3.0 Designations Methodology

3.1 An Overview of EPA's Nine-Factor Analysis

In June 2007, the Administrator issued guidance to the EPA Regional offices regarding the factors that could be considered as the basis for nonattainment area boundaries. In that guidance, EPA identified certain factors that were deemed appropriate to consider in making nonattainment area boundary recommendations and final boundary determinations. EPA noted they would consider these same factors, along with any other relevant information, in evaluating modifications to the boundary recommendations from states and tribes. EPA recommended that states and tribes consider the following nine factors in assessing whether to include an area in the designated nonattainment area boundary:

- Emission data
- Air quality data
- Population density and degree of urbanization (including commercial development)
- Traffic and commuting patterns
- Growth rates and patterns
- Meteorology (weather/transport patterns)
- Geography/topography (mountain ranges or other air basin boundaries)
- Jurisdictional boundaries (e.g., counties, air districts, Reservations, metropolitan planning organizations (MPOs))
- Level of control of emission sources

EPA pointed out that this list of recommended factors was not intended to be exhaustive, and states and tribes were free to submit additional information on factors they believed were relevant for EPA to consider. In general, EPA said that a state's or tribe's demonstration supporting the boundary recommendation for an area should show that: 1) violations are not occurring in the excluded portions of the recommended area, and 2) the excluded portions do not contain emission sources that contribute to the observed violations. EPA indicated that a state or tribal submittal that addressed only whether monitored violations are occurring in an area would not suffice as the sole justification for designating the boundaries of a nonattainment area. The following sections discuss each of the nine factors in more detail.

3.1.1 Factor 1: Emissions Data

The emissions analysis is an examination of emissions that contribute to ambient $PM_{2.5}$, including carbonaceous particles (carbon), inorganic particles (crustal), SO_2, NO_x, VOCs, and ammonia. Emissions data are derived from the 2005 National Emissions Inventory (NEI), version 1, and are given in tons per year. Emissions data indicate the potential for a county to contribute to observed violations, making it useful in assessing boundaries of nonattainment areas.

Emission data from the 2005 NEI Version 1 were used for technical analyses for purposes of area designations for the 2006 24-hour PM2.5 NAAQS.

The 2005 NEI Version 1 is based on the 2002 NEI Version 3, with the following additions:

1) 2005 emissions for electric generating units (EGUs) baed on CEM/heat input reported to EPA by EGUs;

2) 2005 version 1 National Mobile Inventory Model (NMIM) run for onroad and nonroad emissions;

3) Facility closures from state/local and tribal agencies; and,

4) 2005 wildfire/managed burn data.

For more information about the NEI, go to: http://www.epa.gov/ttn/chief/net/2005inventory.html.

For technical analyses for 24-hr PM2.5 designations, PM2.5 emissions data were derived from the 2005 NEI, version 1, and are given in tons per year. Emissions that contribute to ambient PM2.5, including carbonaceous particles (carbon), inorganic particles (crustal), SO2, NOx, VOCs, and ammonia, are included in the following sets of data. Detailed monthly and annual emissions data for each State, by county, are provided in Microsoft Excel spreadsheet format.

Appendix B includes 2005 NEI data.

See also item 2.B. at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html

3.1.2 Factor 2: Air Quality Data

The air quality data factor involves consideration of data from the national network of Federal Reference Method monitors operated to measure total fine particle mass for determining compliance with the PM2.5 NAAQS. In the designations process, EPA also considered fine particle chemical composition data from the Chemical Speciation Network, the IMPROVE monitoring network in national parks and wilderness areas, and for a limited number of sites, a supplemental analysis to evaluate chemical composition for areas having only FRM monitoring (measuring PM2.5 mass only) and no chemical speciation monitor.

<u>$PM_{2.5}$ Design Values</u>

Areas are designated nonattainment for the 24-hr PM2.5 NAAQS because they have at least one ambient monitoring location which violates the standard of 35 µg/m^3. A determination of NAAQS compliance is made by considering the “design value” for each site. The design value for a site is the 3-year average of three annual 98th percentile concentration values. The specific methodology for calculating the $PM_{2.5}$ design values, including computational formulas and data completeness requirements, is described in 40 CFR Part 50, Appendix N. Only $PM_{2.5}$ measurements produced with the Federal Reference Method (FRM) or a Federal Equivalent Method (FEM) can be used for NAAQS comparisons.

