

Technical Support Document:

Chapter 20

Final Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard for Minnesota

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 (SO₂) primary national ambient air quality standard (NAAQS) (2010 SO₂ NAAQS). Our Notice of Availability (NOA)¹ and our Technical Support Document² for our intended designations for the round of designations we are required to complete by December 31, 2017, provided background on the relevant CAA definitions and the history of the designations for this NAAQS. Chapter 1 of this TSD for the final designations explains the definitions we are applying in these final designations. The TSD for the intended Round 3 area designations also described Minnesota’s recommended designations, assessed the available relevant monitoring, modeling, and any other information, and provided our intended designations.

This TSD for the final Round 3 area designations for Minnesota addresses any change by Minnesota to Minnesota’s recommended designations since we communicated our intended designations for areas in Minnesota. It also provides our assessment of additional relevant information that was submitted too close to the signature of the NOA to have been considered in our intended designations, or that has been submitted by Minnesota or other parties since the publication of the NOA. This TSD does not repeat information contained in the TSD for our intended designations except as needed to explain our assessment of the newer information and to make clear the final action we are taking and its basis, but that information is incorporated here as part of our final designations. If our assessment of the information already considered in our TSD for our intended designations has changed based on new information and we are finalizing a designation based on such change in our assessment, this TSD also explains that change. For areas of Minnesota, not explicitly addressed in this chapter, we are finalizing the designations described in our 120-day letters and the TSD for the intended Round 3 area designations. All the final designations are listed in Table 1 below.

The EPA received comments from two entities regarding our intended SO₂ designations in Minnesota: The Minnesota Pollution Control Agency (MPCA) and USG Interiors, LLC (USG).

¹ EPA Responses to Certain State Designation Recommendations for the 2010 Sulfur Dioxide Primary National Ambient Air Quality Standard: Notification of Availability and Public Comment Period, September 5, 2017 (82 FR 41903)

² Technical Support Document: Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard, August 2017. <https://www.epa.gov/sulfur-dioxide-designations/initial-technical-support-documents-area-designations-round-3>

In their comments, MPCA clarified certain modeling parameters used in the Sherburne County analysis and provided additional information supporting their unclassifiable recommendation for Goodhue County. The MPCA's clarifying comments regarding Sherburne County are addressed in the Response to Comments (RTC) document associated with this final action. The new information for Goodhue County is assessed in Section 2 below.

In its comment letter, USG commented on the EPA's intended designations for the Goodhue County, Minnesota, and Walworth County, Wisconsin, areas. The comments specific to Walworth County are being addressed in Chapter 44 of this TSD for final designations specific to Wisconsin. USG's comments on the Goodhue County area consisted of two main parts, a comment letter included as Attachment E which is covered in the RTC document, and a Public Access Preclusion Strategy and Administrative Order Between USG and MPCA (Comment Letter Attachments F and G, respectively). This Public Access Preclusion Strategy and Administrative Order were the exact documents also provided by MPCA as additional information to support the unclassifiable designation for Goodhue County. These documents, submitted by both USG and MPCA, are discussed below.

For the areas in Minnesota that are part of the Round 3 designations process, Table 1 identifies the EPA's final designations and the counties or portions of counties to which they apply. It also lists Minnesota's current recommendations. Minnesota's recommendation for the Goodhue County area was unclassifiable/attainment or unclassifiable at the time of our 120-day letters. However, as part of their comment on the EPA's intended designations, Minnesota reaffirmed their recommendation that the Goodhue County area be designated unclassifiable. The EPA's final designations for these areas are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. Summary of the EPA’s Final Designations and the Designation Recommendations by Minnesota

Area/County	Minnesota’s Recommended Area Definition	Minnesota’s Recommended Designation	EPA’s Intended Designation	EPA’s Final Area Definition ⁺	EPA’s Final Designation ³
Goodhue County, Minnesota	Goodhue County	Unclassifiable	Nonattainment	Goodhue County	Unclassifiable
Cook County, Minnesota	Cook County	Attainment	Unclassifiable/Attainment	Cook County	Attainment/Unclassifiable
Itasca County, Minnesota	Itasca County	Attainment	Unclassifiable/Attainment	Itasca County	Attainment/Unclassifiable
Otter Tail County, Minnesota	Otter Tail County	Attainment	Unclassifiable/Attainment	Otter Tail County	Attainment/Unclassifiable
Sherburne County, Minnesota	Sherburne County	Attainment	Unclassifiable/Attainment	Sherburne County	Attainment/Unclassifiable
Remaining Undesignated Areas*	All other not yet designated counties	Attainment or Unclassifiable	Unclassifiable/Attainment	All other not yet designated counties	Attainment/Unclassifiable

*The EPA is designating the remaining undesignated counties (or portions of counties) in Minnesota as “attainment/unclassifiable.” These areas that we are designating as attainment/unclassifiable (those to which this row of this table is applicable) are identified more specifically in section 8 of Chapter 20 (addressing Minnesota) of the TSD for our intended designations.

+Includes all areas of Indian country geographically located with the county, unless otherwise noted. The EPA is not determining the boundaries of any area of Indian country in this document, including any area of Indian country located in the larger designation area. This document is not a determination related to regulatory authority under the Clean Air Act for such area of Indian country.

