4.0 Analyses of Individual Nonattainment Area

4.5 Region 5 Nonattainment Areas

4.5.1 Illinois

Illinois
Area Designations For the
24-Hour Fine Particle National Ambient Air Quality Standard

The table below identifies the counties in Illinois that EPA has designated as not attaining the 2006 24-hour fine particle ($PM_{2.5}$) standard.[1] A county or part thereof is designated as nonattainment if it has an air quality monitor that is violating the standard or if the county is determined to be contributing to the violation of the standard.

Area	Illinois Recommended Nonattainment Counties	EPA's Designated Nonattainment Counties
Chicago-Gary-Kenosha, IL-IN-WI	Cook DuPage Kane Lake McHenry Will Grundy* (partial) Kendall* (partial)	Cook DuPage Kane Lake McHenry Will Grundy* (partial) Kendall* (partial)
Davenport-Rock Island-Moline, IA-IL	None	Rock Island* (partial)
Paducah-Mayfield, KY-IL	None	Massac* (partial)
Saint Louis, MO-IL	Madison Monroe Saint Clair Randolph* (partial)	Madison Monroe Saint Clair Randolph* (partial)

* Illinois recommended a slightly smaller partial county area, excluding a portion of Baldwin Township from the nonattainment area. EPA is designating the entire township as nonattainment. The other Illinois partial county boundaries are Grundy- Aux Sable and Goose Lake Townships, Kendall- Oswego Township, Rock Island- Black Hawk, Coal Valley, Hampton, Moline, Rock Island, South Moline, and South Rock Island Townships, and Massac- Hillerman Precinct.

EPA Technical Analysis for Chicago-Gary-Kenosha, IL-IN-WI

[1] EPA designated nonattainment areas for the 1997 fine particle standards in 2005. In 2006, the 24-hour $PM_{2.5}$ standard was revised from 65 micrograms per cubic meter (average of 98th percentile values for 3 consecutive years) to 35 micrograms per cubic meter; the level of the annual standard for PM2.5 remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).

EPA reviewed relevant information for the ten counties including eight Illinois counties partly or fully within the area designated nonattainment for the 1997 standards as well as for surrounding counties. There are violating monitors in Cook and Will Counties and in Lake County, Indiana. Illinois recommended a definition of the nonattainment area for the 2006 standards that reflects the same boundaries as were established for the 1997 standards, including Cook, Du Page, Kane, Lake, Mc Henry, and Will counties, Aux Sable and Goose Lake Townships in Grundy County, and Oswego Township in Kendall County. EPA agrees with this recommendation.

EPA also examined information for other counties within and adjacent to the Combined Statistical Area as well as for adjacent counties. The bulk of emissions and population are captured without including DeKalb, Grundy, Kankakee, and Kendall Counties, since these counties have limited emissions and population. Nevertheless, we support the recommendation by the Illinois EPA to include the three townships in Grundy and Kendall counties in the nonattainment area to maintain consistency with the ozone designations and the prior $PM_{2.5}$ designations and thereby facilitate planning, as well as to include slightly more emissions in the planning area.

Emissions for other surrounding counties are relatively low, and no other factor warranted designating these counties nonattainment.

Figure 1 is a map of the counties in the nonattainment area and other relevant information such as the locations and design values of air quality monitors, and the metropolitan area boundary.

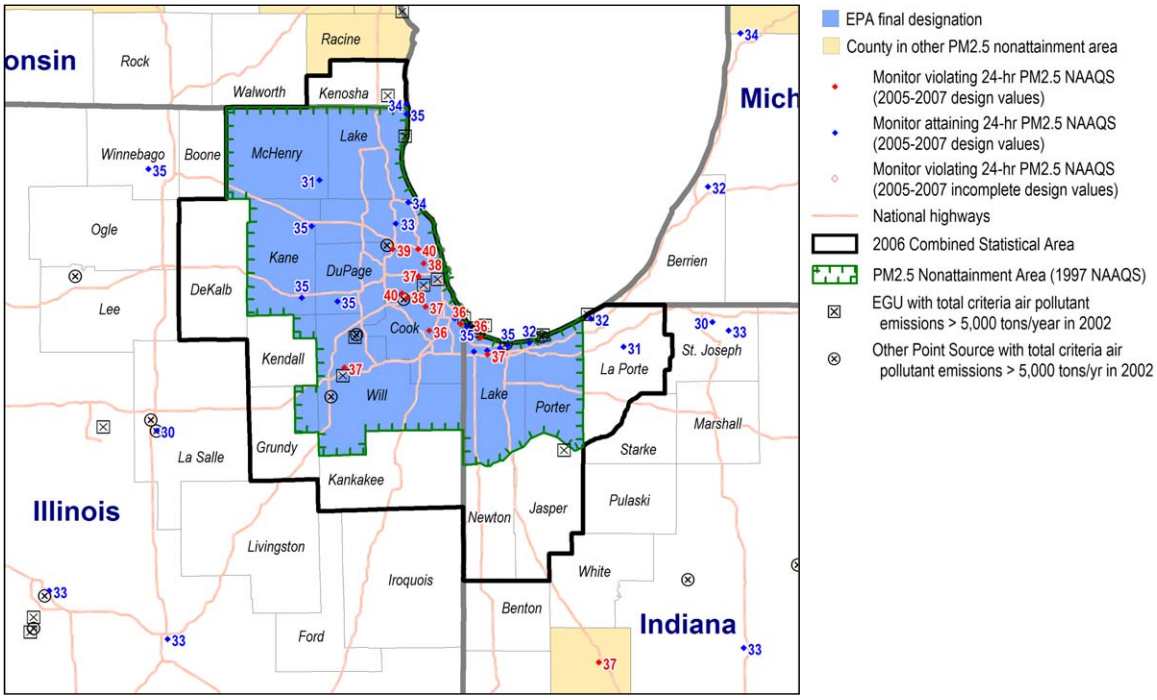


Figure 1

For this area, EPA previously established $PM_{2.5}$ nonattainment boundaries for the 1997 $PM_{2.5}$ NAAQS that included ten full and partial counties, with eight being located in Illinois and two in Indiana.

In its December 18, 2007 letter, Illinois recommended that the same full and partial counties in the Chicago area be designated as "nonattainment" for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2004-2006. These data are from Federal Reference Method (FRM) monitors located in the state. Indiana recommended Lake County be designated as "nonattainment" for the 2006 24-hour $PM_{2.5}$ standard based on air quality data in its May 30, 2008 letter.

In August 2008, EPA notified Illinois and Indiana of its intended designations. In this letter, EPA also requested that if the State wished to provide comments on EPA's intended designation, it should do so by October 20, 2008. EPA stated that it would consider any additional information (e.g., on power plants or partial county areas) provided by the state in making final decisions on the designations. Illinois did not provide any updates for its portion of the Chicago nonattainment area.

Based on EPA's technical analysis described below, EPA has designated six full and two partial counties in Illinois and two Indiana counties as nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as the Chicago nonattainment area, based upon currently available information. These counties are listed in the table below.

The following is a review of data for relevant factors for the Chicago area.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following $PM_{2.5}$ components and precursor pollutants: "$PM_{2.5}$ emissions total," "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other," "SO_2," "NO_x," "VOCs," and "NH_3." "$PM_{2.5}$ emissions total" represents direct emissions of $PM_{2.5}$ and includes: "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other", primary sulfate (SO_4), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO_2 and NO_x, are part of "$PM_{2.5}$ emissions total," they are not shown in Table 1 as separate items). "$PM_{2.5}$ emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "$PM_{2.5}$ emissions other" represents other inorganic particles (crustal). Emissions of SO_2 and NO_x, which are precursors of the secondary $PM_{2.5}$ components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH_3 (ammonia) are also potential $PM_{2.5}$ precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air

quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive manner for considering data for these factors. A more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#B.

Table 1 shows emissions of $PM_{2.5}$ and precursor pollutants components (given in tons per year) and the CES for violating and potentially contributing counties in the Chicago area. Counties that are part of the Chicago nonattainment area for the 1997 $PM_{2.5}$ NAAQS are shown in boldface. Counties are listed in descending order by CES.

Table 1. $PM_{2.5}$ 24-hour Component Emissions, and CESs

County	State Recommended Nonattainment?	CES	$PM_{2.5}$ emissions total	$PM_{2.5}$ emissions carbon	$PM_{2.5}$ emissions other	SO_2	NOx	VOCs	NH_3
Cook, IL	**Yes**	**100**	**10,081**	**5,407**	**4,674**	**35,354**	**175,267**	**152,288**	**4,550**
Lake, IN	**No**	**100**	**7,079**	**1,219**	**5,861**	**39,500**	**54,203**	**24,679**	**3,784**
Will, IL	**Yes**	**95**	**5,432**	**1,236**	**4,195**	**78,792**	**46,028**	**19,886**	**1,407**
Porter, IN	**No**	**41**	**3,901**	**719**	**3,183**	**24,458**	**29,930**	**9,795**	**909**
DuPage, IL	**Yes**	**16**	**2,075**	**1,259**	**816**	**2,013**	**36,880**	**29,541**	**1,385**
Jasper, IN	No	14	2,641	280	2,360	40,723	20,104	3,367	2,929
Kankakee, IL	No	9	1,660	419	1,242	366	7,351	6,830	1,699
Kane, IL	**Yes**	**4**	**1,997**	**733**	**1,263**	**1,037**	**16,528**	**15,578**	**1,293**
Grundy, IL	**Partial**	**3**	**1,105**	**248**	**857**	**362**	**4,057**	**4,223**	**1,027**
Lake, IL	**Yes**	**3**	**2,657**	**1,070**	**1,587**	**14,719**	**29,478**	**32,778**	**747**
Kendall, IL	**Partial**	**2**	**811**	**230**	**581**	**351**	**3,697**	**3,693**	**753**
McHenry, IL	**Yes**	**1**	**2,102**	**634**	**1,468**	**592**	**9,493**	**10,596**	**1,224**
Kenosha, WI	No	1	1,489	460	1,030	33,988	15,967	7,857	647

Table 2 provides the data for CES weighting factors. The trajectory factors are used in CES calculations to account for seasonal meteorology. For the top 10% of days in both the cold and warm seasons, wind trajectories were run for a 48 hour period preceding the high monitor reading. The amount of time the air mass was over a county within the mixing height was calculated. The values were scaled so that the maximum value is 100. Thus, the county that is most likely to be upwind of a monitor on a high concentration day in a season is given a score of 100. The scores for the other counties will reflect the relative likelihood of being upwind. As the concentration of a pollutant will decrease as it goes further downwind, a distance weighting factor is also used in calculating the CES. The distance factor listed on Table 2 provides the distance from the center of a county to the center of the violating county. If a county is violating, the distance used is the average distance from the center to the county line.

Table 2. CES Factor Data

County	CES	Trajectory Factor- Cold	Trajectory Factor- Warm	Distance (mi)
Cook, IL	100	97	72	15.8
Lake, IN	100	100	100	32.5
Will, IL	95	92	68	25.0
Porter, IN	41	84	87	42.4
DuPage, IL	16	81	50	17.5
Jasper, IN	14	58	69	64.9

Kankakee, IL	9	72	60	46.6
Kane, IL	4	42	17	36.1
Grundy, IL	3	56	28	50.1
Lake, IL	3	35	8	37.9
Kendall, IL	2	58	28	38.1
McHenry, IL	1	19	4	50.5
Kenosha, WI	1	15	1	55.4

Within Illinois, emissions are highest in Cook, Will, DuPage, Lake, Kane, and McHenry Counties. The emissions from Kankakee, Grundy, and Kendall Counties are moderate. Based on emission levels and CES values, eight Illinois counties are candidates for a 24-hour $PM_{2.5}$ nonattainment designation.

Factor 2: Air quality data

This factor considers the 24-hour $PM_{2.5}$ design values (in $\mu g/m^3$) for air quality monitors in counties in the Chicago area based on data for the 2005-2007 period. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 24-hour $PM_{2.5}$ standards are met when the 3-year average of a monitor's 98^{th} percentile values are 35 $\mu g/m^3$ or less. A design value is only valid if minimum data completeness criteria are met.

The 24-hour $PM_{2.5}$ design values for counties in the Chicago area are shown in Table 3.

