



SUMMARY FOR REVISED MISSOURI RECOMMENDATION  
8-hour Ozone Nonattainment Designations  
2008 National Ambient Air Quality Standard

INTRODUCTION

This summary describes the process used to formulate the proposed 2008 8-hour ozone nonattainment area boundary recommendation. The U.S. Environmental Protection Agency (EPA) 2008 revision to the 8-hour ozone standard establishes 0.075 parts per million (ppm) as the primary and secondary air quality standard. The previous 8-hour ozone standard was 0.08 ppm with compliance measured at 0.084 ppm due to rounding. The area boundaries are based on the most current ozone monitoring data (2005-07) along with primary guidance from the March 28, 2000, EPA guidance for developing the 2003 8-hour designation recommendations and with secondary guidance from the June 8, 2007, EPA memorandum for 2007 PM designations. After the initial recommendation was published, EPA provided revised guidance for the 2008 designation process. This guidance did not provide new information to address in this recommendation. It is important to note that the 2006-08 monitoring data (current at the time of document creation) was considered during the review process and is included as it provides important evidence to the overall recommendation. As part of the designation effort, the department has conducted a series of three meetings in the four areas potentially impacted by the designation process and has requested local information from stakeholders within those areas. The department developed the “Technical Support Document for Determination of Nonattainment Boundaries in Missouri for the 2008 8-hour Ozone National Ambient Air Quality Standard” to gather information necessary to make this recommendation and address the EPA criteria in detail.

SUMMARY OF RECOMMENDATION

Based on the 2005-07 monitoring data, six distinct areas in Missouri violate the 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS): Kansas City (Missouri/Kansas), St. Louis (Missouri/Illinois), Ste. Genevieve, Southeast Missouri, Springfield, and El Dorado Springs. The proposed boundaries for 8-hour ozone nonattainment areas in Missouri include the following counties:

|                 |   |
|-----------------|---|
| Kansas City:    | Cass, Clay, Clinton, Jackson, Platte                                    |
| St. Louis:      | Franklin, Jefferson, Lincoln, St. Charles, St. Louis, City of St. Louis |
| Ste. Genevieve: | Ste. Genevieve  |

|                      |                                 |
|----------------------|---------------------------------|
| Southeast Missouri:  | Perry                           |
| **Springfield:       | Christian, Greene, Stone, Taney |
| **El Dorado Springs: | Cedar (rural transport)         |

St. Francois County and Cape Girardeau County are recommended for designation as unclassifiable. The remaining counties in the state of Missouri are recommended for designation as attainment/unclassifiable.

The above counties were designated nonattainment based on affirmative answers to one or both of the two basic designation questions: (1) Does the representative ozone monitoring data for each county indicate a violation of the ozone standard? and (2) Do the emissions within this county contribute to a downwind monitored violation?

This recommendation has been developed through in-depth technical evaluations of the available information related to the EPA guidance along with a series of stakeholder meetings and input. The information presented as part of the recommendation has been collected from many different sources including data from individual industrial facilities within Missouri. All the data and the rationale for answering the two questions is presented in the Technical Support Document (TSD) for this recommendation. To be clear, the input provided by stakeholders from all the different areas was considered during the development of the recommendation. The department believes this document is a fair and accurate assessment of the information and incorporates many stakeholder comments and contributions. However, this document does not reflect a consensus reached by all stakeholders that participated in the formal meetings for each area.

\*\*It is important to note that based on the current 2006-08 monitoring data, the counties within the El Dorado Springs and Springfield areas would be designated attainment/unclassifiable for the 2008 ozone NAAQS. Therefore, Springfield/Southwest Missouri area has two recommendation scenarios: one based on the 2005-07 monitoring data that demonstrates a violation of the standard as documented above and the other based on the 2006-08 monitoring data that shows attainment of the standard for the entire area. These two distinct scenarios are presented for completeness.

## BACKGROUND

On March 12, 2008, EPA promulgated a revision to the ozone NAAQS which obligated the state of Missouri to designate the attainment status of all areas of the state. EPA revised the NAAQS by changing the level of the primary and secondary standards from 0.08 ppm to 0.075 ppm with an 8-hour averaging time. The Clean Air Act (CAA) allows each state to recommend initial designations of the attainment status for all areas of the State. Specifically, Section 107(d)(1) of the CAA allows each state an opportunity to recommend attainment/unclassifiable and nonattainment areas including appropriate

boundaries. EPA can accept the recommendation or make modifications as it deems necessary.

The previous 8-hour ozone NAAQS was promulgated in 1997, but legal delays caused the ozone recommendation process to extend until July 2003. After a series of workgroup meetings in both Kansas City and St. Louis, the department provided a designation recommendation that included counties in both areas. The 2003 recommendation included the following counties in the St. Louis area: Franklin, Jefferson, St. Charles, St. Louis and the City of St. Louis. Ultimately, EPA agreed with this recommendation after requesting additional information regarding Ste. Genevieve County.

The 2003 recommendation included the following counties in the Kansas City area: Clay, Jackson, Platte, and the portion of Cass County inside the Metropolitan Planning Organization boundary (northern portion of the county). However, based on the 2001-03 and 2002-04 ozone monitoring data, the Kansas City area attained the 1997 8-hour ozone standard and EPA revised the recommendation to state that these counties would be in attainment of the NAAQS. Further, since the Kansas City area was a maintenance area for the 1-hour ozone standard, EPA required a maintenance plan for the 1997 8-hour ozone standard in the same area as the previous maintenance plan: Clay, Jackson, and Platte Counties.

The remaining counties in Missouri were designated attainment for the 1997 8-hour ozone standard during the 2003 designation process.

Pursuant to the establishment of any new NAAQS, EPA requests states submit boundary recommendations for nonattainment areas twelve months after promulgation. Therefore, Missouri's recommendation for the 2008 8-hour ozone NAAQS will be submitted to EPA before March 12, 2009.

## FEDERAL AREA DESIGNATIONS

Unclassifiable: any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Attainment: any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Nonattainment: 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 ambient air quality standard for the pollutant.

## CRITERIA FOR DESIGNATION:

After initial publication of the draft designation recommendations, EPA published revised guidance for the 2008 ozone standard designation. The guidance used to support this designation comes from two previous guidance documents: the primary guidance is

from the 2003 ozone designation process with secondary guidance from the 2007 PM designation process. There are no differences in criteria from the two previous documents and the newly published guidance. Discussion of Core Based Statistical Areas or Combined Statistical Areas is new to this guidance and reflects EPA's finding that ozone violations are occurring outside large metropolitan areas and potentially near and inside smaller, micropolitan statistical areas. These new areas primarily replace the existing guidance for Metropolitan Statistical Areas and Combined Metropolitan Statistical Areas discussed next.

Pursuant to the 2003 ozone designation process, EPA published a guidance document titled "Boundary Guidance on Air Quality Designations of the 8-hour Ozone National Ambient Air Quality Standards" on March 28, 2000. This guidance was written to assist states in recommending areas under the 1997 8-hour ozone standard. In that guidance, the EPA recommends that the Metropolitan Statistical Area (MSA) or Consolidated Metropolitan Statistical Area (CMSA) serve as the presumptive boundary for the 8-hour ozone nonattainment areas. In order to remove counties within the presumptive boundary or include counties outside the presumptive boundary, each state is required to address the following eleven boundary criteria:

- Emissions and air quality in adjacent areas
- Population density and degree of urbanization including commercial development
- Monitoring data representing ozone concentrations in local areas and larger areas
- Location of emission sources
- Traffic and commuting patterns
- Expected growth
- Meteorology
- Geography/topography
- Jurisdictional boundaries
- Level of control of emissions sources
- Regional emission reductions

Pursuant to the 2007 PM designation process, EPA supplied a guidance memorandum on June 8, 2007 from Robert Meyers to the EPA Regional Administrators. In this guidance, EPA specifically addressed the nonattainment designation of areas that are found to contribute to nearby violating monitors as part of the designation process. Also, EPA did not establish a presumptive boundary for the revised PM standard. Further, EPA addressed nine boundary criteria in this guidance:

- Emission data
- Air quality data
- Population density and degree of urbanization including commercial development
- Traffic and commuting patterns
- Growth rates and patterns
- Meteorology (weather/transport patterns)
- Geography/topography

- Jurisdictional boundaries
- Level of control of emissions sources

It is important to note that the 2008 ozone designation guidance contains the same nine criteria as the 2007 PM designation guidance. Since there is considerable overlap between the two previous guidance documents and the new guidance, the department has included an evaluation of all the criteria listed here in a comprehensive fashion to fully address all the necessary criteria.

