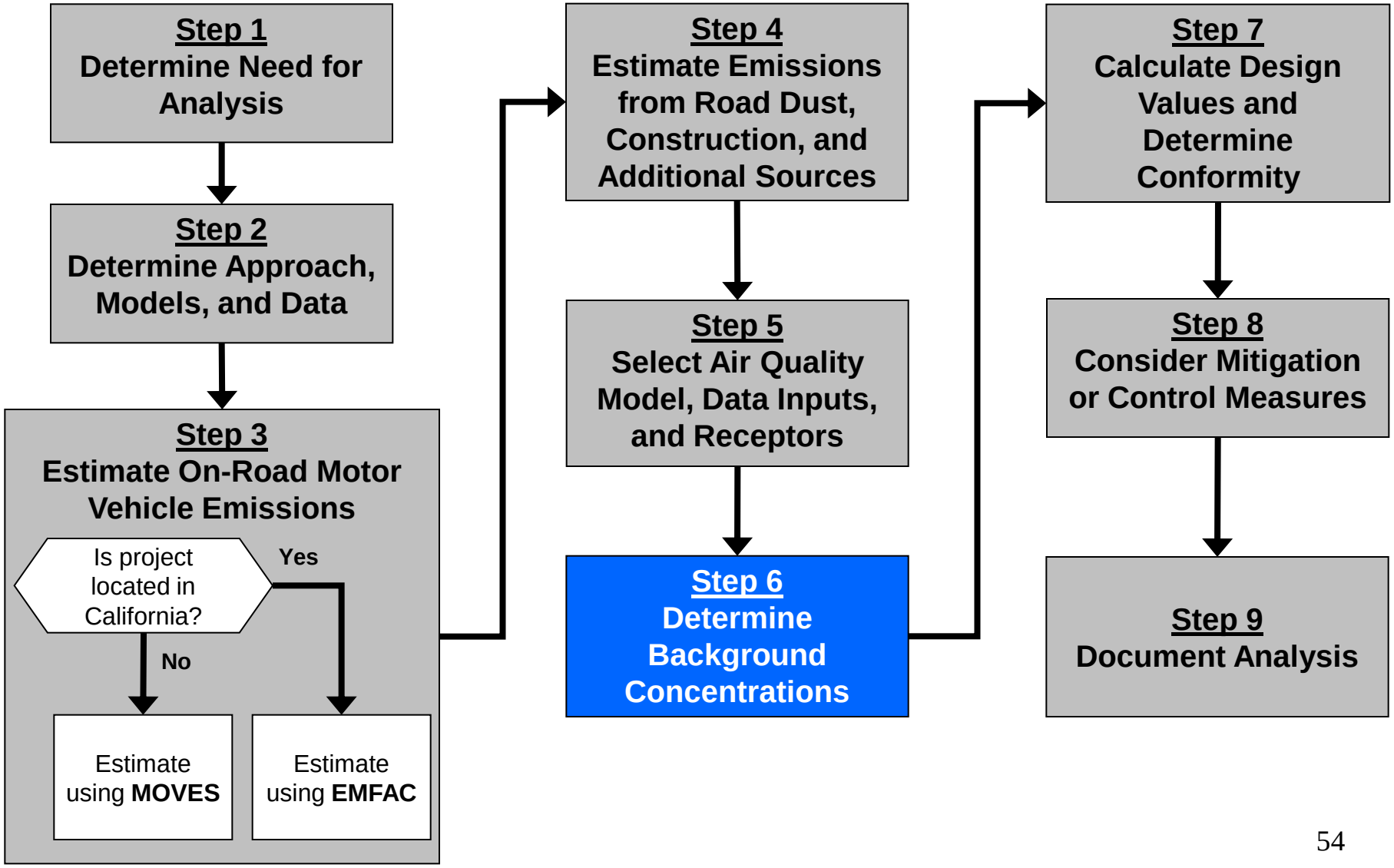


Step 5: Selecting Air Quality Model, Data Inputs, and Receptors

- This includes…
  - » Selecting the air quality model
  - » Characterize emissions sources
  - » Obtaining meteorological data
  - » Specifying receptors in project area
  - » Running the model
- Result of this step: estimated future AQ concentrations…
  - …for the project and any nearby sources that are modeled
  - …at specific receptor locations
  - …over a 5-year period (or 1-year period, if using site-specific met data)
- We provide an air quality modeling overview in **Module 3**
- We will cover using AERMOD in **Module 4** and CAL3QHCR in **Module 5**

