

Technical Support Document:

Chapter 10

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

1. Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (the EPA, we, or us) must designate areas as either “nonattainment,” “attainment,” or “unclassifiable” for the 2010 1-hour sulfur dioxide (SO₂) primary national ambient air quality standard (NAAQS) (2010 SO₂ NAAQS). The CAA defines a nonattainment area as an area that does not meet the NAAQS or that contributes to a nearby area that does not meet the NAAQS. An attainment area is defined by the CAA as any area that meets the NAAQS and does not contribute to a nearby area that does not meet the NAAQS. Unclassifiable areas are defined by the CAA as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS. In this action, the EPA has defined a nonattainment area as an area that the EPA has determined violates the 2010 SO₂ NAAQS or contributes to a violation in a nearby area, based on the most recent 3 years of air quality monitoring data, appropriate dispersion modeling analysis, and any other relevant information. An unclassifiable/attainment area is defined by the EPA as an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO₂ NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.¹ An unclassifiable area is defined by the EPA as an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO₂ NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

This technical support document (TSD) addresses designations for nearly all remaining undesignated areas in Georgia for the 2010 SO₂ NAAQS. In previous final actions, the EPA has

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

issued designations for the 2010 SO₂ NAAQS for selected areas of the country.² The EPA is under a December 31, 2017, deadline to designate the areas addressed in this TSD as required by the U.S. District Court for the Northern District of California.³ We are referring to the set of designations being finalized by the December 31, 2017, deadline as “Round 3” of the designations process for the 2010 SO₂ NAAQS. After the Round 3 designations are completed, the only remaining undesignated areas will be those where a state has installed and timely begun operating a new SO₂ monitoring network meeting the EPA specifications referenced in the EPA’s SO₂ Data Requirements Rule (DRR) (80 FR 51052).

Georgia submitted its first recommendations regarding designations for the 2010 1-hour SO₂ NAAQS on May 31, 2011, in which the State recommended “unclassifiable/attainment” for all counties based on available monitoring information at the time. The State submitted updated air quality analyses for four sources characterized with air dispersion modeling on June 17, 2016, and August 30, 2016. Georgia submitted updated information for another modeled source on June 30, 2016, and later on August 30, 2016. Georgia submitted updated information and air quality modeling for one set of modeling covering two sources on December 13, 2016. The State submitted updated modeling information for two other sources on September 27, 2016, and subsequently on December 28, 2016. Georgia submitted documentation of source shutdown on December 29, 2016. Additionally, on January 12, 2017, the State provided updated documentation of a federally-enforceable limit on SO₂ for a source. Finally, the State then submitted revised modeling for one source on May 31, 2017. Each corresponding section of this TSD will outline the dates on which submittals were received from the State for particular sources. In our intended designations, we have considered all the submissions from the State, except where a recommendation in a later submission regarding a particular area indicates that it replaces an earlier recommendation for that area we have considered the recommendation in the later submission.

For the areas in Georgia that are part of the Round 3 designations process, Table 1 identifies the EPA’s intended designations and the counties or portions of counties to which they would apply. It also lists Georgia’s current recommendations. The EPA’s final designation for these areas will be based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above, and could change based on changes to this information (or the availability of new information) that alters EPA’s assessment and characterization of air quality.

² A total of 94 areas throughout the U.S. were previously designated in actions published on August 5, 2013 (78 FR 47191), July 12, 2016 (81 FR 45039), and December 13, 2016 (81 FR 89870).

³ *Sierra Club v. McCarthy*, No. 3-13-cv-3953 (SI) (N.D. Cal. Mar. 2, 2015).

Table 1. Summary of the EPA’s Intended Designations and the Designation Recommendations by Georgia

Area/County	Georgia’s Recommended Area Definition	Georgia’s Recommended Designation	The EPA’s Intended Area Definition	The EPA’s Intended Designation
Chatham County Area	Chatham County	Unclassifiable/ Attainment	Same as State’s Recommendation	Unclassifiable/ Attainment
Bartow County Area	Bartow County	Unclassifiable/ Attainment	Same as State’s Recommendation	Unclassifiable
Effingham County Area	Effingham County	Unclassifiable/ Attainment	Same as State’s Recommendation	Unclassifiable/ Attainment
Heard County Area	Heard County	Unclassifiable/ Attainment	Same as State’s Recommendation	Unclassifiable/ Attainment
Rest of the state	Rest of the State	Unclassifiable/ Attainment	Same as State’s recommendation	Unclassifiable/ Attainment

* Except for areas that are associated with sources for which Georgia elected to install and began timely operation of a new SO₂ monitoring network meeting the EPA specifications referenced in the EPA’s SO₂ DRR (*see* Table 2), the EPA intends to designate the remaining undesignated counties (or portions of counties) in Georgia as “unclassifiable/attainment” for the SO₂ NAAQS. These areas that we intend to designate as unclassifiable/attainment (those to which this row of this table is applicable) are identified more specifically in Section 7 of this TSD.

Areas for which Georgia elected to install and began timely operation of a new, approved SO₂ monitoring network are listed in Table 2. The EPA is required to designate these areas, pursuant to a court ordered schedule, by December 31, 2020. Table 2 also lists the SO₂ emissions sources around which each new, approved monitoring network has been established.

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

Area	Source(s)
Floyd County	International Paper – Rome

Areas that the EPA previously designated unclassifiable in Round 1 (*see* 78 FR 47191) and Round 2 (*see* 81 FR 45039 and 81 FR 89870) are not affected by the designations in Round 3 unless otherwise noted.

2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a July 22, 2016, memorandum and a March 20, 2015, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. These memoranda supersede earlier designation guidance for the 2010 SO₂ NAAQS, issued on March 24, 2011, and identify factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO₂ NAAQS. The documents also contain the factors that the EPA intends to evaluate in determining the boundaries for designated areas. These factors include: 1) air quality characterization via ambient monitoring or dispersion modeling results; 2) emissions-related data; 3) meteorology; 4) geography and topography; and 5) jurisdictional boundaries.

To assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling for sources that emit SO₂, the EPA released its most recent version of a draft document titled, “SO₂ NAAQS Designations Modeling Technical Assistance Document” (Modeling TAD) in August 2016.⁴

Readers of this chapter of this TSD should refer to the additional general information for the EPA’s Round 3 area designations in Chapter 1 (Background and History of the Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard for States with Sources Not Required to be Characterized).

As specified by the March 2, 2015, court order, the EPA is required to designate by December 31, 2017, all “remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO₂ monitoring network meeting the EPA specifications referenced in the EPA’s” SO₂ DRR. The EPA will therefore designate by December 31, 2017, areas of the country that are not, pursuant to the DRR, timely operating the EPA-approved and valid monitoring networks. The areas to be designated by December 31, 2017, include the areas associated with five sources in Georgia meeting DRR emissions criteria that states have chosen to be characterized using air dispersion modeling, the area associated with one source in Georgia for which air agencies imposed emissions limitations on sources to restrict their SO₂ emissions to less than 2,000 tons per year (tpy), sources that met the DRR requirements by demonstrating shut down of the source (two of which are in Georgia), areas for which the states chose monitoring for the DRR but did not timely meet the approval and operating deadline (none of which are in Georgia), and other areas not specifically required to be characterized by the State under the DRR.

Because many of the intended designations have been informed by available modeling analyses, this preliminary TSD is structured based on the availability of such modeling information. There is a section for each county for which modeling information is available. For some counties, multiple portions of the county have modeling information available and the section on the

² <https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf>. In addition to this TAD on modeling, the EPA also has released a technical assistance document addressing SO₂ monitoring network design, to advise states that have elected to install and begin operation of a new SO₂ monitoring network. See Draft SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, <https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf>.

county is divided accordingly. The EPA reviewed the most recent available SO₂ air quality monitoring data in the Air Quality System (AQS) database for all areas for which modeling analyses are available. For areas where air quality monitoring data is available in the county or nearby, a subsection discussing air quality monitoring data relevant to the area is included. For all other areas, air quality monitoring data was not available in or near the county, and this subsection is not included. The remaining to-be-designated counties are then addressed together in section 7.

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

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

- 1) 2010 SO₂ NAAQS – The primary NAAQS for SO₂ promulgated in 2010. This NAAQS is 75 parts per billion (ppb), based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-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 that, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined either: (1) does not meet the 2010 SO₂ NAAQS, or (2) contributes to ambient air quality in a nearby area that does not meet the NAAQS.
- 4) Designated unclassifiable/attainment area an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO₂ NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.⁵
- 5) Designated unclassifiable area – an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO₂ NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.
- 6) Modeled violation – a violation of the SO₂ NAAQS demonstrated by air dispersion modeling.

⁵ The term “attainment area” is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA’s approval of a state-submitted maintenance plan.

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

3. Technical Analysis for the Chatham County, Georgia Area

3.1. Introduction

The EPA must designate the Chatham County, Georgia, area by December 31, 2017, because the area has not been previously designated and Georgia has not installed and begun timely operation of a new, approved SO₂ monitoring network meeting the EPA specifications referenced in the EPA's SO₂ DRR for any sources of SO₂ emissions in Chatham County.

The Chatham County area runs along the Savannah River, which constitutes the border between Georgia and South Carolina in this area. A portion of the Chatham County modeling domain extends into the State of South Carolina in Jasper County. However, the information in this document does not duplicate information in a document for South Carolina because that State has no DRR sources and no sources of SO₂ over 100 tpy in Jasper County.

3.2. Air Quality Monitoring Data for the Chatham County, Georgia Area

This factor considers the SO₂ air quality monitoring data in the area of Chatham County. The State included monitoring data from the following monitor(s):

- Air Quality System monitor 13-051-1002. This monitor is located at the intersection of W. Lathrop and Augusta Ave. (the Lathrop & Augusta monitor) in Savannah, Georgia, (Global Positioning System coordinates: 32.09045 latitude, -81.13037 longitude) in Chatham County, and is approximately 1.6 kilometers (km) south by southwest of the source. Data collected at this monitor indicates that the most recent design value for data collected between 2014 and 2016 was 52 ppb.⁶ The nearest source to the monitor, International Paper – Savannah, qualified for characterization under the DRR because emissions were greater than 2,000 tpy. Additionally, the monitor was not known to be located where it would capture the points of maximum impact. Georgia therefore decided to assess source impacts as related to the location of the monitor alongside the modeling demonstration to support its recommendation of “unclassifiable/attainment” for the Chatham County area. Georgia believes that the monitor adequately represents the maximum SO₂ impacts for the International Paper – Savannah source. Since Georgia decided to characterize the Chatham County area around the facility using air modeling, the EPA has not approved this monitor to characterize the maximum 1-hour SO₂ concentrations in the area under the DRR. The State intended all available data collected at this monitor to support and corroborate air dispersion modeling results; the discussion of these modeled results follows immediately below. The EPA notes that the most recent monitoring data does not conflict with the conclusion of the modeling demonstration,

⁶ Note: Data collected at this monitor indicates that the 2012–2014 design value was above the NAAQS at 78 ppb, while 2013–2015 data showed a decrease in DV to 70 ppb, below the NAAQS. The 2012–2014 violating DV resulted in the Chatham County area being identified as a potential nonattainment area during Round 2 of designations in 2016. However, in early 2016, the 2013–2015 data was certified, resulting in a valid DV of 70 ppb. Accordingly, the EPA removed the Chatham County area from consideration prior to the Round 2 designations being finalized.

discussed below, that the area is attaining the 1-hour SO₂ NAAQS.

- Air Quality System monitor 13-051-0021. This monitor is located at 2500 E. President Street in Savannah, Georgia, (Global Positioning System coordinates: 32.0692 latitude, -81.0488 longitude) in Chatham County, and is approximately 7.9 km southeast of the source. Data collected at this monitor indicates that the most recent design value for data collected between 2014 and 2016 was 35 ppb. However, this design value is not valid because the monitor did not meet data completeness requirements during 2014.

The EPA confirms that the 2014-2016 design value for these monitors are below the 1-hour SO₂ NAAQS and there is no additional relevant monitored data in AQS that could inform the intended designation action. See the spreadsheet entitled “Sulfur Dioxide Design Values, 2016” under 2016 Design Value Reports posted at <https://www.epa.gov/air-trends/air-quality-design-values> for more information on SO₂ design values design values in Georgia.

3.3. Air Quality Modeling Analysis for the Chatham County, Georgia Area Addressing International Paper - Savannah

3.3.1. *Introduction*

This section 3.3 presents all the available air quality modeling information for a portion of Chatham County that includes International Paper - Savannah. (This portion of Chatham County will often be referred to as “the Chatham County area” within this section 3.3.) This area contains the following SO₂ source around which Georgia is required by the DRR to characterize SO₂ air quality, or alternatively to establish an SO₂ emissions limitation of less than 2,000 tpy:

- The International Paper - Savannah facility emits 2,000 tons or more annually. Specifically, International Paper - Savannah emitted 8,123 tons of SO₂ in 2014. The source emitted 5,865 tons of SO₂ in 2015. This source meets the DRR criteria and thus is on the SO₂ DRR Source list, and Georgia has chosen to characterize it via modeling.

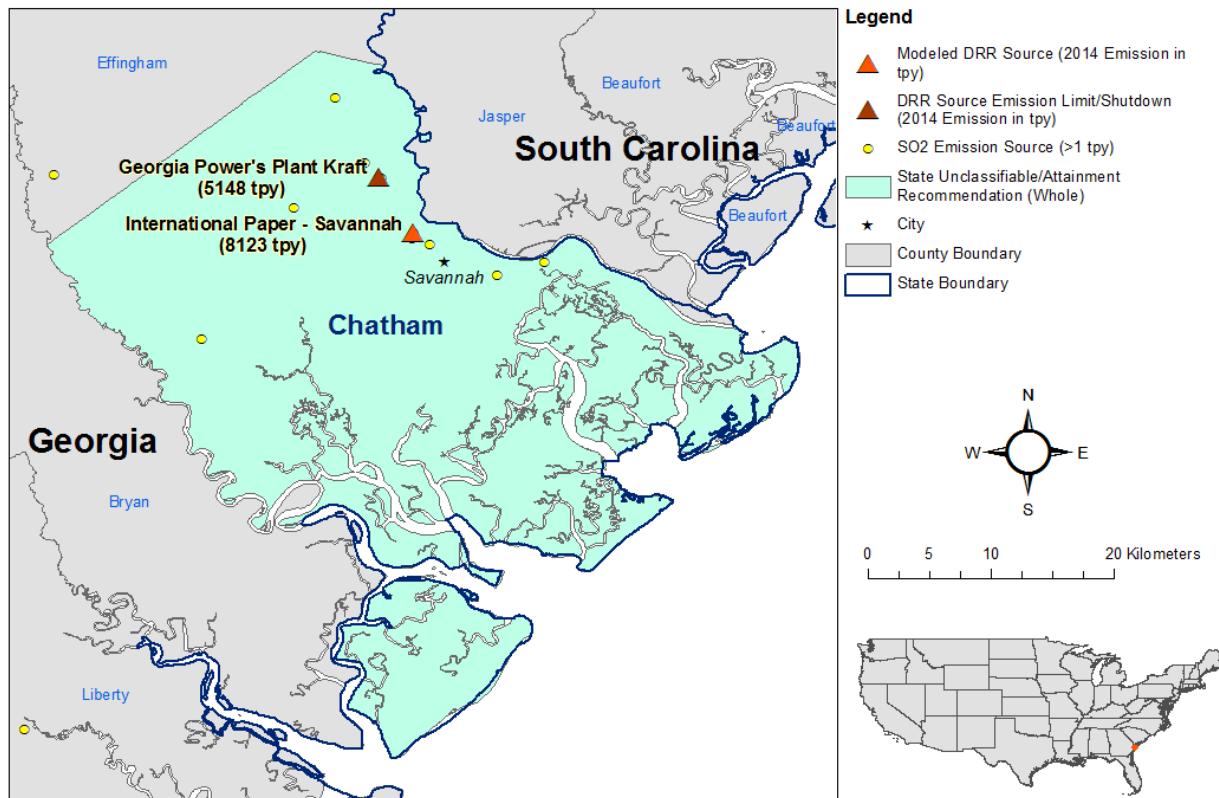
In its submission, Georgia recommended that each county in the State be designated unclassifiable/attainment. Specifically, the State recommended that an area that includes the area surrounding the International Paper – Savannah source be designated as unclassifiable/attainment based in part on an assessment and characterization of air quality impacts from this facility and the fact that no other nearby sources are believed to have a potential impact in the area where the 2010 SO₂ NAAQS may be violated. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing a mixture of actual and allowable emissions. After careful review of the State’s assessment, supporting documentation, and all available data, the EPA preliminarily agrees with the State’s recommendation for the area, and intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

The area that the State has assessed via air quality modeling is located in Savannah, Georgia, on the western bank of the Savannah River. The area is east of Interstate 516 and of the Chatham

City part of town. See Figure 1 below. Also included in the figure are other nearby emitters of SO₂.

The EPA's intended unclassifiable/attainment designation boundary for the Chatham County area is not shown in this figure, but is shown in a figure in the section below that summarizes our intended designation.

Figure 1. Map of the Chatham County, Georgia Area Addressing International Paper – Savannah



The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered three different modeling assessments including two assessments from the State and a preliminary assessment along with the modeling protocol. The two assessments from the State are updates of the preliminary modeling assessment submitted by the International Paper – Savannah facility. To avoid confusion in referring to these assessments and protocols, the following table lists them, indicates when they were received, provides an identifier for the assessment that is used in the discussion of the assessments that follow, and identifies any distinguishing features of the modeling assessments.

Table 3 – Modeling Assessments for the Chatham County Area

Assessment Submitted by	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Georgia*	September 10, 2015	September 10, 2015 Modeling Protocol	
Georgia	June 30, 2016	June 30, 2016 Modeling Report	Georgia updated the International Paper-Savannah's modeling and submitted its own modeling report
Georgia	August 30, 2016	August 30, 2016 Modeling Report or Final Modeling Report	Georgia updated the modeling report submitted on June 30, 2016.

*Georgia forwarded this assessment dated September 10, 2015 and prepared by International Paper – Savannah to the EPA on June 30, 2016.

3.3.2. Modeling Analysis Provided by the State

3.3.2.1. Differences Between and Relevance of the Modeling Assessments Submitted by the State
Georgia originally commissioned a modeling protocol and evaluation from International Paper - Savannah. The State forwarded the modeling protocol, dated September 10, 2015, to the EPA for review and concurrently conducted its own review. Georgia revised the modeling in the September 10, 2015, AECOM Protocol based on its review, and developed its own modeling report dated June 30, 2016, to satisfy the DRR. Georgia included small changes in the modeling, such as including 100-meter (m) spacing for modeled receptors out to a 4 km radius from the source instead of 2.5 km radius. Minor adjustments were seen in the modeled concentrations. The full grid is a square with receptors extending 10 km from the International Paper – Savannah source. When Georgia revised its June 30, 2016, modeling report in August 2016, the State added additional modeled receptors along the facility fenceline. The August 30, 2016, modeling report does not significantly change any inputs, model versions or components, and accordingly, the modeled results and conclusions presented in the report do not significantly change. The remainder of this TSD only refers to the Final Modeling Report from the State.

3.3.2.2. Model Selection and Modeling Components

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

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD

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

The State used AERMOD version 15181 using all regulatory default options. AERMOD version 16216r has since become the regulatory model version. There were no updates from 15181 to 16216r that would significantly affect the concentrations predicted here. A discussion of the State's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

The current version of AERMOD, version 16216r, includes updates to 40 CFR part 51, Appendix W, “Guideline of Air Quality Models,” published on January 17, 2017 (82 FR 5203). This version of AERMOD also includes fixes to bugs that were inadvertently included in version 16216. Georgia used the regulatory default settings for version 15181 available at the time of its modeling preparation and is not making use of any previously unapproved alternative modeling options included in version 16216r and the update to Appendix W.

3.3.2.3. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the “urban” or “rural” determination of a source is important in determining the boundary layer characteristics that affect the model’s prediction of downwind concentrations. For SO₂ modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO₂ sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density. The EPA’s recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 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.

The State used the AERSURFACE model to assess land use in the area within 3 km of the International Paper – Savannah facility. The AERSURFACE model, using Auer’s land use methodology, indicated approximately 40 percent of the surrounding land use was urban, or less than 50 percent urban. For the purpose of performing the modeling for the area of analysis, Georgia determined that it was most appropriate to run the model with rural dispersion coefficients or rural mode and the EPA concurs with this assessment. The EPA agrees that the area surrounding the source can be classified as rural, consistent with one available method (Auer method) for determining land use classification detailed in Section 6.3 of the Modeling TAD.

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

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not

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

The source of SO₂ emissions subject to the DRR in this area is described in the introduction to this section. For the Chatham County area, the State has included no other emitters of SO₂ within 50 km of International Paper - Savannah in any direction. The State determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO₂ NAAQS exceedances in the area of analysis and any potential impact on SO₂ air quality from other sources in nearby areas.⁷ No other sources beyond 50 km were determined by the State to have the potential to cause concentration gradient impacts within the area of analysis.

The grid receptor spacing for the area of analysis chosen by the State is as follows, taken from the August 30, 2016, modeling report:

A Cartesian receptor grid extending to approximately 10 km from IP-Savannah was used in the modeling analysis to assess ground-level SO₂ concentrations. The discrete receptors were placed according to the following configuration based on the center of the plant:

- At property boundary 50 m apart
- Property boundary – 4 km -100 m apart
- 4 km – 10 km - 500 m apart

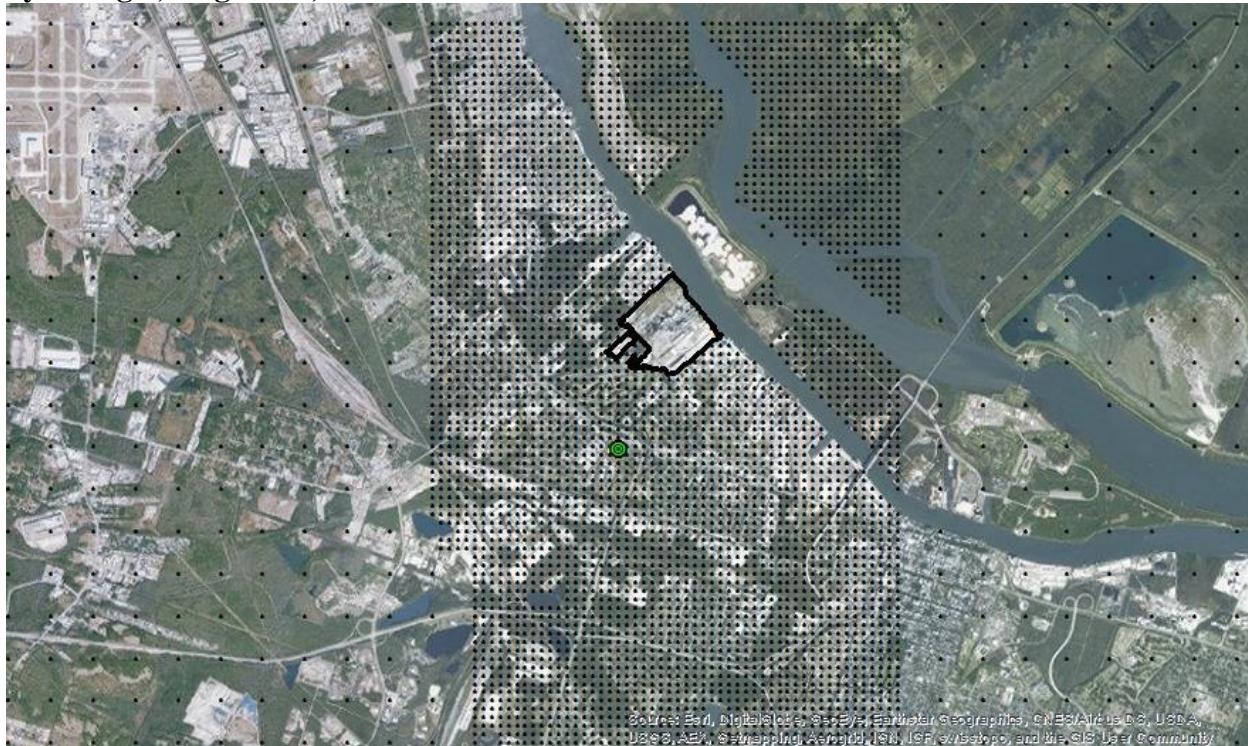
The receptor network contained 6,235 receptors, and the network covered the northwest portion of Chatham County in Georgia and a small southwestern portion of Jasper County in South Carolina. Figures 2 shows the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the State placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to International Paper – Savannah property with the exceptions of locations described in Section 4.2 of the Modeling TAD as not being feasible locations for placing a monitor. Specifically, the State removed receptors from “over bodies of water,” according to Georgia’s August 30, 2016, report. The State also added a specific receptor at the location of the existing monitor.

Georgia did not include modeled receptors inside the facility fenceline, citing that ambient air is defined as “that portion of the atmosphere, external to buildings, to which the general public has access,” at 40 CFR 50.1(e) (See the September 10, 2015, Modeling Protocol and initial modeling assessment from the contractor). The State asserted that the general public does not have access to the area inside the fenceline at International Paper – Savannah because access is restricted to the private property on facility grounds. Georgia asserted that the 10 km grid is sufficient to capture the maximum impact from the source.

⁷ See the Georgia EPD report entitled “Analysis of 1-Hour SO₂ NAAQS Exceedances in Savannah and Rome” (December 23, 2013).

Figure 2: Receptor Grid for the Chatham County Area. Source: “International Paper-Savannah Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS – UPDATE,” prepared by Georgia, August 30, 2016.



Note: The existing monitor in the Chatham County area is denoted by a green circle.

The EPA agrees with the State on the final receptor grid, including those areas excluded from the modeling because either a monitor could not be placed at those locations or the areas did not represent ambient air. The area north of the facility across the river with receptors excluded is facility property with additional fencing. Additionally, the maximum predicted SO₂ concentration from the facility is well away from plant property, approximately 2 km south of the facility, and within the portion of the grid with 100-m spacing. The final receptor grid as described above, therefore, can be expected to adequately characterize SO₂ impacts from the facility.

3.3.2.5. *Modeling Parameter: Source Characterization*

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

In December of 2013, the State of Georgia performed an analysis of exceedances of the 1-hour SO₂ NAAQS which occurred during 2011-13 at two monitors in the Savannah area including the Lathrop & Augusta and East President monitors. The Final DRR Modeling Report submitted by the State of Georgia (dated August 30, 2016) concludes that the maximum predicted impacts from the IP Savannah facility alone occur approximately 2 km south of the facility which is very near (within 1 km of) the Lathrop & Augusta SO₂ monitor. Therefore, the 2013 analysis of

exceedances at the Lathrop & Augusta monitor was utilized by the State to help inform which background sources should be explicitly included in the DRR modeling. Georgia included the following discussion of nearby sources in its August 30, 2016, DRR Modeling Report:

A detailed analysis of all point sources within 50 km of the Lathrop & Augusta SO₂ monitor in Savannah is contained in the attached document titled ‘Analysis of 1-Hour SO₂ NAAQS Exceedances in Savannah and Rome’ (December 23, 2013). This analysis included identification of nearby SO₂ sources and Q/d (emissions/distance) analysis; back trajectory analysis on SO₂ exceedance days, and AERMOD modeling to quantify source-by-source contributions to SO₂ exceedances for all sources with a Q/d over 20. Based on this analysis, it was concluded that the SO₂ emissions from International Paper – Savannah was the primary cause of SO₂ NAAQS exceedances at the Lathrop & Augusta SO₂ monitor. All other sources of SO₂ emissions were deemed to be insignificant. Therefore, no offsite sources will be explicitly modeled and the impact from those sources will be captured in the seasonal diurnally varying background concentration.

The December 23, 2013, report on exceedances referenced above screened for potential nearby sources with the most current version of compiled emissions at the time of report preparation, the 2011 National Emissions Inventory (NEI), version 1. This report considered eight other sources explicitly as having a Q/d over 20.⁸ In this report, Georgia EPD showed that the International Paper – Savannah facility accounted for 69.5 percent of the cumulative Q/d. Considering the shutdown of Plant Kraft, International Paper – Savannah accounts for 80 percent of the cumulative Q/d. The State then made use of back trajectory analyses on days during which the nearest monitor, Lathrop & Augusta, showed exceedances. The back trajectory analysis supported the conclusion that International Paper – Savannah was causing or contributing to most, if not all, exceedances. The nearby Arizona Chemical Corporation was also shown to be in the general upwind direction on days with exceedances, however, as shown in the paragraph to follow, modeling indicates that this source has minimal impacts in the area. Shown in the table below are emissions, distances from the Lathrop & Augusta SO₂ monitor, Q/d values, and cumulative Q/d values for all eight sources in the area that had a Q/d value of greater than 20. International Paper – Savannah data is also shown for comparative purposes.

⁸ The 20d screening method suggests that if a source’s annual emissions in tons (Q) is less than its distance from the primary source in km (d) multiplied by 20, then it is unlikely to have a significant concentration gradient in the area of concern.

Table 4. Analysis of Nearby Sources in Chatham County with 2011 Actual SO₂ Emissions 2011.

Facility Name	SO ₂ (tpy)	Distance to the Lathrop & Augusta SO ₂ Monitor (km)	Q/d	Cumulative Q/d	Percent Cumulative Q/d
International Paper - Savannah	4,232.78	1.83	2,312.05	2,312.05	69.5%
Ga Power - Plant Kraft*	2,806.00	6.61	424.80	2,736.85	82.3%
Southern States Phosphate & Fertilizer	1,211.44	6.59	183.91	2,920.76	87.8%
Georgia-Pacific Consumer Products, LP (Savannah River Mill)	3,724.79	27.51	135.40	3,056.16	91.9%
Imperial-Savannah, LP	502.26	6.12	82.13	3,138.29	94.4%
Weyerhaeuser Company	605.44	8.02	75.46	3,213.74	96.6%
Colonial Terminals, Inc.	82.15	1.77	46.38	3,260.12	98.0%
Arizona Chemical Corporation	31.32	1.11	28.16	3,288.27	98.9%
Ga Power Plant McIntosh	691.81	29.63	23.35	3,311.62	99.6%

*Plant Kraft has since shut down.

In the 2013 analysis by the State, AERMOD modeling was also performed for days with exceedances and utilizing a small receptor grid centered on the Lathrop & Augusta monitor and near the point of maximum impact from IP- Savannah alone. The State used actual emissions data for days with exceedances for the sources listed in the table above. This modeling showed that IP-Savannah caused or contributed to most exceedances. The modeling also showed a maximum 1-hour SO₂ concentration of 2.6 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) from Arizona Chemical. The modeling also indicates one day with impacts from Plant Kraft, but this source has since shut down. This analysis from 2011 is further supported because the second-largest source in the area was Georgia Power's Plant Kraft, a DRR source which has shut down as of October 13, 2015, and the operating permit was formally revoked on November 9, 2016.⁹ Accordingly, the State modeled only the International Paper – Savannah facility to characterize the Chatham County area, including the portion of the county surrounding the Plant Kraft facility. Because Plant Kraft has shut down permanently, the source's new allowable emissions are zero tpy. Therefore, the modeling for International Paper – Savannah accounts for this zero-tpy impact from Plant Kraft.

