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**Technical Support Document (TSD)**

**Kentucky  
Area Designations For the  
2010 SO<sub>2</sub> Primary National Ambient Air Quality Standard**

**Summary**

Pursuant to section 107(d) of the Clean Air Act (CAA), EPA must designate areas as either “nonattainment,” “attainment,” or “unclassifiable” for the 2010 1-hour sulfur dioxide (SO<sub>2</sub>) primary national ambient air quality standard (NAAQS). The CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to poor air quality in a nearby area that does not meet the NAAQS. Table 1 below identifies the counties or portions of counties (or areas of Indian Country) in Kentucky that EPA is initially designating “nonattainment” based on monitored violations. EPA is not yet prepared to designate other areas in Kentucky.

**Table 1. Nonattainment Area Designations for Kentucky**

Area (listed alphabetically)	Kentucky Recommended Designation of Areas/Counties	EPA’s Designation of Areas/Counties
Campbell-Clermont, KY-OH* Campbell County, KY (partial) Clermont County, OH (partial)	Attainment/ Unclassifiable N/A	Nonattainment
Jefferson County, KY Jefferson County (partial)	Nonattainment	Nonattainment

\* This is a multi-region nonattainment area. Additional information on boundary recommendations and analyses can be found in the State of Ohio’s technical support document.

## **Background**

On June 2, 2010, EPA revised the primary SO<sub>2</sub> NAAQS (75 FR 35520, June 22, 2010) by establishing a new 1-hour standard at a level of 75 parts per billion (ppb) which is met at an ambient air monitoring site when the 3-year average of the annual 99<sup>th</sup> percentile of the daily maximum 1-hour average concentrations is less than or equal to 75 ppb, as determined in accordance with Appendix T of 40 CFR part 50. 40 CFR 50.17(a)-(b). EPA has determined that this is the level necessary to provide protection of public health with an adequate margin of safety, especially for children, the elderly and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO<sub>2</sub>. The Agency is revoking the two prior primary standards of 140 ppb evaluated over 24-hours, and 30 ppb evaluated over an entire year because the standards will not add additional public health protection given a 1-hour standard at 75 ppb. Accordingly, EPA is not designating areas in this process on the basis of either of these two prior primary standards. Similarly, the secondary standard for SO<sub>2</sub> has not been revised, so EPA is not designating areas in this process on the basis of the secondary standard.

## **EPA's SO<sub>2</sub> Designation Approach**

Section 107(d) of the CAA provides that not later than 1 year after promulgation of a new or revised NAAQS, state Governors may submit their recommendations for designations and boundaries to EPA. This deadline was in June 2011. Section 107(d) also requires EPA to provide a notification to states of no less than 120-days prior to promulgating an initial area designation that is a modification of a state's recommendation. EPA has reviewed the State's recommendations and has notified the Governor through a letter signed by the Regional Administrator of any intended modifications. While language in section 107 specifically addresses states, we followed the same process for tribes, pursuant to section 301(d) of the CAA and Tribal Authority Rule (40 CFR Part 49). Therefore, we are designating areas of Indian Country, in consultation with the tribes, on the same schedule as state designations. Kentucky does not have any tribes affected by this designation. If a state or tribal government did not submit designation recommendations, EPA is promulgating the designations that it deems appropriate. If a state or tribe disagreed with EPA's intended area designations as released on February 7, 2013, it had an opportunity to demonstrate why any proposed modification was inappropriate.

Designations guidance was issued by EPA through a March 24, 2011, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. This memorandum identifies factors EPA intends to evaluate in determining boundaries for areas designated nonattainment. These 5 factors include: 1) air quality data; 2) emissions and emissions-related data (location of sources and potential contribution to ambient SO<sub>2</sub> concentrations); 3) meteorology (weather/transport patterns); 4) geography/topography (mountain ranges or other air basin boundaries); and 5) jurisdictional boundaries (e.g., counties, air districts, pre-existing nonattainment areas, reservations), among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO<sub>2</sub> NAAQS.

The March 24, 2011, memo recommended that area boundaries be defaulted to the county boundary unless additional information justifies a larger or smaller boundary than that of the county. EPA believes it is appropriate to evaluate each potential area on a case-by-case basis, and to recognize that

area-specific analyses conducted by states, tribal governments and/or EPA may support a different boundary than a default county boundary.

In this TSD, EPA discusses its review and technical analysis of the recommendations regarding areas with violating monitors submitted by the state for designations of the 1-hour SO<sub>2</sub> standard and any modifications from these recommendations.

*Definition of important terms used in this document:*

- 1) **Designated “nonattainment” area** – an area which EPA has determined, based on a state recommendation and/or on the technical analysis included in this document, has violated the 2010 SO<sub>2</sub> NAAQS, based on the most recent three years of air quality monitoring data, or contributes to a violation in a nearby area.
- 2) **Recommended nonattainment area** – an area that a state or tribal government has recommended to EPA to be designated as nonattainment.
- 3) **Violating monitor** – an ambient air monitor meeting all methods, quality assurance and citing criteria and requirements whose valid design value exceeds 75 ppb, as described in Appendix T of 40 CFR part 50.
- 4) **2010 SO<sub>2</sub> NAAQS - 75 ppb**, national ambient air quality standard for SO<sub>2</sub> promulgated in 2010. Based on the 3-year average of the 99<sup>th</sup> percentile of the annual distribution of daily maximum 1-hour average concentrations
- 5) **Design Value** – a statistic that describes the air quality status of a given area relative to the level of the NAAQS.

## Nonattainment Designations

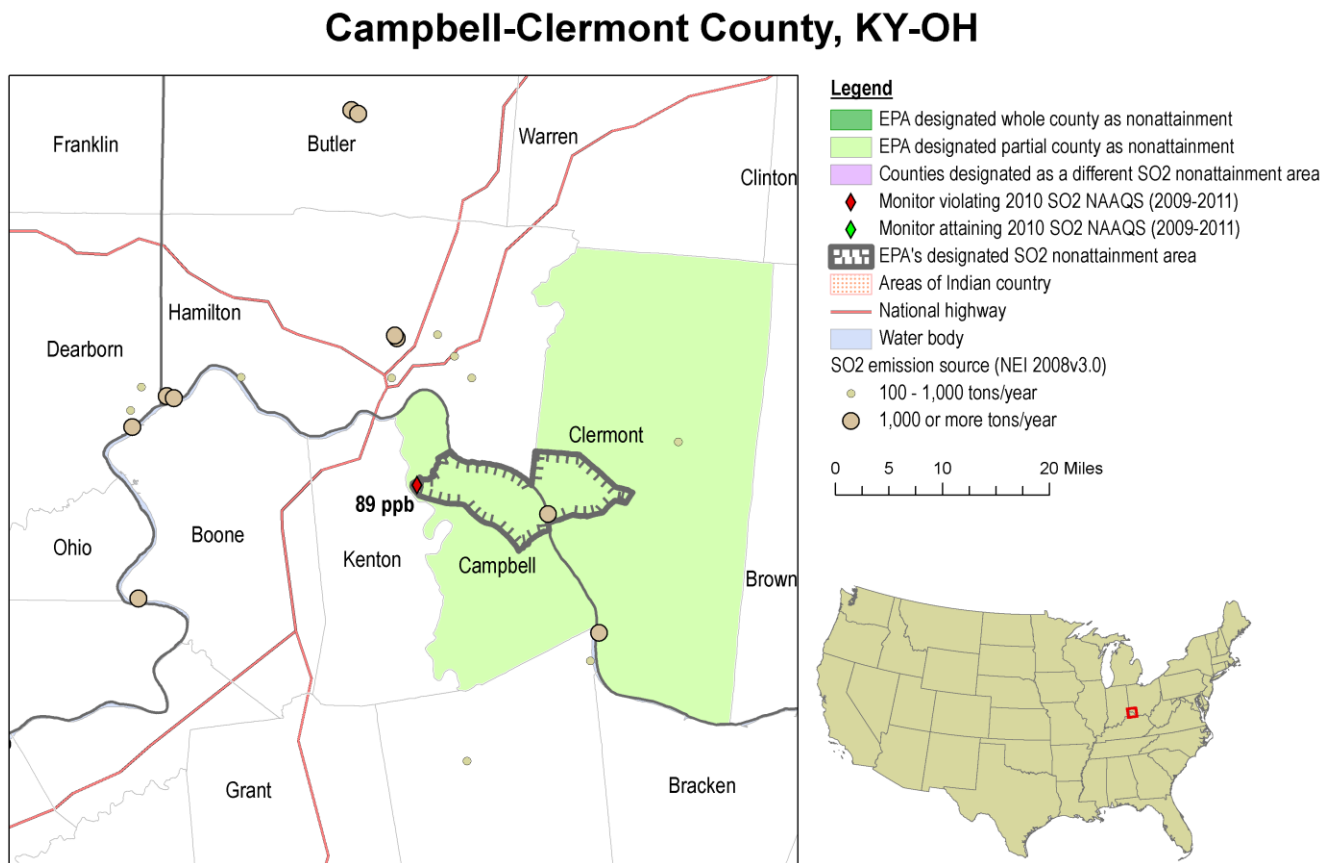
### Technical Analysis for Campbell County Area

