Technical Support Document:

Chapter 16
Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for Louisiana

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). 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 SO_2 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 SO_2 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 SO_2 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 Louisiana for the 2010 SO_2 NAAQS. In previous final actions, the EPA

[1] The term "designated 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.

has issued designations for the 2010 SO_2 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 SO_2 NAAQS. After the Round 3 designations are completed, the only remaining undesignated areas will be those where a state installed and timely began operating a new SO_2 monitoring network meeting EPA specifications referenced in the EPA's SO_2 Data Requirements Rule (DRR) (80 FR 51052). The EPA is required to designate those remaining undesignated areas by December 31, 2020.

Louisiana submitted its recommendation regarding designations for the 2010 1-hour SO_2 NAAQS on May 31, 2011. The state recommended that West Baton Rouge Parish and St. Barnard Parish be designated nonattainment, that 20 named parishes be designated unclassifiable, and that 42 named parishes be designated attainment. (St. Bernard Parish was designated nonattainment in Round 1). In a letter dated July 25, 2012, the state recommended that EPA postpone the designation of West Baton Rouge Parish. The state revised its recommendation for Calcasieu Parish on September 18, 2015, recommending that Calcasieu Parish be designated attainment. (Calcasieu Parish was subsequently designated unclassifiable in Round 2. Also, De Soto Parish was designated unclassifiable/attainment). The state submitted updated air quality analysis on January 13, 2017, but did not revise any of its previous recommendations. In our intended designations, we have considered all the submissions from the state.

For the areas in Louisiana that are part of the Round 3 designations process, Table 1 identifies the EPA's intended designations and the parishes or portions of parishes to which they would apply. The EPA intends to designate each listed parish and portion of a parish as a separately designated area. It also lists Louisiana's 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 Louisiana

Area/Parish	Louisiana's Recommended Area Definition	Louisiana's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Rapides Parish	Rapides Parish	Unclassifiable	Same as State's Recommendation	Unclassifiable/ Attainment
Evangeline Parish (partial)	Evangeline Parish	Unclassifiable	Part of Evangeline Parish bounded by: 570250m E, 3400300m N 570250m E, 3403300m N 572400m E, 3403300m N 572400m E, 3400300m N NAD83 15R	Nonattainment
Evangeline Parish (partial)	Evangeline Parish	Unclassifiable	Part of Evangeline Parish outside of: 570250m E, 3400300m N 570250m E, 3403300m N 572400m E, 3403300m N 572400m E, 3400300m N NAD83 15R	Unclassifiable/ Attainment
St. Mary Parish	St. Mary Parish	Unclassifiable	St. Mary Parish	Unclassifiable
Pointe Coupee Parish	Pointe Coupee Parish	Unclassifiable	Same as State's Recommendation	Unclassifiable
Remaining Parishes to Be Designated in this Action*	Each Parish or Partial Parish as a Separately Designated Area	Nonattainment, Attainment, or Unclassifiable, by Parish	Certain Remaining Parishes and the Remaining Portion of Evangeline Parish	Unclassifiable/ Attainment

* Except for areas that are associated with sources for which Louisiana elected to install and timely began operation of a new SO_2 monitoring network meeting EPA specifications referenced in the EPA's SO_2 DRR (*see* Table 2), the EPA intends to designate the remaining undesignated parishes (or a portion of Evangeline Parish) in Louisiana as "unclassifiable/attainment" as these areas were not required to be characterized by the state under the DRR and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas 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 areas that we intend to designate as unclassifiable/attainment (those to which this row of this table is applicable) are identified more specifically in Table 17 in section 7 of this TSD.

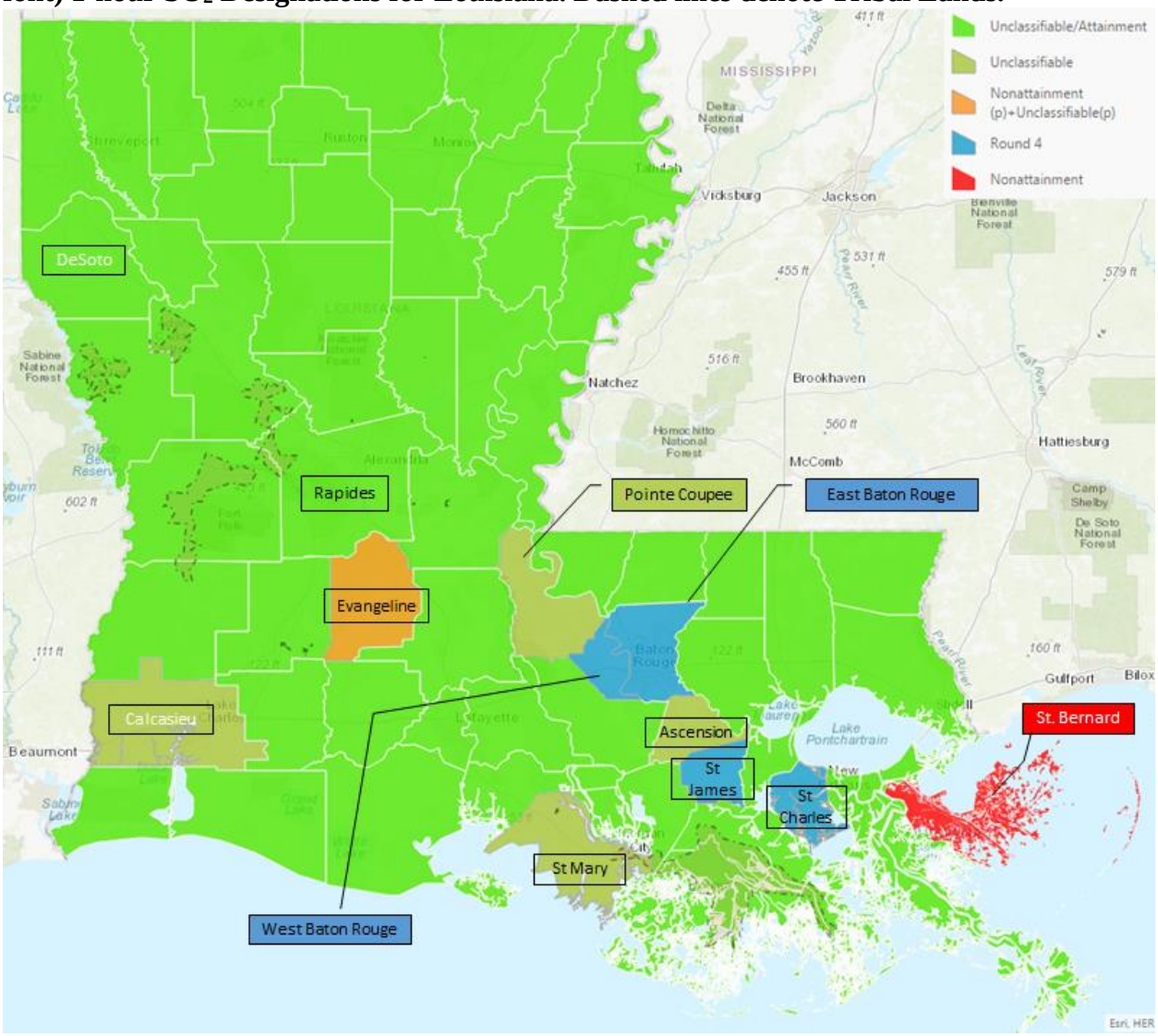
Areas for which Louisiana elected to install and began operation of a new, approved SO_2 monitoring network and which are not being addressed in this round are listed in Table 2. The EPA is required to designate these areas, pursuant to a court ordered schedule, by December 31, 2020. Table 2 also lists the SO_2 emissions sources around which each new, approved monitoring network has been established.

Table 2 – Undesignated Areas for Which Louisiana Installed New Monitors (and Associated Source or Sources)

Area	Source(s)
East Baton Rouge Parish	Oxbow Calcining LLC – Baton Rouge
St. James Parish	Rain CII Carbon LLC – Gramercy Calcining Plant
St. Charles Parish	Rain CII Carbon LLC – Norco Calcining Plant
West Baton Rouge Parish	Sid Richardson Carbon Company Ltd. – Addis Plant

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.

Figure 1: EPA's Previous (Rounds 1 and 2, in white font) and Intended (Round 3, in black font) 1-hour SO_2 Designations for Louisiana. Dashed lines denote Tribal Lands.



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 SO_2 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 SO_2 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 SO_2, the EPA released its most recent version of a draft document titled, "SO_2 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 SO_2 Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO_2 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 SO_2 monitoring network meeting EPA specifications referenced in EPA's" DRR. The EPA will therefore designate by December 31, 2017, areas of the country that are not, pursuant to the DRR, timely operating EPA-approved and valid monitoring networks. The areas to be designated by December 31, 2017, include the areas associated with six sources in Louisiana meeting DRR emissions criteria that the state chose to be characterized using air dispersion modeling,[5] the area associated with one source in Louisiana for which the state imposed an emissions limitation to restrict its SO_2 emissions to less than 2,000 tons per year (tpy), 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 parish for which modeling information is available. The remaining to-be-designated parishes (and the remaining portion of Evangeline Parish) 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 SO_2 NAAQS – The primary NAAQS for SO_2 promulgated in 2010. This NAAQS is 75 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.

[4] 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 SO_2 monitoring network design, to advise states that have elected to install and begin operation of a new SO_2 monitoring network. *See* Draft SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf.

[5] The state submitted modeling analyses for three of these six sources. The state also chose the modeling path under the DRR for several sources in Calcasieu Parish, which has already been designated.

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 SO_2NAAQS, 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 SO_2 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) 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 SO_2 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 SO_2 NAAQS demonstrated by air dispersion modeling.
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 Rapides Parish, Louisiana

3.1 Introduction

The EPA must designate Rapides Parish, Louisiana, by December 31, 2017, because no part of the parish has been previously designated and Louisiana 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 Rapides Parish.

3.2 Air Quality Monitoring Data for Rapides Parish, Louisiana

There is no SO_2 air quality monitoring station in Rapides Parish.

3.3 Air Quality Modeling Data for Rapides Parish, Louisiana

3.3.1 Introduction

This section 3.3 presents all the available air quality modeling information for a portion of Rapides Parish that includes Cleco Power LLC, Brame Energy Center (BEC). (This portion of Rapides Parish, Louisiana will often be referred to as "the Brame Energy Center area" within this section 3.3.). This area contains the following SO_2 sources around which Louisiana is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tpy:

- The Brame Energy Center facility emits 2,000 tons or more annually. Specifically, Brame Energy Center emitted 7,131 tons of SO_2 in 2015. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Louisiana has chosen to characterize it via modeling.

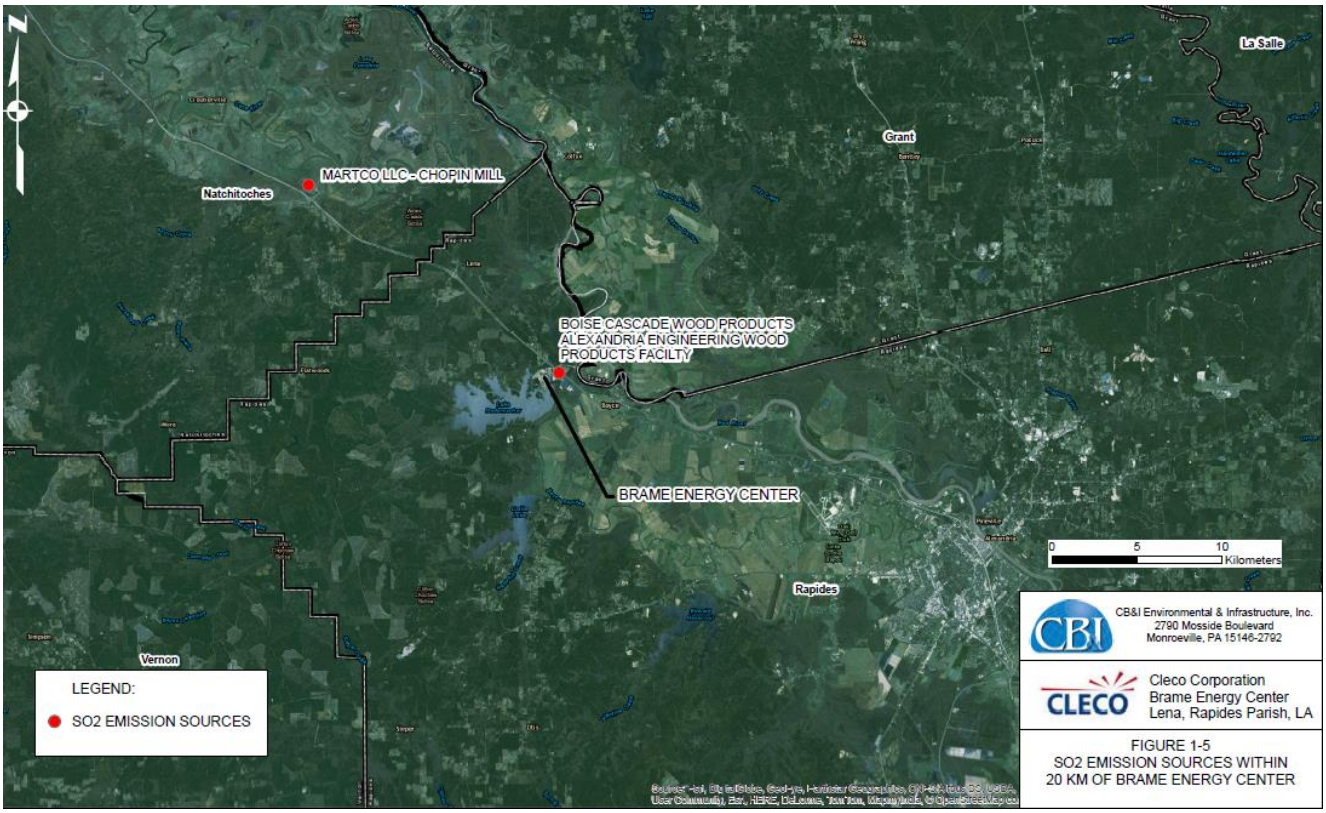
In its May 26, 2011, letter, Louisiana recommended that Rapides Parish be designated as unclassifiable. The state submitted an air quality analysis on January 13, 2017, that characterized the area surrounding the Brame Energy Center in Rapides Parish. The January 13, 2017, submission stated that LDEQ agrees with the conclusion in the consultant's air quality modeling report that Rapides Parish is expected to be in attainment, but LDEQ did not explicitly revise its previous recommendation for Rapides Parish. 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 intends to designate Rapides Parish as unclassifiable/attainment. Our reasoning for this conclusion is explained in section 3.6 of this TSD, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in northern Rapides Parish, Louisiana near the east shore of Lake Rodemacher.

As seen in Figure 2 below, the Brame Energy Center facility is located about 8.5 km SSE of Lena, Louisiana. According to the state's submission, the facility's property is bounded on the east by Interstate Highway 49, on the south by State Highway 121, on the west by Lake Rodemacher, and on the north by State Highway 8.

Also included in Figure 2 are other nearby emitters of SO_2 which were not included in the modeling. These are the Martco Chopin Mill Facility in Natchitoches Parish (2014 emissions of 40 tpy), and the Boise Cascade Alexandria Engineering Wood Products in Rapides Parish (< 1 tpy). Both of these facilities are located within a 20 km radius of the Brame Energy Center facility.

Figure 2: Map of the northern Rapides Parish, Louisiana Area Addressing CLECO Power LLC – Brame Energy Center



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 the company-drafted modeling assessment submitted under the state's letterhead. There were no other submittals concerning this facility.

3.3.2 Modeling Analysis Provided by the State

3.3.2.1 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 15181, the most current available at the time of conducting the modeling. Because no beta options were used in the modeling, just the default options, no significant changes in the modeled concentrations would be expected if the recently released version 16216r were used. The EPA therefore concludes the use of 15181 is acceptable. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

Although the state indicated that it used the 2013 Modeling TAD, the EPA has compared the modeling analyses to the recommendations given in the updated 2016 Modeling TAD, where comparisons to EPA guidance are given in this TSD.

