

Draft Technical Support Document

**Illinois
Area Designations For the
2010 SO₂ Primary National Ambient Air Quality Standard**

Summary

Pursuant to section 107(d) of the Clean Air Act, EPA must initially designate areas as either “unclassifiable”, “attainment”, or “nonattainment” for the 2010 one-hour sulfur dioxide (SO₂) primary national ambient air quality standard (NAAQS). The Clean Air Act defines a nonattainment area as one that does not meet the NAAQS or that contributes to a violation in a nearby area.

Illinois submitted recommendations on June 2, 2011. Table 1 below lists Illinois’s recommendations and identifies the counties or portions of counties in Illinois that EPA intends to designate “nonattainment” based on monitored violations.

Table 1. Nonattainment Area Designations for Illinois

Area	Illinois Recommended Designation of Areas/ Counties	EPA's Intended 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, published on June 22, 2010). EPA revised the primary SO₂ standard by establishing a new one-hour standard at a level of 75 parts per billion (ppb) which is attained when the three-year average of the 99th percentile of one-hour daily maximum concentrations does not exceed 75 ppb. 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. EPA is revoking the two prior primary standards of 140 ppb evaluated over 24 hours, and 30 ppb evaluated over an entire year because they will not add additional public health protection given a one-hour standard at 75 ppb. Accordingly, EPA is not designating areas in this process on the basis of either of these two 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 Clean Air Act requires that not later than one year after promulgation of a new or revised NAAQS, state Governors must submit their recommendations for designations and boundaries to EPA by June 2011. Section 107(d) also requires EPA to provide notification to states no less than 120-days prior to promulgating an initial area designation that is a modification of a state's recommendation. EPA was to promulgate initial area designations within two years of promulgation of the revised primary standard, although EPA has extended this deadline for one additional year due to having insufficient information to promulgate the designations. If a state did not submit designation recommendations, EPA will promulgate the designations that it deems appropriate. If a state or tribe disagrees with EPA's intended designations, they have 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 five 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 criteria deemed to be relevant to establishing appropriate area designations and boundaries for the one-hour SO₂ NAAQS.

The March 24, 2011, memo recommended that area boundaries default to the county boundary unless information provided by the state or tribe 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 differing boundary than a county boundary.

In this technical support document, EPA discusses its review and technical analysis of the recommendations regarding areas with monitored violations submitted by Illinois for designations for the one-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, or contributes to a violation in a nearby area.
- 2) **Recommended nonattainment area** – an area a state or tribe has recommended that EPA designate as nonattainment.
- 3) **Violating monitor** – an ambient air monitor meeting all methods, quality assurance and siting criteria and requirements whose valid design value exceeds 75 ppb, as described in Appendix T of 40 CFR part 50.
- 4) **2010 SO₂ NAAQS** – The NAAQS for SO₂ promulgated in 2010. This NAAQS is 75 ppb, based on the three year average of the 99th percentile of the annual distribution of daily maximum one-hour average concentrations. See 40 CFR Part 50.17.
- 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.