FRM measurement data residing in EPA's Air Quality System (AQS) are used to calculate the 24-hr $PM_{2.5}$ design values. Individual measurements which are judged to be "exceptional" in accordance with the Exceptional Events Rule (such as days with poor air quality caused by wildfire or dust events) are not included in these calculations. State, Local, and Tribal monitoring agencies are required to certify data submitted to AQS on an annual basis, specifically by June 30th of the subsequent year. EPA typically extracts ambient data from AQS for regulatory purposes shortly after that certification due date. EPA then calculates NAAQS design values and posts design value results on a public website. The State and Tribal recommendations sent to EPA in December 2007 were based on data from 2004-2006. The 2005-2007 $PM_{2.5}$ design values were initially posted to www.epa.gov/airtrends in August of 2008 (utilizing a data file extracted from AQS on July 8, 2008). These data were referenced by EPA in its August letters responding to State and Tribal designation recommendations.

Although annual data certification is required by June 30th of the following year, additional time is allowed for EPA to review and finalize its concurrence /non-concurrence of State requests to exclude data from regulatory calculations, as appropriate, due to "exceptional events." In order to provide the most up-to-date design values to support 24-hr designations, EPA re-extracted all 24-hr $PM_{2.5}$ FRM measurement data from AQS on December 15, 2008 and re-computed final $PM_{2.5}$ design values. A summary of the final 24-hour design values for the periods 2004-2006 and 2005-2007 is provided in Appendix C and is also posted on www.epa.gov/airtrends. Appendix C provides a summary listing of the final $PM_{2.5}$ design values for each area to be designated nonattainment for the 24-hour standard.

PM2.5 Chemical Composition Monitoring Data

Fine particle chemical composition data (also known as "speciation data") is important in order to determine the composition of measured PM2.5 and potential contributing emission sources. The speciation data used to support the various designation analyses include data from the routine urban and rural speciation monitoring networks -- the Chemical Speciation Network (CSN) and Interagency Monitoring of Protected Visual Environments (IMPROVE), as well as limited measurements from Federal Reference Method (FRM) filters. For these 24-hr NAAQS analyses, data for the highest PM2.5 days were selected to represent the 24-hr design values as measured by the FRM. These speciation measurement data were adjusted using the SANDWICH procedure to represent the chemical constituents of FRM mass. Depending on availability, completeness and proximity to the PM2.5 design value monitor location, different years of data may have been used for specific analyses. In all cases, however, the data are judged to be representative of the most recent 3-years of PM2.5 levels.

Appendix D is The Chemical Composition of $PM_{2.5}$ to support PM Implementation (PDF), a presentation on the general role of speciation data to support the fine particle designations process and related analyses. It was presented at the $PM_{2.5}$ Implementation and Designations Workshop for

State and Tribal representatives, held June 20-21, 2007 in Chicago, IL. The presentation illustrates how EPA derives fine particle composition associated with PM2.5 mass measurements, how the typical high day and average composition varies spatially and temporally, and how these data relate to potential emission sources.

Appendix E includes a summary of the major chemical components of PM2.5 for a number of areas being designated as nonattainment in December 2008. These data are derived from the Chemical Speciation Network and are presented for the 2005-2007 period.

Appendix F. includes a report entitled "Limited 2004-06 Speciation Data Derived from FRM filters for 20 Areas." The report describes an analysis coordinated by EPA for selected areas without speciation monitoring to evaluate the chemical composition of filters obtained from FRM mass-based monitors. See also: http://www.epa.gov/ttn/naaqs/pm/docs/available_new_speciation_data_pm2.5_naa.pdf.

Appendix G. includes the data file for the report "Limited 2004-06 Speciation Data Derived from FRM filters for 20 Areas." See also: http://www.epa.gov/ttn/naaqs/pm/docs/archive_filters_chemical_analysis_data_2004-2006.xls

Appendix H contains the report "Derivation of the Contributing Emissions Score," and it includes speciation data summaries (2004-2005) for CSN and IMPROVE sites that were used in developing the Contributing Emissions Score. For CSN raw data, see http://www.epa.gov/cgi-bin/htmSQL/mxplorer/query_spe.hsql. For raw IMPROVE data, see http://vista.cira.colostate.edu/views/.