An equally important consideration in the decision to not explicitly model any other sources in the area of analysis is the representativeness of the background concentration data from the Lathrop & Augusta monitor used in this analysis. The State concluded that the impact of the

⁹ For more information, see Georgia EPD's December 29, 2016, letter addressed to the EPA Region 4 available at: <https://www.epa.gov/so2-pollution/so2-data-requirements-rule-january-13-2017-state-submittals-georgia>.

offsite sources not explicitly included in the modeling will be captured by the background monitor, including some impacts from Plant Kraft from the time period during which it still operated. Because the background monitor is located only about 2 km from International Paper - Savannah, the EPA concurs with this determination. See Section 3.3.2.9 of this TSD for additional discussion of the background data used for this modeling assessment.

The State characterized this source within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Georgia calculated actual emissions from the four main emitting units at the facility, but used allowable emissions for six other intermittently operated sources, stationary internal combustion engines. Although the six stationary internal combustion engines at the Mill operate intermittently and fire ultra-low sulfur diesel fuel, they were included in the modeling at full operation in order to fully examine the Mill's impact on ambient SO₂ concentrations. Stack exit temperature and stack exit flow data from similar engines at another International Paper mill were used. Five of the intermittent engines have horizontal stacks and were modeled using a default stack exit velocity of 0.001 meters per second (m/s) according to guidance from AERMOD Implementation Guide. Because of the mixture of actual and allowable emissions used for characterization, the EPA's GEP policy was followed, in accordance with the Modeling TAD. All sources at International Paper – Savannah with an actual stack height of greater than 65 m also had actual stack heights that were less than the GEP formula height for the stack as determined by the GEP formula height equation in 40 CFR 51.100(ii)(2)(ii). The State also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

The EPA agrees with Georgia's method for characterizing the area. The assessment of nearby sources within 50 km of the Lathrop & Augusta monitor justifies the explicit modeling of only the International Paper – Savannah facility. The Lathrop & Augusta background monitor, discussed in Section 3.3.2.9, will capture any impacts from sources in the area not explicitly modeled. As described above, because International Paper – Savannah sources were modeled using a combination of actual and allowable emissions, the stack heights modeled for all sources were consistent with the GEP Policy. Building downwash is also appropriately accounted for.

3.3.2.6. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as potential to emit (PTE) or allowable) emissions rate that is federally-enforceable and effective.

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

these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally-enforceable emissions limit or implemented other federally-enforceable mechanisms and control technologies to limit SO₂ emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a State should be able to find the necessary emissions information for designations-related modeling in the existing SO₂ emissions inventories used for permitting or state implementation plan (SIP) planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, “Guideline on Air Quality Models.”

As previously noted, the State included International Paper - Savannah and no other emitters of SO₂ within 50 km in the area of analysis. The State has chosen to model this facility using a mixture of actual emissions and PTE. The six intermittently operated internal combustion engines were assumed to operate at full capacity to make a conservative estimate of SO₂ impacts in the area of analysis. The four major emitting units at the facility were modeled with the State’s best calculation of actual hourly emissions. The facility in the State’s modeling analysis and their associated annual actual SO₂ emissions between 2011 and 2015 are summarized below.

For International Paper - Savannah, the State provided annual actual SO₂ emissions between 2011 and 2013. This information is summarized in Table 4. A description of how the State obtained hourly emission rates is given below this table.

Table 4. Actual SO₂ Emissions Between 2011 – 2015 from Facilities in the Chatham County Area

Facility Name	SO ₂ Emissions (tpy)				
	2011	2012	2013	2014	2015
International Paper – Savannah	7,053	6,267	6,653	8,123	5,866
Total Emissions from All Modeled Facilities in the State’s Area of Analysis	7,053	6,267	6,653	8,123	5,866

For International Paper – Savannah, the actual hourly emissions data were obtained from emission factors. The emissions during these years, as submitted to the EPA’s emissions inventory system (EIS), were originally calculated with the results of stack tests. In 2014, CEMS were installed at the facility’s largest emitters, including the power boiler. The CEMS data was used to determine new emission factors to better represent operation at the facility, including in prior years, for firing non-condensable gases. Georgia also updated its emission factor for coal burning at the power boiler with updated information. The original emission factor used to develop the EIS was based on stack tests in early 2013, and this factor was revised using daily

2012-2013 coal sulfur data. Georgia revised its calculations of actual emissions from 2011 – 2013 with the newly determined emission factors. This resulted in lower total emissions for the years 2011 – 2013 than what Georgia originally reported to the EIS, but is asserted to be more representative of actual emissions during this time period. The EPA agrees that CEMS data can make a better estimate of the emissions factors for the non-condensable gases, and that the updated information for firing coal provides a reasonable emission factor for the time period assessed. The State began its evaluation of the Chatham County area prior to the availability of the 2014 and 2015 emissions. However, Georgia compared the 2014 and 2015 emissions reported to the EIS to the prior years to determine whether the modeling should be updated. Georgia’s 2015 actual emissions of 5,866 tons of SO₂ represent the facility having operated part of the year with its power boiler burning coal and part of the year with that boiler burning natural gas. The power boiler at the facility has been burning only natural gas since early 2015, resulting in significantly reduced SO₂ emissions for years beyond 2015. The 2015 emissions, and probable future actuals for the facility, are expected to be lower than the emissions calculated for 2011 – 2013. The State concluded, therefore, that including the past actual emissions in its modeling demonstration gave an overestimate of any SO₂ impacts from current operations at International Paper – Savannah in the Chatham County area. The conversion to burning only natural gas at the power boiler has not been submitted as a permit revision, so the power boiler is still eligible to burn coal. Any increase in emissions due to a fuel switch will be noted in emissions reporting and results from the Lathrop & Augusta monitor. Appendix B of the August 30, 2016, modeling report contains more details for Georgia’s selection of modeled emissions.

The EPA agrees with Georgia’s use of past actual emissions for the International Paper – Savannah facility, and with the use of PTE for the intermittently operated units at this facility. Even though emissions increased in 2014 relative to the period modeled, emissions decreased in 2015 and total emissions from 2013-2015 are only approximately 3.3 percent higher than total emissions from 2011-2013. Also, because the maximum concentrations predicted by this analysis are more than 20 µg/m³ below the level of the NAAQS, we do not expect that the conclusion of this analysis would change if emissions data from the 2013-2015 period were used. We believe this set of parameters provides for an acceptable representation of actual SO₂ impacts in the area.

3.3.2.7. Modeling Parameter: Meteorology and Surface Characteristics

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

For the area of analysis for the Chatham County area, the State selected the surface meteorology from on-site wind speed and direction information gathered at the Lathrop & Augusta monitor at

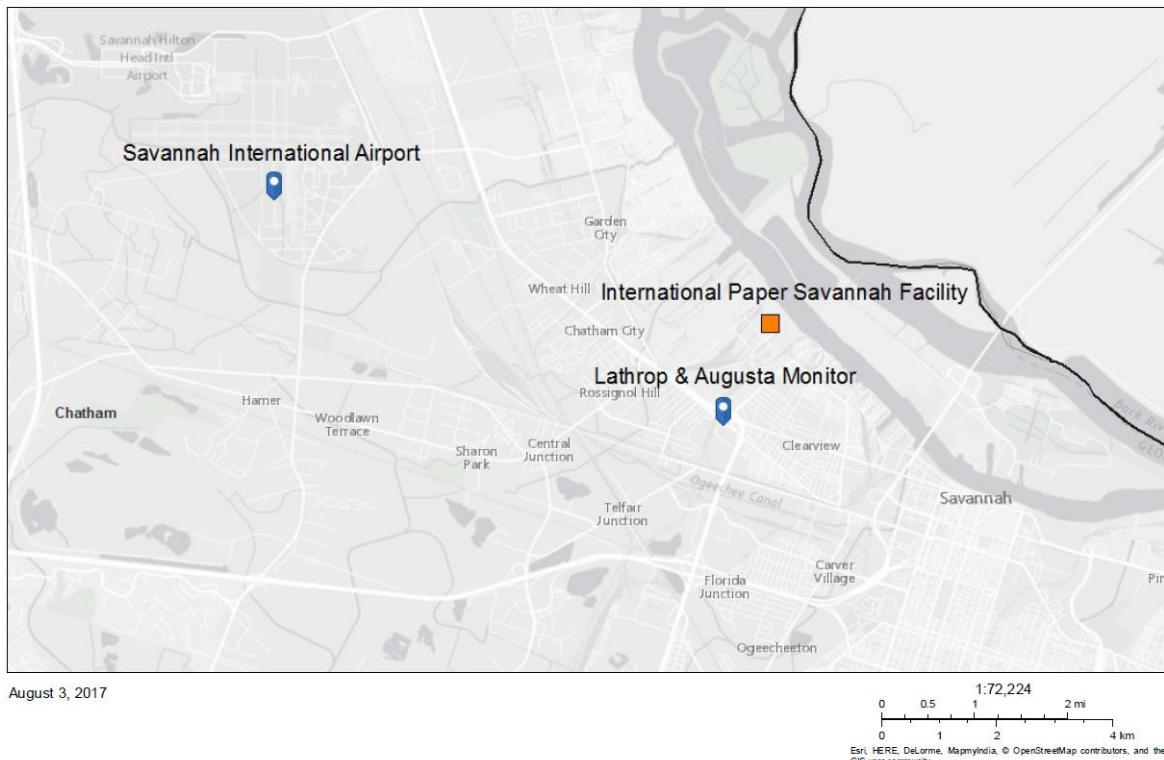
32.09045 latitude, -81.13037 longitude, with other information supplemented by the NWS station at the Savannah International Airport in Savannah, Georgia at Latitude 32.12 N, Longitude -81.2 W and coincident upper air observations from a different NWS station, located at the Charleston Air Force Base in Charleston, South Carolina at Latitude 32.7 N, Longitude -80 W, as best representative of meteorological conditions within the area of analysis. AERSURFACE output files have not been provided by Georgia, so we are not able to confirm the coordinates that were used to calculate the surface roughness, albedo and Bowen ratio surface characteristics

The State used AERSURFACE version 13016 using data from both the Lathrop & Augusta monitoring site and the International Paper facility site to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness [z_o]) for each location. Albedo is the fraction of solar energy reflected from the earth back into space, the Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance, and the surface roughness is sometimes referred to as “ z_o ”. The State estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions for each site. Georgia compared surface characteristics for the area around the Lathrop & Augusta monitoring site and those at the site of the facility. The surface roughness was the only significantly different value between the two sites. Georgia decided to use the surface characteristics from the International Paper – Savannah facility because the modeled concentrations were higher (more conservative) using the surface characteristics at the facility, and because the receptor included at the monitor location performed better as related to actual data. See Appendix A of the August 30, 2016, modeling report for more details on this evaluation.

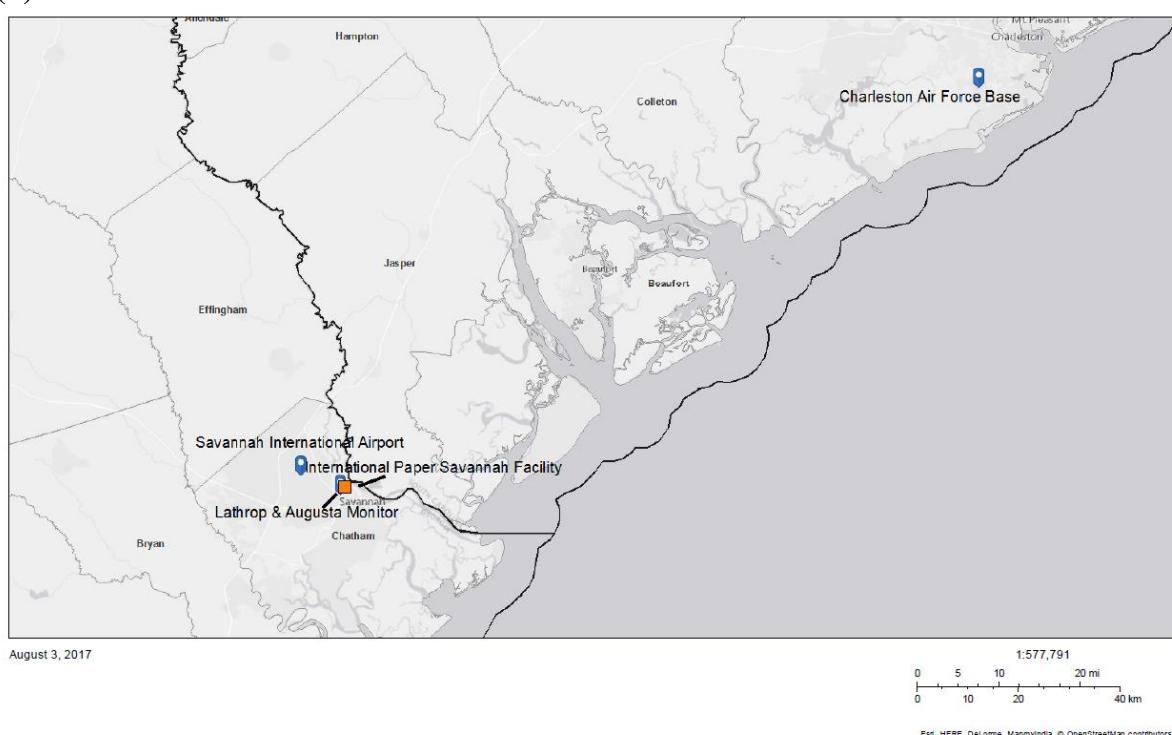
In the figure below, generated by the EPA, the locations of these NWS stations is shown relative to the area of analysis.

Figure 3. (a) Area of Analysis and (b) the NWS and On-site Weather Stations in the Chatham County Area

(a)

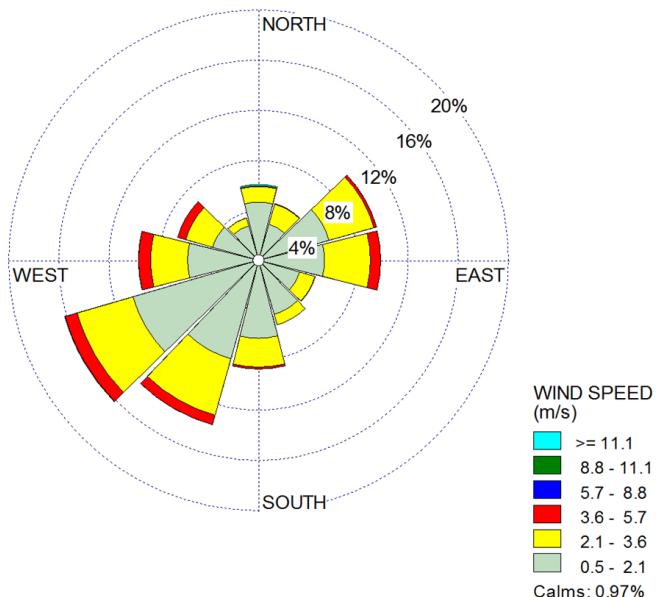


(b)



As part of its recommendation, the State provided the 3-year surface wind rose for the Lathrop & Augusta on-site meteorological data collection. In Figure 4, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The predominant wind direction is from the southwest (approximately 30 percent of the time) with significant winds from the east and northeast (approximately 20 percent of the time). This is consistent with Georgia's December 23, 2013, report on exceedances, which made use of back trajectory analysis and determined that exceedances at the Lathrop & Augusta monitor were from sources to the northeast of the monitor (i.e., International Paper – Savannah).

Figure 4: Chatham County Cumulative Annual Wind Rose for Years 2011 – 2013. Source: “International Paper-Savannah Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS – UPDATE,” prepared by Georgia, August 30, 2016.



Meteorological data from the above surface and upper air on-site and NWS 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 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. 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 m/s in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations.

The EPA believes the meteorology and surface characteristics used in the State's modeling are acceptable. The meteorology made use of site-specific data from the existing monitor in the Chatham County area where possible, and NWS data for supplementary information and upper air data. The EPA believes that the meteorological data reasonably shows that impacts from International Paper – Savannah are expected generally to the east of the facility, but that impacts could be seen to the west as well. The surface characteristics were evaluated for two reasonable areas, and the State's reasoning for selecting one set of characteristics over another favor conservative evaluation of SO₂ impacts in the area and better represent corroborating data from the monitor. The EPA believes that Georgia's analysis is acceptable.

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

The terrain in the area of analysis is best described as gently rolling as the area approaches sea level and is intersected by waterways, including the Savannah River. 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 (USGS) 1/3 arc-second/10-meter resolution National Elevation Dataset (NED). According to the State in its August 30, 2016, modeling report, elevation data were verified by comparing contoured receptor elevations with USGS 7.5-minute topographic map contours.

The EPA confirmed that the Chatham County area has no complex terrain considerations, and accordingly, the facility's characteristics can adequately represent the area and the modeling domain. We also agree with the State's use of AERMAP version 11103 to obtain the elevations of sources, buildings and receptors.

3.3.2.9. Modeling Parameter: Background Concentrations of SO₂

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO₂ that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the State elected to use a "tier 2" approach. Data was obtained from 2011-2013 for AQS Site: 13-051-1002 (the Lathrop & Augusta existing monitor). All SO₂ values corresponding to a wind direction between 0° and 45° were ignored such that impacts were seen from surrounding sources other than Imperial Paper - Savannah. It should be noted that all sources in the area with a Q/d value greater than 20 are located such that their impacts on the background concentrations would not be affected by the excluded wind sectors with the possible exception of Arizona Chemical Corporation which is located between International Paper – Savannah and the Lathrop & Augusta monitor. However, as discussed in Section 3.3.2.5 of this TSD, modeling performed by the State of Georgia in 2013 concluded that the maximum impacts in the area from Arizona Chemical was 2.6 µg/m³. Since the final modeling results, discussed in Section 3.3.2.10 of this TSD indicates SO₂ concentrations over 20 µg/m³ below the 1-hour SO₂ NAAQS, inclusion of

Arizona Chemical Corporation as an explicitly modeled source would not be expected to alter the conclusion of this modeling analysis which is that predicted SO₂ concentrations in the area are below the 1-hour NAAQS. See Table 5 for the hourly values modeled and sorted by season.

Table 5. Tier 2 Approach: Seasonal Varying Hourly Background Concentrations (ppb)¹⁰

Hour of Day	Spring	Summer	Fall	Winter
0:00	7.1	4.2	4.5	12.2
1:00	6.2	4.7	4.8	9.2
2:00	5.6	3.5	4.9	18.2
3:00	3.9	3.5	6.7	8.2
4:00	6.0	4.4	6.9	10.5
5:00	6.5	4.6	7.2	10.9
6:00	6.8	8.2	6.4	8.4
7:00	8.6	12.4	5.9	9.1
8:00	16.5	9.1	15.3	10.4
9:00	14.8	19.0	25.8	21.2
10:00	12.4	15.1	19.4	19.7
11:00	15.8	14.4	18.3	20.3
12:00	10.2	11.1	13.4	16.9
13:00	15.1	7.4	14.2	17.4
14:00	9.5	14.4	17.1	12.2
15:00	8.5	4.9	11.6	9.4
16:00	6.2	6.6	12.0	8.6
17:00	6.3	9.4	9.3	8.0
18:00	6.5	4.6	10.4	12.0
19:00	7.1	5.8	9.3	8.7
20:00	6.8	7.6	6.9	10.3
21:00	7.2	6.2	8.3	9.0
22:00	7.8	5.4	5.1	7.6
23:00	4.8	6.6	6.3	10.1

The EPA agrees that Georgia adequately accounted for background, in accordance with the Modeling TAD. The State made use of the nearest SO₂ monitor, excluding data during times in which the wind direction most aligned with the International Paper – Savannah facility so as not to double-count its impacts.

3.3.2.10. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Chatham County area of analysis are summarized below in Table 6.

¹⁰ The SO₂ NAAQS level is expressed in ppb but AERMOD gives results in µg/m³. The conversion factor for SO₂ (at the standard conditions applied in the ambient SO₂ reference method) is 1ppb = approximately 2.619 µg/m³.

Table 6: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Chatham County Area

Input Parameter	Value
AERMOD Version	15181 (regulatory default)
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	10
Modeled Structures	13
Modeled Fencelines	1
Total receptors	6,235
Emissions Type	Mixed
Emissions Years	2011 – 2013 for actual emissions; full operation during all times for intermittently operated internal combustion engines
Meteorology Years	2011 – 2013
NWS Station for Surface Meteorology	Savannah, GA
NWS Station Upper Air Meteorology	Charleston, SC
NWS Station for Calculating Surface Characteristics	Used facility surface characteristics
Methodology for Calculating Background SO ₂ Concentration	Tier 2 approach using AQS site: 13-051-1002 for 2011 – 2013
Calculated Background SO ₂ Concentration	3.5 – 25.8 ppb

The results presented below in Table 7 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 7. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Chatham County Area

Averaging Period	Data Period	Receptor Location		99 th percentile daily maximum 1-hour SO ₂ Concentration ($\mu\text{g}/\text{m}^3$)	
		Latitude (Deg. North)	Longitude (Deg. West)	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2011-2013	32.0862	-81.1229	172.86	196.4*

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

The State's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 172.86 $\mu\text{g}/\text{m}^3$, equivalent to 66 ppb. This modeled concentration included the background concentration of SO₂, and is based on a mixture of actual and PTE emissions from the facility. Figure 5 below was included as part of the State's recommendation, and indicates that the predicted value occurred south of the facility. A portion of the State's receptor grid is also shown in the figure.

Figure 5: Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Chatham County Area.
Source: “International Paper-Savannah Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS – UPDATE,” prepared by Georgia, August 30, 2016.



The modeling submitted by the State does not indicate that the 1-hour SO₂ NAAQS is violated at the receptor with the highest modeled concentration.

3.3.2.11. The EPA's Assessment of the Modeling Information Provided by the State

The EPA agrees with Georgia's modeling to characterize SO₂ impacts in the Chatham County area. After analyzing nearby sources, the State modeled only the International Paper – Savannah source. Georgia did not include the Plant Kraft facility, which is a DRR source in the modeling. The EPA agrees with the rationale for not including Plant Kraft in the analysis because the facility has since permanently and enforceably shut down. Given that the International Paper - Savannah modeling results show that the area is attaining the NAAQS, and that the background concentrations are at least partially accounting for impacts from Plant Kraft during the 2011–2013 time period prior to its shut down, the EPA believes that Plant Kraft will not impact the attainment or maintenance of the NAAQS of the area and should therefore be included in the same designation determination as International Paper – Savannah. We believe that the entirety of Chatham County, including the International Paper – Savannah and Plant Kraft facilities, should be designated together during this round of designations. The Plant Kraft facility is also discussed above and in Section 7 of this document.

The EPA agrees with the decision to not include other sources in the modeling demonstration, as supported by the December 23, 2013, assessment of exceedances in the area. Also, as discussed in Section 3.3.1.9 of this TSD, the Lathrop and Augusta background monitor should account for the impacts of all sources excluded from the modeling. The EPA believes the modeling domain is appropriate to capture predicted maximum impacts in the Chatham County area. Georgia's selection of meteorology and surface characteristics for the area are also appropriate to make a valid modeling demonstration. The State also appropriately represented the topography of the area with the model and its preprocessors. The State chose to model emissions from the International Paper – Savannah facility during 2011 – 2013 rather than using the most recent available emissions. Even though emissions increased in 2014 relative to the period modeled, emissions decreased in 2015 and total emissions from 2013-2015 are only about 3.3 percent higher than total emissions from 2011-2013. Also, because the maximum concentrations predicted by this analysis are more than 20 µg/m³ below the level of the NAAQS, we do not expect that the conclusion of this analysis would change if emissions data from the 2013-15 period were used. Therefore, this departure from the Modeling TAD is not expected to change the conclusion of this modeling analysis. The State also chose to model six intermittent sources at the facility at maximum utilization rather than the actual emissions. This decision to make use of actual and potential emissions is meant to make a conservative estimate of potential impacts from these intermittently operated internal combustion engines. We believe these decisions are appropriate for the purpose of this modeling demonstration, and for assessing the appropriateness of the existing monitor's location in the Chatham County area. We have also confirmed that Georgia selected its seasonal varying background concentrations consistent with the Modeling TAD.

The State used AERMOD version 15181 using all regulatory default options. AERMOD version 16216r has since become the regulatory model version. There were no updates from version 15181 to 16216r that would significantly affect the concentrations predicted here.

3.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Chatham County Area

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

3.5. Jurisdictional Boundaries in the Chatham County Area

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

The modeling domain extends to a square of 20 km by 20 km, and does not go out to the extent of the entire boundary for Chatham County. The 20 km by 20 km modeling domain also extends into the southernmost portion of Effingham County and partially crosses the State boundary over the Savannah River into Jasper County, South Carolina.

3.6. The EPA's Assessment of the Available Information for the Chatham County Area

The EPA intends to designate the Chatham County area, including the entire County boundary, as unclassifiable/attainment. We believe that Georgia's modeling analysis, and the monitoring data in the area, support the conclusion that there are no expected violations of the 2010 SO₂ NAAQS. The 2014 – 2016 design values for the Lathrop & Augusta monitor is 52 ppb. The existing monitor is 1.6 km from the International Paper – Savannah source. The EPA agrees with Georgia that the current monitor in the Chatham County area corroborates the modeling to show attainment in the area.

Based on the air quality characterization conducted within the Chatham County area of analysis in accordance with the EPA's Modeling TAD, the State concluded that the Chatham County area should be designated as unclassifiable/attainment. This recommendation is based on Georgia's assessment that the International Paper – Savannah source is the main source thought to impact the area. Chatham County includes five total sources that emitted over 100 tons in 2014: International Paper – Savannah; Georgia Power's Plant Kraft, approximately 5 km from the International Paper – Savannah; Southern States Phosphate & Fertilizer, approximately 6.6 km from International Paper - Savannah; Imperial-Savannah, L.P., approximately 5 km from International Paper - Savannah; Weyerhaeuser NR Port Wentworth, approximately 6.7 km from

International Paper - Savannah; and Savannah Acid Plant, LLC, approximately 9.3 km from International Paper - Savannah. As previously discussed, all units at Georgia Power's Plant Kraft in Chatham County have ceased operation, and therefore emissions from this facility will not cause or contribute to a future violation of the NAAQS in our intended unclassifiable/attainment area. Southern States Phosphate and Fertilizer, a fertilizer plant, emitted approximately 597 tons in 2014 according to the 2014 NEI, version 1, and the source did not report emissions to the EPA's EIS for 2015, in accordance with reporting thresholds for the Air Emissions Reporting Requirements (AERR) at subpart A to 40 CFR part 51. Imperial-Savannah, L.P., a sugar processing plant, emitted approximately 582 tons in 2014, and was not required to report emissions to the EPA's EIS in 2015. Weyerhauser NR Port Wentworth, a paper mill, emitted approximately 570 tons in 2014 according to the 2014 NEI, version 1, and the source emitted approximately 383 tons in 2015 according to the EPA's EIS. Finally, the Savannah Acid Plant, LLC emitted approximately 125 tons in 2014 and was not required to report 2015 emissions to the EPA's EIS.

Georgia evaluated possible contributions from each of these sources to SO₂ impacts in the area around the Lathrop & Augusta monitor in the December 23, 2013, report on exceedances. This 2013 analysis of exceedances at the Lathrop & Augusta monitor was utilized by the State to help inform which background sources should be explicitly included in the DRR modeling. The State considered the Q/d factor for all sources within 50 km of the monitor. Those sources with Q/d values greater than 20 were shown to account for over 99 percent of the cumulative Q/d, and included the sources mentioned above as well as two other sources outside of Chatham County: Georgia-Pacific Consumer Products, LP (Savannah River Mill) and Georgia Power's Plant McIntosh. These sources with Q/d > 20 were included in back trajectory analyses for exceedances. Finally, AERMOD was run with actual emissions and meteorological data for each of the sources to assess which source or sources were believed to impact the area around the Lathrop & Augusta monitor. Accordingly, the State modeled only the International Paper – Savannah facility to characterize the Chatham County area, including the portion of the county surrounding the Plant Kraft facility

An equally important consideration in the decision to not explicitly model any other sources in the area of analysis is the representativeness of the background concentration data from the Lathrop & Augusta monitor used in this analysis. The State concluded that the impact of the offsite sources not explicitly included in the modeling will be captured by the background monitor. Because the background monitor is located only about 2 km from International Paper - Savannah, the EPA concurs with this determination. See Section 3.3.2.9 of this TSD for additional discussion of the background data used for this modeling assessment.

The EPA agrees with the technical explanation for the State's treatment of nearby SO₂ sources included in the August 30, 2016, modeling report and supported by the December 23, 2013, analysis of exceedances. We believe the modeling of International Paper – Savannah adequately represents the Chatham County area. The EPA does not believe there are 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. In addition, based on the available information for the remaining areas in Georgia and nearby South Carolina, including monitoring and modeling, there are no current SO₂ nonattainment areas near Chatham County, Georgia, and no expected nearby nonattainment areas for this third round of designations. In addition, there are no nearby areas for

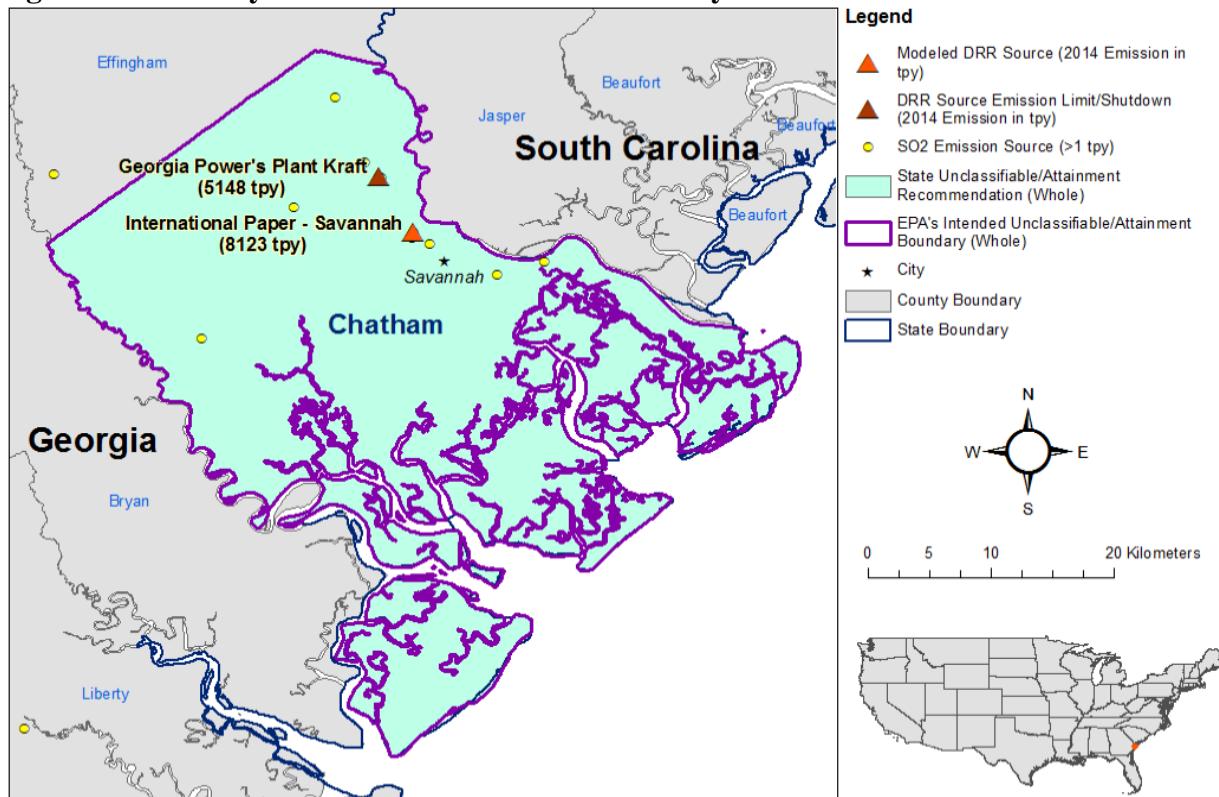
which designations are expected to be deferred until December 31, 2020. Therefore, the Chatham County area is not expected to contribute to ambient air quality in a nearby area that does not meet the NAAQS.