Guidance Reference: Section 7.3

Completing a PM Hot-spot Analysis



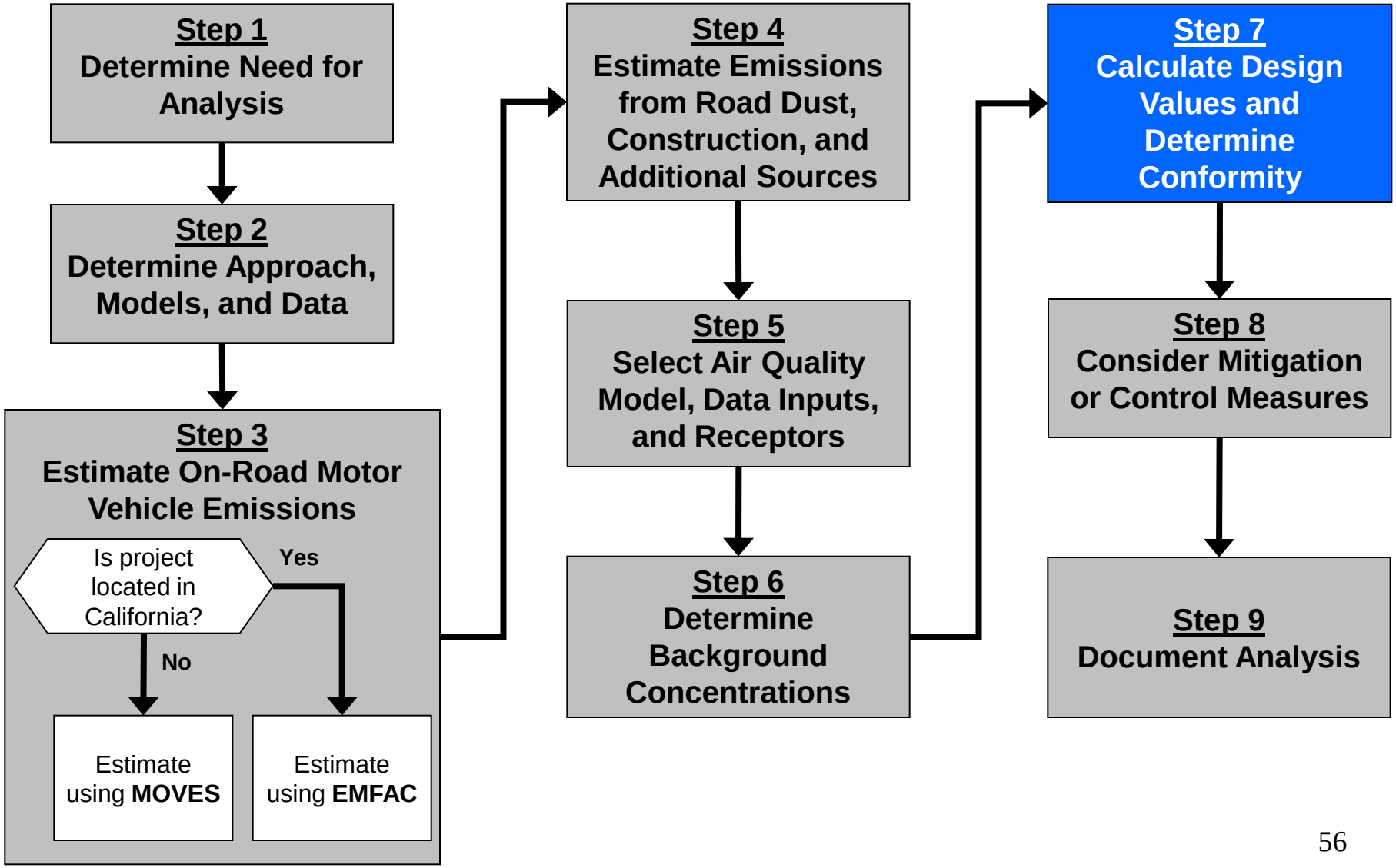
Step 6: Determining Background Concentrations

- "Background" includes sources that are not the project that affect concentrations in project area
  - » In general, nearby sources would be modeled only when affected by the project
  - » Impacts of other sources are captured by background concentrations
- Background concentrations are determined primarily through monitoring data
- Result of this step: file of representative background data (e.g., from an AQ monitor over a 3-year period)
- We will cover in **Module 6**

Guidance Reference:

