Technical Support Document

Michigan

Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA, or the Agency) must designate areas as either "unclassifiable," "attainment," or "nonattainment" for the 2010 one-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS). The CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to a violation in a nearby area. An attainment area is defined as any area other than a nonattainment area that meets the NAAQS. Unclassifiable areas are defined as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

Michigan submitted updated recommendations on September 18, 2015, ahead of a July 2, 2016, deadline for EPA to designate certain areas established by the U.S. District Court for the Northern District of California. This deadline is the first of three deadlines established by the court for EPA to complete area designations for the 2010 SO_2 NAAQS. Table 1 below lists Michigan's recommendations and identifies the counties or portions of counties in Michigan that EPA intends to designate by July 2, 2016 based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. Michigan's Recommended and EPA's Intended Designations

Area	**Michigan's Recommended Area Definition**	**Michigan's Recommended Designation**	**EPA's Intended Area Definition**	**EPA's Intended Designation**
St. Clair, MI	Within St. Clair Co.: Area defined by the St. Clair River on the east, State Highway M-29 to Church Road to Arnold Road to County Line Road on the south, County Line Road and the Macomb/ St. Clair County boundary to Stoddard Road to Wales Ridge Road on the west, and Alpine Road to Fitz Road to Smith Creek Road to Range Road to Huron Avenue to the St. Clair River on the north.	Nonattainment	Within St. Clair Co.: Area defined by the St. Clair River for the eastern boundary, an extension from the St. Clair River straight west to the intersection of State Highway M-29 and St. Clair River Drive, continuing west on State Highway M-29 to Church Road to Arnold Road to County Line Road for the southern boundary, County Line Road and the Macomb/ St. Clair County boundary to Stoddard Road to Wales Ridge Road for the western boundary, and Alpine Road to Fitz Road	Nonattainment

			to Smith Creek Road to Range Road to Huron Avenue, extending straight east from the intersection of Huron Road and River Road to the St. Clair River for the northern boundary.	
Bay County, MI	Bay County	Attainment	Same as State's Recommendation	Unclassifiable
Lansing, MI	Eaton and Ingham Counties	Attainment	Same as State's Recommendation	Unclassifiable/ Attainment
Marquette County, MI	Marquette County	Attainment	Same as State's Recommendation	Unclassifiable/ Attainment
Monroe County, MI	Monroe County	Attainment	Same as State's Recommendation	Unclassifiable
Ottawa County, MI	Ottawa County	Attainment	Same as State's Recommendation	Unclassifiable/ Attainment

Background

On June 3, 2010, EPA revised the primary (health based) SO_2 NAAQS by establishing a new one-hour standard at a level of 75 parts per billion (ppb) which is attained when the three-year average of the 99th percentile of one-hour daily maximum concentrations does not exceed 75 ppb. This NAAQS was published in the Federal Register on June 22, 2010 (75 FR 35520) and is codified at 40 CFR 50.17. EPA determined this is the level necessary to protect public health with an adequate margin of safety, especially for children, the elderly, and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO_2. The two prior primary standards of 140 ppb evaluated over 24 hours, and 30 ppb evaluated over an entire year, codified at 40 CFR 50.4, remain applicable.[1] However, EPA is not currently designating areas on the basis of either of these two primary standards. Similarly, the secondary standard for SO_2, set at 500 ppb evaluated over 3 hours has not been revised, and EPA is also not currently designating areas on the basis of the secondary standard.

General Approach and Schedule

Section 107(d) of the Clean Air Act requires that not later than one year after promulgation of a new or revised NAAQS, state governors must submit their recommendations for designations and boundaries to EPA. Section 107(d) also requires EPA to provide notification to states no less than 120 days prior to promulgating an initial area designation that is a modification of a state's recommendation. If a state does not submit designation recommendations, EPA will promulgate the designations that it deems appropriate. If a state or tribe disagrees with EPA's intended designations, they are given an opportunity within the 120 day period to demonstrate why any proposed modification is inappropriate.

[1] 40 CFR 50.4(e) provides that the two prior primary NAAQS will no longer apply to an area one year after its designation under the 2010 NAAQS, except that for areas designated nonattainment under the prior NAAQS as of August 22, 2010, and areas not meeting the requirements of a SIP Call under the prior NAAQS, the prior NAAQS will apply until that area submits and EPA approves a SIP providing for attainment of the 2010 NAAQS.

On August 5, 2013, EPA published a final rule establishing air quality designations for 29 areas in the United States for the 2010 SO_2 NAAQS, based on recorded air quality monitoring data from 2009 - 2011 showing violations of the NAAQS (78 FR 47191). In that rulemaking, EPA committed to address, in separate future actions, the designations for all other areas for which the Agency was not yet prepared to issue designations.

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

According to the court-ordered schedule, EPA must complete the remaining designations by three specific deadlines. By no later than July 2, 2016 (16 months from the court's order), EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO_2 NAAQS and (2) areas that contain any stationary sources that had not been announced as of March 2, 2015 for retirement and that according to EPA's Air Markets Database emitted in 2012 either (i) more than 16,000 tons of SO_2 or (ii) more than 2,600 tons of SO_2 with an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/MMBTU). Specifically, a stationary source with a coal-fired unit that as of January 1, 2010 had a capacity of over 5 megawatts and otherwise meets the emissions criteria, is excluded from the July 2, 2016 deadline if it had announced through a company public announcement, public utilities commission filing, consent decree, public legal settlement, final state or federal permit filing, or other similar means of communication, by March 2, 2015, that it will cease burning coal at that unit.

The last two deadlines for completing remaining designations are December 31, 2017, and December 31, 2020. EPA has separately promulgated requirements for states and other air agencies to provide additional monitoring or modeling information on a timetable consistent with these designation deadlines. We expect this information to become available in time to help inform these subsequent designations. These requirements were promulgated on August 21, 2015 (80 FR 51052), in a rule known as the SO_2 Data Requirements Rule (DRR).

Updated designations guidance was issued by EPA through a March 20, 2015 memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. This memorandum supersedes earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and it identifies factors that EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The guidance also contains the factors EPA intends to evaluate in determining the boundaries for all remaining areas in the country, consistent with the court's order and schedule. These factors include: 1) Air quality characterization via ambient monitoring or dispersion modeling results; 2) Emissions-related data; 3) Meteorology; 4) Geography and topography; and 5) Jurisdictional

boundaries. This guidance was supplemented by two technical assistance documents intended to assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling or ambient air quality monitoring for sources that emit SO_2. Notably, EPA released its most recent versions of documents titled, "SO_2 NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) and "SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD) in December 2013.

Based on ambient air quality data collected between 2012 and 2014, no violations of the 2010 SO_2 NAAQS have been recorded in any undesignated part of the state.[2] However, there are eight sources in the state meeting the emissions criteria of the consent decree for which EPA must complete designations by July 2, 2016. In this draft technical support document, EPA discusses its review and technical analysis of Michigan's updated recommendations for the areas that we must designate. EPA also discusses any intended modifications from the state's recommendation based on all available data before us.

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 three year average of the 99th percentile of the annual distribution of daily maximum one-hour average concentrations. See 40 CFR 50.17.
2) Design Value - a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.
3) Designated nonattainment area – an area which EPA has determined has violated the 2010 SO_2 NAAQS or contributed to a violation in a nearby area. A nonattainment designation reflects considerations of state recommendations and all of the information discussed in this document. EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analysis, and any other relevant information.
4) Designated unclassifiable area – an area which EPA cannot determine based on all available information whether or not it meets the 2010 SO_2 NAAQS.
5) Designated unclassifiable/attainment area – an area which EPA has determined to have sufficient evidence to find either is attaining or is likely to be attaining the NAAQS. EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analysis, and any other relevant information.
6) Modeled violation – a violation based on air dispersion modeling.

[2] For designations based on ambient air quality monitoring data that violates the 2010 SO_2 NAAQS, the consent decree directs the EPA to evaluate data collected between 2013 and 2015. Absent complete, quality assured and certified data for 2015, the analyses of applicable areas for the EPA's intended designations will be informed by data collected between 2012 and 2014. States with monitors that have recorded a violation of the 2010 SO_2 NAAQS during these years have the option of submitting complete, quality assured and certified data for calendar year 2015 by April 19, 2016 to the EPA for evaluation. If after our review, the ambient air quality data for the area indicates that no violation of the NAAQS occurred between 2013 and 2015, the consent decree does not obligate the EPA to complete the designation. Instead, we may designate the area and all other previously undesignated areas in the state on a schedule consistent with the prescribed timing of the court order, i.e., by December 31, 2017, or December 31, 2020.

7) Recommended attainment area – an area a state or tribe has recommended that EPA designate as attainment.
8) Recommended nonattainment area – an area a state or tribe has recommended that EPA designate as nonattainment.
9) Recommended unclassifiable area – an area a state or tribe has recommended that EPA designate as unclassifiable.
10) Recommended unclassifiable/attainment area – an area a state or tribe has recommended that EPA designate as unclassifiable/attainment.
11) Violating monitor – an ambient air monitor meeting all methods, quality assurance and siting criteria and requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.

Technical Analysis for the St. Clair, Michigan Area

Introduction

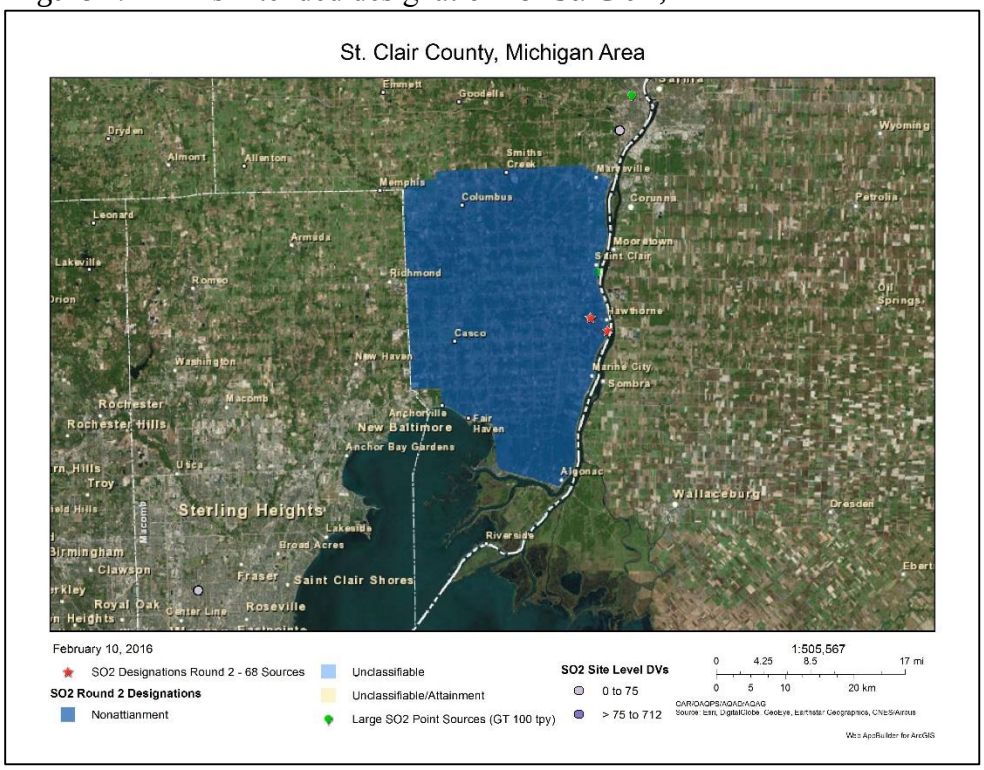
St. Clair County, Michigan contains two stationary sources that according to EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 lbs SO_2/MMBTU. As of March 2, 2015, these stationary sources had not met the specific requirements for being "announced for retirement." Specifically, in 2012, the Belle River Power Plant emitted 24,869 tons of SO_2, and had an emissions rate of 0.621 lbs SO_2/MMBTU, and the St. Clair Power Plant emitted 28,208.476 tons of SO_2, and had an emissions rate of 0.935 lbs SO_2/MMBTU. Pursuant to the March 2, 2015 court-ordered schedule, EPA must designate the area surrounding these facilities by July 2, 2016.

In its submission, Michigan recommended that the area surrounding the Belle River and St. Clair Power Plants, specifically a defined portion of St. Clair County[3], be designated as nonattainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. After careful review of the state's assessment, supporting documentation, and all available data, EPA agrees with the state's recommendation for the area, and intends to designate the area as nonattainment.

The Belle River and St. Clair Power Plants are located in eastern Michigan in the southeastern portion of St. Clair County. As seen in Figure 1 below, the facilities are located next to each other, approximately 6 km southeast of the center of St. Clair along the St. Clair River. Also included in the figure are nearby emitters of SO_2, the state's recommended area for the nonattainment designation, and EPA's intended nonattainment designation for the area.

[3] The portion of St. Clair County recommended by Michigan is defined by the St. Clair River on the east, State Highway M-29 to Church Road to Arnold Road to County Line Road on the south, County Line Road and the Macomb/ St. Clair County boundary to Stoddard Road to Wales Ridge Road on the west, and Alpine Road to Fitz Road to Smith Creek Road to Range Road to Huron Avenue to the St. Clair River on the north.

Figure 1. EPA's intended designation for St. Clair, MI



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

Detailed Assessment

Air Quality Data

This factor considers the SO_2 air quality monitoring data in the area surrounding Belle River and St. Clair Power Plants. The facilities are located in St. Clair County, and the state included monitoring data from the closest monitor (Air Quality System (AQS) site number 26-147-0005) to the facility in its recommendation. This monitor is located at 2525 Dove Road, Port Huron in St. Clair County, and is about 21 km away from Belle River and St. Clair Power Plants. Data collected at this monitor indicates a valid design value for the 2012 to 2014 design period of 69.4 ppb, showing attainment of the 75 ppb standard. This monitor is not located in the recommended nonattainment area, but rather the portion of the county for which Michigan did not make a designation recommendation. Given the distance of this monitor from the power plants, the monitor does not provide reliable evidence as to whether the area near the plants is attaining the NAAQS.

Model Selection and Modeling Components

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.

In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. 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
- BPIPPRIME: 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 15181, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment with 3 km of the facility. According to EPA's modeling guidelines, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50 percent of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50 percent of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area, the state determined that it was most appropriate to run the model in rural mode.

Modeling Parameter: Area of Analysis (Receptor Grid)

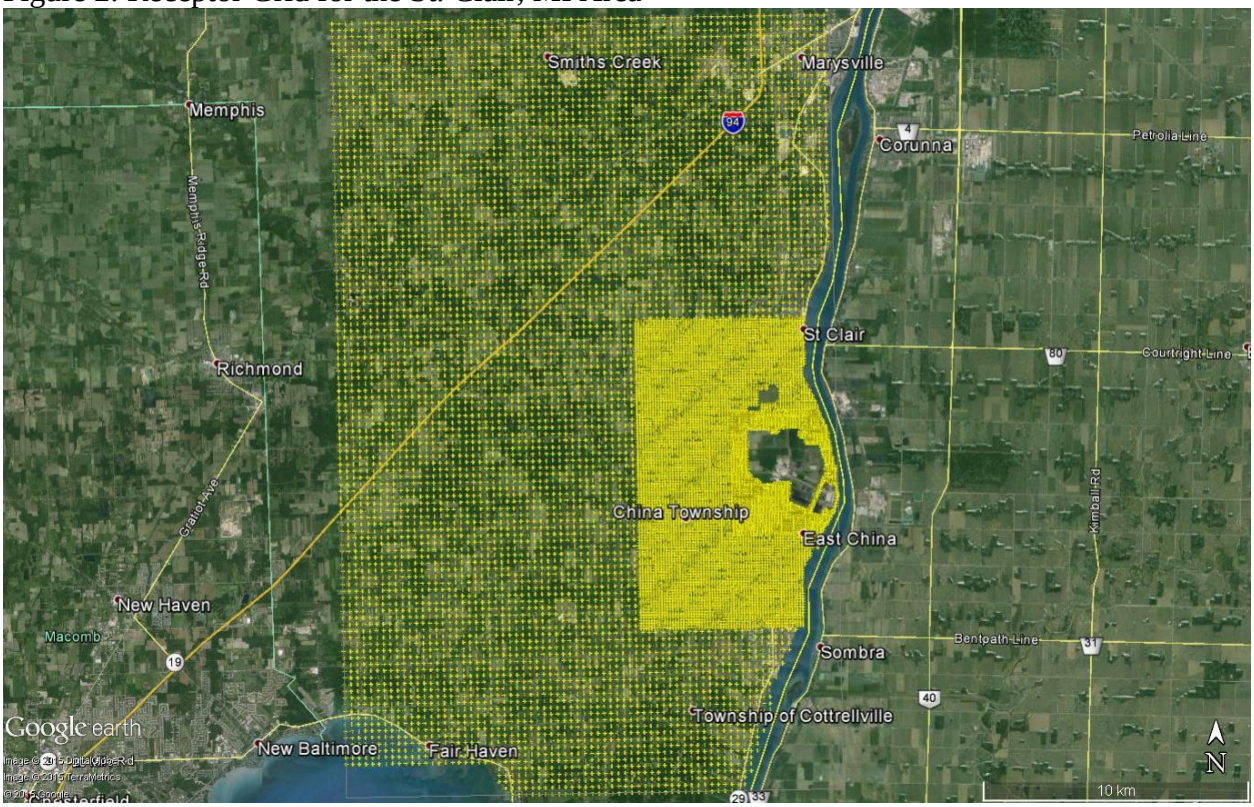
EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the Belle River and St. Clair Power Plants ("the St. Clair area") is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations. For the St. Clair area, the state has not included other emitters of SO_2. E.B. Eddy and Cargill Salt, both located in Port Huron, were originally included, but have recently shut down. The state determined that 10 kilometers (km) was the appropriate distance in order to adequately characterize air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. Aside from exceptionally large sources, sources farther than 10 km from the Belle River and St. Clair Power Plants would not cause significant concentration gradients in the St. Clair area and therefore need not be modeled. The grid receptor spacing for the area chosen by the state is as follows:

- 50 meters (m) out to 500m;
- 100m out to 4 km;
- 250m out to 10 km

The receptor network contained 17,259 receptors, and the network covered ten kilometers from the facilities' fence lines excluding international land, waterways, roadways, secured property, and landfills.