#### Introduction

This technical analysis for the Campbell County Area identifies the partial county with a monitor that violates the 2010 SO<sub>2</sub> NAAQS based on 2009-2011 data, and evaluates nearby counties for contributions to SO<sub>2</sub> concentrations in the area. EPA has evaluated this county and nearby counties based on the weight of evidence of the factors recommended in the March 24, 2011, issued EPA guidance.

Figure 1 is a map of the area analyzed showing the locations and design values of air quality monitors in the area, and the counties surrounding any violating air quality monitors.

**Figure 1 Campbell-Clermont KY-OH SO<sub>2</sub> Nonattainment Area**

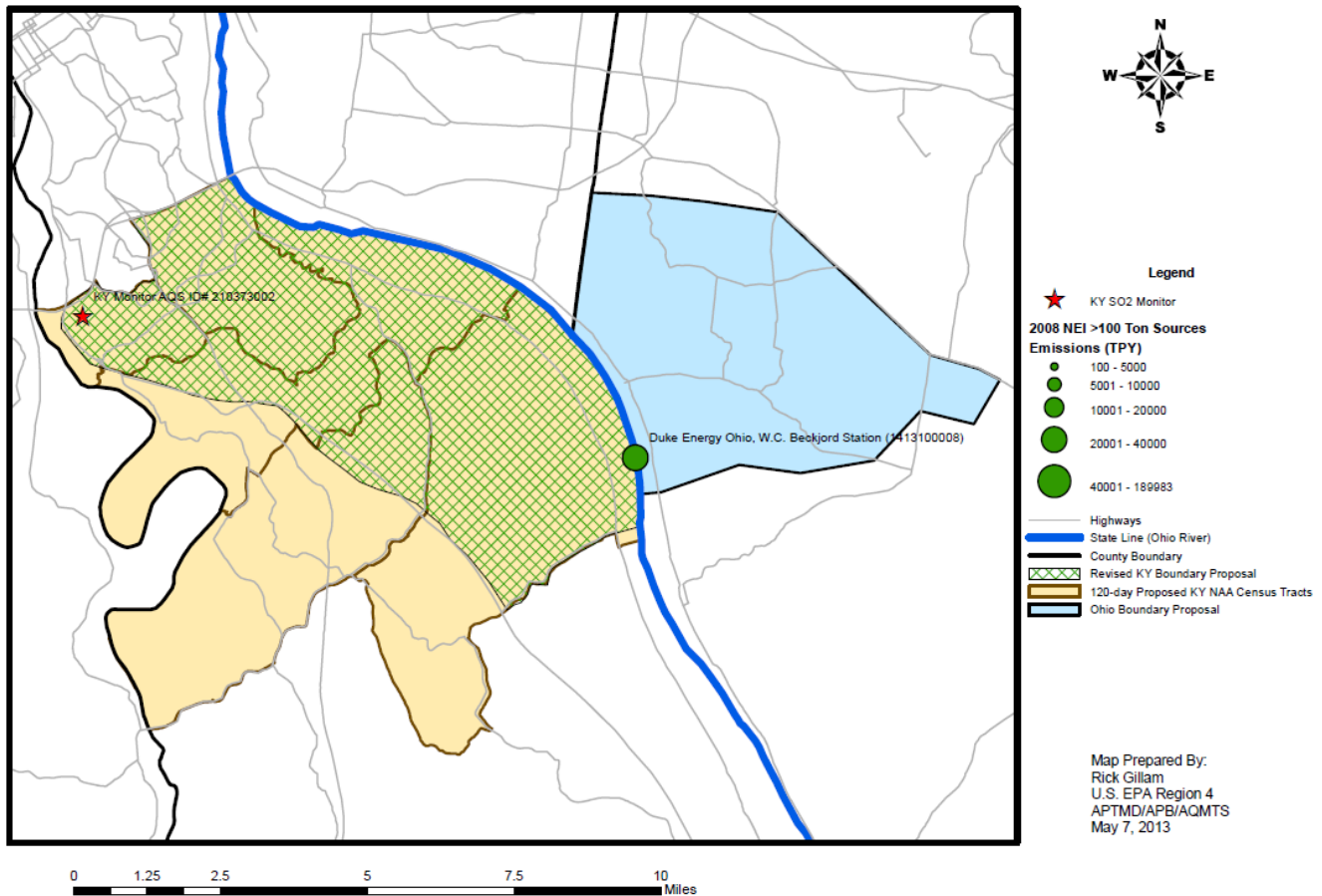


In June 2011, Secretary Leonard K. Peters recommended that 119 counties and one partial county be designated as “unclassifiable” or “attainment” for the 2010 SO<sub>2</sub> NAAQS based on monitored air quality data from 2008-2010. At that time, the monitor in Campbell County, Kentucky was meeting the SO<sub>2</sub>

NAAQS and thus the Commonwealth of Kentucky did not provide a nonattainment boundary recommendation to EPA for Campbell County. Letter from Leonard K. Peters, Secretary, Kentucky Energy and Environment Cabinet, to Gwendolyn Keyes Fleming, Regional Administrator, USEPA, Region 4 (June 2, 2011) (on file with USEPA Region 4 Regulatory Development Section). Kentucky confirmed the earlier recommendations in a letter dated March 6, 2013.

**Figure 2. Nonattainment Area**

**Campbell-Clermont, KY-OH SO<sub>2</sub> Nonattainment Area**



Based on EPA’s technical analysis described below, EPA is initially designating a portion of Campbell County as nonattainment for the 2010 SO<sub>2</sub> NAAQS, based upon currently available information. This partial county is listed above in Table 1. The partial county boundary for Campbell County includes the area bordered by KY Hwy 1566 from Ohio River to KY Hwy 9 (AA Highway) to the Southeast; KY Hwy 9 (AA Highway) from Hwy 1566 to I-275 to the Southwest; I-275 to Hwy 2345 (John’s Hill Road), Hwy 2345 to US-27, US-27 to I-275, I-275 to Ohio River to the Northwest; and the Ohio River from I-275 to KY Hwy 1566 to the Northeast. Also in this Area, EPA is initially designating a portion of Clermont County, Ohio in association with Campbell County, Kentucky. Refer to EPA’s TSD for Ohio for more information on the Clermont County, Ohio portion of this Area. EPA is not yet prepared

to designate other areas in Kentucky, apart from Jefferson County discussed later. In a subsequent round of designations we will make final designations decisions for areas that are not currently included in this nonattainment area designation.

## Detailed Assessment

### *Air Quality Data*

This factor considers the SO<sub>2</sub> air quality monitoring data from a Federal Equivalent Method (FEM) monitor, including the design values (in ppb) calculated for all air quality monitors in Campbell County and the surrounding area based on data for the 2009-2011 period.

The 2011 SO<sub>2</sub> NAAQS design values for Campbell County and the surrounding area are shown in Table 2.