3.1.3 Factor 3: Population Density and Degree of Urbanization

This analysis is an examination of the population for each urban area, as well as the population density for each county in that area. Population data indicate the likelihood of population-based emissions that might contribute to violations.

The information used to derive the Factor 3 values for the 2006 PM2.5 NAAQS was taken from the U.S. Census Bureau estimates for 2000 and 2005 (http://www.census.gov/popest/datasets.html). The population density was presented as the number of people per square mile, and the statistics were rounded to two significant figures.

3.1.4 Factor 4: Traffic and Commuting Patterns

The traffic and commuting analysis includes an examination of the number of commuters in each county who drive to another county within an urban area, the percent of total commuters in each county who commute to other counties within the metropolitan area, and the total Vehicle Miles Traveled (VMT) for each county in thousands of miles.

<u>Vehicle Miles Traveled</u>

Vehicle miles traveled (VMT) data developed for the National Emissions Inventory 2005 version 2 were used in technical analyses of areas for purposes of area designations for the 2006 24-hour PM2.5 NAAQS.

For 2005, a full VMT database at the county, roadway type, and vehicle type level of detail was developed from Federal Highway Administration (FHWA) information. For States and local areas that submitted VMT data that were incorporated in the 2002 NEI, the 2002 NEI VMT data were grown to 2005 using growth factors developed from the FHWA data, and these grown VMT data replaced the baseline FHWA-based VMT data. The resulting VMT database prepared for 2005 include data for all 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands for each of the 12 Highway Performance Modeling System (HPMS) functional roadway types and the 28 MOBILE6 vehicle classes, for a total of 336 records per year per county. The data were prepared in the NMIM National County Database Base Year VMT table format. At this point, States had the opportunity to submit 2005 estimates that replaced EPA's estimates for 2005.

Appendix I includes a description of the methodology for preparing VMT estimates: "Methodology for Preparing VMT Estimates for the National Emission Inventory: 2003, 2004, and 2005."

Appendix J includes VMT totals for 2005 for each county in the United States, in millions of miles: "VMT Data Used for Technical Analyses for Area Designations for the 2006 24-hour PM2.5 NAAQS."

Commuting Data

Information from the U.S. Census 2000 County-to-County Worker Flow Files (downloaded from http://www.census.gov/population/www/cen2000/commuting.html on 6/4/2003) was processed to develop summaries of the number of workers 16 years old and over who are commuting between counties in and around areas under consideration for PM2.5 designations. To manage the exceptionally large files that match every pair of counties in the nation, only county pairs with greater than 10 commuters were included in the tables. The four statistics considered in the designations process from these data were:

1) "Number commuting into any violating counties" indicates the number of residents going from this county into any violating county (including residents who commute within the same county)

2) "Percent commuting into any violating counties" indicates the number of residents going from this county into any violating county (including residents who commute within the same county) divided by the total number of commuters residing in that county.

3) "Number commuting into statistical area" indicates the number of commuters residing in this county and traveling into this particular violating combined statistical area (CSA) or core based statistical area (CBSA) (including residents who commute within the same county). In cases where

no CBSA was identified, then the commuters traveling into the particular violating county were considered.

4) “Percent commuting into statistical area” indicates the number of commuters residing in this county and traveling into this particular violating CSA or CBSA (including residents who commute within the same county) divided by the total number of commuters residing in that county. In cases where no CBSA was identified, then the commuters traveling into the particular violating county were considered.

For items 3 and 4, if the violating monitor(s) in the area were located in a county within a CSA, the CSA was considered to be the statistical area. If the violating monitors was not located in a CSA but in a CBSA, then the CBSA was considered to be the statistical area. If the violating monitor was not located in a CSA or CBSA, then the violating county was considered to be the statistical area.

Appendix K includes county to county worker flow data for relevant areas (from 2000 Census data).

3.1.5 Factor 5: Growth Rates and Patterns

The growth analysis is an evaluation of actual and/or projected percent population growth for counties in an area over a period of time (e.g., ten years).

This factor looks at the population and VMT trends for each area from 2000 to 2005, as well as patterns of population and VMT growth. A county with rapid population or VMT growth is generally an integral part of an urban area and could be an appropriate county for implementing mobile-source and other emission-control strategies, thus warranting inclusion in the nonattainment area.

