



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

OFFICE OF
REGIONAL ADMINISTRATOR

18 AUG 2008

The Honorable Chester J. Culver
Governor of Iowa
State Capitol
1007 East Grand Avenue
Des Moines, IA 50319

Dear Governor Culver:

Thank you for your recommendations on the status of fine particle pollution throughout Iowa. This letter is to notify you of our intent to modify the state's recommendation for designating areas as nonattainment in the state of Iowa. Fine-particle pollution represents one of the most significant barriers to clean air facing our nation today. Health studies link these tiny particles – about 1/30th the diameter of a human hair – to serious human health problems including aggravated asthma, increased respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and even premature death in people with heart and lung disease. Fine particle pollution can remain suspended in the air for long periods of time and create public health problems far away from emission sources. Reducing levels of fine-particle (PM_{2.5}) pollution is an important part of our nation's commitment to clean, healthy air.

In November of 2007, you submitted a recommendation that the entire state of Iowa be designated as attainment for the 2006 24-hour PM_{2.5} National Ambient Air Quality Standard (NAAQS). Your attainment recommendation was based on a review of the 2004-2006 monitoring data. However, you also urged us to review the most recent air monitoring data when making final attainment/nonattainment designations.

In cooperation with your staff at IDNR, we reviewed the most recent air monitoring data available, and based on 2005-2007 monitoring data, we have identified two monitors in the state which violate the 2006 24-hour PM_{2.5} National Ambient Air Quality Standard. The violating monitors are located in Scott and Muscatine Counties. Based on our review, we provided the state of Iowa an opportunity to revise the recommendation provided in November of 2007.

We received a response on May 30, 2008 from IDNR Director, Richard Leopold, which requested a one-year delay before promulgating designations, to allow the state to work aggressively with industries near the monitors to immediately develop and implement control strategies to reduce PM_{2.5} emissions. Mr. Leopold indicated that this might negate the need for the nonattainment designation. As a follow-up, Mr. Leopold sent a letter on July 29, 2008 requesting that if EPA cannot grant a one-year extension of the designation, then the state requests narrow boundaries be drawn for the nonattainment area.

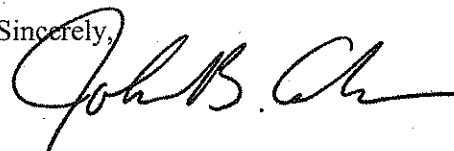
We are very encouraged by the state's effort to work with those sources that it believes contribute to the monitored violations. We are aware that IDNR is in the process of negotiating formal agreements to reduce emissions in the Davenport and Muscatine areas. We encourage continuation of those efforts and look forward to hearing about progress on the agreements.

We have thoroughly reviewed your recommendations and the technical information you have submitted to support your recommendations. We appreciate the effort your department has made to develop this supporting information. At this time we do not intend to provide a one-year extension of the designation process as such extensions are generally based on lack of monitoring data for an area, which is not case for Davenport or Muscatine. Furthermore we intend to modify your recommendation and propose to designate as non-attainment the following counties for the 24-hour PM_{2.5} National Ambient Air Quality Standard (NAAQS) relative to two separate non-attainment areas: Muscatine County, Iowa (relative to the monitored violation in Muscatine, Iowa); and Scott County, Iowa and Rock Island County, Illinois (relative to the monitored violation in Davenport, Iowa.) We have enclosed a detailed description of areas in Iowa where EPA intends to modify the state's recommendations, and the basis for such modification including our evaluation of the nine factors outlined in our June 2007 designations guidance. Included in this enclosure is a brief summary of Region 5's technical support for the designation of Rock Island County in Illinois. For more detailed information regarding Rock Island County, please refer to EPA Region 5's evaluation sent to the state of Illinois and available at the following website <http://www.epa.gov/airprogm/oar/particlepollution/designations/index.htm>.

We understand that you have an interest in further refining and narrowing the boundaries of these two areas. We will continue to work with you to evaluate scientific data in order to ensure that our final decisions achieve clean air for the citizens of Iowa and Illinois.

We intend to make final designation decisions for the 2006 24-Hour PM_{2.5} standards by December 18, 2008. However, if you have additional information that you would like us to consider, please provide this information no later than October 20, 2008. Please also be aware that in the near future, EPA is planning to publish a notice in the Federal Register to solicit public comments on our intended designation decisions. If you have any questions, please do not hesitate to contact me at (913) 551-7006, or you may call Becky Weber, the Director of the Air and Waste Management Division at (913) 551-7487. We look forward to a continued dialogue with you as we work together to implement the PM_{2.5} standards.

Sincerely,



John B. Askew
Regional Administrator

Enclosures

cc: Richard Leopold, Director, IDNR
Wayne Gieselmann, Administrator, Division of Environmental Protection, IDNR
Catharine Fitzsimmons, Chief, Air Quality Bureau, IDNR

EPA intends to designate the remaining Iowa counties as attainment/ unclassifiable

Technical Analysis for the Davenport-Moline-Rock Island, IA-IL Area

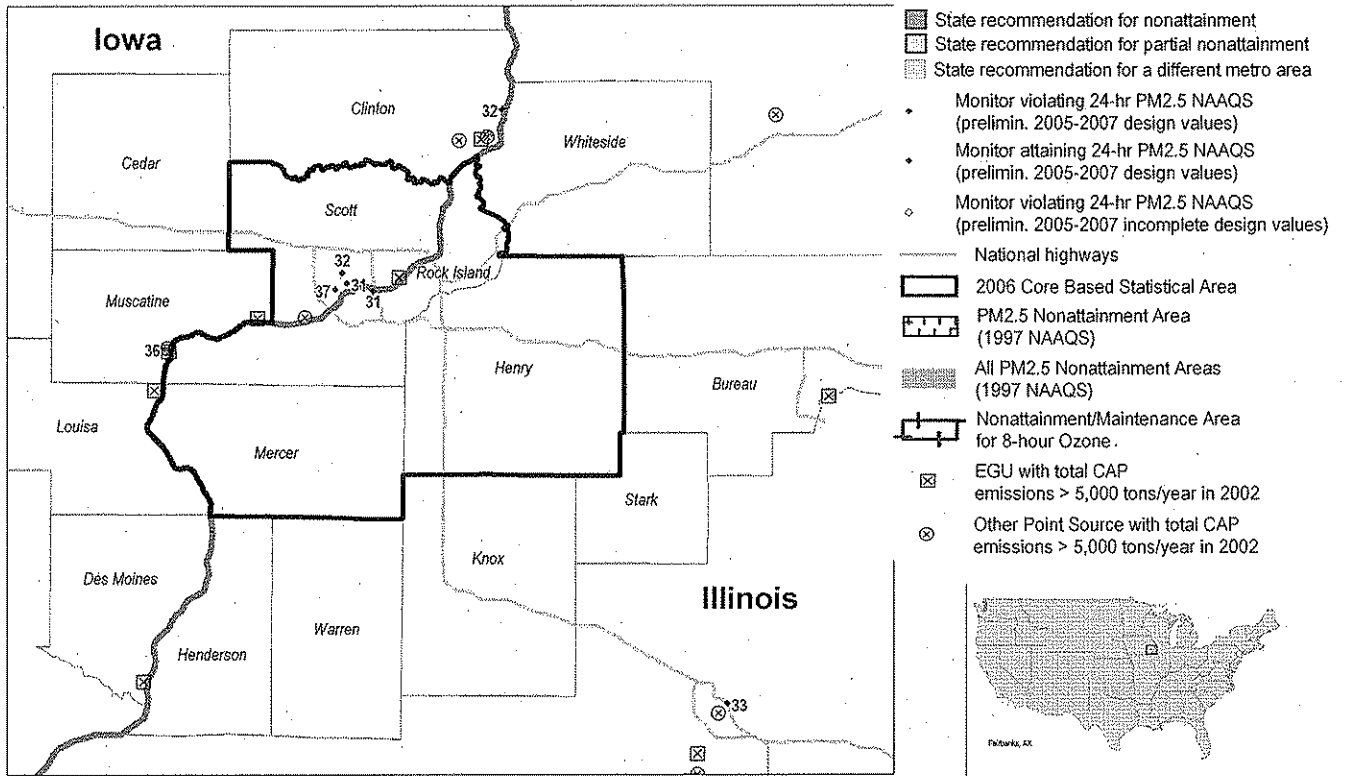
Discussion:

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for the Missouri portion of the St. Louis bi-state metropolitan area identifies the counties with monitors that violate the 24-hour PM_{2.5} standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

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

Davenport-Moline-Rock Island, IA-IL



Counties labeled in bold reflect NAAs under Recommendation for area made by IA's Department of Natural Resources on July 29, 2008 are not reflected on this map.

In a letter dated November 2007, Iowa recommended that all of the counties in Iowa be designated as attainment based on air quality data from 2004-2006. The City of Davenport in Scott County, Iowa, was then determined to have a violation of the 2006 24-hour $PM_{2.5}$ standards based on air quality data from 2005-2007. In response to EPA's notification of this new violation and the request for a designation recommendation, in a letter, dated May 30, 2008, Iowa recommended that EPA delay designating a portion of Scott County for one year. In a subsequent letter, dated July 29, 2008, Iowa requested that, if EPA could not grant a one-year extension of the designation, that EPA designated only a portion of Scott County as nonattainment for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2005-2007. All air quality data are from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state.

In July 2008, the State of Iowa recommended designating only a portion of Scott County as a single nonattainment area. In Iowa's technical support for their nonattainment recommendation, the state conducted an analysis of the 9 factors outlined in EPA's designations guidance. The state reviewed emissions, air quality and meteorological information to support their recommendation of the partial county, as described in the table above. The state concluded that the data strongly indicates that direct $PM_{2.5}$ emissions from point sources in the immediate vicinity of the violating monitor cause and contribute to the 24-hour $PM_{2.5}$ NAAQS violation.

Iowa's evaluation of meteorological information concluded that the dominant wind direction associated with the local exceedance events at the violating monitor shows winds are coming from the south, south-west which is in line with a source of direct PM 2.5 emissions. Iowa also believed that PM_{2.5} precursor emissions of SO₂ and NO_x in the counties analyzed are not significantly contributing to exceedance events classified as local. Iowa asserts that Local events contribute to PM 2.5 concentrations on those days in which a single³ monitor registered a daily average concentration which exceeded 35.5 µg/m³. Also, Iowa asserts regional events contribute the remainder of the exceedance days (i.e. days when other monitors record exceedances). In the regional events, back trajectories indicate that the cumulative impact of emissions sources spread across a wide region are responsible for the elevated PM_{2.5} concentration measured in the area. Iowa further asserts without contributions, the violating monitor would not be in violation of the 24-hour PM_{2.5} NAAQS. Iowa concludes that the review of emissions data, especially in consideration with the ambient data and meteorological data highlights the importance of sources in the immediate vicinity of the violating monitor. Iowa also believes that emissions in the adjacent counties in Illinois are not causing or contributing to the violation of the NAAQS at the violating monitor in the City of Davenport, Iowa.