**Table 2. Air Quality Data for Nonattainment Designations in Kentucky**

County	State Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO <sub>2</sub> Design Value 2009-2011 (ppb)
<b>Campbell County, KY</b>	No	<b>North Kentucky University (NKU)</b>	<b>210373002-42401-1</b>	<b>Highland Heights, KY Lat 39.021806 Long -84.474453</b>	<b>89</b>

Monitors in **Bold** have the highest 2009-2011 design value in the respective county.

Campbell County shows a violation of the 2010 SO<sub>2</sub> NAAQS. Therefore, some area in this county and possibly additional areas in surrounding counties must be designated nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for nonattainment status. Each area has been evaluated based on the weight of evidence of the five factors and other relevant information.

### *Emissions and Emissions-Related Data*

Evidence of SO<sub>2</sub> emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emissions data for SO<sub>2</sub> and any growth in SO<sub>2</sub> emitting activities since the date represented by those emissions data.

### Emissions

EPA recognizes that there may be important new information on emissions levels for the period after 2008, and would consider more recent information if available. Kentucky did not provide updated emissions information, therefore EPA relied on the 2008 National Emissions Inventory (NEI) emissions data (NEI08V3).

Table 3 shows total emissions of SO<sub>2</sub> (given in tons per year (tpy)) for violating and potentially contributing counties in and around the Campbell County area, including sources emitting greater than 100 tons per year of SO<sub>2</sub> according to the 2008 NEI. The Campbell County portion of the nonattainment area for the 2010 SO<sub>2</sub> NAAQS is wholly comprised within Campbell County and is therefore shown in **bold**.

**Table 3. Annual SO<sub>2</sub> Emissions [NEI08V3]**

County	Facility >100 tpy (EIS or State Facility ID)	Facility Emissions (tpy)	Total County SO <sub>2</sub> Emissions (tpy)
<b>Campbell County, KY*</b>	Lafarge North America	0.916417	37.7
	Suez - Degr of Silver Grove LLC	0.385927	
	Northern Kentucky University	0.2439053	
	Barrett Paving Materials	0.176844	
	Sara Lee Foods - Claryville Facility	0.074461	
	Fischer Special Mfg Co	0.00061662	
	Wendling Printing	0.0001035	
	ADM Grain Co	0.0000135	
Clermont County, OH	Walter C. Beckjord Generating Station**	26,403.8	43272.8

\* There are no 100 tpy or greater SO<sub>2</sub> sources in Campbell County. Total 2008 Campbell County SO<sub>2</sub> emissions were 37.7 tpy.

\*\* This facility is located in Clermont County, OH.

Since the 2008 NEI, EPA emissions inventory data shows that SO<sub>2</sub> emissions have been increasing at the Walter C. Beckjord Generating Station. See Table 4 below.

**Table 4. SO<sub>2</sub> Emissions**

	<b>Walter C Beckjord Generating Station - Clermont County, OH</b>				
Year	2008	2009	2010	2011	2012
Emissions tpy (EPA Clean Air Markets Division (CAMD) data)	26400.5	41964.5	69156.3	90834.5	67068.8

### Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 3 represent emissions levels taking into account any control strategies implemented on stationary sources in Campbell County, Kentucky and Clermont County, Ohio up to and including 2008. EPA has not received any additional information from the Commonwealth of Kentucky regarding emissions reductions resulting from controls put into place after 2008.

The Duke Energy W.C. Beckjord facility, located in Clermont County, Ohio, has six coal/steam units and is located 10 miles from the violating monitor. This is a 60 year old plant with no SO<sub>2</sub> controls.

**Meteorology (weather/transport patterns)**

Evidence of source-receptor relationships between specific emissions sources and high SO<sub>2</sub> values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered recent hourly meteorological data from the National Weather Service (NWS) sites nearest to the violating monitor to determine which wind vectors were associated with 1-hour SO<sub>2</sub> exceedances. For the Campbell Area, 2009-2011 meteorological data from the Cincinnati Municipal Airport (ID #724297-93812) and data from the Cincinnati/Northern Kentucky International Airport (ID# 724210-93814) were evaluated. Figure 3 shows a map of the SO<sub>2</sub> monitor location, meteorological data locations, and the major emissions sources in the area. The Cincinnati Municipal Airport is approximately 10 kilometers northeast of the violating monitor. The Cincinnati/Northern Kentucky International Airport is approximately 17 kilometers west of the violating monitor. The primary SO<sub>2</sub> emissions source is the Duke Energy, Walter C. Beckjord Generating Station facility, which is located approximately 18 kilometers east of the violating monitor.

**Figure 3. Map of SO<sub>2</sub> monitor location, meteorological data locations, and the major emissions sources in the area**

**Campbell County, Kentucky  
SO<sub>2</sub> Monitor, Meteorological Data, and Emissions Sources**

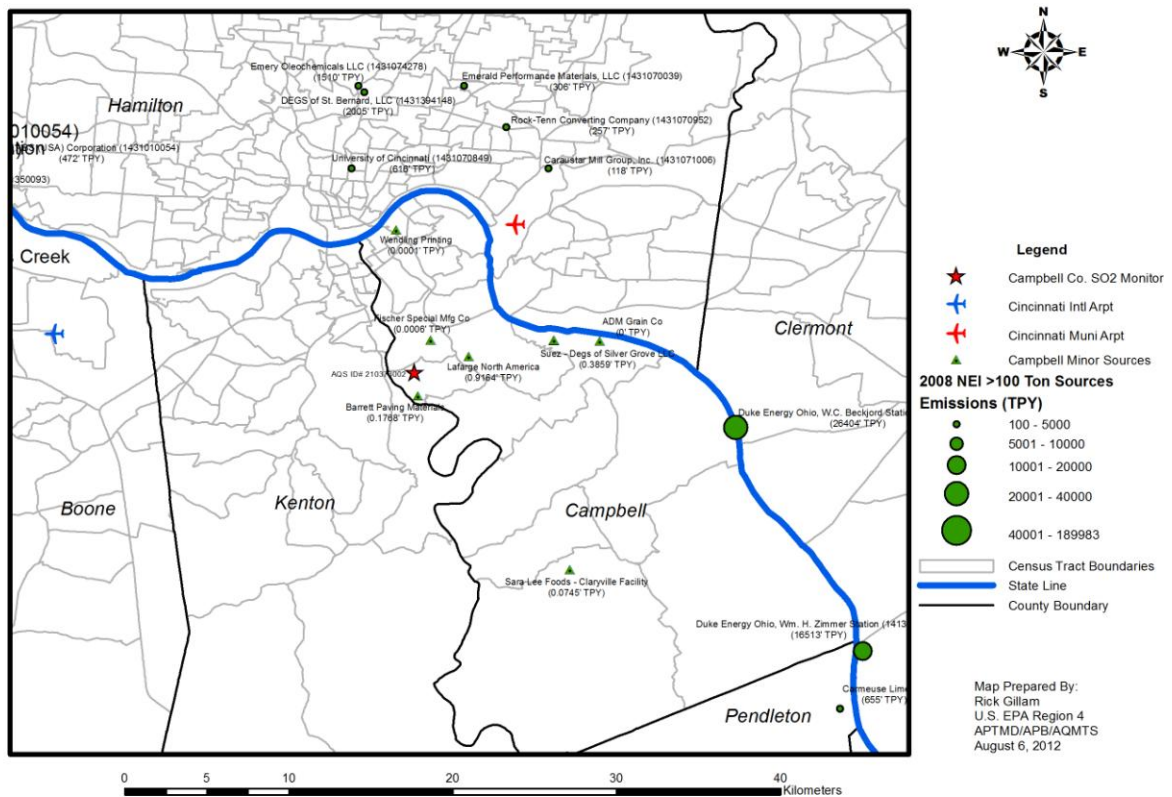
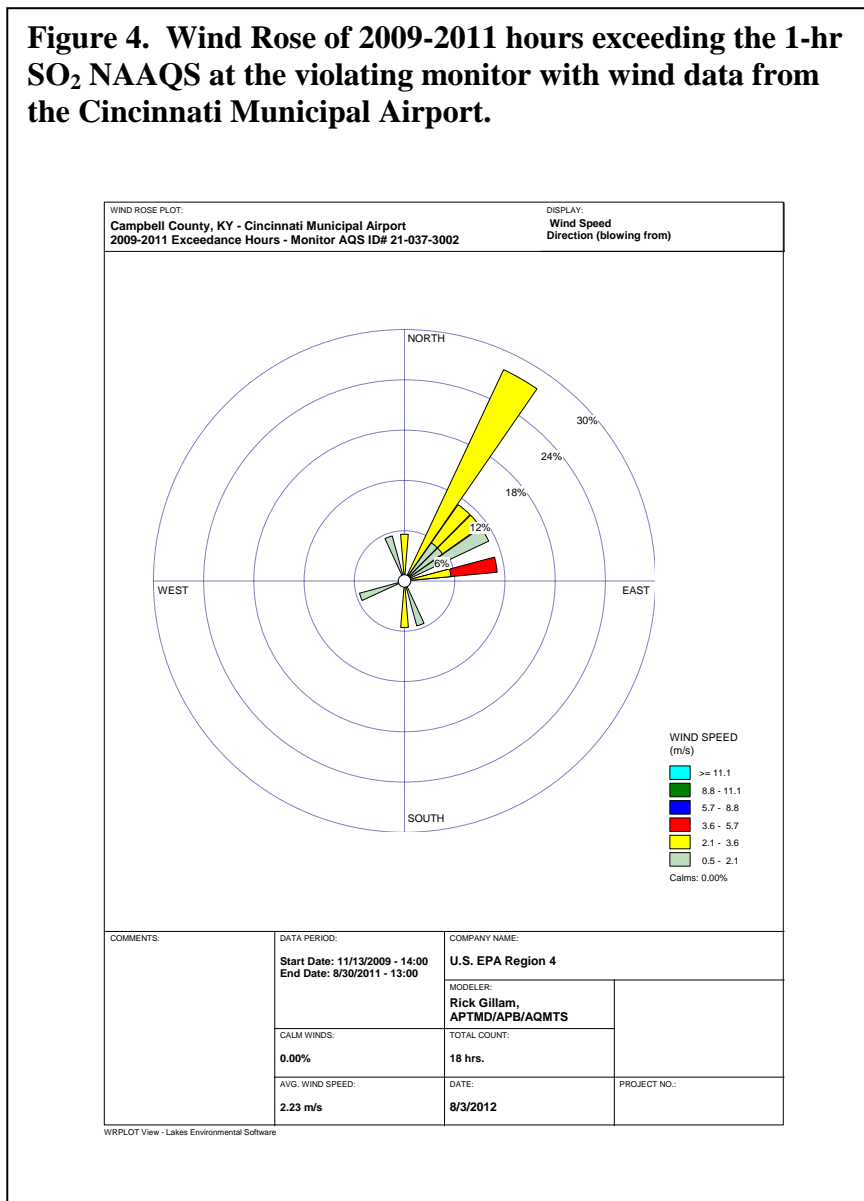




