"The height of the mixing zone…is significant primarily when calculating NO_x emissions rather than hydrocarbons or CO. If NO_x emissions are an important component of the inventory, site-specific data must be gathered on mixing heights. If NO_x emissions are unimportant, mixing height will have little effect on the results and the default value of 3,000 feet can be used for more generalized results."

The EPA *Guideline on Air Quality Models* also identifies four options for establishing the mixing height based on the type and amount of data available as well as its application. These options are summarized below:

- *NCDC Data*: These data are site-specific and based upon the most recent set of "real-world" measurement data near an airport.
- *Support Center for Regulatory Air Models (SCRAM) Data*: These data are available from the EPA Office of Air Quality Planning and Standards SCRAM Bulletin Board. Although these data are based on NCDC measurements, they were collected during the late 1980's and early 1990's and are not the most recent available.
- EPA's *Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States*: This 1972 publication (also called the "Holzworth" report) contains data and graphs depicting mixing heights for mean annual morning and mean summer afternoon conditions across the U.S., by season (i.e., winter, summer, etc.).[77]
- *3,000 feet Mixing Height:* This value is recommended by EPA when no site-specific data is available and is the "default" value contained in EDMS/AEDT.[78,79]

D.2.3.3 Surface Roughness Length, Albedo, Bowen Ratio

AERSURFACE[80] should be used to assess the land use cover and determine the appropriate surface roughness length[81], Bowen ratio[82], and albedo[83] based on land use cover, soil moisture, and seasonal conditions.

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77 EPA, Mixing Heights, *Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States*, 1972 (also called the "Holzworth" report), http://nepis.epa.gov/Exe/ZyNET.exe/20013CDS.TXT?ZyActionD=ZyDocument&Client=EPA&Index=Prior+to+1976&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C70thru75%5CTxt%5C00000005%5C20013CDS.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

78 EPA, *Procedures for Emission Inventory Preparation*, Volume IV, Chapter 5, Section 5.2.2, December, 1992, EPA-420-R-92-009], http://www.epa.gov/otaq/models/nonrdmdl/r92009.pdf.

79 More recent regulatory update also mentions checking the STIP/TIP if mixing height is provided (EPA 40 CFR 93.153).

80 AERSURFACE is a tool that processes land cover data to determine the surface characteristics for use in AERMET.

81 The roughness length is approximately one-tenth of the height of the surface roughness elements. For example, short grass of height 0.01 m has a roughness length of approximately 0.001 m. Surfaces are rougher if they have more protrusions. Forests have much larger roughness lengths than tundra, for example. Roughness length is an