Consistent with the Modeling TAD, receptors for the purposes of this designation effort were placed only in areas where it would also be feasible to place a monitor and record ambient air impacts. The impacts of the area's geography and topography will be discussed later within this document.

Figure 2: Receptor Grid for the St. Clair, MI Area



Modeling Parameter: Source Characterization

The state characterized the sources 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. The state also adequately characterized the sources building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

EPA's Modeling TAD notes that for the purposes 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. The Modeling TAD highly encourages the use of the most detailed throughput, operating schedule and emissions information available.

Variable emissions, temperature, and flow data can be modeled using AERMOD's hourly varying emissions keyword HOUREMIS or variable emission factor keyword EMISFACT. EPA believes that continuous emissions monitoring systems (CEMS) data provide valuable historical emissions information, when it is available, and that these data are available for many electric generating units. However, the TAD also provides the option to use allowable emissions reflecting the applicable, federally enforceable emission limit (referred to as PTE or the allowable emissions rate).

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. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. 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."

The Belle River and St. Clair Plants have stacks that are 2 km apart, and have adjacent fencelines. Therefore, EPA finds it appropriate that Michigan considered the joint impact of these two sources and recommended a combined study area.

As previously noted, the state's modeling included only the Belle River and St. Clair Power Plants, finding no other emitters of SO_2 within 10 km in the area. This distance and these facilities were selected because the state believes that this area adequately represents the area where maximum concentrations of SO_2 are expected and adequately includes the sources which might contribute to those concentrations. E.B. Eddy and Cargill Salt were previously sources of SO_2 in the area, but have recently shut down their coal fired boilers and therefore were not included in the modeling. No other sources within or beyond 10 km were determined by the state to have the potential to cause significant concentration gradient impacts within the area of analysis. The facilities in the area and their associated annual actual SO_2 emissions between 2012 and 2014 are summarized below.

Table 2: Actual SO_2 Emissions between 2012 – 2014 from Facilities in the St. Clair, Michigan Area

Facility Name	Actual SO_2 Emissions (tons per year (tpy))		
	2012	2013	2014
Belle River Power Plant	24,869	24,787	24,467
St. Clair Power Plant	28,208	30,111	27,453
Total Emissions From All Facilities in the State's Area of Analysis	53,077	54,898	51,920

For both Belle River and St. Clair Power Plants, the state used actual emissions from the most recent 3-year data set, i.e., 2012 – 2014. These emissions data were obtained from CEMs.

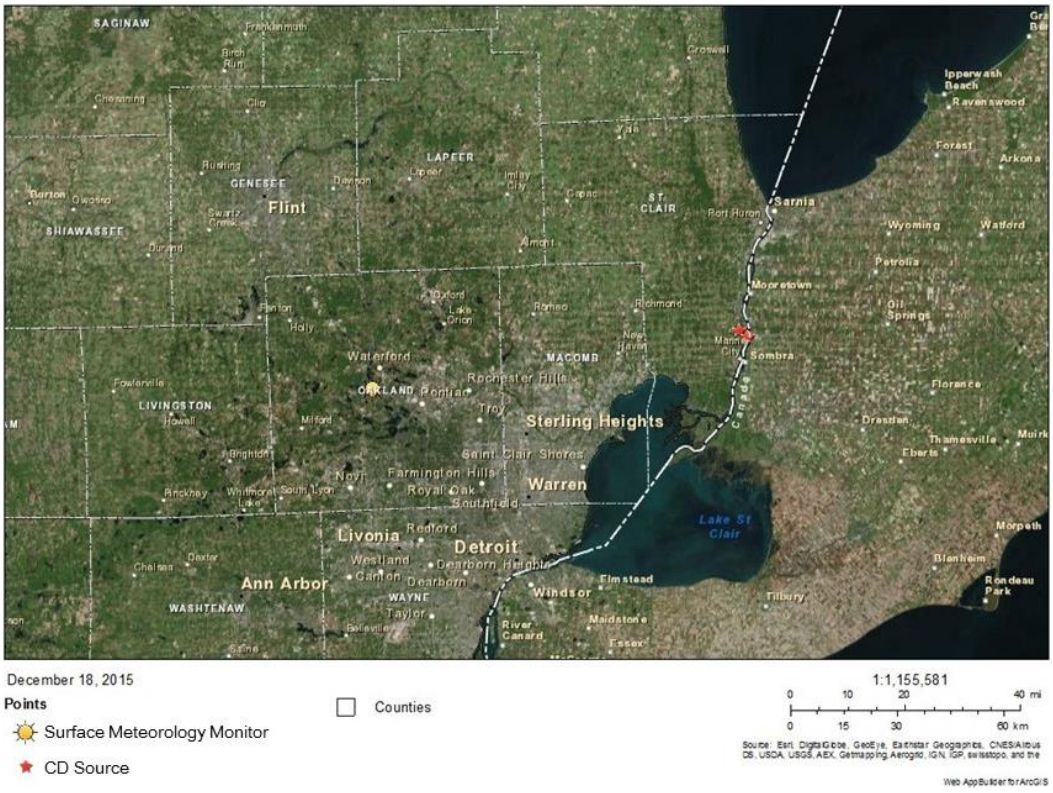
Modeling Parameter: Meteorology and Surface Characteristics

The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are 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 St. Clair area, surface meteorology from Pontiac (77 km away), and coincident upper air observations from White Lake Township, MI, 82 km to the west, were selected as best representative of meteorological conditions within the area.

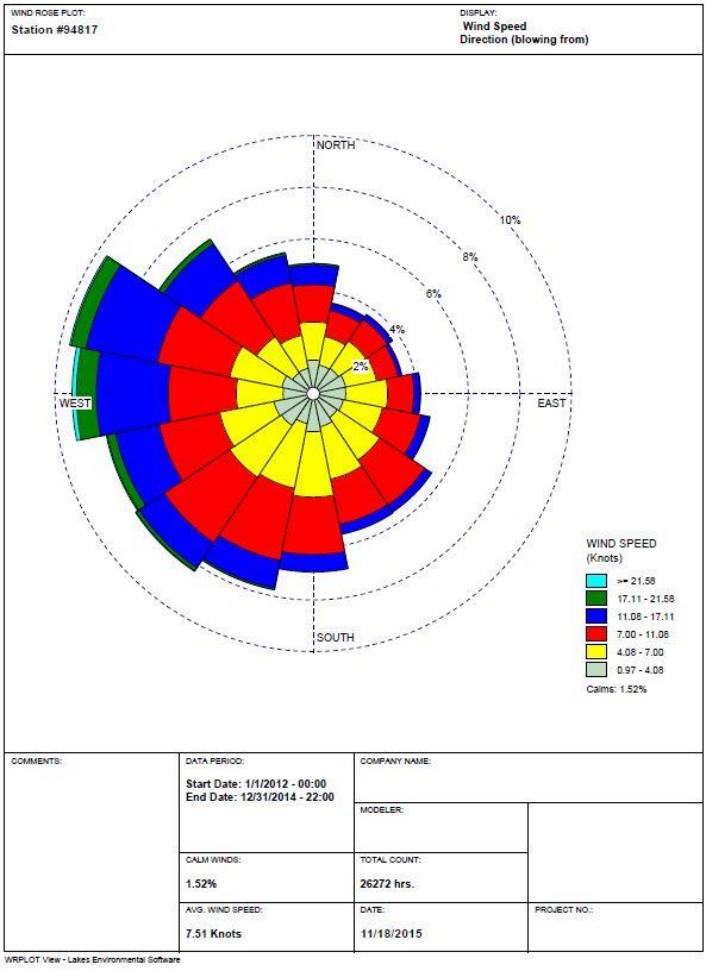
The state used AERSURFACE version 14134 using data from the NWS station in Pontiac, Michigan (located at 42.665° N, 83.41806° W) to estimate the surface characteristics of the area. The state also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (representing the ratio of sensible heat flux to latent heat flux at the ground level), and the surface roughness (representing the influence of ground features such as buildings and vegetation on surface wind flow). In the figure below, generated by EPA, the location of the Pontiac, MI station is shown relative to the St. Clair area.

Figure 3: St. Clair Area and the Pontiac, MI NWS Station



Below is the 3-year surface wind rose for Pontiac, MI. In Figure 4, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The winds predominantly appear to be from westerly directions.

Figure 4: Pontiac, MI Cumulative Annual Wind Rose for Years 2012 – 2014



Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. 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 "Regional Meteorological Data Processing Protocol EPA Region V and States," Draft, August 2014, in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE 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 one minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. 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. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the one minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area is best described as relatively flat. Nevertheless, to account for terrain changes, the AERMAP 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 USGS National Elevation Database.

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 "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For the St. Clair area, the state applied a "first tier" approach using a fixed background concentration. The state determined the value as the Port Huron Monitor design value among selected hours, excluding times when the wind was blowing from the east, reflective of refineries in Canada that would be less likely to impact the power plants, and when the wind was from the south, which would be reflective of the power plants that are being modeled.. The background concentration for this area was determined by the state to be 39.3 micrograms per cubic meter ($\mu g/m^3$), or 15 ppb,[4] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters for the St. Clair area are summarized below in Table 3.

Table 3: AERMOD Modeling Parameters for the St. Clair, MI Area

St. Clair Area	
AERMOD Version	15181
Dispersion Characteristics	Rural
Modeled Sources	2
Modeled Stacks	5

[4] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62$\mu g/m^3$.

Modeled Structures	77
Modeled Fencelines	2
Total receptors	17,259
Emissions Type	Actual
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Pontiac, MI
Upper Air Meteorology Station	White Lake Township, MI
Methodology for Calculating Background SO_2 Concentration	Nearby monitor except hours when wind was from modeled facilities or Canadian facilities
Calculated Background SO_2 Concentration	39.3 $\mu g/m^3$

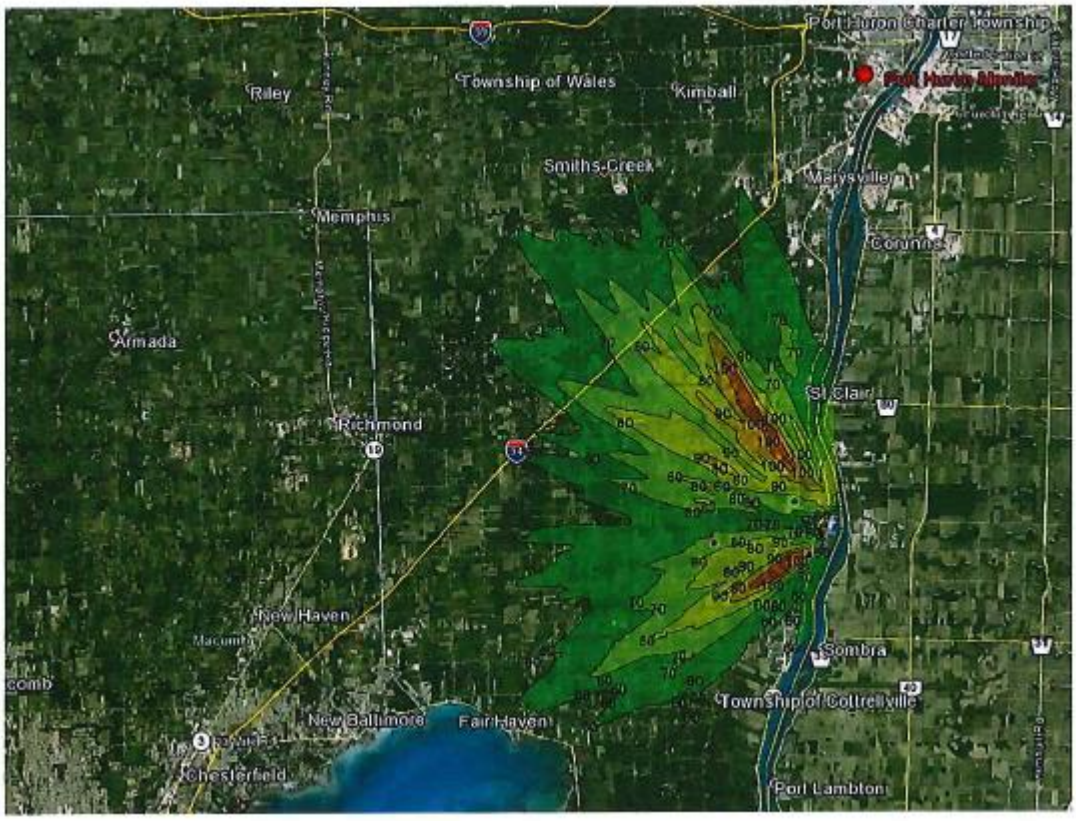
The results presented below in Table 4 show the magnitude and geographic location of the highest predicted modeled concentration based on actual emissions.

Table 4: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the St. Clair, MI Area Based on Actual Emissions

		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	377100	4733900	345.1	196.4

The state's modeling indicates that the predicted 99th percentile 1-hour average concentration within the chosen modeling domain is 345.1 $\mu g/m^3$, or 131.7 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facilities. Figure 5 below was included as part of the state's recommendation, and indicates that the predicted value occurred about 3 km southwest of the power plants.

Figure 5: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the St. Clair Area Based on Actual Emissions



Jurisdictional Boundaries

Once the geographic area associated with the Belle River and St. Clair Power Plants was determined, existing jurisdictional boundaries were considered for the purpose of informing our intended nonattainment area, specifically with respect to clearly defined legal boundaries.

Michigan recommended a partial county area for this nonattainment area defined by the St. Clair River on the east, State Highway M-29 to Church Road to Arnold Road to County Line Road on the south, County Line Road and the Macomb/ St. Clair County boundary to Stoddard Road to Wales Ridge Road on the west, and Alpine Road to Fitz Road to Smith Creek Road to Range Road to Huron Avenue to the St. Clair River on the north. This area includes all receptors that were modeled to be above the standard as well as all sources contributing to the modeled violations.

EPA believes that the boundaries of Michigan's recommended nonattainment area warrant slight clarifications, particularly at the two points where the pertinent roadways do not precisely intersect with the St. Clair River. However, aside from these slight modifications to assure that the nonattainment area is a closed polygon, EPA agrees with the boundaries that Michigan recommended, finding that they otherwise represent appropriate boundaries for the area.

Other Relevant Information

The Sierra Club also submitted modeling showing violations of the standards from the Belle River and St. Clair Power Plants. Sierra Club did not make specific recommendations for nonattainment area boundaries, but the area where Sierra Club modeled violations is within the area Michigan recommended as nonattainment, so that this information supports Michigan's recommendations.

Conclusion

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, EPA intends to designate the area around St. Clair and Belle River Power Plant as nonattainment for the 2010 SO_2 NAAQS. Specifically, the boundaries are a partial county area defined by the St. Clair River for the eastern boundary, an extension from the St. Clair River straight west to the intersection of State Highway M-29 and St. Clair River Drive, continuing west on State Highway M-29 to Church Road to Arnold Road to County Line Road for the southern boundary, County Line Road and the Macomb/ St. Clair County boundary to Stoddard Road to Wales Ridge Road for the western boundary, and Alpine Road to Fitz Road to Smith Creek Road to Range Road to Huron Avenue, extending straight east from the intersection of Huron Road and River Road to the St. Clair River for the northern boundary. These boundaries define the same area as Michigan evidently intended, but better define the area by including short connecting lines at the northeast and southeast corners of the area to assure that the boundaries are completely unambiguous.

At this time, our intended designations for the state only apply to this area and the other areas addressed in this technical support document. Consistent with the conditions in the March 2, 2015 court-ordered schedule, EPA will evaluate and designate all remaining undesignated areas in Michigan by either December 31, 2017, or December 31, 2020.

Technical Analysis for the Bay County, Michigan Area

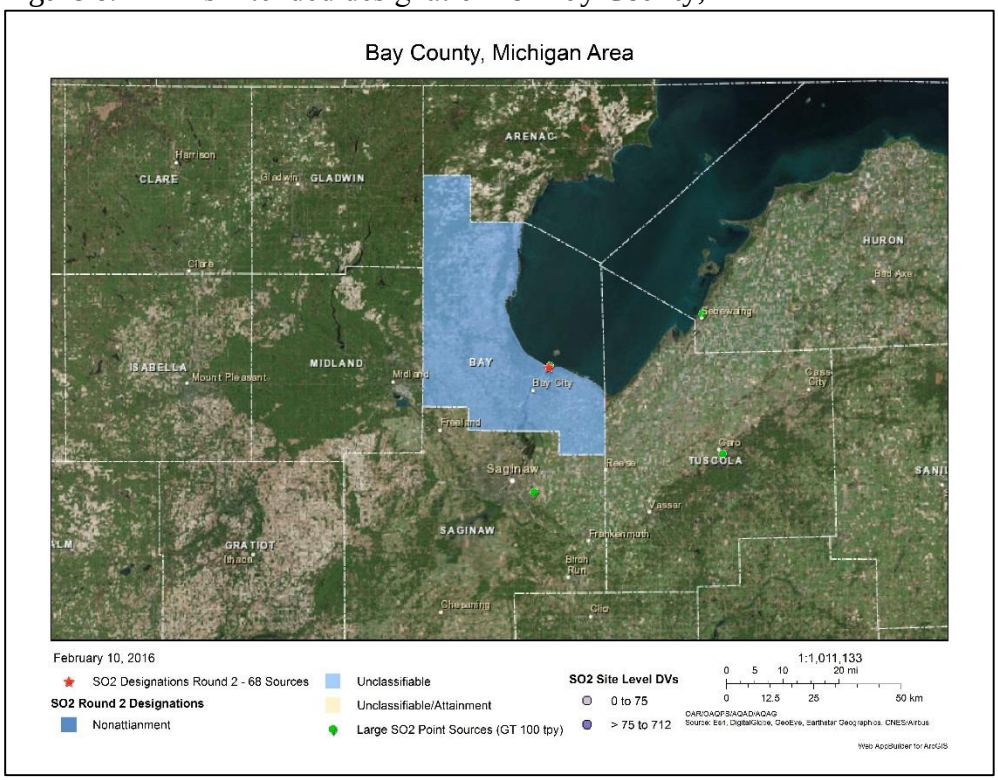
Introduction

Bay County, Michigan contains a stationary source that according to EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 lbs SO_2/MMBTU. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Specifically, the D.E. Karn Generating Complex ("D.E. Karn") emitted 6,850 tons of SO_2, and had an emissions rate of 0.546 lbs SO_2/MMBTU. Pursuant to the March 2, 2015 court-ordered schedule, EPA must designate the area surrounding the facility by July 2, 2016.