3.3.2.2 Modeling Parameter: Rural or Urban Dispersion

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

The state concluded the area was rural in nature after examining aerial photographs and determining the nearest urban area, Alexandria, Louisiana, is approximately 28 km away. This decision is appropriate considering the rural nature of the area, the nearby lake, and the distance of dense urban structures.

3.3.2.3 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 SO_2 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 SO_2 concentrations.

The source of SO_2 emissions subject to the DRR in this area are described in the introduction to this section. For the Brame Energy Center area, the state has not included other emitters of SO_2 within the area of consideration. The state determined that this was appropriate as the nearest source of SO_2 emissions greater than 50 tpy was 72 km distant (the International Paper Red River Mill near Camti, Louisiana). The EPA agrees with the state that this source is not likely to cause gradients in concentration at the Brame Energy Center. The two previously mentioned sources within 50 km emit less than 50 tpy total and their contributions would be represented by the background concentrations from Shreveport, Louisiana, which has three sources greater than 50 tpy within 22km. These two sources are small and far enough from the area of maximum impacts that they would not align with transport conditions such that they would change the modeling's maximum impact if they were included.

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

- Along property line – receptors spaced 100 meters (m) apart
- From property line to 1 km – receptors spaced 100 m apart
- From 1 km to 10 km – receptors spaced 1000 m apart

The receptor network contained 2,249 receptors, including fenceline receptors, over approximately a 20 km by 20 km area, and the network covered approximately 400 km^2 surrounding the Brame Energy Center facility, located in the northern part of Rapides Parish, Louisiana, near Pineville, Louisiana.

Figures 3 and 4, included in the state's recommendation, show the state's chosen area of analysis surrounding Brame Energy Center, as well as the receptor grid for the area of analysis. The receptor grid included a very small portion of Grant Parish. Because the portion of Grant Parish included in the analysis for the Brame Energy Center is so small (and no violation of the NAAQS is indicated), the modeling analysis assessed in this section is not informative for the designation of the entirety of Grant Parish. Therefore, the intended designation for Grant Parish is addressed in section 7 of this TSD. Impacts from sources in Rapides Parish on this area of Grant County, which are relevant to the intended designation for Rapides Parish, are considered in this section.

Consistent with the Modeling TAD, the state placed receptors for the purposes of this designation effort in locations that would be considered ambient air. While the TAD allows exceptions of locations described in Section 4.2 of the Modeling TAD as not being feasible locations for placing a monitor, the state elected to model at locations that would not normally be selected for installation of a monitor. CLECO owns a large tract of unfenced land surrounding the fenced portion of the facility. These areas are not fenced and can be accessed without going through the facility (lake, railroad, interstate, and Bayou Jean de Jean). Receptors were placed over the unfenced property. However, public access to the fenced, inner portion of the facility property is restricted by fencing and two manned guard shacks and two gates. Only the fence-

restricted areas were excluded from the receptor network and receptors were placed in all directions from these restricted areas. There is a large water body (Lake Rodemacher) to the west and south west of Brame Energy Center. There are also small islands within this lake. These areas have unrestricted public access and therefore were considered as ambient air and had receptors.

Figure 3: Area of Analysis for the Brame Energy Center Area

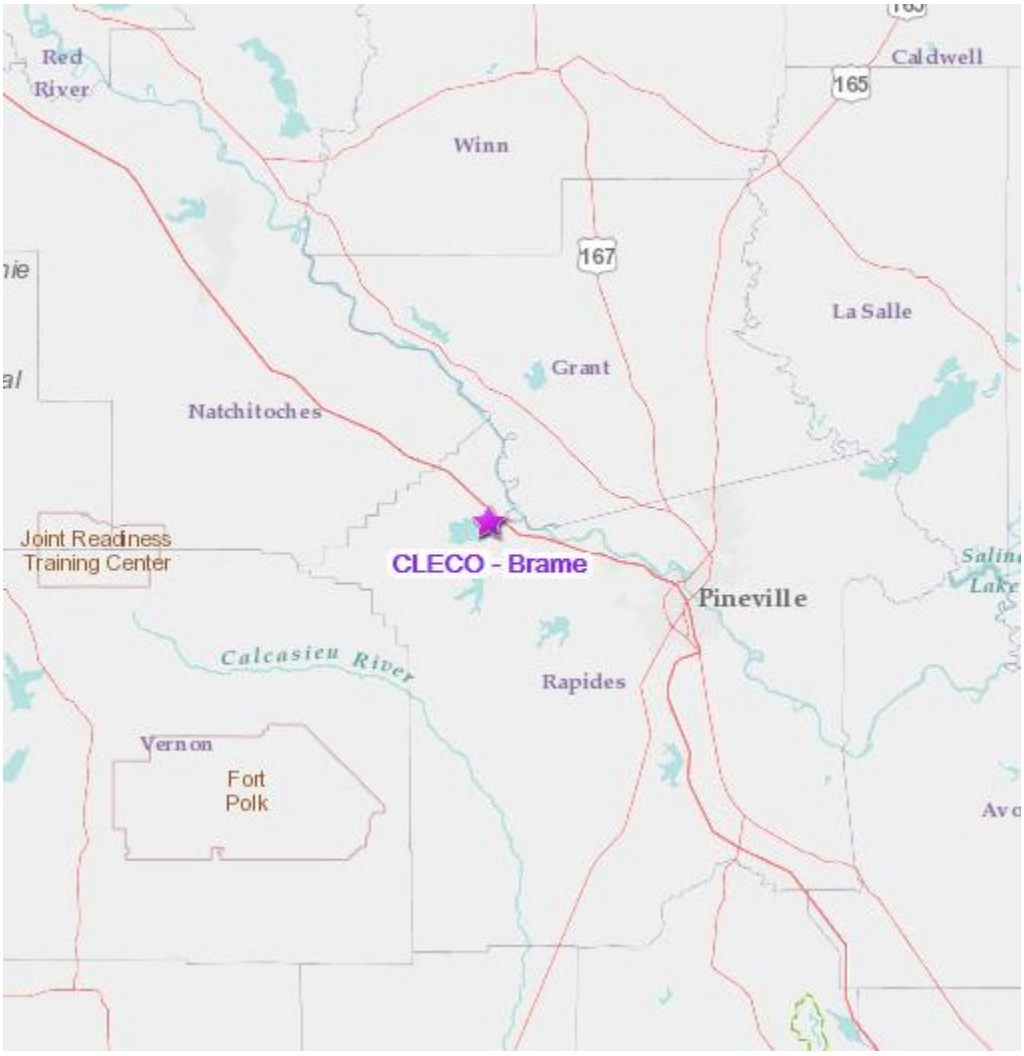
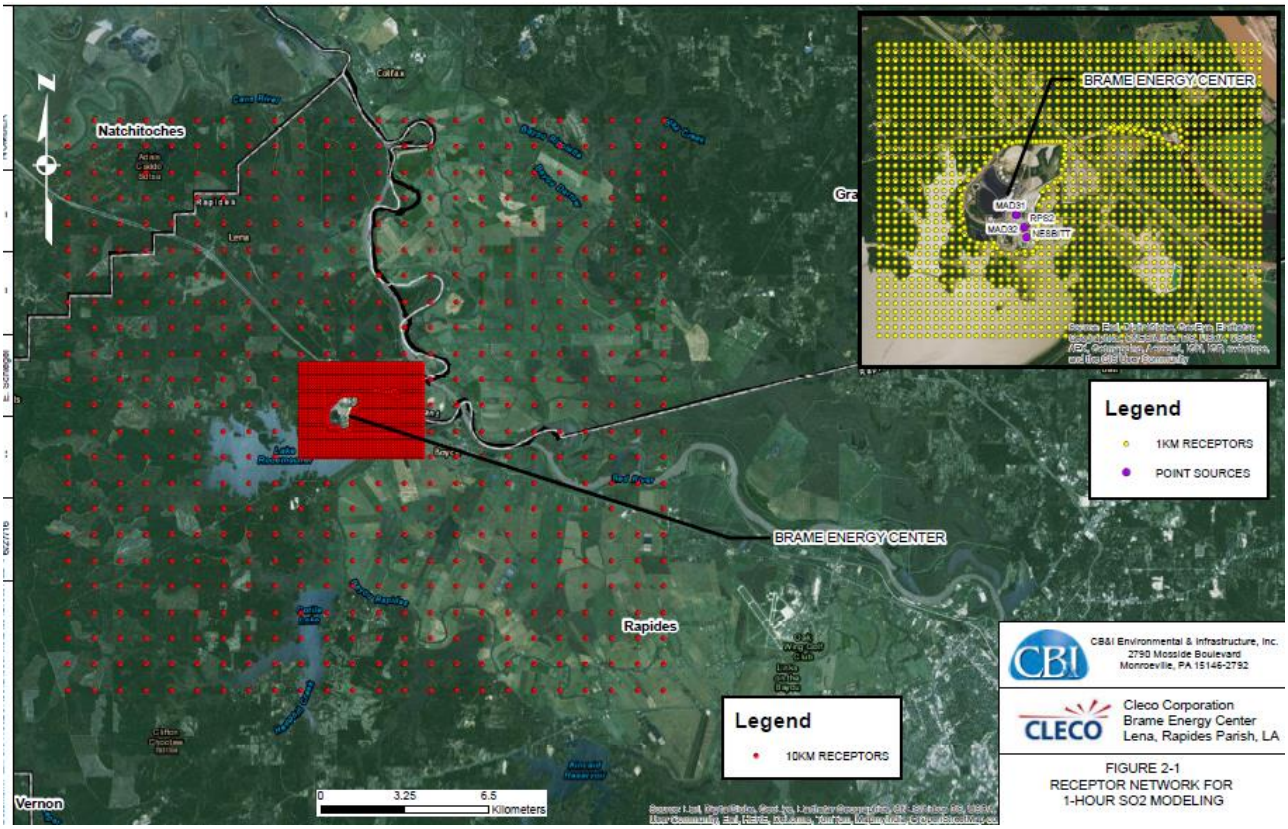


Figure 4: Receptor Grid for the Brame Energy Center Area



Although the grid only extended out to 10km from the plant, the terrain is flat around the facility such that there is no higher elevation area beyond 10 km that might be impacted by an elevated high-concentration plume from the source, other sources are not expected to contribute to the plant's maximum impact, and the results of the analysis showed decreasing impacts as the distance from the source of emissions increased. The concentration levels in the modeling at the edge of the receptor grid are less than 50% of the maximum and are decreasing. Therefore, the extent of the modeling grid, which captured the maximum impact from the plant located very close to the facility, and the placement of receptors as shown in the above illustration, are appropriate.

3.3.2.4 Modeling Parameter: Source Characterization

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

The submitted modeling addressed the four emission sources operating at the Brame Energy Center facility: Nesbit 1, RPS 2, Madison 3-1, and Madison 3-2. These four emitting sources

accounted for more than 99% of the SO_2 emissions within 20 km of Brame Energy Center. The background site in Shreveport, Louisiana, has three SO_2 sources greater than 50 tpy within 22 km, substantially greater than the contributing sources which were not modeled near Brame Energy Center. Therefore, assessing the impact of these emissions sources without explicitly including in the modeling the other minor sources of SO_2 in the area is acceptable.

Hourly stack gas flowrate and stack gas temperatures concurrent with the hourly emissions were used for three of the units. Missing flow and temperature data were presumed to be due to malfunction of the temperature and/or flow monitoring instruments. For these hours, the missing data were replaced by 3-year average values on a unit by unit basis. Unit 1 (Nesbitt 1) does not have a flow monitor and therefore hourly stack flow data was not available. A stack test at 90% load was conducted for this unit in 2006. The stack test provided both stack flow rate and stack temperature. The stack flow rate for each hour was calculated based on this flow rate after adjusting for the change in hourly stack temperature. Because Nesbitt 1 uses pipeline quality natural gas as the primary fuel, the SO_2 emissions are orders of magnitude lower than the other units at Brame Energy Center which burn solid fuels. Therefore, the effect on the modeled results due to the adjustments to the stack gas parameters as described is not expected to be significant.

Building downwash was used for the four sources included in the modeling with the building dimensions and locations and the appropriate stack parameters input to the model.

The state characterized this/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. 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 concludes that the state followed the recommendations of the modeling TAD for charactering the sources.

3.3.2.5 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 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.

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 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 the Brame Energy Center sources and no other emitters of SO_2 in the area of analysis. The state has chosen to model this facility using actual emissions. The facility in the state's modeling analysis and their associated annual actual SO_2 emissions between 2013 and 2015 are summarized below.

For Brame Energy Center, the state provided annual actual SO_2 emissions between 2013 and 2015. This information is summarized in Table 3. A description of how the state obtained hourly emission rates is given below Table 3.

Table 3 - Actual SO_2 Emissions Between 2013 – 2015 from Brame Energy Center

Facility Name	SO_2 Emissions (tpy)		
	2013	2014	2015
CLECO Power LLC – Brame Energy Center	12,524	9,711	7131

For Brame Energy Center, the actual hourly emissions data were obtained from continuous emissions monitors installed on each of the four emission units. The emission rates used in the model were from the hourly raw data that were not corrected for CEMS bias as would be done for data reported to Air Markets Program Data (AMPD). Typically, the bias adjustment for AMPD data is 5% or less, else the CEMS would be recalibrated. Missing CEM data were handled as follows:

- For the hours during which the emission data are unavailable due to CEMs malfunction but the units were running as evidenced by operating logs, the emission data were filled in using the Acid Rain Program data filling procedure in 40 CFR Part 75; and
- For the hours during which the units were shut down as evidenced by the operating logs, these hours were represented in the modeling by entering an emission rate of zero in the AERMOD input file.

Hourly stack gas flowrate and stack gas temperatures concurrent with the hourly emissions were used to develop realistic estimates of the hourly impacts. There were a few hours for each unit in

each year where SO_2 emission rates were available but stack temperature and flow data were missing. The units were presumed to be operating at these hours and the missing data were presumed to be due to malfunction of the temperature and/or flow monitoring instruments. For these hours, the missing data were replaced by a 3-year average value on a unit by unit basis.

Unit 1 (Nesbitt 1) does not have a flow monitor and therefore hourly stack flow data is not available. A stack test at 90% load was conducted for this unit in 2006. The stack test provided both stack flow rate and stack temperature. The stack flow rate for each hour was calculated based on this flow rate after adjusting for the change in hourly stack temperature. For all other units, the hourly stack flow data was obtained from the flow monitors. Because Nesbitt 1 uses pipeline quality natural gas as the primary fuel, the SO_2 emissions are orders of magnitude lower than the other units at BEC which use solid fuels. Therefore, the effect on the modeled results due to the adjustments to the stack gas parameters as described above was expected to be insignificant.

