Technical Support Document:

Chapter 44
Intended Round 3 Area Designations for the 2010 1-Hour SO$_2$ Primary National Ambient Air Quality Standard for Wisconsin

1. Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (the EPA, we, or us) must designate areas as either "nonattainment," "attainment," or "unclassifiable" for the 2010 1-hour sulfur dioxide (SO$_2$) primary national ambient air quality standard (NAAQS) (2010 SO$_2$ NAAQS). The CAA defines a nonattainment area as an area that does not meet the NAAQS or that contributes to a nearby area that does not meet the NAAQS. An attainment area is defined by the CAA as any area that meets the NAAQS and does not contribute to a nearby area that does not meet the NAAQS. Unclassifiable areas are defined by the CAA as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS. In this action, the EPA has defined a nonattainment area as an area that the EPA has determined violates the 2010 SO$_2$ NAAQS or contributes to a violation in a nearby area, based on the most recent 3 years of air quality monitoring data, appropriate dispersion modeling analysis, and any other relevant information. An unclassifiable/attainment area is defined by the EPA as an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO$_2$ NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS[1]. An unclassifiable area is defined by EPA as an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO$_2$ NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

This technical support document (TSD) addresses designations for nearly all remaining undesignated areas in Wisconsin for the 2010 SO$_2$ NAAQS. In previous final actions, the EPA

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[1] The term "designated attainment area" is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA's approval of a state-submitted maintenance plan.

has issued designations for the 2010 SO_2 NAAQS for selected areas of the country.[2] The EPA is under a December 31, 2017, deadline to designate the areas addressed in this TSD as required by the U.S. District Court for the Northern District of California.[3] We are referring to the set of designations being finalized by the December 31, 2017, deadline as "Round 3" of the designations process for the 2010 SO_2 NAAQS. After the Round 3 designations are completed, the only remaining undesignated areas will be those where a state has installed and timely begun operating a new SO_2 monitoring network meeting the EPA specifications referenced in the EPA's SO_2 Data Requirements Rule (DRR). (80 FR 51052) The EPA is required to designate those remaining undesignated areas by December 31, 2020.

Wisconsin submitted its first recommendation letter regarding designations for the 2010 1-hour SO_2 NAAQS on May 26, 2011, which included a recommendation of nonattainment for a portion of Oneida County, including the City of Rhinelander and the Towns of Crescent, Newbold, Pine Lake, and Pelican, a recommendation of attainment for the remainder of Oneida County, and a recommendation of unclassifiable for all other Wisconsin counties. The state submitted updated air quality analyses and an updated recommendation letter on January 13, 2017, which included a recommendation that the EPA designate, in Round 3, all remaining areas (not already designated in Rounds 1 and 2) in Wisconsin as "attainment" of the 2010 SO_2 NAAQS. In our intended designations, we have considered all the submissions from the state, except where a recommendation in a later submission regarding a particular area indicates that it replaces an earlier recommendation for that area we have considered the recommendation in the later submission.

The Forest County Potawatomi Community (FCPC) submitted its recommendation regarding designations for the 2010 1-hour SO_2 NAAQS on May 10, 2011. The FCPC has jurisdiction over reservation, trust, and fee (R/T/F) lands throughout Wisconsin consisting of scattered parcels of land in Forest, Oconto, Marinette, Oneida, Shawano, Fond du Lac, Walworth, and Milwaukee counties. In our intended designations, we have considered all the submissions from the FCPC, except where a recommendation in a later submission regarding a particular area indicates that it replaces an earlier recommendation for that area we have considered the recommendation in the later submission.

For the areas in Wisconsin that are part of the Round 3 designations process, Table 1 identifies the EPA's intended designations and the counties or portions of counties to which they would apply. It also lists Wisconsin's current recommendations. The EPA's final designation for these areas will be 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, and could change based on changes to this information (or the availability of new information) that alters EPA's assessment and characterization of air quality.

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[2] A total of 94 areas throughout the U.S. were previously designated in actions published on August 5, 2013 (78 FR 47191), July 12, 2016 (81 FR 45039), and December 13, 2016 (81 FR 89870).
[3] *Sierra Club v. McCarthy*, No. 3-13-cv-3953 (SI) (N.D. Cal. Mar. 2, 2015).

Table 1. Summary of the EPA's Intended Designations and the Designation Recommendations by Wisconsin

Area/County	Wisconsin's Recommended Area Definition	Wisconsin's Recommended Designation	EPA's Intended Area Definition[+]	EPA's Intended Designation
Marathon County	Full county	Attainment	Marathon County	Unclassifiable/Attainment
Sheboygan County	Full county	Attainment	Sheboygan County	Unclassifiable/Attainment
Walworth County	Full county	Attainment	Walworth County	Nonattainment
Remaining Undesignated Areas to Be Designated in this Action*	Remainder of the state	Attainment	Remainder of the state except for Outagamie County and those other areas already designated by EPA[4] or specifically listed for intended designation elsewhere in this TSD[5]	Unclassifiable/Attainment

[*] Except for areas that are associated with sources for which Wisconsin elected to install and timely began operation of a new SO_2 monitoring network meeting EPA specifications referenced in EPA's SO_2 DRR (Expera Specialty Solutions, LLC-Kaukauna in Outagamie County; see Table 2 below), the EPA intends to designate the remaining undesignated counties (or portions of counties) in Wisconsin as "unclassifiable/attainment" as these areas were not required to be characterized by the state under the DRR and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. These areas that we intend to designate as unclassifiable/attainment (those to which this row of this table is applicable) are identified more specifically in section 6 of this chapter.
+Includes all areas of Indian country geographically located with the county, unless otherwise noted.

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[4] Columbia County (81 FR 45039) and a portion of Oneida County comprised of the City of Rhinelander and four townships, including Crescent Town, Newbold Town, Pine Lake Town, and Pelican Town (78 FR 47191).
[5] Marathon, Sheboygan, and Walworth counties.

Areas for which Wisconsin elected to install and began operation of a new, approved SO_2 monitoring network are listed in Table 2. The EPA is required to designate these areas, pursuant to a court ordered schedule, by December 31, 2020. Table 2 also lists the SO_2 emissions sources around which each new, approved monitoring network has been established.

Table 2. Undesignated Areas Which the EPA Is Not Addressing in this Round of Designations (and Associated Source or Sources)

Area	Source
Outagamie County	Expera Specialty Solutions, LLC-Kaukauna

Wisconsin areas that the EPA previously designated in Round 1 (78 FR 47191), which includes a nonattainment area portion of Oneida County comprised of the City of Rhinelander and four townships, including Crescent Town, Newbold Town, Pine Lake Town, and Pelican Town and Round 2 (81 FR 45039 and 81 FR 89870) which includes an unclassifiable/attainment area comprised of the entirety of Columbia County (81 FR 45039) are not affected by the designations in Round 3 unless otherwise noted.

2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a July 22, 2016, memorandum and 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. These memoranda supersede earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and identify factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The documents also contain the factors that the EPA intends to evaluate in determining the boundaries for designated areas. 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.

To assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling for sources that emit SO_2, the EPA released its most recent version of a draft document titled, "SO_2 NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) in August 2016. [6]

Readers of this chapter of this TSD should refer to the additional general information for the EPA's Round 3 area designations in Chapter 1 (Background and History of the Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for States with Sources Not Required to be Characterized).

As specified by the March 2, 2015, court order, the EPA is required to designate by December 31, 2017, all "remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO_2 monitoring network meeting EPA specifications referenced in EPA's" SO_2 DRR. The EPA will therefore designate by December 31, 2017, areas of the country that are not, pursuant to the DRR, timely operating EPA-approved and valid monitoring networks. The areas to be designated by December 31, 2017, include the areas associated with three sources in Wisconsin meeting DRR emissions criteria that have chosen to be characterized using air dispersion modeling, the areas associated with two sources in Wisconsin for which the state imposed emissions limitations on sources to restrict their SO_2 emissions to less than 2,000 tons per year (TPY), the area associated with one source in Wisconsin that met the DRR requirements by demonstrating shut down of the source, areas for which the state chose monitoring for the DRR but did not timely meet the approval and operating deadline (none of which are in Wisconsin), and other areas not specifically required to be characterized by the state under the DRR.

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[6] https://www.epa.gov/sites/production/files/2016-06/documents/SO₂modelingtad.pdf. In addition to this TAD on modeling, the EPA also has released a technical assistance document addressing SO_2 monitoring network design, to advise states that have elected to install and begin operation of a new SO_2 monitoring network. See Draft SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, https://www.epa.gov/sites/production/files/2016-06/documents/SO₂monitoringtad.pdf.

Because many of the intended designations have been informed by available modeling analyses, this preliminary TSD is structured based on the availability of such modeling information. There is a section for each county for which modeling information is available. The remaining to-be-designated counties are then addressed together in section 6.

The EPA does not plan to revise this TSD after consideration of state and public comment on our intended designation. A separate TSD will be prepared as necessary to document how we have addressed such comments in the final designations.

The following are definitions of important terms used in this document:
1) 2010 SO_2 NAAQS – The primary NAAQS for SO_2 promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations (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 that, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined either: (1) does not meet the 2010 SO_2 NAAQS, or (2) contributes to ambient air quality in a nearby area that does not meet the NAAQS.
4) Designated Unclassifiable/Attainment Area – an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.[7]
5) Designated Unclassifiable Area – an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO_2 NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.
6) Modeled Violation – a violation of the SO_2 NAAQS demonstrated by air dispersion modeling.
7) Recommended Attainment Area – an area that a state, territory, or tribe has recommended that the EPA designate as attainment.

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[7] The term "designated attainment area" is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA's approval of a state-submitted maintenance plan.

8) Recommended Nonattainment Area – an area that a state, territory, or tribe has recommended that the EPA designate as nonattainment.
9) Recommended Unclassifiable Area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable.
10) Recommended Unclassifiable/Attainment Area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable/attainment.
11) Violating Monitor – an ambient air monitor meeting 40 CFR parts 50, 53, and 58 requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
12) We, our, and us – these refer to the EPA.

3. Technical Analysis for the Marathon County Area

The EPA must designate the Marathon County, Wisconsin, area by December 31, 2017, because the area has not been previously designated and Wisconsin has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in Marathon County.

3.1.1. Introduction

This section presents all the available air quality modeling information for Marathon County, which includes the Wisconsin Public Service Corporation – Weston Plant (WPSC-Weston). This area will be referred to as "the Marathon County area" within this section. This area contains the following SO_2 sources, principally the source around which Wisconsin is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tons per year:

- The WPSC-Weston facility emits 2,000 tons or more annually. Specifically, WPSC-Weston emitted 5,521 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Wisconsin has chosen to characterize it via modeling.

- The Domtar Paper-Rothschild (Domtar-Rothschild) facility, which reported 27.29 tons of SO_2 emissions in 2014, is not on the SO_2 DRR Source list.

- The Expera Specialty Solutions paper mill in Mosinee, Wisconsin, (Expera-Mosinee), which reported 1,460.64 tons of SO_2 emissions in 2014, is also not on the SO_2 DRR Source list.

Because we have available results of air quality modeling in which these sources are modeled together, the area around this group of sources is being addressed in this section with consideration given to the impacts of all these sources. Wisconsin recommended that this area be designated attainment.

Wisconsin's assessment and characterization of the air quality impacts from the WPSC-Weston facility and other nearby sources that may have a potential impact in the area where the 2010 SO_2 NAAQS may be exceeded, was performed using air dispersion modeling software, i.e., AERMOD, analyzing a mixture of actual and allowable emissions. After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in Marathon County.

As seen in Figure 1 below, the WPSC-Weston facility is located in the Village of Rothschild on the Wisconsin River in Marathon County.

Also included in the figure are other nearby emitters of SO2. These are Rock Oil Refining, Melron Corporation, WE Energies, Fiber Recovery, Domtar-Rothschild, and Expera-Mosinee.

Figure 1. Map of the Marathon County Area Addressing WPSC-Weston
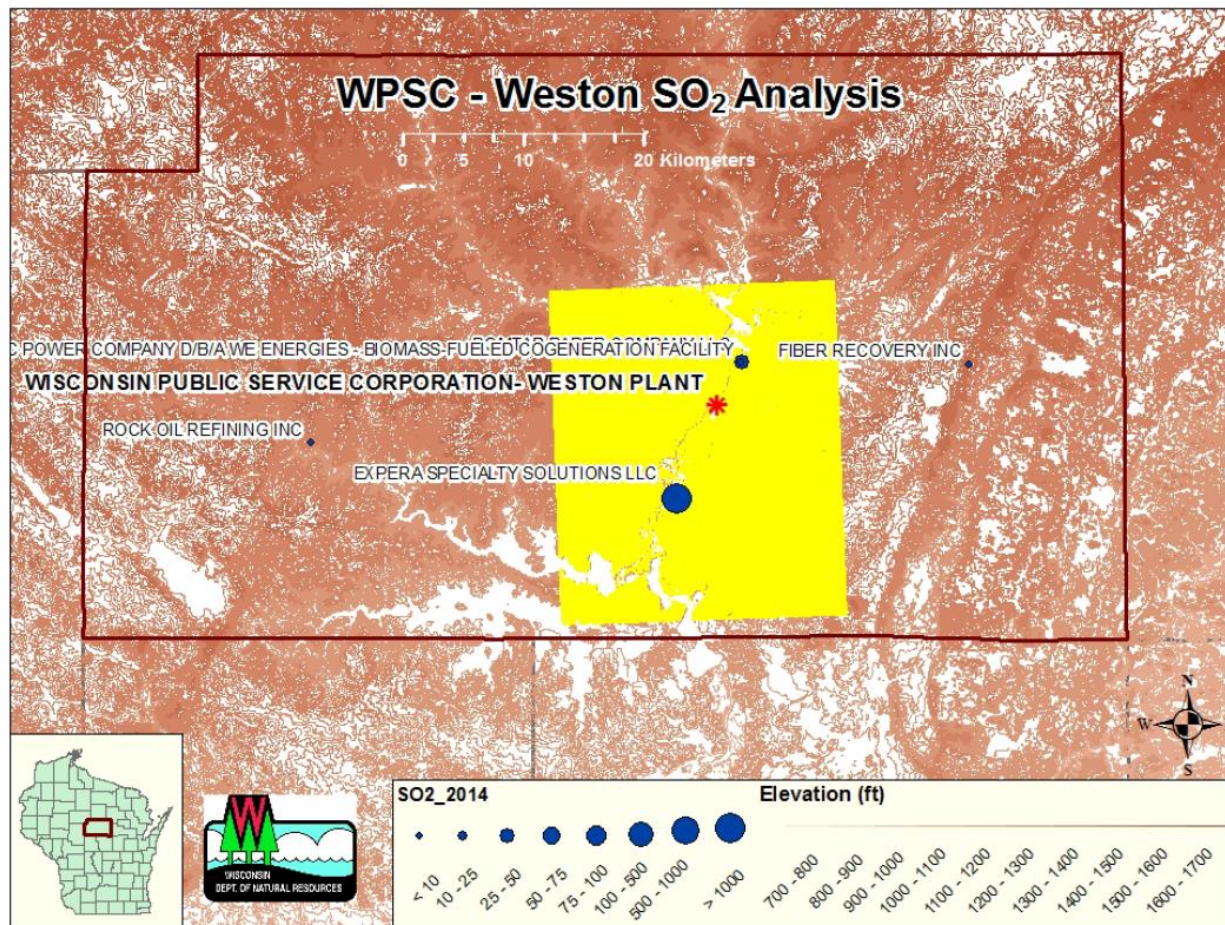
The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered one modeling assessment from the state and no assessments from other parties.

3.1.2. Modeling Analysis Provided by the State

3.1.2.1. Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:
- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD

- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The state used AERMOD version 16216. The current regulatory version of AERMOD is 16216r. This version was released on January 17, 2017. The previous version (16216) was released on December 20, 2016. The modeling for this area was completed prior to the release of AERMOD 16216r. The results of this modeling are not expected to significantly differ had this modeling effort used 16216r instead of 16216. The modeling for this area included the use of the non-default regulatory option ADJ_U* which is a surface friction velocity option in both of these versions of the model. This regulatory option is appropriate when used without site-specific turbulence data, which is the case with the modeling conducted here. A more detailed discussion of the state's approach to the individual components of this modeling effort is provided in the corresponding discussion that follows, as appropriate.

3.1.2.2.   Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the determination of whether a source is in an "urban" or "rural" area is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is also important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the state determined that it was most appropriate to run the model in rural mode, since the area around WPSC-Weston consists primarily of commercial property, residences, and water. Using the Auer[8] methodology as referenced in EPA's *Guideline on Air Quality Models (40 CFR Part 51, Appendix W, USEPA, December 2016)*, the state assessment of the land use around WPSC-Weston showed that less than 50% of the land area within 3 kilometers is industrial, commercial, or dense residential. Therefore, the state selected rural dispersion coefficients to be used in AERMOD. The EPA agrees with Wisconsin's rural characterization of this modeled area as based on the Auer methodology.

3.1.2.3.   Modeling Parameter: Area of Analysis (Receptor Grid)

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and

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[8] Auer, Jr., A.H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies. *Journal of Applied Meteorology,* 17(5): 636–643.

sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

As listed in the introduction to this section, the source of SO_2 emissions subject to the DRR in this area is the WPSC-Weston facility. WPSC-Weston is a base load electric generating facility with a nominal capacity of 1,027 megawatts that began operating in the 1950's. Of the four steam generating units at this facility, Unit 1 (B01) was permanently retired in 2015 as required by Construction Permit 14-MEO-041 and Consent Decree 13-C-10. Unit 2 (B02) switched to exclusively burn natural gas (ceasing coal and oil firing) in 2015 as required by Construction Permit 14-MEO-041. Unit 3 (B03) and Unit 4 (B04) exclusively burn coal.

For the Marathon County area, the state considered six other emitters of SO_2 within 10 km of WPSC-Weston in any direction. The state determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. In addition to WPSC-Weston, the other emitters of SO_2 included in the area of analysis are Rock Oil Refining, Melron Corporation, WE Energies, Fiber Recovery, Domtar-Rothschild, and Expera-Mosinee. As discussed below, the state explicitly modeled two of these other emitters including Domtar-Rothschild and Expera-Mosinee. No other sources beyond 10 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis. The EPA finds acceptable the state's determination as explained in more detail below.

The receptor grid spacing for the area of analysis chosen by the state is a series of nested rectangular grids as follows:
  - 50-meter spacing to 1,000 meters from WPSC-Weston and Expera-Mosinee
 - 100-meter spacing to 10 kilometers from WPSC-Weston and Expera-Mosinee

The receptor network contained 63,220 receptors, and the network covered the south central portion of Marathon County.

Figure 1, included in the state's recommendation, shows the state's chosen area of analysis and the receptor grid surrounding the WPSC-Weston facility. Figure 2 also shows the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the state removed receptors located over waterbodies, including the Wisconsin River. However, potentially inconsistent with the Modeling TAD, the state removed receptors located inside the fence lines of WPSC-Weston, Expera-Mosinee, and Domtar-Rothschild. Receptors inside the fence lines of Expera-Mosinee and Domtar-Rothschild are ambient air with respect to WPSC-Weston. The maximum SO_2 concentration in the modeled area is immediately across the river from Domtar-Rothschild (Figure 5). The concentration gradient in the modeled area near Domtar-Rothschild is such that it appears that it is possible that inclusion of receptors inside the Domtar-Rothschild fence line may have shown a maximum SO_2 concentration at a receptor inside the fence line of Domtar-Rothschild. However, the concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the Domtar-Rothschild fence

line (as well as the Expera-Mosinee fence line, which is to the south of WPSC-Weston and well away from the maximum SO_2 impact in the modeled area) would not have shown SO_2 violations attributable to WPSC-Weston. Additionally, with respect to the exclusion of receptors inside the WPSC-Weston fence line, the concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the WPSC-Weston fence line would not have shown SO_2 violations. Therefore, despite the potential inconsistency with the Modeling TAD, the EPA finds that the removal of these receptors does not prevent us from being able to use these technical data and modeling results to fully assess air quality in the modeled area of analysis and therefore make an accurate designation for this area.

