Technical Support Document:

Chapter 10
Final 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 (SO_2) primary national ambient air quality standard (NAAQS) (2010 SO_2 NAAQS). Our Notice of Availability (NOA)[1] and our Technical Support Document (TSD) [2] for our intended designations for the round of designations we are required to complete by December 31, 2017, provided background on the relevant CAA definitions and the history of the designations for this NAAQS. Chapter 1 of this TSD for the final designations explains the definitions we are applying in the final designations. The TSD for the intended Round 3 area designations also described Georgia's recommended designations, assessed the available relevant monitoring, modeling, and any other information, and provided our intended designations.

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

On September 27, 2017, GA EPD submitted additional information in the form of a revised modeling analysis for the Bartow County area surrounding the Georgia Power Company Plant

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

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

Bowen facility. The information is in response to EPA's August 22, 2017 intended designations related to air dispersion modeling issues identified in the intended designations TSD (modeling of past 3-years of actual emissions). Additionally, on November 2, 2017, EPD provided additional clarification on the calculation of background concentration for a nearby source.[3] Based on review of new technical information from the State, the EPA is revising its intended designations for Bartow County from unclassifiable to attainment/unclassifiable. EPA's rationale for this final designations is presented below in section 2.

For the areas in Georgia that are part of the Round 3 designations process, Table 1 below lists Georgia's current recommendations and EPA's final designations for the counties or portions of counties that the EPA is designating in order to meet the December 31, 2017, court-ordered deadline. These final designations are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above. Table 3 shows that Georgia submitted new information for the Bartow County area surrounding Plant Bowen in response to the EPA's September 5, 2017, NOA and the accompanying TSD. EPA notes the additional information submitted by GA EPD on September 27, 2017 did not include changes to the state's designation recommendation.

Table 1 - Summary of the EPA's Final Designations and the Designation Recommendations by Georgia

Area/ County	Georgia's Recommended Area Definition	Georgia's Recommended Designation	The EPA's Intended Designation	The EPA's Final Area Definition	The EPA's Final Designation[4]
Chatham County Area	Chatham County	Unclassifiable/ Attainment	Unclassifiable/ Attainment	Same as State's	Attainment/ Unclassifiable
Bartow County Area	Bartow County	Unclassifiable/ Attainment	Unclassifiable	Same as State's	Attainment/ Unclassifiable

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[3] GA EPD also provided a supplemental email to EPA on November 2, 2017 further clarifying how the agency calculated the background concentration to account for the impacts from the nearby source Chemical Product Corporation. Email from Yunhee Kim, GEPD to Katherine Walther, EPA Region, APTMD.

[4] Refer to Chapter 1 of Technical Support Document: Final Round 3 Area Designations for the 2010 1-Hour SO$_2$ Primary National Ambient Air Quality Standard for definitions of the designation categories and the terminology change from Unclassifiable/Attainment to Attainment/Unclassifiable.

Effingham County Area	Effingham County	Unclassifiable/ Attainment	Unclassifiable/ Attainment	Same as State's	Attainment/ Unclassifiable
Heard County Area	Heard County	Unclassifiable/ Attainment	Unclassifiable/ Attainment	Same as State's	Attainment/ Unclassifiable
*Rest of the State	Rest of the State	Unclassifiable/ Attainment	Unclassifiable/ Attainment	Same as State's	Attainment/ Unclassifiable

* Except for areas that are associated with sources for which Georgia elected to install and timely began operation of a new SO_2 monitoring network meeting EPA specifications referenced in EPA's SO_2 DRR (see Table 2 below). These areas that we intend to designate as attainment/unclassifiable (those to which this row of this table is applicable) are identified more specifically in Section 7 of Chapter 10 (addressing Georgia) of the TSD for our intended designations.

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

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

Area	Source(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.

The EPA is designating all other counties listed in Table 3 as attainment/unclassifiable for the 2010 SO_2 NAAQS. Specifically, the boundaries are comprised of existing county boundaries.

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

2.1. 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 SO_2 monitoring network to characterize air quality in the vicinity of any source in Bartow County.

In response to the EPA's intended designations letter, on September 27, 2017, Georgia submitted updated modeling with 2014-2016 actual emissions data from Plant Bowen, corresponding meteorological data, and updated background concentrations.

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

On August 22, 2017, the EPA notified Georgia that we intended to designate the Bartow County area as unclassifiable, based on our view that available information did not enable us to determine whether the area is meeting the NAAQS. Additionally, we informed Georgia that our intended boundaries for the unclassifiable area consisted of the entirety of Bartow County. Our intended designation and associated boundary were based on uncertainty in the air quality characterization provided by Georgia regarding if the 2012-2014 modeled actual emissions are representative of emissions in more recent operations, given emissions increased in subsequent years. Plant Bowen's later actual emissions increased from the 2012–2014 period, so the assessment based on past actual emissions that were lower did not adequately indicate that there were no SO_2 NAAQs violations in the Bartow County area. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary TSD for Georgia, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2017-0003.

In the intended designations letter notification to the Governor of Georgia, and further explained in Chapter 10 of the TSD for the intended Round 3 area designations, the EPA recommended an intended designation of unclassifiable based on all available information, including modeling information and all relevant monitoring information.

Table 3 identifies all the modeling assessments evaluated for the intended designations letters and for the intended Round 3 area designations. Additional details can be found in the TSD for the Intended Round 3 Area Designations, Chapter 10.

Table 3 – Modeling Assessments Evaluated in the TSD for the Intended Designation for the Bartow County Area

Organization Submitting Assessment	Date of the Assessment	Identifier used in the TSD for the Intended Round 3 Area Designations, Chapter 10	Distinguishing or Otherwise Key Features
Georgia*	March 23, 2016	March 23, 2016 Modeling Protocol	None.
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 Environmental Protection Division (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 the 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.

The EPA considered all available information for the Bartow County area, including the revised modeling assessment provided by the State on December 28, 2016, and the modeling report addendum submitted May 31, 2017. The EPA considered the revised modeling assessment and addendum to completely supersede the prior assessments because it includes updated information to represent the background SO_2 concentration and because the May 31, 2017, addendum updated the analysis of nearby sources to include possible contributions from a nearby source originally excluded from consideration in error. There were no additional nearby air quality monitors within 40 km of Plant Bowen that could inform the intended designation action. Based on the information at hand in August 2017, the EPA concluded that the state's modeling

analysis did not provide an appropriate basis on which to determine the attainment status of the area.

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

This factor considers the SO_2 air quality monitoring data in the area of Bartow County. Our TSD for the intended area designations considered available data through 2016 for no monitoring sites. The closest monitor is over 40 kilometers (km) from Plant Bowen, one county west of Bartow County, in Floyd County. We do not have certified data for any additional complete calendar years at any site, and we have no new monitoring information of any other type that the EPA has determined warrants revising our prior analysis of available monitoring data.

2.4. Assessment of New Air Quality Modeling Analysis for the Bartow County Area Addressing Georgia Power Plant Bowen

2.4.1. Introduction

This section 2.4.1 presents all the newly 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 2.4.1.) This area contains the following SO_2 source, principally the source around which Georgia was required by the DRR to characterize SO_2 air quality:

- Georgia Power's Plant Bowen facility emits 2,000 tons or more annually. Specifically, Plant Bowen emitted 7,204 tons of SO_2 in 2014. The source emitted 8,103 tons in 2015 and 10,456 tons in 2016. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Georgia has chosen to characterize it via modeling.

On September 27, 2017, Georgia submitted new modeling analyzing air quality in the area surrounding the facility. This new assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. The area that Georgia 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. Georgia's analysis supports a different designation than the EPA's intended designation for this area. The EPA expressed an intent to designate the area as unclassifiable, whereas Georgia's analysis supports a designation as attainment/unclassifiable.