3.3.2.6 Modeling Parameter: Meteorology and Surface Characteristics

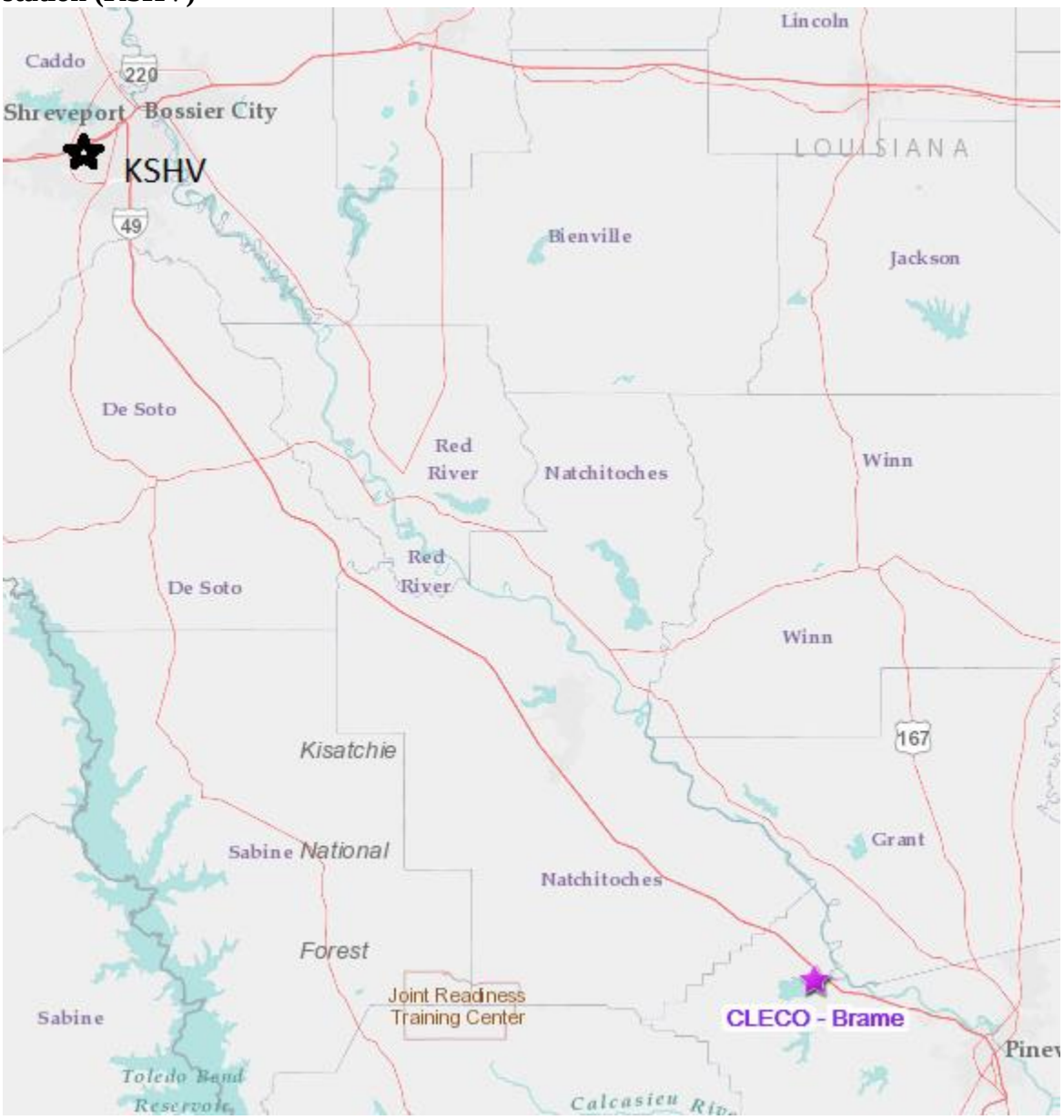
As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of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

For the Brame Energy Center area of analysis, the state selected the surface meteorology and coincident upper air observations from Shreveport, Louisiana Station, KSHV, ID 13957, located at Lat. 32.45 N, Long. 93.82W), 160 km to the northwest of the source as best representative of meteorological conditions within the area of analysis.

The state used AERSURFACE version 13016 using data from Shreveport Regional Airport – WBAN 13957 to estimate the surface characteristics 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 “zo.” The state estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions.

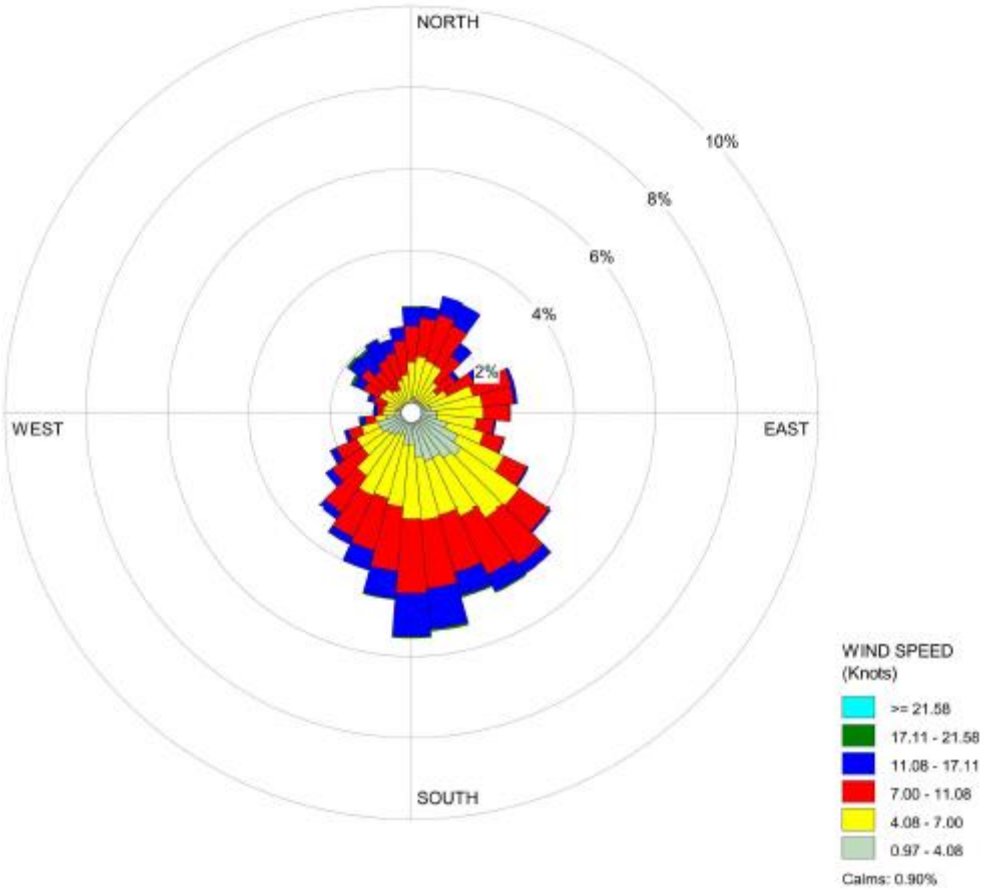
In Figure 5 below, generated by the EPA, the relative location of this NWS station and the Brame Energy Center area of analysis is shown.

Figure 5: Brame Energy Center Area of Analysis and the Shreveport, Louisiana NWS station (KSHV)



As part of its recommendation, the state provided the 3-year surface wind rose for the Shreveport, Louisiana, NWS site. In Figure 6, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The prevailing winds are from the south, especially for the lightest winds.

Figure 6: Shreveport, Louisiana Meteorological Station, Cumulative Annual Wind Rose for Years 2013 – 2015



DATA PERIOD:

START DATE: 1/1/2013 - 00:00
END DATE: 12/31/2015 - 23:59

CB&I Environmental & Infrastructure, Inc.
500 Penn Center Boulevard, Suite 1000
Pittsburgh, Pennsylvania 15235

Cleco Corporation
Brame Energy Center
Lena, Rapides Parish, LA

FIGURE 2-3

3-YEAR COMPOSITE WINDROSE
FROM SHREVEPORT
METEOROLOGICAL STATION

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 draft 2013 SO_2 NAAQS Designation Modeling Technical Assistant Document 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 Shreveport NWS station, among those already mentioned, e.g., "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 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 EPA finds that the meteorology and surface characteristics used in the modeling for Rapides Parish conform to the recommendations of the 2016 Modeling TAD.

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

The terrain in the area of analysis is best described as gently rolling and rural in nature with a large water body adjacent to the source property. To account for these terrain changes, the AERMAP (Version 11103) terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS National Elevation Database North American Datum 83 dataset. We believe this approach is appropriate given the location and geographic features of the area surrounding Brame Energy Center.

3.3.2.8 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 chose the tier 2 approach, calculating the hourly seasonal varying background values for the Shreveport, Louisiana, SO_2 monitor, AQS site ID # 22-015-0008, as shown in Table 4. The background concentrations for this area of analysis were determined by the state to

vary from 4.89 micrograms per cubic meter (µg/m3), equivalent to 1.87 ppb when expressed in 3 significant digits,[6] to 24.89 µg/m3 (9.50 ppb), with an average value of 9.13 µg/m3 (3.49 ppb).

Table 4 - Seasonal Background Values for Shreveport, Louisiana SO_2 Monitor

Hour of Day	Season			
	Winter	Spring	Summer	Fall
1	6.46	6.72	6.81	5.50
2	7.42	6.81	7.51	4.98
3	7.86	6.46	6.90	5.50
4	7.51	6.38	6.99	6.20
5	7.60	6.29	6.90	5.50
6	6.99	6.55	6.81	5.15
7	6.11	6.99	7.25	4.89
8	6.38	8.30	13.54	7.07
9	8.47	9.96	24.45	9.96
10	7.16	11.53	24.89	13.80
11	13.27	11.18	17.99	18.25
12	15.89	11.70	16.16	12.14
13	16.86	10.83	12.31	9.61
14	13.36	9.61	10.04	11.00
15	11.00	8.65	9.78	8.03
16	10.83	7.77	11.88	10.04
17	9.69	8.47	9.69	7.95
18	8.12	8.21	9.43	8.82
19	8.21	7.60	11.00	8.56
20	7.42	7.16	9.17	7.07
21	9.78	6.99	8.21	5.59
22	8.30	8.21	7.16	5.33
23	10.13	9.17	9.96	5.50
24	8.12	7.69	7.25	6.11

The state asserts that the use of the Shreveport SO_2 monitoring data is conservative and would likely over estimate the background concentrations since the 2013-2015 SO_2 emissions within 10 km of the monitor average about 183 tpy while those within 10 km of Brame Energy Center (exclusive of Brame Energy Center emissions) are 0.33 tpy. Although the monitor is not located in the direction from which background air will be commonly advected, the EPA concludes that this is an acceptable, conservative estimate of the SO_2 background for the parish and would likely not underestimate the background concentrations.

[6] The SO_2 NAAQS level is expressed in ppb but AERMOD gives results in µg/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 µg/m^3.

3.3.2.9 Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Brame Energy Center area of analysis are summarized below in Table 5.

Table 5 - Summary of AERMOD Modeling Input Parameters for the Brame Energy Center Area of Analysis

Input Parameter	Value
AERMOD Version	Version 15181 with default parameters.
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	4
Modeled Structures	Several on-site structures were included in downwash analysis. However, only the building dimensions of the four emitting units are given in the modeling file (.ADI)
Modeled Fencelines	2[7]
Total receptors	2249
Emissions Type	Actual
Emissions Years	2013-2015
Meteorology Years	2013-2015
NWS Station for Surface Meteorology	Shreveport, Louisiana Station ID 13957
NWS Station Upper Air Meteorology	Shreveport, Louisiana Station ID 13957
NWS Station for Calculating Surface Characteristics	Shreveport, Louisiana Station ID 13957
Methodology for Calculating Background SO_2 Concentration	Shreveport monitor, AQS Site ID: 22-015-0008 Tier 2 approach based on seasonal hourly design values, using 99th percentile of 2013-2015.
Calculated Background SO_2 Concentration	4.98 to 24.89 μg/m^3 range

[7] The BEC secured property is bounded by two separate fencelines.

The results presented below in Table 6 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

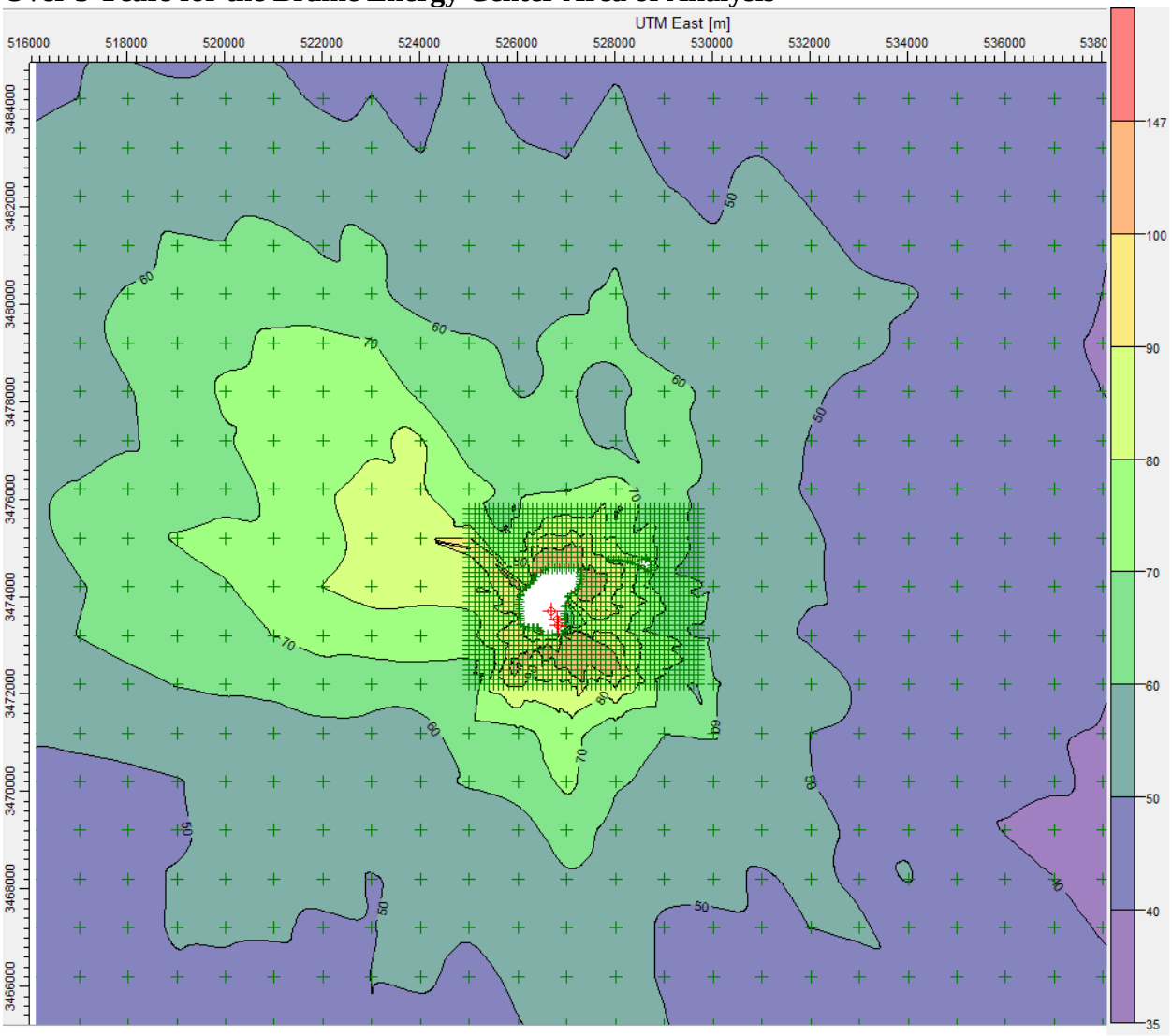
Table 6 - Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over 3 Years for the Brame Energy Center Area of Analysis

Averaging Period	Data Period	Receptor Location UTM zone 15N		99th percentile daily maximum 1-hour SO_2 Concentration (µg/m3)	
		UTM	UTM	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013-2015	527323 E	3473102 N	147	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 µg/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 147 µg/m3, equivalent to 56.13 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility. Figure 7 generated by the EPA from the modeling files provided by the state, and indicates the maximum modeled design value that occurred at UTM 527323 E, UTM 3473102 N, just to the SSE of the facility and located on the highest resolution receptor grid. The state's receptor grid is also shown in the figure. The red plus signs indicate the locations of the stacks.

Figure 7: Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for the Brame Energy Center Area of Analysis



The modeling submitted by the state does not indicate that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration.

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

The modeling provided by the state used appropriate methods and data in a manner consistent with the guidance provided by the EPA. The modeling analysis showed a consistent pattern of decreasing concentrations at increasingly greater distances from the source of emissions. At no point did the predicted design values exceed or approach the 2010 SO_2 NAAQS. The analysis provided by the state used the most current version of AERMOD, as well as acceptable, current and complete meteorological and emissions data.