2. Technical Analysis of New Information for the Goodhue County Area

2.1. Introduction

The EPA must designate the Goodhue County, Minnesota, area by December 31, 2017, because the area has not been previously designated and Minnesota has not installed and begun timely operation of a new, approved SO₂ monitoring network to characterize air quality in the vicinity of any source in Goodhue County. On May 1, 2017, the EPA received a letter from the USG-Red Wing facility (“USG”) accompanying a modeling report for the 2010 SO₂ NAAQS. USG-Red Wing is not a source that was required to be characterized under the EPA’s SO₂ Data Requirements Rule (DRR). Nevertheless, in promulgating area designations the EPA considers all available relevant information, and the EPA has evaluated USG’s modeling as a basis of the intended designation for the Goodhue County area. USG’s modeling report did not recommend a specific boundary or designation. In an August 2, 2017, letter, in response to USG-Red Wing’s

³ Refer to Chapter 1 of Technical Support Document: Final Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard for definitions of the designation categories and the terminology change from Unclassifiable/Attainment to Attainment/Unclassifiable.

modeling report, Minnesota supplemented its recommendation for the Goodhue County area to recommend unclassifiable/attainment, or unclassifiable if the EPA is not able to agree with that designation. Minnesota explained that the modeling was submitted for a reason unrelated to the designation process, but since learning about the modeled violations, Minnesota has been actively working with USG to address the modeled violations. During the public comment period, USG and Minnesota submitted an Administrative Order between Minnesota and USG as well as a Public Access Preclusion Strategy, which are both discussed below.

2.2. Summary of Information Reviewed in the TSD for the Intended Round 3 Area Designations

In the 120-day letter notification to the governor of Minnesota, and further explained in Chapter 20 of the TSD for the intended Round 3 area designations, the EPA proposed a designation of nonattainment based on all available information, including modeling information and all relevant monitoring information. Although the EPA did not have access to the actual modeling files to verify the inputs or results of the modeling, the EPA evaluated all the information available in the modeling reports. Based on the available information, the EPA concluded that USG generally followed the recommendations of the Modeling TAD and Appendix W, including important components of a modeling assessment such as models used, receptor network, source characterization, and emission estimates. However, the EPA did not have enough information to fully evaluate the meteorological data and the variable background concentrations used. Despite these uncertainties, the EPA found the modeling submitted by USG to be an adequate indicator that violations of the standard were occurring in the area around USG-Red Wing and a suitable basis for the intended nonattainment designation, as further discussed in the TSD for our intended designations.

2.3. Assessment of New Air Quality Monitoring Data for the Goodhue County Area

This factor considers the SO₂ air quality monitoring data in the area of Goodhue County. The TSD for our intended area designations considered available data through 2016 for 6 monitoring sites throughout the state. We do not have certified data for any additional complete calendar years at any site, and we have no new monitoring information of any other type that the EPA has determined warrants revising our prior analysis of available monitoring data. The closest monitor is in neighboring Dakota County, 47 km away from USG-Red Wing, and 25 km from the county border. The monitor is therefore not appropriate for characterizing air quality in Goodhue County.

2.4. Air Quality Modeling Analysis for the Goodhue County Area Addressing USG-Red Wing

2.4.1. Introduction

This section 2.4 presents all the newly available air quality modeling information for a portion of Goodhue County that includes USG-Red Wing. The USG-Red Wing facility is not on the SO₂ DRR Source list. In 2014, the EPA conducted a modeling analysis of USG-Red Wing for enforcement purposes. The EPA's modeling indicated a violation of the standard using stack test data and assuming constant operation. The facility responded by conducting their own modeling using actual emissions following the recommendations of the Modeling TAD, which the EPA enforcement modeling generally did not follow. The EPA considers the facility's updated modeling to be the most recent and relevant modeling.

