

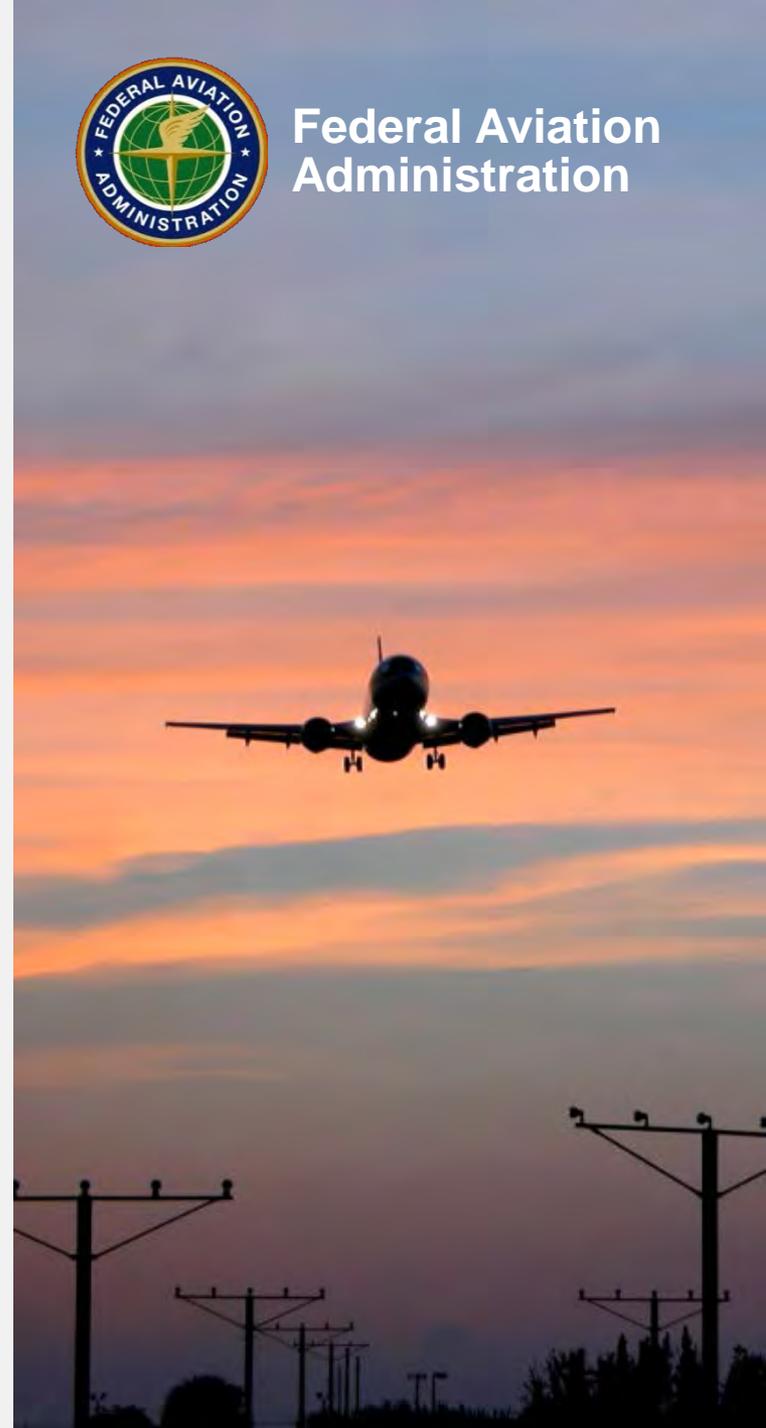
The Aviation Emissions and Air Quality Handbook

AEE 300, Office of
Environment & Energy

January - 2015



Federal Aviation
Administration

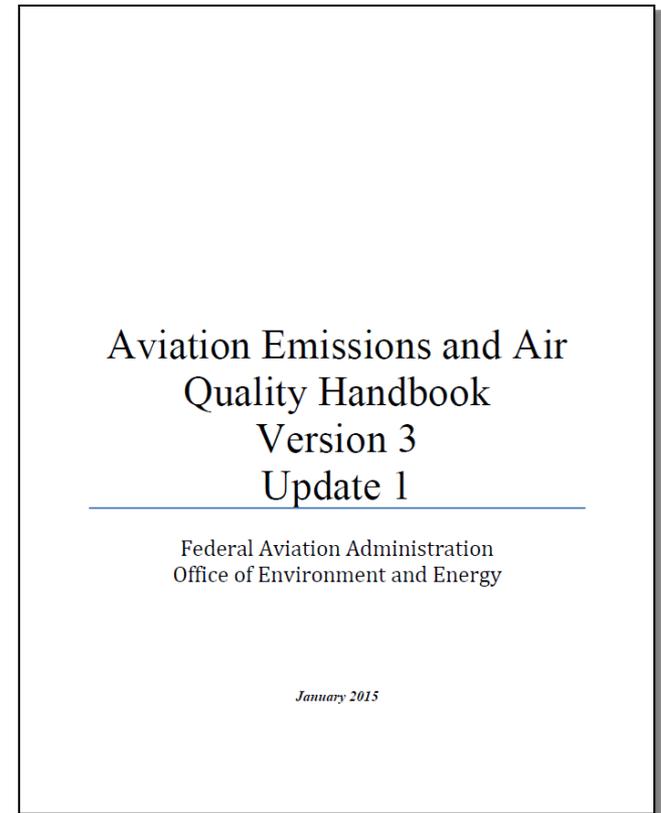


Introduction



The AQ Handbook Objectives

- 1) Provide Guidance and Procedures for Preparing FAA Air Quality Assessments
- 2) Help Ensure The Assessments Meet NEPA and CAA Requirements
- 3) Determine When an Air Quality Assessment is Necessary and What is Appropriate