Table 3. Air Quality Data

County	State Recommended Nonattainment?	Design Values 2004-2006	Design Values 2005-2007
Cook, IL	Yes	42	40
Lake, IN	No	38	37
Will, IL	Yes	36	37
Porter, IN	No	31	32
DuPage, IL	Yes	33	35
Kane, IL	Yes	32	35
Grundy, IL	Partial		
Lake, IL	Yes	33	35
Kendall, IL	Partial		
McHenry, IL	Yes	31	31

Three counties, Cook and Will in Illinois and Lake in Indiana, show violations of the 24-hour $PM_{2.5}$ standard. Therefore, these counties are included in the Chicago nonattainment area. However, the absence of a violating monitor alone is not a sufficient reason to eliminate counties as candidates for nonattainment status. Each county has been evaluated based on the weight of evidence of the nine factors and other relevant information.

For purposes of its review, EPA used data available from the Chemical Speciation Network and the Interagency Monitoring of Protected Visual Environments (IMPROVE) network to estimate the composition of fine particle mass on days with the highest fine

particle concentrations. Analysis of these data indicates that the days with the highest fine particle concentrations in the Chicago area occur about 47% in the warm season and 53% in the cool season. In the warm season, the average chemical composition of the highest days is 72% sulfate, no nitrate, 25% carbon, and 3% crustal. In the cool season, the average chemical composition of the highest days is 21% sulfate, 39% nitrate, 38% carbon, and 2% crustal. These data indicate that sources of SO_2, NOx, and direct $PM_{2.5}$ emissions contribute to violations in the area.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with an FRM monitor. All data from Special Purpose Monitors (SPM) using an FRM is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr $PM_{2.5}$ NAAQS for designation purposes.

Factor 3: Population density and degree of urbanization (including commercial development)

Table 4 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour $PM_{2.5}$ standards.

Table 4. Population

County	State Recommended Nonattainment?	2005 Population	2005 Population Density (pop/mi^2)
Cook, IL	Yes	5,303,943	5545
Lake, IN	No	491,706	980
Will, IL	Yes	642,625	758
Porter, IN	No	157,408	375
DuPage, IL	Yes	931,219	2769
Kane, IL	Yes	483,208	923
Grundy, IL	Partial	43,736	102
Lake, IL	Yes	704,086	1504
Kendall, IL	Partial	79,597	247
McHenry, IL	Yes	304,701	499
Kankakee	No	107,824	158

Within Illinois, the counties with the greatest population are Cook, DuPage, Lake, Will, Kane, and McHenry Counties. The populations and population densities of Kankakee, Grundy, and Kendall Counties are significantly lower.

In the Indiana portion of the Chicago area, Lake County has a sizable population and population density. Both are more moderate in Porter County, but still larger that other area counties designated as nonattainment.

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive to another county within the Chicago area, the percent of total commuters in each county who commute within the area, as well as the total Vehicle Miles Traveled (VMT) for each county in millions of miles (see Table 5). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

Table 5. Traffic and Commuting Patterns

County	State Recommended Nonattainment?	2005 VMT (10^6 mi)	Number Commuting to any violating county	Percent Commuting to any violating county	Number Commuting within statistical area	Percent Commuting within statistical area
Cook, IL	Yes	35,294	2,113,930	89	2,352,120	99
Lake, IN	No	4,588	193,610	93	206,350	99
Will, IL	Yes	4,605	185,690	77	239,340	99
Porter, IN	No	1,677	25,470	35	70,940	98
DuPage, IL	Yes	8,802	161,940	35	464,630	99
Kane, IL	Yes	3,517	36,290	19	190,780	99
Grundy, IL	Partial	623	6,990	38	17,310	95
Lake, IL	Yes	6,016	83,930	26	313,250	99
Kendall, IL	Partial	678	4,230	15	27,860	99
McHenry, IL	Yes	2,104	31,680	24	130,520	98

The listing of counties on Table 5 reflects a ranking based on the number of people commuting to other counties. The counties that are in the nonattainment area for the 1997 $PM_{2.5}$ NAAQS are shown in boldface. All counties in this table are highly integrated into the Chicago area.

Note: The 2005 VMT data used for table 5 and 6 of the 9-factor analysis has been derived using methodology similar to that described in "Documentation for the final 2002 Mobile National Emissions Inventory, Version 3, September 2007, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf. The 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.

Factor 5: Growth rates and patterns

This factor considers population growth for 2000-2005 and growth in vehicle miles traveled for 1996-2005 for counties in Chicago area, 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 likely to be contributing to fine particle concentrations in the area.

Table 6 below shows population, population growth, VMT, and VMT growth for counties that are included in the Chicago area. Counties are listed in descending order based on VMT growth between 1996 and 2005.

Table 6. Population and VMT Growth and Percent Change.

County	Population (2005)	Population % change (2000-2005)	2005 VMT (10^6 mi)	VMT % change (1996-2005)
Kane, IL	483,208	18	3,517	364
McHenry, IL	304,701	16	2,104	196
Kendall, IL	79,597	44	678	166
Will, IL	642,625	26	4,605	135
Lake, IL	704,086	9	6,016	82
DuPage, IL	931,219	3	8,802	43
Grundy, IL	43,736	16	623	30
Porter, IN	157,408	7	1,677	10
Lake, IN	491,706	1	4,588	0
Cook, IL	5,303,943	-1	35,294	-14

The growth rates are not expected to yield significant changes in the distribution of population in the area, so this factor did not significantly influence the decision-making process.

Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered data from National Weather Service instruments and other meteorological monitoring sites in the area. Wind direction and wind speed data for 2005-2007 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons, an October-April "cold" season and a May-September "warm" season. These high days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values.

For each air quality monitoring site, EPA developed a "pollution rose" to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The figure identifies 24-hour $PM_{2.5}$ values by color; days exceeding 35 $\mu g/m^3$ are denoted with a red or black icon. A dot indicates the day occurred in the warm season; a triangle indicates the day occurred in the cool season. The center of the figure indicates the location of the air quality monitoring site, and the location of the icon in relation to the center indicates the direction from which the wind was blowing on that day. An icon that is close to the center indicates a low average wind speed on that day. Higher wind speeds are indicated when the icon is further away from the center.

The pollution rose for the Chicago area is provided in Figure 2. Winds on high concentration days predominantly come from the southwest and southeast, but the overall wind direction is varied. So, it is appropriate to include counties in all directions from the violations.

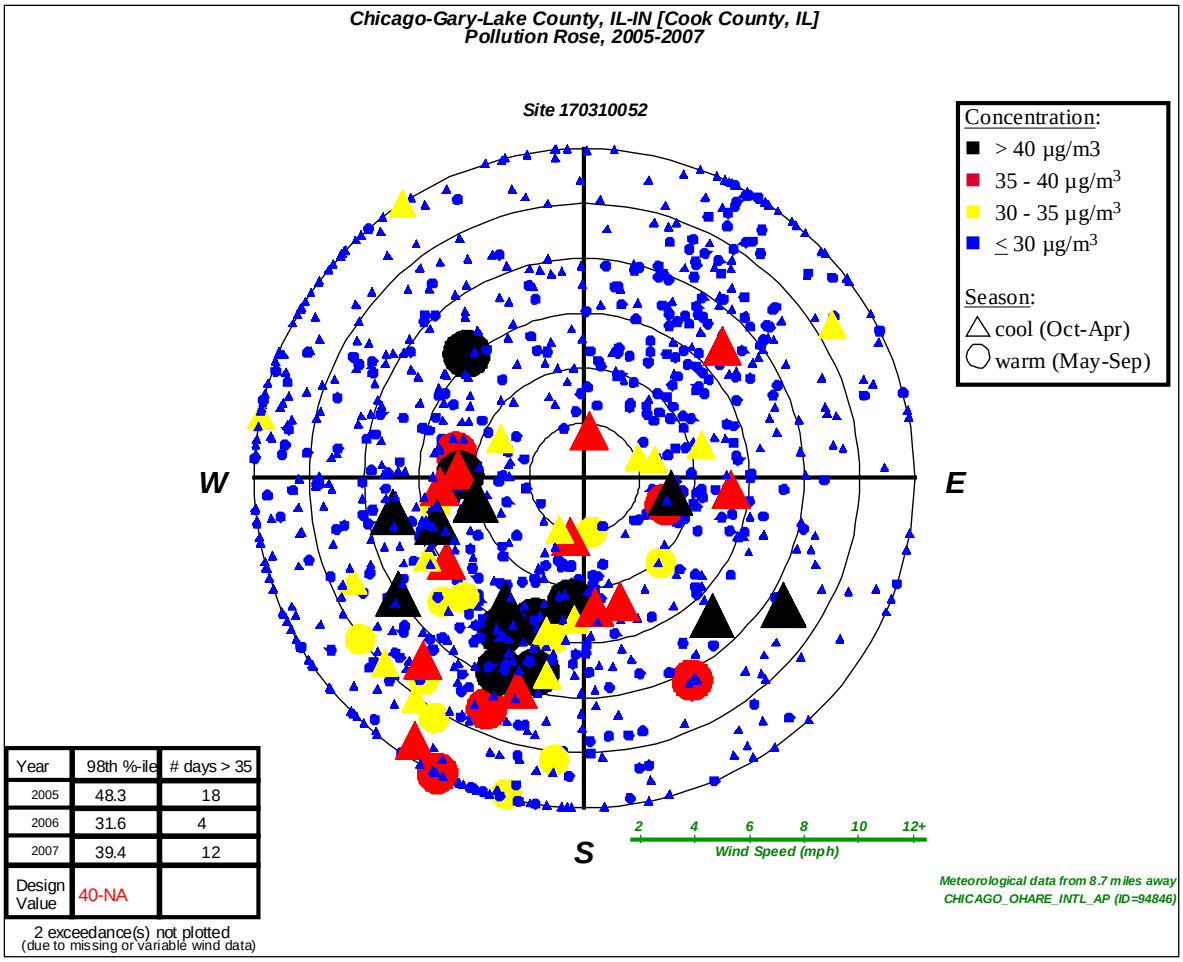


Figure 2

Note: the meteorology factor is also considered in each county's Contributing Emissions Score because the method for deriving this metric included an analysis of trajectories of air masses for high $PM_{2.5}$ days.

Factor 7: Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis evaluates the physical features of the land that might have an effect on the air shed and, therefore, on the distribution of $PM_{2.5}$ over the area.

The Chicago area does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not play a significant role in the decision-making process.

Factor 8: Jurisdictional boundaries

In evaluating the jurisdictional boundary factor, EPA gave special consideration to areas that were already designated nonattainment in 2005 for violating the 1997 fine particle standards. Analysis of chemical composition data in these areas indicates that the same components that make up most of the $PM_{2.5}$ mass in the area on an annual average basis

such as sulfate and direct $PM_{2.5}$ carbon in many eastern areas also are key contributors to the $PM_{2.5}$ mass on days exceeding the 24-hour $PM_{2.5}$ standard. These data indicate that in many cities, the same source categories that contribute to violations of the annual standard also contribute to exceedances of the 24-hour standard.

EPA has generally concluded that counties that were designated as having emissions sources contributing to fine particle concentrations exceeding the 1997 standards (all areas violated the annual standard, two also violated the previous 24-hour standard) also contribute to fine particle concentrations on the highest days. For this reason, EPA believes that for most existing nonattainment areas, the nonattainment area for the 2006 24-hour standard should be the same. Use of existing boundaries also may facilitate air quality planning and the implementation of control measures to attain the standard. Areas already designated as nonattainment represent important boundaries for state air quality planning.

The Chicago ozone nonattainment area consists of the following counties: Cook, Du Page, Kane, Lake, Mc Henry, Will, Aux Sable and Goose Lake Townships in Grundy County, and Oswego Township in Kendall County in Illinois and Lake and Porter Counties in Indiana. The fine particulate nonattainment area matches these boundaries, which will facilitate planning. It is also identical to the fine particulate nonattainment area designed under the 1997 standards.

The Chicago Area Transportation Study (CATS) Policy Committee is the Metropolitan Planning Organization (MPO) for the northeastern Illinois region. CATS webpage: http://www.catsmpo.com/. Northwest Indiana has a separate MPO called the Northwest Indiana Regional Planning Commission, serving Lake, Porter, and LaPorte Counties, with a web site at: http://www.nirpc.org/.

Factor 9: Level of control of emission sources

Under this factor, the existing level of control of emission sources is taken into consideration. The emissions data used by EPA in this technical analysis and provided in Table 1 under Factor 1 represent emissions levels taking into account any control strategies implemented in the Chicago area before 2005 on stationary, mobile, and area sources. Data are presented for $PM_{2.5}$ components that are directly emitted, carbonaceous $PM_{2.5}$ and crustal $PM_{2.5}$, and for pollutants which react in the atmosphere to form fine particles such as SO_2, NOx, VOC, and ammonia.