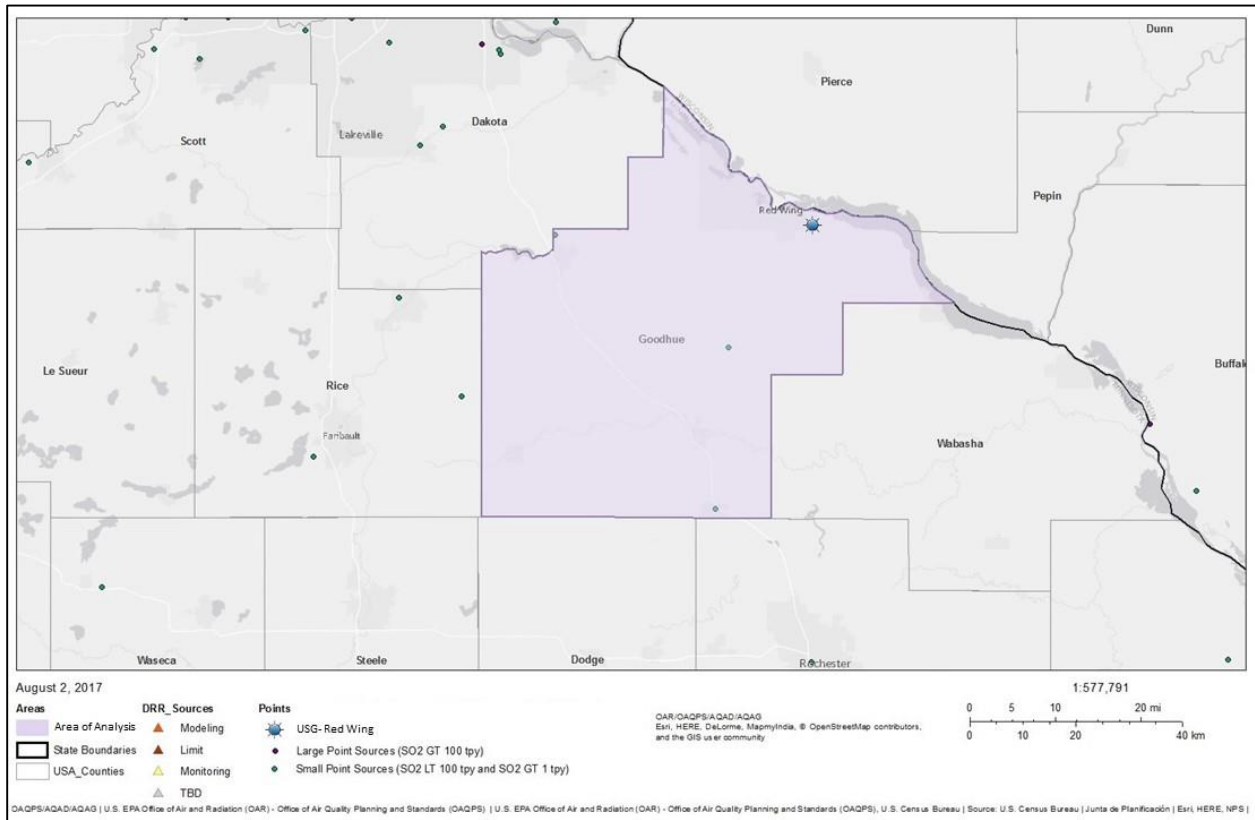
On October 20, 2017, Minnesota submitted new information pertaining to the Goodhue County intended nonattainment area, specifically an Administrative Order⁴ between USG and Minnesota and USG's Public Access Preclusion Strategy⁵. USG also submitted these same documents during the public comment period. Minnesota stated that the new information supports a change relative to the original modeling as to what should be considered ambient air and that it supports a different designation than the EPA's intended nonattainment designation for this area. The EPA had expressed an intent to designate the area as nonattainment in our intended designations, whereas Minnesota purports that this new information supports a designation of unclassifiable.

The area that USG has assessed via air quality modeling is located in the eastern portion of Goodhue County, along the Mississippi River as seen below in Figure 1. No other sources were considered in USG's modeling.

⁴ See Docket ID: EPA-HQ-OAR-2017-0003-0553

⁵ See Docket ID: EPA-HQ-OAR-2017-0003-0553

Figure 1: Map of the Red Wing Area Addressing USG-Red Wing



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 cited in Chapter 1 of this TSD, as appropriate.

2.4.2. Modeling Analysis Provided by USG

The state did not provide any dispersion modeling for this area. In our intended designation, the designation was based on modeling provided by USG. USG has not submitted any updated modeling, but MPCA and USG did submit new information pertaining to what areas should be considered ambient air. This new information is addressed below. The remainder of the modeling analysis assessment below is the same as was presented in the TSD for our intended designations, but is included here as well.

2.4.2.1. 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

USG used AERMOD version 16216r, the current regulatory version of the model with the adjusted surface friction velocity (ADJ_U*) parameter. A discussion of USG’s approach to the individual components is provided in the corresponding discussion that follows, as appropriate. Modeling files were not provided to the EPA, so all the information below is based on the modeling reports provided to the EPA on July 19, 2016, and updated on May 1, 2017.

2.4.2.2. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the “urban” or “rural” determination of a source is important in determining the boundary layer characteristics that affect the model’s prediction of downwind concentrations. For SO₂ modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO₂ 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, USG ran the model using rural dispersion based on information submitted in their report. In EPA’s enforcement modeling, it was determined that rural was appropriate given the lack of any heavy industry or high-density population in the surrounding area. The EPA agrees that rural mode is appropriate for this area.

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

The Modeling 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 SO₂ emission sources or facilities considered for modeling; the extent of concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO₂ concentrations.

For the Goodhue County area, USG has not included any other emitters of SO₂ in the modeling analysis. In their May 1, 2017, modeling update, USG stated that their receptor network was nearly identical to the network used by the EPA in its 2014 enforcement modeling. USG stated that the only difference was excluding receptors over their property. The nested Cartesian receptor grid used by the EPA in its 2014 enforcement modeling, that USG stated they duplicated except for the difference noted above, is as follows:

- Spacing of 20m extending 250m from the source fence line in each direction.
- Spacing of 50m extending from 250m to 500m in each direction
- Spacing of 100m extending from 500m to 1km in each direction
- Spacing of 200m extending from 1km to 2km in each direction

