

Draft Technical Support Document

South Dakota Area Designations for the 2010 SO₂ Primary National Ambient Air Quality Standard

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA, or the Agency) must designate areas as either “unclassifiable,” “attainment,” or “nonattainment” 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. An attainment area is defined as any area other than a nonattainment area that meets the NAAQS. Unclassifiable areas are defined as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

South Dakota submitted updated recommendations on September 16, 2015, ahead of a July 2, 2016, deadline for the EPA to designate certain areas established by the U.S. District Court for the Northern District of California. This deadline is the first of three deadlines established by the court for the EPA to complete area designations for the 2010 SO₂ NAAQS. Table 1 below lists South Dakota’s recommendations and identifies the counties or portions of counties in South Dakota that the EPA intends to designate by July 2, 2016 based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. South Dakota’s Recommended and EPA’s Intended Designations

Area	South Dakota’s Recommended Area Definition ¹	South Dakota’s Recommended Designation	EPA’s Intended Area Definition	EPA’s Intended Designation
Grant County, South Dakota	Grant County, South Dakota	Attainment	Grant County, South Dakota	Unclassifiable

Background

On June 3, 2010, the EPA revised the primary (health based) SO₂ NAAQS 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. This NAAQS was published in the Federal Register on June 22, 2010 (75 FR 35520) and is codified at 40 CFR 50.17. The EPA determined this is the level necessary to protect 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 two prior primary standards of 140 ppb evaluated over 24 hours, and 30 ppb evaluated over an

¹ South Dakota recommended attainment for every county in the State, but EPA is only addressing the recommendation for the recommendation for Grant County at this time.

entire year, codified at 40 CFR 50.4, remain applicable.² However, the EPA is not currently designating areas on the basis of either of these two primary standards. Similarly, the secondary standard for SO₂, set at 500 ppb evaluated over 3 hours has not been revised, and the EPA is also not currently designating areas on the basis of the secondary standard.

General Approach and Schedule

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. Section 107(d) also requires the 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 does not submit designation recommendations, the EPA will promulgate the designations that it deems appropriate. If a state or tribe disagrees with the EPA's intended designations, they are given an opportunity within the 120 day period to demonstrate why any proposed modification is inappropriate.

On August 5, 2013, the EPA published a final rule establishing air quality designations for 29 areas in the United States for the 2010 SO₂ NAAQS, based on recorded air quality monitoring data from 2009 - 2011 showing violations of the NAAQS (78 FR 47191). In that rulemaking, the EPA committed to address, in separate future actions, the designations for all other areas for which the Agency was not yet prepared to issue designations.

Following the initial August 5, 2013 designations, three lawsuits were filed against the EPA in different U.S. District Courts, alleging the Agency had failed to perform a nondiscretionary duty under the CAA by not designating all portions of the country by the June 2013 deadline. In an effort intended to resolve the litigation in one of those cases, plaintiffs Sierra Club and the Natural Resources Defense Council and the EPA filed a proposed consent decree with the U.S. District Court for the Northern District of California. On March 2, 2015, the court entered the consent decree and issued an enforceable order for the EPA to complete the area designations according to the court-ordered schedule.

According to the court-ordered schedule, the EPA must complete the remaining designations by three specific deadlines. By no later than July 2, 2016 (16 months from the court's order), the EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO₂ NAAQS and (2) areas that contain any stationary sources that had not been announced as of March 2, 2015 for retirement and that according to the EPA's Air Markets Database emitted in 2012 either (i) more than 16,000 tons of SO₂ or (ii) more than 2,600 tons of SO₂ with an annual average emission rate of at least 0.45 pounds of SO₂ per one million British thermal units (lbs SO₂/mmBTU). Specifically, a stationary source with a coal-fired unit that as of January 1, 2010 had a capacity of over 5 megawatts and otherwise meets the emissions criteria, is

² 40 CFR 50.4(e) provides that the two prior primary NAAQS will no longer apply to an area one year after its designation under the 2010 NAAQS, except that for areas designated nonattainment under the prior NAAQS as of August 22, 2010, and areas not meeting the requirements of a SIP Call under the prior NAAQS, the prior NAAQS will apply until that area submits and EPA approves a SIP providing for attainment of the 2010 NAAQS. Grant County, South Dakota was neither designated nonattainment under the prior NAAQS as of August 22, 2010, nor failed to meet the requirements of a SIP Call under the prior NAAQS, so this exception does not apply.

excluded from the July 2, 2016 deadline if it had announced through a company public announcement, public utilities commission filing, consent decree, public legal settlement, final state or federal permit filing, or other similar means of communication, by March 2, 2015, that it will cease burning coal at that unit.