3.4 Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for Rapides Parish, Louisiana

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 Rapides Parish, Louisiana

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Rapides Parish. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable. For purposes of this analysis we are using the legal boundaries of Rapides Parish, Louisiana, to define the area subject to our intended unclassifiable/attainment designation.

3.6 The EPA's Assessment of the Available Information for Rapides Parish, Louisiana

Based on the modeling information submitted by the state, showing that 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, we intend to designate Rapides Parish, Louisiana, as a separate unclassifiable/attainment area for the 2010 SO_2 NAAQS.

The modeling results, the conservative nature (i.e., unlikely to underestimate ambient concentrations) of the approach for calculating the background values for SO_2, and the placement of finely-spaced receptors in the area of maximum impact for the area of analysis show the area is in compliance with the standard.

We have considered whether sources in Rapides Parish contribute to ambient air quality in a nearby area that was not included in the modeling grid. The only such nearby area to Rapides Parish for which there is information to expect a violation of the NAAQS is a small area in Evangeline Parish around Cabot Corporation's Ville Platte Plant (see section 4 of this chapter). This small area in Evangeline Parish is at least 23 km from the nearest part of Rapides Parish and over 80 km from the Brame Energy Center. The nearest Round 4 sources are in East Baton Rouge Parish and West Baton Rouge Parish, about 100 km distant for the closest portion of Rapides Parish. We therefore conclude that sources in Rapides Parish do not contribute to air quality in any nearby area that does not meet the NAAQS.

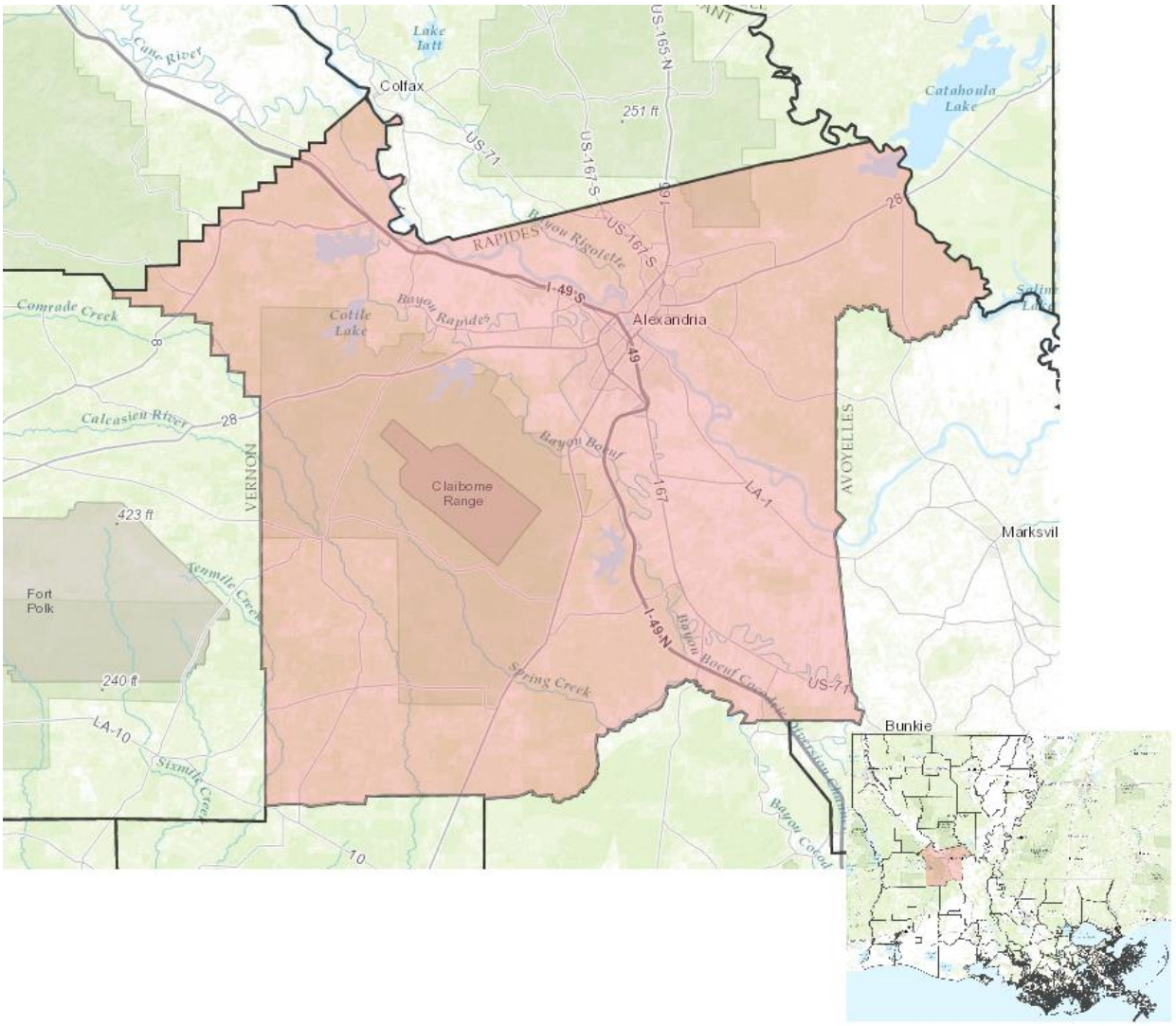
The EPA believes that our intended unclassifiable/attainment area, bounded by the legal jurisdictional boundaries of Rapides Parish, Louisiana, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment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

3.7 Summary of Our Intended Designation for Rapides Parish, Louisiana

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate Rapides Parish, Louisiana, as unclassifiable/attainment for the 2010 SO_2 NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined the area (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundaries are comprised of legal, jurisdictional boundaries of Rapides Parish, Louisiana.

Figure 8 shows the boundary of this intended designated area.

Figure 8: Boundary of the Intended Rapides Parish, Louisiana, Unclassifiable/Attainment Area



At this time, our intended designations for the state only apply to this area and other areas addressed in other sections of this TSD. The EPA intends in a separate action to evaluate and designate all remaining undesignated areas in Louisiana by December 31, 2020.

4. Technical Analysis for a Portion of Evangeline Parish, Louisiana

4.1 Introduction

The EPA must designate Evangeline Parish, Louisiana by December 31, 2017, because no part of the parish has been previously designated and Louisiana 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 Evangeline Parish, Louisiana.

In its May 26, 2011, letter, Louisiana recommended that Evangeline Parish, be designated as unclassifiable. The state submitted an air quality analysis on January 13, 2017, that addressed the area surrounding the Cabot Corporation's Ville Platte Plant in Evangeline Parish. The January 13, 2017, submission did not explicitly revise LDEQ's previous recommendation for Evangeline Parish. In our intended designation, we have considered all the submissions from the state.

We did not receive any other recommendations or modeling analyses concerning the Cabot Ville Platte Plant.

This section addresses the area around Cabot Corporation's Ville Platte Plant in Evangeline Parish. The remainder of the parish is addressed in section 7, because the available air quality modeling analysis does not provide any information for the remainder of the parish.

4.2 Air Quality Monitoring Data for Evangeline Parish, Louisiana

There is no SO_2 air quality monitoring station in Evangeline Parish.

4.3 Air Quality Modeling Data for Evangeline Parish, Louisiana

4.3.1 Introduction

This section 4.3 presents all the available air quality modeling information for Evangeline Parish, Louisiana, which addresses the area around Cabot Corporation's Ville Platte Plant. (This area will often be referred to as "the Ville Platte Plant area" within this section 4.3.) This area contains the following SO_2 source, around which Louisiana is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tpy:

- The Cabot facility produces black carbon. It emits 2,000 tons or more annually. Specifically, Cabot emitted 8,661 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR source list, and Louisiana has chosen to characterize it via modeling. Louisiana has stated this source has been placed under a consent decree[8] and is expected to have lower emissions in future years (minor reductions starting in 2015

[8] USEPA and Louisiana Department of Environmental Quality vs. Cabot Corporation, November 2013, https://www.epa.gov/enforcement/cabot-corporation-clean-air-act-settlement.

but the large reductions will not occur until additional controls are projected to be installed by June 2021 currently).

In its January 13, 2017, submission, Louisiana has not recommended that the area surrounding the Cabot facility be designated nonattainment with respect to the 2010 SO_2 NAAQS. However, the results of the modeling submitted by the state show violations of the NAAQS in the area surrounding Cabot. We intend to designate the area around the Cabot facility as nonattainment for the 2010 SO_2 NAAQS. Specifically, the designated nonattainment area would be a rectangular portion of Evangeline Parish defined by vertices with the UTM coordinates:

570250m E, 3400300m N
570250m E, 3403300m N
572400m E, 3403300m N
572400m E, 3400300m N

NAD83 15R

This intended designation is based on an assessment and characterization of air quality impacts from this facility. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. Our reasoning for this conclusion is explained in section 4.7 of this TSD, after all the available information is presented.

We also intend to designate the remainder of Evangeline Parish as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the designated unclassifiable/attainment area would be that portion of the parish outside a rectangular area defined by vertices with the UTM coordinates:

570250m E, 3400300m N
570250m E, 3403300m N
572400m E, 3403300m N
572400m E, 3400300m N

NAD83 15R

The area that the state has assessed via air quality modeling is located within 20 km of the Cabot facility and is entirely in Evangeline Parish, Louisiana. The Cabot facility is located approximately 6.5 km north northeast of Ville Platte, Louisiana, near the intersection of Tate Cove Rd and Cabot Rd. The Cabot facility is the largest source of SO_2 emissions in the area.[9] Figure 9 is a map of the area around the Cabot facility. The EPA's intended nonattainment designation boundary for the Evangeline Parish area is not shown in this figure, but is shown in a figure in section 4.8 that summarizes our intended designation.

[9] SO_2 emissions from the Cabot Facility account for more than 99% of the emissions in Evangeline Parish.

Figure 9: Map of the Ville Platte Plant Area

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.

4.3.2 Modeling Analysis Provided by the State

The Louisiana Department of Environmental Quality submitted a modeling report for the Cabot Ville Platte facility on January 13, 2017. An analysis of that submittal follows.

4.3.2.1 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 version 15181
- AERMAP: the terrain processor for AERMOD version 11103
- AERMET: the meteorological data processor for AERMOD version 14134
- BPIPPRM: the building input processor version 04112
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data version 14343
- AERSURFACE: the surface characteristics processor for AERMET version 13016
- AERSCREEN: a screening version of AERMOD Not used for Evangeline Parish analysis

The state used AERMOD version 15181, the most current available at the time of conducting the modeling. Since no beta options were used and only default options in the model, no significant

changes in the modeled concentrations would be expected if the recently released version 16216r were used. The EPA therefore concludes the use of 15181 is appropriate. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

4.3.2.2 Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is 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. We evaluated information provided (zoomed in on the area around the facility in images provided in the modeling materials) and concur that the area analyzed is rural in nature and the selection of the rural mode for the model is appropriate.

4.3.2.3 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 SO_2 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 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 Ville Platte Plant area, the state has not included other emitters of SO_2 because it did not identify any other sources emitting 15 tpy or more of SO_2 within 50 km of the facility. 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 violation 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.

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

- A 20 km rectangular grid centered on the Cabot facility, extending 10 km in each direction;
- A spacing of 100 m out to a distance of 2 km from the fence line of the facility; and then spacing of 500 m from 2 km to 5 km; and, finally, 1000 m from 5 km to 10 km;

The receptor network contained 25,834 receptors. The network is contained within the eastern portion of Evangeline Parish. The overlapping of the receptors was caused by the state's generating a "fenceline grid" in BEEST with the tiers as given above.

Figures 10, 11, and 12, derived from the state's submittal, show the state's chosen area of analysis surrounding the Cabot facility, as well as the near- and far-field receptor grids 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. Only the area within the Cabot Ville Platte fenceline was excluded from the analysis, and this exclusion was not complete. The state placed some model receptors within the fenceline of the Cabot facility which were included in the design value calculations. Even considering these receptors, the highest modeled design value occurred outside the facility property

Figure 10: Area of Analysis for the Ville Platte Plant Area. The radius of the circle is 20 km.

