



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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

OFFICE OF
REGIONAL ADMINISTRATOR

18 AUG 2008

Doyle Childers
Director
Missouri Department of Natural Resources
1101 Riverside Drive
Jefferson City, MO 65101

Dear Director Childers:

Thank you for your recommendations on the status of fine particle pollution throughout Missouri. This letter is to notify you of our intent to modify the state's recommendation for designating areas as nonattainment in the state of Missouri. 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 December of 2007, you submitted a recommendation for determining attainment and nonattainment boundaries for the 24-hour PM_{2.5} National Ambient Air Quality Standard (NAAQS). You recommended designating the entire state as attainment for this standard. We have thoroughly reviewed your recommendations and the technical information you have submitted to support your recommendations.

Based on the available information, we believe that areas in Missouri contribute to violating monitors in the Illinois portion of the St. Louis area. Therefore, we intend to modify your recommendation and designate the City of St. Louis and the counties of St. Louis, St. Charles, Franklin, and Jefferson as nonattainment for the 24-hour PM_{2.5} National Ambient Air Quality Standard (NAAQS). Attached to this letter is a detailed enclosure containing tables and a map in which EPA identifies the area which we intend to include as a nonattainment area for the 2006 24-hour PM_{2.5} NAAQS. This attachment also contains our evaluation of the nine factors outlined in our June 2007 designations guidance.

Notwithstanding the proposal described above, we intend to continue to work with your staff to review available information to ensure that the nonattainment area is properly defined so that the area is able to attain the standard as quickly as possible. Should you have additional information that you wish to be considered by EPA in this process, please provide it to us by October 20, 2008.

We intend to make final designation decisions for the 2006 24-Hour PM_{2.5} standards by December 18, 2008. Please also be aware that in 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,

A handwritten signature in black ink, appearing to read "John B. Askew". The signature is fluid and cursive, with a long horizontal stroke at the end.

John B. Askew
Regional Administrator

Enclosure

cc: Jim Kavanaugh, Director, MDNR Air Pollution Control Program.

Review of Designations in Missouri For the Particulate Matter Air Quality Standard

The following table identifies the individual areas and counties comprising those areas in Missouri that EPA considered to designate as nonattainment for the 2006 fine particulate matter ("PM_{2.5}") air quality standard.¹ Where EPA intends to include only part of a county in a nonattainment area, we have indicated the boundaries of the portion of the county that will be included. Following this table is a discussion of each area and the basis for EPA's intended designations and then a description of the data EPA examined. EPA intends to designate as attainment/ unclassifiable all other Missouri counties or parts thereof not identified in the table below.

Area	Current PM _{2.5} Nonattainment Area for 1997 PM _{2.5} NAAQS	Missouri Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties for the 2006 24-hour PM _{2.5} NAAQS
St. Louis, MO-IL	Franklin Jefferson St. Charles St. Louis City of St. Louis	None	Franklin Jefferson St. Charles St. Louis City of St. Louis

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

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 PM_{2.5} remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).

- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

Additional information on the nine factors can be found in the Appendix.