Sections 3.7 , 8, & 9

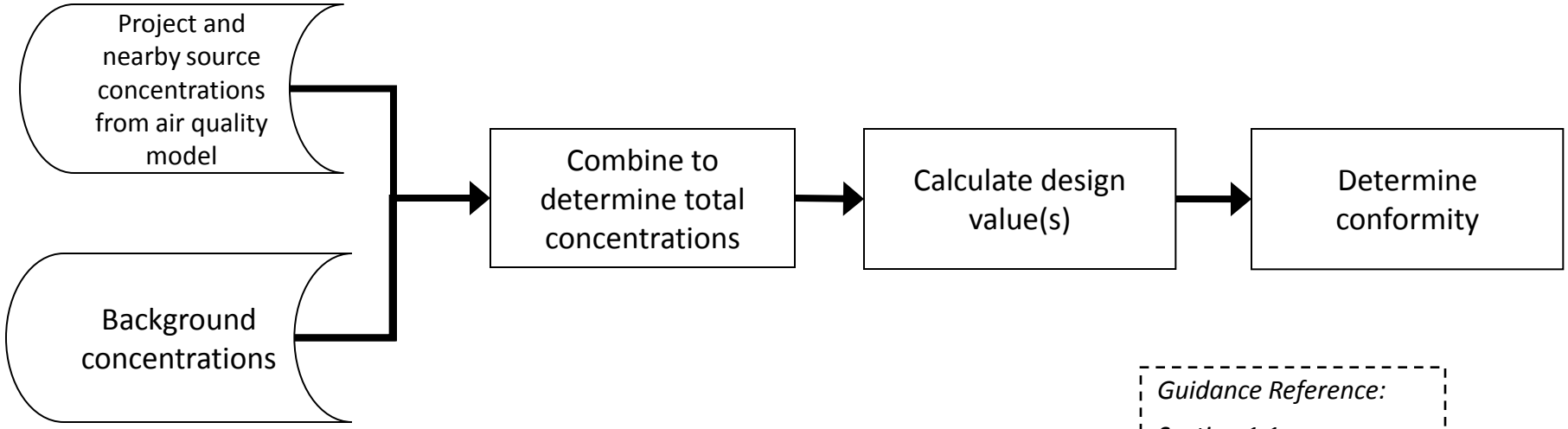
Completing a PM Hot-spot Analysis



Step 7: Calculating Design Values and Determining Conformity

- For conformity purposes, a "design value" is a statistic that describes future air quality concentrations in the project area that can be compared to a particular NAAQS

- Calculated by combining:
  - » Air quality modeling results (concentrations from the project and any nearby sources, e.g., over a 5-year period) *with*
  - » Representative background concentrations (e.g., over a 3-year period)



Guidance Reference:

Section 1.1

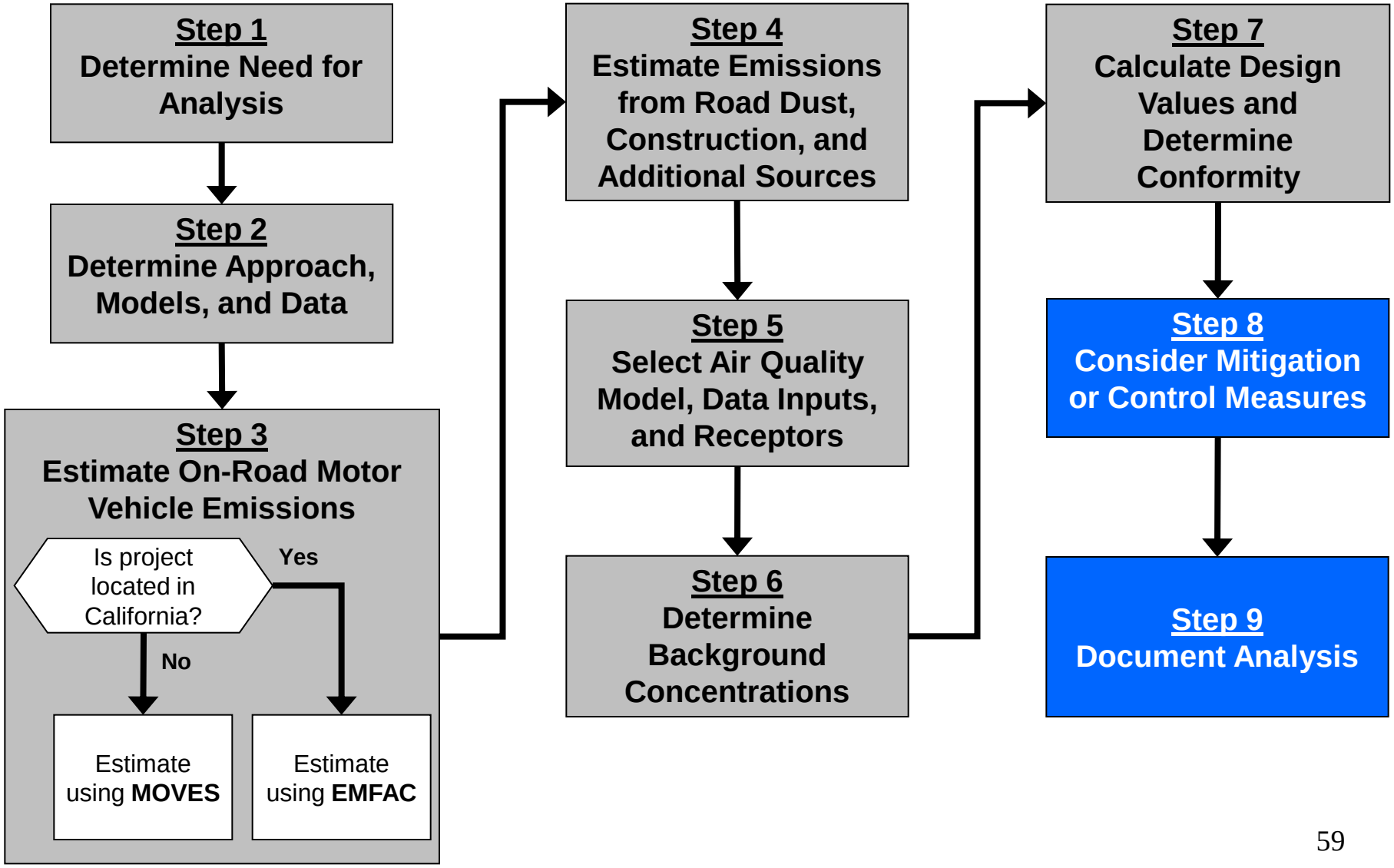
Step 7: Calculating Design Values and Determining Conformity