## PROCESS FOR DEVELOPING RECOMMENDATIONS

The department held a series of three meetings in each of the four areas of the state impacted by this revised standard. These meetings were designed to provide information to stakeholders and allow the affected communities to better understand the designation process. Also, the department provided the technical information used in the recommendation development to these stakeholders via the 8-hour ozone designation Web site: (<http://www.dnr.mo.gov/env/apcp/ozone/8hourdesignationprocess.htm>). In addition, the Web site includes a link that allows stakeholders to submit information or comments regarding the technical data. Based on the attendance at the meetings, the department believes these meetings encouraged participation from many stakeholders. Environmental interests, industry, county commissioners, mayors, county health departments, regional planning organizations, local air quality control agencies, neighboring state air agencies, EPA Region VII, and other air quality management partners attended the meetings.

Similar to the 2003 ozone designation process, the department decided to publish a draft recommendation for public comment and review. The draft document was made available to the public 30 days prior to the department presenting the draft designation recommendation to the Missouri Air Conservation Commission as part of the public hearing on December 4, 2008. After consideration of the comments received, the department is presenting this final statewide recommendation for adoption by the commission. Upon adoption, the Governor or his designee will send the recommendation to EPA Region VII. After this submittal, EPA will consider all states' recommendations and provide an additional opportunity for comment on the final designation status of all areas. The department is, and will remain, committed to keeping stakeholders involved throughout the remaining designation process and subsequent State Implementation Plan development process.

## CRITERIA FOR ESTABLISHING BOUNDARIES AND DISCUSSION OF BOUNDARY DEVELOPMENT

Although every nonattainment area is unique, the recommendations for all the areas considered were consistently guided by the following principles:

- Existing 8-hour ozone nonattainment/maintenance areas were recommended for inclusion in the 2008 8-hour ozone boundary recommendation.
- Any county that contains a monitor that violates the 2008 8-hour ozone standard is included in an existing nonattainment area or becomes part of its own area.
- Areas that have a violating monitor using the 2005-07 ozone design values, but do not have violations based on 2006-08 design values will have two different scenarios presented. One will be based on the 2005-07 ozone design values and the other will be based on the 2006-08 ozone design values.
- Using the EPA boundary criteria and the information presented in the technical support document, counties that exhibit a pattern of frequent and significant contribution were considered for inclusion in the applicable nonattainment area. Along with this technical information, the department considered relevant policy considerations as part of the designation process. The review of contributing factors must be conducted for different counties in a consistent manner statewide. Due to the fact each of the counties has unique characteristics, the factors for the designation of each county are compared with the other counties and evaluated in a collective fashion.

Section 107(d)(1)(A) of the Clean Air Act defines a nonattainment area as any area that does not meet or that contributes to nearby areas not meeting the ambient air quality standard. The relevant EPA guidance allows states to consider, at a minimum, the boundary criteria when establishing boundaries. The implementation of control strategies that will eventually be used in the attainment demonstrations for these areas is a distinct and separate process and is not a primary consideration in this boundary evaluation. It is premature to consider control strategies in this process when the strategies have not been finalized or even evaluated.

In order to determine trends within each potential ozone nonattainment area and provide the most comprehensive set of information, the department chose to begin the evaluation process with counties within the metropolitan statistical area (MSA). Based on information gathered in the 2003 ozone designation process for the Kansas City metropolitan complex, the Department also preliminarily identified counties bordering the MSAs with higher VOC and/or NO<sub>x</sub> emissions or that were part of a contiguous MSA. The 2007 MSA boundary (developed by the United States Office of Management and Budget) for Kansas City has expanded in both Missouri and Kansas since the 2003 designation process. The following Missouri counties were examined in the Kansas City area: Bates, Caldwell, Cass, Clay, Clinton, Jackson, Lafayette, Platte, and Ray in the MSA and Andrew, Buchanon, De Kalb, Henry, and Johnson outside the MSA. It should be noted that the Warrensburg micropolitan statistical area (Johnson County) is part of the 2006 Combined Statistical Area for Kansas City.

The department also began the St. Louis evaluation with the St. Louis MSA and preliminarily identified counties bordering the MSAs with higher VOC and/or NO<sub>x</sub> emissions. The 2007 MSA boundary (developed by the United States Office of Management and Budget) for St. Louis has expanded in both Missouri and Illinois since the 2003 designation process. The following Missouri counties were examined in the St.

Louis area: Franklin, Jefferson, Lincoln, St. Charles, St. Louis, Washington, and the City of St. Louis in the MSA and Crawford, Gasconade, Montgomery, Perry, Pike, St. Francois, and Ste. Genevieve outside the St. Louis MSA. It should be noted that the Farmington micropolitan statistical area (St. Francois County) is part of the 2006 Combined Statistical Area for St. Louis.

The Southeast Missouri violating monitor (Farrar in Perry County) is in a region that is not in or contiguous with one of the three major metropolitan areas in Missouri (St. Louis, Kansas City, or Springfield). Since this area is very close to the St. Louis area, there is some overlap of counties within the evaluation for both areas. Since Perry County has the monitor with the violation (Farrar), the contiguous micropolitan statistical area ( $\mu$ SA - Cape Girardeau) was the basis for the initial evaluation. Note: the St. Louis MSA is not contiguous with Perry County. Therefore, the following Missouri counties were evaluated as part of the Southeast Missouri area: Bollinger and Cape Girardeau inside the Cape Girardeau  $\mu$ SA and Perry, Scott, St. Francois, and Ste. Genevieve outside the  $\mu$ SA. The Sikeston  $\mu$ SA (Scott County) is considered part of the Combined Statistical Area for Cape Girardeau.

For Springfield/Southwest Missouri, the department chose to begin the boundary designation evaluating counties with representation in the Ozarks Clean Air Alliance. This organization has endeavored to bring local stakeholders together to discuss air quality issues within the Springfield/Southwest Missouri area. These counties are as follows: Christian, Dallas, Greene, Polk, and Webster in the Springfield MSA; Stone and Taney in the Branson MSA; and Barry, Lawrence, and Dade counties outside both MSA boundaries. In addition to the counties in the Clean Air Alliance, the department evaluated several counties due to potential upwind transport contribution to the Springfield and El Dorado Springs monitored violations. These counties included: Cedar with the monitor, and Barton, Jasper, McDonald, and Newton.