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 International Paper – Savannah as unclassifiable/attainment for the 2010 SO₂ NAAQS. Specifically, the boundaries are comprised of the entirety of Chatham County. There are no remaining portions of Chatham County that remain to be characterized in the EPA's Round 4 of designations in 2020, nor are there any other portions of the County that have a separate area of analysis for Round 3. The EPA believes that our intended unclassifiable/attainment area, bounded by the Chatham County boundary, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment area.

3.7. Summary of Our Intended Designation for the Chatham County Area

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the Chatham County area as unclassifiable/attainment for the 2010 SO₂ NAAQS because the EPA has determined the area meets the 2010 SO₂ NAAQS and does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundaries are comprised of the entirety of Chatham County. Figure 6 shows the boundary of this intended designated area.

Figure 6. Boundary of the Intended Chatham County Unclassifiable/Attainment Area



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 intends in a separate action to evaluate and designate all remaining undesignated areas in Georgia by December 31, 2020.

4. Technical Analysis for the Bartow County Area

4.1. Introduction

The EPA must designate the Bartow County area by December 31, 2017, because the area has not been previously designated and Georgia has not installed and begun timely operation of a new, approved SO₂ monitoring network meeting the EPA specifications referenced in the EPA's SO₂ DRR for any sources of SO₂ emissions in Bartow County.

4.2. Air Quality Monitoring Data for the Bartow County Area

This factor considers the SO₂ air quality monitoring data in the area of Bartow County. Georgia provided no monitoring information for the Bartow County area. The EPA reviewed the available air quality monitoring data in the AQS database and found no nearby data for Bartow County. The closest monitor is over 40 km from Plant Bowen, one county west of Bartow County in Floyd County. In reviewing the available air quality monitoring data in AQS, the EPA

determined that there is no relevant data in AQS collected in or near Bartow County that could inform the intended designation action. The most recent SO₂ design values for all areas of the country are available at <https://www.epa.gov/air-trends/air-quality-design-values>.

4.3. Air Quality Modeling Analysis for the Bartow County Area Addressing Georgia Power Plant Bowen

4.3.1. *Introduction*

This section 4.3 presents all the available air quality modeling information for a portion of Bartow County that includes Georgia Power's Plant Bowen (This portion of Bartow County will often be referred to as "the Bartow County area" within this section 4.3). This area contains the following SO₂ source, principally the source around which Georgia is required by the DRR to characterize SO₂ air quality, or alternatively to establish an SO₂ emissions limitation of less than 2,000 tpy:

- Georgia Power's Plant Bowen facility emits 2,000 tons or more annually. Specifically, Plant Bowen emitted 7,204 tons of SO₂ in 2014. The source emitted 8,103 tons in 2015. This source meets the DRR criteria and thus is on the SO₂ DRR Source list, and Georgia has chosen to characterize it via modeling.

In its submission, Georgia recommended that each county in the State be designated unclassifiable/attainment. Specifically, Georgia recommended that an area that includes the area surrounding the Georgia Power Plant Bowen, be designated as unclassifiable/attainment based in part on an assessment and characterization of air quality impacts from this facility and the fact that no other nearby sources are believed to have a potential impact in the area where the 2010 SO₂ NAAQS may be exceeded. 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 does not believe we have enough information to designate the area as unclassifiable/attainment, and intends to designate the area as unclassifiable. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

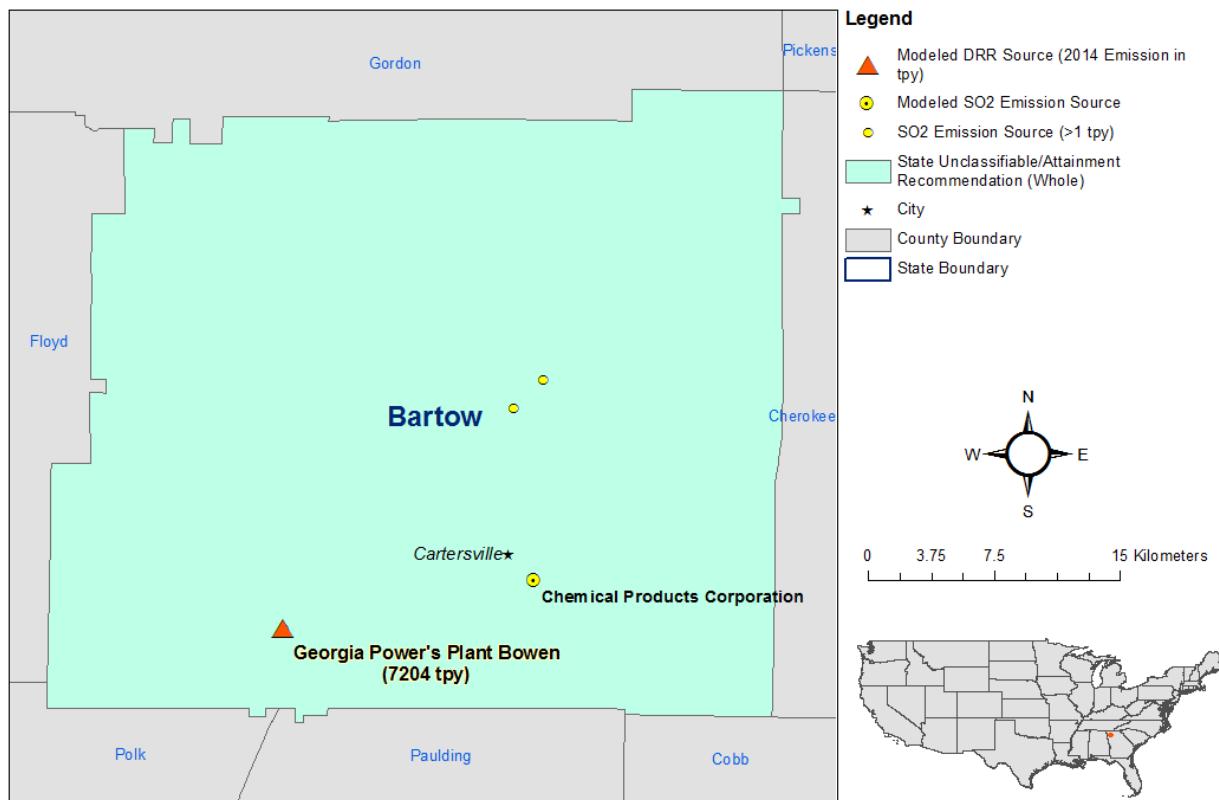
The area that the State has assessed via air quality modeling is located in the southwest portion of Bartow County, extending partly into the nearby neighboring Counties of Paulding, Polk, and Floyd.

As seen in Figure 7 below, the Plant Bowen facility is located in the city of Cartersville, which is approximately 40 miles (64 km) northwest of Atlanta. Also included in the figure are other nearby emitters of SO₂¹¹ and the State's recommended area for the unclassifiable/attainment designation. The EPA's intended unclassifiable designation boundary for the Bartow County

¹¹ All other SO₂ emitters of 1 tpy or more (based on information in the 2014 NEI, version 1) are shown in Figure 9. If no sources not named previously are shown, there are no additional SO₂ emitters above this emission level in the vicinity of the named source(s).

area is not shown in this figure, but is shown in a figure in the section below that summarizes our intended designation.

Figure 7. Map of the Bartow County Area Addressing Georgia Power's Plant Bowen.



The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered two related modeling assessments, including one assessment from the State and one assessment from other parties. The EPA received modeling protocols and updates to those protocols in addition to the modeling reports. To avoid confusion in referring to these assessments and protocols, the following table lists them, indicates when they were received, provides an identifier for the assessment that is used in the discussion of the assessments that follow, and identifies any distinguishing features of the modeling assessments.

Table 8 – Modeling Assessments for the Bartow County Area

Assessment Submitted by	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Georgia*	March 23, 2016	March 23, 2016 Modeling Protocol	
Georgia	June 17, 2016	June 17, 2016 Modeling Protocol Addendum	Georgia updated Plant Bowen's protocol and submitted its own modeling report.
Georgia	September 27, 2016	September 27, 2016 Modeling Protocol Update	Georgia updated the modeling protocol.
Georgia**	November 18, 2016	November 18, 2016 Georgia Power Modeling Report	Georgia Power sent a modeling report to Georgia EPD.
Georgia	December 28, 2016	December 28, 2016 Modeling Report	Georgia reviewed the Georgia Power Modeling Report and completed its own modeling assessment.
Georgia	May 31, 2017	May 31, 2017 Modeling Report Addendum or Final Modeling Report	Georgia responded to EPA comments and re-ran modeling

*Georgia forwarded this protocol prepared by Plant Bowen dated March 23, 2016, to the EPA on June 17, 2016.

**Georgia forwarded this modeling report prepared by Georgia Power dated November 18, 2016, to the EPA on December 28, 2016.

4.3.2. Modeling Analysis Provided by the State

4.3.2.1.Differences Between and Relevance of the Modeling Assessments Submitted by the State
 Georgia originally commissioned a modeling protocol and evaluation from Plant Bowen. The State forwarded the modeling protocol, dated March 23, 2016, to the EPA for review and concurrently conducted its own review. Georgia revised the protocol in the June 17, 2016, Modeling Protocol Addendum, based on its review. Georgia included small changes in its Addendum, including the addition of receptors along the facility fenceline. Georgia subsequently updated the modeling protocol again in its September 27, 2016, Modeling Protocol Update to

include a different background value for the modeling assessment, utilizing a monitor 40 km west by northwest from Plant Bowen to account for potential impacts from sources near the monitor. Georgia Power made use of the September 27, 2016, Modeling Protocol Update to conduct dispersion modeling, and submitted its assessment to Georgia EPD on November 18, 2016. Finally, Georgia reviewed the Georgia Power Modeling Report, and developed its own modeling report dated December 28, 2016, to satisfy the DRR. Georgia included small changes in the modeling, such as including different meteorology than that used by Georgia Power due to the Cartersville Airport NWS station, which was used for surface meteorology, having missing one-minute data for June-December in 2013. Georgia EPD developed two versions of the 2013 meteorological data: one version used one-minute data for Lovell Field Airport station in Chattanooga, Tennessee to fill in the missing 1-minute data, and a second version used 5-minute data for the Cartersville Airport station to fill in the missing data. The modeling prepared by Georgia Power used the first version of the meteorology, and the Georgia EPD modeling used the second version. Minor adjustments were seen in the modeled concentrations. Later, the EPA noted two issues with the December 28, 2016 Modeling Report, including a nearby source that was overlooked and potential discrepancies in emissions data for Plant Bowen. Accordingly, Georgia EPD updated its modeling demonstration and provided the updated modeling and information in the final May 31, 2017, Modeling Report Addendum. The final report from the State is primarily used in this TSD, but details from the protocols or other report may be relevant.

4.3.2.2. Model Selection and Modeling Components

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

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

The State originally used AERMOD version 15181 using all regulatory default options. However, with the updated May 31, 2017 modeling, the State made use of AERMOD version 16216r. A discussion of the State's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

The current version of AERMOD, version 16216r, includes updates to 40 CFR part 51, Appendix W, "Guideline of Air Quality Models," published on January 17, 2017 (82 FR 5203). This version of AERMOD also includes fixes to bugs that were inadvertently included in version 16216. Georgia in its final May 31, 2017, Modeling Report used AERMOD version 16216r with all regulatory default settings.

4.3.2.3. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the “urban” or “rural” determination of a source is important in determining the boundary layer characteristics that affect the model’s prediction of downwind concentrations. For SO₂ modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO₂ sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

The EPA’s recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 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. The State analyzed the land use types within a 3 km radius from the center of Plant Bowen as shown in Figure 8 and determined that the area is predominantly rural. For the purpose of performing the modeling for the area of analysis, Georgia determined that it was most appropriate to run the model with rural dispersion coefficients or rural mode. The EPA concurs with this assessment, based on the image shown in Figure 8.

Figure 8 - Land Use Map for area around the Plant Bowen Facility. Source: “Modeling Protocol Bowen Steam Electric Generating Plant 1-hour SO₂ NAAQS Modeling,” prepared by AECOM for Georgia Power Company, March 2016.



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

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO₂ emission sources or facilities considered for modeling; the extent of concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO₂ concentrations.

The source of SO₂ emissions subject to the DRR in this area is described in the introduction to this section. For the Bartow County area, the State has included no other emitters of SO₂ within 50 km of Plant Bowen in any direction. The State determined that this was the appropriate

distance to adequately characterize air quality through modeling to include the potential extent of any SO₂ NAAQS exceedances in the area of analysis and any potential impact on SO₂ air quality from other sources in nearby areas. No other sources beyond 50 km were determined by the State to have the potential to cause concentration gradient impacts within the area of analysis.

Although potential impacts from sources within 50 km of Plant Bowen were considered, the State's final area of analysis extends 20 km from the facility.

The grid receptor spacing for the area of analysis chosen by the State is as follows, taken from the December 28, 2016, Modeling Report:

The Cartesian receptors were placed according to the following configuration based on the center of the Plant Bowen:

- 0 km – 2km - 100 m apart
- 2 km – 5 km - 250 m apart
- 5 km – 10 km - 500 m apart
- 10 km – 20 km - 1,000 m apart

This domain is sufficient to capture the maximum impact. Receptors were also placed at 100-m intervals within Plant Bowen's ambient air boundary. Although the SO₂ Modeling TAD specifies that receptors need not be placed at locations where it is not feasible to place a monitor (e.g., water bodies and within facility property lines), the receptor grid conservatively simulates all areas including within the facility's ambient air boundary that is not generally accessible to the public. This receptor grid represents a very conservative approach to the modeling analysis. All receptor locations are represented in the Universal Transverse Mercator projections, Zone 16, North American Datum 1983.

Receptors were placed at 100-m intervals within what the State characterized as Plant Bowen's ambient air boundary. Georgia's June 17, 2016, Modeling Protocol Addendum also specifies that 100-m increments are used at Plant Bowen's fenceline, consistent with the Modeling TAD.

The receptor network contained 5,722 receptors, and the network covered the southwest portion of Bartow County, the southeast portion of Floyd County, the northeast portion of Polk County, and the northern portion of Paulding County.

Figures 9 and 10, included in the State's recommendation, show the State's chosen area of analysis surrounding Plant Bowen as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the State placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility, including other facilities' property, though Georgia did not exclude locations inside the Plant Bowen facility. As shown above, the modeling assessment included receptors within Plant Bowen's ambient air boundary and over water bodies to provide for the most conservative air characterization possible. The receptors which could potentially have been excluded in accordance with the Modeling TAD do not include the max concentrations shown in this TSD.

Figure 9: Area of Analysis for the Bartow County Area Showing Nearby Sources within a 50-km Radius. Source: “Plant Bowen Modeling Addendum Submitted by Georgia EPD May 31, 2017,” prepared by Georgia, May 31, 2017.

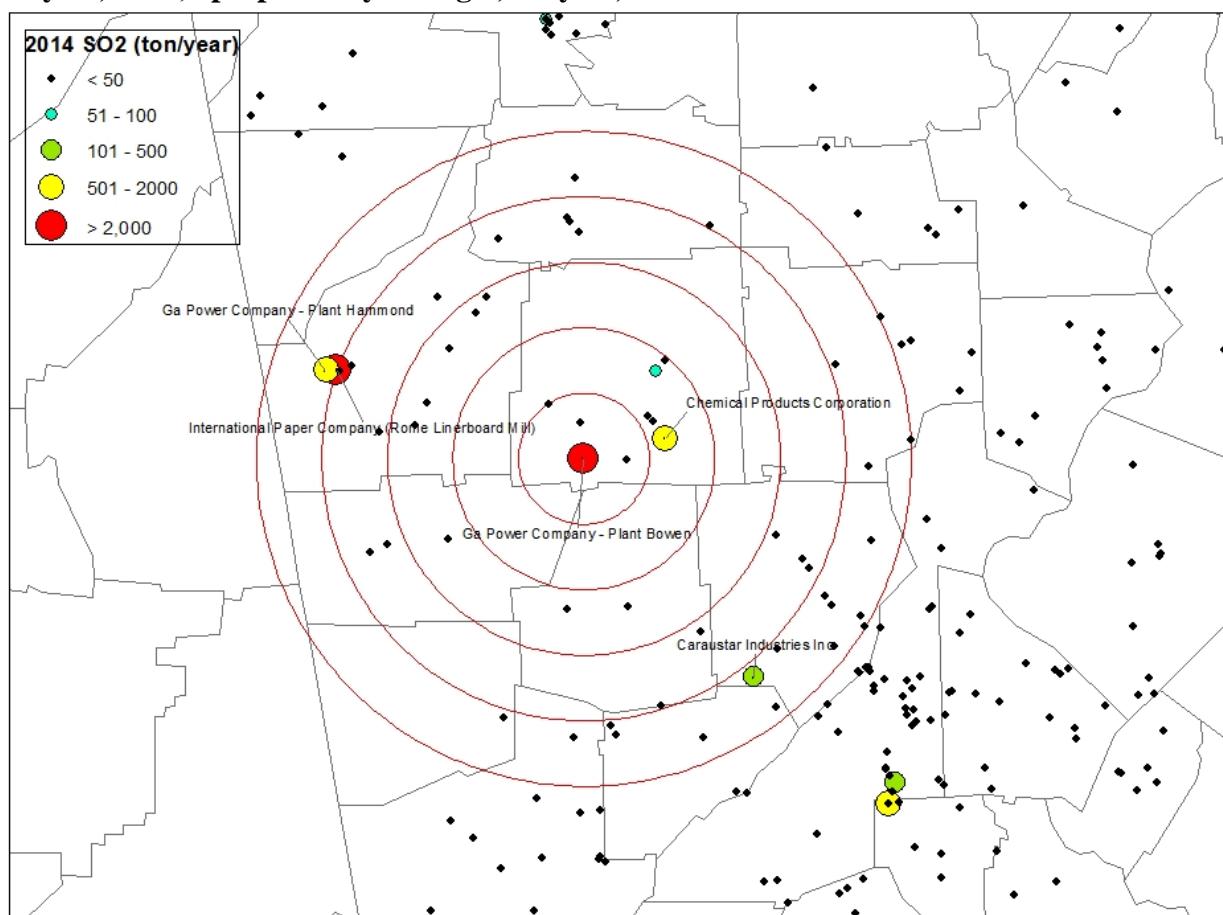
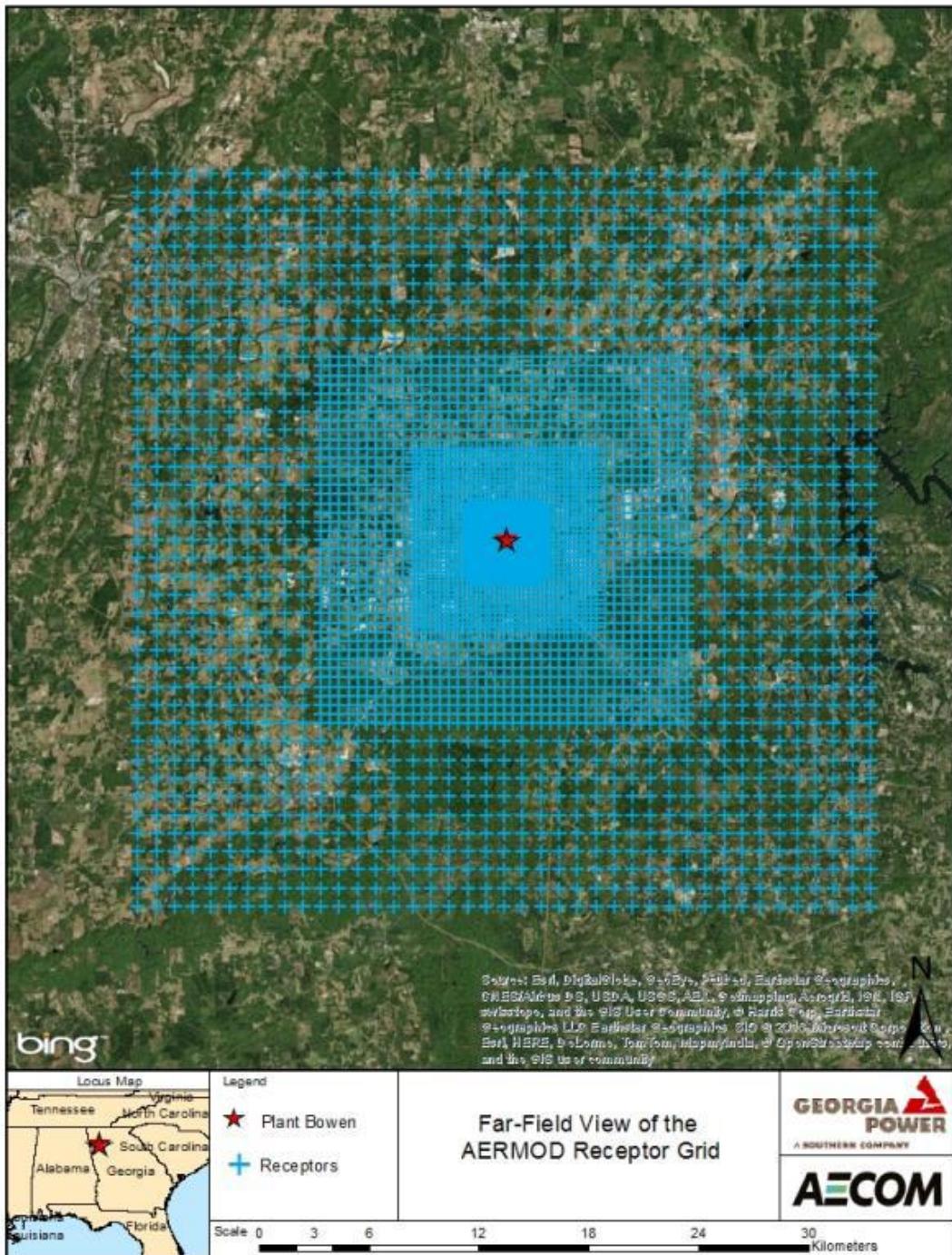


Figure 10: Receptor Grid for the Bartow County Area. Source: “Modeling Protocol Bowen Steam Electric Generating Plant 1-hour SO₂ NAAQS Modeling,” prepared by Plant Bowen, March 2016, and submitted to the EPA on June 17, 2016.



The EPA agrees with the State on the final receptor grid, which does not exclude any receptors in the 20 km area of analysis. The final grid is consistent with the Modeling TAD, but above and

beyond what is required by the Modeling TAD because it includes receptors that could have been excluded in a manner consistent with the TAD. The final receptor grid, therefore, can be expected to adequately characterize SO₂ impacts from the Plant Bowen facility. The maximum predicted concentration occurs within 3 km of Plant Bowen which is within the 100-m spacing area (See Figures 14a and 14b).

4.3.2.5. *Modeling Parameter: Source Characterization*

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

Georgia's updated May 31, 2017, Modeling Report Addendum screened for potential nearby sources with the 2014 NEI, version 1. This addendum considered sources within 50 km, and showed only three sources with reasonable possibility to impact the area, two of which with a Q/d over 20. The International Paper – Rome facility and Georgia Power's Plant Hammond are both located approximately 40 km from Plant Bowen, and were modeled separately. Moreover, Georgia's September 27, 2016, Modeling Protocol Update shows that the modeling for the Bartow County area would account for potential impacts from these sources by use of the Floyd monitor to establish the background concentration. There is one additional source with a Q/d > 20: Chemical Products Corporation is located approximately 12.7 km east of Plant Bowen. Originally, Chemical Products Corporation was erroneously left off of the list of nearby sources within 50 km of Plant Bowen. Accordingly, Georgia EPD updated its analysis and the approach used to account for impacts from offsite sources in the May 31, 2017, Modeling Report Addendum. The State considered this additional source, but did not directly model it due to complex terrain and because the State did not have 2012 or 2013 emissions information for Chemical Products Corporation at the time of the analysis. Georgia EPD decided to account for possible impacts from Chemical Products Corporation in addition to those from International Paper – Rome and Plant Hammond by adjusting the modeled background concentration. See further discussion on this approach Section 4.3.2.9 of this TSD. All remaining nearby sources were shown to have small Q/d potential contributions. Accordingly, the State modeled only the Plant Bowen facility to characterize the Bartow County area.

The State characterized this source 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 BPIPPRM was used to assist in addressing building downwash.

The assessment of nearby sources within 50 km of Plant Bowen and approach to including impacts from nearby sources with an adjusted background concentration justifies not explicitly including the International Paper – Rome and Plant Hammond facilities in the modeling. The use of actual stack heights is appropriate given the actual emissions used in the modeling. Building downwash is also appropriately accounted for.

4.3.2.6. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally-enforceable and effective.

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

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally-enforceable mechanisms and control technologies to limit SO₂ emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a State should be able to find the necessary emissions information for designations-related modeling in the existing SO₂ emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

The State has chosen to model this facility using actual emissions. The facility in the State's modeling analysis and its associated annual actual SO₂ emissions between 2012 and 2014 are summarized below.

For Plant Bowen, the State provided annual actual SO₂ emissions between 2012 and 2014. This information is summarized in Table 9. A description of how the State obtained hourly emission rates is given below this table.

Table 9. Actual SO₂ Emissions Between 2012 – 2015 from Facilities in the Bartow County Area

Facility Name	SO ₂ Emissions (tpy)			
	2012	2013	2014	2015
Georgia Power Plant Bowen	3,119	3,511	7,204	8,104
Total Emissions from All Modeled Facilities in the State's Area of Analysis	3,119	3,511	7,204	8,104

For Plant Bowen, the actual hourly emissions data were obtained from CEMS. The EPA compared the hourly emissions used in Georgia's modeling with the emissions data found in the CAMD Acid Rain emissions database. Discrepancies were found between the emissions used by Georgia and those in the CAMD database. In response to this finding, Georgia EPD completed additional modeling with updated emissions from CAMD in the May 31, 2017, Modeling Report Addendum. The modeled emissions in the Final Modeling Report (2012: 3,121 tpy, 2013: 3,516 tpy, and 2014: 7,206 tpy) are slightly higher than the CAMD emissions because hourly emissions for partial operating hours were not adjusted downward in the model to reflect operating time less than one hour. In this way, the initial concerns about discrepancies in the emissions data were alleviated with the updated modeling. While the EPA initially thought that the 2012-2014 dataset would be representative of emissions for the Area, further evaluation of the 2015 emissions has raised uncertainty on whether the 2012-2014 dataset should be used in the modeling analysis. Recently the EPA noticed that the 2015 emissions has increased to more than 2 times the 2012 emissions. It also appears that there was an overall increase in both the emission rate per hour as well as the heat input from 2014 to 2015. These increases raise uncertainty on whether the actual emission used in the modeling (2012-2014) are representative of the emissions in more recent operations.

4.3.2.7. *Modeling Parameter: Meteorology and Surface Characteristics*

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

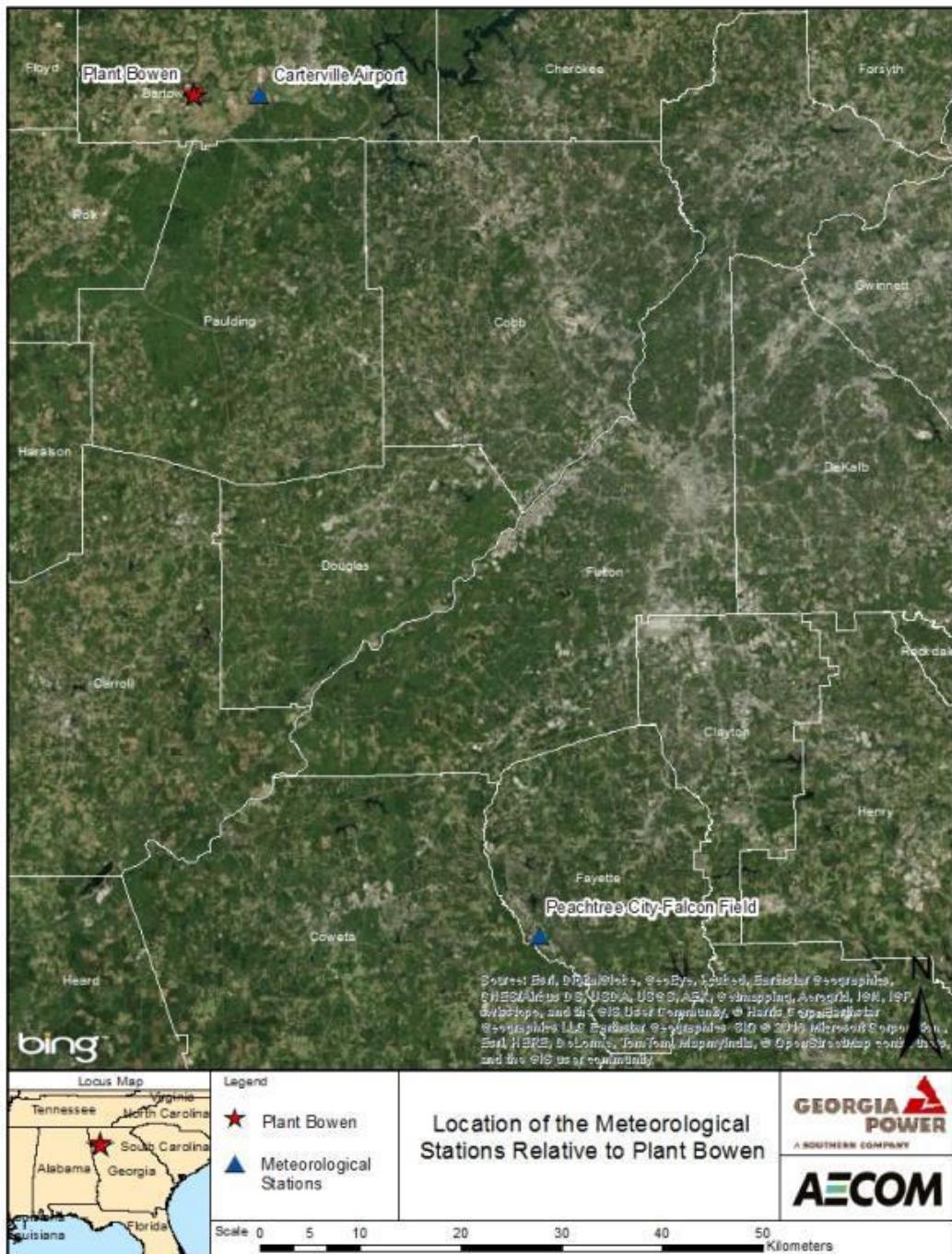
For the area of analysis for the Bartow County area, the State selected the surface meteorology from the Cartersville Airport NWS Station in Cartersville, Georgia located at Latitude 34.123 N; Longitude 84.849 W and coincident upper air observations from the Peachtree City – Falcon Field Airport NWS station in Peachtree City, Georgia, located at Latitude 33.363 N; Longitude 84.569 W as best representative of meteorological conditions within the area of analysis. The EPA has checked the location of the Cartersville Airport NWS station and found that it is actually located at 34.115831 N, 84.850741 W, which is approximately 1 km south of the coordinates provided in the surface met file (*.sfc) provided by Georgia. AERSURFACE output files have not been provided by Georgia, so we are not able to confirm the coordinates that were used to calculate the surface roughness, albedo and Bowen ratio surface characteristics.