- Each NAAQS calculates design values differently
- Result of this step: design values for the project that are then used to determine if project conforms
- Will we cover this step in **Module 7**

Guidance Reference:

Sections 3.8 & 9

Completing a PM Hot-spot Analysis



Step 8: Considering Mitigation and Control Measures in an Analysis

- Mitigation and control measures can be considered at any stage of a PM hot-spot analysis
- Can be applied to project itself or other PM sources in project area
- Additional emissions/AQ modeling may be required
- Sections 93.123(c)(4) and 93.125(a) require written commitments to be obtained from the project sponsor or operator prior to making the project-level conformity determination

Guidance Reference:

Sections 3.9 & 10.1

Categories of Potential Measures

- Retrofitting, replacing vehicles/engines and using cleaner fuels
  - » Retrofit diesel engines
  - » Update fleet to cleaner engines
  - » Retirement/replacement of older diesel vehicles

- Reduced idling programs
  - » Implement anti-idling program trucks/buses

- Transportation project design revisions
  - » Reduce diesel vehicles at one location
  - » Reduce idling within facility
  - » Route traffic away from populated areas
  - » Consider alternative travel/goods movement transportation modes

Guidance Reference:

Section 10.2

Categories of Potential Measures

- Fugitive dust control programs
  - » Cover open trucks during project construction
  - » Street cleaning program
  - » Site watering program
  - » Street and shoulder paving and erosion control
  - » Reduce use of salt and sand in project area
- Reduce background concentrations by addressing other source emissions
  - » Reduce school bus emissions
  - » Reduce emissions from ships, cargo handling equipment, and other vehicles at ports
  - » Adopt locomotive anti-idling measures
  - » Remanufacture locomotives
  - » Reduce stationary source emissions

Guidance Reference:

Section 10.2

Step 9: Documenting the PM Hot-spot Analysis

- Documentation should be sufficient to support the conclusion that the proposed project meets conformity rule requirements
- Included in project-level conformity determination
- Appropriate sections of NEPA analysis (e.g., project description, etc.) could be referenced

Guidance Reference:

Section 3.10

Documenting the PM Hot-spot Analysis

Should include, at a minimum (see guidance for details):

1. Description of proposed project, when it is expected to open, and projected travel activity data

2. Analysis year(s) examined and factors considered in determining year(s) of peak emissions

3. Emissions modeling data, including model used, inputs and results, and how project was characterized in terms of links

4. Model inputs and results for road dust, construction emissions, and emissions from other sources (as applicable)

Guidance Reference:

Section 3.10

Documenting the PM Hot-spot Analysis

5. Air quality modeling data, including model used, inputs and results, and receptors employed

6. How background concentrations were determined

7. Any mitigation and control measures implemented

8. How interagency and publication participation requirements were met

9. Conclusion that the proposed project meets conformity requirements for PM NAAQS

10. Sources of data for modeling; any critical assumptions made

Guidance Reference:

Section 3.10

Class Exercise

For each case, what year(s) might be analyzed in a PM hot-spot analysis?

