

Technical Support Document

Ohio 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 a violation in a nearby area.

Ohio submitted designation recommendations on June 3, 2011, and submitted supplemental information and amended recommendations on June 29, 2011, April 12, 2012, and January 18, 2013. On February 6, 2013, EPA sent out a letter with intended designations for some areas in Ohio. Ohio responded in letters dated March 13, 2013 and April 26, 2013. Ohio also provided additional information on June 19, 2013. Table 1 below identifies the counties or portions of counties in Ohio that EPA is initially designating “nonattainment” based on monitored violations. EPA is not yet prepared to designate other areas in Ohio, and will address such areas and their sources in a future round of final designations.

Table 1. Nonattainment Area Designations for Ohio

Area	Ohio's Recommendation of Areas/ Counties	EPA's Nonattainment Designation of Areas/Counties
Lake County, Ohio Lake County	Nonattainment	Nonattainment
Muskingum River, Ohio Morgan County (partial): Center Township	Nonattainment	Nonattainment
Washington County (partial): Waterford Township	Nonattainment	Nonattainment
Steubenville OH-WV Jefferson County, OH (partial): Cross Creek, Steubenville, Warren, and Wells Townships and Steubenville City	Nonattainment Nonattainment*	Nonattainment Nonattainment
Brooke County, WV (partial): Cross Creek Tax District		
Campbell-Clermont County KY-OH Campbell County, KY (partial) (See KY TSD)	Unclassifiable*	Nonattainment
Clermont County, OH (partial): Pierce Township	Unclassifiable	Nonattainment

*Recommendation by West Virginia or Kentucky; Ohio made no recommendation outside Ohio.

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 met at an ambient air quality monitoring site when the three-year average of the annual 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 CAA provides that not later than one 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 date was in 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. If a state did not submit designation recommendations, EPA is promulgating the designations that it deems appropriate. If a state or tribe disagreed with EPA's intended designations, it had an opportunity to demonstrate why it believed 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 evaluated 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 information deemed to be relevant to establishing appropriate area designations and boundaries for the one-hour SO₂ NAAQS.

The March 24, 2011, designation guidance 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 (TSD), EPA discusses its review and technical analysis of the recommendations regarding areas with monitored violations submitted by Ohio 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 that a state or tribe has recommended to EPA to be designated 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.

A. Technical Analysis for the Lake County, Ohio Area

Introduction

This technical analysis for the Lake County, Ohio Area identifies the monitor that violated 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 designations guidance. This county is listed above in Table 1.

Ohio recommended that Lake County be designated as nonattainment for the 2010 SO₂ NAAQS based on monitored air quality data from 2008-2010. EPA agrees with Ohio's recommendation. EPA is initially designating Lake County, Ohio as nonattainment for the 2010 SO₂ NAAQS, based upon currently available information, including the monitored design value for 2009-2011. Areas and sources that we are not prepared to conclude are contributing to the monitored violations or to other possible violations are not included in this initial nonattainment area, and will be addressed in a future round of final designations. Figure 1 shows the nonattainment area and the monitor location.

Lake County, OH

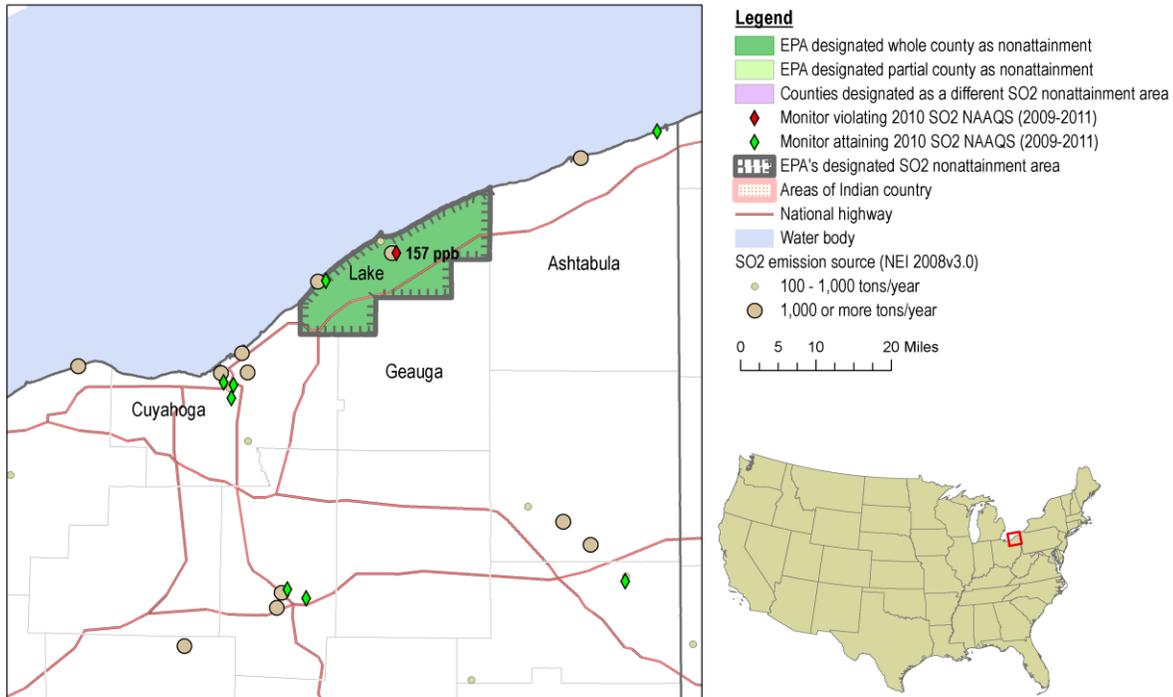


Figure 1. Map of Lake County, Ohio Nonattainment Area.

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 Lake County and the surrounding area based on data for the 2009-2011 period. The 2010 SO₂ NAAQS design value for Lake County is shown in Table 2.

Table 2. Air Quality Data for Lake County Nonattainment Designations

County	State Recommended Nonattainment?	Monitor Air Quality System ID	Monitor Location	SO ₂ Design Value, 2009 - 2011 (ppb)
Cuyahoga	No	39-035-0038	Cleveland	71
	No	39-035-0045	Cleveland	42
	No	39-035-0060	Cleveland	73*
	No	39-035-0065	Newburgh Hts	38
Lake	Yes	39-085-0003	Eastlake	33
	Yes	39-085-0007	Painesville	157
Ashtabula	No	39-007-0001	Conneaut	24

Monitor in Bold has the highest 2009-2011 design value in the area.