The State used AERSURFACE version 13016 using data from the Cartersville NWS station to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness [z_o]) of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space, the Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance, and

the surface roughness is sometimes referred to as “ z_0 ”. The State estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions. The State compared surface characteristics between the Cartersville NWS station and the Plant Bowen facility in the June 17, 2016, Modeling Protocol Addendum. Georgia concluded that the Cartersville Airport NWS surface conditions would be used in the modeling demonstration because no significant differences were seen.

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

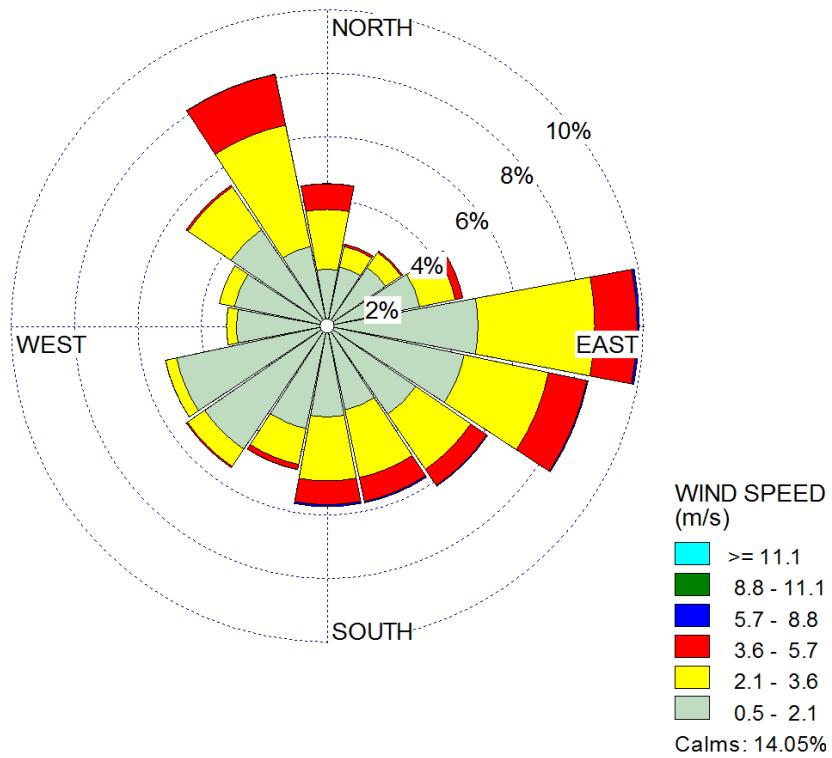
Figure 11. Area of Analysis and the NWS stations in the Bartow County Area. Source: “Modeling Protocol Bowen Steam Electric Generating Plant 1-hour SO₂ NAAQS Modeling,” prepared by Plant Bowen, March 2016.



As part of its recommendation, the State provided the 3-year surface wind rose for the Cartersville, Georgia NWS station. In Figure 12, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The predominant wind direction is from the east (approximately 10 percent of the time) with significant winds from the

southeast (approximately 14 percent of the time) and from the north by northwest direction (approximately 18 percent of the time).

Figure 12: Bartow County Cumulative Annual Wind Rose for Years 2012-2014. Source: “GA EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia Power - Plant Bowen,” prepared by Georgia, December 28, 2016.



Meteorological data from the above surface and upper air NWS 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 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. Wind data of 1-minute duration was missing from the Cartersville Airport NWS station for June-December, 2013. Georgia EPD developed two versions of the 2013 meteorological data. One version used 1-minute data from the Lovell Field Airport NWS station located in Chattanooga, TN at Latitude 35.03 N; Longitude 85.2 W to fill in the missing 1-minute data and a second

version used 5-minute data from the Cartersville Airport NWS station to fill in the missing data. The Georgia Power modeling used the version with 1-minute data from the Lovell Field Airport NWS station and the Georgia EPD modeling used the version with 5-minute data from the Cartersville Airport NWS station. These data were 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 m/s in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The May 31, 2017 Modeling Report Addendum indicates that AERMET version 16216r was used with the ADJ_U* option in the revised modeling. The EPA believes the meteorology and surface characteristics used in the State's modeling are acceptable. The meteorology in the final modeling report made use of the nearby Cartersville Airport NWS data and data from the Peachtree City – Falcon Field Airport NWS for upper air data. The EPA believes that the meteorological data reasonably shows that impacts from Plant Bowen can be expected to the west of the facility and to the southeast as well. The surface characteristics were evaluated for two reasonable areas, and the State's reasoning for selecting one set of characteristics over another are appropriate. Georgia complied with the EPA guidance in developing this aspect of its modeling parameters.

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

The terrain in the area of analysis is best described as simple with gently rolling hills. To account for these minor 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 1-sec NED.

The EPA confirmed that the Bartow County area has no complex terrain considerations, and accordingly, the surface characteristics selected can adequately represent the area and the modeling domain. We also agree with the State's use of AERMAP version 11103 to obtain the elevations of sources, buildings and receptors.

4.3.2.9. Modeling Parameter: Background Concentrations of SO₂

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO₂ that are ultimately added to the modeled design values: 1) a “tier 1” approach, based on a monitored design value, or 2) a temporally varying “tier 2” approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the State elected to use a “tier 1” approach. Data was obtained from AQS monitor 13-115-0003 in Rome, Georgia. This monitor is located less than 1 km from International Paper-Rome and is used to

conservatively estimate the impact of the emissions from Plant Hammond and International Paper-Rome. The State considered several recent design values, selecting the 2012-2014 design values (46 ppb when expressed in two significant figures)¹² over the 2013-2015 design values (35 ppb) and the 2014-2016 design values (42 ppb) to make the most conservatively high estimate of a background concentration. Georgia EPD then adjusted the design values for the purposes of selecting an adequate background value for the Plant Bowen modeling assessment. The State made use of recent modeling supporting the relocation of the Rome SO₂ monitor to the area of maximum impact for this purpose.

Next, the State scaled the 2012-2014 design values at the Rome monitor to the maximum adjusted design values, meaning the value that would have been expected had the Rome monitor been in the area of maximum impact during that time. This maximum adjusted design values for the area of maximum impact was then scaled downward to the maximum expected along the eastern/southern border of the modeling domain used for the Rome monitor siting. The resultant maximum adjusted design values in the direction of Plant Bowen is 30 ppb. The State conservatively assumed that this expected concentration at the border of the Rome monitor siting modeling domain did not decrease with distance throughout the area of analysis for Plant Bowen.

Additionally, the State accounted for possible impacts from the nearby Chemical Products Corporation facility with the background monitoring concentration parameter. The State decided to consider impacts from Chemical Products Corporation by using the Rome monitor as a proxy for a monitor near the facility. Georgia EPD cited similar meteorology, topography, and surface characteristics between the areas surrounding the Chemical Products Corporation and International Paper – Rome facilities and the similar stack heights for both facilities as support for this approach. Accordingly, the State started with the maximum adjusted design values for the Rome monitor (64 ppb) and scaled the value by the ratio of average annual emissions rates from Chemical Products Corporation and International Paper – Rome. The resultant value of the background concentration expected from Chemical Products Corporation is 15.4 ppb.

Finally, the State added the estimates for background concentrations near International Paper – Rome and Plant Hammond (30.3 ppb) and near Chemical Products Corporation (15.4 ppb) to the modeling assessment for Plant Bowen. The final effective background concentration value of 45.7 ppb is then incorporated into the final AERMOD results.

¹² The SO₂ NAAQS level is expressed in ppb but AERMOD gives results in µg/m³. The conversion factor for SO₂ (at the standard conditions applied in the ambient SO₂ reference method) is 1 ppb = approximately 2.619 µg/m³.

The EPA believes that Georgia's approach for addressing any potential impacts from the Chemical Products Corporation facility SO₂ emissions in the area near the Plant Bowen facility conservatively overestimates the potential concentrations. Additionally, the EPA agrees that Georgia's use of the monitor located near the International Paper – Rome facility is sufficient to account for potential impacts from the International Paper – Rome and Plant Hammond facilities due to their proximity to the monitor.

4.3.2.10. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Bartow County area of analysis are summarized below in Table 10.

Table 10: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Bartow County Area

Input Parameter	Value
AERMOD Version	16216r (default options)
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	4
Modeled Structures	5
Modeled Fencelines	1
Total receptors	5,722
Emissions Type	Actual
Emissions Years	2012 - 2014
Meteorology Years	2012 - 2014
NWS Station for Surface Meteorology	Cartersville, GA
NWS Station Upper Air Meteorology	Peachtree City, GA
NWS Station for Calculating Surface Characteristics	Cartersville, GA
Methodology for Calculating Background SO ₂ Concentration	Tier 1 based on adjusted design values from 2012 – 2014 using AQS Site: 13-115-0003
Calculated Background SO ₂ Concentration	45.7 ppb

The results presented below in Table 11 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 11. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Bartow County Area

Averaging Period	Data Period	Receptor Location		99 th percentile daily maximum 1-hour SO ₂ Concentration (µg/m ³)	
		Latitude	Longitude	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2012 - 2014	34.1044	-84.9100	185.8	196.4*

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

The State's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 185.8 $\mu\text{g}/\text{m}^3$, equivalent to 70.9 ppb. This modeled concentration included the background concentration of SO₂, and is based on actual emissions from the facility. Figure 13a below was included as part of the State's recommendation, and indicates that the predicted value occurred 2.53 km south of Plant Bowen. The State's receptor grid is also shown in the figure. Figure 13b then shows a closer image of the area of maximum concentration with the additional 100-meter spacing around the maximum receptor.

Figure 13a: Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Bartow County Area. Source: “Plant Bowen Modeling Addendum Submitted by Georgia EPD May 31, 2017,” prepared by Georgia, May 31, 2017.

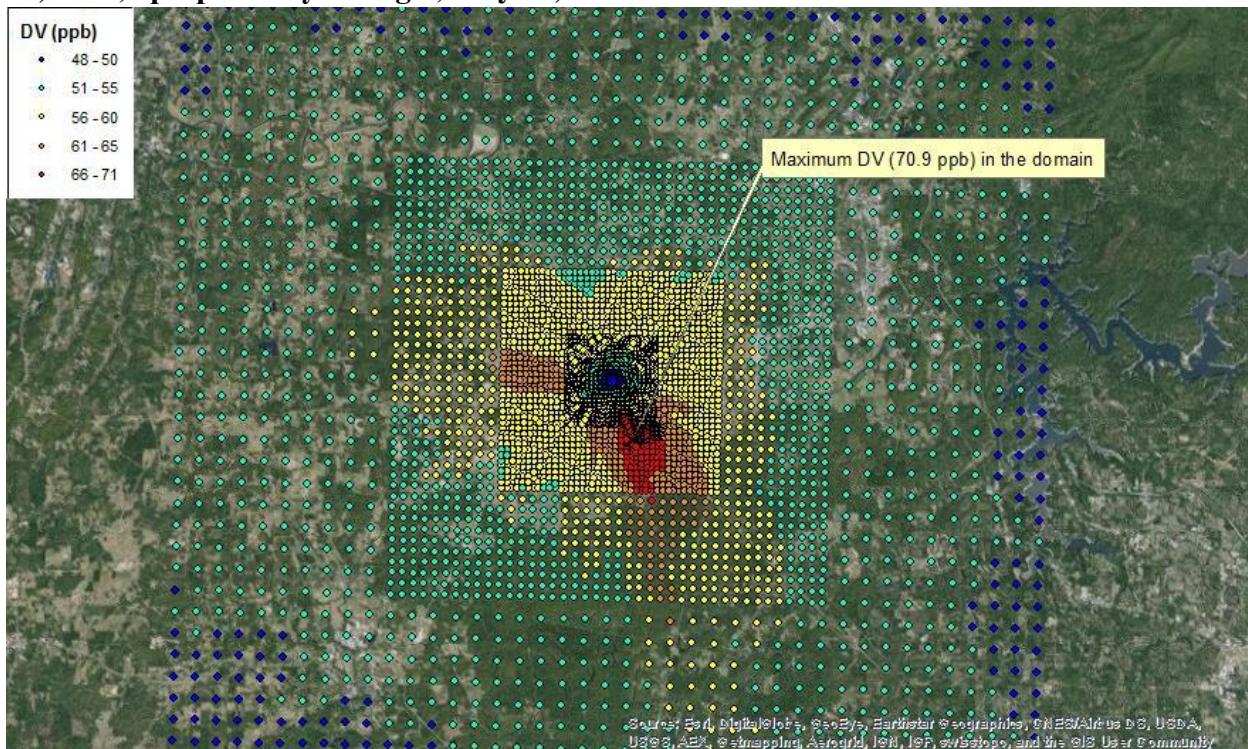
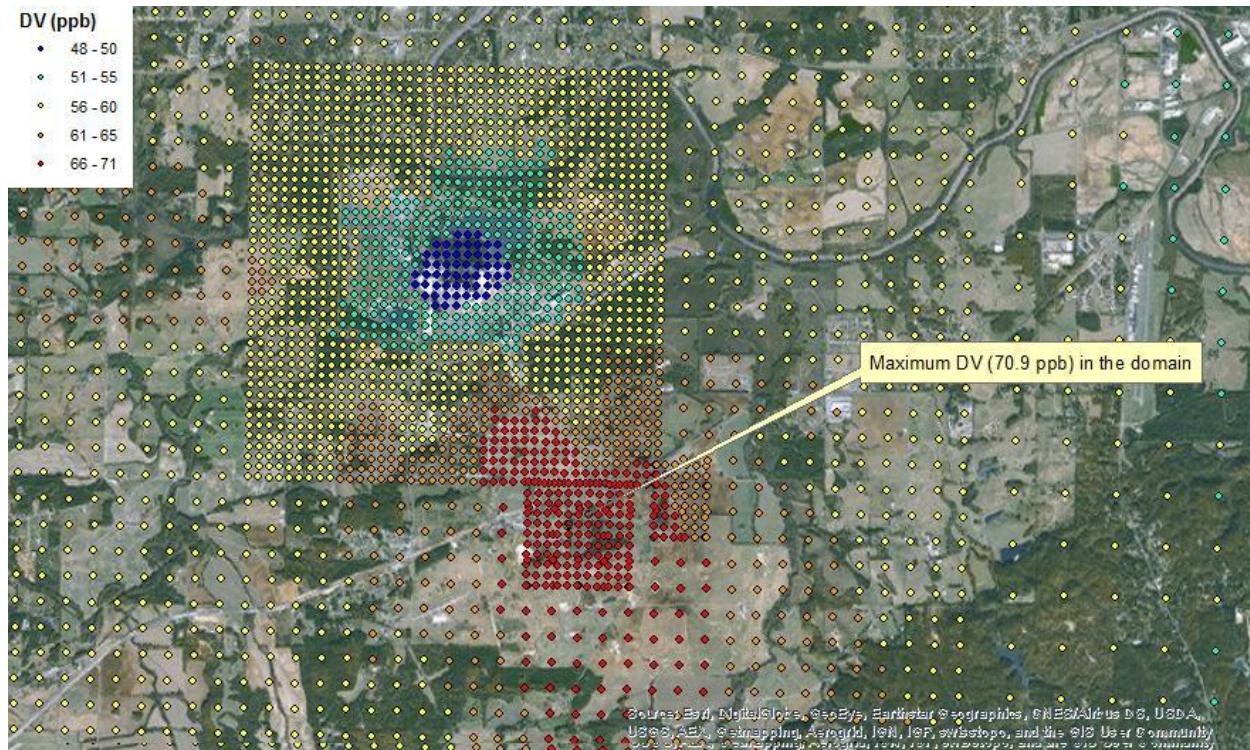


Figure 13b: Zoomed in View of the Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations for the Bartow County Area. Source: “Plant Bowen Modeling Addendum Submitted by Georgia EPD May 31, 2017,” prepared by Georgia, May 31, 2017.



The modeling submitted by the State does not indicate that the 1-hour SO₂ NAAQS is violated at the receptor with the highest modeled concentration.

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

The EPA mostly agrees with Georgia’s methodology for modeling to characterize SO₂ impacts in the Bartow County area. The EPA believes the modeling domain is appropriate to capture predicted maximum impacts in the Bartow County area. Georgia’s selection of meteorology and surface characteristics for the area are also appropriate to make a valid modeling demonstration. The State adequately represented the topography of the area with the model and its preprocessors. The State chose to use actual emissions to reflect normal operation of the Plant Bowen source. We believe these decisions are appropriate for the purpose of this modeling demonstration.

The State made use of AERMOD version 16216r, the most recent version available at the time the updated modeling was conducted. The EPA agrees that this model version is appropriate to characterize the area because the State made use of default regulatory options available at the time and followed the Modeling TAD wherever possible.

However, the EPA has identified an issue that creates uncertainty in the modeling results and conclusion that there are not modeled violations of the 1-hour SO₂ NAAQS. The emissions from the Plant Bowen facility in 2015 increased approximately 5,000 tpy over the emissions in 2012. Therefore, the emissions used in the modeling (i.e., 2012-2014) do not appear to be representative of the emissions in more recent operation and therefore may not be appropriate to demonstrate whether this area is currently attaining the NAAQS.

4.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Bartow County Area

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

4.5. Jurisdictional Boundaries in the Bartow County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for the Bartow County area. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable. The modeling domain extends into several counties. Polk and Paulding Counties have no DRR sources within their boundaries; and Floyd County has the International Paper – Rome facility within its boundaries, which is approximately 40 km from Plant Bowen. International Paper is a DRR source for which Georgia elected to deploy an existing, relocated monitor (AQS ID: 13-115-0003) to characterize the area and inform designations by December 31, 2020. Additionally, the modeling for Plant Bowen uses the existing SO₂ monitor in Rome, Georgia as the background monitor. This monitor is located less than 1 km from International Paper-Rome and is used to estimate the impact of the emissions from Plant Hammond and International Paper-Rome in the Bartow County area. The most recent design values for the monitor are as follows: the 2012-2014 design value is 46 ppb, the 2013-2015 design value is 35 ppb, and the 2014-2016 design value is 42 ppb. Any contribution Plant Bowen has on International Paper-Rome would be captured by the monitor. Additionally, the receptor grid for the Plant Bowen modeling demonstration extends 20 km from Plant Bowen. Concentrations at the western edge of the Plant Bowen receptor grid, the edge of the grid closest to the International Paper - Rome facility, range from 3.0-6.3 ppb (this range excludes the background concentration). The highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain for Plant Bowen occurs 2.53 km to the south of Plant Bowen, not in the direction of International Paper – Rome.

4.6. The EPA's Assessment of the Available Information for the Bartow County Area

The EPA intends to designate the Bartow County area, including the entire County boundary, as unclassifiable. The EPA mostly agrees with Georgia's methodology for modeling to characterize SO₂ impacts in the Bartow County area. However, the EPA has identified an issue that creates uncertainty in the modeling results and conclusion that there are not modeled violations of the 1-hour SO₂ NAAQS. The emissions from the Plant Bowen facility in 2015 increased approximately 5,000 tpy over the emissions in 2012. Therefore, the emissions used in the modeling (i.e., 2012-2014) do not appear to be representative of the emissions in more recent operation and therefore may not be appropriate to demonstrate whether this Area is currently attaining the NAAQS.

Based on the available information for the remaining areas in Georgia, including monitoring and modeling, there are no current SO₂ nonattainment areas near Bartow County, Georgia, and no expected nonattainment areas for this third round of designations. Furthermore, the area of maximum concentration is expected within 3 km of the Plant Bowen facility.

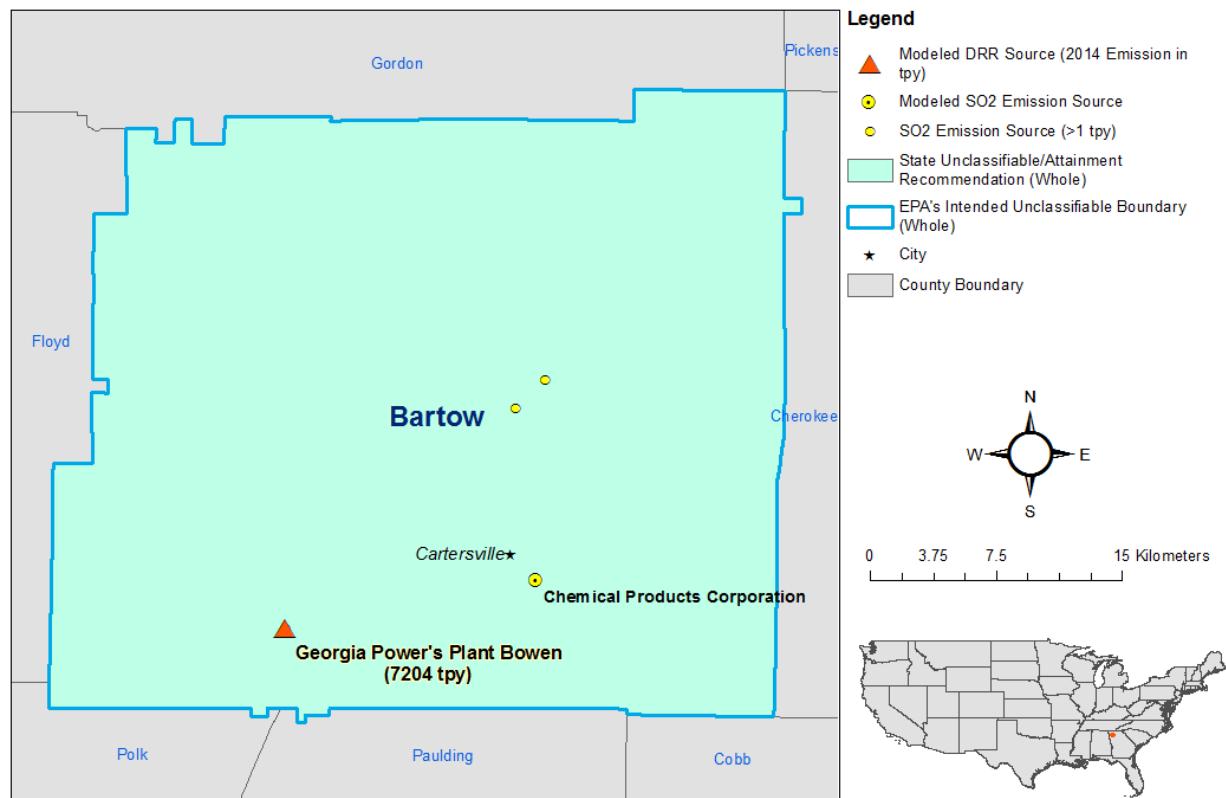
After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the area around Plant Bowen as unclassifiable for the 2010 SO₂ NAAQS because the area cannot be classified on the basis of available information as meeting or not meeting the NAAQS or as contributing or not contributing to a nearby area that does not meet the NAAQS. The increase of emissions at Plant Bowen since the 2012-2014 modeled period creates uncertainty in the States modeling results and conclusions. Specifically, the boundaries are comprised of the entirety of Bartow County. There are no remaining portions of Bartow County that remain to be characterized in the EPA's Round 4 of designations in 2020, nor are there any other portions of the County that have a separate area of analysis for Round 3.

The EPA believes that our intended unclassifiable area, bounded by the entirety of Bartow County, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable area.

4.7. Summary of Our Intended Designation for the Bartow County Area

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate Bartow County area as unclassifiable for the 2010 SO₂ NAAQS based upon uncertainties in the Plant Bowen emissions used in the modeling. Accordingly, the Bartow County area cannot be classified on the basis of available information as meeting or not meeting the NAAQS. Specifically, the boundaries are comprised of the entirety of Bartow County. Figure 14 shows the boundary of this intended designated area.

Figure 14. Boundary of the Intended Bartow County Unclassifiable Area



At this time, our intended designations for the State only apply to this area and the other areas presented in this TSD. The EPA intends in a separate action to evaluate and designate all remaining undesigned areas in Georgia by December 31, 2020.

5. Technical Analysis for the Effingham County Area

5.1. Introduction

The EPA must designate the Effingham County area by December 31, 2017, because the area has not been previously designated and Georgia has not installed and begun timely operation of a new, approved SO₂ monitoring network meeting the EPA specifications referenced in the EPA's SO₂ DRR for any sources of SO₂ emissions in Effingham County.

5.2. Air Quality Monitoring Data for the Effingham County Area

This factor considers the SO₂ air quality monitoring data in the area of Effingham County. Georgia provided no monitoring information for the Effingham County area. The EPA reviewed the available air quality monitoring data in the AQS database and found no nearby data for Effingham County. The closest monitor is over 27 km from Savannah River Mill, one county south of Effingham County in Chatham County. In reviewing the available air quality monitoring data in AQS, the EPA determined that there is no relevant data in AQS collected in or near Effingham County that could inform the intended designation action. The most recent SO₂ design values for all areas of the country are available at <https://www.epa.gov/air-trends/air-quality-design-values>.

5.3. Air Quality Modeling Analysis for the Effingham County Area Addressing Georgia-Pacific's Savannah River Mill and Georgia Power's Plant McIntosh

5.3.1. *Introduction*

This section 5.3 presents all the available air quality modeling information for a portion of Effingham County that includes Georgia-Pacific's Savannah River Mill and Georgia Power's Plant McIntosh. (This portion of Effingham County will often be referred to as "the Effingham County area" within this section 5.3). This area contains the following SO₂ sources around which Georgia is required by the DRR to characterize SO₂ air quality, or alternatively to establish an SO₂ emissions limitation of less than 2,000 tpy:

- The Savannah River Mill and Plant McIntosh facilities emitted 2,000 tons or more annually. Specifically, in 2014 Savannah River Mill emitted 2,105 tons of SO₂ and Plant McIntosh emitted 2,268 tons. The Savannah River Mill facility emitted 2,183 tons in 2015, and Plant McIntosh emitted 350 tons in 2015 and 127 tons in 2016. These sources met the DRR criteria and thus are on the SO₂ DRR Source list, and Georgia has chosen to characterize them via modeling.
- The Effingham County Power, LLC facility (Effingham County Power) and South Carolina Electric & Gas's Jasper Generating Station (Jasper Generating Station) are not on the SO₂ DRR Source list, but are included in the modeling. Effingham County Power emitted 3.2 tons in 2014 and did not report emissions in 2015, consistent with the

reporting thresholds of the AERR at subpart A to 40 CFR part 51. Jasper Generating Station emitted 98.6 tons in 2014 and 12 tons in 2015.

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

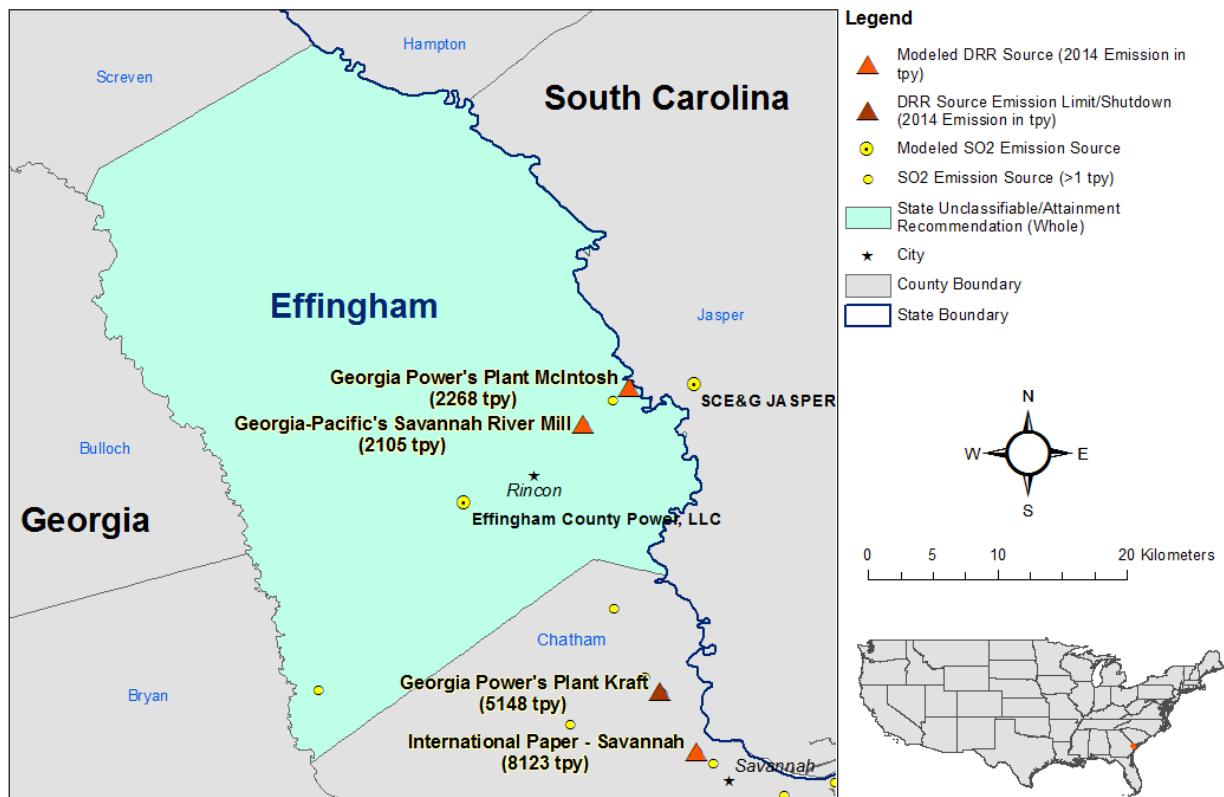
In its submission, Georgia recommended that each county in the State be designated unclassifiable/attainment. Specifically, the State recommended that an area that includes the area surrounding Savannah River Mill and Plant McIntosh, be designated as unclassifiable/attainment based in part on an assessment and characterization of air quality impacts from these facilities and other nearby sources that may have a potential impact in the area where the 2010 SO₂ NAAQS may be exceeded. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing a mixture of actual and allowable emissions. After careful review of the State's assessment, supporting documentation, and all available data, the EPA preliminarily agrees with the State's recommendation for the area, and intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

The area that the State has assessed via air quality modeling is located in the southeast portion of Effingham County in Rincon, Georgia on the western bank of the Savannah River. The location is north of Savannah, Georgia and directly west of Jasper Count, South Carolina.