Review for the St. Louis Area

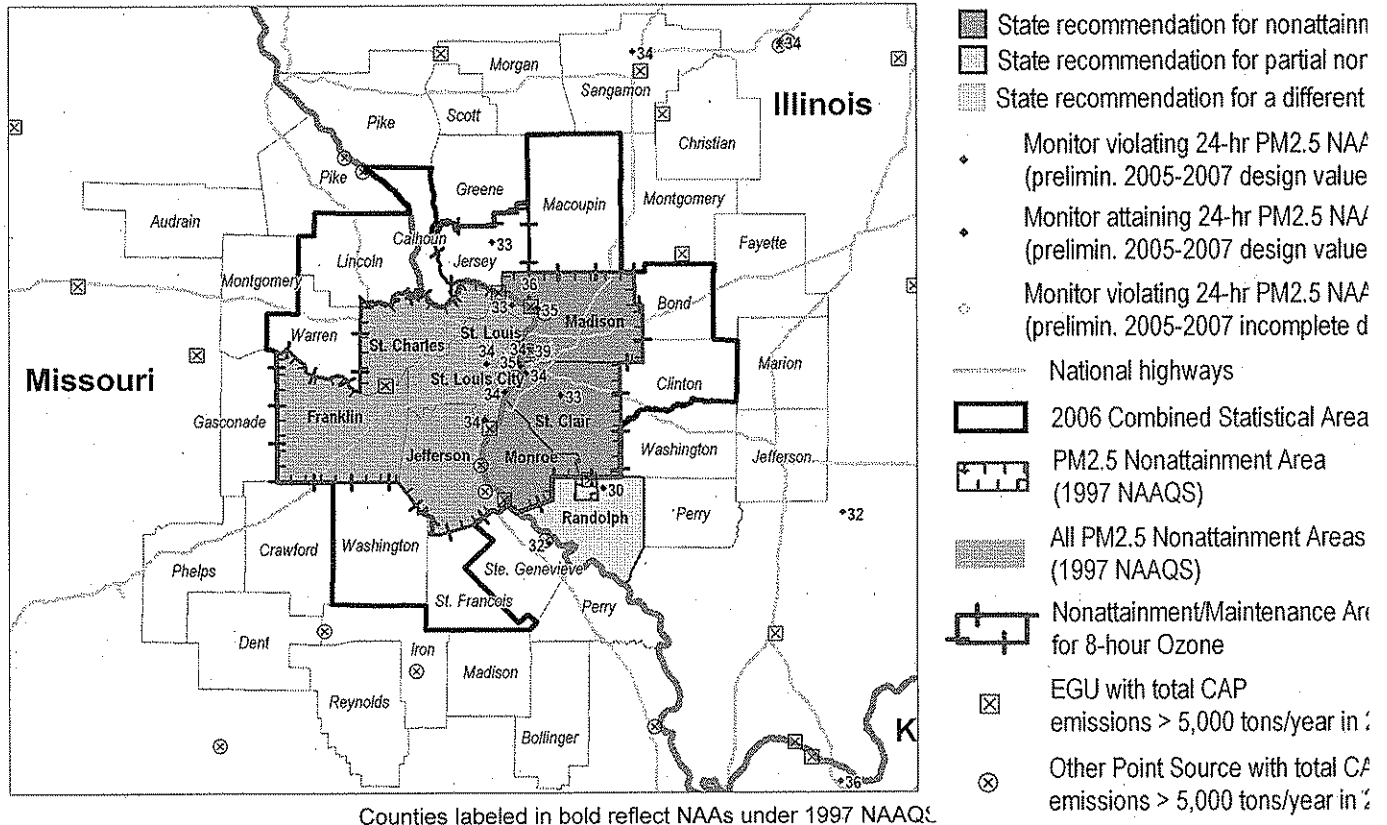
EPA reviewed the nine factors for the four counties and the City of St. Louis (including five counties in Illinois) partly or fully within the area designated nonattainment for the 1997 standards as well as for surrounding counties. There are violating monitors in Madison County, Illinois. In December 2007, Missouri recommended that the entire state be designated as attainment, and Illinois recommended a definition of the nonattainment area for the 2006 standards that is similar to the boundaries that were established for the 1997 PM_{2.5} standards, including Madison, Monroe and St. Clair Counties along with a portion of Randolph County. Also, 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. For specific information regarding the counties in the Illinois portion of St. Louis, 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>.

EPA disagrees with Missouri's recommendation to designate the entire state as attainment. From a review of the nine factors, as described below, EPA believes that the Missouri counties identified in the table above contribute PM_{2.5} pollution to the monitors violating in Madison County, Illinois; and therefore, should be included in the St. Louis nonattainment area. Section 107(d) of the Clean Air Act defines a nonattainment area as any area that does not meet or that contributes to ambient air quality in a nearby area that does not meet the national primary or secondary air quality standard for the pollutant.