First, in response to the request for a 1-year extension, EPA believes that there is sufficient information to make designation determination at this time. Second, EPA has taken Iowa's recommendation of a partial county designation for Scott County under consideration, but finds that the information provided, to date, does not adequately support a partial county designation. Iowa has not provided sufficient information to show what portion of the PM 2.5 contribution to the violating monitor at 300 Wellman Steet is attributable to the nearby source. Nor has sufficient information been provided to explain the contribution from other metro area sources and from longer rangel transport. In reviewing the monitoring data provided by Iowa, we conclude that whereas there are days when only one monitor exceeds the standard, it is not appropriate to only look at the violating monitor in order to develop a nonattainment boundary. It is important to look at the monitoring trends across the network in order to comprehensively understand the nature of the monitored exceedances. Also, EPA believes that PM_{2.5} precursor emissions of SO₂ and NO_x in the counties need to be analyzed further to determine whether other sources of pollutants are contributing to exceedance events. Section 107 of the Clean Air Act defines a nonattainment as an area that is violating the standard and the area that is contributing to the violation.

Based upon currently available information, EPA believes that all of Scott County, Iowa should be designated nonattainment for the 24-hour PM_{2.5} air-quality standard as part of the Davenport-Moline-Rock Island area. In addition, EPA believes that the nonattainment area should include Rock Island County in Illinois. Rock Island County has emissions that commonly are transported 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 area. For more detailed information regarding Rock Island County, please

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refer to EPA Region 5's evaluation sent to the state of Illinois and available at the following website

<http://www.epa.gov/airprogm/oar/particlepollution/designations/index.htm>.

Davenport-Moline-Rock Island, IA-IL	State-Recommended Nonattainment Counties	EPA-Recommended Nonattainment Counties
Iowa	Scott (partial)	Scott

Summary of the 9-factor analysis for the Iowa Portion of the Davenport-Moline-Rock Island, IA-IL

The Iowa Department of Natural Resources (IDNR) provided EPA with technical data of their 9-factor analysis some of which differed from what was used by EPA. For example, EPA relied upon the 2005 version of the National Emissions Inventory whereas IDNR may have used 2006 emissions data where available to them for some sources of emissions. Another difference between EPA and IDNR's evaluation of the 9 factors is that explains that pollutant emissions of direct PM 2.5 are of highest importance in reviewing emissions and in understanding the nature of exceedances at the violating monitor in Davenport. EPA has not prioritized pollutants which contribute to PM 2.5 formation as Iowa has done their analysis.

The CES for the Davenport-Moline-Rock Island area indicates that Scott County, with a score of 100, is contributing the most to its own violation. The ranking of counties, in regards to CES is as follows Scott, Muscatine, Clinton, Rock Island, Henry and Mercer. Although the CES indicates a sizable contribution to Davenport from Clinton County on high days, a more refined analysis of only the violating days, provided by Iowa (and identified in Table 2.2), indicates that no more than 15% of these high could be the result of a source-oriented contribution from large sources in Clinton County.

Though the CES also indicates a notable contribution from Muscatine County, Muscatine County is located in a separate CBSA from Scott County, and EPA intends to designate Muscatine County, which also has a violaton of the 2006 24-hour PM2.5 NAAQS, as a separate nonattainment area.

An exclusion for Rock Island County, Illinois is not supportable. Rock Island County is part of the same CBSA as Scott County, has a broad mix of sources, and appears to be integrated with the Scott County population . Due to the connectivity of Rock Island county to the area commonly refered to as the Quad Cities area, it is not clear that emissions from Rock Island county do not contribute to the violating monitor in Davenport.

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," "SO₂," "NO_x," "VOCs," and "NH₃." "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 (SO₄), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO₂ 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 SO₂ and NO_x, which are precursors of the secondary PM_{2.5} components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH₃ (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 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 way for consideration of data for these factors. A summary of the CES is included in attachment 2, and 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 (tpy) and the CES for violating and potentially contributing counties in the Davenport-Rock Island 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 (tpy)	PM _{2.5} emissions carbon (tpy)	PM _{2.5} emissions other (tpy)	SO ₂ (tpy)	NO _x (tpy)	NH ₃ (tpy)	VOCs (tpy)
Scott, IA	Partial	100	2,034	395	1,639	9,173	11,317	1,986	9,323
Muscatine, IA	Partial	80	1,702	283	1,419	27,020	10,717	1,083	4,910
Clinton, IA	No	52	2,711	354	2,357	11,506	13,217	4,870	11,503
Rock Island, IL	No	27	932	269	663	2,169	6,140	664	7,359
Henry, IL	No	7	1,273	252	1,021	268	6,648	2,805	3,431
Mercer, IL	No	4	793	149	644	133	1,120	1,026	1,469

A review of the precursor emissions identified in Table 1 shows of the counties listed that Iowa counties contribute 68% of the total PM_{2.5} emissions, 95% of the SO₂ emissions, 72% of the NO_x emissions and 68% of the VOC emissions. The CES for the counties listed in Table 1 also provide support to the understanding of the role that pollutants

emitted in Iowa counties play in the formation of PM_{2.5}. A description of the CES scores are found at the end of this document.

Factor 2: Air Quality Data

A monitor in Davenport, Iowa at 300 Wellman Street exceeds the 24-hour PM_{2.5} standard with a design value of 37 µg/m³. PM_{2.5} monitoring at this site began in 2005, thus no trends in design values are available at this time. The design values at the 10th and Vine or Adams School monitors are below the current level of the NAAQS. Although there is only one violating monitor in Scott County, Iowa, the absence of a violating monitor, alone, is not a sufficient reason to eliminate other areas, which may be contributing. Other areas are evaluated based on the weight of evidence of all nine factors and other relevant information.

Table 2. Air Quality Data

County	State Recommended Nonattainment?	Design Values 2004-06 (µg/m ³)	Design Values 2005-07 (µg/m ³)
Scott, IA*	Partial	32	37
Rock Island, IL	No	30	31
Henry, IL	No	0**	0**
Mercer, IL	No	0**	0**
Muscatine, IA	Partial	34	36
Clinton, IA	No	34	32

*There are a total of three (3) PM_{2.5} monitors in Scott County, IA. The only monitor reflected in this table is the violating monitor.

** There are no PM_{2.5} monitoring stations in this county; therefore there are no monitoring values.

Table 2.1 Air Quality Data for Individual Monitors in the Davenport-Moline-Rock Island Area and Muscatine Areas

City	County	Site Name	03-05 DV	04-06 DV	05-07 DV
Clinton	Clinton	23rd & Commanche	Site started in 2006 - Design Values are not available until 3 years of data have been collected.		
Clinton	Clinton	Roosevelt St.	36	34	32
Muscatine	Muscatine	1409 Wisconsin	38	34	36
Davenport	Scott	10th & Vine	32	30	31
Davenport	Scott	3029 N. Division St. (Adams School)	33	32	32
Davenport	Scott	300 Wellman St.	N/A	N/A	37

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 total concentrations of the chemical composition at the speciation monitor in Davenport located at 10th and Vine Streets, for the cold season, are as follows: 26% sulfate, 17% carbonaceous PM_{2.5}, 55% nitrate and 2% crustal. For the warm season, the total concentrations of the chemical composition at the speciation monitor in Davenport located at 10th and Vine Streets, are as follows: 77% sulfate, 20% carbonaceous PM_{2.5}, 0% nitrate and 2% crustal.

In order to further understand the trends at the monitors in the area, the Iowa Department of Natural Resources provided and EPA evaluated information for individual days when an exceedance of the standard was monitored. An exceedance day at a particular monitor is defined as a day in which the measured 24-hour average PM_{2.5} concentration is greater than or equal to 35 µg/m³. Sorting the monitoring data in this manner can assist in discerning trends and in further understanding of the nature of the monitored exceedances. The following table assists in the review of the individual days when a monitor recorded an exceedance. This information, in combination with the meteorological information, discussed in Factor 6, assists in the understanding of the trends in exceedances in the Davenport-Moline-Rock Island, IA-IL area.

The daily averaged PM_{2.5} concentrations in Table 2.2 are colored coded according to concentrations. Exceedances are highlighted in red, and indicate a daily average concentration greater than or equal to 35 µg/m³. Cells shown in yellow represent concentrations equal to or greater than 30 µg/m³ and less than or equal to 35 µg/m³. Green indicates daily averaged PM_{2.5} concentrations less than or equal to 30 µg/m³. Blank cells indicate no measurements were made at a particular monitor on that day.

From Table 2.2, it is observed that there are days when multiple monitors record exceedances on the same days, and there are days when only a single monitor exceeds the standard. Out of the 21 exceedance days listed in Table 2.2, eight out of the 21 days are days in which only the monitor at 300 Wellman (a.k.a. Blackhawk Foundry monitor) recorded exceedances of the standard. In contrast, out of the 21 days listed in Table 2.2, 4 out of the 21 days are days when only the "Jefferson" monitor recorded exceedances of the standard. As such, there are 9 days when more than one monitor in the Davenport-Moline-Rock Island area exceeds the standard.

Table 2.2 Air Quality Data for Individual PM_{2.5} Monitors in Davenport-Moline-Rock Island, IA-IL, Muscatine, IA and Select Surrounding Counties Compared to Individual Days when Exceedances were Monitored.