As seen in Figure 15 below, the Savannah River Mill facility is located northeast of downtown Rincon, approximately 4 km west of the Savannah River. Also shown is that the Plant McIntosh facility is located on the western bank of the Savannah River, approximately 4 km northeast of the Savannah River Mill facility.

Also included in the figure is the State's recommended area for the unclassifiable/attainment designation. The EPA's intended unclassifiable/attainment designation boundary for the Effingham County area is not shown in this figure, but is shown in a figure in the section below that summarizes our intended designation.

Figure 15. Map of the Effingham County Area Addressing Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh.



The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered two related modeling assessments, including one assessment from the State and one assessment from other parties. The EPA also considered a modeling protocol and an update to that protocol in addition to the two modeling reports. To avoid confusion in referring to these assessments and protocols, the following table lists them, indicates when they were received, provides an identifier for the assessment that is used in the discussion of the assessments that follow, and identifies any distinguishing features of the modeling assessments.

Table 12 – Modeling Assessments for the Effingham County Area

Assessment Submitted by	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Georgia*	March 30, 2016	March 30, 2016 Georgia-Pacific Protocol	
Georgia	June 17, 2016	June 17, 2016 Modeling Protocol Addendum	Georgia updated the Georgia-Pacific protocol and submitted its own modeling report.
Georgia	September 30, 2016	September 30, 2016 Modeling Protocol Update	Georgia updated its Modeling Protocol Addendum for background concentrations.
Georgia**	December 13, 2016	November 9, 2016 Georgia-Pacific Modeling Report	Georgia-Pacific sent a modeling report to Georgia EPD.
Georgia	December 13, 2016	December 13, 2016 Modeling Report or Final Modeling Report	Georgia reviewed the Georgia-Pacific Modeling Report and completed its own modeling assessment.

*Georgia forwarded this protocol dated March 30, 2016 and prepared by Georgia-Pacific to EPA on June 17, 2016.

**Georgia forwarded to the EPA this modeling report prepared by Georgia-Pacific dated November 9, 2016.

5.3.2. Modeling Analysis Provided by the State

5.3.2.1. Differences Between and Relevance of the Modeling Assessments Submitted by the State

Georgia originally commissioned a modeling protocol and evaluation from Georgia-Pacific. The State forwarded the modeling protocol, dated March 30, 2016, to the EPA for review and concurrently conducted its own review. Georgia revised the Georgia-Pacific Protocol in the June 17, 2016, Modeling Protocol Addendum, based on its review. Georgia included small additional justifications for the Addendum, including meteorological data selection, background

concentrations, and offsite sources considered. Georgia subsequently updated its Modeling Protocol Addendum to adjust how the background concentration is included and the potential impacts from International Paper – Savannah are accounted for. Georgia-Pacific made use of the September 30, 2016, Modeling Protocol Update to conduct dispersion modeling, and submitted its assessment to Georgia EPD on November 9, 2016. Finally, Georgia reviewed the Georgia-Pacific Modeling Report, and developed its own modeling report dated December 13, 2016, to satisfy the DRR. The December 13, 2016, Modeling Report does not significantly change any inputs, model versions, or components, and accordingly, the modeled results and conclusions presented in the report do not significantly change. The final report from the State is primarily used in this TSD, but details from the protocols or other report may be relevant to the EPA's assessment, and are mentioned accordingly wherever necessary.

5.3.2.2. Model Selection and Modeling Components

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

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

The State used AERMOD version 15181 using all regulatory default options. AERMOD version 16216r has since become the regulatory model version. There were no updates from 15181 to 16216r that would significantly affect the concentrations predicted here. A discussion of the State's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

The current version of AERMOD, version 16216r, includes updates to 40 CFR part 51, Appendix W, "Guideline of Air Quality Models," published on January 17, 2017 (82 FR 5203). This version of AERMOD also includes fixes to bugs that were inadvertently included in version 16216. Georgia used the regulatory default settings for version 15181 available at the time of its modeling preparation and is not making use of any previously unapproved alternative modeling options included in version 16216r and the update to Appendix W.

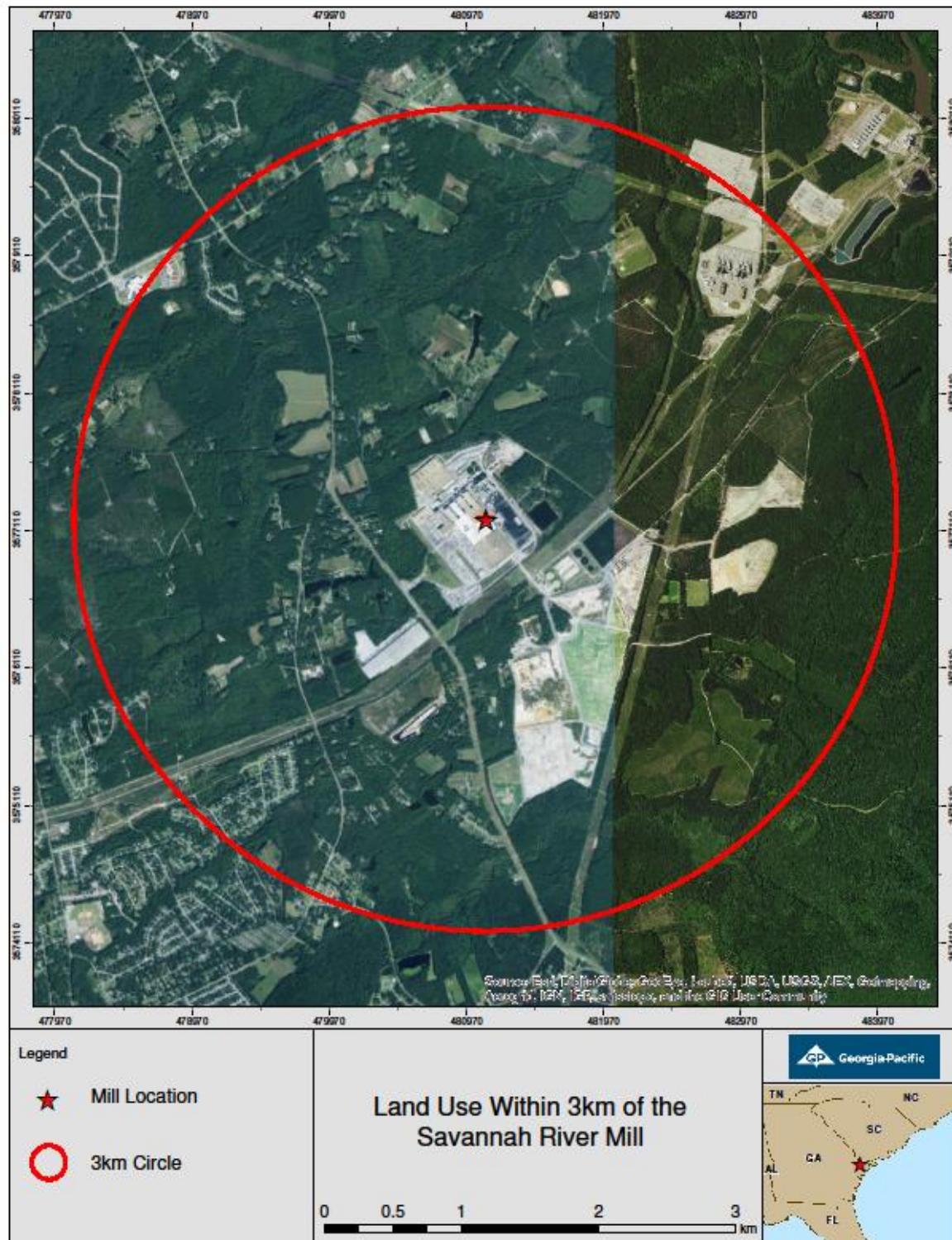
5.3.2.3. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO₂ modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO₂ sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density. The EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 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.

The State analyzed the land use types within a 3 km radius from the center of Savannah River Mill as shown in Figure 16 and determined that the area is predominantly rural. Therefore, for the purpose of performing the modeling for the area of analysis, Georgia determined that it was most appropriate to run the model with rural dispersion coefficients or rural mode and the EPA concurs with this assessment.

Figure 16: Land Use Map for Area Within 3km of the Savannah River Mill Facility.
Source: “1-hour Sulfur Dioxide National Ambient Air Quality Standards Attainment Demonstration Dispersion Modeling Protocol,” prepared by Georgia-Pacific for Georgia, March 30, 2016.



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

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO₂ emission sources or facilities considered for modeling; the extent of concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO₂ concentrations.

The sources of SO₂ emissions subject to the DRR in this area are described in the introduction to this section. For the Effingham County area, the State has included two other emitters of SO₂ within 50 km of Savannah River Mill and Plant McIntosh in any direction. The State determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO₂ NAAQS exceedances in the area of analysis and any potential impact on SO₂ air quality from other sources in nearby areas. In addition to Georgia-Pacific's Savannah River Mill and Georgia Power's Plant McIntosh, the other emitters of SO₂ included in the area of analysis are: Effingham County Power in Rincon, Georgia, located approximately 9.8 km southwest of Savannah River Mill; and South Carolina Electric & Gas's Jasper Generating Station in Hardeeville, South Carolina, located approximately 7.9 km east of Savannah River Mill across the Savannah River. No other sources beyond 50 km were determined by the State to have the potential to cause concentration gradient impacts within the area of analysis.

The grid receptor spacing for the area of analysis chosen by the State is as follows, taken from the November 9, 2016, Georgia-Pacific Modeling Report:

A comprehensive Cartesian receptor grid, extending approximately 20 km from the SRM was used in the AERMOD modeling analyses to assess maximum ground-level SO₂ concentrations. The Cartesian receptors grid consists of the following receptor spacing:

- From the center of SRM to a distance of 5,000 m at 100-m intervals
- Beyond 5,000 m to 10,000 m at 500-m intervals
- Beyond 10,000 m to 20,000 m at 1000-m intervals

The receptor network contained 12,992 receptors, and the network covered the southeast portion of Effingham County, extending into the northern portion of Chatham County, Georgia and the western portion of Jasper County, South Carolina.

Figures 17 and 18, included in the State's recommendation and the March 30, 2016, Modeling Protocol, respectively, show the State's chosen area of analysis surrounding Georgia-Pacific Savannah River Mill and Plant McIntosh, as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the State placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility, including other facilities' property, though Georgia did not exclude receptors inside the modeled facilities. As shown above, the modeling assessment included receptors within

Savannah River Mill, Plant McIntosh, Effingham County Power, and Jasper Generating Station property boundaries and over water bodies to either follow the Modeling TAD or to provide for the most cautious air characterization possible. The receptors inside the plant boundaries and over water bodies do not include the maximum concentrations shown in this TSD.

Figure 17: Area of Analysis for the Effingham County Area Including Nearby Sources in a 50-km Radius. Source: “GA EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh,” prepared by Georgia, December 13, 2016.

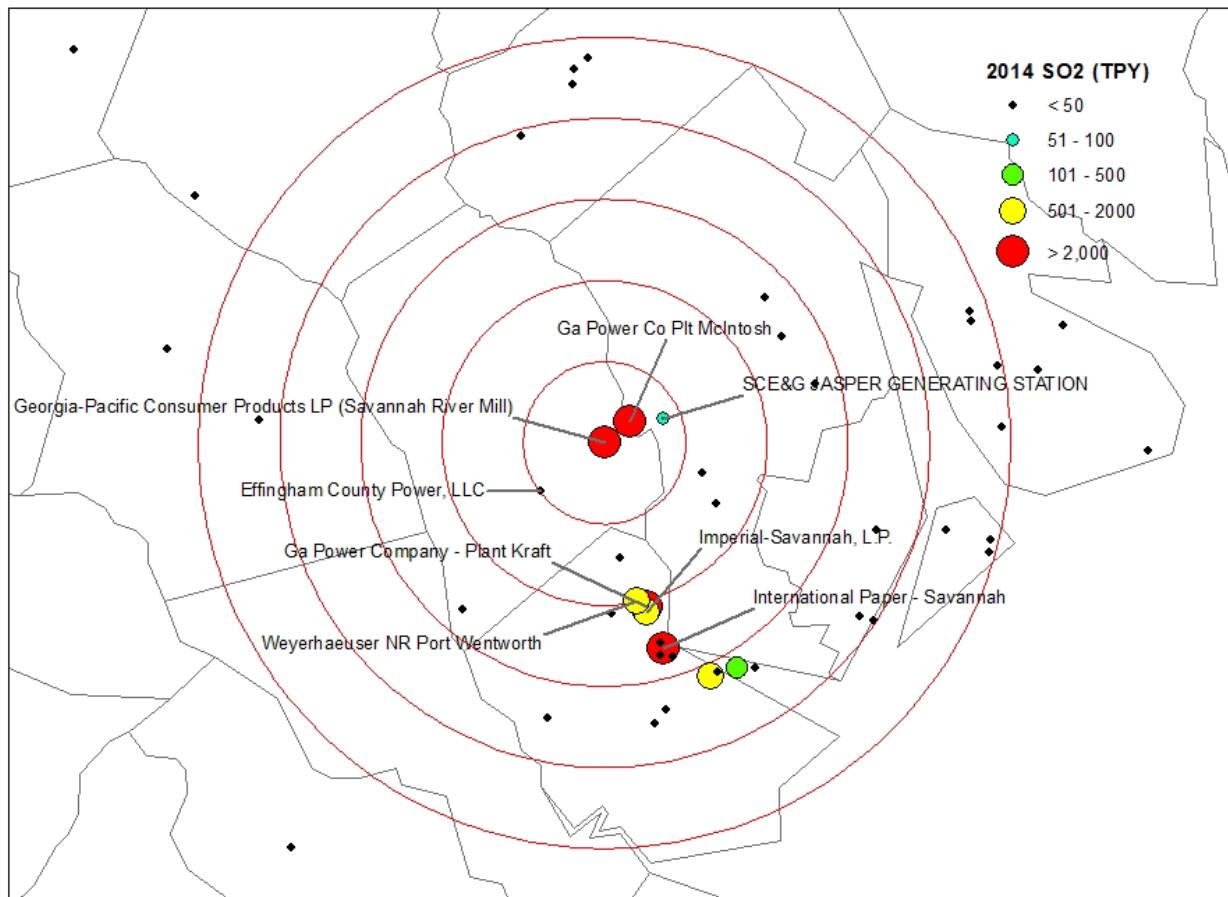
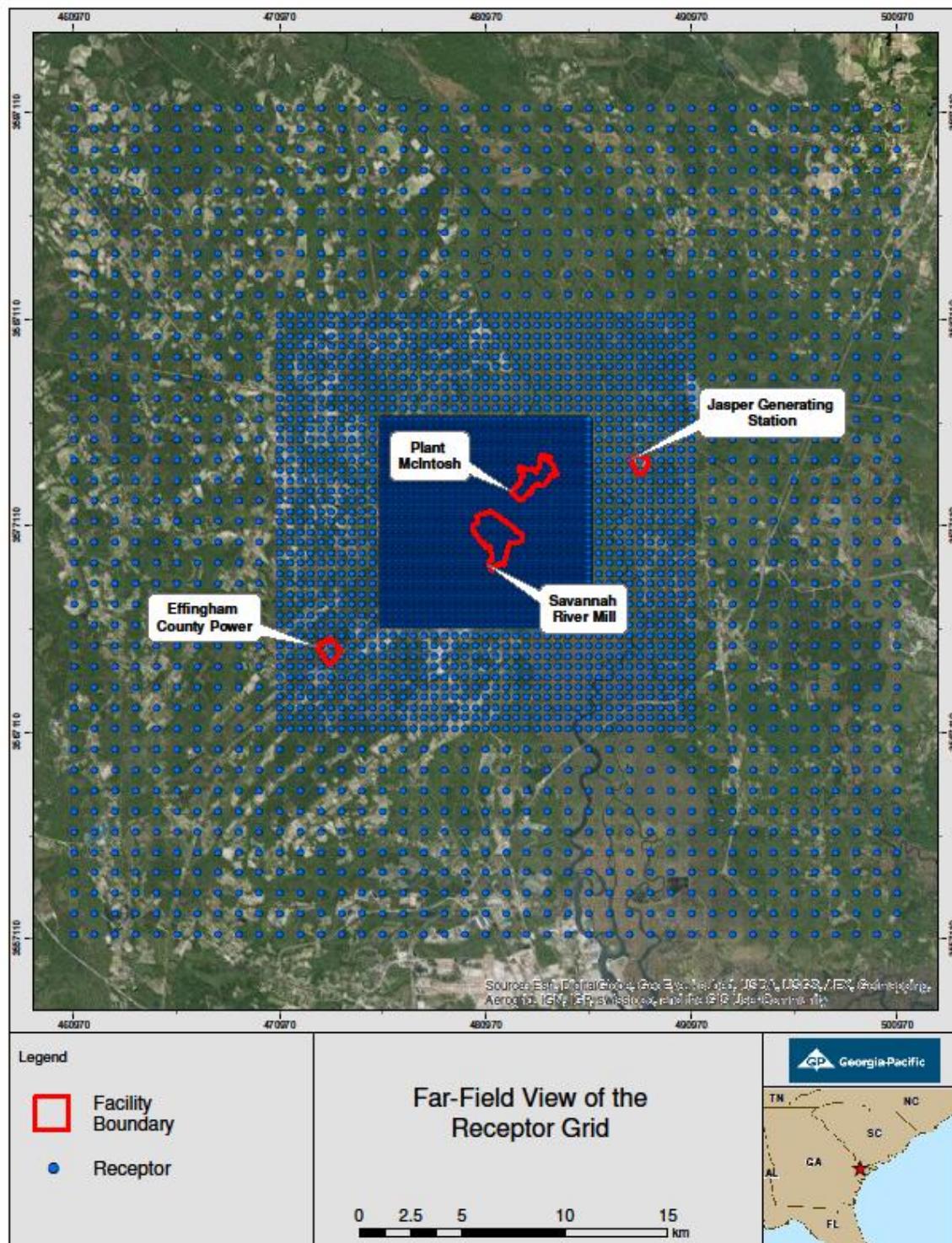


Figure 18: Receptor Grid for the Effingham County Area. Source: “1-hour Sulfur Dioxide National Ambient Air Quality Standards Attainment Demonstration Dispersion Modeling Protocol,” prepared by Georgia-Pacific for Georgia, March 30, 2016.



The EPA agrees with the State on the final receptor grid, which does not exclude any receptors in the 20 km area of analysis. The final grid is consistent with the Modeling TAD but above and

beyond what is required by the Modeling TAD because it includes receptors that could have been excluded in a manner consistent with the TAD. The final receptor grid, therefore, can be expected to adequately characterize SO₂ impacts from the Savannah River Mill and Plant McIntosh facilities as well as the other two facilities included in the modeling. The maximum predicted concentration occurs within 1 km of the Savannah River Mill facility which is within the 100-meter receptor spacing area (See Figure 22).

5.3.2.5. Modeling Parameter: Source Characterization

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

The Final Modeling Report submitted by the State of Georgia indicated that the two electricity generating facilities within 10 km of Savannah River Mill and Plant McIntosh would be included in the modeling due to proximity. These two facilities are Effingham County Power (in GA) and Jasper Generating Station (SC). In addition, the Q/d screening technique was used to evaluate additional nearby sources for potential inclusion in the modeling analysis. The Q/d analysis was applied using the most current version of compiled emissions available at the time of report preparation, the 2014 NEI, version 1. The Q/d analysis considered sources within 50 km, and showed four sources (in addition to Savannah River Mill and Plant McIntosh) with a Q/d over 20 including: International Paper – Savannah, a DRR source, located 26.3 km south of Savannah River Mill; Plant Kraft, located 20.9 km south of Savannah River Mill; Weyerhaeuser NR Port Wentworth, located 19.9 km south of Savannah River Mill; and Imperial-Savannah, L.P., located 21.5 km south of Savanna River Mill. International Paper – Savannah is a DRR source and was previously modeled. Potential impacts from this source will be accounted for in this modeling analysis using representative background ambient monitoring data as described in Section 5.3.2.9 of this TSD.

The impacts from the remaining three sources with Q/d values greater than 20, including Georgia Power Plant Kraft, Weyerhaeuser NR Port Wentworth, and Imperial-Savannah, L.P. were accounted for in the seasonal background concentrations from the Augusta & Lathrop monitor. These facilities are located approximately 7 km away from the Augusta & Lathrop SO₂ monitor, but are located approximately 20 km away from Savannah River Mill and Plant McIntosh. These same facilities are approximately 10 km away from the edge of the 10 km modeling sub-domain used for this modeling analysis for Effingham County. Therefore, the use of the 2012-2014 seasonal hour of day background SO₂ concentrations will be a conservative estimate (or over-estimate) of the background concentrations (not including IP-Savannah) since Weyerhaeuser NR Port Wentworth, Imperial Savannah, L.P., and Georgia Power Plant Kraft are further away from the Plant McIntosh and Georgia Pacific Savannah River Mill modeling domain than they are from the Lathrop & Augusta SO₂ monitor.

All remaining nearby sources were shown to have small (less than 20) Q/d potential contributions. Accordingly, the State explicitly modeled only the Savannah River Mill, Plant McIntosh, Effingham County Power, and Jasper Generating Station facilities to characterize the Effingham County area.

The State characterized these 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 for the three boilers at Savannah River Mill and the steam generating unit at Plant McIntosh. Miscellaneous sources at Savannah River Mill, the combustion turbines at Plant McIntosh, and nearby sources that were modeled with the allowable or PTE emission rates followed the EPA's GEP policy. All sources that were modeled at allowable emission rates have actual stack heights less than 65 m which is the minimum height allowed by the GEP policy. The State also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

The EPA agrees with Georgia's method for characterizing the area. The assessment of nearby sources within 50 km of Savannah River Mill, and special considerations of the background concentration addressed later in this TSD, justify the explicit modeling of Savannah River Mill and Plant McIntosh with largely actual emissions, and Effingham County Power and Jasper Generating Station with allowable emissions. The use of actual stack heights and GEP stack height calculations is appropriate given the mixed use of actual and allowable emissions. Building downwash is also appropriately accounted for.

5.3.2.6. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally enforceable and effective.

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

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO₂ emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a State should be able to find the necessary emissions information for designations-related modeling in the existing SO₂ emissions inventories used for permitting or SIP planning demonstrations. In the event that these

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

As previously noted, the State included Savannah River Mill and Plant McIntosh, and two other emitters of SO₂ within 50 km in the area of analysis. For this area of analysis, 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. The facilities in the State’s modeling analysis and their associated actual or PTE rates are summarized below.

For Savannah River Mill and Plant McIntosh, the State provided annual actual SO₂ emissions between 2012 and 2014 for most of the larger sources. Savannah River Mill used actual emissions for three primary power boilers (BO01 – BO03). Plant McIntosh modeled actual hourly emissions for the steam generating unit. This information is summarized in Table 13. A description of how the State obtained hourly emission rates is given below this table.

Table 13. Actual SO₂ Emissions Between 2012 – 2015 from Facilities in the Area of Analysis for the Effingham County Area

Facility Name	SO ₂ Emissions (tpy)			
	2012	2013	2014	2015
Savannah River Mill (Units: BO01 – BO03)	2,770	2,129	2,062	2,182
Plant McIntosh – Steam Generating Unit SG01	0	491	2,267	340
Total Emissions from All Facilities in the Area of Analysis Modeled Based on Actual Emissions	2,770	2,620	4,329	2,522

For Savannah River Mill and Plant McIntosh, the actual hourly emissions data were obtained from CEMs. The EPA compared the hourly emissions used in Georgia’s modeling with the emissions data found in the CAMD Acid Rain emissions database. Emissions in 2015 for both facilities were consistent with emissions in the years modeled (2012-2014).

The combustion turbines at Plant McIntosh were modeled at PTE. For Jasper Generating Station and Effingham County Power, the State provided PTE values. Savannah River Mill also provided PTE values for 13 miscellaneous sources at the facility. This information is summarized in Table 14. A description of how the State obtained PTE emission rates is given below this table.

Table 14. SO₂ Emissions based on PTE from Facilities in the Area of Analysis for the Effingham County Area

Facility Name	SO ₂ Emissions (tpy, based on PTE)
Savannah River Mill – 13 Miscellaneous Units	204
Jasper Generating Facility	1,399
Plant McIntosh – Combustion Turbines	93
Effingham County Power, LLC	40
Total Emissions from Facilities in the Area of Analysis Modeled Based on PTE	1,736

The PTE in tpy for the above facilities was determined by the EPA by multiplying the maximum PTE hourly emission rates for each unit by 8,760 hours in a year. Emissions were assumed to be the same in each modeled year.

The modeled emission parameters for Effingham County Power were obtained from the Georgia EPD permit database and the Jasper Generating facility data were provided by South Carolina Department of Health and Environmental Control (DHEC). The Savannah River Mill miscellaneous emission sources were modeled at their maximum hourly SO₂ emission rate and representative stack parameters.

The EPA agrees with Georgia's use of actual emissions for the larger units at the Savannah River Mill and Plant McIntosh facilities, and with the use of PTE for Effingham County Power, Jasper Generating Station, the combustion turbines at Plant McIntosh, and the miscellaneous units at Savannah River Mill. We also agree with the use of 2012-2014 emissions, since the emissions at Plant McIntosh and Savannah River Mill in 2015 are consistent with emissions from the 2012-2014 period modeled. We believe this set of parameters provides for a conservative representation of any possible SO₂ impacts in the area.

5.3.2.7. Modeling Parameter: Meteorology and Surface Characteristics

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

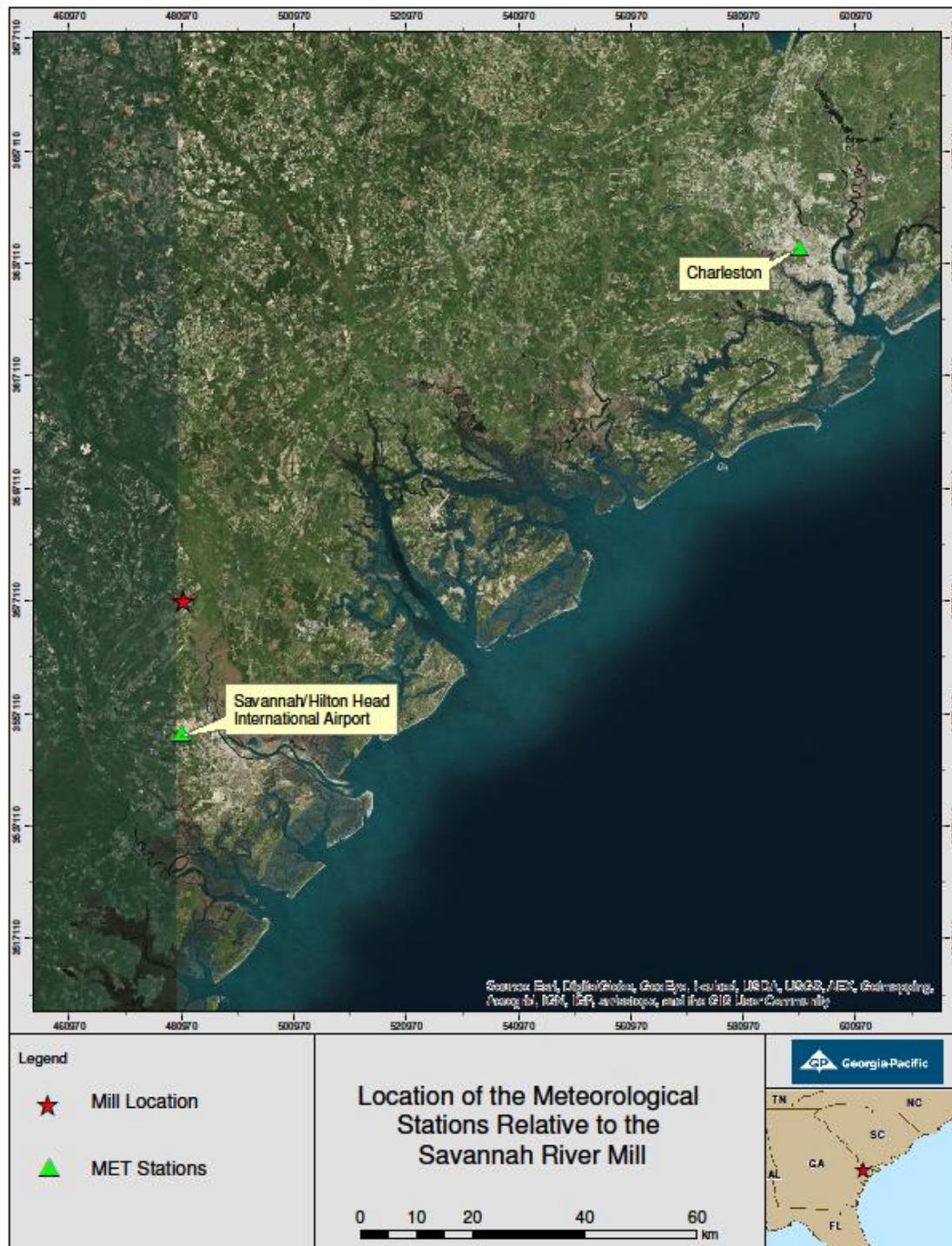
For the area of analysis for the Effingham County area, the State selected the surface meteorology from the NWS station at the Savannah International Airport in Savannah, Georgia at Latitude 32.12 N, Longitude -81.2 W and coincident upper air observations from a different NWS station located at the Charleston Air Force Base in Charleston, South Carolina, at Latitude 32.7 N, Longitude -80 W as best representative of meteorological conditions within the

area of analysis. AERSURFACE output files have not been provided by Georgia, so we are not able to confirm the coordinates that were used to calculate the surface roughness, albedo and Bowen ratio surface characteristics

The State used AERSURFACE version 13016 using data from the NWS station in Savannah, Georgia to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness [z_o]) of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space, the Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance, and the surface roughness is sometimes referred to as “ z_o ” The state estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions.

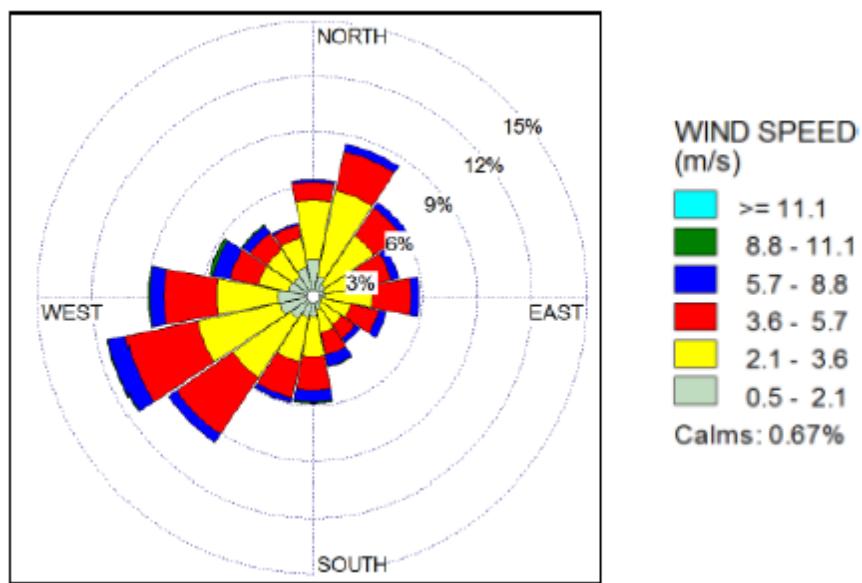
In the figure below, included in the State’s recommendation, the locations of these NWS stations is shown relative to the area of analysis.