In its submission, Michigan recommended that the area surrounding D.E. Karn, specifically the entirety of Bay County, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual and allowable emissions. In this analysis, the JC Weadock Generating Complex (JCW), a facility that is co-located with D.E. Karn, was not included in the modeling because, due to a Federal consent decree, the units at JCW must be retired by April 15, 2016. After careful review of the state's assessment, supporting documentation, and all available data, EPA agrees that the modeling, assuming the shutdown of JCW, shows attainment of the NAAQS. However, since the assumption of the shutdown does not reflect the current state of the Bay County air quality, EPA intends to designate Bay County as unclassifiable. EPA anticipates finalizing the designation of the area as unclassifiable/attainment once the source is confirmed as shutdown.

D.E. Karn is located in eastern Michigan in the southeastern portion of Bay County. As seen in Figure 6 below, the facility is located approximately 7 km northeast of the center of Bay City, situated on the Saginaw Bay, part of Lake Huron. Also included in the figure are nearby emitters of SO_2, the state's recommended area for the attainment designation, and the coterminous area that EPA intends to designate as unclassifiable/attainment.

Figure 6. EPA's intended designation for Bay County, MI



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

Detailed Assessment

Air Quality Data

No monitors are located in or near Bay County to inform the designation for this area.

Model Selection and Modeling Components

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. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. 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
- BPIPPRIME: 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 14134, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment with 3 km of the facility. According to EPA's modeling guidelines, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50 percent of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50 percent of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area, the state determined that it was most appropriate to run the model in rural mode. This determination was reached by using Auer's land use methodology.

Modeling Parameter: Area of Analysis (Receptor Grid)

EPA believes that a reasonable first step towards characterization of air quality in the area surrounding D.E. Karn is to determine the extent of the area of analysis, i.e., 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 of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations. For the Bay County area, the state has not included other emitters of SO_2. D.E. Karn is co-located with JCW which is comprised of coal-fired utility boiler Units 7 and 8 and ancillary equipment; however, under a federally enforceable consent decree, Units 7 and 8 are required to be retired no later than April 15, 2016. Therefore JCW was not included in this modeling analysis. The state determined that 10 km was the appropriate distance in order to adequately characterize air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. Aside from exceptionally large sources, sources farther than 10 km from D.E. Karn would not cause significant concentration gradients in the Bay County area and therefore need not be modeled. The grid receptor spacing for the area of analysis chosen by the state is as follows:

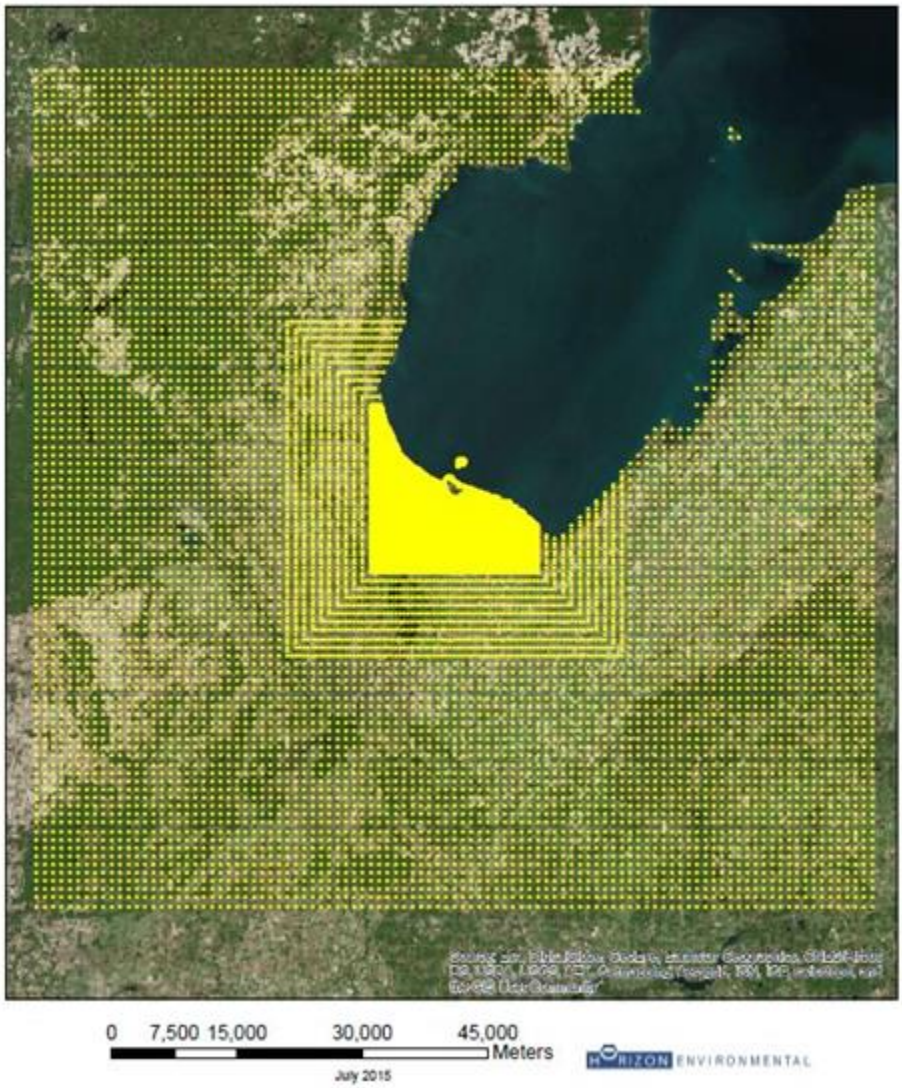
- 100 m spacing from fenceline to 2 km from the facility
- 200 m spacing from 2 km to 10 km from the facility
- 500 m spacing from 10 km to 20 km from the facility
- 1 km spacing from 20 to 50 km from the facility
- An additional nested receptor grid at 100 meter spacing was placed in the area of the maximum impacts which were occurring beyond 2 kilometers from the facility.

The receptor network contained 15,361 receptors, and the network covered an area 50 km from the facility fenceline, excluding the Saginaw River and Saginaw Bay.

Figure 7, included in the state's recommendation, shows the receptor grid for the area. Consistent with the Modeling TAD, receptors for the purposes of this designation effort were

placed only in areas where it would also be feasible to place a monitor and record ambient air impacts. The impacts of the area's geography and topography will be discussed later within this document.

Figure 7: Receptor Grid for the Bay County, MI Area



Modeling Parameter: Source Characterization

The state characterized the source(s) within the area in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions and allowable emissions since all stacks were lower than EPA's good engineering practices (GEP) stack height. This approach is in accordance with EPA policy for allowable emissions limits. 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 BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

EPA's Modeling TAD notes that for the purposes 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. The Modeling TAD highly encourages the use of the most detailed throughput, operating schedule and emissions information available.

Variable emissions, temperature, and flow data can be modeled using AERMOD's hourly varying emissions keyword HOUREMIS or variable emission factor keyword EMISFACT. EPA believes that continuous emissions monitoring systems (CEMS) data provide valuable, historical emissions information, when it is available, and that these data are available for many electric generating units. However, the TAD also provides the option to use allowable emissions reflecting the applicable, federally enforceable emission limit (referred to as PTE or the allowable emissions rate).

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. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. 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 D.E. Karn as the only significant SO2 source within the area. JCW, since it is being required in a federal consent decree to shut down by April 15, 2016, is treated as having a PTE of 0 tpy, and was therefore not included in the modeling. The state looked for other sources within 10 km of D.E. Karn because the state believes that this area adequately represents the area where maximum concentrations of SO_2 are expected and adequately includes the sources which might contribute to those concentrations. No other sources within or beyond 10 km were determined by the state to have the potential to cause significant concentration gradients within the area. For this area, the state has opted to use a hybrid approach, where emissions from certain facilities are expressed as actual emissions, and those from other facilities are expressed as PTE rates. EPA also identified no other sources of SO_2 in the county or otherwise near to D.E. Karn over 100 tpy of SO_2.

For D.E. Karn, annual actual SO_2 emissions between 2012 and 2014 are summarized below by unit.

Table 5: Actual SO_2 Emissions between 2012 – 2014 from D.E. Karn

Unit Name	SO2 Emissions (tpy)		
	2012	2013	2014
Unit 1	3,477	3,550	2,565
Unit 2	3,303	4,936	3,751
Unit 3	27	36	2
Unit 4	43	34	34
Total Emissions From All Units at D.E. Karn	6,850	8,556	6,352

For D.E. Karn Units 3 and 4, the state used actual emissions from the most recent 3-year data set, i.e., 2012 – 2014. This emissions data was obtained from CEMs. These units are peaker units, and only sporadically used, so actual emissions are a better representation than the allowable limits.

For D.E. Karn Units 1 and 2, the state has chosen to model the most recent federally enforceable PTE limits for SO_2, which are summarized below. Units 3 and 4 share one stack and Units 1 and 2 have their own stacks. As a result, EPA considers the emissions of Units 1 and 2 to be sufficiently independent of the emissions of Units 3 and 4 to justify accepting the different approaches for these pairs of units, i.e., for Michigan's modeling of PTE for Units 1 and 2 and modeling actual emissions for 3 and 4 to be acceptable.

Table 6: SO_2 Emissions modeled based on PTE for the Bay County Area

Unit Name	SO_2 Emissions (lbs/hr, based on PTE)	SO_2 Emissions (tpy/hr, based on PTE)
Karn Unit 1	225.0	985.5
Karn Unit 2	228.6	1,001.3
JC Weadock	*0*	*0*
Total Emissions	453.6	1,986.8

Source in italics was not included in the modeling due to a consent decree required shutdown date of April 15, 2016.

The PTE limits for the D.E. Karn units were the result of an installation permit issued on April 30, 2015 to reflect new SO_2 control technology.

In summary, Michigan modeled the actual emissions of D.E. Karn Units 3 and 4 shown in Table 5 and the allowable emissions of D.E. Karn Units 1 and 2 shown in Table 6, and modeled JC Weadock as being shut down.

Modeling Parameter: Meteorology and Surface Characteristics

The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are 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.

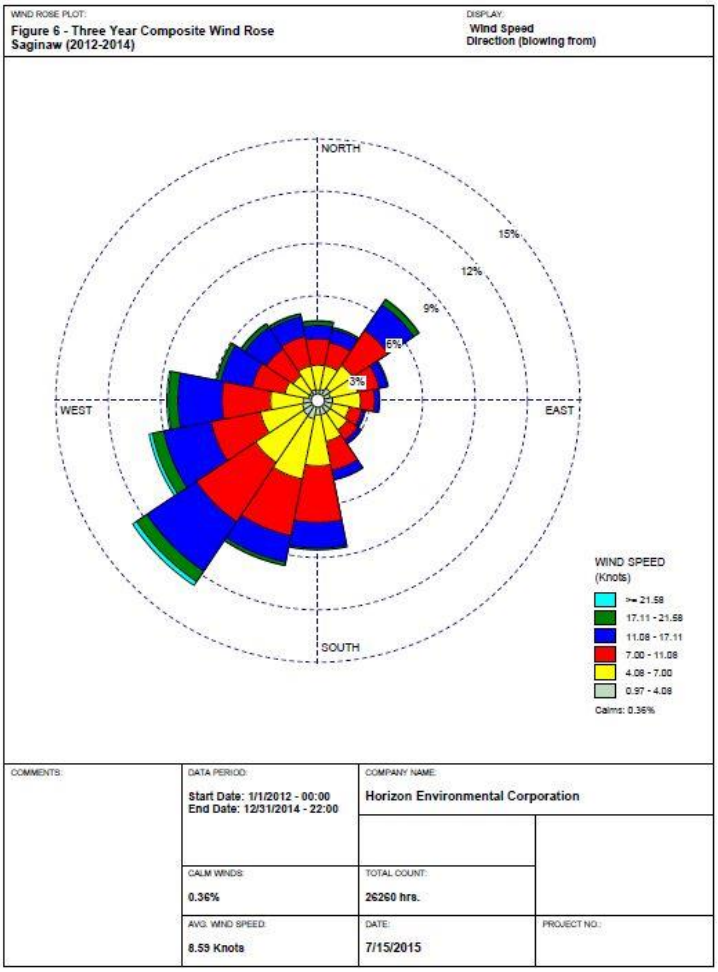
For the Bay County area, surface meteorology from the Saginaw MBS Airport station, 23 km to the southwest, and coincident upper air observations from the White Lake station, 109 km to the south were selected as best representative of meteorological conditions within the area.

The state used AERSURFACE using data from the Saginaw MBS Airport station (located at 43.53306° N, -84.07972° W) to estimate the surface characteristics of the area. The state estimated values for 12 spatial sectors out to 1 km at a monthly temporal resolution for average conditions. The state also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (representing the ratio of sensible heat flux to latent heat flux at the ground level), and the surface roughness (representing the influence of ground features such as buildings and vegetation on surface wind flow). In the figure below, generated by EPA, the location of the Saginaw MBS Airport station is shown relative to D.E. Karn area.

Figure 8: D.E. Karn Area and the Saginaw MBS Airport Station

As part of its recommendation, the state provided the 3-year surface wind rose for the Saginaw, MI surface station. In Figure 9, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The wind direction is predominantly from the southwest, occurring about 12.5 percent of the time.

Figure 9: Saginaw, MI Cumulative Annual Wind Rose for Years 2012 – 2014



Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. 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 the modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE 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 one minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. 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. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the one minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area is best described as relatively flat. Nevertheless, to account for terrain changes, the AERMAP 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 USGS National Elevation Database.

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 "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For Bay County, the state applied a "first tier" approach using a fixed background concentration. The state used the design concentration from the Lansing, MI monitor (AQS site number 26-065-0012) to determine Bay County background concentrations. The background concentration for this area was determined by the state to be 46.9 μg/m^3, or 17.9 ppb,[5] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters for the Bay County area are summarized below in Table 7.

Table 7: AERMOD Modeling Parameters for the Bay County, MI Area

Bay County, MI Area	
AERMOD Version	14134
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	2
Modeled Fencelines	1

[5] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62μg/m^3.

Total receptors	15361
Emissions Type	Actual and PTE
Emissions Years	Actual emissions: 2012-2014 Allowable emissions: Limit effective 2014/2015 (see text)
Meteorology Years	2012-2014
Surface Meteorology Station	Saginaw MBS Airport Station, MI
Upper Air Meteorology Station	White Lake Station, MI
Methodology for Calculating Background SO_2 Concentration	Fixed value derived from Lansing monitor data
Calculated Background SO_2 Concentration	46.9 $\mu g/m^3$

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

Table 8: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Bay County Area Based on Actual and PTE Emissions

		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	267425	4832577	122.6	196.4*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

The state's modeling indicates that the predicted 99th percentile 1-hour average concentration within the chosen modeling domain is 122.6 $\mu g/m^3$, or 46.8 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from Units 3 and 4 and allowable emissions Units 1 and 2 of D.E. Karn. Figure 10 below was included as part of the state's recommendation, and indicates that the predicted value occurred about 5 km to the southwest of the facility.

Figure 10: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Bay County, MI Area Based on Actual and PTE Emissions

Jurisdictional Boundaries

Once the geographic area associated with D.E. Karn was determined, existing jurisdictional boundaries were considered for the purpose of informing our intended unclassifiable area, specifically with respect to clearly defined legal boundaries.

Michigan recommended the entirety of Bay County, MI be designated attainment. The modeling grid extended to 50 km, covering the entirety of the county and portions of the surrounding area. With the exception of JCW, EPA determined that there are no other significant sources of SO_2 in or near the county's borders emitting at or above 500 tpy but for the single source, i.e., D.E. Karn, included in the state's modeling analysis. EPA does not have any information on JCW's current impact on the area, but does not believe that there are any other sources of SO_2 in or around Bay County with the potential to cause or contribute to a violation of the NAAQS within the state's recommended boundary.

EPA believes that our intended unclassifiable area, consisting of Bay County, MI, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our intended unclassifiable area.

Other Relevant Information

No other relevant information was received for this area.

Conclusion

After careful evaluation of the state's recommendation and supporting information, EPA is unable at this time to determine whether the area is meeting or not meeting the NAAQS, and therefore intends to designate the area around D.E. Karn as unclassifiable for the 2010 SO_2 NAAQS. EPA agrees that the modeling analysis assuming the shutdown of JCW shows attainment of the standard, but EPA does not have any information on JCW's current impact on the area, so therefore cannot determine the collective impact of D.E. Karn and JCW. EPA intends to designate the entirety of Bay County, MI as unclassifiable, but anticipates finalizing the designation of the area as unclassifiable/attainment once the source is confirmed as shutdown.

At this time, our intended designations for the state only apply to this area and the other areas addressed in this technical support document. Consistent with the conditions in the March 2, 2015 court-ordered schedule, EPA will evaluate and designate all remaining undesignated areas in Michigan by either December 31, 2017, or December 31, 2020.