Season	Date	County	Muscatine	Scott	Scott	Scott	Rock Island	Clinton	Clinton	Johnson	Linn	Dominant
		Name	Garfield	Blackhawk	Jefferson	Adams	Arsenal	Rainbow	Chancy	Hoover	Cdr Rpds	Wind Direction
		191390015	191630019	191630015	191630018	171613002	190450021	190450019	191032001	191130037	KDVN	
winter	1/30/2005			37							40	65
winter	1/31/2005	37	33	31	31			34		40	45	99
winter	2/1/2005			40							48	83
winter	2/3/2005	36	40	37	35	35		41		41	35	260
summer	6/24/2005	31	37	31	31			31		33	30	217
summer	6/27/2005	37	42	38	38			39		36	35	188
summer	8/2/2005	44	61	44	46	46		45		41	41	176
fall	9/10/2005	34	37	35	35			35		33	34	171
fall	9/11/2005			41							39	187
fall	9/12/2005			40							38	193
fall	9/13/2005	23	41	24		23	24		23	22	22	228
winter	12/21/2005	37	33	31	11			40		39	33	248
winter	12/24/2005	34	36	36	37	39		37		30	26	356
fall	11/7/2006	19	31	29	27	27		37	36	20	18	193
fall	11/25/2006	33	36	38	35	20	51	51		37	37	154
winter	2/23/2007	44	11	10	9	10	9	10		9	10	108
winter	2/24/2007	63	10	9	9			9		11		103
winter	2/28/2007	65		19				21		19		110
spring	3/9/2007	42	44	42				37		42		228
spring	5/3/2007	42	9	9	8	9		8	10	9	10	99
spring	5/4/2007	61	16	15				16		19		99
spring	5/5/2007	63	23	23				22		27		100
spring	5/23/2007	20	33	23				23	37	17		180
spring	5/30/2007		26	27	27	27		29	37		22	181
summer	6/16/2007	32	36					30		33		291
summer	7/26/2007	32	36	28	30			31	31	29	26	223
fall	9/21/2007	22	37	24	24			27	29	22	20	204
fall	11/19/2007	26	39	27				26		26		205
fall	11/20/2007	28	34	36	34	25		33	33	37	25	57
winter	12/17/2007		38	29	32			32	36		30	217
winter	12/19/2007	55	57	57						55		191
winter	12/20/2007	48	48	45	46	46			44	47	53	111

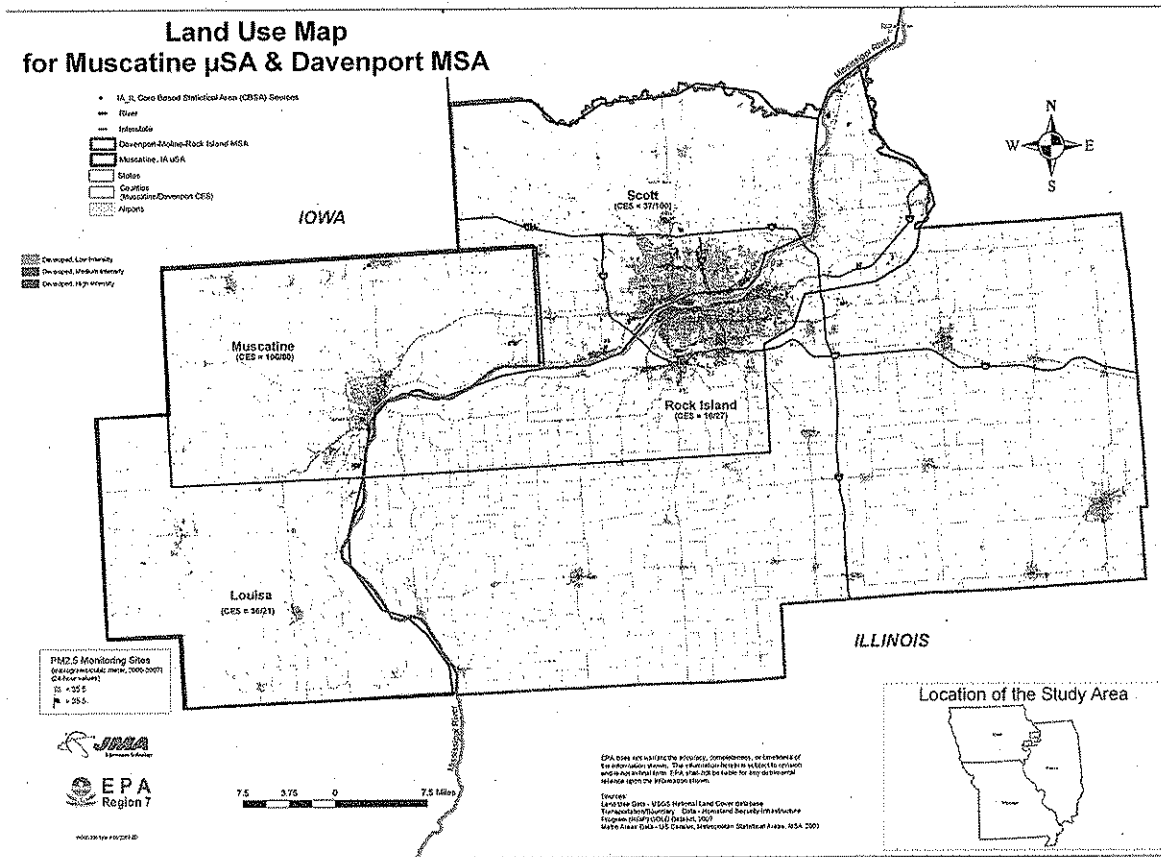
Factor 3: Population Density and Degree of Urbanization (including commercial development)

Table 3 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 may give an indication of whether it is likely that population-based emissions contribute to violations of the 24-hour PM_{2.5} standards.

Table 3. Population

County	State Recommended Nonattainment?	2005 Population	2005 Population Density (pop/sq mi)
Scott, IA	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	Partial	42,567	95
Clinton, IA	No	49,744	70

Figure 3.1 Land Use Map for the Counties in the Davenport-Moline-Rock Island IA-IL Area and Surrounding Counties



The urbanized portions of Scott and Rock Island counties are geographically located close to each other, i.e the area is commonly known as the Quad Cities area. The Quad Cities area of Iowa includes the cities of Davenport and Bettendorf on the Iowa side, and Moline and Rock Island on the Illinois side. As illustrated in Table 3 and Figure 3.1, the populations in the counties evaluated are predominantly concentrated in the urbanized portions of the counties, such as the cities of Davenport, Bettendorf, Moline, and Rock Island.

However, as illustrated on Figure 3.1, the urbanized areas of the Quad Cities are not connected to urbanization found in Muscatine County, Iowa, in terms of land use and continuous urbanization.

Factor 4: Traffic and Commuting Patterns

This factor considers the number of commuters in each county who drive to another county within the Davenport-Moline-Rock Island area; the percent of total commuters in each county who commute to other counties within the Davenport-Moline-Rock Island area, as well as the total Vehicle Miles Traveled (VMT) for each county in thousands of

miles (see Table 4). 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 4. 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	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	Partial	372	17,330	85	1,060	5

The listing of counties on Table 4 reflects a ranking based on the number of people commuting to other counties.

The 2005 VMT data used for Table 4 and 5 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:
[atftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf](http://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 VMT for 1996-2005 for counties in Davenport-Moline-Rock Island 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.

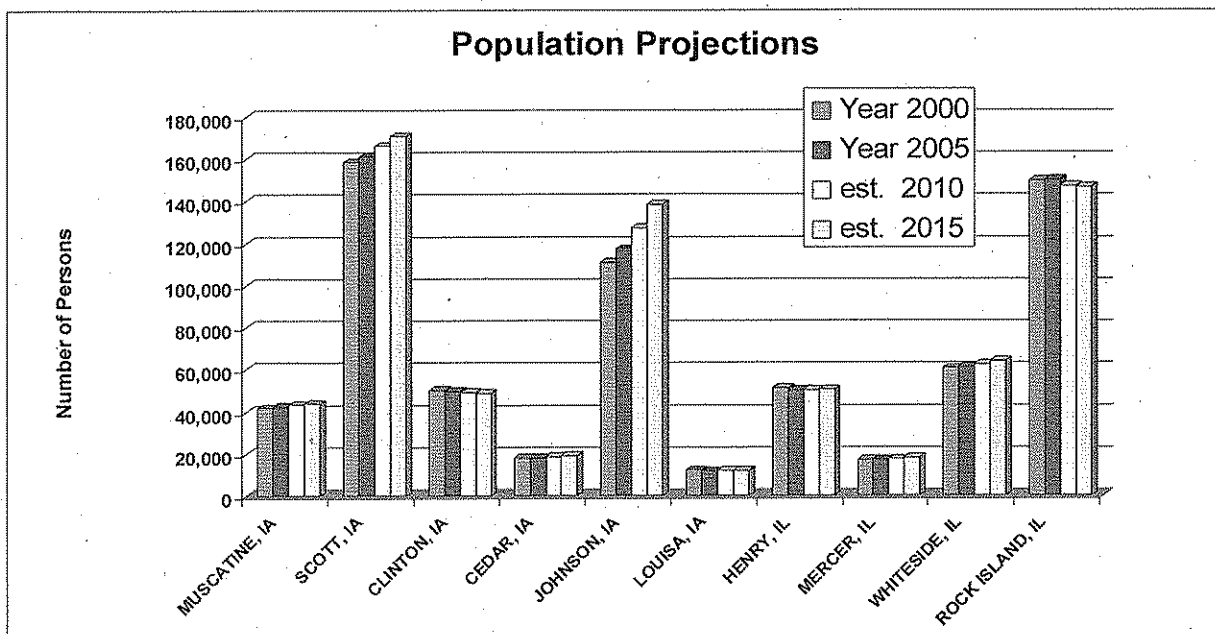
Table 5 below shows population, population growth, VMT and VMT growth for counties that are included in the Davenport-Rock Island Area. Counties are listed in descending order based on VMT growth between 1996 and 2005.

Table 5. Population and VMT Values and Percent Change.

County	Population (2005)	Population % change (2000 - 2005)	2005 VMT (1000s mi)	VMT % change (1996 to 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

Figure 5.1. was provided to EPA by the Iowa Department of Natural Resources as part of their technical support for the state’s designation recommendation. This information was assembled from several data sources, such as U.S. Census Bureau, Iowa and Illinois Department of Commerce, Bi-State Regional Commission and other sources. This chart compliments Table 5 in that it illustrates, graphically, the growth that occurred in Scott County from 2000-2005 and displays trends from various counties in and surrounding the Davenport-Moline-Rock Island area.

Figure 5.1 Population Projections Chart



Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered the most representative National Weather Service wind direction and speed data throughout the year, with an emphasis on “high PM_{2.5} days.” 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 this factor, EPA also considered each County’s CES, which includes an analysis of trajectories of air masses for high PM_{2.5} days.