In considering county-level emissions, EPA used data from the 2005 National Emissions Inventory, the most updated version of the national inventory available at the beginning of the designations process in late 2007. However, EPA recognized that for certain counties, emissions may have changed since 2005. For example, certain power plants or large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2005. Some States provided updated information on emissions and emission controls in their comments to EPA. EPA considered such additional information in making final designation decisions.

With regard to nearby power plants, EPA considered information about whether a specific plant installed federally enforceable emission controls by December 2008 resulting in significant emissions reductions. A control requirement is considered to be federally-enforceable if it is required by a State regulation adopted in a State implementation plan, if it is included in a federally-enforceable Title V operating permit, or if it is required by a consent decree which also requires the controls to be included in federally enforceable permit upon termination of the consent decree. In making final decisions, EPA also considered whether a facility would continue to emit pollutants which contribute to $PM_{2.5}$ exceedances even after emission controls are operational.

Wisconsin provided information on a power plant in Kenosha County, Wisconsin. This is immediately North of the Chicago nonattainment area. EPA determined that the Kenosha County facility is well controlled. The emission controls are federally enforceable. Kenosha County is not considered to contribute to violations in the Chicago area with the updated emissions information and the information on the other eight factors. Therefore, EPA determined that including Kenosha County in the Chicago nonattainment area is not warranted. No other information was provided regarding other power plants or any other large sources in the Chicago area.

Note: EPA has provided a thorough response to each of the specific comments raised by the State in the Response to Comments document. Additional information regarding responses to specific State comments can be found in EPA's Response to Comments document at http://www.epa.gov/pmdesignations/2006standards/tech.htm.

EPA Technical Analysis for Davenport-Rock Island-Moline, IA- IL

The Davenport-Moline-Rock Island area is currently designated attainment for $PM_{2.5}$. A monitor in Davenport (Scott County) is showing violations of the standard. Illinois recommended including no part of Illinois in the nonattainment area. EPA reviewed relevant information for the four counties in the metropolitan statistical area and for surrounding counties.

EPA believes that Rock Island County has moderate emissions that commonly are blown toward the violating monitor in Scott County. We also believe that sufficient commuting occurs between Rock Island County and Scott County such that Rock Island County must be considered an integral part of the Davenport (Quad Cities) area.

EPA recognizes that emissions in close proximity to the monitor may make an important contribution to the violations. Indeed, EPA recognizes the possibility that reduction of the emissions close to the monitor may suffice to address the violation. Nevertheless, our obligation under Clean Air Act section 107 in defining a nonattainment area is to identify the area that is violating the standard and the nearby area that is contributing to the violation. The nearby area that contributes to the violation is then included in the planning area evaluated for measures for attaining the standard. Even if the state already suspects that its control strategy will focus on sources in the immediate vicinity of the

violating monitor, EPA must apply a nonattainment designation to the entire nearby area that contributes to the violation, such that the SIP planning will address the entire nearby contributing area.

Furthermore, the available evidence suggests that local emissions in the immediate vicinity of the monitor contribute only a fraction of the concentrations in Davenport. A much larger fraction of the concentrations in Davenport arise from emissions farther from the monitor. EPA believes that an important component of these concentrations arises from a contribution from emissions throughout the Quad Cities area. While the impact of Rock Island County appears to be less than that of Scott County, Iowa, the impact nevertheless appears sufficiently substantial to include Rock Island County in the nonattainment area.

Illinois and Iowa provided extensive information on the impacts of various sources and areas on the violating monitor in Scott County, including both modeling using AERMOD assessing impacts of point sources in Rock Island County on Scott County concentrations and using CAMx assessing the impact of Scott County zeroing out the emissions of Rock Island County. In EPA's view, these modeling results confirm that while Rock Island County emissions represent only a fraction of the origins of the violation in Scott County, the impact is nevertheless sufficient to warrant a conclusion that at least portions of Rock Island County contribute to the nearby Davenport violation.

Iowa provided further information on emissions for portions of Scott County. EPA also examined information on the distribution of emissions and population within Rock Island County. These data suggest that emissions and population are highly concentrated within the urban portions of these counties, such that designating a portion of these counties will suffice to include the predominant fraction of both PM2.5-related emissions and population. EPA is including the following townships within Rock Island County in the Davenport-Rock Island-Moline nonattainment area: Black Hawk, Coal Valley, Hampton, Moline, Rock Island, South Moline, and South Rock Island Townships. These townships include about 89 percent of the population, about 97 percent of the emissions of SO_2 in the county, and about 87 percent of the NOx emissions in the county. When considered in combination with the partial county nonattainment area in Scott County, Iowa, the area being designated nonattainment includes about 89 percent of the population, about 98 percent of the SO2 emissions, and about 91 percent of the NOx emissions present in Scott and Rock Island Counties. Consequently, EPA believes that this group of townships, in combination with the designated area in Iowa, represents the area nearby to the violation that is violating or contributing to violations of the 24-hour $PM_{2.5}$ standard.

EPA also examined information for Henry and Mercer Counties as well as for nearby counties outside the metropolitan area. EPA found that these other counties are more distant from the violating monitor in Davenport, have relatively low emissions, and no other factor warranted inclusion of the counties in the nonattainment area.

Figure 1 is a map of the counties in the nonattainment area and other relevant information such as the locations and design values of air quality monitors, and the metropolitan area boundary.

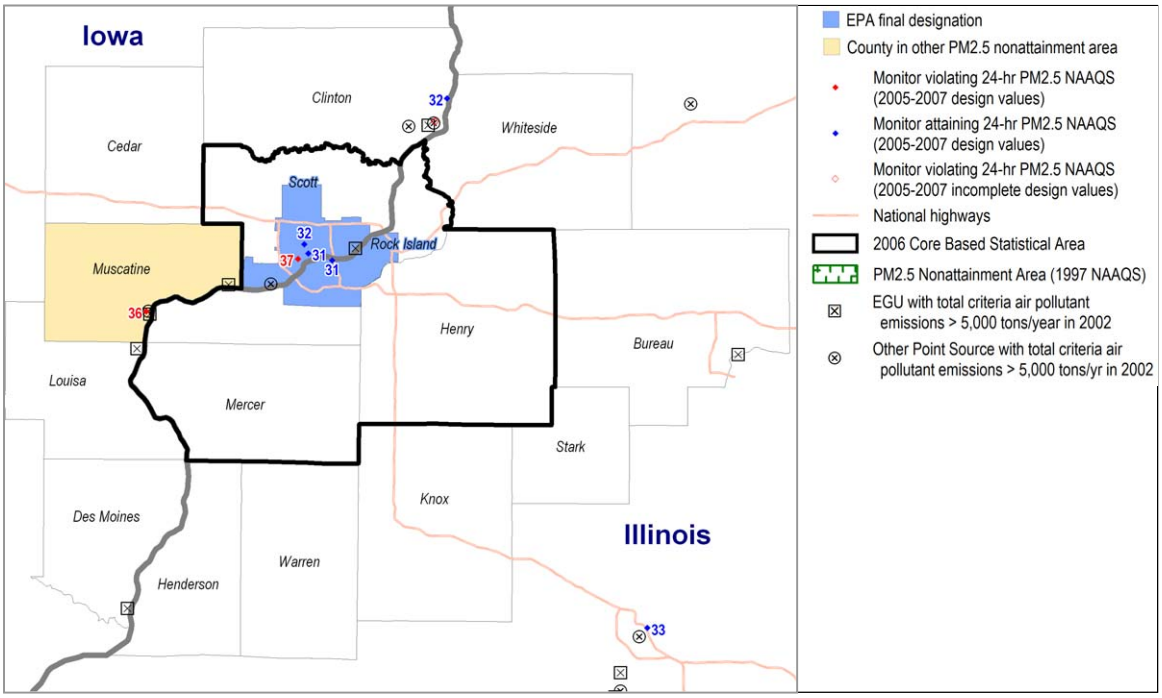


Figure 1

In its August 6, 2008 letter, Illinois recommended that EPA designate Rock Island County in the Davenport area as "attainment" for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2005-2007. These data are from Federal Reference Method (FRM) monitors located in the state.

On August 18, 2008, EPA notified Illinois and Iowa of its intended designations. In this letter, EPA also requested that if the State wished to provide comments on EPA's intended designation, it should do so by October 20, 2008. EPA stated that it would consider any additional information (e.g., on power plants or partial county areas) provided by the state in making final decisions on the designations.

Based on EPA's technical analysis of currently available information, as described below, EPA has designated a partial county in Illinois and a partial county in Iowa as nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as the Davenport nonattainment area.

The following is a review of data for relevant factors for the Davenport area.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following $PM_{2.5}$ components and precursor pollutants: "$PM_{2.5}$ emissions total," "$PM_{2.5}$ emissions carbon,"

"$PM_{2.5}$ emissions other," "SO_2," "NO_x," "VOCs," and "NH_3." "$PM_{2.5}$ emissions total" represents direct emissions of $PM_{2.5}$ and includes: "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other", primary sulfate (SO_4), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO_2 and NO_x, are part of "$PM_{2.5}$ emissions total," they are not shown in Table 1 as separate items). "$PM_{2.5}$ emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "$PM_{2.5}$ emissions other" represents other inorganic particles (crustal). Emissions of SO_2 and NO_x, which are precursors of the secondary $PM_{2.5}$ components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH_3 (ammonia) are also potential $PM_{2.5}$ precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive manner for considering data for these factors. A more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

Table 1 shows emissions of $PM_{2.5}$ and precursor pollutants components (given in tons per year) and the CES for violating and potentially contributing counties in the Davenport area. Counties are listed in descending order by CES.

Table 1. $PM_{2.5}$ 24-hour Component Emissions, and CESs.

County	State Recommended Nonattainment?	CES	$PM_{2.5}$ emissions total	$PM_{2.5}$ emissions carbon	$PM_{2.5}$ emissions other	SO_2	NOx	VOCs	NH_3
Scott, IA	Yes, Partial	100	2,034	395	1,639	9,173	11,317	9,323	1,986
Muscatine, IA	Yes, Other	80	1,702	283	1,419	27,020	10,717	4,910	1,083
Clinton, IA	No	52	2,711	354	2,357	11,506	13,217	11,503	4,870
Rock Island, IL	No	27	932	269	663	2,169	6,140	7,359	664
Henry, IL	No	7	1,273	252	1,021	268	6,648	3,431	2,805
Mercer, IL	No	4	793	149	644	133	1,120	1,469	1,026

Table 2 provides the data for CES weighting factors. The trajectory factors are used in CES calculations to account for seasonal meteorology. For the top 10% of days in both the cold and warm seasons, wind trajectories were run for a 48 hour period preceding the high monitor reading. The amount of time the air mass was over a county within the mixing height was calculated. The values were scaled so that the maximum value is 100. Thus, the county that is most likely to be upwind of a monitor on a high concentration day in a season is given a score of 100. The scores for the other counties will reflect the relative likelihood of being upwind. As the concentration of a pollutant will decrease as it goes further downwind, a distance weighting factor is also used in calculating the CES. The distance factor listed on Table 2 provides the distance from the center of a county to

the center of the violating county. If a county is violating, the distance used is the average distance from the center to the county line.

Table 2. CES Factor Data.

County	CES	Trajectory Factor- Cold	Trajectory Factor- Warm	Distance (mi)
Scott, IA	100	100	78	11.9
Muscatine, IA	80	75	65	25.7
Clinton, IA	52	75	50	19.1
Rock Island, IL	27	98	87	16.9
Henry, IL	7	68	59	29.9
Mercer, IL	4	91	100	29.4

In Illinois, Rock Island County has a substantial fraction of the area's emissions. Henry and Mercer Counties have limited emissions.

Iowa recommended that only a portion of Scott County be designated nonattainment. EPA reviewed the pertinent information and concluded that the nonattainment area recommended by Iowa excluded much of the emissions that contribute to the violation. A more extensive discussion of this review is provided elsewhere in this technical support document.

EPA conducted an extensive review of available information to assess information on emissions from subcounty portions of Scott and Rock Island Counties. This review relied on information from the 2002 NEI as available from EPA's Technology Transfer Network web site, given the ease of access to information with which to estimate subcounty emissions. This review focused on assessing emissions of the urban portions of Scott and Rock Island Counties, although use of recognized township jurisdictional boundaries leads to inclusion of some areas that are relatively rural. For purposes here, the urban portion of Scott County is being defined to include the entirety of Buffalo, Davenport, Pleasant Valley, and Sheridan Townships, and the portions of Blue Grass, Hickory Grove, and Lincoln Townships that are within the City of Davenport. For purposes here, the urban portion of Rock Island County is being defined to include Black Hawk, Coal Valley, Hampton, Moline, Rock Island, South Moline, and South Rock Island Townships.