The first consideration for nonattainment designations is based on the air quality data to determine if the collective area violates the standard. Based on the 2005-07 monitoring period, the Kansas City, St. Louis, Ste. Genevieve, Springfield/Southwest Missouri, and Southeast Missouri areas violate the 2008 8-hour ozone NAAQS. The counties with monitored violations are as follows:

Kansas City – Cass, Clay, Clinton

St. Louis – Jefferson, Lincoln, St. Charles, St. Louis, City of St. Louis

Ste. Genevieve – Ste. Genevieve

Southeast Missouri – Perry

Springfield – Greene

El Dorado Springs – Cedar

Therefore, these counties are being designated nonattainment under the “does not meet the standard” provision of Section 107(d)(1)(A) of the Clean Air Act. The monitoring data contained in the technical support document Tables KC2, STL2, SE2, and SW2 illustrates the 2005-07 and current 2006-08 ozone design values for each monitor (Ste. Genevieve is contained in Table STL2). If the current 2006-08 data is used, the Springfield and El Dorado Springs violating areas change because the 4<sup>th</sup> highest concentrations in 2008 are much less than the 4<sup>th</sup> highest concentrations in 2005 at every Missouri monitor. This difference is very important to the designation process because compliance with the 8-hour ozone standard is based on the most recent three-year average of the 4<sup>th</sup> highest 8-hour ozone concentration at each monitoring site. Based on the new data, all monitors in southwest Missouri would meet the 2008 ozone standard. Therefore, as documented above, the Southwest Missouri region will have two different scenarios pursuant to this recommendation: all counties in the region attainment (2006-08 monitoring data) and violating/contributing counties in region nonattainment (2005-07 monitoring data). Also, the violating monitor in Cass County meets the ozone standard using the 2006-08 ozone design value. This fact does not change the designation as nonattainment for Cass County due to the department’s finding of contribution to the downwind Kansas City monitored violations. The design values for the remainder of Missouri sites in Kansas City and St. Louis along with Perry County illustrate a violation of the standard using both sets of monitoring data.

The second consideration for nonattainment designations is based on contribution to areas not meeting the NAAQS under Section 107(d)(1)(A). This consideration is much more difficult and requires a comprehensive evaluation of the criteria included in the relevant EPA guidance. In determining which areas are contributing, the department gathered information and analyzed it with respect to these criteria. The proposed recommendation considered all the relevant information including: emissions size and location, predominant meteorological conditions that lead to high ozone concentrations, population and urbanization of counties, traffic patterns and transportation corridors, existing jurisdictional boundaries, and population/emission growth. The question is whether the information gathered supports the conclusion that a particular county has a frequent and significant contribution to downwind ozone concentrations that violate the 2008 8-hour ozone standard. A close evaluation of the contribution criteria seems to indicate that if a county does not have a significant amount of precursor emissions (volatile organic compounds [VOC] or oxides of nitrogen [NO<sub>x</sub>]), it should not be included in the designated area. Also, the idea of long range and regional transport of ozone and its precursors leading to ozone problems throughout the eastern United States is now well established and leads to the conclusion that all ozone precursor sources contribute to ozone formation. Yet, the Clean Air Act limits the designation of contributing areas to “nearby areas”. These two facts eliminate a number of counties in Missouri from inclusion in nonattainment boundaries based on the contribution test. The inclusion of counties within an existing 8-hour nonattainment or maintenance area in the new boundary recommendation is straightforward since the evaluation demonstrates a sizable contribution for each of these counties in Missouri. In evaluating significant



contribution, counties have been compared to other counties within the area to determine the level of potential contribution to high ozone levels. Below is a discussion of both monitoring status and an evaluation of the contribution of emissions impacting ozone values for all counties that have monitored a violation of the standard in the last two design value periods by geographic region.

### Kansas City

In the Missouri portion of the Kansas City maintenance area, Clay County is the only county with ozone monitoring. Jackson and Platte Counties do not contain ozone monitors. The design value for Rocky Creek was 87 ppb for the 2005-07 monitoring period and 81 ppb for the 2006-08 monitoring period. Cass and Clinton Counties also contain monitoring sites that violated the ozone standard for the 2005-07 time period (Cass – Richards Gebaur South with a design value of 77 ppb and Clinton – Trimble with a design value of 85 ppb). The design value for the Richards Gebaur South site is 72 ppb and the Trimble design value is 79 ppb for the 2006-08 monitoring period. These two counties border the current 8-hour maintenance area and are located inside the Kansas City MSA. Jackson and Platte Counties both contain a portion of the Kansas City contiguous metropolitan complex.

The pattern of population density, emission density, and vehicle miles traveled are considerably higher for Jackson and Platte counties (especially the metropolitan core areas) when compared to the other counties in the MSA (Table KC3 of the TSD). It should be noted that Cass County has the highest VMT and contains a portion of the contiguous metropolitan complex. Jackson and Platte Counties have a substantial amount of precursor emissions (59.4 tons per day VOC and 92.1 tons per day NO<sub>x</sub> – Jackson; 11.3 tons per day VOC and 43.0 tons per day NO<sub>x</sub> – Platte). These emissions were projected as part of a 2009 emission inventory analysis and include controls already occurring in the Kansas City area. The corresponding percentages of the total maintenance area for each county are as follows: Jackson – 35.3% VOC and 35.6% NO<sub>x</sub>; Platte – 6.7% VOC and 16.6% NO<sub>x</sub>. Further, the Jackson County 2007 population is estimated as 666,890 and the Platte County 2007 population is 84,881. Platte County also has considerable connection to the other counties in the maintenance area based on 2004 Census Bureau commuter data (56.6% of the working population in Platte County worked in Jackson, Clay, Wyandotte (KS), or Johnson (KS) counties). The existing 8-hour maintenance area boundary, meteorology, connection to the metropolitan core area, and total emission in Platte and Jackson Counties lead directly to the conclusion of contribution to violating monitors in the area. Other factors such as level of control of sources and regional emission reductions were less relevant in determining the attainment status of these counties.

Clinton County contains a monitor that violates the 2008 8-hour ozone standard. The emissions, population, and meteorological conditions conducive for elevated ozone formation relative to the Kansas City metropolitan complex do not indicate a Clinton County contribution to other violating monitors. The 2009 emissions are 3.2 tons per day

VOC and 3.2 tons per day NO<sub>x</sub> (less than 2% for both VOC and NO<sub>x</sub> of the maintenance area total), the 2007 population is 20,894, and the county is north of the Kansas City metropolitan area (downwind). Nearly all of the monitored exceedances at the Trimble monitor have a strong contribution from the upwind Kansas City metropolitan area. Clinton County does have a connection to the maintenance area counties (48.7% of working residents in Clinton County work in the maintenance area - over 4,000 commuters). Also, Clinton County is part of the metropolitan statistical area for Kansas City. Clinton County was not found to have a significant contribution to other violating monitors. Its inclusion in the Kansas City nonattainment area is primarily due to the downwind receptor relationship with sources from the Kansas City core emission area.

Cass County has a monitor in the extreme northern portion of the county that violated the 2008 8-hour ozone standard using the 2005-07 monitoring data (77 ppb), but does not violate the standard using 2006-08 monitoring data (72 ppb). Therefore, the focus of the determination for this county was based on the contribution to downwind violating monitors. Cass County has the largest population of any county in the region not in the current maintenance area (97,133 in 2007). It has the strongest connection to the maintenance area with 60% of employed residents working in those counties (over 24,000 people). It is upwind of the other counties in the maintenance area under conditions conducive to elevated ozone formation (winds with a strong southerly component). The projected 2009 emissions in Cass County are 8.9 tons per day VOC and 9.4 tons per day NO<sub>x</sub> (5.3% VOC and 3.6% NO<sub>x</sub> of the maintenance area total). Further, northern Cass County contains a portion of the contiguous Kansas City metropolitan area and it is part of the Kansas City MSA. Cass County has the largest projected population growth rate of any county in the region (48% from 2000-2020) and the 2020 projected population is 121,000 people. The inclusion of Cass County in the recommended Kansas City 8-hour ozone nonattainment area is based on the strong connection to the metropolitan area, the current population and large growth of the county in the future, the upwind location of the county, and the sizable amount of precursor emissions that contribute to downwind ozone formation.