*Data for 2009 is incomplete.

Lake County shows a violation of the 2010 SO₂ NAAQS at one of its monitors. Therefore, some area in Lake 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 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 considered county emissions data for SO₂ and data for sources within 50 kilometers of violating monitors. Ohio provided this data in its June 3, 2011 submittal. Ohio’s emissions data came from facility reports to the state, which were the basis for Ohio’s submittal to the 2008 National Emissions Inventory (NEI). EPA relied primarily on this data for its analysis of Ohio’s SO₂ designation recommendations.

Table 3 shows the annual emissions of SO₂ (given in tons per year) for violating and potentially contributing counties in and around Lake County, and sources emitting greater than 100 tons per year of SO₂ according to the 2008 NEI. Lake County is shown in **bold**. Most of the facilities in Ashtabula and Cuyahoga Counties are over 40 kilometers from the Lake County monitors. Given their distance from the Lake County monitor, we are not yet prepared to conclude that emissions from these sources are contributing to the monitored violation in Lake County. We will further address these sources in a future round of designations.

Table 3. SO₂ Emissions for the Lake County Area (NEI08V3)

County	Facility Located in State Recommended Nonattainment Area?	Facility Name	Facility Location/ Distance from violating monitor (km)	Facility Total SO ₂ Emissions (tons per year)
Lake	Yes	Eastlake Power Plant	Willoughby/17	50521.0
	Yes	Painesville Municipal Electric Plant	Painesville/1	7212.0
	Yes	Carmeuse Lime – Grand River Operations	Grand River/4	910.0
	Yes	Lubrizol Corporation	Painesville/3	23.0
	Yes	Lubrizol Corporation – Wickliffe Facility	Wickliffe/23	6.7
Cuyahoga	No	Lake Shore Power Plant	Cleveland/39	4582.0
	No	The Medical Center Company	Cleveland/41	2203.0
	No	Cleveland Thermal LLC	Cleveland/45	1332.0
	No	ArcelorMittal Cleveland, Inc.	Cleveland/46	718.0
	No	Charter Steel – Cleveland, Inc.	Cleveland/47	61.0
Ashtabula	No	FirstEnergy Ashtabula Plant	Ashtabula/44	3850.0
	No	Millennium Organic Chemicals, Inc. Plant 2	Ashtabula/44	20.0
	No	Millennium Organic Chemicals, Inc. Plant 1	Ashtabula/45	6.4
	No	USA Waste Geneva Landfill	Geneva/28	2.9

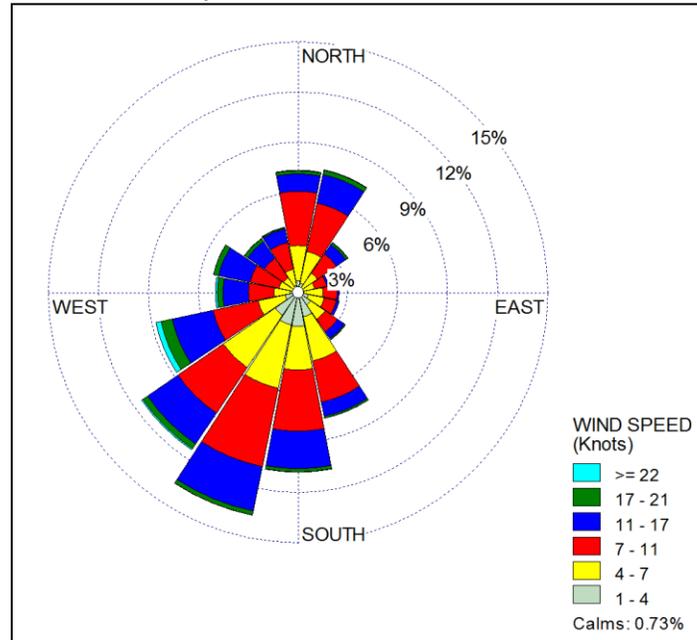
Emission Controls

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 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 initial nonattainment area. As shown in Figure 2, meteorological records for the nearest meteorological station, in Cleveland, indicate that winds blow predominantly from the southwest, the winds in this area can come from any direction.

Figure 2: Wind Rose for Lake County, OH



Source: OEPA Software: WRPLOT-Lakes Environmental Software

Near Lake Erie, a diurnal lake/land breeze pattern may occur. Therefore, sources in all directions can have some potential contribution. Lake County's two largest sources, Painesville Municipal Electric Plant and Eastlake Power Plant, are to the west and southwest, frequent wind directions.

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

Lake County is adjacent to Lake Erie. The area can experience lake and land breezes, but the geographical and topographical features of the area are not considered to significantly limit air pollution transport. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

Jurisdictional Boundaries

Once the geographic area associated with the area violating the SO₂ standard and the nearby areas contributing to the monitored violations are determined, we considered existing jurisdictional boundaries for the purpose of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions of the area. There are no current SO₂ nonattainment areas in Lake County and the surrounding region for the prior SO₂ NAAQS. The recommended nonattainment area is Lake County. The SO₂ sources which are likely to be the main contributors to the violating monitor's design value are located within this county. The violating SO₂ ambient air quality monitor is also located within Lake County. EPA finds the county boundaries to be a suitably clear basis for defining nonattainment area boundaries.

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 is initially designating Lake County as a nonattainment area for the 2010 SO₂ NAAQS. An air quality monitor in Lake County shows violations of the 2010 SO₂ NAAQS. Lake County facilities emit over 58,000 tons per year of SO₂ (based on 2008 data). The large facilities in the neighboring counties are 40 kilometers or more from the violating Lake County monitor. Given their distance from the violating Lake County monitor, we are not yet prepared to conclude that emissions from these sources contributing to the violation in Lake County or to other possible violations, and will further address these sources in the future. Therefore, EPA finds that Lake County encompasses the appropriate initial nonattainment area based on the violating monitor. In a subsequent round of designations, we will make final designation decisions for areas and their sources in Ohio not included in the nonattainment area designations addressed in this TSD.

B. Technical Analysis for the Muskingum River, OH Area

Introduction

This technical analysis for the Muskingum River Area identifies the monitor 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 designations guidance.

Ohio recommended that Center Township in Morgan County and Waterford Township in Washington County be designated as nonattainment for the 2010 SO₂ NAAQS. For clarity, EPA will refer to this nonattainment area as the Muskingum River Area, since the primary source in the area is American Electric Power's Muskingum River Power Plant. EPA is initially designating Center Township in Morgan County and Waterford Township in Washington County in Ohio as the Muskingum River nonattainment area, based upon currently available information. These partial counties are listed above in Table 1. Areas and sources that we are not prepared to conclude are contributing to the monitored violations or to other possible violations are not included in this initial nonattainment area,

and will be further addressed in a future round of final designations. Figure 3 shows a map of the nonattainment area including the monitor location.