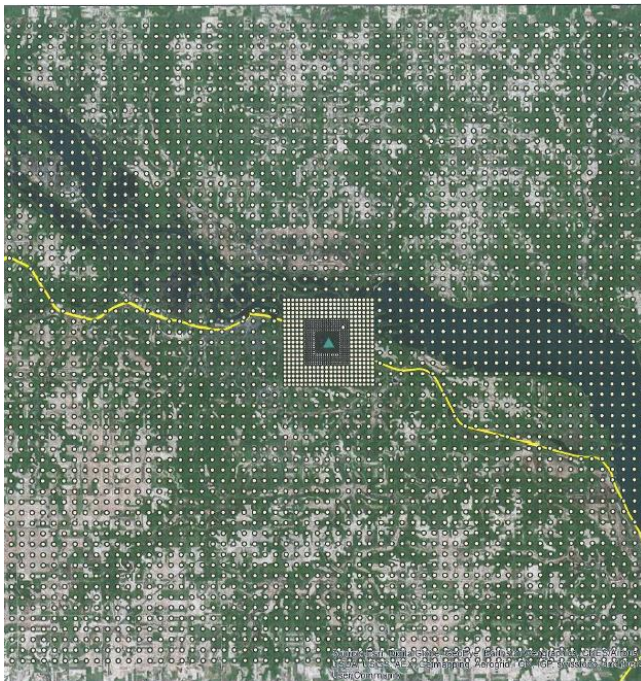
- Spacing of 500m extending from 2km to 15km in each direction

The receptor network contained 5,444 receptors, and the network covered the northeastern portion of Goodhue County extending into Wisconsin.

Figure 2, included in USG’s May 1, 2017, modeling report, shows the receptor grid for the area of analysis.

USG placed receptors for the purposes of this designation effort in all locations except for locations within their fenced facility boundary and except for a small area of non-contiguous leased property. Public access to this leased property is now precluded, and, as discussed below, it is infeasible to place monitor in this area. USG did include receptors over water, though the Modeling TAD allows such exclusions.

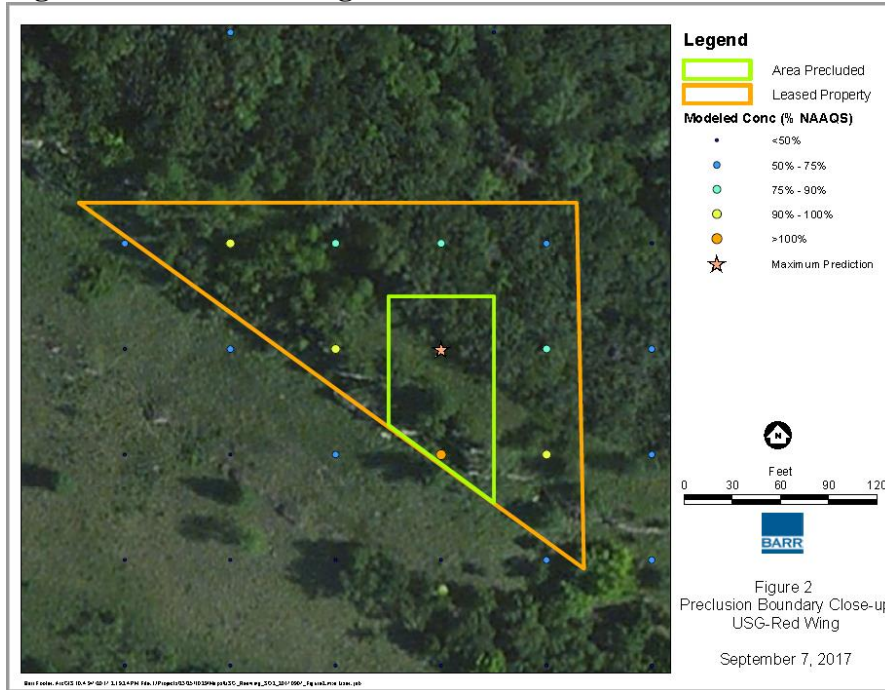
Figure 2: Receptor Grid for the Goodhue County Area



As discussed later in this document, in the May 1, 2017, modeling update, USG found that there were two receptors violating the standard. These receptors were located up on a bluff across from the facility. The facility, as part of their Public Access Preclusion Strategy,⁶ leased an area around the violating receptors as well as a larger surrounding area. The Public Access Preclusion Strategy submitted by Minnesota and USG during the public comment period, included four steps to precluding public access from the area: 1) provide for a long-term leasing of the area, 2) effective natural barriers, 3) fence, and 4) signs designating “USG Property- No Trespassing.” Figure 3 below shows the area that has been leased as well as the violating receptors and the fenced area (listed as Area Precluded in the legend).

⁶ See Docket ID: EPA-HQ-OAR-2017-0003-0553

Figure 3: USG-Red Wing Leased Area and Fence Line



The requirements to secure the area around the violating receptors and “precluded public access to this area until such time that the MPCA determines it is no longer necessary as part of an ambient air quality standards compliance demonstration” is part of the October 2, 2017, Administrative Order⁷ between USG and Minnesota. The lease agreement for USG is for five years and includes an option to extend. A portion of the fence can be seen below in Figure 4. USG also discussed the natural barriers in the area and included pictures of the bluff with a steep drop off just past this pictured area and the dense vegetation throughout the area.

⁷ See Docket ID: EPA-HQ-OAR-2017-0003-0553

Figure 4: USG-Red Wing Fence



The EPA finds that the Administrative Order and Public Access Preclusion Strategy support exclusion of the receptors on the facility’s leased land. Since under state law the area cannot be made accessible to the public, it would not be reasonable to expect that a monitor would be placed at the site to assess air quality that could impact public health there. Therefore, it is infeasible to place a monitor at the site. Consistent with the EPA’s 2015 Guidance, model receptors were only placed where a monitor could be placed.