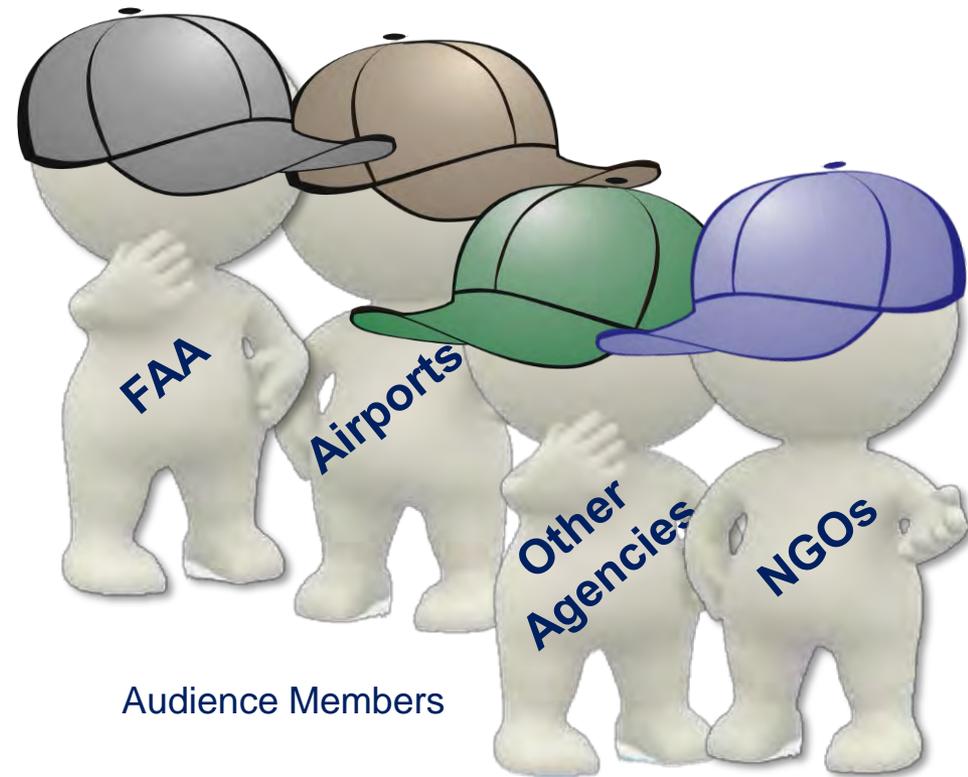


FAA AQ Handbook Cover

[Hdbk. Pg. 1]

The AQ Handbook Audience

- FAA Departments and Offices
- Other federal, state and local agencies
- Airport Sponsors
- Non-Governmental Agencies (NGOs)
- Seasoned Practitioners and Newcomers



[Hdbk. Pg. 2]

The AQ Handbook Features

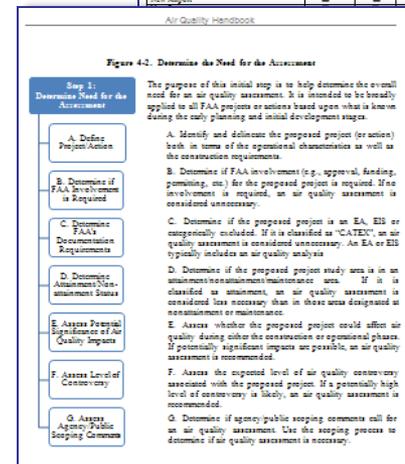
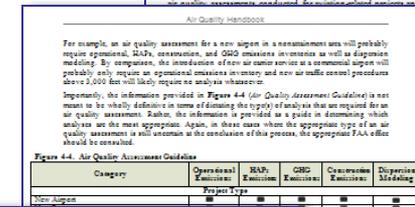
- Updates 1997 Version and 2004 Addendum
- Current With FAA Orders, Policies and Guidelines
- Covers New Topics (HAPs, GHGs)
- Uses Latest Models (AEDT, MOVES)
- Internet “Links” to All References
- Guideline Materials Supported by Technical Appendices
- User-friendly and in plain English



The AQ Handbook Sections

Executive Summary

1. Introduction & Background
 2. Regulatory Framework
 3. Sources & Types of Air Emissions
 4. Air Quality Assessment Process
 5. Air Quality Assessment Models
 6. Preparing an Emissions Inventory
 7. Conducting Dispersion Modeling
 8. Conformity
 9. Coordination Best Practices
- References, Glossary, Acronyms, Abbreviations
- Appendices



Example Pages

[Hdbk. Pgs. 2 - 3]