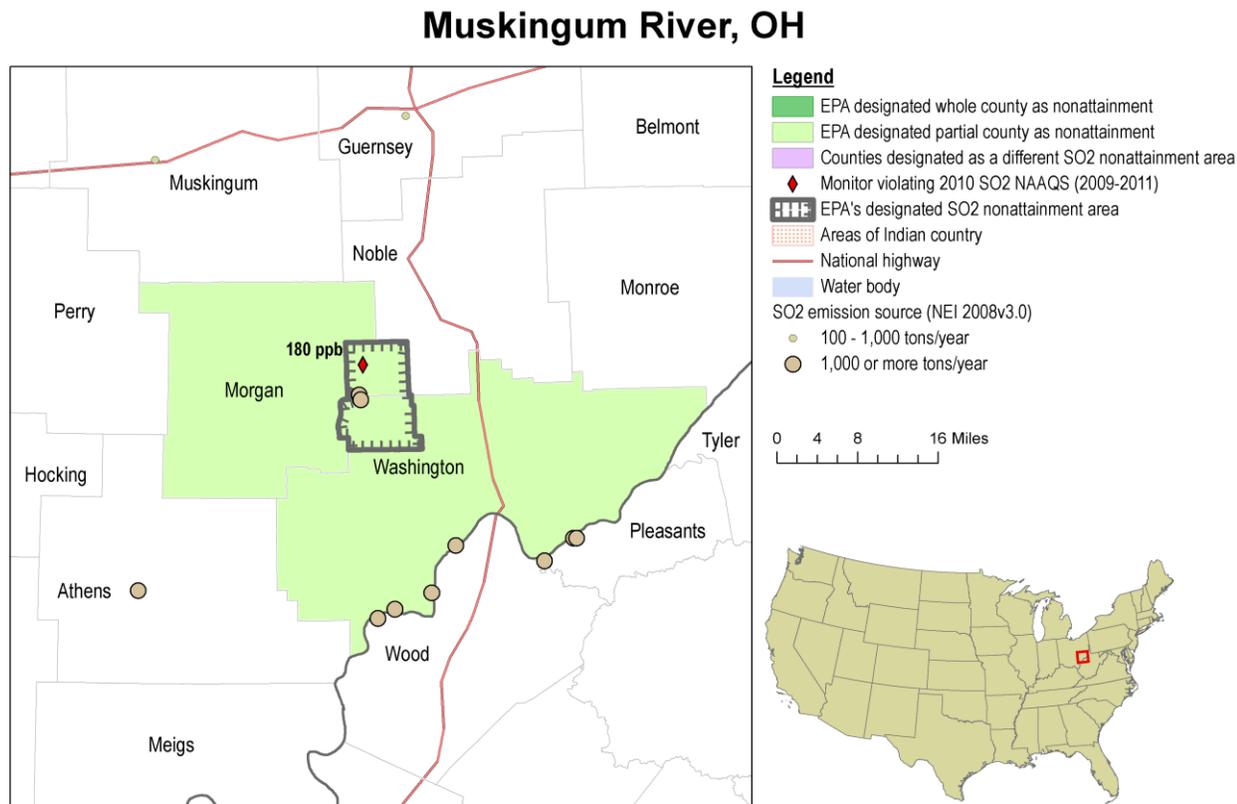


Figure 3. Map of Muskingum River, OH Nonattainment Area.

Detailed Assessment

Air Quality Data

This factor considers SO₂ air quality monitoring data and the design value (in ppb) calculated for the air quality monitor in Morgan County for 2009-2011. The 2010 SO₂ NAAQS design value for Morgan County is shown in Table 4.

Table 4. Air Quality Data for the Muskingum River Area

County	State Recommended Nonattainment?	Monitor Air Quality System ID	Monitor Location	SO ₂ Design Value, 2009 - 2011 (ppb)
Morgan	Yes	39-115-0004	Hackney, OH	180

Morgan County shows a monitored 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 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 considered county emissions data for SO₂ and data for sources within 50 kilometers of violating monitors. Ohio provided this data in its June 3, 2011 submittal. Ohio's emissions data came from facility reports to the state, which were the basis for Ohio's submittal to the 2008 NEI. EPA relied primarily on this data for its analysis of Ohio's SO₂ designation recommendations.

Table 5 shows the annual emissions of SO₂ (given in tons per year) for potentially contributing counties in and around the Muskingum River Area and sources emitting greater than 100 tons per year of SO₂ according to the 2008 NEI. There are no such sources of SO₂ within Morgan County, except that a portion of the Muskingum River power plant, which is generally inventoried as part of Washington County, is physically located in Morgan County. Ohio considered all SO₂ sources within 50 kilometers of the violating monitor. Listed below are the sources which are considered most likely to impact the Morgan County SO₂ monitor's design value. They are all located within 5 to 12 kilometers of the monitor. There are two additional sources that emit over 100 tons per year in Washington County, but they are 37 kilometers from the Morgan County monitor. There are two sources which emit over 100 tons per year in two other neighboring counties, but they are over 40 kilometers from the Morgan County monitor. Based on the distance of these sources from the violating monitor, EPA is not yet prepared to conclude that these sources in neighboring counties contribute to the monitored violation in Morgan County or to other possible violations. We will further address these sources and areas in a future round of final designations.

Table 5. SO₂ Emissions for the Muskingum River Area (NEI08V3)

County	Facility Located in State Recommended Nonattainment Area?	Facility Name	Facility Location/ Distance from monitor	Facility total SO ₂ Emissions (tons per year)
Washington	Yes	Muskingum River Power Plant	Waterford/5	133,338.0
	Yes	Globe Metallurgical	Waterford/5	1190.6
	Yes	Washington Energy Facility	Beverly/6	0.81
	Yes	AEP/Columbus Southern Waterford Plant	Waterford/12	0.66