3.1.6 Factor 6: Meteorology

The analysis of meteorological data considers the contribution of meteorological conditions such as wind speed and wind direction to high $PM_{2.5}$ concentrations. EPA evaluated wind trajectories and pollution roses in evaluating this factor.

Wind Trajectories

Meteorology plays a major role in the formation and transport of fine particulate matter over large areas. To better take into account the transport of PM2.5 precursors and primary emissions to the violating monitor, the HYSPLIT trajectory model developed by NOAA was used to calculate wind trajectories 48 hours backward in time from the violating monitor to show the path the air mass took on its way to the site. Trajectories were run for those days with PM2.5 concentrations greater than the 98th percentile for a particular year. Depending upon when an area first violated the 24-hour standard, either the three year period from 2004 through 2006 or 2005 or 2007 was used. A trajectory was started from eight equally spaced times spread across the span of each day (i.e., at three hour intervals). The initial start height for each backward trajectory was set to the mixing height at the start time. The mixing height at the start time was calculated by the HYSPLIT model. Two additional evenly spaced starting heights relative to the starting mixing height and a fourth height at 10 meters were used to calculate trajectories in the same manner described above. The trajectories were plotted using Google Earth and animations were created to show the path the air masses took on their way to the violating site. The trajectory paths were plotted as white lines with the locations of the air mass along the path were represented as colored dots to show the time the air mass passed over a location.

The county trajectory weight corresponding to the values used for the Contributing Emissions Score (CES) were also plotted to show the meteorological adjustment used for the CES. The trajectory weights provide an indication of the likelihood of a county being upwind of a violating monitor on days with high PM2.5 concentrations. The locations of electric generating units were also displayed as yellow push pins on the map. The violating site was marked by a yellow star. Where appropriate, an area's trajectories were divided into two seasons based on the time of year when the day above the 98th percentile occurred. The warm season was designated as the months of May through September, while the cold season was all other months of the year. A more detailed description of the CES and its components is provided in given in appendix H, Derivation of the Contributing Emissions Score.

Appendix L, Back Trajectory Information, includes a number of static images showing the trajectories for days greater than the annual 98th percentiles during either 2004 through 2006 or 2005 through 2007 for the following areas: Madison WI, Paducah KY, Clarksville TN, Parkersburg WV, Knoxville TN, Louisville KY, Huntington WV, and Cleveland OH. The last two pages of the document contain two examples of trajectory animations for the Paducah, KY area from September 10, 2005 and July 26, 2007. The concentration at the violating site for each day is noted next to the site which is marked by a yellow star. The trajectory paths are represented by white lines with the locations of the air mass at a particular time being represented by colored dots. The clock at the top of the animation shows the time of day.

<u>Pollution Roses</u>

Pollution rose graphics were produced for $PM_{2.5}$ federal reference method (FRM) ambient monitoring sites located in or near one of the 58 identified “potential” nonattainment areas. A rose plot was generated for each ambient monitoring site. Each rose figure combines 24-hour FRM data (2005 to 2007) with available same-day meteorological 24-hour resultant wind speed and wind direction information. Each rose provides a visual indication of the predominant direction and associated speed in which the wind was blowing on each $PM_{2.5}$ sample day. Meteorological information (i.e., wind speed and wind direction) from the National Weather Service (NWS) reporting station nearest each ambient monitoring site were summarized to a 24-hour basis and paired with the site’s $PM_{2.5}$ 24-hour average concentrations. Hourly NWS wind speed and wind direction data were aggregated to a daily (24-hour) “resultant” basis by calculating vector averages.[1]

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[1] “Vector average” means that the daily 24-hour wind speed and wind direction have been calculated by considering 24 individual observations of wind speed and direction, and summing (and then averaging) these as vector quantities. If the wind direction is constant during the 24 hours, the 24-hour speed will simply be the average of the hourly wind speeds.