### St. Louis

In the Missouri portion of the 1997 St. Louis 8-hour ozone nonattainment area, every county monitors a violation of the 2008 ozone standard with the exception of Franklin County. The City of St. Louis and Jefferson, St. Charles, and St. Louis Counties all have at least one violating monitor. Franklin County does not contain an ozone monitor. The closest monitor to Franklin County is located in Pacific. Pacific is located very near the border between St. Louis County and Franklin County (shown on Technical Support Document Figure STL1). This monitor has a design value of 83 ppb for the 2005-07 monitoring period and 76 ppb for the 2006-08 monitoring period. Therefore, Franklin County evaluation is based on the contribution to the other violating monitors in St. Louis (discussed below). The Foley monitor in Lincoln County violates the ozone standard with a 2005-07 design value of 87 ppb and a 2006-08 design value of 80 ppb. Therefore, Lincoln County is required to be designated nonattainment due to its violating monitor under Section 107(d).

Overall, in the St. Louis area, the majority of emissions and population are located within the current 8-hour ozone nonattainment area as shown in Table STL3 of the Technical Support Document. Specifically, Franklin County has a sizable amount of 2009 projected VOC (14.6 tons per day) and NO<sub>x</sub> emissions (44.0 tons per day) that correspond to 5.4% for VOC and 10.7% for NO<sub>x</sub> of the inventory in the current St. Louis 8-hour ozone nonattainment area. Further, these emissions have been controlled by several VOC and NO<sub>x</sub> regulations in the St. Louis area under previous state implementation plans. Franklin County has a large commuter connection with the other counties in the St. Louis nonattainment area (39% of working residents work in other Missouri and Illinois nonattainment counties). In addition, the 2007 population for Franklin County is 100,045 people. The projected population growth between 2000 and 2020 for Franklin County is 18 percent (2020 population over 110,000). The connection to the other counties in the nonattainment area, the considerable amount of precursor emissions, and its current inclusion in the ozone nonattainment area lead to the recommendation for inclusion in the 2008 St. Louis ozone nonattainment area.

Lincoln County and its relationship to upwind St. Louis is very similar to Clinton County and its relationship to upwind Kansas City. As noted previously, the Foley monitor violates the 2008 8-hour ozone standard. However, the precursor emissions and meteorological conditions conducive for elevated ozone formation relative to the St. Louis metropolitan complex do not indicate Lincoln County contribution to other violating monitors. The 2009 emissions are 6.1 tons per day VOC and 7.2 tons per day NO<sub>x</sub> (2% for both VOC and NO<sub>x</sub> of the maintenance area total), the 2007 population is 51,528, and the county is north of the St. Louis metropolitan area (downwind). The projected population growth of Lincoln County is very high (over 90% between 2000 and 2020). Nonetheless, nearly all of the monitored exceedances at the Foley monitor have a strong contribution from the upwind St. Louis metropolitan area. Lincoln County does have a connection to the nonattainment area counties (53% of working residents in Lincoln County work in the maintenance area - over 9,000 commuters). Also, Lincoln County is part of the metropolitan statistical area for St. Louis. Lincoln County was not found to have a significant contribution to other violating monitors. Its inclusion in the St. Louis nonattainment area is primarily due to the downwind receptor relationship with sources from the St. Louis core emission area.

#### Ste. Genevieve

The Bonne Terre site also monitors a violation of the 2008 standard with a design value of 83 ppb for the 2005-07 monitoring period and 79 ppb for the 2006-08 monitoring period. This monitor is located in Ste. Genevieve County (near the border with St. Francois County). Upon review of comments from stakeholders in St. Francois County and the Southeast Missouri Regional Planning Commission, the department has conducted some additional analyses to more thoroughly investigate the relationship between the emissions in St. Francois and Ste. Genevieve Counties and ozone impacts in the area. Further, there is no specific guidance on the use of a single monitor as being representative of multiple counties. Therefore, the department has found there is

sufficient uncertainty as to whether St. Francois County meets the air quality standard to make a recommendation for designation as unclassifiable with respect to the monitoring status of the county. Therefore, since the Bonne Terre monitoring site in Ste. Genevieve County violates the ozone standard, Ste. Genevieve is required to be designated nonattainment under the “does not meet the air quality standard” provision of Clean Air Act Section 107(d)(1)(A)(i).

In order to determine the appropriate nonattainment area for Ste. Genevieve County, the contribution to elevated ozone concentrations in the St. Louis area from sources in Ste. Genevieve County and from St. Louis emission sources to elevated ozone concentrations at the Bonne Terre monitor must also be evaluated. Further, the contributions from St. Francois County on downwind St. Louis must be examined. The population, growth, and emission characteristics of St. Francois and Ste. Genevieve Counties are somewhat different. St. Francois County contains a micropolitan statistical area (Farmington) and has a 2007 population of 62,810. Ste. Genevieve County is much more rural in nature (population density and urbanization) and has a 2007 population of 17,841. The projected population growth for St. Francois County is 25% from 2000 to 2020 (nearly 70,000 people in 2020), while Ste. Genevieve County has no projected population growth between 2000 and 2020. The 2009 projected NO<sub>x</sub> emissions in Ste. Genevieve County are quite large, 30.2 tons per day, which account for over 7% of the total St. Louis nonattainment area inventory, and will be primarily generated from three large point sources in the county. The VOC emissions in both counties are less than 6 tons per day and are nearly 2% of the St. Louis nonattainment area inventory. Further, the NO<sub>x</sub> emissions in St. Francois County are less than 2% of the St. Louis nonattainment area inventory (5.1 tons per day). Neither county is in the St. Louis MSA, but both are adjacent to the current 8-hour nonattainment area and are upwind (south) of the area under predominant high ozone conditions. Neither county is strongly connected to the current St. Louis 8-hour nonattainment area through traffic patterns. Comments were received from multiple parties regarding the inclusion or exclusion of Ste. Genevieve County in the recommended St. Louis ozone nonattainment area.

The comments that concurred with our initial recommendation to include Ste. Genevieve County in the St. Louis area noted the large amount of NO<sub>x</sub> emissions and the upwind nature of the county to St. Louis. There were numerous comments that requested Ste. Genevieve County not be included as part of the St. Louis area. These comments contained a variety of rationale and included the following logic: (1) Ste. Genevieve is a very rural county with no strong connection to the St. Louis area, (2) the current regional governmental structure would need to change significantly if Ste. Genevieve County was part of the St. Louis area, (3) the vast majority of NO<sub>x</sub> emissions in Ste. Genevieve County are from three distinct point sources, and (4) the present controls required in the St. Louis area would produce little impact if implemented in Ste. Genevieve County. The department concurs with the comment that Ste. Genevieve County is very rural in nature and is not strongly connected to the St. Louis area. It is also important to note that this rural nature translates to a different planning approach than the St. Louis metropolitan complex as denoted by many commenters. While not explicitly required in the designation guidance, an understanding of the possible requirements under the Clean Air

Act is beneficial to this discussion. Unless EPA changes the requirements for ozone nonattainment areas dramatically, the NO<sub>x</sub> emissions from these three large point sources will require a Reasonably Available Control Technology (RACT) evaluation regardless of whether the sources are included in a Ste. Genevieve Ozone Nonattainment Area or the St. Louis Area Ozone Nonattainment Area. Further, while there can be no official finding of RACT for any one of these sources, the Holcim – Lee Island plant has installed a selective non-catalytic reduction system for NO<sub>x</sub> control. This control was found by the department, at the time of permit issuance, to be innovative control technology above the required Best Available Control Technology required in attainment areas. The inclusion of an inspection and maintenance program and Stage I/II gasoline vapor recovery for Ste. Genevieve would not provide sufficient ozone concentration impact at either the Bonne Terre monitor or downwind St. Louis monitors, but would be costly to business and citizens in the county.