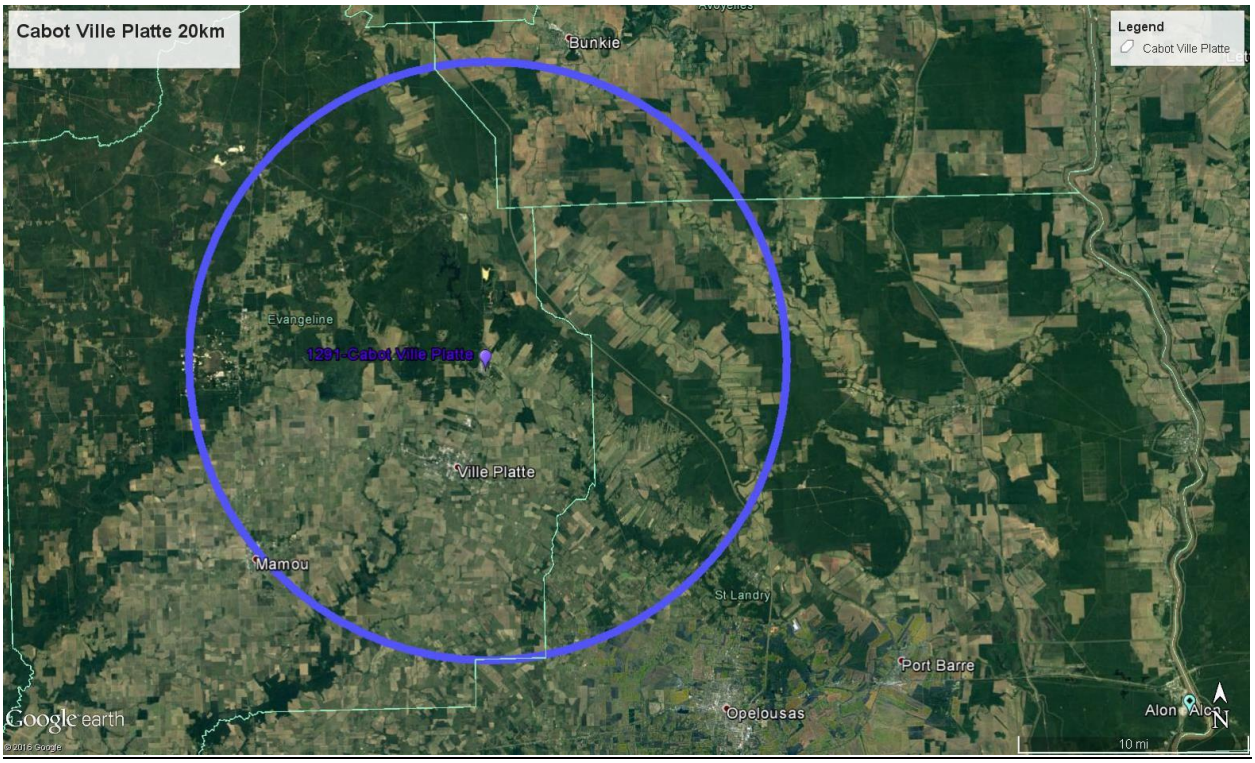


Figure 11: Far-Field Receptor Grid for the Ville Platte Plant Area

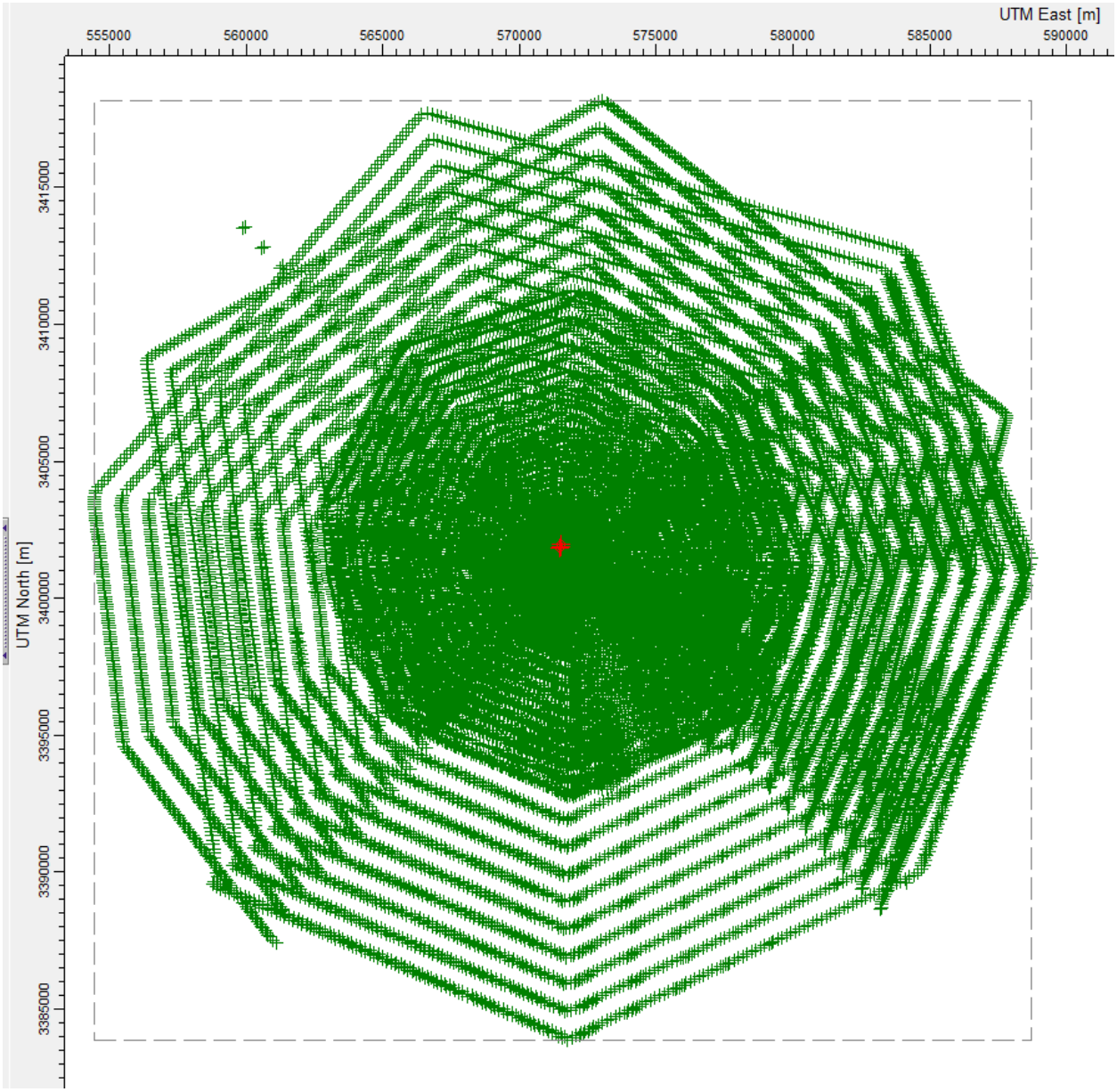
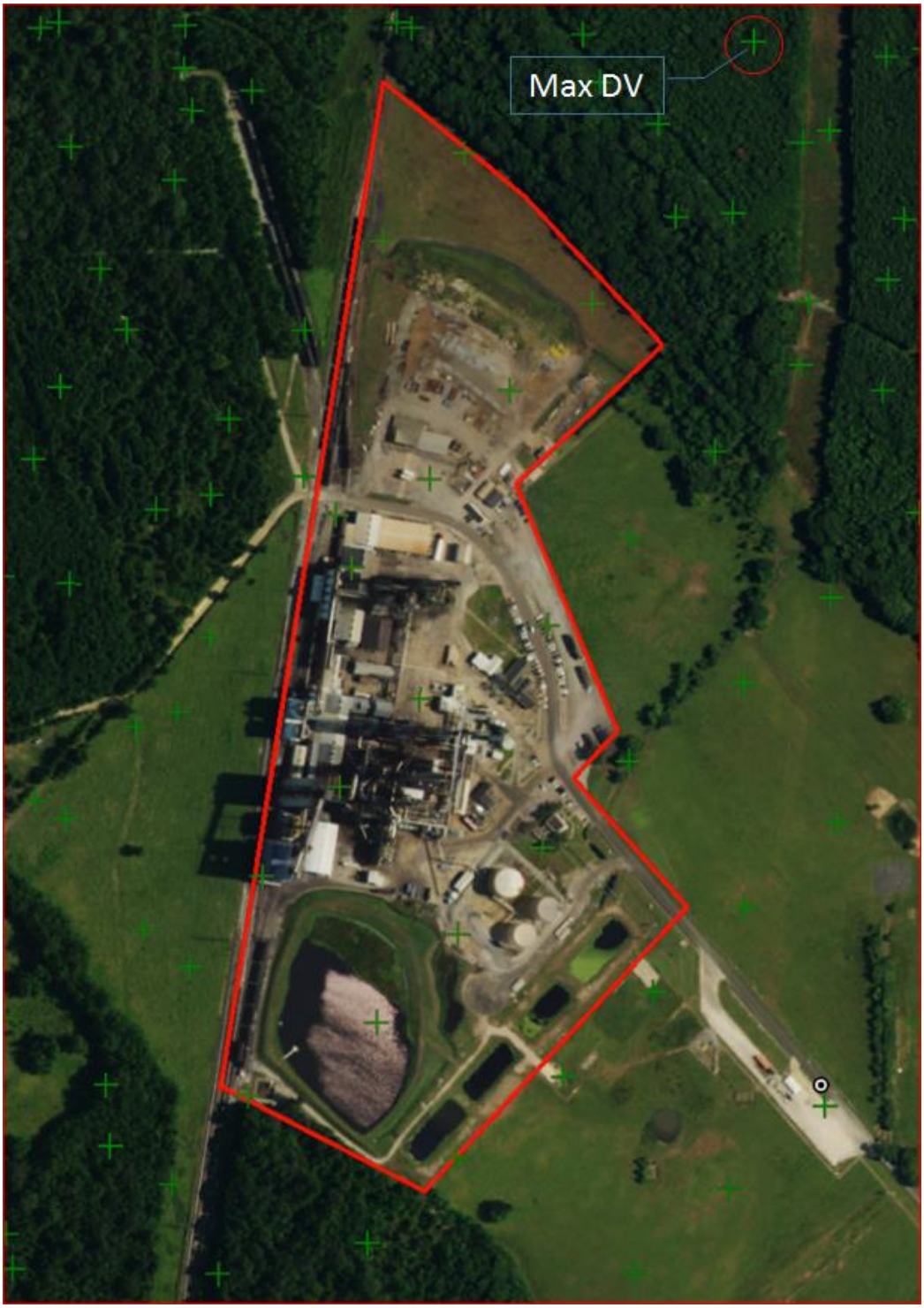


Figure 12: Near-field Receptor Grid for the Ville Platte Plant Area. The green "+" symbols represent the locations of receptors around the Cabot Ville Platte facility with the location of the maximum design value indicated by the red circle. Some receptors are evident within the facility fenceline itself (red boundary) and were included in the design value calculation using the modeled results.



4.3.2.4 Modeling Parameter: Source Characterization

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

The state modeled only the emission sources from the Cabot facility since this source accounted for greater than 99% of the SO_2 emissions in the parish and there are no other sources of SO_2 greater than 15 tpy within 50 km of the site.

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 EPA concludes that the source characterization by the state conforms with the guidelines of the modeling TAD.

4.3.2.5 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 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 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 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 only Cabot within the area of analysis. The state has chosen to model the facility using actual emissions. The annual actual SO_2 emissions of the facility between 2013 and 2015 are summarized below.

For the Cabot facility, the state provided annual actual SO_2 emissions between 2013 and 2015. This information is summarized in Table 7. A description of how the state obtained hourly emission rates is given below Table 7.

Table 7 - Actual SO_2 Emissions Between 2013 – 2015 from Cabot Corp. -- Ville Platte Plant

Facility Name	SO_2 Emissions (tpy)		
	2013	2014	2015
Cabot Corp. -- Ville Platte Plant	8,519.76	8,661.39	8,094.1

For the Cabot facility, the actual hourly emissions data were used in the modeling. The state calculated actual hourly emission data using operational data provided by the facility.

4.3.2.6 Modeling Parameter: Meteorology and Surface Characteristics

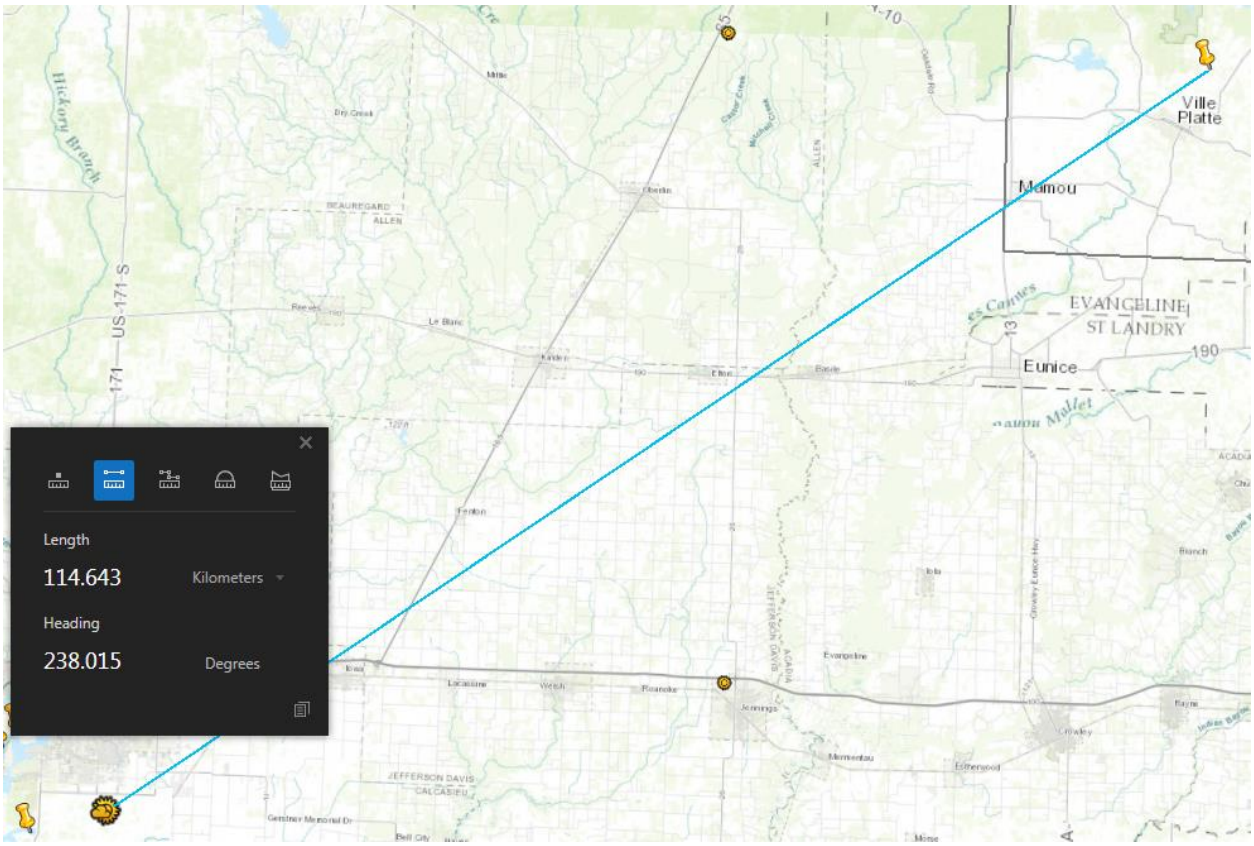
As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of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

For the Ville Platte Plant area, the state selected the surface meteorology and coincident upper air observations from the NWS station in Lake Charles Regional Airport, station ID 3937, Lake Charles, Louisiana, located at latitude 30.13°N, longitude 93.22°W, 115.3 km to the southwest of the source as best representative of meteorological conditions within the area of analysis.

The state used AERSURFACE version 13016 using data from the Lake Charles NWS station to estimate the surface characteristics 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 25,834 spatial sectors out to 10 km at an annual temporal resolution for average conditions.

In Figure 13 below, generated by the EPA, the location of this NWS station is shown relative to the area of analysis.

Figure 13: Area of Analysis and the NWS station in the Ville Platte Plant Area



The EPA has generated a 3-year wind rose using the surface data. In Figure 14, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The predominant wind directions are from the northeast and from the south while winds from the west are very rare. The concentration contour plot reflects the predominant wind directions with much lower design values to the west of the facility.

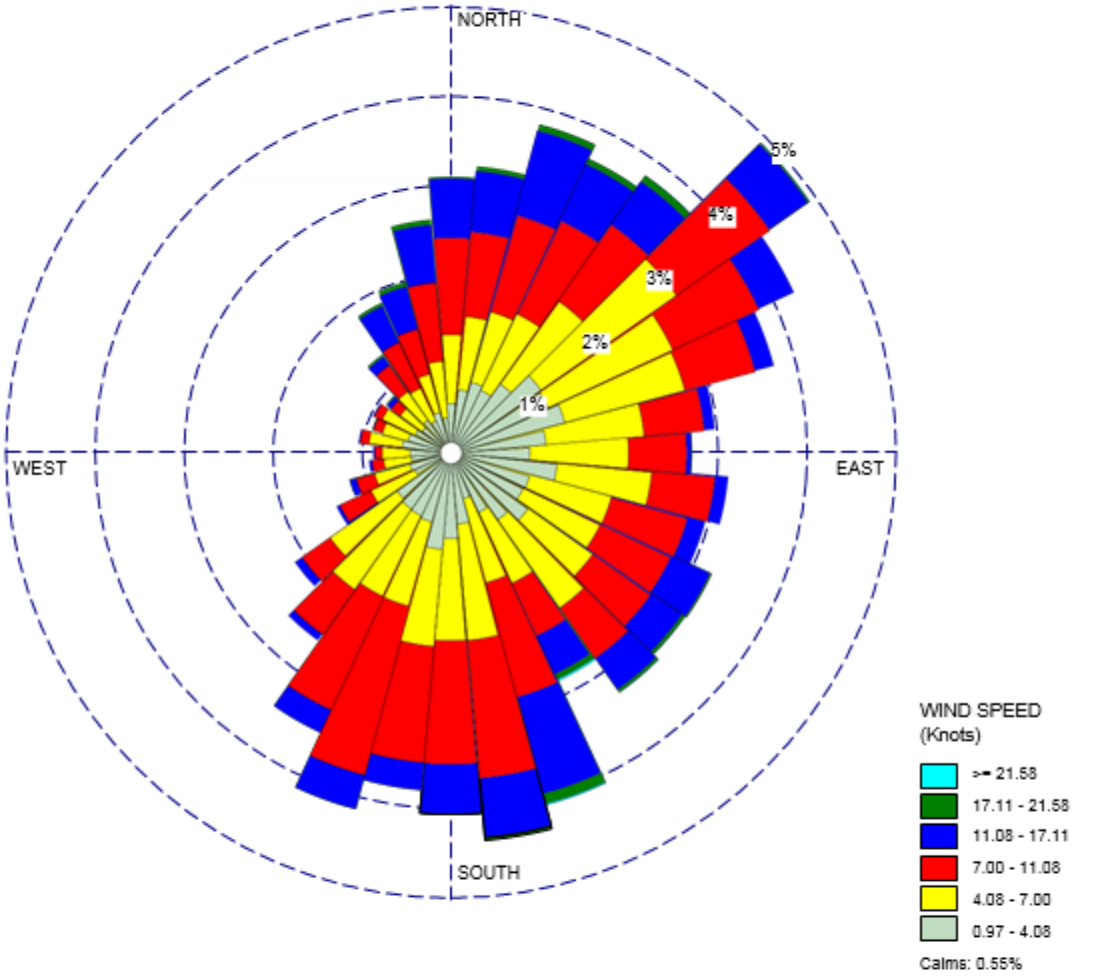
Figure 14: Evangeline Parish Cumulative Annual Wind Rose for Years 2013 – 2015 for the Lake Charles Surface Meteorological Data

WIND ROSE PLOT:

Station #03937 - LAKE CHARLES/MUNICIPAL ARPT, LA

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2013 - 00:00 **End Date: 12/31/2015 - 23:59**	MODELER:	
	CALM WINDS: **0.55%**	TOTAL COUNT: **26199 hrs.**	
	AVG. WIND SPEED: **6.71 Knots**	DATE: **3/22/2017**	PROJECT NO.:

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 modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration was provided from the Lake Charles airport 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.