On the rose graphics, the center of the plot (i.e., the crosshair intersection of a north-south line and an east-west line) represents the ambient monitor location. Colored symbols (triangles and dots), depicting the reported 24-hour average $PM_{2.5}$ concentrations, are plotted around the monitor with their relative position (to the monitor center) denoting the 24-hr average resultant wind speed and direction. More specifically:

- The color and size of the symbols reflects the concentration of $PM_{2.5}$ on a given day. Small blue symbols indicate a 24-hour average concentration of 30 µg/m3 or less; medium-sized yellow symbols indicate 24-hour average concentrations between 30 and 35 (29.9 to 34.4) µg/m3; large red symbols identify daily concentrations between 35 and 40 (35.5 to 40.4) µg/m3; and large black symbols identify concentrations greater than 40 (> 40.5). Thus, the red and black symbols show exceedances of the 24-hour $PM_{2.5}$ NAAQS.

- The symbol shape indicates that "season" corresponding to the reported observation. Triangle symbols are used for readings collected in the "cool" season (October through April, inclusive) and dot symbols are used to mark observations that were collected in the "warm" season (May through September).

- The location of the plotted symbol in relation to the center of the diagram indicates the direction from which the wind was predominantly traveling that day (i.e., the 24-hour resultant wind direction). Thus, a symbol in the top left quadrant of the pollution rose demonstrates that the wind was emanating from the northwest direction on the date of that particular monitor reading. High concentration markers, especially when grouped together, identify the typical directional location or "source" of high particulate (and/or particulate precursor) emissions.

- The symbol's distance from the center of the plot represents the "resultant wind speed" for the day. Resultant wind speeds are indicated by the distance of the symbol from the center of the plot. The center of the plot indicates a wind speed of zero; concentric reference rings are drawn at 2 miles per hour increments up to 12 miles per hour (i.e., at 2, 4, 6, 8, 10, and 12 mph). Resultant speeds greater than 12 miles per hour are capped at 12 mile per hour, and plotted on the outer reference ring. Thus, symbols located close to the center of the diagram indicate a slower resultant wind speed (and perhaps stagnation conditions); symbols located further away from the center indicate higher wind speeds and ostensibly, more possibility of pollutant transport over a longer distance.

There are several situations in which reported $PM_{2.5}$ observations are not plotted for a particular site:

1. Exceptional event-flagged days that have been approved by EPA (i.e., AQS concurrence code ='Y') are not shown. Note that a July, 2008 AQS extraction was the source of the $PM_{2.5}$ data used to generate the pollution roses but that subsequent exceptional event

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If the wind direction changed from hour to hour, the 24-hour speed will be less than the simple average of the hourly wind speed and the direction will be a type of average of the hourly directions. Together, the vector resolved wind direction and speed represent the net forward path of an air mass during the 24 hours, accounting for any meandering due to shifts in wind direction.

approvals were made and considered in the designation process. Thus, in some situations, exceedances are plotted (and included in associated counts) that would not have been if a newer dataset were utilized. In these situations, the identified 98th percentiles and 24-hour design values are probably overstated.

2. Days in which there is insufficient meteorological data available for the nearest NWS site are not plotted.
3. If wind data are available but indicate extreme variability (as identified by a ratio of resultant speed / scalar speed of less than 0.4) then the observation also is not shown.[2]

A note on the plot shows the number of exceedance days not plotted for one of the last two reasons.

The distance between the ambient monitoring site and the NWS site is provided on each plot. For about 90% of the air quality monitoring sites, the distance to the NWS site is within 30 miles. For cases where the distance between the air quality and meteorological site is great and/or where there are significant topographic differences separating the sites, the meteorological data may not be fully representative of conditions at the air monitoring site. This issue should be taken into consideration when evaluating such data.

