
Technical Support Document (TSD)

**Illinois
Area Designations For the
2010 SO₂ 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 one-hour sulfur dioxide (SO₂) 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 tribal areas) in Illinois that EPA intends to designate “nonattainment” for the primary 2010 SO₂ NAAQS.

Illinois submitted recommendations on June 2, 2011. On February 6, 2013, EPA sent out a letter with intended designations for Illinois. Illinois did not respond to EPA’s intended designation. Table 1 below lists Illinois’s June 2, 2011 recommendations and identifies the counties or portions of counties in Illinois that EPA is initially designating “nonattainment” based on monitored violations. EPA is not yet prepared to designate other areas in Illinois, and will address them in subsequent rounds of designation.

Table 1. Nonattainment Area Designations for Illinois

Area	Illinois Recommended Designation of Areas/ Counties	EPA's Designation of Areas/ Counties
Pekin, IL Tazewell County (partial) - Cincinnati Township, - Pekin Township Peoria County (partial) - Hollis Township	Nonattainment Unclassifiable	Nonattainment Nonattainment
Lemont, IL Cook County (partial) - Lemont Township Will County (partial) - Dupage Township - Lockport Township	Nonattainment Nonattainment	Nonattainment Nonattainment

Background

On June 3, 2010, EPA revised the primary SO₂ 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 quality monitoring site when the 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentration at each monitor in an area does not exceed 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 SO₂. 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 SO₂ has not been revised, so EPA is not designating areas in this process on the basis of the secondary standard.

EPA's SO₂ 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. For the 2010 SO₂ NAAQS, this deadline was June 3, 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 State Commissioner through letter signed by the Regional Administrator of any intended modifications. [While language in section 107 specifically addresses states, we intend to follow the same process for tribes, pursuant to section 301(d) of the CAA and Tribal Authority Rule (40 CFR Part 49). Therefore, we intend to designate tribal areas, in consultation with the tribes, on the same schedule as state designations.] If a State or Tribe did not submit designation recommendations, EPA is to promulgate the designations that it deems appropriate. If a state or tribal government disagrees with EPA's intended area designations, it had an opportunity to demonstrate why any proposed modification is 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 SO₂ 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, metropolitan planning organization), among any other information deemed relevant to establishing appropriate area designations and boundaries for the 1-hour SO₂ NAAQS.

The March 24, 2011, designations guidance memo recommended that area boundaries be defaulted to the county boundary unless additional provided 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, tribes 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 submitted by Illinois for designations of the 1-hour SO₂ 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 SO₂ NAAQS, based on the most recent three years of air quality monitoring data from 2009-2011, 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 SO₂ NAAQS** - 75 ppb, national ambient air quality standard for SO₂ promulgated in 2010. Based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations
- 5) **Design Value** – a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.