Technical Analysis for the Lansing, MI Area

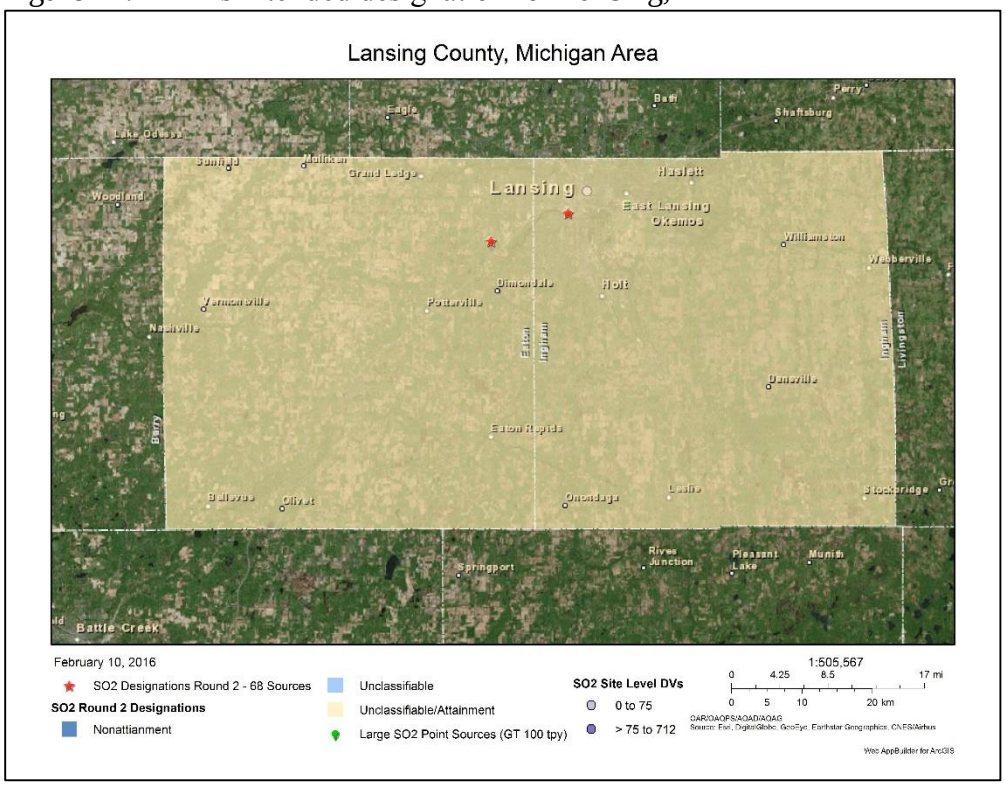
Introduction

The Lansing area contains two stationary sources that according to EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 lbs SO_2/MMBTU. As of March 2, 2015, these stationary sources had not met the specific requirements for being "announced for retirement." Specifically, in 2012, the Eckert Generating Station ("Eckert") emitted 3,677 tons of SO_2, and had an emissions rate of 0.58 lbs SO_2/MMBTU and the Erickson Generating Station ("Erickson") emitted 2,685 tons of SO_2, and had an emissions rate of 0.64 lbs SO_2/MMBTU. Pursuant to the March 2, 2015 court-ordered schedule, EPA must designate the area surrounding these facilities by July 2, 2016.

In its submission, Michigan recommended that the area surrounding these two plants, specifically the entirety of Ingham and Eaton Counties, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. After careful review of the state's assessment, supporting documentation, and all available data, EPA agrees that the area is attaining the standard, and intends to designate Ingham and Eaton Counties as unclassifiable/attainment

The Eckert and Erickson Power Stations are located in Lansing in central Michigan, and are 9 km apart. The Eckert Power Station is in Ingham County along the Grand River near central Lansing, about 2 km from downtown Lansing. The Erickson Power Station is located in Easton County on the southwest side of Lansing, about 10 km from the downtown area. Figure 11 below shows the locations of the facilities, nearby emitters of SO_2, the state's recommended area for the attainment designation, and EPA's intended coterminous unclassifiable/attainment designation for the area.

Figure 11. EPA's intended designation for Lansing, MI



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

Detailed Assessment

Air Quality Data

An ambient air quality monitor, (AQS site number 26-065-0012), located approximately 3 km from the Eckert Power Station and 11 km from the Erickson Power Station. The design value for this monitor for the 2012-2014 design period was 18 ppb. Although Michigan based its designation recommendations on modeling rather than monitoring information, this nearby monitor was relied upon to determine the background concentration for this area.

Model Selection and Modeling Components

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. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. 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

- BPIPPRIME: 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 14134, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment with 3 km of the facility. According to EPA's modeling guidelines, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50 percent of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50 percent of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area, the state determined that it was most appropriate to run the model in rural mode. A land use analysis showed the area around the Eckert Station to be 53 percent urban. However, a historic modeling analysis demonstrated that rural coefficients represent this borderline urban area more accurately. The Ericson facility is more clearly rural through population and land use analyses.

Modeling Parameter: Area of Analysis (Receptor Grid)

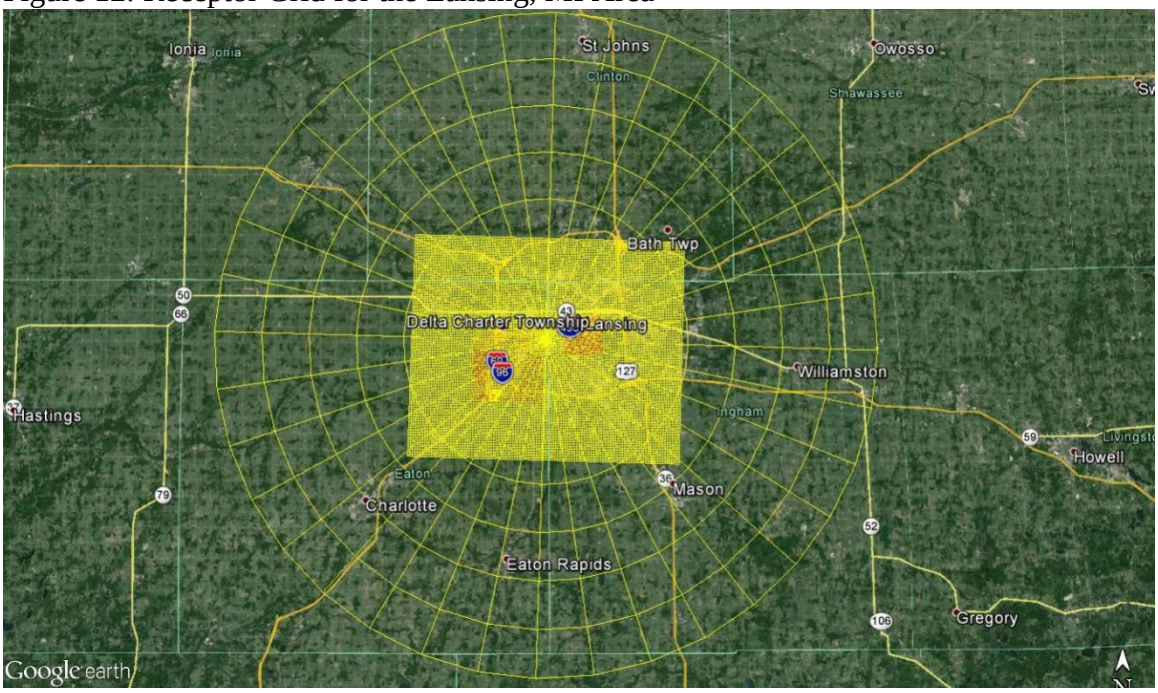
EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the Eckert and Erickson Power Stations is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations. For the Lansing area, the state has included 3 other emitters of SO_2 within 10 km of either Eckert or Erickson in any direction. The state determined that this was the appropriate distance in order to adequately characterize air quality from the facilities and other nearby sources which may have a potential significant impact in the area where maximum concentrations of SO_2 are expected. Aside from exceptionally large sources, sources farther than 10 km from the Eckert and Erickson Power Stations would not cause significant concentration gradients in the Lansing area and therefore need not be modeled. In addition to Eckert and Erickson, the other emitters of SO_2 included in the area are: Michigan State University, Thompson-McCully Asphalt, and Superior Asphalt. The grid receptor spacing for the area chosen by the state is as follows:

- 100 m spacing from facility centers to 2 km from the facilities
- 250 m spacing from 2 km to 10 km from the facilities
- 5,000 m spacing from 15 km to 35 km from the facilities
- An additional nested receptor grid at 50 meter spacing was placed in the area of the maximum impacts.

The receptor network contained 18,816 receptors, and the network covered portions of Ingham and Eaton Counties.

Figure 12, included in the state's recommendation, shows the receptor grid for the area. Although in principle Michigan placed receptors only in areas where it would also be feasible to place a monitor, in practice Michigan conservatively placed receptors at all locations according to the above grid except for receptors within the fencelines of Eckert and Erickson. The impacts of the area's geography and topography will be discussed later within this document.

Figure 12: Receptor Grid for the Lansing, MI Area



Modeling Parameter: Source Characterization

The state characterized the sources within the area in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions and followed EPA's good engineering practices (GEP) policy in conjunction with allowable emissions limits. The state also adequately characterized the sources' building layout and locations, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

EPA's Modeling TAD notes that for the purposes 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. The Modeling TAD highly encourages the use of the most detailed throughput, operating schedule and emissions information available.

Variable emissions, temperature, and flow data can be modeled using AERMOD's hourly varying emissions keyword HOUREMIS or variable emission factor keyword EMISFACT. EPA believes that continuous emissions monitoring systems (CEMS) data provide valuable historical emissions information, when it is available, and that these data are available for many electric generating units. However, the TAD also provides the option to use allowable emissions reflecting the applicable, federally enforceable emission limit (referred to as PTE or the allowable emissions rate).

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. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. 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 Eckert and Erickson and 3 other emitters of SO_2 within 10 km in the area. The state selected this distance and facilities because the state believes that this area adequately represents the area where maximum concentrations of SO_2 are expected and adequately includes the sources which might contribute to those concentrations. No other sources within or beyond 10 km were determined by the state to have the potential to cause significant concentration gradients within the area. For this area, the state has opted to use a hybrid approach, using actual emissions from certain facilities and PTE rates from other facilities.

This information is summarized below, showing the most recently available actual or PTE emissions (as pertinent) for the facilities in the area.

Table 9: Actual and Allowable SO_2 Emissions Between from Facilities in the Lansing, MI Area

Facility Name	Allowable Emissions (tpy)	SO2 Actual Emissions (tpy)			Distance from Eckert (km)	Distance from Erickson (km)
		2012	2013	2014		
Eckert Power Station	----	3,677	2,256	2,312	----	9
Erickson Power Stations	----	2,685	3,903	3,627	9	----
Thompson-McCully Company	241	----	----	----	12	4
Superior Asphalt, Inc.	81	----	----	----	9	0.5
Michigan State University*	----	(809)	(475)	473	6	15

Total Emissions From All Facilities in the Area of Analysis**	----	7,157	6,954	6,734

*Michigan modeled the only the 2014 actual emissions for Michigan State University, but the 2012 and 2013 emissions are shown to get a general emissions profile of the area.
**Includes allowable emissions for Thompson-McCully Company and Superior Asphalt, Inc. in all three years and assumes the same actual value for Michigan State University for all three years.

For both Eckert and Erickson, the state used actual emissions from the most recent 3-year data set, i.e., 2012 – 2014. These emissions data were obtained from CEMs.

For Michigan State University, the state used actual emissions from 2014. Emissions data for this facility were obtained from Michigan's annual emissions inventory. Although the state used 2014 only data instead of using data for 2012 and 2013 that more closely reflect emissions for those years, the three year average of 586 tpy is not significantly higher than the 2014 tpy of 473. Modeling for this area, using the lowered modeled rate for Michigan State University, estimates concentrations well below the standard, so this emissions discrepancy is not significant enough to warrant concern about the attainment status of this area.

For the Thompson-McCully Company and Superior Asphalt facilities, the state has chosen to model the facilities using the most recent federally enforceable PTE limits for SO_2. The PTE limits for these facilities were chosen as the most conservative approach using available data.

Modeling Parameter: Meteorology and Surface Characteristics

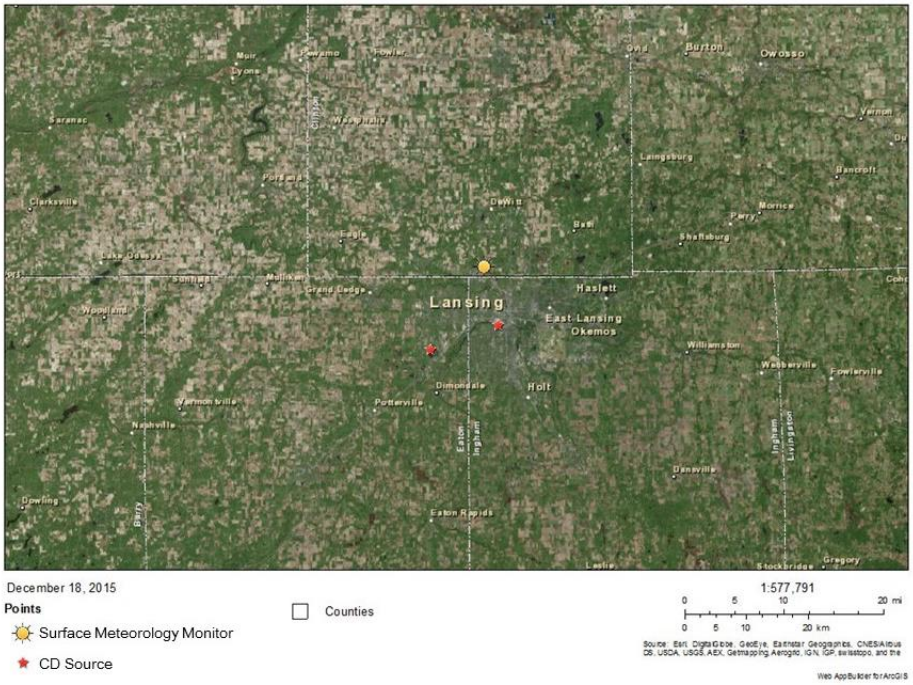
The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are 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 Lansing area, surface meteorology from Capitol City Airport, 7 km to the north of Eckert Power Station, and coincident upper air observations from White Lake, MI, 88 km to the east, were selected as best representative of meteorological conditions within the area.

The state used AERSURFACE using data from the Capitol City Airport station in Lansing (located at 42.78028° N, -84.57889° W) to estimate the surface characteristics of the area. The state estimated values for 12 spatial sectors out to 1 km at a monthly temporal resolution for average conditions. The state also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (representing the ratio of sensible heat flux to latent heat flux at the ground level), and the surface roughness (representing the influence of ground features such as buildings and vegetation on surface wind flow). In the figure below,

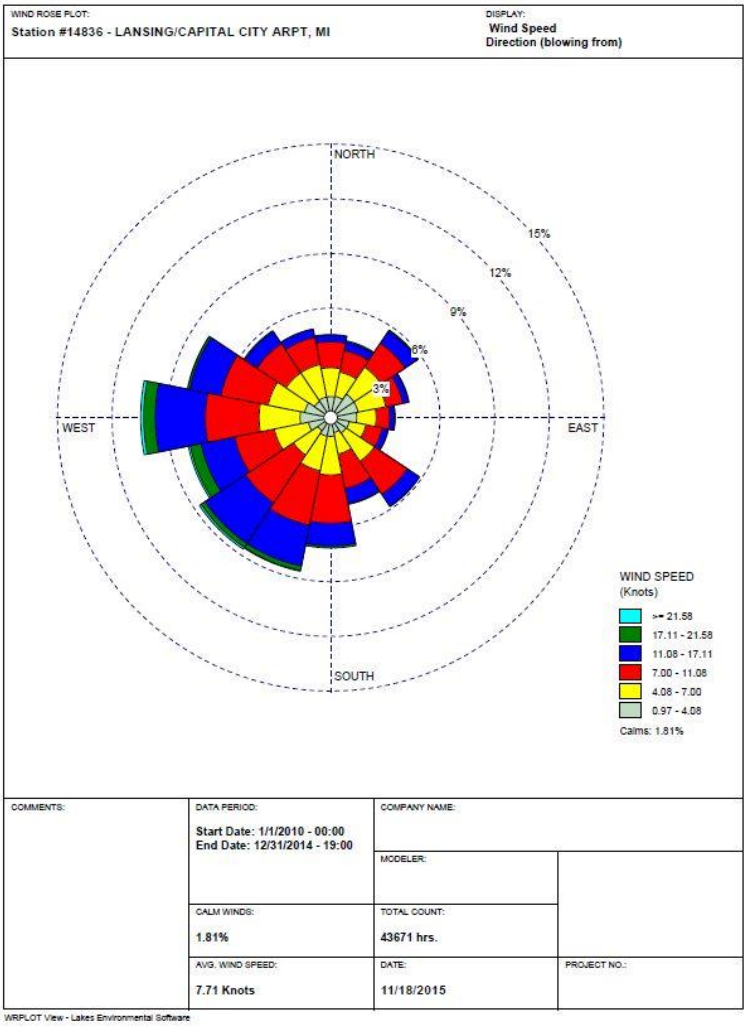
generated by EPA, the location of the Capitol City Airport station is shown relative to Eckert and Erickson .

Figure 13: Eckert and Erickson and the Capitol City Airport Station



In Figure 14, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The wind is most frequently from the southwest, occurring about 11 percent of the time.

Figure 14: Capitol City Airport Cumulative Annual Wind Rose for Years 2012 – 2014



Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. 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 the modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE 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 one minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. 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. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the one minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area is best described as relatively flat. Nevertheless, to account for terrain changes, the AERMAP 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 USGS National Elevation Database.

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 "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For the Lansing area, the state chose the monitored design value from the Ingham County monitor. The background concentration for this area was determined by the state to be 46.9 micrograms per cubic meter ($\mu g/m^3$), or 17.9 ppb,[6] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters for the Lansing area are summarized below in Table 10.

Table 10: AERMOD Modeling Parameters for the Lansing, MI Area

Lansing, MI Area	
AERMOD Version	14134
Dispersion Characteristics	Rural
Modeled Sources	5
Modeled Stacks	12
Modeled Structures	17
Modeled Fencelines	5
Total receptors	18816

[6] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62$\mu g/m^3$.

Emissions Type	Actual and PTE
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Capitol City Airport, Lansing, MI
Upper Air Meteorology Station	White Lake, MI
Methodology for Calculating Background SO_2 Concentration	Ingham County monitor
Calculated Background SO_2 Concentration	46.9 $\mu g/m^3$

The results presented below in table 10 show the magnitude and geographic location of the highest predicted modeled concentration based on actual and PTE emissions.