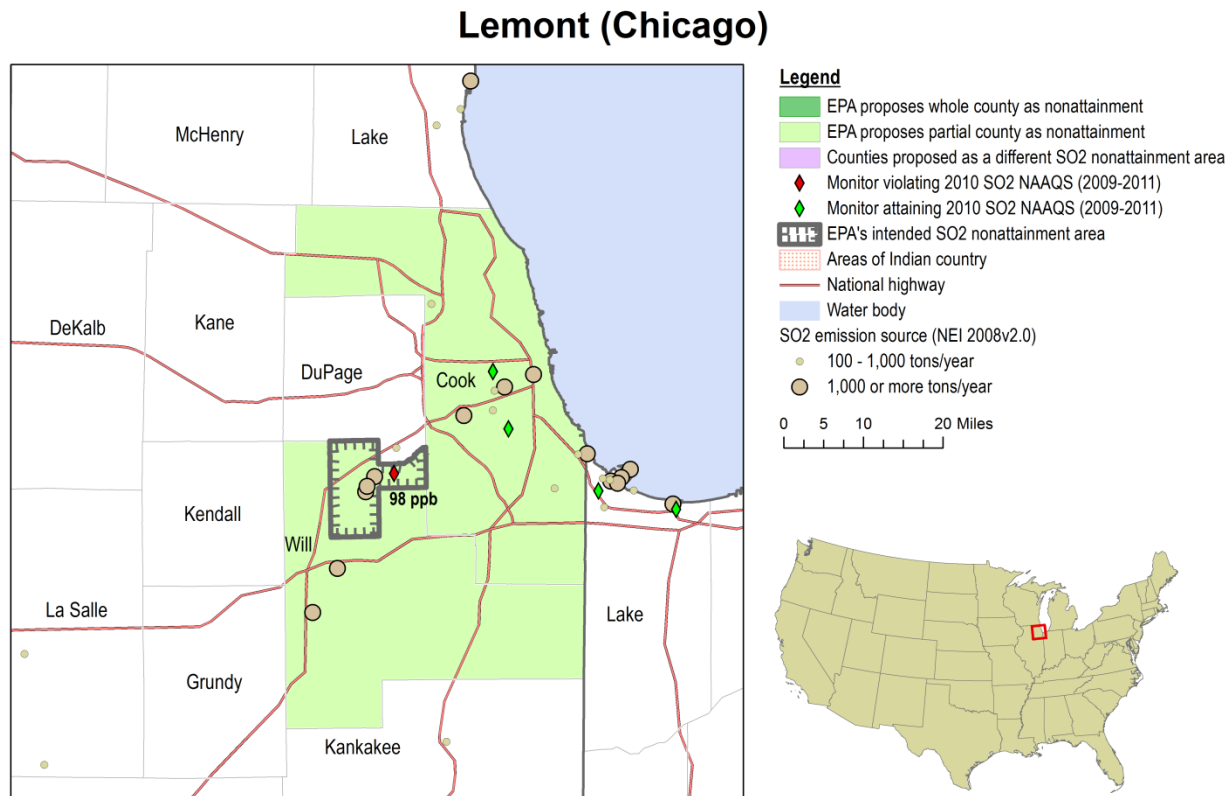
Technical analysis for the Lemont, IL Area

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 intended Lemont, IL nonattainment area



Illinois analyzed the sources that might be contributing to the monitored violation in Lemont. Based on this assessment, Illinois recommends that an area consisting of DuPage and Lockport Townships in Will County and Lemont Township in Cook County be designated as nonattainment. This recommendation reflects 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 intending to designate 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.

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 (NEI08V2).

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 (NEI08V2)

County	Facility in State Recommended N.A. Area?	Facility	Emissions NEI08V15 (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	20,562
	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	511 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	114 tpy	41.785, 87.7519	24	
Will	No	MWG Joliet Station	18,281 tpy	41.4947, 88.125	22	64,126
	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. These sources are at sufficient distance from the monitor, with sufficiently low emissions, for EPA to judge, as recommended by Illinois, that these sources do not contribute significantly to the monitored violation at the Lemont monitor.

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. Midwest Generation's Joliet Station and the Exxon-Mobil refinery are sufficient distance and do not have sufficiently high emissions to warrant being included in this nonattainment area based on the monitored violation.

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)

When considering a one-hour standard, violations can occur at anytime, even when weather patterns are varied from the normal trends of the area. For this area, winds can be from any direction. Therefore, for a one-hour standard, it is useful to consider all directions to have potential contribution. Nevertheless, according to wind information provided with Illinois' recommendations, winds in this area come from the west and southwest more frequently than from other quadrants, particularly when concentrations are high at the Lemont monitor, so sources to the west and southwest of the Lemont monitor are most likely to contribute to violations at this monitor.

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

The Chicago 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. 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 a nonattainment area, based on the violating monitor in Cook County, that includes the township that contains the monitoring site and two townships in Will County, DuPage and Lockport Townships, that are judged to contribute to the monitored violation. In judging the area to be included in the Lemont nonattainment area based on the violation recorded at the Lemont monitor, EPA judged that sources in Cook County outside Lemont Township, as well as the Midwest Generation Joliet plant and the Exxon-Mobil refinery in Will County, are sufficiently distant from the violating monitor to warrant being excluded from this nonattainment area.