Emission Controls

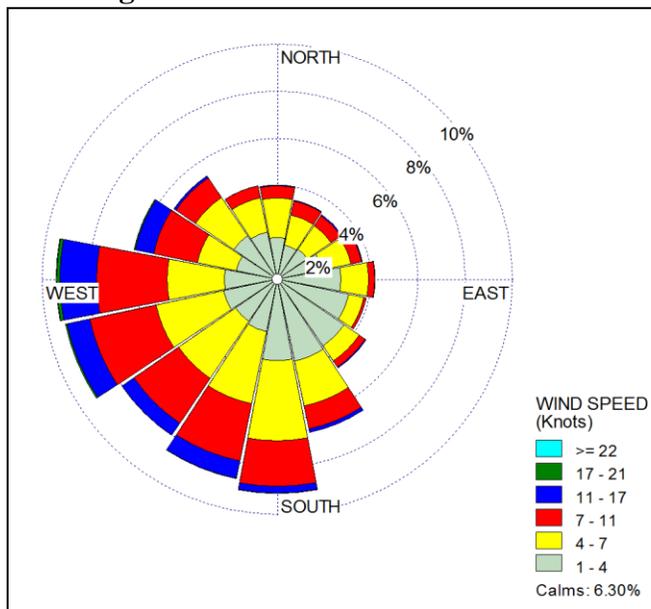
The emissions data used by EPA in this technical analysis and provided in Table 5 represent emissions levels taking into account any control strategies implemented on stationary sources in the area up to and including 2008. EPA has not received any additional information on emissions reductions resulting 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. Shown in Figure 4, winds in this general area tend to blow most often from the southwestern directions, but can come from any direction.

Figure 4: Wind Rose for Muskingum River Area



Source: OEPA Software: WRPLOT-Lakes Environmental Software

All four sources in Washington County are south-southwest of the monitor, which is a frequent wind direction.

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

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

Jurisdictional Boundaries

Once the geographic area associated with the area violating the SO₂ standard and the nearby areas contributing to the monitored violations are determined, we considered existing jurisdictional boundaries for the purpose of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions of the area. There are no current SO₂ nonattainment areas in Morgan and Washington Counties under the prior NAAQS. The state recommended Muskingum River nonattainment area for the 2010 SO₂ NAAQS consists of the two adjacent townships in Morgan and Washington Counties which contain the SO₂ sources contributing to the monitored violations. The SO₂ ambient air quality monitor is also located within this area. Townships in Ohio have well established boundaries and EPA finds that they are suitable for defining Ohio's nonattainment areas.

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 agrees with Ohio's recommendation and is initially designating Center Township in Morgan County and Waterford Township in Washington County as the Muskingum River nonattainment area for the 2010 SO₂ NAAQS. An air quality monitor in Morgan County is violating the 2010 SO₂ NAAQS based on monitored air quality data from 2009-2011. The sources that are considered most likely to impact the Morgan County SO₂ monitor's design value are all located within 5 to 12 kilometers of the monitor within Ohio's recommended boundary. Therefore, EPA finds that the boundaries described herein encompass the appropriate initial nonattainment area for the 2010 SO₂ NAAQS. EPA is not yet ready to conclude that the emissions from sources located outside the nonattainment area boundary contribute to the monitored violation or to other possible violations. In a subsequent round of designations, we will make final designation decisions for areas and sources in Ohio not included in the nonattainment area designations addressed in this TSD.

Interstate Areas

The next two technical analyses discuss nonattainment designations that cross state boundaries. The Steubenville, OH-WV Interstate Area and the Campbell-Clermont, KY-OH Interstate Area are adjacent to the Ohio River, which forms the boundary between Ohio and West Virginia, and between Ohio and Kentucky. The location of the main SO₂ sources and the monitors are such that Ohio, West Virginia, and Kentucky sources can cause or contribute to air quality impacts on the opposite side of the Ohio River. Therefore, these nonattainment areas should be treated as interstate areas. Ohio did not specifically address interstate issues when addressing these areas in its June 3, 2011 submittal. This TSD focuses on the Ohio portion of these interstate nonattainment areas.¹

EPA's "120-day letter" to Ohio, sent on February 6, 2013, expressed the intent to include a portion of Belmont County, Ohio, as part of an area then called the Wheeling, WV-OH Area that EPA intended to designate nonattainment. Ohio responded by providing information in support of a recommendation not to include any portion of Belmont County in this nonattainment area. EPA agrees with this recommendation and is designating an area now called the Marshall WV nonattainment area that includes no portion of Ohio. As a result, this document is not discussing this area in detail, and the primary discussion of this area is in the TSD for West Virginia areas. A detailed review of the information provided by Ohio is provided in the response to comments document.

C. Technical Analysis for the Steubenville, OH-WV Interstate Area

Introduction

This technical analysis for the Ohio portion of the Steubenville, OH-WV Interstate Area identifies the monitors that violate the 2010 SO₂ NAAQS and evaluates nearby counties for contributions to SO₂

¹ More detailed information regarding the portions of the nonattainment areas within West Virginia and Kentucky are provided in technical support documents for these states.

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 designation guidance.

Ohio has recommended that four townships in Jefferson County, near the city of Steubenville, Ohio, be designated as nonattainment for the 2010 SO₂ NAAQS. Ohio subsequently clarified its intent that Steubenville City is part of its recommended nonattainment area. West Virginia recommended that the Cross Creek Tax District in Brooke County, West Virginia, also be designated nonattainment. Brooke County is located across the Ohio River from Steubenville. The full analysis for the West Virginia portion of this area can be found in the TSD for West Virginia. EPA is combining these areas to form the Steubenville, OH-WV Interstate Area. Based on EPA's technical analysis described below, EPA is initially designating Cross Creek, Steubenville, Warren, and Wells Townships and Steubenville City in Jefferson County and the Cross Creek Tax District in Brooke County, West Virginia as nonattainment for the 2010 SO₂ NAAQS. Areas and sources that we are not yet prepared to conclude are contributing to the monitored violations or to other possible violations are not included in this initial nonattainment area, and will be further addressed in a future round of final designations. Figure 5 shows a map of the nonattainment area and the monitor location.