As seen in Figure 1 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 SO$_2$.[5] These are Chemical Products Corporation (CPC), Gerdau Ameristeel US, Inc., and Anheuser-Busch, Inc. These sources are located east and northeast of Plant Bowen, with Gerdau Ameristeel US, Inc. and Anheuser-Busch, Inc. emitting less than 100 tons per year (tpy) and CPC emitting greater than 100 tpy.

Figure 1. Map of the Bartow County, Georgia Area Addressing Plant Bowen
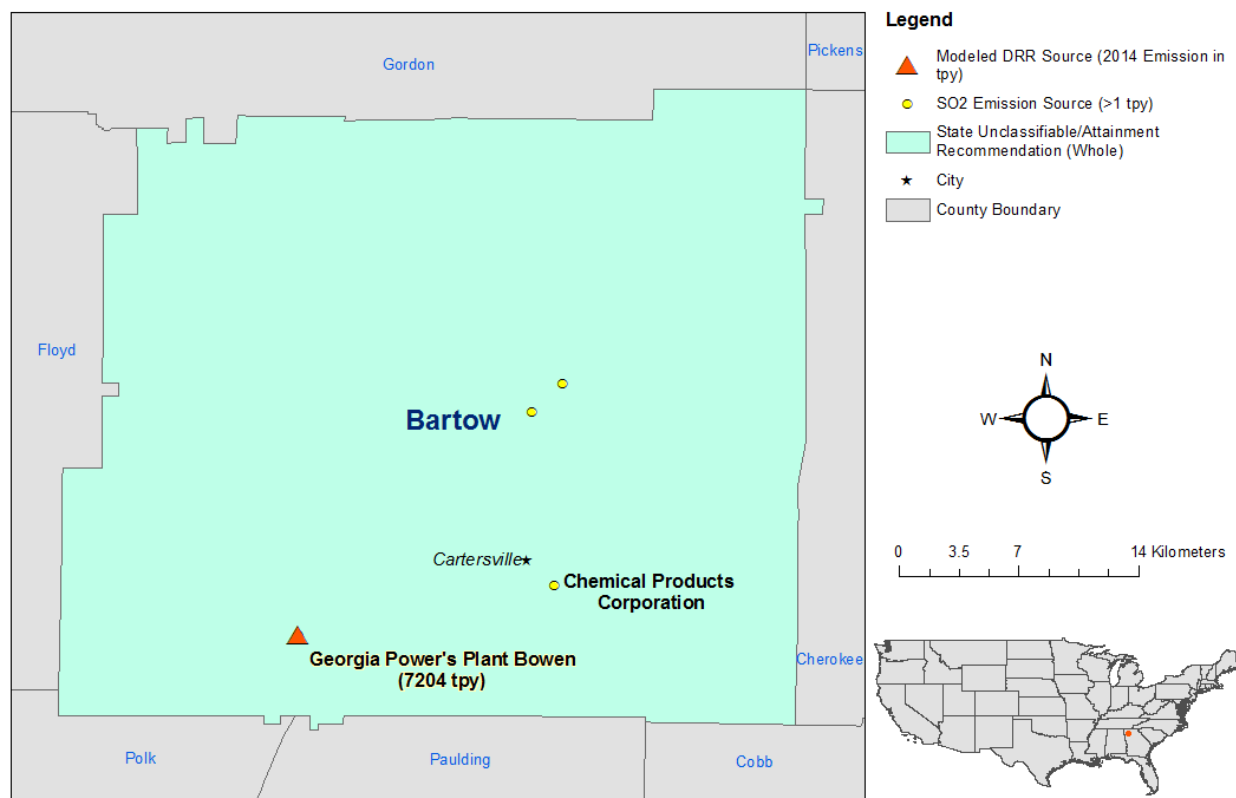
The discussion and analysis that follows below will reference the Modeling Technical Assistance Documents (Modeling TAD) and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance cited in Chapter 1 of this TSD, as appropriate.

For this area, the EPA received and considered one different new modeling assessment, beyond those identified above in Table 3 that were reviewed in its TSD for its intended designations, including one assessment from the State and no assessments from other parties. To avoid confusion in referring to these assessments, 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.

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[5] All other SO$_2$ emitters of 1 tpy or more (based on information in the 2014 NEI, version 1) are shown in Figure 3. If no sources not named previously are shown, there are no additional SO$_2$ emitters above this emission level in the vicinity of the named source(s).

Table 4 –New Modeling Assessments for the Bartow County Area

Organization Submitting Assessment	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Georgia	September 27, 2017	September 2017 Modeling	Only new information received after the NOA and intended designations

2.4.2. Differences Among and Relevance of the Modeling Assessments

In response to the EPA's intended designations letter, on September 27, 2017, Georgia submitted updated modeling with 2014-2016 actual emissions data from Plant Bowen, corresponding meteorological data, and updated background concentrations. The modeling assessed for the intended designations TSD included 2012-2014 actual emissions and background concentrations corresponding to that time period. Sections 2.4.6, 2.4.7, 2.4.8, and 2.4.10 address those particular elements of the revised modeling submission. Sections 2.4.3-2.4.5 and Section 2.4.9 contain the information included in the intended designations TSD, as those modeling parameters did not change with the revised modeling submission. All further discussion of modeling results reflects evaluation of the newer analysis provided to the EPA.

2.4.3. Model Selection and Modeling Components

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

The State used AERMOD version 16216r, the currently approved version. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

2.4.4. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the determination of whether a source is in an "urban" or "rural" area is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is also

important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the State determined that it was most appropriate to run the model in rural mode.

The 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 2 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 2.

Figure 2. Land Use Map for the 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.
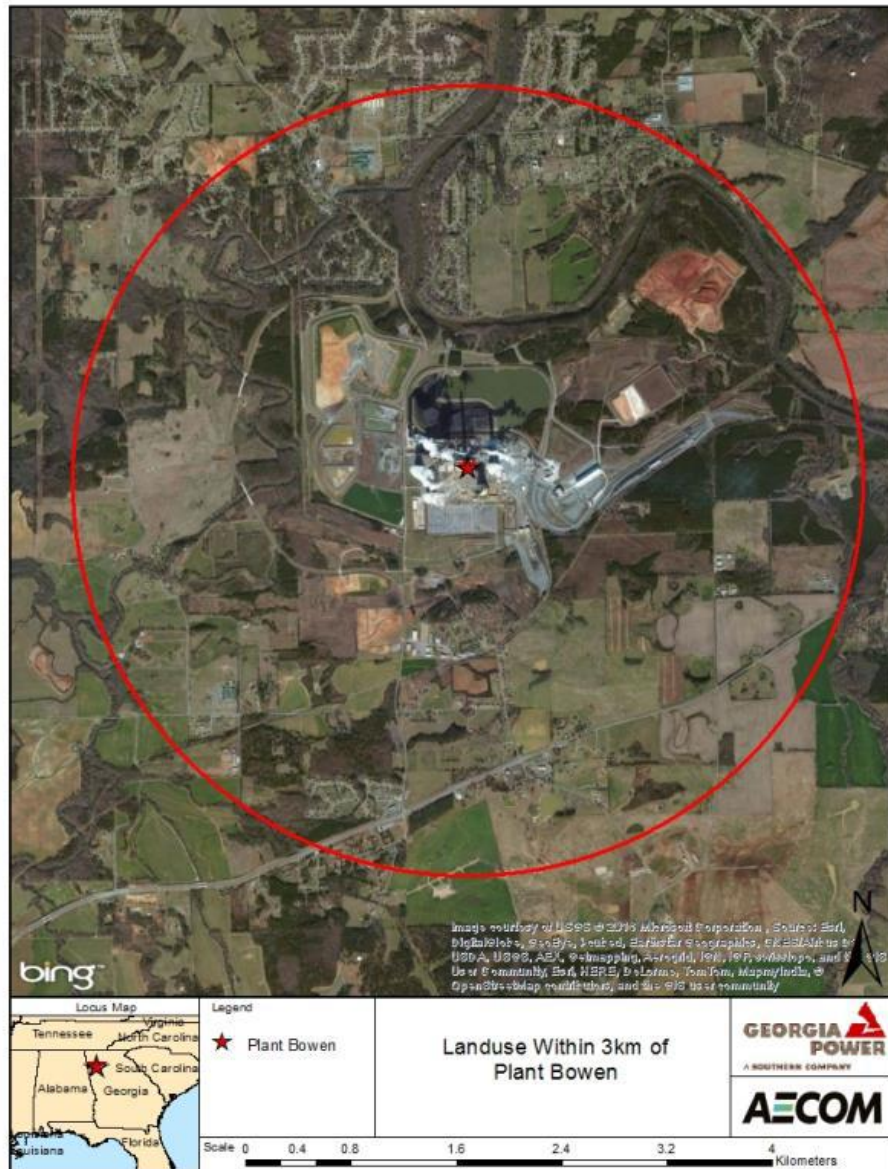
The EPA agrees with Georgia's analysis and the State's decision to apply rural dispersion characteristics. No changes were made in the land use assessment between the initial modeling submission and the revised modeling.