Figure 19. Area of Analysis and the NWS stations in the Effingham County Area. Source: “1-hour Sulfur Dioxide National Ambient Air Quality Standards Attainment Demonstration Dispersion Modeling Protocol,” prepared by Georgia-Pacific for Georgia, March 30, 2016.



As part of its recommendation, the State provided the 3-year surface wind rose for the Savannah, Georgia NWS station. In Figure 20, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Analysis of the NWS data indicate winds blow predominately from the west (approximately 9 percent of the time), southwest (approximately 21 percent of the time) and northeast (approximately 8 percent of the time) directions.

Figure 20: Effingham County Area Cumulative Annual Wind Rose from Savannah, Georgia for Years 2012-2014. Source: “GA EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh,” prepared by Georgia, December 13, 2016.



Meteorological data from the above surface and upper air NWS 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 accordance with the AERMOD Implementation Guide 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 1-minute duration was provided from the first NWS station mentioned above, 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 m/s in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA believes the meteorology and surface characteristics used in the State's modeling are acceptable. The meteorology in the final modeling report made use of the Savannah International Airport NWS surface data and NWS data from the Charleston Air Force Base NWS for upper air data. The EPA believes that the meteorological data and the fact that two main sources are modeled together reasonably show that impacts from Savannah River Mill and Plant McIntosh can be expected to the east of the Savannah River Mill facility (west of the Plant McIntosh facility). The surface characteristics were evaluated for three reasonable areas, the two NWS stations and the Savannah River Mill site, and the State's reasoning for selecting one set of characteristics over another are appropriate. Georgia complied with the EPA guidance in developing this aspect of its modeling parameters.

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

The terrain in the area of analysis is best described as generally flat with slight elevation changes. To account for these minor 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 NED.

The EPA confirmed that the Effingham County area has no complex terrain considerations, and accordingly, the surface characteristics selected can adequately represent the area and the modeling domain. We also preliminarily agree with the State's use of AERMAP version 11103 to obtain the elevations of sources, buildings and receptors.

5.3.2.9. Modeling Parameter: Background Concentrations of SO₂

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO₂ that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the State elected to use the "tier 2" approach, but modified for its specific situation. Data was obtained from 2012-2014 for AQS Site: 13-051-1002, the Lathrop & Augusta monitor in Savannah, Georgia. This background was meant to account for emissions from several nearby sources between the Effingham County area of analysis and the monitor. All SO₂ values corresponding to a wind direction between 10° and 45° were ignored since those impacts were described to be directly attributable to the International Paper – Savannah facility outside of the county area.

This was done because the impacts of International Paper -Savannah were directly accounted for in a more conservative way through modeling as described in the following paragraph. See Table 15 for the hourly values modeled and sorted by season.

Table 15. Tier 2 Approach: Seasonal Varying Hourly Background Concentrations (ppb)¹³

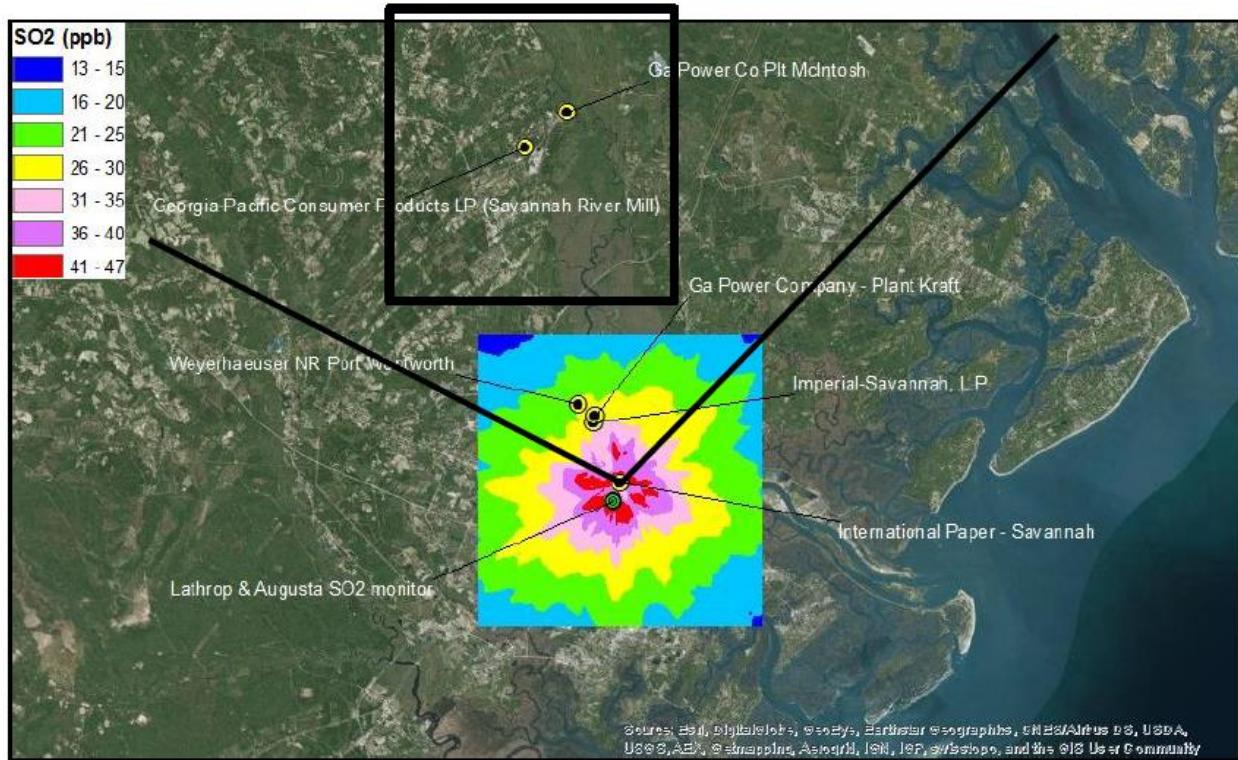
Hour of Day	Spring	Summer	Fall	Winter
1	12.0	4.5	3.6	6.5
2	12.0	4.9	3.7	6.3
3	19.0	4.5	4.7	7.7
4	11.0	4.4	4.4	12.3
5	9.6	7.1	5.0	8.6
6	7.6	7.5	5.2	10.4
7	8.3	6.6	8.0	15.4
8	10.2	7.3	13.4	13.8
9	13.4	14.5	9.0	18.2
10	20.0	18.1	21.1	24.1
11	19.0	20.3	14.9	22.8
12	26.9	24.9	14.1	21.0
13	22.5	12.8	11.9	19.8
14	18.7	17.2	11.0	17.2
15	24.6	12.5	15.8	17.7
16	20.5	8.1	5.2	9.0
17	10.2	6.3	5.9	11.7
18	8.8	5.9	5.6	7.1
19	11.0	5.9	4.5	6.7
20	6.9	5.9	4.5	5.6
21	7.0	6.8	5.2	7.9
22	6.8	5.5	4.6	9.9
23	7.7	6.3	3.6	7.3
24	11.6	6.4	3.6	11.7

Because the impacts from International Paper – Savannah on the background concentrations were removed from the background data by exclusion of values within the 10-degree to 45-degree sector, the impacts from International Paper – Savannah had to be accounted for in some manner. Therefore, in addition to inclusion in the modeling of the background concentrations shown in Table 15 above, the impacts from IP Savannah were accounted for by utilizing the modeling that was performed for International Paper – Savannah for DRR purposes (see Section 3 of this document). The maximum modeled SO₂ concentration from International Paper – Savannah alone along the northern edge of the 20-km by 20-km modeling domain for the Chatham County area was determined. See Figure 21 below for a visual representation of this setup and Appendix A of the December 13, 2016, Modeling Report for more detail. This value (19.2 ppb/50.3 µg/m³) was added to the maximum modeled impact from all sources explicitly

¹³ The SO₂ NAAQS level is expressed in ppb but AERMOD gives results in µg/m³. The conversion factor for SO₂ (at the standard conditions applied in the ambient SO₂ reference method) is 1ppb = approximately 2.619 µg/m³.

included in the modeling for Effingham County including the background concentrations from Table 15 above. This approach overestimates the impacts from International Paper – Savannah in the Effingham County area since concentrations from International Paper – Savannah will continue to decrease at further distances from this source. In other words, the impacts from International Paper – Savannah are expected to be higher along the northern edge of the Chatham County area modeling grid than they are expected to be within the modeling grid for Savannah River Mill and Plant McIntosh. Consequently, the contribution modeled from International Paper – Savannah is likely to be an overestimate of its actual impacts.

Figure 21: Modeling Domain for International Paper – Savannah as Related to a 10 km Sub-Domain for the Effingham County Area. Source: “GA EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh,” prepared by Georgia, December 13, 2016.



The EPA agrees that Georgia adequately accounted for background, in accordance with the Modeling TAD. The State made use of the nearest SO₂ monitor, excluding data when the wind direction most aligned with the International Paper – Savannah facility so as not to double-count its impacts.

5.3.2.10. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Effingham County area of analysis are summarized below in Table 16.

Table 16: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Effingham County Area

Input Parameter	Value
AERMOD Version	15181 (regulatory default)
Dispersion Characteristics	Rural
Modeled Sources	4
Modeled Stacks	29
Modeled Structures	40
Modeled Fencelines	3
Total receptors	12,992
Emissions Type	Mixed
Emissions Years	2012-2014
Meteorology Years	2012-2014
NWS Station for Surface Meteorology	Savannah, GA
NWS Station Upper Air Meteorology	Charleston, SC
NWS Station for Calculating Surface Characteristics	Savannah, GA
Methodology for Calculating Background SO ₂ Concentration	Tier 2 approach using AQS site: 13-051-1002 for 2012 – 2014
Calculated Background SO ₂ Concentration	3.6 ppb – 26.9 ppb

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

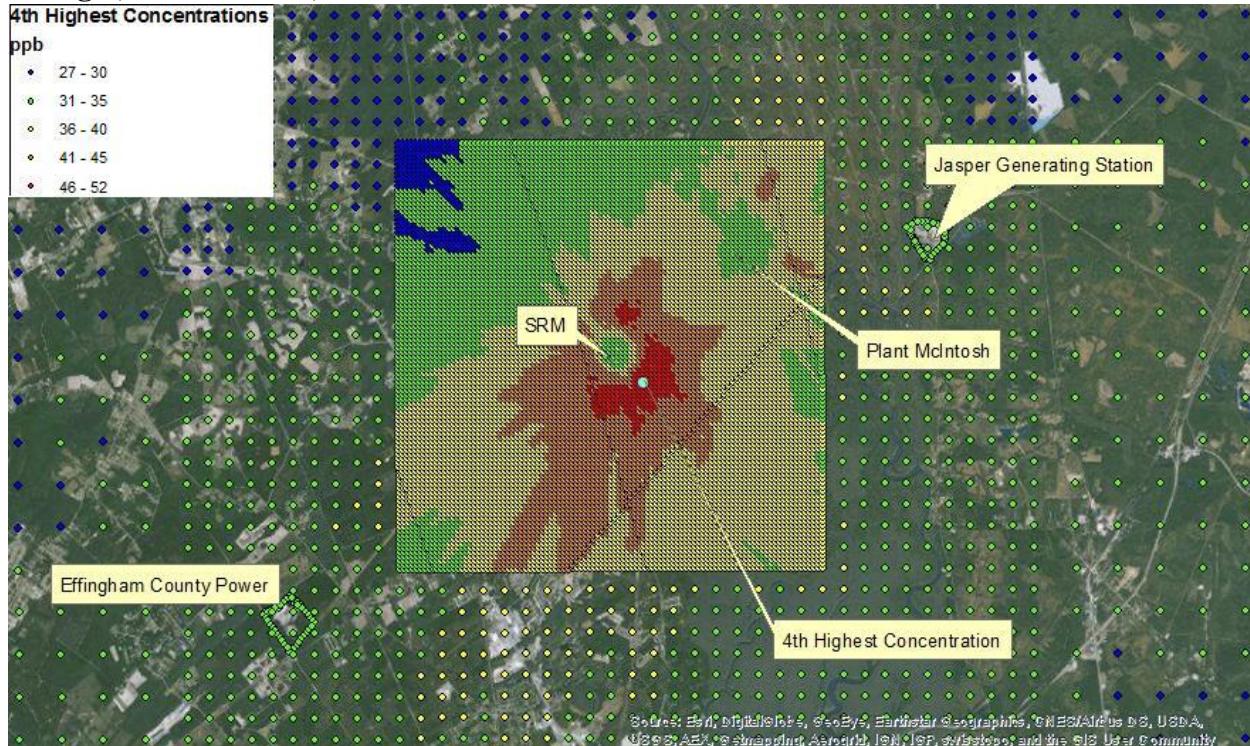
Table 17. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Effingham County Area

Averaging Period	Data Period	Receptor Location [UTM zone 17]		99 th percentile daily maximum 1-hour SO ₂ Concentration ($\mu\text{g}/\text{m}^3$)	
		UTM Easting (m)	UTM Northing (m)	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2012-2014	3576715	481773	187.5	196.4*

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

The State's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 187.5 $\mu\text{g}/\text{m}^3$, equivalent to 71.6 ppb. This modeled concentration included the background concentration of SO₂, and is based on a mixture of actual and PTE emissions from the facility/facilities. Figure 22 below was included as part of the State's recommendation, and indicates that the predicted value occurred 0.86 km southeast of Savannah River Mill. The State's receptor grid is also shown in the figure.

Figure 22: Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Effingham County Area. Source: “GA EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh,” prepared by Georgia, December 13, 2016.



The modeling submitted by the State does not indicate that the 1-hour SO₂ NAAQS is violated at the receptor with the highest modeled concentration.

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

The EPA agrees with Georgia’s modeling to characterize SO₂ impacts in the Effingham County area. The State chose to model the two DRR sources together, and to include two other nearby sources within 10 km of Savannah River Mill, Effingham County Power and Jasper Generating Station. The EPA believes the modeling domain is appropriate to capture predicted maximum impacts in the Effingham County area. Georgia’s selection of meteorology and surface characteristics for the area are also appropriate to make a valid modeling demonstration. The State also represented the topography of the area with the model and its preprocessors. The State chose to model emissions from the Savannah River Mill and Plant McIntosh facilities during 2012 – 2014 rather than using the most recent available emissions. This departure from the Modeling TAD is acceptable because 2015 emissions at both Plant McIntosh and Savannah River Mill are consistent with emissions from the 2012-2014 period modeled. The State also chose to model 13 miscellaneous sources at the Savannah River Mill facility at maximum utilization rather than the actual emissions. This decision to make use of actual and potential emissions overestimates the potential impacts from these intermittently operated internal

combustion engines. The other nearby sources, Effingham County Power and Jasper Generating Station, were modeled at PTE rather than actual emissions, again likely to overestimate the actual SO₂ impacts. We believe these decisions are appropriate for the purpose of this modeling demonstration. We have also confirmed that Georgia selected its seasonal varying background concentrations consistent with the Modeling TAD.

Finally, the EPA agrees with the technique used by the State of Georgia to account for the potential impacts from International Paper – Savannah on the modeled SO₂ concentrations within the Effingham County modeling domain. The impacts from International Paper – Savannah were accounted for by utilizing the modeling that was performed for International Paper – Savannah for DRR purposes. The maximum modeled SO₂ concentration from International Paper – Savannah alone along the northern edge of the 20-km by 20-km modeling domain for the Chatham County area was determined and included throughout the Effingham County area modeling domain. This approach overestimates the impacts from International Paper – Savannah in the Effingham County area since concentrations from International Paper – Savannah will continue to decrease at further distances from this source. Therefore, the EPA believes the State adequately accounted for impacts from International Paper – Savannah in the Effingham County area of analysis.

The State made use of AERMOD version 15181, the most recent version available at the time the modeling was conducted. The EPA agrees that this model version is appropriate to characterize the area because the State is not making use of any previously un-approved alternative modeling options included in version 16216r and the update to Appendix W and followed the Modeling TAD as appropriate.

In addition, based on the available information for the remaining areas in Georgia and nearby South Carolina, including monitoring and modeling, there are no current SO₂ nonattainment areas near Effingham County, Georgia, and no expected nonattainment areas for this third round of designations. Therefore, the Effingham County area is not expected to contribute to ambient air quality in a nearby area that does not meet the NAAQS.

5.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Effingham County Area

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

5.5. Jurisdictional Boundaries in the Effingham County Area

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

The modeling domain extends to a square of 20 km by 20 km, and does not go out to the extent of the entire boundary for Effingham County. This domain extends into Chatham County and also partially crosses the State boundary over the Savannah River into Jasper County, South Carolina.

5.6. The EPA's Assessment of the Available Information for the Effingham County Area

The EPA intends to designate the Effingham County area, including the entire County boundary, as unclassifiable/attainment. We believe that Georgia's modeling analysis supports the conclusion that there are no expected violations of the 2010 SO₂ NAAQS in the area. There is no current monitoring data available for the area, so the modeling serves to reflect the air quality expected in the years modeled. In addition, based on the available information for the remaining areas in Georgia and nearby South Carolina, including monitoring and modeling, there are no current SO₂ nonattainment areas near Effingham County, Georgia, and no expected nonattainment areas for this third round of designations. Therefore, the Effingham County area is not expected to contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Based on the air quality characterization conducted within the Effingham County area of analysis in accordance with the EPA's Modeling TAD, the State concluded that the area should be designated as unclassifiable/attainment. This recommendation is based on Georgia's assessment that the Savannah River Mill and Plant McIntosh facilities are the main sources thought to significantly impact the area, and the inclusion of the two closest sources at PTE. Effingham County includes two total sources that emitted over 100 tons in 2014: Savannah River Mill and Plant McIntosh. Effingham County Power, an electric generating facility, emitted approximately 3.2 tons in 2014 according to the 2014 NEI, version 1, and was not required to report emissions for the EPA's EIS for 2015, in accordance with reporting thresholds for the AERR at subpart A to 40 CFR part 51. South Carolina's Jasper Generating Station emitted a total of 98.6 tons in 2014 according to the 2014 NEI, version 1, and a total of 12 tons in 2015, according to the EPA's EIS.

Georgia evaluated possible contributions from these sources and other sources within 50 km of Savannah River Mill to SO₂ impacts in the area surrounding Savannah River Mill and Plant McIntosh. Georgia decided in the modeling protocol to include possible contributions from the Effingham County Power and Jasper Generating Station facilities by modeling PTE. Georgia also included impacts from nearby sources in Chatham County through a seasonal varying background concentration from the Lathrop & Augusta monitor in Savannah, Georgia. Finally, the State included potential impacts from International Paper – Savannah facility by including its

maximum modeled impact along the northern edge of the 20-km by 20-km receptor grid for the Chatham County modeling completed for the DRR. This impact along the edge of the modeling domain for Chatham County was added to the average fourth maximum modeled concentration in the Effingham County area. The EPA agrees with the technical explanation for the State's treatment of nearby SO₂ sources included in the September 30, 2016, Modeling Protocol Update and the December 13, 2016, Modeling Report. We believe the modeling of the sources included adequately represents the Effingham County area. The agrees that the seasonal varying background concentrations included adequately account for any impacts of other sources not explicitly modeled.

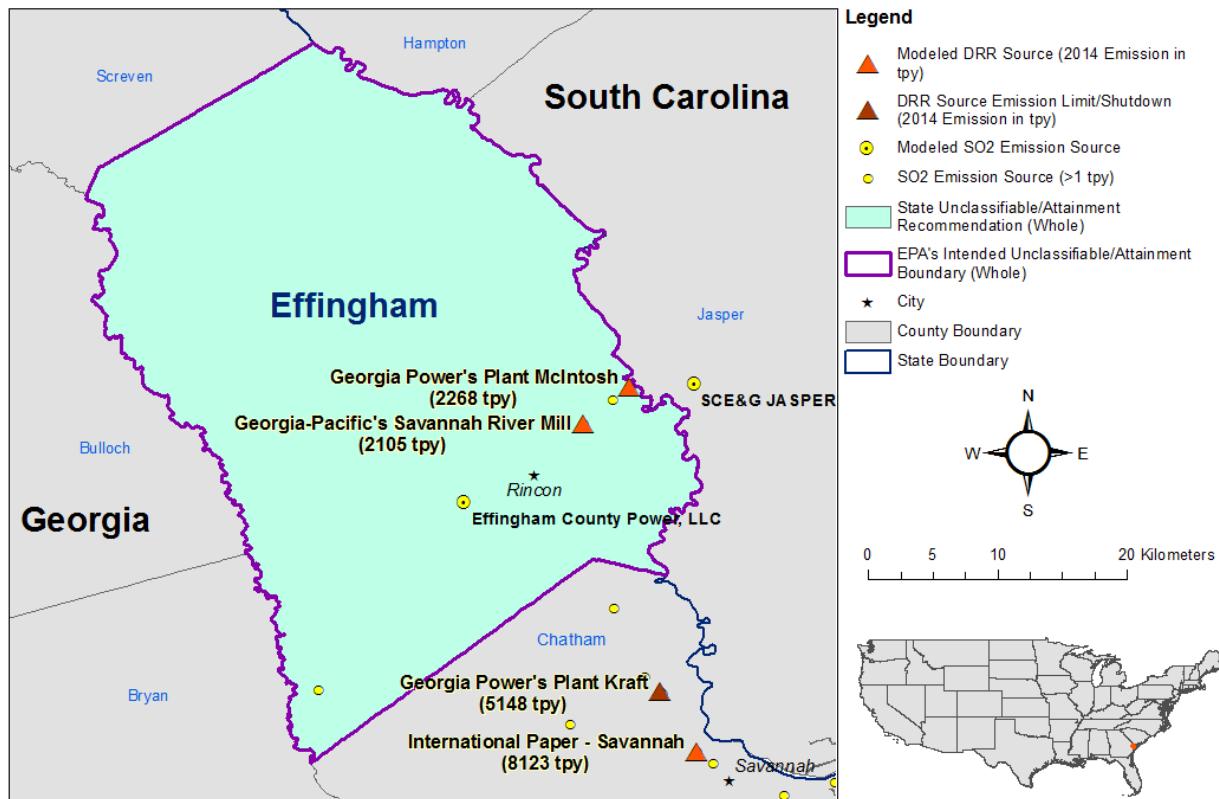
After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the area around Savannah River Mill and Plant McIntosh as unclassifiable/attainment for the 2010 SO₂ NAAQS. Specifically, the boundaries are comprised of the entirety of Effingham County. There are no remaining portions of Effingham County that remain to be characterized in the EPA's Round 4 of designations in 2020, nor are there any other portions of the County that have a separate area of analysis for Round 3.

The EPA believes that our intended unclassifiable/attainment area, bounded by the Effingham County boundary, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment area.

5.7. Summary of Our Intended Designation for the Effingham County Area

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the Effingham County area as unclassifiable/attainment for the 2010 SO₂ NAAQS because the EPA has determined the area meets the 2010 SO₂ NAAQS and does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundaries are comprised of the entirety of Effingham County. Figure 23 shows the boundary of this intended designated area.

Figure 23. Boundary of the Intended Effingham County Unclassifiable/Attainment Area



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 intends in a separate action to evaluate and designate all remaining undesignated areas in Georgia by December 31, 2020.

6. Technical Analysis for the Heard County Area

6.1. Introduction

The EPA must designate the Heard County area by December 31, 2017, because the area has not been previously designated and Georgia has not installed and begun timely operation of a new, approved SO₂ monitoring network meeting the EPA specifications referenced in the EPA's SO₂ DRR for any sources of SO₂ emissions in Heard County.

The Heard County area runs along the Chattahoochee River. A portion of the Heard County modeling domain extends into the State of Alabama in Randolph and Cleburne Counties.

However, the information in this document does not duplicate information in a document for Alabama because that State has no DRR sources and no sources of SO₂ over 100 tpy in Randolph or Cleburne Counties.

6.2. Air Quality Monitoring Data for the Heard County Area

This factor considers the SO₂ air quality monitoring data in the area of Heard County. Georgia provided no monitoring information for the Heard County area. The EPA reviewed the available air quality monitoring data in the AQS database and found no nearby data for Heard County. The closest monitor is over 70 km from Plant Wansley, two counties east of Heard County in Fulton County. In reviewing the available air quality monitoring data in AQS, the EPA determined that there is no relevant data in AQS collected in or near Heard County that could inform the intended designation action. The most recent SO₂ design values for all areas of the country are available at <https://www.epa.gov/air-trends/air-quality-design-values>.

6.3. Air Quality Modeling Analysis for the Heard County Area Addressing Georgia Power Plant Wansley

6.3.1. *Introduction*

This section 6.3 presents all the available air quality modeling information for a portion of Heard County that includes Georgia Power Plant Wansley. This area contains the following SO₂ source around which Georgia is required by the DRR to characterize SO₂ air quality, or alternatively to establish an SO₂ emissions limitation of less than 2,000 tpy:

- The Georgia Power – Plant Wansley facility emitted 2,000 tons or more annually. Specifically, Plant Wansley emitted 2,443 tons of SO₂ in 2014, and 2,931 tons in 2015. This source meets the DRR criteria and thus is on the SO₂ DRR Source list, and Georgia has chosen to characterize it via modeling.
- The Georgia Power – Plant Yates facility emitted 2,000 tons or more annually. Specifically, Plant Yates emitted 8,105 tons of SO₂ in 2014 and 3,330 tons in 2015. This source meets the DRR criteria and thus is on the SO₂ DRR Source list, and Georgia has chosen to characterize it via modeling.

- Several other sources are not on the DRR Source list, but were included in the modeling as nearby sources. The Municipal Electric Authority of Georgia (MEAG Power), Chattahoochee Energy, and Wansley Combined-Cycle Generating Plant emitted 3.5 tons, 6.5 tons, and 12.5 tons in 2014, respectively.

Because we have available results of air quality modeling in which these sources are modeled together, the area around this source is being addressed in this section with consideration given to the impacts of these sources.

In its submission, Georgia recommended that each county in the State be designated unclassifiable/attainment. Specifically, the State recommended that an area that includes the area surrounding the Plant Wansley facility source be designated as unclassifiable/attainment based on an assessment and characterization of air quality impacts from this facility and other nearby sources that may have a potential impact in the area where the 2010 SO₂ NAAQS may be exceeded. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing a mixture of actual and allowable emissions. After careful review of the State's assessment, supporting documentation, and all available data, the EPA agrees with the State's recommendation for the area, and intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

The area that the State has assessed via air quality modeling is located in the northeast portion of Heard County, extending into the northwest portion of Coweta County and the southern portion of Carroll County.

As seen in Figure 24 below, the Plant Wansley facility is located in Carrollton, Georgia approximately 44 miles southwest of Atlanta. Plant Wansley is located directly west of the Chattahoochee Bend State Park and the Chattahoochee River.

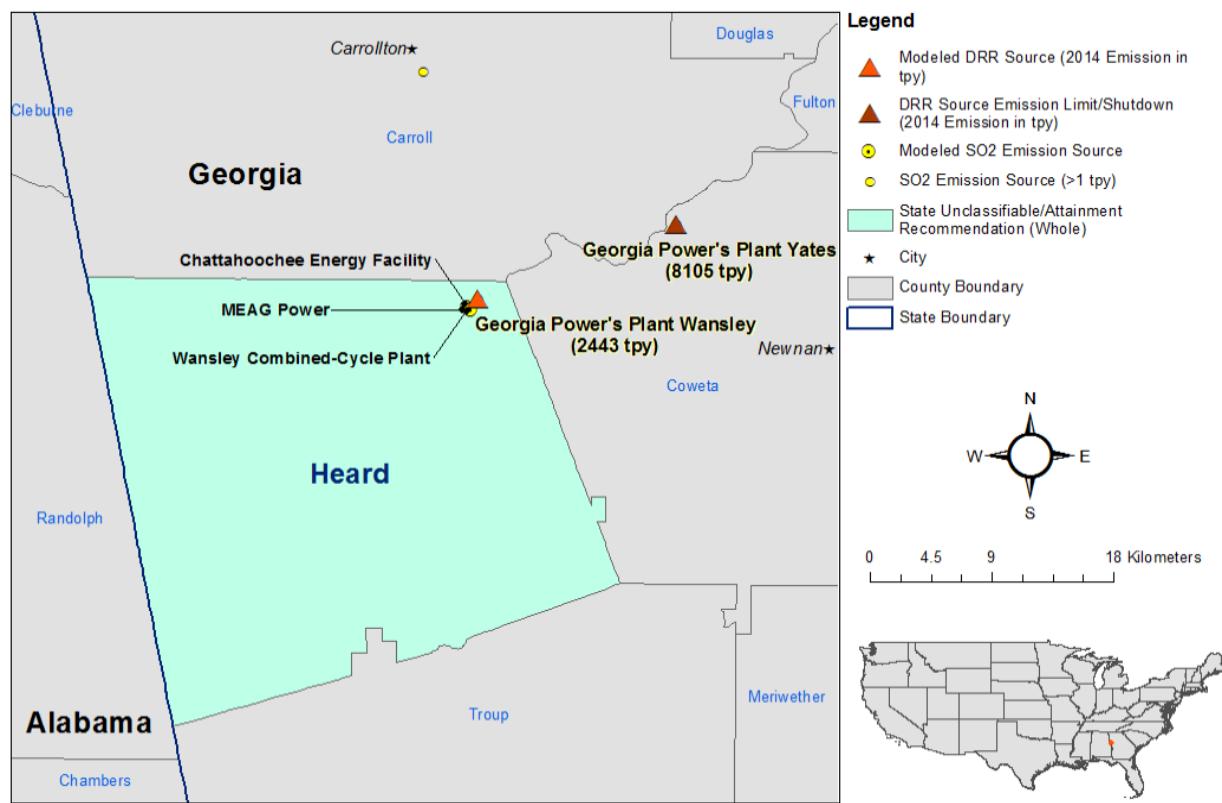
Also included in the figure are other nearby emitters of SO₂.¹⁴ There is only one emitter of more than 100 tpy of SO₂ within 50 km of Plant Wansley. This nearby source is another DRR source: Georgia Power's Plant Yates in Newnan, Georgia in Coweta County, located approximately 13.7 km northeast from Plant Wansley. Plant Yates has taken a limit as its pathway to satisfy the DRR. Units 1–5 at Plant Yates were permanently shut down on April 15, 2015, and units 6 and 7 were converted from coal-fired to natural gas-fired by the same date, in accordance with an April 29, 2014, title V permit revision to comply with the Mercury and Air Toxics Rule. The facility then added permit condition 3.2.1, restricting all fuel burning to natural gas, in its title V operating permit effective January 10, 2017. In the narrative to the January 27, 2015, title V revision application, the State shows the new PTE calculation for SO₂ emissions based on burning only natural gas as outlined in condition 3.2.1. Georgia decided to include Plant Yates, the nearest SO₂ source, in the modeling analysis. Because of the federally-enforceable changes at

¹⁴ All other SO₂ emitters of 1 tpy or more (based on information in the 2014 NEI, version 1) are shown in Figure 24. If no sources not named previously are shown, there are no additional SO₂ emitters above this emission level in the vicinity of the named source(s).