Figure 4 shows a wind rose of the hours exceeding the 1-hr SO<sub>2</sub> NAAQS (75 ppb) at the Campbell County violating monitor. The wind rose was developed using wind data from the Cincinnati Municipal Airport site.

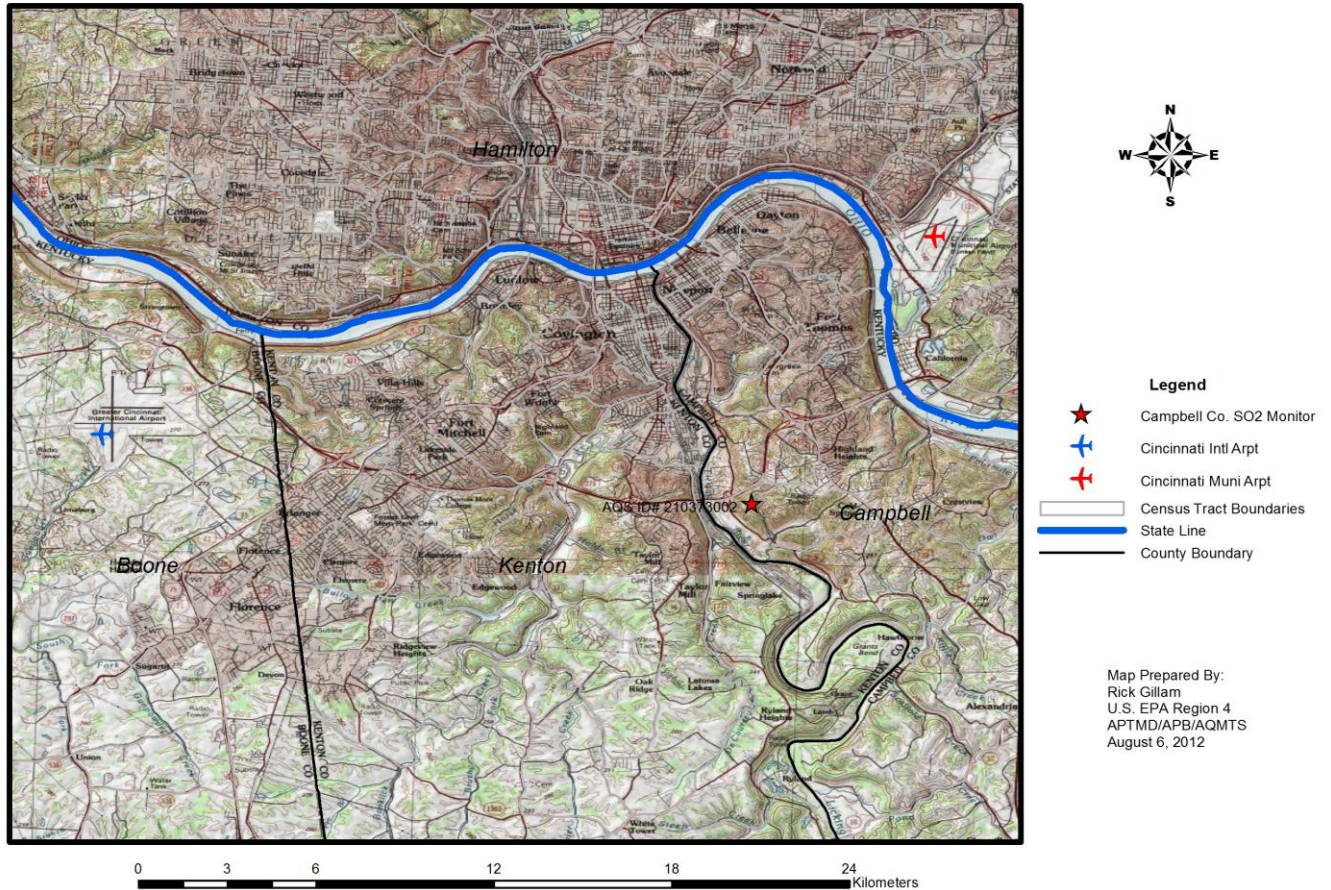
**Figure 4. Wind Rose of 2009-2011 hours exceeding the 1-hr SO<sub>2</sub> NAAQS at the violating monitor with wind data from the Cincinnati Municipal Airport.**



EPA has determined that the wind data from the Cincinnati municipal airport is not likely to be representative of winds at the monitor location in Campbell County. The reason is that the Municipal Airport is located in the Little Miami River valley, which is approximately 2 kilometers wide with steep hills approximately 300 feet high on both sides of the valley and oriented in Northeast to Southwest direction. See Figure 5 for a topographic map of the Area. The river valley is likely influencing the surface level winds measured at the airport by "channeling" them in the Northeast to Southwest direction.

Figure 5. Topographic Map showing the Cincinnati Municipal Airport in the Little Miami River Valley

## Campbell County, Kentucky, Topographic Map



Since the Cincinnati Municipal Airport wind data is not likely representative of the winds at the violating monitor location, EPA evaluated wind data from the Cincinnati/Northern Kentucky Airport. As can be seen in Figure 5, the relatively flat terrain near the Cincinnati/Northern Kentucky Airport makes it likely to be generally representative of the wind patterns in the area. Figure 6 provides a wind rose of the 2009-2011 hours exceeding the 1-hr SO<sub>2</sub> NAAQS at the violating monitor with wind data from the Cincinnati/Northern Kentucky Airport site.

