APPENDIX D - Atmospheric Dispersion Modeling

D.1 Overview

This appendix discusses the methodology, typical input data, and endpoints associated with atmospheric dispersion modeling of airport-related sources. **Section 7.1** (*Atmospheric Dispersion Modeling for Airports*) discusses the available guidance for preparing and reporting the results of dispersion modeling for FAA projects/actions.

D.2 Dispersion Modeling Data

The fundamental concepts and elements of air dispersion modeling include the following:

- Model identification and options
- Emission source release characteristics
- Meteorological data
- Spatial allocation
- Temporal profiles
- Topography data
- Building downwash
- Receptor locations
- NO_x to NO_2 conversion
- Background concentrations

These concepts and elements are discussed individually in the following sections.

D.2.1 Model Identification and Options

AERMOD is a steady-state Gaussian dispersion model recommended by the EPA for short-range (i.e., up to 50 kilometers) dispersion of air pollutant emissions from point, area, line, and volumes sources over simple, intermediate, and complex terrain.[70] As such, AERMOD serves as dispersion modeling component for the FAA's EDMS/AEDT.

The model predicts both short- (i.e., 1-, 3, 8, 24-hour) and long-term (i.e., annual) average concentrations (in microgram per cubic meter or $\mu g/m^3$) at each receptor. These concentrations may be presented as plot files and receptor files providing the results for both tabular and graphical display.

AERMOD is typically executed using the regulatory default options (e.g., stack-tip downwash, buoyancy-induced dispersion, and final plume rise), default wind speed profile categories, default potential temperature gradients, and no pollutant decay. AERMOD also has the capability to account for building downwash effects[71] and to employ gas or particle deposition or wet/dry depletion of the plume.[72]

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[70] EPA, Preferred/Recommended Models, http://www.epa.gov/scram001/dispersion_prefrec.htm.

[71] The term *building downwash* describes the effect that wind flowing over or around a structure(s) has on plumes released from nearby sources (such as stacks). Essentially, structure(s) create a cavity of recirculating winds in the area near the structure(s), and these cavities cause increased vertical dispersion of plumes emitted from