Draft Technical Support Document

Georgia
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.

Georgia submitted updated recommendations on September 17, 2015, ahead of a July 2, 2016, deadline for the EPA to designate certain areas. This deadline is the first of three deadlines established by the U.S. District Court for the Northern District of California for the EPA to complete area designations for the 2010 SO_2 NAAQS. Table 1 below lists Georgia's recommendations and identifies the counties or portions of counties in Georgia that the EPA intends to designate by July 2, 2016, based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. Georgia's Recommended and the EPA's Intended Designations

Area	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Juliette, Georgia	Monroe County Bibb County Jones County Jasper County Butts County Lamar County Upson County and Crawford County	Attainment	Same as the State's recommendation with the exception of Bibb County	Unclassifiable/ Attainment

Background

On June 3, 2010, the 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. The EPA determined this is the level necessary to protect public health with an adequate margin of safety, especially for children, the elderly and those with asthma. These groups are particularly susceptible to the health effects associated with breathing 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, the 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 the EPA is also not currently designating areas on the basis of the secondary standard.

General Approach and Schedule

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

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

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

According to the court-ordered schedule, the EPA must complete the remaining designations by three specific deadlines. By no later than July 2, 2016 (16 months from the court's order), the EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO_2 NAAQS and (2) areas that contain any stationary sources that had not been announced

[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 state implementation plan (SIP) Call under the prior NAAQS, the prior NAAQS will apply until that area submits and the EPA approves a SIP providing for attainment of the 2010 NAAQS. The Juliette Area was not designated nonattainment under the prior SO_2 NAAQS nor is it not meeting the requirements of a SIP Call under the prior NAAQS.

as of March 2, 2015, for retirement and that according to the EPA's Air Markets Database emitted in 2012 either (i) more than 16,000 tons of 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. The EPA has separately promulgated requirements for states and other air agencies to provide additional monitoring or modeling information on a timetable consistent with these designation deadlines. We expect this information to become available in time to help inform these subsequent designations. These requirements were promulgated on August 21, 2015 (80 FR 51052), in a rule known as the SO_2 Data Requirements Rule (DRR).

Updated designations guidance was issued by the EPA through a March 20, 2015 memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. This memorandum supersedes earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and it identifies factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The guidance also contains the factors the EPA intends to evaluate in determining the boundaries for all remaining areas in the country, consistent with the court's order and schedule. These factors include: 1) Air quality characterization via ambient monitoring or dispersion modeling results; 2) Emissions-related data; 3) Meteorology; 4) Geography and topography; and 5) Jurisdictional boundaries. This guidance was supplemented by two technical assistance documents intended to assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling or ambient air quality monitoring for sources that emit SO_2. Notably, the 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, violations[2] of the 2010 SO_2 NAAQS were only recorded in Chatham County, GA and no other monitored violations have been recorded in any other undesignated part of the state.[3] Furthermore there are no air quality

[2] Georgia early certified their 2015 1-hour SO_2 air quality data for the Chatham County monitor (at Lanthorp & August Air Quality System ID: 13-051-1002 on January 20, 2016. The EPA's review of the 2013-2015 1-hour SO_2 data indicates no violation of the 2010 SO_2 NAAQS. Therefore, the consent decree does not obligate the EPA to complete the designation for Chatham County. Instead, the EPA will designate the area and all other previously undesignated areas in the state on a schedule consistent with the prescribed timing of the consent order, i.e., December 31, 2017, or December 31, 2020.

[3] 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

monitors in Monroe County. In addition, there is one source in the state meeting the emissions criteria of the consent decree for which the EPA must complete designations by July 2, 2016. In this draft technical support document, the EPA discusses its review and technical analysis of Georgia's updated recommendations for the areas that we must designate. The 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 the 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. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analysis, and any other relevant information.
4) Designated unclassifiable area – an area which the EPA cannot determine based on all available information whether or not it meets the 2010 SO_2 NAAQS.
5) Designated unclassifiable/attainment area – an area which the EPA has determined to have sufficient evidence to find either is attaining or is likely to be attaining the NAAQS. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analysis, and any other relevant information.
6) Modeled violation – a violation based on air dispersion modeling.
7) Recommended attainment area – an area a state or tribe has recommended that the EPA designate as attainment.
8) Recommended nonattainment area – an area a state or tribe has recommended that the EPA designate as nonattainment.
9) Recommended unclassifiable area – an area a state or tribe has recommended that the EPA designate as unclassifiable.
10) Recommended unclassifiable/attainment area – an area a state or tribe has recommended that the EPA designate as unclassifiable/attainment.

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.

