

# Commonwealth of Kentucky

## **PM<sub>2.5</sub> Designations**

Response to August 19, 2008

Comments from EPA



Steven L. Beshear  
Governor

**Energy and Environment Cabinet  
Department for Environmental Protection**

Leonard K. Peters  
Secretary

Division for Air Quality  
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October 17, 2008

Mr. James I. Palmer, Jr.  
Regional Administrator  
U.S. EPA, Region 4  
Atlanta Federal Center  
61 Forsyth Street, S.W.  
Atlanta, Georgia 30303-8960

Dear Mr. Palmer:

On December 2007 and June 2008, Kentucky submitted to EPA recommended attainment/nonattainment designations for PM<sub>2.5</sub> in accordance with Section 107 of the Clean Air Act. Kentucky's recommendation was based on EPA's guidance criteria that was available at the time. Kentucky felt confident of the information submitted and fully anticipated EPA's concurrence with Kentucky's recommendations.

On August 19, 2008 Kentucky received EPA's modified recommendations for designations under the PM<sub>2.5</sub> standard. EPA used the 2005 NEI data while Kentucky used 2002 VISTAS ASIP modeling inventory in the original analysis. Further, a "contributing emissions scoring" process which had not previously been made available to states was utilized by EPA in making its recommendations. Information on this methodology only became available in August 2008, after recommendations were done. EPA should have introduced the scoring system well in advance to allow states to use their thorough knowledge of the monitoring network and local and regional circumstances to make their designations. This leaves the state with a difficult task in providing further information on the additional counties that EPA has recommended for nonattainment designation.

Kentucky is also greatly concerned that EPA has proposed nonattainment designations of some counties due to the presence of a coal-fired electric generating unit within their borders. This approach is being applied to all counties within a Metropolitan Statistical Area with monitored nonattainment, as well as, those counties adjacent to those areas. Since EPA has previously stated that the implementation of national programs to lower the sulfur content in gasoline and diesel will bring most areas into attainment with the fine particulate standard and preclude the need for local control strategies, it seems unnecessary to impose additional planning and reporting burdens on such counties. In fact many of these counties are rural in nature and

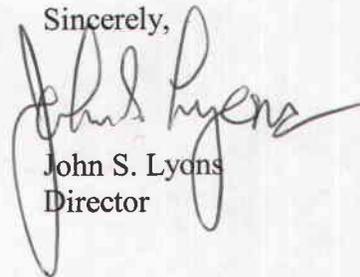
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free of any major industry beyond the single coal-fired electric generating unit. Such an approach will unnecessarily and arbitrarily impose the stigma of non-attainment and subject the area to requirements that could have serious adverse economic impacts.

In keeping with the spirit of the 120-day consultation period provided by the Clean Air Act, Kentucky submits herewith additional information to support its original recommendation along with the response to EPA's comments for consideration of data under the Exceptional Events rule for the Louisville and Paducah areas. Kentucky will comply with the Clean Air Act and cooperate with U.S. EPA in improvement of air quality for the citizens of the Commonwealth. However, Kentucky remains concerned about the potential impact of nonattainment designations since implementation requirements for nonattainment areas have not yet been determined.

If you have any questions regarding this matter, please contact Mr. John Gowins of my staff at (502) 564-3999.

Sincerely,

A handwritten signature in black ink, appearing to read "John S. Lyons". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

John S. Lyons  
Director

JSL/lme

cc: Dick Schutt

## General Comments

On August 19, 2008, U.S. EPA responded to Kentucky on recommendations made in December 2007 and June 2008 for designations of areas under the 2006 24-hour PM<sub>2.5</sub> standards. In that response, EPA states that: "In accordance with the Clean Air Act, I write to inform you that the U.S. Environmental Protection Agency (EPA) intends to modify Kentucky's recommended designations and boundaries." Although U.S. EPA had previously issued specific guidance on information and documentation that was expected in states' first round submittals, EPA did not use information provided by states in developing its August 19 response. In fact, EPA used very different information and methodologies in developing those proposals.

### Contributing Emissions Score

The Commonwealth was surprised to learn that EPA had employed the use of a "contributing emissions scoring" process to evaluate counties for emissions contributions to an area attainment problem. At no time during states' development of recommendations did U.S. EPA offer information concerning this methodology. Further, EPA did not afford the states the opportunity to provide input on the appropriateness of or the science behind this methodology. Information on this methodology only became available in August 2008, after recommendations were done. This approach was revealed in EPA's comments on Kentucky's recommended PM 2.5 Boundary Designation December and June submittals. Taking this approach, especially at such a late date, is not only contrary to boundary guidance provided to states by U.S. EPA, but insults the established designation process which allows states to use their thorough knowledge of the monitoring network and local and regional circumstances to make those designations. A brief description and a link to the Contributing Emissions Score (CES) Technical Documentation, which consist of over 1,000 pages of information was provided in EPA's comments.

EPA should provide all documentation and a step-by-step process report that shows the calculations of the Contributing Emissions Score (CES) for each county in Kentucky that EPA proposes to be nonattainment. The development of the CES appears to involve a large number of assumptions, data, and calculations, and it is not practicable to expect Kentucky to be able to verify the accuracy of each step without the supporting documentation and processes. Due to the number of errors contained in the August 19, 2008 letter, Kentucky feels that it is imperative to review the process of developing the CES for the areas proposed for nonattainment by EPA.

Given the facts presented above, the Commonwealth must go on record as being strongly opposed to the use of this process.

- U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one

population of statistical data, and then continue comparisons with a different population of statistical data.

- U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis. For population growth, EPA used 2000-2005, but for growth in vehicle miles traveled (VMT) the years 1996-2005 were used. It seems inconsistent to make comparisons with data from one set of years, and then continue comparisons with a different interval of years.
- With the VMT data, a review and improvement of the commuting table data, ideally to also include locally derived current data, would give a more accurate picture. For instance, Louisville's VMT from local current calculations are approximately 4%-20% different from the data in the Traffic and Commuting Patterns table in EPA's response letter. In addition, columns to the right of '2005 VMT' would likely be significantly different using local data as opposed to 2000 census data. Census data versus locally derived data would likely also significantly affect the VMT growth rates in the section titled growth rates and patterns.

## **Additional Regional/National Controls**

EPA has finalized or is in the process of finalizing several new control initiatives that are designed to lower emissions that contribute to PM 2.5 levels. The implementation dates for many of these initiatives will begin within the next two years and in many instances, will be in place well before control plan submittal deadlines or attainment dates. This fact should lead to the conclusion that greater caution should be exercised before saddling an area with a nonattainment designation when no local control strategies will be available or required.

In the August 19, 2008 response to Kentucky, EPA has proposed nonattainment designations for several counties, either within the MSA or adjacent to an MSA, due to the location of a power plant within their borders.

Although at this point in time it is uncertain what reductions can be attributed to CAIR or its' replacement, it is certain that some manner of control similar to CAIR will be implemented. This will further reduce these emissions since the SCR should be operated year-round instead of only during the ozone season. Kentucky's NOx SIP Call regulations remain in effect and, if CAIR continues to be in limbo, it will cover the 2009 allocation timeframe. In addition, Non-EGUs in Kentucky will also be required to put on BART controls, which will further achieve PM air quality improvements.

To designate counties nonattainment because they have a power plant in them would place additional hardships on the county and would be counterproductive since the EGUs in the entire region will be mandated by EPA's CAIR rule to significantly control their PM precursor emissions without being designated nonattainment.

## Mobile Controls

In many areas, EPA based potential nonattainment designations on the supposition that population, commuter traffic, or VMT played an important role in determining potential impacts on PM<sub>2.5</sub> levels within an MSA. It is not feasible to designate a county as nonattainment if the only reason an area has been included was due to these population-based factors. With national controls being implemented that would address this contribution, including these counties as nonattainment would place additional, burdensome planning requirements on these local areas for no useful purpose. Due to the Tier 2 Vehicle and Low Sulfur Gasoline program, which became effective beginning in 2006, average national gasoline sulfur levels dropped 90%. The new Low Sulfur Diesel Rule, which began to be phased in beginning in 2007, along with new clean engines operating requirements will reduce NOx emissions by 50%, and reduce PM emissions by more than 90%. The implementation of these new federal rules will significantly decrease the fine particulate contribution in and from areas impacted by population and transportation factors.

## Issues with the August 19, 2008 Response Letter

There were many contradictions or inaccuracies noted throughout the August 19<sup>th</sup> letter from EPA

- On page 3 of EPA's response letter it was mentioned that the average chemical composition of the highest days in the Cincinnati-Middleton area is 82 percent sulfate. A few pages later EPA contradicts themselves by saying that NOx was considered the main precursor pollutant in Boone, Campbell, and Kenton Counties and should be considered for nonattainment based on this factor.
- On page 4, Kentucky is not able to understand how counties who receive low Contributing Emissions Scores such as Boone (6), Kenton (3) and Campbell (2) are being considered for nonattainment status while Counties that have a CES higher or equal to the mentioned Counties (Jefferson, IN (7); Adams, OH (6)) are not being considered for nonattainment status. Also, on page 17, Muhlenberg received a CES of 100. EPA's proposal finds that only two of its nine delineated factors weigh in favor of designating Muhlenberg County as contributing to violations of the standard in Clarksville, Tennessee. It is not clear why Muhlenberg was given such a high score when it did not infringe 7 of the 9 factors.
- On page 7, the '2005 VMT' data should be labeled 'millions' (annual) miles not 1000's. This error occurs throughout the letter in the Traffic and Commuting Patterns Table.
- On page 11, the response for the Geography/topography factor was inconsistent throughout the entire response. EPA determined in each area that there were "no geographical or topographical barriers significantly limiting air-pollution transport within its air shed." However, despite the common factor, the answer alternated between each factor as to whether or not the absence of

topographical and geographical barriers “contributed to violations in the area” or “did not play a significant role in the decision-making process.” The lack of a geographical/topographical barrier should either benefit an area or cause a problem.

- On page 17, Table 1, the data listed for “PM<sub>2.5</sub> emissions carbon” and “PM<sub>2.5</sub> emissions other” is erroneous when compared to the 2005 NEI data.
- Page 27, Kentucky noticed that no information or data was given for Mason County, West Virginia even though the EPA letter addressed to West Virginia listed Mason County as being considered for nonattainment status.
- Page 32, NOx SIP Call was spelled Knox SIP Call.
- Page 39, Table 4, VMT numbers are incorrect.
- Page 50, In Table 1, the data listed for PM<sub>2.5</sub> emissions total is erroneous when compared to the 2005 NEI data.

## Conclusions

- EPA should refine its approach of using the contributing emissions score. Kentucky believes that EPA’s use of the contributing emissions scoring approach was skewed. The use of the CES was revealed in EPA’s comments on Kentucky’s recommended PM 2.5 Boundary Designation December and June submittals. EPA should have introduced the scoring system well in advance to allow states to use their thorough knowledge of the monitoring network and local and regional circumstances to make their designations.
- New fuel and engine requirements to assist in lowering PM concentrations in our urban areas are being implemented along with the NOx SIP Call regulations which will remain in effect to cover the 2009 allocation timeframe until CAIR is negated or replaced.
- As other national studies have shown, urban PM levels can definitely be driven by localized activities. EPA needs to be cognizant of information submitted by states where there appear to be definite “pockets” of nonattainment and an urban core impact area. This can most readily be seen where there are monitors attaining the standard located within a short distance of a monitor in violation.

## BOONE COUNTY, KENTUCKY

Boone County is part of the Cincinnati-Hamilton, OH-KY-IN Metropolitan Statistical Area (MSA) and is located to the west of Kenton County, Kentucky, to the north of Grant County, Kentucky, to the northeast of Gallatin County, Kentucky, and to the southwest of Cincinnati, Ohio.

EPA's August 19, 2008 proposal on appropriate designations for Kentucky included Boone County as nonattainment based on the following criteria:

- EPA indicates that Boone County has significant emissions and a large power plant in the County.
- EPA indicates that Boone County had a population growth between 2000 and 2005 as well as a sizable increase in VMT from 1996 to 2005.

### Emissions Data

In Kentucky's December recommendations, the 2002 VISTAS ASIP modeling inventory was used for the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website. Using the data from NEI, the following information was developed.

Hamilton and Clermont Counties in Ohio and Dearborn County in Indiana contribute 92% of all SO<sub>x</sub> within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Boone County emits only 2% of SO<sub>x</sub> emissions from the counties recommended by EPA as having the potential to impact the violating monitors. A similar comparison can be made with both NO<sub>x</sub> and PM. Boone County's NO<sub>x</sub> and PM emissions rank at 8% of the total EPA recommended areas. In a detailed review of EPA's recommended areas to be designated nonattainment, Boone County ranks consistently at less than or equal to 4% of combined emissions contributions within EPA's proposed nonattainment boundaries. See Figures 1-4 below.

Figure 1

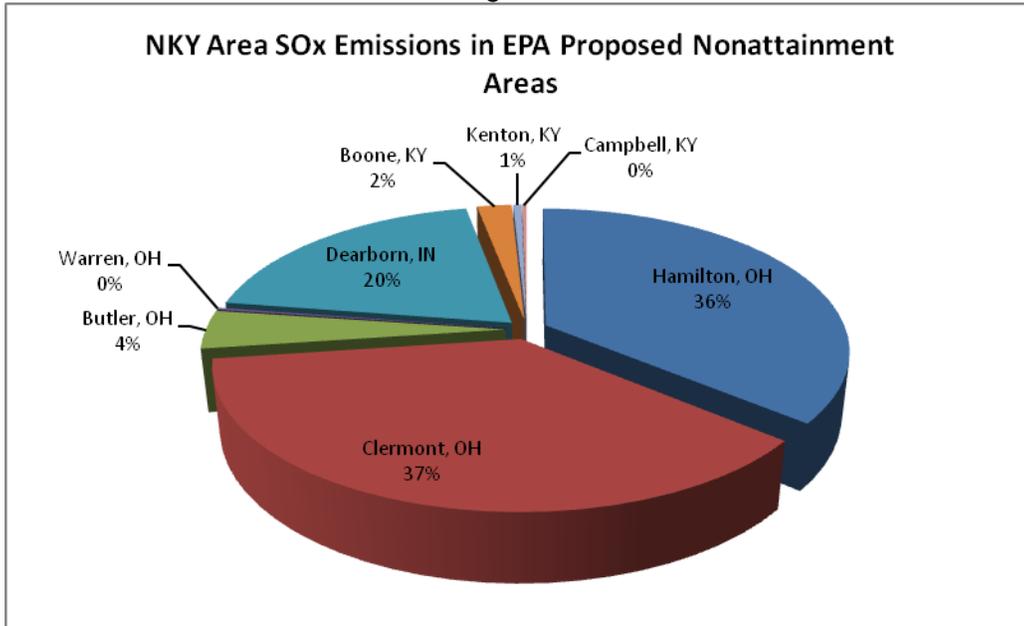


Figure 2

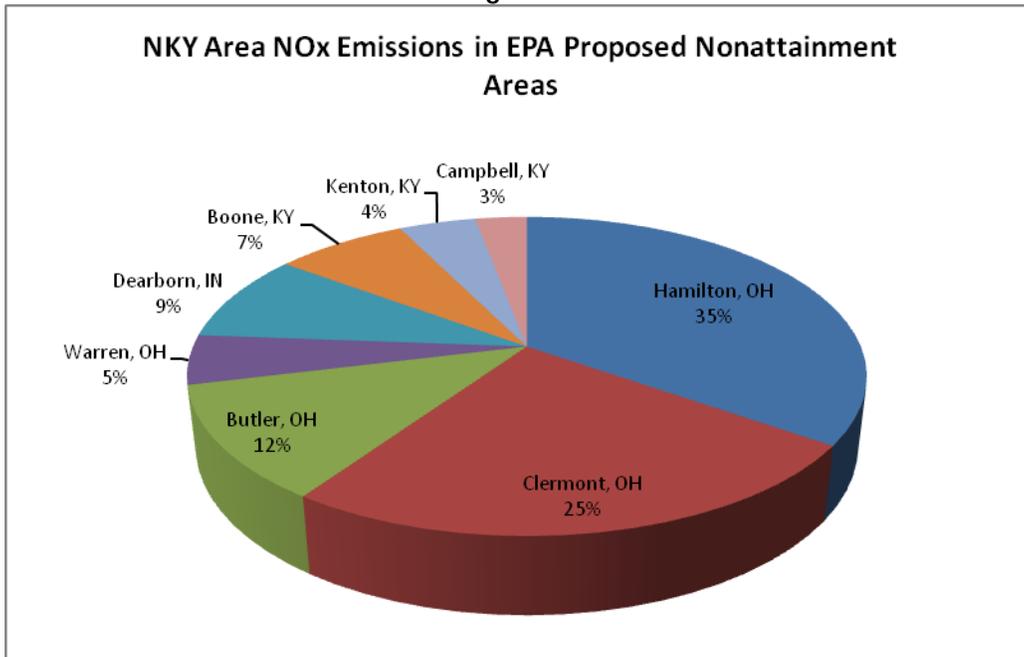


Figure 3

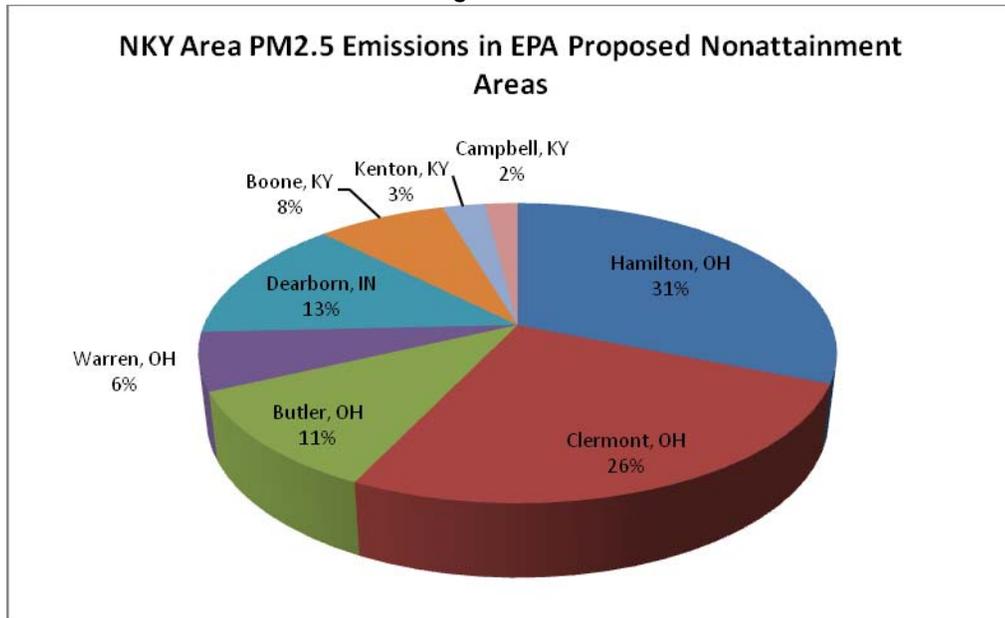
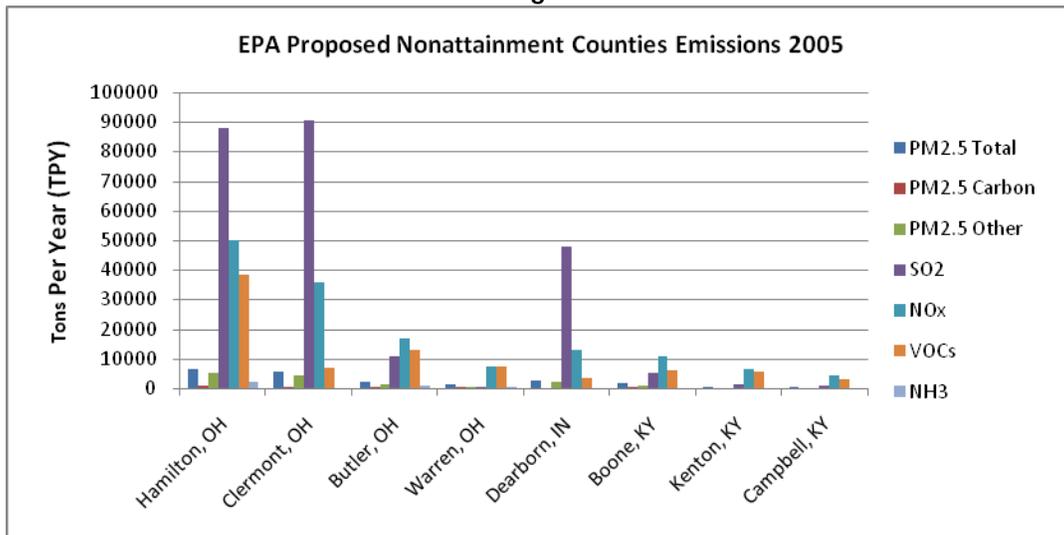


Figure 4



EPA states in their August 19<sup>th</sup> response that the average chemical composition of the highest days in the Cincinnati-Middleton area is 82 percent sulfate. EPA then says that NOx was considered the main precursor pollutant in Boone, Campbell, and Kenton Counties and should be considered for nonattainment based on this factor. Since the chemical composition on the highest days is 82% sulfate, it seems unlikely that the 2% contribution of SO<sub>2</sub> and the 8% contribution of NOx from Boone County would contribute to the area's nonattainment designation, especially when considering the percentage contribution from the other counties (figures 1-4 above).

## Controls and Emission Reductions in Boone County, Kentucky

Duke Energy East Bend Station Unit 2, which is located in Boone County, Kentucky, is an electric power generating station consisting of one pulverized coal-fired, dry bottom, wall-fired boiler. The boiler (Unit 02) has an input capacity of 6313 mmBtu/hr. Unit 2 is equipped with an electrostatic precipitator (ESP), flue gas desulfurization (FGD) unit, low nitrogen oxide burners and a Selective Catalytic Reduction (SCR) unit. As can be seen in the table below, these controls provide for significant reductions in precursor PM 2.5 pollutants. Although at this point in time it is uncertain what reductions can be attributed to CAIR or its' replacement, it is certain that some manner of control similar to CAIR will be implemented. This will further reduce these emissions since the SCR should be operated year-round instead of only during the ozone season.

<b>Duke Energy East Bend Station Level of Emission Control</b>				
<b>Pollutant</b>	<b>Unit 2 2007 Actual Controlled Emissions (tpy)</b>	<b>Unit 2 2007 Actual Uncontrolled Emissions (tpy)</b>	<b>Total Plant 2007 Actual Controlled Emissions (tpy)</b>	<b>Total Plant 2007 Actual Uncontrolled Emissions (tpy)</b>
NO <sub>2</sub>	5,563	18,266	5,563	18,266
PM <sub>10</sub>	239	59,679	343	60,468
Total PM	357	89,073	649	90,859
SO <sub>2</sub>	2,452	76,496	2,452	76,496

Kentucky's NO<sub>x</sub> SIP Call regulations remain in effect and if CAIR continues to be in limbo will cover the 2009 allocation timeframe.

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## MONITORING DATA & TRENDS

As can be seen in Figure 5 below, the speciation data from Kentucky's Covington speciation monitor indicates that sulfate and organic carbon are the major components of the PM<sub>2.5</sub> values. As can be seen in Figure 1 above and Figure 6 below, Boone County, Kentucky, contributes only 2% of the SO<sub>2</sub> in the area, and only 14% of the organic carbon within EPA's proposed nonattainment counties.

Figure 5

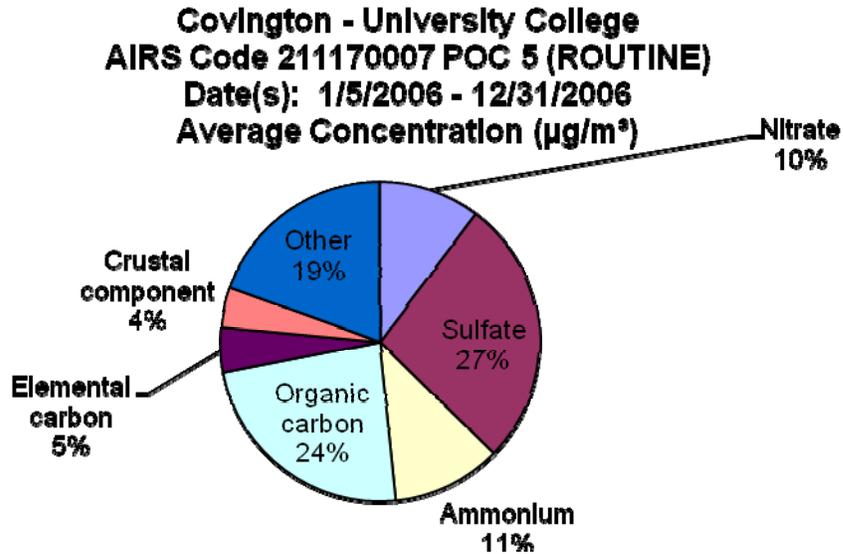
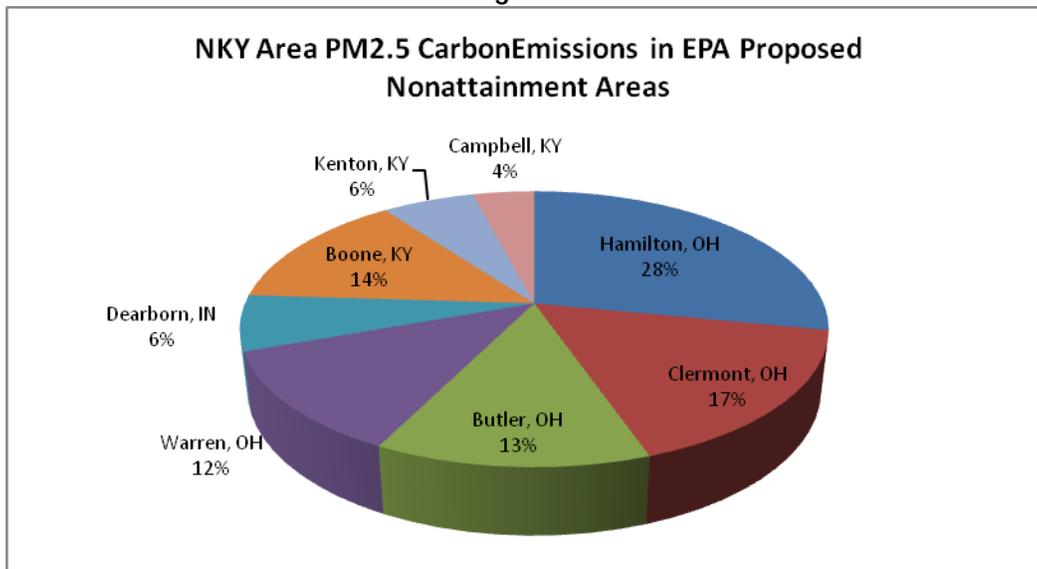


Figure 6



## Traffic and Commuting Patterns

EPA's position on traffic and commuting patterns in the August 19<sup>th</sup> letter noted that Boone County has potentially significant numbers of commuters impacting Hamilton County.

Hamilton and Butler Counties in Ohio contribute to 58.5% of the Vehicle Miles Travelled within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Boone County contributed only 5.6% of the total VMT's in the counties recommended by EPA as having the potential to impact the violating monitors. Due to the small contribution from Boone County, this factor should also not be used in determining nonattainment status for this county.