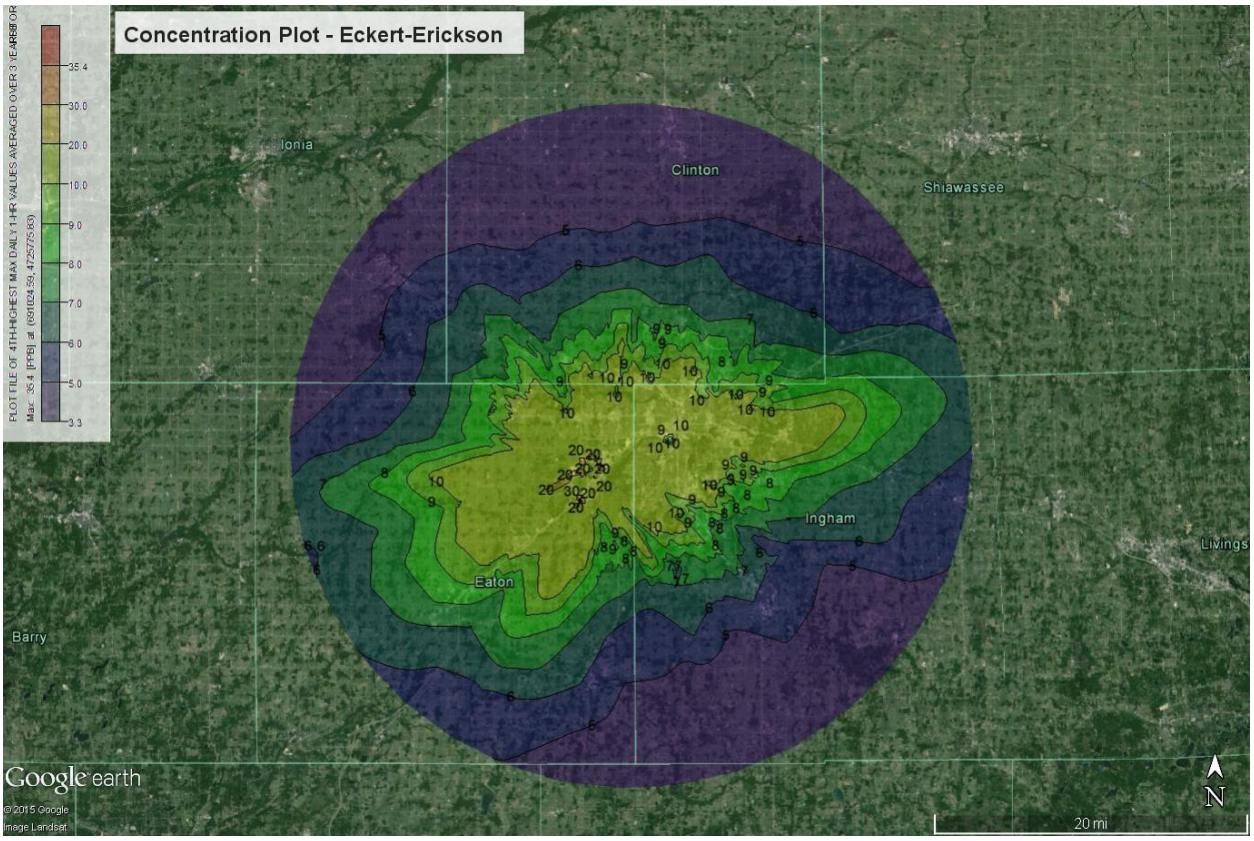
Table 11: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Lansing, MI Area Based on Actual and PTE Emissions

		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	691025	4725776	139.6	196.4*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

The state's modeling indicates that the predicted 99th percentile 1-hour average concentration within the chosen modeling domain is 139.6 $\mu g/m^3$, or 53.3 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual and or PTE emissions from the facilities. Figure 15 below was included as part of the state's recommendation, and indicates that the predicted value occurred 3 km south of Erickson , and 11 km southwest of Eckert. The state's receptor grid is also shown in the figure.

Figure 15: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Lansing, MI Area Based on Actual and PTE Emissions



Jurisdictional Boundaries

Once the geographic area of analysis associated with Eckert and Erickson was determined, existing jurisdictional boundaries are considered for the purpose of informing our intended unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries. Michigan recommended the entirety of Ingham and Eaton Counties, Michigan be designated unclassifiable/attainment. The modeling grid extended to 35 km, covering the majority of the two counties and additional surrounding area. EPA determined that there are no other significant sources of SO_2 in either of the counties or near their borders emitting at or above 100 tpy but for the sources included in the state's modeling analysis. As a result, EPA does not believe that there are any sources of SO_2 in or around these counties with the potential to cause or contribute to a violation of the NAAQS within the state's recommended boundaries.

EPA believes that our intended unclassifiable/attainment area, consisting of Ingham and Eaton Counties, are comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our intended unclassifiable/attainment area.

Other Relevant Information

No other relevant information was received for this area.

Conclusion

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, EPA intends to designate the area around Eckert and Erickson as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, EPA intends for the designated area to include the entirety of Ingham and Eaton Counties.

At this time, our intended designations for the state only apply to this area and the other areas addressed in this technical support document. Consistent with the conditions in the March 2, 2015 court-ordered schedule, EPA will evaluate and designate all remaining undesignated areas in Michigan by either December 31, 2017, or December 31, 2020.

Technical Analysis for the Marquette County, MI Area

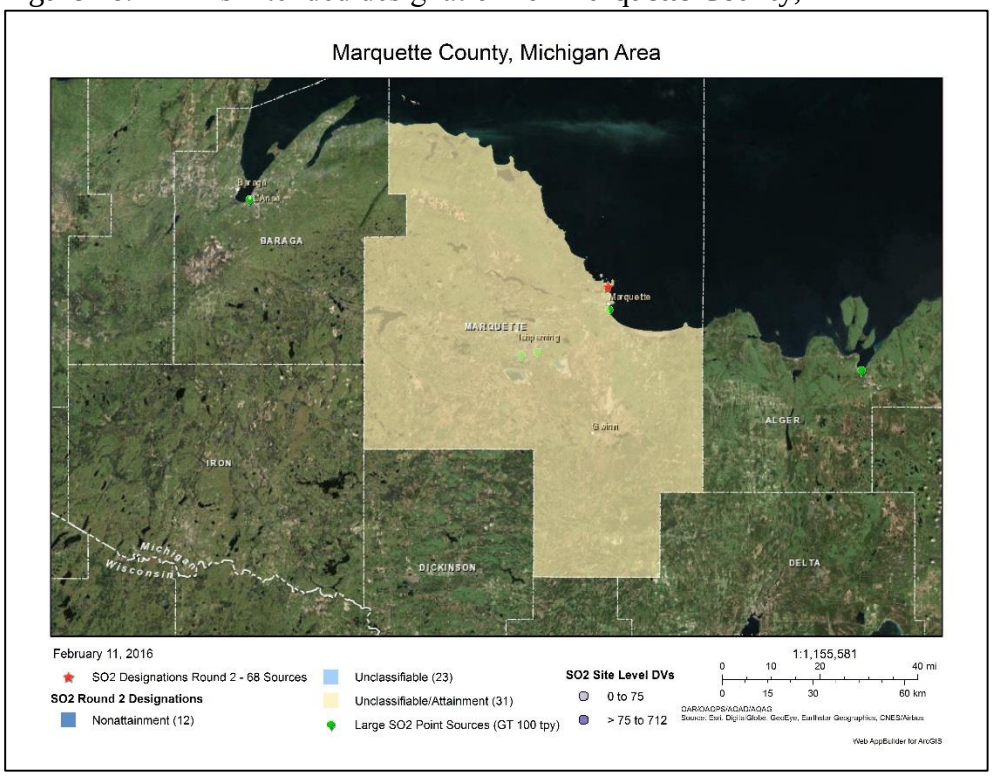
Introduction

Marquette County contains a stationary source that according to EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 lbs SO_2/MMBTU. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Specifically, in 2012, the Presque Isle Power Plant ("Presque Isle") emitted 6,028 tons of SO_2, and had an emissions rate of 0.513 lbs SO_2/MMBTU. Pursuant to the March 2, 2015 court-ordered schedule, EPA must designate the area surrounding the facility by July 2, 2016.

In its submission, Michigan recommended that the area surrounding Presque Isle, specifically the entirety of Marquette County, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual and allowable emissions. After careful review of the state's assessment, supporting documentation, and all available data, EPA agrees that the area is attaining the standard, and intends to designate Marquette County as unclassifiable/attainment.

Presque Isle is located in Marquette County in the Upper Peninsula of Michigan. As seen in Figure 16 below, the facility is located approximately 4 km north of the center of Marquette along the Dead River adjacent to Lake Superior. Also included in the figure are nearby emitters of SO_2, the state's recommended area for the attainment designation, and EPA's intended area for the unclassifiable/attainment designation.

Figure 16. EPA's intended designation for Marquette County, MI



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

Detailed Assessment

Air Quality Data

No monitors are located in or near Marquette County to inform the designation for this area.

Model Selection and Modeling Components

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. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. 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
- BPIPPRIME: 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 14134, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment with 3 km of the facility. According to EPA's modeling guidelines, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50 percent of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50 percent of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area, the state determined that it was most appropriate to run the model in rural mode based on a land use/ land cover analysis.

Modeling Parameter: Area of Analysis (Receptor Grid)

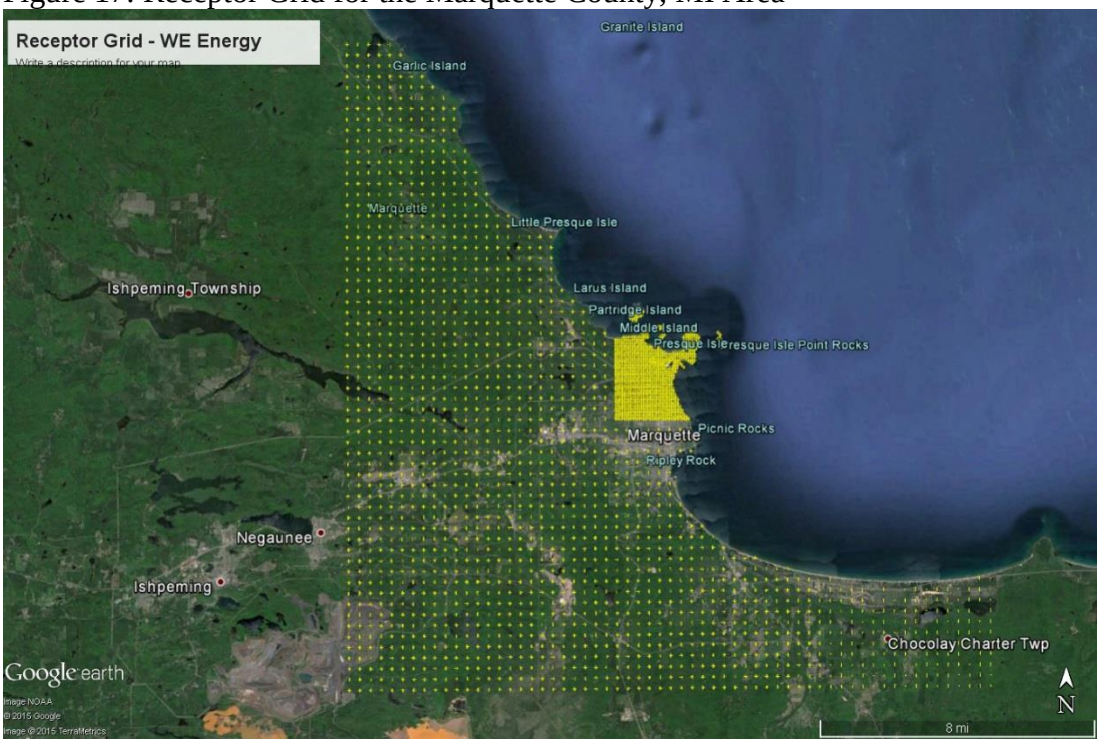
EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the Presque Isle is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations. For the Marquette County area, the state has included 2 other emitters of SO_2 within 10 km of Presque Isle Power Plant in any direction. The state determined that this was the appropriate distance in order to adequately characterize air quality from the facility and other nearby sources which may have a significant impact in the area where maximum concentrations of SO_2 are expected. Aside from exceptionally large sources, sources farther than 10 km from Presque Isle would not cause significant concentration gradients in the Marquette County area and therefore need not be modeled. In addition to the Presque Isle Power Plant, the other emitters of SO_2 included in the area are: Marquette Board of Light and Power and Northern Michigan University. The grid receptor spacing for the area of analysis chosen by the state is as follows:

- 25 m along the fenceline
- 100 m spacing from fenceline to 2.5 km from the facility
- 500 m spacing from 2.5 km to 15 km from the facility
- No receptors were placed on Lake Superior

The receptor network contained 3,120 receptors, and the network covering an eastern portion of Marquette County including Marquette Township and the City of Marquette.

Figure 17, included in the state's recommendation, shows the receptor grid for the area. Consistent with the Modeling TAD, receptors for the purposes of this designation effort were placed only in areas where it would also be feasible to place a monitor and record ambient air impacts. In particular, no receptors were placed over Lake Superior. The impacts of the area's geography and topography will be discussed later within this document.

Figure 17: Receptor Grid for the Marquette County, MI Area



Modeling Parameter: Source Characterization

The state characterized the sources within the area in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions and followed EPA's GEP policy in conjunction with allowable emissions limits. The state also adequately characterized the source's building layout and locations, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

EPA's Modeling TAD notes that for the purposes 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. The Modeling TAD highly encourages the use of the most detailed throughput, operating schedule and emissions information available.

Variable emissions, temperature, and flow data can be modeled using AERMOD's hourly varying emissions keyword HOUREMIS or variable emission factor keyword EMISFACT. EPA believes that CEMS data provide valuable historical emissions information, when it is available, and that these data are available for many electric generating units. However, the TAD also provides the option to use allowable emissions reflecting the applicable, federally enforceable emission limit (referred to as PTE or the allowable emissions rate).

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. Specifically, a facility may have recently

adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. 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 Presque Isle and 2 other emitters of SO_2 that are within 10 km of Presque Isle. The state selected this distance and these facilities because the state believes that this area adequately represents the area where maximum concentrations of SO_2 are expected and adequately includes the sources which might contribute to those concentrations. No other sources within or beyond 10 km were determined by the state to have the potential to cause significant concentration gradients within the area. For this area, the state has opted to use a hybrid approach, where emissions from certain facilities are expressed as actual emissions, and those from other facilities are expressed as PTE rates.

Table 12 shows the emissions of Presque Isle Power Plant and all other sources of SO2 in Marquette County emitting over 100 tpy, showing the data EPA considered in determining the appropriateness of the sources included in the modeling analysis. Sources outside Marquette County are even less likely to have significant impacts in the Presque Isle area.

Table 12: SO_2 Emissions from Facilities in the Marquette County, MI

Facility Name	Allowable Emissions (tpy)	Actual SO_2 Emissions (tpy)			Distance from Presque Isle Power Plant (km)
		2012	2013	2014	
Presque Isle Power Plant	----	6,028	6,001	6,304	----
Marquette Board of Light and Power*	----	(304)	(404)	1,160	2
Northern Michigan University	100	----	----	----	5
Empire Iron Mining Partnership	----	----	----	*319*	*22*
Tilden Mining Company	----	----	----	*976*	*25*
Total Emissions From All Modeled Facilities in the Area of Analysis**	----	6,432	6,505	7,564	

*Michigan modeled the 2014 actual emissions for Marquette Board of Light and Power, but the 2012 and 2013 emissions are shown to get a general emissions profile of the area.
**Includes allowables for Northern Michigan University in all three years.
Facilities in italics were not included in the modeling domain or in the Total Emissions from All Facilities in the Area of Analysis.

For Presque Isle the state used actual emissions from the most recent 3-year data set, i.e., 2012 – 2014. These emissions data were obtained from CEMS.

For the Marquette Board of Power and Light, the state used actual emissions from 2014. Emissions data for this facility were obtained from Michigan's annual emissions

inventory. Although the state used 2014 only data instead of using data for 2012 and 2013 that more closely reflect emissions for those years, the three year average of 623 tpy is lower than the 2014 tpy of 1,160. Therefore, this use of annual actual emissions from 2014 was a more conservative approach than using year-specific emissions data.

The PTE limit for Northern Michigan University was chosen as the most conservative approach using available data.

Modeling Parameter: Meteorology and Surface Characteristics

The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are 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.

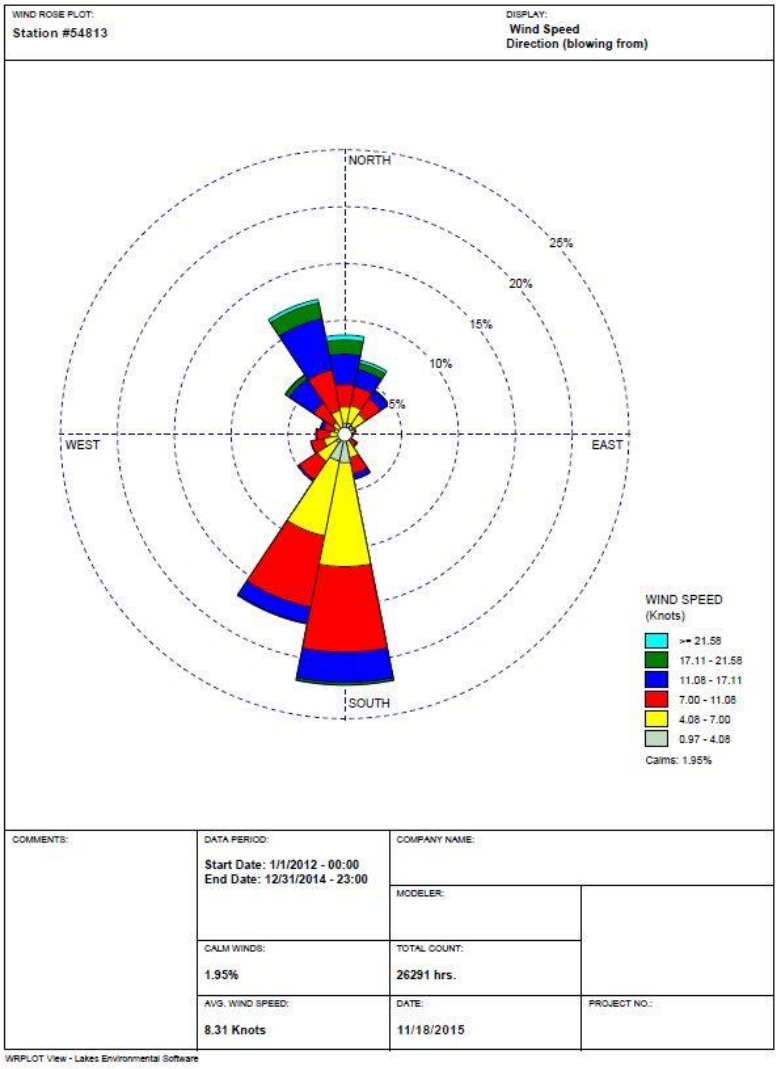
For the Marquette County area, surface meteorology from the NWS station in Munising, MI, 60 km to the northwest, and coincident upper air observations from Gaylord, MI, 272 km to the southeast were selected as best representative of meteorological conditions within the area.