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 Juliette Area

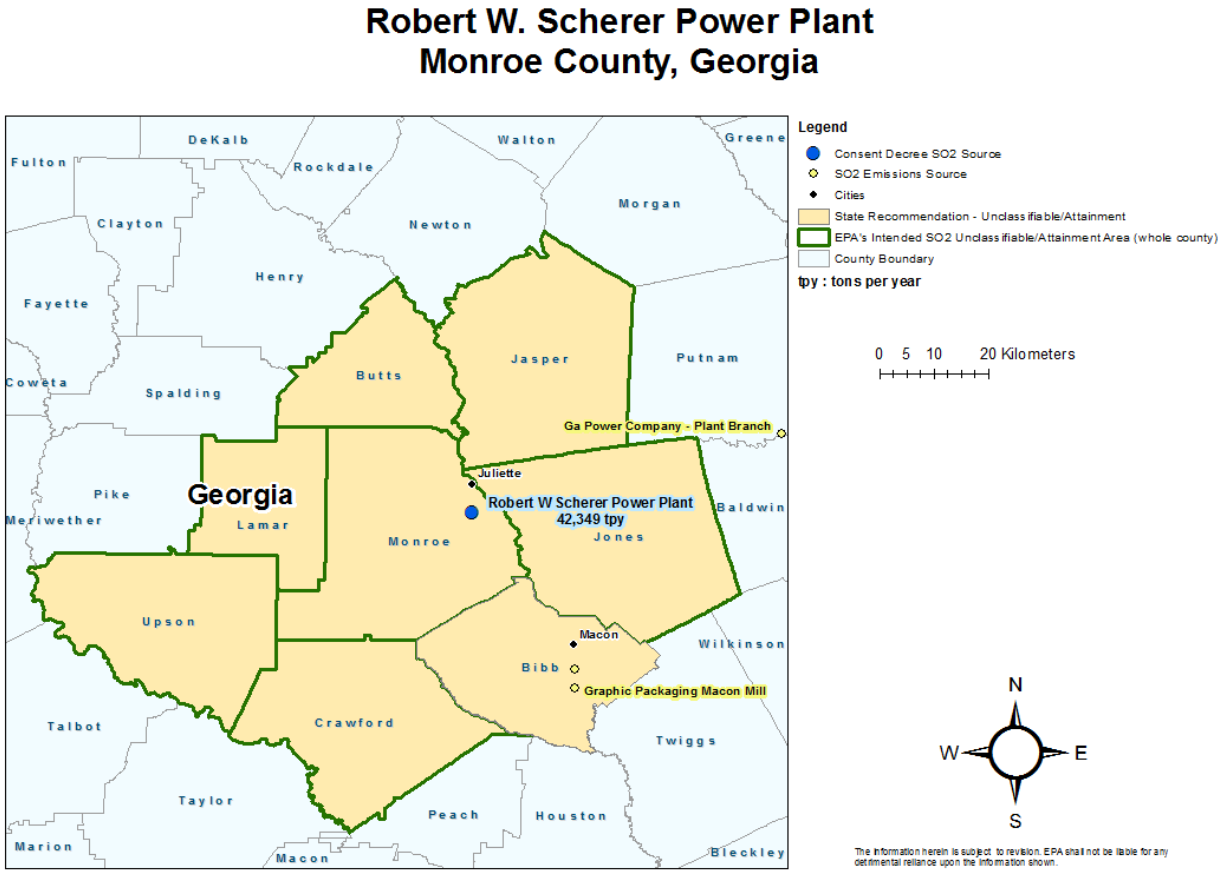
Introduction

Plant Scherer is a stationary source that according to the 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 Robert W. Scherer Power Plant (Plant Scherer) emitted 42,349.16 tons of SO_2, and had an emissions rate of 0.372 lbs SO_2/mmBTU. Pursuant to the March 2, 2015 court-ordered schedule, the EPA must designate the area surrounding the facility by July 2, 2016. Plant Scherer is an electric power generation plant with four sub-critical pulverized coal-fired boilers.

In its submission, Georgia recommended that the area surrounding Plant Scherer, specifically the entirety of Monroe, Bibb, Jones, Jasper, Butts, Lamar, Upson and Crawford Counties, be designated as unclassifiable/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 of analysis 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, the EPA agrees, in part, that the area is attaining the standard, and intends to designate the majority of the state's recommended area as unclassifiable/attainment, i.e., Monroe, Jones, Jasper, Butts, Lamar, Upson, and Crawford Counties. At this time, the EPA does not intend to designate Bibb County; instead, the Agency will designate this county and all other remaining undesignated areas of Georgia not addressed in this TSD by either December 31, 2017, or December 31, 2020, consistent with the deadlines of the final consent decree.

Plant Scherer is located in central Georgia in the town of Juliette, which is in the northeastern part of Monroe County. The facility is located approximately 3 miles south of the center of Juliette, Georgia just north of Macon, Georgia and approximately 70 miles south of Atlanta, Georgia. Figure 1 below includes nearby emitters of SO_2, the state's recommended area for the unclassifiable/attainment designation, and the EPA's intended designation for the Juliette Area.

Figure 1. The EPA's Intended Designations for Plant Scherer and the Juliette Area



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

Detailed Assessment

Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. 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

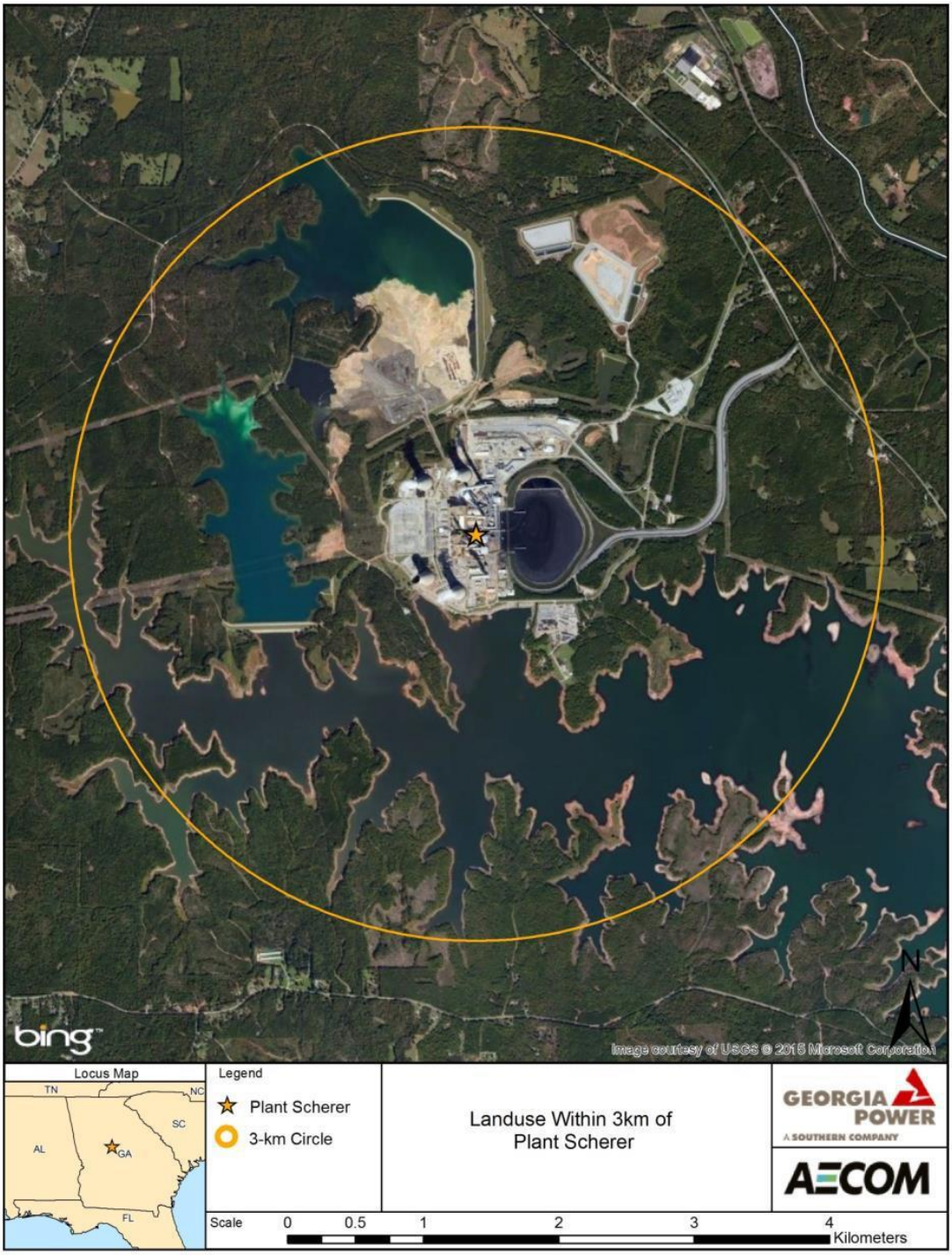
- BPIPPRIME: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The state used AERMOD version 14134 (released May 14, 2014), and a discussion of the individual components will be referenced in the corresponding discussion that follows as appropriate.