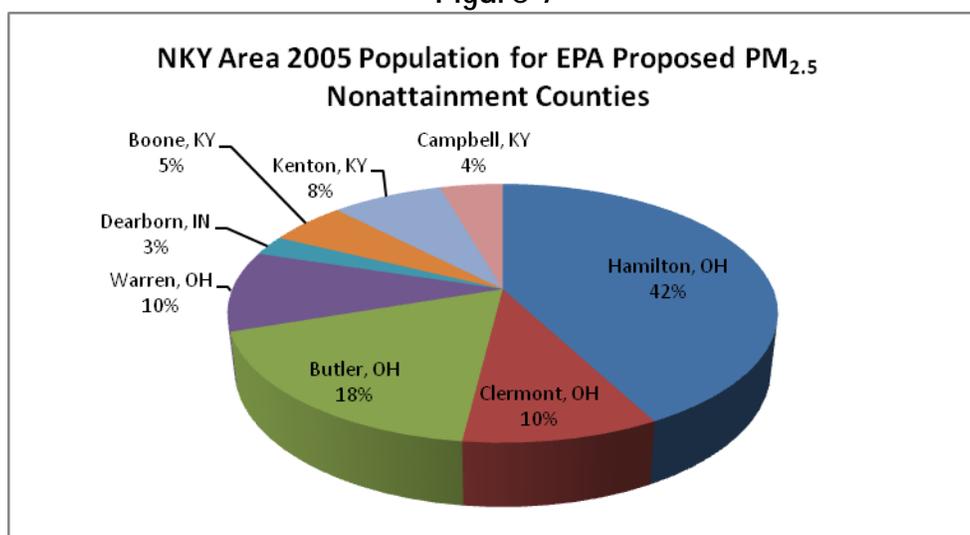
Further, regarding the VMTs that EPA has utilized in their analysis, Kentucky has been unable to document the basis for the development of this data. EPA has provided the spreadsheet containing the VMT numbers used in the analysis, but to date has been unable to provide Kentucky with the supporting documentation in the development of these numbers. Since the numbers used in Kentucky's previous recommendation submittals were developed by area agencies responsible for transportation conformity, we must insist that the numbers in our previous submittals are more reflective of the transportation sector in these areas.

Therefore, Kentucky believes that Boone County does not have the commuter or VMT potential to contribute to PM<sub>2.5</sub> violations in the area.

## Population Density and Growth

EPA states that Boone County had relatively high population growth that had the potential to impact PM<sub>2.5</sub> violations in the area. Boone County makes up only 5% of the population within EPA's proposed nonattainment boundaries, see Figure 7 below.

Figure 7



Therefore, Kentucky believes that the population in Boone County should not be used as a determining factor for potential contributions to PM<sub>2.5</sub> violations in Southwestern Ohio.

## Conclusions

Based on the factors discussed above, Kentucky believes that Boone County should be designated attainment for the PM<sub>2.5</sub> standard.

- Kentucky believes that EPA's use of the contributing emissions scoring approach was skewed. A review of actual percentages of emissions contributions to an area shows that Boone County does not have the potential to contribute to PM<sub>2.5</sub> levels within the region.
- Contributions from commuters and vehicle miles traveled in Boone County have been shown to have no potential to impact PM<sub>2.5</sub> levels within the region when compared to the levels from other counties and therefore should not be used to determine nonattainment status for this county.
- The population of Boone County is not significant enough to have the potential to impact PM<sub>2.5</sub> levels in the region. Boone County's population actually represents only 5% of EPA's proposed nonattainment boundaries.
- Additional emission reductions on a national and regional level will provide substantial benefits in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

- Given the existing level of control on the Duke Energy East Bend Station (Unit 2) as reflected in the table above, including Boone County as nonattainment in order to gain additional controls would serve no purpose.

Based on the above conclusions, Boone County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies with little or no benefit to the area.

Substantial local emission reductions from Boone County have already occurred, or will have occurred well before attainment dates for this standard. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacements, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, and the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the result should be that Boone County, Kentucky, be designated attainment for the PM<sub>2.5</sub> Standard.

## Campbell County, Kentucky

Campbell County is part of the Cincinnati-Hamilton, OH-KY-IN Metropolitan Statistical Area (MSA) and is located to the east of Kenton County, Kentucky, to the north of Pendleton County, Kentucky, and to the southeast of Cincinnati, Ohio.

EPA's August 19, 2008 proposal on appropriate designations for Kentucky included Campbell County as nonattainment based on the following criteria:

- EPA indicates that Kenton County has significant emissions.
- EPA states that Campbell County has relatively high traffic and commuting patterns that are significant enough to contribute to PM<sub>2.5</sub> violations in the MSA.

### Emissions Data

In Kentucky's December recommendations, 2002 VISTAS ASIP modeling inventory was used in the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website. Using the data from NEI, the following information was developed.

Hamilton and Clermont Counties in Ohio and Dearborn County in Indiana contribute 92% of all SO<sub>x</sub> within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Campbell County emits 0% of SO<sub>x</sub> emissions from the counties recommended by EPA as having the potential to impact the violating monitors. A similar comparison can be made with both NO<sub>x</sub> and PM. Campbell County's NO<sub>x</sub> and PM emissions rank at 3% and 2% of the total EPA recommended areas, respectively. In a detailed review of EPA's recommended areas to be designated nonattainment, Campbell County ranks consistently at less than or equal to 1% of combined emissions contributions within EPA's proposed nonattainment boundaries. See Figures 1-4 below.

Figure 1

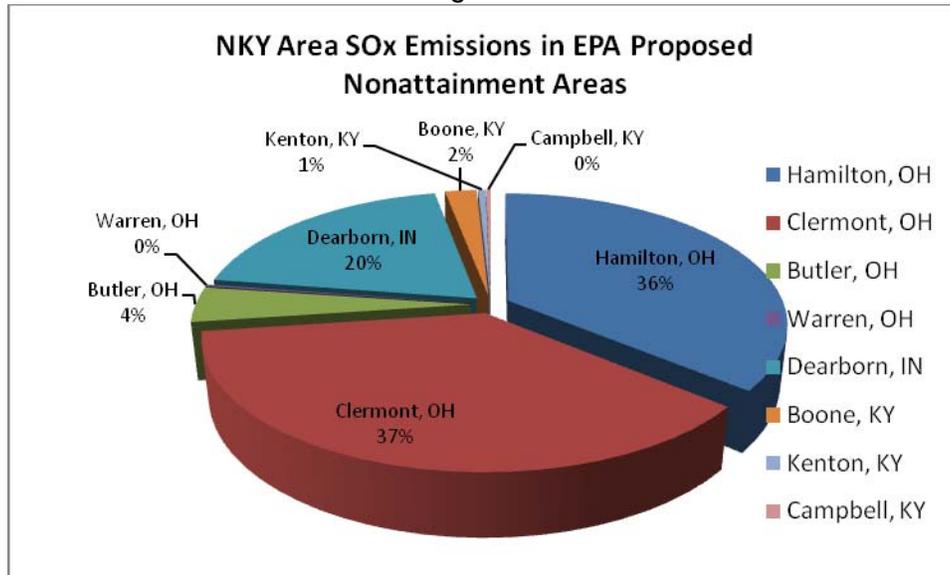


Figure 2

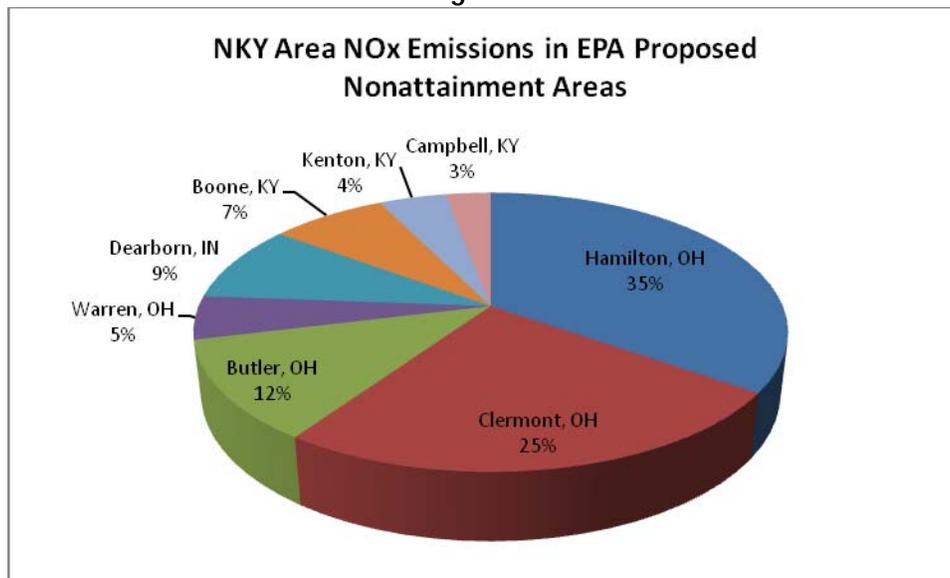


Figure 3

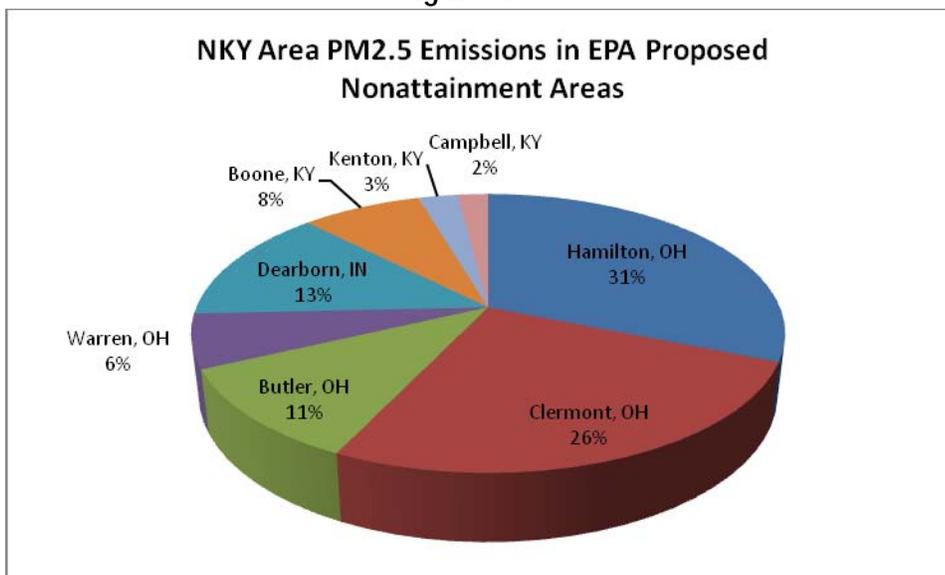
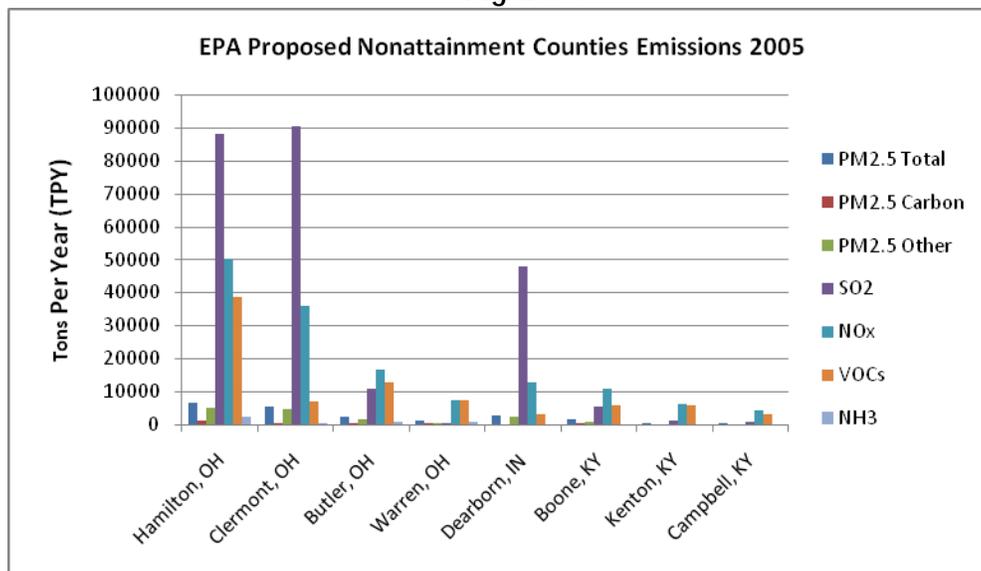


Figure 4



EPA states in their August 19<sup>th</sup> response that the average chemical composition of the highest days in the Cincinnati-Middleton area is 82 percent sulfate. EPA then says that NOx was considered the main precursor pollutant in Boone, Campbell, and Kenton Counties and should be considered for nonattainment based on this factor. Since the chemical composition on the highest days is 82% sulfate, it seems unlikely that the 0% contribution of SO<sub>2</sub> and the 3% contribution of NOx from Campbell County would contribute to the area's nonattainment designation, especially when considering the percentage contribution from the other counties (figures 1-4 above).

## **Additional Regional/National Controls**

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## **Traffic and Commuting Patterns**

EPA's position on traffic and commuting patterns in the August 19<sup>th</sup> letter noted that Campbell County has potentially significant numbers of commuters impacting Hamilton County.

Although EPA stated that commuting patterns may play a role in PM<sub>2.5</sub> levels throughout the region, they also state that Hamilton and Butler Counties had the highest number of commuters traveling to both violating counties and the statistical area.

Additionally, when reviewing VMT data, it should be noted that in 2005 Campbell County contributed only 5.2% of the total VMT's in the counties recommended by EPA as having the potential to impact the violating monitors. This factor should also not be used in determining a nonattainment designation for Campbell County.

Further, regarding the VMTs that EPA has utilized in their analysis, Kentucky has been unable to document the basis for the development of this data. EPA has provided the spreadsheet containing the VMT numbers used in the analysis, but to date has been unable to provide Kentucky with the supporting documentation in the development of these numbers. Since the numbers used in Kentucky's previous recommendation submittals were developed by area agencies responsible for transportation conformity, we must insist that the numbers in our previous submittals are more reflective of the transportation sector in these areas.

Therefore, Kentucky believes that Campbell County does not have the commuter or VMT potential to contribute to PM<sub>2.5</sub> violations in the area.

## **Conclusions**

Based on the factors discussed above, Kentucky believes that Campbell County should be designated attainment for the PM<sub>2.5</sub> standard.

- Kentucky believes that EPA's use of the contributing emissions scoring approach was skewed. A review of actual percentages of emissions contributions to an area shows that Campbell County does not have the potential to contribute to PM<sub>2.5</sub> levels within the region.
- Contributions from commuters and vehicle miles traveled in Campbell County have been shown to have no potential to impact PM<sub>2.5</sub> levels within the region when compared to the levels from other counties and therefore should not be used to determine nonattainment status.
- Additional emission reductions on a national and regional level will provide substantial additional emission reductions in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

Based on the above conclusions, Campbell County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the downward trend in monitored values, and the result should be that Campbell County, Kentucky, should be designated attainment for the PM<sub>2.5</sub> Standard.

## Kenton County, Kentucky

Kenton County is part of the Cincinnati-Hamilton, OH-KY-IN Metropolitan Statistical Area (MSA) and is located to the west of Campbell County, Kentucky, to the east of Boone County, Kentucky, and to the south of Cincinnati, Ohio.

EPA's August 19, 2008 proposal on appropriate designations for Kentucky included Kenton County as nonattainment based on the following criteria:

- EPA indicates that Kenton County has significant emissions.
- EPA indicates that Kenton County has monitoring data very close to the PM<sub>2.5</sub> standard, and that this indicates a potential to contribute to the PM<sub>2.5</sub> violations in the area;
- EPA states that Kenton County has relatively high traffic and commuting patterns that are significant enough to contribute to PM<sub>2.5</sub> violations in the MSA.
- EPA indicates that Kenton County has a population density that is significant enough to contribute to PM<sub>2.5</sub> violations in the MSA.

### Emissions Data

In Kentucky's December recommendations, the 2002 VISTAS ASIP modeling inventory was used for the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website. Using the data from NEI, the following information was developed.

Hamilton and Clermont Counties in Ohio and Dearborn County in Indiana contribute 92% of all SO<sub>x</sub> within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Kenton County emits only 1% of SO<sub>x</sub> emissions from the counties recommended by EPA as having the potential to impact the violating monitors. A similar comparison can be made with both NO<sub>x</sub> and PM. Kenton County's NO<sub>x</sub> and PM emissions rank at 4% and 3% of the total EPA recommended areas, respectively. In a detailed review of EPA's recommended areas to be designated nonattainment, Kenton

County ranks consistently at less than or equal to 2% of combined emissions contributions within EPA's proposed nonattainment boundaries. See Figures 1-4 below.

Figure 1

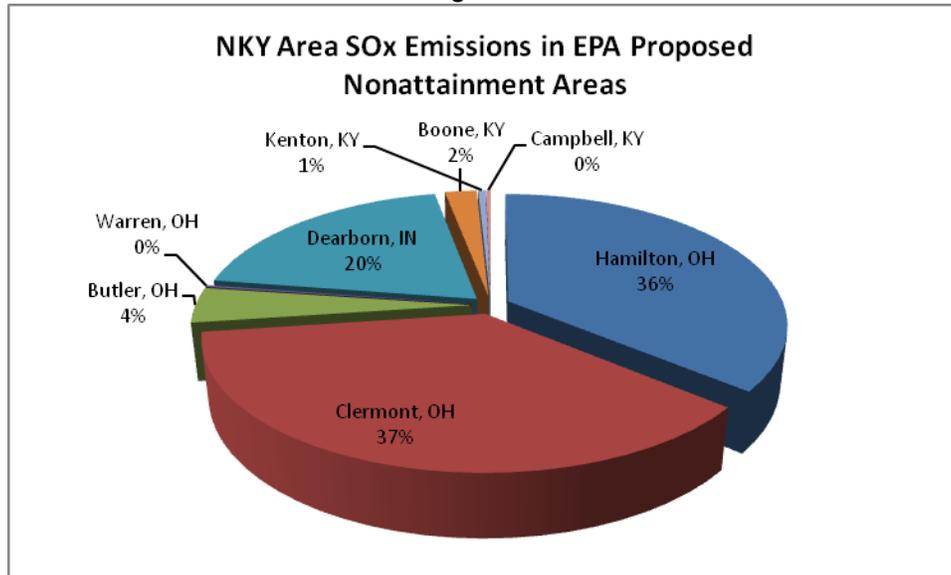


Figure 2

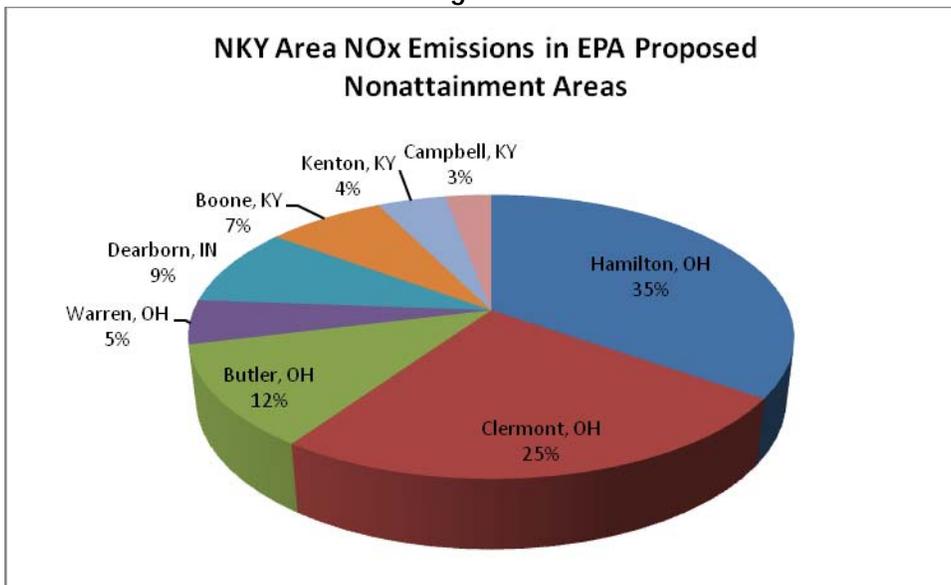


Figure 3

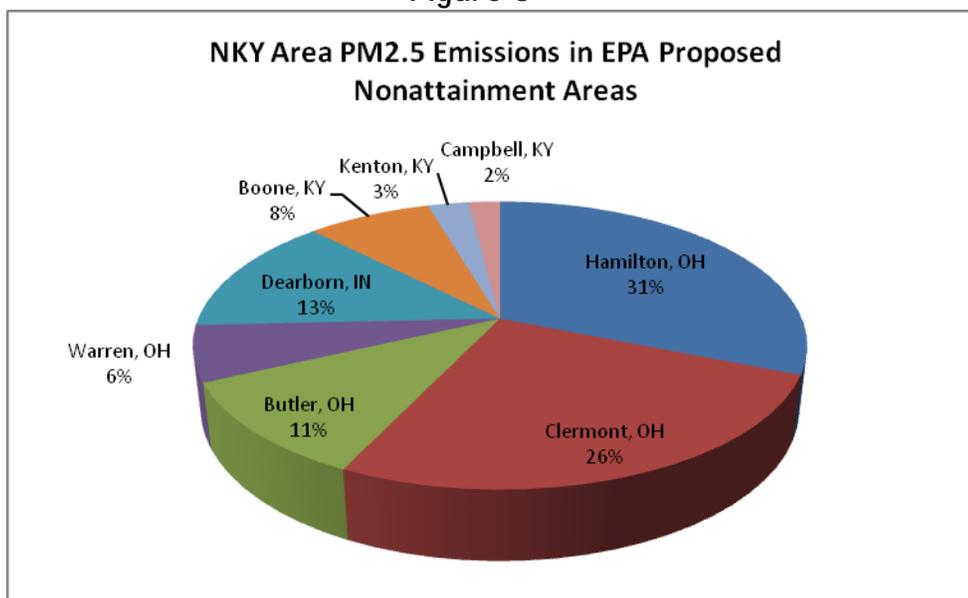
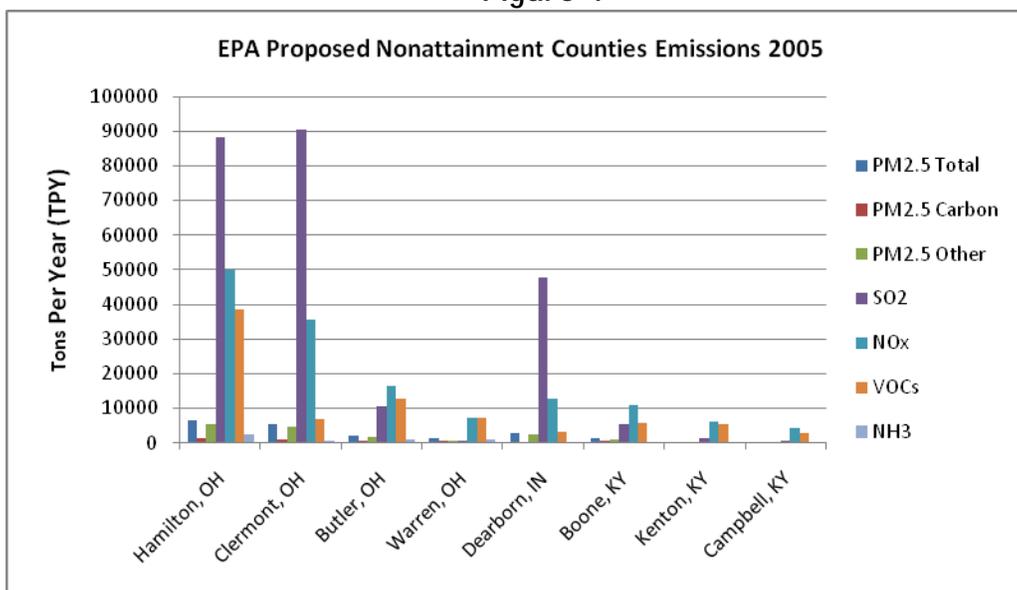


Figure 4



EPA states in their August 19<sup>th</sup> response that the average chemical composition of the highest days in the Cincinnati-Middleton area is 82 percent sulfate. EPA then says that NOx was considered the main precursor pollutant in Boone, Campbell, and Kenton Counties and should be considered for nonattainment based on this factor. Since the chemical composition on the highest days is 82% sulfate, it seems unlikely that the 2% contribution of SO<sub>2</sub> and the 8% contribution of NOx from Kenton County would contribute to the area's nonattainment designation, especially when considering the percentage contribution from the other counties (figures 1-4 above).

## **Additional Regional/National Controls**

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## **Traffic and Commuting Patterns**

EPA's position on traffic and commuting patterns in the August 19<sup>th</sup> letter noted that Kenton County has potentially significant numbers of commuters impacting Hamilton County.

Hamilton and Butler Counties in Ohio contribute 58.5% of the Vehicle Miles Travelled within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Kenton County contributed only 8.6% of the total VMT's in the counties recommended by EPA as having the potential to impact the violating monitors. Due to the small contribution from Kenton County, this factor should also not be used in determining a nonattainment designation for this county.

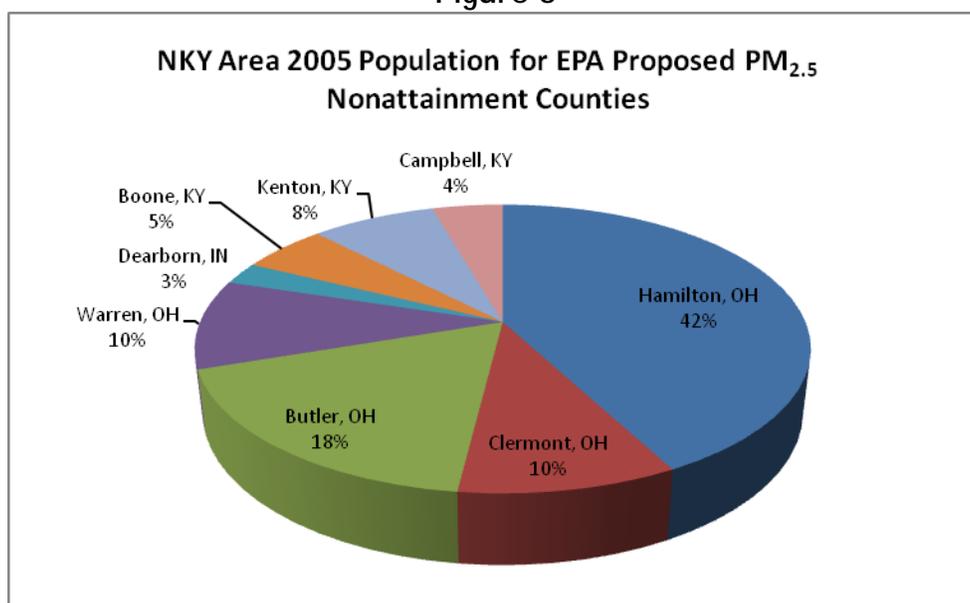
Further, regarding the VMTs that EPA has utilized in their analysis, Kentucky has been unable to document the basis for the development of this data. EPA has provided the spreadsheet containing the VMT numbers used in the analysis, but to date has been unable to provide Kentucky with the supporting documentation in the development of these numbers. Since the numbers used in Kentucky's previous recommendation submittals were developed by area agencies responsible for transportation conformity, we must insist that the numbers in our previous submittals are more reflective of the transportation sector in these areas.

Therefore, Kentucky believes that Kenton County does not have the commuter or VMT potential to contribute to PM<sub>2.5</sub> violations in the area.