The last two deadlines for completing remaining designations are December 31, 2017, and December 31, 2020. The EPA has separately promulgated requirements for states and other air agencies to provide additional monitoring or modeling information on a timetable consistent with these designation deadlines. We expect this information to become available in time to help inform these subsequent designations. These requirements were promulgated on August 21, 2015 (80 FR 51052), in a rule known as the SO₂ Data Requirements Rule (DRR).

Updated designations guidance was issued by the EPA through a March 20, 2015 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 supersedes earlier designation guidance for the 2010 SO₂ NAAQS, issued on March 24, 2011, and it identifies factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO₂ NAAQS. The guidance also contains the factors the EPA intends to evaluate in determining the boundaries for all remaining areas in the country, consistent with the court's order and schedule. These factors include: 1) Air quality characterization via ambient monitoring or dispersion modeling results; 2) Emissions-related data; 3) Meteorology; 4) Geography and topography; and 5) Jurisdictional boundaries. This guidance was supplemented by two technical assistance documents intended to assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling or ambient air quality monitoring for sources that emit SO₂. Notably, the EPA released its most recent versions of documents titled, "SO₂ NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) and "SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD) in December 2013.

Based on ambient air quality data collected between 2012 and 2014, no violations of the 2010 SO₂ NAAQS have been recorded in any undesignated part of the State.³ However, there is 1 source in the State meeting the emissions criteria of the consent decree for which the EPA must complete designations by July 2, 2016. In this draft technical support document, the EPA discusses its review and technical analysis of South Dakota's updated recommendation for the area that we must designate. The EPA also discusses any intended modifications from the State's recommendation based on all available data before us.

³ For designations based on ambient air quality monitoring data that violates the 2010 SO₂ NAAQS, the consent decree directs the EPA to evaluate data collected between 2013 and 2015. Absent complete, quality assured and certified data for 2015, the analyses of applicable areas for the EPA's intended designations will be informed by data collected between 2012 and 2014. States with monitors that have recorded a violation of the 2010 SO₂ NAAQS during these years have the option of submitting complete, quality assured and certified data for calendar year 2015 by April 19, 2016 to the EPA for evaluation. If after our review, the ambient air quality data for the area indicates that no violation of the NAAQS occurred between 2013 and 2015, the consent decree does not obligate the EPA to complete the designation. Instead, we may designate the area and all other previously undesignated areas in the State on a schedule consistent with the prescribed timing of the court order, i.e., by December 31, 2017, or December 31, 2020.

The following are definitions of important terms used in this document:

- 1) 2010 SO₂ NAAQS – The primary 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 50.17.
- 2) Design Value - a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.
- 3) Designated nonattainment area – an area which the EPA has determined has violated the 2010 SO₂ NAAQS or contributed to a violation in a nearby area. A nonattainment designation reflects considerations of state recommendations and all of the information discussed in this document. The EPA’s decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analysis, and any other relevant information.
- 4) Designated unclassifiable area – an area which the EPA cannot determine based on all available information whether or not it meets the 2010 SO₂ NAAQS.
- 5) Designated unclassifiable/attainment area – an area which the EPA has determined to have sufficient evidence to find either is attaining or is likely to be attaining the NAAQS. The EPA’s decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analysis, and any other relevant information.
- 6) Modeled violation – a violation based on air dispersion modeling.
- 7) Recommended attainment area – an area a state or tribe has recommended that the EPA designate as attainment.
- 8) Recommended nonattainment area – an area a state or tribe has recommended that the EPA designate as nonattainment.
- 9) Recommended unclassifiable area – an area a state or tribe has recommended that the EPA designate as unclassifiable.
- 10) Recommended unclassifiable/attainment area – an area a state or tribe has recommended that the EPA designate as unclassifiable/attainment.
- 11) Violating monitor – an ambient air monitor meeting all methods, quality assurance and siting criteria and requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.