In summary, the EPA finds that the state followed the guidance of the Modeling TAD in processing the meteorological data and the site chosen was the closest site which had both upper air and surface data available. It used the most recent 3 years of meteorological data available.

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

The terrain in the area of analysis is best described as flat 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 Digital Elevation Model data.

The relative lack of terrain relief, especially near the Cabot facility where the highest modeled design values occur indicate that the terrain plays a minor role in the distribution of SO_2 impacts from the facility.

4.3.2.8 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 chose the tier 1 option, using the 3-year design value derived from the West Baton Rouge monitor: AQS site ID 221210001, which is approximately 29 km from the Cabot

facility and is located in an area with a larger industry footprint than the area around the Cabot facility. The single value of the background concentration for this area of analysis was determined by the state to be 19 micrograms per cubic meter (μg/m3), equivalent to 7.3 ppb when expressed in two significant figures, and that value was incorporated into the final AERMOD results.

The state's decision to use the background concentration monitored at the West Baton Rouge monitor is conservative in this case given the larger concentration of industry in that area and the lack of similarly emitting SO_2 emission sources in Evangeline Parish other than the Cabot facility. However, even if a background of zero were assumed, the modeling of the sources resulted in modeled violations, so the conclusion from the modeling would not change.

4.3.2.9 Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Evangeline Parish area of analysis are summarized below in Table 8.

Table 8 - Summary of AERMOD Modeling Input Parameters for the Ville Platte Plant Area

Input Parameter	Value
AERMOD Version	Version 15181 with regulatory defaults
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	5
Modeled Structures	5
Modeled Fencelines	Yes
Total receptors	25834
Emissions Type	Actual
Emissions Years	2013-2015
Meteorology Years	2013-2015
NWS Station for Surface Meteorology	Lake Charles NWS
NWS Station Upper Air Meteorology	Lake Charles NWS
NWS Station for Calculating Surface Characteristics	Lake Charles NWS
Methodology for Calculating Background SO_2 Concentration	Tier 1, AQS site 221210001, West Baton Rouge
Calculated Background SO_2 Concentration	19 μg/m3

The results presented below in Table 9 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 9 - Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over 3 Years for the Ville Platte Plant Area

Averaging Period	Data Period	Receptor Location UTM zone 15R		99th percentile daily maximum 1-hour SO_2 Concentration (µg/m3)	
		UTM	UTM	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013-2015	571696 E	3402478 N	277.6	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 µg/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 277.6 µg/m3, equivalent to 105.99 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility. Figures 15 and 16 below were included as part of the state's recommendation, and indicate that the predicted value occurred near the Northeast boundary of the Cabot facility at UTM 571696 N, 3402478 W.

Figure 15: Far Field Modeling Results Contour with Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for the Area of Analysis for the Evangeline Parish Area

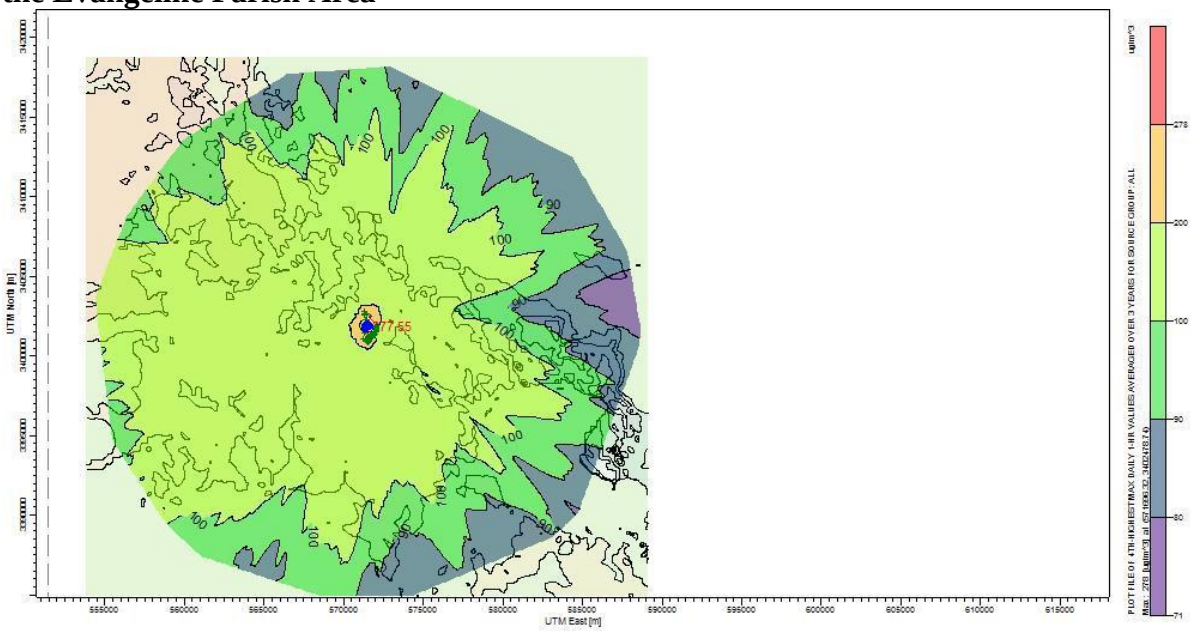
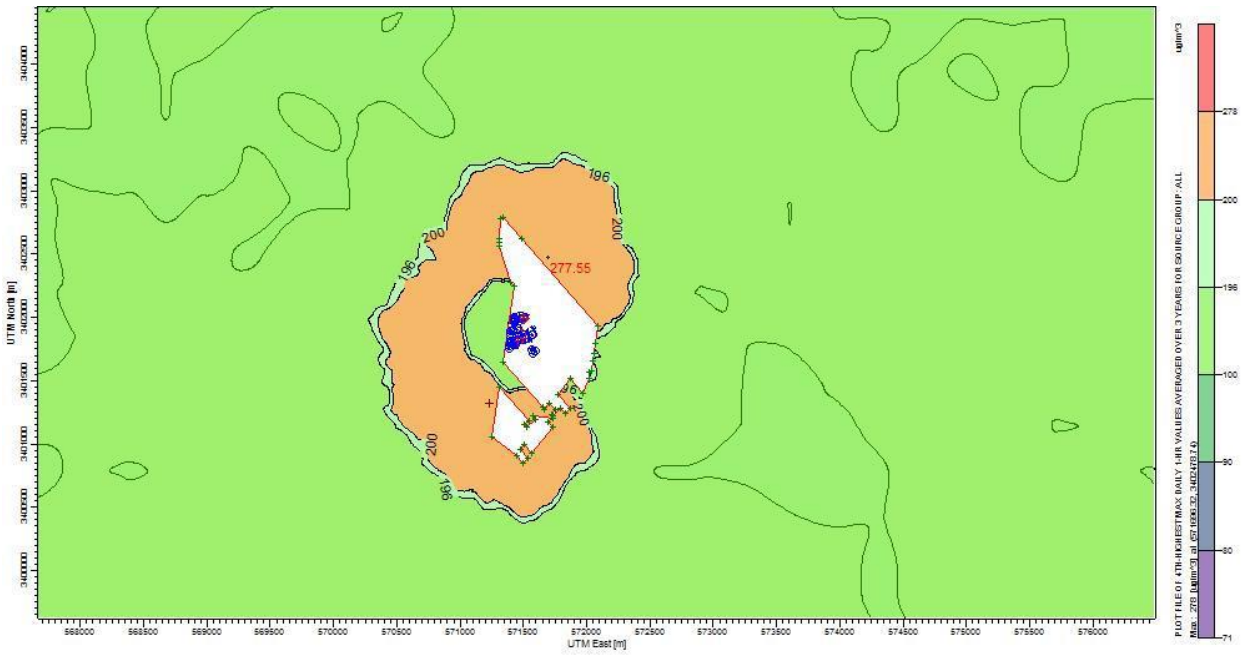


Figure 16: Near Field Impact Contour with Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for the Area of Analysis for the Evangeline Parish Area



The modeling submitted by the state indicates that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration. The modeling results also identify the area in which a NAAQS violation was modeled, information that is relevant to the selection of the boundaries of the area that will be designated. There are no sources with emission rates greater than 15 tpy within 50 km of Cabot Ville Platte, so there is no information to suggest that sources other than the Cabot facility contribute to a NAAQS violation near the facility. We intend to designate an area around the Cabot facility as nonattainment for the 2010 SO_2 NAAQS. Specifically, the designated nonattainment area would be a rectangular portion of Evangeline Parish defined by vertices with the following UTM coordinates: The model indicated violation of the NAAQS only within this geographic area and the boundaries described will adequately encompass this area of violation. A review of the 2014 NEI indicates that there are no neighboring parishes that have sources with emissions over 100 tpy other than Rapides parish discussed above. Therefore, we did not identify any areas in surrounding parishes that were potentially violating the standard, therefore there are no nearby areas in other parishes where Cabot would be expected to contribute to violations.

570250m E, 3400300m N
570250m E, 3403300m N
572400m E, 3403300m N
572400m E, 3400300m N

NAD83 15R

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

The sole modeling results made available to the EPA for the Evangeline Parish area were from Louisiana. The modeling submitted by the state indicates that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration. The state followed the EPA guidance contained in the Modeling TAD for receptors, emissions, surface processing, and meteorology. The default options for the version of AERMOD employed were set and an appropriate rural land use characterization were used. While a conservative methodology (i.e., likely to overestimate concentrations) was used for estimating the background concentrations for the facility, even if a background of zero were assumed, the conclusion from the modeling that the 1-hour SO_2 NAAQS is violated would not change. We consider the modeling results to be appropriate for the purposes of designating Evangeline Parish.

4.4 Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for Evangeline Parish, Louisiana

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 Evangeline Parish, Louisiana

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Evangeline Parish. To the extent possible and appropriate, our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable. In the case of Evangeline Parish there is a single major source of SO_2 emissions.

The state's May 26, 2011, recommendation was that the entirety of Evangeline Parish be designated unclassifiable. While the state subsequently furnished the modeling showing an area of nonattainment for the Evangeline Parish it did not recommend a designation and therefore, as well, did not recommend boundaries in the context of a designation of nonattainment. The EPA observes that the modeled area of nonattainment is confined to the immediate surroundings of the Cabot facility and that the design value gradients fall off rapidly with distance. There are no other sources of SO_2 greater than 15 tpy within 50 km to influence the concentrations in the area of nonattainment. The EPA reviewed the 2014 NEI for the surrounding parishes and only the Rapides Parish discussed previously had a source with emissions over 100 tpy. Therefore, other than Rapides Parish which has been modeled and demonstrates no NAAQS violations, there are no other surrounding parishes where violations would be expected. Thus, there are no surrounding areas that Cabot could contribute to violations of the NAAQS. The EPA is not aware of any existing physical or jurisdictional boundaries that could be used to define an area that would include the area of modeled violation of the NAAQS without also including considerable area with no indication of NAAQS violation and without including areas that do not contribute to the air quality impacts in the nonattainment area.

4.6 Other Information Relevant to the Designations for the Evangeline Parish Area

Our review of the available information for Evangeline Parish has found that there are no:

- 3rd party modeling results available.
- Relevant SO_2 monitoring data available.
- Other areas of analysis within Evangeline Parish.
- Nearby designated nonattainment areas or areas intended to be designated nonattainment in this round that pose an issue of whether the Cabot facility would be contributing to their nonattainment.
- Sources with emission rates greater than 15 tpy within 50 km of Cabot Ville Platte.
- Sources located within 85 km with emissions greater than 100 tpy and whose impact would not be represented through the background concentration.
- Nearby undesignated areas with newly installed and timely operating monitoring networks that are not being designated at this time.
- Recent reductions in actual or PTE emissions in current effect.

4.7 The EPA's Assessment of the Available Information for the Evangeline Parish, Louisiana Area

Based on our review of the modeling submitted by the state, and the absence of any other contravening evidence, we find the geographic area defined by the following UTM coordinates:

570250m E, 3400300m N
570250m E, 3403300m N
572400m E, 3403300m N
572400m E, 3400300m N

NAD83 15R

as displayed in Figure 17 (below) to be an appropriate definition for the intended designation. The model indicated violations of the NAAQS only within this geographic area and the boundaries described will adequately encompass this area of violation. This area is approximately 2 km by 4 km.

We do not believe it is appropriate to define a wider geographic area as part of the nonattainment area because the Cabot facility accounts for greater than 99% of the recorded SO_2 emissions in the Parish. We have no information that suggests that any source outside our intended nonattainment area contributes to the air quality within the intended nonattainment area.

The EPA believes that our intended nonattainment area, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended nonattainment area.

4.8 Summary of Our Intended Designation for Evangeline Parish, Louisiana

Louisiana recommended a designation of unclassifiable for Evangeline Parish. EPA regulations for implementing the SO_2 NAAQS require Louisiana to characterize SO_2 air quality in Evangeline Parish. After careful evaluation of the information provided by the state, as well as the current (2014-2016) air monitoring data and air dispersion modeling analyses provided by Louisiana, the modeling results indicating that a portion of Evangeline Parish may be violating the 2010 primary SO_2 NAAQS or contains sources that may be contributing to air quality in a nearby area that may be violating the 2010 primary SO_2 NAAQS, which would require a modification of the recommended designation. We invite Louisiana to review the available information and further discuss this issue with the EPA in order to inform an appropriate final designation.

Specifically, the designated nonattainment area would be a rectangular portion of Evangeline Parish defined by vertices with the following UTM coordinates:

570250m E, 3400300m N
570250m E, 3403300m N
572400m E, 3403300m N
572400m E, 3400300m N

NAD83 15R

The remainder of Evangeline Parish, outside of the intended nonattainment area, is intended to be designated as unclassifiable/attainment.

Figure 17: Intended Nonattainment Area for the SO_2 NAAQS for Evangeline Parish, Louisiana

At this time, our intended designations for the state only apply to this area and the other areas addressed in this chapter. The intended designation for the remainder of Evangeline Parish is

Unclassifiable/Attainment. The EPA intends in a separate action to evaluate and designate all remaining undesignated areas in Louisiana by December 31, 2020.

5. Technical Analysis for St. Mary Parish, Louisiana

5.1 Introduction

The St. Mary Parish, Louisiana, is located in south-central Louisiana on Vermilion Bay, which empties into the Gulf of Mexico. The EPA must designate St. Mary Parish by December 31, 2017, because no part of the parish has been previously designated and Louisiana 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 St. Mary Parish.

In its May 26, 2011, letter, Louisiana recommended that St. Mary Parish be designated as unclassifiable. St. Mary Parish contains three SO_2 sources with 2014 emissions greater than 2,000 tpy which were listed by Louisiana as subject to the Data Requirements Rule. In its letter of July 1, 2016, Louisiana elected to meet the DRR requirements to characterize air quality in the area around these listed sources through air quality modeling. The state has not submitted an air quality modeling analysis that addresses this area. As well, there are no monitors sited in locations which would be expected to measure the maximum impact from the three sources or the area. The operational SO_2 monitoring site nearest to the DRR sources in St. Mary Parish is over 80 km distant.