**Figure 6. Wind Rose of 2009-2011 hours exceeding the 1-hr SO<sub>2</sub> NAAQS at the violating monitor with wind data from the Cincinnati/Northern Kentucky Airport site.**

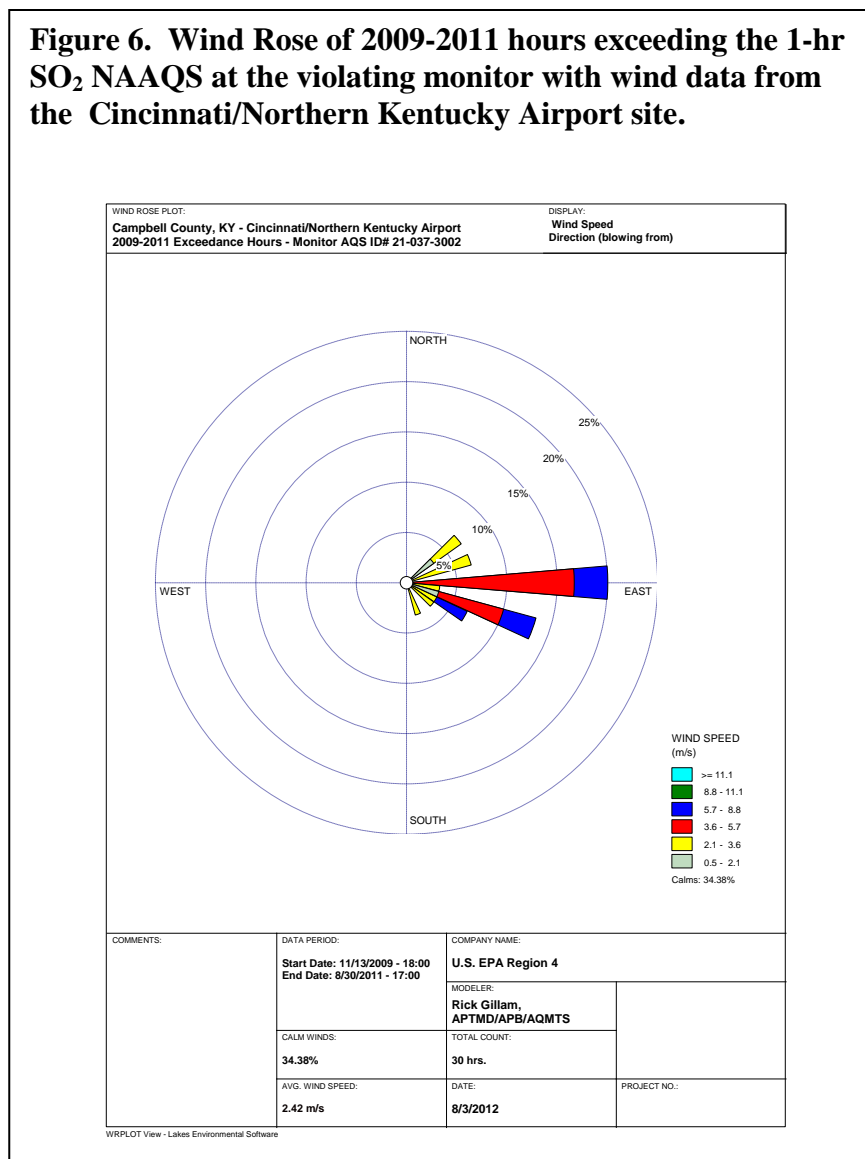


Figure 6 shows that the majority of the exceeding hours have winds blowing from the east with generally moderate wind speeds. As can be seen in Figure 3, the Duke Energy Beckjord facility is located approximately 18 kilometers east of the monitor. No other major sources are located near the violating monitor in the east direction. Therefore, the Duke Energy Beckjord facility is likely the major contributor to the violating monitor's design value.

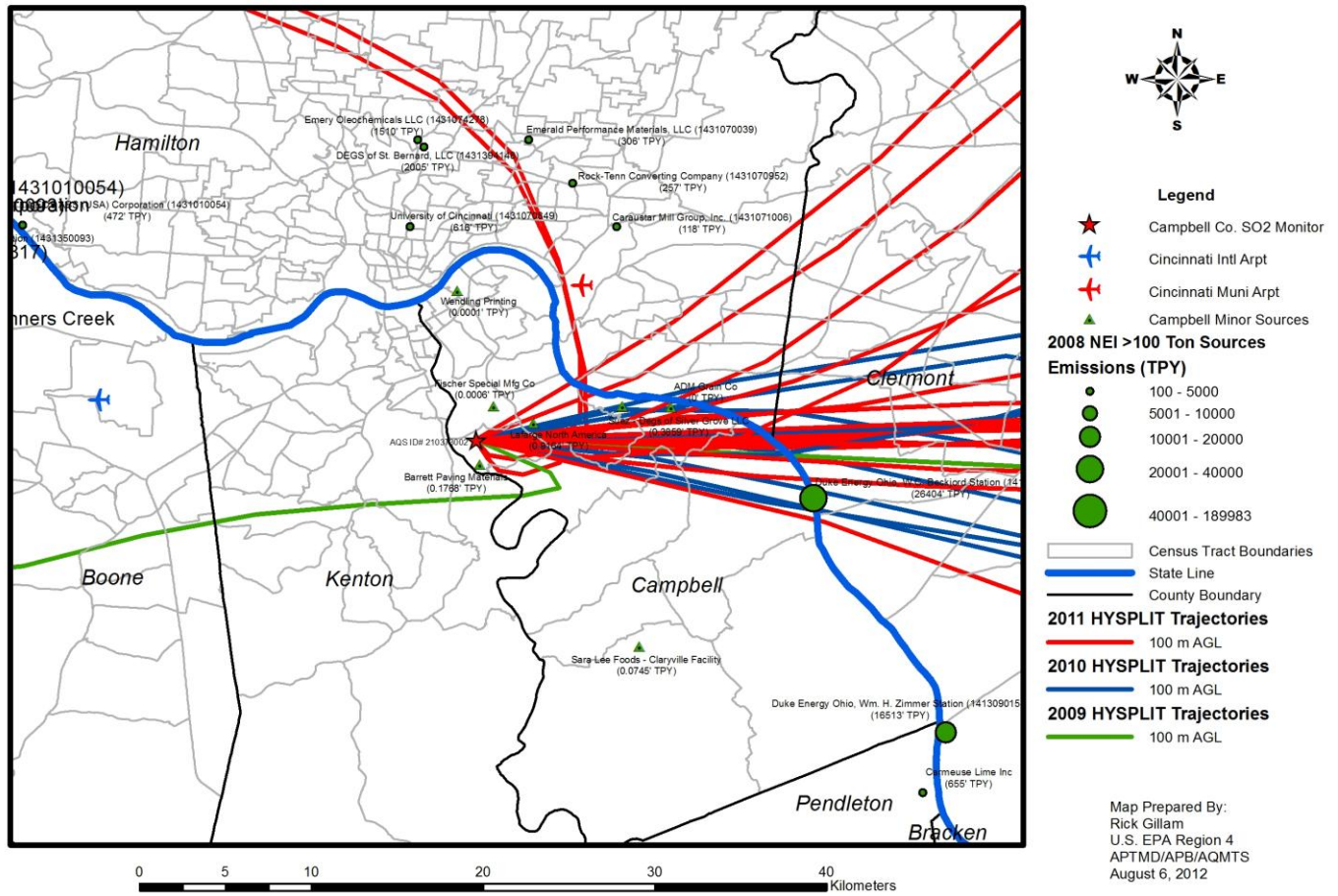
In order to further evaluate potential contribution to the violating monitor, EPA performed a wind back-trajectory analysis using the National Oceanic and Atmospheric Administration (NOAA) Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT)<sup>1</sup> model. The HYSPLIT back-trajectories were created using NOAA's archived Eta Data Assimilation System, 40 kilometer grid resolution meteorological dataset (EDAS 40 kilometers). The back trajectories originated at the violating monitor location on each hour that corresponds to a measured exceedance of the 1-hr SO<sub>2</sub> NAAQS and were

<sup>1</sup> Draxler, R.R. and Rolph, G.D., 2012. HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) Model access via NOAA ARL READY Website (<http://ready.arl.noaa.gov/HYSPLIT.php>). NOAA Air Resources Laboratory, Silver Spring, MD.

initialized at 100 meters above ground level with the “Model Vertical Velocity” model option. Figure 7 shows the results of the back-trajectory analysis.