Background Information



Sec. 2: Regulatory Framework

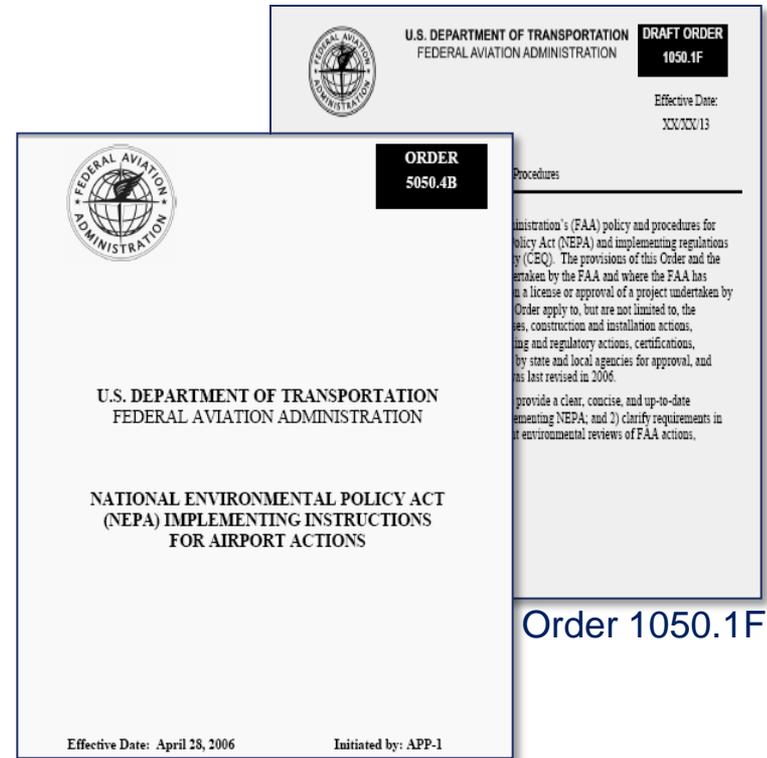
National Environmental Policy Act (NEPA)

FAA Order 1050.1F

Environmental Impacts: Policies and Procedures and Desk Reference

FAA Order 5050.4b

National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects



Order 5050.4b

Order 1050.1F

[Hdbk. Pgs. 4 - 6]

Sec. 2: Regulatory Framework

Clean Air Act (CAA)

- National Ambient Air Quality Standards (NAAQS)
- Attainment/Nonattainment Areas
- State Implementation Plans (SIPs)
- General/Transportation Conformity Rules



[Hdbk. Pgs. 5 - 9]

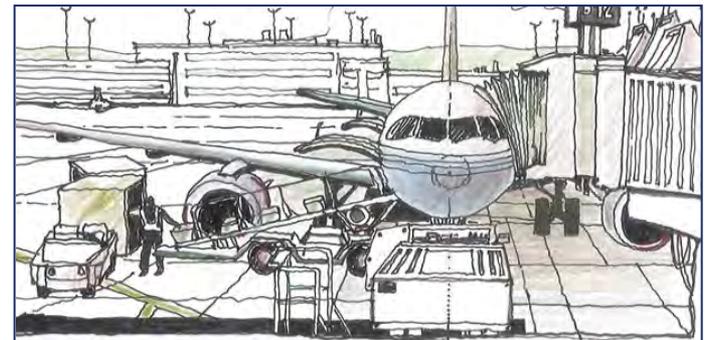
Sec. 3: Sources & Types of Emissions

Sources

- Aircraft
- Auxiliary Power Units (APUs)
- Ground Support Equipment (GSE)
- Ground Access Vehicles
- Stationary & Area Sources
- Construction

Types

- Criteria Pollutants (and their precursors)
- Hazardous Air Pollutants (HAPs)
- Greenhouse Gases (GHGs)

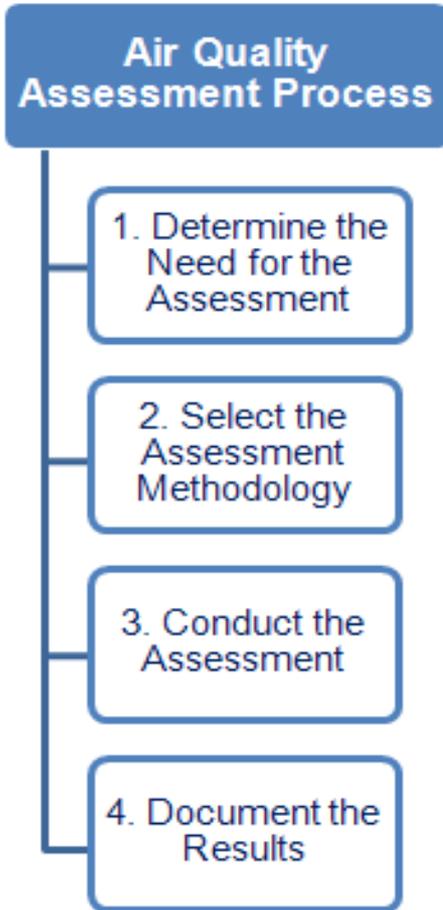


[Hdbk. Pgs. 10 - 17]

Process



Sec. 4: Air Quality Assessment Process



Following a 4-step approach, this section is designed to help *Handbook* users:

1. Determine when an air quality assessment is warranted,
2. Formulate an appropriate approach to preparing the assessment,
3. Conduct the assessment, and
4. Document the results.



[Hdbk. Pgs. 18 - 19]

Step 1: Determine Need for the Assessment

Step 1. Determine Need for the Assessment

1.A. Define
Project/Action

1.B. Determine if
FAA Involvement is
Required

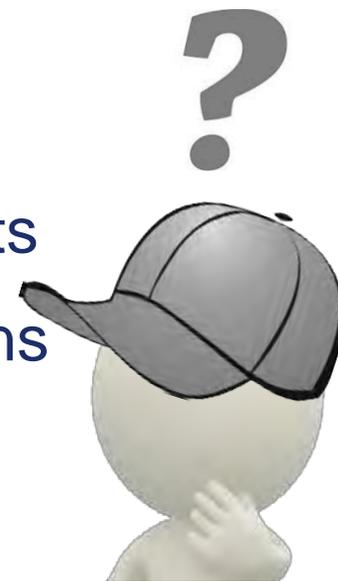
1.C. Determine if
Project/Action Will
Increase Emissions