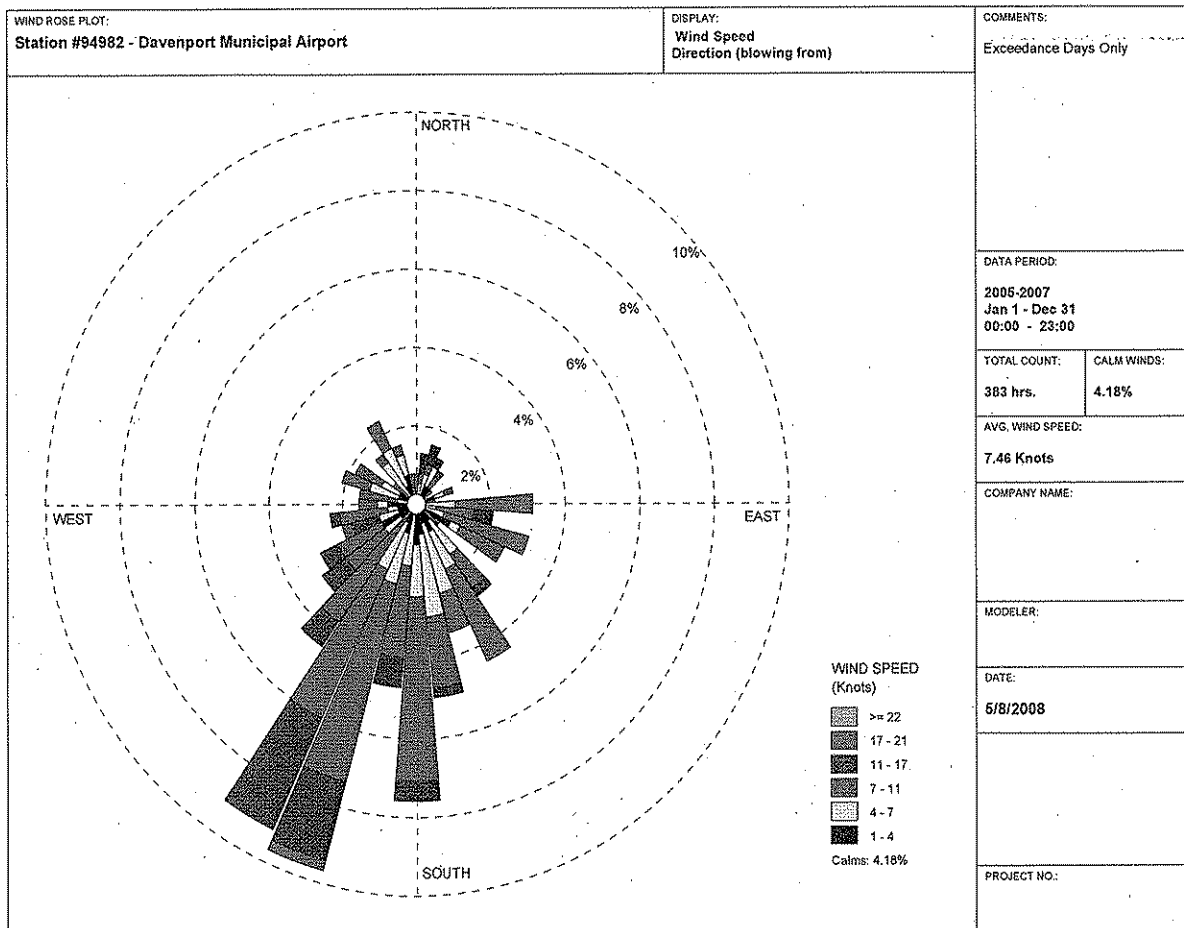
EPA also relied upon information provided the Iowa Department of Natural Resources as part of their technical support for the state's designation recommendation. The purpose of this analysis is to determine contributing emissions in any particular direction relative to the violating monitor. The purpose of the analysis is conducted by IDNR and EPA is to determine contributing emissions in any particular direction relative to the violating monitor.

IDNR provided wind rose plots generated using WRPLOT VIEW, developed by Lakes Environmental (<http://www.lakes-environmental.com>). IDNR has stated that wind speed and direction measured by either of the Davenport Municipal Airport (KDVN) or Quad City International Airport (KMLI) Automated Surface Observing System (ASOS) stations are representative of the wind field at the violating monitor in Scott County, Iowa as they are approximately equidistant from the monitor location and are not unduly influenced by differences in surrounding terrain. However, in terms of a wind rose analysis, IDNR concluded that agreement in wind direction is more important than similarity in wind speed measurements due to the emphasis placed on wind directions. More importantly, the dataset from the KDVN ASOS is preferred over the KMLI ASOS data due to completeness for the years 2005 through 2007. The anemometer at the KDVN ASOS had 94% data capture for hourly wind speed and direction measurements collected near the top of the hour, compared to 74% (including a 6 month data gap in 2006) by the KMLI ASOS.

Figure 6.1 shows the wind rose for exceedance days in 2005-2007. Each petal represents a measured wind direction (direction the wind is blowing from), which were archived in 10 degree intervals ranging from 10 to 360. The azimuth of each petal indicates the measured wind direction, and the length from the center of the plot measures the relative frequency each wind direction was observed. For a particular wind direction the length of the colored segments indicates the relative frequency of six wind speeds bins, which is shown in the lower right corner

Examining wind data in this manner only for days when the violating monitor measures a 24-hour average $PM_{2.5}$ concentration greater than or equal to $35.5 \mu g/m^3$ provides evidence that sources in a particular direction from the violating monitor may have contributed to the violation of the NAAQS. In other words, sources of emissions, located immediately south-southwest of the monitor, most likely contributes to the violation of the 24-hour NAAQS for $PM_{2.5}$

Figure 6-1 Wind Rose for Davenport Municipal Airport for Exceedance Days in 2005-2007.

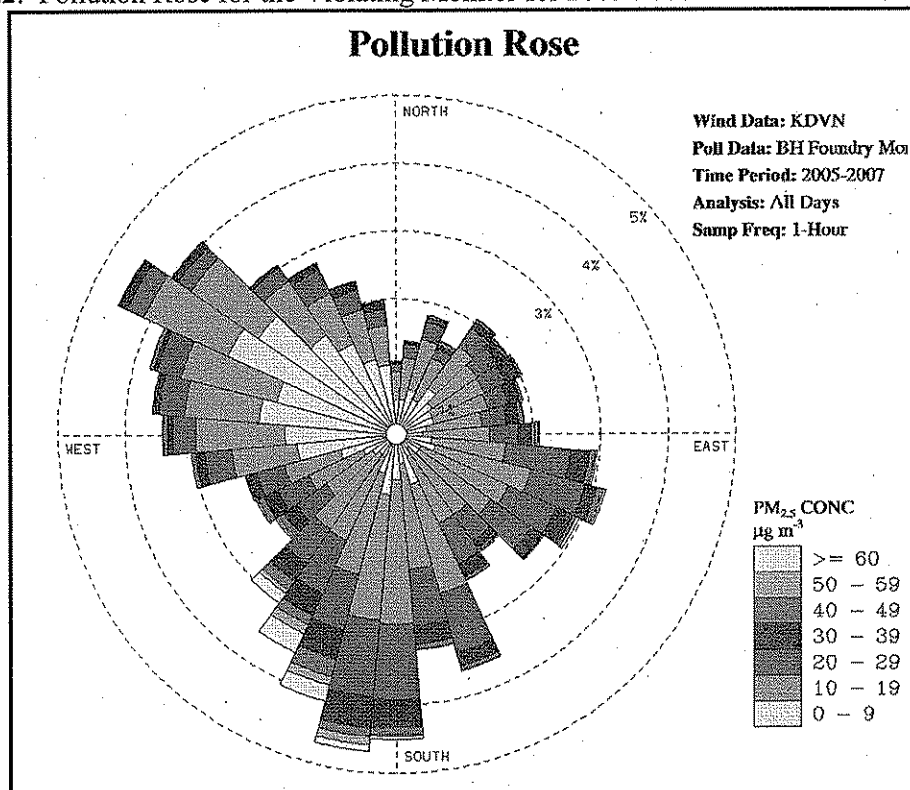


Another analysis technique, provided by IDNR and used by EPA in determining the intended nonattainment boundary, is the pollution roses. A pollution rose assists in assessing the pollutant transport characteristics at the monitor location. This graphical plot is similar in interpretation to a wind rose, except binned wind speed is replaced by measured $PM_{2.5}$ concentrations, measured by the Filter Dynamics Measurement System - Tapered Element Oscillating Microbalance (FDMS-TEOM) sampler located at the violating monitoring. Hourly $PM_{2.5}$ concentrations are paired with hourly wind directions measured by the KDVN ASOS. This analysis shows the relative frequency of $PM_{2.5}$ concentrations measured while winds were observed from each direction. However, while the FDMS-TEOM instrumentation is used for continuous $PM_{2.5}$ measurements it is not the Federal Reference Method (FRM) for monitoring and calculating the $PM_{2.5}$ design value for the Blackhawk Foundry monitor. Also, while the hourly FDMS-TEOM measurements, when averaged daily, correlate well with the daily sampled FRM data (r^2 of 0.9166), EPA has not defined a standard particle conditioning protocol for continuous monitors and therefore hourly values between different sampling methods may vary. Therefore, this analysis is used only as a qualitative assessment of air quality at the monitor.

Figure 6.2 shows for the time period of 2005-2007 the cleanest air arrived from a northwesterly direction. The lowest range of $PM_{2.5}$ concentrations in the plot are most

frequently observed with a northwesterly wind, which was one of the most frequently measured wind directions. Moderate air quality was observed more frequently when the measured wind direction had a southerly or easterly component. The poorest air quality was observed when winds blow from the south-southwest.

Figure 6.2. Pollution Rose for the Violating Monitor for 2005-2007



Note: the meteorology factor is also considered in each county's CES 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 looks at 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 Davenport-Rock Island Area.

The Davenport-Moline-Rock Island 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 (e.g., existing PM and ozone areas)

In evaluating the jurisdictional boundary factor, consideration was given to existing boundaries and organizations that may facilitate air quality planning and the

implementation of control measures to attain the standard. Areas designated as nonattainment (e.g for PM_{2.5} or 8-hour ozone standard) represent important boundaries for state air quality planning. In the case of the areas being evaluated, none of these areas are currently designated as nonattainment for any of the National Ambient Air Quality Standards. There was a review of the information regarding the Bi-State Regional Commission which represents the Metropolitan Planning Organization (MPO) for urbanized area transportation planning in the Quad Cities area. The MPO serves Henry, Mercer, and Rock Island Counties in Iowa and Scott and Muscatine Counties in Iowa. Its web site is: www.bistateonline.org. However, it was believed that the Bi-State planning area was not a key factor in determining the intended nonattainment boundary.

Factor 9: Level of control of emission sources

This factor considers emission controls currently implemented for major sources in the Davenport-Moline- Rock Island area.