Figure 2. Receptor Grid for the Marathon County Area
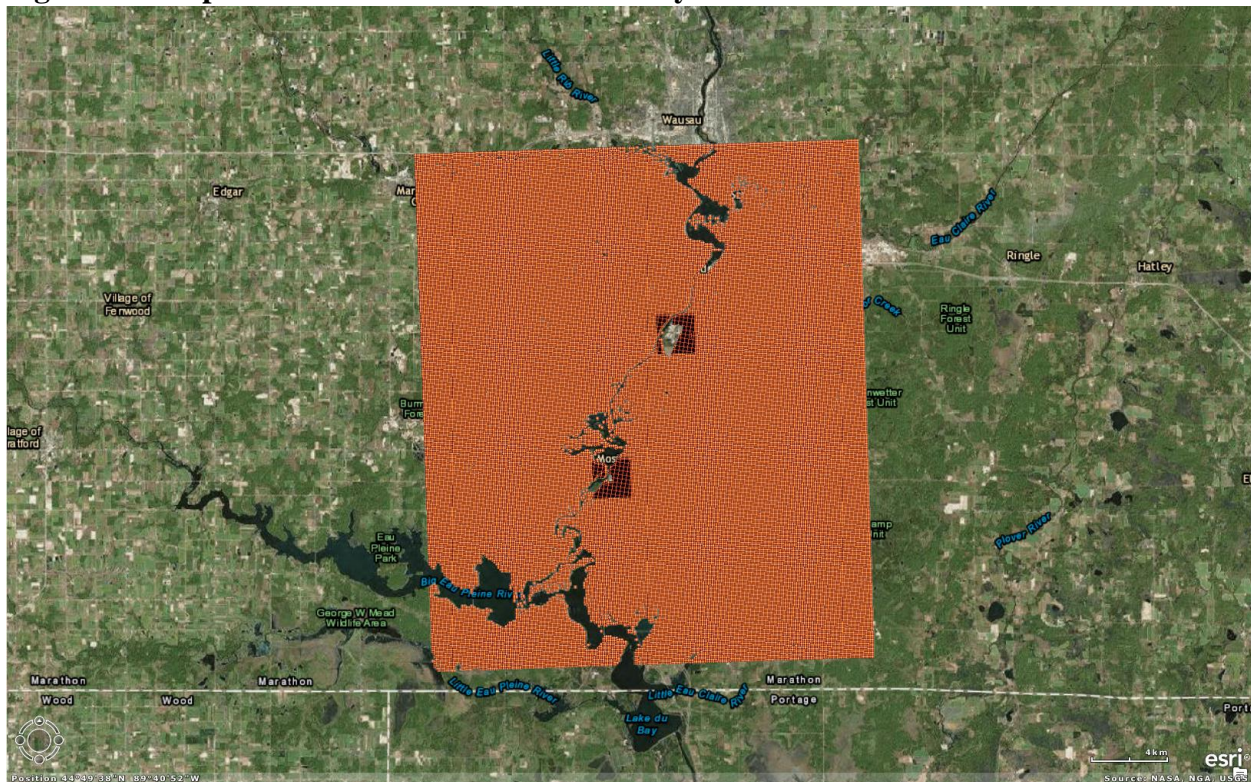
3.1.2.4.   Modeling Parameter: Source Characterization
Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building downwash (if warranted), and the use of actual stack heights with actual emissions or following GEP policy with allowable emissions.

The state explicitly included WPSC-Weston, the Domtar-Rothschild facility, and the Expera-Mosinee facility in the modeling analysis. Other sources were excluded for the reasons described below.

Rock Oil Refining is located 34 kilometers west of WPSC-Weston. The facility recycles solid waste, including waste contaminated with used oil. The facility reported SO_2 emissions of less

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than 1 ton in 2015 from combustion of solid waste. Due to the distance between facilities and the small emissions, the impact of Rock Oil Refining, the state excluded this source from the modeling analysis and assumed its impact to be part of the background concentration. The EPA finds acceptable the state's determination and reasoning for excluding this source from the modeling analysis.

Melron Corporation is located 11 kilometers east-northeast of WPSC-Weston with reported SO_2 emissions of less than 1 ton in 2015. The facility manufactures hardware with SO_2 emissions coming from melting, pouring, and cooling of steel. Due to the distance between facilities and the small emissions, the state excluded this source from the modeling analysis and assumed its impact to be part of the background concentration. The EPA finds acceptable the state's determination and reasoning for excluding this source from the modeling analysis.

WE Energies, a subsidiary of WEC Energy Group, operates the Biomass Cogeneration Facility located 4 kilometers northeast of WPSC-Weston. The facility reported just over 1 ton of SO_2 in 2015 from the combustion of biomass. The state describes the emissions from this facility as venting through a stack with good dispersion, so the state excluded this source from the modeling analysis and assumed its impact to be part of the background concentration. The EPA finds acceptable the state's analysis that since this source reported just over 1 ton of SO_2 emissions in 2015 and is 4 kilometers away from WPSC-Weston, the impact from this source may reasonably be assumed to be part of the background concentration.

Fiber Recovery is located 21 kilometers east-northeast of WPSC-Weston, with reported SO_2 emissions of 4 tons in 2015. The facility is adjacent to a solid waste landfill and combusts landfill gas in internal combustion engines. The state remarked that "Regulatory dispersion modeling shows that the stacks are affected by downwash and the maximum impact of the stacks is close to the facility." Since a separate modeling analysis conducted by the state shows the impact of Fiber Recovery is not in the vicinity of WPSC-Weston and the emissions are small, the state excluded this source from the modeling analysis and assumed its impact to be part of the background concentration. The EPA finds acceptable the state's analysis that since this source is 21 kilometers away from WPSC-Weston with reported SO_2 emissions of 4 tons in 2015, the impact from this source may reasonably be assumed to be part of the background concentration.

Domtar-Rothschild is located just over 4 kilometers northeast of WPSC-Weston. The facility has an acid plant and other pulping operations that emit SO_2. The facility reported SO_2 emissions of 29 tons in 2015 from several short stacks. Due to the nature of the emissions, the uncertainty of modeled impact from the stacks, and the distance between Domtar-Rothschild and WPSC-Weston, the state included this source in its modeling analysis. The EPA agrees with this determination and reasoning for including this source in the modeling analysis.

Expera Specialty Solutions operates a paper mill in Mosinee, Wisconsin, about 8 kilometers south-southwest of WPSC-Weston. The facility is an integrated Kraft pulp and paper mill, and has four boilers (B20, B21, B24, B25) to provide steam and electricity for the plant. The facility reported 1,498 tons of SO_2 in 2015, almost all from the two coal boilers B20 (212 MMBTU/hr) and B24 (143 MMBTU/hr). The facility also operates a lime kiln that produces SO_2 emissions. Due to the amount and nature of the emissions, and the distance between Expera-Mosinee and

WPSC-Weston, the state included this source in its modeling analysis. The EPA agrees with this determination and reasoning for including this source in the modeling analysis.

With the exception of the removal of the receptors within the fence lines and other deviations explained in more detail throughout this section, the state characterized WPSC-Weston, the Domtar-Rothschild facility, and the Expera-Mosinee facility within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions, with the exceptions of Unit 2 and Unit 3 at WPSC-Weston. For these emission units, the state used actual stack heights (73.95 meters and 151.24 meters for Units 2 and 3, respectively) in conjunction with allowable emissions.[9] The state also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM version 04274 was used to assist in addressing building downwash.

3.1.2.5. *Modeling Parameter: Emissions*

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent three years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted potential to emit (PTE), also referred to as allowable emissions rate, that is federally enforceable and effective.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent three calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations. In the event that these

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[9] The Modeling TAD recommends that allowable emissions be modeled with the lesser of actual stack height or allowable good engineering practice (GEP) stack height. The EPA has confirmed that the actual stack heights (73.95 meters and 151.24 meters for Units 2 and 3, respectively) at WPSC-Weston are lower than the heights that could be considered GEP (122.35 meters and 189.36 meters for Units 2 and 3, respectively).

short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, the state included the WPSC-Weston facility and two other emitters of SO_2, including Domtar-Rothschild and Expera-Mosinee to explicitly model. For this area of analysis, the state has opted to use a hybrid approach, where emissions from Domtar-Rothschild, Expera-Mosinee, and WPSC-Weston Unit 4 are expressed as actual emissions, and emissions from WPSC-Weston Unit 2 and Unit 3 are expressed as allowable emissions. The facilities and emission units in the state's modeling analysis and their associated actual or estimated actual rates are summarized below.

Facility reported annual actual SO_2 emissions between 2013 and 2015 are summarized in Table 3. A description of how the state obtained hourly emission rates is given below this table.

Table 3. Actual SO₂ Emissions Between 2013 – 2015 from Facilities in the Area of Analysis for the Marathon County Area

Facility Name	SO₂ Emissions (TPY)		
	2013	2014	2015
WPSC-Weston	7,119.52	5,520.54	4,098.73
Expera-Mosinee	1,380.63	1,460.64	1,497.78
Domtar-Rothschild	28.37	27.29	28.58
Total Emissions from All Explicitly Modeled Facilities in the Area of Analysis	8,528.52	7,008.47	5,625.09

For WPSC-Weston Unit 2, the state calculated a PTE of 2.63 tpy using EPA's AP-42 emission factor and the maximum heat input capacity of Unit 2, which is a natural gas-fired boiler. Unit 2 ceased burning coal and oil in 2015 and now only burns natural gas (Construction Permit 14-MEO-041).

For WPSC-Weston Unit 3, the state calculated allowable emissions. Since the applicable limit was based on a 30-day average, the state then applied an adjustment factor to determine a comparably stringent 1-hour value to use in its modeling analysis. The January 1, 2017, federally enforceable SO_2 emission limit (Construction Permit 14-MEO-041) for Unit 3 is 0.08 lbs/MMBTU on a 30-day rolling average basis. To estimate a comparable hourly emission rate, the state used the method outlined in Appendix C of EPA's April 2014 Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions. The state determined the units at the Columbia Energy Center (WPL-Columbia) in Columbia County, Wisconsin, are comparable to WPSC-Weston Unit 3. WPSC-Weston Unit 3 is a pulverized Powder River Basin (PRB) coal, tangentially fired, dry bottom subcritical boiler installed in 1981, and is controlled with a dry flue gas desulfurization system. Both Units 1 and 2 at WPL-Columbia are larger than the WPSC-Weston Unit 3, but are both pulverized PRB coal, tangentially fired, dry bottom subcritical boilers, with dry flue gas desulfurization systems installed in the mid-1970s. The EPA agrees with the state's determination that the units at WPL-Columbia are comparable to WPSC-Weston Unit 3 since WPL-Columbia Units 1 and 2 and WPSC-Weston Unit 3 burn the same type of fuel, are the same type of boiler, and have the same control device. Additionally, since the WPL-Columbia

units are larger, this provides the potential for a conservative (i.e. potential overestimation of emissions) comparison. From the emission data captured on the CEMS at WPL-Columbia, the state divided the 99th percentile of the hourly mass (pounds) value by the 99th percentile of the 30-day average hourly mass (pounds) value. The state calculated the ratios for each unit at WPL-Columbia separately and determined the higher ratio to be 5. The state multiplied the WPSC-Weston Unit 3 30-day emission limit of 0.08 lbs/MMBTU by 5, which resulted in a maximum hourly emission rate estimate of 0.40 lbs/MMBTU. The state used this hourly emission rate of 0.40 lbs/MMBTU for WPSC-Weston Unit 3 in its modeling analysis. While the EPA in most cases finds less adjustment to be appropriate, this adjustment factor should provide a conservative (i.e. err on the side of overestimating emissions) assessment of whether WPSC-Weston Unit 3, in conjunction with the other emissions units at WPSC-Weston, is contributing to a modeled violation of the 2010 SO_2 NAAQS.

For WPSC-Weston Unit 4, the state obtained the actual hourly emissions from CEMS data. The EPA confirmed that the sum of the hourly emissions used in the model HOUREMIS file is roughly equal to the annual emissions reported for this unit.

WPSC-Weston Unit 1 was permanently shut down in 2015 (Construction Permit 14-MEO-041 and Consent Decree 13-C-10), therefore the allowable emissions from this unit are zero. Each of the three remaining boilers at WPSC-Weston has a small, natural gas auxiliary heating boiler. There are also three combustion turbines at WPSC-Weston. The state did not include the emissions from these units in its modeling analysis, since the state determined the contributions from the three natural gas auxiliary heating boilers and the three combustion turbines to the facility's overall SO_2 emissions to be low. The EPA assessed the emission reports for this facility and agrees with Wisconsin's determination that the SO_2 emissions for the natural gas auxiliary heating boilers and combustion turbines at WPSC-Weston are low (reported emissions for these units, combined, over 2013-2015 add up to less than 1 ton of SO_2).

For the Domtar-Rothschild and Expera-Mosinee facilities, the state calculated the estimated actual hourly emissions for the modeling analysis by dividing the yearly mass by the reported hours of operation in each year 2013, 2014, 2015, then averaging the hourly rates by stack. The state applied the same emission rate to all modeled hours. The EPA assessed the emission reports for these facilities, which both report operations of most emission units/processes at 24 hours per day nearly every day of the year. While the state's method of representing SO_2 emissions from these facilities deviated from the TAD and is not conservative (i.e. errs on the side of underestimating emissions), the EPA finds that a more conservative (i.e. erring on the side of overestimating emissions) approach to representing the SO_2 emissions from these facilities would not be likely to change the overall result of the state's modeling analysis, which shows a maximum impact of 54.4 ppb (the 2010 SO_2 NAAQS is 75 ppb).

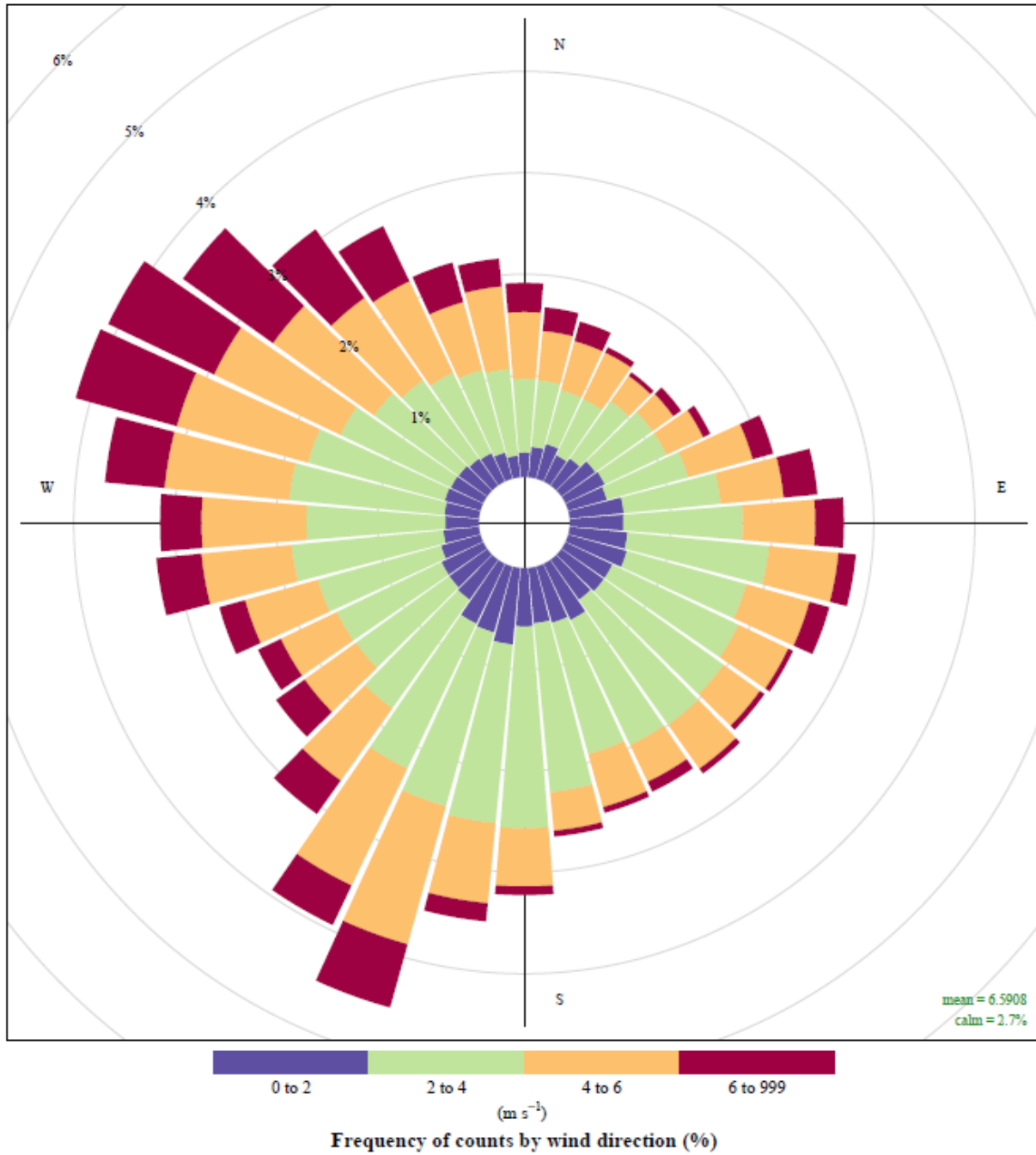*3.1.2.6.   Modeling Parameter: Meteorology and Surface Characteristics*
As noted in the Modeling TAD, the most recent three years of meteorological data (concurrent with the most recent three years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration (FAA), and military stations.

For the area of analysis for the Marathon County area, the state selected the surface meteorology from the Alexander Field South Wood County Airport (KISW) instrumentation tower and coincident upper air observations from Green Bay, Wisconsin, as best representative of meteorological conditions within the area of analysis. KISW is 57 km south-southwest of WPSC-Weston and located near the Wisconsin River at the edge of the City of Wisconsin Rapids in an area with similar land cover to the land cover around WPSC-Weston. The Wausau Downtown Airport (KAUW) is located 8 km north-northeast of WPSC-Weston, but the airport is surrounded on three sides by the Wisconsin River and the airflow is dominated by Rib Mountain, located 4 kilometers west. Traditionally, the state has only used the Wausau data for facilities located within the downtown area of the City of Wausau. The state indicated it does not consider the next closest airport stations, Merrill Municipal Airport (KRRL), Langlade County Airport (KAIG), Stevens Point Municipal Airport (KSTE), Marshfield Municipal Airport (MFI), and Central Wisconsin Airport (CWA) to be representative as none use the same high quality equipment as KISW or KAUW, nor do they report wind information by the minute, and all have high numbers of missing and calm hours.

Following the methods described in EPA's AERMOD Implementation Guide, the state generated surface characteristics around KISW using AERSURFACE version 13016. Specifically, the state derived snow cover for each month during the period 2013-2015 from National Snow Analyses maps from the National Operational Hydrologic Remote Sensing Center. The state ran AERSURFACE for both snow and no-snow conditions. The state adjusted the albedo, Bowen ratio, and surface roughness based on the number of days with snow cover during each month. As detailed in the AERMOD Implementation Guide, the state based soil moisture conditions for each meteorological data year on the monthly Palmer Drought Severity Index for the area as obtained from the National Centers for Environmental Information.

In the figure below, generated by the EPA, the location of this NWS station is shown relative to the area of analysis.

Figure 3. NWS station near the Marathon County Area

July 26, 2017

1:1,155,581

In Figure 4, depicting a 3-year surface wind rose for KISW, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Figure 4 shows that winds are most prevalent from the west to northwest and south to southwest. However, wind appears likely from any direction.

Figure 4. Marathon County Cumulative Annual Wind Rose for Years 2013 – 2015

Frequency of counts by wind direction (%)

Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with AERMET version 16216. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The state followed the methodology and settings presented in EPA's AERMOD Implementation Guide in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE version 13016 to best represent surface characteristics. Hourly surface meteorological data records are read by AERMET, and include all the necessary

elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 2-minute average speed and direction reported each minute was provided from KISW, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE version 15272. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the state set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA finds that the meteorological data used in this assessment is adequately representative of the weather conditions in the area.

3.1.2.7. Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The terrain in the area of analysis is hilly, with prominent relief northwest of WPSC-Weston, extending about 765 feet above the Wisconsin River elevation. To account for these terrain changes, the AERMAP version 11103 terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the 1999 USGS National Elevation Dataset. The EPA finds that Wisconsin has suitably represented terrain in the area of analysis.