The EPA evaluated the permanence of this approach given the five-year term of the lease. The EPA concluded that the preclusion of public access is adequately permanent because the lease is renewable and because Minnesota’s Administrative Order requires USG to continue to preclude public access to this area until the state determines it is no longer necessary as part of an ambient air quality standards compliance demonstration.

2.4.2.4. 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.

USG characterized this source within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, USG used actual stack heights in conjunction with actual emissions. USG, using EPA and MPCA supplied files, 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 BPIPFRM (version 04274) was used to assist in addressing building downwash.

USG did not include any other sources of SO₂ in the modeling. No other sources of SO₂ over 100 tpy are located anywhere in the county. ADM – Red Wing is 5 km away from USG-Red Wing

and emitted 6 tons of SO₂ in 2014. The next closest source of SO₂ over 100 tpy is Flint Hills Resources, which emitted 690 tons of SO₂ in 2014, located 50 km northwest of USG-Red Wing in Dakota County.

Although the nearby source was not included, the background monitor, which will be discussed below in section 3.3.9, is located near the Flint Hills Resources facility. Therefore, the EPA agrees that the addition of a representative background concentration accounts for potential impacts from this facility. The EPA finds USG appropriately characterized its emission points in the modeling analysis.

2.4.2.5. Modeling Parameter: Emissions

The 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 3 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 (referred to as PTE or 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 SO₂ 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 3 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 SO₂ 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, USG did not include any other emitters of SO₂ in the area of analysis. USG has chosen to model using actual emissions. USG's modeling analysis used annual actual SO₂ emissions between 2014 and 2016 which are summarized in Table 2 below. A description of how USG obtained hourly emission rates is given below this table.

Table 2. Actual SO₂ Emissions Between 2014 – 2016 from USG⁸

Facility Name	SO ₂ Emissions (tpy)		
	2014	2015	2016
USG-Red Wing	482.5	499.6	460.0

For USG, the actual hourly emissions data were obtained by creating hourly emissions inventories from multiplying actual hourly melt tonnage by emissions factors determined by the average of annual stack tests for 2014 through 2016 for the cupolas and the blow chamber stacks. Stack parameters were held constant and duplicated from the EPA’s 2014 enforcement modeling. The EPA finds USG’s emissions were adequately characterized.

2.4.2.6. Modeling Parameter: Meteorology and Surface Characteristics

As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 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.

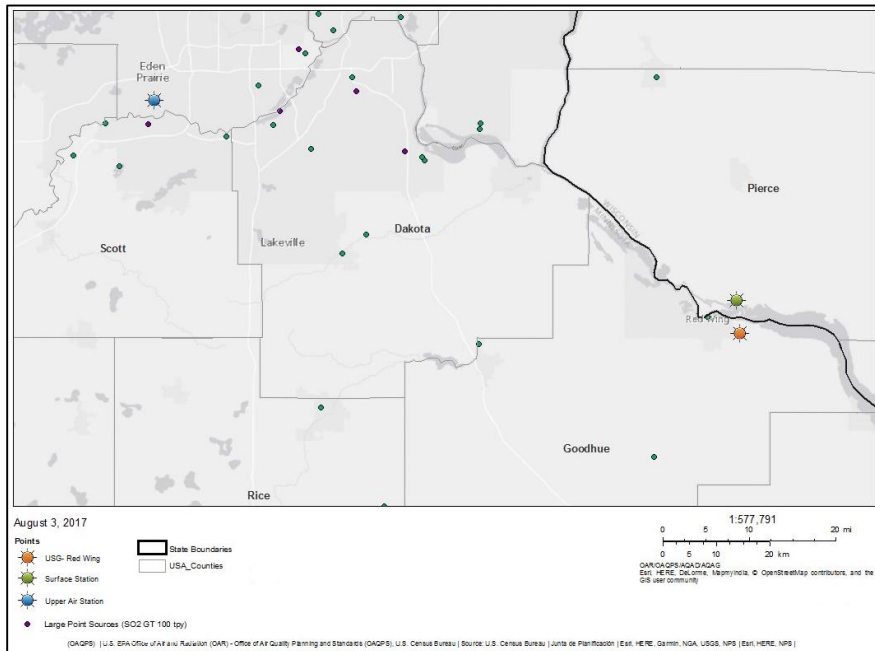
For the area of analysis for the Goodhue County area, USG selected 2014 to 2016 surface meteorology from the Red Wing Regional Airport in Bay City, Wisconsin, (KRGK), located just across the Mississippi river, about 3 km north of the USG facility. Upper air observations were from the Chanhassen NWS site (KMPX), located roughly 90 km to the west-northwest of the USG facility. While the Red Wing Airport NWS site is certainly located well to provide representative data, it was found to be missing a considerable amount of wind data. Based on the USG report, the surface data had 26 percent of the wind parameters listed as missing. The company supplemented the missing data using prognostic meteorological data generated by the MM5 (5th Generation Penn State/NCAR Mesoscale Model) meteorological model. The MM5 model was run by a third party and the required meteorological parameters were extracted from the grid cell centered on the USG main stack location. Specific information about how the MM5 model was run and how well it performs in the area was not provided to the EPA. Therefore, the EPA is unable to determine the reliability of the prognostic meteorology in this modeling analysis, which in turn creates significant uncertainties in the estimates of air concentrations in the area.