1.D. Determine
Attainment/Non-
attainment Status

1.E. Assess
Agency/Public
Scoping Comments

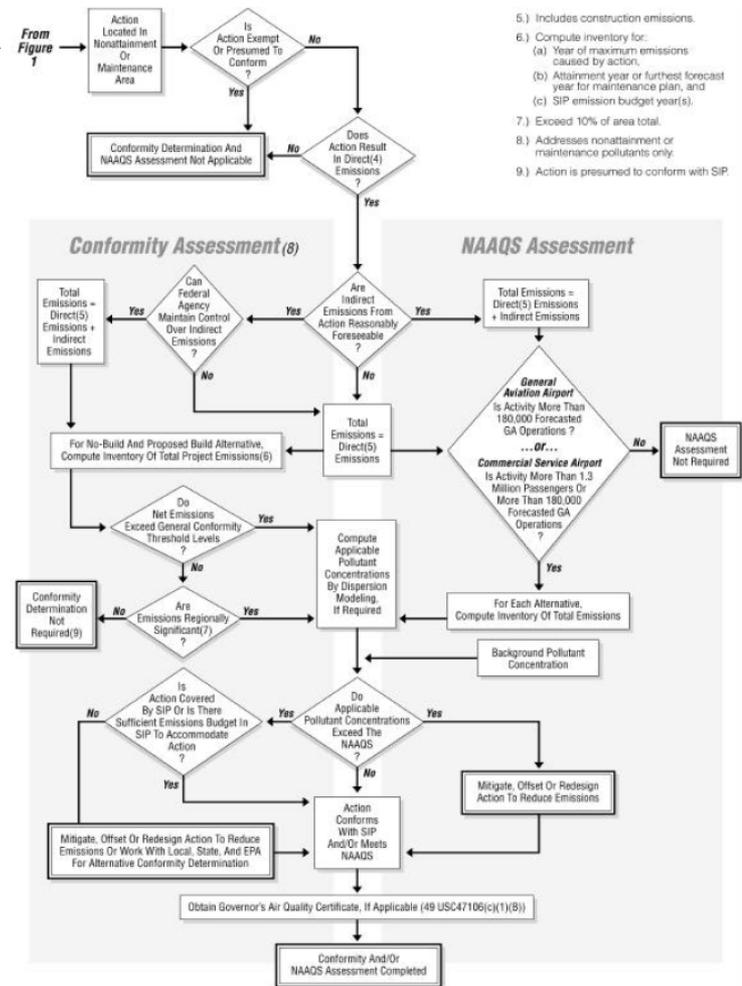
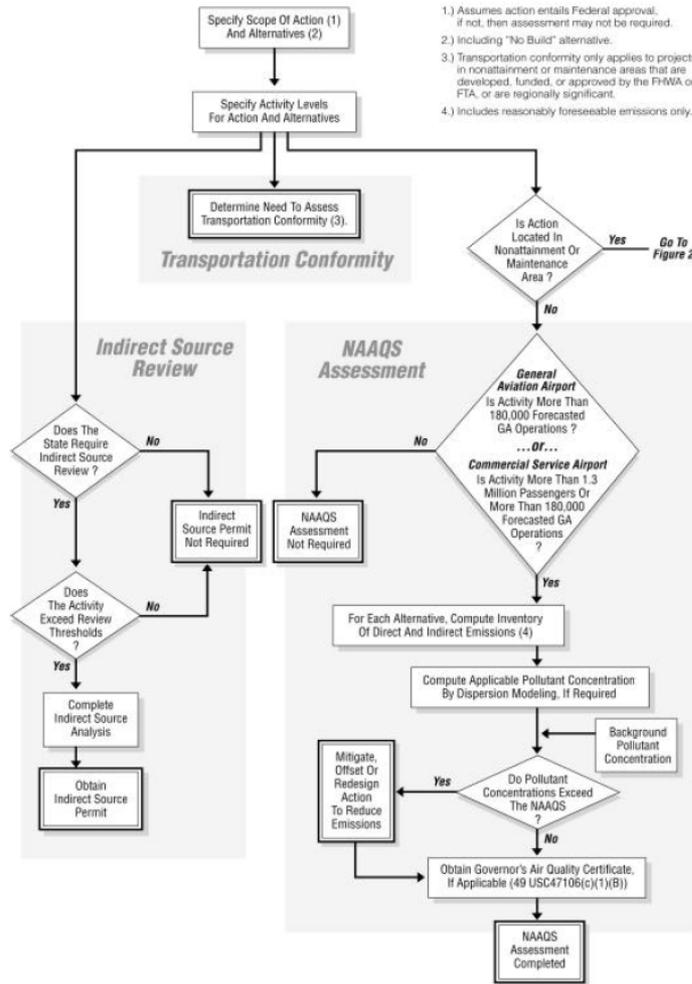
This section helps *Handbook* users determine the need for an air quality assessment taking into consideration such factors as:

- Project/Action Definition
- FAA's Involvement & Documentation Requirements
- Potential Increased Emissions
- Scoping Comments