## **Population Density and Growth**

EPA stated that Kenton County had relatively high population growth that had the potential to impact PM<sub>2.5</sub> violations in the area. Kenton County makes up only 8% of the population within EPA's proposed nonattainment boundaries, see Figure 5 below.

Figure 5



Comparing the population density of Hamilton County, Ohio and Kenton County, Kentucky, does not provide a useful criteria since the size of Kenton County is 60% smaller than Hamilton County, and the population of Kenton County is 81% less than Hamilton County. A more representative criteria is the percentage of the Kentucky counties' population to the counties listed in EPA's letter as a whole which is 17%, or just Kenton County, which is only 8% of the population of the counties listed by EPA.

Therefore, Kentucky believes that the population in Kenton County should not be used as a determining factor for potential contributions to PM<sub>2.5</sub> violations in Southwestern Ohio.

## Conclusions

Based on the factors discussed above, Kentucky believes that Kenton County should be designated attainment for the PM<sub>2.5</sub> standard.

- Kentucky believes that EPA's use of the contributing emissions scoring approach was skewed. A review of actual percentages of emissions contributions to an area shows that Kenton County does not have the potential to contribute to PM<sub>2.5</sub> levels within the region.
- Contributions from commuters and vehicle miles traveled in Kenton County have been shown to have no potential to impact PM<sub>2.5</sub> levels within the region when compared to the levels from other counties and therefore should not be used to determine nonattainment status for this county.

- The population of Kenton County is not significant enough to have the potential to impact PM<sub>2.5</sub> levels in the region. Kenton County's population actually represents only 8% of EPA's proposed nonattainment boundaries.
- Additional emission reductions on a national and regional level will provide substantial additional emission reductions in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Low Sulfur programs, and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

Based on the above conclusions, Kenton County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the downward trend in monitored values, and the result should be that Kenton County, Kentucky, should be designated attainment for the PM<sub>2.5</sub> Standard.

## MUHLENBERG COUNTY, KENTUCKY

Muhlenberg County is located in the Western Coal Field region of the state. The Green River forms much of the eastern border of the county while the Pond River forms the entire western border. Lake Malone State Park is located in the south central part of Muhlenberg County.

EPA's August 19, 2008 proposal on appropriate designations for Kentucky included Muhlenberg County as nonattainment based on the following criteria:

- EPA indicates that Muhlenberg County has significant emissions and two large power plants in the County;

### Emissions Data

In Kentucky's December recommendations, the 2002 VISTAS ASIP modeling inventory was used for the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website. Using the data from NEI, the following information was developed.

In Table 1 of the Muhlenberg area in EPA's August 19<sup>th</sup> letter, the data listed for "PM<sub>2.5</sub> emissions carbon" and "PM<sub>2.5</sub> emissions other" is erroneous when compared to the 2005 NEI data. If EPA is going to use this data to assess a county's candidacy for a nonattainment designation, they should ascertain that they are using the correct data in this assessment.

EPA's proposed designation completely ignores and is entirely inconsistent with the fact that measured values at the Christian County monitor which is substantially closer in proximity to Muhlenberg County does not show a violation of the 24-hour PM<sub>2.5</sub> standard. This should be recognized by EPA as particularly significant given that Christian County is within the Clarksville MSA and is geographically located between Muhlenberg County and Montgomery County, Tennessee. Kentucky feels that

if Muhlenberg's emissions were contributing to the Montgomery County monitor then they would also affect the monitor in Christian County. Further, Muhlenberg County is located downwind of predominant SSW wind directions from Montgomery County, TN and Christian County, KY.

As discussed extensively by Tennessee in a June 10, 2008 submittal to EPA Region 4, the monitor in Montgomery County that showed exceedances of the 24-hour  $PM_{2.5}$  standard in 2005 is located near the maintenance building at a golf course in Clarkesville. The location of this monitor could result in elevated air contamination due to localized influences, and thus concentrations at this monitor would not be representative of the wider region. The golf course maintenance building includes several fuel storage tanks, which could lead to unrepresentatively high values for carbon fraction, and lawn maintenance equipment and golf cart storage, which could lead to unrepresentatively high values for sulfate and nitrate fractions. The monitor is also located next to a practice putting green, which is mowed frequently, and could result in unrepresentatively elevated crustal fractions of  $PM_{2.5}$ . EPA should find, based upon the documentation provided by Tennessee, that any exceedance at the subject monitor is due primarily, if not entirely, to these localized sources of  $PM_{2.5}$  and  $PM_{2.5}$  precursor emissions and not emissions from sources in Muhlenberg County.

### **Additional Emission Reductions in Muhlenberg County, Kentucky**

TVA Paradise, which is located in Muhlenberg County, is a facility that consists of three cyclone-furnace coal-fired boilers. All three coal-fired boilers are equipped with staged overfire air and selective catalytic reduction modules for nitrogen oxides emission control. Boiler Units 1 and 2 are equipped with venturi-type limestone slurry flue gas desulfurization scrubbers for  $SO_2$  and particulate control. Boiler Unit 3 is equipped with an electrostatic precipitator and a wet limestone FGD scrubber for particulate and  $SO_2$  control. The Unit 3 FGD scrubber that came online in 2006 has significantly reduced the TVA Paradise  $SO_2$  emissions by 49,704 tons per year given the Unit 3 2005 emissions (53,519 tpy) compared to the Unit 3 2007 emissions (3,815 tpy). TVA Paradise's total  $SO_2$  emissions in 2005 were 84,401 tpy while in 2007 its  $SO_2$  emissions had decreased to 33,818 tpy due to the addition of the Unit 3 scrubber. In addition, although not considered as BART since TVA had previously related to KYDAQ its intent to install controls to mitigate  $SO_3$  emissions at TVA Paradise, TVA plans to install hydrated lime injection controls on TVA Paradise Units 1-3 at to address  $SO_3$  emissions and improve visibility at Class I areas. Given the TVA Paradise existing emission controls that are in place that have significantly reduced the emissions at TVA Paradise and additional controls planned, KYDAQ requests that EPA reconsider its decision and not designate Muhlenburg County as nonattainment for the 24-hour particulate matter standard.

<b>TVA Paradise Level of Emission Control*</b>				
<b>Pollutant</b>	<b>Unit 3 2005 Actual Emissions (tpy)</b>	<b>Unit 3 2007 Actual Emissions*</b> (tpy)	<b>Total Plant 2005 Actual Emissions (tpy)</b>	<b>Total Plant 2007 Actual Emissions*</b> (tpy)
SO <sub>2</sub>	53,519	3,815	84,401	33,818

\*A TVA Paradise Unit 3 FGD scrubber, which came online in 2006, has significantly reduced the TVA Paradise SO<sub>2</sub> emissions by 49,704 tons per year from 2005 to 2007 levels.

## **ADDITIONAL REGIONAL/NATIONAL CONTROLS**

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## **Meteorology**

It should be noted that EPA's "pollution rose" shows that on the high days the majority of the fine particle concentrations and the wind direction moved from the southwest. The direction of the wind would indicate that the main influence to the Montgomery County monitor would be the EGU's and other point sources located in Humphreys and Stewart Counties, Tennessee not TVA Paradise in Muhlenberg County.

A review of the nine HYSPLITS run for the Montgomery County, TN high days, show that only one has the potential to be moving through Muhlenberg towards the Tennessee monitor. The HYSPLITS are supplied at the end of this section.

## **Conclusions**

Based on the factors discussed above, Kentucky believes that Muhlenberg County should be designated attainment for the PM<sub>2.5</sub> standard.

- Kentucky believes that EPA's use of the contributing emissions scoring approach was skewed. A review of HYSPLITS on days of high monitor readings shows that Muhlenberg County does not have the potential to contribute to PM<sub>2.5</sub> levels within the region.
- Additional emission reductions on a national and regional level will provide substantial benefits in the region. The anticipated sulfur reductions due to the

Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

- It appears EPA has included Muhlenberg County as a potential nonattainment area due to an emissions contribution from TVA Paradise. However, given the TVA Paradise existing emission controls that are in place that have significantly reduced the emissions at TVA Paradise and additional controls planned, KYDAQ requests that EPA reconsider its decision and not designate Muhlenberg County as nonattainment for the 24-hour particulate matter standard.
- Muhlenberg County, a county that is not in the Clarksville metropolitan statistical area and is geographically separated from Montgomery County by other counties not proposed as nonattainment, should not be identified as contributing to such nonattainment status, and therefore should not be included within the nonattainment boundary for the Clarksville nonattainment area.
- EPA's proposal finds that only two of its nine delineated factors weigh in favor of designating Muhlenberg County as contributing to violations of the standard in Clarksville, Tennessee. The results of EPA's assessment of the other 7 factors should warrant designation of Muhlenberg County as attainment.

Based on the above conclusions, Muhlenberg County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies with little or no benefit to the area.

Substantial local emission reductions from Muhlenberg County have already occurred, or will have occurred well before attainment dates for this standard. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, and the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the result should be that Muhlenberg County, Kentucky, be designated attainment for the PM<sub>2.5</sub> Standard.



Steven L. Beshear  
Governor

**Energy and Environment Cabinet  
Department for Environmental Protection**

Leonard K. Peters  
Secretary

Division for Air Quality  
200 Fair Oaks Lane, 1st Floor  
Frankfort, Kentucky 40601-1403  
www.air.ky.gov

October 21, 2008

Mr. James I. Palmer, Jr.  
Regional Administrator  
U.S. EPA, Region 4  
Atlanta Federal Center  
61 Forsyth Street, S.W.  
Atlanta, Georgia 30303-8960

Dear Mr. Palmer:

On October 17, 2008, Kentucky submitted their response to EPA's modified recommendations for designations under the PM<sub>2.5</sub> standard. In the Muhlenberg County section of the document, there is a reference to back trajectories run for Montgomery County, TN. These trajectories were inadvertently omitted from the document that Kentucky submitted to EPA. Kentucky is sending the trajectories along with this letter and requesting that EPA include them as part of the submitted package.

If you have any questions regarding this matter, please contact Mr. John Gowins of my staff at (502) 564-3999.

Sincerely,

A handwritten signature in blue ink that reads "John E. Gowins".

John E. Gowins  
Supervisor, Evaluation Section

JEG/lme

cc: Dick Schutt

# **HYSPLITS for Montgomery County, TN**

48-hour trajectories for the annual Top Ten  
24-hour maximum PM<sub>2.5</sub> concentrations in each year  
(2004, 2005, 2006)

While also noting the  
Annual Top 3 Violating Days

**2004**

**NONE**

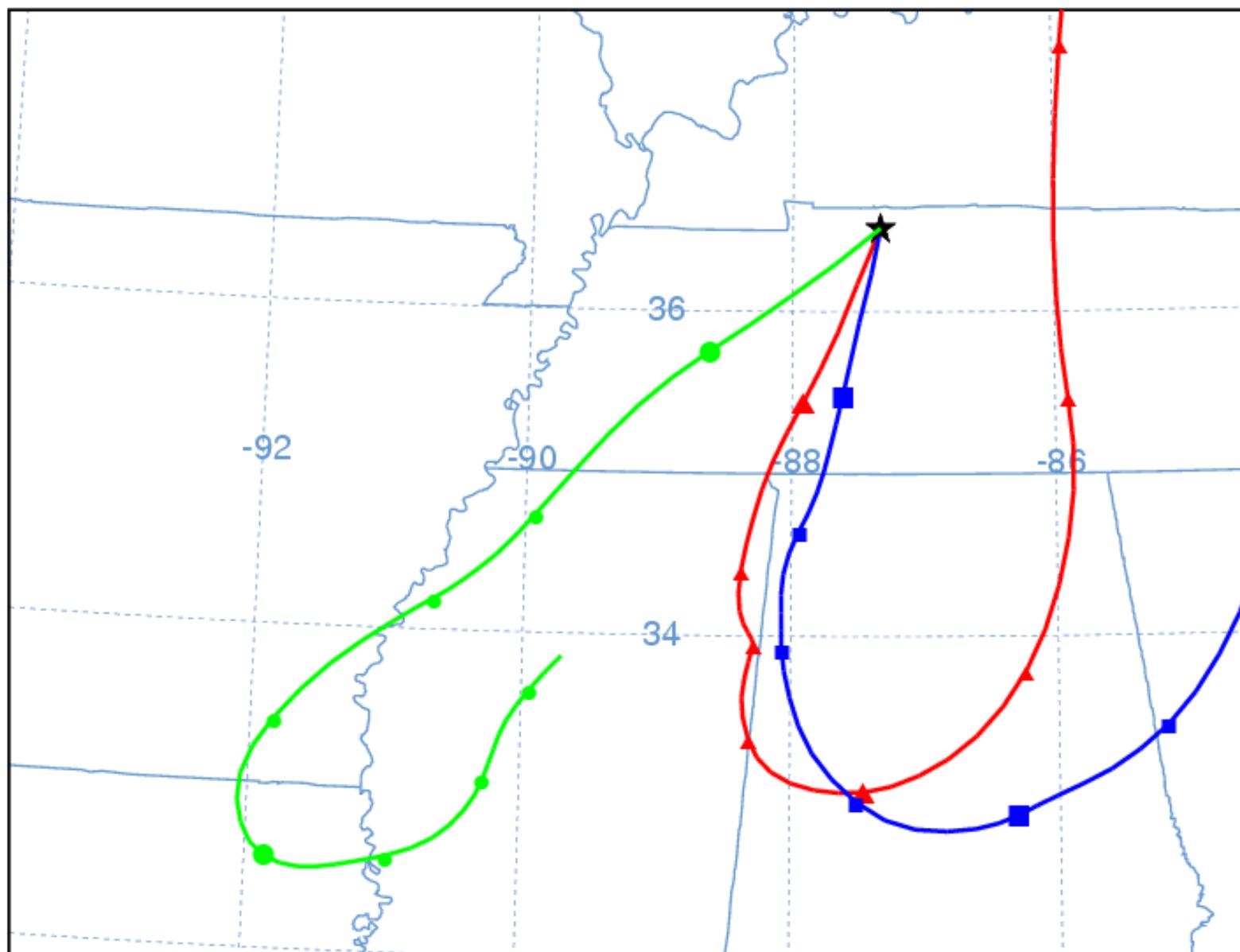
**2005**

# NOAA HYSPLIT MODEL

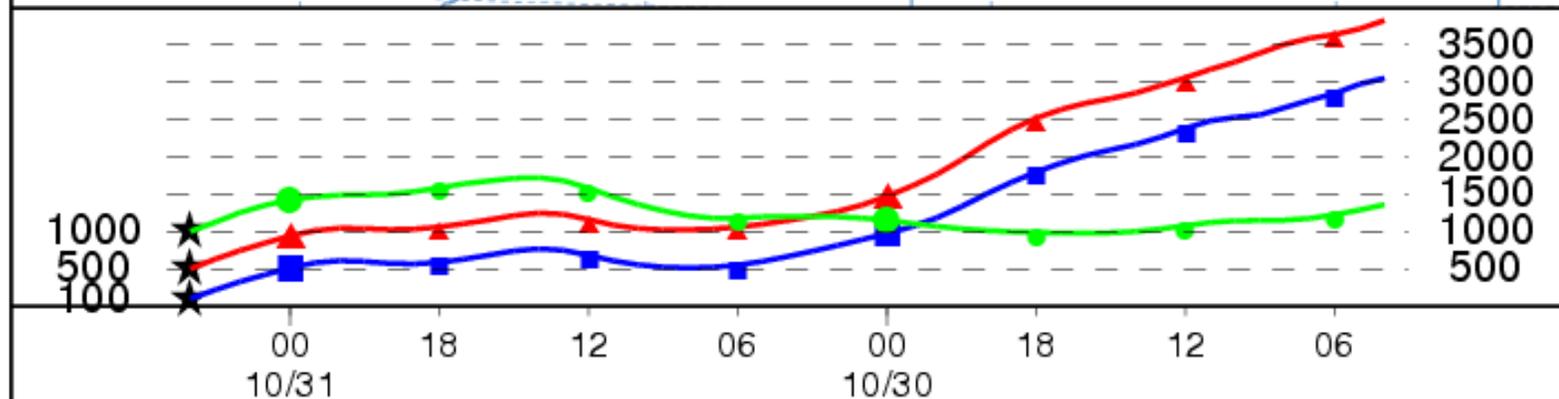
## Backward trajectories ending at 04 UTC 31 Oct 05

### EDAS Meteorological Data

Source ★ at 36.51 N 87.33 W



Meters AGL

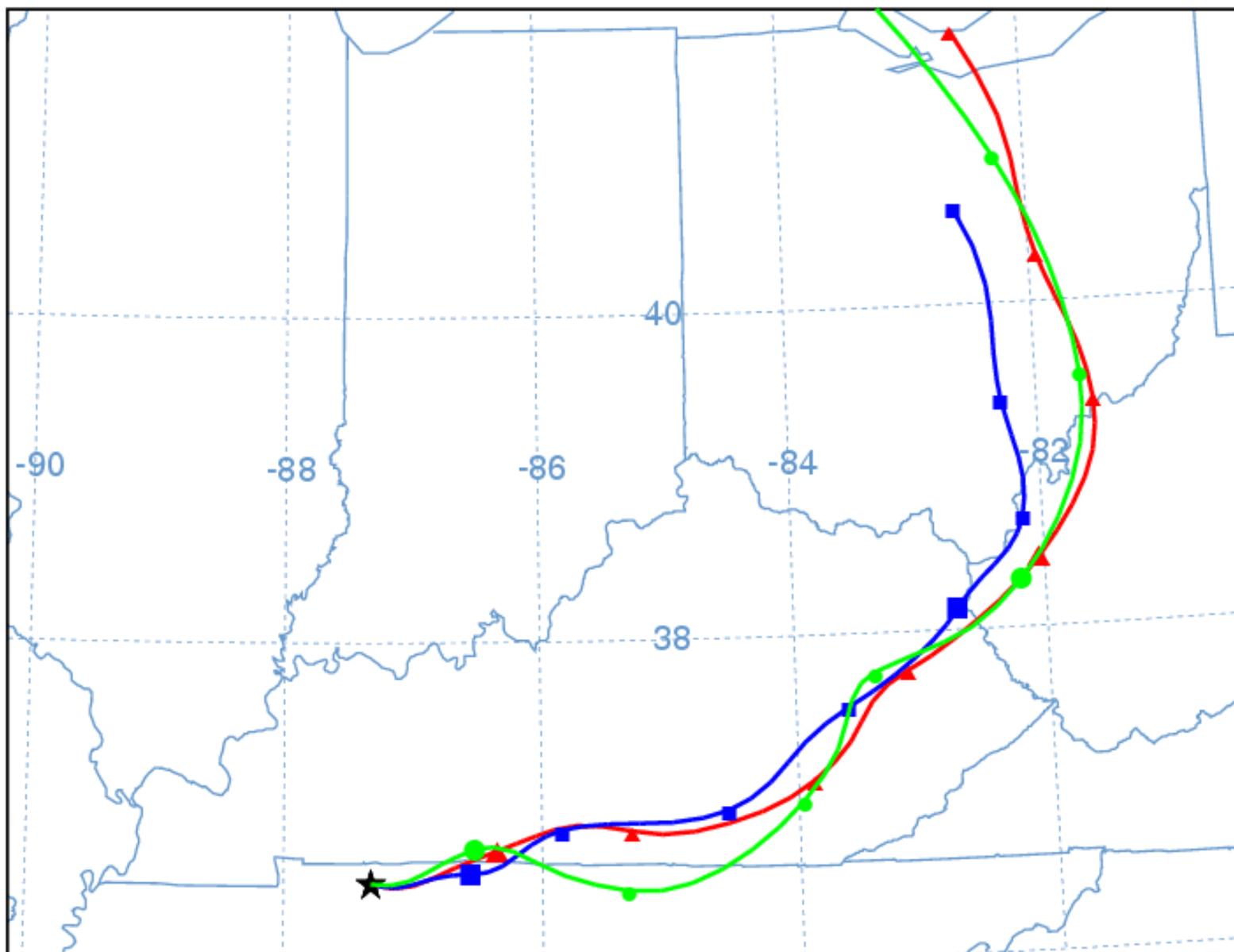


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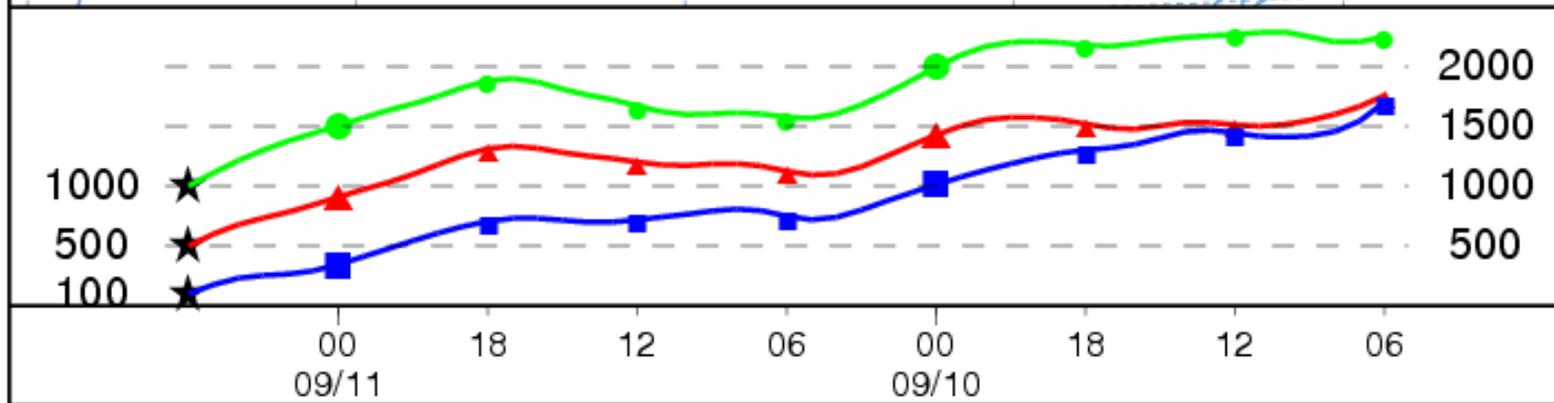
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NOAA HYSPLIT MODEL  
 Backward trajectories ending at 06 UTC 11 Sep 05  
 EDAS Meteorological Data

Source ★ at 36.51 N 87.33 W



Meters AGL

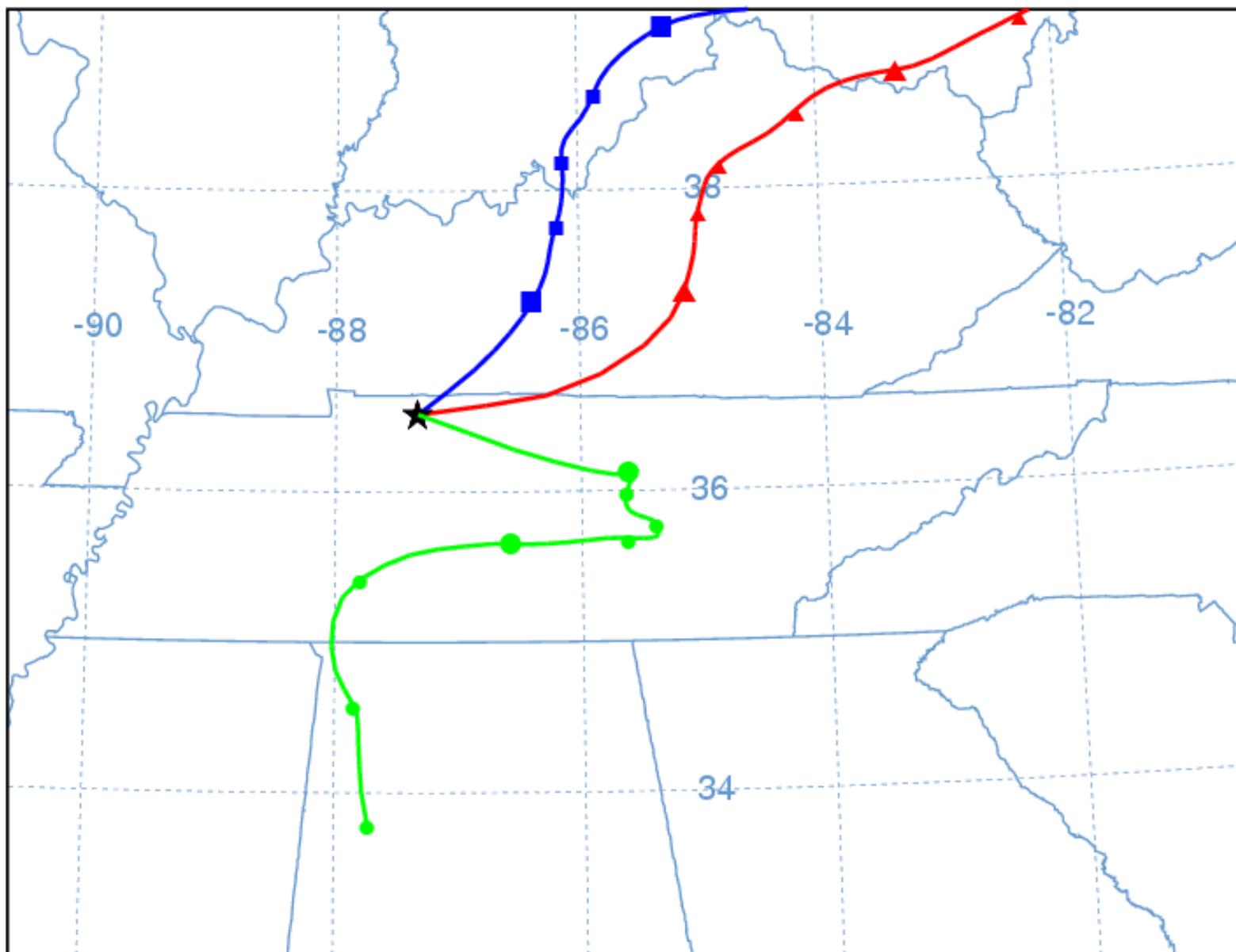


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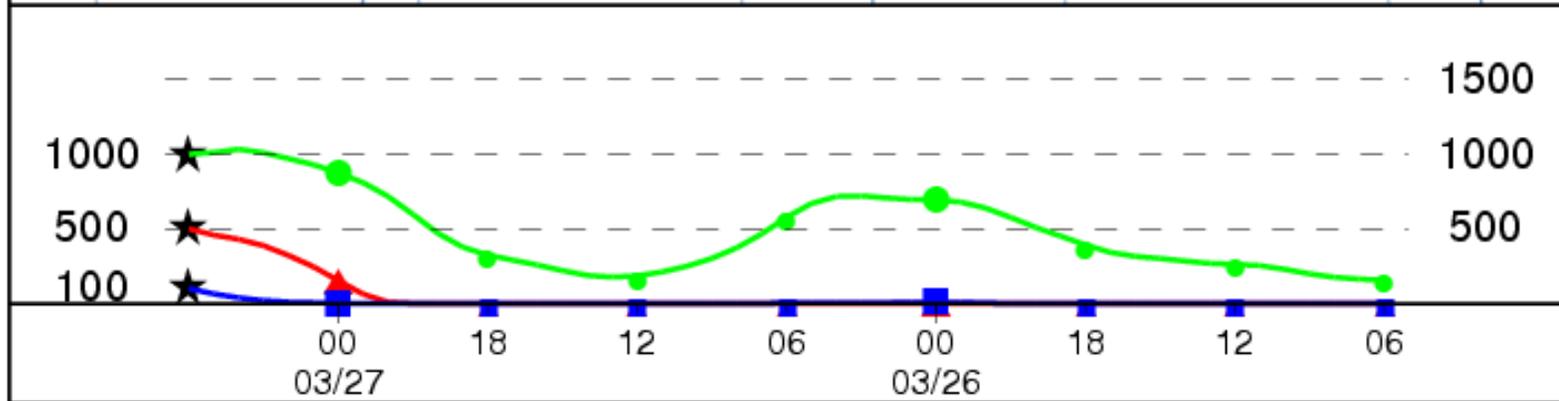
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NOAA HYSPLIT MODEL  
 Backward trajectories ending at 06 UTC 27 Mar 05  
 EDAS Meteorological Data