Steubenville, OH-WV

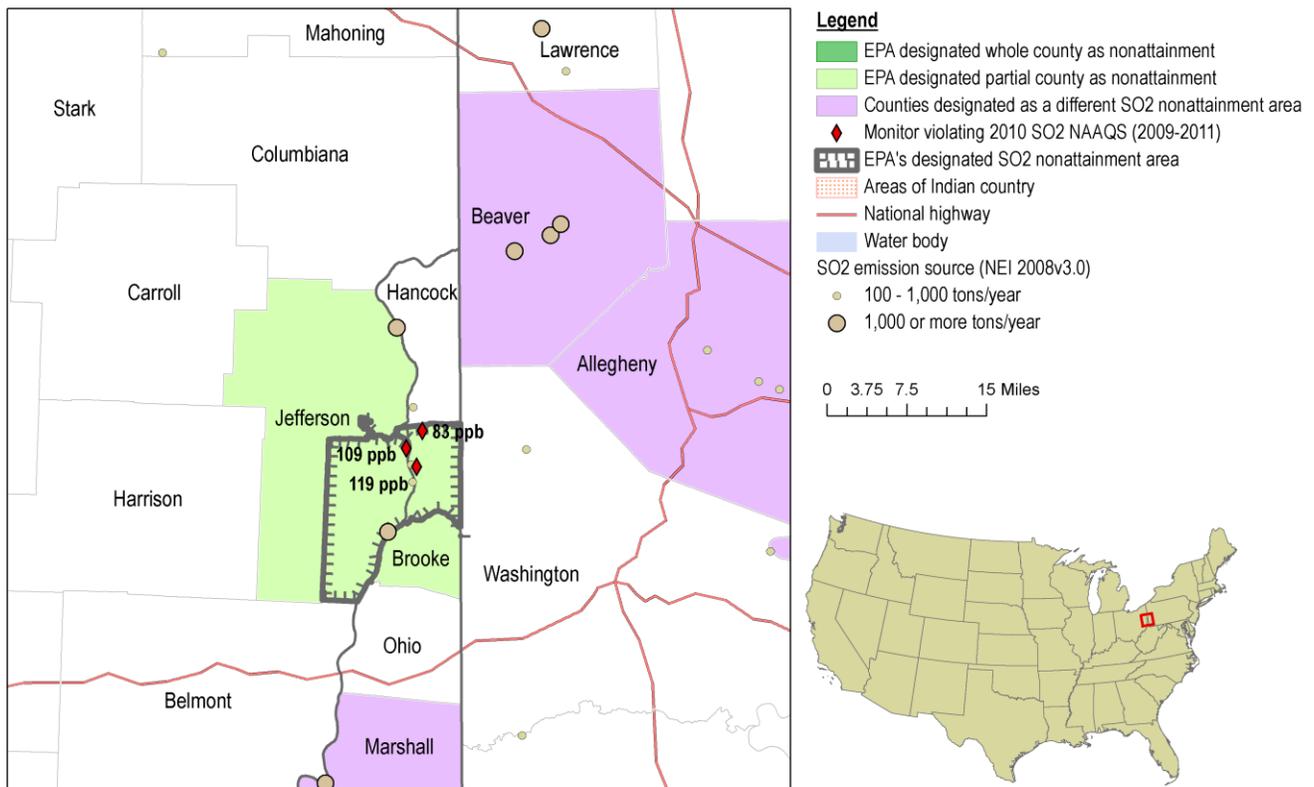


Figure 5. Map of the Steubenville, OH-WV Interstate Nonattainment Area

Detailed Assessment

Air Quality Data

This factor considers SO₂ air quality monitoring data for the monitors in Jefferson and Brooke Counties. The SO₂ NAAQS design values for these counties are shown in Table 6.

Table 6. Air Quality Data for the Steubenville, OH-WV Interstate Area (NEI08V3)

County	State Recommended Nonattainment?	Monitor Air Quality System ID	Monitor Location	SO ₂ Design Value, 2009 – 2011 (ppb)
Jefferson, OH	Yes	39-081-0017	Steubenville, OH	109
Brooke, WV	Yes	54-009-0005	Mahan Lane (Follansbee)	119
Brooke, WV	Yes	54-009-0007	McKims	83
Brooke, WV	Yes	54-009-0011	Marland Heights (Weirton)	174

Jefferson County shows a monitored violation of the 2010 SO₂ NAAQS. Therefore, some area in this county 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. Additional monitors in Brooke County, West Virginia, are also showing violations of the 2010 SO₂ NAAQS, as discussed in the West Virginia TSD. Based on evidence that violations are occurring in Jefferson County, Ohio, and Brooke County, West Virginia, EPA is initially designating a nonattainment area that includes the sources in the area that contribute to these monitored violations.

Emissions and Emissions-Related Data

Evidence of SO₂ emissions 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 considered county emissions data for SO₂ and data for sources within 50 kilometers of violating monitors. Ohio provided this data with respect to Ohio sources in its June 3, 2011 submittal. Ohio’s emissions data came from facility reports to the state, which were the basis for Ohio’s submittal to the 2008 NEI. EPA relied primarily on these data and corresponding West Virginia data for its analysis of Ohio’s SO₂ designation recommendations.

Table 7 shows the emissions of SO₂ in Ohio which may contribute to violations in and around the Steubenville, OH-WV Interstate Area. The county shown in **bold** contains the Ohio portion of the Steubenville, OH-WV Interstate Area nonattainment area for the 2010 SO₂ NAAQS.

Table 7. Ohio SO₂ Emissions for the Steubenville, OH-WV Interstate Area

County	Facility Located in State Recommended Nonattainment Area?	Facility Name	Facility Location/ Distance from Monitor (km)	Total SO ₂ Emissions (tons per year)
Jefferson	No	FirstEnergy W.H. Sammis Power Plant	Stratton, OH/18	102,197.0*
	Yes	American Electric Power/Buckeye Power Cardinal Power Plant	Brilliant, OH/13	33,317.0
	Yes	Severstal Wheeling, Inc	Steubenville/ Mingo Junction, OH/5	700.0
	Yes	Severstal Wheeling, Inc	Yorkville, OH/15	0.24
	Yes	Mingo Junction Energy Center	Mingo Junction, OH/5	82.0
	No	Titanium Metals Corp.	Toronto, OH/9	0.20
Columbiana	No	Heritage – WTI, Inc	East Liverpool, OH/30	3.60
Belmont	No	Severstal Wheeling, Inc.	Martins Ferry, OH/28	0.06
Carroll	No	Summitville Tiles, Inc.	Minerva, OH/33	7.0

* The W.H. Sammis plant has recently reduced its emissions pursuant to a consent decree. Data shown above is from the 2008 NEI.