Modeling Parameter: Rural or Urban Dispersion

The 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 the 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. As shown in Figure 2 below, the 3-km area surrounding Plant Scherer is predominantly rural. Therefore, the state determined that is was most appropriate to run the model with rural dispersion coefficients.

Figure 2: Land Use Analysis Within 3 Kilometers of Plant Scherer. Source: "Modeling Report Plant Scherer 1-hour SO_2 NAAQS Modeling" prepared by AECOM for Georgia Power Company, July 2015.



Modeling Parameter: Area of Analysis (Receptor Grid)

The EPA believes that a reasonable first step towards characterization of air quality in the area surrounding Plant Scherer 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 Juliette Area, the state evaluated offsite SO_2 sources within 70 km of the facility in any direction and determined that it was not necessary to include any offsite sources in order to adequately characterize air quality on the vicinity of Plant Scherer. This determination was based on the actual 2013 emissions at each facility and the distance of each facility from Plant Scherer. Table 2 of the September 14, 2015, designations recommendations from the state of Georgia details the results of this evaluation. In addition, Georgia Power Company Plant Branch, located 49 km to the east of Plant Scherer, was not included in the modeling because it ceased operations in 2015 and any impacts from this distant source are accounted for in the background concentration included with the modeling results. The state determined that a receptor grid extending 50 km in all directions from Plant Scherer was appropriate in order to adequately characterize air quality from the facility. . 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 potential impact in the area of analysis where maximum concentrations of SO_2 are expected.

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

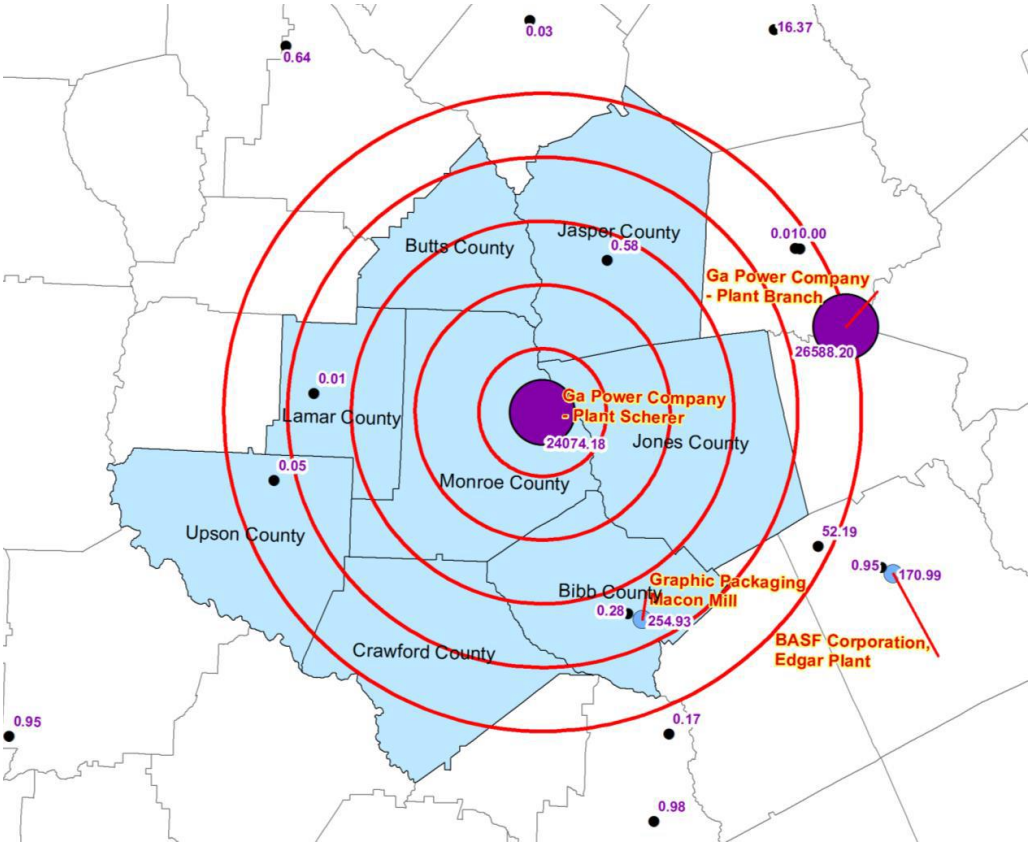
- 100 meter spacing from the center of the plant out to 2 km
- 250 meter spacing from 2 kilometers out to 3 km
- 500 meter spacing from 3 kilometers out to 10 km
- 1,000 meter spacing from 10 kilometers out to 50 km
- Maximum concentrations were resolved to 100 meter spacing

The receptor network contained 15,550 receptors, and the network covered the following counties in Georgia: most of Monroe County, western Jones County, extreme southeastern Butts County, southwestern Jasper County and extreme northern Bibb County.