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. No counties were recommended as nonattainment by the State.

St. Louis, MO-IL



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 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 contribution for counties near the area with the violating monitor. Note that this metric is not the exclusive way for consideration of data for these factors. A summary of the CES is included in the Appendix, 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} components (given in tons per year) and the CESs for 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 (tpy)	PM _{2.5} emissions carbon (tpy)	PM _{2.5} emissions other (tpy)	SO ₂ (tpy)	NO _x (tpy)	VOCs (tpy)	NH ₃ (tpy)
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

* Counties in bold represent those in the St. Louis nonattainment area for the 1997 PM_{2.5} NAAQS
 ** Part of Randolph County, Illinois is in the 1997 PM_{2.5} NAAQS nonattainment area

A review of the precursor emissions identified in Table 1 shows that 54% of the total PM_{2.5} emissions, 67% of the SO₂ emissions, 70% of the NO_x emissions and 73% of the VOC emissions in the 10 county area are emitted in the Missouri counties and the city of St. Louis. The CES for the counties listed in Table 1 also provide support to the understanding of the role that pollutants emitted in Missouri counties play in the formation of PM_{2.5}. We note that Franklin County, the lowest ranked county in Missouri for which EPA is proposing inclusion into the nonattainment area, has a CES score equal to the lowest scoring Illinois county (Monroe) proposed for inclusion into the nonattainment area (by the State of Illinois and EPA Region 5) and more than ten times the total PM_{2.5} direct and precursor emissions of Monroe County.

A description of the CES scores are found at the end of this document.

Factor 2: Air quality data

The 24-hour PM_{2.5} design values for counties in the St. Louis area are shown in Table 2.

Table 2. Air Quality Data

County	State Recommended Nonattainment?	Design Values 2004-06 ($\mu\text{g}/\text{m}^3$)	Design Values 2005-07 ($\mu\text{g}/\text{m}^3$)
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	0***	0***
Monroe, IL*	Yes	0***	0***
Montgomery, IL	No	0***	0***
Clinton, IL	No	0***	0***

* Counties in bold represent those in the St. Louis nonattainment area for the 1997 PM_{2.5} NAAQS
** Part of Randolph County, Illinois is in the 1997 PM_{2.5} NAAQS nonattainment area
*** There are no PM_{2.5} monitors in this county; therefore there are no monitoring values for this county.

Madison County, Illinois has monitored violations of the 24-hour PM_{2.5} standard as outlined in Table 2. Therefore, Madison County, Illinois is included in the St. Louis 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. On high concentration days during cold weather months in this area, EPA found on average a total urban contribution of 12.1 $\mu\text{g}/\text{m}^3$, consisting of 2.2 $\mu\text{g}/\text{m}^3$ of sulfate, 9.1 $\mu\text{g}/\text{m}^3$ of organic particles, and 0.8 $\mu\text{g}/\text{m}^3$ of miscellaneous inorganic particulate. On high concentration days during warm weather months in this area, EPA found on average a total urban contribution of 7.1 $\mu\text{g}/\text{m}^3$, consisting of 3.3 $\mu\text{g}/\text{m}^3$ of sulfate and 3.8 $\mu\text{g}/\text{m}^3$ of organic particulate emissions. These estimates were used for weighting of the emissions of different pollutants in calculating the contributing emissions scores.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with a FRM or FEM monitor. All data from Special Purpose Monitors (SPM) using an FRM, FEM, or Alternative Reference Method (ARM) which has operated for more than 24 months 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 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 give an indication of whether it is likely that population-based emissions might 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)
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

* Counties in bold represent those in the St. Louis nonattainment area for the 1997 PM_{2.5} NAAQS
 ** Part of Randolph County, Illinois is in the 1997 PM_{2.5} NAAQS nonattainment area