Source ★ at 36.51 N 87.33 W



Meters AGL



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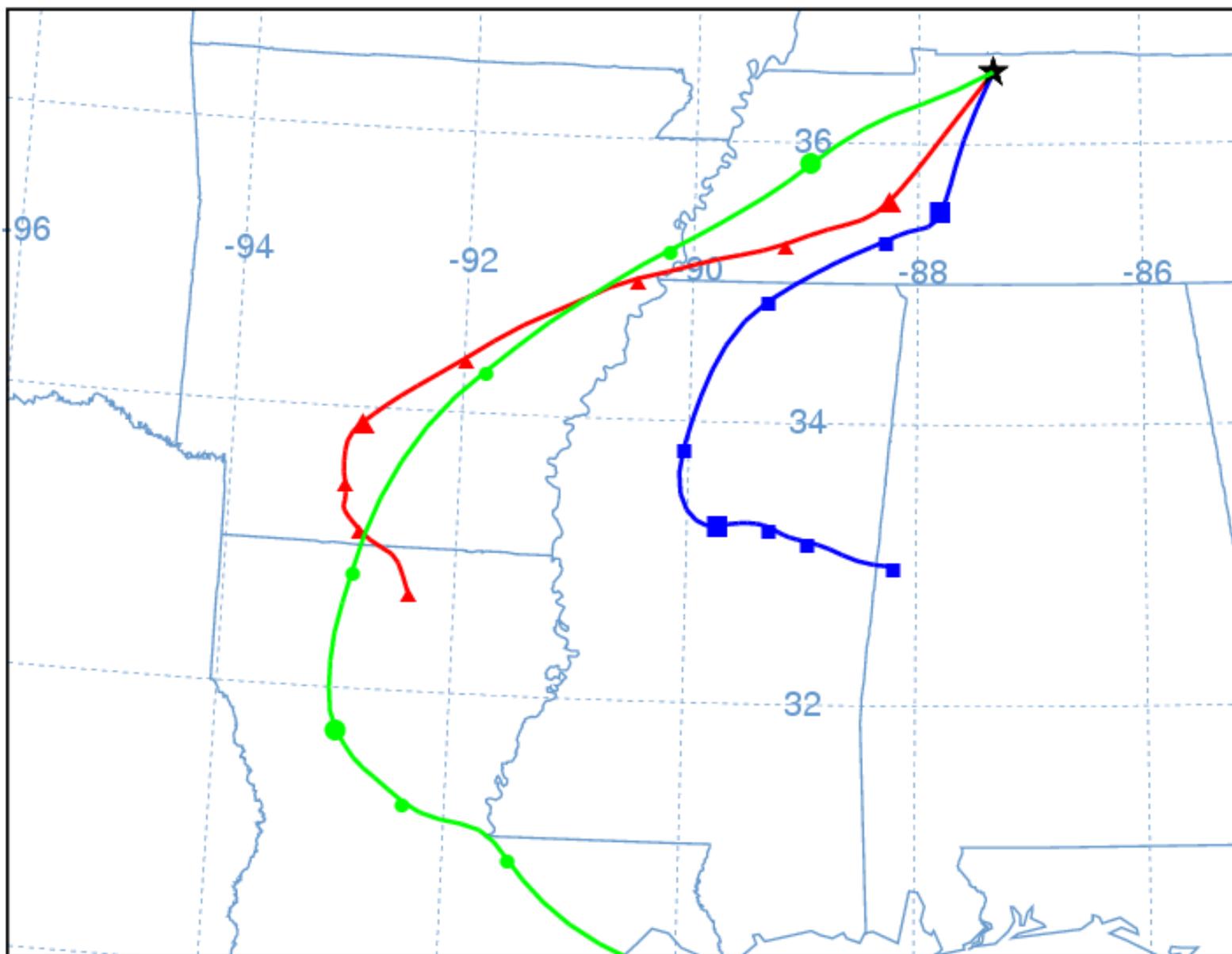
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# NOAA HYSPLIT MODEL

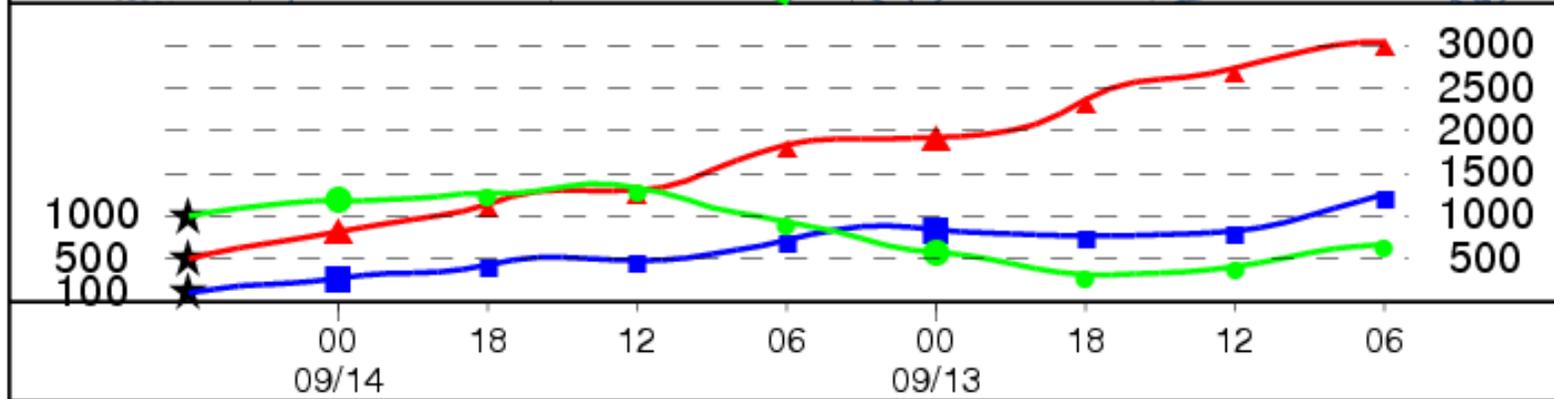
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### EDAS Meteorological Data

Source ★ at 36.51 N 87.33 W



Meters AGL

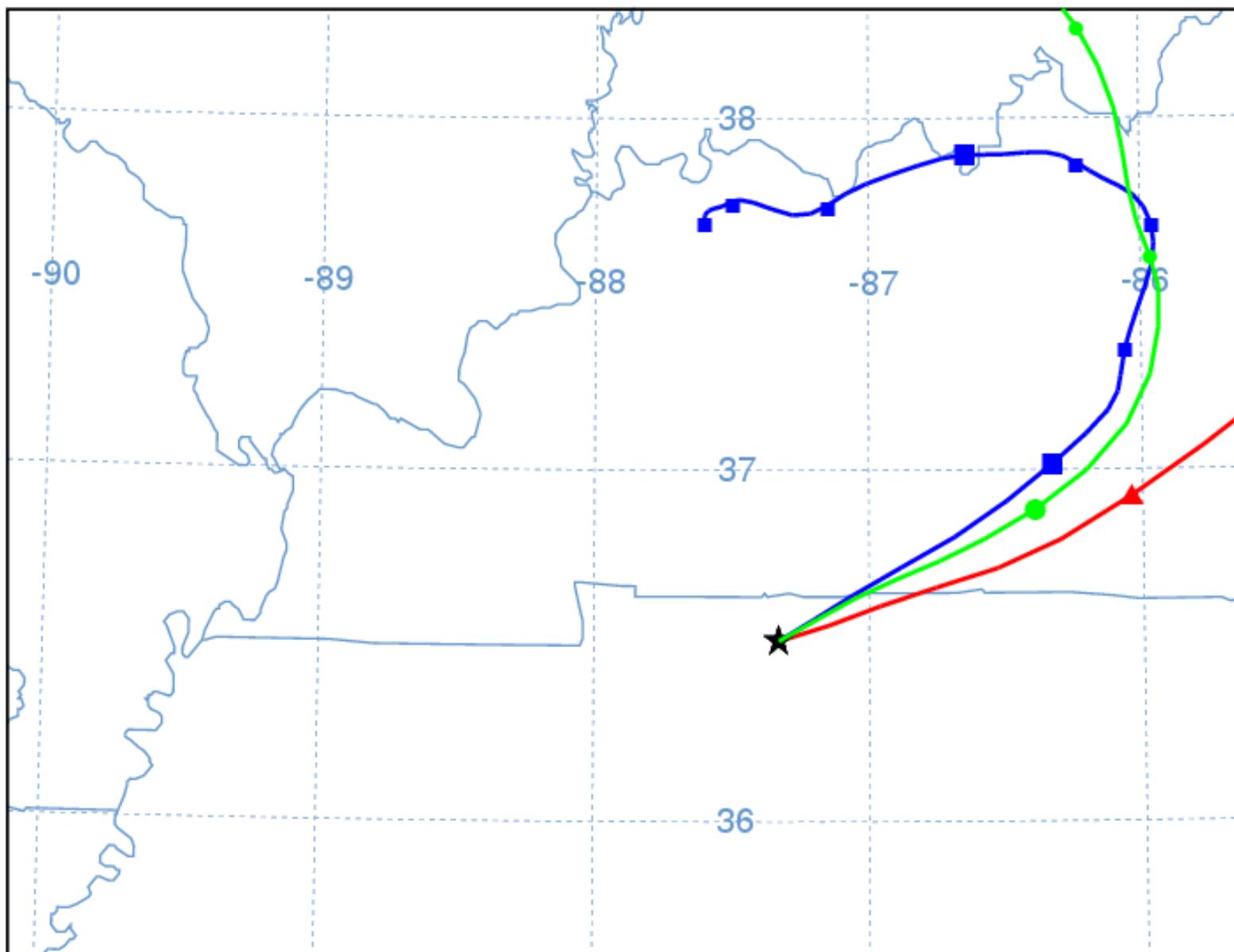


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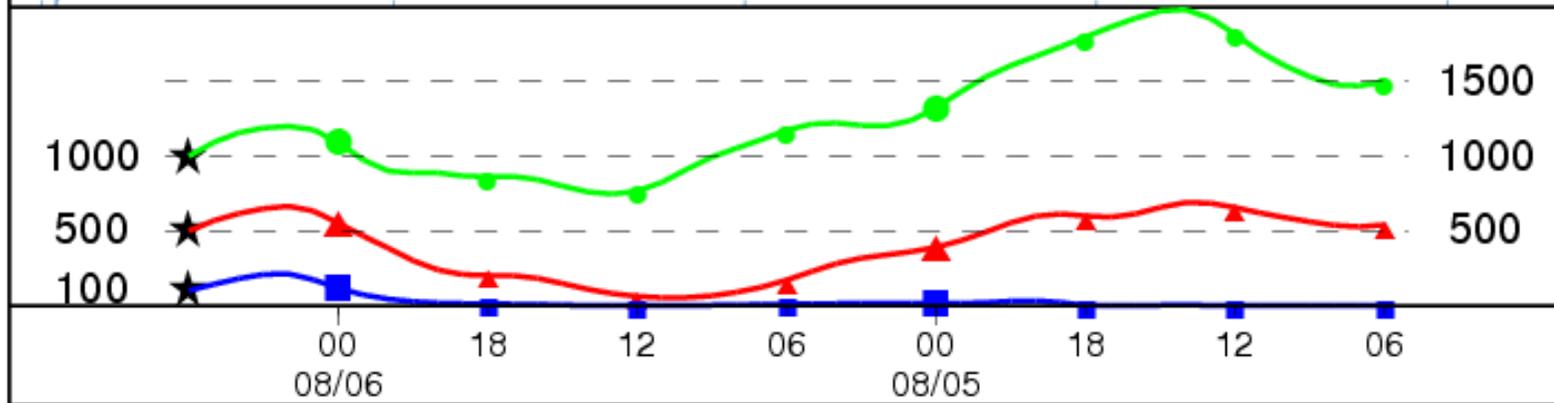
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 Produced with HYSPLIT from the NOAA ARL Website (<http://www.arl.noaa.gov/ready/>)

NOAA HYSPLIT MODEL  
 Backward trajectories ending at 06 UTC 06 Aug 05  
 EDAS Meteorological Data

Source ★ at 36.51 N 87.33 W



Meters AGL

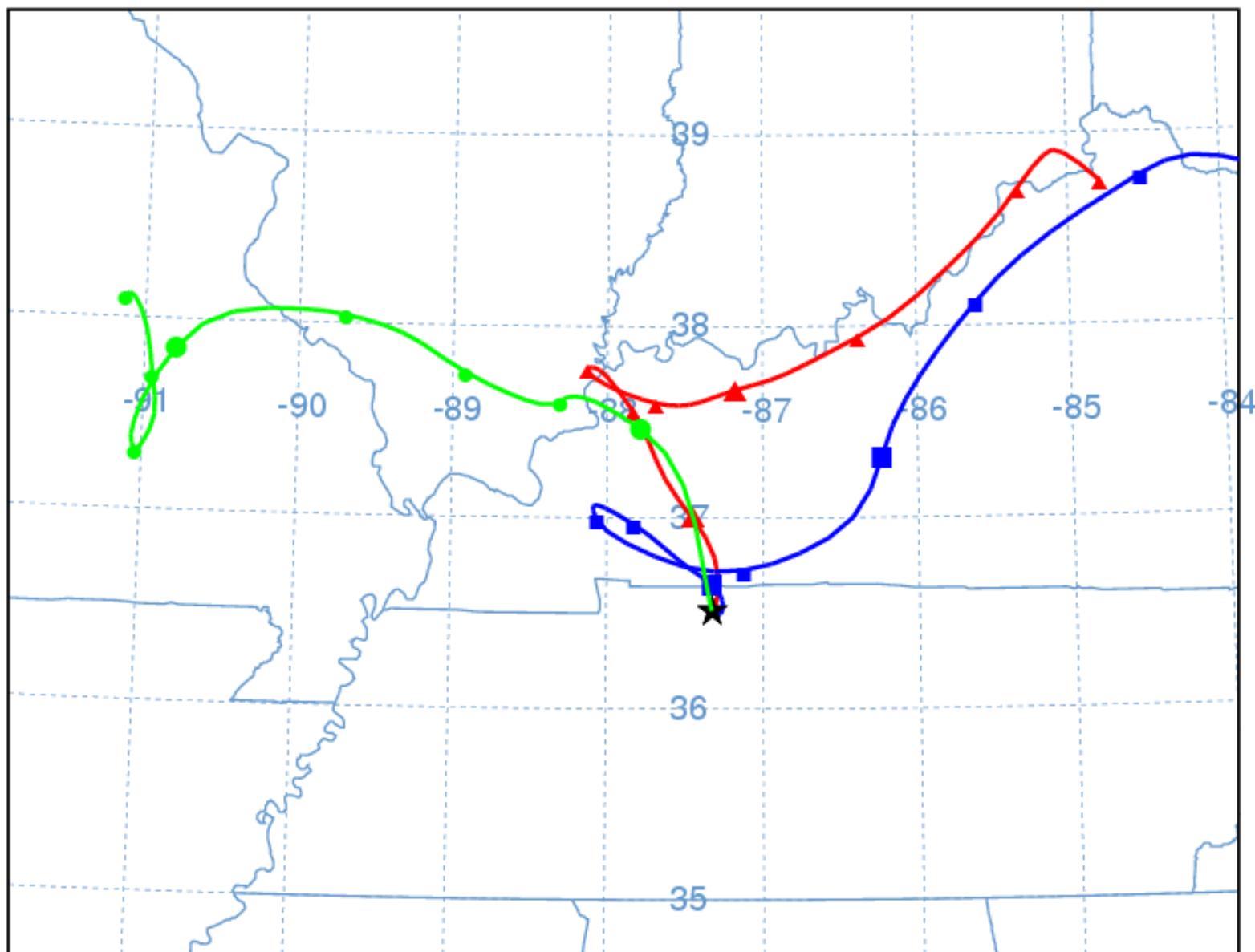


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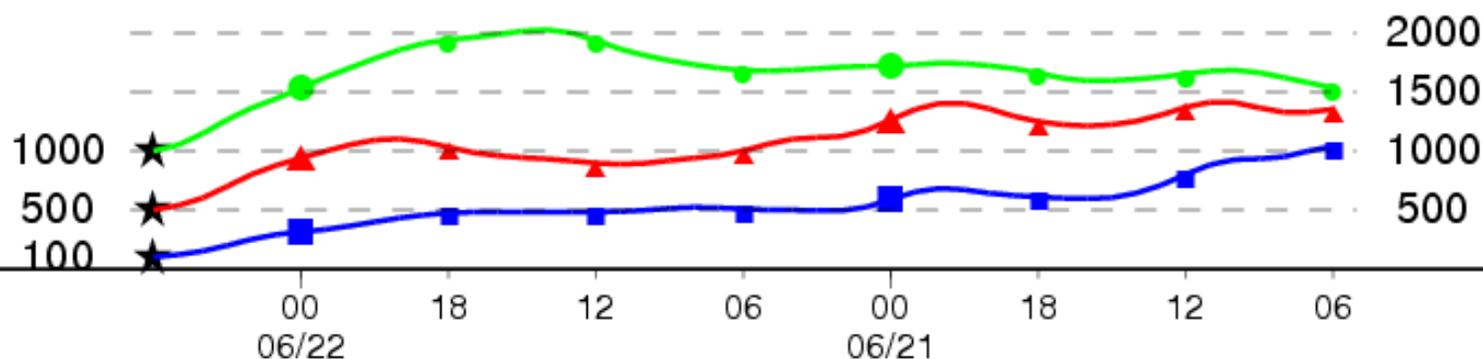
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 Produced with HYSPLIT from the NOAA ARL Website (<http://www.arl.noaa.gov/ready/>)

NOAA HYSPLIT MODEL  
 Backward trajectories ending at 06 UTC 22 Jun 05  
 EDAS Meteorological Data

Source ★ at 36.51 N 87.33 W



Meters AGL



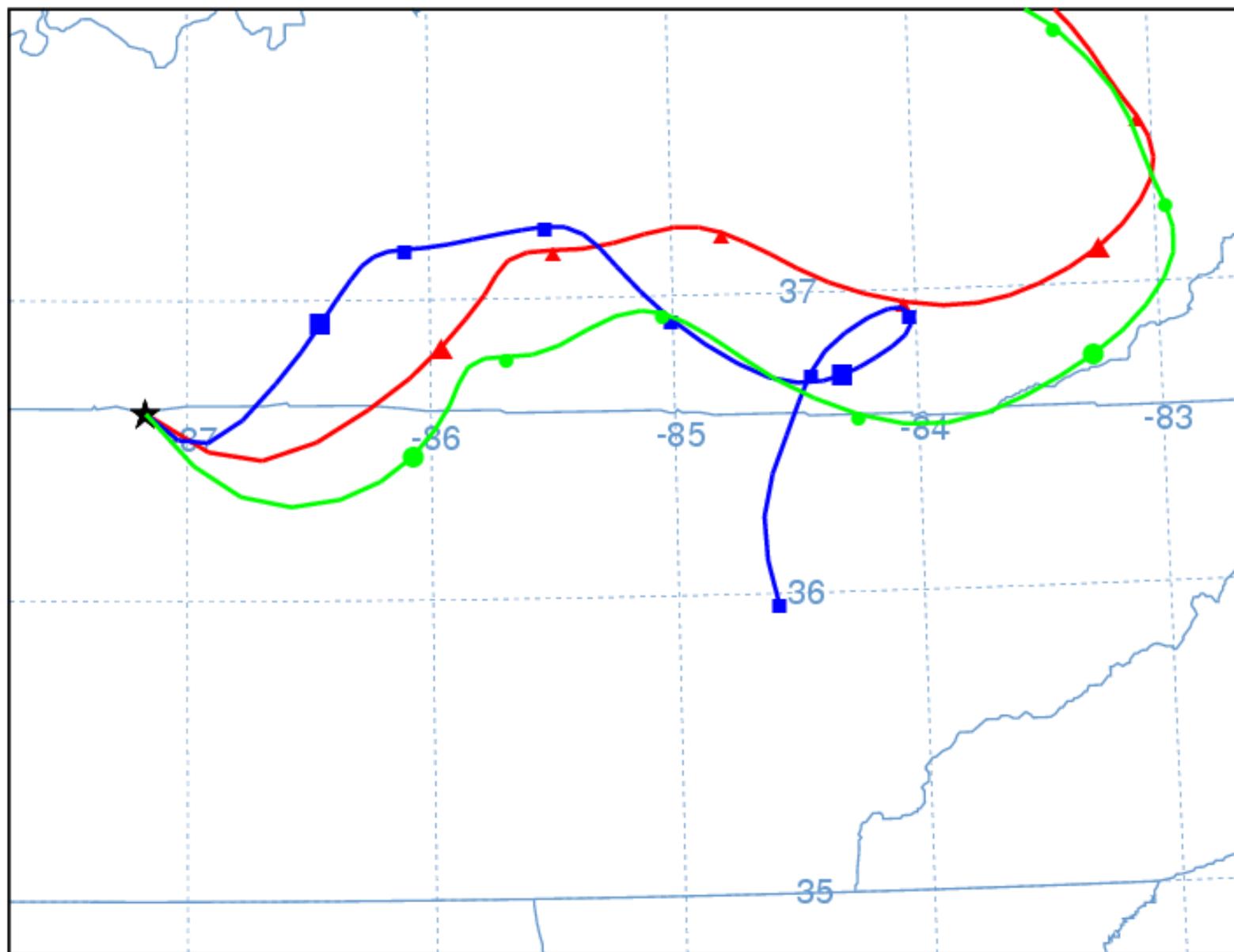
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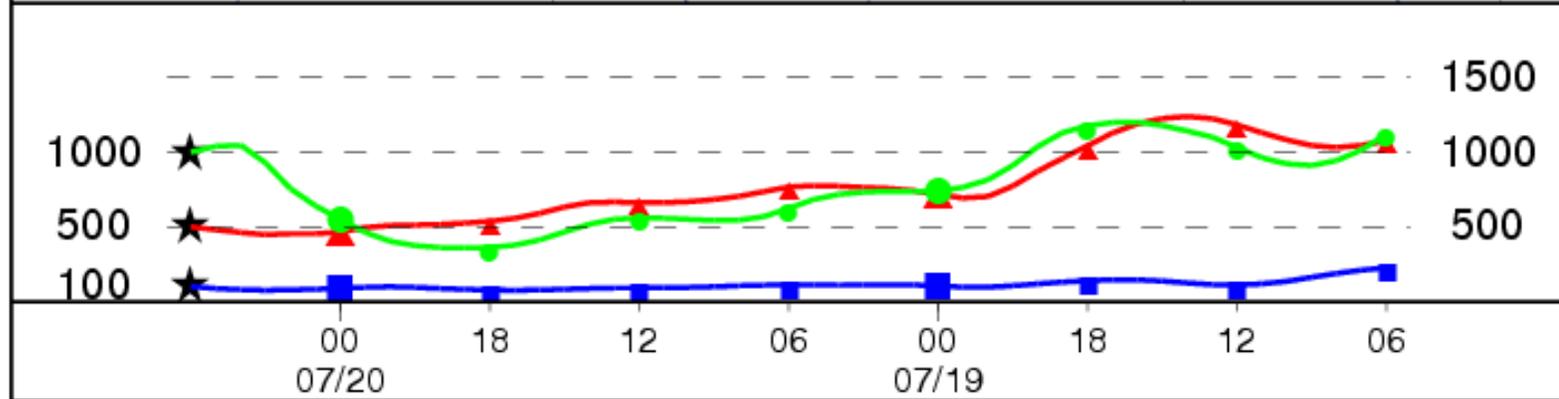
**2006**

NOAA HYSPLIT MODEL  
 Backward trajectories ending at 06 UTC 20 Jul 06  
 EDAS Meteorological Data

Source ★ at 36.62 N 87.17 W



Meters AGL

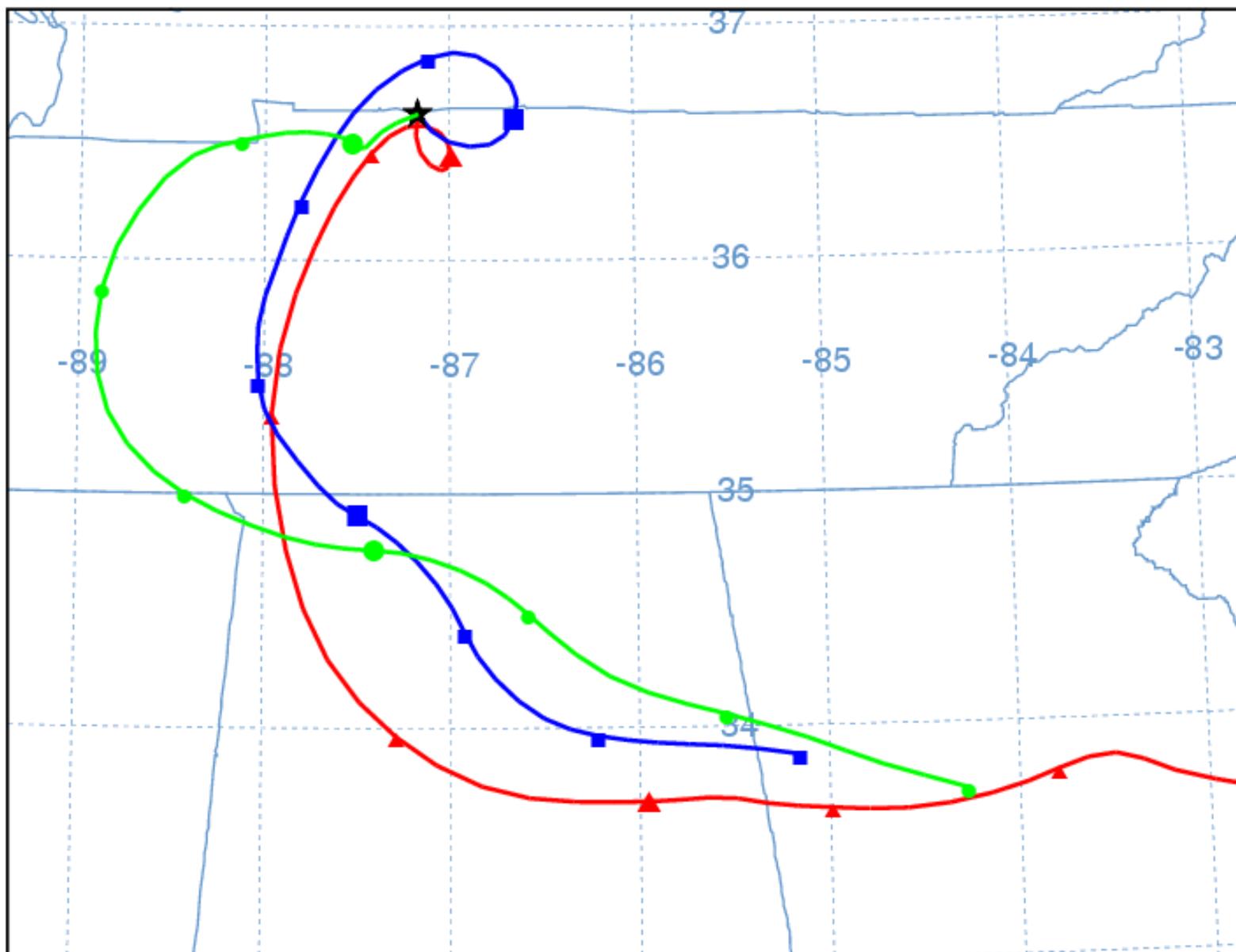


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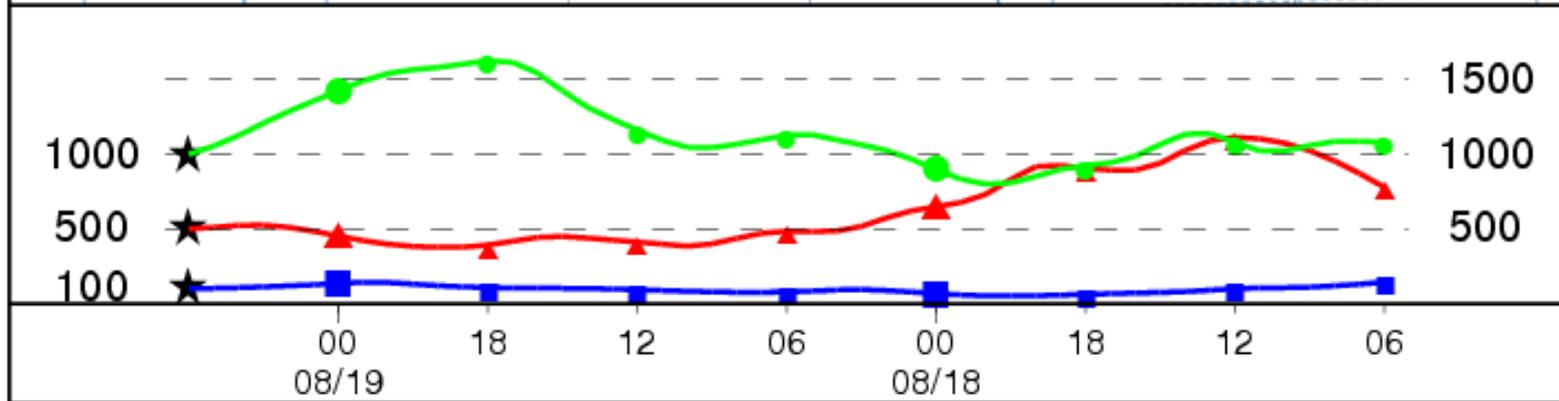
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NOAA HYSPLIT MODEL  
 Backward trajectories ending at 06 UTC 19 Aug 06  
 EDAS Meteorological Data