The state used AERSURFACE data from the NWS station in Munising, MI (located at 46.41667° N, 86.65° W) to estimate the surface characteristics of the area. The state estimated values for 12 spatial sectors out to 1 km at a monthly temporal resolution for average conditions. The state also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (representing the ratio of sensible heat flux to latent heat flux at the ground level), and the surface roughness (representing the influence of ground features such as buildings and vegetation on surface wind flow). In the figure below, generated by EPA, the location of the NWS station in Munising, MI is shown relative to the Presque Isle Power Plant area.

Figure 18: Presque Isle Power Area and the Munising, MI NWS station

As part of its recommendation, the state provided the 3-year surface wind data for Munising, MI. In Figure 19, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The winds are predominantly from a southerly direction, occurring about 22 percent of the time.

Figure 19: Munising, MI Cumulative Annual Wind Rose for Years 2012 – 2014



Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. 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 "Regional Meteorological Data Processing Protocol EPA Region V and States," Draft, August 2014, in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE 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 one minute duration was provided from the same instrument tower, but in a different formatted file to

be processed by a separate preprocessor, AERMINUTE. 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. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the one minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area is best described as relatively flat. Nevertheless, to account for terrain changes, the AERMAP 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 USGS National Elevation Database.

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 "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For the Marquette County area, the state applied a "first tier" approach using a fixed background concentration. The state determined the value as the design value from the Forest County, WI monitor, AQS site number 55-041-0007, without excluding any times for purposes of eliminating source impacts. While this monitor is somewhat distant from Marquette County, the environs are similar, and so the Forest County monitor likely provides a reasonable estimate of the background concentrations encountered in Marquette County. The background concentration for this area was determined by the state to be 17.9 micrograms per cubic meter ($\mu g/m^3$), or 6.8 ppb,[7] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters for the Marquette County area are summarized below in Table 13.

[7] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62$\mu g/m^3$.

Table 13: AERMOD Modeling Parameters for the Marquette County, MI Area

Marquette County, MI Area	
AERMOD Version	14134
Dispersion Characteristics	Rural
Modeled Sources	4
Modeled Stacks	4
Modeled Structures	4
Modeled Fencelines	3
Total receptors	3120
Emissions Type	Northern Michigan University: PTE Presque Isle and others: Actual
Emissions Years	2012-2014 or 2014
Meteorology Years	2012-2014
Surface Meteorology Station	Munising, MI
Upper Air Meteorology Station	Gaylord, MI
Methodology for Calculating Background SO_2 Concentration	Design value from Forest County, WI (AQS site number 55-041-0007)
Calculated Background SO_2 Concentration	17.8 $\mu g/m^3$

The results presented below in Table 14 show the magnitude and geographic location of the highest predicted modeled concentration based on the combination of actual and PTE emissions described above.

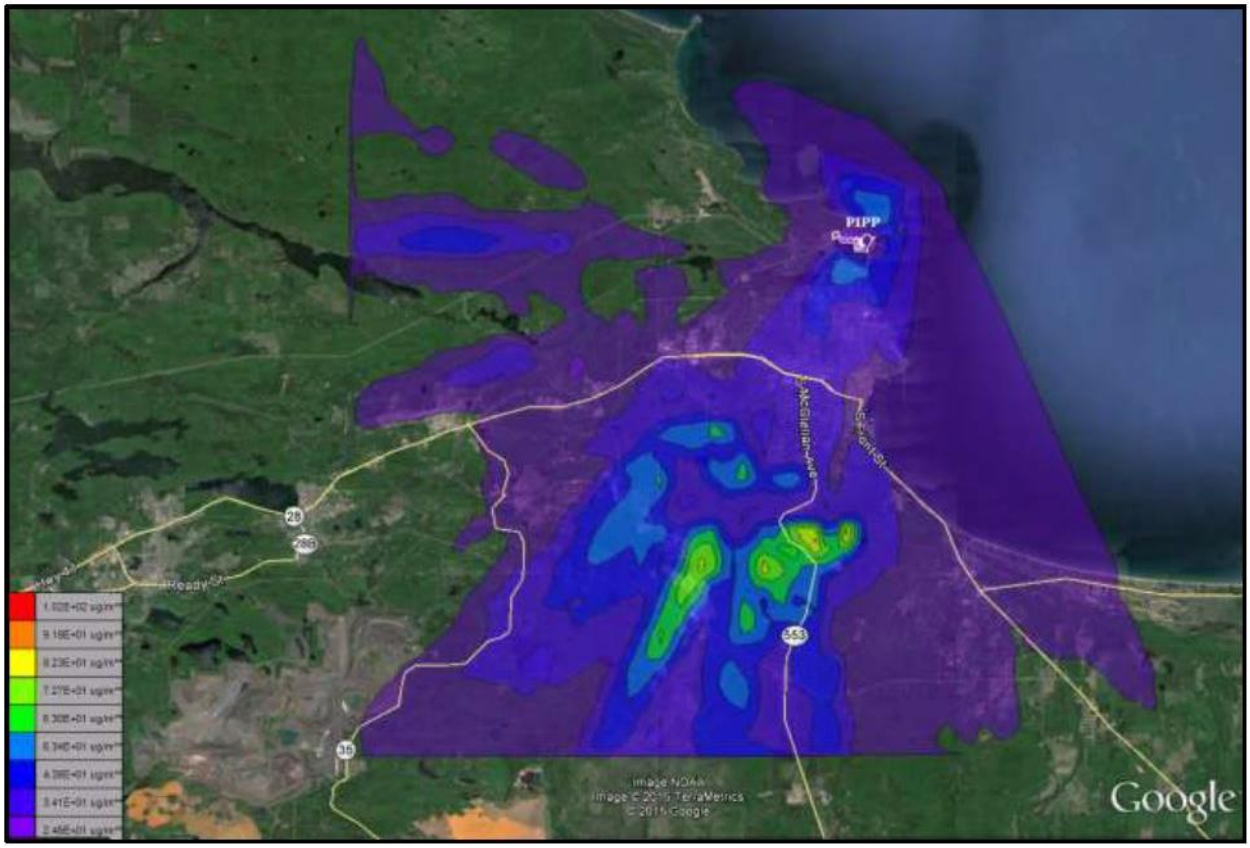
Table 14: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Marquette County, MI Area Based on Actual and Emissions

		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	466725	5151475	104.5	196.4*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

The state's modeling indicates that the predicted 99th percentile 1-hour average concentration within the chosen modeling domain is 104.5 $\mu g/m^3$, or 39.9 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual and PTE emissions from the facilities. Figure 20 below was included as part of the state's recommendation, and indicates that the predicted value occurred about 7.5 km south west of the power plant.

Figure 20: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Marquette County, MI Area Based on Actual and PTE Emissions



Jurisdictional Boundaries

Once the geographic area of analysis associated with Presque Isle was determined, existing jurisdictional boundaries were considered for the purpose of informing our intended designated area, specifically with respect to clearly defined legal boundaries. The state recommended designating the entirety of Marquette County. While the modeling analysis did not include the emissions from either Tilden Mining or Empire Iron Mining, EPA does not believe that emissions from these facilities are causing or contributing to violations of the NAAQS within the area of analysis, and, consequently, the entirety of Marquette County. The contractor modeled a 15 km grid around Presque Isle as attaining the standard with the maximum impact 7.5 km away from the facility. Based on the distance between Presque Isle and Tilden Mining and Empire Iron Mining (approximately 22 km), EPA does not believe that emissions from either of these sources would impact the modeled maximum concentration. Therefore, EPA believes that our intended unclassifiable/attainment area, consisting of the entirety of Marquette County, applies clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our intended unclassifiable/attainment area.

Other Relevant Information

No other relevant information was received for this area.

Conclusion

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, EPA intends to designate the area around Presque Isle Power Plant as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the area are comprised of the entirety of Marquette County, MI.

At this time, our intended designations for the state only apply to this area and the other areas presented in this technical support document. Consistent with the conditions in the March 2, 2015 court-ordered schedule, EPA will evaluate and designate all remaining undesignated areas in Michigan by either December 31, 2017, or December 31, 2020.

Technical Analysis for the Monroe County, MI Area

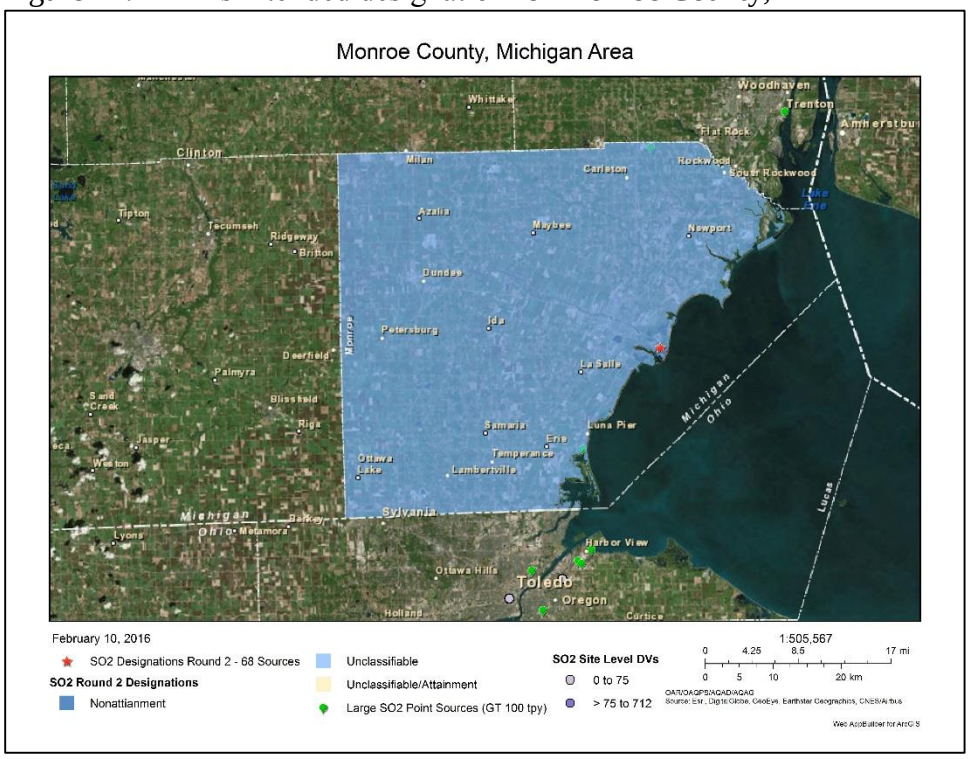
Introduction

Monroe County, Michigan contains a stationary source that according to EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 lbs SO_2/MMBTU. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Specifically, in 2012 the Monroe Power Plant ("Monroe") emitted 49,151 tons of SO_2, and had an emissions rate of 0.62 SO_2/MMBTU. Pursuant to the March 2, 2015 court-ordered schedule, EPA must designate the area surrounding the facility by July 2, 2016.

In its submission, Michigan recommended that the area surrounding Monroe, specifically the entirety of Monroe County, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing allowable emissions. In this analysis, the J.R. Whiting Generating Complex (Whiting) was not included in the modeling because, due to a Federal consent decree, Whiting must be retired by April 15, 2016. After careful review of the state's assessment, supporting documentation, and all available data, EPA agrees that the modeling, assuming the shutdown of Whiting, shows attainment of the NAAQS. However, since the assumption of the shutdown does not reflect the current state of the Monroe County air quality, EPA intends to designate Monroe County as unclassifiable. EPA anticipates finalizing the designation of the area as unclassifiable/attainment once the source is confirmed as shutdown.

Monroe is located in southeastern Michigan in the eastern portion of Monroe County. As seen in Figure 21 below, the facility is located approximately 5 km southeast of the center of the City of Monroe along Lake Erie near the mouth of the River Raisin. Also included in the figure are nearby emitters of SO_2, the state's recommended area for the Monroe designation, and EPA's intended coterminous unclassifiable designation for the area.

Figure 21. EPA's intended designation for Monroe County, MI



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

Detailed Assessment

Air Quality Data

An ambient air quality monitor, (AQS site number 26-115-0006), located approximate 3.5 km north of Monroe, began operation at the beginning of 2013. The average of the 99th percentile of daily maximum concentrations for 2013 and 2014 was 18.1 µg/m^3. Although Michigan did not analyze whether this site is indicative of maximum concentrations near Monroe, and Michigan based its designation recommendations on modeling rather than monitoring information, this information helps support a finding that this area is attaining the SO_2 NAAQS.

Model Selection and Modeling Components

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. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. 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
- BPIPPRIME: 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 14134, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment with 3 km of the facility. According to EPA's modeling guidelines, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50 percent of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50 percent of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area, the state determined that it was most appropriate to run the model in rural mode based on a land use analysis.

Modeling Parameter: Area of Analysis (Receptor Grid)

EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the Monroe Power Plant is to determine the extent of the area of analysis, i.e., 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 of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations. For the Monroe County area, the state has included 3 other emitters of SO_2 within 22 km of the Monroe in any direction. The state determined that generally 10 km was the appropriate distance in order to adequately characterize air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected, and that aside from exceptionally large sources, sources farther than 10 km from the power plants would not cause significant concentration gradients in the area, and therefore would not need to be modeled. However, in this case, the contractor running the model decided to take a more conservative approach than what the state had recommended for the other areas and include an extra source outside of the 10 km but within the recommended attainment area of the county boundary. In addition to the Monroe, the other emitters of SO_2 included in the area of analysis are: IKO Monroe, Guardian Industries, and Gerdau MacSteel Monroe. Whiting, under a federally enforceable consent decree, is required to be retired no later than April 15, 2016 and was therefore not included in this modeling analysis. The grid receptor spacing for the area of analysis chosen by the state is as follows:

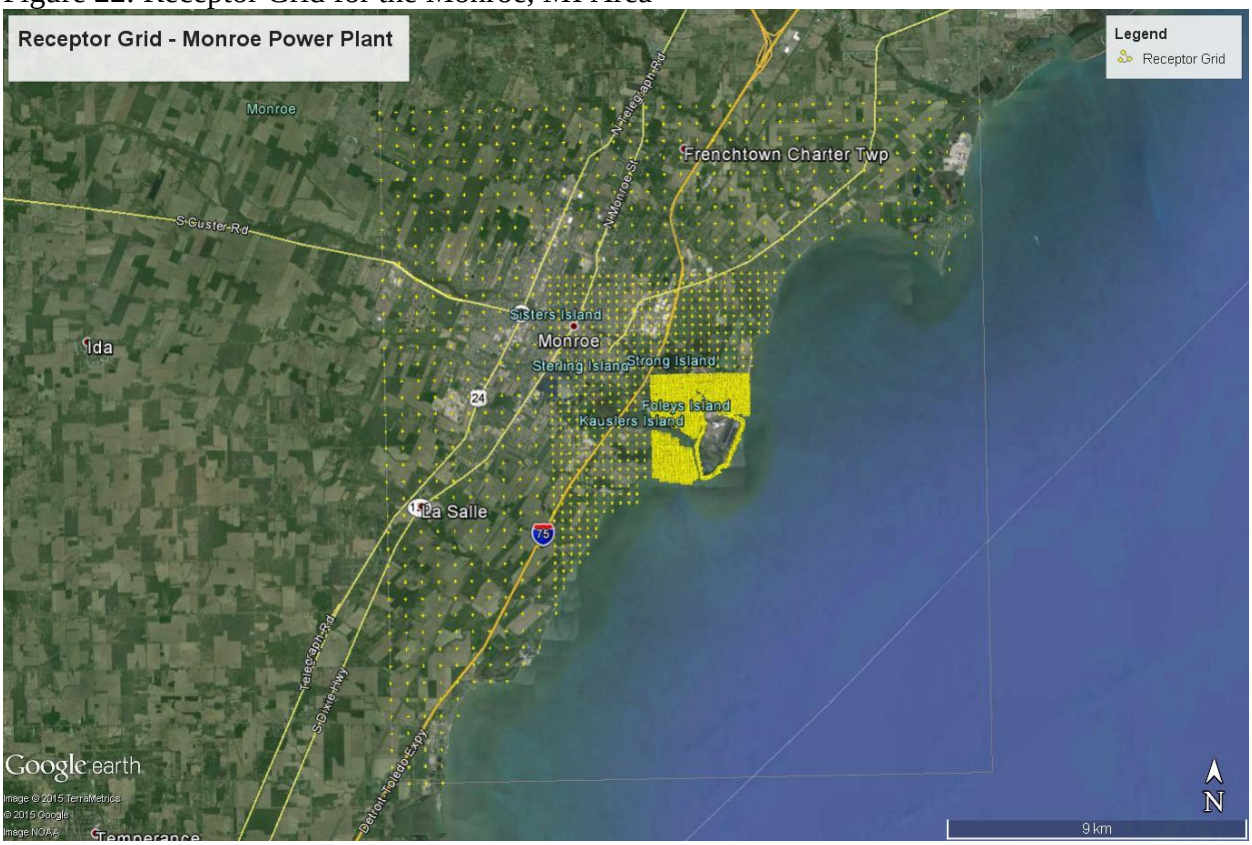
- 25 m along the Monroe fenceline
- 50 m spacing from fenceline to 2 km from Monroe Power Plant

- 250 m spacing from 2 km to 5 km from Monroe Power Plant
- 500 m spacing from 5 km to 10 km from Monroe Power Plant
- Except that no receptors were placed over water bodies such as Lake Erie

The receptor network contained 68,145 receptors, and the network covered the eastern portion of Monroe County, MI.

Figure 22, included in the state's recommendation, shows the receptor grid for the area. Consistent with the Modeling TAD, receptors for the purposes of this designation effort were placed only in areas where it would also be feasible to place a monitor and record ambient air impacts; for example, no receptors were placed over Lake Erie. The impacts of the area's geography and topography will be discussed later within this document.

Figure 22: Receptor Grid for the Monroe, MI Area



Modeling Parameter: Source Characterization

The state characterized the source(s) within the area in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions and followed EPA's good engineering practices (GEP) policy in conjunction with allowable emissions limits. The state also adequately characterized the sources' building layout and locations, as well as the stack parameters, e.g., exit temperature, exit

velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

EPA's Modeling TAD notes that for the purposes 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. The Modeling TAD highly encourages the use of the most detailed throughput, operating schedule and emissions information available.