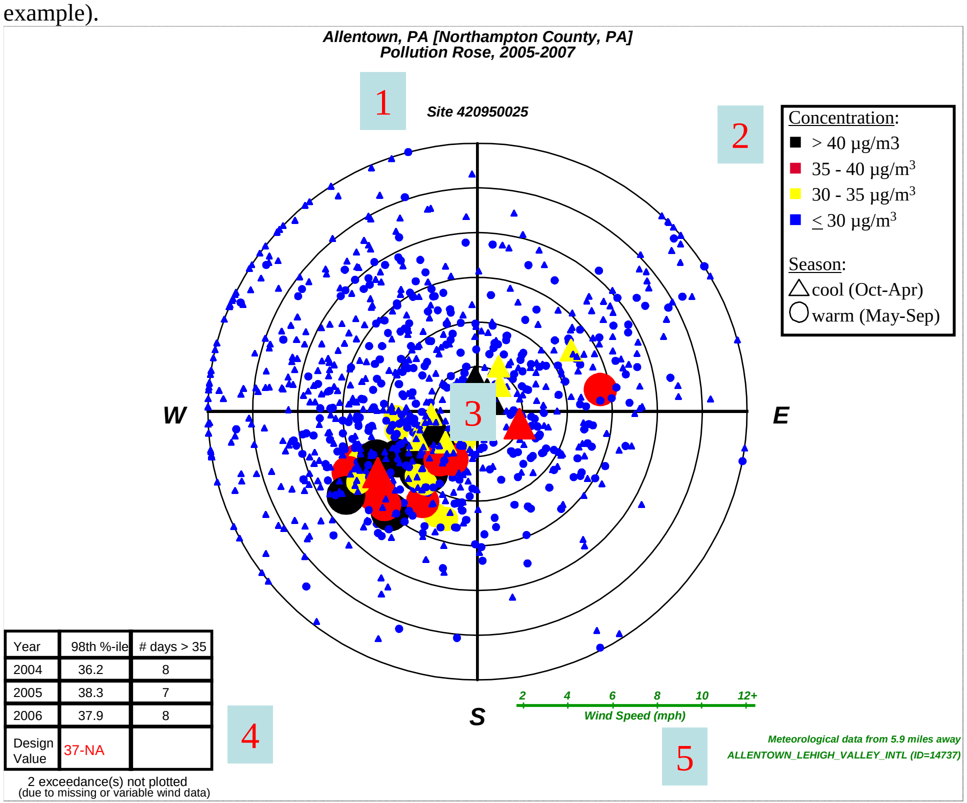
Pollution roses for the 58 areas included in the designations process are provided in Appendix M.

An example pollution rose and detailed description is shown below.

[2] For example, if the wind was from the east for 12 hours at one speed and then from the west for 12 hours at the same speed, the vector resolved wind speed and direction would both be zero. The ratio of scalar to resultant wind speeds would be zero. Such a day would not be plotted on the wind rose because doing so could give the impression that there was little transport potential when in reality there was opportunity for the air measured at the site to have been appreciably influenced by emissions at some distance.

Pollution Rose Key

1. The top line of the title shows the "potential" nonattainment area in which the monitoring site is located (or nearby). The "potential" areas are typically based on (in this priority order) existing $PM_{2.5}$ nonattainment area boundaries (as prescribed in the 2006 FR notice), a combined statistical area (CSA) if the site is part of one, a core-based statistical area (CBSA) if the site is located in one of those that does not map to a CSA; or else just a county-state if the county is not part of CBSA. The area name in the top title is followed by the county and state names in parenthesis. A subtitle (the third printed line) identifies the AQS site code represented by the plot. The site in the example plot has an AQS site ID of 42095002, and is located in Northampton County, PA, which is identified as part of the potential nonattainment area of Allentown, PA.
2. A legend in the right top corner shows the symbol colors used to identify the daily concentration range and the symbol markers used to show season.
3. The rose plot body shows the individual 24-hour average concentrations for the site plotted around the site (center) directionally relevant to the compass bearing the wind was blowing from and distance-relevant according to the resultant wind speed that day. The example plot shows that there are sample days occurring in every wind quadrant but that most of the days appear to be plotted to the left (or west), more specifically between NNW and SSW. Most of the high concentration days for the example site appear to occur when the wind blows from the SW at speeds of about 4-8 miles per hour.
4. 2005-2007 $PM_{2.5}$ summary information for the plotted site is shown in a table at the bottom left of the figure. The table shows the annual 98th percentiles, annual counts of (non-concurred) NAAQS exceedances, and also the 3-year 24-hour standard design value (shown in red if violating the NAAQS and in blue if not). A note below the table tells how many non-concurred exceedances were not plotted because of missing met data or variable wind conditions. In the example plot, the site had 23 total exceedances over the 3-year period 2005-2007: 8 in 2005, 7 in 2006, and 8 in 2007. The annual 98th percentiles for the site are 36.2 µg/m3 for 2005; 38.3 µg/m3 for 2006; and 37.9 µg/m3 in 2007. The 3-year design value for the site is 37 µg/m3. According to the note below the table, 2 exceedances (out of the 23 total) were not plotted because of missing met data or variable winds.
5. A two-line green-font text entry at the bottom right corner of the figure identifies the specific NWS site from which meteorological data were used to generate the plot (bottom line), and the distance between that NWS site and the ambient monitoring location and (top line). In the example plot, met data from the Allentown Lehigh Valley International Airport (NWS ID = 1437) were used to generate the rose plot; that NWS site is approximately 5.9 miles from the $PM_{2.5}$ monitoring site. A key for the plotted wind speeds (i.e., the concentric circles) is shown just below the plot body (above the "5" in the example).