5.2 Air Quality Monitoring Data St. Mary Parish

There is no SO_2 air quality monitoring station in St. Mary Parish.

5.3 Air Quality-Related Information for St Mary Parish, Louisiana

A portion of St. Mary Parish contains the following SO_2 sources around which Louisiana is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tpy:

- The Cabot – Canal facility emits 2,000 tons or more annually. Specifically, Cabot – Canal emitted 6,365 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Louisiana has chosen to characterize it via modeling.
- The Orion - Ivanhoe facility emits 2,000 tons or more annually. Specifically, Orion - Ivanhoe emitted 6,266 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Louisiana has chosen to characterize it via modeling.
- The Columbia – North Bend facility emits 2,000 tons or more annually. Specifically, Columbia – North Bend emitted 6,297 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Louisiana has chosen to characterize it via modeling.

Because these sources are in close proximity, such that the impact of their emissions likely combine and should be 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.

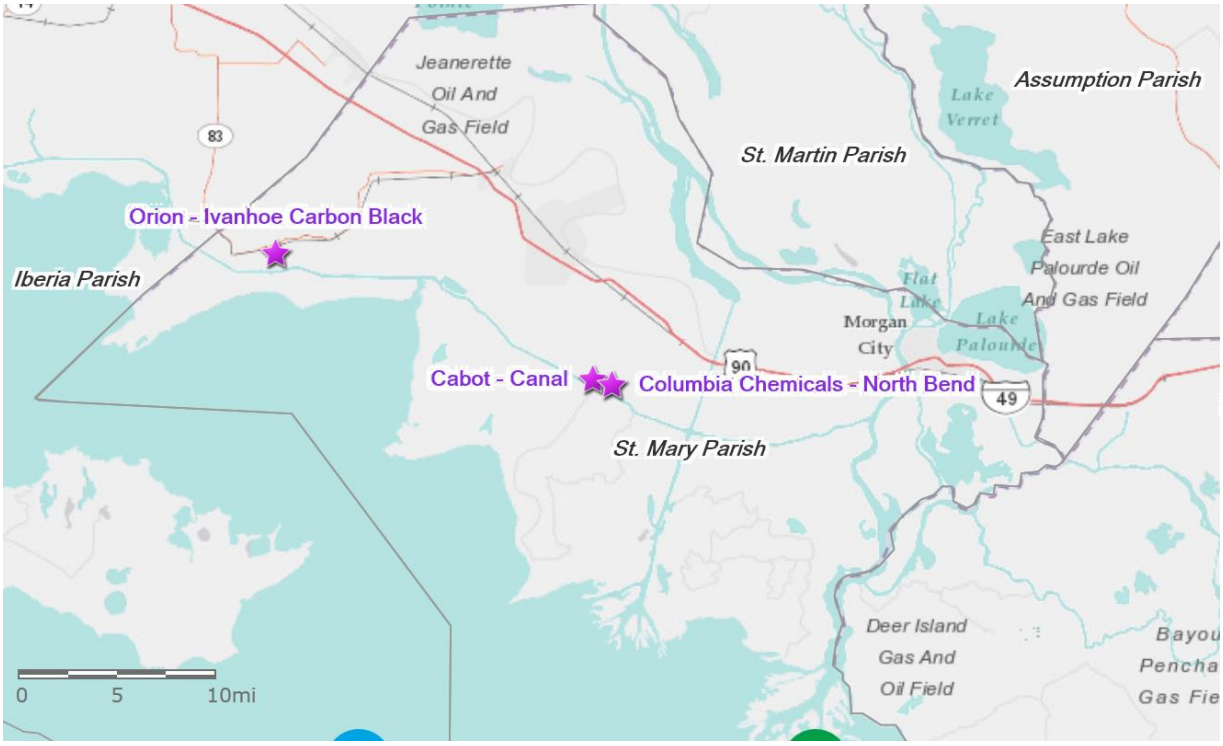
Louisiana has not submitted modeling for these three facilities or the area in St. Mary Parish, or made a new recommendation for how the area surrounding the facilities should be designated. Louisiana did previously submit a modeling protocol, but no actual modeling results have been submitted. This protocol called for an assessment and characterization to be performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. After careful review of the available information, supporting documentation, and all available data, the EPA intends to designate the area as unclassifiable. Our reasoning for this conclusion is explained in a section 5.6 this TSD, after all the available information is presented.

As seen in Figure 18 below, the Cabot - Canal and Columbia –North Bend facilities are located centrally inside St. Mary Parish near Franklin, Louisiana, and are within 4 km of the Bayou Teche National Wildlife Refuge. They are located about 1.5 km apart in the Atchafalaya watershed along the Intracoastal Waterway-From Bayou Boeuf Lock to Bayou Sale.

As shown in Figure 18, Orion – Ivanhoe is located in the northwest part of St. Mary Parish near the boundary with Iberia Parish and is about 27 kilometers from the other two DRR sources. It is situated near West Cote Blanche Bay on the section of the Intracoastal Waterway that runs from New Iberia Southern Drainage Canal to Bayou Sale (Estuarine).

These three sources in St. Mary Parish account for 99.9% of the SO_2 emissions in the parish. The nearest SO_2 source outside the parish with more than 100 tpy of SO_2 emissions is over 50 km away.

Figure 18: Map of the St. Mary Parish, Louisiana Area addressing Cabot – Canal, Columbia – North Bend, and Orion – Ivanhoe Facilities



5.4 Jurisdictional Boundaries in St. Mary Parish, Louisiana

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

In its May 26, 2011, letter, the state recommended that the entirety of St. Mary Parish be designated as a separate unclassifiable area.

5.5 Other Information Relevant to the Designations for the St. Mary Parish Area

There are no currently designated nonattainment areas near St. Mary Parish and the closest DRR (Round 4) source outside the parish is over 70 km distant and 2 parishes away. Based on this it is not expected that the sources in St. Mary Parish would have an impact on current or possible future nonattainment areas outside the parish, but the EPA cannot make a determination regarding this due to the state not submitting any modeling and there being no other relevant air quality information currently available sufficient to form a conclusion.

5.6 The EPA's Assessment of the Available Information for St. Mary Parish, Louisiana

The state has not submitted modeling for the three DRR sources in St. Mary Parish and therefor the EPA has no modeling data from which to determine the impacts from these sources in St. Mary Parish or in nearby areas. As well, there are no monitors sited in locations which would be expected to measure the maximum impact from these sources or the area.

There are no currently designated nonattainment areas near St. Mary Parish or undesignated areas not being designated in this action, and the closest DRR source outside the parish is over 70 km distant. There are no sources with actual emissions greater than 100 tpy in the surrounding parishes. Based on this it is not expected that the sources in St. Mary Parish would contribute to air quality in areas outside the parish that do not meet the NAAQS, but there is not sufficient currently available information to establish this.

The parishes adjacent to St. Mary Parish - Iberia, St. Martin, Assumption, and Terrebonne parishes - are being proposed to be designated as unclassifiable/attainment in section 7 of this TSD. These parishes have no SO_2 monitoring data. These parishes do not have any DRR sources located within their borders and so did not have DRR requirements for modeling or monitoring, and the EPA currently has no relevant air quality characterization information about these parishes.

Because St. Mary Parish was required to be characterized under the DRR and we do not have available information to determine whether St. Mary Parish violates the NAAQS and there also is not sufficient information to establish that it does not contribute to air quality in a nearby area that violates the NAAQS, we intend to designate the parish as unclassifiable. Our intended

designation would cover the entire parish. The final designation of St. Mary Parish may be different than this intended designation if the EPA receives reliable modeling from the state or another party.

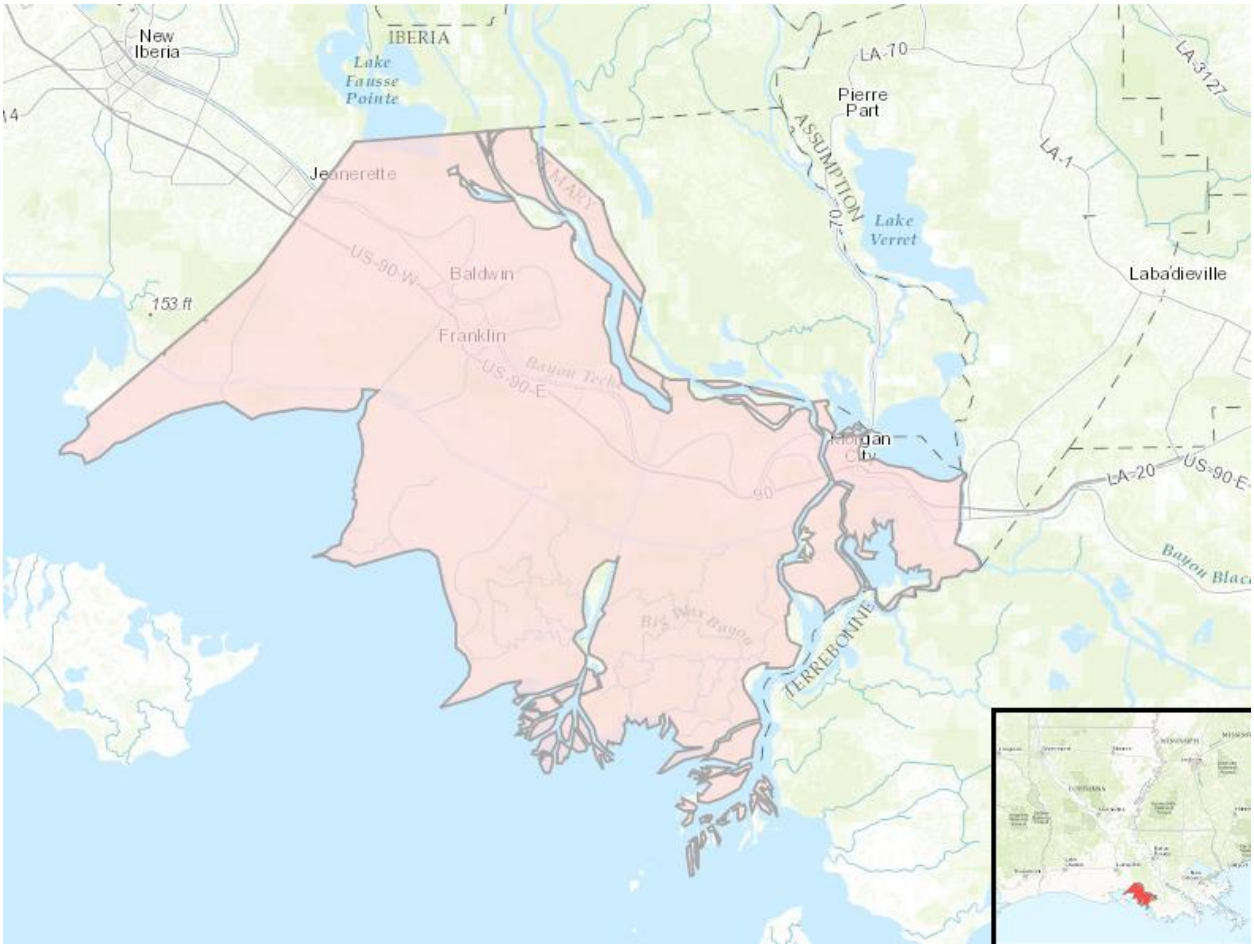
The EPA believes that our intended unclassifiable area, bounded by the boundaries of St. Mary Parish, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable area.

5.7 Summary of Our Intended Designation for St. Mary Parish, Louisiana

After careful evaluation of the state's recommendation, as well as all available relevant information, the EPA intends to designate St. Mary Parish as unclassifiable for the 2010 SO_2 NAAQS. Specifically, the boundaries are comprised of boundary of St. Mary Parish, Louisiana.

Figure 19 shows the boundary of this intended designated area.

Figure 19: Boundary of the Intended St. Mary Parish Unclassifiable Area



At this time, our intended designations for the state only apply to this area and the other areas addressed in this chapter. The EPA intends in a separate action to evaluate and designate all remaining undesignated areas in Louisiana by December 31, 2020.

6. Technical Analysis for Pointe Coupee Parish, Louisiana

6.1 Introduction

The EPA must designate Pointe Coupee Parish, Louisiana, by December 31, 2017, because no part of the parish has been previously designated and Louisiana 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 Pointe Coupee Parish.

In its May 26, 2011, letter, Louisiana recommended that Pointe Coupee Parish, be designated as unclassifiable. The state submitted an air quality analysis on January 13, 2017, that addressed the area surrounding the Louisiana Generating LLC – Big Cajun II Power Plant in Pointe Coupee Parish. The January 13, 2017, submission did not explicitly revise LDEQ's previous recommendation for Pointe Coupee Parish. In our intended designation, we have considered all the submissions from the state.

We did not receive any other recommendations or modeling analyses concerning the Louisiana Generating LLC – Big Cajun II Power Plant.

6.2 Air Quality Monitoring Data for Pointe Coupee Parish

There is no SO_2 air quality monitoring station in Pointe Coupee Parish.

6.3 Air Quality Modeling Data for Pointe Coupee Parish, Louisiana

6.3.1 Introduction

This section presents all the available air quality modeling information for a portion of Pointe Coupee Parish, and nearby portions of other parishes, that includes Louisiana Generating LLC – Big Cajun II Power Plant (Big Cajun II). (This area of analysis will often be referred to as "the Big Cajun II area" within this section 6.3.). This area contains the following SO_2 sources around which Louisiana is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tpy:

- The Big Cajun II facility in Pointe Coupee Parish emits 2,000 tons or more annually. Specifically, Big Cajun II emitted 34,140 tons of SO_2 in 2014, according to the 2014 National Emissions Inventory (version 1). This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Louisiana has chosen to characterize it via modeling.
- The Oxbow Calcining LLC - Baton Rouge Calcined Coke Plant facility in East Baton Rouge Parish emits 2,000 tons or more annually. Specifically, Oxbow emitted 4,098 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source

list, and Louisiana has chosen to characterize it via monitoring. The new monitoring station near Oxbow is in East Baton Rouge Parish.

- The Georgia-Pacific Consumer Operations LLC - Port Hudson Operations facility in East Baton Rouge Parish was not on the SO_2 DRR Source list but was included by Louisiana in the modeling analysis for total combined concentrations of SO_2. Specifically, Georgia Pacific emitted 544 tons of SO_2 in 2014.