⁸ This table reflects edits based on USG comments. Further discussion of the comments is provided in the RTC.

While it is likely USG used AERSURFACE in the development of the meteorological data set, no information on the parameters or conditions selected was provided in the modeling report provided to the EPA.

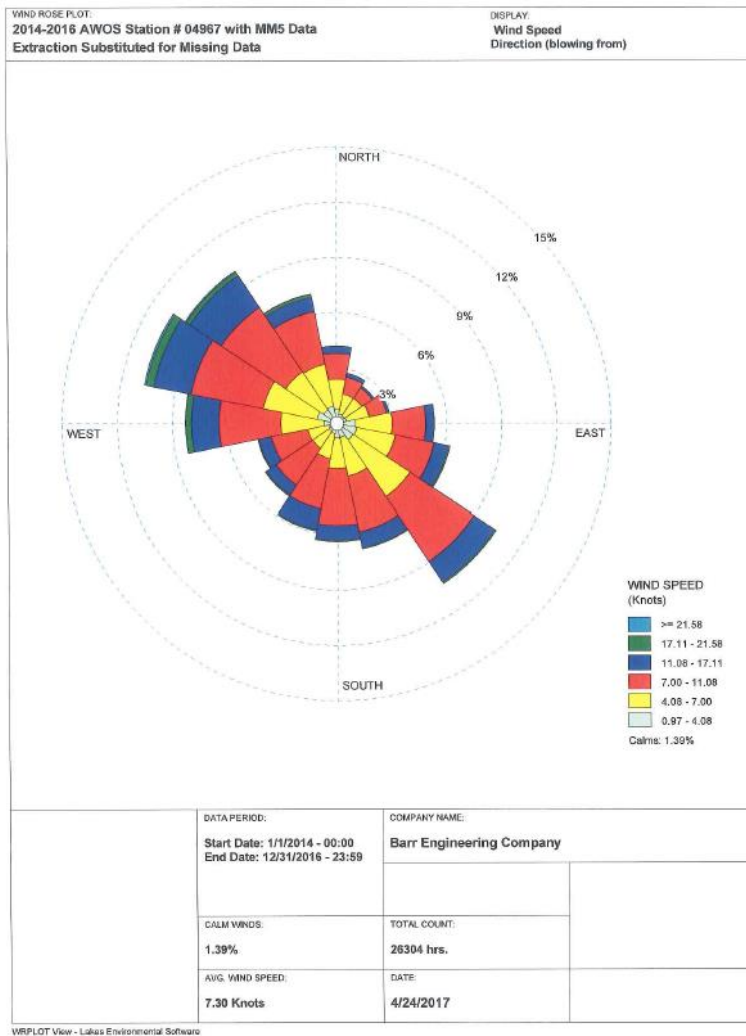
In the figure below, generated by the EPA, the locations of these NWS stations are shown relative to the area of analysis.

Figure 5: Area of Analysis and the NWS stations in the Goodhue County Area



As part of its analysis, USG provided the 3-year surface wind rose for the Red Wing Regional Airport, supplemented by MM5 prognostic data. In Figure 6, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. While winds blow from all directions during the year, the wind rose shows a predominantly northwest-southeast oriented direction. USG attributes the orientation of the predominant winds primarily to the nearby river valley. The river valley likely influences the frequency of different wind directions, although the frequency of different wind directions is similar to that found elsewhere in Minnesota, which also has a predominance of northwest-southeast winds. While the surface data set from KRGK has 20 percent calm hours, the data set that also incorporates prognostic data has only 1 percent calm hours.

Figure 6. Goodhue County Cumulative Annual Wind Rose for Years 2014 – 2016



Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor (version 16216). The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. No specific information was provided by USG regarding the detailed methodology followed in processing the meteorological data.

As noted above, USG did not provide specific details regarding the processing of their meteorological data. In general, their approach involved use of the nearby Red Wing Regional Airport NWS site for surface meteorological parameters. This set includes a significant percentage of missing data. The surface file missing hours were augmented using parameters generated by the MM5 prognostic meteorological model. The EPA did not have enough information to evaluate the reliability of the prognostic meteorology in this modeling analysis, which in turn creates uncertainties in the estimates of air concentrations in the area.

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

The terrain in the area of analysis is best described as moderately complex. Elevation increases within a couple kilometers to the east, west, and south are in the 100 m range. To the north, a hill rises roughly 70 m about 0.5 km away from the facility. In their comments on the EPA's intended designations, USG indicated that they used the elevation files from the 2014 EPA enforcement modeling. These files were generated using AERMAP to determine the receptor elevations.

2.4.2.8. Modeling Parameter: Background Concentrations of SO₂

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO₂ 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, USG chose a tier 2 approach based on a monitor in Dakota County (AQS ID 27-037-0443) using data from 2013-2015. This monitor is located about 1.6 km to the southwest of the Flint Hills Resources refinery. Specific maximum and minimum background values were not included in the report. An example concentration for the area is 2 ppb for February for 10 am to 11 am. While the EPA does not have the full set of background values used by USG, the EPA did confirm the valid design value for this monitor for 2014-2016 was 3 ppb, which is a reasonable background concentration for this area of rural Minnesota. Given that the example concentration provided of 2 ppb is very close to the design value of this monitor, the EPA finds the approach followed by USG is likely adequate for characterizing the background concentrations for the area. However, as the EPA didn't have access to the actual files used, there is some uncertainty around the background concentrations used in this analysis.