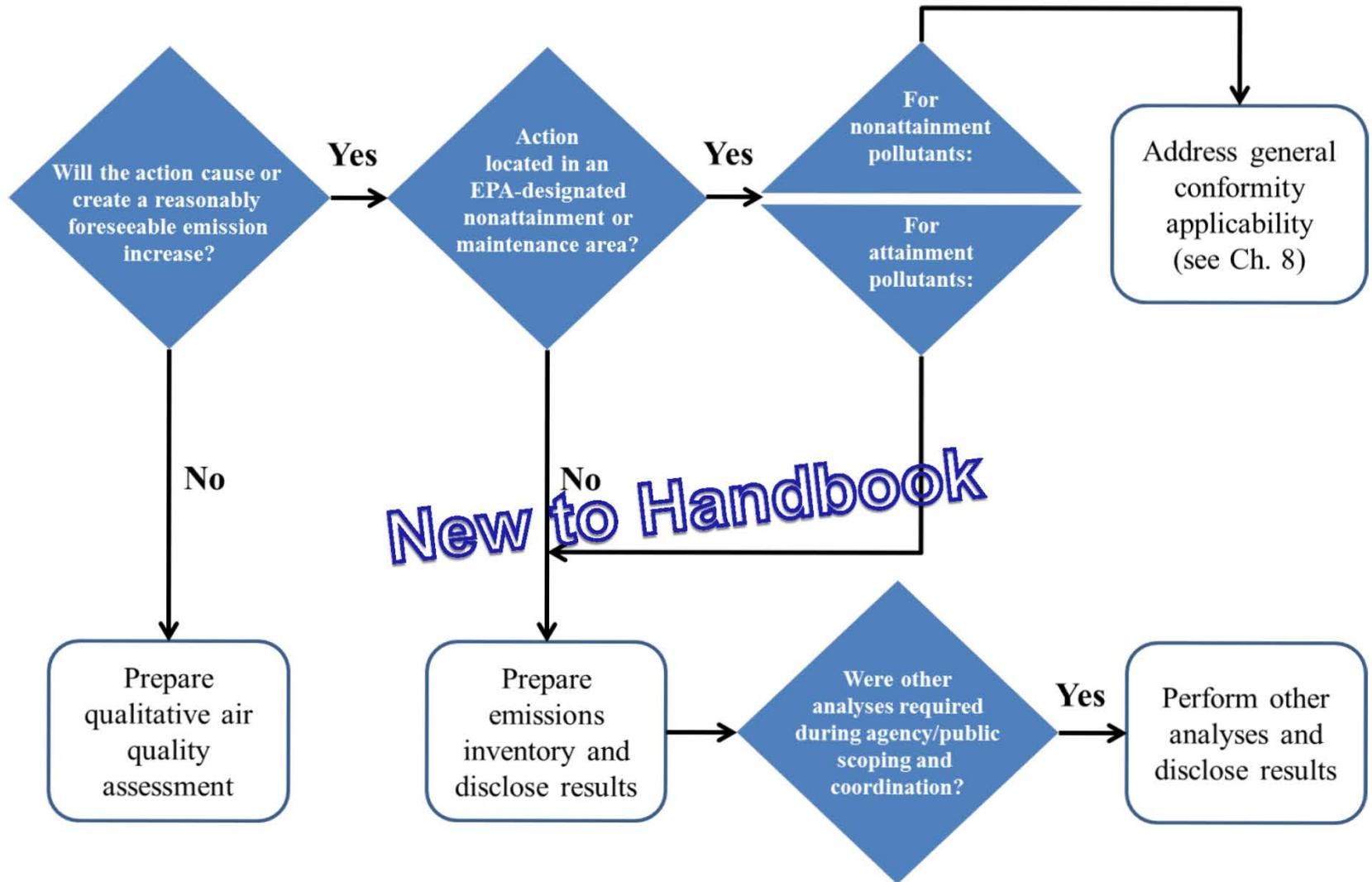


[Hdbk. Pgs. 20 - 22]

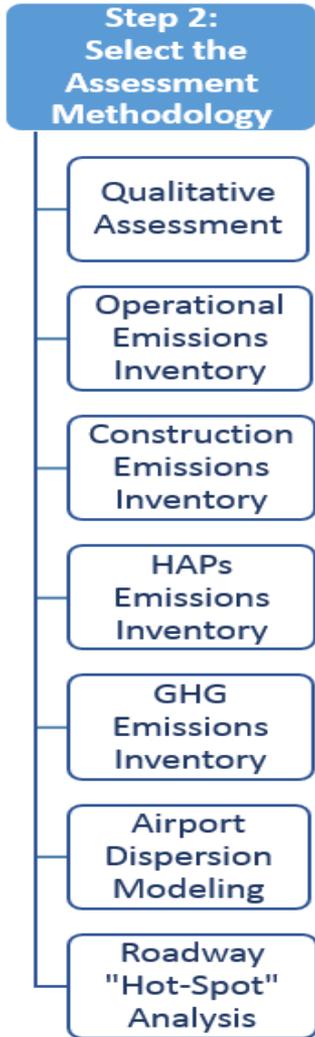
OLD AQ Assessment Decision Flow Diagram



Air Quality Assessment Decision Flow Diagram



Step 2: Select the Assessment Methodology



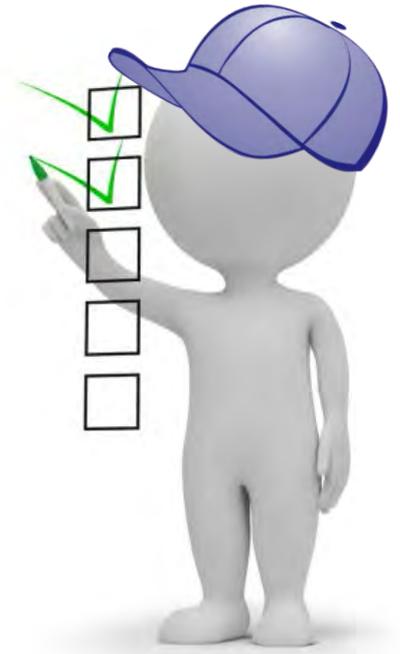
This step helps the *Handbook* users to determine the type(s) of analyses that are appropriate for the air quality assessment.