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

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

limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The source of SO_2 emissions subject to the DRR in this area is described in the introduction to this section. For the Bartow County area, the State has included no other emitters of SO_2 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 SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 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. Georgia evaluated the ratio of emissions from nearby sources to their distance from Plant Bowen, known as Q/d, to help determine which sources might be appropriate to consider. Only two nearby sources, International Paper- Rome (IP-Rome)(2,356 tpy in 2014 and 40 km from Plant Bowen) and Chemical Products Corporation (CPC) (565 tpy in 2014 and 12.7 km from Plant Bowen), showed Q/d values larger than 20. The Q/d value for IP-Rome is 2356TPY/40km = 59 and the Q/d value for CPC is 565 TPY/12.7 km = 44. The State elected to use the background concentration as the basis for determining possible SO_2 impacts in the Bartow County area from these sources, as discussed in Sections 2.4.6 and 2.4.10 of this chapter of the TSD.

The grid receptor spacing for the area of analysis chosen by the State is as follows, taken from the September 2017 Modeling:

> The Cartesian receptors were placed according to the following configuration based on the center of the Plant Bowen:
> - 0 km – 2km - 100 meters (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 property boundary. Although the March 20, 2015, guidance specifies that receptors need not be placed at locations where one would not place a monitor, the receptor grid conservatively simulates all areas including within the facility's property boundary that is not generally accessible to the public. 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.

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 3 and 4, 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.

The State placed receptors for the purposes of this designation effort in all locations within the receptor grid outlined above. Georgia did not exclude locations inside the Plant Bowen facility property boundary or water bodies. These receptors, which could potentially have been excluded in accordance with the March 20, 2015, guidance, do not include the maximum concentrations shown in this TSD.

Figure 3. Area of Analysis for the Bartow County Area Showing Nearby Sources within a 50-km Radius. Source: "Georgia EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia Power - Plant Bowen with 2014-2016 Emissions September 27, 2017," prepared by Georgia EPD, September 27, 2017.
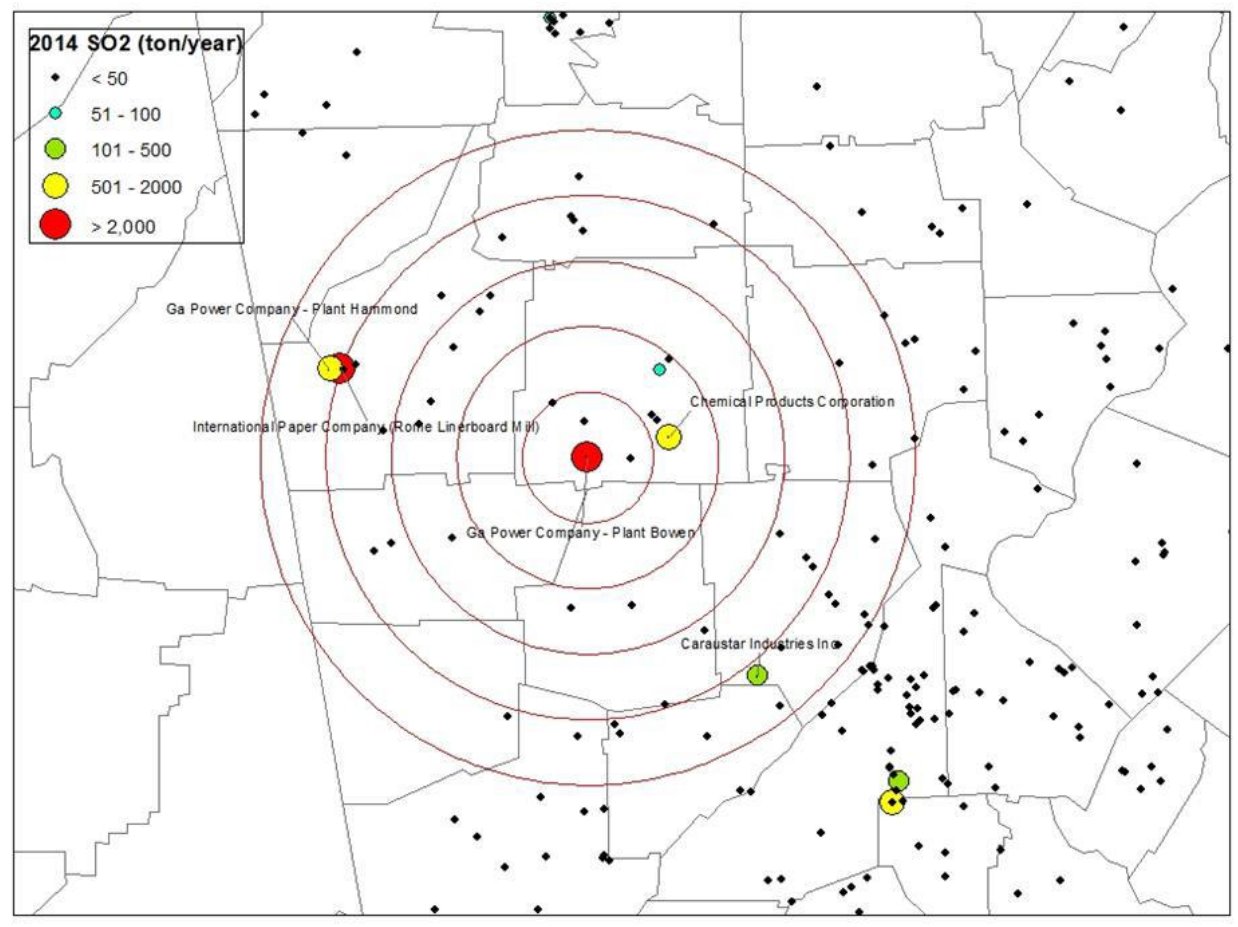
Figure 4. Receptor Grid for the Bartow County Area. Source: "Modeling Protocol Bowen Steam Electric Generating Plant 1-hour SO$_2$ NAAQS Modeling," prepared by Plant Bowen, March 2016, and submitted to the EPA on June 17, 2016.
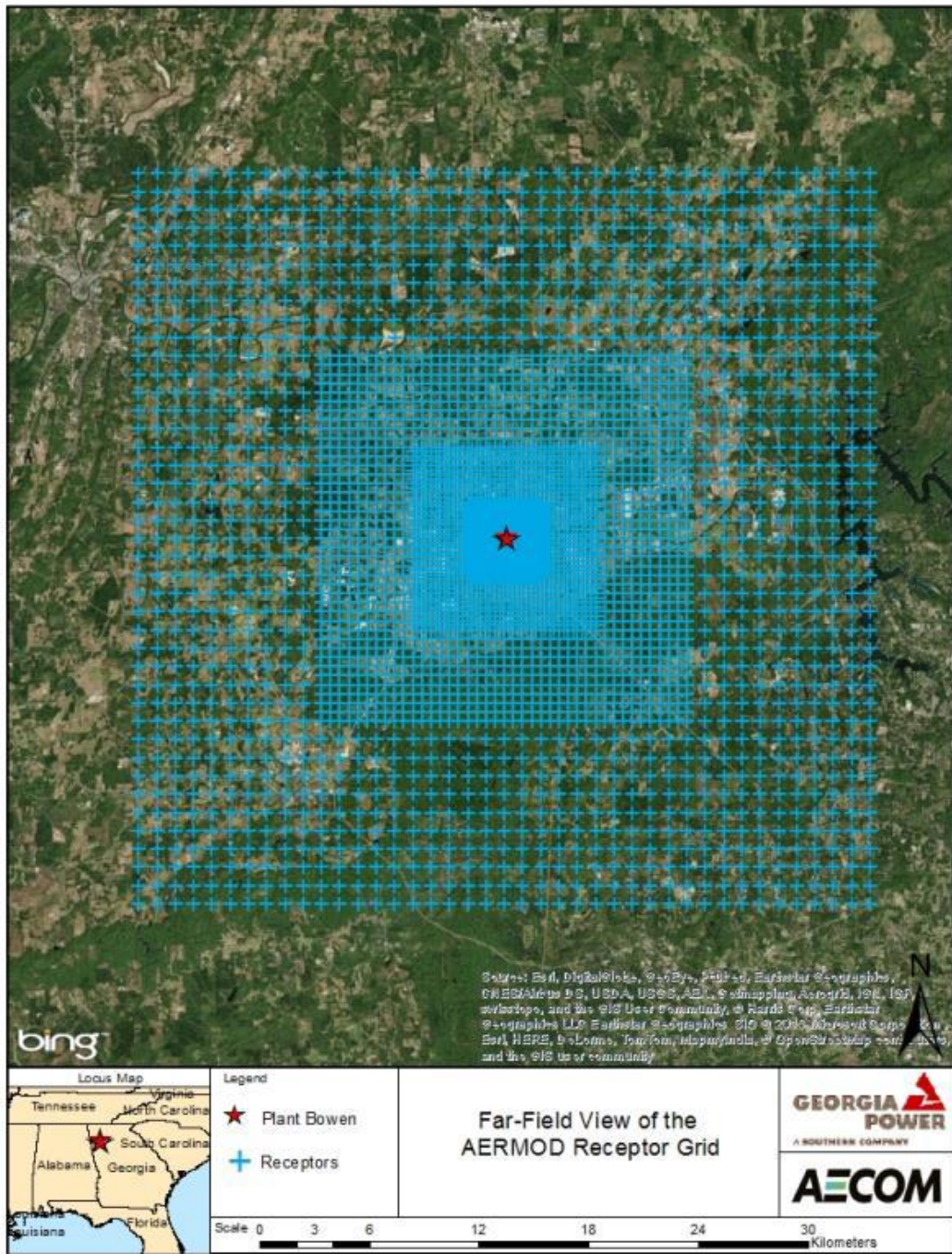
No changes were made in the receptor grid between the initial modeling submission and the revised modeling. The EPA agrees with the State on the final receptor grid, which does not exclude any receptors in the 20 km area of analysis. The final grid is consistent with the Modeling TAD, and includes receptors that could have been excluded in a manner consistent