Detailed discussion of inventory information for Scott County is included elsewhere in this technical support document. For Rock Island County, the urban portion includes virtually all emissions of sulfur dioxide. For point sources, according to 2002 NEI information, the urban portion includes 1,792 or 99 percent of the 1,812 tons per year emitted in Rock Island County. Using population as an approximate surrogate for the distribution of mobile and area source sulfur dioxide emissions in the county, 359 of the 403 tons per year are estimated to be emitted in the urban portion. In total across Rock Island County, the urban portion is estimated to have 2,151 or 87 percent of the 2215 tons per year of sulfur dioxide emissions in Rock Island County. For NOx, again using population as an approximate surrogate for the distribution of mobile and area source NOx emissions, 89 percent of the 6,292 tons per year of this category of Rock Island

County NOx emissions, or approximately 5,600 tons per year, are emitted in the urban portion of the county. Of the 730 tons per year of point source NOx emissions estimated in the 2002 inventory, 544 are emitted by sources in the urban portion of the county. In total, 87 percent of the NOx emissions are emitted from the urban portion of the county. In Scott County, using similar assumptions regarding spatial distribution, approximately 11,917 of the 12,820 tons per year are estimated to be emitted in the urban portion of the county. In total, EPA estimates that 91 percent of the total NOx emissions from the two counties is emitted in the urban portions of these counties.

For fine particulate matter, EPA estimates that 96 of the 170 tons per year of point source direct emissions of fine particulate matter are emitted in the urban portion of the area. Again using population as an approximate surrogate for the distribution of mobile and area source PM2.5 emissions, 89 percent of the 462 tons per year emitted by mobile sources and by minor point sources in Rock Island County (411 tons per year) is emitted within the urban portion of the county. In total, 80 percent of these emissions are emitted in the urban portion of the area. Similarly, for Scott County, EPA estimates that 1632 or 95 percent of the 1714 tons per year of major point, minor point, and mobile source emissions is emitted in the urban portion of the county. In total across the two counties, EPA estimates that 91 percent of these emissions are emitted from the urban portion of these counties.

The 2002 inventory also indicates a significant quantity of PM2.5 emissions emitted from agricultural tilling and fugitive dust from roadways. This component of particulate matter (labeled "crustal" or miscellaneous inorganic particulate matter) is found to represent a low fraction of observed total particulate matter, either on a total composition basis or on an estimated "urban excess" basis. EPA also does not have reliable information to assess what fraction of fugitive dust from roadways is emitted in the urban versus the rural portions of these counties. Although some of the road dust emissions and a small fraction of the agricultural tilling emissions occur within the identified townships, EPA conservatively assumed that all of these emissions are outside the defined "urban" area. In Rock Island County, these emissions are estimated to be 505 tons per year, such that the "urban" portion of Rock Island County is estimated to emit a total of 507 tons per year out of a county total of 1137 tons per year, or 45 percent. Using similar estimates from Scott County, the total emissions in the "urban" portions of the two counties is 2139 tons per year, or 63 percent of the 3395 tons per year emitted across the full two counties.

Factor 2: Air quality data

This factor considers the 24-hour $PM_{2.5}$ design values (in $\mu g/m^3$) for air quality monitors in counties in the Davenport area based on data for the 2005-2007 period. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 24-hour $PM_{2.5}$ standards are met when the 3-year average of a monitor's 98^{th} percentile values are 35 $\mu g/m^3$ or less. A design value is only valid if minimum data completeness criteria are met.

The 24-hour $PM_{2.5}$ design values for counties in the Davenport area are shown in Table 3.

Table 3. Air Quality Data

County	State Recommended Nonattainment?	Design Values 2004-2006	Design Values 2005-2007
Scott, IA	Yes, Partial	32	37
Rock Island, IL	No	30	31
Henry, IL	No		
Mercer, IL	No		
Muscatine, IA	Yes, Other	34	36
Clinton, IA	No	34	32

Scott County, Iowa exceeded the 24-hour $PM_{2.5}$ standard in 2005-2007. There were no violations in the Illinois portion of the Davenport nonattainment area. However, the absence of a violating monitor alone is not a sufficient reason to eliminate counties as candidates for nonattainment status. Each county has been evaluated based on the weight of evidence of the nine factors and other relevant information.

For purposes of its review, EPA used data available from the Chemical Speciation Network and the Interagency Monitoring of Protected Visual Environments (IMPROVE) network to estimate the composition of fine particle mass on days with the highest fine particle concentrations. Analysis of these data indicates that the days with the highest fine particle concentrations in the Davenport area occur about 58% in the warm season and 42% in the cool season. In the warm season, the average chemical composition of the highest days is 77% sulfate, no nitrate, 20% carbon, and 2% crustal. In the cool season, the average chemical composition of the highest days is 26% sulfate, 55% nitrate, 17% carbon, and 2% crustal. These data indicate that sources of SO_2, NOx, and direct $PM_{2.5}$ emissions contribute to violations in the area.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with an FRM monitor. All data from Special Purpose Monitors (SPM) using an FRM is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr $PM_{2.5}$ NAAQS for designation purposes.

Factor 3: Population density and degree of urbanization (including commercial development)

Table 4 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour $PM_{2.5}$ standards.

Table 4. Population

County	State	2005	2005

	Recommended Nonattainment?	Population	Population Density (pop/mi^2)
Scott, IA	Yes, Partial	161,170	345
Rock Island, IL	No	147,454	327
Henry, IL	No	50,508	61
Mercer, IL	No	16,840	30
Muscatine, IA	Yes, Other	42,567	95
Clinton, IA	No	49,744	70

The populations of Rock Island County, Illinois and Scott County, Iowa stand out above the other area counties.

EPA further examined the population residing in the urban portions of Scott and Rock Island Counties. The definition that EPA used of the urban portions of these counties is described under Factor 1 above. EPA found that the urban portion of Scott County includes 89 percent of the county's population (approximately 144,000 people), and the urban portion of Rock Island County also includes 89 percent of that county's population (approximately 131,000 people). Thus, the combined urban portions of these counties (as described above) include 89 percent of the population of the two counties.

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive within or into the Davenport area, the percent of total commuters in each county who commute within or into the area, as well as the total Vehicle Miles Traveled (VMT) for each county in millions of miles (see Table 5). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

Table 5. Traffic and Commuting Patterns

County	State Recommended Nonattainment?	2005 VMT (10^6 mi)	Number Commuting to any violating counties	Percent Commuting to any violating counties	Number Commuting into statistical area	Percent Commuting into statistical area
Scott, IA	Yes, Partial	1,614	61,500	79	74,020	95
Rock Island, IL	No	1,313	14,240	20	67,530	97
Henry, IL	No	695	1,870	8	22,340	91
Mercer, IL	No	135	1,200	15	6,570	85
Clinton, IA	No	423	2,610	11	3,600	15
Muscatine, IA	Yes, Other	372	17,330	85	1,060	5

The listing of counties on Table 4 reflects a ranking based on the number of people commuting into or within the Davenport area. Scott County, Iowa and Rock Island County, Illinois have the most commuters within the Davenport area.

Note: The 2005 VMT data used for table 5 and 6 of the 9-factor analysis has been derived using methodology similar to that described in "Documentation for the final 2002 Mobile National Emissions Inventory, Version 3, September 2007, prepared for the

Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf. The 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.

Factor 5: Growth rates and patterns

This factor considers population growth for 2000-2005 and growth in vehicle miles traveled for 1996-2005 for counties in Davenport area, 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 likely to be contributing to fine particle concentrations in the area.

Table 6 below shows population, population growth, VMT, and VMT growth for counties that are included in the Davenport area. Counties are listed in descending order based on VMT growth between 1996 and 2005.

Table 6. Population and VMT Growth and Percent Change.

Location	Population (2005)	Population % change (2000-2005)	2005 VMT (10^6 mi)	VMT % change (1996-2005)
Muscatine, IA	42,567	2	372	43
Clinton, IA	49,744	-1	423	39
Scott, IA	161,170	2	1,614	25
Henry, IL	50,508	-1	695	7
Rock Island, IL	147,454	-1	1,313	3
Mercer, IL	16,840	-1	135	-12

The growth rates are not expected to yield significant changes in the distribution of population in the area, so this factor did not significantly influence EPA's decision.

Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered data from National Weather Service instruments and other meteorological monitoring sites in the area. Wind direction and wind speed data for 2005-2007 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons, an October-April "cold" season and a May-September "warm" season. These high days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values.

For each air quality monitoring site, EPA developed a "pollution rose" to understand the prevailing surface-level wind direction and wind speed on the days with highest fine particle concentrations. The pollution rose for the Davenport area is Figure 2, and is constructed from wind indicators from a site located in Rock Island County. The figure identifies 24-hour $PM_{2.5}$ values by color; days exceeding 35 $\mu g/m^3$ are denoted with a red or black icon. A dot indicates the day occurred in the warm season; a triangle indicates the day occurred in the cool season. The center of the figure indicates the location of the

air quality monitoring site, and the location of the icon in relation to the center indicates the direction from which the wind was blowing on that day. An icon that is close to the center indicates a low average wind speed on that day. Higher wind speeds are indicated when the icon is further away from the center.

The Davenport area pollution rose indicates that winds on high concentration days come from a variety of directions, and occur under both high wind and low wind conditions. So, it is appropriate to consider counties in all directions from the violations for this factor. The winds on high concentration days in the warm season are more likely to come from the south to southwest direction. In contrast, the winds on high concentration days in the cold season come from multiple directions, and occur mainly with winds averaging less than 8 mph.

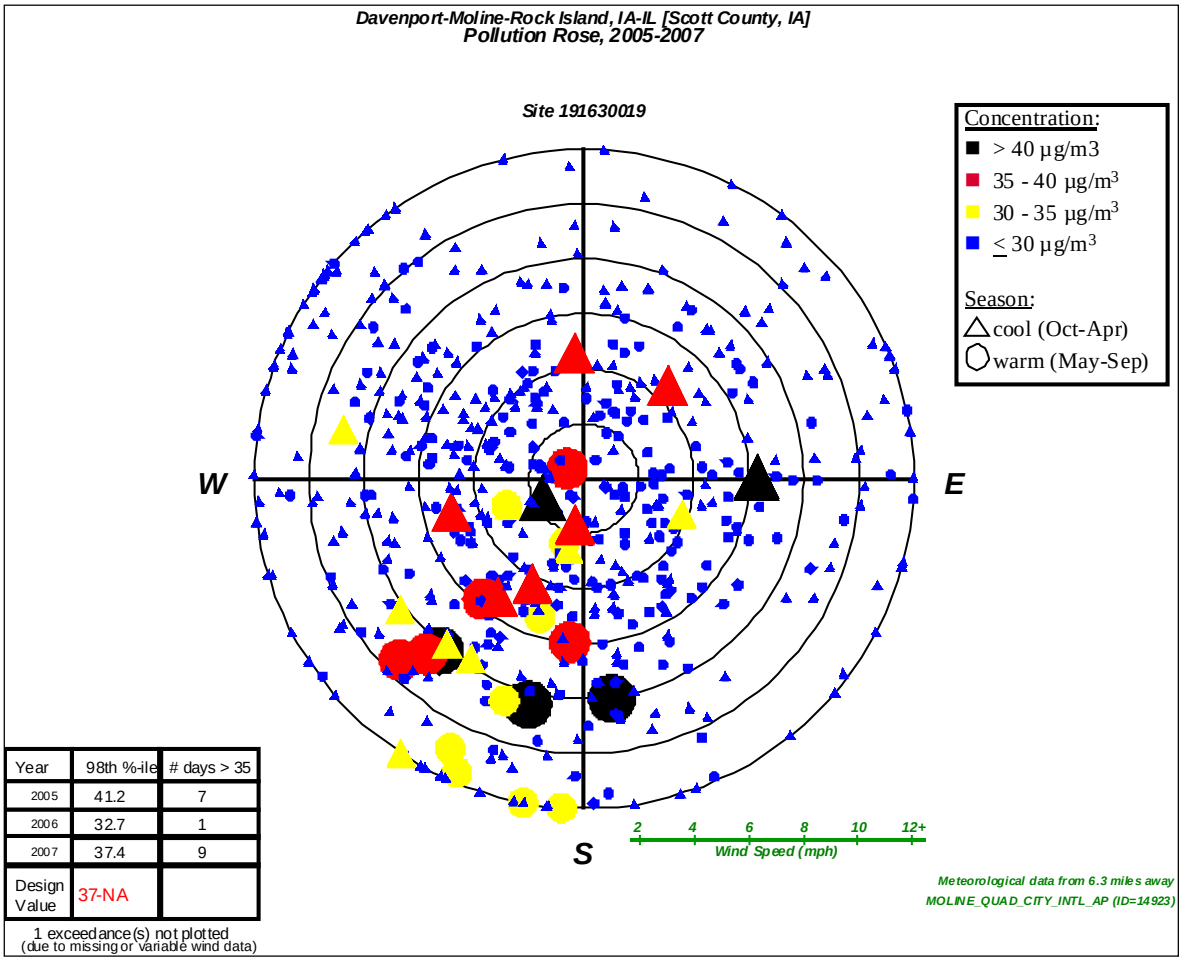


Figure 2

Note: The meteorology factor is also considered in each county's Contributing Emissions Score because the method for deriving this metric included an analysis of trajectories of air masses for high $PM_{2.5}$ days. Also, Iowa provided a separate wind rose and a pollution rose constructed from a site in Scott County, Iowa in the information

accompanying their recommendations. This additional information is discussed in the Iowa TSD.