The emission estimates on Table 1 (under Factor 1) include any control strategies implemented by the states in the Davenport-Moline-Rock Island area before 2005 that may influence emissions of any component of PM_{2.5} emissions (i.e., total carbon, SO₂, NO_x, and crustal PM_{2.5}). This is the case for Clinton County, Iowa. As presented on Table 1, emissions in Clinton County were evaluated because of Clinton County's proximity to Scott County, the county with the violating monitor. Clinton County ranked as one of the highest counties with precursor emissions. However, upon closer evaluation and in working in IDNR, there was evidence that emissions reductions have occurred in Clinton County since 2005. In reviewing the emissions from Title V facilities in Clinton County, EPA noted that Archer Daniels Midland had a high percentage of the county's emissions especially for SO₂, NO_x and VOC emissions and reviewed ADM' facility. This facility was part of a national global settlement with ADM. As a result, the company has made and will be making substantial air pollution control upgrades at the plant, including installation of RTO's, scrubber enhancements, replacement of obsolete coal-fired boilers with state of the art FBC boilers, and fuel switches to natural gas. The control strategy is described in more detail in the "Control Technology Plan for Clinton, IA, Wet Corn Mill" attachment to the Consent Decree. Based on this information, EPA has determined that despite a relatively high CES score for Clinton County, IA that the ADM reductions are an important factor to consider in determining nonattainment boundaries.

In recognition of the emission reductions at ADM-Clinton which occurred since 2005, EPA recognizes that certain power plants or large sources of emissions in this potential nonattainment area may have installed emission controls or otherwise significantly reduced emissions since 2005 and that this information may not be reflected in this analysis. EPA will consider additional information on emission controls in making final designation decisions. In cases where specific plants already have installed emission controls or plan to install such controls in the near future, EPA requests additional information on:

- the plant name, city, county, and township/tax district
- identification of emission units at the plant, fuel use, and megawatt capacity
- identification of emission units on which controls will be installed, and units on which controls will not be installed
- identification of the type of emission control that has been or will be installed on each unit, the date on which the control device became / will become operational, and the emission reduction efficiency of the control device
- the estimated pollutant emissions for each unit before and after implementation of emission controls
- whether the requirement to operate the emission control device will be federally enforceable by December 2008, and the instrument by which federal enforceability will be ensured (e.g. through source-specific SIP revision, operating permit requirement, consent decree)

EPA Technical Analysis for the Muscatine, Iowa Area

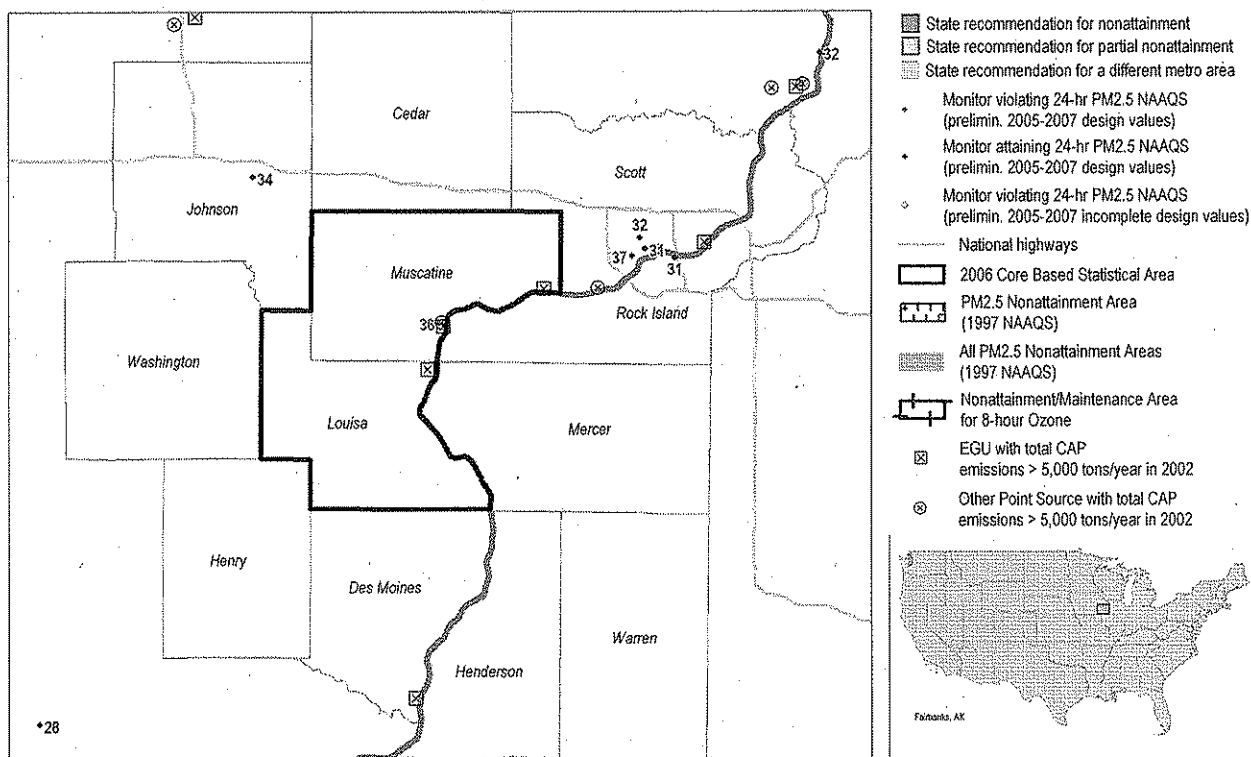
Discussion

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for [area] identifies the counties with monitors that violate the 24-hour PM_{2.5} standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

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

Muscatine, IA



Counties labeled in bold reflect NAAs under 1997 NAAQS
 Recommendation for area made by IA's Department of Natural Resources on July 29, 2008 not reflected on this map

In a letter dated November 2007, Iowa recommended that all of the counties in Iowa be designated as attainment based on air quality data from 2004-2006. The City of Muscatine in Muscatine County, Iowa, was then determined to have a violation of the 2006 24-hour PM_{2.5} standards based on air quality data from 2005-2007. In response to EPA's notification of this new violation and the request for a designation recommendation, in a letter, dated May 30, 2008, Iowa recommended that EPA delay designating a portion of Muscatine County for one year. In a subsequent letter, dated July 29, 2008, Iowa requested that, if EPA could not grant a one-year extension of the designation, that EPA designated only a portion of Muscatine County as nonattainment for the 2006 24-hour PM_{2.5} standard based on air quality data from 2005-2007. All air quality data are from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state.

In July 2008, the State of Iowa recommended designating only a portion of Muscatine County as a single nonattainment area. In Iowa's technical support for their nonattainment recommendation, the state conducted an analysis of the 9 factors outlined in EPA's designations guidance. The state reviewed emissions, air quality and meteorological information to support their recommendation of the partial county, as described in the table above. The state concluded that the data strongly indicates that direct PM_{2.5} emissions from point sources in the immediate vicinity of the violating monitor cause and contribute to the 24-hour PM_{2.5} NAAQS violation.

Iowa's evaluation of meteorological information concluded that the dominant wind direction associated with the local exceedance events at the violating monitor shows winds are coming from the east, south-east, which is in line with a source of direct PM 2.5 emissions. Iowa defines local events to be those events when only a single⁴ monitor registered a daily average concentration which exceeded 35 $\mu\text{g}/\text{m}^3$. Iowa asserts that local events which contribute towards exceedances at the Garfield School monitor in Muscatine are characterized by daily average wind directions from the east to slightly southeast. The meteorology analysis indicated that these patterns of consistent wind direction play an important role in causing local exceedance events. Emission sources in the vicinity of the violating monitors contribute enough direct PM_{2.5} to cause exceedances at the PM_{2.5} monitors in question. Iowa asserts that PM_{2.5} precursor emissions of SO₂ and NO_x in the counties analyzed are not significantly contributing to exceedance events classified as local.

First, in response to the request for a 1-year extension, EPA believes that there is sufficient information to make designation determination at this time. Second, EPA has also taken Iowa's recommendation of a partial county designation for Muscatine County under consideration, but finds that the information provided, to date, does not adequately support a partial county designation. Iowa has not provided sufficient information to show what portion of the PM 2.5 contribution to the violating monitor at 300 Wellman Street is attributable to the nearby source. Nor has sufficient information been provided to explain the contribution from other metro area sources and from longer ranger transport. In reviewing the monitoring data provided by Iowa, we conclude that whereas there are days when only one monitor exceeds the standard, it is not appropriate to only look at the violating monitor in order to develop a nonattainment boundary. It is important to look at the monitoring trends across the network in order to comprehensively understand the nature of the monitored exceedances. Also, EPA believes that PM_{2.5} precursor emissions of SO₂ and NO_x in the counties need to be analyzed further to determine whether sources of pollutants are contributing to exceedance events. Section 107 of the Clean Air Act defines a nonattainment as an area that is violating the standard and the area that is contributing to the violation.

Based on EPA's 9-factor analysis described below, EPA believes that Muscatine County should be designated nonattainment for the 24-hour PM_{2.5} air-quality standards based upon currently available information. This is shown in the table below.

Muscatine, Iowa	State-Recommended Nonattainment Counties	EPA-Recommended Nonattainment Counties
Iowa	Muscatine (partial)	Muscatine

⁴

Summary of the 9-factor analysis for the Muscatine, Iowa Nonattainment Area.

The CES for the Muscatine area indicates that Muscatine County, with a score of 100, is contributing the most to its own violation. Muscatine County emissions are also among the highest of the counties evaluated. Muscatine County is also the county with the violating monitor. Although the CES indicates a sizable contribution to Muscatine from Louisa County on high days, a more refined analysis of only the violating days, provided by Iowa (and identified in Table 2.2), indicates that roughly half of violating days are attributed to near-field source in Muscatine, and the other half are attributed to broad regional-scale pollution episodes that are not atypical for Midwestern locations. On exceedance days at the violating monitor, winds are not coming from the south (the direction in which the MidAmerican facility is located in proximity to the violating monitor) provides support for the exclusion of Louisa County, Iowa from the intended nonattainment area.

Also, the CES was based on 2005 emissions data that does not reflect significant SO₂ emission reductions at the power plant in Louisa, MidAmerican Energy Co. – Louisa Station, due to federally enforceable controls that became operational in December 2007. On exceedance days at the violating monitor, winds are not coming from the south (the direction in which the MidAmerican facility is located in proximity to the violating monitor) provides support for the exclusion of Louisa County, Iowa from the intended nonattainment area.

Though the CES also indicates a notable contribution from Scott County has a ..., it is located in a separate CBSA from Muscatine and EPA intends to designate Scott County, which also has a violaton of the 2006 24-hour PM_{2.5} NAAQS, as nonattainment.

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,” “SO₂,” “NO_x,” “VOCs,” and “NH₃.” “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 (SO₄), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO₂ 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 SO₂ and NO_x, which are precursors of the secondary PM_{2.5} components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH₃ (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 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 way for consideration of data for these factors. A summary of the CES is included in attachment 2, and 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 pollutant components (given in tons per year (tpy) and the CES for violating and potentially contributing counties in the Muscatine Area. Note that Davenport-Moline-Rock Island, IA-IL is a nearby area, located in an adjacent core-based statistical area (CBSA), and is being recommended as a separate nonattainment area that would include Scott County, Iowa and Rock Island, IL.