2.4.2.9. Summary of Modeling Inputs and Results

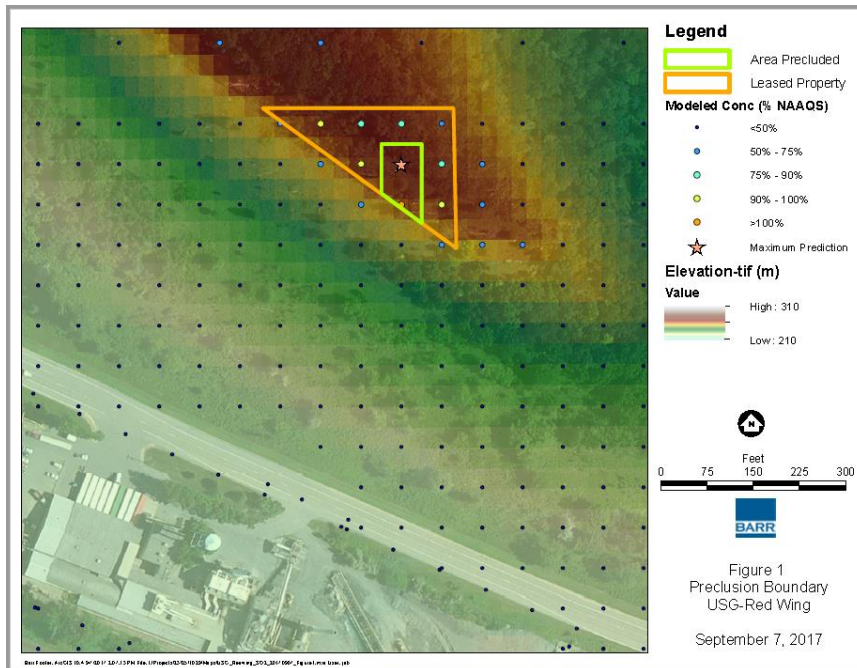
The AERMOD modeling input parameters for the Goodhue County area of analysis are summarized below in Table 3.

Table 3: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Goodhue County Area

Input Parameter	Value
AERMOD Version	16216r (with ADJ_U*)
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	Downwash was modeled but number of structures is unknown.
Modeled Fencelines	1
Total receptors	5,444
Emissions Type	Actual
Emissions Years	2014-2016
Meteorology Years	2014-2016
NWS Station for Surface Meteorology	Red Wing Regional Airport in Bay City, WI (KRGK) with prognostic (MM5) data
NWS Station Upper Air Meteorology	Chanhassen NWS site (KMPX)
NWS Station for Calculating Surface Characteristics	Unknown
Methodology for Calculating Background SO ₂ Concentration	Tier 2 based on Dakota County (AQS Site No. 27-037-0443)
Calculated Background SO ₂ Concentration	Variable (Range unknown)

USG’s modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 219.5 µg/m³, equivalent to 83.81 ppb based on 2014-2016 actual emissions. This modeled concentration included a background concentration of SO₂, and is based on actual emissions from the facility. Figure 7 below was included as part of USG’s submittal, and indicates that the predicted design value occurred about 200 meters north of the facility (in UTM zone 15, 541073.9 meters east, 4934015.5 meters north). A portion of USG’s receptor grid is also shown in the figure.

Figure 7: Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over 3 Years for the Area of Analysis for the Goodhue County Area



However, the violating receptors are all within USG’s leased and fenced area that the source and state assert should not be considered as ambient air. Although new modeling excluding these receptors was not provided, USG’s May 1, 2017, modeling report shows the only receptors violating the standard are contained within the area that is currently leased by the facility (and is now required under state law to be precluded from public access). Considering the acceptably reduced set of receptors, excluding receptors inside the facility’s owned or leased property that has been adequately justified as precluded to public access and thus would be an unreasonable and therefore infeasible location to place a monitor, figures 3 and 7 (included in USG’s public comments) show that the area is attaining the standard.

2.4.2.10. *The EPA’s Assessment of the Modeling Information Provided by the State*

The EPA did not have access to the actual modeling files to verify the inputs or results of the modeling. From the information available in the modeling reports, the EPA believes that USG generally followed the recommendations in the Modeling TAD and Appendix W in most respects, including important components of a modeling assessment such as models used, receptor networks, source characterization, and emission estimates. However, in some important respects, most notably in the partial use of unjustified prognostic meteorological data, the EPA does not have sufficient information to fully evaluate USG’s modeling.

As discussed in Section 2.4.2.3, the EPA finds that the Administrative Order and Public Access Preclusion Strategy support exclusion of the receptors on the facility’s leased land as locations no longer accessible to the public and where one would not place a monitor, consistent with the March 2015 Guidance. The EPA concluded that this preclusion was adequately permanent, given that the five-year lease is renewable and given that Minnesota’s Administrative Order requires

USG to continue to preclude public access to this area until the state determines it is no longer necessary as part of an ambient air quality standards compliance demonstration.

2.5. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Goodhue 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.