3.1.2.8.   Modeling Parameter: Background Concentrations of SO$_2$

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO$_2$ that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state chose the tier 2 approach using temporally varying background monitored concentrations developed from the 2013-2015 Horicon (Dodge County) SO$_2$ monitor (AQS ID 55-027-0001) data. The Horicon monitor is located 174 km southeast of WPSC-Weston. There are no sources with SO$_2$ emissions greater than 100 tons per year within 50 km of the Horicon monitor site. The state indicated its use of the Modeling TAD which references calculating concentrations by hour of day and season as noted in the earlier March 1, 2011 memorandum, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 Ambient Air Quality Standard*. The state indicated that as per the Modeling TAD, when calculating the hour-of-day and season values, the selected value should represent the ranked percentile of the standard; however, the March 2011 *Clarification* memo also discusses calculating concentrations by hour-of-day and month, but using a higher ranked value such as the maximum in each period indicating, "for more detailed temporal pairing, such as season by hour-of-day and day-of-week or month by hour-of-day, the 1st-highest values from the distribution for each temporal combination should be used." Wisconsin decided to use the maximum 1-hour SO$_2$ concentration observed at the Horicon monitor for each hour of day for each month of the year over the 2013-2015 time-period. The EPA considers this to be comparable to the method outlined in the Modeling TAD, since it is more conservative (i.e. errs on the side of overestimating the background concentrations by taking the maximum 1-hour SO$_2$ concentrations rather than the 99th percentile values), and, therefore, finds this approach to be acceptable for use in Wisconsin's modeling analysis. The background concentrations for this area of analysis were determined by the state to vary from 1.4 micrograms per cubic meter (µg/m^3), equivalent to 0.53 ppb when expressed in 2 significant figures,[10] to 14.1 µg/m^3 (5.4 ppb).

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[10] The SO$_2$ NAAQS level is expressed in ppb but AERMOD gives results in µg/m^3. The conversion factor for SO$_2$ (at the standard conditions applied in the ambient SO$_2$ reference method) is 1ppb = approximately 2.619 µg/m^3.

3.1.2.9.   Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Marathon County area of analysis are summarized below in Table 4.

Table 4. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Marathon County Area

Input Parameter	Value
AERMOD Version	16216 (with ADJ_U*)
Dispersion Characteristics	Rural
Modeled Sources	3
Modeled Stacks	15
Modeled Structures	220
Modeled Fence Lines	3
Total receptors	63,220
Emissions Type	Hybrid
Emissions Years	2013−2015 (actuals) PTE for WPSC-Weston Unit 2 based on emission factor since Unit 2 ceased burning coal and oil in 2015 and now only burns natural gas (Construction Permit 14-MEO-041) PTE for WPSC-Weston Unit 3 based on federally enforceable limit effective date of January 1, 2017 (Construction Permit 14-MEO-041)
Meteorology Years	2013−2015
NWS Station for Surface Meteorology	Alexander Field South Wood County Airport (KISW)
NWS Station Upper Air Meteorology	Green Bay, Wisconsin
NWS Station for Calculating Surface Characteristics	Alexander Field South Wood County Airport (KISW)
Methodology for Calculating Background SO_2 Concentration	2013−2015 Horicon (Dodge County) SO_2 Monitor AQS ID 55-027-0001
Calculated Background SO_2 Concentration	1.4−14.1 μg/m^3

The results presented below in Table 5 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 5. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentration Averaged Over Three Years for the Area of Analysis for the Marathon County Area

| Averaging Period | Data Period | Receptor Location UTM zone 16 | | 99th percentile daily maximum 1-hour SO₂ Concentration (μg/m³) | |
		UTM Easting (m)	UTM Northing (m)	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013−2015	292300	4974200	142.4	196.4*

*Equivalent to the 2010 SO₂ NAAQS of 75 ppb using a 2.619 μg/m³ conversion factor

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 142.4 μg/m³, equivalent to 54.4 ppb. This modeled concentration includes the background concentration of SO₂ and is based on a mixture of actual and PTE emissions from the facilities. Figure 5 below indicates that the predicted value occurred near Domtar-Rothschild, approximately 4.2 km northeast of WPSC-Weston.

Figure 5. Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Marathon County Area
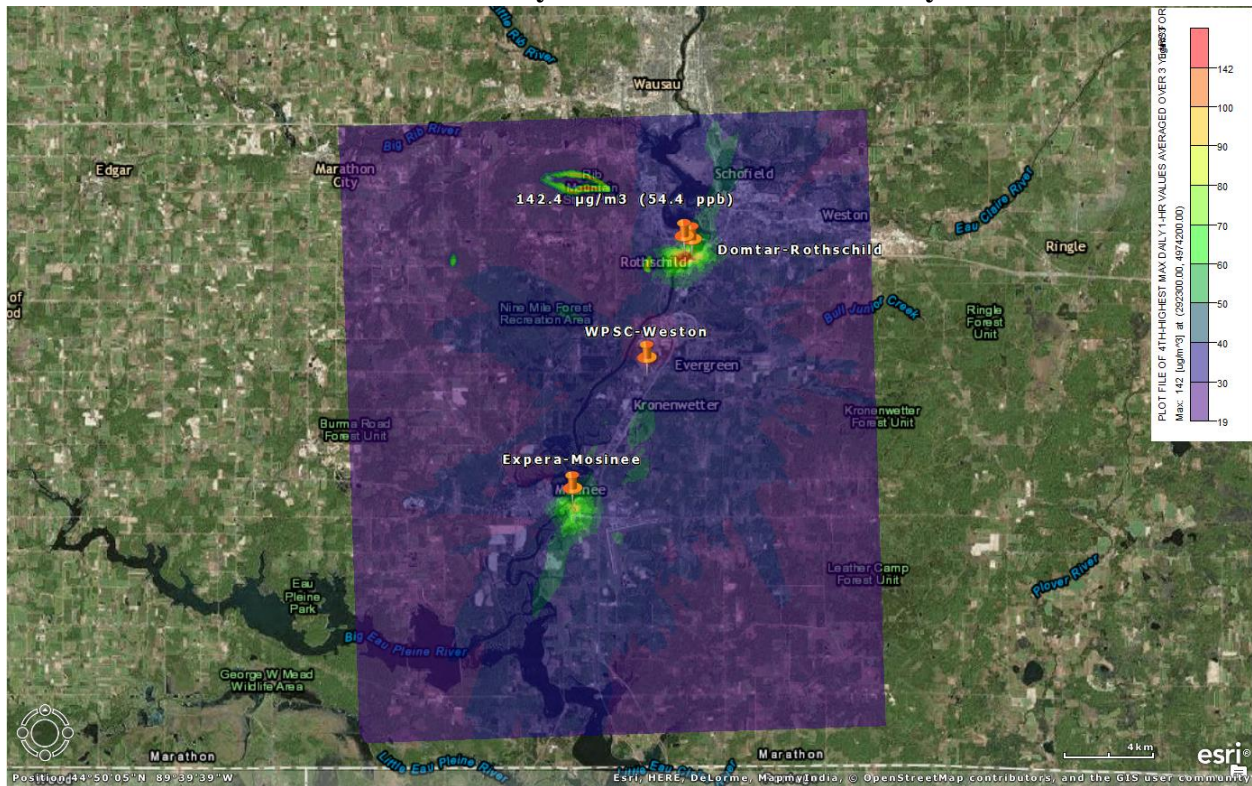
The modeling submitted by the state indicates that the 1-hour SO₂ NAAQS is not violated at the receptor with the highest modeled concentration.

3.2. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Marathon County Area

These factors have been incorporated into the air quality modeling efforts and results discussed above. The EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the modeling.

3.3. Jurisdictional Boundaries in the Marathon County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Marathon County. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

3.4. The EPA's Assessment of the Available Information for the Marathon County Area

The most reliable evidence regarding air quality with respect to SO_2 pollution in Marathon County is Wisconsin's modeling analysis, which uses detailed information on SO_2 emissions, meteorology, and topography in general accordance with EPA's Modeling TAD, thereby obtaining a reliable assessment of air quality in the area. In instances where the modeling analysis deviates from the TAD, the EPA evaluated the deviations for reasonableness and drew the following conclusions.

In terms of emissions, Wisconsin has appropriately considered federally enforceable and effective limits on WPSC-Weston Units 2 and 3 and appropriately adjusted the Unit 3 30-day limit to a comparably stringent 1-hour limit as per the Appendix C of EPA's April 2014 Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions. Wisconsin did not model emissions from the natural gas auxiliary heating boilers associated with Units 2, 3, and 4 or the emissions from the three combustion turbines at WPSC-Weston. The EPA considers Wisconsin's omission of these emissions to be reasonable, since the reported emissions from these units add up to less than 1 ton over the 3-year modeled period. Wisconsin underestimated the actual emissions from the nearby sources including Domtar-Rothschild and Expera-Mosinee as compared to the reported actual emissions for these sources, however the EPA finds that the discrepancies are not large enough to raise concerns about whether a more conservative approach to representing the SO_2 emissions from these facilities would have been likely to change the overall result of the state's modeling analysis, which shows a maximum impact of 54.4 ppb (the 2010 SO_2 NAAQS is 75 ppb).

In terms of receptor placement, Wisconsin deviated from the Modeling TAD by removing receptors from within the fence line of the WPSC-Weston, Domtar-Rothschild, and Expera-Mosinee properties. Receptors inside the fence line of Expera-Mosinee and Domtar-Rothschild are ambient air with respect to WPSC-Weston. The maximum SO_2 concentration in the modeled area is immediately across the river from Domtar-Rothschild (Figure 5). The concentration gradient in the modeled area near Domtar-Rothschild is such that it appears that it is possible that inclusion of receptors inside the Domtar-Rothschild fence line may have shown a maximum SO_2 concentration at a receptor inside the fence line of Domtar-Rothschild. However, the concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the Domtar-Rothschild fence line (as well as the Expera-Mosinee fence line, which is to the south of WPSC-Weston and well away from the maximum SO_2 impact in the modeled area) would not have shown SO_2 violations attributable to WPSC-Weston. Additionally, with respect to the exclusion of receptors inside the WPSC-Weston fence line, the concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the WPSC-Weston fence line (potential ambient air boundary) would not have shown SO_2 violations. Therefore, despite the inconsistency with the Modeling TAD, the EPA finds that the removal of these receptors does not prevent us from being able to use these technical data and modeling results to fully assess air quality in the modeled area of analysis and therefore make an accurate designation for this area.

For the background SO_2 concentration, Wisconsin used a method that deviates from the Modeling TAD. The EPA considers Wisconsin's method acceptable, since it is more conservative (i.e. errs on the side of overestimating the background concentrations by taking the maximum 1-hour SO_2 concentrations rather than the 99th percentile values) as described in detail above.

3.5.   Summary of Our Intended Designation for the Marathon County Area

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 WPSC-Weston, along with the remainder of Marathon County, as unclassifiable/attainment for the 2010 SO_2 NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined the area (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the EPA intends to designate the entirety of Marathon County as unclassifiable/attainment. The EPA is basing this conclusion predominantly on the modeling analysis provided by Wisconsin, which demonstrates that the area near WPSC-Weston is attaining the SO_2 standard. This conclusion is also based on a finding that no other SO_2 sources not explicitly included in or intentionally excluded from the modeling analysis, as described in detail above, are located in or near Marathon County, such that Wisconsin's analysis may be considered to demonstrate that no violations are occurring anywhere in Marathon County nor is there any indication of contribution to existing nonattainment areas.

4. Technical Analysis for the Sheboygan County Area

The EPA must designate the Sheboygan County area by December 31, 2017, because the area has not been previously designated and Wisconsin has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in Sheboygan County.

4.1.1. Introduction

This section presents all the available air quality modeling information for Sheboygan County, which includes Wisconsin Power and Light's Edgewater Generating Station (WPL-Edgewater). This area will be referred to as "the Sheboygan County area" within this section. This area contains the following SO_2 sources, principally the source around which Wisconsin is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tons per year:

- The WPL-Edgewater facility emits 2,000 tons or more annually. Specifically, WPL-Edgewater emitted 10,665 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Wisconsin has chosen to characterize it via modeling.

- The Sheboygan Wastewater Treatment Plant (Sheboygan WWTP), which reported 3.67 tons of SO_2 emissions in 2014, is not on the SO_2 DRR Source list.

Because we have available results of air quality modeling in which these sources are modeled together, the area around this group of sources is being addressed in this section with consideration given to the impacts of all these sources. Wisconsin recommended that this area be designated attainment.

Wisconsin's assessment and characterization of the air quality impacts from the WPL-Edgewater facility and other nearby sources that may have a potential impact in the area where the 2010 SO_2 NAAQS may be exceeded, was performed using air dispersion modeling software, i.e., AERMOD, analyzing a mixture of actual and allowable emissions. After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in Sheboygan County.

As seen in Figure 6 below, the WPL-Edgewater facility is located in the southern part of the City of Sheboygan, adjacent to Lake Michigan in Sheboygan County, Wisconsin. Sheboygan is located in east central Wisconsin approximately 50 kilometers north-northeast of Milwaukee.

Also included in the figure are other nearby emitters of SO_2. These are the Sheboygan WWTP and the Kohler Co-Engine Plant.

Figure 6. Map of the Sheboygan County Area Addressing WPL-Edgewater
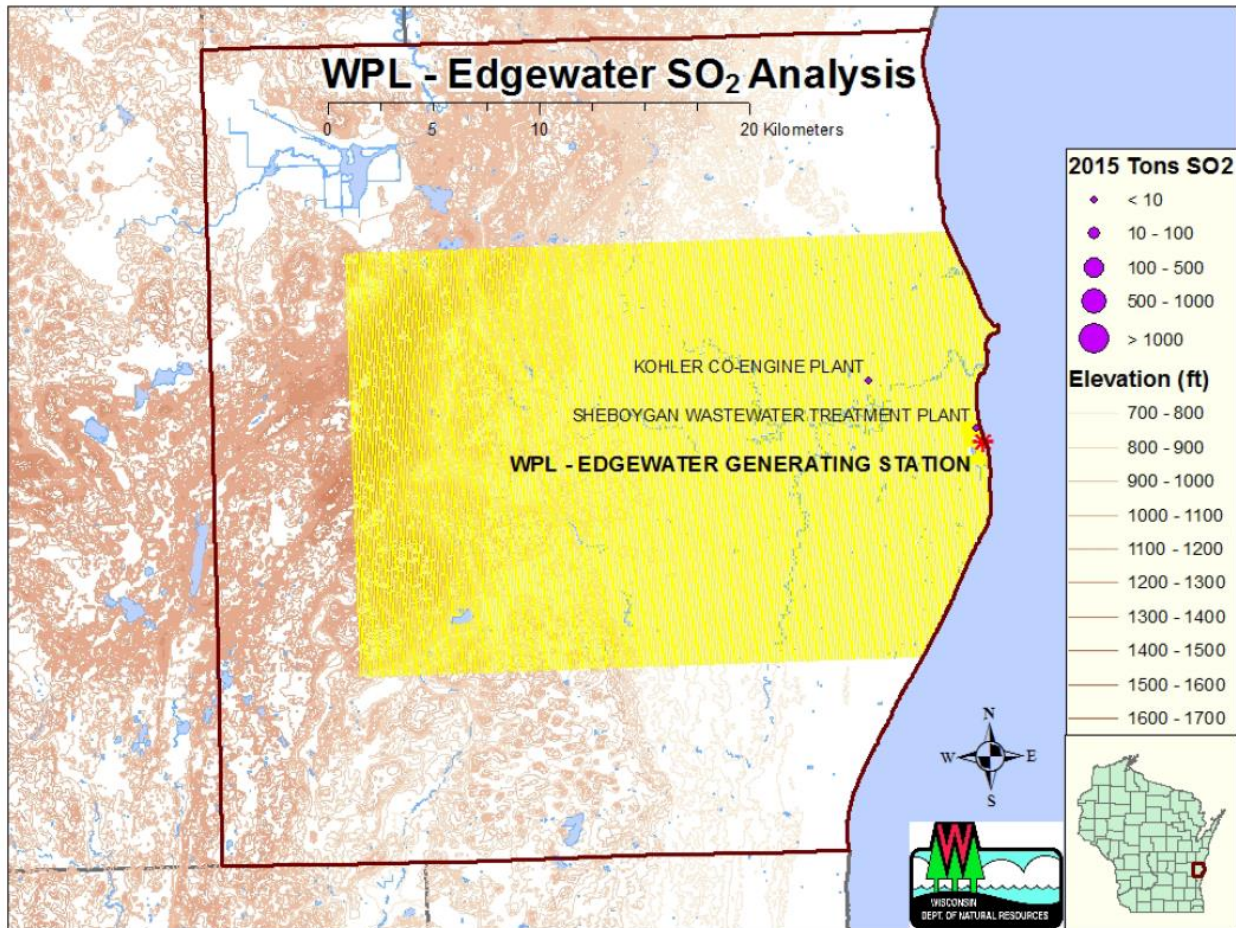
The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered one modeling assessment from the state and no assessments from other parties.

4.1.2. *Modeling Analysis Provided by the State*

4.1.2.1. *Model Selection and Modeling Components*

The EPA's Modeling TAD notes that for area designations under the 2010 SO₂ NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:
- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor

- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The state used AERMOD version 16216. The current regulatory version of AERMOD is 16216r. This version was released on January 17, 2017. The previous version (16216) was released on December 20, 2016. The modeling for this area was completed prior to the release of AERMOD 1626r. The results of this modeling are not expected to significantly differ had this modeling effort used 16216r instead of 16216. The modeling for this area included the use of the non-default regulatory option ADJ_U* which is a surface friction velocity option in the model version 16216. This regulatory option is appropriate when used without site-specific turbulence data, which is the case with the modeling conducted here. A more detailed discussion of the state's approach to the individual components of this modeling effort is provided in the corresponding discussion that follows, as appropriate.

4.1.2.2. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the determination of whether a source is in an "urban" or "rural" area is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is also important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the state determined that it was most appropriate to run the model in rural mode. The area around WPL-Edgewater consists primarily of water (Lake Michigan), commercial property, residences, and the Sheboygan Wastewater Treatment Plant (WWTP). Using the Auer[11] methodology as referenced in EPA's *Guideline on Air Quality Models (40 CFR Part 51, Appendix W, USEPA, December 2016)*, the state assessment of the land use around WPL-Edgewater showed that less than 50% of the land area within 3 kilometers is industrial, commercial, or dense residential. Therefore, the state selected rural dispersion coefficients to be used in AERMOD. The EPA agrees with the rural characterization of this modeled area as based on the Auer methodology.

4.1.2.3. Modeling Parameter: Area of Analysis (Receptor Grid)

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

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[11] Auer, Jr., A.H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies. *Journal of Applied Meteorology,* 17(5): 636–643.

The source of SO_2 emissions subject to the DRR in this area is described in the introduction to this section. For the Sheboygan County area, the state has included two other emitters of SO_2 within 10 km of WPL-Edgewater and the receptor grid was extended to 35 km west of WPL-Edgewater due to the higher terrain in western Sheboygan County. The state determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. In addition to WPL-Edgewater, the other emitters of SO_2 included in the area of analysis are the Sheboygan Wastewater Treatment Plant (WWTP) and the Kohler Company Engine Plant. No other sources beyond 10 km (35 km to the west) were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis. The EPA finds acceptable the state's determination as explained in more detail below.

The receptor grid spacing for the area of analysis chosen by the state is as follows:

- 50-meter spacing to 1,000 meters from the stacks
- 100-meter spacing to 10 kilometers
- Due to the higher terrain in western Sheboygan County, additional 100-meter spaced points were placed extending to 35 km west of the facility

The receptor network contained 59,076 receptors, and the network covered the central portion of Sheboygan County from Lake Michigan to the east and 35 km from WPL-Edgewater to the west.

Figure 6, included in the state's recommendation, shows the state's chosen area of analysis and the receptor grid surrounding the WPL-Edgewater facility. Figure 7 also shows the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the state removed receptors located over waterbodies, including Lake Michigan. However, potentially inconsistent with the Modeling TAD, the state removed receptors located inside the fence line of WPL-Edgewater and inside the fence line of the Sheboygan WWTP. Receptors inside the fence line of the Sheboygan WWTP are ambient air with respect to WPL-Edgewater. The maximum SO_2 concentration in the modeled area is well away from the Sheboygan WWTP (Figure 10), and the concentration gradients in the modeled area are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the Sheboygan WWTP fence line would not have shown SO_2 violations attributable to WPL-Edgewater. Additionally, with respect to the exclusion of receptors inside the WPL-Edgewater fence line, the concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the WPL-Edgewater fence line would not have shown SO_2 violations. Therefore, despite the potential inconsistency with the Modeling TAD, the EPA finds that the removal of these receptors does not prevent us from being able to use these technical data and modeling results to fully assess air quality in the modeled area of analysis and therefore make an accurate designation for this area.