In reviewing the population and population density factor, as outlined in Table 3, the counties of highest population in the St. Louis bi-state area are identified for inclusion in the intended PM_{2.5} nonattainment area. Individually, these counties have populations at least populations over 90,000 people (of the counties in Missouri, Franklin County is the least populated with 98,987 people). Table 3 also illustrate that the area's population density varies across the St. Louis region. Population density assists in evaluating a county or city's contribution to the violating monitor. However, population density serves as a guide to assist in the evaluation of contribution, but as with the all factors, it alone does not provide absolute justification for determining nonattainment boundaries.

To further demonstrate potential population growth the EPA considered planned construction projects for roads and businesses, and planned major relocations of businesses. According to the East-West Gateway Council of Governments' (the metropolitan planning organization), long-term transportation planning document, "Legacy 2035, June 2007", between the years of 2011 and 2035 Missouri will spend a projected \$413 million dollars on three interstate construction projects on MO-141, I-55 and I-70 alone. These projects are necessary to add lanes, or relocate lanes, in an effort to accommodate additional motorists and reduce traffic congestion. Missouri is planning a number of additional projects to improve road conditions and other locations that attribute to congestion, such as interchange revisions, parkway upgrades and new bridges.

Factor 4: Traffic and commuting patterns

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
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

* Counties in bold represent those in the St. Louis nonattainment area for the 1997 PM_{2.5} NAAQS
** Part of Randolph County, Illinois is in the 1997 PM_{2.5} NAAQS nonattainment area

Table 4 reveals that although the majority of the populous does not regularly travel directly to/from the county monitoring violations (Madison County), the population does routinely travel to/from and within the MSA as a whole. Missouri counties attribute for 78% of the total number commuting into the MSA with St. Louis County, City of St. Louis and St. Charles ranking as the top three commuting counties.

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 suggests a typical pattern of high urban core traffic with the major interstate highways such as Interstates 70, 270, 44, and 55 in the Missouri portion of the bi-state area. The interstate highways outside the core urban area contribute the majority of the VMT in those particular counties.

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: [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

Table 5 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 change between 1996 and 2005.

Table 5. Population and VMT Growth and Percent Change.

County	Population (2005)	Population % change (2000-05)	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

* Counties in bold represent those in the St. Louis nonattainment area for the 1997 PM_{2.5} NAAQS
 ** Part of Randolph County, Illinois is in the 1997 PM_{2.5} NAAQS nonattainment area

As listed in Table.5, population growth above 5% occurred in the following counties between 2000 and 2005: St. Charles, Franklin, and Jefferson and Monroe in Illinois. Only two counties had a decline in population from 2000-2005, and those were St. Louis County and Randolph County, Illinois. The VMT in St. Louis has grown across the bi-state area, except for the City of St. Louis and Madison County, Illinois. The City of St. Louis and Madison County, which is the county with the violating monitor, had drops in VMT of 8 and 12 percent, respectively. Also, it is notable from Table 5 that no area had a drop in population and had a drop in VMT.

The Missouri Economic Research and Information Center (MERIC) reported in 2007 that St. Louis County, City of St. Louis, and St. Charles County were amongst the five Missouri counties with the highest number of new businesses forming in 2006 and 2007 with an estimated 3,501 new businesses forming in the three areas during that time. The St. Louis Business Journal lends to the expectation that the St. Louis area will continue to grow and attract businesses reporting on July 11, 2008, that a large company, Furniture Brands International, will move to a new world headquarters in Clayton, Missouri (St. Louis County). The publication goes on to state that “the new location at 1 North Brentwood will provide 40 percent more space and house about 150 additional employees”.

Factor 6: Meteorology (weather/transport patterns)

Table 6 shows the average prevailing surface wind directions for high PM_{2.5} days by quadrant for each county in the St. Louis area. These data show that 24-hour PM_{2.5} concentrations are influenced by emissions in any direction at various times, but these data also suggest that emissions in some directions relative to the violation are more likely to contribute than emissions in other direction.