Source ★ at 36.62 N 87.17 W



Meters AGL



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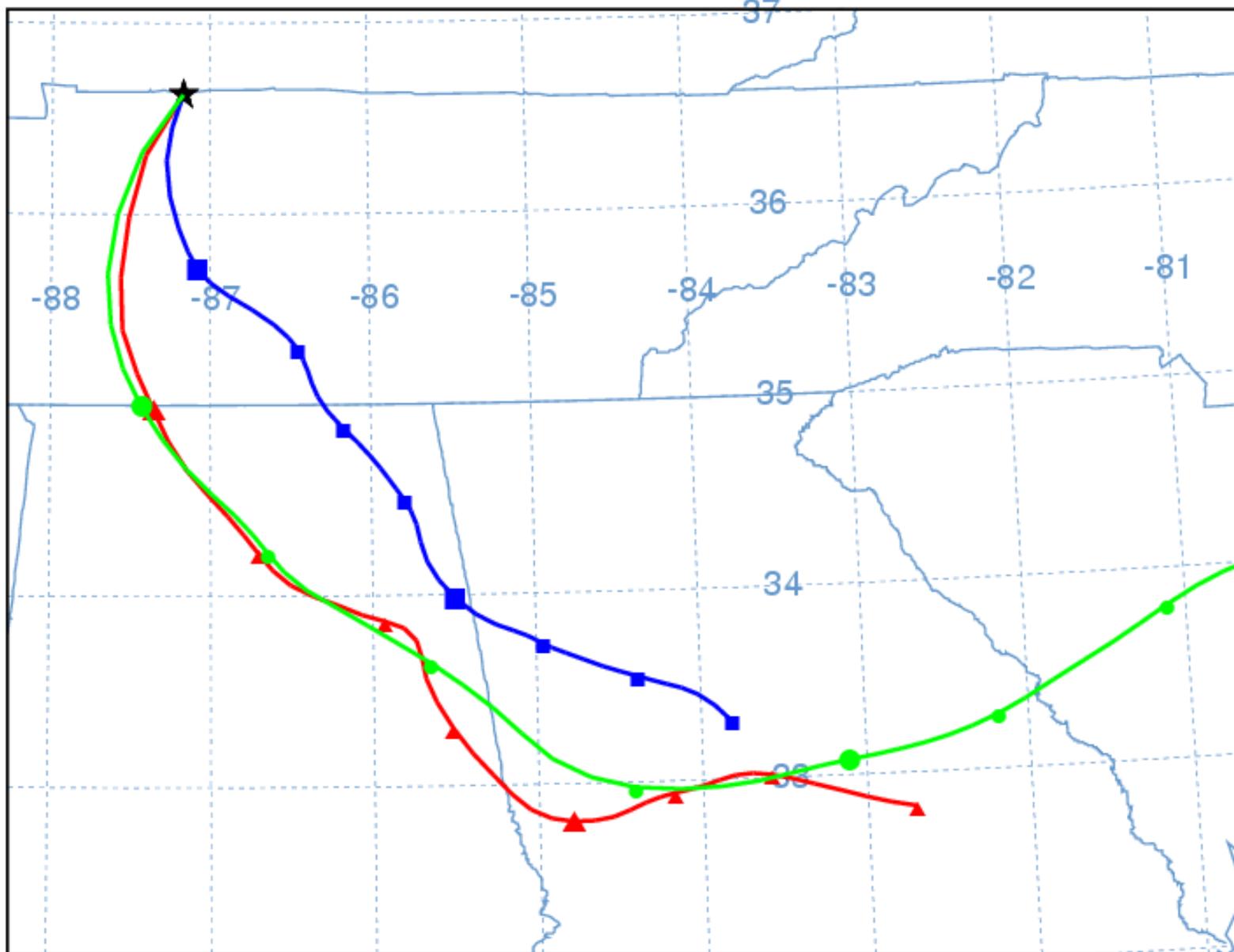
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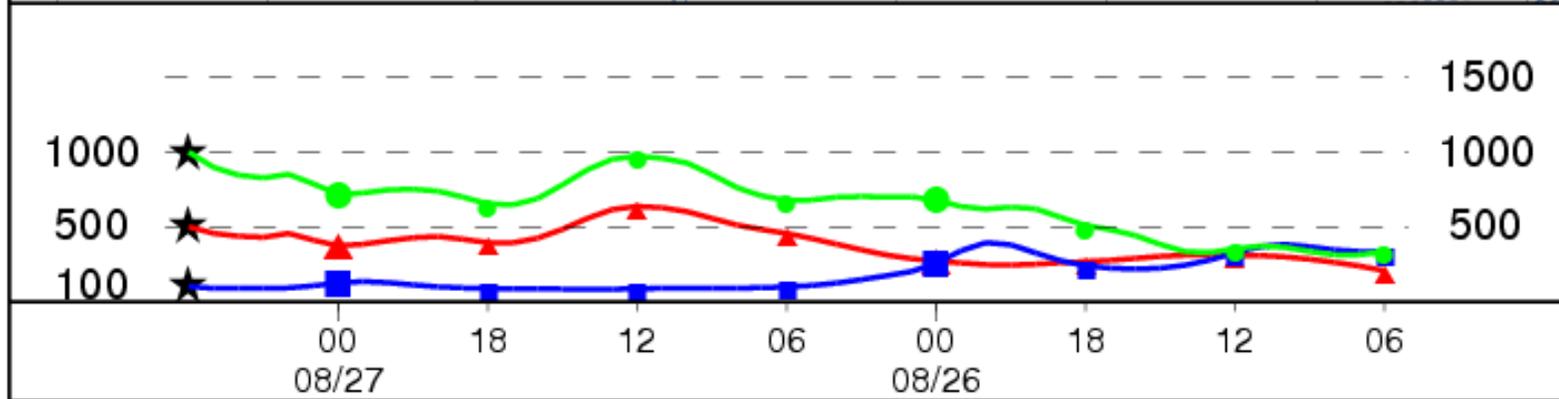
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### EDAS Meteorological Data

Source ★ at 36.62 N 87.17 W



Meters AGL



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 Vertical Motion Calculation Method: Model Vertical Velocity  
 Produced with HYSPLIT from the NOAA ARL Website (<http://www.arl.noaa.gov/ready/>)

## BOYD COUNTY, KENTUCKY

Boyd County is part of the Huntington-Ashland Metropolitan Statistical Area (MSA) and is located to the south-southeast of Greenup County, Kentucky, and to the east-northeast of Carter County, Kentucky, and north of Lawrence County, Kentucky.

EPA's August 19, 2008 proposal on appropriate designations for Kentucky included Boyd County as nonattainment based on the following criteria:

- EPA indicates that Boyd County has significant SO<sub>x</sub>, NO<sub>x</sub>, and PM emissions in close proximity to the violating MSA monitors and that anticipated controls would not be implemented until after designations are made;
- EPA indicates that Boyd County has monitoring data very close to violating the standard, and EPA states that this indicates a potential to contribute to the PM<sub>2.5</sub> violations in the area;
- EPA indicates that the population and population density of Boyd County has a potential to contribute to the PM<sub>2.5</sub> violations in the area.

### Emissions Data

In Kentucky's June recommendations, the 2002 VISTAS ASIP modeling inventory was used for the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website. Using the data from NEI, the following information was developed.

Kentucky noticed that no information or data was given for Mason County, West Virginia even though the EPA letter addressed to West Virginia listed Mason County as being considered for nonattainment status. Mason County's emission and population numbers were collected and included into Kentucky's data and are represented in the information below.

Adams and Gallia Counties alone contribute 60% of all SO<sub>x</sub> within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Boyd County emits only 3% of SO<sub>x</sub> emissions from the counties recommended by EPA as having the potential to impact the violating monitors. A similar comparison can be made with both NO<sub>x</sub> and PM. Boyd County's NO<sub>x</sub> emissions rank at 6% of the total EPA recommended areas, and PM at 7%. In a detailed review of EPA's recommended areas to be designated nonattainment, Boyd County ranks consistently at less than 4% of combined emissions contributions within EPA's proposed nonattainment boundaries. See Figures 1-4 below.

Figure 1

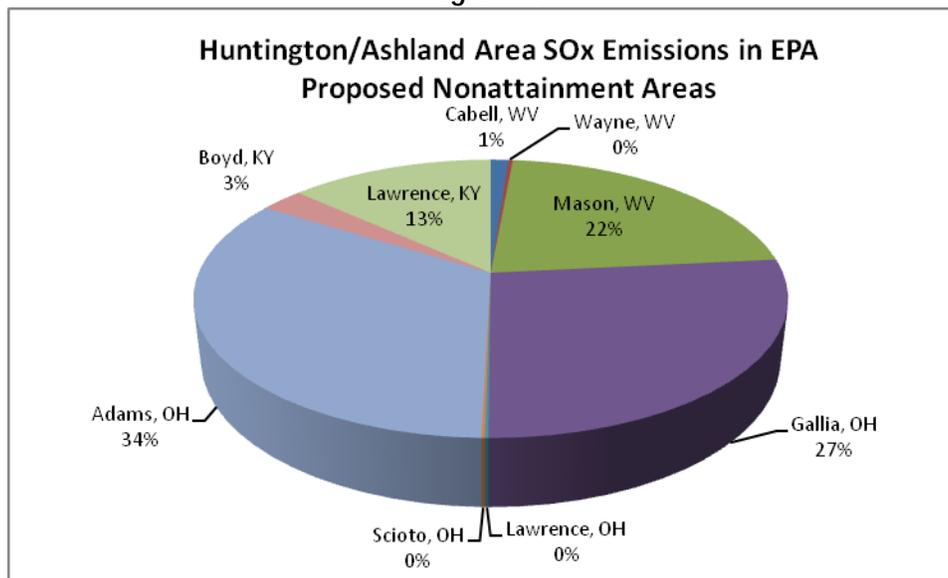


Figure 2

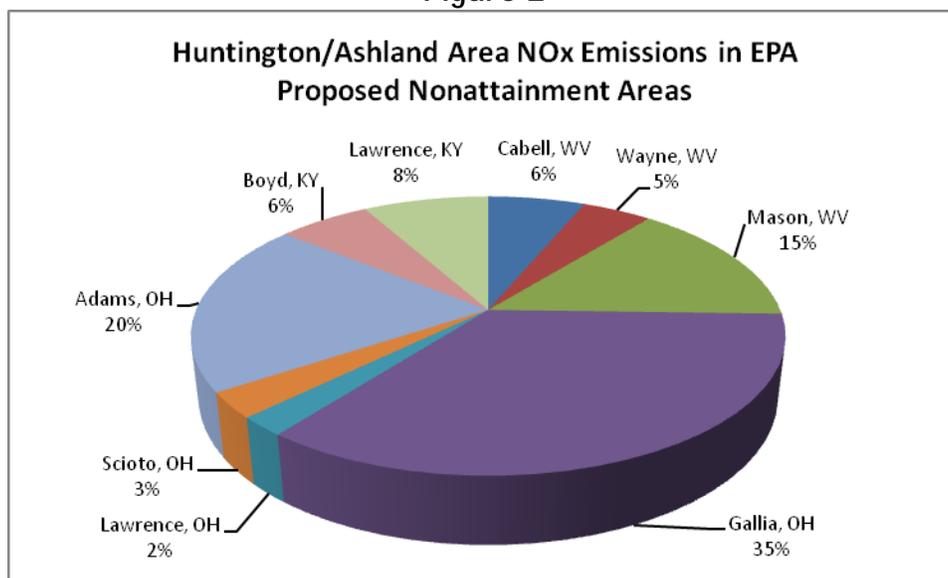


Figure 3

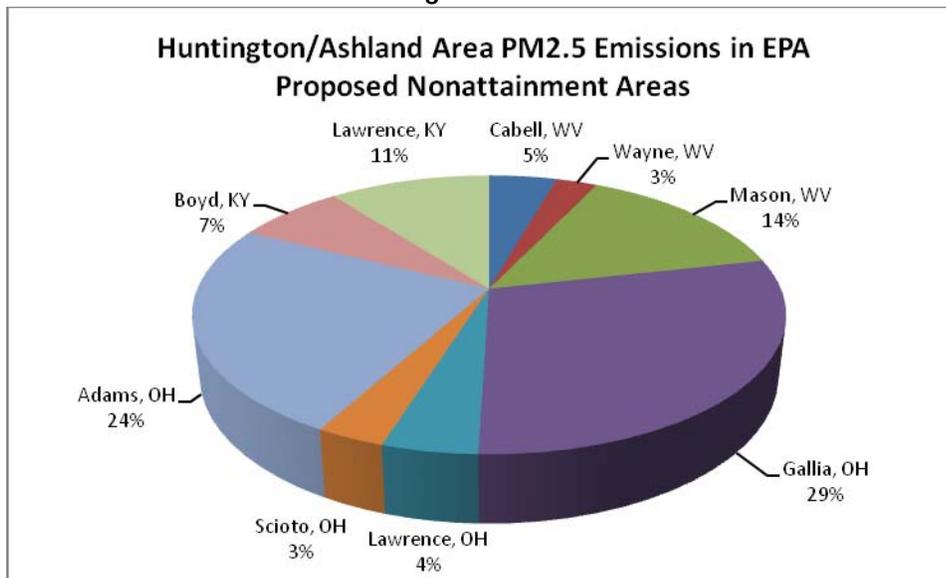
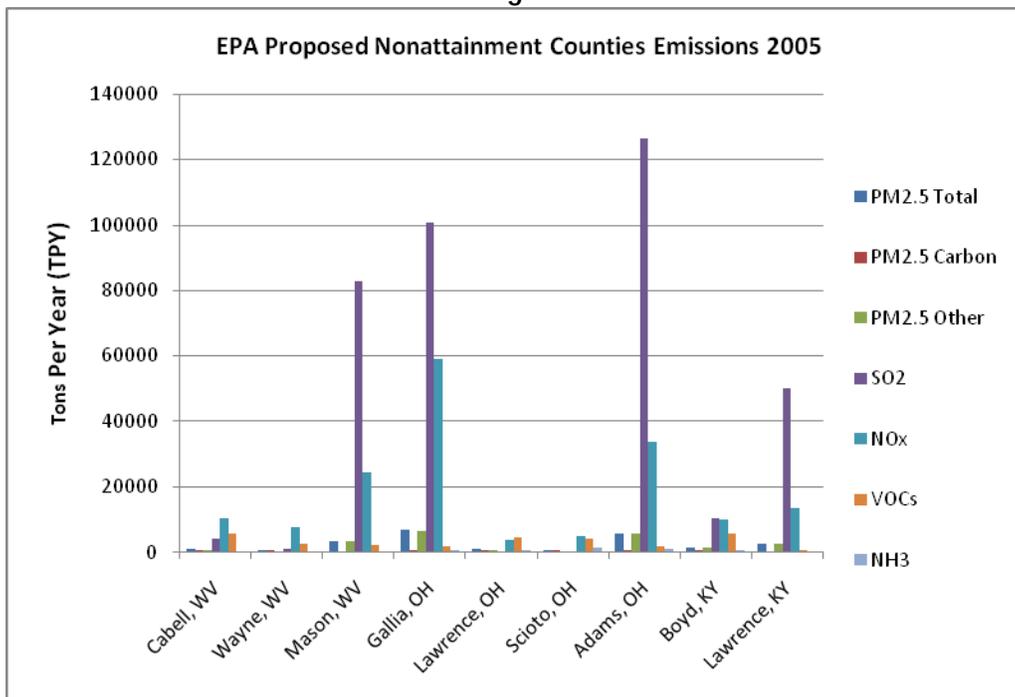


Figure 4



## ADDITIONAL REGIONAL/NATIONAL CONTROLS

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## Monitoring Data

The monitor located in Boyd County shows attainment with the PM<sub>2.5</sub> standard. As can be seen in Figure 6 below, the speciation data from Kentucky's Ashland speciation monitor indicates that sulfate and organic carbon are the major components of the PM<sub>2.5</sub> values. As can be seen in Figure 1 above and Figure 7 below, Boyd County, Kentucky, contributes only 3% of the SO<sub>2</sub> in the area, and only 11% of the organic carbon within EPA's proposed nonattainment counties.

Figure 6

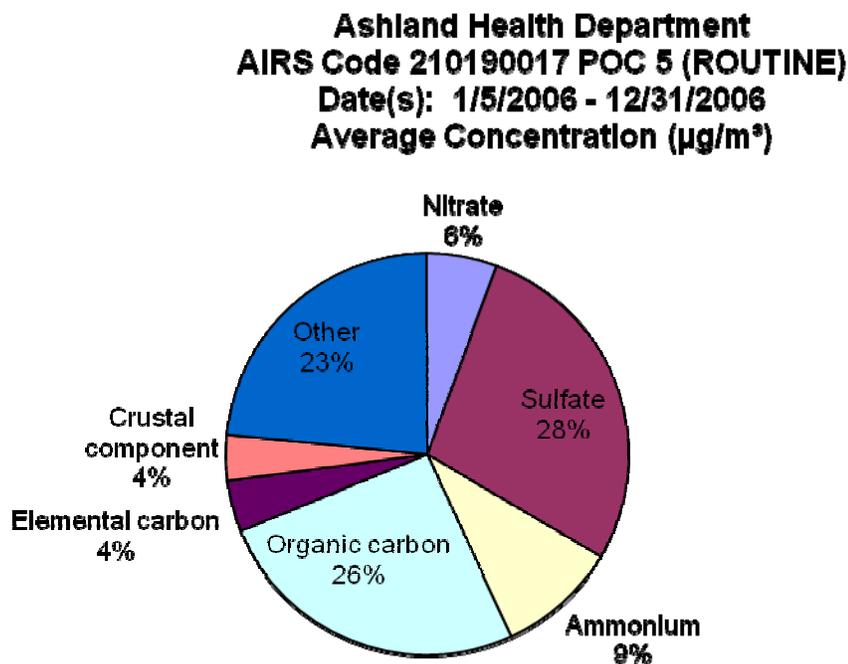
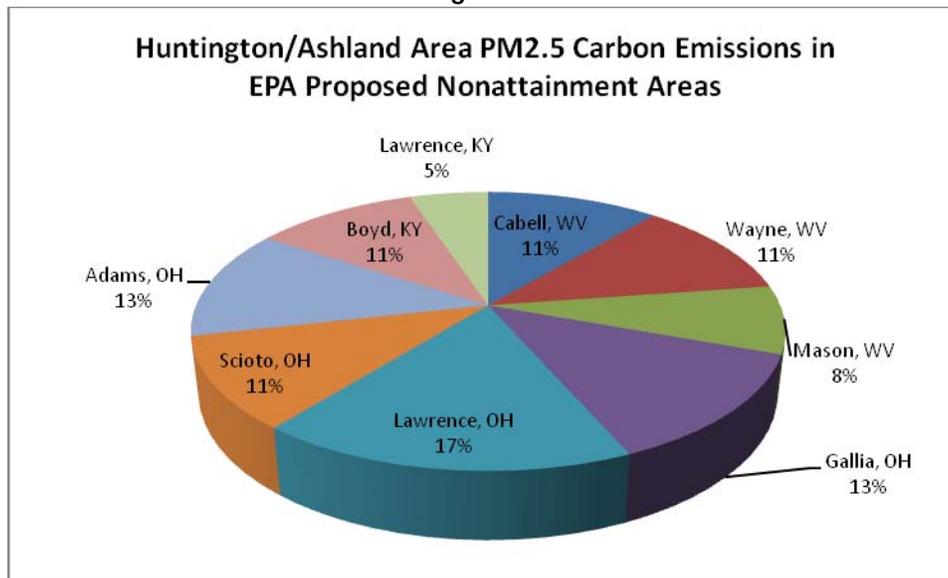


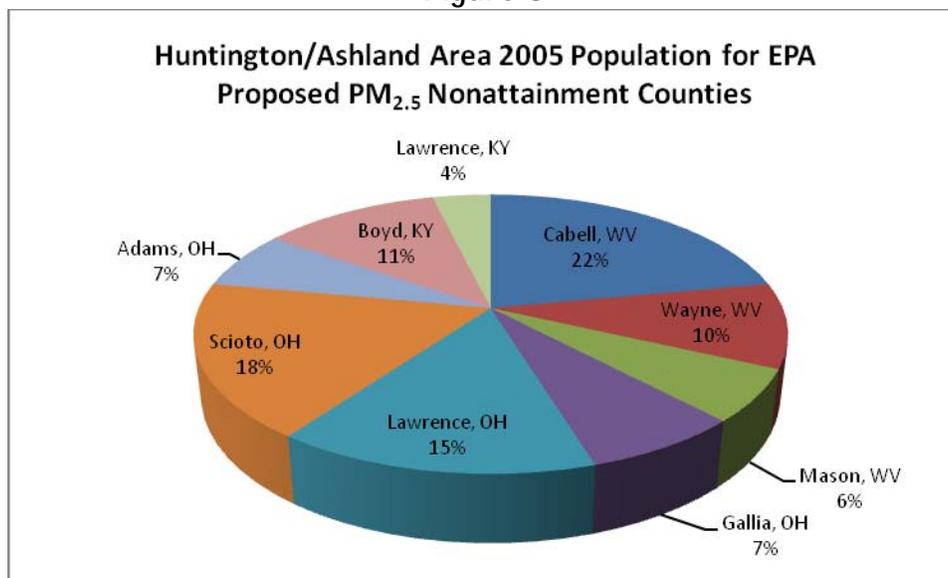
Figure 7



## Population Density and Growth

EPA stated that Boyd County had relatively high population growth that had the potential to impact PM<sub>2.5</sub> violations in the area. Boyd County makes up only 12% of the population within EPA's proposed nonattainment boundaries, see Figure 8 below.

Figure 8



Additionally, the 2005 census data indicates Boyd County's population from 2000 through 2005 *decreased* by approximately 0.8% (49,752 to 49,37). The population in the county is expected to decrease overall by 1.0% between 2000 and 2015.

Therefore, Kentucky believes that the population in Boyd County does not have the potential to contribute to PM<sub>2.5</sub> violations in the area.

## Conclusion

Based on the factors discussed above, Kentucky believes that Boyd County should be designated attainment for the PM<sub>2.5</sub> standard.

- Kentucky believes that EPA's use of the contributing emissions scoring approach was skewed. A review of actual percentages of emissions contributions to an area shows that Boyd County does not have the potential to contribute to PM<sub>2.5</sub> levels within the region.
- The population of Boyd County is not significant enough to have the potential to impact PM<sub>2.5</sub> levels in the region. Population in this area has shown a continuing decline over the last several years and that decline is anticipated to continue. Boyd County's population actually represents only 12% of the population within EPA's proposed nonattainment boundaries.
- Additional emission reductions on a national and regional level will provide substantial benefits in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

Based on the above conclusions, Boyd County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies. Substantial local emission reductions from Boyd County have already occurred, or will have occurred well before attainment dates for this standard. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, and the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the result should be that Boyd County, Kentucky, be designated attainment for the PM<sub>2.5</sub> Standard.

## LAWRENCE COUNTY, KENTUCKY

Lawrence County is south of the Huntington-Ashland Metropolitan Statistical Area (MSA) and is located to the south of Boyd County and to the southwest of Huntington, West Virginia. The Big Sandy River forms its eastern border.

EPA's August 19, 2008 proposal on appropriate designations for Kentucky included Lawrence County as nonattainment based on the following criteria:

- EPA indicates that Lawrence County has moderate SO<sub>x</sub>, and NO<sub>x</sub> emissions from a power plant and its close proximity to the violating MSA monitors.

### Emissions Data

In Kentucky's June recommendations, the 2002 VISTAS ASIP modeling inventory was used for the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website. Using the data from NEI, the following information was developed.

Kentucky noticed that no information or data was given for Mason County, West Virginia even though the EPA letter addressed to West Virginia listed Mason County as being considered for nonattainment status. Mason County's emission and population numbers were collected and included into Kentucky's data and are represented in the information below.

Adams and Gallia Counties alone contribute 60% of all SO<sub>x</sub> within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Lawrence County emits only 13% of SO<sub>x</sub> emissions from the counties recommended by EPA as having the potential to impact the violating monitors. A similar comparison can be made with both NO<sub>x</sub> and PM. Lawrence County's NO<sub>x</sub> and PM emissions rank at 8% and 10% of the total EPA recommended areas, respectively. In a detailed review of EPA's recommended nonattainment areas, Lawrence County ranks consistently at less than

or equal to 12% of combined emissions contributions within EPA's proposed nonattainment boundaries. See Figures 1-4 below.