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Figure 7. Receptor Grid for the Sheboygan County Area

4.1.2.4.   Modeling Parameter: Source Characterization

Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building downwash (if warranted), and the use of actual stack heights with actual emissions or following GEP policy with allowable emissions.

The state explicitly included WPL-Edgewater and the Sheboygan WWTP in the modeling analysis. The state excluded the Kohler Company Engine Plant for the reasons described as follows. The Kohler Company Engine Plant, located 6 kilometers northwest of WPL-Edgewater, manufactures engines ranging in size from 23-40 horsepower. These small engines are tested while using natural gas, propane, or unleaded gasoline. The reported SO_2 emissions in 2015 were approximately 0.7 tons for the facility. The state indicated that regulatory dispersion modeling for the Kohler Engine Plant showed that maximum modeled impacts are close to the facility, not in the vicinity of WPL-Edgewater. Due to the amount of emissions and the distance between the Kohler Engine Plant and WPL-Edgewater, the state assumed the impact of the Kohler Engine SO_2 emissions to be included in the background concentration. The EPA finds acceptable the state's determination and reasoning for excluding this source from the modeling analysis.

With the exception of the removal of the receptors within the fence lines and other deviations explained in more detail below, the state characterized WPL-Edgewater and the Sheboygan WWTP within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions, with the exception of WPL-Edgewater Unit 5. For this emission unit, the state used the actual stack

height (167.03 meters) in conjunction with allowable emissions.[12] The state also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM version 04274 was used to assist in addressing building downwash.

4.1.2.5.   Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent three years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted potential to emit (PTE), also referred to as allowable emissions rate, that is federally enforceable and effective.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent three calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, the state included WPL-Edgewater and the Sheboygan WWTP to explicitly model. For this area of analysis, the state has opted to use a hybrid approach, where emissions from the Sheboygan WWTP are expressed as actual emissions, and those from WPL-Edgewater are expressed as actual emissions from Unit 4 and allowable emissions from Unit 5. The facilities in the state's modeling analysis and their reported annual actual SO_2 emissions from 2013 to 2015 are summarized in Table 6. A description of how the state obtained hourly emission rates is given below this table.

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[12] The Modeling TAD recommends that allowable emissions be modeled with the lesser of actual stack height or allowable good engineering practice (GEP) stack height. The EPA has confirmed that the actual stack height (167.03 meters) for the exhaust stack associated with WPL−Edgewater Unit 5 is lower than the height that could be considered GEP (175.67 meters) for this stack.

Table 6. Actual SO$_2$ Emissions Between 2013 – 2015 from Facilities in the Area of Analysis for the Sheboygan County Area

Facility Name	SO$_2$ Emissions (TPY)		
	2013	2014	2015
WPL-Edgewater	13,760.27	10,665.44	10,619.36
Sheboygan WWTP	3.77	3.67	No SO$_2$ emissions reported
Total Emissions from All Explicitly Modeled Facilities in the Area of Analysis	13,760.27	10,665.44	10,619.36

For WPL-Edgewater Unit 4, the state obtained actual hourly emissions from CEMS data, which reflect actual hourly operation for the period 2013-2015, with emission rate, exit gas velocity, and exit gas temperature entered for each hour. The EPA confirmed that the sum of the hourly emissions used in the model HOUREMIS file is approximately equal to the annual emissions reported for this unit.

For WPL-Edgewater Unit 5, the state calculated allowable emissions. Since the applicable limit was based on a 30-day average, the state then applied an adjustment factor to determine a comparably stringent 1-hour value to use in its modeling analysis. The federally enforceable emission limit (Construction Permit 16-POY-079) for WPL-Edgewater Unit 5 is 0.075 lbs/MMBTU on a 30-day rolling average basis. To estimate a comparable hourly emission rate, the state used the method outlined in Appendix C of EPA's April 2014 Guidance for 1-Hour SO$_2$ Nonattainment Area SIP Submissions. The state determined the units at the Columbia Energy Center (WPL-Columbia) in Columbia County, Wisconsin, are comparable to WPL-Edgewater Unit 5. Both Units 1 and 2 at WPL-Columbia are pulverized PRB coal, tangentially fired, dry bottom subcritical boilers, with dry flue gas desulfurization systems installed in the mid-1970s. WPL partially owns and operates WPL-Columbia. The two coal units at WPL-Columbia are comparable in size and age to Unit 5 at WPL-Edgewater, and both WPL-Columbia units have limitations on their SO$_2$ emissions identical to Edgewater. Both WPL-Columbia units also have the same type of SO$_2$ emission control as WPL-Edgewater Unit 5 and both WPL-Columbia units have been meeting the emission limitation since January 1, 2015, or earlier. Given these similarities, the EPA agrees with the state's determination that the units at WPL-Columbia are comparable to WPL-Edgewater Unit 5. From the 2015 emission data captured on the CEMS at WPL-Columbia, the state divided the 99th percentile of the hourly mass (pounds) value by the 99th percentile of the 30-day average hourly mass (pounds) value. The state calculated the ratios for each unit at WPL-Columbia separately and determined the higher ratio to be 5. The state multiplied the WPL-Edgewater Unit 5 30-day emission limit of 0.075 lbs/MMBTU by 5, which resulted in a maximum hourly emission rate estimate of 0.375 lbs/MMBTU. The state used this hourly emission rate of 0.375 lbs/MMBTU for WPL-Edgewater Unit 5 in its modeling analysis. While the EPA in most cases finds less adjustment to be appropriate, this adjustment factor should provide a conservative (i.e. slight overestimation of emissions) assessment of whether WPL-Edgewater Unit 5, in conjunction with the other emissions units at WPSC-Weston, is contributing to a modeled violation of the 2010 SO$_2$ NAAQS.

WPL-Edgewater Unit 3 was permanently shut down at the end of December 2015 (Consent Decree 13-cv-266), therefore the allowable emissions from this unit are zero. There are no other SO_2 emitting sources at WPL-Edgewater other than the two coal-fired boilers, Unit 4 and Unit 5.

For the Sheboygan WWTP the state calculated hourly rates for each regularly operated unit (including six natural gas, digester gas, and/or fuel oil-fired boilers/furnaces) by dividing the yearly reported mass emissions over the 2013-2015 period, by the reported hours of operation in each year 2013, 2014, and 2015, then averaging the hourly rates by stack. The SO_2 emissions from the Sheboygan WWTP are relatively small including 3.77 tons reported in 2014, 3.67 tons reported in 2015, and no SO_2 emissions reported in 2016 (perhaps because Wisconsin only requires sources to report SO_2 emission above 5 tpy as per Wisconsin rule NR 438). Therefore, despite the deviation from the TAD, the EPA finds Wisconsin's method of representing the SO_2 emissions from the Sheboygan WWTP acceptable for use in its modeling analysis.

4.1.2.6.   Modeling Parameter: Meteorology and Surface Characteristics
As noted in the Modeling TAD, the most recent three years of meteorological data (concurrent with the most recent three years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration (FAA), and military stations.

For the area of analysis for the Sheboygan County area, the state selected the surface meteorology from Sheboygan County Memorial Airport (KSBM) and coincident upper air observations from Green Bay, Wisconsin, as best representative of meteorological conditions within the area of analysis. The instrumentation tower at KSBM is 13 kilometers northwest of WPL-Edgewater and is the closest station that records wind speed and direction each minute. KSBM is west of the City of Sheboygan and is surrounded by small farm fields and wetlands. The area is effected by the lake breeze circulation developed by Lake Michigan, and the state has determined that with no geographic features in between WPL-Edgewater and the airport, the wind patterns will be similar between the sites.

Following the methods described in the AERMOD Implementation Guide, the state generated surface characteristics around KSBM using AERSURFACE version 13016. Specifically, the state derived snow cover for each month during the period 2013-2015 from National Snow Analyses maps from the National Operational Hydrologic Remote Sensing Center. The state ran AERSURFACE for both snow and no-snow conditions. The state adjusted the albedo, Bowen ratio, and surface roughness based on the number of days with snow cover during each month. As detailed in the AERMOD Implementation Guide, the state based soil moisture conditions for each meteorological data year on the monthly Palmer Drought Severity Index for the area as obtained from the National Centers for Environmental Information.

In the figure below, generated by the EPA, the location of this NWS station is shown relative to the area of analysis.
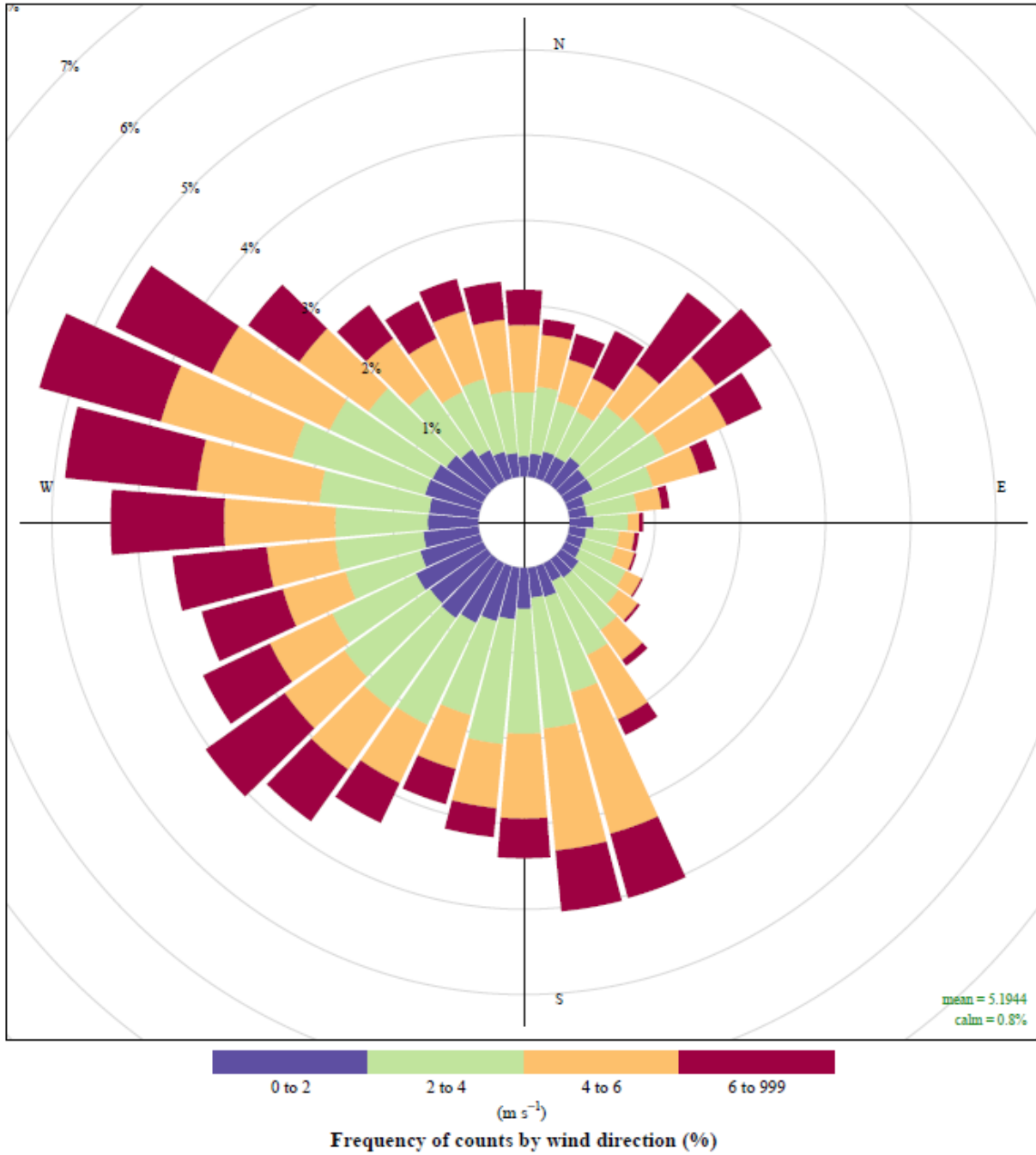
Figure 8. NWS station in the Sheboygan County Area
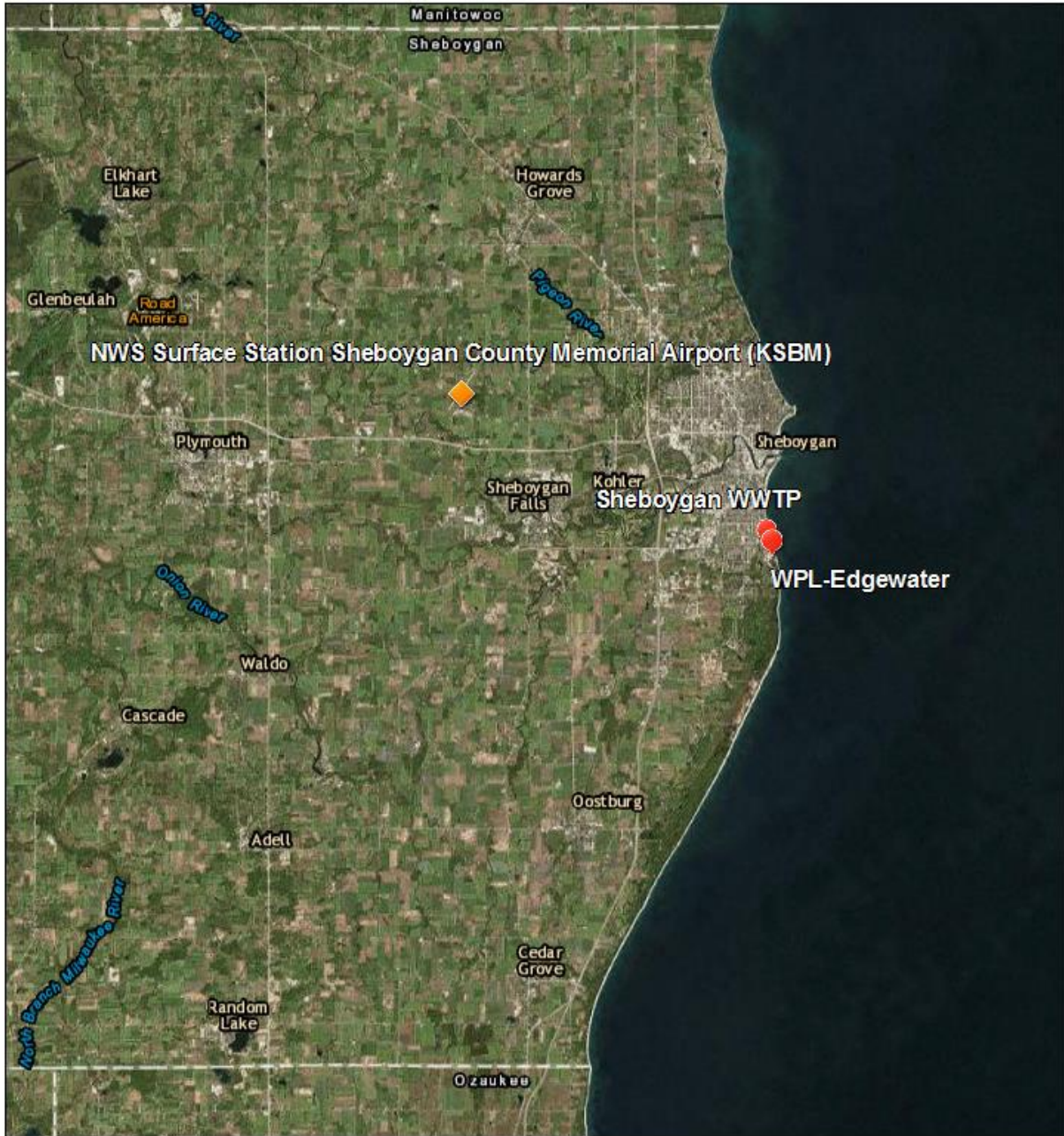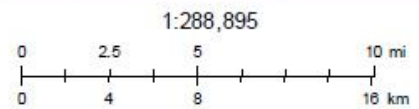
In Figure 9, depicting the 3-year surface wind rose for KSBM, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Figure 9 shows that winds are most prevalent from the west to northwest. However, wind appears likely from any direction.

Figure 9. Sheboygan County Cumulative Annual Wind Rose for Years 2013 – 2015

Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with AERMET version 16216. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The state followed the methodology and settings presented in EPA's AERMOD Implementation Guide in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE version 13016 to best represent surface characteristics. Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 2-minute average speed and direction reported each minute was provided from KSBM, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE version 15272. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the state set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA finds that the meteorological data used in this assessment is adequately representative of the weather conditions in the area.

4.1.2.7. Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The terrain in the area of analysis is generally flat, except in the western portion of the county (approximately 30 kilometers west of the City of Sheboygan) where local relief is 500-600 feet above the elevation of Lake Michigan. To account for these terrain changes, the AERMAP version 11103 terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the 1999 USGS National Elevation Dataset. The EPA finds that Wisconsin has suitably represented terrain in the area of analysis.

4.1.2.8.   Modeling Parameter: Background Concentrations of SO$_2$

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO$_2$ that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state chose the tier 2 approach using the Horicon (Dodge County) monitor, which is located approximately 50 kilometers southwest of the facility. Other than WPL-Edgewater, there are no sources with SO$_2$ emissions greater than 100 tons per year within 50 kilometers of the Horicon monitor. The state indicated its use of the Modeling TAD which references calculating concentrations by hour of day and season as noted in the earlier March 1, 2011 memorandum, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO$_2$ Ambient Air Quality Standard*. The state indicated that as per the Modeling TAD, when calculating the hour-of-day and season values, the selected value should represent the ranked percentile of the standard; however, the March 2011 *Clarification* memo also discusses calculating concentrations by hour-of-day and month, but using a higher ranked value such as the maximum in each period indicating, "for more detailed temporal pairing, such as season by hour-of-day and day-of-week or month by hour-of-day, the 1st-highest values from the distribution for each temporal combination should be used." Wisconsin decided to use the maximum 1-hour SO$_2$ concentration observed at the Horicon monitor for each hour of day for each month of the year over the 2013-2015 time-period. The EPA considers this to be comparable to the method outlined in the Modeling TAD, since it is more conservative (i.e. errs on the side of overestimating the background concentrations by taking the maximum 1-hour SO$_2$ concentrations rather than the 99th percentile values), and, therefore, finds this approach to be acceptable for use in Wisconsin's modeling analysis. The background concentrations for this area of analysis were determined by the state to vary from 1.4 micrograms per cubic meter (µg/m^3), equivalent to 0.53 ppb when expressed in 2 significant figures[13], to 14.1 µg/m^3 (5.4 ppb).

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[13] The SO$_2$ NAAQS level is expressed in ppb but AERMOD gives results in µg/m^3. The conversion factor for SO$_2$ (at the standard conditions applied in the ambient SO$_2$ reference method) is 1ppb = approximately 2.619 µg/m^3.

4.1.2.9. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Sheboygan County area of analysis are summarized below in Table 7.

Table 7. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Sheboygan County Area

Input Parameter	Value
AERMOD Version	16216 (with ADJ_U*)
Dispersion Characteristics	Rural
Modeled Sources	2
Modeled Stacks	8
Modeled Structures	51
Modeled Fence Lines	2
Total receptors	59,076
Emissions Type	Hybrid
Emissions Years	2013−2015 (actuals) Federally enforceable limit effective date of January 1, 2017, for WPL-Edgewater Unit 5 (Construction Permit 16-POY-079)
Meteorology Years	2013−2015
NWS Station for Surface Meteorology	Sheboygan County Memorial Airport (KSBM)
NWS Station Upper Air Meteorology	Green Bay, Wisconsin
NWS Station for Calculating Surface Characteristics	Sheboygan County Memorial Airport (KSBM)
Methodology for Calculating Background SO_2 Concentration	2013−2015 Horicon (Dodge County) SO_2 Monitor AQS ID 55-027-0001
Calculated Background SO_2 Concentration	1.4−14.1 $\mu g/m^3$

The results presented below in Table 8 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 8. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO2 Concentration Averaged Over Three Years for the Area of Analysis for the Sheboygan County Area

Averaging Period	Data Period	Receptor Location UTM zone 16		99th percentile daily maximum 1-hour SO2 Concentration ($\mu g/m^3$)	
		UTM Easting (m)	UTM Northing (m)	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013−2015	440600	4841800	87.5	196.4*

*Equivalent to the 2010 SO2 NAAQS of 75 ppb using a 2.619 $\mu g/m^3$ conversion factor

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 87.5 $\mu g/m^3$, equivalent to 33.4 ppb. This modeled concentration includes the background concentration of SO2, and is based on a mixture of actual and PTE emissions from the facilities. Figure 10 below indicates that the predicted value occurred off property, approximately 3.2 kilometers northwest of WPL-Edgewater in a commercial area.