Table 6. Prevailing Wind Directions for High PM_{2.5} Days.

High days	Prevailing Wind Direction (%)

	NW	SW	SE	NE
Days when only 1 monitor in St. Louis Area violated				
2/18/04	0	76	4	4
1/28/05	0	0	96	4
9/13/05	0	59	16	4
2/28/06	0	0	13	42
4/29/06	0	0	96	0
5/8/06	0	29	44	0
8/12/06	0	0	48	28
Days when more than 1 monitor in St. Louis Area violated				
9/3/04	4	12	50	8
9/12/04	14	0	41	0
1/31/05	9	0	4	40
2/3/05	17	55	0	0
2/27/05	4	0	58	12
6/24/05	0	54	24	10
6/27/05	0	60	12	0
8/2/05	0	8	54	0
8/8/05	0	12	55	0
9/10/05	0	36	32	0
Data based on EPA Wind Roses for St. Louis International Airport All percentages approximate. Due N, S, E, and W winds not included				

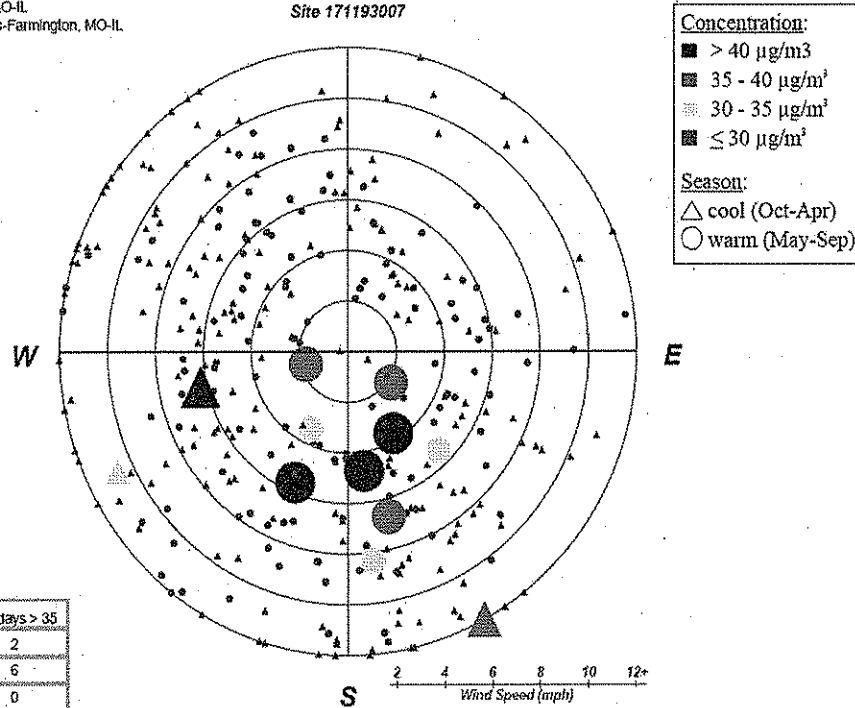
For each air quality monitoring site, EPA developed a “pollution rose” to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The figure identifies 24-hour PM_{2.5} values by color; days exceeding 35 ug/m³ are denoted with a red or black icon. 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.

Figure 3 Pollution Rose for Madison County, Illinois (County with violating monitor in 2004-2006)

Madison County, IL
Pollution Rose, 2004-2006

Existing NAA: St. Louis, MO-IL
CSA: St. Louis-St. Charles-Farmington, MO-IL
CBSA: St. Louis, MO-IL

Site 171193007



Year	98th %ile	# days > 35
2004	30.0	2
2005	41.2	6
2006	28.3	0
Design Value	33-A	

All exceedances plotted

Meteorological data from 16.8 miles away
ST LOUIS LAMBERT INTL ARPT (ID=13894)
located in near St. Louis, MO-IL

As shown in the pollution rose in Figure 3, the average prevailing surface wind direction for high PM_{2.5} days in Madison County, Illinois (which is the county with the violating monitor in 2004-2006) are from the southeast, southwest. The pollution rose shows that 24-hour PM_{2.5} concentrations are influenced by emissions from any direction at various times, but these data also suggest that emissions from some directions relative to the violation are more likely to contribute to the violation than emissions from other directions.