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3.1.7 Factor 7: Geography/Topography

The geography/topography factor involves an examination of physical features of the land that might have an effect on the airshed and, therefore, on the distribution of particulate matter over an area. For example, an area located in a valley bordered by mountains could experience very different effects to the airshed from an area with generally uninterrupted flat terrain. Topography was an issue primarily in western nonattainment areas. Topographical maps are included in a number of area-specific technical analyses.

3.1.8 Factor 8: Jurisdictional Boundaries

The jurisdictional boundaries factor involves consideration of existing boundaries that may facilitate or affect implementation of programs to improve air quality. The planning and organizational structure of an area was considered to provide insights into how air quality planning and enforcement is carried out in a potential nonattainment area. Examples of jurisdictional boundaries include counties, air districts, Tribal Reservations, metropolitan planning organizations (MPOs), and existing nonattainment areas.

3.1.9 Factor 9: Level of Control of Emission Sources

The level of control of emission sources factor involves the consideration of emission control programs and associated emission reductions that would be currently in place at the time the designations are finalized. In considering this factor, EPA recognized that the most recent national emission inventory data available was from the year 2005. EPA requested that the States and Tribes provide any additional information regarding emission controls put in place through 2008. EPA also used information maintained by EPA's Clean Air Markets Division on power plant emissions and future planned emission controls. Data on future planned emission controls for electric utilities were obtained from the National Electric Energy Data System (NEEDS) database and unit-level annual emissions data was obtained from EPA's national electric utility emissions database. The NEEDS / emissions database (May 2008 version) used in the designations process is included as Appendix N.

3.2 Contributing Emissions Score

The Contributing Emissions Score (CES) is an EPA-developed method to help identify counties that are potentially contributing to violations of the 2006 24-hour national ambient air quality standards (NAAQS) for fine particles (PM2.5). The CES is a tool EPA used in conjunction with the factors recommended by EPA guidance to assess the contribution, if any, of a given area to the ambient air quality of a nearby area not meeting the 2006 24-hour PM2.5 NAAQS. The CES results help to determine an appropriate potential nonattainment area boundary for an area that should be designated nonattainment for the 24- hour NAAQS. It expands on the methodology previously used for calculating the Weighted Emissions Score (WES), which EPA developed to help inform decisions about nearby contributing areas for the PM2.5 NAAQS during the nonattainment area designation process completed in 2004. That process addressed areas violating the 1997 annual PM2.5 NAAQS. The CES is only one piece of information considered by EPA in the analysis for evaluating PM2.5 nonattainment areas for the 2006 24-hour PM2.5 NAAQS.

For the 24-hour PM2.5 designation process, the CES incorporates additional information that was not included in the WES calculation, reflecting differences between an annual versus a 24-hour standard. It specifically considers the influence of emissions and meteorology on days with high 24-hour fine particle concentrations, and incorporates the seasonal composition of fine particle mass and source receptor distance relationships.[3] The latter information is relevant for a 24-hour standard, for which individual days affect attainment status, unlike an annual standard. The CES estimates the effect of pollutant transport with a method similar to the Weighted Emissions Potential (WEP) and the Emission Impact Potential (EIP). These daily PM2.5 assessment techniques, developed by non-EPA authors, use wind trajectories and distance to better characterize the potential impact of nearby areas. It is important to note that the CES represents a very generalized approach and has been implemented as such across the country using only county level data for consistency purposes. For this reason, EPA recognizes that if more refined or updated data exist for a specific area (e.g., higher resolved meteorological data or more recent emissions data), state and local agencies have the opportunity to provide that information to EPA for the revision of the Contributing Emissions Scores.

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[3] These concepts were originally presented to an audience of representatives from USEPA, state and local environmental agencies at the PM2.5 Implementation Program and the Area Designation Process for the 2006 PM2.5 Standards workshop in Chicago, IL)