**Figure 7. HYSPLIT Back-trajectory analysis of 2009-2011 hours exceeding the 1-hr SO<sub>2</sub> NAAQS at the violating monitor**

## Campbell County, Kentucky, HYSPLIT Back-Trajectories



As can be seen in Figure 7, the results of the back-trajectory analysis generally agree with the surface-level wind analysis shown in the wind rose in Figure 6. The trajectory analysis shows that winds blow primarily from the east during hours exceeding the 1-hr SO<sub>2</sub> NAAQS. This analysis supports the conclusion presented above that the Duke Energy Beckjord facility is likely the major contributor to the violating monitor’s design value.

### ***Geography/Topography (mountain ranges or other air basin boundaries)***

Campbell County does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

### ***Jurisdictional Boundaries***

Once EPA identified the general areas that the Agency anticipated would be included in the nonattainment area, EPA then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas. With regard to the 2010 SO<sub>2</sub> NAAQS, EPA believes that the appropriate jurisdictional boundaries to be considered to include counties, air districts, pre-existing nonattainment areas, reservations, among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO<sub>2</sub> NAAQS.

No area in Campbell County has been or is currently designated nonattainment for a prior SO<sub>2</sub> NAAQS, so EPA had no boundary related to a previous nonattainment designation to consider for this area. Additionally, this area does not include Indian Country. Therefore, EPA has identified major and established highways as well as a portion of the Ohio River to define a clearly identifiable boundary for the Kentucky portion of the nonattainment area.

The violating monitor is located in Campbell County, Kentucky; however, the largest nearby source of the SO<sub>2</sub> is located across state lines in Clermont County, Ohio.

### ***Other Relevant Information***

EPA did not receive additional information, relevant to establishing a nonattainment area boundary for this Area.

### **Conclusion**

After considering the factors described above, EPA finds that it is appropriate to include the portions of counties listed in Table 1 in the Campbell-Clermont, KY-OH area as the initial nonattainment area for the 2010 SO<sub>2</sub> NAAQS, based on the violating monitor. The partial county boundary for Campbell County includes the area contained within the following borders:

Southeast: KY Hwy 1566 from Ohio River to KY Hwy 9 (AA Highway)

Southwest: KY Hwy 9 (AA Highway) from Hwy 1566 to I-275

Northwest: I-275 to Hwy 2345 (John's Hill Road), Hwy 2345 to US-27, US-27 to I-275, I-275 to Ohio River

Northeast: Ohio River from I-275 to KY Hwy 1566

The air quality monitor in Campbell County shows a violation of the 2010 SO<sub>2</sub> NAAQS, based on 2009-2011 air quality data. Based on the consideration of all the relevant and available information, as described above, EPA is initially designating portions of Campbell County as described above, in conjunction with portions of Clermont County, Ohio, as nonattainment for the 2010 SO<sub>2</sub> NAAQS. Areas and sources that we are not yet prepared to conclude are contributing to the monitored violation or other possible violations are not included in this initial nonattainment area. In a subsequent round of designations, we will further address such areas and sources and make final designations decisions for areas that are not currently included in the nonattainment areas addressed in this TSD.

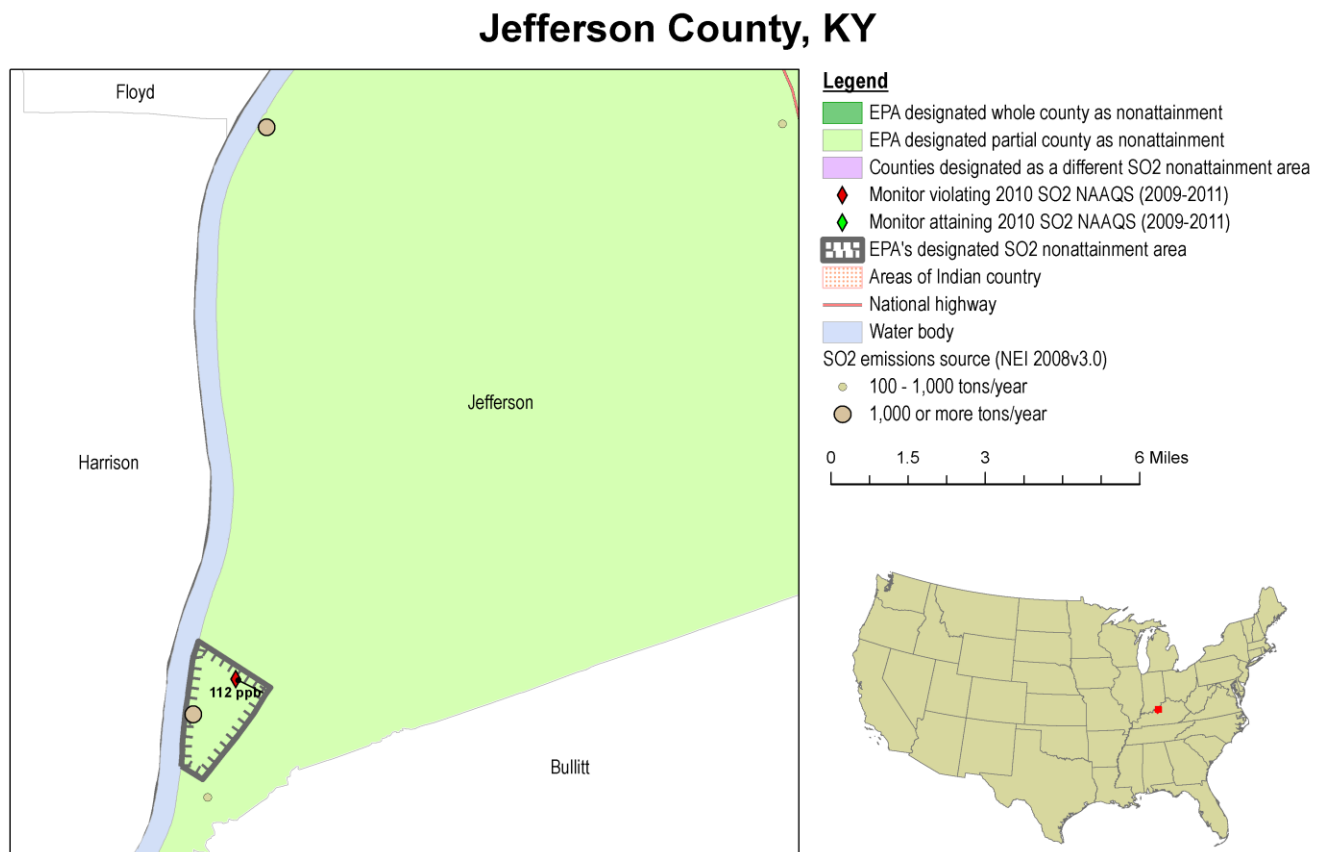
### Technical analysis for Jefferson County

#### Introduction

This technical analysis for Jefferson County identifies the monitor that violates the 2010 SO<sub>2</sub> NAAQS based on 2009-2011 data, and evaluates nearby counties for contributions to SO<sub>2</sub> concentrations in the area. EPA has evaluated this county and nearby counties based on the weight of evidence of the factors recommended in the March 24, 2011, issued EPA guidance.