Plant Yates since the time period used for modeling at Plant Wansley, 2012–2014, this source is included in the modeling at its new federally-enforceable PTE.¹⁵ The other sources included in the modeling are MEAG Power, Chattahoochee Energy Facility, and Wansley Combined-Cycle Generating Plant, all located approximately 1 km southwest of Plant Wansley. These additional facilities are modeled at allowable emission rates.

Also included in the figure is the State's recommended area for the unclassifiable/attainment designation. The EPA's intended unclassifiable/attainment designation boundary for the Heard County area is not shown in this figure, but is shown in a figure in the section below that summarizes our intended designation.

Figure 24. Map of the Heard County Area Addressing Georgia Power's Plant Wansley.



The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered two related modeling assessments, including one assessment conducted by the State and one assessment conducted by other parties. The State submitted both of these modeling reports. To avoid confusion in referring to these assessments,

¹⁵ For more information, see Georgia's information submitted to satisfy the DRR, including the updated operating permit for Plant Yates, available at: <https://www.epa.gov/so2-pollution/so2-data-requirements-rule-january-13-2017-state-submittals-georgia>.

the following table lists them, indicates when they were received, provides an identifier for the assessment that is used in the discussion of the assessments that follow, and identifies any distinguishing features of the modeling assessments.

Table 18 – Modeling Assessments for the Heard County Area

Assessment Submitted by	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Georgia*	March 23, 2016	March 23, 2016 Georgia Power Protocol	
Georgia	June 17, 2016	June 17, 2016 Modeling Protocol Addendum	Georgia updated the Georgia Power protocol and submitted its own modeling report.
Georgia	September 27, 2016	September 27, 2016 Modeling Protocol Update	Georgia updated its Modeling Protocol Addendum nearby source inclusion.
Georgia**	November 18, 2016	November 18, 2016 Georgia Power Modeling Report	Georgia Power sent a modeling report to Georgia EPD.
Georgia	December 28, 2016	December 13, 2016 Modeling Report or Final Modeling Report	Georgia reviewed the Georgia Power Modeling Report and completed its own modeling assessment.

*Georgia forwarded this protocol prepared by Georgia Power dated March 23, 2016 to the EPA on June 17, 2016.

**Georgia forwarded this modeling report prepared by Georgia Power dated November 18, 2016 to the EPA on December 28, 2016.

6.3.2. Modeling Analysis Provided by the State

6.3.2.1. Differences Between and Relevance of the Modeling Assessments Submitted by the State
 Georgia originally commissioned a modeling protocol and evaluation from Georgia Power. The State forwarded the modeling protocol, dated March 23, 2016, to the EPA for review and concurrently conducted its own review. Georgia revised the Georgia Power Protocol in the June 17, 2016, Modeling Protocol Addendum, based on its review. Georgia included small additional justifications for the Addendum, including the addition of receptors along the facility fenceline and providing additional justification for meteorology and an updated background selection. Georgia subsequently updated its Modeling Protocol Addendum to respond to the EPA

comments by adjusting how impacts from Plant Yates are included. Georgia Power made use of the September 27, 2016, Modeling Protocol Update to conduct dispersion modeling, and submitted its assessment to Georgia EPD on November 18, 2016. Finally, the State reviewed the Georgia Power Modeling Report, and developed its own modeling report dated December 28, 2016, to satisfy the DRR. The December 28, 2016, Modeling Report made use of the most updated version of the modeling tool available at the time, while Georgia Power made use of an older version of the model, and therefore, small differences in the results are seen. The final report from the State is primarily used in this TSD, but details from the protocols or other report may be relevant to the EPA's assessment, and are mentioned accordingly wherever necessary.

6.3.2.2. Model Selection and Modeling Components

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

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

The State used AERMOD version 15181. A discussion of the State's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

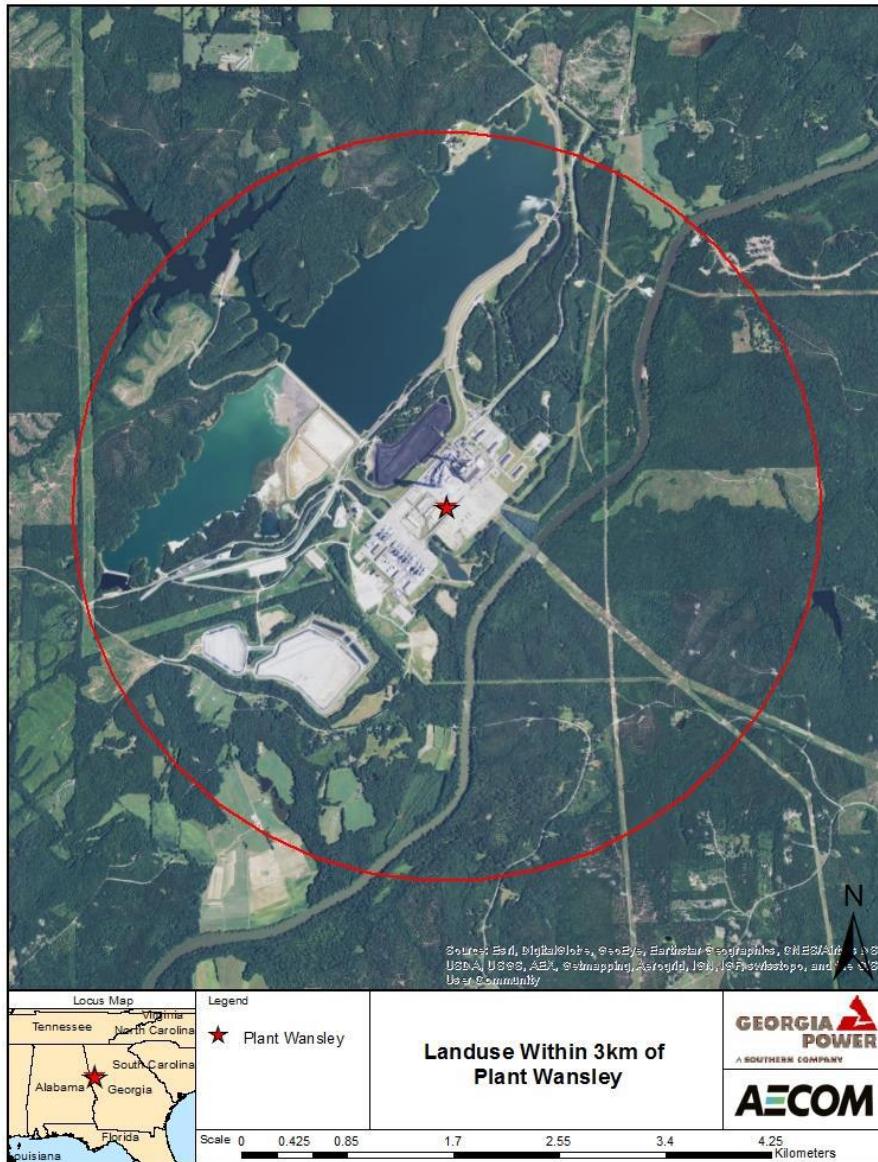
The current version of AERMOD, version 16216r, includes updates to 40 CFR part 51, Appendix W, "Guideline of Air Quality Models," published on January 17, 2017 (82 FR 5203). This version of AERMOD also includes fixes to bugs that were inadvertently included in version 16216. Georgia used the regulatory default settings for version 15181 available at the time of its modeling preparation and is not making use of any previously unapproved alternative modeling options included in version 16216r and the update to Appendix W.

6.3.2.3. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO₂ modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO₂ sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density. The EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 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.

The State analyzed the land use types within a 3 km radius from the center of Plant Wansley as shown in Figure 25 and determined that the area is predominantly rural. Therefore, for the purpose of performing the modeling for the area of analysis, the State determined that it was most appropriate to run the model in rural mode, and the EPA concurs with this assessment. For the purpose of performing the modeling for the area of analysis, Georgia determined that it was most appropriate to run the model with rural dispersion coefficients or rural mode and the EPA concurs with this assessment. The EPA agrees that the area surrounding the source can be classified as rural.

Figure 25 - Land Use Map for area around the Plant Wansley Facility. Source: “Modeling Protocol Wansley Steam Electric Generating Plant 1-hour SO₂ NAAQS Modeling,” prepared by AECOM for Georgia Power, March 23, 2016.



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

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO₂ emission sources or facilities considered for modeling; the extent of concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO₂ concentrations.

The sources of SO₂ emissions subject to the DRR in this area are described in the introduction to this section. For the Heard County area, the State has included Plant Wansley and four other emitters of SO₂ within 50 km in any direction. The State determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO₂ NAAQS exceedances in the area of analysis and any potential impact on SO₂ air quality from other sources in nearby areas. In addition to Plant Wansley, the other emitters of SO₂ included in the area of analysis, as identified above, are: MEAG Power, Chattahoochee Energy, Wansley Combined-Cycle Generating Plant, and Plant Yates. No other sources beyond 50 km were determined by the State to have the potential to cause concentration gradient impacts within the area of analysis.

The grid receptor spacing for the area of analysis chosen by the State is as follows, taken from the Modeling Protocol:

Receptor Locations – A comprehensive Cartesian receptor grid extending to approximately 20 km from the Plant Wansley in all directions was used in the AERMOD modeling analysis to assess ground-level SO₂ concentrations. The Cartesian receptors were placed according to the following configuration based on the center of the Plant Wansley:

- From the center of the plant out to a distance of 2,000 m at 100-m increments
- Beyond 2,000 m to 5,000 m at 250-m increments
- Beyond 5,000 m to 10,000 m at 500-m increments
- Beyond 10,000 m to 20,000 m at 1000-m increments.

The receptor network contained 7,096 receptors, and the network covered much of Heard County, western Coweta County and all but the northernmost portion of Carroll County.

Figures 26 and 27, included in the State's recommendation, shows the State's chosen area of analysis surrounding Plant Wansley, as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the State placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility, including other facilities' property. As shown above, the modeling assessment included receptors within the Plant Wansley, Plant Yates, MEAG Power, Chattahoochee Energy, and Wansley Combined-Cycle Generating Plant property boundaries and over water bodies to follow TAD recommendations or provide for the most conservative air characterization possible. The

receptors on plant properties an over water bodies do not include the max concentrations shown in this TSD.

Figure 26: Area of Analysis for the Heard County Area including Nearby Sources within 50 km of Plant Wansley. Source: “Plant Wansley Modeling Protocol Addendum,” prepared by Georgia, June 17, 2016.

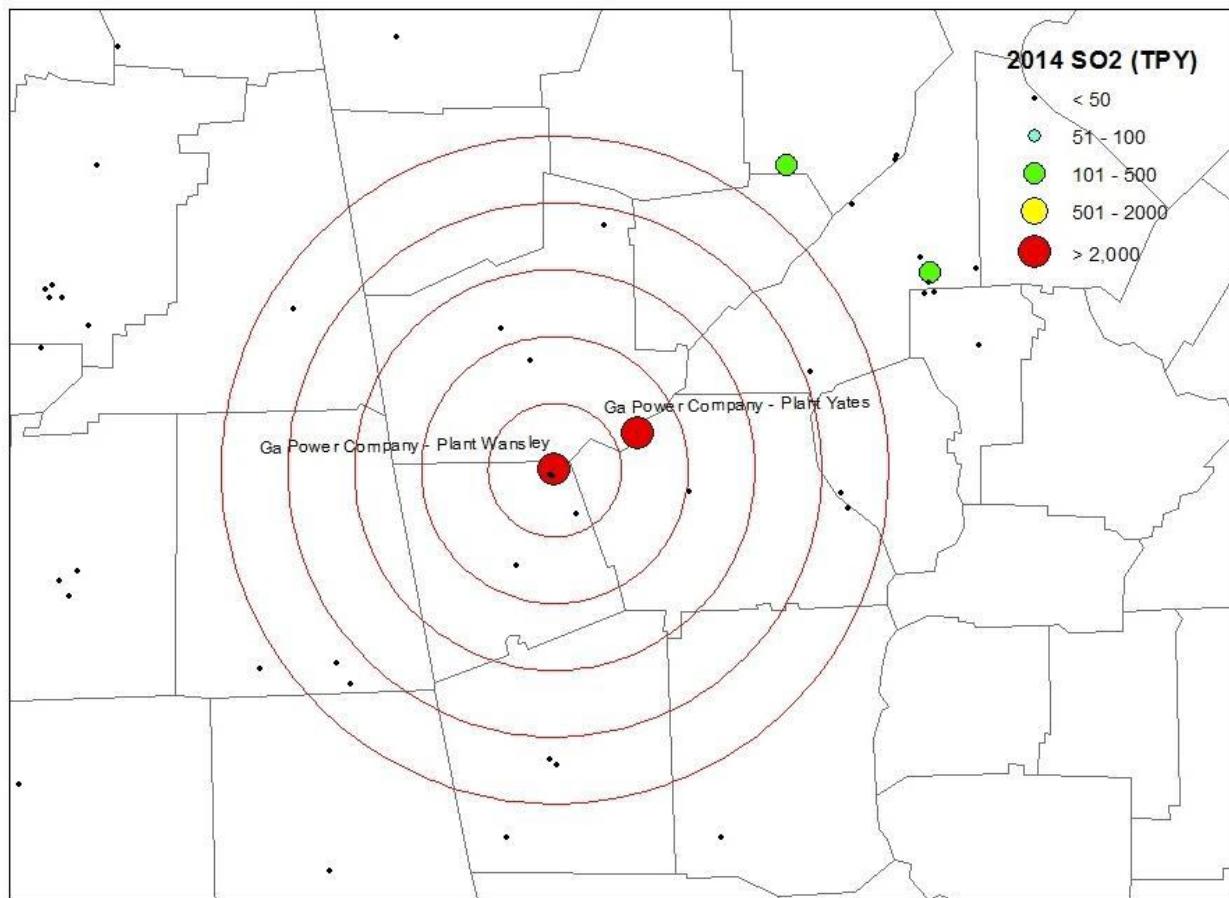
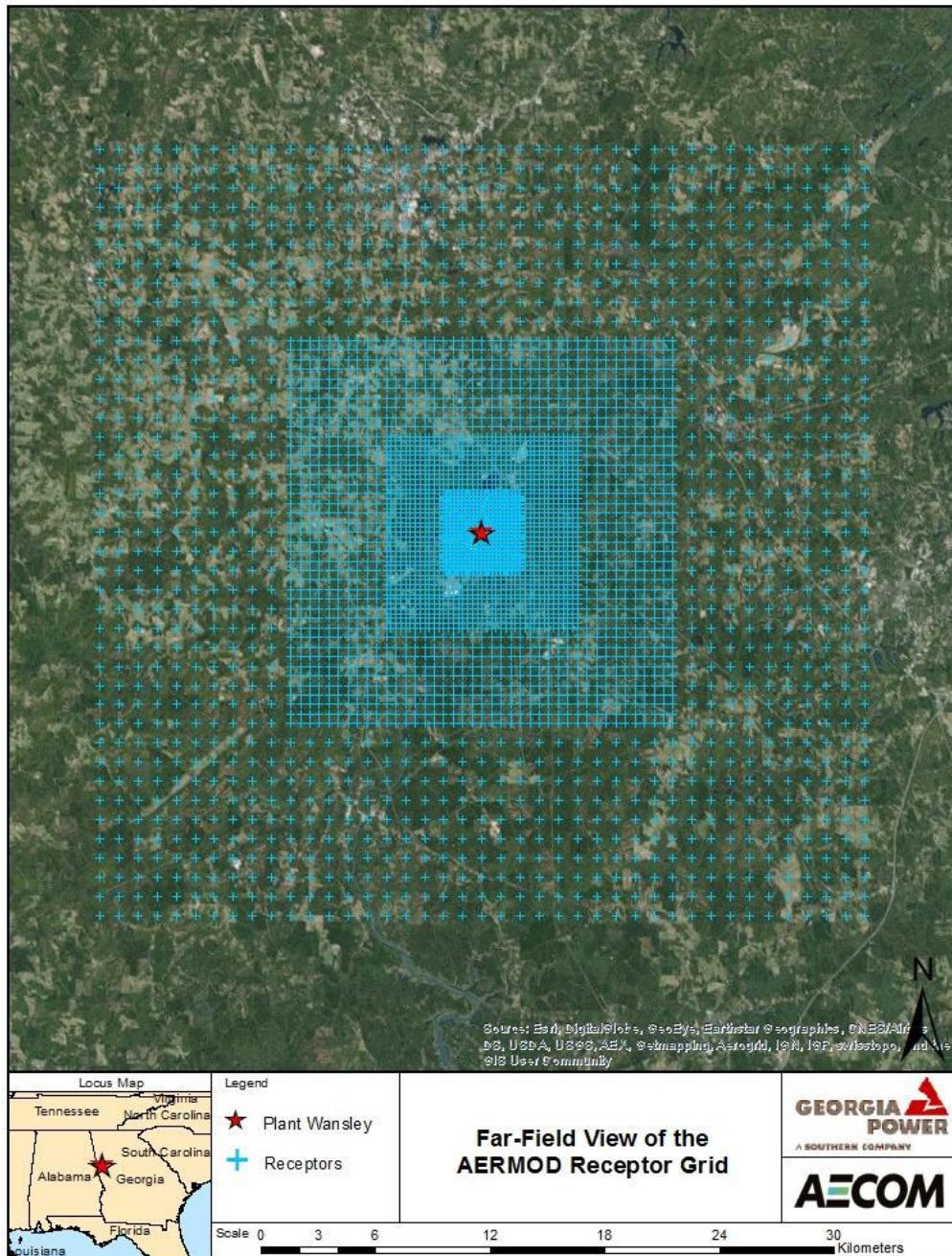


Figure 27: Receptor Grid for the Heard County Area. Source: “Modeling Protocol Wansley Steam Electric Generating Plant 1-hour SO₂ NAAQS Modeling,” prepared by AECOM for Georgia Power, March 23, 2016.



The EPA agrees with the State on the final receptor grid, which does not exclude any receptors in the 40 km x 40 km area of analysis. The final grid is consistent with the Modeling TAD, but above and beyond what is required by the Modeling TAD because it includes receptors that could have been excluded in a manner consistent with the TAD. The final receptor grid, therefore, can be expected to adequately characterize SO₂ impacts from the Plant Wansley facility as well as four other sources included in the modeling. The maximum predicted

concentration occurs within 3 km of the Plant Wansley facility which is within the 100-m receptor spacing area (See Figure 30).

6.3.2.5. *Modeling Parameter: Source Characterization*

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

Georgia's June 17, 2016, Modeling Protocol Addendum screened for potential nearby sources with the most current version of compiled emissions at the time of report preparation, the 2014 NEI, version 1. This addendum considered sources within 50 km, and showed only one source with reasonable possibility to impact the area with a Q/d over 20. The Plant Yates facility, 13.7 km northeast of Plant Wansley, emitted 8,105 tons in 2014. However, as discussed above, coal operations at the facility have shut down (retired unit exemptions confirmed per CAMD), and the source fires only natural gas. Therefore, Plant Yates was included in the modeling at its newer PTE to account for possible impacts. There are also three electric generating facilities within 1 km of Plant Wansley: MEAG Power, Chattahoochee Energy, Wansley Combined-Cycle Generating Plant all have low actual emissions (<15 tons emitted in 2014). Georgia decided to include these sources at PTE to estimate possible impacts in the Heard County area. All remaining nearby sources were shown to have small Q/d potential contributions. Accordingly, the State modeled Plant Wansley with the addition of these four facilities to explicitly characterize the Heard County area.

The State characterized these source 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 for Plant Wansley. The State followed the EPA's GEP policy in conjunction with allowable emissions limits for all off site sources. The State also adequately characterized building layouts and locations for Plant Wansley, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

The EPA agrees with Georgia's method for characterizing the area. The assessment of nearby sources within 50 km of Plant Wansley justify the explicit modeling of Plant Wansley at actual emissions, and Plant Yates, MEAG Power, Chattahoochee Energy, and Wansley Combined-Cycle Generating Plant with allowable emissions. The use of actual stack heights for Plant Wansley and GEP stack height calculations for offsite sources is appropriate given the mixed use of actual and allowable emissions. Building downwash is also appropriately accounted for.

6.3.2.6. *Modeling Parameter: Emissions*

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally-effective.

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

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally-enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO₂ emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a State should be able to find the necessary emissions information for designations-related modeling in the existing SO₂ emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, the State included Plant Wansley and four other emitters of SO₂ within 50 km in the area of analysis. For this area of analysis, 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. The facilities in the State's modeling analysis and their associated actual or PTE rates are summarized below.

For Plant Wansley, the State provided annual actual SO₂ emissions between 2012 and 2014. This information is summarized in Table 19. A description of how the State obtained hourly emission rates is given below this table.

Table 19. Actual SO₂ Emissions Between 2012 – 2015 from Facilities in the Area of Analysis for the Heard County Area

Facility Name	SO ₂ Emissions (tpy)			
	2012	2013	2014	2015
Georgia Power – Plant Wansley	2,102	1,197	2,443	2,931
Total Emissions from All Facilities in the Area of Analysis Modeled Based on Actual Emissions	2,102	1,197	2,443	2,931

For Plant Wansley, the actual hourly emissions data were obtained from CEMS certified according to 40 CFR Part 75. The EPA confirmed the sum of hourly emissions included in the modeling match the annual emissions listed in Table 19. For Plant Yates, Wansley Combined-Cycle Generating Plant, Chattahoochee Energy Facility and Municipal Electric Authority of Georgia, the State provided PTE values. This information is summarized in Table 20. A description of how the State obtained hourly emission rates is given below this table.

Table 20. SO₂ Emissions based on PTE from Facilities in the Area of Analysis for the Heard County Area

Facility Name	SO ₂ Emissions (tpy, based on PTE)
Plant Yates	18.4
Wansley Combined-Cycle Generating Plant	26.3
Chattahoochee Energy Facility	10.7
Municipal Electric Authority of Georgia (MEAG Power)	13.1
Total Emissions from Facilities in the Area of Analysis Modeled Based on PTE	68.5

The annual tpy for the above facilities was determined by the EPA by multiplying the maximum allowable hourly emission rates for each unit by 8,760 hours in a year. The December 28, 2016, Modeling Report says Georgia's online prevention of significant deterioration (PSD) modeling inventory database (<https://psd.georgiaair.org/inventory>) was used to determine PTE for the Wansley Combined-Cycle Generating Plant, Chattahoochee Energy Facility, and MEAG Power. For Plant Yates, Georgia used AP-42 emission factors for burning natural gas and the capacity limits for each turbine to determine PTE. Georgia EPD used emission factors and maximum heat generation at the rated capacity for equipment to determine maximum (PTE) rates in lb/hr. These rates were directly modeled by the State, assuming continuous operation at the maximum rated capacity throughout the three years modeled. Plant Yates shut down units 1 – 5 at its facility, and completed converting units 6 and 7 to natural gas, by April 15, 2015. The title V operating permit dated August 29, 2014 details these changes at the facility, and the updated permit dated January 10, 2017 puts a condition in place such that only natural gas can be burned at the facility. Emissions were assumed to be the same in each modeled year. For units 1 – 5, Plant Yates submitted retired unit exemption forms to the EPA under the Acid Rain, Clean Air Interstate Rule, and Cross-State Air Pollution Rule programs. Therefore, these units are permanently and enforceably shut down.

The EPA agrees with Georgia's use of actual emissions for Plant Wansley, and with the use of PTE for Plant Yates, MEAG Power, Chattahoochee Energy, and Wansley Combined-Cycle Generating Plant. However, to evaluate whether the 2012-2014 emissions are appropriate for the modeling, the EPA considered the 2015 emissions in the CAMD database. Plant Wansley emissions increased to 2,931 tons in 2015 and 4,856 tons in 2016. This is an increase from 2012 to 2015 of approximately 39 percent. Yet the final modeling results (see Section 6.3.2.10) indicate a maximum 1-hour SO₂ concentration of only 15 ppb which represents only 20 percent of the NAAQS. Therefore, the EPA expects that the NAAQS would still be attained if the modeling was re-run using hourly emissions data from 2014-2016 instead of 2012-2014.

6.3.2.7. Modeling Parameter: Meteorology and Surface Characteristics

As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological

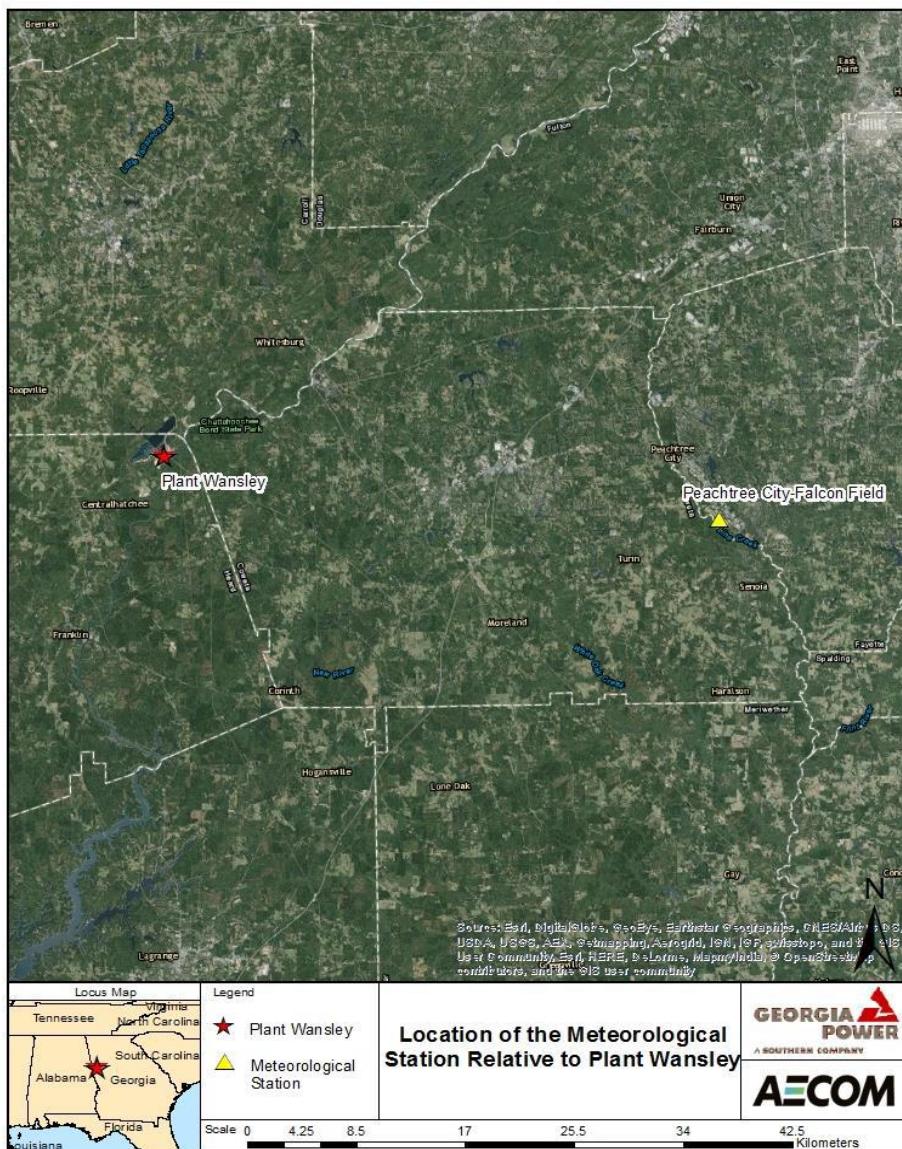
monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include NWS stations, site-specific or onsite data, and other sources such as universities, FAA, and military stations.

For the area of analysis for the Heard County area, the State selected the surface meteorology from the Peachtree City – Falcon Field Airport NWS station in Peachtree City, Georgia located at Latitude 33.355 N, Longitude 84.567 W and coincident upper air observations from the same NWS station as best representative of meteorological conditions within the area of analysis. AERSURFACE output files have not been provided by Georgia, so we are not able to confirm the coordinates that were used to calculate the surface roughness, albedo and Bowen ratio surface characteristics

The State used AERSURFACE version 13016 using data from the Peachtree City, Georgia NWS station to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness [z_0]) of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space, the Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance, and the surface roughness is sometimes referred to as “ z_0 ” The state estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions.

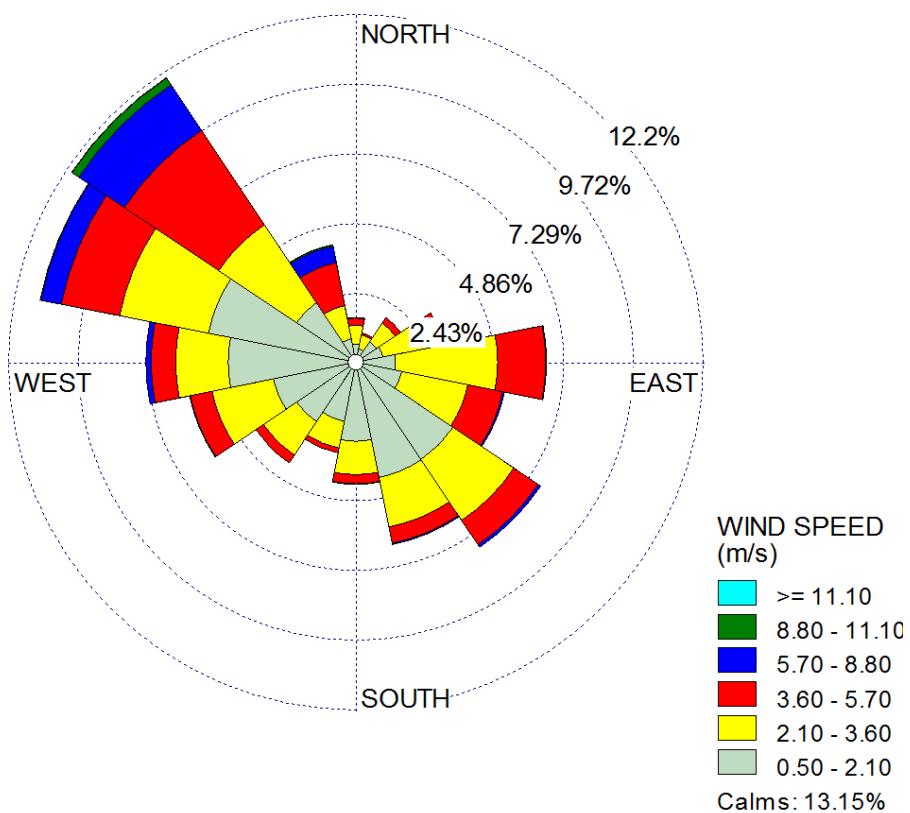
In the figure below, included in the March 23, 2016, Modeling Protocol, the location of this NWS station is shown relative to the area of analysis.

Figure 28. Area of Analysis and the NWS station in the Heard County Area



As part of its recommendation, the State provided the 3-year surface wind rose for the Peachtree City, Georgia NWS station. In Figure 29, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Analysis of the NWS data indicates wind blow predominately from the west, northwest and southeast directions.