Figures 3 and 4, included in the state's recommendation, show the state's chosen area of analysis surrounding Plant Scherer, as well as the receptor grid for the area of analysis.

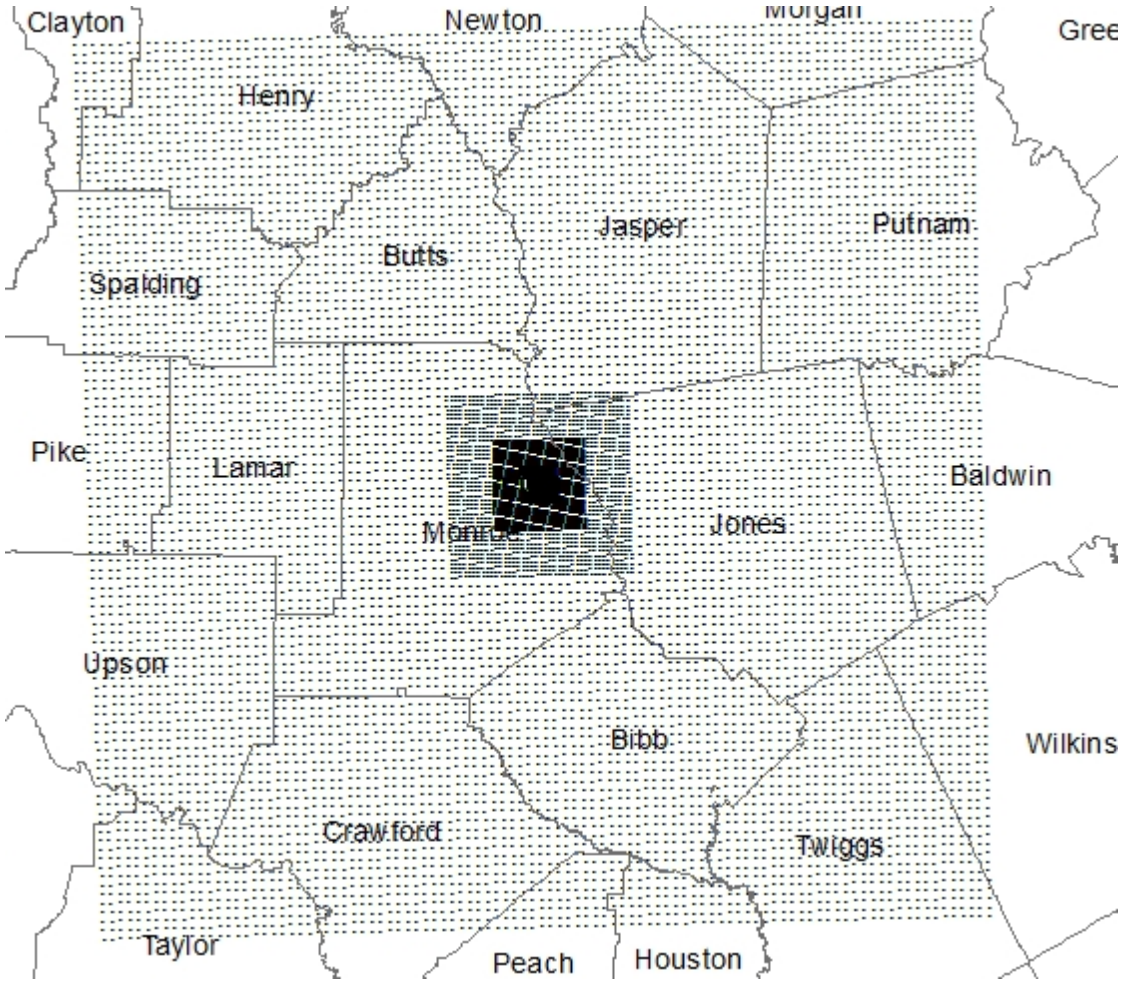
Consistent with the Modeling TAD, receptors for the purposes of this designation effort were placed only in areas where it would also be feasible to place a monitor and record ambient air impacts. The impacts of the area's geography and topography will be discussed later within this document.

Figure 3: Juliette Area of Analysis. Source: "Modeling Report Plant Scherer 1-hour SO_2 NAAQS Modeling" prepared by AECOM for Georgia Power Company, July 2015.



Red circles are placed in 10 km increments out to 50 km.

Figure 4: Receptor Grid for Juliette Area of Analysis. Source: "Modeling Report Plant Scherer 1-hour SO_2 NAAQS Modeling" prepared by AECOM for Georgia Power Company, July 2015.



Modeling Parameter: Source Characterization

The state characterized the source(s) 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 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

The 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. However, the TAD does provide for the flexibility of using allowable emissions in the form of the most recently permitted, (referred to as potential to emit (PTE) or allowable) emissions rate.

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

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 Plant Scherer and no other emitters of SO_2 within 50 km in the area of analysis. The state evaluated offsite SO_2 sources within 70 km of Plant Scherer in any direction and determined that it was not necessary to include any offsite sources in order to adequately characterize air quality on the vicinity of Plant Scherer. This determination was based on the actual 2013 emissions at each facility and the distance of each facility from Plant Scherer. This distance was selected because the state believes that this area of analysis adequately represents the area where maximum concentrations of SO_2 are expected. Georgia Power Plant Branch in Putnam County located approximately 49 km northeast of Plant Scherer and 45 km from the Monroe County border reported emissions of 32,544 tons of SO_2 in 2014. According to information available to the EPA[4], all units at Plant Branch were permanently shutdown by April 2015 resulting in zero potential to emit. Plant Branch was not explicitly included in the modeling analysis for Plant Scherer, but rather was considered in the background concentrations accounting for impacts from nearby sources including Plant Branch's historic actual emissions. Considering the distance from Plant Scherer and Monroe County border, and consideration of cumulative impacts captured in the background concentrations, the EPA does not have reason to believe that emissions from this now non-operational facility are causing or contributing to a violation of the SO_2 NAAQS in the Juliette Area of analysis.