The other consideration for inclusion of Ste. Genevieve County in the St. Louis nonattainment area is the source/receptor relationship between St. Louis sources and the Bonne Terre monitor. Based on comments received, the department conducted additional meteorological analyses to identify surface meteorological conditions associated with ozone exceedance days at the Bonne Terre site. This is in addition to the meteorological analysis conducted previously that evaluated synoptic and regional conditions. The previous analyses illustrated that the synoptic and regional surface flows for elevated ozone at Bonne Terre had southerly, easterly, and northerly (from St. Louis) winds. The additional analyses tried to more specifically identify the number of exceedance days primarily influenced by local Ste. Genevieve sources and sources in the St. Louis area. There were 33 days during 2004-2008 that exceeded the 2008 8-hour ozone standard at the Bonne Terre monitor. The analysis indicated ten days with ozone contributions from St. Louis (Missouri or Illinois) emission sources. Further, ten additional days were found to have specific contributions with light easterly winds (likely contribution from Ste. Genevieve NO<sub>x</sub> sources). The remaining days illustrated a pattern of high regional ozone and had a strong southerly component.

Two important items were discovered from this additional analysis: (1) St. Francois County emission sources do not have a frequent impact on the Bonne Terre monitor and (2) the same number of days from St. Louis and easterly (Ste. Genevieve) emissions were impacting exceedance concentrations at the Bonne Terre monitor. To put these exceedance day contribution numbers in context, the Foley monitor in Lincoln County had 45 exceedance days between 2005 and 2008. All the exceedance days were found to be impacted by St. Louis emissions. Given this information, the ultimate question is whether the Bonne Terre monitor is impacted more by the St. Louis area or by local (Ste. Genevieve) emission sources that contribute to violations of the standard. This question is important because the 2000 EPA designation guidance says each monitor/County in violation should be placed in the same nonattainment area as the emission sources impacting it. In the case of Ste. Genevieve County, the monitoring information shows multiple emission sources impacting the Bonne Terre monitor. The St. Louis and Ste. Genevieve source regions impact the monitor on the same number of days.

In summary, the department is recommending that Ste. Genevieve County be designated a distinct nonattainment area from St. Louis. This conclusion is based on the following: the strong desire of the Ste. Genevieve County government for independent air quality planning separate from the St. Louis area, the fact that the NO<sub>x</sub> emissions are primarily from a set of large industrial facilities and not a variety of different sources, the likelihood of consistent control outcomes from a nonattainment designation as a stand-alone area when compared to inclusion in the St. Louis area, similar impact from multiple source regions including local sources from Ste. Genevieve, the very rural nature of the county, the fact that Ste. Genevieve is not inside the current St. Louis MSA, the lack of strong commuter connection to the current St. Louis nonattainment area, and notwithstanding, the generally upwind nature of the county and the large amount of NO<sub>x</sub> emissions generated in Ste. Genevieve.

### Southeast

In Southeast Missouri, the Farrar monitor (Perry County) also violates the standard with a 2005-07 design value of 80 ppb and a 2006-08 design value of 76 ppb. Based on the meteorological analysis, this monitored violation is not due to contributions from emissions in the St. Louis or Ste. Genevieve nonattainment areas. Perry County is rural in nature and does not contain a sizable employment center for the region. The 2009 projected emissions from sources in Perry County are 4.6 tons per day of VOC and 6.4 tons per day of NO<sub>x</sub>. There is limited population (<20,000) and growth (<10% between 2000 and 2020) in Perry County and it does not have a strong connection to either Cape Girardeau or the St. Louis metropolitan complex with respect to commuter traffic. Based on this information, the department found that Perry County does not contribute to other violating monitors in the region. Based on the overall technical analysis, contributions to elevated ozone concentrations at the Farrar site are due to regional transport as well as near-field transport primarily from areas east and south of the monitor.

### Springfield/Southwest

In Southwest Missouri, the Hillcrest monitor (Greene County) and the El Dorado Springs monitor (Cedar County) violate the standard for the 2005-07 monitoring period. The design value for the Hillcrest sampler was 77 ppb and the design value for El Dorado Springs was 76 ppb during that time period. The 2006-08 design values both demonstrate attainment of the standard (73 ppb – Hillcrest and 72 ppb – El Dorado Springs). Greene County and Cedar County are not similar in virtually any manner with respect to ozone analysis. Greene County has a substantial amount of precursor emissions (23.3 tons per day VOC and 44.1 tons per day NO<sub>x</sub>), has a large population (over 250,000 in 2007), is the center of the metropolitan statistical area and economic complex in Southwest Missouri (Springfield), and is very urbanized and densely populated. Cedar County has a low amount of precursor emissions (4.6 tons per day VOC and 2.1 tons per day NO<sub>x</sub>), has a very small population (less than 15,000), is not strongly connected to any metropolitan area via commuter traffic, and has no sizable areas of urbanization or high population density. The meteorological analysis for the El Dorado Springs monitor does not implicate Springfield area emissions as a contributor to

elevated ozone formation in Cedar County. This analysis shows potential contribution from the Joplin/Tulsa areas and some contribution from extreme northwest Arkansas. Greene County emissions were found to contribute to elevated ozone concentrations at the Hillcrest monitor, but Cedar County emissions were not found to contribute to elevated ozone concentrations at El Dorado Springs. Therefore, Greene County meets both tests (monitored violation in 2005-07 and contribution to the violation) and is included in the Springfield nonattainment area (2005-07 scenario); while Cedar County meets the monitored violation test in 2005-07, but does not meet the contribution test. Therefore, the recommendation for Cedar County is designation (2005-07 scenario) as a rural transport area under Section 182(h) of the Clean Air Act.

Again, the entire Southwest Missouri region will be recommended for attainment using the 2006-08 monitoring data.

After the initial findings with respect to monitored violations, the remaining counties in each area were examined for contribution to these monitored violations. Counties inside each individual MSA, but outside the current maintenance or nonattainment areas, were evaluated due to the 2003 EPA guidance recommending the MSA as the presumptive boundary for each metropolitan area. Some counties were identified quickly as minimally contributing based on low precursor emission levels. For counties designated based on contribution to downwind areas, the EPA guidance factors represent a technique that emphasizes emissions and meteorological factors to elevated ozone formation. In general, when emissions and meteorology clearly support the inclusion of a county in the boundary, less scrutiny is given to the remaining factors. Likewise, if emissions and meteorology clearly do not support the inclusion of a county, then less scrutiny is given to the other factors. The counties that required further examination in each area for the contribution test are as follows:

Kansas City – inside the MSA (Bates, Caldwell, Johnson, Lafayette, Ray);  
outside the MSA (Buchanan, Henry)

St. Louis – inside the MSA (Warren, Washington); outside the MSA  
(Pike, St. Francois)

Southeast Missouri – Cape Girardeau, Scott

Springfield – inside the MSA (Christian, Dallas, Polk, Webster); outside  
the MSA (Taney, Stone, Jasper, Newton)

El Dorado Springs – Jasper, Newton

## Kansas City

The counties inside the Kansas City MSA that were evaluated for contribution to the Kansas City violating monitors include two counties that are predominantly “downwind” of the area: Caldwell and Ray. These two counties have less than 25,000 population, have no sizable areas of urbanization or high population density, and have less than 2% of each precursor emission total for the Kansas City maintenance area. Also, both counties have a nearly flat population growth rate. Ray County is more connected to the Kansas City core with over 5,000 commuters into the maintenance area, while Caldwell County has only 1,200 commuters (Caldwell nearly 30% of working people and Ray over 55% of working people employed in the maintenance area). Caldwell and Ray Counties were not determined to contribute to the violating monitors in the Kansas City area even though both counties are part of the MSA (presumptive boundary). Therefore, these counties were not included in the recommended Kansas City 2008 8-hour ozone nonattainment area.