Figure 1

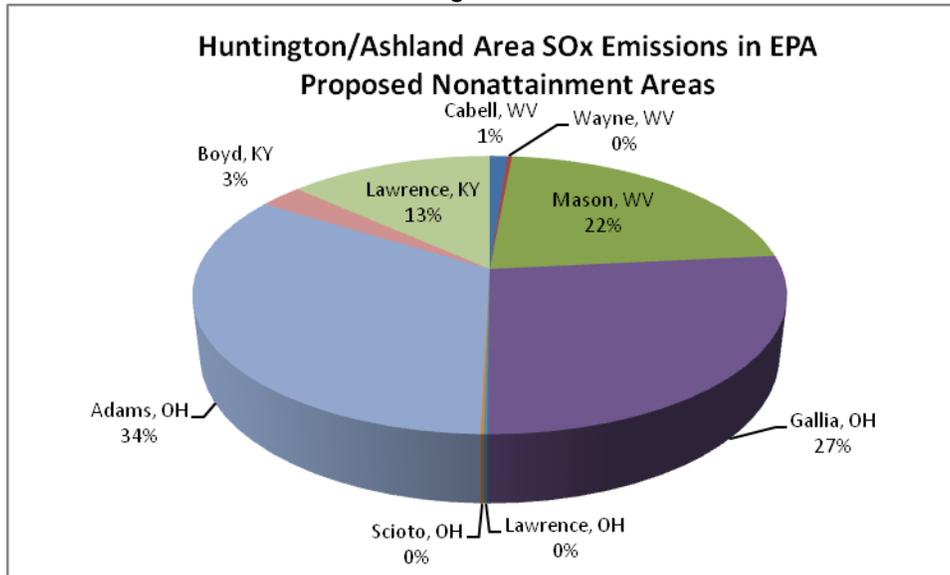


Figure 2

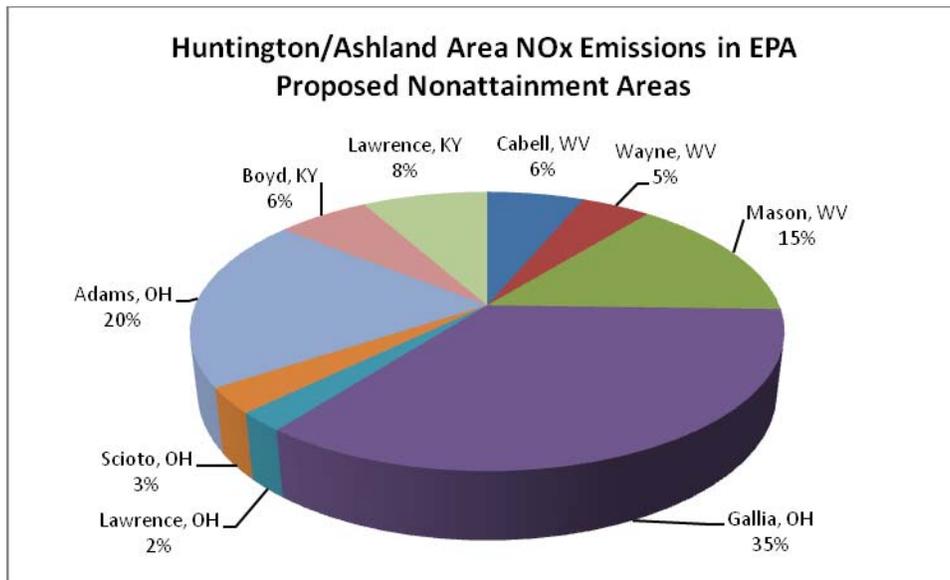


Figure 3

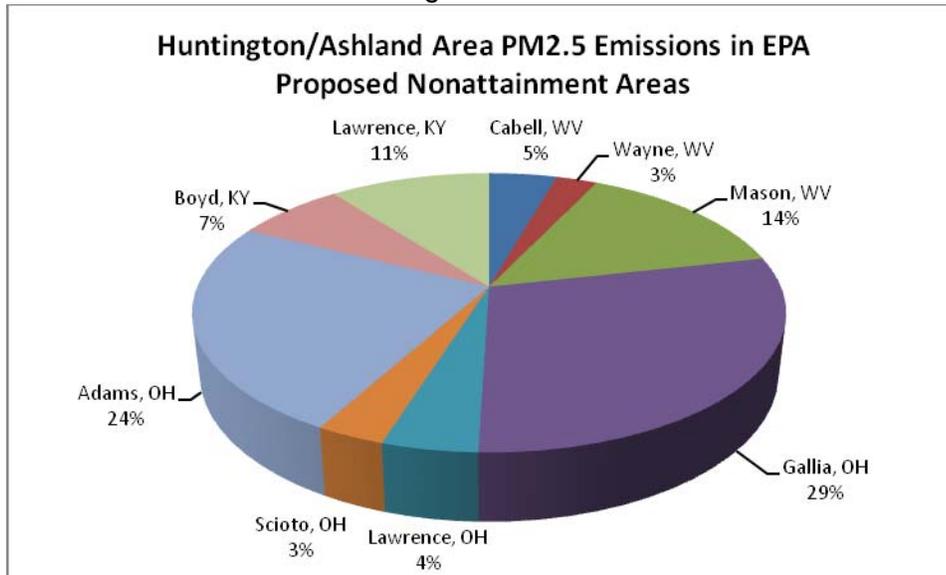
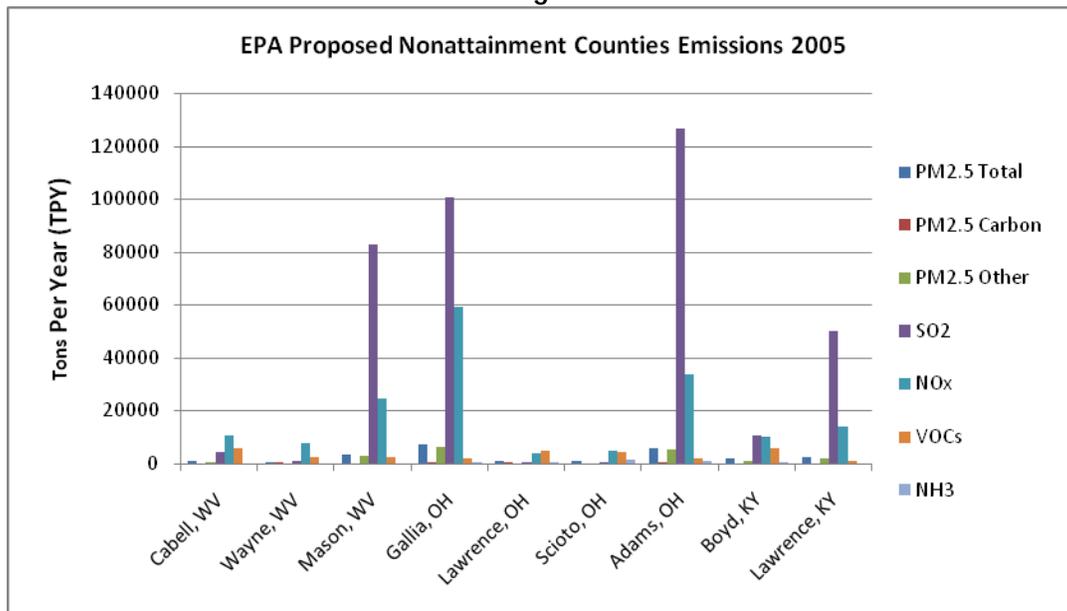


Figure 4



## Additional Emission Reductions in Lawrence County, Kentucky

American Electric Power (AEP), which is located in Lawrence County, consists of two pulverized coal-fired boilers:

Unit 01 (BSU1: 2512 mmBTU/hour 260 MW) is a pulverized coal-fired, dry bottom, wall-fired unit constructed on or before January 1963, equipped with overfire air, low NOX burners and an electrostatic precipitator.

Unit 02 (BSU2: 7914 mmBTU/hour 800 MW) is a pulverized coal-fired, dry bottom, wall-fired unit constructed on or before October 1969, equipped with an electrostatic precipitator, ammonia flue gas conditioning, low NOX burners, and selective catalytic reduction.

Pursuant to a 10/9/2007 consent decree and for BART, AEP must install a SO<sub>2</sub> FGD scrubber on the larger Big Sandy Unit 2 by December 31, 2015. Assuming a conservative 90 percent control on the 2007 SO<sub>2</sub> emissions from Unit 2, the required scrubber would significantly reduce SO<sub>2</sub> emissions from AEP Big Sandy by an estimated 36,971 tons per year when the scrubber is operational on Unit 2. Also, pursuant to the consent decree AEP Big Sandy Unit 1 now is required to continue to burn coal with a sulfur content of no greater than 1.75 lb/mmBTU on an annual basis. In addition to the FGD scrubber on Unit 2 for BART, AEP is also required for BART to install ammonia injection on Unit 1 to address inorganic condensable emissions to improve visibility in Class I areas.

Given the existing and future new controls required for AEP Big Sandy by consent decree and BART, KYDAQ requests that EPA consider this information regarding the reduction in emissions at AEP for the attainment/nonattainment designations.

<b>AEP Big Sandy Level of Emission Control*</b>				
<b>Pollutant</b>	<b>Unit 2 2007 Actual Emissions (tpy)</b>	<b>Unit 2 2007 Actual Emissions With FGD Control Applied* (tpy)</b>	<b>Total Plant 2007 Actual Emissions (tpy)</b>	<b>Total Plant 2007 Actual Emissions With Unit 2 FGD Control Applied* (tpy)</b>
SO <sub>2</sub>	41,079	4,108	54,192	17,221

\*Assuming a conservative control efficiency of 90%, the FGD scrubber required by consent decree on AEP Unit 2 would significantly reduce SO<sub>2</sub> emissions by an estimated 36,971 tons per year based on 2007 emissions.

## Additional Regional/National Controls

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire

area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NOx emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

### Monitoring Data

The monitor located in Boyd County shows attainment with the PM<sub>2.5</sub> standard. As can be seen in Figure 5 below, the speciation data from Kentucky's Ashland speciation monitor indicates that sulfate and organic carbon are the major components of the PM<sub>2.5</sub> values. As can be seen in Figure 1 above and Figure 6 below, Lawrence County, Kentucky, contributes only 13% of the SO<sub>2</sub> in the area, and only 5% of the organic carbon within EPA's proposed nonattainment counties.

Figure 5

**Ashland Health Department  
AIRS Code 210190017 POC 5 (ROUTINE)  
Date(s): 1/5/2006 - 12/31/2006  
Average Concentration (µg/m<sup>3</sup>)**

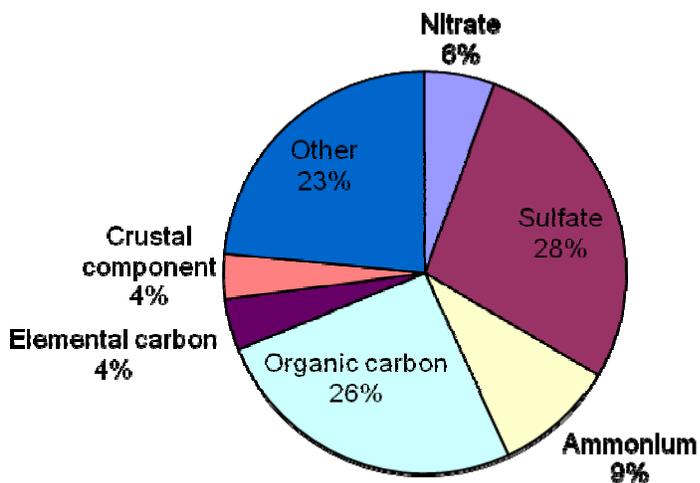
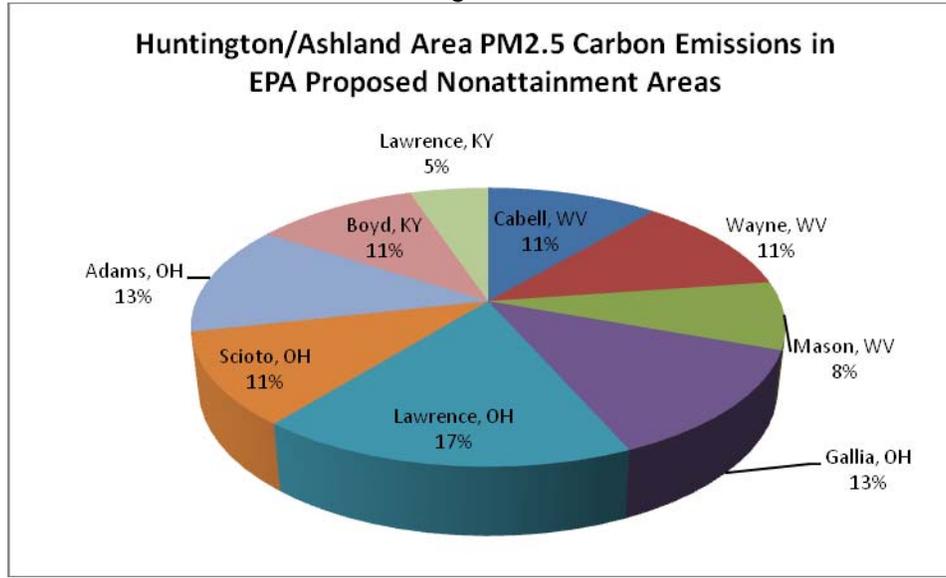


Figure 6



## Conclusions

Based on the factors discussed above, Kentucky believes that Lawrence County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard.

- Kentucky believes that EPA's use of the contributing emissions scoring approach was skewed. A review of actual percentages of emissions contributions to an area shows that Lawrence County does not have the potential to contribute to PM<sub>2.5</sub> levels within the region.
- Given the existing and future new controls required for AEP Big Sandy by consent decree and BART, KYDAQ requests that EPA reconsider its decision and not designate a portion of Lawrence County, Kentucky nonattainment for the 24-hour particulate matter standard.
- Additional emission reductions on a national and regional level will provide substantial benefits in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs, and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

Based on the above conclusions, Lawrence County, Kentucky should be designated attainment for the PM 2.5 standard. To have this county designated nonattainment would invoke additional, substantial, and unnecessary requirements on local government planning agencies. Substantial local NO<sub>x</sub> emission reductions from

Lawrence County have already occurred. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, and the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the result should be that Lawrence County, Kentucky, should be designated attainment for the PM<sub>2.5</sub> Standard.

## Bullitt County, Kentucky

Bullitt County is part of the Louisville, KY-IN Metropolitan Statistical Area (MSA) and is on the I-65 South interstate corridor. It is located directly south of Jefferson County, southwest of Spencer County, northwest of Nelson County, and northeast of Hardin County.

EPA's August 19, 2008, proposal on appropriate designations for Kentucky included Bullitt County as nonattainment based on the following criteria:

- EPA indicates that Bullitt County has significant emissions and close proximity to the violating MSA monitors.
- EPA indicates that Bullitt County has monitoring data very close to the PM<sub>2.5</sub> standard, and that this indicates a potential to contribute to the PM<sub>2.5</sub> violations in the area;
- EPA indicates that Bullitt County had a high population growth between 2000 and 2005 compared to the other counties in the Louisville area.
- EPA indicates that Bullitt County had a sizable increase in VMT from 1996-2005, an increase greater than Clark, Floyd and Hardin Counties in the Louisville Area.

### Emissions Data

In Kentucky's December recommendations, the 2002 VISTAS ASIP modeling inventory was used for the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website. Using the data from NEI, the following information was developed.

Floyd County in Indiana, and Jefferson County in Kentucky contribute 96% of all SO<sub>x</sub> within the counties EPA has recommended as nonattainment for PM<sub>2.5</sub>. By comparison, Bullitt County emits only 1% of SO<sub>x</sub> emissions from the counties

recommended by EPA as having the potential to impact the violating monitors. A similar comparison can be made with both NO<sub>x</sub> and PM. Bullitt County's NO<sub>x</sub> and PM emissions rank at 4% and 6% of the total EPA recommended areas, respectively. In a detailed review of EPA's recommended areas to be designated nonattainment, Bullitt County ranks consistently at less than or equal to 2% of combined emissions contributions within EPA's proposed nonattainment boundaries. See Figures 1-4 below.

Figure 1

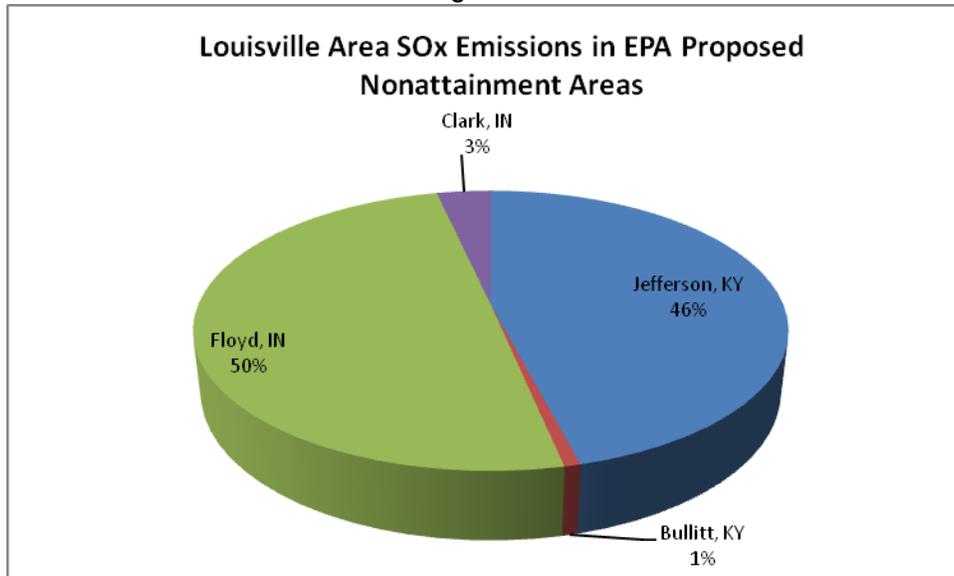


Figure 2

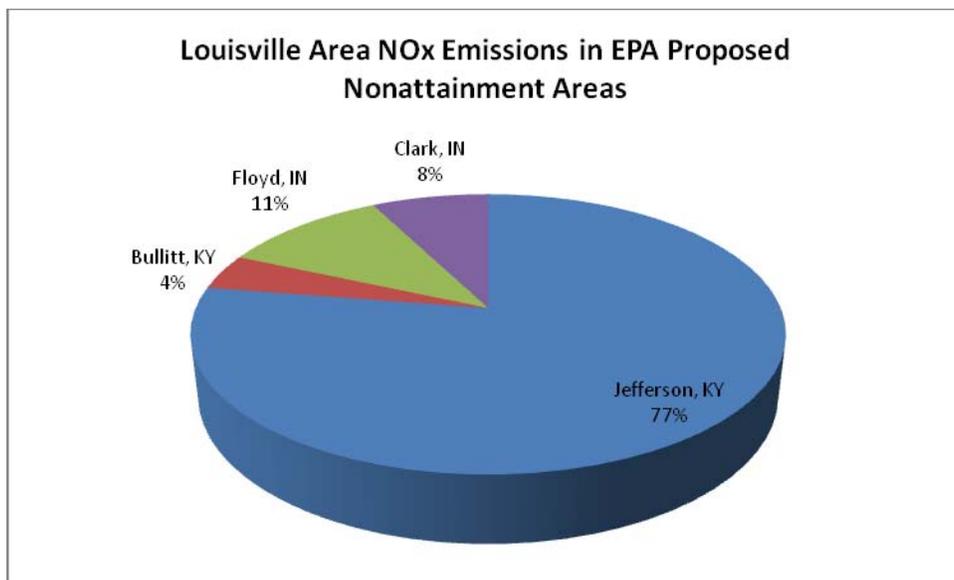


Figure 3

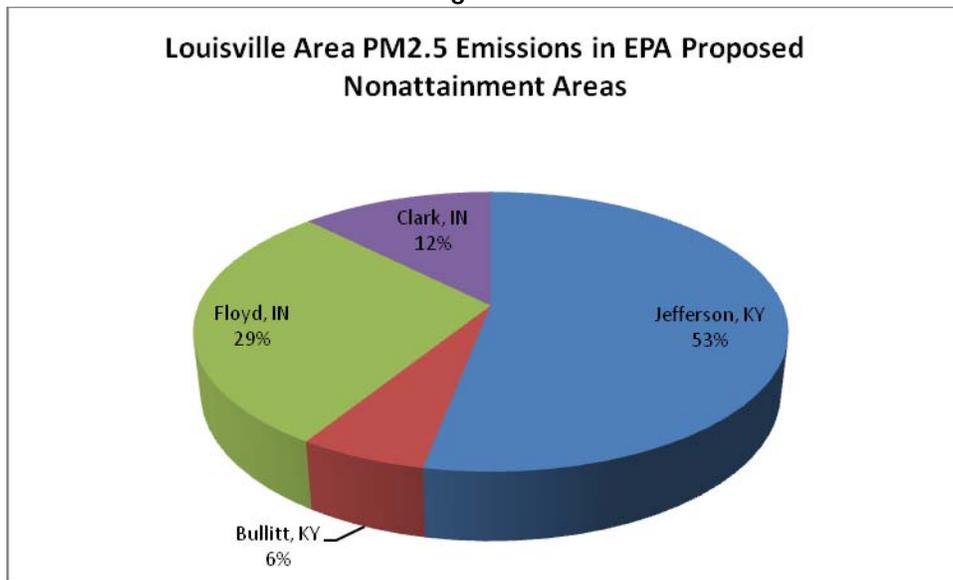
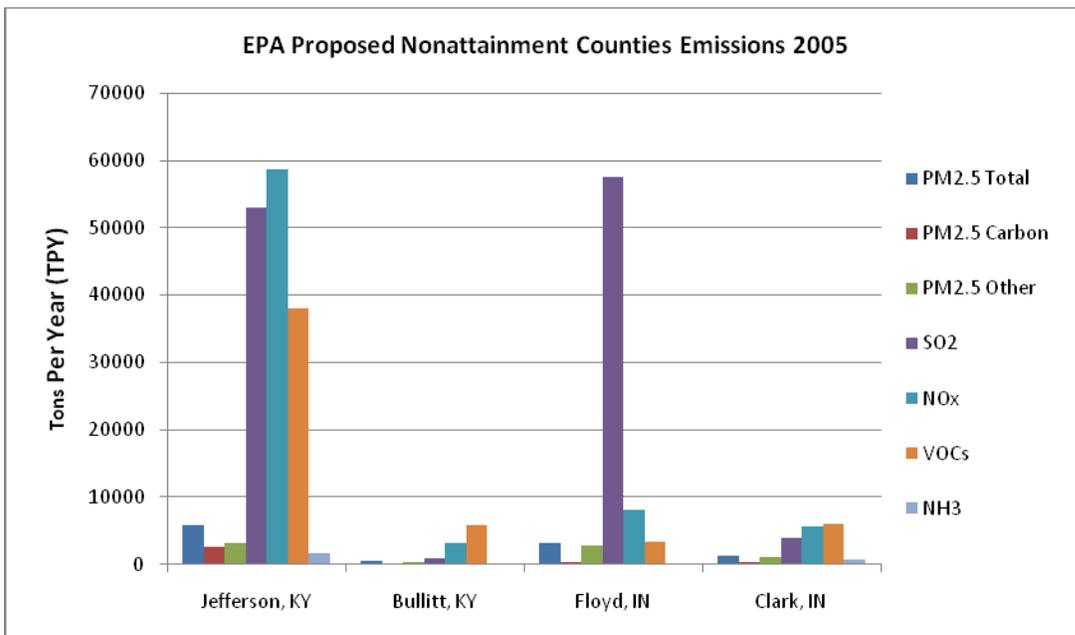


Figure 4



In Figure 5 below, the data from Jefferson County's speciation monitor on Barret Avenue indicates that sulfates are the major components of the PM<sub>2.5</sub> values in the area. As can be seen in Figure 1 above and Figure 6 below, Bullitt County, Kentucky, contributes 1% of the SO<sub>2</sub> and approximately 8% of the total organic carbon emissions in the counties recommended by EPA as having the potential to impact the violating monitor.

Figure 5

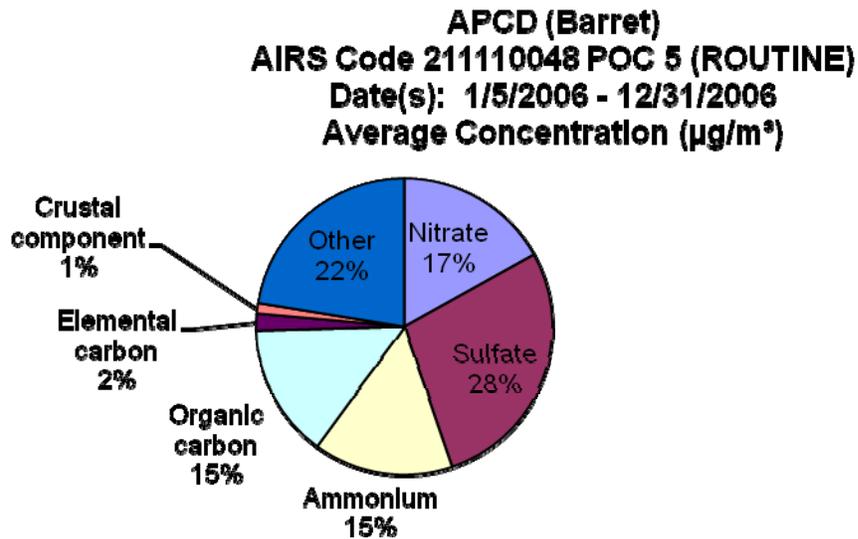
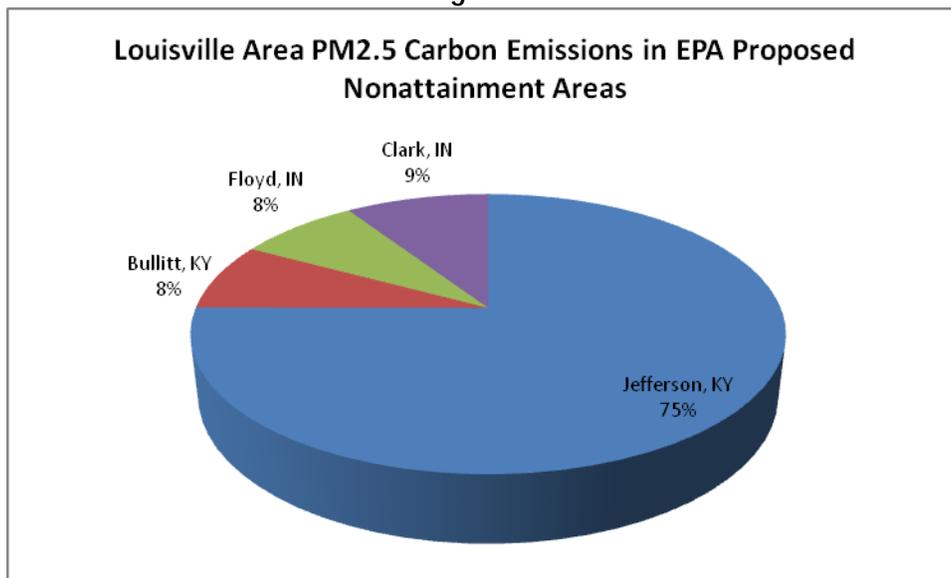


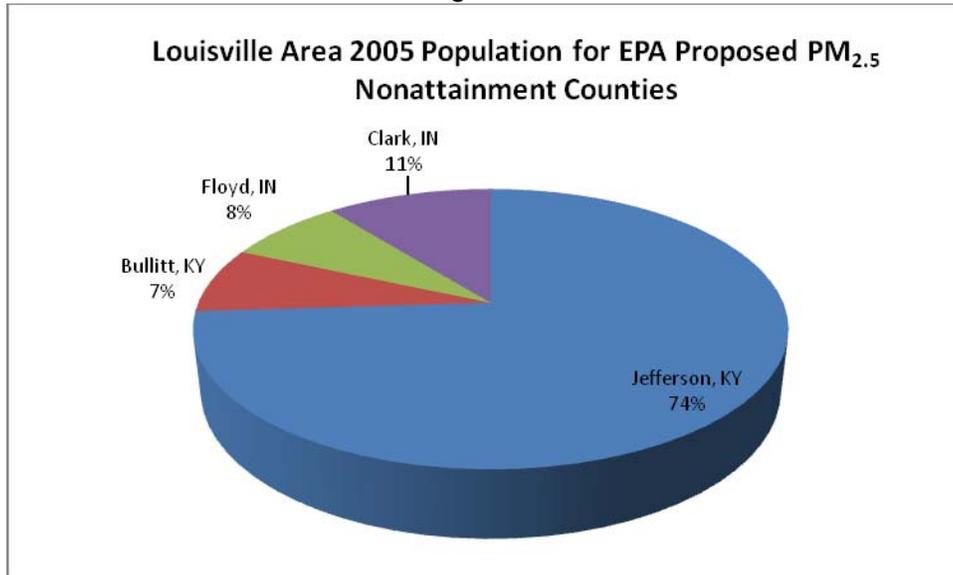
Figure 6



## Population Density and Growth

EPA stated that Bullitt County had relatively high population growth that had the potential to impact PM<sub>2.5</sub> violations in the area. Bullitt County makes up only 7% of the population within EPA's proposed nonattainment boundaries, see Figure 7 below.