Additionally, Graphic Packaging Macon Mill located in Bibb County emitted reported 254 tons in 2013 and 620 tons in 2014 and is a major prevention of significant deterioration (PSD) source that Georgia did not explicitly include in the modeling analysis for Plant Scherer. This source

[4] In September 2013, Georgia Power retired Plant Branch Unit 2 and as well as Units 1, 3, and 4 in April 2015. Georgia Power certified under penalty of law that the retirements are permanent in the Retired Unit Exemption (RUE) forms submitted to the EPA under the Acid Rain, CAIR, and CSAPR programs.

was, however, considered in the calculated background concentration. This source is approximately 35 km from Plant Scherer, which is distant enough that its impacts would be significantly reduced in terms of overlapping with those of Plant Scherer shown in Figure 3. Cherokee Brick and Title Company also located in Bibb County, emitted 146.8 tons of SO_2 in 2014. The source is located approximately 29.5 km from Plant Scherer and 17.6 km to Monroe County border. The source is also located 10.5 km from Jones County which is the nearest county the EPA intends to designate as unclassifiable/attainment. Given that this source is far enough from Plant Scherer and Monroe County that impacts are reduced in terms of overlapping with those of Plant Scherer EPA has no reason to believe, this source would cause or contribute to a violation of the SO_2 NAAQS within the Juliette Area of analysis. Both sources are currently operating as major PSD sources in Bibb County and as such could potentially model impacts within their respective fencelines.

Plant Scherer is the only SO_2 source in Monroe County, Georgia emitting 100 tpy or more of SO_2. Based on an analysis of actual emissions for sources within 50 km of Plant Scherer, no other sources were determined by the state to have the potential to cause significant concentration gradient impacts within the area of analysis. No other SO_2 emitting sources within the area of analysis were found to emit over 6 tpy of SO_2 emissions including in Monroe County based on 2014 actual emissions. Actual annual SO_2 emissions for Plant Scherer between 2012 and 2014 are summarized below.

Table 2: Actual SO_2 Emissions Between 2012 – 2014 for Plant Scherer[5]

	SO_2 Emissions (tons per year(tpy))		
Facility Name	2012	2013	2014
Plant Scherer	42,349.16	24,074.58	5,175.49

For Plant Scherer, 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

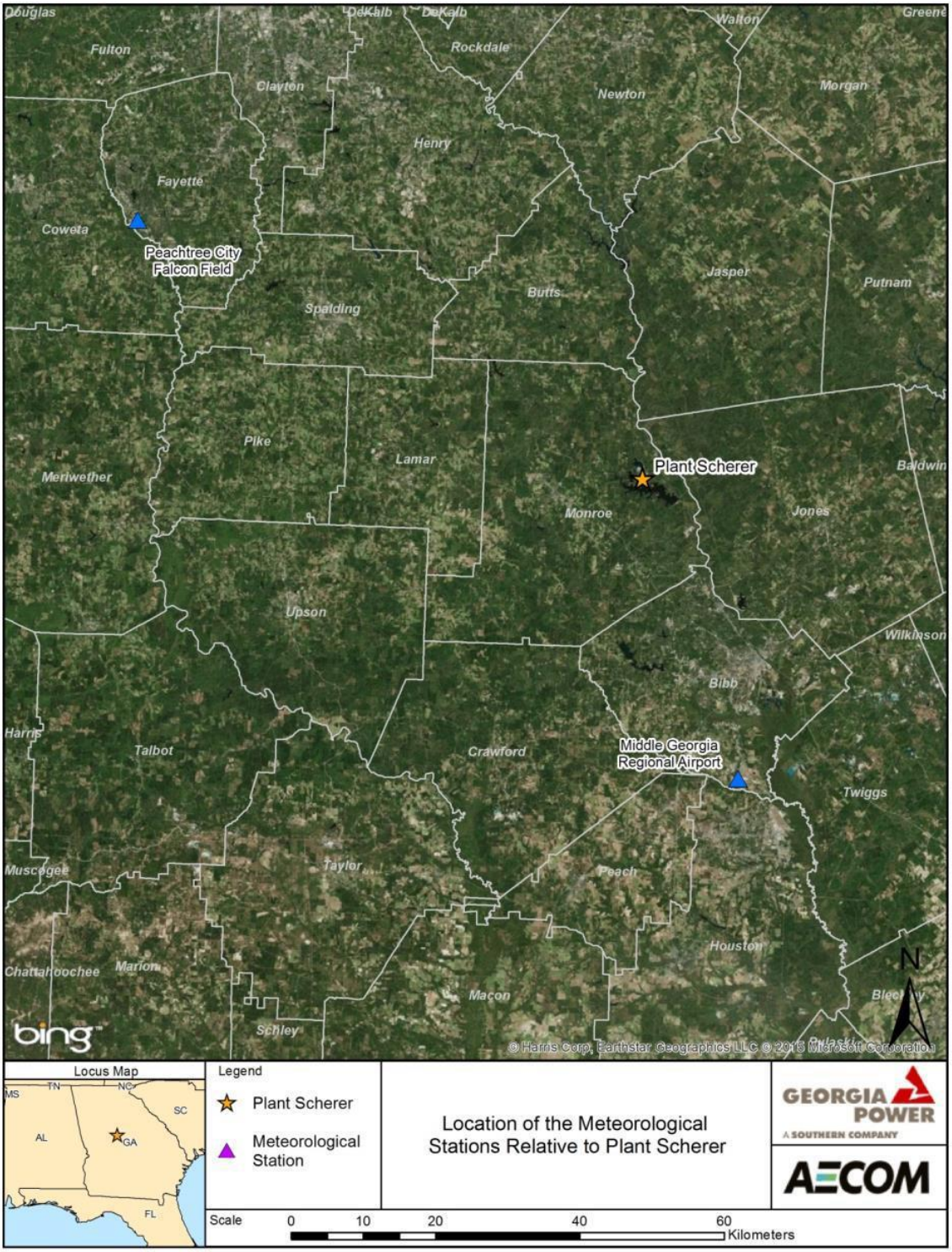
The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of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

[5] Actual emissions data were obtained from CEMS and reflect the same emissions reported to the EPA's Air Markets Database.