Johnson and Lafayette Counties are also inside the Kansas City MSA and lie east-southeast and east of the Kansas City downtown core. The meteorological analysis is not definitive in excluding these wind directions from potential contribution to some of the violating sites in the Kansas City area. However, there is still very limited support for these counties to be included from a meteorological perspective. Lafayette County has slightly over 30,000 residents, a small amount of urbanization and higher population density along Interstate 70, flat population growth. Further, Lafayette County has precursor emission totals of 6.2 tons per day VOC and 8.4 tons per day NO<sub>x</sub> which correspond to 3.7% VOC and 3.2% NO<sub>x</sub> of the Kansas City maintenance area inventory and over 5,000 residents working in the maintenance area. Johnson County has greater than 50,000 population, a 20% population growth by 2020, and an area with higher population density along US Highway 50. The commuter data for Johnson County provides some connection between the county and the remainder of the Kansas City metropolitan area (4,530 residents working in the Kansas City maintenance area). Johnson County sources emit NO<sub>x</sub> and VOC emissions at a rate of 6 TPD for both (3.4% VOC and 2.4% NO<sub>x</sub> of the maintenance area). While there is some rationale to suggest a contribution, the department’s finding for Johnson and Lafayette Counties is that they do not contribute to downwind Kansas City ozone violations based on a review of all the relevant boundary guidance factors. This leads to their exclusion from the recommendation for the 2008 Kansas City nonattainment area.

Bates County is upwind of the Kansas City area under predominant ozone conducive conditions and is part of the Kansas City MSA. However, the emissions (2% VOC and 1.5% NO<sub>x</sub>), population (17,000), urbanization (very limited), and connection to the Kansas City metropolitan area (1,232 commuters per day) do not suggest sufficient evidence to include Bates County as a contributor to ozone violations. Therefore, Bates County will be recommended for attainment status of the 2008 ozone standard.

Buchanan County is outside the Kansas City MSA and is the center of the St. Joseph MSA. This county has a sizable amount of ozone precursor emissions (10.4 tons per day



VOC and 15.0 tons per day NO<sub>x</sub> – both nearly 6% of the maintenance area inventory), a population of over 85,000, and urbanization as part of the St. Joseph area. Further, there is a commuter connection between Buchanan County and the Kansas City area (6,100 residents work in the maintenance area). Nonetheless, the meteorological analysis does not provide evidence that Buchanan County emissions impact violating monitors in the Kansas City area. Based on the downwind nature of Buchanan County and notwithstanding its emissions, connection to Kansas City, population, and urbanization, the department has found that emissions in Buchanan County do not contribute to elevated ozone formation at the current Kansas City violating monitors. Therefore, it is excluded from the Kansas City nonattainment area recommendation. It is important to note that ozone monitoring downwind (north) of the St. Joseph area is planned for the 2009 ozone season. This will allow the department to help establish the ozone concentrations downwind of St. Joseph and determine if additional violations of the standard exist in the St. Joseph area. At the current time, there are no ozone monitors in that area.

Henry County is southeast of the downtown Kansas City area, is outside the MSA, is somewhat distant from the core metropolitan area, and does not border the existing maintenance area. This county has a sizable amount of precursor emissions (8.3 tons per day VOC and 24.1 tons per day NO<sub>x</sub> – 5% VOC and 9% NO<sub>x</sub> of the Kansas City maintenance area inventory). Henry County is rural in nature, has less than 25,000 residents, and only 1,200 residents commute to the maintenance area for work. The single largest source in Henry County is the Montrose power plant that is included in the statewide utility NO<sub>x</sub> rule and the upcoming Clean Air Interstate Rule. Further, the meteorological analysis is not conclusive for southeasterly winds being a frequent contributor to downwind Kansas City elevated ozone concentrations (southerly and southwesterly more predominant). Therefore, notwithstanding the potential upwind nature of the county and the large amount of precursor emissions, the department has found that there is not sufficient evidence to include Henry County as part of the Kansas City ozone nonattainment area.

### St. Louis

The two counties inside the St. Louis MSA, Warren and Washington, both show little evidence to suggest sufficient downwind contribution to St. Louis violating monitors for inclusion in the 8-hour ozone nonattainment area recommendation. Warren County has less than 2% of the St. Louis nonattainment inventory for both VOC and NO<sub>x</sub> (4.7 tons per day VOC and 5.1 tons per day NO<sub>x</sub>) and a population of 30,000 (but a projected population growth rate of over 60%). The commuter connection to the current nonattainment area has over 5,000 people from Warren County working in St. Louis. Further, Warren County is downwind of the St. Louis metropolitan area under predominant wind conditions. Washington County has 1% or less of the St. Louis nonattainment inventory for both VOC and NO<sub>x</sub> (2.6 tons per day VOC and 1.7 tons per day NO<sub>x</sub>) and a population of less than 25,000 (flat growth). Also, less than 2,000 people commute from Washington County to the St. Louis nonattainment area. Washington County is south-southwest of the St. Louis urban area and is an upwind

county for the St. Louis monitoring violations. However, the emissions in both of these counties are not sufficient to contribute significantly to elevated ozone concentrations in the St. Louis area. Therefore, even though these counties are part of the St. Louis MSA, the recommendation for these counties is attainment of the 2008 ozone standard.

Pike County is outside the St. Louis MSA and is somewhat distant from the downtown St. Louis area. Pike County has a very large amount of ozone precursor emissions (12.2 tons per day VOC and 37.6 tons per day NO<sub>x</sub> – VOC nearly 5% and NO<sub>x</sub> 9% of the St. Louis nonattainment area inventory), a population of under 20,000, and is a very rural county with limited urbanization and areas of high population density. One of the two large non-utility point sources in Pike County (a cement kiln) recently decided to close its current kiln operation in 2009. Further, there is no strong commuter connection between Pike County and the St. Louis area (1,200 residents work in the maintenance area). Also, the meteorological analysis does not provide evidence that Pike County emissions impact violating monitors in the St. Louis area. Based on the downwind nature of Pike County and its rural nature along with the limited population, recent large source closure, and location outside the St. Louis MSA; and notwithstanding its significant amount of ozone precursor emissions, the department has found that emissions in Pike County do not contribute to elevated ozone formation at the monitors currently violating the 2008 ozone standard in the St. Louis area. Therefore, it is being recommended for designation as attainment of the 2008 ozone standard.

St. Francois County was evaluated for potential contribution to the St. Louis area and the Ste. Genevieve area. St. Francois County sources emit a moderate level of both ozone precursors (5.5 TPD – VOC and 5.1 TPD NO<sub>x</sub>). The projected population growth rate is 25 percent between 2000 and 2020 and the overall projected 2020 population is nearly 70,000 people. Further, St. Francois County has over 6,000 residents working in the current St. Louis nonattainment area. This county is much more urbanized and connected to the St. Louis area than Ste. Genevieve County. St. Francois County is not part of the St. Louis MSA, but the Farmington micropolitan statistical area is part of the St. Louis/Farmington Combined Statistical Area (CSA). However, the department's initial finding was that St. Francois did not contribute to downwind St. Louis air quality violations based on a lack of precursor emissions.

St. Francois County was originally designated based on the Bonne Terre site monitored violation. Upon review of comments from stakeholders in St. Francois County and the Southeast Missouri Regional Planning Commission, the department re-evaluated the Bonne Terre monitor as a representative site for St. Francois County. There is no specific guidance on the use of a single monitor as being representative of multiple counties or on the representative distance of a monitor. Therefore, the department has found there is sufficient uncertainty as to whether St. Francois County meets the air quality standard to make a recommendation for designation as unclassifiable with respect to the monitoring status of the county. Also, the department utilized the same surface meteorological analysis detailed above to more thoroughly investigate the relationship between the emissions in St. Francois and ozone impacts in the area (including the Bonne Terre monitor). This analysis illustrated very little evidence of emissions from St. Francois

County impacting exceedance days at the Bonne Terre monitor. Therefore, the department has confirmed that St. Francois County emissions do not contribute to monitored violations of the standard and the county is being recommended as unclassifiable based on the uncertainty associated with the monitored concentrations at the Bonne Terre site.