Factor 7: Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis evaluates the physical features of the land that might have an effect on the air shed and, therefore, on the distribution of $PM_{2.5}$ over the area.

The Davenport area does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not significantly influence EPA's decision.

Factor 8: Jurisdictional boundaries

In evaluating the jurisdictional boundary factor, EPA gave special consideration to areas that were already designated nonattainment in 2005 for violating the 1997 fine particle standards. However, this area was designated attainment for the 1997 standards, so nonattainment area boundaries for the 1997 standards were not a factor in determining this area's boundaries.

Transportation planning for the Quad Cities area is accomplished through the Bi-State Regional Commission, which is the Metropolitan Planning Organization (MPO). The MPO serves Henry, Mercer, and Rock Island Counties in Illinois and Scott and Muscatine Counties in Iowa. Its web site is **www.bistateonline.org**. The Bi-State planning area itself was not a key factor in determining the Davenport area nonattainment boundary; other factors pointed to an area smaller than the entire 5-county area.

Factor 9: Level of control of emission sources

Under this factor, the existing level of control of emission sources is taken into consideration. The emissions data used by EPA in this technical analysis and provided in Table 1 under Factor 1 represent emissions levels taking into account any control strategies implemented in the Davenport area before 2005 on stationary, mobile, and area sources. Data are presented for $PM_{2.5}$ components that are directly emitted, carbonaceous $PM_{2.5}$ and crustal $PM_{2.5}$, and for pollutants which react in the atmosphere to form fine particles such as SO_2, NOx, VOC, and ammonia.

In considering county-level emissions, EPA used data from the 2005 National Emissions Inventory, the most updated version of the national inventory available at the beginning of the designations process in late 2007. However, EPA recognized that for certain counties, emissions may have changed since 2005. For example, certain power plants or large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2005. Some States provided updated information on emissions and emission controls in their comments to EPA. EPA considered such additional information in making final designation decisions.

With regard to nearby power plants, EPA considered information about whether a specific plant installed federally enforceable emission controls by December 2008 resulting in significant emissions reductions. A control requirement is considered to be federally-enforceable if it is required by a State regulation adopted in a State implementation plan, if it is included in a federally-enforceable Title V operating permit, or if it is required by a consent decree which also requires the controls to be included in federally enforceable permit upon termination of the consent decree. In making final decisions, EPA also considered whether a facility would continue to emit pollutants which contribute to $PM_{2.5}$ exceedances even after emission controls are operational.

Illinois did not provide information on control of sources in Rock Island County, and EPA assumes that the emission estimates in the 2005 inventory reasonably represent current emissions.

EPA Technical Analysis for Paducah-Mayfield, KY-IL

The only monitor in the Paducah-Mayfield area is in McCracken County, Kentucky. Kentucky requested concurrence on several claims that elevated concentrations were attributable to exceptional events, in particular due to wildfires. EPA reviewed this request, denied some of these claims, and concluded that the Paducah area is violating the 24-hour $PM_{2.5}$ standard.

The Paducah-Mayfield combined statistical area includes one county in Illinois: Massac County. This county has a relatively high fraction of the emissions in the area, and the winds commonly blow from Massac County into McCracken County on high concentration days. A substantial fraction of the Massac County emissions are attributable to the Joppa Steam Plant.

Illinois provided information that Ameren, the owner of the Joppa Steam Plant, has committed to install and operate control equipment, including separated overfire air in 2010 and scrubbers and baghouses in 2013 and 2014. EPA applauds these commitments and notes that these controls will ease the effort of planning for attainment. Nevertheless, EPA is promulgating designations based on current contributions to current air quality, and is not adjusting nonattainment area boundaries to reflect control that is not planned to be in place until two years and more into the future.

Illinois also provided additional information on the location of the Joppa Steam Plant in relation to Paducah, in conjunction with wind information to indicate that winds rarely blow from the Joppa Steam Plant toward the violating monitor in Paducah on days when the monitor is exceeding the 24-hour standard. Further discussion of this information is provided in the response to comments document. EPA found that current emissions at this facility are sufficiently high and winds blow sufficiently frequently from the plant toward Paducah to conclude that the plant's emissions contribute to the violation.

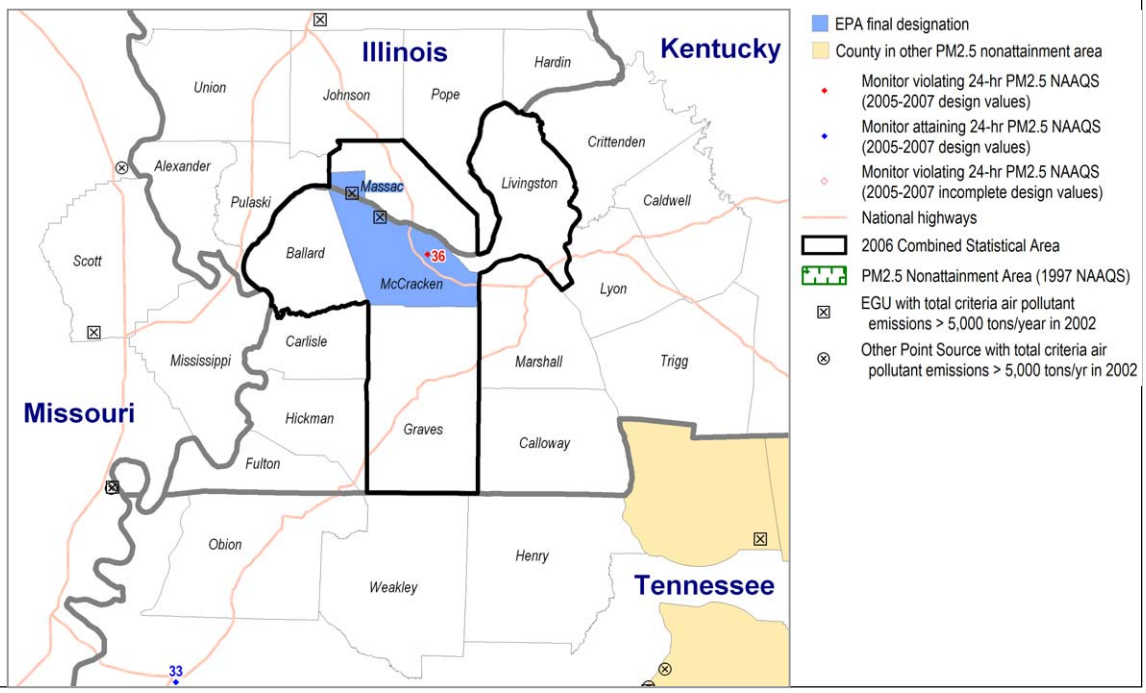
The Joppa Steam Plant emits virtually all of the SO2 emitted in Massac County and a significant fraction of the NOx and directly emitted particulate matter emitted in the

county. The population in Massac County and the number of commuters commuting from Massac County to Paducah are relatively low. Therefore, EPA believes that the contribution of Massac County to violations in Paducah can be adequately captured by including just the portion of Massac County that includes the Joppa Steam Plant. This plant is located in Hillerman Precinct of Massac County. Therefore, EPA is designating a Paducah nonattainment area that in Illinois only includes Hillerman Precinct.

EPA also examined information for other Illinois counties around the Paducah-Mayfield area. These other counties have relatively low emissions, and no other factor warrants their inclusion in the Paducah-Mayfield nonattainment area.

Figure 1 is a map of the counties in the nonattainment area and other relevant information such as the locations and design values of air quality monitors, and the metropolitan area boundary.

Figure 1. Paducah-Mayfield, KY-IL 24-hr $PM_{2.5}$ Nonattainment Area



In its June 2, 2008 letter, Illinois recommended that the Illinois counties in the Paducah area be designated as "attainment" for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2005-2007. These data are from Federal Reference Method (FRM) monitors located in the state.

In August 2008, EPA notified Illinois and Kentucky of its intended designations. In this letter, EPA also requested that if the State wished to provide comments on EPA's intended designation, it should do so by October 20, 2008. EPA stated that it would consider any additional information (e.g., on power plants or partial county areas) provided by the state in making final decisions on the designations.

Based on EPA's technical analysis described below, EPA has designated a Paducah nonattainment area that in Illinois includes Hillerman Precinct in Massac County, based upon currently available information.

The following is a review of data for relevant factors for the Paducah area.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following $PM_{2.5}$ components and precursor pollutants: "$PM_{2.5}$ emissions total," "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other," "SO_2," "NO_x," "VOCs," and "NH_3." "$PM_{2.5}$ emissions total" represents direct emissions of $PM_{2.5}$ and includes: "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other", primary sulfate (SO_4), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO_2 and NO_x, are part of "$PM_{2.5}$ emissions total," they are not shown in Table 1 as separate items). "$PM_{2.5}$ emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "$PM_{2.5}$ emissions other" represents other inorganic particles (crustal). Emissions of SO_2 and NO_x, which are precursors of the secondary $PM_{2.5}$ components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH_3 (ammonia) are also potential $PM_{2.5}$ precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive manner for considering data for these factors. A more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

Table 1 shows emissions of $PM_{2.5}$ components (given in tons per year) and the CESs for potentially contributing counties in the Paducah area. Counties are listed in descending order by CES.

Table 1. $PM_{2.5}$ 24-hour Component Emissions, and CESs.

County	State Recommended Nonattainment?	CES	$PM_{2.5}$ emissions total	$PM_{2.5}$ emissions carbon	$PM_{2.5}$ emissions other	SO_2	NOx	VOCs	NH_3
McCracken, KY	No	100	1,339	293	1,046	38,956	24,803	6,661	366
Massac, IL	No	66	1,958	159	1,799	26,884	12,369	2,612	417
Graves, KY	No	6	797	278	520	413	1,735	1,867	2,538
Ballard, KY	No	5	596	140	456	927	2,785	1,661	855
Livingston, KY	No	3	318	121	197	337	2,155	1,200	239

McCracken and Massac Counties have substantially greater emissions than the other nearby counties.

Table 2 provides the data for CES weighting factors. The trajectory factors are used in CES calculations to account for seasonal meteorology. For the top 10% of days in both the cold and warm seasons, wind trajectories were run for a 48 hour period preceding the high monitor reading. The amount of time the air mass was over a county within the mixing height was calculated. The values were scaled so that the maximum value is 100. The county that is most likely to be upwind of a monitor on a high concentration day in a season is given a score of 100. The scores for the other counties will reflect the relative likelihood of being upwind. As the concentration of a pollutant will decrease as it goes further downwind, a distance weighting factor is also used in calculating the CES. The distance factor listed on Table 2 provides the distance from the center of a county to the center of the violating county. If a county is violating, the distance used is the average distance from the center to the county line.

Table 2. CES Factor Data.

County	CES	Trajectory Factor- Cold	Trajectory Factor- Warm	Distance (mi)
McCracken	100	95	98	8.9
Massac	66	85	94	8.2
Graves	6	100	80	25.3
Ballard	5	76	77	16.3
Livingston	3	82	100	23.3

Factor 2: Air quality data

This factor considers the 24-hour $PM_{2.5}$ design values (in $\mu g/m^3$) for air quality monitors in counties in the Paducah area based on data for the 2005-2007 period. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 24-hour $PM_{2.5}$ standards are met when the 3-year average of a monitor's 98^{th} percentile values are 35 $\mu g/m^3$ or less. A design value is only valid if minimum data completeness criteria are met.