Technical Analysis for the Grant County, South Dakota Area

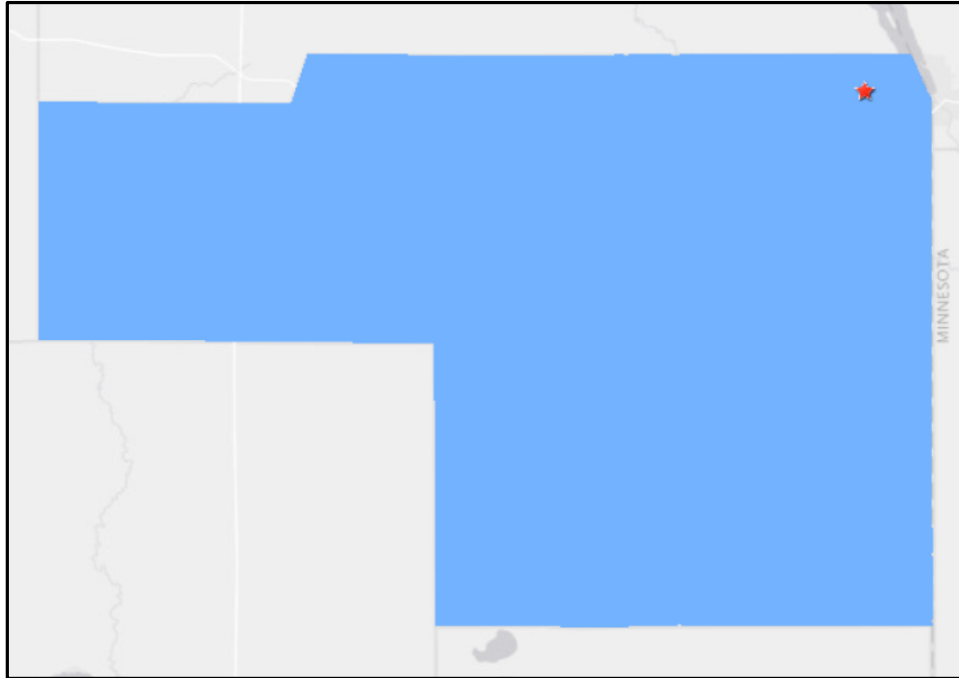
Introduction

The Grant County area contains a stationary source that according to the EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO₂ or more than 2,600 tons of SO₂ and had an annual average emission rate of at least 0.45 pounds of SO₂ per one million British thermal units (lbs SO₂/mmBTU). As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Specifically, in 2012, the Big Stone Plant emitted 12,290 tons of SO₂, and had an emissions rate of 0.81 SO₂/mmBTU. Pursuant to the March 2, 2015 court-ordered schedule, the EPA must designate the area surrounding the facility by July 2, 2016.

In its submission, South Dakota recommended that the area surrounding the Big Stone Plant, specifically the entirety of Grant County, be designated as attainment based on an assessment and characterization of air quality from the facility. This assessment and characterization was performed using historic ambient monitoring from November 2001 to October 2002. After careful review of the State's assessment, supporting documentation, and all available data, the EPA does not agree with the State's recommendation for the area, and intends to designate the area as unclassifiable. Specifically, based on available information we are not able to determine whether the area is meeting or not meeting the NAAQS, and our intended unclassifiable area consists of Grant County.

The Big Stone Plant is located in Eastern South Dakota in the northeastern portion of Grant County. As seen in Figure 1 below, the facility (indicated by a red star) is located in the northeast corner of the county. Also included in the figure are nearby emitters of SO₂ (none), the State's recommended area for the attainment designation, and the EPA's intended unclassifiable designation for the area, both of which consist of the entire county as shown in blue.

Figure 1. The EPA's intended designation for Grant County, South Dakota



*Blue indicates unclassifiable

The discussion and analysis that follows below will reference the State's use of the Modeling TAD, the EPA's assessment of the State's modeling in accordance with the Modeling TAD, and the factors for evaluation contained in the EPA's March 20, 2015 guidance, as appropriate.

Detailed Assessment

Air Quality Data

This factor considers the SO₂ air quality monitoring data in the area surrounding the Big Stone Plant. The facility is located in Grant County; however, there are no ambient air quality monitors located in this county. The State included historic monitoring data from 2001 and 2002 in its recommendation for the closest neighboring county, i.e., Roberts County. The table below shows information related to the monitor(s) located in this county, which was provided by the State.