Variable emissions, temperature, and flow data can be modeled using AERMOD's hourly varying emissions keyword HOUREMIS or variable emission factor keyword EMISFACT. EPA believes that continuous emissions monitoring systems (CEMS) data provide valuable historical emissions information, when it is available, and that these data are available for many electric generating units. However, the TAD also provides the option to use allowable emissions reflecting the applicable, federally enforceable emission limit (referred to as PTE or the allowable emissions rate).

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. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. 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 the Monroe Power Plant and 3 other emitters of SO_2 within 22 km in the area. The state selected this distance and facilities because the state believes that this area adequately represents the area where maximum concentrations of SO_2 are expected and adequately includes the sources which might contribute to those concentrations. No other sources beyond 22 km were determined by the state to have the potential to cause significant concentration gradients within the area. Whiting, since it is being required in a federal consent decree to shut down by April 15, 2016, is treated as having a PTE of 0 tpy, and was therefore not included in the modeling. For this area, the state has opted to use a hybrid approach, where emissions from certain facilities are expressed as actual emissions, and those from other facilities are expressed as PTE rates.

This information is summarized below is the most recently available actual or PTE emissions for the facilities in the area.

Table 15: Actual and Allowable SO_2 Emissions Between from Facilities in the Monroe County, MI Area

Facility Name	Allowable Emissions (tpy)	SO2 Actual Emissions (tpy)			Distance from Monroe Power Plant (km)
		2012	2013	2014	
Monroe Power Plant	14,293	49,151	43,766	6,286	----
Guardian Industries*	----	(613)	(581)	581	22
Gerdau MacSteel Monroe*	----	(22)	(23)	22	1
IKO Monroe	88	----	-----	----	7
J.R. Whiting	*0*	----	----	----	*14*
Total Emissions From All Modeled Facilities in the Area of Analysis**	14,984				

Source in italics was not included in the modeling due to a consent decree required shutdown date of April 15, 2016.
*Michigan modeled the 2014 actual emissions for Guardian Industries and Gerdau MacSteel Monroe, but the 2012 and 2013 emissions are shown to get a general emissions profile of the area.
**Includes allowables for Monroe Power Plant and IKO Monroe in all three years and assumes the same 2014 actual value for Guardian Industries and Gerdau MacSteel Monroe for all three years.

For the Guardian Industries and Gerdau MacSteel Monroe facilities, the state used actual emissions from 2014 instead of using data for 2012 and 2013 that more closely reflect emissions for those years. Emissions data for both facilities for 2012 and 2013 was obtained from Michigan's annual emissions inventory. For the Gerdau MacSteel Monroe facility, the three year average for 2012 to 2014 is the same as emissions in 2014. The three year average for Guardian Industries of 592 tpy is not significantly higher than the 2014 emissions of 581 tpy. Modeling for this area, using the lower modeled rate for these facilities, estimated concentrations well below the standard, so these emissions discrepancies are not significant enough to warrant concern about the attainment status of this area.

For Monroe and IKO Monroe facilities, the state has chosen to model the facilities using the most recent federally enforceable PTE limits for SO_2. The PTE limit for the Monroe Power Plant was associated with the use of new control technology. The PTE limit for the IKO Monroe facility was chosen as the most conservative approach using available data.

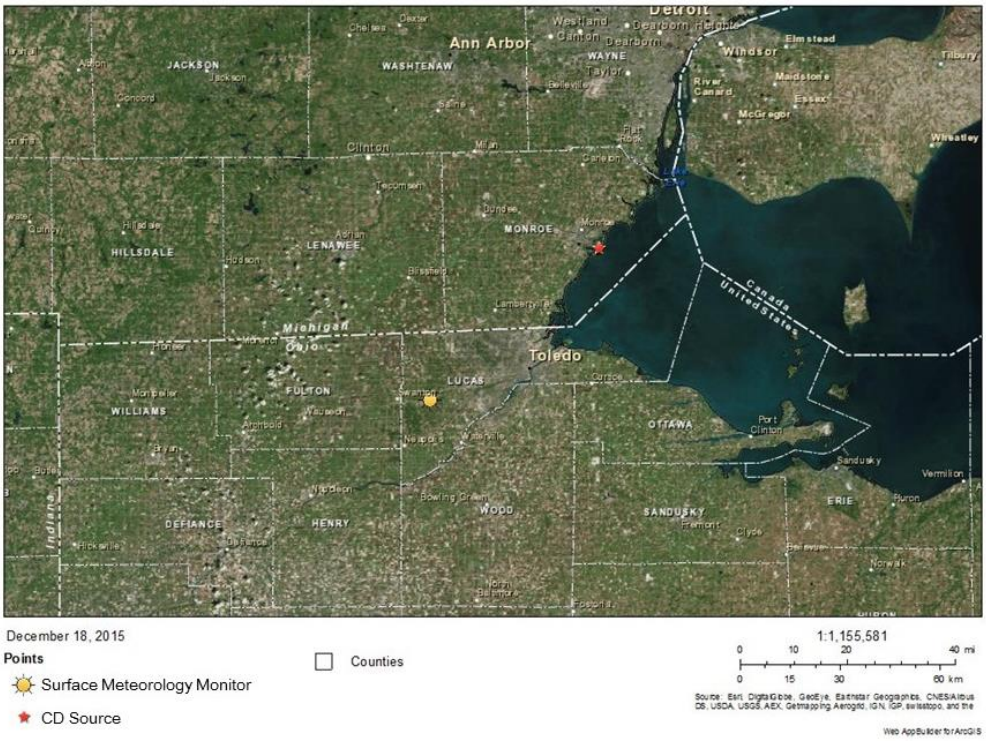
Modeling Parameter: Meteorology and Surface Characteristics

The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are 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 Monroe County area, surface meteorology from the station in Toledo, OH, 50 km to the southwest, and coincident upper air observations from the NWS station in White Lake Township, MI, 90 km to the north, were selected as best representative of meteorological conditions within the area.

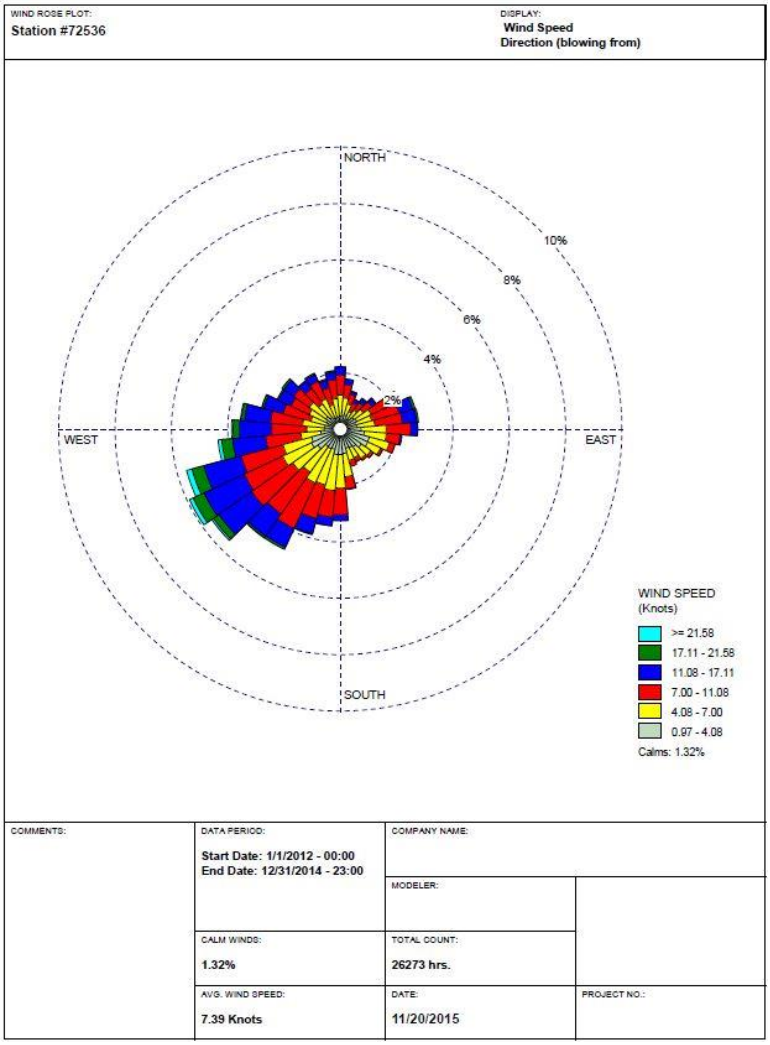
The state used AERSURFACE version 13016 using data from the station in Toledo, OH (located at 41.58861° N, 83.80139° W) to estimate the surface characteristics of the area. The state estimated values for 12 spatial sectors out to 1 km at a monthly temporal resolution for average conditions. The state also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (representing the ratio of sensible heat flux to latent heat flux at the ground level), and the surface roughness (representing the influence of ground features such as buildings and vegetation on surface wind flow). In the figure below, generated by EPA, the location of the Toledo, OH station is shown relative to the Monroe area.

Figure 23: Monroe Power Plant Area and the Toledo, OH



As part of its recommendation, the state provided the 3-year surface wind data for Toledo, OH. In Figure 24, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The wind predominantly blows from southwesterly directions.

Figure 24: Toledo, OH Cumulative Annual Wind Rose for Years 2012 – 2014



Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. 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 "Regional Meteorological Data Processing Protocol EPA Region V and States," Draft, August 2014, in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE 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 one minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. 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. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the one minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area is best described as flat and simple. To account for these terrain changes, the AERMAP 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 USGS National Elevation Database.

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 "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For the Monroe County area, the state chose a conservative variation on the first tier approach. The background concentration was based on a monitor from the nearby Sterling State Park (monitor number 26-115-0006) without data when the Monroe Power Plant was impacting the monitor. However, only two years of data were available, so the highest 4th high was selected from the two years. The result was higher, and therefore more conservative, than the result from the Michigan City, IN monitor that has been previously relied upon for this area, and more generally the result, despite being based on less than three years of data, may be considered a reasonable estimate of a conservative background concentration. The background concentration for this area was determined by the state to be 47.7 micrograms per cubic meter ($\mu g/m^3$), or 18.2 ppb,[8] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters for the Monroe County area are summarized below in Table 16.

[8] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62$\mu g/m^3$.

Table 16: AERMOD Modeling Parameters for the Monroe County, MI Area

Monroe County, MI Area	
AERMOD Version	14134
Dispersion Characteristics	Rural
Modeled Sources	4
Modeled Stacks	7
Modeled Structures	35
Modeled Fencelines	4
Total receptors	68145
Emissions Type	Monroe and IKO Monroe: PTE Guardian Industries and Gerdau MacSteel Monroe: Actual
Emissions Years	2014
Meteorology Years	2012-2014
Surface Meteorology Station	Toledo, OH
Upper Air Meteorology Station	White Lake Township, MI
Methodology for Calculating Background SO_2 Concentration	Sterling State Park Monitor
Calculated Background SO_2 Concentration	47.7 $\mu g/m^3$

The results presented below in Table 17 show the magnitude and geographic location of the highest predicted modeled concentration based on actual and PTE emissions.

Table 17: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Monroe County, MI Area Based on Actual and PTE Emissions

		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	303710	4642500	159.8	196.4*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

The state's modeling indicates that the predicted 99th percentile 1-hour average concentration within the chosen modeling domain is 159.8 $\mu g/m^3$, or 61 ppb. This modeled concentration included the background concentration of SO_2, and is based on PTE emissions for Monroe and IKO Monroe and actual average emissions from Guardian Industries and Gerdau MacSteel Monroe. Figure 25 below was included as part of the state's recommendation, and indicates that the predicted value occurred 3 km northwest of the Monroe Power Plant.

Figure 25: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Monroe County Area Based on a Combination of Actual and PTE Emissions

Jurisdictional Boundaries

Once the geographic area of analysis associated with the Monroe Power Plant was determined, existing jurisdictional boundaries were considered for the purpose of informing our intended unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries.

Michigan recommended the entirety of Monroe County, MI be designated attainment. Monroe County is bordered by an existing nonattainment area, in Wayne County, but the monitored violation and most of the sources contributing to violations in the Detroit area are in or near to the City of Detroit, over 15 km from the Monroe County border, and no sources in Wayne County would be considered to contribute to any potential air quality problems in Monroe County. In the Toledo, Ohio area, south of Monroe County, the Bay Shore Power Plant emitted 2,002 tpy in 2014. Bay Shore is 5 km from the southeast border of Monroe County. Monroe County is also in the least frequent wind direction from the source. Therefore, Bay Shore is likely to be characterized under the DRR, but is unlikely to cause or contribute to a violation of the NAAQS within the state's recommended boundaries. EPA does not have any information on Whiting's current impact on the area, and therefore cannot determine the collective impact of Monroe, Whiting, IKO Monroe, Guardian Industries, and Gerdau MacSteel Monroe. However, EPA does not believe that there are any other sources of SO_2 in or around Monroe County with

the potential to cause or contribute to a violation of the NAAQS within the state's recommended boundary.

EPA believes that our intended unclassifiable area, consisting of Monroe County, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our intended unclassifiable area.

Other Relevant Information

The Sierra Club also submitted modeling to EPA on September 17, 2015. This modeling showed a violation of the standard for the Monroe Power Plant. The main difference between modeling from the state and modeling from Sierra Club is the emission levels modeled. Sierra Club modeled actual emissions from 2012 to 2014. However, the actual emissions do not account for the recent controls and emission limits that were effective for the plant in 2014. EPA believes that the federally enforceable emissions limits relied by the state are an appropriate basis for the designation of Monroe County, notwithstanding the evidence from the Sierra Club that actual emissions from 2012 to 2014 may have caused violations of the SO_2 NAAQS.

Conclusion

After careful evaluation of the state's recommendation and supporting information, EPA is unable at this time to determine whether the area is meeting or not meeting the NAAQS, and therefore intends to designate the area around the Monroe Power Plant as unclassifiable for the 2010 SO_2 NAAQS. EPA agrees that the modeling analysis assuming the shutdown of Whiting shows attainment of the standard, but EPA does not have any information on Whiting's current impact on the area, and therefore cannot determine the collective impact of all the sources in the area. EPA intends to designate the entirety of Monroe County, MI as unclassifiable, but anticipates finalizing the designation of the area as unclassifiable/attainment once the source is confirmed as shutdown.

At this time, our intended designations for the state only apply to this area and the other areas presented in this technical support document. Consistent with the conditions in the March 2, 2015 court-ordered schedule, EPA will evaluate and designate all remaining undesignated areas in Michigan by either December 31, 2017, or December 31, 2020.

Technical Analysis for the Ottawa County, MI Area

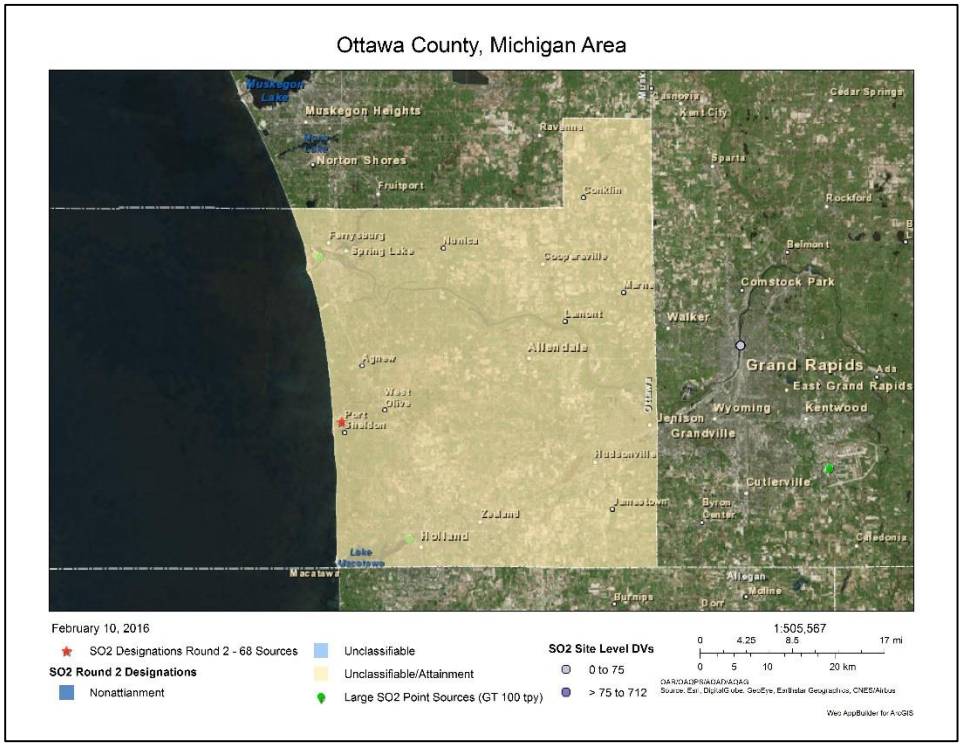
Introduction

Ottawa County contains a stationary source that according to EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 lbs SO_2/MMBTU. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Specifically, in 2012, the J.H. Campbell Generating Station ("J.H. Campbell") emitted 21,501 tons of SO_2, and had an emissions rate of 0.52 lbs SO_2/MMBTU. Pursuant to the March 2, 2015 court-ordered schedule, EPA must designate the area surrounding the facility by July 2, 2016.

In its submission, Michigan recommended that the area surrounding J.H. Campbell, specifically the entirety of Ottawa County, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area where maximum concentrations of SO_2 are expected. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. After careful review of the state's assessment, supporting documentation, and all available data, EPA agrees that the area is attaining the standard, and intends to designate Ottawa County as unclassifiable/attainment.

J.H. Campbell is located in Western Michigan in the central western end of Ottawa County adjacent to Lake Michigan approximately 16 km north of Holland, Michigan. Figure 26, below, includes nearby emitters of SO_2, the state's recommended area for the attainment designation, and EPA's intended unclassifiable/attainment designation for the area.

Figure 26. EPA's intended designation for Ottawa County, MI



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

Detailed Assessment

Air Quality Data

This factor considers the SO_2 air quality monitoring data in the area near J.H. Campbell. Michigan now operates a monitoring site in West Olive, in Ottawa County (AQS site number 26-139-0011). However, this site only began operation in January 2015, so this site does not yet provide a useful indication of air quality in the Ottawa County area. Michigan previously operated a site in Jenison, also in Ottawa County (AQS site number 26-139-0005). This site operated only in 2012 and 2013, for which the average of the two years' 99th percentile of daily maximum concentrations was 15 ppb, but this site did not collect sufficient data to provide a valid design value. Therefore, air quality monitoring in Ottawa County does not provide a reliable indication of whether the area is meeting the SO_2 NAAQS. A monitor in neighboring Kent County is not indicative of whether Ottawa County is meeting the SO_2 NAAQS.