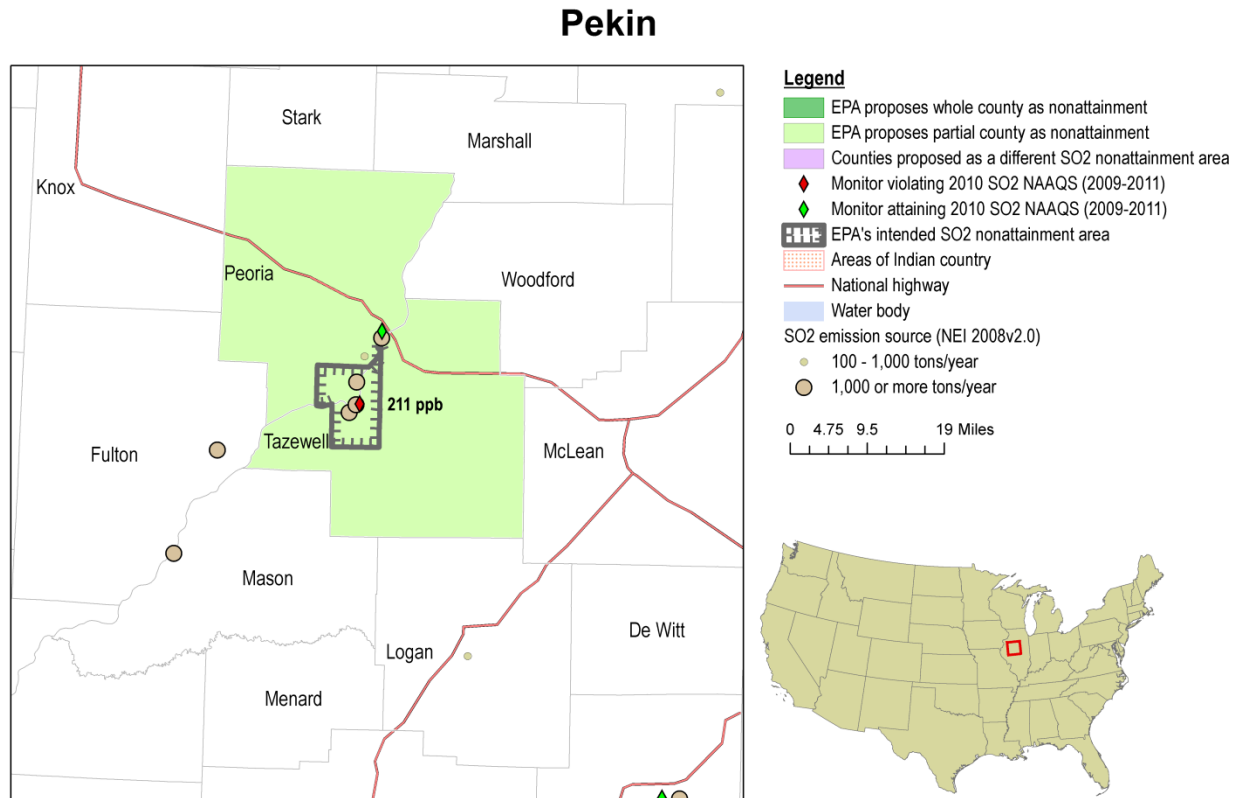
Technical analysis for the Pekin, IL Area

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 2 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 2. Map of sources, monitors, and intended nonattainment area boundaries in the Pekin, IL area



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 intending initially to designate a Pekin nonattainment area consisting of Cincinnati and Pekin Townships in Tazewell County and Hollis Township in Peoria.

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 nonattainment status.

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 (NEI08V2).

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 (NEI08V2)

County	Facility Located in State Recommended Nonattainment Area?	Facility – Total SO ₂ Air Emissions NEI08V2 (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	14,677
	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	34,415
	Yes	Aventine Renewable Energy – 11,830 tpy	40.5553, 89.6629	1	

*This source is included in the nonattainment area that EPA intends to promulgate

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 does 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 concentrations at the monitor. This source is located in Hollis Township, and so this township warrants being considered an area that contributes to the violation measured in Pekin.

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)

When considering a one-hour standard, violations can occur at anytime, even when weather patterns are varied from the normal trends of the area. For this area, wind patterns can be from any direction. Therefore, for a one-hour standard, it is useful to consider all directions to have potential contribution. The wind rose provided by Illinois suggests that winds come most frequently from the south, and somewhat frequently from the northwest, but winds come from all directions with sufficient frequency to suggest that meteorology is not a significant factor in defining this nonattainment area.

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. 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 and the area known to be violating the standard. However, EPA believes that the initial nonattainment area based on monitored violations 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. Therefore, EPA believes that Hollis Township of Peoria County warrants inclusion in the Pekin nonattainment area. Thus, after considering the factors described above, EPA intends initially to designate 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.