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 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 (e.g., existing PM and ozone areas)

The East-West Gateway Council of Governments (EWGCC) is the Metropolitan Planning Organization (MPO) for the bi-state St. Louis area. EWGCC webpage: <http://www.ewgateway.org/>

The existing nonattainment area for the 1997 PM_{2.5} NAAQS is as follows:

- In Missouri- St. Charles, Franklin, Jefferson, St. Louis counties and the City of St. Louis.
- In Illinois- Madison, Monroe, St. Clair Counties and Baldwin Township, Randolph County

The existing nonattainment area for the 1997 8-hour ozone NAAQS is as follows:

- In Missouri -St. Charles, Franklin, Jefferson, St. Louis counties and the City of St. Louis.
- In Illinois - Jersey, Madison, Monroe, and St. Clair Counties

Factor 9: Level of control of emission sources

The emission estimates on Table 1 include any control strategies implemented by the States in the St. Louis 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}).

In considering county-level emissions, EPA considered 2005 emissions data from the National Emissions Inventory. 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)

Summary:

Violations recorded at two separate monitors sited in Madison County, Illinois for 2005 through 2007. This county is a part of the St. Louis metropolitan statistical area. According to section 107(d) of the CAA, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to the violations.

In December 2007, Missouri submitted a recommendation that the entire state be designated as attainment for the PM2.5 24-hour standard.

After an evaluation of the 9 factors, EPA has determined that it disagrees with Missouri's recommendation. EPA proposes to add Franklin, Jefferson, St. Charles, and St. Louis Counties and the City of St. Louis to the list of three full counties and one partial county within the St. Louis metropolitan area that Illinois and Region 5 are proposing for nonattainment designation. (The recommendation for Illinois includes Madison, St. Clair and Monroe counties in full, and Randolph county in part.)

The basis for EPA's position with regard to the Missouri nonattainment boundaries centers on factors 1- Emissions Data, 3-Population, 4-Traffic and Commuting Patterns, 5-Growth Rates, and 6-Meteorology.

EPA's evaluation of Factors 1 and 6 indicates that the areas within the Missouri boundaries proposed by EPA emit 76% of the total amount of emissions of PM2.5 and its precursor in the St. Louis metro areas when compared to the counties recommended for nonattainment on the Illinois side. In addition, over one third of the days in which violations were monitored at the Illinois monitor site, the winds were favorable for transport of PM2.5 and PM2.5 precursors from Missouri sources towards the Illinois monitors. This probable contribution from Missouri side sources is confirmed by the CES scores.

Factors 3, 4 and 5 are indicators could be considered surrogates for emissions contributions and many of these contributions are not fully accounted for in the emissions inventories. Our evaluation revealed that approximately 74% of the St. Louis metropolitan area population resides on the Missouri side of the state line and approximately 78% of the commuting miles traveled into and within the St. Louis area on the Missouri side.

Consequently, as a result of the large proportion of Missouri emissions in the metropolitan area and available meteorological data which indicates that on a significant portion of the days with monitored violations, winds originate from the Missouri side of the state line, Missouri is likely a significant contributor to monitored PM2.5 values in the metropolitan area. Therefore, EPA proposes that the counties of add Franklin, Jefferson, St. Charles, and St. Louis Counties and the City of St. Louis be included in the nonattainment area.