For the Juliette Area of analysis, surface meteorology from the NWS station in Macon, Georgia (44 km to the south), and coincident upper air observations from the NWS station in Peachtree City, Georgia (80 km to the northwest), were selected as best representative of meteorological conditions within the area of analysis.

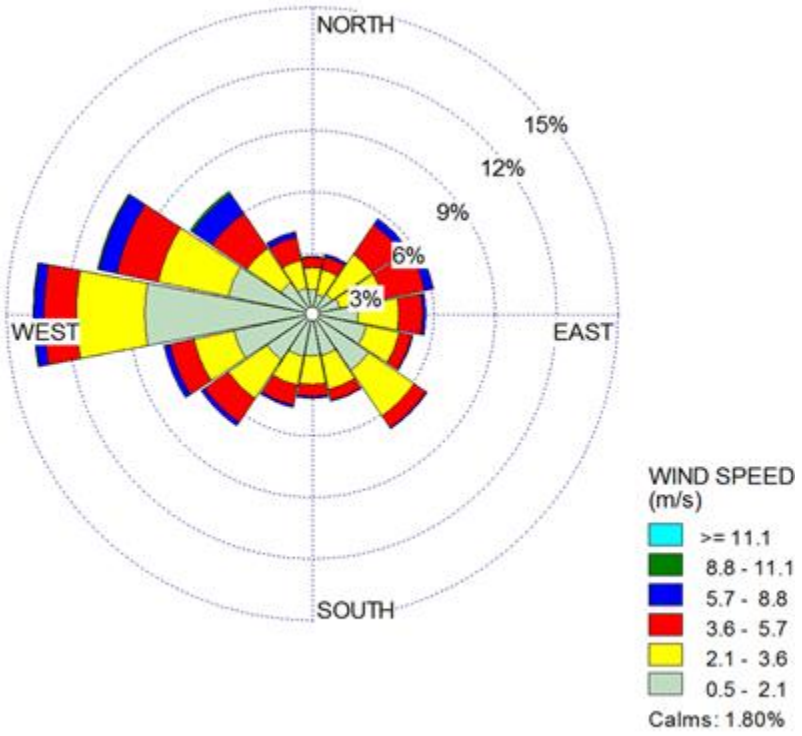
The state used AERSURFACE version 14134 using data from the NWS station in Macon, Georgia, (located at latitude 32.6878, longitude 83.6544) to estimate the surface characteristics of the area of analysis. The state estimated values for 12 spatial sectors out to 1 km at a seasonal temporal resolution 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 (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as "Zo"). In the figure below, included in the state's recommendation, the location of the Macon, Georgia NWS station is shown relative to the Juliette Area of analysis.

Figure 5: Juliette Area of Analysis and the Macon, Georgia NWS Station (Middle Georgia Regional Airport) and the Peachtree City NWS Station. Source: "Modeling Report Plant Scherer 1-hour SO_2 NAAQS Modeling" prepared by AECOM for Georgia Power Company, July 2015.



As part of its recommendation, the state provided the 3-year surface wind rose for Macon, Georgia for the period 2012-2014. In Figure 6, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. This wind rose shows that the predominant wind direction in Macon is from the west.

Figure 6: Macon Georgia Cumulative Annual 3-Year Wind Rose For 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 AERMOD implementation guide (09078) in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Modeling Parameter: Geography and Terrain

The terrain in the area of analysis is best described as gently rolling. 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 United States Geological Survey 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 Plant Scherer analysis, the state chose to use the 2011-2013 1-hour SO_2 design value for the Decatur, Georgia monitor. The state determined this monitor to be representative of background concentrations in the area. The background concentration for this area of analysis was determined by the state to be 30.3 micrograms per cubic meter ($\mu g/m^3$), or 11.6 ppb,[6] and that value was incorporated into the final AERMOD results provided by the state.

The EPA has performed an additional analysis of available background monitoring data in the area and has identified an ambient air monitor in Bibb County which has a 2012-2014 design value of 15 ppb (39.3 $\mu g/m^3$). The EPA has determined that the Bibb County monitor provides a more appropriate background concentration for the analysis, due to its proximity to the area of analysis. Adding the Bibb County monitor background value to the 99th percentile modeled value of 98.24 $\mu g/m^3$ results in a total SO_2 concentration of 137.54 $\mu g/m^3$ (versus the SO_2 total concentration provided by the state of 128.54 $\mu g/m^3$ using the Decatur background value)

Summary of Modeling Results

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

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

Table 3: AERMOD Modeling Parameters for the Juliette Area of Analysis

Plant Scherer Analysis	
AERMOD Version	14134
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	4
Modeled Structures	6
Modeled Fencelines	0
Total receptors	15,550
Emissions Type	Actual
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Macon, Georgia
Upper Air Meteorology Station	Peachtree City, Georgia
Methodology for Calculating Background SO_2 Concentration	1st tier – monitored design value
Calculated Background SO_2 Concentration	15 ppb (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.