These include emissions inventories for:

- Operational Emissions,
- Construction Emissions,
- HAPs and GHGs, and

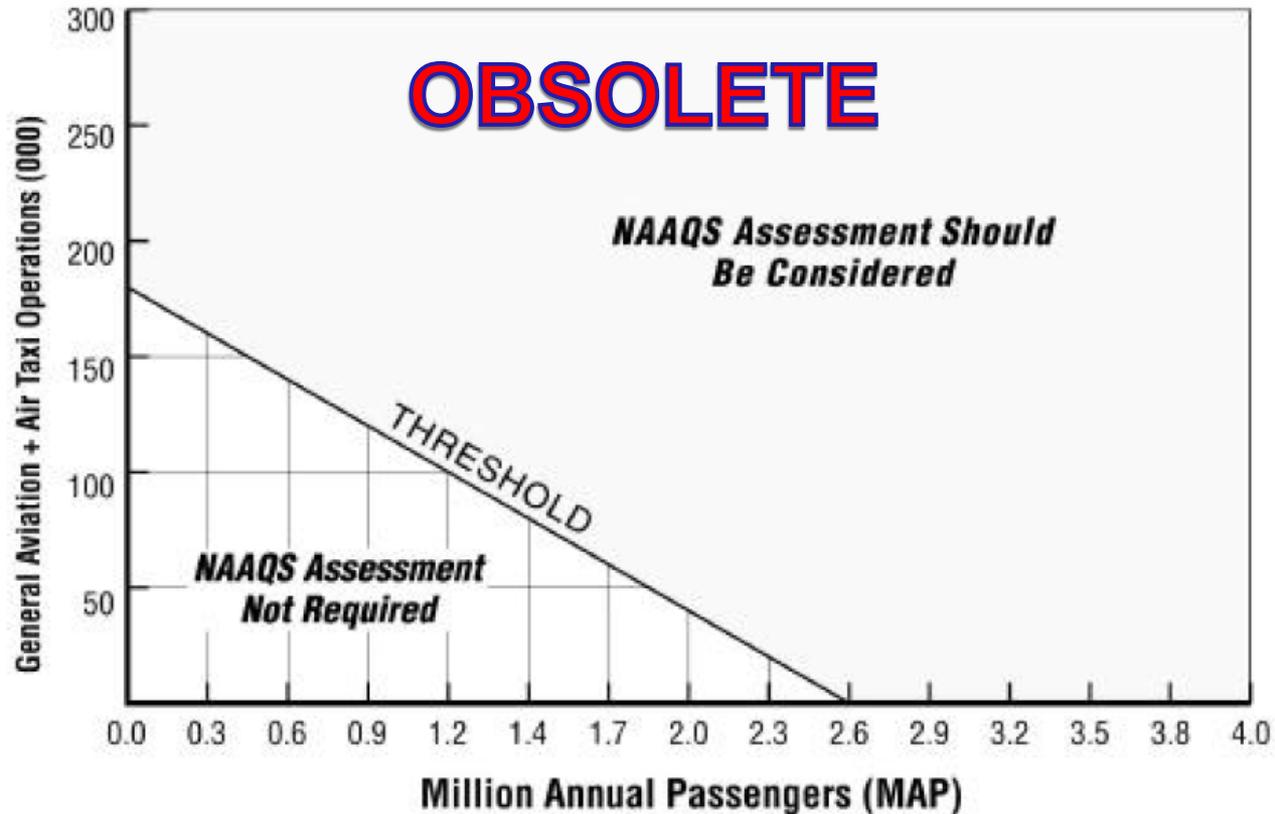
Dispersion modeling for:

- Airports and
- Roadways.



[Hdbk. Pgs. 23 - 26]

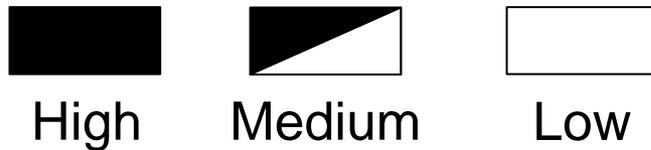
DELETED: Activity Threshold for NAAQS Assessment



There is no single, universal criterion for determining what type of analysis is appropriate for FAA-supported projects or actions.

NEW: Air Quality Assessment *Example* Guide

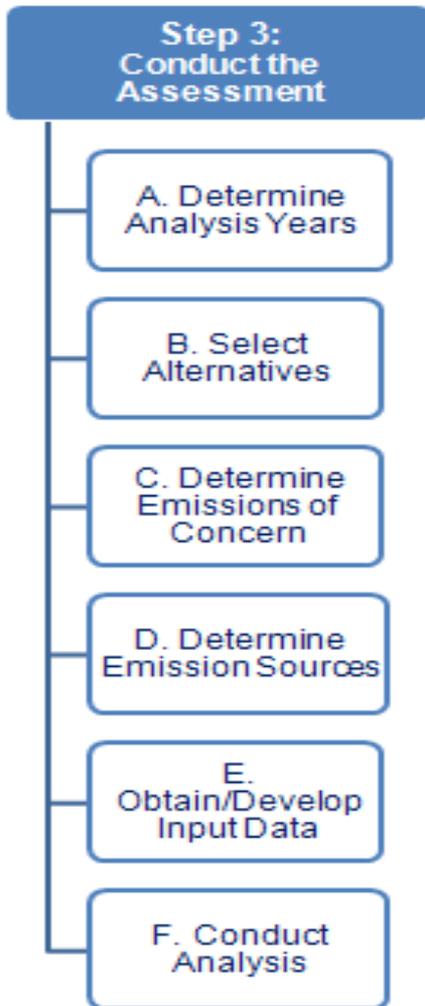
How appropriate is a particular analysis type?



There is no single, universal criterion for determining what type of analysis is appropriate for FAA - supported projects or actions.