with our guidance. The final receptor grid, therefore, can be expected to adequately characterize SO_2 impacts from the Plant Bowen facility. The maximum predicted concentration occurs within 3.12 km of Plant Bowen, which is within the 100-m spacing area (See Figure 7).

2.4.6. 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 the good engineering practices 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 have 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. 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. In the original modeling report submitted to EPA in January 2017, Chemical Products Corporation was erroneously left off of the list of nearby sources within 50 km of Plant Bowen due to an error in the location coordinates in Georgia's Emissions Inventory. Accordingly, Georgia updated its analysis and the approach used to account for impacts from offsite sources in the May 31, 2017, Modeling Report Addendum. In the May 2017 Modeling Report, the State considered this additional source, but stated it did not directly model this source due to complex terrain near the facility and because the State did not have 2012 or 2013 emissions information for Chemical Products Corporation at the time of the analysis. Georgia 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. The details of this approach are discussed in the EPA's intended designations TSD. The September 2017 Modeling updated this approach using 2014-2016 monitor data to be consistent with the 2014-2016 emissions used in this modeling. 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 and accounted for potential impacts from all other sources with representative background concentrations. The EPA's assessment of the state's approach to address these nearby sources within the area of analysis is in section 2.4.10 of this TSD.

The State characterized Plant Bowen 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.

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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 Plant Hammond and Chemical Products facilities in the modeling. The EPA's assessment of the state's approach to the CPC facility within the modeling is in section 2.4.10 of this TSD. For Plant Bowen, the use of actual stack heights is appropriate given the actual emissions used in the modeling. Building downwash is also appropriately accounted for.

2.4.7. Modeling Parameter: Emissions

The Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as 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 Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 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 SO_2 emissions inventories used for permitting or state implementation plan 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 only included Plant Bowen in the area of analysis. The EPA's assessment of the state's approach to inclusion of nearby sources within the area of analysis is in section 2.4.10 of this TSD. The State has chosen to model this facility using actual emissions. The facility in the State's modeling analysis and its associated annual actual SO_2 emissions between 2014 and 2016 are summarized below.

For Plant Bowen, the State provided annual actual SO_2 emissions between 2014 and 2016. This information is summarized in Table 5. A description of how the State obtained hourly emission rates is given below this table.

Table 5. Actual SO₂ Emissions Between 2014 – 2016 from Facilities in the Bartow County Area

	SO₂ Emissions (tpy)		
Facility Name	**2014**	**2015**	**2016**
Georgia Power Plant Bowen	7,207	8,106	10,456
Total Emissions from All Modeled Facilities in the State's Area of Analysis	7,207	8,106	10,456

For Plant Bowen, the actual hourly emissions data were obtained from CEMS. The modeled emissions in the September 2017 Modeling are slightly higher than the EPA's Clean Air Market's Division emissions because hourly emissions for partial operating hours were not adjusted downward in the model to reflect operating time less than one hour. While the EPA initially thought that the 2012-2014 dataset that was used in the initial modeling would be representative of emissions for the area, further evaluation of the 2015 emissions raised uncertainty on whether the 2012-2014 dataset should be used in the modeling analysis. The EPA noticed that the 2015 emissions had increased to more than 2 times the 2012 emissions. There was also an overall increase in both the emission rate per hour as well as the heat input from 2014 to 2015. These increases raised uncertainty on whether the actual emission used in the initial modeling (2012-2014) are representative of the emissions in more recent operations. To address this uncertainty, Georgia submitted revised modeling in September 2017 using the most recent available emissions, from 2014-2016.