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

County	State Recommend ed Non- attainment?	CES	PM _{2.5} emissions total (tpy)	PM _{2.5} emissions carbon (tpy)	PM _{2.5} emissions other (tpy)	SO ₂ (tpy)	NOx (tpy)	VOCs (tpy)	NH ₃ (tpy)
Muscatine County, IA	Partial	100	1702	283	1419	27020	10717	4910	1083
Louisa County, IA	No	36	868	198	670	12505	6521	1036	1509
Scott County, IA	Partial	37	2034	395	1639	9173	11317	9323	1986
Johnson County, IA	No	24	1321	420	901	3598	5509	7214	2806
Cedar County, IA	No	17	750	192	558	229	3084	1581	2053
Rock Island, IL	No	16	932	269	663	2169	6140	7359	664
Des Moines, IA	No	13	1168	209	960	6046	4662	2390	537

The CES for the Muscatine area indicates that Muscatine County, with a score of 100, is contributing the most to its own violation, followed by Scott County, Iowa and Louisa County, Iowa, with scores of 37 and 36, respectively.

A review of the precursor emissions identified in Table 1 shows that, of the counties listed, Muscatine County contributes 35% of the total PM_{2.5} emissions, 52% of the SO₂ emissions, 31% of the NOx emissions, and 22% of the VOC emissions. Muscatine has the highest SO₂ emissions (27,020 tpy), followed by Louisa (12,505 tpy) and Scott (9,173 tpy). Muscatine and Scott have the highest emissions of NOx (10,717 tpy and 11,317 tpy, respectively).

Based on consideration of emission levels and CES values, Muscatine, and Scott Counties in Iowa are candidates for a 24-hour PM_{2.5} nonattainment designation.

However, Scott County, located in a different CBSA, is also violating the 2006 24-hour PM_{2.5} standards and EPA intends to designate Scott County nonattainment as part of the Davenport-Moline-Rock Island, IA-IL nonattainment area.

Factor 2: Air quality data

This factor considers the 24-hour PM_{2.5} design values (in µg/m³) for air quality monitors in counties in the Muscatine 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 98th percentile values are 35µg/m³ or less. A design value is only valid if minimum data completeness criteria are met. The monitor at 1409 Wisconsin in the city of Muscatine has a design value of 36 µg/m³.

Table 2. Air Quality Data

County	State Recommended Nonattainment?	Design Values 2004-06 (µg/m ³)	Design Values 2005-07 (µg/m ³)
Muscatine, IA	Partial	34	36
Scott, IA*	Partial	32	37
Rock Island, IL	No	30	31
Henry, IL	No	0**	0**
Mercer, IL	No	0**	0**
Clinton, IA	No	34	32

* There are a total of three (3) PM_{2.5} monitors in Scott County, IA. The only monitor reflected in this table is the violating monitor.
 ** There are no PM_{2.5} monitors in this county; therefore there are no monitoring values.

Table 2.1 Air Quality Data for Individual Monitors in the Davenport/Rock Island and Muscatine Areas

City	County	Site Name	03-05 DV	04-06 DV	05-07 DV
Clinton	Clinton	23rd & Commanche	Site started in 2006 - Design Values are not available until 3 years of data have been collected.		
Clinton	Clinton	Roosevelt St.	36	34	32
Muscatine	Muscatine	1409 Wisconsin	38	34	36
Davenport	Scott	10th & Vine	32	30	31
Davenport	Scott	3029 N. Division St. (Adams School)	33	32	32
Davenport	Scott	300 Wellman St.(Blackhawk Foundary)	N/A	N/A	37

In order to understand further the trends at the monitor in Muscatine, the Iowa Department of Natural Resources provided and EPA evaluated information for individual days when an exceedance of the standard was monitored. Sorting the monitoring data in this manner can assist in discerning trends and in further understanding of the nature of

the monitored exceedances. The following table assists in the review of the individual days when a monitor recorded an exceedance. This information, in combination with the meteorological information, discussed in Factor 6, assists in the understanding of the trends in exceedances in the Muscatine, IA area.

The daily averaged PM_{2.5} concentrations in Table 2.2 are colored coded according to concentrations. Exceedances are highlighted in red, and indicate a daily average concentration greater than or equal to 35 µg/m³. Cells shown in yellow represent concentrations equal to or greater than 30. µg/m³ and less than or equal to 35 µg/m³. Green indicates daily averaged PM_{2.5} concentrations less than or equal to 30 µg/m³. Blank cells indicate no measurements were made at a particular monitor on that day.

From Table 2.2, monitoring data from monitors in Scott, Muscatine, Rock Island, Clinton, Johnson and Linn are identified. There are 32 days in which at least one monitor is violating in these counties. For Muscatine County, there are 14 days when the monitors record an exceedance. In order to evaluate trends in the monitors data, we compared the monitored exceedances at Muscatine to monitors in other counties. There are approximately 8 days when monitors only Muscatine County recorded exceedances, and 6 days when Scott Counties record exceedances when monitors in Scott County exceeded..

Table 2.2 Air Quality Data for Individual PM_{2.5} Monitors in Davenport-Moline-Rock Island, IA-IL, Muscatine, IA and Select Surrounding Counties Compared to Individual Days when Exceedances were monitored.

Season	Date	County	Scott	Scott	Rock Island	Clinton	Clinton	Johnson	Linn	Dominant	
		Name	Garfield	Blackhawk	Jefferson	Adams	Arsenal	Rainbow	Chancy	Hoover	Cdr Rpds
		191390015	191630019	191630015	191630018	171613002	190450021	190450019	191032001	191130037	KDVN
winter	1/30/2005			37						40	65
winter	1/31/2005	37	33	31	31		34		40	45	99
winter	2/1/2005			40						48	83
winter	2/3/2005	36	40	37	35	35	41		41	35	260
summer	6/24/2005	31	37	31	31		31		33	30	217
summer	6/27/2005	37	42	38	38		39		36	35	188
summer	8/2/2005	44	51	44	45	46	45		41	41	176
fall	9/10/2005	34	37	35	35		35		33	34	171
fall	9/11/2005			41						39	187
fall	9/12/2005			40						38	193
fall	9/13/2005	23	41	24		23	24		23	22	228
winter	12/21/2005	37	33	31	11		40		39	33	248
winter	12/24/2005	34	36	36	37	39	37		30	26	356
fall	11/7/2006	19	31	29	27	27	37	36	20	18	193
fall	11/25/2006	33	36	36	35	20	51	51	37	37	154
winter	2/23/2007	44	11	10	9	10	9	10	9	10	108
winter	2/24/2007	53	10	9	9		9		11		103
winter	2/28/2007	65		19			21		19		110
spring	3/9/2007	42	44	42			37		42		228
spring	5/3/2007	42	9	9	6	9	8	10	9	10	99
spring	5/4/2007	61	16	15			16		19		99
spring	5/5/2007	63	23	23			22		27		100
spring	5/23/2007	20	33	23			23	37	17		180
spring	5/30/2007		26	27	27	27	29	37		22	181
summer	6/16/2007	32	36				30		33		291
summer	7/26/2007	32	36	28	30		31	31	29	26	223
fall	9/21/2007	22	37	24	24		27	29	22	20	204
fall	11/19/2007	26	39	27			26		26		205
fall	11/20/2007	28	38	36	34	25	33	33	37	25	57
winter	12/17/2007		38	29	32		32	36		30	217
winter	12/19/2007	55	57	57					59		191
winter	12/20/2007	48	48	45	46	46		44	47	53	111

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

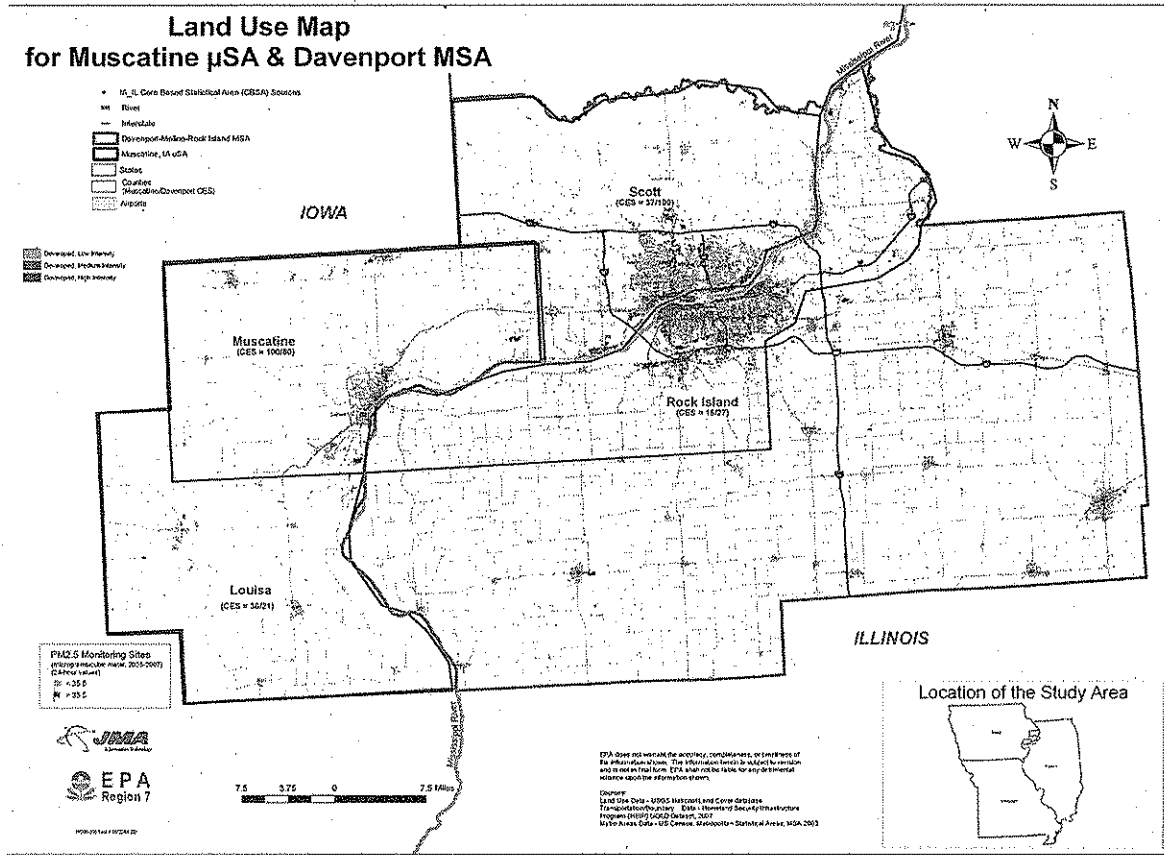
Table 3 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data may give an indication of whether it is likely that population-based emissions contribute to violations of the 24-hour PM_{2.5} standards.