Figure 7



## Traffic and Commuting Patterns

In Table 4 of the Louisville area, the data listed for Traffic and Commuting Patterns is erroneous when compared to the link to the technical information provided on EPA's website. If EPA is going to use this data to assess a county's candidacy for a nonattainment designation, it should ascertain that it is using the correct data in this assessment.

EPA's position on traffic and commuting patterns in the August 19<sup>th</sup> letter noted that Bullitt County has potentially significant numbers of commuters impacting the area. However, further in the document under a specific discussion of population levels, EPA states that Jefferson County has the highest population while Bullitt County's population is moderately sized. In 2005 Bullitt County contributed to only 7% of the population and 6.5% of the VMT's in the area recommended by EPA as having the potential to impact the violating monitors. Due to the small contribution from Bullitt County, this factor should also not be used in determining a nonattainment designation for this county.

It is important to note that any possible impacts from population or commuter contributions from Bullitt County would be mitigated by the later referenced national fuel programs: the Low Sulfur Diesel Program and the Tier 2 Vehicle and Gasoline Low Sulfur program.

Therefore, Kentucky believes that Bullitt County does not have the population, or VMT potential to contribute to PM<sub>2.5</sub> violations in the area.

## Regional/National Controls

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## Conclusions

Based on the factors discussed above, Kentucky believes that Bullitt County should be designated attainment for the PM<sub>2.5</sub> standard.

- Kentucky believes that EPA's use of the contributing emissions scoring approach was skewed. A review of actual percentages of emissions contributions to an area shows that Bullitt County does not have the potential to contribute to PM<sub>2.5</sub> levels within the region.
- Emissions data, population, and commuter data show that the actual percentage of contribution from Bullitt County itself is exceptionally low compared to other counties within the region. This analysis actually points to Bullitt County monitor being impacted by emissions from somewhere else within the region.
- Additional emission reductions on a national and regional level will provide substantial benefits in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs, and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

Based on the above conclusions, Bullitt County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies, especially since a thorough review of information shows that Bullitt County is being impacted by emissions coming from outside the county. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the downward trend in

monitored values, and the result is that Bullitt County, Kentucky, should be designated attainment for the PM<sub>2.5</sub> Standard.

## Jefferson County, Kentucky

Jefferson County is part of the Louisville, KY-IN Metropolitan Statistical Area (MSA) and is located at the intersection of the I-65 North-South, I-71 North-South, and I-64 East-West interstate corridors in central Kentucky.

EPA's August 19, 2008, proposal on appropriate designations for Kentucky included Jefferson County as nonattainment based on the following criteria:

- EPA indicates that Jefferson County has significant emissions and close proximity to the violating MSA monitors.
- EPA indicates that Jefferson County has monitoring data violating the PM<sub>2.5</sub> standard, and that this indicates a potential to contribute to the PM<sub>2.5</sub> violations in the area;
- EPA states that Jefferson County has relatively high traffic and commuting patterns, and that Jefferson County's population growth is significant enough to contribute to PM<sub>2.5</sub> violations in the MSA.
- EPA indicates that Jefferson County had a sizable increase in VMT from 1996-2005, an increase greater than Clark, Floyd and Hardin Counties in the Louisville Area.
- EPA indicates that Jefferson County has significant emissions and two large power plants (Cane Run and Mill Creek) that contribute to the nonattainment area.

### Emissions Data

In Kentucky's December recommendations, the 2002 VISTAS ASIP modeling inventory was used for the original analysis. It is important to note here that EPA, in their review, used the 2005 NEI data.

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website.

## Traffic and Commuting Patterns

In Table 4 of EPA's letter for the Louisville area, the data listed for Traffic and Commuting Patterns is erroneous when compared to the link to the technical information provided on EPA's website. If EPA is going to use this data to assess a county's candidacy for a nonattainment designation, it should ascertain that it is using the correct data in this assessment.

On several occasions Kentucky indicated to Region IV personnel that we wanted to review the documentation for the VMTs EPA utilized in the boundary recommendation letter of August 19. In some cases these numbers were significantly different from the numbers that Kentucky used in the recommendation package. As of the date of this letter, no additional documentation on the VMTs that EPA used has been made available, therefore Kentucky has had no opportunity to review and/or analyze the numbers contained in EPA's August 19 letter.

With the VMT data, a review and improvement of the commuting table data, ideally to also include locally derived current data, would give a more accurate picture. For instance, Louisville's VMT from local current calculations are approximately 4%-20% different from the data in the Traffic and Commuting Patterns table in EPA's response letter. In addition, columns to the right of '2005 VMT' would likely be significantly different using local data as opposed to 2000 census data. Census data versus locally derived data would likely also significantly affect the VMT growth rates in the section titled growth rates and patterns.

It is important to note that any possible impacts from population or commuter contributions from Jefferson County would be mitigated by the later referenced national fuel programs; the Low Sulfur Diesel Program and the Tier 2 Vehicle and Gasoline Low Sulfur program.

Therefore, Kentucky believes that Jefferson County does not have the population, or VMT potential to contribute to PM<sub>2.5</sub> violations in the area.

## Regional/National Controls

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## Monitoring Data

Kentucky has enclosed the response to EPA's comments for consideration of data under the Exceptional Events rule in the Exceptional Events section located toward the back of this document. As can be seen in Figure 1 below, it appears that Kentucky would have met the daily standard if the submitted dates were all flagged.

Figure 1

Daily Standard/Excluding All Flagged Data							
Site Name	2004	2005	2006	2007		2004-2006	2005-2007
Southwick	29.3	37.3	29.8	31.8		32.1	33.0
Wyandotte	28.3	33.8	30.9	31.4		31.0	32.0
Barret	28.3	35.2	29.4	30.6		31.0	31.7
Watson	25.8	30	28.4	32		28.1	30.1
Jeffersonville	27.9	35.1	32.2	37		33.1	34.8

## Conclusions

Based on the factors discussed above, Kentucky believes that Jefferson County should be designated attainment for the PM<sub>2.5</sub> standard.

- Additional emission reductions on a national and regional level will provide substantial benefits in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs, and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.
- EPA should have determined that the correct data was being used for the VMT assessment. Also the VMT data should include locally derived current data which would give a more accurate picture.
- Each monitor in the Louisville area would meet the daily standard if EPA approves Kentucky's submitted exceptional events dates.

Based on the above conclusions, Jefferson County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and

the downward trend in monitored values, and the result is that Jefferson County, Kentucky, should be designated attainment for the PM<sub>2.5</sub> Standard.

## MCCRACKEN COUNTY, KENTUCKY

McCracken County is part of the Paducah-Mayfield, Kentucky-Illinois, Metropolitan Statistical Area (MSA). Paducah is located 137 miles northwest of Nashville, Tennessee; 176 miles southeast of St. Louis, Missouri; and 217 miles southwest of Louisville, Kentucky.

EPA's August 19, 2008 proposal on appropriate designations for Kentucky included McCracken County as nonattainment based on the following criteria:

- EPA indicates that McCracken County has significant emissions and a large power plant in the County;
- EPA indicates that McCracken County has monitoring data violating the PM<sub>2.5</sub> standard, and that this indicates a potential to contribute to the PM<sub>2.5</sub> violations in the area;
- EPA indicates that Kenton County has a population density that is significant enough to contribute to PM<sub>2.5</sub> violations in the MSA;
- EPA indicates that McCracken County had a sizable increase in VMT from 1996 to 2005;
- EPA states that McCracken County has relatively high traffic and commuting patterns that are significant enough to contribute to PM<sub>2.5</sub> violations in the MSA.

### Emissions Data

U.S. EPA used a list of counties including some that were outside of the MSA for certain Factor analyses, and would exclude these same counties in different Factor analyses. It seems inconsistent to make comparisons with one population of statistical data, and then continue comparisons with a different population of statistical data. This comment also applies where U.S. EPA used certain time intervals for one Factor analysis and a different time interval in another Factor analysis.

Kentucky attempted to use the data directly from EPA's response letter to calculate emission and population percentages. However, some errors were discovered in the data, which is discussed in detail in the General Comments section of this document. It was decided to review the data from the NEI website.

In Table 1 of EPA's letter for the Paducah area, the data listed for PM<sub>2.5</sub> emissions total is erroneous when compared to the 2005 NEI data. If EPA is going to use this data to assess a county's candidacy for a nonattainment designation, it should ascertain that it is using the correct data in this assessment

## ADDITIONAL REGIONAL/NATIONAL CONTROLS

The implementation of new federal rules to decrease the amount of sulfur in both gasoline and diesel fuel will significantly decrease the amount of SO<sub>2</sub> in the entire area. Because of the Low Sulfur Diesel Rule, in 2007, new clean engines operating on 15-ppm sulfur diesel fuel will reduce NO<sub>x</sub> emissions by 50%, and reduce PM emissions by more than 90%. Due to the Tier 2 Vehicle and Gasoline Sulfur program, the average national gasoline sulfur levels were lowered 90% in 2006.

## MONITORING DATA

Kentucky has enclosed the response to EPA's comments for consideration of data under the Exceptional Events rule in the Exceptional Events section located toward the back of this document. As can be seen in Figure 1 below, it appears that Kentucky would have met the daily standard if the submitted dates were all flagged.

Figure 1

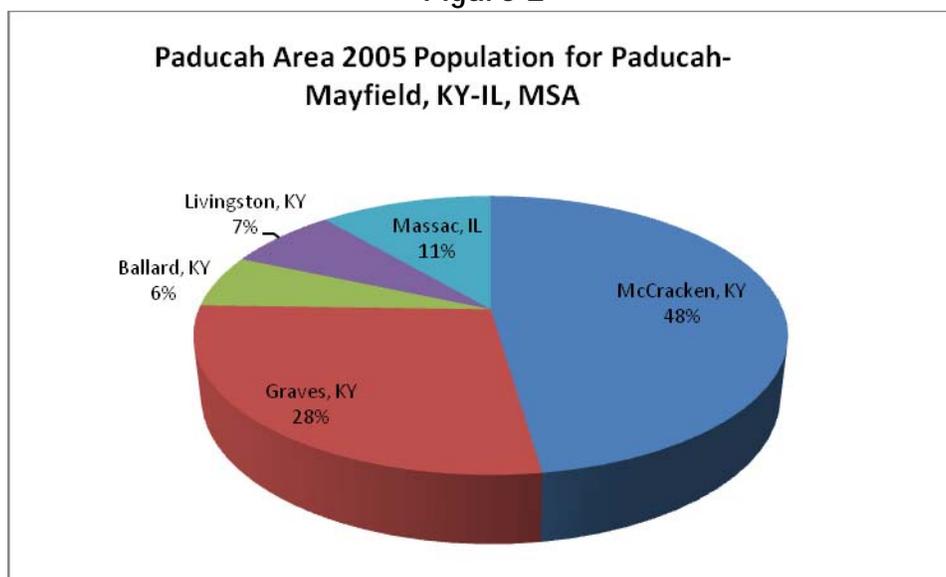
Daily Standard/Excluding All Flagged Data				
County Site ID #	2004 24-hour	2005 24-hour	2006 24-hour	2004-2006 3-year avg. 24-hour
McCracken 21-145-1004	26.5	28.6	31.4	28.8

County Site ID #	2005 24-hour	2006 24-hour	2007 24-hour	2005-2007 3-year avg. 24-hour
McCracken 21-145-1004	28.6	31.4	33.9	31.3

## Population Density and Growth

EPA stated that McCracken County had relatively high population growth that had the potential to impact PM<sub>2.5</sub> violations in the area. McCracken County makes up 48% of the population in the entire MSA, see Figure 2 below.

Figure 2



The 2006 census data indicates McCracken County's population from 2000 through 2006 *decreased* by approximately 0.9% (65,514 to 64,950). The population in the county is expected to decrease overall by 2.1% between 2000 and 2015.

Therefore, Kentucky believes that the population in McCracken County should not be used as a determining factor for potential contributions to PM<sub>2.5</sub> violations in the area.

## Conclusions

Based on the factors discussed above, Kentucky believes that McCracken County should be designated attainment for the PM<sub>2.5</sub> standard.

- The monitor located in McCracken County would meet the daily standard if EPA approves Kentucky's submitted exceptional events dates.
- The population of McCracken County has shown a continuing decline over the past several years and that decline is anticipated to continue.
- Additional emission reductions on a national and regional level will provide substantial benefits in the region. The anticipated sulfur reductions due to the Low Sulfur Diesel Rule, the Tier 2 Vehicle and Gasoline Sulfur programs, and the Clean Air Interstate Rule (CAIR), or its' replacement, will further lower pollutant levels within this region.

Based on the above conclusions, McCracken County, Kentucky should be designated attainment for the PM<sub>2.5</sub> standard. To have this county designated nonattainment would invoke additional, substantial, unnecessary requirements on local government planning agencies with little or no benefit to the area.

Substantial local emission reductions from McCracken County have already occurred, or will have occurred well before attainment dates for this standard. Drastic emission reductions are scheduled to occur in the mobile sector throughout the next several years that will greatly impact pollutant levels in the area. Couple these changes with those anticipated by the CAIR, or its' replacement, provisions which will further reduce SO<sub>x</sub> and NO<sub>x</sub> emissions within the region, and the air monitoring data demonstrating attainment of the PM<sub>2.5</sub> Standard, and the result should be that McCracken County, Kentucky, be designated attainment for the PM<sub>2.5</sub> Standard.

**PM<sub>2.5</sub> Exceptional Events Technical  
Support Document**

**Louisville, KY-IN Metropolitan  
Statistical Area**

**2004-2007**

## **Comments on PM<sub>2.5</sub> Exceptional Events Technical Support Document for the Louisville, KY-IN Metropolitan Statistical Area (2004-2007)**

### **General Comments**

There are four critical requirements for the demonstration to justify data exclusion for exceptional events listed in 40 CFR 50.14.

Section (c) (3) (iii) reads

“The demonstration to justify data exclusion shall provide evidence that:”

- (A) The event satisfies the criteria set forth in 40 CFR 50.1(j);
- (B) There is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected the air quality in the area;
- (C) The event is associated with a measured concentration in excess of normal historical fluctuations, including background; and
- (D) There would have been no exceedance or violation but for the event.

The order of the criteria is intentional and critical to the evaluation of exceptional events. Logically one would determine if the event met the criteria, then would determine if the event actually affected air quality in the area, and then determine if that affect was in excess of normal historical fluctuations, etc. The last evaluation would be to determine if an exceedance or violation of a standard was caused by the event.

### **Comments on Step 1 Monthly Average Comparison (page 2):**

EPA uses a 3-year monthly average as one of its benchmarks for determining a “normally expected concentration” at the site. Given the annual variations in measured monthly means this methodology may not be appropriate for every event especially in an urban setting.

EPA also uses the 24-hour NAAQS as the upper benchmark. “If the three-year average was greater than the annual PM<sub>2.5</sub> NAAQS and the requested value was less than the 24-hr PM<sub>2.5</sub> NAAQS then EPA concurrence was not given to the requested value.” This practice appears to be in conflict with the guidance provided in Federal Register/Vol 72, No. 55 page 13570. C. Use of a “But For” Test, 2. Final Rule.

“The short-term NAAQS is based on a 3-year average of the annual 98<sup>th</sup> percentile of 24-hour values. Therefore, it is possible that one or two of these annual concentration values may be below the level of the NAAQS while the 3-year average is above the level of the NAAQS. Because three annual 98<sup>th</sup> percentile concentration values are included in the determination of a short-term PM<sub>2.5</sub> NAAQS violation, individual measurements below the NAAQS may contribute to a violation.”

“To accommodate the 3-year form of the PM<sub>2.5</sub> NAAQS, this rule will allow measurements whose concentrations are greater than the level of the annual NAAQS to be flagged as being affected by exceptional events for the purposes of contributing to an exceedance or violation of the PM<sub>2.5</sub> NAAQS.”

“Thus we provide the following clarification that individual measured values greater than the annual PM<sub>2.5</sub> NAAQS will be considered ‘exceedances’ under this rule and therefore eligible to be considered for exclusion for comparisons to either the annual or 24-hour NAAQS.”

For the upper benchmark LMAPCD used the annual 95<sup>th</sup> percentile because this level appeared to better correlate with the definition that the event is unlikely to recur at a particular location. The 95<sup>th</sup> percentile addresses the use of the 98<sup>th</sup> percentile for the short-term NAAQS and also takes into consideration the effect that measured values above the annual standard but below the short-term standard may have on the calculation of the 3-year annual averages used for comparison against the annual NAAQS.

EPA does include a 95<sup>th</sup> percentile value in their analysis but because these values do not match the 95<sup>th</sup> percentiles calculated by LMAPCD, an explanation of how they were calculated is necessary. In some cases the 95<sup>th</sup> percentiles listed in the tables are higher than the annual 98<sup>th</sup> percentiles for the sites.

#### **Comments on EPA denial of July 4, 2004 submittal:**

Page 4

EPA states that LMAPCD did not clearly demonstrate a clear causal relationship between the measured concentration and the event. LMAPCD used strip chart data from continuous instruments (TEOMs) to establish a clear causal relationship between the event and measured readings. The strip charts clearly show increasing levels of PM<sub>2.5</sub> as the fireworks begin and then decreasing levels as they end. Given the fact that EPA encourages the use and deployment of continuous instruments for other purposes including issuance of the Air Quality Index, pollution maps, and modeling, further guidance is requested from EPA as to why they do not consider this data sufficient for exceptional event purposes.

Part of EPA’s denial is based on a 2-step analysis that uses monthly means to determine if the event meets requirement C under the definition of an exceptional event. This analysis is inappropriate for fireworks. The impact from fireworks typically lasts only a few hours but that impact is from emissions several magnitudes higher than what would normally occur. The strip chart data submitted by LMAPCD clearly show measured values as high as 280µg/m<sup>3</sup> occurred during the fireworks displays. LMAPCD contends the measurements made by the continuous instruments provide evidence that measured concentrations during the event were significantly beyond normal historical fluctuations and therefore these events meet requirement C.

To support LMAPCD’s concern that the 2-step analysis used by EPA may exclude events that should be considered, the following analysis is provided.

Data collected by the continuous instruments located at the sites were used to estimate the potential impact of the fireworks on the FRM measurements. Using this method, the 24-hour average was calculated for the TEOMs (TEOM Value) using all the data and then recalculated excluding the data that were collected during the fireworks displays (Adjusted TEOM). The difference divided by the TEOM measurement produced the (% Contribution of Fireworks to TEOM Mass). Assuming a proportional relationship between the TEOMs and the FRMs this % contribution was then applied to the (FRM Value) and the difference (FRM Mass attributed to fireworks) was subtracted from (FRM Value) to produce (Adjusted FRM). In this case, the adjusted FRM values were below the annual standard which suggests that “but for” the fireworks, the exceedance would not have occurred.

AQS ID	Sample Date	FRM Value	TEOM Value	Adjusted TEOM Value	% Contribution of Fireworks to TEOM Mass	FRM Mass attributed to fireworks	Adjusted FRM
21-111-0043-1	7/4/04	33.1	39.8	15.4	61%	20.1	13.0
21-111-0043-2	7/4/04	25.4	39.8	15.4	61%	15.5	9.9
21-111-0044	7/4/04	26.4	38.9*	16.8	57%	15.0	11.4

\* TEOM at this site is a PM<sub>10</sub>

**Comments on EPA denial of July 3-4, 2005 submittal:**

Page 5

There is an error in table 2 for AQS ID 21-111-0051. The observed concentration of 28.9 occurred on 7/3/05 not 7/4/05.

LMAPCD contends that the strip chart data from the continuous instruments meets requirement B and establishes a clear causal relationship between the measurements claimed. The strip charts clearly show measured values as high as 251µg/m<sup>3</sup> occurred during the fireworks displays and therefore requirement C is met.

**Comments on EPA denials of data for the July 3-4-2006 submittal:**

Page 6

EPA Region 4’s denial of most of the values for this event appears to be based on the flagged values being above the monthly mean and below 35µg/m<sup>3</sup>. This analysis is not consistent with the guidance provided nor is it consistent with the analysis conducted by EPA Region 5 which concurred with a value of 31.4µg/m<sup>3</sup> for the Jeffersonville, Indiana monitor for this same event.

**Comments on November 11-12, 2005 Fort Knox Range Fire:**

Page 11 Table 4

The observed concentration for 21-111-0044 on 11/11/2005 should be 28.8. There was no sample collected for site 21-111-0048 on 11/11/2005.

**Comments on July 21, 2004 Events:**

Page 16

The data in Table 5 are incorrect. The correct data are:

AQS ID	Sample Date	Observed concentration	95 <sup>th</sup> percentile
21-111-0043-1	7/21/04	35.1	27.0
21-111-0043-2	7/21/04	35.7	27.6
21-111-0044	7/21/04	34.2	26.6

Page 16/Section B

The statement “The NOAA satellite smoke maps show no smoke plume coverage over the Louisville, KY-IN MSA from the 20<sup>th</sup> through the 23<sup>rd</sup> of July 2004 is misleading. The maps were used to show that a smoke plume had passed through the area during the event. This statement ignores the complex chemistry of PM<sub>2.5</sub> and assumes that the passing of a smoke plume over the area would have no impact on air quality once the visible part of the plume is dispersed.

Because incorrect data were used in EPA’s analysis, EPA should reanalyze the event using the correct data and allow for comments on the corrected analysis.

**Comments on September 8-13, 2005 Event:**

Page 21-22/Section B

This event was influenced by wildfires in two separate regions and therefore the demonstration was for smoke impact from Arkansas, Mississippi, Texas and the Northeastern United States. The HYSPLIT Model for September 7-10 shows the trajectory for the Northeastern fires. The HYSPLIT Model for September 11-13 shows the trajectory for the Arkansas, Mississippi, and Texas fires.

The statement the NOAA smoke plume maps provided is a composite of the dates listed is incorrect. Separate maps were provided for September 7-14. Only the last map was a composite and it was used to demonstrate the magnitude and the scale of the event. EPA should analyze this event using the separate maps for each date in making the determination as an exceptional event.

Given that sulfates typically account for approximately 30% of total mass, it would not be uncommon for the Louisville Metro area to also have higher sulfate values when mass measurements are higher. Although organic carbon is typically used as a tracer for wildfire smoke, the composition of smoke is much more complex than just organic carbon. The presence of elevated levels of organic carbon is simply one more piece of the puzzle. The assumption that the contribution of organic carbon has to be high enough to cause an exceedance ignores the contribution of other chemical species that may be attributed to the wildfire smoke and ignores the rest of the evidence provided.

Page 25/Section D

The heading September 13, 2006 for the chart is incorrect. It should be September 13, 2005.

**Comments on July 18-20, 2006 Event:**

Page 26/Section B

EPA states the HYSPLIT backward trajectory does not indicate the air mass traveling from the Kansas Wildfires. The trajectory was run back to the 16<sup>th</sup> where it ends in northwest Missouri and has a north east trajectory for the next day. Although the NOAA map indicates the fires originated in Kansas the densest portion of the plume is in the area where the trajectory begins.

Given that sulfates typically account for approximately 30% of total mass, it would not be uncommon for the Louisville Metro area to also have higher sulfate values when mass measurements are higher. Although organic carbon is typically used as a tracer for wildfire smoke, the composition of smoke is much more complex than just organic carbon. The presence of elevated levels of organic carbon is simply one more piece of the puzzle. The assumption that the contribution of organic carbon has to be high enough to cause an exceedance ignores the contribution of other chemical species that may be attributed to the wildfire smoke and ignores the rest of the evidence provided.

**Comments on August 25-26, 2006 Event:**

Page 29/Section B

The statement that the NOAA satellite smoke maps show no smoke plume coverage over the Louisville, KY-IN MSA on August 25<sup>th</sup> and 26<sup>th</sup> is misleading. The maps were used to show that a smoke plume had passed through the area during the event. This statement ignores the complex chemistry of PM<sub>2.5</sub> and assumes that the passing of a smoke plume over the area would have no impact on air quality once the visible part of the plume is dispersed.

Page 30/Section D

Given that sulfates typically account for approximately 30% of total mass, it would not be uncommon for the Louisville Metro area to also have higher sulfate values when mass measurements are higher. Although organic carbon is typically used as a tracer for wildfire smoke, the composition of smoke is much more complex than just organic carbon. The presence of elevated levels of organic carbon is simply one more piece of the puzzle. The assumption that the contribution of organic carbon has to be high enough to cause an exceedance ignores the contribution of other chemical species that may be attributed to the wildfire smoke and ignores the rest of the evidence provided.

#### **Comments on June 2, 2007 Event:**

Page 32/Sections A & B

EPA states that this event was an air stagnation event and although the wind rose graphs do show calm conditions it also shows mild winds (3-6 mph) from the direction of the smoke plume. The mild winds from the direction of the smoke plume is also consistent with the Source Impact Tool analysis EPA performed in Section B. Therefore denying concurrence of the event due to air stagnation appears contradictory.

Page 33/Sections C & D

The sections appear to contradict each other. In section C, EPA states that the modeled concentrations of sulfate are below the seasonal average. In section D, EPA states the maps indicate a regional event of elevated sulfate concentrations and that the increased levels of sulfate negates the claim there would have been no exceedance “but for” the event.

In Section C the statement “modeled organic carbon is shown to be at or moderately above the average concentrations” suggests there was impact from the smoke. However, EPA appears to use the modeled levels as argument to deny concurrence. Modeling is simply another tool that may be used to support or deny an argument. In this case, one could also argue that the moderate increase in organic carbon and smoke shown by the model supports the argument that the fires impacted the area.

#### **Comments on August 2-4, 2007 Event**

Page 35/Section B

The statement that the NOAA Satellite Fire Detection maps do not sufficiently establish a casual relationship is questioned. The map for August 2<sup>nd</sup> submitted by LMAPCD indicates the smoke plume is so dense the State borders are difficult to distinguish.