### Southeast Missouri

Cape Girardeau County in Southeast Missouri is the center of the Cape Girardeau micropolitan statistical area ( $\mu$ SA). When discussing the impact on the Farrar monitor, it is important to understand the secondary nature of ozone. The distance between the contributing emission sources in this county and the receptor or monitor location is the important concept. Initially, the Farrar monitor in Perry County was sited to collect pre-construction ozone data from a major VOC source being permitted in Cape Girardeau County. The siting for the monitor was designed to provide sufficient distance from the source to the location of the maximum ozone concentration for impacts from that source (15-25 miles north). The data collected at this monitor was very close to the 1997 ozone standard and, therefore, the department placed a permanent monitoring site at Farrar in 2004 to better characterize the ozone concentrations in Southeast Missouri (specifically downwind of Cape Girardeau). The ozone impacts from sources in Cape Girardeau County and southern Illinois on this monitor are linked to the precursor emissions from these areas. The emissions in Cape Girardeau County are nearly 9 tons per day of VOC and 17 tons per day of NO<sub>x</sub>. Further, the urbanization and population density in Cape Girardeau County are substantially higher than the surrounding area. Also, Cape Girardeau County's population is nearly 75,000 people with a 16% growth rate between 2000 and 2020.

Several comments were received regarding the exclusion of Cape Girardeau County from the Southeast Missouri nonattainment area recommendation. These comments focused on the contention that the Farrar site is being influenced by high regional ozone and Cape Girardeau County emission sources do not contribute significantly to the violations at Farrar. In order to address this comment, the department conducted three sets of analyses. The first set is the same surface meteorological analyses conducted for the Bonne Terre monitor discussed previously. There were thirty-six (36) days that monitored exceedances of the 2008 ozone standard at the Farrar monitor. The results of the surface meteorological analyses were sixteen (16) days with a strong southerly/southeasterly component, twelve (12) days with a strong easterly component, three (3) days with a northwesterly component, one (1) day with extremely calm winds, and four (4) days with no distinctive pattern. This illustrates the same finding as the previous meteorological analysis conducted for the area. The previous analysis identified two primary wind directions for the Farrar monitor when ozone concentrations exceed the standard; south and east.

The second analysis included an evaluation of the Farrar and Houston (IL) monitors that are located to the south of St. Louis. All these sites can provide (on different days) an overall regional ozone concentration for the area. This evaluation was conducted using

the same dataset as the first analysis and identified days with a strong southerly or easterly component. After the wind direction evaluation, an 8-hour maximum concentration difference was calculated between the Farrar and Houston (IL) sites to provide a “local” impact for those days at the Farrar monitor. The local impact on the 16 south/southeasterly days ranged from 5 to 14 ppb with an average of 9.4 ppb. The local impact on the 12 easterly days ranged from 4 to 11 ppb with an average of 7.5 ppb. It is important to note this evaluation does not isolate Cape Girardeau County or southern Illinois counties contributions exclusively because it is wind direction specific and not emission location specific. Further, there are some sizable NO<sub>x</sub> sources to the south of Cape Girardeau in Scott and New Madrid Counties. However, the proximity of the monitors does allow for a comparison between local and regional influence. The finding here is that nearby emissions to the south and east of the Farrar monitor have a significant impact on violations.

The last set of analyses included a photochemical modeling evaluation using the 2009 St. Louis 8-hour ozone attainment demonstration. This analysis was aimed at providing a modeled concentration for the emissions from Cape Girardeau County on the surrounding grid cells. This evaluation used days with lower predicted concentrations (50-70 ppb) in southeast Missouri due to the fact that the 45-day meteorological episodes simulated were developed for St. Louis exceedance days and not southeast Missouri exceedance days. Nonetheless, the model is able to predict the impact from a particular geographic region’s man-made emissions for each day. The overall impact from Cape Girardeau County emissions ranged from near 0 ppb to 6 ppb on nearby grid cells during this simulation. It is critical to understand the magnitude of this contribution when compared to other findings of significance for ozone. During the NO<sub>x</sub> SIP call rulemakings, EPA defined significant contribution for ozone as a modeled impact of 2 ppb from an entire state on another downwind state. In the Control of NO<sub>x</sub> Emissions From Upwind Sources rule for St. Louis (10 CSR 10-6.345), the department defined a 1 ppb impact on the downwind area as the threshold for additional controls on a single source upwind of St. Louis. Therefore, a maximum impact of six ppb (on a lower concentration day) could easily be defined as significant under any of the previous regulations. Also, this impact is comparable to the local impacts from the south under the second analysis.

The conclusions of all these additional analyses further support the finding that Cape Girardeau County contains emission sources that contribute to ozone violations in Perry County. It is important to note that the department found that sources in Cape Girardeau County do not impact the Bonne Terre monitor and sources in Ste. Genevieve or St. Francois Counties do not impact the Farrar monitor.

The violations at the Perry County monitor represent a new type of ozone problem. The violations are not directly caused by emissions from metropolitan areas with larger populations as commonly found under previous ozone standards, but are the combined result of ozone and precursor transport with additional contribution from a nearby set of emissions. The department has concerns regarding the regulatory impacts on sources and the communities in these more rural areas because the Clean Air Act Amendments of 1990 did not envision non-metropolitan areas being designated nonattainment.

Therefore, the air quality planning for these new areas need to be decidedly different than the original planning contemplated under the CAAA. The department believes the area could attain the ozone standard over the next few years given the additional NOx control provided by the Clean Air Interstate Rule on electric utilities in the eastern United States and the corresponding ozone impact. In addition, the Cape Girardeau community leaders have begun an evaluation of control measures that could be undertaken by the communities in Cape Girardeau County to reduce ozone impacts in Southeast Missouri. The department fully supports the work of local communities to develop air quality controls or plans that reduce the impact of the community on air quality problems. This type of proactive approach puts the community leadership in a strong position to address air quality issues and provide “local” solutions to any and all problems. In consideration of the above issues, the department is recommending a designation of unclassifiable for Cape Girardeau County.

Scott County is located south of Cape Girardeau County and is not part of the Cape Girardeau μSA, but is part of the Combined Cape Girardeau/Sikeston statistical area. The emissions in Scott County are also sizable – 6.6 tons per day VOC and 14.2 tons per day NOx. These emission totals are slightly less than Cape Girardeau’s and the NOx emissions are influenced strongly by one source in far southern portion of the county. This source (Sikeston Power Plant) is part of the NOx SIP call for control of utility NOx emissions and is also included in the Clean Air Interstate Rule. The population density and urbanization of Scott County illustrate Sikeston as the main center for employment and population, again in the southern portion of the county. However, there is a connection between extreme northern Scott County and the Cape Girardeau metropolitan area (south Cape Girardeau County). Further, there are over 4,000 residents of Scott County that work in Cape Girardeau County with very few (100 residents) working in Perry County. The population of Scott County is over 40,000, but the growth rate between 2000 and 2020 is flat. As discussed previously for Cape Girardeau County, the meteorological analysis illustrates that Scott County is upwind of the violating monitor. Notwithstanding its upwind status and the sizable emission totals, the department has found that Scott County emissions do not contribute significantly to the “nearby” Farrar monitor’s ozone violations.

#### Springfield/Southwest Missouri

The Springfield and El Dorado Springs monitors do not violate the ozone standard using the 2006-08 monitoring data and the contribution analyses detailed here are only relevant if the monitors violate the standard in the future. These contribution data were gathered and analyzed due to the 2005-07 monitoring period that showed a violation of the standard for both areas.