Figure 10. Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Sheboygan County Area
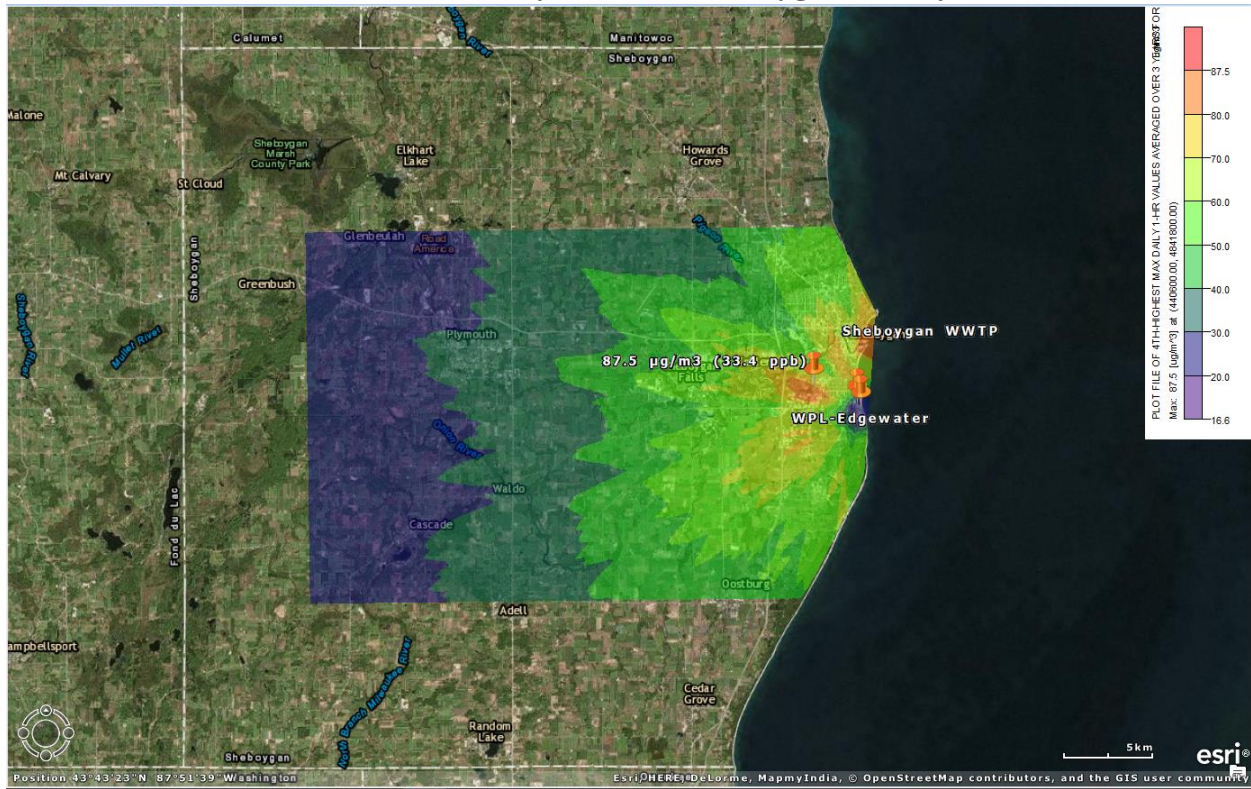
The modeling submitted by the state indicates that the 1-hour SO₂ NAAQS is not violated at the receptor with the highest modeled concentration.

4.2. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Sheboygan County Area

These factors have been incorporated into the air quality modeling efforts and results discussed above. The EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the modeling.

4.3. Jurisdictional Boundaries in the Sheboygan County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Sheboygan County. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

4.4. The EPA's Assessment of the Available Information for the Sheboygan County Area

The most reliable evidence regarding air quality with respect to SO_2 pollution in Sheboygan County is Wisconsin's modeling analysis, which uses detailed information on SO_2 emissions, meteorology, and topography in general accordance with EPA's Modeling TAD, thereby obtaining a reliable assessment of air quality in the area. In instances where Wisconsin's modeling analysis deviates from the TAD, the EPA evaluated the deviations for reasonableness and drew the following conclusions.

In terms of emissions, Wisconsin has appropriately considered the federally enforceable limit on WPL-Edgewater Unit 5 and appropriately adjusted its 30-day limit to a comparably stringent 1-hour limit as per the Appendix C of EPA's April 2014 Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions. Wisconsin underestimated the actual emissions from the nearby Sheboygan WWTP as compared to the reported actual emissions for this source; however, the SO_2 emissions from the Sheboygan WWTP are relatively small such that the EPA finds the discrepancy to be inconsequential. Therefore, despite the deviation from the Modeling TAD, EPA finds acceptable Wisconsin's method of representing the Sheboygan WWTP emissions in its modeling analysis.

In terms of receptor placement, Wisconsin deviated from the Modeling TAD by removing receptors located inside the fence line of WPL-Edgewater and inside the fence line of the Sheboygan WWTP. Receptors inside the fence line of the Sheboygan WWTP are ambient air with respect to WPL-Edgewater. The maximum SO_2 concentration in the modeled area is well away from the Sheboygan WWTP (Figure 10), and the concentration gradients in the modeled area are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the Sheboygan WWTP fence line would not have shown SO_2 violations attributable to WPL-Edgewater. Additionally, with respect to the exclusion of receptors inside the WPL-Edgewater fence line, the concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the WPL-Edgewater fence line would not have shown SO_2 violations. Therefore, despite the inconsistency with the Modeling TAD, the EPA finds that the removal of these receptors does not prevent us from being able to use these technical data and modeling results to fully assess air quality in the modeled area of analysis and therefore make an accurate designation for this area.

For the background SO_2 concentration, Wisconsin used a method that deviates from the Modeling TAD, but the EPA considers Wisconsin's method acceptable, since it is more conservative (i.e. errs on the side of overestimating the background concentrations by taking the maximum 1-hour SO_2 concentrations rather than the 99th percentile values) as described in detail above.

4.5. Summary of Our Intended Designation for the Sheboygan County Area

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 WPL-Edgewater, along with the remainder of Sheboygan County, as unclassifiable/attainment for the 2010 SO_2

NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined the area (i) meets the 2010 SO$_2$ NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the EPA intends to designate the entirety of Sheboygan County as unclassifiable/attainment. The EPA is basing this conclusion predominantly on the modeling analysis provided by Wisconsin, which demonstrates that the area near WPL-Edgewater is attaining the SO$_2$ standard. This conclusion is also based on a finding that no other SO$_2$ sources not explicitly included in or intentionally excluded from the modeling analysis, as described in detail above, are located in or near Sheboygan County, such that Wisconsin's analysis may be considered to demonstrate that no violations are occurring anywhere in Sheboygan County nor is there any indication of contribution to existing nonattainment areas.

5. Technical Analysis for the Walworth County Area

The EPA must designate the Walworth County area by December 31, 2017, because the area has not been previously designated and Wisconsin has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in Walworth County.

5.1.1. Introduction

This section presents Wisconsin's air quality modeling information for Walworth County, which includes USG Interiors, LLC-Walworth (USG-Walworth). This area will be referred to as "the Walworth County area" within this section. The USG-Walworth facility does not emit 2,000 tons or more annually, but was added to the SO_2 DRR Source list by action of the EPA in a letter to Wisconsin dated April 12, 2016, since the EPA conducted a 2014 modeling analysis for enforcement purposes which indicates a modeled violation of the 2010 SO_2 NAAQS.

Wisconsin adopted on January 31, 2017, Wisconsin Administrative Order AM-16-01, subsequently referred to as "AM-16-01", with a compliance date of October 1, 2017, and submitted it to EPA on January 31, 2017, (supplemented on March 20, 2017) for incorporation into Wisconsin's SIP. AM-16-01 imposes on USG-Walworth an SO_2 emission limit on the mineral wool production process in conjunction with a minimum cupola stack flue gas flow rate and an increased cupola stack height. Wisconsin's assessment and characterization of the air quality impacts from the USG-Walworth facility that may have a potential impact in the area where the 2010 SO_2 NAAQS may be exceeded, was performed using air dispersion modeling software, i.e., AERMOD, and AM-16-01 allowable emissions. The EPA has reviewed Wisconsin's modeling including the AM-16-01 requirements for USG-Walworth and agrees that the state's modeling demonstrates attainment. Additional reasoning for this conclusion is explained in a later section, after all the available information is presented. The EPA recently approved AM-16-01 into the Wisconsin SIP, thereby making the requirements of AM-16-01 federally enforceable, via a direct final rulemaking (82 FR 31458). This direct final rule will be effective September 5, 2017. However, since AM-16-01 has a compliance date of October 1, 2017, the EPA cannot consider the prospective impact of these requirements. The EPA has 2014 EPA enforcement modeling for USG-Walworth that indicates (in absence of the AM-16-01 requirements) a violation of the standard. Since the AM-16-01 requirements are not currently in force and EPA enforcement modeling indicates that current air quality in this area is in violation of the 2010 SO_2 NAAQS, EPA intends to conditionally designate Walworth County as nonattainment. However, since the AM-16-01 requirements will be in force before we take final action on the designation for the USG-Walworth area (which will be after October 1, 2017), the EPA anticipates designating the area unclassifiable/attainment in a final action by December 31, 2017.

The area that the state has assessed via air quality modeling is located in Walworth County. As seen in Figure 11 below, the USG-Walworth facility is located in the Village of Walworth in southern Walworth County, Wisconsin, bordering the state of Illinois. Walworth is located in south central Wisconsin approximately 90 kilometers southeast of Madison, Wisconsin.

Also included in the figure is Advanced Disposal Services Mallard Ridge Landfill (Mallard Ridge) and other nearby facilities.

Figure 11. Map of the Walworth County Area Addressing USG-Walworth
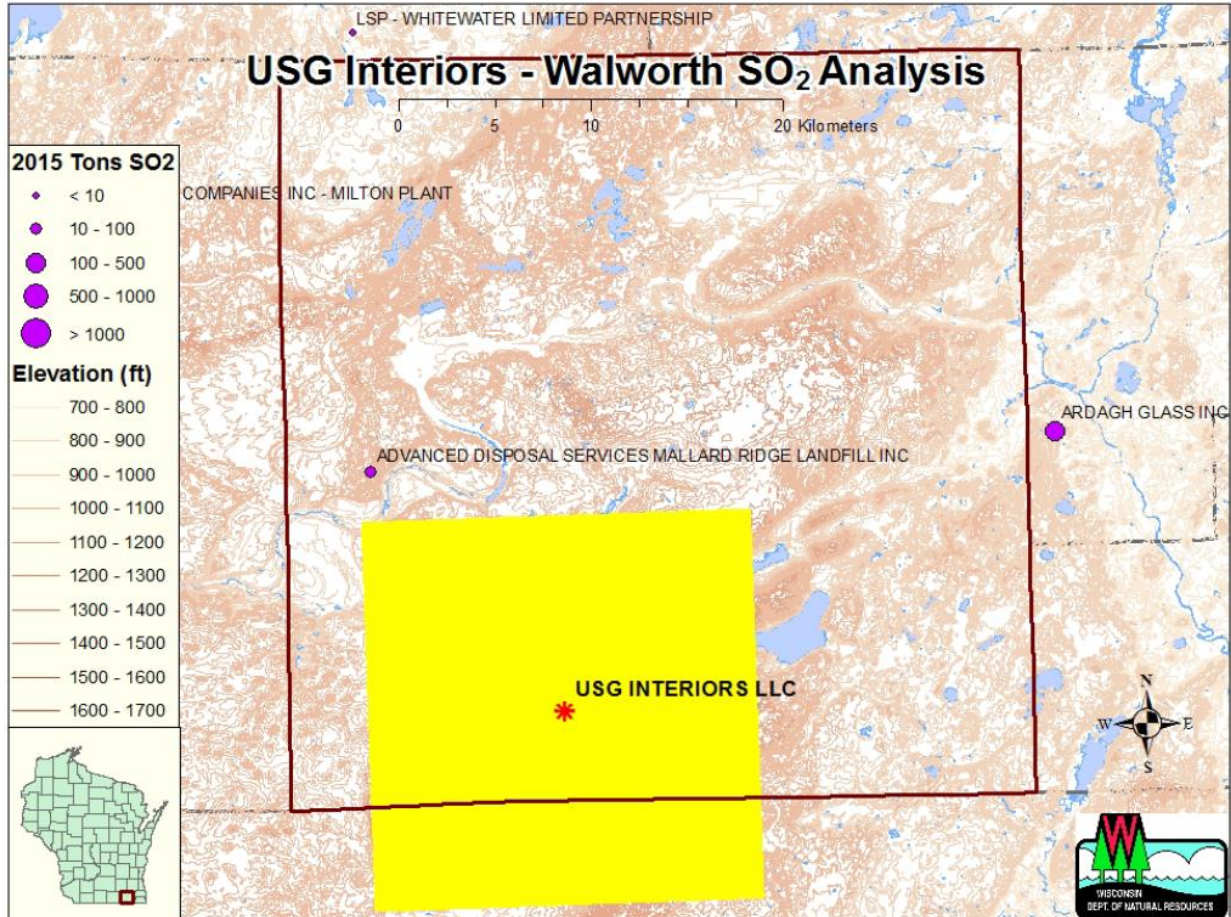
The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered one modeling assessment from the state. The EPA conducted in 2014 a modeling analysis of USG-Walworth for enforcement purposes. The EPA's 2014 enforcement modeling indicates a violation of the 2010 SO_2 NAAQS. For this reason, USG-Walworth was added to the SO_2 DRR Source list by action of the EPA in a letter to Wisconsin dated April 12, 2016. Wisconsin's modeling analysis and the EPA's 2014 enforcement modeling analysis are detailed below.

5.1.2. Modeling Analysis Provided by the State

5.1.2.1.   Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:
- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The state initially used AERMOD version 16216. The current regulatory version of AERMOD is 16216r. This version was released on January 17, 2017. The previous version (16216) was released on December 20, 2016. The initial modeling for this area was completed prior to the release of AERMOD 16216r. Since the resulting maximum impact of this modeling is so close to the level of the NAAQS, EPA Region 5 requested that the state re-run the modeling using 16216r. The state has indicated via email that it re-ran the modeling using AERMOD version 16216r and found no difference in the model results between the two versions, which is to be expected since the update going from version 16216 to 16216r only affected AREACIRC sources and not point sources like USG-Walworth. The modeling for this area included the use of the non-default regulatory option ADJ_U* which is a surface friction velocity option in the model. This regulatory option is appropriate when used without site-specific turbulence data, which is the case with the modeling conducted here. A more detailed discussion of the state's approach to the individual components of this modeling effort is provided in the corresponding discussion that follows, as appropriate.

5.1.2.2.   Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the determination of whether a source is in an "urban" or "rural" area is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is also important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the state determined that it was most appropriate to run the model in rural mode. The area around USG-Walworth consists primarily of residences, with some commercial property. Using the Auer[14] methodology as referenced in EPA's *Guideline on Air Quality Models (40 CFR Part 51, Appendix W, USEPA, December 2016)*, the state assessment of the land use around USG-Walworth showed that less

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[14] Auer, Jr., A.H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies. *Journal of Applied Meteorology,* 17(5): 636–643.

than 50% of the land area within 3 kilometers is industrial, commercial, or dense residential. Therefore, the state selected rural dispersion coefficients to be used in AERMOD. The EPA agrees with the state's rural characterization of this modeled area as based on the Auer methodology.

5.1.2.3.   *Modeling Parameter: Area of Analysis (Receptor Grid)*

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The source of SO_2 emissions subject to the DRR in this area is described in the introduction to this section. For the Walworth County area, the state has included one other emitter of SO_2 within 10 km of USG-Walworth in any direction. The state determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. In addition to USG-Walworth, the other emitter of SO_2 included in the area of analysis is Mallard Ridge. No other sources beyond 10 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis. The EPA finds acceptable the state's determination as explained in more detail below.

The receptor grid spacing for the area of analysis chosen by the state is as follows:

- 25-meter spacing to 700 meters from the center of the USG-Walworth facility
- 50-meter spacing to 1200 meters from the center of the USG-Walworth facility
- 100-meter spacing to 10 kilometers

The receptor network contained 44,660 receptors, and the network covered the south central portion of Walworth County, Wisconsin, extending into McHenry and Boone counties in Illinois.

Figure 11, included in the state's recommendation, shows the state's chosen area of analysis and the receptor grid surrounding the USG-Walworth facility. Figure 12 also shows the receptor grid for the area of analysis.

Figure 12. Receptor Grid for the Walworth County Area
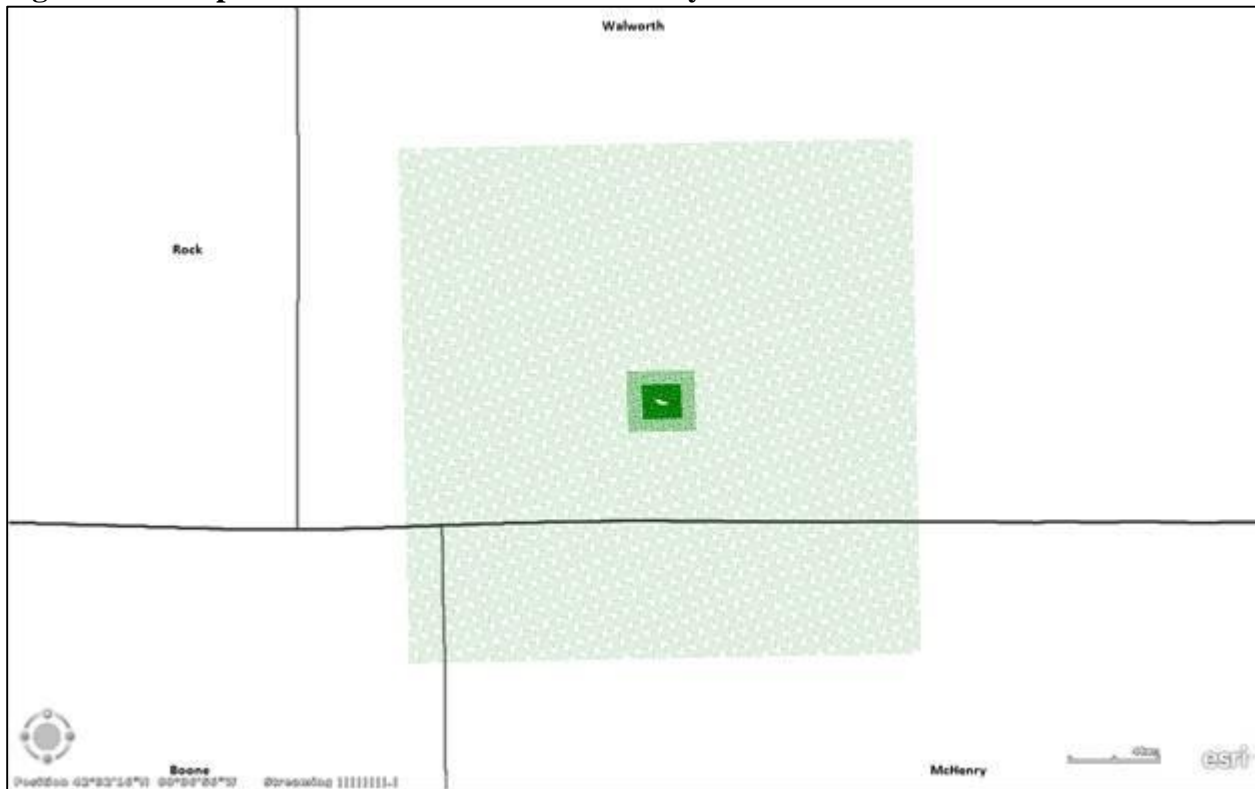
Potentially inconsistent with the Modeling TAD, the state removed receptors located inside the fence line of USG-Walworth. Figure 13, included in the state's recommendation, shows the USG-Walworth property boundary and receptors. The concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the USG-Walworth fence line would not have shown SO_2 violations. Therefore, despite the potential inconsistency with the Modeling TAD, the EPA finds that the removal of these receptors does not prevent us from being able to use these technical data and modeling results to fully assess air quality in the modeled area of analysis and therefore make an accurate designation for this area.