Parts of four counties in Ohio lie within 50 kilometers of the Jefferson County monitor. Columbiana County has one SO₂ source, emitting 3.6 tons per year. The source is located 30 kilometers from the violating monitor in Jefferson County. The SO₂ sources in Carroll County and Belmont County within 50 kilometers are also very low in SO₂ emissions, less than 10 tons per year, and are located at a similar distance. Based on the level of emissions from these sources and their distance from the violating Jefferson County monitor, EPA is not yet prepared to conclude that these sources contribute to the monitored violation or to other possible violations, and will further address these sources in a future round of final designations. Most of the significant sources within Jefferson County are located in the townships that Ohio recommended be designated nonattainment. The exception is the FirstEnergy's W.H. Sammis power plant, which is located 18 kilometers north of the Jefferson County monitor and a similar distance from the violating monitors in Brooke County, West Virginia. The W.H. Sammis power plant significantly reduced its emissions after installing pollution controls in 2010. The Columbiana County SO₂ monitor in East Liverpool, about 14 kilometers north of the power plant, has measured a noticeable drop in SO₂ concentrations since 2010. Its SO₂ design value (three year average of annual 99th percentile concentrations) was 117 ppb for 2007-2009, when the 2007 99th percentile value was 128 ppb. For 2008-2010, the design value had fallen to 90 ppb, with a 99th percentile value of 47 in 2010. For 2009-2011, the design value was 62 ppb, with a 99th percentile value of 27 ppb in 2011. While that monitor is in a different direction from the W.H. Sammis plant than the violating monitors being addressed here, this information provides suggestive evidence that the impact of the W.H. Sammis plant at the monitors in the Steubenville, OH-WV area that are monitoring violations has also probably declined significantly. Based on this information, considering the potential impact of the remaining emissions of this plant in light of the distance of the plant from the violating monitors, EPA is not yet prepared to conclude that the W.H. Sammis power plant is contributing to the violations at the Jefferson County monitor or the Brooke County monitors or to other possible violations, and will further address this source in a future round of final designations.

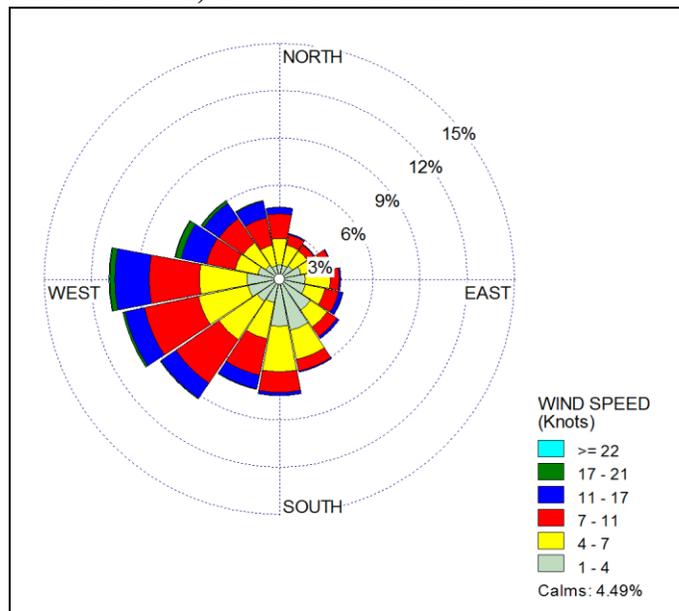
Emission Controls

The emissions data used by EPA in this technical analysis and provided in Table 7 represent emissions levels taking into account any control strategies implemented on stationary sources in the area up to and including 2008. Ohio did not submit any additional information on actual emissions reductions resulting from controls put into place after 2008, but the EPA Clean Air Markets Division database indicates that the W.H. Sammis Power Plant has reduced its emissions significantly after installing pollution controls in 2010. For example, in 2011, the reported SO₂ emissions were 4,202 tons.

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. As shown in Figure 6, winds are most frequently from the west and southwest directions.

Figure 6: Wind Rose for Steubenville, OH-WV Interstate Area



Source: OEPA Software: WRPLOT-Lakes Environmental Software

The wind is more likely from the south than the north, so the much larger Cardinal Power Plant to the south of the monitors is more likely to affect air quality at the violating monitors than the smaller, further Sammis Power Plant to the north.

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

The recommended nonattainment portion of Jefferson County lies along the Ohio River, in the foothills of the Appalachians. While the river valley can experience nighttime inversions and air flow into and out of the valley, the geographical and topographical features of the area are not considered to significantly limit air pollution transport. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

Jurisdictional Boundaries

Once the geographic area associated with the area violating the SO₂ standard and the nearby areas contributing to the monitored violations are determined, we considered existing jurisdictional boundaries for the purpose of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions of the area. There are no current SO₂ nonattainment areas in Jefferson County for the prior SO₂ NAAQS. The recommended nonattainment area for the 2010 SO₂ NAAQS for the Ohio portion of the Steubenville, OH-WV area consists of the four townships along the Ohio River in Jefferson County as well as Steubenville City, which contain SO₂ sources that contribute to the monitored violations. The SO₂ ambient air quality monitors within Ohio are also located within this area. Townships in Ohio have well established boundaries and EPA finds that they are a suitable administrative basis for defining Ohio's nonattainment areas, in conjunction with city boundaries in selected cases.

Other Relevant Information

In its April 12, 2012 recommendations, Ohio recommended a nonattainment area defined on the basis of townships, to include Steubenville Township but not separately to specify the inclusion of Steubenville City. EPA concurred with these recommendations based on an assumption that the contributing sources in Steubenville City were included in Steubenville Township. The map of EPA's intended nonattainment area demonstrates EPA's intent that this area, including the area within Steubenville City, be included in the nonattainment area. Upon further review, EPA believes that Steubenville City is defined as a separate administrative unit that is not part of Steubenville Township. EPA consulted with Ohio, and Ohio has clarified its intent that the area within the outer boundaries of the four listed townships be designated nonattainment, i.e. that Ohio recommended that Steubenville City as well as the four listed townships be designated nonattainment. EPA's designation is consistent with this clarified recommendation.

Conclusion

A monitor in Jefferson County, OH shows a monitored violation of the SO₂ NAAQS based on air quality data from 2009-2011. Additional monitors in Brooke County, West Virginia are also showing violations of the SO₂ NAAQS, as discussed West Virginia TSD. After considering the factors described above, EPA is initially designating Cross Creek, Steubenville, Warren, and Wells Townships and Steubenville City in Jefferson County as the Ohio portion of the Steubenville, OH-WV interstate SO₂ nonattainment area. EPA is combining this Ohio portion with the Cross Creek Tax District in Brooke County in West Virginia to form a single bi-state nonattainment area. The area includes the violating monitors and nearby areas with sources that we can presently determine contribute to the violations of the 2010 SO₂ NAAQS. EPA is not yet ready to conclude that the emissions from sources located outside the nonattainment boundary contribute to the monitored violations or to other possible violations. In a subsequent round of designations, we will make final designation decisions for areas and sources in Ohio not included in the nonattainment area designations addressed in this TSD.