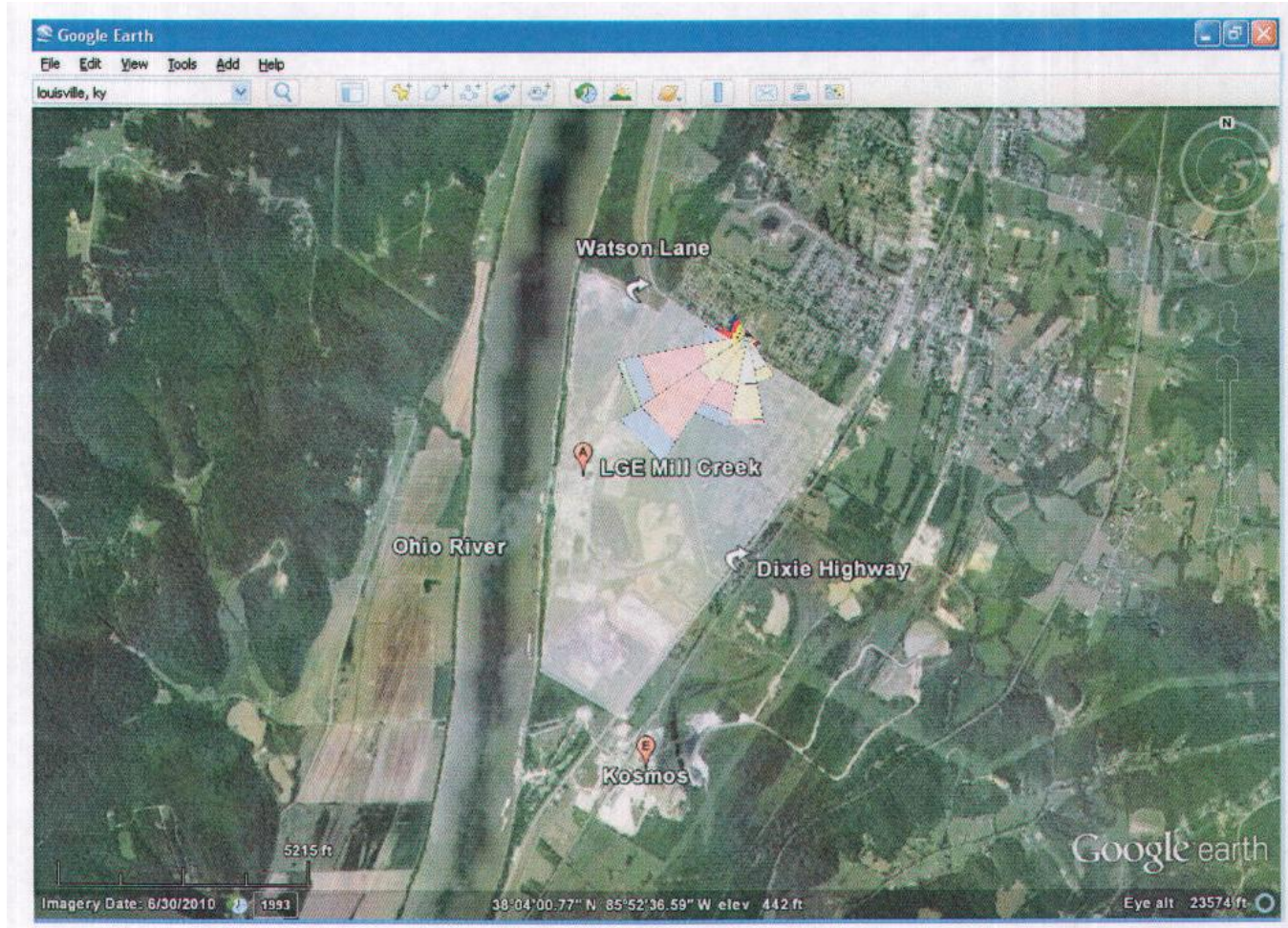
Figure 8 is a map of the area analyzed showing the location and design value of air quality monitors in the areas, and the counties surrounding any violating air quality monitors.

**Figure 8**



In June 2011, Secretary Leonard K. Peters recommended that Jefferson County (in its entirety) be designated as nonattainment for the 2010 SO<sub>2</sub> NAAQS based on monitored air quality data from 2008-2010. Secretary Leonard K. Peters provided an update to the original recommendation on December 20, 2011, and January 15, 2013. In its updated recommendation, Kentucky recommended a partial county boundary around the Jefferson County monitor. Kentucky confirmed the earlier recommendations in a letter dated March 6, 2013. See Figure 9. Letter from Leonard K. Peters, Secretary, Kentucky Energy and Environment Cabinet, to Gwendolyn Keyes Fleming, Regional Administrator, USEPA, Region 4 (June 2, 2011, and updated on December 20, 2011, and January 15, 2013) (on file with USEPA Region 4 Regulatory Development Section).

**Figure 9. Kentucky's Proposed Nonattainment Area for Jefferson County**



Based on EPA's technical analysis described below, EPA is initially designating a portion of Jefferson County as nonattainment for the 2010 SO<sub>2</sub> NAAQS based upon currently available information. The boundary for the Jefferson County Area is the same as recommended by Kentucky as identified in Figure 9 above. Areas and sources that we are not yet prepared to conclude are contributing to the monitored violations are not included in this initial nonattainment area.

### **Detailed Assessment**

#### ***Air Quality Data***

This factor considers the SO<sub>2</sub> air quality monitoring data, including the design values (in ppb) calculated for the air quality monitor in Jefferson County based on data for the 2009-2011 period.

The 2010 SO<sub>2</sub> NAAQS design values for Jefferson County and the surrounding area are shown in Table 5.



**Table 5. Air Quality Data for Nonattainment Designations in Commonwealth**

County	Commonwealth Recommended Nonattainment?	Monitor Name	Monitor Air Quality System ID	Monitor Location	SO <sub>2</sub> Design Value, 2007 - 2009 (ppb)	SO <sub>2</sub> Design Value, 2008-2010 (ppb)	SO <sub>2</sub> Design Value, 2009-2011 (ppb)
<b>Jefferson</b>	<b>N/A</b>	Jefferson	211110051		117	112	<b>112</b>

Monitors in Bold have the highest 2009-2011 design value in the respective county.

Jefferson County shows a violation of the 2010 SO<sub>2</sub> NAAQS. Therefore, some area in this county and possibly additional areas in surrounding counties must be designated nonattainment. The absence of a violating monitor alone is not a sufficient reason to eliminate nearby counties as candidates for nonattainment status. Each area has been evaluated based on the weight of evidence of the five factors and other relevant information.

***Emissions and Emissions-Related Data***

Evidence of SO<sub>2</sub> emissions sources in the vicinity of a violating monitor is an important factor for determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluated county level emission data for SO<sub>2</sub> and any growth in SO<sub>2</sub> emitting activities since the date represented by those emissions data.

Emissions

EPA recognizes that there may be important new information on emissions levels for the period 2008, and would consider more recent years if available. Kentucky provided emissions information which is included in Table 6 below.

Table 6 shows total emissions of SO<sub>2</sub> (given in tpy) for violating and potentially contributing counties in and around Jefferson County and sources emitting (or anticipated to contribute) greater than 100 tons per year of SO<sub>2</sub> according to the 2008 NEI.

**Table 6. SO<sub>2</sub> Emissions [NEI08V3]**

County	Facility Located in Commonwealth Recommended Nonattainment Area?	Facility – Total SO <sub>2</sub> Air Emissions [2008 NEI] (tons per year)	Facility Location	Total County SO <sub>2</sub> Emissions (tons per year)
Jefferson	<b>Yes</b>	LGE, MCS 28,581	38.0531, -85.91	41,333
Jefferson	<b>No</b>	LGE, CRS 10,103	38.1828, -85.8894	
Jefferson	<b>No</b>	Oxy Vinyls 573	38.22022, -85.82885	
Jefferson	<b>No</b>	Louisville Med 482	38.24937, -85.74983	
Jefferson	<b>No</b>	Kosmos Cement 304	38.03634, -85.90869	
Jefferson	<b>No</b>	B-F Dist 252	38.20832, -85.79272	
Jefferson	<b>No</b>	Carbide 150	38.22251, -85.84046	
Jefferson	<b>No</b>	McAlpine 145	38.27884, -85.79078	
Jefferson	<b>No</b>	American Rubber 120	38.20892, -85.8458	
Jefferson	<b>No</b>	Airport 112	38.1846, -85.7484	

### Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 6 represent emissions levels taking into account any control strategies implemented on stationary sources in Jefferson County up to and including 2008. EPA has not received any additional information from the Commonwealth of Kentucky regarding emissions reductions resulting from controls put into place after 2008.