Figure 29: Peachtree City, Georgia Cumulative Annual Wind Rose for Years 2012 – 2014.
 Source: “GA EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia Power - Plant Wansley,” prepared by Georgia, December 28, 2016.



Meteorological data from the above surface and upper air NWS 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 accordance with the AERMOD Implementation Guide 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 1-minute duration was provided from Peachtree City, Georgia NWS station, 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 m/s in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA believes the meteorology and surface characteristics used in the State's modeling are acceptable. The meteorology in the final modeling report made use of the Peachtree City, Georgia, NWS surface and upper air data. Georgia complied with the EPA guidance in developing its modeling parameters.

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

The terrain in the area of analysis is best described as simple to 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 USGS 1-sec NED.

The EPA has determined that the surface characteristics selected can adequately represent the area and the modeling domain. We also agree with the State's use of AERMAP version 11103 to obtain the elevations of sources, buildings and receptors.

6.3.2.9. Modeling Parameter: Background Concentrations of SO₂

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO₂ that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the State elected to use the "tier 1" approach. Design values were obtained using 2013-2015 data for AQS Site: 13-089-0002 (South DeKalb). The total SO₂ emissions within 20 km from Plant Wansley (excluding Plant Yates which was explicitly modeled) is 28.6 tpy and the total SO₂ emissions within 20 km of the South DeKalb SO₂ monitor is 1,017 tpy. Therefore, the 3-year design value from the South DeKalb SO₂ monitor will likely provide an over-estimate estimate of background SO₂ concentrations near Plant Wansley. The single value of the background concentration for this area of analysis was determined by the State to be 13.1 µg/m³, equivalent to 5 ppb when expressed in 1 significant figure,¹⁶ and that value was incorporated into the final AERMOD results.

¹⁶ The SO₂ NAAQS level is expressed in ppb but AERMOD gives results in µg/m³. The conversion factor for SO₂ (at the standard conditions applied in the ambient SO₂ reference method) is 1ppb = approximately 2.619 µg/m³.

The EPA agrees that Georgia adequately accounted for background, in accordance with the Modeling TAD. The State made use of the design value from the nearby South DeKalb SO₂ monitor for the 2013-2015 period and this is consistent with the TAD.

6.3.2.10. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Heard County area of analysis are summarized below in Table 21.

Table 21: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Heard County Area

Input Parameter	Value
AERMOD Version	15181 (regulatory default)
Dispersion Characteristics	Rural
Modeled Sources	5
Modeled Stacks	11
Modeled Structures	3
Modeled Fencelines	0
Total receptors	7,096
Emissions Type	Mixed
Emissions Years	2012-2014
Meteorology Years	2012-2014
NWS Station for Surface Meteorology	Peachtree City, GA
NWS Station Upper Air Meteorology	Peachtree City, GA
NWS Station for Calculating Surface Characteristics	Peachtree City, GA
Methodology for Calculating Background SO ₂ Concentration	Tier 1 approach based on 2013 – 2015 design value from AQS site: 13-089-0002.
Calculated Background SO ₂ Concentration	13.1 µg/m ³

The results presented below in Table 22 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

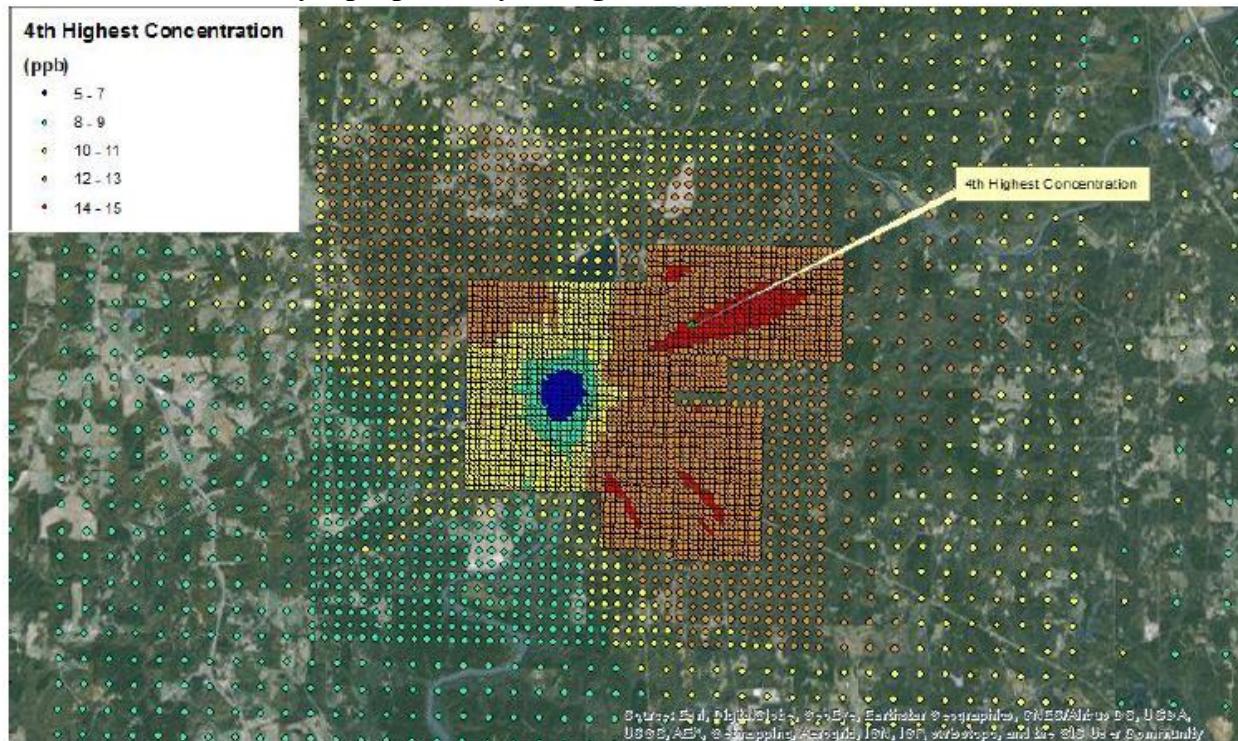
Table 22. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Heard County Area

Averaging Period	Data Period	Receptor Location		99 th percentile daily maximum 1-hour SO ₂ Concentration (µg/m ³)	
		Latitude (Deg. N)	Longitude (Deg. W)	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2012-2014	33.4238	-85.0080	38.3	196.4*

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

The State's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 38.3 $\mu\text{g}/\text{m}^3$, equivalent to 15 ppb. This modeled concentration included the background concentration of SO₂, and is based on a mixture of actual and PTE emissions from the facilities. Figure 30 below was included as part of the State's recommendation, and indicates that the predicted value occurred 2-3 km northeast of Plant Wansley. The State's receptor grid is also shown in the figure.

Figure 30: Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Area of Analysis for the Heard County Area. Source: “GA EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia Power - Plant Wansley,” prepared by Georgia, December 28, 2016.



The modeling submitted by the State does not indicate that the 1-hour SO₂ NAAQS is violated at the receptor with the highest modeled concentration.

6.3.2.11. The EPA’s Assessment of the Modeling Information Provided by the State
The EPA agrees with Georgia’s methodology for modeling to characterize SO₂ impacts in the Heard County area. The EPA believes the modeling domain is appropriate to capture predicted maximum impacts in the Heard County area. Georgia’s selection of meteorology and surface characteristics and background monitor concentrations for the area are also appropriate to make a valid modeling demonstration. The State chose to use actual emissions to reflect normal operation of the Plant Wansley source. We believe these decisions are appropriate for the purpose of this modeling demonstration.

In addition, based on the available information for the remaining areas in Georgia, including monitoring and modeling, there are no current SO₂ nonattainment areas near Heard County, Georgia, and no expected nonattainment areas for this third round of designations. In addition, there are no nearby areas for which designations are expected to be deferred until December 31, 2020. Therefore, the Heard County area is not expected to contribute to ambient air quality in a nearby area that does not meet the NAAQS.

The State made use of AERMOD version 15181, the most recent version available at the time the modeling was conducted. The EPA agrees that this model version is appropriate to characterize the area because the State made use of default regulatory options and any updates to the model are not expected to change any of the predicted SO₂ impacts.

The EPA notes that the emissions from the Plant Wansley facility in 2015 increased approximately 829 tpy over the emissions in 2012. This is an increase from 2012 (2015 emissions are approximately 39 percent higher than 2012 emissions). Yet the final modeling results (see Section 6.2.2.10) indicate a maximum 1-hour SO₂ concentration of only 15 ppb which represents only 20 percent of the NAAQS. Therefore, the EPA expects that the NAAQS would still be attained if the modeling was re-run using hourly emissions data from 2014-2016 instead of 2012-2014.

6.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Heard County Area

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

6.5. Jurisdictional Boundaries in the Heard County Area

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

The modeling domain extends to a square of 40 km by 40 km, and covers much of Heard, Carroll, and Coweta Counties. The domain extends into the southern portion of Douglas and Fulton Counties, the northern portions of Troup and Meriwether Counties, and also covers the eastern portions of Randolph and Cleburne Counties in neighboring in Alabama. There is only one other major source for SO₂ within the domain, Plant Yates, and it is explicitly modeled.

6.6. The EPA's Assessment of the Available Information for the Heard County Area

The EPA intends to designate the Heard County area, including the entire County boundary, as unclassifiable/attainment. We believe that Georgia's modeling analysis supports the conclusion that there are no expected violations of the 2010 SO₂ NAAQS in the area. There is no current monitoring data available for the area, so the modeling serves to reflect the air quality expected in the years modeled. In addition, based on the available information for the remaining areas in Georgia and nearby Alabama, including monitoring and modeling, there are no current SO₂ nonattainment areas near Heard County, Georgia, and no expected nonattainment areas for this third round of designations. Furthermore, the area of maximum concentration is expected within 3 km of the Plant Wansley facility. Therefore, the Heard County area is not expected to contribute to ambient air quality in a nearby area that does not meet the NAAQS.

The EPA notes that the emissions from the Plant Wansley facility in 2015 increased approximately 829 tpy over the emissions in 2012. This is an increase from 2012 (2015 emissions are approximately 39 percent higher than 2012 emissions). Yet the final modeling results (see Section 6.2.2.10) indicate a maximum 1-hour SO₂ concentration of only 15 ppb which represents only 20 percent of the NAAQS. Therefore, the EPA does not expect that if modeling were re-run using hourly emissions data from 2013-2015 that the NAAQS would be violated. Therefore, the EPA agrees with Georgia's conclusion that there are not modeled violations of the 1-hour SO₂ NAAQS.

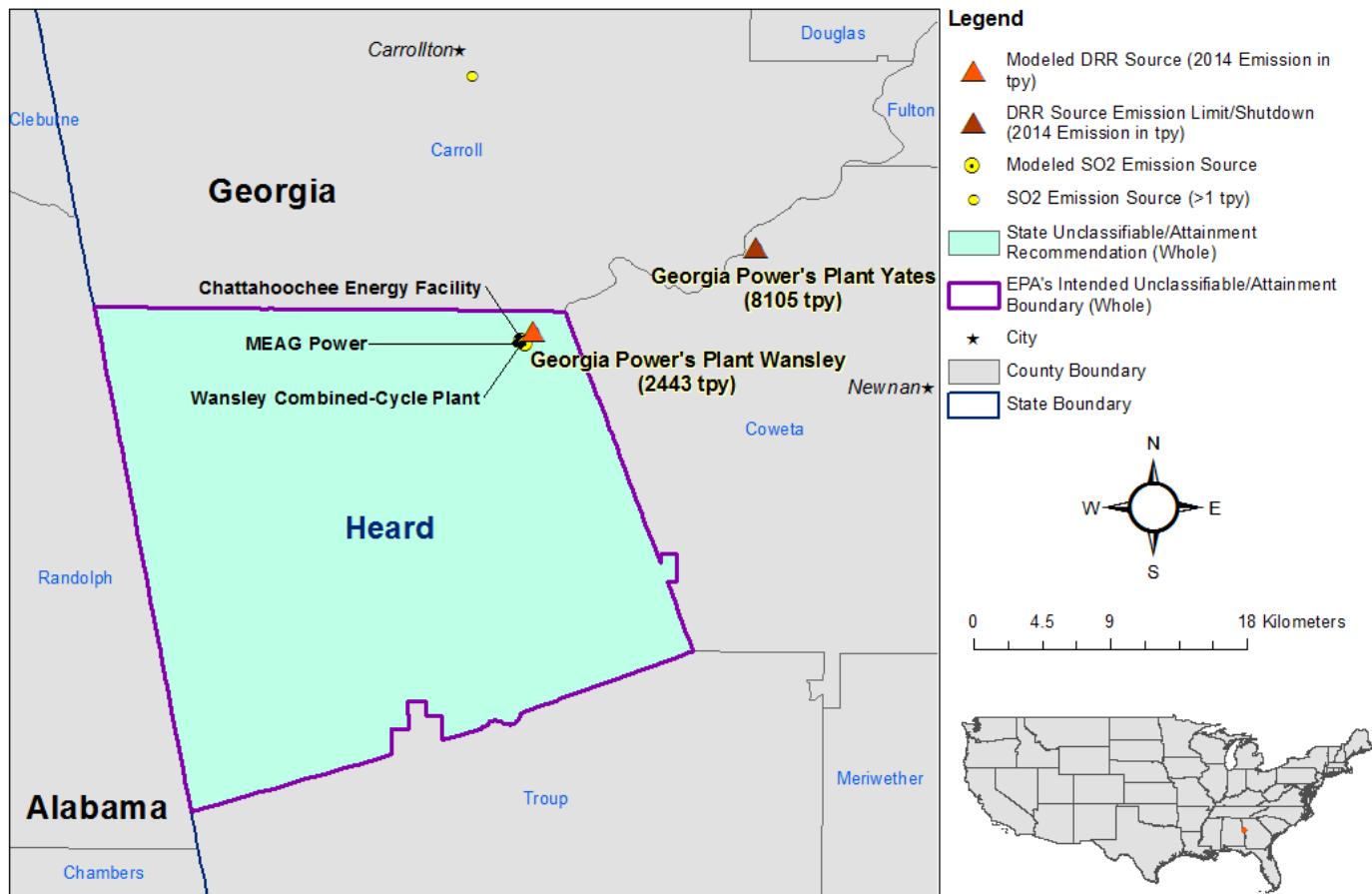
After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the area around Plant Wansley as unclassifiable/attainment for the 2010 SO₂ NAAQS. Specifically, the boundary is comprised of the entirety of Heard County. There are no remaining portions of Heard County to be characterized in the EPA's Round 4 of designations in 2020, nor are there any other portions of the County that have a separate area of analysis for Round 3.

The EPA believes that our intended unclassifiable/attainment area, bounded by the Heard County boundary, will have clearly defined legal boundaries, and we intend to find this boundary to be a suitable basis for defining our intended unclassifiable/attainment area.

6.7. Summary of Our Intended Designation for the Heard County Area

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the Heard County area as unclassifiable/attainment for the 2010 SO₂ NAAQS because the EPA has determined the area meets the 2010 SO₂ NAAQS and does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundary is comprised of the entirety of Heard County. Figure 31 shows the boundary of this intended designated area.

Figure 31. Boundary of the Intended Heard County Unclassifiable/Attainment Area



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 intends in a separate action to evaluate and designate all remaining undesignated areas in Georgia by December 31, 2020.

7. Technical Analysis for Remaining areas in Georgia

7.1. Introduction

In its May 31, 2011, recommendations, Georgia recommended that all counties be designation unclassifiable/attainment and that no areas be designated as nonattainment. This assessment and characterization is based on analysis of emissions and air quality monitoring data in the counties and surrounding areas except for those listed in Table 2 for which the EPA intends to designate by December 31, 2020. After careful review of the State's assessment, supporting documentation, and all available data, the EPA intends to designate the remaining counties in Georgia as unclassifiable/attainment because the remaining areas in the State were not required to be characterized under 40 CFR 51.1203(c) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.¹⁷ Therefore, the EPA is designating the remaining counties in Table 23 in the State as unclassifiable/attainment.¹⁸

Georgia installed and began operation of a new, approved SO₂ monitoring network by January 1, 2017 for only one DRR source (see Table 2). Accordingly, the EPA must designate the remaining counties by December 31, 2017. The EPA is designating the counties in Table 23 in the State as "unclassifiable/attainment."

Table 23. Counties that the EPA Intends to Designate Unclassifiable/Attainment

County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Appling County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Atkinson County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Bacon County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Baker County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Baldwin County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Banks County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Barrow County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment

¹⁸ This table excludes those counties that were designated unclassifiable in Round 2. These counties, Butts, Crawford, Jasper, Jones, Lamar, Monroe and Upson, were designated unclassifiable/attainment as part of the Juliette Area in association with Plant Scherer.

County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Ben Hill County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Berrien County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Bibb County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Bleckley County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Brantley County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Brooks County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Bryan County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Bulloch County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Burke County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Calhoun County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Camden County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Candler County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Carroll County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Catoosa County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Charlton County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Chattahoochee County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Chattooga County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Cherokee County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Clarke County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Clay County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Clayton County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment

County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Clinch County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Cobb County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Coffee County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Colquitt County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Columbia County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Cook County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Coweta County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Crisp County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Dade County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Dawson County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Decatur County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
DeKalb County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Dodge County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Dooly County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Dougherty County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Douglas County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Early County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Echols County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Elbert County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Emanuel County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Evans County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment

County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Fannin County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Fayette County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Forsyth County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Franklin County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Fulton County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Gilmer County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Glascock County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Glynn County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Gordon County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Grady County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Greene County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Gwinnett County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Habersham County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Hall County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Hancock County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Haralson County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Harris County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Hart County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Henry County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Houston County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Irwin County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment

County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Jackson County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Jeff Davis County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Jefferson County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Jenkins County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Johnson County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Lanier County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Laurens County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Lee County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Liberty County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Lincoln County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Long County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Lowndes County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Lumpkin County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Macon County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Madison County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Marion County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
McDuffie County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
McIntosh County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Meriwether County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Miller County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Mitchell County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment

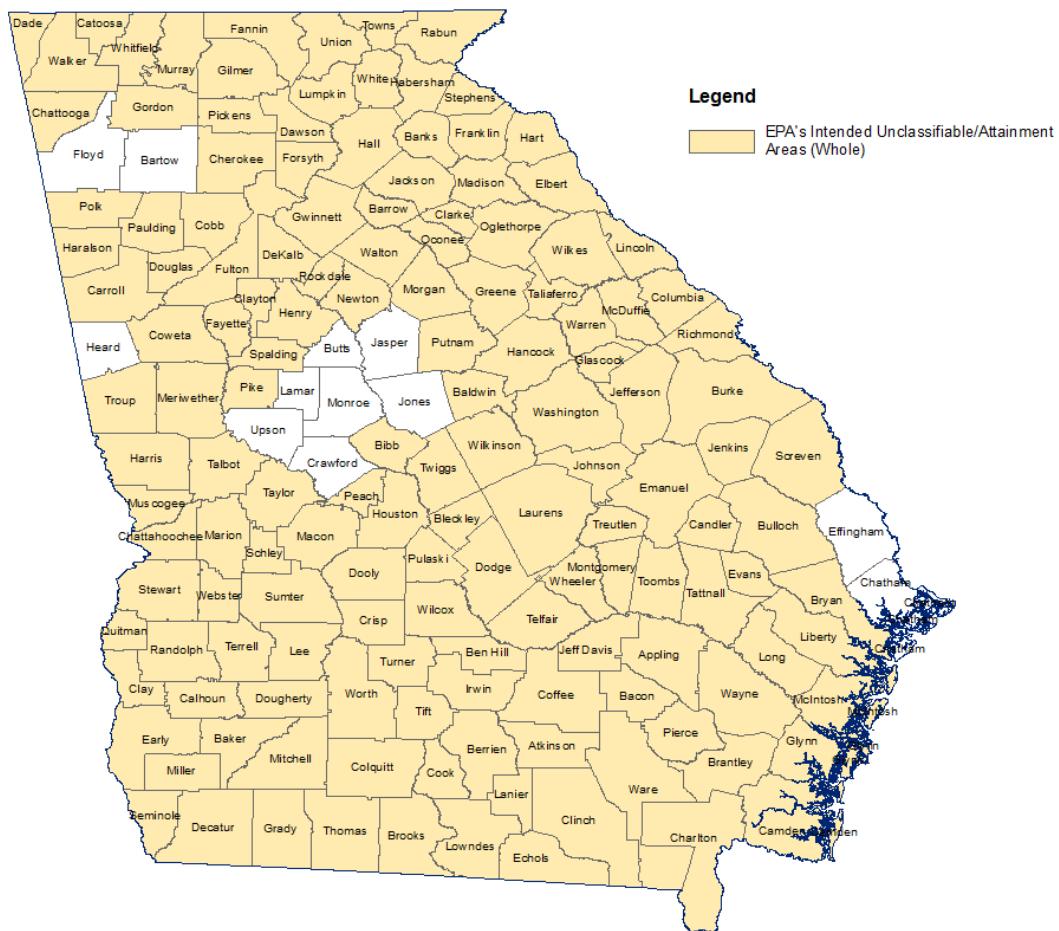
County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Montgomery County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Morgan County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Murray County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Muscogee County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Newton County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Oconee County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Oglethorpe County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Paulding County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Peach County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Pickens County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Pierce County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Pike County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Polk County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Pulaski County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Putnam County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Quitman County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Rabun County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Randolph County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Richmond County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Rockdale County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Schley County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment

County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Screven County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Seminole County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Spalding County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Stephens County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Stewart County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Sumter County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Talbot County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Taliaferro County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Tattnall County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Taylor County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Telfair County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Terrell County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Thomas County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Tift County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Toombs County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Towns County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Treutlen County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Troup County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Turner County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Twiggs County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment
Union County	Entire county	Unclassifiable/ attainment	Same as state's	Unclassifiable/ attainment

County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Area Definition	The EPA's Intended Designation
Walker County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Walton County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Ware County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Warren County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Washington County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Wayne County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Webster County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Wheeler County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
White County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Whitfield County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Wilcox County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Wilkes County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Wilkinson County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment
Worth County	Entire county	Unclassifiable/attainment	Same as state's	Unclassifiable/attainment

Table 23 also summarizes Georgia's recommendations for these areas. Specifically, the State recommended that all aforementioned counties in the State be designated as unclassifiable/attainment based on the lack of any information indicating a violation of the 2010 1-hour SO₂ NAAQS. After careful review of the State's assessment, supporting documentation, and all available data, the EPA agrees with the State's recommendation for these areas, and intends to designate the areas as unclassifiable/attainment for the reasons specified above. Figure 32 shows the locations of these areas within Georgia.

Figure 32. The EPA's Intended Unclassifiable/Attainment Designations for Counties in Georgia Based on Available of Information



As referenced in the Introduction (see Table 2), the counties associated with sources for which Georgia has installed and begun timely operation of a new, approved SO₂ monitoring network are required to be designated by December 31, 2020, but are not being addressed at this time. Counties previously designated unclassifiable in Round 1 (*see 78 Federal Register 4719*) and Round 2 (*see 81 Federal Register 45039*) will remain unchanged unless otherwise noted.

7.2. Air Quality Monitoring Data for the Remaining Areas in Georgia

AQS monitors identified in Table 24 below, located in several of the remaining undesignated Counties have sufficient valid data for 2014–2016, and these data do not indicate any violations of the 2010 SO₂ NAAQS at the monitoring sites in that period though the EPA does not currently have available information to support that the monitors are located in maximum concentration for each area. However, no DRR sources are located near these monitors, nor in these Counties, and the EPA has no other relevant data such as modeling, for these areas. Accordingly, the EPA has determined that the intended designation of unclassifiable/attainment is appropriate.

Table 24. Monitoring Data for Counties that the EPA Intends to Designate Unclassifiable/Attainment¹⁹

County	AQS ID	Latitude	Longitude	2014-2016 Design Value (ppb)
Bibb	13-021-0012	32.80540788	-83.54352078	9
DeKalb	13-089-0002	33.68797	-84.29048	14
Fulton	13-121-0055	33.7201924	-84.35705616	6
Richmond	13-245-0091	33.433349	-82.022217	60

7.3. Jurisdictional Boundaries in Remaining areas in Georgia

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

Georgia recommended that all counties be designated as unclassifiable/attainment. The EPA intends to designate all counties individually based on the existing county boundaries.

Muscogee County along Georgia's western border with Alabama is within 1 km of a DRR source in Russell County, Alabama: Continental Carbon Company's Phoenix City Plant. Additionally, Camden County along Georgia's coast and southern border with Florida is within 3.3 km of a DRR source in Nassau County, Florida: WestRock CP's Fernandina Beach Mill. Finally, Echols County along Georgia's southern border with Florida is within 17.8 km of a DRR source in Hamilton County, Florida: White Spring Agricultural Chemicals' Swift Creek Complex. The modeling to characterize the Alabama DRR source and the two Florida DRR sources in counties neighboring Georgia show no SO₂ impacts that would indicate a violation of the NAAQS in the Georgia counties. See the technical support documents for those states for

¹⁹ For more information, see Georgia EPD's December 29, 2016, letter addressed to EPA Region 4 available at: <https://www.epa.gov/so2-pollution/so2-data-requirements-rule-january-13-2017-state-submittals-georgia>.

more information. This further supports our intended designation of unclassifiable/attainment for these three counties in Georgia.

7.4. The EPA's Assessment of the Available Information for Remaining Areas in Georgia

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the areas in the above Table 23 as unclassifiable/attainment for the 2010 SO₂ NAAQS. These counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. These counties therefore meet the definition of an "unclassifiable/attainment" area.

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

There are no current monitoring data available for the vast majority of the remaining counties. Five of the 151 undesignated counties in Georgia had sufficient valid monitoring data, as indicated in Section 7.2, but have not been demonstrated to be located in maximum concentrations for their respective areas. One additional monitor with valid data for the 2013 – 2015 time period is located in Floyd County. As discussed in Section 1 of this document, Floyd County is being designated in Round 4. The data for Bibb, DeKalb, Fulton, and Richmond Counties show design values well below the NAAQS. Furthermore, these areas do not have any DRR sources. Therefore, this SO₂ data does not conflict with the EPA's intended unclassifiable/attainment designation for these counties. The data for Chatham County does not conflict with the modeling demonstration done for the area surrounding International Paper – Savannah discussed in Section 3, on which the EPA is basing its intended unclassifiable/attainment designation

Based on the any available information for the remaining counties, including the four counties with valid SO₂ data, the State concluded that these counties should be designated as unclassifiable/attainment. This recommendation is based on Georgia's assessment that no evidence of SO₂ impacts leading to violations of the 2010 SO₂ NAAQS is available. No remaining undesignated counties have DRR sources within their boundaries except for those which have imposed federally-enforceable limitations on PTE or have permanently shut down.

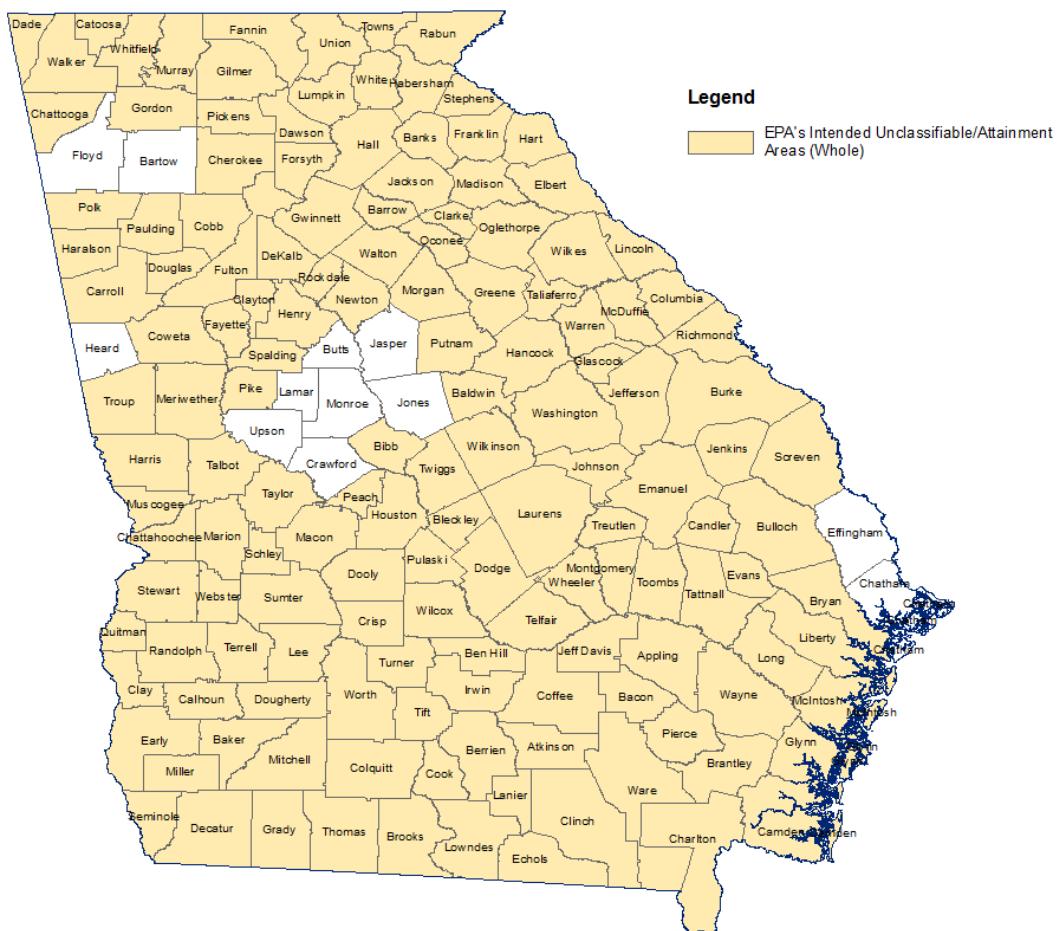
The EPA agrees with the State's recommendation for these remaining areas. We believe the available information supports our intended unclassifiable/attainment designation. In addition, based on the available information for the remaining areas in Georgia and nearby South Carolina, Alabama, and Florida, including monitoring and modeling, there are no current SO₂ nonattainment areas near these remaining counties in Georgia, and no expected nonattainment areas for this third round of designations. Therefore, the remaining areas in Georgia are not expected to contribute to ambient air quality in any nearby areas that do not meet the NAAQS.

7.5. Summary of Our Intended Designation for Remaining areas in Georgia

After careful evaluation of the State's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate all other counties as unclassifiable/attainment for the 2010 SO₂ NAAQS. Specifically, the boundaries are comprised of existing county boundaries for the 147 counties neither designated in July 2016, selected for designation by air quality data in 2020, nor modeled and discussed in other sections of this document. Figure 32 above shows the location of these areas within Georgia.

For these other counties the boundaries of the unclassifiable/attainment areas are the county boundaries. The boundaries for exceptions to this are described below. Figure 33 shows the boundary of intended unclassifiable/attainment area.

Figure 33. Boundary of the Intended Unclassifiable/Attainment Areas in Georgia



At this time, our intended designations for the State only apply to these areas and the other areas presented in this TSD. The EPA intends to evaluate and designate all remaining undesignated areas in Georgia by December 31, 2020.