D. Technical Analysis for the Campbell-Clermont, KY-OH Interstate Area

Introduction

This technical analysis for the Ohio portion of the Campbell-Clermont, KY-OH interstate area identifies the monitor that violates the 2010 SO₂ NAAQS and evaluates the adjacent Ohio 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 designations guidance.

Campbell County, Kentucky, is adjacent to and across the Ohio River from Hamilton and Clermont Counties, Ohio. The Campbell County monitor is located in Highland Heights, Kentucky, about 11 kilometers south of Cincinnati, Ohio. The Campbell County monitor is violating the 2010 SO₂ NAAQS for the 2009-2011 period. Because the Campbell County SO₂ monitor was not violating the 2010 SO₂ NAAQS for 2008-2010, Kentucky did not include it in its June 2, 2011 SO₂ designation recommendations. See EPA's TSD for Kentucky. Ohio did not include a discussion of the Cincinnati area in its June 3, 2011 letter, since the SO₂ monitors in that part of Ohio did not indicate a NAAQS violation. However, after reviewing emissions and meteorological data for the region surrounding the Campbell County monitor, EPA determined that one township in Clermont County, Ohio, and a portion of Campbell County, Kentucky, should be designated as nonattainment for the 2010 SO₂ NAAQS, to form the Campbell-Clermont, KY-OH Interstate Area. EPA informed Ohio and Kentucky of the intent to designate these areas on February 6, 2013. Kentucky responded on March 6, 2013, stating that Campbell County should not be included in the nonattainment area. Further discussion of Kentucky's letter can be found in the Kentucky TSD. 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. EPA is initially designating this portion of Campbell County, Kentucky, and Pierce Township, Clermont County, Ohio, as the Campbell-Clermont, KY-OH nonattainment area for the 2010 SO₂ NAAQS. Areas and sources that we are not yet prepared to conclude are contributing to the monitored violations or to other possible violations are not included in this initial nonattainment area, and will be further addressed in a future round of final designations. Figure 7 is a map of the Campbell-Clermont, KY-OH Interstate Area, showing the location of the air quality monitor.

Campbell-Clermont County, KY-OH

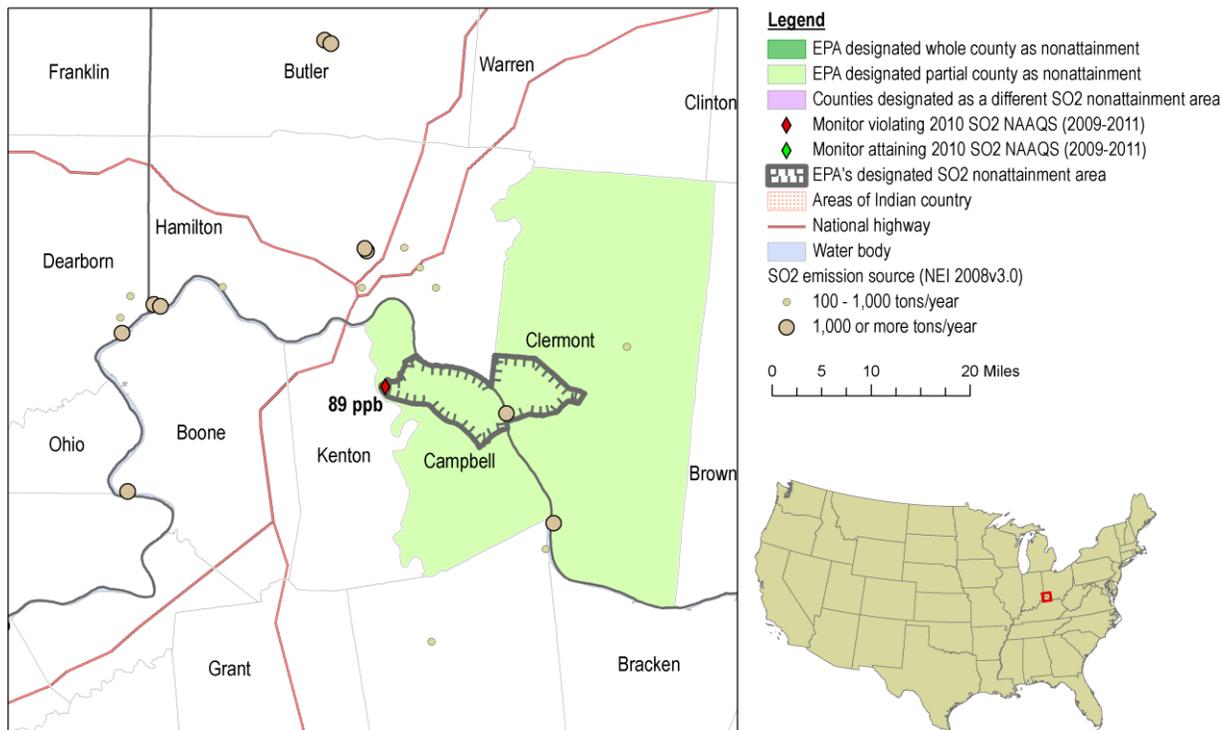


Figure 7. Map of Campbell-Clermont, KY-OH Interstate Nonattainment Area.

Detailed Assessment

Air Quality Data

This factor considers SO₂ air quality monitoring data and the 2009-2011 design value (in ppb) calculated for the air quality monitor in Campbell County. The 2010 SO₂ NAAQS design value for Campbell County is shown in Table 8. The nearest Ohio SO₂ monitor is located in Hamilton County near Cleves, about 30 kilometers northwest of the Campbell County monitor.

Table 8. Air Quality Data for Campbell County

County	State Recommended Nonattainment?	Monitor Air Quality System ID	Monitor Location	SO ₂ Design Value, 2009 - 2011 (ppb)
Campbell Co, KY	No	21-037-3002	Highland Heights, KY	89
Hamilton Co, OH	No	39-061-0010	Cleves, OH	69*

*The 2010 data were incomplete at this monitor.