Technical analysis for the Lemont, IL Area

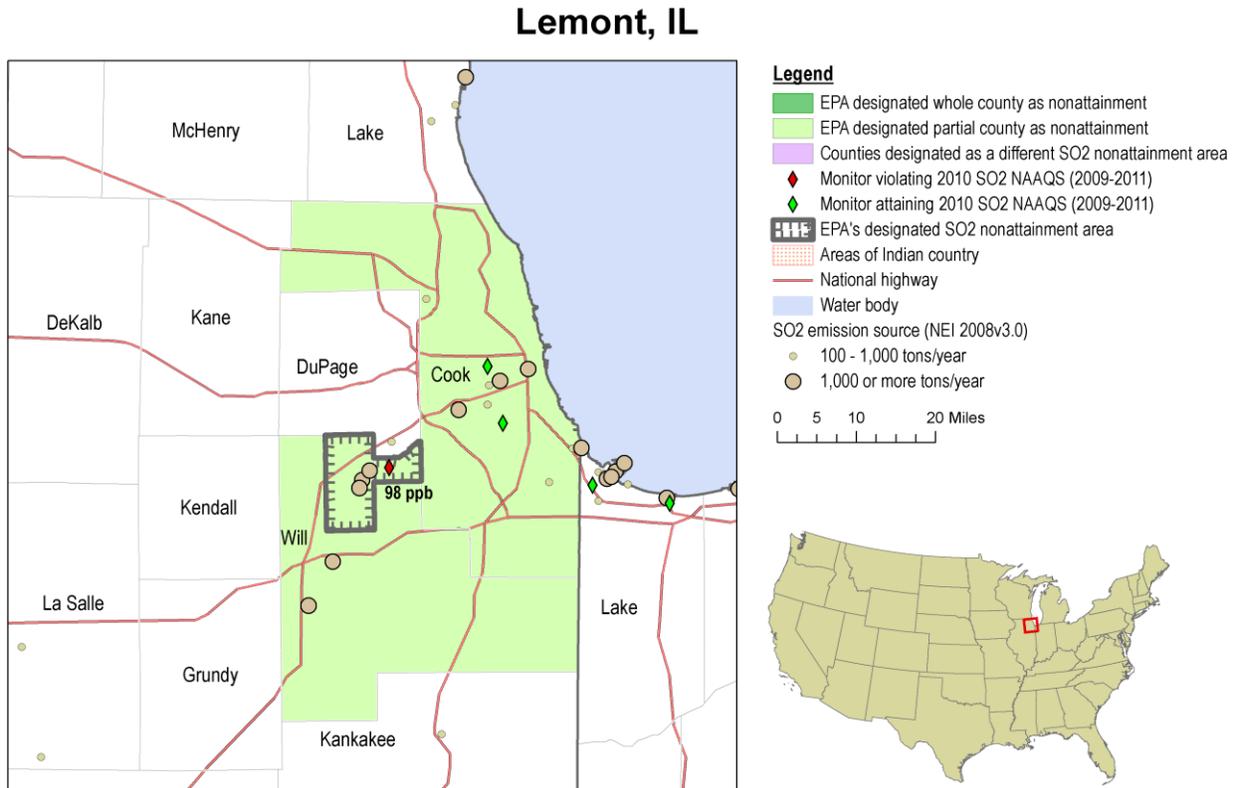
Introduction

This technical analysis for the Lemont, IL area identifies Cook County with a monitor, in Lemont, that violates the 2010 SO₂ NAAQS, and evaluates nearby counties for contributions to SO₂ concentrations in the area. EPA has evaluated this county and nearby counties based on the evidence for the factors recommended in the March 24, 2011 EPA guidance.

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

Lemont Township in Cook County recorded a 2009 to 2011 design value of 98 ppb. Multiple other monitors in Cook County and a monitor in Will County showed design values below the standard, with values ranging from 18 to 30 ppb.

Figure 1. Map of sources and monitors in the Chicago area and the Lemont, IL nonattainment area



Illinois analyzed the sources that might be contributing to the monitored violation in Lemont. Based on this assessment, Illinois recommended that an area consisting of DuPage and Lockport Townships in Will County and Lemont Township in Cook County be designated as nonattainment. This recommendation reflected Illinois' view that no significant sources are located in Cook County near Lemont but that three significant sources are located nearby in Will County.

Based on EPA's technical analysis described below, EPA is initially designating a Lemont nonattainment area consisting of Lemont Township in Cook County and DuPage and Lockport Townships in Will County as nonattainment for the 2010 SO₂ NAAQS. Areas and sources that we are not yet prepared to conclude are contributing to monitored violations or to other possible violations are not included in this initial nonattainment area. Such sources and areas will be further addressed in a subsequent round of final designations.

Detailed Assessment

Air Quality Data

This factor considers the SO₂ air quality monitoring data, including the design values (in ppb) calculated for all air quality monitors in the Chicago metropolitan area based on data for the 2009-2011 period.

The 2010 SO₂ NAAQS design values for the Chicago area within Illinois are shown in Table 2.

Table 2. Air Quality Data in the Chicago Area

County	State Recommended Nonattainment?	Monitor Air Quality System ID	Monitor Location	SO ₂ Design Value, 2009-2011 (ppb)
Cook	No	17-031-0050	41.7076, -87.5686	20*
	No	17-031-0063	41.877, -87.6343	18*
	No	17-031-0076	41.7514, -87.7135	24
	Yes	17-031-1601	41.6681, -87.9906	98
	No	17-031-4002	41.8552, -87.7525	30
	No	17-031-4201	42.1400, -87.7992	18*
Will	No	17-197-0013	41.46, -88.182	28*

*Data are incomplete. Value is determined from available data for instrument identified as POC 2. Monitors in Bold have the highest 2009-2011 design value in the respective county.

The Lemont monitor in Cook County shows a violation of the 2010 SO₂ NAAQS.

Emissions and Emissions-Related Data

Evidence of SO₂ 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 SO₂ and any growth in SO₂ emitting activities since the date represented by those emissions data.