Figure 13. USG-Walworth Property Boundary and Receptors
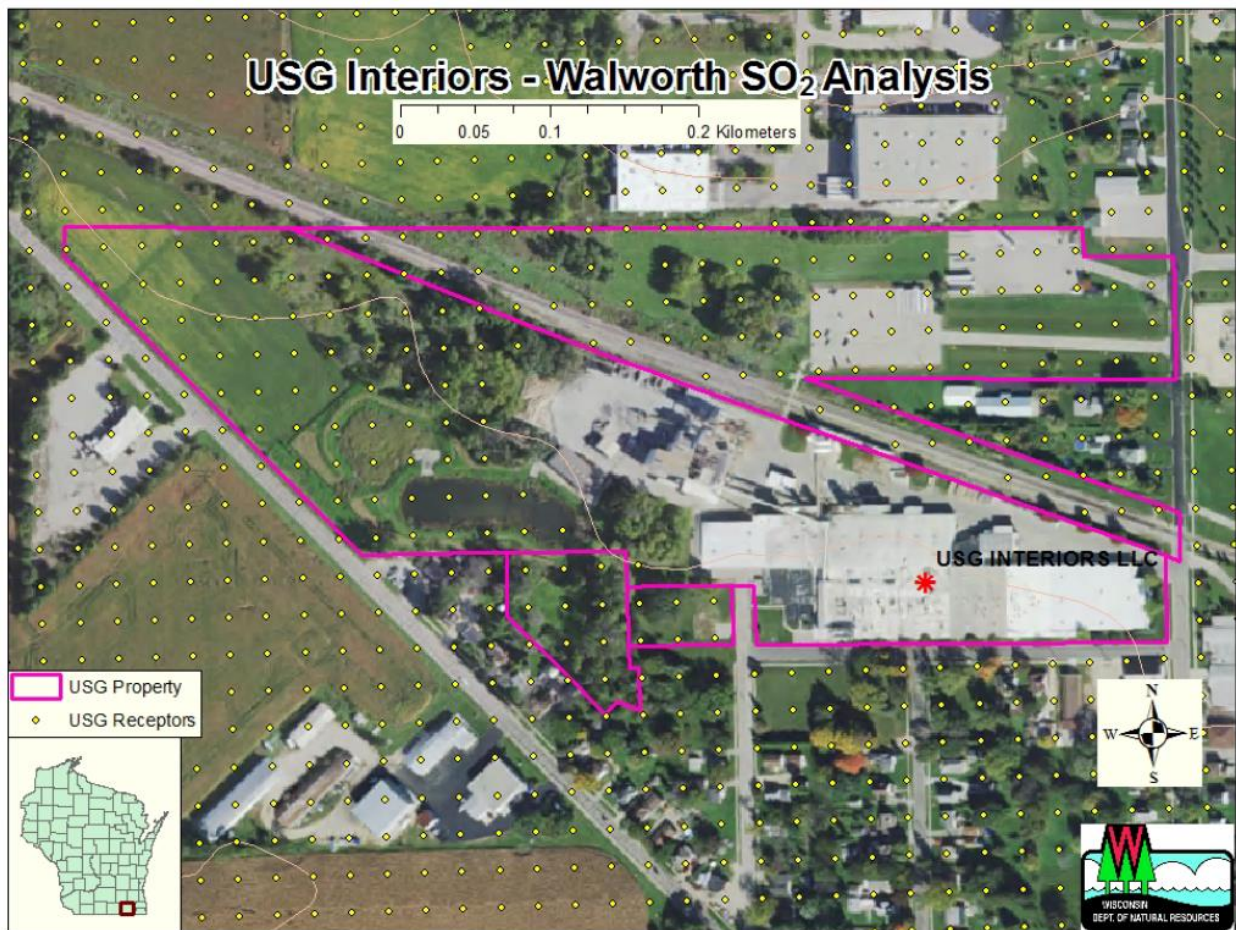
5.1.2.4.   Modeling Parameter: Source Characterization

Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building downwash (if warranted), and the use of actual stack heights with actual emissions or following GEP policy with allowable emissions.

The state explicitly included USG-Walworth in the modeling analysis. The state excluded Mallard Ridge for the following reasons. Mallard Ridge is located approximately 16 kilometers northwest of USG-Walworth. The facility reported SO_2 emissions of 19 tons in 2015 from engine and flare stacks. The state indicated that regulatory dispersion modeling showed that the maximum impact from Mallard Ridge is close to the Mallard Ridge facility. Since the impact of Mallard Ridge is not in the vicinity of USG-Walworth and the emissions are comparatively small, the state is assuming the impact of Mallard Ridge to be part of the background concentration. The EPA finds acceptable the state's determination and reasoning for excluding this source from the modeling analysis.

The state characterized USG-Walworth in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual

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emissions for the 14.3 MMBTU natural gas-fired boiler, acoustical tile dryer, and finishing/curing ovens. For the mineral wool production process (cupola stack S12 and blow chamber stacks S21, S22, S24), the state used the (future allowable) SO_2 emission limit and increased (future actual) cupola stack height[15] required by AM-16-01 with a compliance date of October 1, 2017. The state also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM version 04274 was used to assist in addressing building downwash.

5.1.2.5.   Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent three years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted potential to emit (PTE), also referred to as allowable emissions rate, that is federally enforceable and effective. In this case, the state used five years of meteorological data paired with both actual and allowable emissions.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent three calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, the state explicitly modeled USG-Walworth and no other emitters of SO_2 within 10 km in the area of analysis. The state chose to model SO_2 emissions from the mineral

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[15] The Modeling TAD recommends that allowable emissions be modeled with the lesser of actual stack height or allowable good engineering practice (GEP) stack height. The EPA has confirmed that the (future) actual stack height (53.34 meters) required by AM-16-01 with a compliance date of October 1, 2017, is lower than the height that could be considered GEP (65 meters).

wool production process at this facility using the increased stack height and allowable limit required by AM-16-01 with a compliance date of October 1, 2017. The facility in the state's modeling analysis and its associated emission rates are summarized below.

For USG-Walworth, the PTE for the mineral wool production process is listed in Table 9 and the actual emissions for the remaining units are listed in Table 10. A description of how the state obtained hourly emission rates is given below these tables.

Table 9. SO₂ Emissions based on PTE from USG-Walworth in the Walworth County Area

Emission Unit or Process	SO$_2$ Emissions (TPY, based on PTE)
Mineral wool production process	1,320.13

Table 10. SO₂ Emissions based on reported actuals from USG-Walworth in the Walworth County Area

Emission Unit or Process	SO$_2$ Emissions (TPY, based on reported actuals)
14.3 MMBTU natural gas-fired boiler	0.037
Acoustical tile dryer	0.006
Finishing/Curing Ovens	0.283

The emissions listed in the tables above in tons per year for USG-Walworth were determined based on the allowable SO$_2$ emission limit of 301.3 pounds per hour (AM-16-01) from the mineral wool production process (cupola stack S12 and blow chamber stacks S21, S22, S24) and reported actual emissions from the remaining units which include a natural gas fired boiler, an acoustical tile dryer process, and two finishing/curing ovens. In addition to the 1-hour limit of 301.3 lbs/hour in AM-16-01, Wisconsin opted to set a 30-day rolling average limit of 238.0 lbs/hour. The state relied on Appendix C of EPA's April 2014 Guidance for 1-Hour SO$_2$ Nonattainment Area SIP Submissions, which discusses the option to establish limits with averaging times up to 30 days in length, recommends that any such limit be established at a level that is comparably stringent to the 1-hour average limit, and recommends a detailed procedure for determining such a comparably stringent limit. Wisconsin used an adjustment factor of 0.79, which EPA identified in its 2014 guidance as an appropriate adjustment factor for determining equivalent emission limitation between 1-hour and 30-day rolling average timeframes for uncontrolled coal-fired boilers based on a national analysis of utility coal boiler emissions. Wisconsin followed the recommendations of the 2014 guidance in determining an appropriate level for this limit. Therefore, the EPA finds the state has applied an appropriate adjustment, yielding a 30-day rolling average emission limit that has comparable stringency to the 1-hour average limit. In AM-16-01 Wisconsin has established a two-tiered enforcement regime, in which stack tests provide 5-year assessments of compliance, tested against the 1-hour limit, and continuous emissions data, as collected via routine mass balance calculations, provide a continuous assessment of compliance, tested against the 30-day average limit.

In a submittal dated January 31, 2017, and supplemented on March 20, 2017, Wisconsin requested that the EPA include AM-16-01 into the Wisconsin SIP. AM-16-01 requires use of a taller stack and establishes a new SO_2 emission limit for the mineral wool production process at USG-Walworth with a compliance date of October 1, 2017. The EPA recently approved AM-16-01 into the Wisconsin SIP, thereby making the requirements of AM-16-01 federally enforceable, via a direct final rulemaking (82 FR 31458) effective September 5, 2017. When designating areas, the EPA does not consider anticipated future emission reductions that are not yet effective and in force. But for the AM-16-01 requirements not being effective and in force until Wisconsin's AM-16-01 compliance date of October 1, 2017, the EPA finds acceptable Wisconsin's use of these emissions inputs to its modeling analysis.

### 5.1.2.6.   Modeling Parameter: Meteorology and Surface Characteristics

As noted in the Modeling TAD, the most recent three years of meteorological data (concurrent with the most recent three years of emissions data) should be used in designations efforts. In this case, the state used five years of meteorological data and emissions. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration (FAA), and military stations.

For the area of analysis for the Walworth County area, the state selected the surface meteorology from the Dane County Regional Airport (KMSN) and coincident upper air observations from Green Bay, Wisconsin, as best representative of meteorological conditions within the area of analysis. The instrumentation tower at KMSN is northeast of Madison, Wisconsin, and 90 kilometers northwest of USG-Walworth. The state selected KMSN since it is near the relatively small city of Madison and surrounded by small farm fields and wetlands, similar to the land cover around USG-Walworth. The state chose not to use the surface meteorology from the Chicago-Rockford International Airport, which is 56 kilometers southwest of USG-Walworth, since it is near the relatively larger city of Rockford, Illinois, compared to that of Madison, Wisconsin. The state also chose not to use the surface meteorology from the Southern Wisconsin Regional Airport (KJVL), the Burlington Municipal Airport (KBUU), or the Waukesha County Airport (KUES) since none of these three airports uses the same quality of equipment as KMSN or KRFD, and since they do not report wind information by the minute, and they have high numbers of missing or calm hours.

Following the methods described in the AERMOD Implementation Guide, the state generated surface characteristics around KMSN using AERSURFACE version 13016. Specifically, the state derived snow cover for each month during the period 2011-2015 from National Snow Analyses maps from the National Operational Hydrologic Remote Sensing Center. The state ran AERSURFACE for both snow and no-snow conditions. The state adjusted the albedo, Bowen ratio, and surface roughness based on the number of days with snow cover during each month. As detailed in the AERMOD Implementation Guide, the state based soil moisture conditions for each meteorological data year on the monthly Palmer Drought Severity Index for the area as obtained from the National Centers for Environmental Information.

In Figure 14 below, generated by the EPA, the location of this NWS station is shown relative to the area of analysis.

Figure 14. NWS station near the Walworth County Area
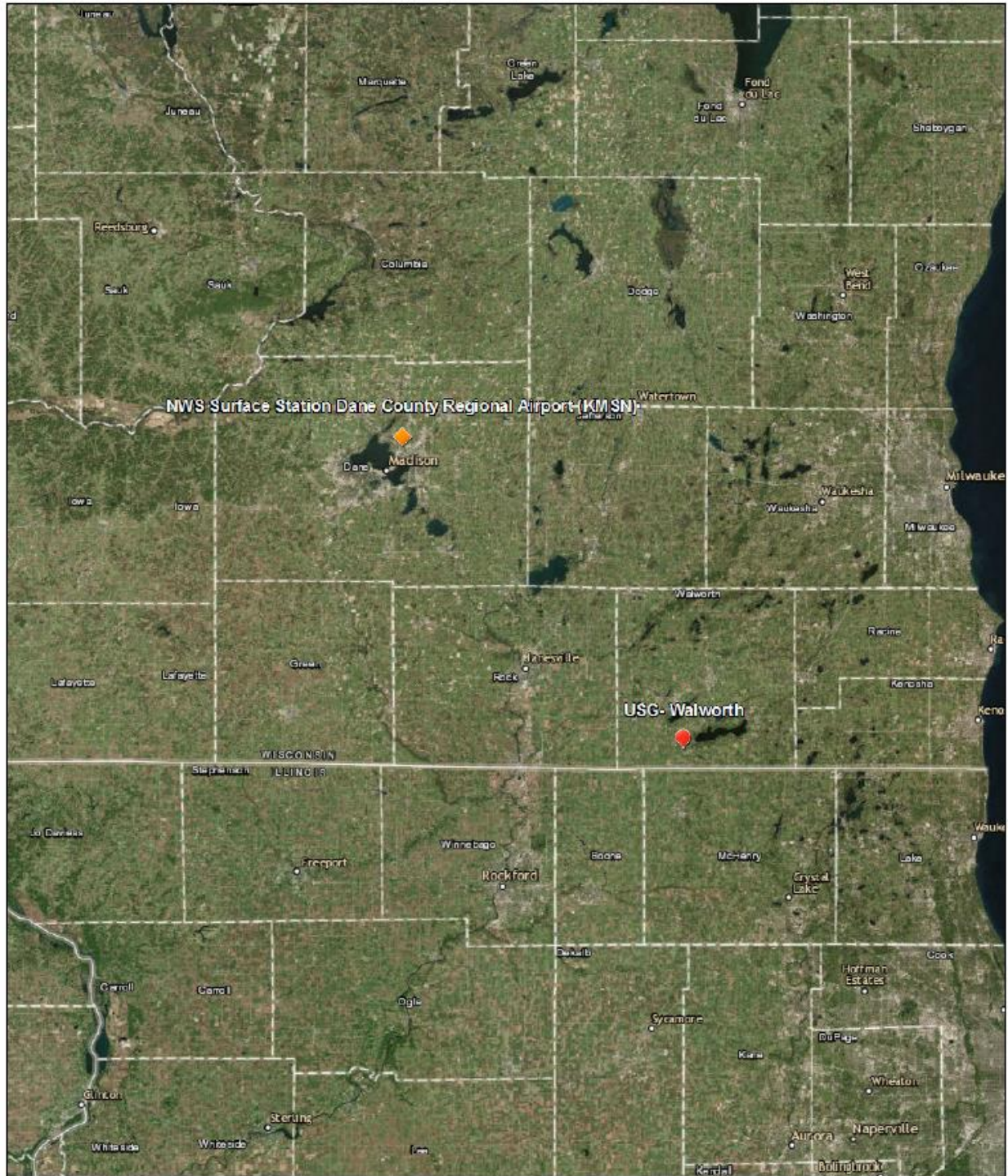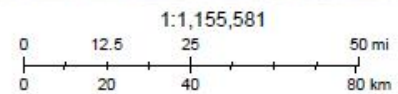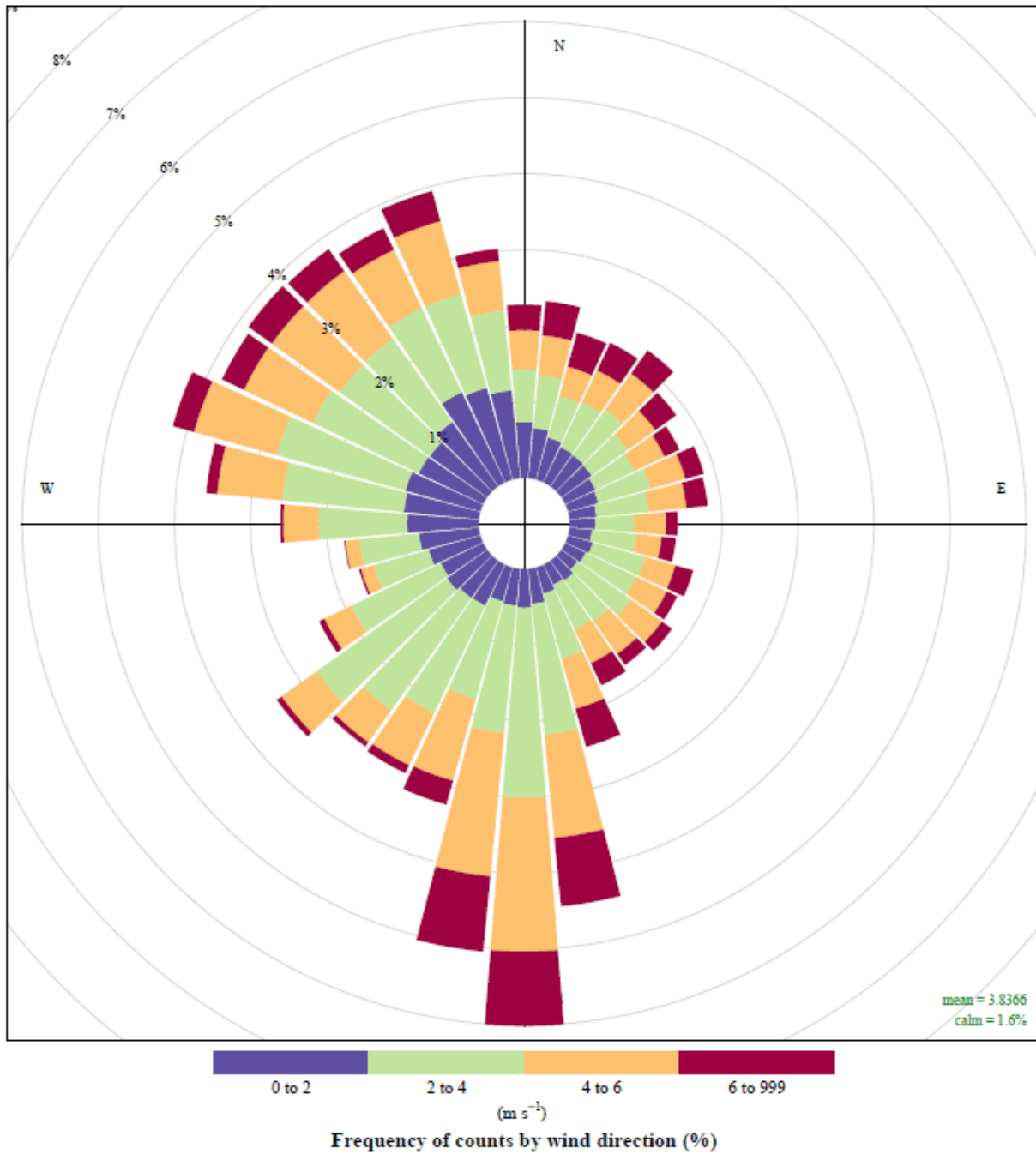
In Figure 15, depicting the 5-year surface wind rose for KMSN, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Figure 15 shows that winds are most prevalent from the south. However, wind appears likely from any direction.

Figure 15. Walworth County Cumulative Annual Wind Rose for Years 2011 – 2015

Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with AERMET version 16216. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The state followed the methodology and settings presented in EPA's AERMOD Implementation Guide in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE version 13016 to best represent surface characteristics. Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 2-minute average speed and direction reported each minute was provided from KMSN, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE version 15272. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the state set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA finds that the meteorological data used in this assessment is adequately representative of the weather conditions in the area.

5.1.2.7. *Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain*

The terrain in Walworth County is generally flat with rolling hills extending to the east and southeast with local relief of 150-200 feet above the elevation of USG-Walworth. To account for these terrain changes, the AERMAP version 11103 terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the 1999 USGS National Elevation Dataset. The EPA finds that Wisconsin has suitably represented terrain in the area of analysis.

5.1.2.8.   Modeling Parameter: Background Concentrations of SO$_2$

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO$_2$ that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state chose the tier 2 approach using the Horicon (Dodge County) monitor located 100 kilometers north of the facility. There are no sources with SO$_2$ emissions greater than 100 tons per year within 50 kilometers of the Horicon site. The state indicated its use of the Modeling TAD which references calculating concentrations by hour of day and season as noted in the earlier March 1, 2011, memorandum, *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO$_2$ Ambient Air Quality Standard*. The state indicated that as per the Modeling TAD, when calculating the hour-of-day and season values, the selected value should represent the ranked percentile of the standard; however, the March 2011 *Clarification* memo also discusses calculating concentrations by hour-of-day and month, but using a higher ranked value such as the maximum in each period indicating, indicating "for more detailed temporal pairing, such as season by hour-of-day and day-of-week or month by hour-of-day, the 1st-highest values from the distribution for each temporal combination should be used." Wisconsin decided to use the maximum 1-hour SO$_2$ concentration observed at the Horicon monitor for each hour-of-day for each month over the 2013-2015 time-period. The EPA considers this to be comparable to the method outlined in the Modeling TAD, since it is more conservative (i.e. errs on the side of overestimating the background concentrations by taking the maximum 1-hour SO$_2$ concentrations rather than the 99th percentile values), and, therefore, finds this approach to be acceptable for use in Wisconsin's modeling analysis. The background concentrations for this area of analysis were determined by the state to vary from 1.4 micrograms per cubic meter (µg/m^3), equivalent to 0.53 ppb when expressed in 2 significant figures,[16] to 14.1 µg/m^3 (5.4 ppb).