Table 3. Population

County	State Recommended Nonattainment?	2005 Population	2005 Population Density (pop/sq mi)
Muscatine, IA	Partial	42,567	95
Louisa, IA	No	11,813	28
Scott, IA	Partial	161,170	345
Johnson, IA	No	117,194	188
Cedar, IA	No	18,240	31
Rock Island, IL	No	147,454	327
Des Moines, IA	No	40,975	95

As can be determined from Table 3, the counties of Scott, IA, Johnson, IA, and Rock Island, IA are moderately populated areas, while the others, including Muscatine County, are fairly sparsely populated.

Figure 3.1 Land Use Map for the Counties in the Muscatine Micropolitan and Select Surrounding Counties



As Figure 3.1 illustrates, the most utilized land area in the counties which were evaluated is in the urbanized portion of Muscatine County. This figure also illustrates that the City of Muscatine and cities which comprise the Quad Cities (i.e. City of Davenport, City of Bettendorf) comprise the Iowa portion and cities of Moline and Rock Island comprise the Illinois side) are not connected, in terms of land use and continuous urbanization.

Factor 4: Traffic and Commuting Patterns

This factor considers the number of commuters in each county who drive to another county within the Muscatine micropolitan area, the percent of total commuters in each county who commute to other counties within the Muscatine micropolitan area, as well as the total Vehicle Miles Traveled (VMT) for each county in thousands of miles (see Table 4). 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 4. 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
Muscatine, IA	Partial	372	17,330	85	17,110	84
Louisa, IA	No	99	1,490	26	4,140	73
Scott, IA	Partial	1,614	61,500	79	1,540	2
Johnson, IA	No	1,268	650	1	450	1
Cedar, IA	No	422	1,550	16	940	10
Rock Island, IL	No	1,313	14,240	20	940	1
Des Moines, IA	No	322	80	0	210	1

The listing of counties on Table 4 reflects a ranking based on the number of people commuting to other counties. The information in Table 4 further supports the discussion in Factor 3 that the Muscatine area is not connected to the Quad Cities area.

The 2005 VMT data used for Table 4 and 5 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:
[atftp://ftp.epa.gov/EmisInventory/2002finalnei/documentation/mobile/2002_mobile_nei_version_3_report_092807.pdf](http://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.

The number of commuters into the statistical area is quite low as compared with other areas in the country. Based on the data in Table 4, commuting and VMT do not appear to play a significant role in contributing to violations of the 24-hr PM_{2.5} standards in Muscatine County.

Factor 5: Growth rates and patterns

This factor considers population growth for 2000-2005 and growth in VMT for 1996-2005 for counties in Muscatine micropolitan 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 5 below shows population, population growth, VMT and VMT growth for counties that are included in the Muscatine micropolitan area and surrounding counties. Counties are listed in descending order based on VMT growth between 1996 and 2005.

Table 5. Population and VMT Values and Percent Change.

County	Population (2005)	Population % change (2000 - 2005)	2005 VMT (millions mi annually)	VMT % change (1996 to 2005)
Muscatine, IA	42,567	2	372	43
Johnson, IA	117,194	5	1,268	42
Scott, IA	161,170	2	1,614	25
Cedar, IA	18,240		422	24
Des Moines, IA	40,975	-3	322	21
Rock Island, IL	147,454	-1	1,313	3
Louisa, IA	11,813	-3	99	-32

Figure 5.1 Population Projections Chart

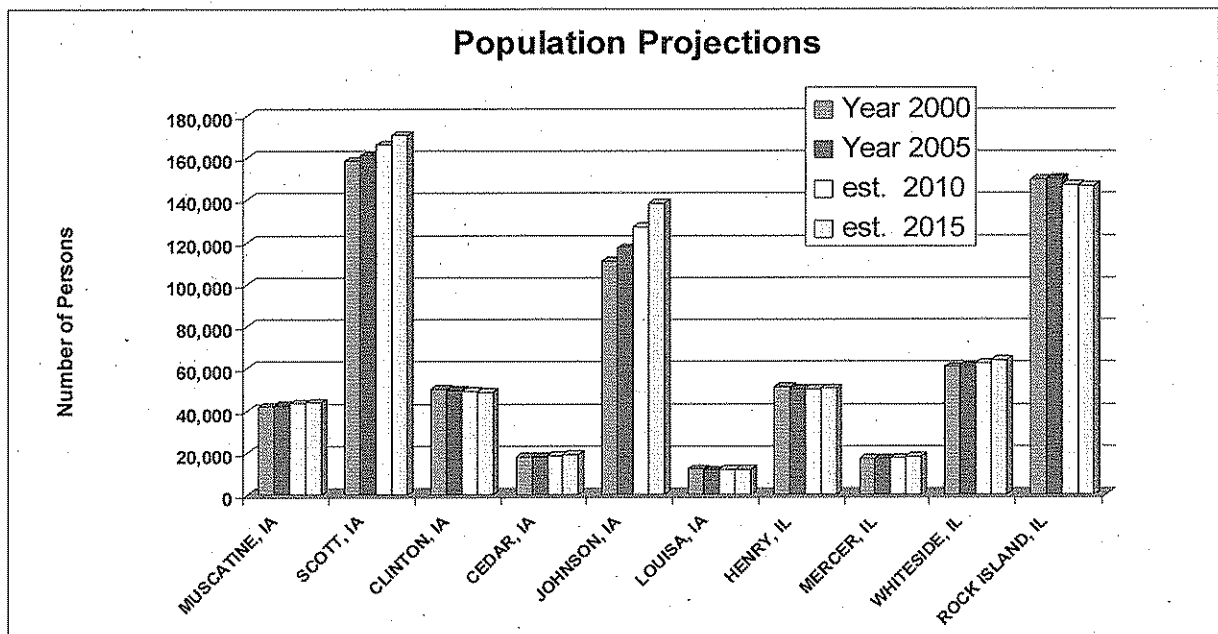


Figure 5.1. was provided to EPA by the Iowa Department of Natural Resources as part of their technical support for the state's designation recommendation. This information was assembled from several data sources, such as U.S. Census Bureau, Iowa and Illinois Department of Commerce, Bi-State Regional Commission and other sources. This chart compliments Table 5 in that it illustrates, graphically, that Muscatine County did not grown or only slightly grew from 2000-2005. This figure also displays trends from various counties in and surrounding the Muscatine Micropolitan area.

As noted in the information provided above, Muscatine County only grew by 2% from 2000 to 2005, but had the largest VMT growth of the counties evaluated.

Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered the most representative National Weather Service wind direction and speed data throughout the year, with an emphasis on “high PM_{2.5} days.” 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 this factor, EPA also considered each County’s CES, which includes an analysis of trajectories of air masses for high PM_{2.5} days.

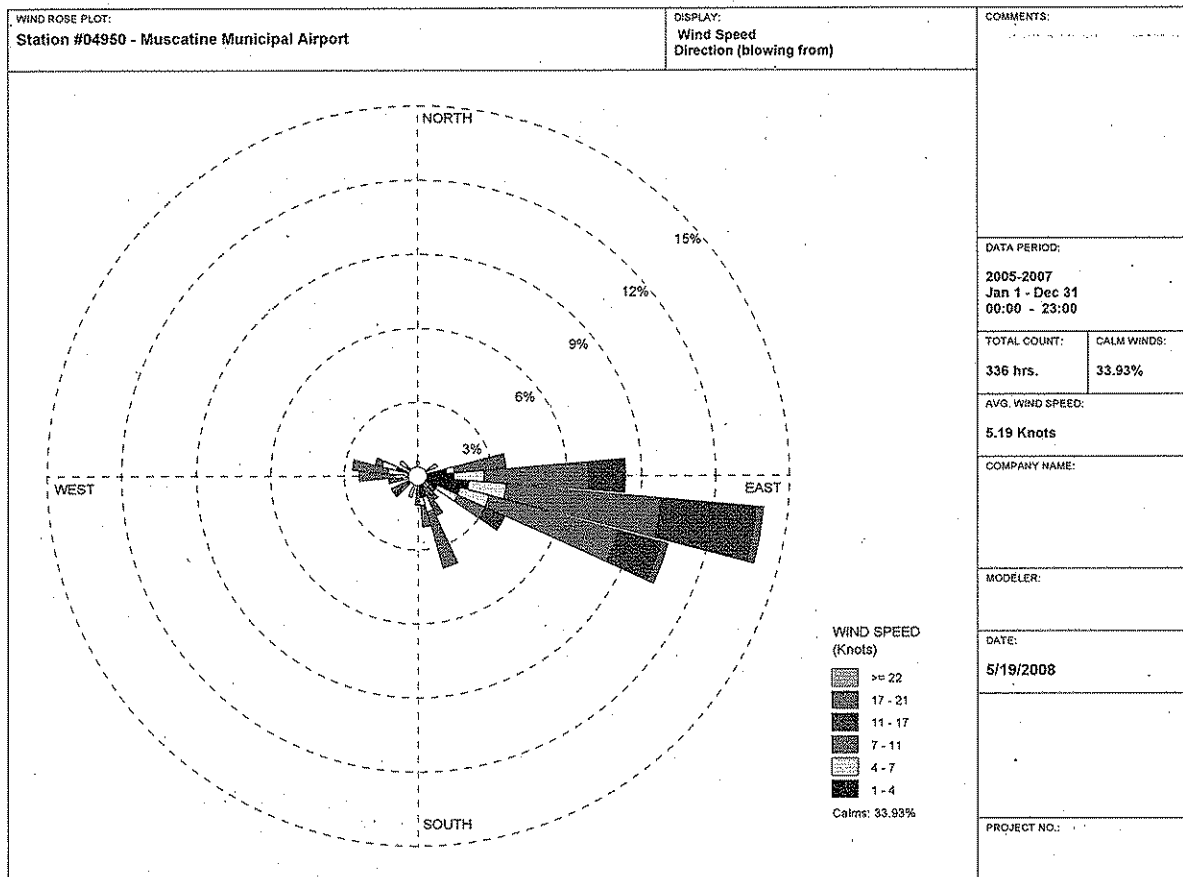
EPA also relied upon information provided by the Iowa Department of Natural Resources as part of their technical support for the state’s designation recommendation. The purpose of the analysis conducted by IDNR and EPA was to determine contributing emissions in any particular direction relative to the violating monitor.

IDNR provided wind rose plots generated using WRPLOT VIEW, developed by Lakes Environmental (<http://www.lakes-environmental.com>). Wind roses are a graphical representation of prevailing wind directions. They show the relative frequency of each observed wind direction for the 3-year analysis period. Representative wind data used in this analysis were collected at meteorological observation stations, typically located at airports. The airport in Muscatine County (Muscatine Municipal Airport (KMUT)) operates an Automated Weather Observing System (AWOS) station, which collects a variety of meteorological variables, including wind data. This is the source of the data for Figure 6.1.