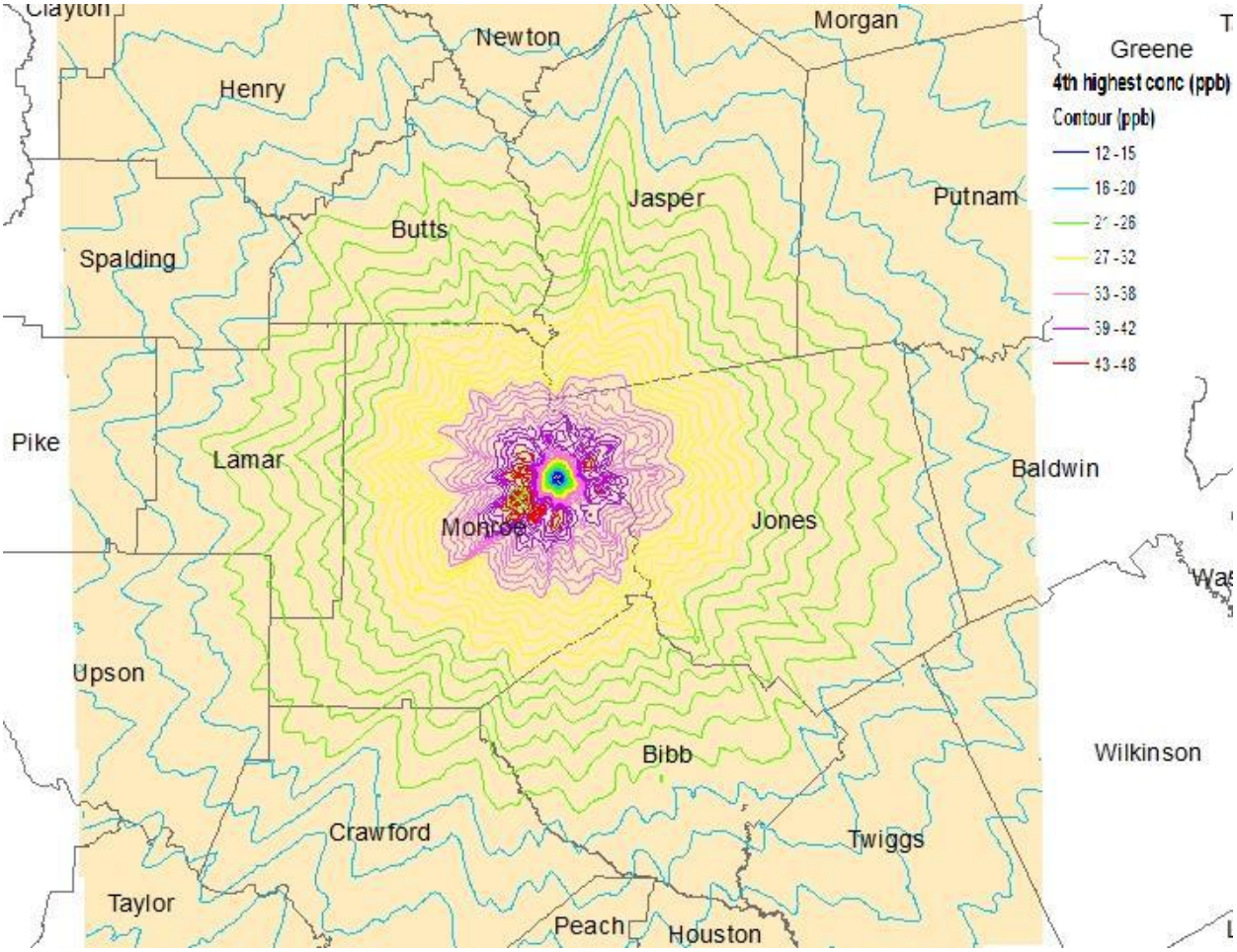
Table 4: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Juliette Area of Analysis Based on Actual Emissions

		Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
Averaging Period	Data Period	UTM East (meters)	UTM North (meters)	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	234000	3659550	137.54	196.5*

*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 98.21 $\mu g/m^3$, or 37.5 ppb. When the representative background value from the Bibb County monitor is added to the modeled value, the total concentration is 137.54 $\mu g/m^3$, or 52.5 ppb. This modeled concentration is based on actual emissions from Plant Scherer. Figure 7 below was included as part of the state's recommendation, and indicates that the predicted value occurred approximately 3.6 kilometers west of Plant Scherer. The state's receptor grid is shown in Figure 4.

Figure 7: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Juliette Area of Analysis Based on Actual Emissions. Source: Georgia's "Additional Plant Scherer Dispersion Modeling for the SO_2 NAAQS, February 2, 2016"



Jurisdictional Boundaries:

Once the geographic area of analysis associated with Plant Scherer and background concentration is determined, existing jurisdictional boundaries are considered for the purpose of informing our intended unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries. Georgia's designation recommendations included Monroe County and seven additional counties (Bibb, Jones, Jasper, Butts, Lamar, Upson, and Crawford) based on a modeling analysis with a 50 km radius modeling domain centered around Plant Scherer. Georgia evaluated offsite SO_2 sources within 70 km of Plant Scherer facility in any direction and determined that it was not necessary to include any offsite sources in order to adequately characterize air quality on the vicinity of Plant Scherer. This determination was based on the actual 2013 emissions at each facility and the distance of each facility from Plant Scherer. Plant Scherer is the only SO_2 source in Monroe County, Georgia emitting 100 tpy or more of SO_2. Of the seven additional counties Georgia recommended, six have no stationary sources that

emitted SO_2 over 6 tpy (based on 2014 actual emissions).[7] Therefore, these sources have no potential to cause significant concentration gradient impacts within the area of analysis. EPA has reason to believe there are no additional sources in areas adjacent to our intended area that are likely to cause or contribute to a violation of the NAAQS in the area of analysis.

Bibb County, includes two SO_2 emitting sources that emitted over 100 tpy of SO_2 in 2014. Graphic Packaging Macon Mill, considered a major PSD stationary source, is located approximately 35 km from Plant Scherer and 21 km from Monroe County border, which is distant enough that its impacts would be significantly reduced in terms of overlapping with those of Plant Scherer shown in Figure 3. The source showed 254 tpy in 2013, and reported 620 tpy in 2014 and was not included in the state's modeling analysis due to it distance from Plant Scherer relative to its emissions. This source's 2012-2014 emissions were however considered in the calculated background concentrations. The EPA has reason to believe that this source would not cause significant concentration gradient impacts within the area of analysis.

Additionally, Cherokee Brick and Title Company also located in Bibb County, emitted 146.8 tons of SO_2 in 2014. The source is located approximately 29.5 km from Plant Scherer and 17.6 km to Monroe County border. The source is also located 10.5 km from Jones County which is the nearest county the EPA intends to designate as unclassifiable/attainment. Given the distance from Plant Scherer and Monroe and Jones Counties these two sources are distant enough that impacts are reduced in terms of overlapping with those of Plant Scherer. Therefore, the EPA has no reason to believe, these two sources would cause or contribute to a violation of the SO_2 NAAQS within the Juliette Area of analysis. However, even though GA EPD's 50 km model domain extends into Bibb County, both sources are currently operating major PSD sources with the potential to cause concentration gradient impacts within Bibb County near the vicinity of the source's fenceline when considering PSD permitting. Therefore the EPA has reason to believe that designations for Bibb County, at this time, should be deferred. Consistent with the conditions in the March 2, 2015 court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Georgia by either December 31, 2017, or December 31, 2020.