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[16] The SO$_2$ NAAQS level is expressed in ppb but AERMOD gives results in µg/m^3. The conversion factor for SO$_2$ (at the standard conditions applied in the ambient SO$_2$ reference method) is 1ppb = approximately 2.619 µg/m^3.

5.1.2.9.   Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Walworth County area of analysis are summarized below in Table 11.

Table 11. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Walworth County Area

Input Parameter	Value
AERMOD Version	16216 (with ADJ_U*)
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	17
Modeled Structures	2
Modeled Fence Lines	1
Total receptors	44,660
Emissions Type	Hybrid
Emissions Years	PTE for USG-Walworth mineral wool production process (cupola stack S12 and blow chamber stacks S21, S22, S24) based on Wisconsin Administrative Order AM-16-01 SO_2 emission limit and increased cupola stack height with compliance date of October 1, 2017 (82 FR 31458)
Meteorology Years	2011−2015
NWS Station for Surface Meteorology	Dane County Regional Airport (KMSN)
NWS Station Upper Air Meteorology	Green Bay, Wisconsin
NWS Station for Calculating Surface Characteristics	Dane County Regional Airport (KMSN)
Methodology for Calculating Background SO_2 Concentration	2011−2015 Horicon (Dodge County) SO_2 Monitor AQS ID 55-027-0001
Calculated Background SO_2 Concentration	1.4−14.1 μg/m^3

The results presented below in Table 12 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 12. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentration Averaged Over Five Years for the Area of Analysis for the Walworth County Area

| Averaging Period | Data Period | Receptor Location UTM zone 16 | | 99th percentile daily maximum 1-hour SO₂ Concentration (μg/m³) | |
		UTM Easting (m)	UTM Northing (m)	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2011−2015	368550	4710875	194.5	196.4*

*Equivalent to the 2010 SO₂ NAAQS of 75 ppb using a 2.619 μg/m³ conversion factor

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 194.5 $\mu g/m^3$, equivalent to 74.3 ppb. This modeled concentration included the background concentration of SO_2, and is based on a hybrid of actual and (future) AM-16-01 allowable emissions from the facility. Figure 16 below indicates that the predicted value occurred off property, approximately 300 meters northeast of the USG-Walworth stacks and about 100 meters north of the USG-Walworth property in a commercial/warehouse area.

Figure 16. Predicted 99th Percentile Daily Maximum 1-Hour SO2 Concentrations Averaged Over Five Years for the Area of Analysis for the Walworth County Area
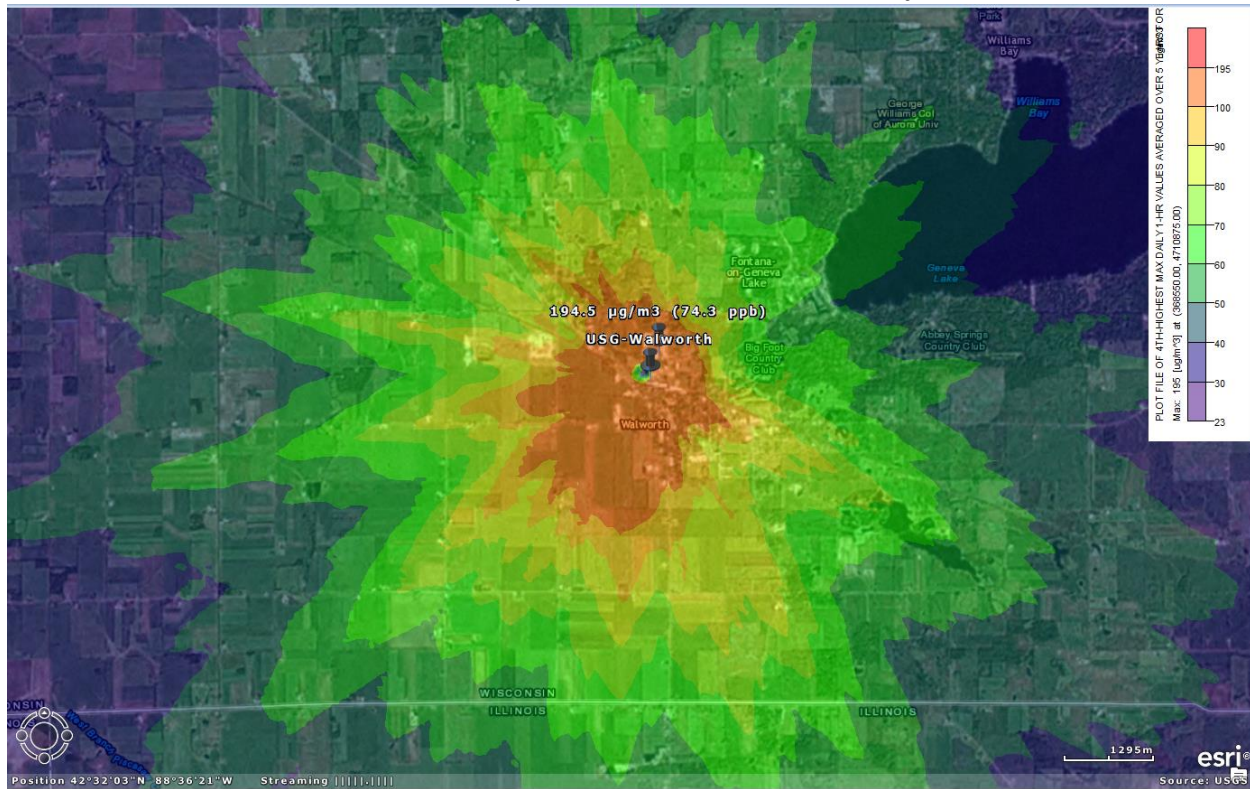
The modeling submitted by the state indicates that the 1-hour SO2 NAAQS is not violated at the receptor with the highest modeled concentration.

The EPA's assessment of the modeling information provided by the state is detailed below after first providing a summary of the EPA's 2014 enforcement modeling analysis which prompted the EPA action of adding USG-Walworth to the SO2 DRR Source list.

5.1.3. EPA's Modeling Analysis

5.1.3.1. Model Selection

The EPA conducted its 2014 enforcement modeling analysis of USG-Walworth using AERMOD version 14134. There have been three revisions to AERMOD and two revisions to AERMET since the 14134 version. The changes have mostly consisted of bug fixes and enhancements that are not expected to significantly change the concentrations produced by the 14134 version for this analysis. One change from the 14134 version of the models to the current version (16216r) is the adjusted surface friction velocity parameter (ADJ_U*) option in AERMET, which Wisconsin opted to use in its version 16216 modeling analysis of USG-Walworth described above. Had ADJ_U* been an option in version 14134 and been used for the purposes of the EPA's enforcement modeling analysis, any reduction in concentration estimates resulting from the use of this modification would likely have been relatively modest and not changed the overall

modeling result which showed a 99th percentile daily maximum 1-hour SO_2 concentration of 179.65 ppb, while the 2010 SO_2 NAAQS is 75 ppb.

5.1.3.2.   Modeling Parameter: Rural or Urban Dispersion

The EPA ran the model in rural mode based on a visual inspection of the land use surrounding the facility using satellite imagery.

5.1.3.3.   Modeling Parameter: Area of Analysis (Receptor Grid)

The EPA's receptor grid spacing is as follows:

- 25-meter spacing to about 750 meters from the center of the USG-Walworth facility
- 50-m spacing to about 1250 meters from the center of the USG-Walworth facility

The receptor network contained 4,539 receptors, and the network covered an area approximately 2500 m by 2500 m, centered on the USG-Walworth facility.

The EPA explicitly modeled USG-Walworth and no other emitters of SO_2.

5.1.3.4.   Modeling Parameter: Source Characterization, Emissions, and Background Concentrations of SO_2

For its 2014 enforcement modeling analysis, the EPA characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter, and, where appropriate, used the AERMOD component BPIPPRM version 04274 to assist in addressing building downwash. The EPA used actual stack heights in conjunction with estimated actual emissions. The EPA estimated SO_2 emissions from the mineral wool production process using a mass balance approach based on historical throughput and production information provided by USG-Walworth. This modeled emission rate is listed in the table below. The modeled emission rates for the other units at the facility (boiler, dryer, ovens) were obtained from Wisconsin. The EPA did not calculate a background SO_2 concentration for this modeling analysis.

Table 13. SO₂ Emissions from USG-Walworth in the Walworth County Area

Emission Unit or Process	SO₂ Emissions (TPY)
Mineral wool production process	1,138.49

5.1.3.5.   Modeling Parameters: Meteorology and Surface Characteristics Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The EPA used five years of meteorological data representing 2006-2010. The EPA selected the surface meteorology from the Dane County Regional Airport (KMSN) and coincident upper air

observations from Green Bay, Wisconsin, as best representative of meteorological conditions within the area of analysis. The EPA used AERMOD-ready files generated by Wisconsin as available during the time of EPA's modeling analysis using AERMET 14134, the AERSURFACE preprocessor to characterize the surface parameters (surface roughness, Bowen ratio, and albedo) in the area, and the AERMAP (version 11103) terrain preprocessor program to specify terrain elevations for all the receptors.

5.1.3.6.   *Summary of Modeling Inputs and Results*

The AERMOD modeling input parameters for the Walworth County area of analysis are summarized below in Table 14.

Table 14. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Walworth County Area

Input Parameter	Value
AERMOD Version	14134
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	18
Modeled Structures	2
Modeled Fence Lines	1
Total receptors	4,539
Emissions Type	Estimated actual emissions
Emissions Years	2006-2010
Meteorology Years	2006-2010
NWS Station for Surface Meteorology	Dane County Regional Airport (KMSN)
NWS Station Upper Air Meteorology	Green Bay, Wisconsin (KGRB)
NWS Station for Calculating Surface Characteristics	Dane County Regional Airport (KMSN)
Methodology for Calculating Background SO_2 Concentration	_
Calculated Background SO_2 Concentration	_

The results presented below in Table 15 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 15. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO$_2$ Concentration Averaged Over Five Years for the Area of Analysis for the Walworth County Area

Averaging Period	Data Period	Receptor Location UTM zone 16		99th percentile daily maximum 1-hour SO$_2$ Concentration ($\mu g/m^3$)	
		UTM Easting (m)	UTM Northing (m)	Modeled concentration (excluding background)	NAAQS Level
99th Percentile 1-Hour Average	2006-2010	368475	4710775	470.5*	196.4**

*Original 2014 EPA enforcement modeling using version 14134 produced a high-4th high value of 535.9 µg/m^3 rather than the SO$_2$ design value, which is the 99th percentile daily maximum 1-hour SO$_2$ concentration. Therefore, EPA re-ran the original 2014 enforcement modeling in 2016 keeping everything the same in the modeling analysis as described above with the exception of using AERMOD version 15181 (which was the latest version available at the time) rather than AERMOD version 14134. The resulting 99th percentile daily maximum 1-hour SO$_2$ concentration was determined to be 470.5 µg/m^3.
**Equivalent to the 2010 SO$_2$ NAAQS of 75 ppb using a 2.619 µg/m^3 conversion factor

The EPA's enforcement modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 470.5 μg/m^3, equivalent to 179.65 ppb. This modeled concentration is based on estimated actual emissions, as described above. Figure 17 below indicates that the predicted value occurred off property, approximately 200 meters north of USG-Walworth.

Figure 17. Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Five Years for the Area of Analysis for the Walworth County Area
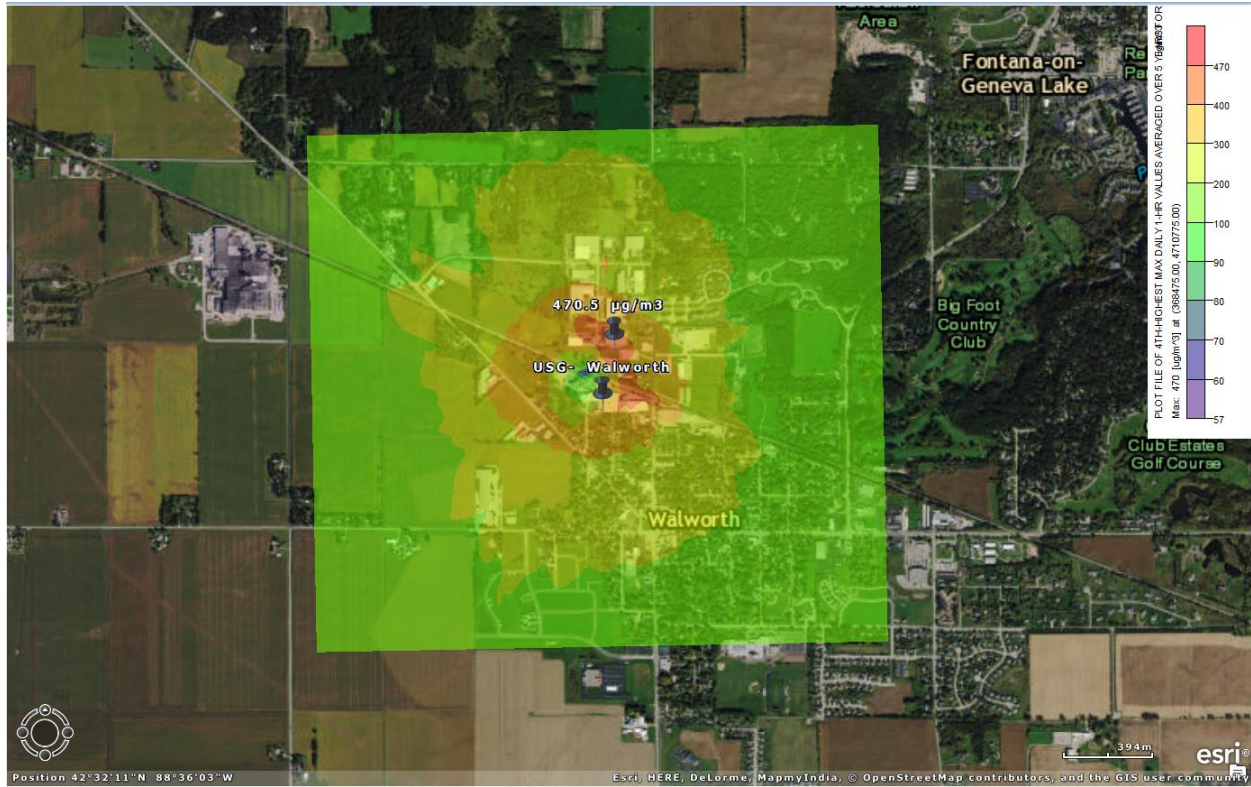
The EPA's modeling was not conducted fully in accordance with the EPA's Modeling TAD, since this modeling was conducted for EPA enforcement purposes. Nonetheless this modeling shows that the 2010 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration, which is why the EPA added USG-Walworth to the DRR list.

5.2. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Walworth County Area

These factors have been incorporated into the air quality modeling efforts and results discussed above. The EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the modeling.

5.3. Jurisdictional Boundaries in the Walworth County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Walworth County. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

5.4. The EPA's Assessment of the Available Information for the Walworth County Area

If the allowable emissions used were currently federally enforceable and effective, the most current evidence regarding air quality with respect to SO_2 pollution in Walworth County would be Wisconsin's modeling analysis, which uses (now enforceable but not yet in force) AM-16-01 requirements and detailed information on SO_2 emissions, meteorology, and topography in general accordance with EPA's Modeling TAD. The modeling would therefore be a reliable assessment of future (October 1, 2017, going forward) air quality in the area.

In instances where Wisconsin's modeling analysis deviates from the TAD, the EPA evaluated the deviations for reasonableness and drew the following conclusions.

In terms of emissions, Wisconsin has appropriately considered actual emissions for the 14.3 MMBTU natural gas-fired boiler, the acoustical tile dryer, and the finishing/curing ovens and future allowable SO_2 emissions from the mineral wool production process as required by AM-16-01 with a compliance date of October 1, 2017, and appropriately adjusted the 30-day limit to a comparably stringent 1-hour limit as per the Appendix C of EPA's April 2014 Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions.

In terms of receptor placement, Wisconsin potentially deviated from the Modeling TAD by removing receptors from within the fence line of the USG-Walworth property. The concentration gradients in the modeled area overall are such that in examining the spatial distribution of impacts, it appears that inclusion of receptors inside the USG-Walworth fence line would not have shown SO_2 violations. Therefore, despite the potential inconsistency with the Modeling TAD, the EPA finds that the removal of these receptors does not prevent us from being able to use these technical data and modeling results to fully assess air quality in the modeled area of analysis and therefore make an accurate designation for this area.

For the background SO_2 concentration, Wisconsin used a method that deviates from the Modeling TAD. The EPA considers Wisconsin's method acceptable, since it is more conservative (i.e. errs on the side of overestimating the background concentrations by taking the maximum 1-hour SO_2 concentrations rather than the 99th percentile values) as described in detail above.

5.5. Summary of Our Intended Designation for the Walworth County Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA finds that Wisconsin has demonstrated that its administrative order AM-16-01 provides for the area near USG-Walworth to attain the standard.

In a submittal dated January 31, 2017, and supplemented on March 20, 2017, Wisconsin requested that the EPA include AM-16-01 into the Wisconsin SIP. AM-16-01 requires use of a taller stack and establishes a new SO_2 emission limit for the mineral wool production process at USG-Walworth with a compliance date of October 1, 2017. The EPA recently approved AM-16-01 into the Wisconsin SIP, thereby making the requirements of AM-16-01 federally enforceable, via a direct final rulemaking (82 FR 31458) effective September 5, 2017. Wisconsin's submittal also includes AERMOD modeling to demonstrate that this limit and taller stack provides for attainment of the SO_2 NAAQS in the area of USG-Walworth. The EPA has reviewed this modeling, as described in detail above, and agrees that this limit and taller stack provide for attainment.

When designating areas, the EPA does not consider anticipated future emission reductions that are not yet effective and in force. The EPA recently approved AM-16-01 into the Wisconsin SIP via a direct final rulemaking (82 FR 31458), thereby making the requirements of AM-16-01 federally enforceable, effective September 5, 2017. However, since Wisconsin's AM-16-01 has a compliance date of October 1, 2017, the EPA cannot consider the prospective impact of these requirements. The EPA has 2014 EPA enforcement modeling for USG-Walworth that indicates (in absence of the AM-16-01 requirements) a violation of the standard. Since the AM-16-01 requirements are not currently in force and EPA enforcement modeling indicates that current air quality in this area is in violation of the 2010 SO_2 NAAQS, the EPA intends to conditionally designate Walworth County as nonattainment. Specifically, the EPA intends to designate the entirety of Walworth County as nonattainment. However, since the AM-16-01 requirements will be in force before we take final action on the designation for the USG-Walworth area (which will be after October 1, 2017), the EPA anticipates designating the area unclassifiable/attainment in a final action by December 31, 2017. The EPA is basing this conclusion predominantly on the modeling analysis provided by Wisconsin, which demonstrates that, with the new AM-16-01 requirements on the mineral wool production process at USG-Walworth, the area near USG-Walworth will be attaining the SO_2 standard with a compliance date of October 1, 2017. This conclusion is also based on a finding that no other SO_2 sources not explicitly included in or intentionally excluded from the modeling analysis, as described in detail above, are located in or near Walworth County, such that Wisconsin's analysis may be considered to demonstrate that no violations are occurring anywhere in Walworth County nor is there any indication of contribution to existing nonattainment areas.

Wisconsin has recommended a designation of attainment for Walworth County. EPA regulations for implementing the SO_2 NAAQS require Wisconsin to characterize SO_2 air quality in Walworth County. In considering the state's recommendation, we have taken into account all available information, including any current (2014-2016) air monitoring data, and any air dispersion modeling analyses provided by Wisconsin or by a third party. The air dispersion modeling data show either that Walworth County may be violating the 2010 primary SO_2

NAAQS or contains sources that may be contributing to air quality in a nearby area that may be violating the 2010 primary SO_2 NAAQS, which would require a modification of the recommended designation. We recognize, however, that we recently approved new requirements on USG-Walworth (82 FR 31458), which are contained in Wisconsin Administrative Order AM-16-01. EPA has reviewed Wisconsin's modeling, which includes the new AM-16-01 requirements for USG-Walworth, and agrees that the state's modeling demonstrates attainment. EPA's approval of the AM-16-01 requirements will become effective September 5, 2017, and AM-16-01 contains a compliance date of October 1, 2017. Because the AM-16-01 requirements will be in force before we take final action on the designation for the USG-Walworth area, EPA anticipates designating the area unclassifiable/attainment in December 2017.