Figure 6.1 shows the wind rose for exceedance days in 2005-2007. Each petal represents a measured wind direction (direction the wind is blowing from), which were archived in 10 degree intervals ranging from 10 to 360. The azimuth of each petal indicates the measured wind direction, and the length from the center of the plot measures the relative frequency each wind direction was observed. For a particular wind direction the length of the colored segments indicates the relative frequency of six wind speeds bins, which is shown in the lower right corner.

Examining wind data only for days when the violating monitor in Muscatine County measures a 24-hour average PM_{2.5} concentration greater than or equal to 35.ug/m³ provides evidence that sources in a particular direction from the violating monitor may have contributed to the violation of the NAAQS. Figure 6-1 shows a large percentage of hourly wind directions were observed to be from an east-southeasterly direction on exceedance days in 2005-2007.

Figure 6.1 Wind rose for Muscatine Municipal Airport for Exceedance days in 2005-2007.



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 looks at 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 Muscatine County area.

The Muscatine County 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 (e.g., existing PM and ozone areas)

In evaluating the jurisdictional boundary factor, consideration was given to existing boundaries and organizations that may facilitate air quality planning and the implementation of control measures to attain the standard. Areas designated as nonattainment (e.g for PM_{2.5} or 8-hour ozone standard) represent important boundaries for state air quality planning. In the case of the areas being evaluated, none of these areas

are currently designated as nonattainment for any of the National Ambient Air Quality Standards. There was a review of the information regarding the Bi-State Regional Commission which represents the Metropolitan Planning Organization (MPO) for urbanized area transportation planning in the Muscatine and Quad Cities area. The MPO serves Henry, Mercer, and Rock Island Counties in Iowa and Scott and Muscatine Counties in Iowa. Its web site is: www.bistateonline.org. However, the Bi-State planning area was not a key factor in determining the intended nonattainment boundary.

Jurisdictional and other boundaries were not a significant factor in determining the intended nonattainment area for the Muscatine.Micropolitan area.

Factor 9: Level of control of emission sources

This factor considers emission controls currently implemented for major sources in the Muscatine Micropolitan Area.

The emission estimates on Table 1 (under Factor 1) include any control strategies implemented by the states in the Muscatine area before 2005 that may influence emissions of any component of PM_{2.5} emissions (i.e., total carbon, SO₂, NO_x, and crustal PM_{2.5}). A source of interest in this evaluation, under Factor 9 is the MidAmerican Energy Co. - Louisa Station in Louisa County, IA. This unit has an EPA-issued PSD permit and is subject to NSPS Subpart D. The state also issued recent permits under its SIP-approved (52 FR 23981, June 26, 1987) construction permits program, establishing more stringent emissions rates and authorizing installation of a flue gas desulfurization device (FGD), low NO_x burners (LNB), and baghouse as a replacement for their existing ESP. The scrubber became operational earlier this year. All permitted emissions rates are federally enforceable.

In considering county-level emissions EPA considered 2005 emissions data from the NEI. EPA recognizes that certain power plants or large sources of emissions in this potential nonattainment area may have installed emission controls or otherwise significantly reduced emissions since 2005 and that this information may not be reflected in this analysis. EPA will consider additional information on emission controls in making final designation decisions. In the case of MidAmerican, Louisa Station, information was available and provided by IDNR which was considered in determining the intended nonattainment boundary. However, in cases where specific plants already have installed emission controls or plan to install such controls in the near future, which may not have been known at the time of this evaluation, EPA requests additional information on:

- the plant name, city, county, and township/tax district
- identification of emission units at the plant, fuel use, and megawatt capacity
- identification of emission units on which controls will be installed, and units on which controls will not be installed

- identification of the type of emission control that has been or will be installed on each unit, the date on which the control device became / will become operational, and the emission reduction efficiency of the control device
- the estimated pollutant emissions for each unit before and after implementation of emission controls
- whether the requirement to operate the emission control device will be federally enforceable by December 2008, and the instrument by which federal enforceability will be ensured (e.g. through source-specific SIP revision, operating permit requirement, consent decree)

Attachment 2

Description of the Contributing Emissions Score

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. Using this methodology, scores were developed for each county in and around the relevant metro area. The county with the highest contribution potential was assigned a score of 100, and other county scores were adjusted in relation to the highest county. The CES represents the relative maximum influence that emissions in that county have on a violating county. The CES, which reflects consideration of multiple factors, should be considered in evaluating the weight of evidence supporting designation decisions for each area.

The CES for each county was derived by incorporating the following significant information and variables that impact PM_{2.5} transport:

- Major PM_{2.5} components: total carbon (organic carbon (OC) and elemental carbon (EC)), SO₂, NO_x, and inorganic particles (crustal).
- PM_{2.5} emissions for the highest (generally top 5%) PM_{2.5} emission days (herein called "high days") for each of two seasons, cold (Oct-Apr) and warm (May-Sept)
- Meteorology on high days using the NOAA HYSPLIT model for determining trajectories of air masses for specified days
- The "urban increment" of a violating monitor, which is the urban PM_{2.5} concentration that is in addition to a regional background PM_{2.5} concentration, determined for each PM_{2.5} component
- Distance from each potentially contributing county to a violating county or counties

A more detailed description of the CES can be found at
http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

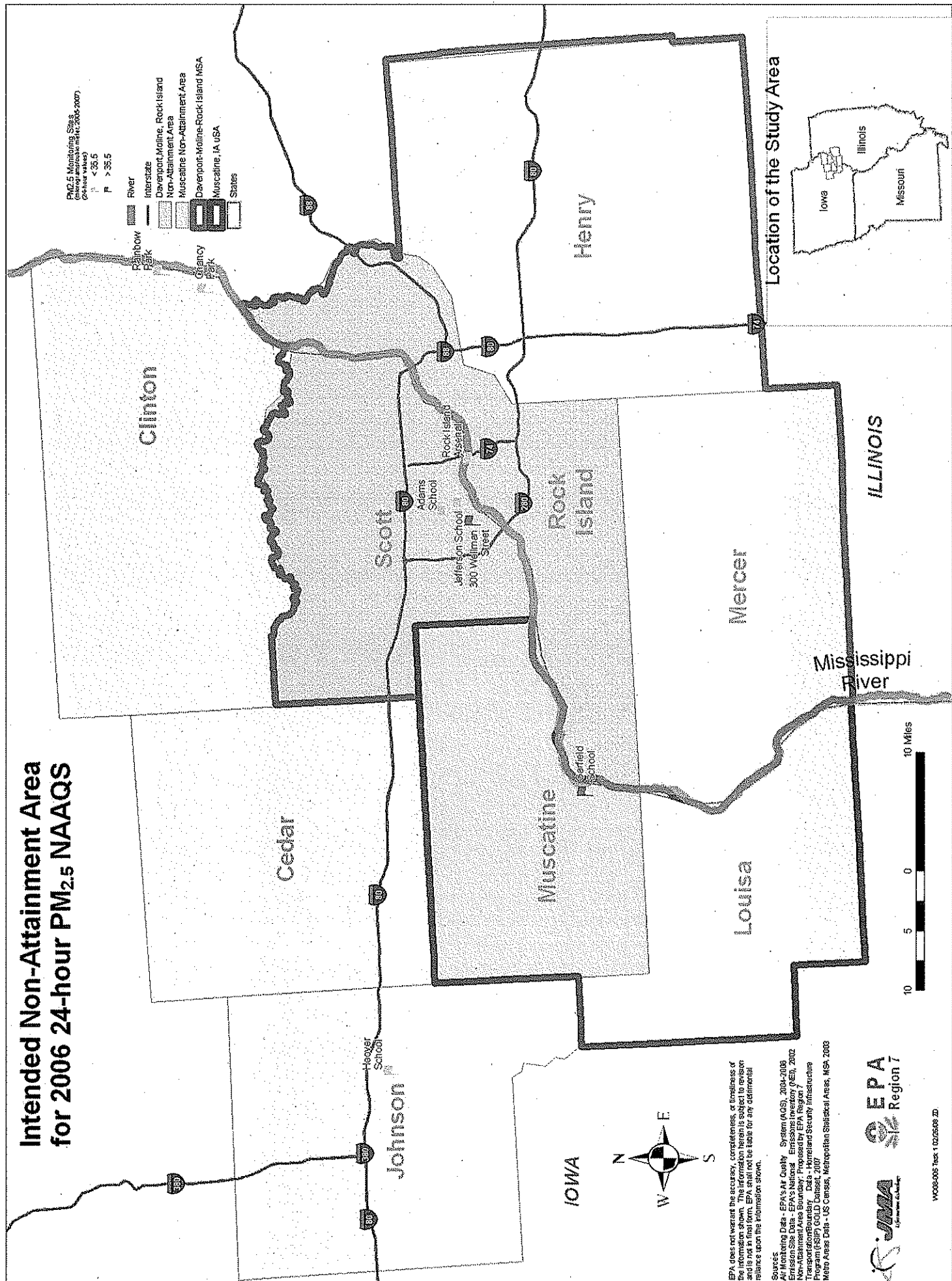
Intended Non-Attainment Area for 2006 24-hour PM_{2.5} NAAQS

PM_{2.5} Monitoring Sites
(Using annual/seasonal/1-hr, 2005-2007,
6-hour values)

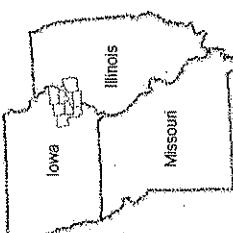
F < 35.5
P > 35.5

- River
- Interstate
- Deavenport, Moline, Rock Island Non-Attainment Area
- Muscatine Non-Attainment Area
- Deavenport-Moline-Rock Island MSA
- Muscatine, IA USA
- States

Rainbow Park
Grantcy Park

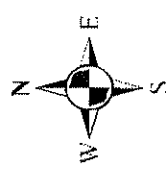


Location of the Study Area



ILLINOIS

Mississippi River



EPA does not warrant the accuracy, completeness, or timeliness of the information shown. The information herein is subject to revision and is not in final form. EPA shall not be liable for any detrimental reliance upon the information shown.

Sources
 Air Monitoring Data - EPA's Air Quality System (AQS), 2004-2006
 Emission Site Data - EPA's National Emissions Inventory (NEI), 2002
 Non-Attainment Area Boundary, Proposed by EPA Region 7
 Program (RSP) GOLD Dataset, 2007
 Metro Areas Data - US Census, Metropolitan Statistical Areas, MSA, 2003