2.4.8. 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, 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. The EPA has reviewed the AERSURFACE files from Georgia EPD's website and confirmed that the coordinates that were used to calculate the surface roughness, albedo and Bowen ratio surface characteristics were the same as the coordinates used in the surface meteorology files: Latitude 34.123 N and Longitude 84.849 W.

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_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 are shown relative to the area of analysis.

Figure 5. 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 September 2017 submittal, the State provided the 3-year surface wind rose for the Cartersville, Georgia NWS station. In Figure 6, 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 11 percent of the time) with significant winds from the

southeast (approximately 19 percent of the time) and from the north by northwest direction (approximately 22 percent of the time).

Figure 6. Bartow County Cumulative Annual Wind Rose for Years 2014 – 2016. Source: "Georgia EPD Dispersion Modeling for the 2010 1-Hour SO2 NAAQS: Georgia Power - Plant Bowen with 2014-2016 Emissions September 27, 2017," prepared by Georgia, September 27, 2017.
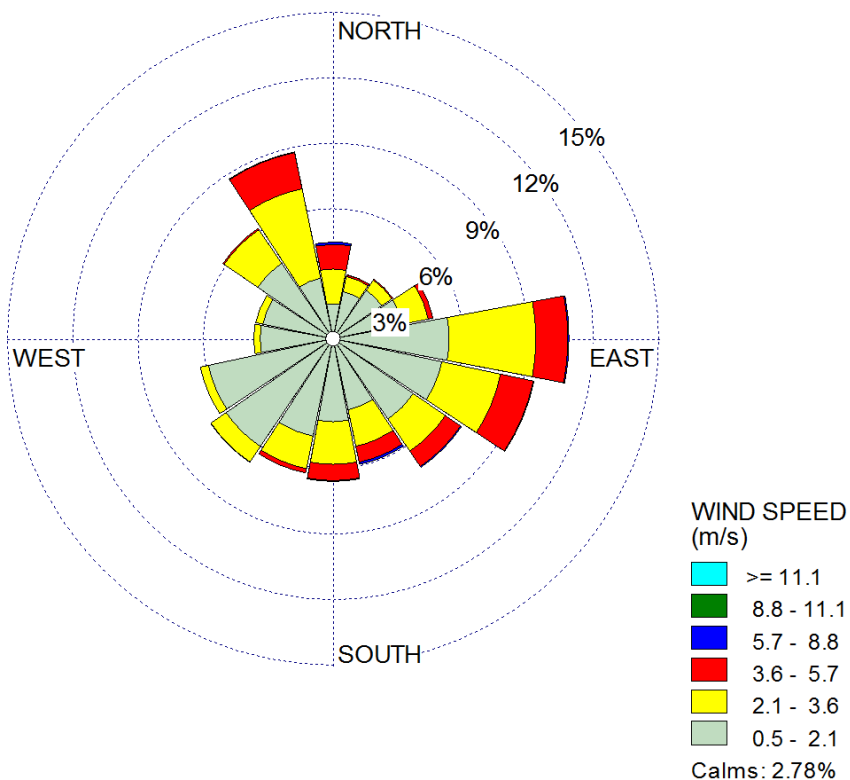
Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The State followed 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. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration was provided from the Cartersville 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 meters per second in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The September 2017 Modeling indicates that AERMET version 16216r was used with the ADJ_U* option in the updated modeling. Meteorology data for the period of 2014-2016 was used in this modeling, which corresponds with the 2014-2016 actual emissions from Plant Bowen that were modeled. 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 EPA has assessed the meteorological and surface characterization in Georgia's modeling, including the conclusions Georgia has drawn from the wind rose above, and concludes that this component of Georgia's modeling is appropriate.

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

The terrain in the area of analysis is best described as being in the foothills of the southern Appalachian Mountains with some elevated terrain. A small number of modeling receptors (4 receptors out of the total 5,722 receptors) in the area of analysis are located on mountain peaks above the height of the Plant Bowen stacks. These 4 receptors are located in the far northwest corner of the receptor grid over 25 km from Plant Bowen and would be classified as complex terrain. The elevations of the receptors throughout the remainder of the receptor grid are all below the height of the Plant Bowen stacks with some on hilltops and some in valleys. 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 1-sec National Elevation Database.

The EPA has assessed this component of the State's modeling and concludes that the State has appropriately addressed the potential impacts of terrain in the Bartow County area. We agree with the State's use of AERMAP version 11103 to obtain the elevations of sources, buildings and receptors. No changes were made in this component of the State's modeling between the initial modeling submission and the revised modeling.

2.4.10. Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the State elected to use a "tier 1" approach. Data was obtained from Air Quality System (AQS) monitor 13-115-0003 in Rome, Georgia. 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. Additionally, Georgia used the data from this monitor to estimate the impacts from the CPC facility located approximately 13 km from Plant Bowen. In their May 31, 2017, Modeling Report Addendum, Georgia described the procedure they followed to calculate the representative background value used in the Plant Bowen modeling.

In the September 2017 Modeling, the State updated their approach outlined in the May 31, 2017 Modeling Report Addendum to use the 2014-2016 design value from the Rome Monitor (42 parts per billion [ppb] when expressed in two significant figures)[6] to be consistent with the period of 2014-2016 actual emissions modeled for Plant Bowen. Georgia EPD then adjusted the design values for the purposes of determining an appropriate background value for the Plant Bowen modeling assessment. For this analysis, the State updated the dispersion modeling that was submitted to EPA on April 11, 2016, to support the relocation of the Rome Monitor to the location of maximum impact near the IP Rome facility for use in Round 4 of the SO_2 designations. Georgia's April 2016 modeling was performed using 2012-2014 emissions and meteorology. In the September 2017 modeling submittal, Georgia updated the analysis with 2014-2016 emissions and meteorology data. The updated modeling was performed using AERMET (v16216) with ADJ_U* and AERMOD (v16216r).

Next, the State scaled the 2014-2016 monitored design value at the Rome monitor to the maximum adjusted monitored design value, meaning the value that would have been expected had the Rome monitor been located in the area of maximum impact during that time. This maximum adjusted design value 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.

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[6] The SO_2 NAAQS level is expressed in ppb but AERMOD gives results in $\mu g/m^3$. The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.619 $\mu g/m^3$.

Maximum Adjusted Design Value (MADV) at IP-Rome Modeling Domain Border
= (MADV at Rome monitor) x (Maximum Normalized Design Value (NDV) at the east/south borders)/(Maximum NDV in the domain)
(51.6 ppb) x (11.2 ppb)/(39.2 ppb) = **14.7 ppb**

The resultant maximum adjusted design value in the direction of Plant Bowen is 14.7 ppb. The State 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. Therefore, in the State's modeling analysis, a constant background value of 14.7 ppb was added to the modeled concentration from Plant Bowen at each receptor in the modeling domain to account for the potential impacts from the IP-Rome and Plant Hammond facilities that are located over 41 km from Plant Bowen. The EPA agrees that Georgia's use of the monitor located near the International Paper – Rome facility is appropriate to account for potential impacts from the International Paper – Rome and Plant Hammond facilities due to their proximity to the monitor and because the concentration at the edge of the domain used to site the monitor would decrease as the distance increases from facilities toward the Bartow County area and Plant Bowen.

Additionally, the Georgia stated that it accounted for possible impacts from the nearby CPC facility with the background monitoring concentration parameter[7]. The State decided to consider impacts from CPC by using the Rome monitor as a proxy for a monitor near the CPC facility. Georgia cited similar meteorology, topography, and surface characteristics between the areas surrounding the CPC and International Paper – Rome facilities and the similar stack heights for both facilities as support for this approach. Accordingly, to calculate the CPC adjusted background concentration, the State started with the maximum adjusted design value for the Rome monitor (51.6 ppb) and scaled the value by the ratio of average annual emissions rates over three years (2014-2016) from CPC and International Paper – Rome.