The 24-hour $PM_{2.5}$ design values for counties in the Paducah area are shown in Table 3.

Table 3. Air Quality Data

County	State Recommended Nonattainment?	Design Values 2004-06 ($\mu g/m^3$)	Design Values 2005-07 ($\mu g/m^3$)
McCracken, KY	No	33	36
Massac, IL	No		
Graves, KY	No		
Ballard, KY	No		
Livingston, KY	No		

Under this factor, we also consider fine particle composition monitoring data. Air quality monitoring data on the composition of fine particle mass are available from the EPA Chemical Speciation Network and the IMPROVE monitoring network. Analysis of these data indicates that the days with the highest fine particle concentrations in the Paducah

area occuring about 90% in the warm season and about 10% in the cool season. In the warm season, the average chemical composition of the highest days is 79% sulfate, 19% carbon, 2% crustal, and 0% nitrate. In the cool season, the average chemical composition of the highest days is 52% sulfate, 25% carbon, 21% nitrate, and 2% crustal. These data indicate that sources of SO2, direct PM2.5, and NOx emissions contribute to violations in the area.

McCracken County, Kentucky shows a violation of the 24-hour $PM_{2.5}$ standard for 2005-2007. There is no monitoring data in the Illinois portion of the Paducah area. However, the absence of a violating monitor or monitoring data is not a sufficient reason to eliminate counties as candidates for nonattainment status. Each county in the area has been evaluated based on the weight of evidence of the nine factors and other relevant information.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with an FRM monitor. All data from Special Purpose Monitors (SPM) using an FRM is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr $PM_{2.5}$ NAAQS for designation purposes.

Factor 3: Population density and degree of urbanization (including commercial development)

Table 4 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour $PM_{2.5}$ standards.

Table 4. Population

County	State Recommended Nonattainment?	2005 Population	2005 Population Density (pop/sq mi)
McCracken, KY	No	64,690	241
Massac, IL	No	15,225	63
Graves, KY	No	37,650	68
Ballard, KY	No	8,262	30
Livingston, KY	No	9,783	29

Massac County, Illinois has a low population of just over 15,000. McCracken County, Kentucky, is the central county in the area and has population more than four times larger.

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive to another county within the Paducah area the percent of total commuters in each county who commute within the area, as well as the total Vehicle Miles Traveled (VMT) for each county in millions of miles (see Table 5). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

Table 5. Traffic and Commuting Patterns

County	State Recommended Nonattainment?	2005 VMT (10^6 mi)	Number Commuting to any violating counties	Percent Commuting to any violating counties	Number Commuting within statistical area	Percent Commuting within statistical area
McCracken, KY	No	832	24,200	84	26,830	93
Graves, KY	No	435	2,350	15	12,880	83
Massac, IL	No	225	1,950	30	5,860	90
Livingston, KY	No	174	1,770	41	3,580	82
Ballard, KY	No	102	1,290	35	3,380	92

McCracken County has the highest VMT and highest number of commuters of any county in the area. A modest percentage of workers commute from Massac County and the other area counties to McCracken County, but numbers of total commuters to McCracken County are fairly low.

Note: The 2005 VMT data used for table 5 and 6 of the 9-factor analysis has been derived using methodology similar to that described in "Documentation for the final 2002 Mobile National Emissions Inventory, Version 3, September 2007, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf. The 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.

Factor 5: Growth rates and patterns

This factor considers population growth for 2000-2005 and growth in vehicle miles traveled for 1996-2005 for counties in Paducah area, 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 likely to be contributing to fine particle concentrations in the area.

Table 6 below shows population, population growth, VMT, and VMT growth for counties in the Paducah area. Counties are listed in descending order based on VMT growth between 1996 and 2005.

Table 6. Population and VMT Growth and Percent Change.

County	Population (2005)	Population % change (2000-2005)	2005 VMT (10^6 mi)	VMT % change (1996-2005)
McCracken, KY	64,690	-1	832	26
Massac, IL	15,225	1	225	25

Graves, KY	37,650	2	435	21
Ballard, KY	8,262	-1	102	12
Livingston, KY	9,783	0	174	56

All of the counties in the Paducah-Mayfield CSA showed negligible population change between 2000 and 2005. VMT generally increased in all counties, with McCracken, KY, and Massac, IL having fairly sizeable increases in VMT from 1996 to 2005, at 26 and 25 percent, respectively.

Overall, population growth rates are not expected to yield significant changes in the distribution of population in the area, so this factor did not significantly influence the decision-making process.

Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered data from National Weather Service instruments and other meteorological monitoring sites in the area. Wind direction and wind speed data for 2005-2007 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons, an October-April "cold" season and a May-September "warm" season. These high days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values.

For each air quality monitoring site, EPA developed a "pollution rose" to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The figure identifies 24-hour $PM_{2.5}$ values by color; days exceeding 35 $\mu g/m^3$ are denoted with a red or black icon. A dot indicates the day occurred in the warm season; a triangle indicates the day occurred in the cool season. The center of the figure indicates the location of the air quality monitoring site, and the location of the icon in relation to the center indicates the direction from which the wind was blowing on that day. An icon that is close to the center indicates a low average wind speed on that day. Higher wind speeds are indicated when the icon is further away from the center.

The pollution rose for the Paducah area is below as Figure 2. Winds on high concentration days are generally quite low and come from the southwest and northeast slightly more frequently than other directions. Still, the wind direction is varied. So, it is appropriate to include counties in all directions from the violations. When considered along with speciation monitoring data showing that most of the high days are in the warm season with high sulfate levels, this meteorological information indicates that certain high days may occur under stagnant conditions.

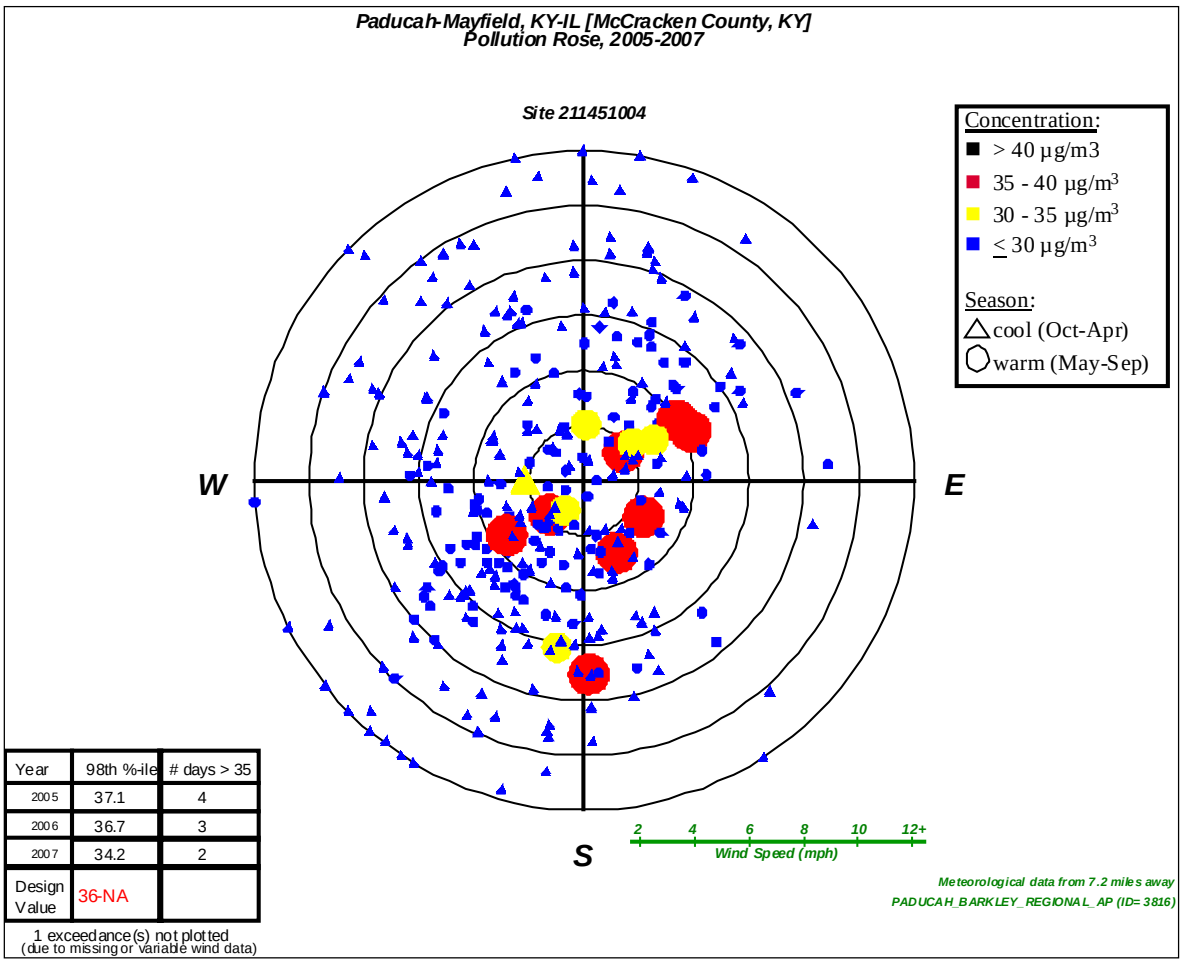


Figure 2

Note: the meteorology factor is also considered in each county's Contributing Emissions Score because the method for deriving this metric included an analysis of trajectories of air masses for high $PM_{2.5}$ days.

Factor 7: Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis evaluates the physical features of the land that might have an effect on the air shed and, therefore, on the distribution of $PM_{2.5}$ over the area.

The Paducah area does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not play a significant role in the decision-making process.

Factor 8: Jurisdictional boundaries

In evaluating the jurisdictional boundary factor, EPA gave special consideration to areas that were already designated nonattainment in 2005 for violating the 1997 fine particle standards. However, this area was designated attainment for the 1997 standards, so

nonattainment area boundaries for the 1997 standards were not a factor in determining this area's boundaries.

The Paducah maintenance area from its former one-hour ozone designation is comprised of Livingston and Marshall Counties in Kentucky. No portion of Illinois was in the Paducah ozone nonattainment area. This factor did not play a significant role in the decision-making process.

Factor 9: Level of control of emission sources

Under this factor, the existing level of control of emission sources is taken into consideration. The emissions data used by EPA in this technical analysis and provided in Table 1 under Factor 1 represent emissions levels taking into account any control strategies implemented in the Paducah area before 2005 on stationary, mobile, and area sources. Data are presented for $PM_{2.5}$ components that are directly emitted, carbonaceous $PM_{2.5}$ and crustal $PM_{2.5}$, and for pollutants which react in the atmosphere to form fine particles such as SO_2, NOx, VOC, and ammonia.

In considering county-level emissions, EPA used data from the 2005 National Emissions Inventory, the most updated version of the national inventory available at the beginning of the designations process in late 2007. However, EPA recognized that for certain counties, emissions may have changed since 2005. For example, certain power plants or large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2005. Some States provided updated information on emissions and emission controls in their comments to EPA. EPA considered such additional information in making final designation decisions.

With regard to nearby power plants, EPA considered information about whether a specific plant installed federally enforceable emission controls by December 2008 resulting in significant emissions reductions. A control requirement is considered to be federally-enforceable if it is required by a State regulation adopted in a State implementation plan, if it is included in a federally-enforceable Title V operating permit, or if it is required by a consent decree which also requires the controls to be included in federally enforceable permit upon termination of the consent decree. In making final decisions, EPA also considered whether a facility would continue to emit pollutants which contribute to $PM_{2.5}$ exceedances even after emission controls are operational.

Illinois provided information on the Joppa Steam Plant in Massac County, Illinois. The Joppa Steam Plant plans to install emission controls between 2010 and 2014. The planned controls will reduce sulfur dioxide, nitrogen oxides, and fine particulate emissions. Low NOx burners and a baghouse are currently in use at the Joppa plant. Still, current emissions from the plant (more than 25,000 tons SO2 and 5000 tons NOx annually) are high enough to warrant inclusion of the plant as a partial county area in the Paducah nonattainment area.