Emissions

The most recent year for which national emissions information was compiled was 2008. Illinois did not provide more recent emissions information. Therefore, EPA relied on the 2008 National Emissions Inventory (NEI) emissions data (NEI08V3).

Table 3 shows total emissions of SO₂ (given in tons per year) for Cook County and for adjoining Will County. Table 3 also shows pertinent information for sources in these counties emitting greater than 100 tons per year of SO₂ according to the 2008 NEI.

Table 3. SO₂ Emissions in the Chicago Area (NEI08V3)

County	Facility in State Recommended N.A. Area?	Facility	Emissions NEI08V3 (tons per year)	Facility Location	Distance to Lemont Monitor (km)	Total County SO ₂ Emissions (tons per year)
Cook	No	Crawford Station	6,627 tpy	41.8278, -87.7236	28	19,346
	No	Fisk Station	4,486 tpy	41.8408, -87.6533	34	
	No	Corn Products	2,203 tpy	41.7751, -87.8224	18	
	No	Koppers	823 tpy	41.8206, -87.7487	26	
	No	O'Hare Airport	498 tpy	41.9772, -87.9044	35	
	No	Saint-Gobain Containers	345 tpy	41.6439, -87.6003	32	
	No	Carmeuse Lime	321 tpy	41.7056, -87.5438	37	
	No	Midway Airport	110 tpy	41.785, -87.7519	24	
Will	No	MWG Joliet Station	18,281 tpy	41.4947, -88.125	22	63,967
	Yes	MWG Will County Station	16,497 tpy	41.6344, -88.0592	7	
	No	Exxon Mobil	16,404 tpy	41.4138, -88.1835	33	
	Yes	Oxbow Midwest Calcining	6,205 tpy	41.6622, -88.0379	4	
	Yes	CITGO Petroleum	6,137 tpy	41.6444, -88.0559	6	

The sources in Cook County are at considerable distances from the violating monitor. For example, the closest source is Corn Products Corporation, at about 18 kilometers from the monitor, with emissions of about 2,300 tons per year, and the highest emitting source in Cook County, Midwest Generation's Crawford Station, is about 28 kilometers away, emitting about 6,600 tons per year. Based on the distance of these sources from the violating monitor, EPA is not yet prepared to conclude that these sources contribute to the Lemont monitor's design value. These sources will be further addressed in a subsequent round of designations.

Three of the sources in Will County are relatively close to the Lemont monitor and have sufficient emissions that Illinois recommended including the townships containing these sources in the Lemont nonattainment area. However, considering their emission levels and based on their distance from the monitor, EPA is not yet prepared to conclude that two other Will County sources, Midwest Generation's Joliet Station and the Exxon-Mobil refinery, are contributing to the Lemont monitor's design value. These two sources will also be further addressed in subsequent a round of designations.

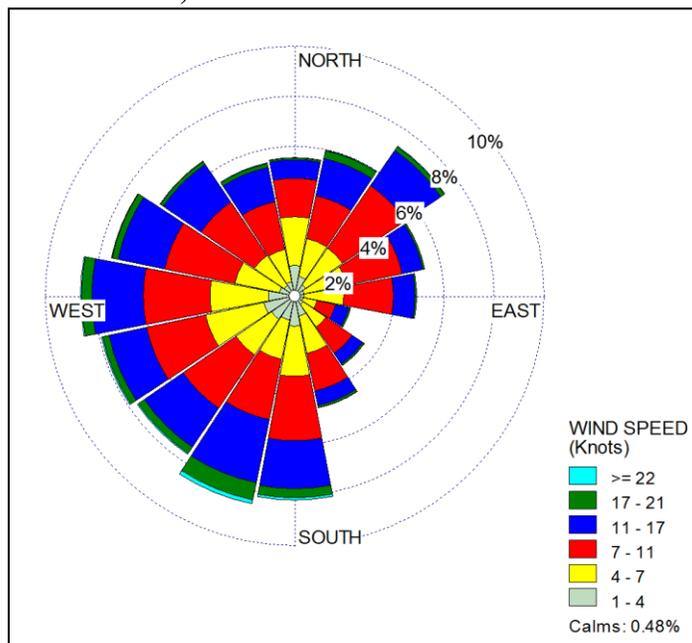
Emissions Controls

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 this area up to and including 2008. EPA has not received any additional information on 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 SO₂ values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area. Figure 2 shows the prevalent wind direction for the Lemont, IL area.