6. Analysis for the Remaining Counties in Wisconsin

6.1. Introduction

The state has not timely installed and begun operation of a new, approved SO_2 monitoring network meeting EPA specifications referenced in EPA's SO_2 DRR for any sources of SO_2 emissions in the counties identified in Table 16 below. Accordingly, the EPA must designate these counties by December 31, 2017. At this time, there are no air quality modeling results available to the EPA for these counties. In addition, there is no air quality monitoring data that indicate any violation of the 1-hour SO_2 NAAQS.

Wisconsin recommended that the remainder of the state be designated as "attainment." The EPA intends to designate these areas as "unclassifiable/attainment" since these counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

The FCPC recommended a designation of unclassifiable for its reservation, trust, and fee (R/T/F) lands located in Oneida, Shawano, Fond du Lac, Walworth, and Milwaukee counties. Part of Oneida County, including the City of Rhinelander and four townships, including Crescent Town, Newbold Town, Pine Lake Town, and Pelican Town, which was designated as nonattainment in Round 1 (78 FR 47191), is adjacent to Forest County but not immediately adjacent to the FCPC lands in Forest County. After careful review of the FCPC's assessment, supporting documentation, and all available data, the EPA intends to designate these Wisconsin counties, including the FCPC R/T/F lands within these counties, as "unclassifiable/attainment" since these areas were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

The FCPC recommended a designation of attainment for the FCPC R/T/F lands located in Forest, Oconto, and Marinette counties based on air quality monitoring data and emissions-related data. The FCPC SO_2 monitor (AQS ID 55-041-0007) is located in Lincoln Township in Forest County, about 4.5 miles east of the city of Crandon. The 2014-2016 SO_2 design value at this monitor is 6 ppb, and there are no major SO_2 sources on FCPC lands in Forest County. There are emergency diesel generators at the Tribe's casino in Carter and at the Tribe's Health and Wellness Center east of Crandon. The two FCPC parcels of land outside of Forest County in Oconto and Marinette counties are within 3.5 and 4.25 miles, respectively, from the Forest County line. From the FCPC SO_2 monitor, the parcels are approximately 15 miles southeast in Oconto County and approximately 22 miles east in Marinette County. After careful review of the FCPC's assessment, supporting documentation, and all available data, the EPA intends to designate Forest, Oconto, and Marinette Counties, including the FCPC R/T/F lands within these counties, as "unclassifiable/attainment" since these areas were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area

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may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

The EPA is designating the counties in Table 16 below as "unclassifiable/attainment" since these counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Table 16. Counties that the EPA Intends to Designate Unclassifiable/Attainment

Wisconsin's Recommended Boundary	Wisconsin's Recommended Designation	EPA's Intended Area Definition County or Partial County (p)+	EPA's Intended Designation
All remaining areas	Attainment	Adams County	Unclassifiable/Attainment
All remaining areas	Attainment	Ashland County	Unclassifiable/Attainment
All remaining areas	Attainment	Barron County	Unclassifiable/Attainment
All remaining areas	Attainment	Bayfield County	Unclassifiable/Attainment
All remaining areas	Attainment	Brown County [17]	Unclassifiable/Attainment
All remaining areas	Attainment	Buffalo County	Unclassifiable/Attainment
All remaining areas	Attainment	Burnett County	Unclassifiable/Attainment
All remaining areas	Attainment	Calumet County	Unclassifiable/Attainment
All remaining areas	Attainment	Chippewa County	Unclassifiable/Attainment
All remaining areas	Attainment	Clark County	Unclassifiable/Attainment
All remaining areas	Attainment	Crawford County	Unclassifiable/Attainment
All remaining areas	Attainment	Dane County	Unclassifiable/Attainment

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[17] As per the options under the SO_2 Data Requirements Rule (DRR), Georgia-Pacific Consumer Products, LP in Brown County took an SO_2 limit of 1,981 TPY (WDNR Construction Permit 13-JJW-073-R1).

Wisconsin's Recommended Boundary	Wisconsin's Recommended Designation	EPA's Intended Area Definition County or Partial County (p)[+]	EPA's Intended Designation
All remaining areas	Attainment	Dodge County	Unclassifiable/Attainment
All remaining areas	Attainment	Door County	Unclassifiable/Attainment
All remaining areas	Attainment	Douglas County	Unclassifiable/Attainment
All remaining areas	Attainment	Dunn County	Unclassifiable/Attainment
All remaining areas	Attainment	Eau Claire County	Unclassifiable/Attainment
All remaining areas	Attainment	Florence County	Unclassifiable/Attainment
All remaining areas	Attainment	Fond du Lac County	Unclassifiable/Attainment
All remaining areas	Attainment	Forest County	Unclassifiable/Attainment
All remaining areas	Attainment	Grant County [18]	Unclassifiable/Attainment
All remaining areas	Attainment	Green County	Unclassifiable/Attainment
All remaining areas	Attainment	Green Lake County	Unclassifiable/Attainment
All remaining areas	Attainment	Iowa County	Unclassifiable/Attainment
All remaining areas	Attainment	Iron County	Unclassifiable/Attainment
All remaining areas	Attainment	Jackson County	Unclassifiable/Attainment
All remaining areas	Attainment	Jefferson County	Unclassifiable/Attainment
All remaining areas	Attainment	Juneau County	Unclassifiable/Attainment
All remaining areas	Attainment	Kenosha County	Unclassifiable/Attainment
All remaining areas	Attainment	Kewaunee County	Unclassifiable/Attainment

[18] WPL-Nelson Dewey Generating Station in Grant County permanently shut down on December 31, 2015.

Wisconsin's Recommended Boundary	Wisconsin's Recommended Designation	EPA's Intended Area Definition County or Partial County (p)[+]	EPA's Intended Designation
All remaining areas	Attainment	La Crosse County	Unclassifiable/Attainment
All remaining areas	Attainment	Lafayette County	Unclassifiable/Attainment
All remaining areas	Attainment	Langlade County	Unclassifiable/Attainment
All remaining areas	Attainment	Lincoln County	Unclassifiable/Attainment
All remaining areas	Attainment	Manitowoc County	Unclassifiable/Attainment
All remaining areas	Attainment	Marinette County	Unclassifiable/Attainment
All remaining areas	Attainment	Marquette County	Unclassifiable/Attainment
All remaining areas	Attainment	Menominee County	Unclassifiable/Attainment
All remaining areas	Attainment	Milwaukee County	Unclassifiable/Attainment
All remaining areas	Attainment	Monroe County	Unclassifiable/Attainment
All remaining areas	Attainment	Oconto County	Unclassifiable/Attainment
All remaining areas	Attainment	Oneida County (p) [19]	Unclassifiable/Attainment
All remaining areas	Attainment	Ozaukee County	Unclassifiable/Attainment
All remaining areas	Attainment	Pepin County	Unclassifiable/Attainment
All remaining areas	Attainment	Pierce County	Unclassifiable/Attainment
All remaining areas	Attainment	Polk County	Unclassifiable/Attainment
All remaining areas	Attainment	Portage County	Unclassifiable/Attainment

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[19] The EPA previously designated as nonattainment in Round 1 (78 FR 47191) a portion of Oneida County comprised of the City of Rhinelander and four townships, including Crescent Town, Newbold Town, Pine Lake Town, and Pelican Town. EPA intends to designate the remainder of Oneida County as unclassifiable in this round (Round 3).

Wisconsin's Recommended Boundary	Wisconsin's Recommended Designation	EPA's Intended Area Definition County or Partial County (p)[+]	EPA's Intended Designation
All remaining areas	Attainment	Price County	Unclassifiable/Attainment
All remaining areas	Attainment	Racine County	Unclassifiable/Attainment
All remaining areas	Attainment	Richland County	Unclassifiable/Attainment
All remaining areas	Attainment	Rock County	Unclassifiable/Attainment
All remaining areas	Attainment	Rusk County	Unclassifiable/Attainment
All remaining areas	Attainment	St. Croix County	Unclassifiable/Attainment
All remaining areas	Attainment	Sauk County	Unclassifiable/Attainment
All remaining areas	Attainment	Sawyer County	Unclassifiable/Attainment
All remaining areas	Attainment	Shawano County	Unclassifiable/Attainment
All remaining areas	Attainment	Taylor County	Unclassifiable/Attainment
All remaining areas	Attainment	Trempealeau County	Unclassifiable/Attainment
All remaining areas	Attainment	Vernon County	Unclassifiable/Attainment
All remaining areas	Attainment	Vilas County	Unclassifiable/Attainment
All remaining areas	Attainment	Washburn County	Unclassifiable/Attainment
All remaining areas	Attainment	Washington County	Unclassifiable/Attainment
All remaining areas	Attainment	Waukesha County	Unclassifiable/Attainment
All remaining areas	Attainment	Waupaca County	Unclassifiable/Attainment
All remaining areas	Attainment	Waushara County	Unclassifiable/Attainment
All remaining areas	Attainment	Winnebago County	Unclassifiable/Attainment

Wisconsin's Recommended Boundary	Wisconsin's Recommended Designation	EPA's Intended Area Definition County or Partial County (p)[+]	EPA's Intended Designation
All remaining areas	Attainment	Wood County [20]	Unclassifiable/Attainment

+Includes all areas of Indian country geographically located with the county, unless otherwise noted.

As referenced in the Introduction (see Table 2 of the Introduction), Outagamie County associated with Expera Specialty Solutions, LLC-Kaukauna, the only DRR source for which Wisconsin has installed and begun timely operation of a new, approved SO_2 monitoring network, is required to be designated by December 31, 2020, and is, therefore, not being addressed at this time. Wisconsin counties or partial counties previously designated in Round 1 (78 FR 4719)[21] and Round 2 (81 FR 45039)[22] will remain unchanged unless otherwise noted.

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[20] As per the options under the Data Requirements Rule (DRR), Catalyst Paper – Biron Mill in Wood County took an SO_2 limit of 1,819 TPY (WDNR Construction Permit 16-POY-131).

[21] The EPA previously designated as nonattainment in Round 1 (78 FR 47191) a portion of Oneida County comprised of the City of Rhinelander and four townships, including Crescent Town, Newbold Town, Pine Lake Town, and Pelican Town.

[22] The EPA previously designated the entirety of Columbia County as unclassifiable/attainment in Round 2 (81 FR 45039).

Figure 18. The EPA's Designations and Intended Designations for Counties in Wisconsin
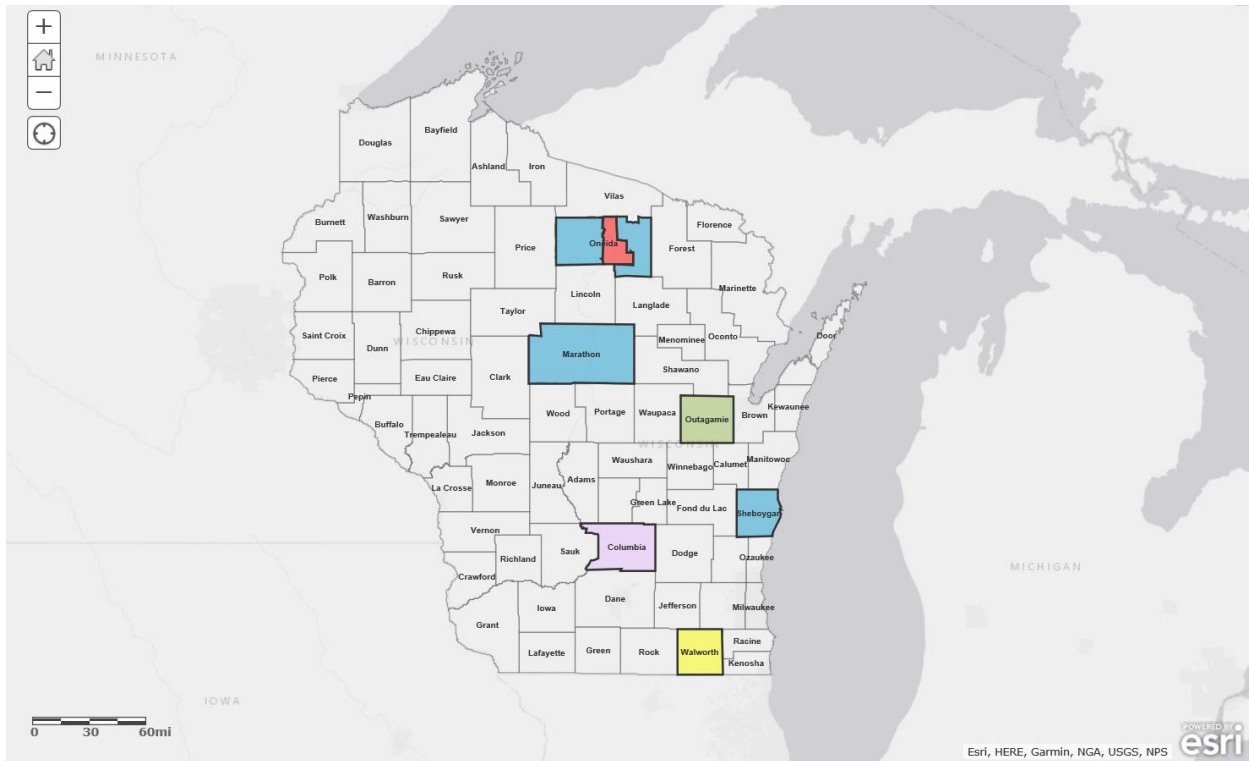

Figure 18 shows EPA's previous designations and intended designations for areas in Wisconsin including (in red) the area previously designated as nonattainment in Round 1 (78 FR 47191) which is a portion of Oneida County comprised of the City of Rhinelander and four townships, including Crescent Town, Newbold Town, Pine Lake Town, and Pelican Town; (in pink) the entirety of Columbia County previously designated as unclassifiable/attainment in Round 2 (81 FR 45039); (in blue and white) the counties EPA intends to designate as unclassifiable/attainment in Round 3, including the remaining portions of Oneida County not designated as nonattainment in Round 1; and the entirety of Walworth County (in yellow) which, as explained previously, the EPA intends to conditionally designate as nonattainment in Round 3. As explained above, Outagamie County (in green) will be addressed in a separate action by December 31, 2020.

6.2. Air Quality Monitoring Data for the Remaining Counties in Wisconsin

As indicated in Table 17, AQS monitors 55-041-0007, 55-027-0001, 55-025-0041, 55-009-0005, and 55-079-0026 located in Forest, Dodge, Dane, Brown, and Milwaukee counties, respectively, have sufficient valid data for 2014-2016 and these data indicate that there was no violation of the 2010 SO$_2$ NAAQS at the monitoring site in that period. These data were available to the EPA for consideration in the designations process, however, since it is unclear if these monitors are

located in areas of maximum concentration, it is unclear if the data are representative of the area's actual air quality.

Table 17. SO₂ Monitors in Wisconsin which indicate no violation of the 2010 SO₂ NAAQS

AQS ID	Location	2014-2016 DV (ppb)
55-041-0007	Forest County	6
55-027-0001	Dodge County	4
55-025-0041	Dane County	5
55-009-0005	Brown County	54
55-079-0026	Milwaukee County	15

Air quality design values for all monitors can be found at https://www.epa.gov/air-trends/air-quality-design-values.

6.3. Jurisdictional Boundaries in the Remaining Counties in Wisconsin

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for all other counties. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

6.4. The EPA's Assessment of the Available Information for the Remaining Counties in Wisconsin

These counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. These counties therefore meet the definition of an "unclassifiable/attainment" area.

Our intended unclassifiable/attainment areas, bounded by county and state boundaries, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment areas.

6.5. Summary of Our Intended Designation for the Remaining Counties in Wisconsin

After careful evaluation of the state's recommendation and FCPC's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate all other counties (except for Outagamie County and those other counties already

designated by the EPA[23] or specifically listed for intended designation elsewhere in this Chapter[24]) as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the boundaries are comprised of county boundaries unless otherwise noted.

Figure 18 above shows the location of these areas within Wisconsin.

For the remaining counties in Wisconsin other than Oneida County, the boundary of the unclassifiable/attainment area is the county boundary. The boundaries for exceptions to this (the rest of Oneida County) are depicted below in Figure 19.

Figure 19. Intended Partial Oneida County Unclassifiable/Attainment Area
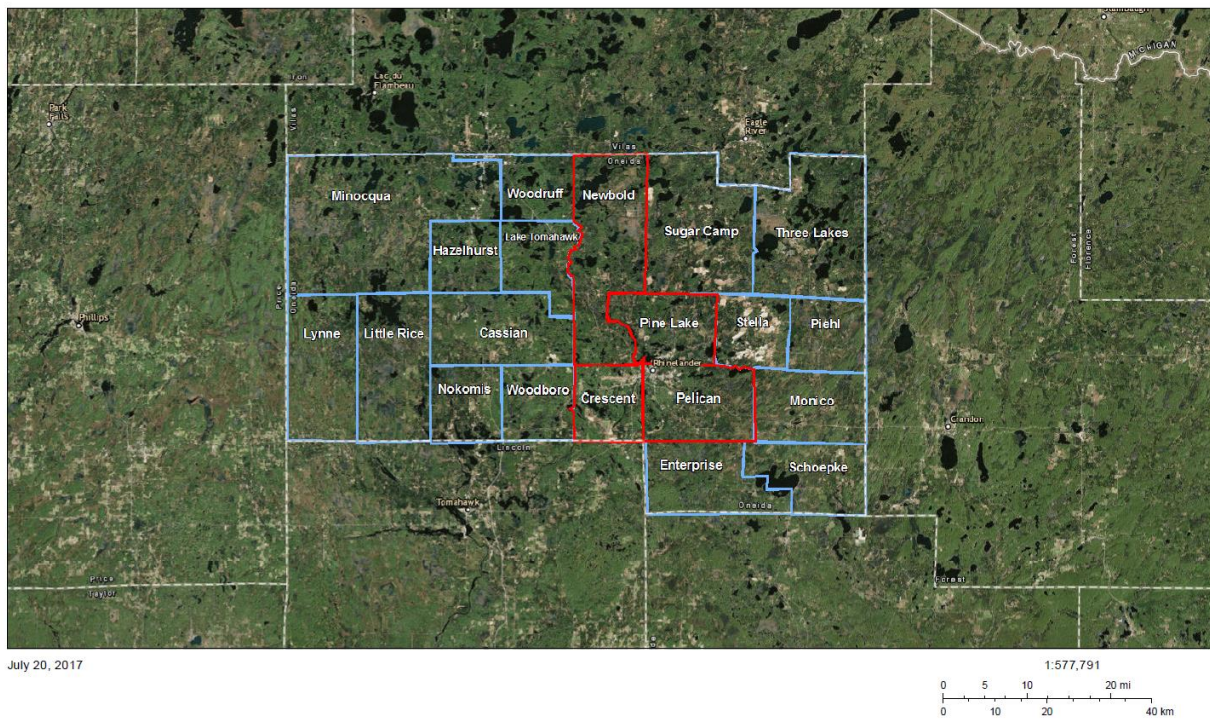

July 20, 2017

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Figure 19 shows the boundary of the intended partial Oneida County unclassifiable/attainment area, which includes the townships outlined in blue, which are Minocqua, Hazelhurst, Lake Tomahawk, Woodruff, Sugar Camp, Three Lakes, Lynne, Little Rice, Cassian, Stella, Piehl, Nokomis, Woodboro, Monico, Enterprise, and Shoepke. The areas outlined in red including the City of Rhinelander and the townships of Crescent, Newbold, Pine Lake, and Pelican were previously designated as nonattainment in Round 1 (78 FR 47191).

At this time, our intended designations for the state and tribal lands only apply to this area and the other areas presented in this Chapter. The EPA intends to evaluate and designate all remaining undesignated areas in Wisconsin, specifically Outagamie County, by December 31, 2020.

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[23] Columbia County (81 FR 45039) and a portion of Oneida County comprised of the City of Rhinelander and four townships, including Crescent Town, Newbold Town, Pine Lake Town, and Pelican Town were previously designated as nonattainment in Round 1. (78 FR 47191).

[24] Marathon, Sheboygan, and Walworth counties.