The EPA notes that Georgia Power's Plant Branch in Putnam County, located approximately 45, 22, and 12 km from Monroe, Jasper and Jones county borders respectively reported 2014 emissions of 32,544.7 tons. However, operations at Plant Brach had ceased by April 2015. Specifically, Unit 2 was retired in September 2013 and Units 1, 3, and 4 were retired in April 2015 and therefore the facility's potential to emit SO_2 emissions is effectively zero. Furthermore, the 2012-2014 background concentration 39.3 $\mu g/m^3$ or 15 ppb accounts for cumulative impacts from nearby sources including Plant Branch's historic actual emissions. As a result, the EPA does not have reason to believe that emissions from this now non-operational facility are causing or contributing to a violation of the NAAQS in the Monroe area of analysis or other neighboring counties.

The EPA believes that our intended unclassifiable/attainment area, consisting of Monroe County, GA, and surrounding counties of Jones, Jasper, Butts, Lamar, Upson and Crawford, is comprised

[7] Unless otherwise noted, 2014 annual emissions data were obtained via the Emissions Inventory System (EIS) gateway, in which states report emissions pursuant to 40 CFR Part 51, Subpart A. The EIS gateway can be accessed via: http://www3.epa.gov/ttnchie1/eis/gateway/.

of clearly defined legal boundaries, and we find this boundary to be a suitably clear basis for defining our intended unclassifiable/attainment designation. The consent decree directs the EPA to designate the area around Plant Scherer, which may be confined only to the county where the facility is located, i.e., Monroe County, provided the plant's impacts were of such limited scope. However, we has reason to believe that the state has adequately addressed air quality in the counties that we intend to designate as unclassifiable/attainment. Specifically, Georgia's modeling analysis extending 50 km from Plant Scherer indicates compliance with the NAAQS in the additional counties included in our intended designation, and the EPA has determined that there are no additional sources in areas adjacent to our intended area that are likely to cause or contribute to a violation of the NAAQS in the area of analysis. Therefore, the EPA intends to designate the majority of the state's recommended area as unclassifiable/attainment, but reiterates that we are deferring the designation for Bibb County at this time.

Other Relevant Information

The EPA received air dispersion modeling results from the Sierra Club, in which the submitter asserts that SO_2 emissions from Plant Scherer, when considered alone or in tandem with other local sources, are causing a violation of the NAAQS. A discussion of the modeling performed by the Sierra Club follows below, with references to the EPA's Modeling TAD as appropriate.
The Sierra Club modeling was performed using the most recent version of AERMOD, AERMET, and AERMINUTE, with data provided to the Sierra Club by regulatory air agencies and through other publicly-available sources as documented below. Sierra Club stated that the analysis was conducted in adherence to all available EPA guidance for evaluating source impacts on attainment of the 1-hour SO_2 NAAQS via aerial dispersion modeling.
Georgia evaluated Sierra Club's modeling and provided an explanation in their modeling report why the conservative assumptions Sierra Club used in the modeling were not appropriate. The following text from Georgia's revised recommendation summarizes the inappropriate assumptions made in the Sierra Club modeling:

> *"…The modeling presented here appropriately matched emissions with the appropriate stack. However, the modeling submitted by the Sierra Club did not. The Sierra Club modeling modeled all emissions (scrubbed and not scrubbed) out of the scrubber stack. Clearly, this is not appropriate and will lead to unrealistically high modeled design values since uncontrolled SO_2 emissions are modeled out of the shorter and cooler (less plume rise) stacks. As a result, the Sierra Club modeling shows modeled violations of the SO_2 NAAQS while the Georgia Power modeling shows that the modeled design value is 36% below the NAAQS."* – Excerpt from Pages 3-4 of Georgia August 24, 2015 Modeling Summary Document

The EPA agrees with Georgia's assessment of the Sierra Club's modeling. Emissions that have been scrubbed will be emitted from one of the shorter 847 feet tall stacks. Non-scrubbed emissions will emit from one of the taller 1,000 feet tall bypass stacks. The Sierra Club assumed that all emissions (scrubbed and non-scrubbed) are emitted from the shorter scrubber stacks (847 feet). This would not properly represent stack conditions when the scrubber is either not installed or turned off and the emissions are being vented to the taller bypass stack. As indicated in the

excerpt above, if any portion of the actual emissions for Plant Scherer are not modeled from the appropriate stack, the difference in stack height and exit temperature could cause the model to predict reduced atmospheric dispersion therefore resulting in over-predictions of surface level ambient concentrations. Therefore, having reviewed Georgia's modeling, Sierra Club's modeling, and Georgia's assessment, the EPA preliminarily agrees with Georgia's assessment.

Conclusion

The EPA considered modeling submitted by both the state of Georgia and Sierra Club and determined that Georgia's assumptions and input parameters regarding the behavior of emissions through the scrubbers was more representative of actual operations at Plant Scherer and resulting SO_2 emissions.

Based on the air quality characterization conducted within the Juliette Area of analysis in accordance with the EPA's Modeling TAD, the state concluded that Monroe, Bibb, Jones, Jasper, Butts, Lamar, Upson and Crawford Counties be designated as unclassifiable/attainment. This recommendation is based on Georgia's assessment that there were no large SO_2 emitting sources beyond the 50 km analysis area that could impact the area. As previously discussed, all units at Georgia Power's Plant Branch in Putnam County have ceased operation, and therefore the EPA does not expect emissions from this facility to cause or contribute to a future violation of the NAAQS in our intended unclassifiable/attainment area.

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the area around Plant Scherer as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the boundaries are comprised of Monroe, Jones, Jasper, Butts, Lamar, Upson and Crawford Counties.

At this time, our intended designations for the state only apply to this area and the other areas presented in this technical support document. The EPA does not intend on designating Bibb County at this time. Instead, consistent with the conditions in the March 2, 2015 court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Georgia by either December 31, 2017, or December 31, 2020.