Assumptions for Exercises

- Cases should be assumed to involve projects of local air quality concern
- Cases are illustrative only
- Cases do not include additional information about project or interagency consultation that would be used in an actual PM hot-spot analysis

Guidance Recap

- Need to choose an analysis year or years within the transportation plan during when:
  - Peak emissions from the project are expected
  - A new or worsened NAAQS violation would most likely occur due to cumulative impacts of project and background concentrations

- Need to consider the following factors:
  - Changes in vehicle fleets
  - Changes in traffic volumes, speeds, and VMT
  - Expected trends in background concentrations in the project area and the impacts of any nearby sources (e.g., those affected by the project)

Guidance Reference:

Section 2.8

Case 1: New Interchange

- A new interchange connecting a 4-lane principal arterial with a 6-lane freeway through entrance/exit ramps to provide truck access to local warehouses and other businesses

- Project will be completed October 2015
  - » Distribution centers and warehouses will be locating on the arterial and in place in 2017

- Air quality in the area has been improving

- No nearby sources need to be included in air quality modeling

Case 1: Questions

- What are the factors that influence the analysis year(s)?

- What are potential analysis year(s)?

Case 1: Questions

- What are the factors that influence the analysis year(s)?
  - » Changes in vehicle fleets
    - – Significant new increase in trucks in project area
  - » Changes in traffic volumes, speeds, and VMT
    - – More traffic at the interchange by 2017
  - » Expected trends in background concentrations, including nearby sources that are affected
    - – Air quality concentrations are trending downward
    - – No nearby sources affecting the project area to consider
- What are potential analysis year(s)?
  - » 2016: could be year of peak emissions, if truck emission rates have greater influence on overall emissions
  - » 2017: could be year of peak emissions, if the number of trucks has greater influence on overall emissions

Case 2: Highway Expansion

- An existing 4-lane arterial (2 lanes in each direction) is to be expanded to 8 lanes (4 lanes in each direction) from its end point at a shipping port to an interstate a few miles away
  - » Purpose is to accommodate a 50% increase in truck round trips to the port projected to result from increased future activity at the port
- Project will be completed October 2015
- Port authority's financial forecasts show the port's volume will continue to rise until the 4th quarter of 2020
  - » Truck traffic anticipated to rise to keep pace with increasing port activity

Case 2: Questions

- For this case, what are the factors that influence the analysis year(s)?

- What are potential analysis year(s)?

Case 2: Questions

- For this case, what are the factors that influence the analysis year(s)?
  - » Changes in vehicle fleets
    - – Increase in percentage of trucks that make up AADT
  - » Changes in traffic volumes, speeds, and VMT
    - – Increased truck traffic, effect on speed, increased VMT
  - » Expected trends in background concentrations, including nearby sources that are affected
    - – Project intended to accommodate additional port volume; increase in port emissions have to be considered in choice of analysis year(s)

- What are potential analysis years?
  - » 2016 (year after project opens) and/or
  - » 2021 (year after project and port emissions peak)

Case 3: New Bus Terminal

- A new bus terminal is planned that will be approved now and built in two phases:
  - » Phase I will be completed Sept 2016 and will comprise the terminal building and be able to accommodate 50 buses at one time
  - » Phase II will be completed in June 2018 and include another 50 bus bays
  - » Terminal will operate from 6 am to 10 pm and will generate 2 bus trips per hour per bay
- Transit operator will initially operate terminal with existing diesel buses
  - » Has committed to replace diesels with CNG buses beginning 2020 – Will replace 10 buses per year
- Area missed its 2010 attainment date; has been given extension to 2015

Case 3: Questions

- For this case, what are the factors that influence the analysis year(s)?

- What are potential analysis year(s)?

Case 3: Questions

- For this case, what are the factors that influence the analysis year(s)?
  - » Changes in vehicle fleets
    - – Bus fleet will become cleaner as it changes from diesel to CNG beginning in 2020
  - » Changes in traffic volumes, speeds, and VMT
    - – Project will result in differences in these factors
  - » Expected trends in background concentrations, including nearby sources that are affected by the project
  - » Other factor: Terminal will be developed in two stages, so two analysis years should be modeled
- What are potential analysis years?
  - » 2017 (after phase I completed) and
  - » 2019 (after phase II completed)

End of Module 1

Questions?