Figure 2: Wind Rose for Lemont, IL



Source: IEPA Software: WRPLOT-Lakes Environmental Software

The wind rose above shows that winds are most likely to come from the south, west, and southwest directions, but also frequently come from all the northeast direction, and occasionally from the other directions. This shows that a source from any direction could contribute to the violation at the monitor. The three largest nearby emitters, MWG Will County Station, Oxbow Midwest Calcining, and CITGO Petroleum, are located to the west and southwest of the monitor, which are the frequent wind directions.

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

The Lemont area does not have any geographical or topographical barriers significantly limiting air pollution transport within its airshed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

Jurisdictional boundaries

Illinois does not have any current SO₂ nonattainment areas under the prior SO₂ NAAQS. Townships in Illinois have well established boundaries and are a suitable basis for defining nonattainment areas.

Other Relevant Information

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

Conclusion

Illinois has adequately justified an initial nonattainment area, based on the violating monitor in Cook County, which includes the Lemont Township containing the monitoring site and two townships in Will County, DuPage and Lockport Townships, with sources that contribute to the monitored violation. Based on the distance from the violating monitor and wind rose analysis, EPA is not yet prepared to conclude that other sources in Cook County outside Lemont Township, as well as the Midwest Generation Joliet plant and the Exxon-Mobil refinery in Will County, contribute to the Lemont monitor's design value. In a subsequent round of designations, EPA will make final designations decisions for areas and sources that are not currently included in the initial nonattainment area designation addressed in this TSD.

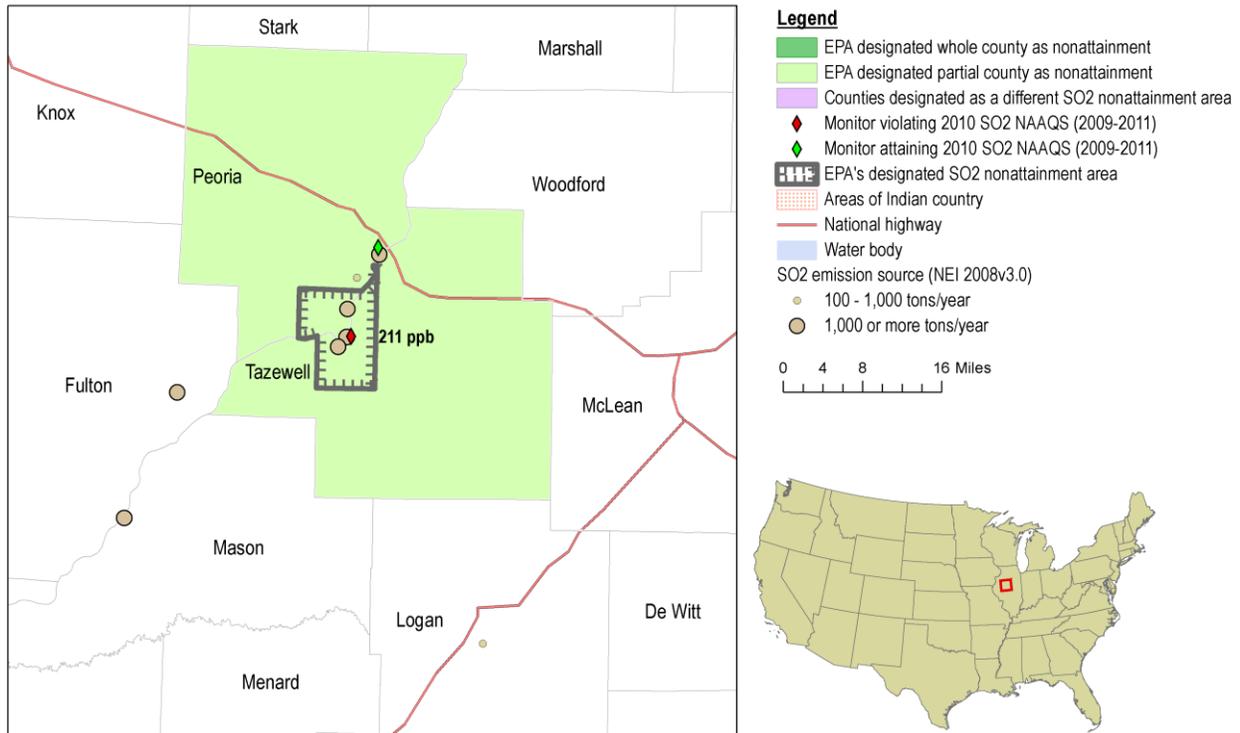
Technical analysis for the Pekin, IL Area

Introduction

This technical analysis for the Pekin, IL area identifies a Tazewell County monitor that violates the 2010 SO₂ NAAQS. EPA has evaluated this county and nearby counties based on the evidence for the factors recommended in the March 24, 2011 EPA guidance.