APPENDIX:

Background on Criteria EPA used to define its intended nonattainment areas

On June 8, 2007, in a memorandum from Robert Meyers to the EPA Regional Administrators, EPA issued guidance on a timetable for designation of areas violating the PM_{2.5} air quality standards promulgated in 2006 and factors that EPA urged states to consider as they prepared recommendations for nonattainment area boundaries. This guidance was sent to the Governor of Ohio as an attachment to a letter dated July 9, 2007, requesting the State's recommendations. The guidance identified nine factors: emissions, air quality, population density and degree of urbanization, traffic and commuting patterns, growth rates and patterns, meteorology, geography/topography, jurisdictional boundaries, and level of control of emission sources.

The Clean Air Act dictates that nonattainment areas be defined to include both areas that are violating the standards and nearby areas that are contributing to the violations. Assessment of areas contributing to violations is complicated by the multiple pollutants that are components of fine particulate matter, the variable significance of these multiple components, and the complexities of photochemical formation and dispersion. To facilitate its review of available information, EPA prepared a "Contributing Emissions Score" (CES) for each potentially violating county. EPA derived a CES for each relevant county using information on emissions, air quality, and meteorology. The score for each county is computed relative to the highest scoring county in the area, so that scores range between 0 and 100. These scores represent an estimate of the relative maximum influence that emissions in that County have on a violating county. The weight that the CES plays in determining the boundaries of any violating area varies from area to area depending on how well the CES methodology takes into account characteristics of an area that impact transport and dispersion of PM_{2.5} and depending on the significance of other factors.

Briefly, a CES for each county was derived by incorporating the following information and variables that impact PM_{2.5} transport into the screening approach:

- 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

Factor 1: Emissions data

For this factor, EPA looked at county-based levels of emissions of the following PM_{2.5} components: PM_{2.5} emissions total (which includes PM_{2.5} emissions carbon and

emissions other), PM_{2.5} emissions carbon (includes organic carbon OC and elemental carbon (EC)), and PM_{2.5} emissions other (which includes inorganic particles (crystal)), as well as emissions of SO₂ and NO_x which are precursors of secondary PM_{2.5} components. Emissions data were derived from the 2005 National Emissions Inventory (NEI). EPA also considered each county's Contributing Emissions Score (CES), whose derivation is briefly described above.

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 each area based on data for the 2004-2006 and 2005-2007 periods. 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 35 µg/m³ or less. A design value is only valid if minimum data completeness criteria are met.

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

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

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive to another county within the area, the percent of total commuters in each county who commute to other counties within area, as well as the total vehicle miles traveled (VMT) for each county in millions of miles. A county with numerous commuters is generally an integral part of an urban area and could be an appropriate county for implementing mobile-source emission control strategies, thus warranting inclusion in the nonattainment area.

Factor 5: Growth rates and patterns

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

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" 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 this factor, EPA also considered each County's CES, which includes 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 area.