The counties inside the Springfield MSA that were evaluated for contribution to the Springfield violating monitor include two counties that are predominantly “downwind” of the area: Dallas and Polk. These two counties have 16,000 (Dallas) and 30,000 (Polk) population, have no sizable areas of urbanization or high population density, and have less than 10% of each precursor emission total for the Springfield MSA (VOC – Polk 3.6

and Dallas 2.4 tons per day and NO<sub>x</sub> – Polk 3.5 and Dallas 1.8 tons per day). Also, both counties have approximately a 30% population growth rate from 2000-2020. Polk County is more connected to the Springfield core with over 3,000 commuters into Greene County, while Dallas County has only 800 commuters (Polk nearly 30% of working people and Dallas over 13% of working people employed in Greene County). Polk and Dallas Counties were determined to not contribute to the violating monitors in the Kansas City area even though both counties are part of the MSA (presumptive boundary), because they have limited emissions and are downwind of the violating monitor in Springfield. Therefore, these counties were not included in the recommended Springfield 2008 8-hour ozone nonattainment area.

Christian County is located due south of Greene County and is located in the Springfield MSA. Christian County has the largest population of any county in the MSA, not including Greene County (73,066 in 2007). It has the strongest connection to the maintenance area counties with 50% of employed residents working in Greene County (nearly 14,000 people). It is upwind of the violating monitor under conditions conducive to elevated ozone formation (winds with a southerly component). The projected 2009 emissions in Christian County are 5.6 tons per day VOC and 5.1 tons per day NO<sub>x</sub> (14.2% VOC and 8.4% NO<sub>x</sub> of the Springfield MSA total). Further, north-central Christian County contains a portion of the contiguous Springfield metropolitan area. Christian County has the largest population growth rate of any county in the state (98% from 2000-2020) and the 2020 projected population is 107,000 people. The inclusion of Christian County as a contributing county to the ozone violations in Springfield is based on the strong connection to the metropolitan area, the current population and large growth of the county in the future, the upwind location of the county, and the sizable amount of precursor emissions that contribute to downwind ozone formation.

Webster County is located east of the Springfield downtown area and is part of the Springfield MSA. The meteorological analysis suggests that there are days with wind directions from Webster County to the violating site in Springfield. However, there is still limited support for Webster County to be included from a meteorological perspective. Webster County has slightly over 35,000 residents, a very small amount of urbanization and a small area of higher population density along Interstate 44, and a 50% population growth between 2000 and 2020. Further, precursor emission totals of 4.7 tons per day VOC and 6.0 tons per day NO<sub>x</sub> correspond to 11.8% VOC and 10.0% NO<sub>x</sub> of the Springfield MSA inventory. Also, over 6,000 residents work in the Greene County. While there is some rationale to suggest a contribution, the department's finding for Webster County is that it does not contribute to downwind Springfield ozone violations based on a review of all the relevant boundary guidance factors.

Taney and Stone Counties comprise the Branson μSA and are located south of the Springfield violating monitor. Taney County contains Branson proper and has a 2007 population of 45,721. Stone County is somewhat more rural in nature (population density and urbanization) and has a 2007 population of 28,658. The projected population growth for Taney County is 49% from 2000 to 2020 (nearly 60,000 people in 2020), while Stone County has a projected population growth of 30% between 2000 and 2020

(37,000 people in 2020). The 2009 projected VOC emissions in both counties are quite large (10.8 tons per day – Stone and 15.0 tons per day - Taney), corresponding to 27% and 37% of the total Springfield MSA inventory. The NOx emissions in both counties are less than 6 tons per day and are between 6% and 8% of the Springfield MSA inventory. Further, the connection to the Springfield area from the Branson area is 8,000 commuters per day. The level of VOC emissions from both counties along with the projected growth, commuter connection to the Springfield area, and upwind nature of the counties to Springfield provides sufficient evidence that Stone and Taney Counties contribute to the downwind monitor in Springfield.

Jasper and Newton Counties comprise the Joplin MSA, are not contiguous with either the Springfield MSA or Cedar County, and were evaluated for contribution to both Springfield and El Dorado Springs. The meteorological analysis for Springfield monitored violations did illustrate a few days when contributions could be resulting from Joplin area emissions, but did not highlight the Joplin area as a frequent contributor to ozone in Springfield. However, the analyses for El Dorado Springs did identify the Joplin, Tulsa, and northwest Arkansas areas as potential contributors to ozone violations. Jasper County contains the majority of Joplin’s urbanized area and has a sizable amount of ozone precursor emissions (13.4 tons per day VOC and 13.9 tons per day NOx – 34% and VOC – 23% of the Springfield MSA inventory), a population of over 115,000 with a 30% population growth rate between 2000 and 2020, and urbanization as part of the Joplin area. There is a small commuter connection between Jasper County and the Springfield area (2,500 residents work in the Springfield MSA). Newton County has nearly half the emissions of Jasper County (6.4 tons per day VOC and 7.1 tons per day NOx), a population of 56,038 in 2007 and a growth of 18% between 2000 and 2020. There are slightly over 1,000 residents commuting to the Springfield MSA for work. The critical issue for the counties in the Joplin MSA is not amount of emissions which are sizable, but distance and connection to the counties containing violating monitors. The department found that, even though the meteorological analysis provides evidence that Jasper and Newton County emissions contribute to the El Dorado Springs violating monitor, the monitor is not “nearby” and does not believe that there is sufficient evidence to find a frequent and significant contribution. Further, the Springfield area meteorological analysis also does not provide evidence that these counties contribute to the monitored violation in Springfield.

A full discussion of the all designation criteria is provided in the Technical Support Documents for each area.

## SUMMARY

Based on the 2006-08 monitoring timeframe, the proposed 2008 8-hour ozone nonattainment boundary recommendations for Missouri contain the following counties in one of four nonattainment areas:

Kansas City:

Cass, Clay, Clinton, Jackson, Platte

|                     |   |
|---------------------|---|
| St. Louis:          | Franklin, Jefferson, Lincoln, St. Charles, St. Louis, City of St. Louis |
| Ste. Genevieve:     | Ste. Genevieve  |
| Southeast Missouri: | Perry   |

Two additional areas are included due to monitored violations during the 2005-07 monitoring period, but these areas attained the standard for 2006-08. Therefore, these areas will be recommended as attainment with the 2005-07 information provided for completeness. The counties included in these areas are:

|                    |                                 |
|--------------------|---------------------------------|
| Springfield:       | Christian, Greene, Stone, Taney |
| El Dorado Springs: | Cedar (rural transport)         |

St. Francois County is recommended for unclassifiable status due to the uncertainty regarding the ozone concentration data in St. Francois County. Cape Girardeau County is recommended for unclassifiable status due to concerns over the implementation of the 2008 standard and the corresponding requirements on smaller communities that are influenced by regional ozone transport. The remainder of the state of Missouri is being recommended for attainment/unclassifiable status with respect to the new ozone standard. This includes the only county in Missouri with a monitor that did not exceed the 2008 ozone standard in either 2005-07 or 2006-08 (Randolph County). The design value for the Mark Twain State Park monitor was 75 ppb in 2005-07 and 71 ppb in 2006-08.

This designation process has identified new ozone problem areas that do not meet the “traditional” definition of metropolitan ozone nonattainment areas. These new areas include some that contribute to ozone formation (Cass) or receive ozone impacts from the large metropolitan complexes of St. Louis (Lincoln) and Kansas City (Clinton). Another monitored area has been found to contribute to its own problems and will be designated as a separate nonattainment area (Ste. Genevieve). One other monitored area (Perry) is not impacted directly by a large metropolitan area and was found to have contribution from regional as well as multiple smaller metropolitan area emission sources. Further, there are four additional communities that will begin ozone sampling in 2009 and the results of this monitoring will help the department better understand the ozone problem in Missouri with respect to the 2008 ozone standard. These four communities are Joplin, St. Joseph, Columbia, and Jefferson City.

It is important to understand that emission controls proposed for these new potential nonattainment areas will not necessarily be identical to controls in the existing ozone areas in Missouri. Control strategy development is accomplished through the State Implementation Plan Process for each nonattainment area and will happen through a stakeholder process similar to the process used in the development of this draft



recommendation. The goal of this recommendation development process was to gather the necessary information and to provide a technically sound product for submittal to EPA Region VII.