EPA Technical Analysis for Saint Louis, MO-IL

EPA reviewed relevant information for the nine counties including four Illinois counties partly or fully within the area designated nonattainment in St. Louis for the 1997 $PM_{2.5}$ standards as well as for surrounding counties. There are violating monitors in Madison County, Illinois. Illinois recommended a definition of the nonattainment area for the 2006 standards that is similar to the boundaries that were established for the 1997 standards, including Madison, Monroe and St. Clair Counties along with a portion of Randolph County, Illinois. Illinois recommended that the nonattainment area for the 2006 standards differ from the nonattainment area for the 1997 standards by the exclusion of the portion of Baldwin Township in Randolph County that is west of the Kaskaskia River.

EPA concurs with Illinois's recommendation to include Madison, Monroe, and St. Clair Counties in the St. Louis nonattainment area. However, EPA believes that all of Baldwin Township of Randolph County should be included as well. The most important factor influencing this judgment is the factor relating to jurisdictional boundaries. The inclusion of a full township will make nonattainment requirements easier to administer, since information on emissions and source locations are more readily available on a township basis than with respect to a specially defined subset of the township. Furthermore, EPA believes that establishment of a nonattainment area that fully matches the nonattainment area established for the 1997 standards would simplify nonattainment planning by assuring that identical requirements apply for an identical area. At the same time, as addressed in more detail in our documentation of our designations for the 1997 standards, Baldwin Township contains almost all of the emissions and therefore makes almost the entirety of the contribution of Randolph County to the violations, so that a designation of just Baldwin Township as nonattainment will suffice to address the contribution of this portion of the area. As discussed below, Randolph County does not rank high for any factors other than emissions, indicating that only Baldwin County where the power plant is located is appropriate for inclusion in the nonattainment area.

The most significant emissions in Baldwin Township are from Ameren's Baldwin Station. This plant is subject to a consent decree requiring significant SO_2 emission reductions between 2010 and 2012. Emissions at this plant also reflect the use of lower sulfur coal than had been burned in previous decades. Nevertheless, current emissions remain relatively high. Baldwin Township is also fairly nearby to violations and is commonly upwind of those violations. Therefore, EPA concluded that Baldwin Township is currently contributing to violations of the standard.

EPA reviewed the relevant information for other counties within the combined statistical area as well as counties adjacent to the combined statistical area in order to determine the appropriate nonattainment area. Sangamon County has moderate emissions but is rarely upwind on days with elevated 24-hour $PM_{2.5}$ concentrations. Other Illinois counties in or near the combined statistical area have relatively low emissions, and no other factor warranted inclusion of any of the counties in the nonattainment area.

Figure 1 is a map of the counties in the nonattainment area and other relevant information such as the locations and design values of air quality monitors, and the metropolitan area boundary.

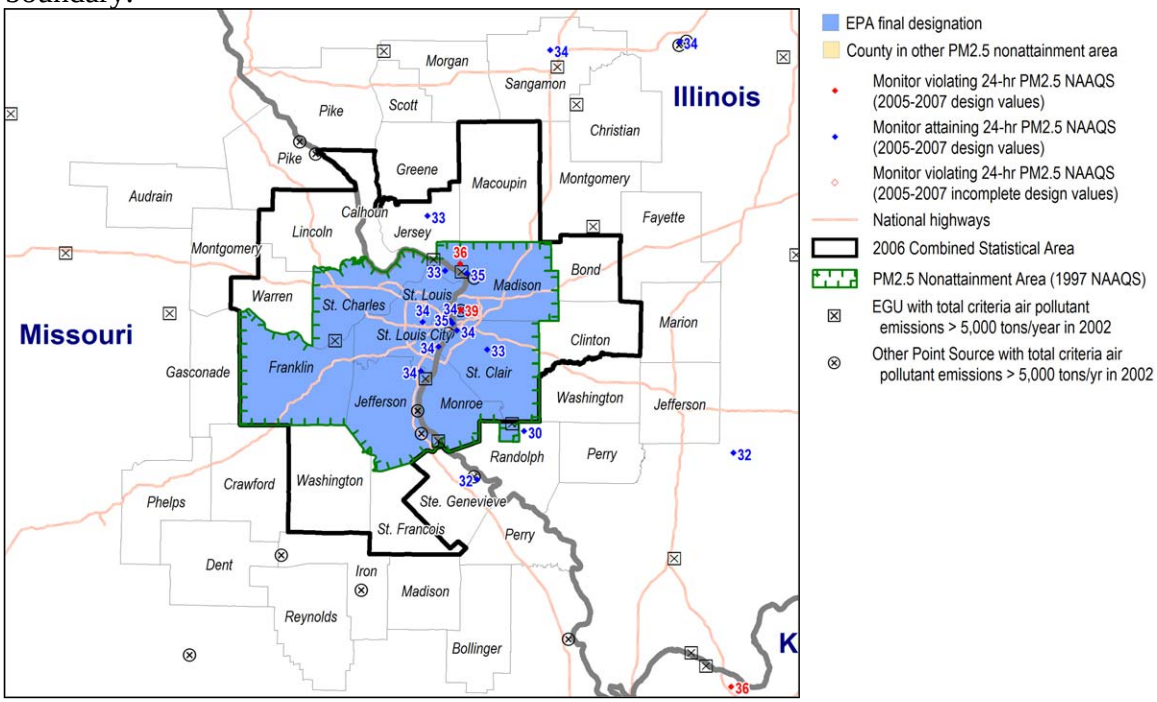


Figure 1

For this area, EPA previously established $PM_{2.5}$ nonattainment boundaries for the 1997 $PM_{2.5}$ NAAQS that included nine full and partial counties, with four being located in Illinois and five in Missouri including the city of St. Louis.

In its December 18, 2007 letter, Illinois recommended similar full and partial counties in the St. Louis area be designated as "nonattainment" for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2004-2006. Illinois recommended a smaller partial county area that would exclude a portion of Baldwin Township in Randolph County from the nonattainment area. The power plant is in the portion Illinois recommended as nonattainment. These data are from Federal Reference Method (FRM) monitors located in the state.

In August 2008, EPA notified Illinois and Missouri of its intended designations. In this letter, EPA also requested that if the State wished to provide comments on EPA's intended designation, it should do so by October 20, 2008. EPA stated that it would consider any additional information (e.g., on power plants or partial county areas) provided by the state in making final decisions on the designations.

Based on EPA's technical analysis described below, EPA has designated three full counties and one partial county in Illinois and four counties and a city in Missouri as nonattainment for the 24-hour $PM_{2.5}$ air-quality standard as the St. Louis nonattainment area, based upon currently available information.

The following is a review of data for relevant factors for the Saint Louis area.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following $PM_{2.5}$ components and precursor pollutants: "$PM_{2.5}$ emissions total," "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other," "SO_2," "NO_x," "VOCs," and "NH_3." "$PM_{2.5}$ emissions total" represents direct emissions of $PM_{2.5}$ and includes: "$PM_{2.5}$ emissions carbon," "$PM_{2.5}$ emissions other", primary sulfate (SO_4), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO_2 and NO_x, are part of "$PM_{2.5}$ emissions total," they are not shown in Table 1 as separate items). "$PM_{2.5}$ emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "$PM_{2.5}$ emissions other" represents other inorganic particles (crustal). Emissions of SO_2 and NO_x, which are precursors of the secondary $PM_{2.5}$ components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH_3 (ammonia) are also potential $PM_{2.5}$ precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive manner for considering data for these factors. A more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

Table 1 shows emissions of $PM_{2.5}$ and precursor pollutants components (given in tons per year) and the CES for violating and potentially contributing counties in the St. Louis area. Counties that are part of the St. Louis nonattainment area for the 1997 $PM_{2.5}$ NAAQS are shown in boldface. Counties are listed in descending order by CES.

Table 1. $PM_{2.5}$ 24-hour Component Emissions, and CESs.

County	State Recommended Nonattainment?	CES	$PM_{2.5}$ emissions total	$PM_{2.5}$ emissions carbon	$PM_{2.5}$ emissions other	SO_2	NOx	VOCs	NH_3
Madison, IL	**Yes**	**100**	**4,945**	**1,148**	**3,796**	**27,320**	**19,373**	**15,676**	**1,393**
St. Louis, MO	**No**	**55**	**4,221**	**1,707**	**2,513**	**29,966**	**55,605**	**54,821**	**2,954**
St. Louis City	**No**	**48**	**1,686**	**625**	**1,060**	**12,171**	**24,702**	**20,647**	**439**
St. Clair, IL	**Yes**	**22**	**1,496**	**487**	**1,009**	**2,142**	**10,233**	**10,869**	**1,281**
St. Charles, MO	**No**	**17**	**3,694**	**619**	**3,075**	**54,561**	**20,773**	**12,419**	**1,182**
Jefferson, MO	**No**	**16**	**2,945**	**824**	**2,121**	**45,574**	**16,722**	**9,273**	**493**
Randolph, IL	**Partial**	**9**	**2,505**	**306**	**2,199**	**24,605**	**9,384**	**2,331**	**993**
Montgomery, IL	No	7	2,463	263	2,200	41,131	12,122	2,789	1,055
Franklin, MO	**No**	**5**	**2,812**	**621**	**2,190**	**56,767**	**15,595**	**5,748**	**1,818**
Monroe, IL	**Yes**	**5**	**744**	**235**	**508**	**293**	**3,057**	**2,529**	**654**
Clinton, IL	No	5	923	206	717	506	2,982	2,919	2,890

Within Illinois, emissions are highest in Madison, St. Clair, and Randolph Counties. The emissions from Montgomery, Monroe, and Clinton Counties are moderate. Based on emission levels and CES values, these Illinois counties were candidates for a 24-hour $PM_{2.5}$ nonattainment designation.

Table 2 provides the data for CES weighting factors. The trajectory factors are used in CES calculations to account for seasonal meteorology. For the top 10% of days in both the cold and warm seasons, wind trajectories were run for a 48 hour period preceding the high monitor reading. The amount of time the air mass was over a county within the mixing height was calculated. The values were scaled so that the maximum value is 100. Thus, the county that is most likely to be upwind of a monitor on a high concentration day in a season is given a score of 100. The scores for the other counties will reflect the relative likelihood of being upwind. As the concentration of a pollutant will decrease as it goes further downwind, a distance weighting factor is also used in calculating the CES. The distance factor listed on Table 2 provides the distance from the center of a county to the center of the violating county. If a county is violating, the distance used is the average distance from the center to the county line.

Table 2. CES Factor Data.

County	CES	Trajectory Factor- Cold	Trajectory Factor- Warm	Distance (mi)
Madison, IL	100	85	69	15.0
St. Louis, MO	55	84	61	38.1
St. Louis City, MO	48	100	99	24.0
St. Clair, IL	22	81	100	27.1
St. Charles, MO	17	63	25	47.2
Jefferson, MO	16	54	39	55.4
Randolph, IL	9	41	52	56.3
Montgomery, IL	7	40	10	38.1
Franklin, MO	5	38	8	69.6
Monroe, IL	5	68	76	39.3
Clinton, IL	5	52	60	28.9

Factor 2: Air quality data

This factor considers the 24-hour $PM_{2.5}$ design values (in $\mu g/m^3$) for air quality monitors in counties in the St. Louis area based on data for the 2005-2007 period. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 24-hour $PM_{2.5}$ standards are met when the 3-year average of a monitor's 98^{th} percentile values are 35 $\mu g/m^3$ or less. A design value is only valid if minimum data completeness criteria are met. The 24-hour $PM_{2.5}$ design values for counties in the St. Louis area are shown in Table 3.

Table 3. Air Quality Data

County	State Recommended Nonattainment?	Design Values 2004-2006	Design Values 2005-2007
Madison, IL	Yes	39	39
St. Louis, MO	No	32	34

St. Louis City, MO	No	34	35
St. Clair, IL	Yes	33	34
St. Charles, MO	No	32	33
Jefferson, MO	No	32	34
Randolph, IL	Partial	27	30
Franklin, MO	No		
Monroe, IL	Yes		
Montgomery, IL	No		
Clinton, IL	No		

One county (Madison) in Illinois shows a violation of the 24-hour $PM_{2.5}$ standard. Therefore, this county was a strong candidate for inclusion in the St. Louis nonattainment area. However, this factor alone is not sufficient to eliminate the other counties in the St. Louis area as candidates for nonattainment status. EPA considered each county's CES as well as the eight other factors plus other relevant factors or circumstances when determining which counties to include in the St. Louis nonattainment area.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with an FRM monitor. All data from Special Purpose Monitors (SPM) using an FRM is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr $PM_{2.5}$ NAAQS for designation purposes.

Factor 3: Population density and degree of urbanization (including commercial development)

Table 4 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour $PM_{2.5}$ standards.