2.6. Jurisdictional Boundaries in the Goodhue County Area

The EPA's goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable. Minnesota recommended that the EPA designate Goodhue County as either unclassifiable or unclassifiable/attainment. The boundaries of Goodhue County are well established and well known, so that these boundaries provide a good basis for defining the area being designated.

2.7. Other Information Relevant to the Designations for the Goodhue County Area

The modeling originally conducted by the EPA for enforcement purposes used AERMOD version 15181 and AERMET version 14134. Emissions used in the modeling were generated from stack test data and modeled as a constant emission rate. Stack parameters were also derived from the stack test data. A receptor grid consisting of 5,500 receptors, including terrain elevations was utilized. This is the same receptor grid used by USG except for minor revisions as noted in Section 3.3.4 of the Minnesota chapter of the TSD for our intended designations. The meteorological data used in the EPA modeling was processed by the state and consisted of surface data collected at the Minneapolis/St. Paul NWS station with upper air data collected at the Chanhassen NWS site. Five years of meteorology was used in the EPA modeling. Information on how surface characteristics were processed in AERSURFACE was unavailable. The predicted 99th percentile daily maximum concentration averaged over 5 years was 903.4 $\mu\text{g}/\text{m}^3$. This value did not include a background concentration.

USG's modeling was in response to enforcement modeling conducted by the EPA in 2014. The EPA's enforcement modeling was based on 2010-2014 maximum stack test emissions held constant for each hour of the year. USG's modeling is a more refined and accurate characterization of recent actual emissions for the area that more closely followed the Modeling TAD. Therefore, this chapter review focused on the USG modeling as most representative of current air quality in the area. USG's modeling report did mention a second run using the unapproved LOWWIND3 beta modeling option. However, this is an alternate non-regulatory model option and USG did not receive the necessary EPA concurrence to use it for regulatory

purposes, therefore that modeling run was not considered reliable or representative of air quality in the Goodhue area. The use of the LOWWIND3 option was the only difference in USG's subsequent modeling runs.

2.8. The EPA's Assessment of the Available Information for the Goodhue County Area

Initial EPA modeling conducted for enforcement purposes showed a violation of the SO₂ NAAQS. Based primarily on more refined emission estimates, the best available evidence regarding current air quality in Goodhue County is the modeling provided by USG. There is no available nearby monitoring information. The modeling generally follows the recommendations in the Modeling TAD and Appendix W. However, in some important respects, most notably in the partial use of unjustified prognostic meteorological data and in the determination of variable background concentrations, the EPA does not have sufficient information to fully evaluate USG's modeling.

The modeling domain included the northeastern portion of Goodhue County. However, the EPA did not find any other sources of SO₂ in or near the county that were likely to cause or contribute to a violation of the standard within the county.

On August 2, 2017, Minnesota supplemented their recommendation for the Goodhue County area to recommend unclassifiable/attainment, or unclassifiable if the EPA is not able to agree with that designation. Minnesota's recommendation was based on progress Minnesota had made in working with USG to address the modeled violations.

On October 20, 2017, Minnesota recommended unclassifiable for the area and supplemented this recommendation with an Administrative Order between USG and Minnesota as well as USG's Public Access Preclusion Strategy. Although new modeling was not submitted, Minnesota and USG asked the EPA to reconsider what areas of the previously submitted modeling should be considered ambient air.

As discussed in Section 2.4.2.3 of this chapter, the EPA finds that the Administrative Order and Public Access Preclusion Strategy support exclusion of the receptors on the facility's leased land as locations no longer accessible to the public and where one would not reasonably place a monitor consistent with the March 2015 Guidance. As noted previously, the EPA concluded that this preclusion of public access, as required by state law, was adequately permanent. Therefore, among receptors that are not now acceptably excluded from consideration, the modeling submitted by USG no longer indicates violations are occurring in the area surrounding USG-Red Wing.

The EPA did not have access to USG's modeling files to verify the information in the modeling reports. In addition, the EPA had specific concerns about the meteorological data and the background concentrations that were used. The EPA's concerns with the modeling are also explained in more detail in the TSD for our intended designations for Minnesota.

Despite the new information that alleviates the previous indication of violations occurring in the area, the EPA is not able to definitively determine that this area is meeting the 2010 SO₂ NAAQS, due to the EPA's noted uncertainties in the modeling. Consequently, the EPA agrees with Minnesota's recommendation to designate this area unclassifiable.

The EPA believes that our final unclassifiable area, bounded by Goodhue County, will have clearly defined legal boundaries, and we find these boundaries to be a suitable basis for defining our final unclassifiable area.

2.9. Summary of Our Final Designation for the Goodhue County Area

Minnesota has recommended a designation of unclassifiable for Goodhue 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 Minnesota or by any other organization. After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA is designating Goodhue County as unclassifiable for the 2010 SO₂ NAAQS. As explained in Chapter 1 of this TSD for the final designations, in this action, an unclassifiable area is defined by the EPA as an area for which the available information does not allow EPA to determine whether the area meets the definition of a nonattainment area or the definition of an attainment/unclassifiable area. As noted previously, the available information for the Goodhue County area does not allow the EPA to classify the area as either nonattainment or attainment/unclassifiable so this area meets the EPA's definition of an unclassifiable area. Specifically, the boundaries are comprised of Goodhue County. Figure 8 shows the boundary of the final designated area.

Figure 8: Boundary of the Final Goodhue County Unclassifiable Area