Table 2: Available Air Quality Data for the Area Closest to Big Stone Power Plant

County	State Recommendation	Air Quality (Systems) Monitor ID	Monitor Location	Distance to Big Stone Power Plant	SO ₂ Max Value in ppb
Roberts	Attainment	46-109-4003	482 nd Ave, Big Stone City, South Dakota	4 miles	28 ppb (2001-2002, both partial years)

EPA does not consider the historic monitoring data presented by South Dakota as appropriate for comparison to the NAAQS. The data are not complete, recent or shown to be in the area of maximum concentration. EPA does not consider this historic monitor as sufficient to rule out that an exceedance of the 2010 SO₂ NAAQS may occur in the immediate vicinity of the facility.

South Dakota also included the design values for every other SO₂ monitor in the State. This was provided as justification for the State’s recommended attainment designation for every county in South Dakota. At this time, EPA is not reviewing the designations information for areas in the State apart from the area surrounding the Big Stone Power Plant, which must be designated by July 2, 2016.

Emissions and Emissions-Related Data

Evidence of SO₂ emissions from the source meeting the emissions criteria of the March 2, 2015 consent decree, i.e., Big Stone Power Plant, is an important factor for determining whether the immediate area is experiencing elevated levels of SO₂ concentrations. Other considerations for this factor include county level SO₂ emissions data and data for sources located within 50 km.

As part of its recommendation, South Dakota included the annual emissions from the top emitters of SO₂ in the State of South Dakota. South Dakota obtained the data for these sources and their emissions from the yearly facility reports that are submitted to the State. South Dakota included emissions information from sources across the State rather than only emissions somewhat nearby the Big Stone Power Plant because the State recommended attainment for the entire State rather than making a designation just for the area near Big Stone. As previously noted, Big Stone emitted 12289.66 of SO₂ in 2012. According to the 2011 NEI, there are no other sources within 100 km of Big Stone that emit at or above 100 tpy of SO₂.

Emissions Controls

The EPA recognizes that control strategies implemented after the release of the 2011 NEI may not be reflected, or may warrant further discussion. In its designation recommendation, the State indicated that SO₂ pollution controls required as part of the State's regional haze plan (approved by EPA April 26, 2012, 77 FR 24845) would be installed and operational at the Big Stone facility by fall of 2015.⁴ The regional haze SIP requires the installation of semi-dry flue gas desulfurization (FGD), which was estimated to reduce SO₂ levels at the facility by 90%, for an estimated 1,880 tons/year of SO₂ from the facility.

Meteorology (Weather & Transport Patterns)

Evidence of source-receptor relationships between specific emissions sources and high SO₂ concentrations in the surrounding area is another important factor in determining the appropriate extent of the EPA's intended unclassifiable area. The State did not include any meteorological information in its designation recommendation.

Geography and Topography (Mountain Ranges or Other Air Basin Boundaries)

The Big Stone Power Plant is located in flat terrain, and is about 3 kilometers southwest of Big Stone Lake, which forms a portion of the South Dakota/Minnesota border.

Jurisdictional Boundaries

Once the geographic area associated with the immediate area surrounding the Big Stone Power Plant and any nearby areas which may potentially be contributing to elevated levels of SO₂ around the facility are determined, existing jurisdictional boundaries are considered for the purpose of informing our intended unclassifiable area. Specific attention will be given to clearly defined legal boundaries.

The EPA believes that our intended unclassifiable area, consisting of Grant County, South Dakota, are comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our intended unclassifiable area. Although South Dakota requested in its September 16, 2015 recommendation letter that each county in the State be designated attainment for the 2010 SO₂ NAAQS, EPA is not proposing to designate any areas outside of Grant County at this time. This is because no other South Dakota counties contain sources subject to the July 2, 2016 designation deadline.

Other Relevant Information

⁴ The Big Stone FGD system was fully operational on December 29, 2015.

The EPA did not receive any additional information about the area in the immediate vicinity of Big Stone Power Plant.

Conclusion

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the area around Big Stone Power Plant as unclassifiable for the 2010 SO₂ NAAQS. The boundaries of our intended unclassifiable area are the same as those of Grant County, South Dakota.

EPA intends to make this designation based on a lack of technical information, including data from ambient air quality monitors or air dispersion modeling sufficient to indicate whether or not the area around Big Stone Power Plant is attaining the 2010 SO₂ NAAQS. At this time, our intended designations for the State only apply to Grant County, South Dakota. Consistent with the conditions in the March 2, 2015 court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in South Dakota by either December 31, 2017 or December 31, 2020.