Table 4. Population

County	State Recommended Nonattainment?	2005 Population	2005 Population Density (pop/sq mi)
Madison, IL	Yes	263,975	357
St. Louis, MO	No	1,002,258	1914
St. Louis City, MO	No	352,572	5334
St. Clair, IL	Yes	259,388	385
St. Charles, MO	No	329,606	557
Jefferson, MO	No	213,011	321
Randolph, IL	Partial	33,116	55
Franklin, MO	No	98,987	107
Monroe, IL	Yes	31,289	79
Montgomery, IL	No	30,304	43
Clinton, IL	No	36,138	72

Madison and St. Clair Counties have the largest populations in the Illinois portion of the St. Louis area and are therefore candidates for inclusion in the nonattainment area based on this factor. The populations of Randolph, Monroe, Montgomery, and Clinton Counties are smaller with all having fewer than 37,000 residents.

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive within or into the St. Louis area, the percent of total commuters in each county who commute into or within the area, as well as the total Vehicle Miles Traveled (VMT) for each county in millions of miles (see Table 5). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

Table 5. Traffic and Commuting Patterns

County	State Recommended Nonattainment?	2005 VMT (10^6 mi)	Number Commuting to any violating counties	Percent Commuting to any violating counties	Number Commuting into statistical area	Percent Commuting into statistical area
St. Louis, MO	**No**	**14,165**	**3,800**	**1**	**493,070**	**99**
St. Charles, MO	**No**	**3,185**	**740**	**0**	**147,420**	**99**
St. Louis City	**No**	**3,638**	**1,250**	**1**	**139,280**	**99**
Madison, IL	**Yes**	**2,318**	**75,490**	**62**	**119,590**	**98**
St. Clair, IL	**Yes**	**3,019**	**7,040**	**6**	**110,870**	**98**
Jefferson, MO	**No**	**2,241**	**490**	**1**	**96,860**	**99**
Franklin, MO	**No**	**1,436**	**150**	**0**	**43,600**	**97**
Clinton, IL	No	378	1,600	9	14,760	87
Monroe, IL	**Yes**	**359**	**420**	**3**	**13,560**	**95**
Randolph, IL	**Partial**	**261**	**180**	**1**	**2,790**	**21**
Montgomery, IL	No	525	290	2	1,300	10

The listing of counties on Table 5 reflects a ranking based on the number of people commuting to other counties. The counties that are in the nonattainment area for the 1997 $PM_{2.5}$ NAAQS are shown in boldface. The counties that comprise the 1997 standards area remain highly integrated into the St. Louis area. Most commuters traveled within the St. Louis area. Clinton County has low annual VMT and a modest number of workers who commute into violating counties. A modest number of Randolph County commuters traveled into the St. Louis metropolitan area. Even fewer Montgomery County commuters travel into the area.

Note: The 2005 VMT data used for table 5 and 6 of the 9-factor analysis has been derived using methodology similar to that described in "Documentation for the final 2002 Mobile National Emissions Inventory, Version 3, September 2007, prepared for the Emission Inventory Group, U.S. EPA. This document may be found at: ftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_ve

rsion_3_report_092807.pdf. The 2005 VMT data were taken from documentation which is still draft, but which should be released in 2008.

Factor 5: Growth rates and patterns

This factor considers population growth for 2000-2005 and growth in vehicle miles traveled for 1996-2005 for counties in the St. Louis area, 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 likely to be contributing to fine particle concentrations in the area.

Table 6 below shows population, population growth, VMT, and VMT growth for counties that are included in the St. Louis area. Counties are listed in descending order based on VMT growth between 1996 and 2005.

Table 6. Population and VMT Growth and Percent Change.

County	Population (2005)	Population % change (2000-2005)	2005 VMT (10^6 mi)	VMT % change (1996-2005)
Monroe, IL	31,289	13	359	47
St. Louis, MO	1,002,258	-1	14,165	33
St. Charles, MO	329,606	15	3,185	28
Montgomery, IL	30,304	-1	525	27
Franklin, MO	98,987	5	1,436	19
St. Clair, IL	259,388	1	3,019	13
Clinton, IL	36,138	2	378	11
Randolph, IL	33,116	-2	261	2
Jefferson, MO	213,011	7	2,241	1
St. Louis City, MO	352,572	2	3,638	-8
Madison, IL	263,975	2	2,318	-12

The counties that experienced the highest growth rates are some of the smaller counties, such as Monroe County, Illinois. Thus, the growth rates are not expected to yield significant changes in the distribution of population in the area, so this factor did not significantly influence the decision-making process.

Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered data from National Weather Service instruments and other meteorological monitoring sites in the area. Wind direction and wind speed data for 2005-2007 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons, an October-April "cold" season and a May-September "warm" season. These high days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values.

For each air quality monitoring site, EPA developed a "pollution rose" to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The figure identifies 24-hour $PM_{2.5}$ values by color; days exceeding 35

µg/m^3 are denoted with a red or black icon. A dot indicates the day occurred in the warm season; a triangle indicates the day occurred in the cool season. The center of the figure indicates the location of the air quality monitoring site, and the location of the icon in relation to the center indicates the direction from which the wind was blowing on that day. An icon that is close to the center indicates a low average wind speed on that day. Higher wind speeds are indicated when the icon is further away from the center.

The pollution rose for the St. Louis area is provided below in Figure 2. Emissions from the southwest and southeast are most prone to contribute to nonattainment. Thus, Monroe, St. Clair, Madison and Randolph Counties in Illinois are appropriate for consideration under this factor.

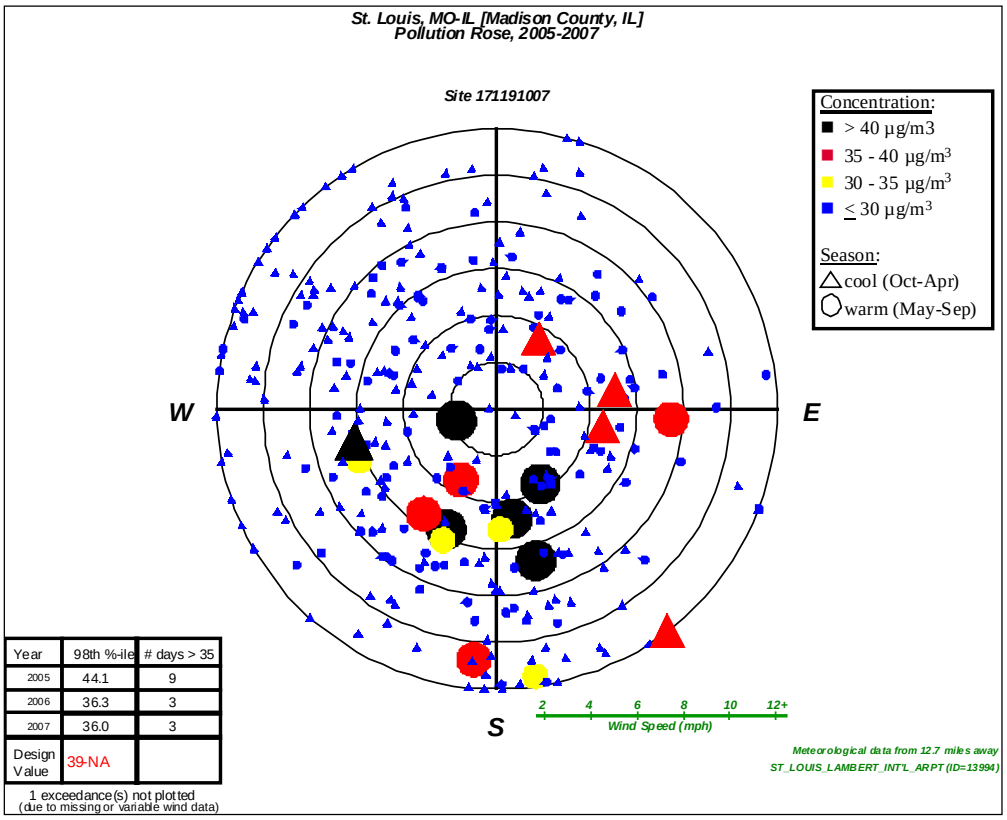


Figure 2

Note: the meteorology factor is also considered in each county's Contributing Emissions Score because the method for deriving this metric included an analysis of trajectories of air masses for high $PM_{2.5}$ days.

Factor 7: Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis evaluates the physical features of the land that might have an effect on the air shed and, therefore, on the distribution of $PM_{2.5}$ over the area.

The St. Louis area does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not play a significant role in the decision-making process.

Factor 8: Jurisdictional boundaries

In evaluating the jurisdictional boundary factor, EPA gave special consideration to areas that were already designated nonattainment in 2005 for violating the 1997 fine particle standards. Analysis of chemical composition data in these areas indicates that the same components that make up most of the $PM_{2.5}$ mass in the area on an annual average basis such as sulfate and direct $PM_{2.5}$ carbon in many eastern areas also are key contributors to the $PM_{2.5}$ mass on days exceeding the 24-hour $PM_{2.5}$ standard. These data indicate that in many cities, the same source categories that contribute to violations of the annual standard also contribute to exceedances of the 24-hour standard.

Most areas that were originally designated nonattainment for the $PM_{2.5}$ standards still have not attained the air quality standards. Thus, EPA has generally concluded that counties that were designated as having emissions sources contributing to fine particle concentrations which continue to exceed the 1997 standards (all areas violated the annual standard, two also violated the previous 24-hour standard) also contribute to fine particle concentrations on the highest days. For this reason, EPA believes that for most existing nonattainment areas, the nonattainment area for the 2006 24-hour standard should be the same. Consideration also should be given to existing boundaries and organizations as they may facilitate air quality planning and the implementation of control measures to attain the standard. Areas already designated as nonattainment represent important boundaries for state air quality planning.

As noted, Madison, St. Clair, Monroe and a portion (Baldwin Township) of Randolph Counties are included in the $PM_{2.5}$ nonattainment area for the 1997 standards. Under this factor it is appropriate to consider these same counties for designation for the 2006 standards.

The Ease-West Gateway Council of Governments (EWGCG) is the Metropolitan Planning Organization (MPO) for the bi-state St. Louis area. The EWGCG web site is: http://www.ewgateway.org/.

The Illinois portion of the St. Louis ozone nonattainment area consists of Jersey, Madison, Monroe, and St. Clair Counties.

Factor 9: Level of control of emission sources

Under this factor, the existing level of control of emission sources is taken into consideration. The emissions data used by EPA in this technical analysis and provided in Table 1 under Factor 1 represent emissions levels taking into account any control strategies implemented in the St. Louis area before 2005 on stationary, mobile, and area sources. Data are presented for $PM_{2.5}$ components that are directly emitted, carbonaceous

$PM_{2.5}$ and crustal $PM_{2.5}$, and for pollutants which react in the atmosphere to form fine particles such as SO_2, NOx, VOC, and ammonia.

In considering county-level emissions, EPA used data from the 2005 National Emissions Inventory, the most updated version of the national inventory available at the beginning of the designations process in late 2007. However, EPA recognized that for certain counties, emissions may have changed since 2005. For example, certain power plants or large sources of emissions in or near this area may have installed emission controls or otherwise significantly reduced emissions since 2005. Some States provided updated information on emissions and emission controls in their comments to EPA. EPA considered such additional information in making final designation decisions.

With regard to nearby power plants, EPA considered information about whether a specific plant installed federally enforceable emission controls by December 2008 resulting in significant emissions reductions. A control requirement is considered to be federally-enforceable if it is required by a State regulation adopted in a State implementation plan, if it is included in a federally-enforceable Title V operating permit, or if it is required by a consent decree which also requires the controls to be included in federally enforceable permit upon termination of the consent decree. In making final decisions, EPA also considered whether a facility would continue to emit pollutants which contribute to $PM_{2.5}$ exceedances even after emission controls are operational.

No information was provided regarding recent emission controls installed at power plants or any other large sources in the Illinois portion of the St. Louis area. Thus, this factor was not significant in determining the boundary of the nonattainment area.

EPA is designating three full and one partial county as nonattainment in the Illinois portion of the St. Louis area. EPA reviewed the information on counties in the St. Louis area and determined that Madison County, Illinois has a 2005-2007 design value exceeding the 2006 standards and that two counties (Monroe and St. Clair) and a partial county (Baldwin Township in Randolph County) in the Illinois portion of the St. Louis area contribute to the violation based on this analysis. Monroe and St. Clair Counties were shown to be nonattainment candidates based on several of the factors. The emissions from the partial county area in Randolph County combined with the county being low for other factors including population and commuting made EPA determine a partial county designation was reasonable.