Figure 3 is a map of the area showing the location and the design value of the air quality monitor in the area, and the counties surrounding this air quality monitor. The monitor in Pekin (Tazewell County) recorded a 2009 to 2011 design value of 211 ppb. A monitor in Peoria County recorded a 2009 to 2011 design value of 36 ppb, based on incomplete data. No other SO₂ monitor is located in these or any neighboring counties.

Figure 3. Map of sources, monitors, and nonattainment area boundaries in the Pekin, IL area
Pekin, IL



Illinois analyzed the sources that might be contributing to the monitored violation in Pekin. Based on this assessment, Illinois recommended that an area consisting of Cincinnati and Pekin Townships in Tazewell County be designated as nonattainment.

EPA believes that Hollis Township in Peoria County also contributes to the violation monitored in Tazewell County. E.D. Edwards Station, a power plant operated by Ameren, is located in this township. This source emits approximately 11,000 tons of SO₂ per year, in a location that is about 4.5 kilometers in a direction that is periodically upwind of the Pekin monitor.

Based on EPA's technical analysis described below, and based on a monitored violation, EPA is initially designating a Pekin nonattainment area consisting of Cincinnati and Pekin Townships in Tazewell County and Hollis Township in Peoria County. 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. Such areas and sources will be addressed in a subsequent round of final designations.

EPA received comments from Ameren and from the Illinois Environmental Regulatory Group objecting to the inclusion of Hollis Township in the nonattainment area, as well as comments from Citizens Against Ruining the Environment and the Respiratory Health Association generally supporting the intended designation. These comments are addressed in more detail in the response to comments document.

Detailed Assessment

Air Quality Data

This factor considers the SO₂ air quality monitoring data, including the design value (in ppb) calculated for the air quality monitor in Tazewell County based on data for the 2009-2011 period. The only other monitor in this part of Illinois is located in Peoria County. The 2010 SO₂ NAAQS design values for the Tazewell and Peoria County monitors are shown in Table 4.

Table 4. Air Quality Data in the Pekin Area

County	State Recommended Nonattainment?	Monitor Air Quality System ID	Monitor Location	SO ₂ Design Value, 2009-2011 (ppb)
Peoria	No	17-143-0024	40.6874, -89.6069	36
Tazewell	Yes	17-179-0004	40.5565, -89.654	211

The Tazewell County monitor shows a violation of the 2010 SO₂ 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 inclusion in a nonattainment area.

Emissions and Emissions-Related Data

Evidence of SO₂ 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 SO₂ and any growth in SO₂ emitting activities since the date represented by those emissions data.

Emissions

The most recent year for which national emissions information was compiled was 2008. Illinois reported data indicating that emissions from pertinent sources in 2007 and 2009 were similar to emissions in 2008. Therefore, EPA relied on the 2008 National Emissions Inventory (NEI) emissions data (NEI08V3).

Table 5 shows total emissions of SO₂ (given in tons per year) for Tazewell County and for adjoining Peoria County. Table 5 also shows pertinent information for sources in these counties emitting greater than 100 tons per year of SO₂ according to the 2008 NEI.

Table 5. SO₂ Emissions in the Pekin Area (NEI08V3)

County	Facility Located in State Recommended Nonattainment Area?	Facility – Total SO ₂ Air Emissions NEI08V3 (tons per year)	Facility Location	Distance to Pekin Monitor (km)	Total County SO ₂ Emissions (tons per year)
Peoria	No*	Ameren – E.D. Edwards Stn – 11,224 tpy	40.5958, -89.6631	4	14,603
	No	ADM – 3049 tpy	40.6756, -89.6073	14	
	No	Keystone Steel & Wire – 138 tpy	40.6420, -89.6467	10	
Tazewell	Yes	MWG – Powerton Stn. – 22,355 tpy	40.5408, -89.6786	3	34,358
	Yes	Aventine Renewable Energy – 11,830 tpy	40.5553, -89.6629	1	