> CPC MADV = (MADV at Rome Monitor) x (CPC SO_2 Average Emissions)/(IP-Rome SO_2 Average Emissions)
> 12.9 ppb= (51.6 ppb) x (524.87 TPY)/(2102.23 TPY)

The resultant value of the background concentration expected from CPC is 12.9 ppb. Therefore, in the State's modeling analysis, a constant background value of 12.9 ppb was added to the modeled concentration from Plant Bowen at each receptor in the modeling domain to account for the potential impacts from the CPC facility located approximately 13 km from Plant Bowen.

In summary, Georgia used adjusted monitored background concentrations to account for potential impacts from the IP-Rome, Plant Hammond and CPC facilities in the Bartow County

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[7] Georgia EPD also provided a supplemental email to EPA on November 2, 2017 further clarifying how the agency calculated the background concentration to account for the impacts from the CPC. Email from Yunhee Kim, GEPD to Katherine Walther, EPA Region, APTMD.

area. The total adjusted background concentration used to account for all three facilities was 27.6 ppb (14.7 ppb for IP-Rome/Plant Hammond and 12.9 for CPC).

Because CPC is located relatively near Plant Bowen (approximately 13 km), the EPA performed further analyses of the available information to evaluate the appropriateness of Georgia's use of an adjusted background concentration to account for potential impacts from CPC. Since Georgia did not model the SO_2 emissions from CPC, the EPA used the Plant Bowen modeling results at receptors located near the CPC as a surrogate to estimate the potential impacts from the CPC facility in the area of maximum concentration near the Plant Bowen facility. Based upon a review of the modeling output files provided by Georgia, the EPA determined that Plant Bowen's modeled impacts at the receptors located closest to the CPC facility are approximately 29 $\mu g/m^3$ or 11 ppb (without any background concentration added).

The EPA performed a comparison of the source characteristics and emissions at Plant Bowen with those at CPC. Plant Bowen has 4 large coal fired boiler units that have flue gas desulfurization scrubbers. During normal operation they emit out of two "scrubber stacks" that are 675 feet tall. If there are any issues with the scrubbers, the units emit from the 1000 feet tall bypass stacks. The 2016 annual emissions from Plant Bowen are 10,456 tpy in the EPA's CAMD emissions database. CPC's SO_2 emissions are emitted primarily from one unit – the "north kiln" stack which is 190 feet tall. The north kiln stack emitted 514 TPY of the total facility 524 TPY in 2016 according to the EPA's EIS Gateway. Since Plant Bowen's stacks are much taller and the SO_2 emissions are much greater, the modeled concentrations from Plant Bowen near the CPC are likely much larger than the modeled concentrations would be from CPC near the Plant Bowen facility.

In AERMOD, or other Gaussian air dispersion models, the modeled concentrations are directly proportional to the modeled emission rates. Therefore, adjusting Plant Bowen's modeled concentration near the CPC facility by the ratio of emissions from CPC to the emissions from Plant Bowen provides a methodology to estimate the potential impacts from CPC at the same distance. Note that use of annual emissions for this analysis introduces some level of uncertainty since the Plant Bowen modeling was done using hourly varying actual emissions rates. However, the EPA believes that the uncertainty is not likely enough to prevent use of the analysis to help evaluate Georgia's use of an adjusted background concentration for evaluating CPC's impacts. Dividing CPC's emissions (524 tpy) by Plant Bowen's emissions (10456 tpy) equals 0.05. So, CPC's emissions are approximately 5% of Plant Bowen's. Multiplying Plant Bowen's maximum modeled impact near the CPC facility (11 ppb) by the ratio of CPC emissions to Plant Bowen's emissions = 11 ppb x 0.05 = 0.55 ppb. This 0.55 ppb concentration is likely an overestimate because the stack height and plume rise of the CPC emissions is much less than Plant Bowen's, so the CPC modeled concentrations likely decrease much more rapidly as a function of distance than Plant Bowen's. The EPA believes that this analysis supports Georgia's position that using a 12.9 ppb background value conservatively overestimates CPC's potential modeled impacts in the area of Plant Bowen's maximum modeled concentration.

Section 4.1 of the EPA's Modeling Technical Assistance Document (TAD), states:

> "When considering other sources to include in the modeling, Appendix W states in Section 8.2.3.b that all sources expected to cause a significant concentration gradient in the vicinity of the source of interest should be explicitly modeled and that the number of such sources is expected to be small except in unusual cases. Other sources in the area, i.e. those not causing significant concentration gradients in the vicinity of the source of interest, should be included in the modeling via monitored background concentrations…

> …concentration gradients associated with a particular source will be generally largest between the source and the maximum ground level concentrations from the source. Beyond that distance, gradients tend to be smaller and more spatially uniform. The memo also offers a general guideline that the distance between a source and its maximum ground level concentration is generally 10 times the stack height in flat terrain."

Since CPC's stack height is 190 ft. (58 m), according to the general guideline of 10 times stack height presented in the SO_2 Modeling TAD, the distance to the maximum modeled ground level concentration from CPC would be no more than 580 m in flat terrain, and very likely to be less than 1 km. An evaluation of the topography in the area shows that, while there is complex elevated terrain in the area, the terrain is relatively flat between CPC and Plant Bowen (See Figure 7). The location of the maximum modeled ground level concentration from Plant Bowen is approximately 11 km from CPC. Therefore, it is unlikely that the emissions from CPC would cause a significant concentration gradient near Plant Bowen's maximum modeled concentration. Therefore, as discussed in the SO_2 Modeling TAD, Georgia's decision to account for potential impacts from CPC in the modeling analysis via background monitored concentrations is appropriate.

Additionally, Plant Bowen's maximum modeled concentration is 150.9 $\mu g/m^3$ or 57.6 ppb (including the background concentration of 27.6 ppb). Subtracting Georgia's adjusted background concentration of 12.9 ppb for CPC impacts equals 44.7 ppb (57.6 ppb – 12.9 ppb = 44.7 ppb). Therefore, the CPC modeled concentrations at the point of maximum modeled concentration would need to be greater than 30.3 ppb (75 ppb – 44.7 ppb = 30.3 ppb) for the modeling including CPC to result in a modeled exceedance of the 1-hour SO2 NAAQS of 75 ppb.

Considering the weight of evidence from Georgia's background analysis and EPA's additional analyses presented above, the EPA believes that it is highly unlikely that inclusion of CPC in the Plant Bowen modeling analysis would result in modeled violations of the 1-hour SO2 NAAQS.