Project/Action Category	Operational Emissions Inventory	HAPs Emissions Inventory	GHG Emissions Inventory	Construction Emissions Inventory	Dispersion Modeling
Project Type					
New Airport	■	■	■	■	☑
New Runway	☑	■	■	■	☑
Major Runway Extension	☑	☑	☑	■	☑
New or Expanded Terminal	☑	☑	☑	■	☑
Relocated Terminal	☑	☑	☑	■	☑
Roadway Modifications	☑	☑	☑	■	☑
New or Expanded Cargo Facility	☑	☑	☑	■	☑
New or Expanded Parking	☑	☑	☑	■	☑
New or Expanded Utility Plant	☑	☑	☑	■	☑
New Fuel Storage System	□	☑	□	■	□
New or Modified Taxiway	□	☑	□	■	☑
Runway Safety Area	□	□	□	☑	□
Runway Rehabilitation	□	□	□	□	□
Obstruction Removal	□	□	□	□	□
Air Traffic Control Tower	□	□	□	☑	□
Action Type					
Increase in Aircraft Operations	☑	☑	☑	□	☑
Change in Runway Utilization	☑	☑	☑	□	☑
Change in Fleet Mix	☑	☑	☑	□	☑
Increase in Taxi Time/Delay	☑	☑	☑	□	☑
Increase in Motor Vehicle Trips	☑	☑	☑	□	☑
Air Traffic Procedures < 3,000 ft	☑	☑	☑	□	□
Air Traffic Procedures > 3,000 ft	□	□	□	□	□
Land Acquisition	□	□	□	□	□
Navigational System	□	□	□	□	□
<small>¹The symbols indicate the relative level of appropriateness of an analysis to a project/action: ■ = High, ☑ = Medium, □ = Low</small>					
<small>²Importantly, the information provided in this figure is not meant to be definitive or all-inclusive in terms of dictating the type(s) of air quality assessments that are required for FAA projects or actions. Rather, the information is provided as a guide in determining which analyses are the most appropriate.</small>					

Step 3: Conduct the Assessment



This step helps the *Handbook* users to set up and conduct the air quality assessment. This is accomplished through the consideration of the following:

- Action/Project Alternatives
- Period(s) of Interest
- Emission Sources and Types of Pollutants
- Necessary Input Data



[Hdbk. Pgs. 27 - 29]

Step 4: Document the Results

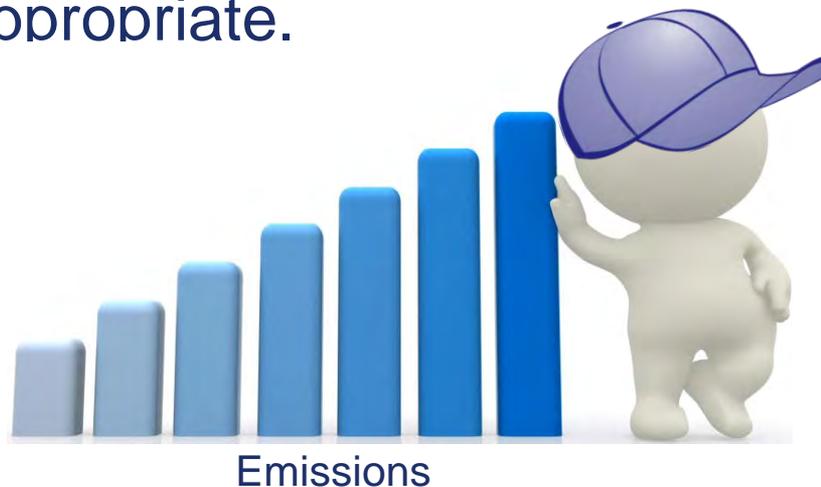
Step 4: Coordination/Review and Documentation of Results

A.
Coordination/
Review

B. Report
Results

C. Interpret
Results

This step helps *Handbook* users to coordinate, document and explain the air quality assessment results using methods that are both useful and appropriate.



[Hdbk. Pg. 28]

Tools & Methods



Consistent Formats for Methodology Sections

For ease of understanding, each section follows the same format and sequence of information:

- Introduction and Background
- Agency Guidance (e.g. HAPs, GHGs)
- Methods
- Results
- Appendices



FAA HAPs and GHG Guidance Documents

Sec. 5: Air Quality Assessment Models

This section identifies and provides guidance on models and databases that are available to *Handbook* users for conducting air quality assessments.

Models	Emissions Inventories				Dispersion Modeling	
	Criteria Pollutants		GHG	HAPs	Airport	Roadway (Hot-Spot Analysis)
	Airport Operation	Airport Construction				
EDMS/AEDT	✓		✓	✓	✓	
MOVES	✓	✓	✓	✓		✓
NONROAD		✓				
AERMOD					✓	✓
CAL3QHC						✓

[Hdbk. Pgs. 30 - 35]

Sec. 6: Preparing an Emissions Inventory

Following FAA guidance, this section aids *Handbook* users in the preparation of emissions inventories for three categories of emissions:

- Criteria Pollutants (and their precursors)
- Hazardous Air Pollutants (HAPs)
- Greenhouse Gases (GHGs)

Source	Emissions (tons)					
	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5}
Aircraft	718	146	482	59.7	7.3	7.3
APUs	22.8	4.3	12.7	2.2	2.2	2.2
Stationary Sources	30.2	0.2	4.3	<0.1	60.2	60.2
GSE	32.8	6.3	51.0	0.4	5.9	5.7
Motor Vehicles	261	6.2	35.1	0.8	2.6	1.2
Total Proposed Action	1,087	160	585	63.1	78.2	76.6
Total No Action	1,018	154	536	58.9	76.6	75.3
Net Increase (project-related)	69	6	49	4.2	1.6	1.3

[Hdbk. Pgs. 36 - 56]



Sec. 7: Conducting Dispersion Modeling

Following U.S. EPA guidance, this section aids *Handbook* users in conducting atmospheric dispersion modeling in support of FAA actions/projects.