*This source is included in the nonattainment area that EPA is promulgating

The two significant sources in Tazewell County are located in Cincinnati and Pekin Townships, respectively, which Illinois has recommended including in the Pekin nonattainment area. Illinois did not recommend including any of Peoria County in this nonattainment area. However, EPA finds that Ameren’s E.D. Edwards power plant is only 4 kilometers from the monitor and has significant emissions with potential to have significant impact on recorded concentrations at the monitor. This source is located in Hollis Township, and so this township warrants consideration for its contributions to the violation measured in Pekin. Based on their distance from the violating monitor, EPA is not yet prepared to conclude that the other sources in Peoria County contribute to the violating monitor’s design value. These sources will be further addressed in a subsequent round of designations.

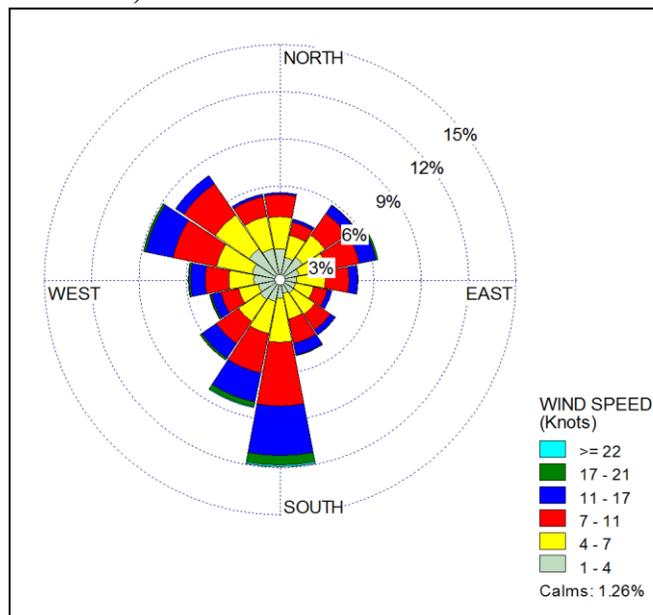
Emissions Controls

The emissions data used by EPA in this technical analysis and provided in Table 5 represent emissions levels taking into account any control strategies implemented on stationary sources in this area up to and including 2008. EPA has not received any additional information on 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 SO₂ values at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of the nonattainment area. Figure 4 shows the prevalent wind direction for the Lemont, IL area.

Figure 4: Wind Rose for Pekin, IL



Source: IEPA Software: WRPLOT-Lakes Environmental Software

The wind rose above suggests that winds come most frequently from the south, somewhat frequently from the northwest, and occasionally from the other directions. Focusing on days when concentrations are above the level of the standard, winds from the north (including variable winds that at least in part include north winds) occur with sufficient frequency to suggest that nearby significant sources located north as well as west and southwest of the monitor are contributing to violations measured in Pekin. As discussed in more detail in the response to comments document, winds from the north (including variable winds that at least in part include north winds) also occur in particular at times when the standard is exceeded at the Pekin monitor.

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

The Pekin area does not have any geographical or topographical barriers significantly limiting air pollution transport within its airshed. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

Jurisdictional boundaries

Illinois does not have any current SO₂ nonattainment areas under the prior SO₂ NAAQS. Townships in Illinois have well established boundaries and are a suitable basis for defining nonattainment areas.

Other Relevant Information

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

Conclusion

Illinois' recommendation to define the Pekin, IL nonattainment area to include Cincinnati and Pekin Townships of Tazewell County appropriately includes the portions of Tazewell County that are contributing to the measured violation. However, EPA has determined that the initial nonattainment area should also include Hollis Township in Peoria County, which includes Ameren's E.D. Edwards Station. This source has substantial emissions relatively close to the monitor measuring a violation, and analysis of wind information supports a finding of contribution of emissions from the direction of this source to the violating monitor. Therefore, EPA believes that Hollis Township of Peoria County warrants inclusion in the initial Pekin nonattainment area. Thus, after considering the factors described above, EPA is initially designating an area that includes Cincinnati and Pekin Townships in Tazewell County and Hollis Township in Peoria County as the Pekin, IL nonattainment area for the 2010 SO₂ NAAQS. In a subsequent round of designations, we will make final designations decisions for areas and sources that we are not yet prepared to conclude are contributing to the monitored violations or to other possible violations and that are not currently included in the initial nonattainment area designation addressed in this TSD.