Model Selection and Modeling Components

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. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. 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
- BPIPPRIME: 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

Michigan relied on modeling performed on behalf of the owner of J.H. Campbell by a contractor named Horizon Environmental Corporation. The contractor used AERMOD version 14134. A discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment with 3 km of the facility. According to EPA's modeling guidelines, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50 percent of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50 percent of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area, the state determined that it was most appropriate to run the model in rural mode. This approach, based on an Auer analysis of nearby land use, is consistent with the generally rural nature of the area.

Modeling Parameter: Area of Analysis (Receptor Grid)

EPA believes that a reasonable first step towards characterization of air quality in the area surrounding J.H. Campbell is to determine the extent of the area of analysis, i.e., 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 of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations. For the Ottawa County area, the state identified no other significant emitters of SO_2 within 10 km of J.H. Campbell in any direction and more generally no other facilities that warranted being modeled in this analysis. Aside from exceptionally large sources, sources farther than 10 km from J.H. Campbell would not cause significant concentration gradients in the Ottawa County area and

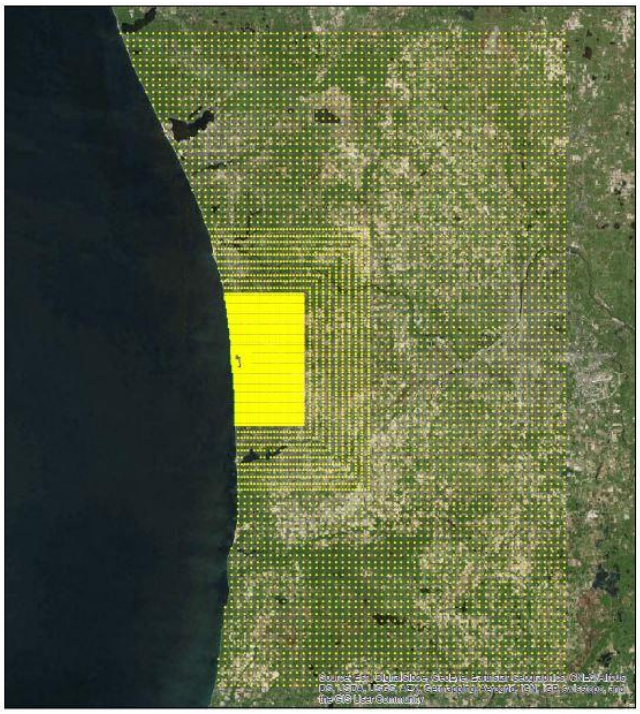
therefore need not be modeled. The grid receptor spacing for the area chosen by the contractor is approximately as follows:

- Along the fenceline, receptors every 50 meters
- From the facility to 2 km, receptors every 100 meters
- From 2 km to 10 km, receptors every 200 meters
- From 10 km to 20 km, receptors every 500 meters
- From 20 km to 50 km, receptors every 1000 meters

The receptor network contained 12,447 receptors, and the network covered Ottawa County and portions of neighboring Allegan, Muskegon, and Kent Counties.

Figure 27, included in the state's recommendation, shows the receptor grid for the area. Consistent with the Modeling TAD, receptors for the purposes of this designation effort were placed only in areas where it would also be feasible to place a monitor and record ambient air impacts. The contractor placed no receptors over Lake Michigan, and also did not place any receptors within the fenceline of J.H. Campbell. The impacts of the area's geography and topography will be discussed later within this document.

Figure 27: Receptor Grid for the J.H. Campbell Modeling Analysis



Modeling Parameter: Source Characterization

The contractor characterized J.H. Campbell in accordance with the best practices outlined in the Modeling TAD. Specifically, the contractor used actual stack heights in conjunction with actual emissions. The contractor also adequately characterized J.H. Campbell'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 BPIPPRIME was used to assist in addressing building downwash.

Modeling Parameter: Emissions

EPA's Modeling TAD notes that for the purposes 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. The Modeling TAD highly encourages the use of the most detailed throughput, operating schedule, and emissions information available.

Variable emissions, temperature, and flow data can be modeled using AERMOD's hourly varying emissions keyword HOUREMIS or variable emission factor keyword EMISFACT. EPA believes that continuous emissions monitoring systems (CEMS) data provide valuable historical emissions information, when it is available, and that these data are available for many electric generating units.

However, the TAD also provides the option to use allowable emissions reflecting the applicable, federally enforceable emission limit (referred to as PTE or the allowable emissions rate). 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. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS. These new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. 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."

J.H. Campbell has recently become subject to emission limits requiring significant emission reductions at the facility. However, the designation process must consider current air quality, and these limits do not take effect until June 30, 2016 for some units and December 31, 2016 for other units. Therefore, modeling for this analysis was primarily based on actual emissions, with the exception that the combustion turbine at the facility was modeled at an emission rate reflecting current worst case fuel oil quality (15 ppm sulfur content) and at rated capacity.

As previously noted, the state included only J.H. Campbell in this analysis. Other sources in Ottawa County have sufficiently low emissions and are sufficient distance from J.H. Campbell that the sources are causing no significant concentration gradient near J.H. Campbell, and their impacts may be considered as part of the monitored background concentration.

Table 18 shows the emissions of J.H. Campbell and the other sources in Ottawa County emitting over 100 tpy, showing the data EPA considered in concluding that these other sources need not be included in the J.H. Campbell modeling analysis. Sources outside Ottawa County are even less likely to have significant impacts in the Ottawa County area.

Table 18: Actual SO_2 Emissions from Facilities in Ottawa County, MI

	Actual SO_2 Emissions (tpy)			Distance from J.H. Campbell (km)
Facility Name	2012	2013	2014	
J.H. Campbell	21,501	23,627	25,760	----
J.B. Sims	*287*	*175*	*167*	*18*
Holland WWTP	*1,823 (Based on 2011 NEI)*			*15*
Total Emissions in the Contractor's Area of Analysis	21,501	23,627	25,760	

Facilities in italics were not included in the modeling domain or in the Total Emissions in the Contractor's Area of Analysis.

For J.H. Campbell, for the primary, coal-fired emission units, the state used actual emissions from the most recent 3-year data set, i.e., 2012 – 2014. These emissions data were obtained from CEMS. For a combustion turbine at this facility, fired with diesel oil, the modeled emissions reflected worst case actual fuel quality (15 ppm sulfur) and capacity operation. (In discussion below, this combination of actual emissions data based on CEMS for the coal-fired boilers with maximum actual emissions for the oil-fired turbine will be referred to as based on actual emissions.)

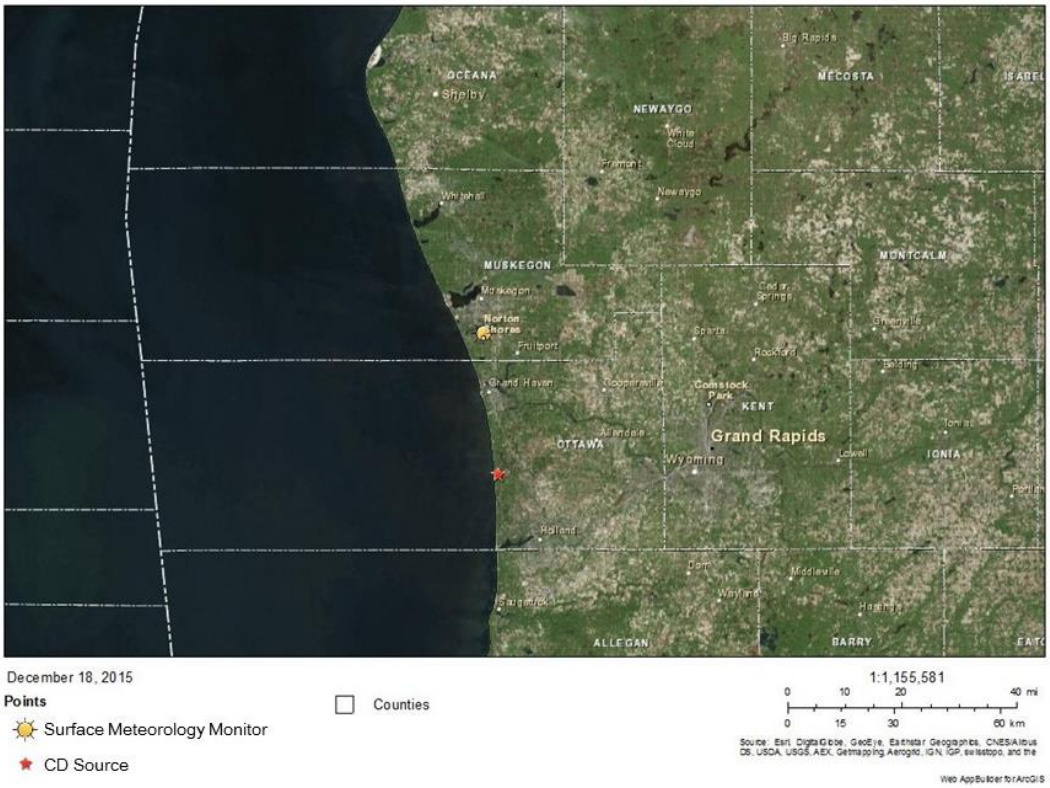
Modeling Parameter: Meteorology and Surface Characteristics

The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data are 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 Ottawa County area, surface meteorology from the NWS station in Muskegon, Michigan, 29 km to the north, and coincident upper air observations from the NWS station in Green Bay, Wisconsin, approximately 230 km to the northwest, were selected as best representative of meteorological conditions within the area.

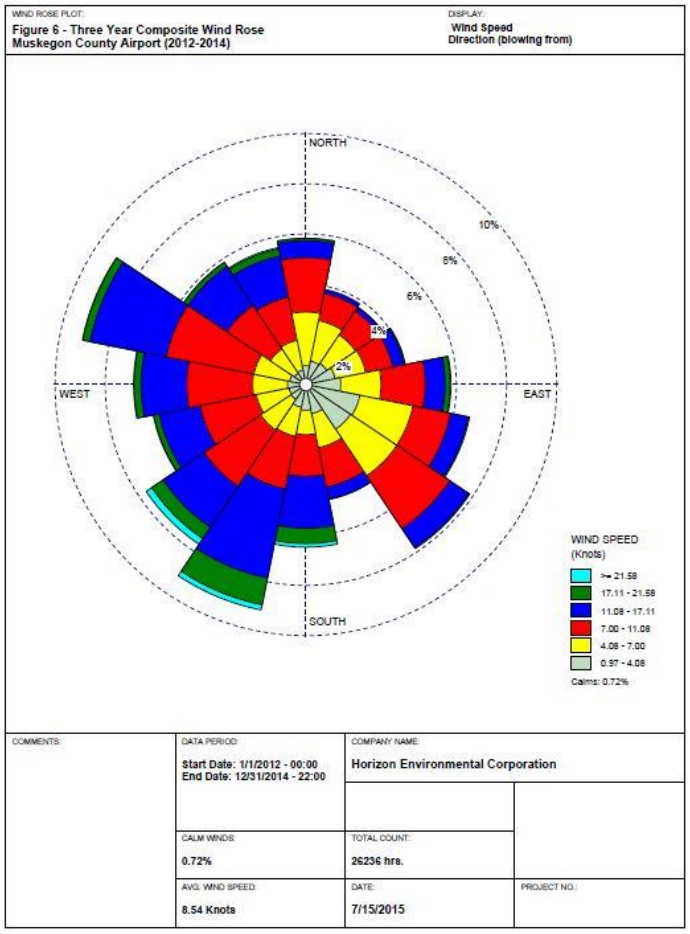
The state used AERSURFACE using data from the NWS station in Muskegon, Michigan (located at 43.17111° N, 86.23667° W) to estimate the surface characteristics of the area. These surface characteristics are the albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (representing the ratio of sensible heat flux to latent heat flux at the ground level), and the surface roughness (representing the influence of ground features such as buildings and vegetation on surface wind flow). The state estimated values for 12 wind direction sectors, examining surface roughness out to 1 km and albedo and Bowen ratio for a 10 km square area centered on the NWS station. In the figure below, generated by EPA, the location of the Muskegon, Michigan NWS station is shown relative to J.H. Campbell.

Figure 28: Ottawa County area and the Muskegon, Michigan NWS



As part of its recommendation, the state provided the 3-year surface wind rose for Muskegon, Michigan. In Figure 29, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. This figure shows that, if one examines all wind speeds, winds are somewhat more prone to blow from the west northwest, the south southwest, and the southeast, while if one focuses on low wind speeds, these winds are especially prone to blow from the southeast.

Figure 29: Muskegon, Michigan Cumulative Annual Wind Rose for Years 2012 – 2014



Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The contractor followed the methodology and settings presented in "Regional Meteorological Data Processing Protocol, EPA Region 5 and States," Draft, August 2014, in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE 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 one minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. 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. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the one minute wind data.

Modeling Parameter: Geography and Terrain

The terrain in the area is best described as relatively flat. Nevertheless, to account for terrain changes, the AERMAP 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 USGS National Elevation Database.

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 "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For the Ottawa County area, the state recommended a "first tier" approach based on data from the Grand Rapids ambient monitor (AQS site number 26-081-0020) for the period 2012 to 2014. The background concentration for this area was determined by the state to be 27 micrograms per cubic meter ($\mu g/m^3$), or 10.3 ppb,[9] and that value was incorporated into the final AERMOD results.

Summary of Modeling Results

The AERMOD modeling parameters for the Ottawa County area are summarized below in Table 19.

Table 19: AERMOD Modeling Parameters for the Ottawa County Area

J.H. Campbell, Michigan Area	
AERMOD Version	14134
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	1
Modeled Fencelines	1
Total receptors	12,447

[9] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62$\mu g/m^3$.

Emissions Type	Boilers 1-3: Actual Turbine: Maximum actual
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Muskegon, Michigan
Upper Air Meteorology Station	Green Bay, Wisconsin
Methodology for Calculating Background SO_2 Concentration	Fixed Concentration from Grand Rapids, Michigan
Calculated Background SO_2 Concentration	27 $\mu g/m^3$

The results presented below in Table 20 show the magnitude and geographic location of the highest predicted modeled concentration based on actual emissions.

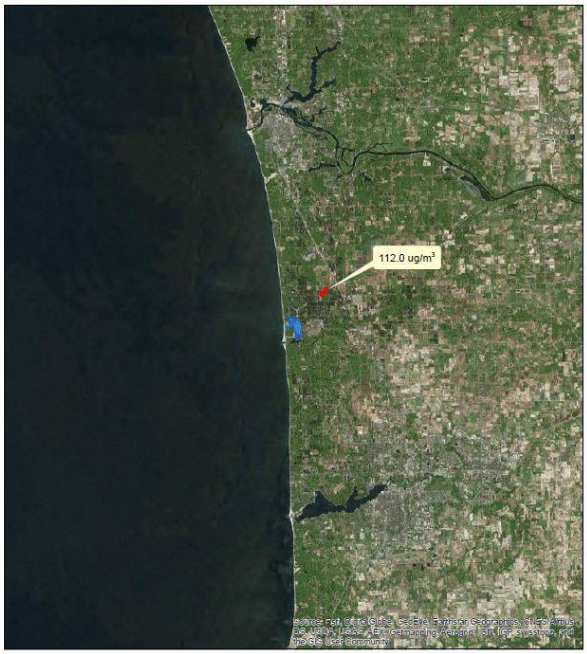
Table 20: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Ottawa County Area Based on Actual Emissions

		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	332800	4121600	139	196.4*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

The state's modeling indicates that the predicted 99th percentile 1-hour average concentration within the chosen modeling domain is 139 $\mu g/m^3$, or 53 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from J.H. Campbell (with turbine emissions based on maximum actual emissions). Figure 30 below was included as part of the state's recommendation, and indicates that the predicted value occurred 3.5 km northeast of the facility.

Figure 30: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in Ottawa County Area Based on Actual Emissions



Jurisdictional Boundaries

Once the geographic area of analysis associated with J.H. Campbell was determined, existing jurisdictional boundaries were considered for the purpose of informing our intended unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries. The state recommended designation of the entirety of Ottawa County. Ottawa County has clearly defined, well known boundaries that appropriately define the area to be designated. While the contractor's modeling analysis did not include the emissions from either Holland WWTP or J.B. Sims, EPA does not believe that emissions from these facilities are causing or contributing to violations of the NAAQS within the area of analysis, and subsequently – the entirety of Ottawa County. The contractor modeled a 50 km grid around J.B. Campbell as attaining the standard with the maximum impact 3.5 km away from the facility. Based on the distance between J.H. Campbell and either Holland WWTP or J.B. Sims (approximately 15 km), EPA does not believe that emissions from either of these sources would impact the modeled maximum concentration. The B.C. Cobb Generating Station, in Muskegon County, 14 km north of Ottawa County's northern boundary, and 38 km north of J.H. Campbell, emitted 9,266 tons of SO_2 in 2014. B.C. Cobb is not only far enough from J.H. Campbell to be unlikely to cause significant concentration gradients near J.H. Campbell, it is also of sufficient distance from the intended unclassifiable/attainment area, considering its size, as to be unlikely to causing or contributing to a violation within the area. For comparison, as noted above, J.H. Campbell, emitting an average of 23,629 tons per year in 2012 to 2014, had a peak concentration (below the NAAQS) at a distance of 3.5 km from the plant. In addition, due to a consent decree, B.C. Cobb must retire or switch to natural gas by April 15, 2106. Therefore, EPA believes that our intended

unclassifiable/attainment area, consisting of the entirety of Ottawa County, applies clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our intended unclassifiable/attainment area.

Other Relevant Information

No other relevant information was received for this area.

Conclusion

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, EPA intends to designate the area around J.H Campbell as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the unclassifiable/attainment area would be defined to include the entire Ottawa County.

At this time, our intended designations for the state only apply to this area and the other areas presented in this technical support document. Consistent with the conditions in the March 2, 2015 court-ordered schedule, EPA will evaluate and designate all remaining undesignated areas in Michigan by either December 31, 2017, or December 31, 2020.