The reference to wind speeds and calm conditions made by EPA do not match the local meteorological data provided. On August 2<sup>nd</sup> local data did not indicate calm conditions and there were wind speeds up to 8 mph. It is important to note this discrepancy because

this is the date the densest portion of the plume arrived. August 3<sup>rd</sup> and 4<sup>th</sup> were relatively calm which suggests the plume continued to cover the area over multiple days.

#### Page 36/Section C

The measured values flagged are clearly above the monthly mean, the 84<sup>th</sup> percentiles and the 95<sup>th</sup> percentiles and therefore are above historical fluctuations, including background.

#### Page 37/Section D

Given that sulfates typically account for approximately 30% of total mass, it would not be uncommon for the Louisville Metro area to also have higher sulfate values when mass measurements are higher. Although organic carbon is typically used as a tracer for wildfire smoke, the composition of smoke is much more complex than just organic carbon. The presence of elevated levels of organic carbon is simply one more piece of the puzzle. The assumption that the contribution of organic carbon has to be high enough to cause an exceedance ignores the contribution of other chemical species that may be attributed to the wildfire smoke and ignores the rest of the evidence provided.

#### **Comments on September 6, 2007 Event**

#### Page 38/Section B

The statement of the absence of a smoke plume over the area is misleading. The maps were used to show that a smoke plume had passed through the area during the event. This statement ignores the complex chemistry of PM<sub>2.5</sub> and assumes that the passing of a smoke plume over the area would have no impact on air quality once the visible part of the plume is dispersed.

Given that the pollution roses, wind rose maps, NOAA maps, trajectory models, and data are all evidence to a causal connection to the event and the use of these are all acceptable tools according to the guidance, LMAPCD contends that a causal connection was established and asks EPA for additional clarification as to why they believe the connection was not established.

#### Page 39/Section C

The data submitted by LMAPCD clearly shows that on 9/1/07 the values were below the annual standard of 15µg/m<sup>3</sup> and were actually below the annual averages measured at the closest background sites in Indiana and Kentucky. Also, the data shows that as the smoke plume moved into the area the levels increased. The data also show that as the event ends the measured levels decrease. In addition the data submitted by LMAPCD indicates that 5 values were above the annual 95<sup>th</sup> percentiles. Therefore, LMAPCD contends that the data submitted are sufficient to demonstrate that the values measured were in excess of normal historical fluctuations, including background.

**PM<sub>2.5</sub> Exceptional Events Technical  
Support Document**

**Paducah, KY-IL Metropolitan  
Statistical Area**

**2005-2007**

**PM2.5 Exceptional Events Technical Support Document Comments:  
June 21-24, 2005**

**Table 1 - Site-specific information used in analysis ( $\mu\text{g}/\text{m}^3$ )**

AQS	Date	Observed Concentration	Monthly Mean	84 <sup>th</sup> Percentile	95 <sup>th</sup> Percentile	EPA Concurrence
21-145 -1004	6/21/2005	36.9	16.3	22.8	27.0	NO
21-145 -1004	6/24/2005	37.1	16.3	22.8	27.0	NO

Following the regulatory guidance provided in the “Treatment of Data Influenced by Exceptional Events” final rule, Kentucky evaluated PM<sub>2.5</sub> data by determining whether the data met the definition of an “exceptional event” according to 40 CFR 50.1 (j):

*“Exceptional event means an event that affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event. It does not include stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance.”*

To explain the rationale for not granting concurrence of the exceptional event, EPA Region 4 commented specifically to three of the requirements listed in 40 CFR 50.14. Preserving the integrity of the comment, EPA Region 4’s statements are quoted directly from the *PM<sub>2.5</sub> Exceptional Events Technical Support Document, U.S. Environmental Protection Agency Region 4, State of Kentucky: Paducah KY-IL Metropolitan Statistical Area 2005-2007* document.

The following comments are related to the PM<sub>2.5</sub> samples collected on June 21 and June 24, 2005:

**I. EPA Comment (page number 4):**

**A. EVENT DISCRIPTION [sic]:**

*Documentation submitted by the Kentucky DAQ claims that smoke from wildfires in western Kentucky caused NAAQS exceedances at the site listed above. The requested values that passed both steps with concentrations of  $36.9\mu\text{g}/\text{m}^3$  and  $37.1\mu\text{g}/\text{m}^3$  were collected on June 21 and June 24, 2005, respectively. However, the documentation submitted by the Kentucky DAQ did not demonstrate a clear causal relationship between the measured concentration and the event, and did not demonstrate that there would have been no exceedance “but for” the events on June 21 and June 24, 2005.*

**Kentucky Response:**

EPA Region 4 clearly identifies a two-step analysis of the data on page 2 of the *PM<sub>2.5</sub> Exceptional Events Technical Support Document, U.S. Environmental Protection Agency Region 4, State of Kentucky: Paducah KY-IL Metropolitan Statistical Area 2005-2007*

document. The two-step analysis consists of a “Monthly Average Comparison” and a “Monthly 84<sup>th</sup> Percentile Comparison.” In support of an exceptional event determination, EPA Region 4 declares that “the requested values passed both steps” of the analysis.

However, EPA Region 4 then states that the values are not an exceptional event because a clear and casual event and the “but for” the event are not demonstrated. Kentucky does not agree with this conclusion. The documentation provided by Kentucky in the *Request for Concurrence of the Exceptional Event Flags on PM<sub>2.5</sub> 2004-2006 Data* demonstrated that the concentrations requested for exclusion meet the requirements of 40 CFR 50.14.

## **II. EPA Comment (page number 4):**

### ***B. CAUSAL CONNECTION BETWEEN THE EVENT AND AIR QUALITY***

*KYDAQ submittal consisted of National Oceanic and Atmospheric Administration (NOAA) map of “hot spots”, a wind rose and historical data for the month of June (2002 -2006). PM<sub>2.5</sub> speciation data was collected in the Paducah area during this time period as seen in Figure 5. High aerosol particulate concentrations can be seen in the source region on June 21 and June 24, 2005, in Figures 1-4. The wind speed and wind direction suggests impact for the location of the local fires to the Paducah site. This evidence alone is insufficient to establish a causal relationship between the local wildfires and the exceedance of the 24-hr NAAQS.”*

#### **Kentucky Response:**

As EPA Region 4 acknowledges, Kentucky provided NOAA maps of “hot spots”, meteorological data, and comparable historical data to demonstrate the causal relationship between the event and the measurement. EPA further concluded that “high aerosol particulate concentrations can be seen in the source region on June 21 and June 24, 2005, in Figures 1-4.” This evidence visibly defines the exceptional event as the cause of the exceedance of the 24-hr NAAQS.

## **III. EPA Comment (page number 4):**

### ***C. COMPARISON TO BACKGROUND LEVELS***

*The sulfate measured at the Paducah site was approximately 4 times higher than the seasonal<sup>1</sup> average versus the organic carbon which was 1.3 higher. Sulfate and organic carbon concentrations on the 21st and 24th, respectively are illustrated in Figures 1 – 4. A widespread sulfate event is evident across the southeast U.S. on these days. Thereby indicating that exceedance was more likely caused by the increased level of sulfates mass measured that day as opposed to the organic carbon mass measured.*

**Kentucky Response:**

As indicated by EPA Region 4's comment above, the data analysis provided by Kentucky supplied in the *Request for Concurrence of the Exceptional Event Flags on PM<sub>2.5</sub> 2004-2006 Data* demonstrated that the concentrations requested for exclusion are outliers and skew the data high. The historical data from 2002-2007 reiterates that the event recorded on June 21 and June 24, 2005 was exceptional, as the concentrations are the site's two highest measured concentrations for the month of June between 2002 and 2007. Furthermore, EPA Region 4 states organic carbon measurements were 1.3 times higher than background measurements; thus, confirming Kentucky's justification for exclusion under the exceptional events rule.

Following the regulatory guidance to justify data exclusion, the provided evidence justifies data exclusion by demonstrating that "the event is associated with a measured concentration in excess of normal historical fluctuations, including background." Although EPA Region 4 defines the event as a "widespread sulfate event", the requirements listed in 40 CFR 50.14(c)(3)(iii)(C) does not speciate PM<sub>2.5</sub> to establish whether the measured concentration exceeds normal historical fluctuations. Thus, the demonstration to exclude the exceptional events data satisfies the requirements of 40 CFR 50.14(c)(3)(iii)(C).

**IV. EPA Comment (page number 5):*****D. DEMONSTRATION OF NO EXCEEDANCE "BUT FOR" THE EVENT***

*The requirement to establish that there would have been no exceedance or violation "but for" this event, as found in Section §50.14(c)(3)(iii)(B), has not been met. Speciated fine particulate matter data collected at the Paducah site on June 21, 2005 measured sulfate and organic carbon levels of 23.2 mg/m<sup>3</sup> and 6.13 mg/m<sup>3</sup>, respectively (Figure 5). The increased levels of sulfate negates the possibility that there would have been no exceedance of the NAAQS "but for" this event.*

**Kentucky Response:**

In accordance with the "but for" requirement detailed in 40 CFR 50.14(c)(3)(iii)(D), the request for data exclusion demonstrates that there would have been no exceedance or violation but for the event. EPA Region 4 identifies the organic carbon measurements as 1.3 times higher than background levels and the sulfates as 4 times higher than the seasonal average. Yet, EPA Region 4 concludes that the "increased levels of sulfate negates the possibility that there would have been no exceedance of the NAAQS 'but for' this event."

The understanding of atmospheric chemistry does not allow for generalizations to estimate the contributions based on species of PM<sub>2.5</sub>. The precursor gases react with air pollutants to form a variety of compounds. Furthermore, the burning of biomass results in elevated sulfate concentrations. Thus, the species of compounds does not accurately calculate the contributions to the PM<sub>2.5</sub> concentrations in excess of the NAAQS.<sup>1</sup>

<sup>1</sup> "Chemical composition of atmospheric aerosols during the 2003 summer intense forest fire period" C.A. Pio et al. / *Atmospheric Environment* 42 (2008) 7530–7543.  
www.elsevier.com/locate/atmosenv

EPA Region 4 established that “a widespread sulfate event is evident” and Kentucky detailed the monitoring results of the event. The measured concentrations resulted in a NAAQS violation and the data analysis demonstrated that there would have been no exceedance or violation but for the event.

**Conclusion**

EPA Region 4 and Kentucky both demonstrated that an exceptional event occurred on June 21 and 24, 2005, at the Paducah (21-145-1004) site, through data analysis, maps, and graphs. Kentucky identified the exceptional event through data analysis and found the significant outliers in the historical data set. EPA Region 4 concurred with the Kentucky data analysis in their two-step process. With limited resources, Kentucky researched and identified the local fires near and around the monitoring location. EPA Region 4 concurred that the fires were evident through their acknowledgement of the “hot spots” on the NOAA map and through their organic carbon analysis. EPA Region 4 further concluded that the exceptional event occurred by stating “a widespread sulfate event is evident across the southeast U.S. on these days”.

Kentucky acknowledges the sulfate event as an exceptional event impacting the data at the Paducah (21-145-1004) monitoring site. According to the definition of an exceptional event in 40 CFR 50.1 (j), an exceptional event is “not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event.” The data analysis, as concurred by EPA Region 4’s analysis, clearly identifies a single time event that has not been repeated in seven years of monitoring. Such an event is not controllable or preventable by Kentucky.

The nearest large sulfate emitter for the Paducah (21-145-1004) site is the TVA Shawnee electrical utility company. The utility is located in McCracken County, west of the Paducah monitoring station. The utility is required by permit to continuously monitor their SO<sub>2</sub>, NO<sub>x</sub> and opacity emissions. TVA Shawnee reported zero hours of noncompliance during the second quarter of 2005. Therefore, the exceptional event meets the definition of “exceptional event” as defined in 40 CFR 50.1(j).

**PM2.5 Exceptional Events Technical Support Document Comments:  
September 10, 2005**

Table 2 - Site-specific information used in analysis (µg/m<sup>3</sup>)

AQS ID	Date	Observed Concentration	Monthly Mean	84 <sup>th</sup> Percentile	95 <sup>th</sup> Percentile	EPA Concurrence
21-145-1004	9/10/2005	39.6	15.2	22.4	35.3	No

Following the regulatory guidance provided in the “Treatment of Data Influenced by Exceptional Events” final rule, Kentucky evaluated PM<sub>2.5</sub> data by determining whether the data met the definition of an “exceptional event” according to 40 CFR 50.1 (j):

*“Exceptional event means an event that affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event. It does not include stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance.”*

To explain the rationale for not granting concurrence of the exceptional event, EPA Region 4 commented specifically to three of the requirements listed in 40 CFR 50.14. Preserving the integrity of the comment, EPA Region 4’s statements are quoted directly from the *PM<sub>2.5</sub> Exceptional Events Technical Support Document, U.S. Environmental Protection Agency Region 4, State of Kentucky: Paducah KY-IL Metropolitan Statistical Area 2005-2007* document.

The following comments are related to the PM<sub>2.5</sub> samples collected on September 10, 2005:

**I. EPA Comment** (page number 7):

**A. EVENT DISCRIPTION:** *(sic)*

*Documentation submitted by the Kentucky DAQ claims that smoke from wildfires in Arkansas and Mississippi caused NAAQS exceedances at the site listed above. The only requested value that passed both steps with a concentration of 39.6µg/m<sup>3</sup> was collected on September 10, 2005. The documentation submitted by the Kentucky DAQ did not demonstrate a clear causal relationship between the measured concentration and the event, and did not demonstrate that there would have been no exceedance “but for” the event on September 10, 2005.*

**Kentucky Response:**

EPA Region 4 clearly identifies a two-step analysis of the data on page 2 of the *PM<sub>2.5</sub> Exceptional Events Technical Support Document, U.S. Environmental Protection Agency Region 4, State of Kentucky: Paducah KY-IL Metropolitan Statistical Area 2005-2007* document. The two-step analysis consists of a “Monthly Average Comparison” and a “Monthly 84<sup>th</sup> Percentile Comparison.” In support of an exceptional event determination, EPA Region 4 declares that “the requested value passed both steps” of the analysis.

However, EPA Region 4 states that the value is not an exceptional event because a clear and casual event and the “but for” the event are not demonstrated. Kentucky does not agree with this conclusion. The documentation provided by Kentucky in the *Request for Concurrence of the Exceptional Event Flags on PM<sub>2.5</sub> 2004-2006 Data* demonstrated that the concentrations requested for exclusion meet the requirements of 40 CFR 50.14.

**II. EPA Comment** (page number 7):

***B. CAUSAL CONNECTION BETWEEN THE EVENT AND AIR QUALITY***

*KYDAQ* submittal consisted of National Oceanic and Atmospheric Administration (NOAA) map “Hot Spots”, wind rose graphs of meteorological data and historical data for the month of September (2002 -2006). The causal relationship suggested is solely based on wind speed and wind direction. This evidence alone is insufficient to establish a causal relationship between the Arkansas and Mississippi wildfires and the exceedance of the 24-hr NAAQS.

**Kentucky Response:**

Kentucky does not concur with this conclusion. Kentucky supplied data analysis, NOAA smoke maps and wind rose graphs as evidence of the exceptional event. Kentucky did not make the request for concurrence “solely based on wind speed and wind direction.”

**III. EPA Comment** (page number 7):

***C. COMPARISON TO BACKGROUND LEVELS***

*The 24-hr average PM<sub>2.5</sub> concentration is above the 30-day mean, and the calculated 95<sup>th</sup> percentile. A widespread sulfate event is evident across the Eastern U.S. on September 10, 2005 (Figure 7). The seasonal<sup>3</sup> average for sulfate is 4.8µg/m<sup>3</sup> and for organic carbon is 4.7µg/m<sup>3</sup> at the Paducah site thereby indicating that the exceedance was more likely caused by the increased level of sulfates mass measured that day as opposed to the organic carbon mass measured.*

**Kentucky Response:**

EPA Region 4 comments that the seasonal SO<sub>4</sub> and OC particulate averages for the Paducah (21-145-1004) site are 4.8 µg/m<sup>3</sup> and 4.7 µg/m<sup>3</sup>. EPA Region 4 does not mention that measured speciated data is not available at the site on September 10, 2005. The scheduled PM<sub>2.5</sub> speciation sample date at the Paducah site is September 13, 2005. Therefore, a measured concentration of OC and SO<sub>4</sub> from the Paducah (21-145-1004) site is not available to compare to the seasonal background levels.

**VI. EPA Comment** (page number 8):

***D. DEMONSTRATION OF NO EXCEEDANCE “BUT FOR” THE EVENT***

*The requirement to establish that there would have been no exceedance “but for” this event, as found in Section §50.14(c)(3)(iii)(B), has not been met. This is supported by widespread elevated sulfate levels over the entire Eastern U.S. coupled with the organic carbon levels equal to the seasonal<sup>4</sup> average. This suggests that the elevated PM<sub>2.5</sub> levels observed at the Paducah site on September*

*10, 2005, were not caused by transport of airborne particulate matter attributed to the Arkansas/Mississippi wildfire event, but due to increased levels of sulfates.*

**Kentucky Response:**

In accordance with the “but for” requirement detailed in 40 CFR 50.14(c)(3)(iii)(D), the request for data exclusion demonstrates that there would have been no exceedance or violation “but for” the event. EPA Region 4 identifies the SO<sub>4</sub> and OC concentration levels for background but do not identify actual measured concentrations at the site. Kentucky and EPA Region 4 supplied maps of particulate matter over the Paducah region of Kentucky. Kentucky provided a NOAA map identifying the particulate matter as smoke. EPA Region 4 provided a map with the same particulates matter trace but identified the trace as SO<sub>4</sub>.

The understanding of atmospheric chemistry does not allow for generalizations to estimate the contributions based on species of PM<sub>2.5</sub>. The precursor gases react with air pollutants to form a variety of compounds. Furthermore, the burning of biomass results in elevated sulfate concentrations. Thus, the species of compounds does not accurately calculate the contributions to the PM<sub>2.5</sub> concentrations in excess of the NAAQS.

EPA Region 4 established that there were “widespread elevated sulfate levels over the entire Eastern U.S.”, and Kentucky detailed the monitoring results of the event. The measured concentration resulted in a NAAQS violation, and the data analysis demonstrated that there would have been no exceedance or violation but for the event.

**Conclusion:**

Kentucky and EPA Region 4 both determined that the September 10, 2005, concentration of 39.6 ug/m<sup>3</sup> is an outlier of the normal data set. Kentucky supplied maps, created with NOAA satellite analysis, which identified a smoke plume moving into the Kentucky air space on September 10, 2005 and remained over Kentucky until September 13, 2005.

The SO<sub>4</sub> and OC concentration map provided by EPA Region 4 is similar to the analyzed smoke map generated by the NOAA program. Both maps indicate an exceptional event occurred on September 10, 2005. Kentucky also reiterates the understanding of atmospheric chemistry does not allow for generalizations to estimate the contributions based on species of PM<sub>2.5</sub>. The precursor gases react with air pollutants to form a variety of compounds. Furthermore, the burning of biomass results in elevated sulfate concentrations. Thus, the species of compounds does not accurately calculate the contributions to the PM<sub>2.5</sub> concentrations in excess of the NAAQS.

The data analysis, maps and graphs provided by Kentucky and EPA Region 4 support the evidence of an exceptional wild fire event occurring on the September 10, 2005. The evidence does not support non-concurrence based on increased levels of sulfate.

**PM2.5 Exceptional Events Technical Support Document Comments:  
July 19, 2006**

**Table 3** - Site-specific information used in analysis ( $\mu\text{g}/\text{m}^3$ )

AQS ID	Date	Observed Concentration	Monthly Mean	84 <sup>th</sup> Percentile	95 <sup>th</sup> Percentile	EPA Concurrence
21-145-1004	7/19/2006	36.7	17.4	23.9	34.1	No

Following the regulatory guidance provided in the “Treatment of Data Influenced by Exceptional Events” final rule, Kentucky evaluated PM<sub>2.5</sub> data by determining whether the data met the definition of an “exceptional event” according to 40 CFR 50.1 (j):

*“Exceptional event means an event that affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event. It does not include stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance.”*

To explain the rationale for not granting concurrence of the exceptional event, EPA Region 4 commented specifically to three of the requirements listed in 40 CFR 50.14. Preserving the integrity of the comment, EPA Region 4’s statements are quoted directly from the *PM<sub>2.5</sub> Exceptional Events Technical Support Document, U.S. Environmental Protection Agency Region 4, State of Kentucky: Paducah KY-IL Metropolitan Statistical Area 2005-2007* document.

The following comments are related to the PM<sub>2.5</sub> samples collected on July 19, 2006:

**I. EPA Comment** (page number 9):

**A. EVENT DESCRIPTION:** *(sic)*

*Documentation submitted by the Kentucky DAQ claims that smoke from wildfires in Arkansas and Mississippi caused NAAQS exceedance at the site listed above. The only requested value that passed both steps with a concentration of  $36.7\mu\text{g}/\text{m}^3$  was collected on July 19, 2006. The documentation submitted by the Kentucky DAQ did not demonstrate a clear causal relationship between the measured concentration and the event, and did not demonstrate that there would have been no exceedance “but for” the event on July 19, 2006.*

**Kentucky Response:**

Kentucky does not agree with this conclusion. EPA Region 4 clearly identifies a two-step analysis of the data on page 2 of the *PM<sub>2.5</sub> Exceptional Events Technical Support Document, U.S. Environmental Protection Agency Region 4, State of Kentucky: Paducah KY-IL Metropolitan Statistical Area 2005-2007* document. EPA Region 4 states in the Event Description that “the only requested value that passed both steps with a

concentration of  $36.7\mu\text{g}/\text{m}^3$  was collected on July 19, 2006.” EPA Region 4 data analysis supports an exceptional event. However, EPA Region 4 then states that the value is not an exceptional event because a clear and casual event and the “but for” the event are not demonstrated.

The data analysis by EPA Region 4 and the data analysis by Kentucky supplied in the *Request for Concurrence of the Exceptional Event Flags on  $\text{PM}_{2.5}$  2004-2006 Data* demonstrates that the concentration being requested for exclusion is an outlier. The outlier indicates that an exceptional event occurred to skew the data high.

## **II. EPA Comment (page number 9):**

### ***B. CAUSAL CONNECTION BETWEEN THE EVENT AND AIR QUALITY***

*KYDAQ* submittal consisted of National Oceanic and Atmospheric Administration (NOAA) analyzed smoke map wind rose graphs of meteorological data and historical data for the month of July (2002-2006.) The causal relationship suggested that Western Kentucky was blanketed with a smoke plume from the Arkansas and local wildfires; and that local meteorological conditions indicated calm winds from the southeast. This evidence alone is insufficient to establish a causal relationship between the Arkansas and Mississippi wildfires and the exceedance of the 24-hr NAAQS.

### **Kentucky Response:**

Kentucky does not concur with the conclusion that “this evidence alone is insufficient to establish a causal relationship between the Arkansas and Mississippi wildfires and the exceedance of the 24-hr NAAQS.” Kentucky’s, as well as EPA Region 4’s, data analysis demonstrates a clear outlier of a normal July data set for the Paducah (21-145-1004) monitoring site. The data analysis along with evidence from an independent organization, NOAA, and the wind speed/wind direction graphs provide evidence of the casual relationship between the measured exceedance and the exceptional event.

## **III. EPA Comment (page number 9):**

### ***C. COMPARISON TO BACKGROUND LEVELS***

*The 24-hr average  $\text{PM}_{2.5}$  concentration is above the 30-day mean, and the calculated 95<sup>th</sup> percentile. A widespread sulfate event is evident across the entire state of Kentucky on July 19, 2006. Organic carbon is shown to be above average concentrations only in Alabama and parts of Georgia and Mississippi (Figure 11). The seasonal<sup>5</sup> average for sulfate is  $3.9\mu\text{g}/\text{m}^3$  and for organic carbon is  $4.7\mu\text{g}/\text{m}^3$  at the Paducah site. The State of Kentucky including the Paducah site (Figures 10-11) has sulfate levels between 14 and  $16\mu\text{g}/\text{m}^3$  and organic carbon levels in the range of  $4\mu\text{g}/\text{m}^3$ . Thereby indicating that exceedance was more likely caused by the increased level of sulfates mass measured that day as opposed to the organic carbon mass measured.*

**Kentucky Response:**

Kentucky does not concur with the conclusion that the exceedance at the Paducah (21-145-1004) monitoring site is not an exceptional event. EPA Region 4 has not demonstrated that a sulfate event occurred in the southeast during the exceptional event on July 19, 2006. Regardless, the sulfate concentrations do not preclude defining the event as an exceptional event.

The PM<sub>2.5</sub> speciation sampler at the Paducah (21-145-1004) monitoring site was discontinued in March of 2006. EPA Region 4 can not provide any graph analysis of speciated data from the Paducah site. Also, the OC concentration map provided by EPA Region 4 is almost similar to the analyzed smoke map generated by the NOAA program, with the OC concentration south of the identified smoke plume.

The maps provided by EPA Region 4 and Kentucky support the evidence of an exceptional event occurring on July 19, 2006. NOAA is an independent agency analyzing smoke plumes identified on satellite imagery. The OC map provided by EPA Region 4 is an interpretation of ambient data. However, ambient OC data is not available for the Paducah site on July 19, 2006.

**IV. EPA Comment (page number 10):*****D. DEMONSTRATION OF NO EXCEEDANCE “BUT FOR” THE EVENT***

*The requirement to establish that there would have been no exceedance or violation “but for” this event, as found in Section §50.14(c)(3)(iii)(B), has not been met. The widespread sulfate over parts of Tennessee, Kentucky, Illinois, Indiana, Ohio and West Virginia, suggest a regional impact combined with stagnant wind conditions. The levels of organic carbon measured are at or below the seasonal averages suggests that the elevated PM<sub>2.5</sub> levels observed at the Paducah site on July 19, 2006, were not caused by transport of airborne particulate matter attributed to a wildfire event, but due to high sulfate levels.*

**Kentucky Response:**

Kentucky does not concur with the conclusion that “there would have been no exceedance or violation “but for” this event, as found in Section §50.14(c)(3)(iii)(B), has not been met.” Kentucky provided evidence of the “but for” through the historical data analysis, which EPA Region 4 concurred with their two-step analysis, the NOAA smoke maps, and wind rose graphs. In accordance with 40 CFR 50.14(c)(3)(iii)(D), the request for data exclusion demonstrates that there would have been no exceedance or violation “but for” the event.

**Conclusion:**

EPA Region 4 and Kentucky both demonstrated that an exceptional event occurred on July 19, 2006, at the Paducah (21-145-1004) site, through data analysis, maps, and graphs. Kentucky identified the exceptional event through data analysis and found the significant outliers in the historical data set. EPA Region 4 concurred with the Kentucky data analysis in their two-step process. With limited resources, Kentucky researched and

identified the local fires near and around the monitoring location. EPA Region 4 concurred that the fires were evident through their acknowledgement of the “hot spots” on the NOAA map and through their organic carbon analysis.

According to the definition of an exceptional event in 40 CFR 50.1 (j), an exceptional event is “not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by the Administrator in accordance with 40 CFR 50.14 to be an exceptional event.” Such an event is not controllable or preventable by Kentucky.

The nearest large sulfate emitter for the Paducah (21-145-1004) site is the TVA Shawnee electrical utility company. The utility is located in McCracken County, west of the Paducah monitoring station. The utility is required by permit to continuously monitor their SO<sub>2</sub>, NO<sub>x</sub> and opacity emissions. TVA Shawnee reported zero hours of noncompliance during the third quarter of 2006. Therefore, the exceptional event meets the definition of “exceptional event” as defined in 40 CFR 50.1(j).