Figure 7. Topographic Map showing the locations of Plant Bowen and Chemical Products Corporation. Created by U.S. EPA on December 13, 2017.
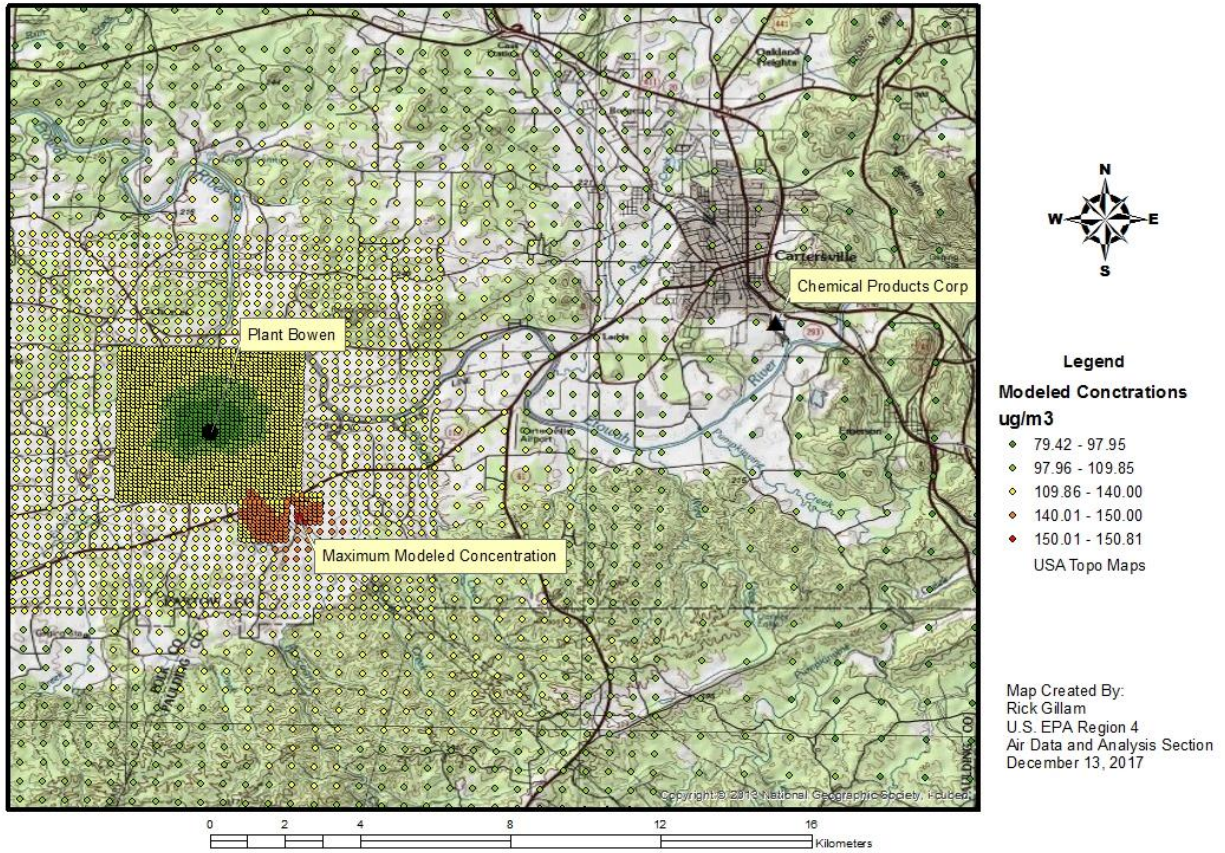
The EPA believes that Georgia's approach for addressing any potential impacts from the Chemical Products Corporation facility SO_2 emissions in the area near the Plant Bowen facility is acceptable Additionally, the EPA agrees that Georgia's use of the monitor located near the International Paper – Rome facility is sufficient to account for potential impacts from the International Paper – Rome and Plant Hammond facilities due to their proximity to the monitor and the likelihood that the concentration at the edge of the domain used to site the monitor would decrease as it draws closer to the Bartow County area and Plant Bowen.

2.4.11. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Bartow County area of analysis are summarized below in Table 6. All input parameters were the same as the initial modeling with the exception of the emissions years, the meteorology years, the design value years that the background concentration was calculated from, and the calculated background SO_2 concentration that was used in the modeling, which were all updated with the September 2017 Modeling.

Table 6. 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	2014-2016
Meteorology Years	2014-2016
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 design value from 2014-2016 using AQS Site: 13-115-0003
Calculated Background SO_2 Concentration	27.6 ppb (72.28 µg/m³)

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

| Averaging Period | Data Period | Receptor Location | | 99th percentile daily maximum 1-hour SO₂ Concentration (μg/m³) | |
		Latitude	Longitude	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2014-2016	34.1042	-84.9009	150.9	196.4*

*Equivalent to the 2010 SO₂ NAAQS of 75 ppb reflecting 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 150.9 μg/m³, equivalent to 57.6 ppb. This modeled concentration included the background concentration of SO₂, and is based on actual emissions from the facility. Figure 8 below was included as part of the State's recommendation, and indicates that the predicted value occurred 3.12 km southeast of Plant Bowen. The State's receptor grid is also shown in the figure.

Figure 8. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Three Years for the Bartow County Area. Source: "Georgia EPD Dispersion Modeling for the 2010 1-Hour SO₂ NAAQS: Georgia Power - Plant Bowen with 2014-2016 Emissions September 27, 2017," prepared by Georgia, September 27, 2017.
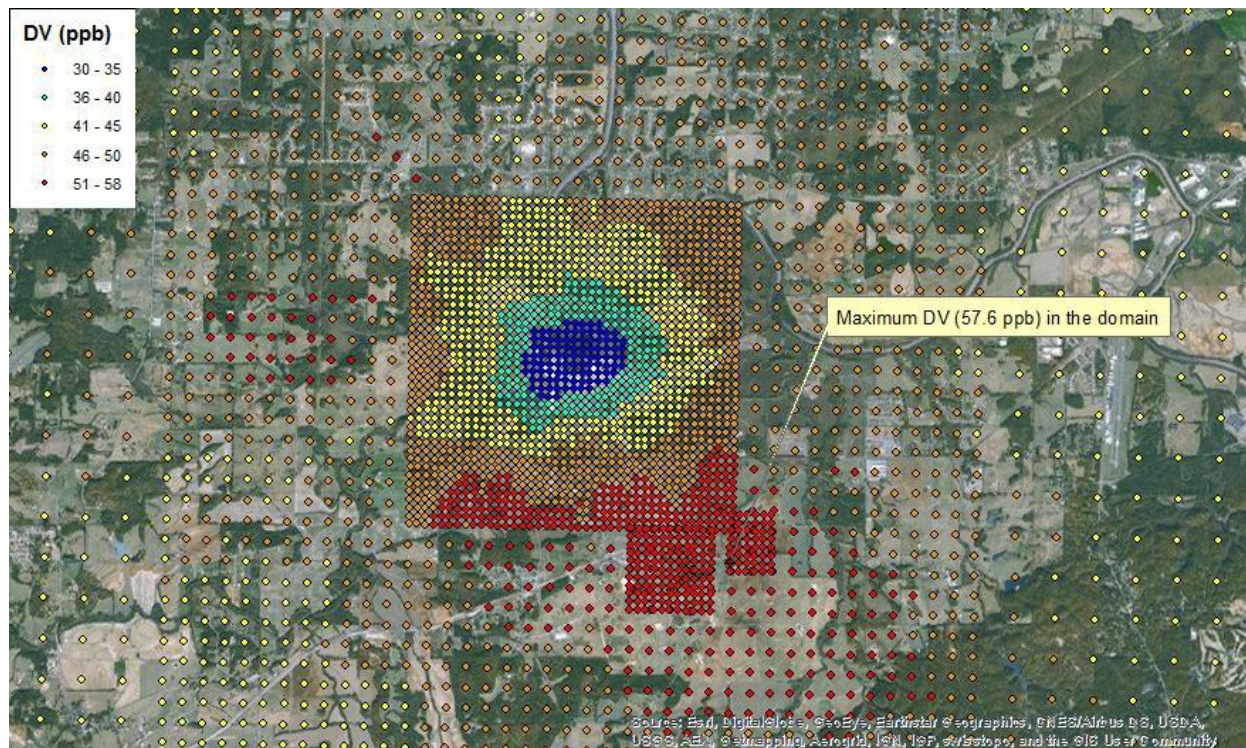
The modeling submitted by the State indicates that the 1-hour SO₂ NAAQS is attained at all receptors in the area.

2.4.12. 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 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.