### *Meteorology (weather/transport patterns)*

Evidence of source-receptor relationships between specific emissions sources and high SO<sub>2</sub> values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area boundary. For this factor, EPA considered recent hourly meteorological data from the NWS site nearest to the violating monitor to determine which wind vectors were associated with 1-hour SO<sub>2</sub> exceedances. For the Jefferson County Area, the meteorological data used in this analysis is for 2009-2011 from the Louisville Standiford Field Airport site (ID # 724230-93821). The Louisville Standiford Field site is approximately 19 kilometers northeast of the southern violating monitor (AQS ID # 21-111-0051). The primary SO<sub>2</sub> emissions source nearby the monitor is the Louisville Gas & Electric, Mill Creek Station facility, located approximately 1.5 kilometers southwest from the southern violating monitor.

Figure 10 shows a wind rose of the hours exceeding the 1-hr SO<sub>2</sub> NAAQS (75 ppb) at the Jefferson County violating monitor (AQS ID # 21-111-0051). The wind rose was developed using wind data from the Louisville Standiford Field Airport site.

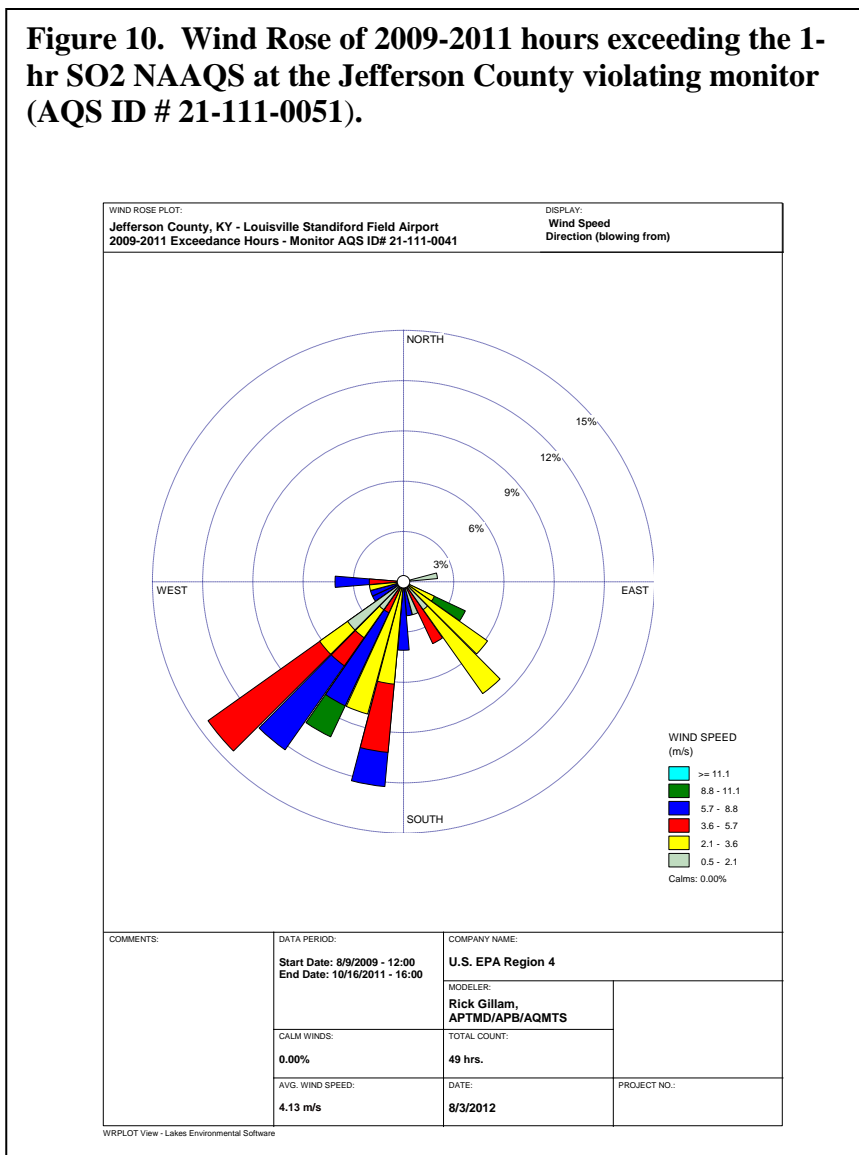


Figure 10 shows that the majority of the exceeding hours have winds blowing from the southwest quadrant with moderate to high wind speeds. As can be seen in Figure 9 the Louisville Gas & Electric, Mill Creek Station facility is located approximately 1.5 kilometers southwest of the monitor. Therefore, the Louisville Gas & Electric, Mill Creek Station facility is likely the major contributor to the violating monitor's design value.

This analysis supports the conclusion presented above that the Louisville Gas & Electric, Mill Creek Station facility is likely the major contributor to the violating monitor's design value.

### ***Geography/topography (mountain ranges or other air basin boundaries)***

Jefferson County does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

### ***Jurisdictional boundaries***

Once EPA identified the general areas that the Agency anticipated would be included in the initial nonattainment area, EPA then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas.

No area in Jefferson County has been or is currently designated nonattainment for a prior SO<sub>2</sub> NAAQS, so EPA had no boundary related to previous nonattainment designations to consider for this area. Therefore, EPA has identified major and established roadways as well as a portion of the Ohio River and specific geographic coordinates to define a clearly identifiable boundary of the nonattainment area.

### ***Other Relevant Information***

EPA did not receive additional information, including modeling results, relevant to establishing a nonattainment area boundary for this area.

### **Conclusion**

After considering the factors described above, EPA finds that it is appropriate to include the portion of Jefferson County listed in Table 1 as the initial nonattainment area for the 2010 SO<sub>2</sub> NAAQS, based on the violating monitor information.

The air quality monitor in Jefferson County shows a violation of the 2010 SO<sub>2</sub> NAAQS, based on 2009-2011 air quality data. Based on the consideration of all the relevant and available information, EPA is initially designating the area within the boundary that borders the LGE Mill Creek Power Plant in the southern portion of Jefferson County as prescribed by the Commonwealth, encompassing the Watson Lane Monitor as shown in Figure 9 as nonattainment. The following is a complete description of the boundary.

The portion of Jefferson County contained within the following borders:

North: Ethan Allen Way extended to the Ohio River at UTM Easting (m) 595738, UTM Northing 4214086 and Dixie Highway (US60 and US31W) at UTM Easting (m) 59751, UTM Northing 4212946<sup>2</sup>;

East: Along Dixie Highway from UTM Easting (m) 597515, UTM Northing 4212946 to UTM Easting (m) 595859, UTM Northing 4210678;

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<sup>2</sup> The UTM coordinates provided here have a reference datum of NAD 1983 UTM Zone 16N.

South: Near the adjacent property lines of Louisville Gas and Electric - Mill Creek Electric Generating Station and Kosmos Cement where they join Dixie Highway at UTM Easting (m) 595859, UTM Northing 4210678 and the Ohio River at UTM Easting (m) 595326, UTM Northing 4211014;

West: Along the Ohio River from UTM Easting (m) 595326, UTM Northing 4211014 to UTM Easting (m) 595738, UTM Northing 4214086.

Areas and sources that we are not yet prepared to conclude are contributing to the monitored violation or other possible violations are not included in this initial nonattainment area. In a subsequent round of designations, we will further address such areas and sources and make final designations decisions for areas and sources that are not currently included in the nonattainment area designation addressed in this TSD.