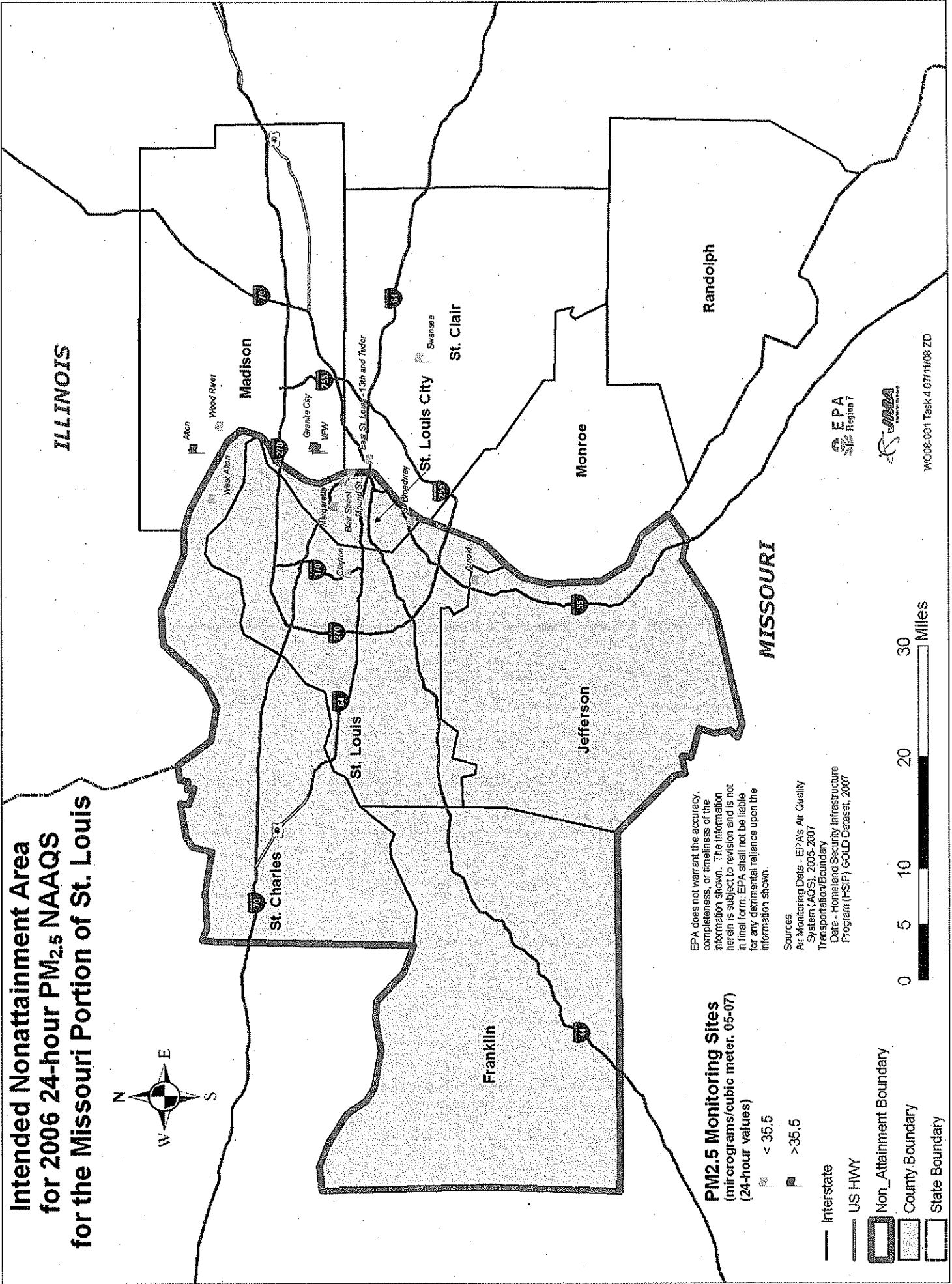
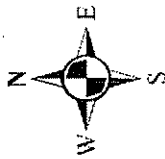
Factor 8: Jurisdictional boundaries (e.g., existing PM and ozone areas)

In evaluating the jurisdictional boundary factor, consideration should be 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.

Factor 9: Level of control of emission sources

This factor considers emission controls currently implemented in the area. The emission estimates under Factor 1 include any control strategies implemented in each 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}).

Intended Nonattainment Area for 2006 24-hour PM_{2.5} NAAQS for the Missouri Portion of St. Louis



PM_{2.5} Monitoring Sites
(micrograms/cubic meter, 05-07)
(24-hour values)

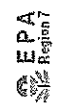
■ < 35.5

■ > 35.5

- Interstate
- US HWY
- Non-Attainment Boundary
- County Boundary
- State Boundary

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 (AQIS), 2005-2007
Transportation/Boundary Data - Homeland Security Infrastructure Program (HSIP) GOLD Dataset, 2007



WC008-001 Task 4.07/11/08 ZD