Previously, the EPA had identified an issue that created uncertainty in the initial modeling results and conclusion that there are not modeled violations of the 1-hour SO_2 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 initial modeling (i.e., 2012-2014) did 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. Georgia submitted revised modeling on September 27, 2017, which modeled Plant Bowen using 2014-2016 actual emissions, with concurrent meteorology data, and updated background concentrations. The revised modeling has sufficiently addressed the EPA's previous concerns and is appropriate to determine whether the area is attaining the NAAQS.

As discussed in the intended designations TSD and in Section 2.4.10 of this TSD, Georgia estimated SO_2 impacts from three nearby sources, International Paper-Rome, Georgia Power Plant Hammond and Chemical Products Corporation, using an adjusted 2014-2016 background concentration from the AQS monitor 13-115-0003 in Rome, Georgia. This monitor is located less than 1 km from International Paper-Rome and is appropriately used to estimate the impact of the emissions from Plant Hammond and International Paper-Rome, since these facilities are located approximately 40 km from Plant Bowen. Georgia used a similar procedure to determine a representative background concentration to account for the potential SO_2 concentrations from the CPC facility. The total adjusted background concentration used to account for all three facilities was 27.6 ppb (14.7 ppb for IP-Rome/Plant Hammond and 12.9 for CPC). This 27.6 ppb background concentration was added to the modeled concentrations from Plant Bowen at all of the receptors throughout the modeling domain. The procedure Georgia used to calculate the representative adjusted background values is summarized in Section 2.4.10 of this TSD. Because CPC is located relatively near Plant Bowen (approximately 13 km), the EPA performed further analyses of the available information to evaluate the appropriateness of Georgia's use of an adjusted background concentration to account for potential impacts from CPC. The details of these analyses are discussed in Section 2.4.10 of this TSD and included an evaluation of emissions, source characteristics, distance, and topography in the area. The EPA's additional analysis indicates that Georgia's adjusted background procedure is acceptable for addressing impacts from the CPC facility in the Plant Bowen area of analysis.

2.5. 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.

2.6. 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 SO_2 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 4.4-8.8 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 3.12 km to the southeast of Plant Bowen, not in the direction of International Paper – Rome.

2.7. 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 attainment/unclassifiable. The EPA agrees with Georgia's methodology for modeling to characterize SO_2 impacts in the Bartow County area. In the intended designations letter, the EPA had identified an issue that created uncertainty in the modeling results and conclusion that there are not modeled violations of the 1-hour SO_2 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) did 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. In response to the EPA's intended designations letter, on September 27, 2017, Georgia submitted updated modeling with 2014-2016 actual emissions data from Plant Bowen, corresponding meteorological data, and updated background concentrations. This revised modeling has addressed and resolved the EPA's previous concern regarding the increased emissions in 2015 by modeling the most recent set of emissions data available. Additionally, the EPA has further evaluated the potential contributions of emissions from the CPC facility located approximately 13 km from Plant Bowen. The results of this additional analysis, summarized in Section 2.4.10 of this TSD, confirm that Georgia's procedure for addressing the potential impacts from CPC is acceptable.

Based on the available information for the remaining areas in Georgia, including monitoring and modeling, there are no current SO_2 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 3.12 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 attainment/unclassifiable for the 2010 SO_2 NAAQS. The EPA's previous concern regarding the increase of emissions at Plant Bowen since the 2012-2014 modeled period has been resolved with the revised modeling submitted by Georgia on September 27, 2017. 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 final attainment/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 final attainment/unclassifiable area.

2.8.   Summary of Our Final 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 is designating Bartow County as attainment/unclassifiable for the 2010 SO_2 NAAQS because the EPA has determined the area meets the 2010 SO_2 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 Bartow County. Figure 8 shows the boundary of this final designated area.

Figure 8. Boundary of the Final Bartow County Attainment/Unclassifiable Area
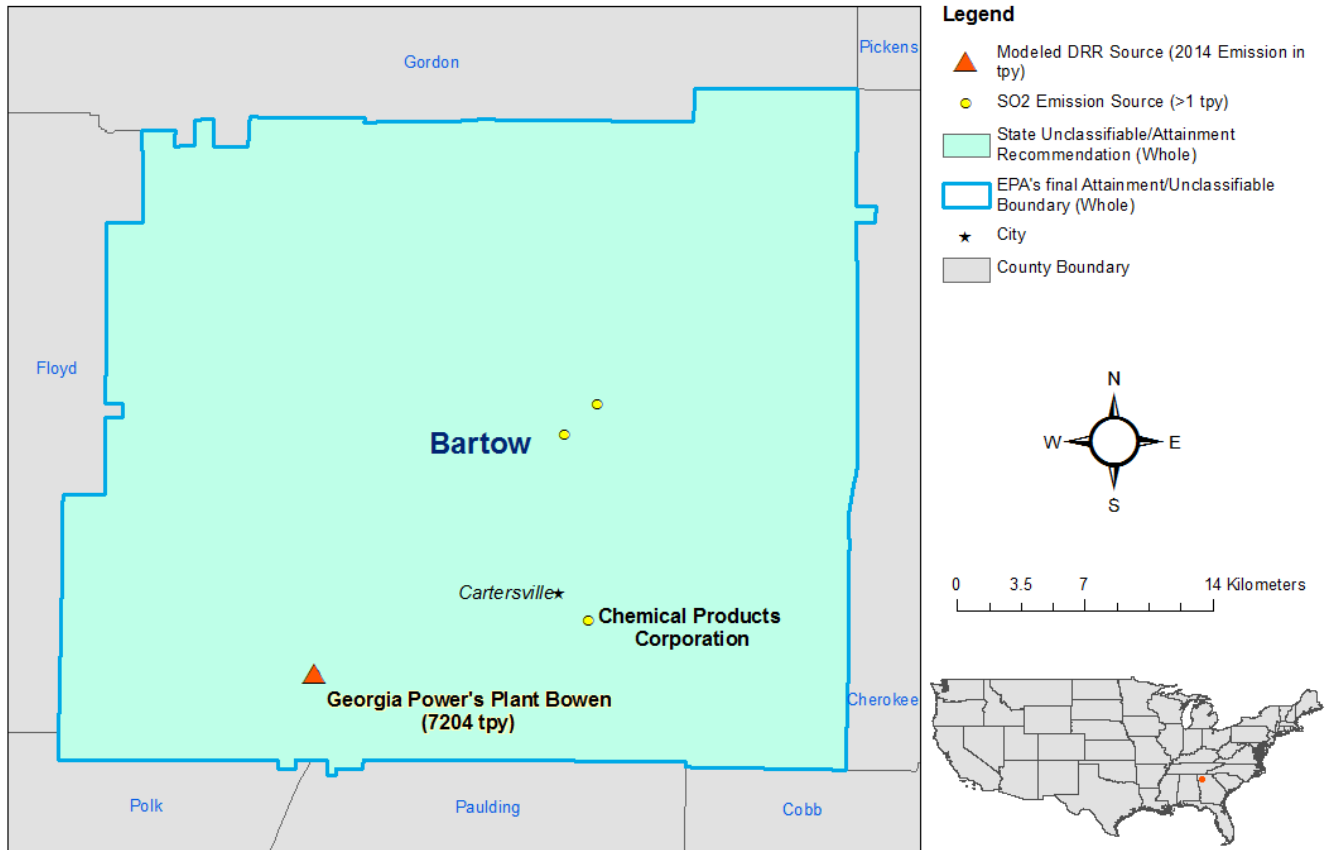
At this time, our final designations for the State only apply to this area and the other areas presented in this chapter. The EPA intends in a separate action to evaluate and designate all remaining undesignated areas in Georgia by December 31, 2020.