Campbell County shows a monitored 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 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 considered county emissions data for SO₂ and data for sources within 50 kilometers of violating monitors. Duke Energy's W. C. Beckjord Station, a coal-fired power plant, is likely to be the main Ohio source contributing to the violation at the Campbell County monitor. It is located 16 kilometers east of the monitor. The W.C. Beckjord Station emitted over 26,000 tons of SO₂ in 2008 (NEI08V3), and more recent data from EPA's Clean Air Markets Division suggests that its SO₂ emissions have increased significantly in more recent years. The W. C. Beckjord Station is located on the Ohio River in Pierce Township, near the town of New Richmond, Clermont County, Ohio. Duke Energy also operates the W. H. Zimmer Generating Station in Clermont County. This power plant emitted 16,000 tons of SO₂ in 2008. The Zimmer Generating Station is located 27 kilometers from the Campbell County monitor. Based on its distance from the violating monitor and a meteorology analysis, EPA is not yet prepared to conclude that the Zimmer Generating Station contributes to the Campbell County violating monitor's design value. We will further address this source in a future round of final designations. There are eight facilities in southern Hamilton County which are located to the north or northwest of the Campbell County monitor, at distances of 13 kilometers or more. Of the sources closest to the monitor, two emit more than 1,000 tons of SO₂; the others emit 100-600 tons of SO₂. Based on the distance of these sources from the violating monitor and a meteorology analysis, EPA is also not prepared to conclude that these sources are contributing to the monitored violation in Campbell County, and will likewise further address these sources in a future round of final designations. The largest facility in Hamilton County, Duke Energy's Miami Fort Station, emits about 25,000 tons of SO₂, but is located 30 kilometers west of the violating monitor. Given that distance and a meteorological analysis, EPA is not yet prepared to conclude that the the Miami Fort Station is contributing to violations at the Campbell County monitor, and will address this source in a future round of final designations. Therefore, within Ohio, EPA is including only Pierce Township in Clermont County, in which Duke Energy's W. C. Beckjord Station is located, in the initial nonattainment area based on the monitored violation. EPA is designating Pierce Township in Clermont County nonattainment for the 2010 SO₂ NAAQS and combining it with the nonattainment portion of Campbell County, Kentucky, to form the Campbell-Clermont, KY-OH interstate nonattainment area.

Table 9 shows the total emissions of SO₂ for potentially contributing sources emitting more than 100 tons per year of SO₂ according to the 2008 NEI, in Hamilton and Clermont Counties, Ohio.

Table 9. Ohio SO₂ Emissions for the Campbell-Clermont (KY-OH) Area (NEI08V3)

County	Facility Located in State Recommended Nonattainment Area?	Facility Name	Facility Location/ Distance from monitor (km)	Total SO ₂ Emissions (tons per year)
Hamilton	No	Duke Energy Miami Fort Station	North Bend/30	24,691.0
	No	DEGS of St. Bernard, LLC	St. Bernard/17	2,005.0
	No	E.I. DuPont Fort Hill Plant	North Bend/31	1,143.0
	No	University of Cincinnati	Cincinnati/13	616.0
	No	INEOS ABS (USA) Corporation	Addyston/24	472.0
	No	Emerald Performance Materials, LLC	Cincinnati/27	306.0
	No	Rock-Tenn Converting Company	Cincinnati/16	257.0
	No	Caraustar Mill Group, Inc	Cincinnati/13	118.0
Clermont	No*	Duke Energy W.C. Beckjord Station	New Richmond/16	26,404.0
	No	Duke Energy W.H. Zimmer Generating Station	Moscow/27	16,513.0
	No	ZF Batavia LLC (Ford)	Batavia/31	118.0

*Facility is located in EPA-designated nonattainment area.

Emission Controls

The emissions data used by EPA in this technical analysis and provided in Table 9 represent emissions levels taking into account any control strategies implemented on stationary sources in the area up to and including 2008. EPA has not received any additional information on emissions reductions resulting from controls put into place after 2008. However, ZF Batavia (Ford) closed in late 2008. Also, The Beckjord Station has significantly increased its emissions since 2008. EPA Clean Air Markets Division information for 2010-2012 indicates that the W.C. Beckjord Station has increased its SO₂ emissions to around 70,000 tons per year in recent years.

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 initial nonattainment area. EPA analyzed the wind data in the vicinity of the Campbell County monitor in an effort to determine which areas outside Campbell County should be included in the designated nonattainment area. Wind data were considered from several meteorological measurement sites, including an air quality monitoring site in Cincinnati, Ohio and two airports in the Cincinnati area. The data suggested that Clermont County SO₂ sources, such as the W.C. Beckjord Station power plant, could contribute to the SO₂ NAAQS violation at the Campbell County monitor. Data from Cincinnati/Northern Kentucky International Airport indicated that during the hours when the monitor showed exceedances of the 2010 SO₂ NAAQS, the wind was blowing from the east and east-southeast. This meteorological data is expected to be generally representative of Campbell County. EPA also used the HYSPLIT Trajectory Model to create wind trajectories showing the path that winds may have followed over several hours. This model uses a forecast meteorological dataset instead of surface wind observations. The trajectories indicated that airflow tended to come from the east during the hours with monitored SO₂ NAAQS exceedances, which supports the inclusion of a portion of Campbell County in the nonattainment area, and is not supportive of the inclusion of Hamilton County sources to the north of the monitor. Full details of this meteorological analysis can be found in the TSD for Kentucky.

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

Clermont County borders the Ohio River. While the river valley can experience nighttime inversions and air flow into and out of the valley, the geographical and topographical features of the area are not considered to significantly limit air pollution transport. Therefore, this factor did not play a significant role in determining the nonattainment boundary.

Jurisdictional Boundaries

Once the geographic area associated with the area violating the SO₂ standard and the nearby areas contributing to the monitored violations are determined, we considered existing jurisdictional boundaries for the purpose of providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions of the area. Clermont County is not currently nonattainment for SO₂ for the prior SO₂ NAAQS. EPA is designating Pierce Township in Clermont County as nonattainment for the 2010 SO₂ NAAQS, because it contains a large SO₂ source which contributes to high concentrations at the Campbell County, Kentucky ambient air quality monitor. Townships in Ohio have well established boundaries and EPA finds that they are a suitable administrative basis for defining Ohio's nonattainment areas.

Other Relevant Information

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

Conclusion

The air quality monitor in Campbell County, Kentucky is violating the 2010 SO₂ NAAQS based on 2009-2011 data. Therefore, some area in this county and possibly additional areas in surrounding

counties must be initially designated nonattainment. After considering the factors described above, EPA is initially designating Pierce Township in Clermont County in Ohio and a portion of Campbell County, Kentucky as the Campbell-Clermont, KY-OH interstate nonattainment area. EPA finds that Pierce Township contains a large SO₂ source that contributes to high concentrations at the Campbell County, Kentucky monitor. The specific boundaries of the Campbell County, Kentucky portion of this area are described above and in the Kentucky TSD. EPA is not yet ready to conclude that the emissions from sources located outside the nonattainment boundary contribute to the monitored violation or to other possible violations. In a subsequent round of designations, we will make final designation decisions for areas and sources in Ohio not included in the nonattainment area designations addressed in this TSD.