Pollutant	Averaging Period	NAAQS	Modeling Year ($\mu\text{g}/\text{m}^3$)			
			2015		2020	
			No Action	Proposed Action	No Action	Proposed Action
NO ₂	1-hour	188	123	142	120	150
	Annual	100	78.5	78.8	77.3	80.8
CO	1-hour	40,000	19,800	19,900	20,800	20,000
	8-hour	10,000	8,200	8,400	7,200	8,200
SO ₂	1-hour	195	51	48	50	47
	3-hour	1,300	473	416	474	415
PM ₁₀	24-hour	150	54.6	54.5	55.2	54.1
PM _{2.5}	24-hour	35	29.5	29.7	29.8	29.3
	Annual	12	9.7	9.6	9.6	9.5

Note: Results include background concentrations. $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

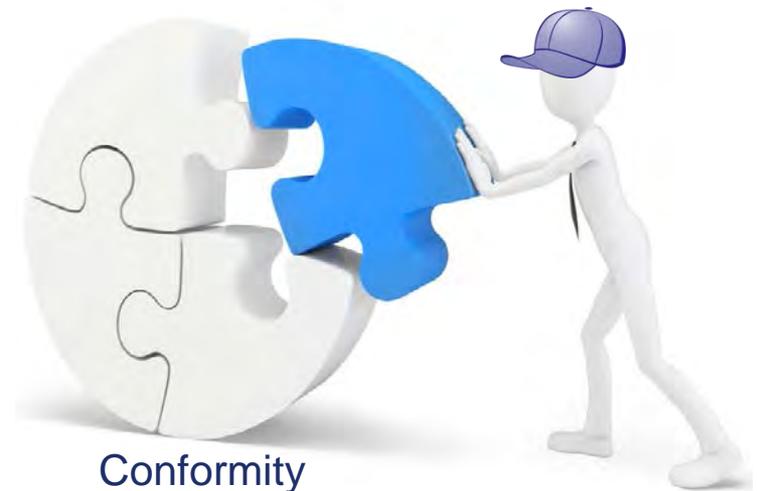
[Hdbk. Pgs. 57 - 68]



Sec. 8: Conformity

This section aids *Handbook* users in the understanding and application of the CAA Conformity requirements and processes. Topics include the following:

- General and Transportation Conformity
- Applicability Analysis
- *De-minimis* Levels, Exemptions and Presumed to Conform
- Agency and Public Review
- FAA and ACRP Guidance



[Hdbk. Pgs. 69 - 77]

Sec. 9: Coordination Best Practices

This *Handbook* section identifies opportunities, objectives and methods for conducting coordination between the FAA, reviewing agencies and other stakeholders involved in the air quality assessment process.

Two common and effective methods are featured:

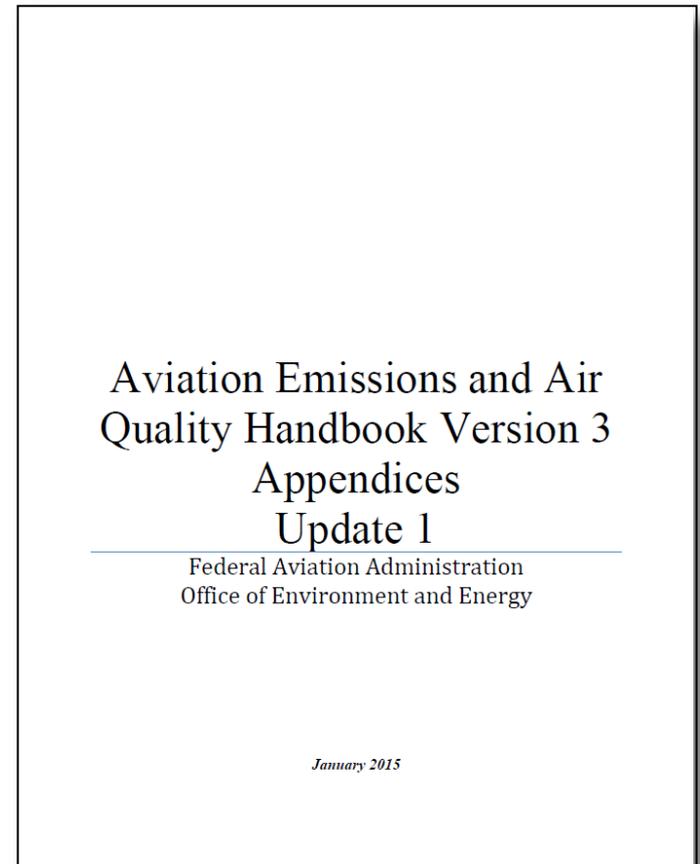
- NEPA Scoping Process
- Air Quality Assessment Protocol



[Hdbk. Pgs. 78 - 79]

Appendices

- A1 - Aircraft Emission Inventory
- A2 - APU Emission Inventory
- A3 - GSE Emission Inventory
- A4 - Ground Access Vehicle Emission Inventory
- A5 - Stationary Sources Emission Inventory
- A6 - Construction Emission Inventory
- B - Emissions Inventory for HAPs
- C - Emissions Inventory for GHGs
- D - Atmospheric Dispersion Modeling
- E - Roadway Dispersion Modeling
- F - Data and Information Sources



FAA AQ Handbook
Appendices Cover

For More Handbook Information

- Download Copy:
http://www.faa.gov/regulations_policies/policy_guidance/envir_policy/airquality_handbook/

- FAA Contacts:
 - Christopher Sequeira
 - Nicole Didyk

AEE 300, Office of Environment & Energy