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

6.3.2 Modeling Analysis Provided by the State

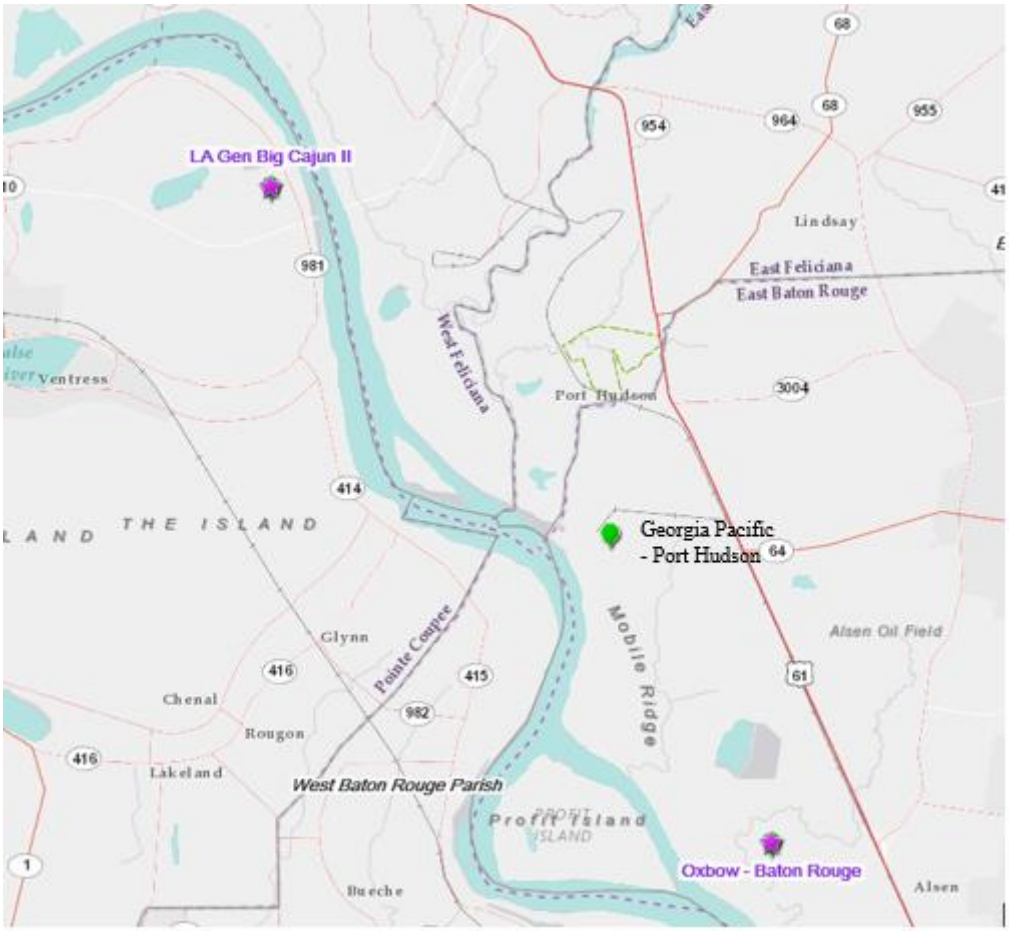
In its submission, Louisiana provided an assessment and characterization of air quality impacts from these facilities. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions as measured by CEMS or estimated based on other information.

After careful review of the state's assessment, supporting documentation, and all available data, the EPA believes that the appropriate designation for Pointe Coupee Parish is unclassifiable. This intended designation is appropriate because the area around Big Cajun II was required to be characterized by the state under 40 CFR 51.1203(c) or (d) and on the basis of available information this area cannot be classified as to whether it contributes to ambient air quality in a nearby area that may not meet the NAAQS. The modeling results indicate that Pointe Coupe Parish itself attains the 1-hour SO_2 standard. However, potential violations of the NAAQS in neighboring East Baton Rouge Parish were identified by the modeling exercise. The modeling showed that Big Cajun II emissions may contribute to potential modeled NAAQS violations in East Baton Rouge Parish in the vicinity of a DRR source – Oxbow – near which the state has installed a new monitor (an area that is not being designated at this time, as all of East Baton Rouge Parish will be designated in Round 4). The modeled violations of the NAAQS near Oxbow are likely mostly attributable to Oxbow's own emissions, but there are indications in the modeling results suggesting that Big Cajun II also contributes to concentrations around Oxbow. However, there are several factors in the modeling of the concentrations around Oxbow (Oxbow's emissions characterization, downwash, and the receptor grid) that result in uncertainty as to the validity of the modeled violation, thus preventing any conclusion as to whether Big Cajun II contributes to air quality in an area that does not meet the NAAQS.

The area that the state has assessed via air quality modeling is located in eastern Pointe Coupee Parish, the southcentral area of West Feliciana Parish, the western portion of East Feliciana Parish, and the northwestern portion of East Baton Rouge Parish. As seen in Figure 20 below, the Big Cajun II facility is located in eastern Pointe Coupee Parish, near State Road 10 and State Highway 964.

Also included in Figure 20 are other nearby emitters of SO_2.[10] These are Georgia Pacific – Port Hudson, and Oxbow Calcining. The EPA's intended unclassifiable designation boundary for the Pointe Coupee Parish, Louisiana, area is not shown in Figure 20, but is shown in a figure in section 6.7 that summarizes our intended designation

Figure 20: Map of the Big Cajun II Area



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 one modeling assessment from the state.

6.3.2.1 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:

[10] All other SO_2 emitters of 20 tpy or more (based on information in the inventory data source) are shown in Figure 20. 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 sources.

- 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, the most current available at the time of conducting the modeling. Because the regulatory default options were used in the model, no significant changes in the modeled concentrations would be expected if the recently released version 16216 were used, and thus the use of 15181 is acceptable. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

6.3.2.2 Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is 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 area around Big Cajun II is predominantly rural, with agricultural with low population density being much greater than 50% of the land use. The property is bounded by the Mississippi River on the east, tilled fields to the north and west and a mix of agricultural fields and forested lands to the south. In this case the EPA agrees that by the Auer method criteria for 50% or greater agricultural area fraction, it is appropriate to run the model in rural mode.

6.3.2.3 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 SO_2 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 SO_2 concentrations.

The sources of SO_2 emissions subject to the DRR in this area are described in the introduction to this section. For the Big Cajun II area, the state has included two other emitters of SO_2 within 20 km of the Big Cajun II facility 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 violations in the area of analysis and any potential impact

on SO_2 air quality from other sources in nearby areas. In addition to Big Cajun II, the other emitters of SO_2 included in the area of analysis are: Georgia Pacific – Port Hudson and Oxbow Calcining. Georgia Pacific – Port Hudson and Oxbow Calcining are both located in East Baton Rouge Parish, with Georgia Pacific approximately 11 km to the southeast of Big Cajun II and Oxbow approximately 20 km to the southeast of Big Cajun II.

Table 10 lists potentially contributing sources of SO_2 in an area around Big Cajun II, and Figure 21 graphically shows how total potentially contributing sources of SO_2 emissions accumulate with distance from Big Cajun II. Sources beyond 20 km were determined by the state to not have the potential to cause concentration gradient impacts within the area of analysis and that their contribution could be represented through the background SO_2

Figure 21: Cumulative 2014 Tons of SO_2 Emissions with Increasing Distance from Big Cajun II

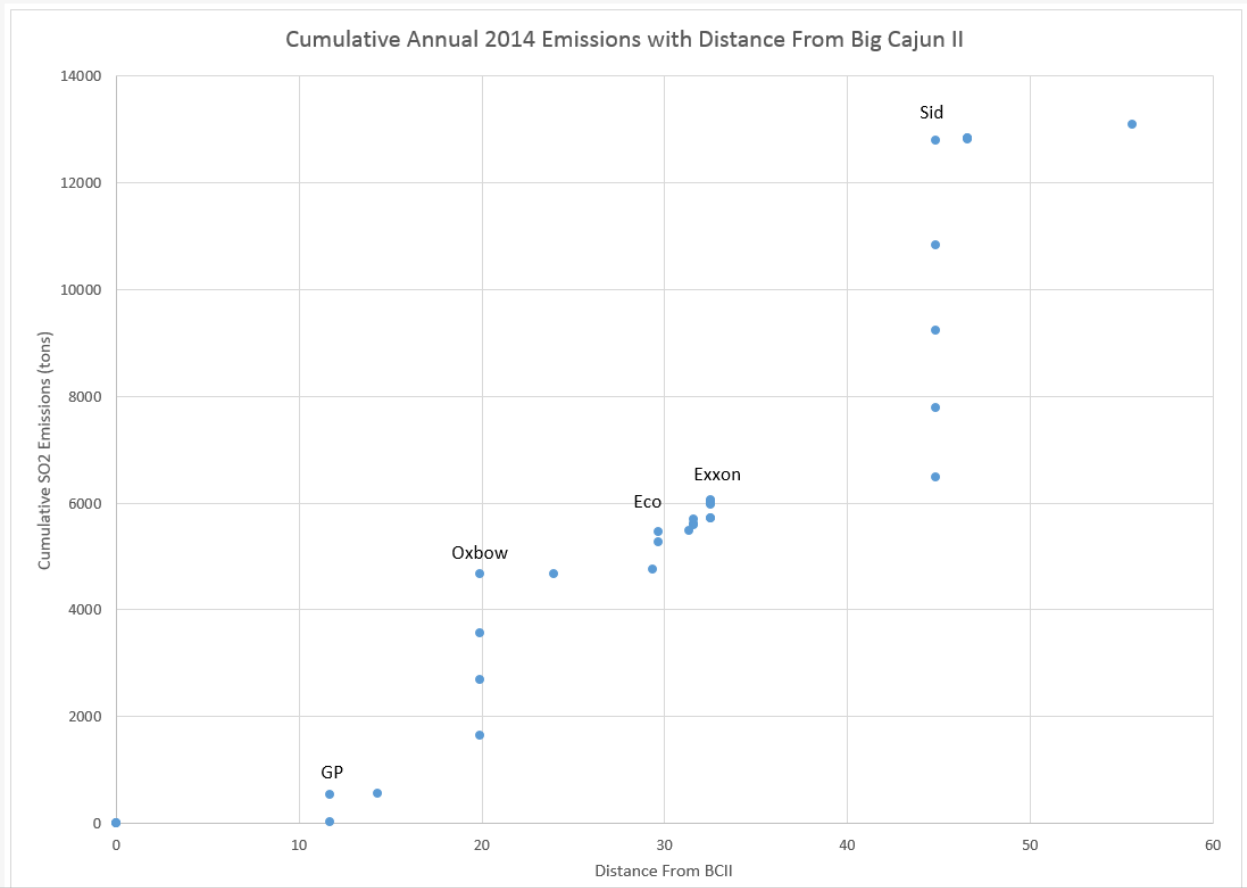


Table 10 - 2014 SO_2 Emissions by Facility with Increasing Distance from Big Cajun II. The facilities in blue font were not included directly in the modeling.

Facility	Distance from Big Cajun II (km)		2014 Emissions (tons)
Louisiana Generating LLC - Big Cajun II Power Plant	0		34,140
Georgia-Pacific Consumer Operations LLC - Port Hudson Operations	11.7		544
Alma Plantation LLC - Alma Facility	14.3		18
Oxbow Calcining LLC - Baton Rouge Calcined Coke Plant	19.9		4,098
ExxonMobil Chemical Co - Baton Rouge Polyolefins Plant	24		16
Criterion Catalysts & Technologies LP - Port Allen Plant	29.3		87
Eco Services Operations LLC - Sulfuric Acid Plant	29.7		696
Entergy Gulf States Louisiana LLC - Louisiana Station Electrical Generating Plant	31.3		24
ExxonMobil Baton Rouge Chemical Plant	31.6		210
ExxonMobil Baton Rouge Refinery	32.5		364
Sid Richardson Carbon Co - Addis Plant	44.8		6,743
The Dow Chemical Co - Louisiana Operations	46.6		44
EnLink LIG Liquids LLC - Plaquemine Gas Plant	55.6		240
Grand Total			47,224

As discussed in section 6.3.1.7 on the background concentrations, the sources further south than 20 km away were adequately characterized by using a background monitor located to record the impact of these source.

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

- 50-meter spacing along the facility fence line;
- 100-meter spacing extending from the fence line to 3 kilometers;
- 200-meter spacing extending from 3 to 5 kilometers;
- 500-meter spacing extending from 5 to 10 kilometers; and
- 1,000-meter spacing extending from 10 to 20 kilometers.

Receptors were not placed within the fenceline of Big Cajun II since the facility limits access to the property with a fence. Two receptor locations within the Georgia Pacific fence line were also omitted from the cumulative modeling. Modeling with emissions from all sources showed concentrations below the NAAQS in the vicinity of Georgia Pacific, so it is unlikely there would have been modeled violations at these two receptor points if they had not been omitted. An additional run that included these receptors, but did not include emissions from Georgia Pacific operations, was also completed. The additional run indicated that emissions from sources other than Georgia Pacific operations do not result in a violation of the standard at these two receptors.

The receptor network contained 7,593 receptors, and the network comprised 400 square kilometers in the southeastern section of Louisiana. The area covers the eastern portion of Pointe

Coupee Parish, the southcentral area of West Feliciana Parish, the western portion of East Feliciana Parish, and the northwestern portion of East Baton Rouge Parish.

Figures 22, 23 and 24, included in the state's recommendation, show the state's chosen area of analysis surrounding Big Cajun II, as well as the receptor grids for the area of analysis.

Figure 22: Area of Analysis for the Big Cajun II Area

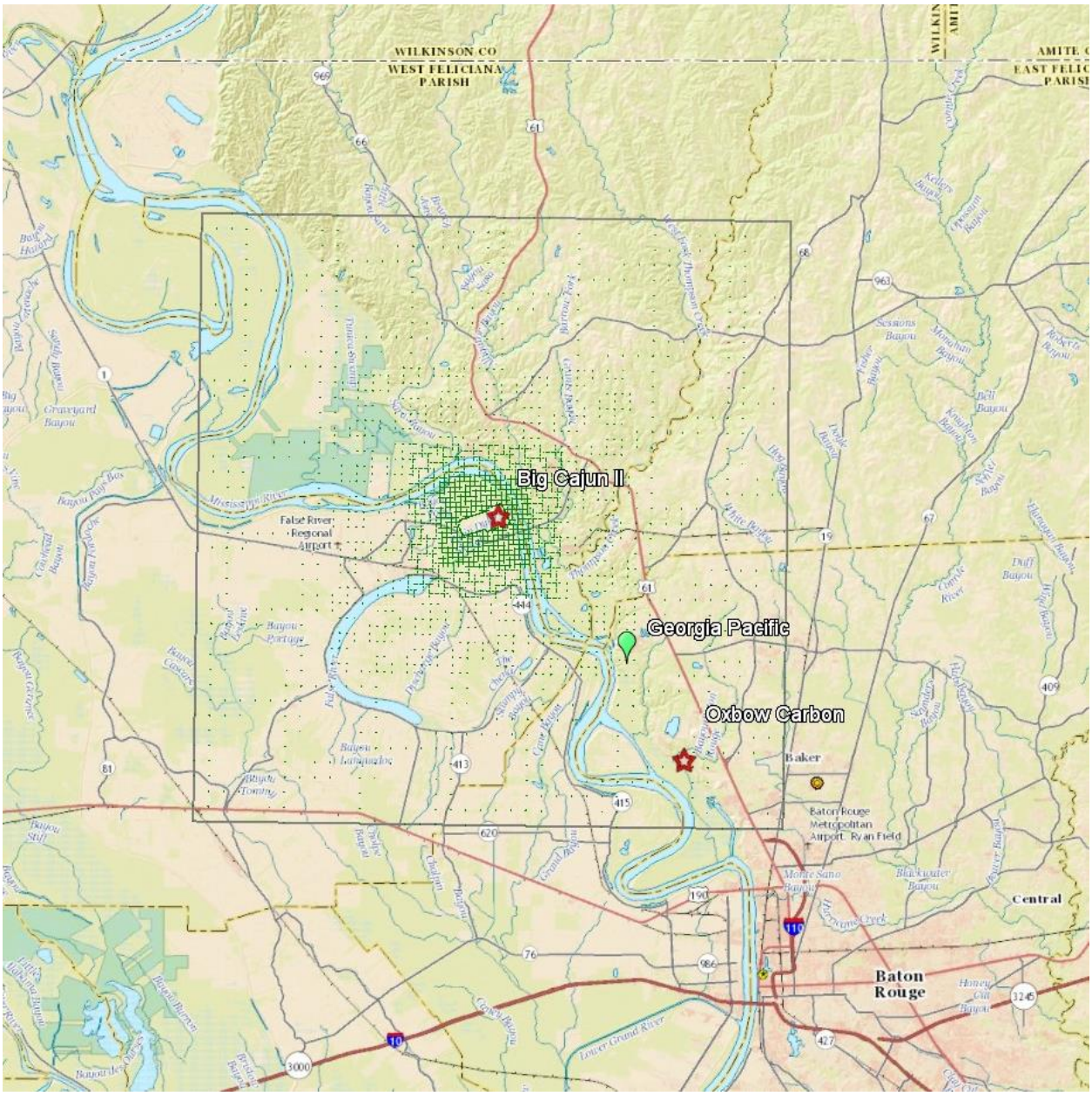


Figure 23: Far Field Receptor Grids for the Big Cajun Area

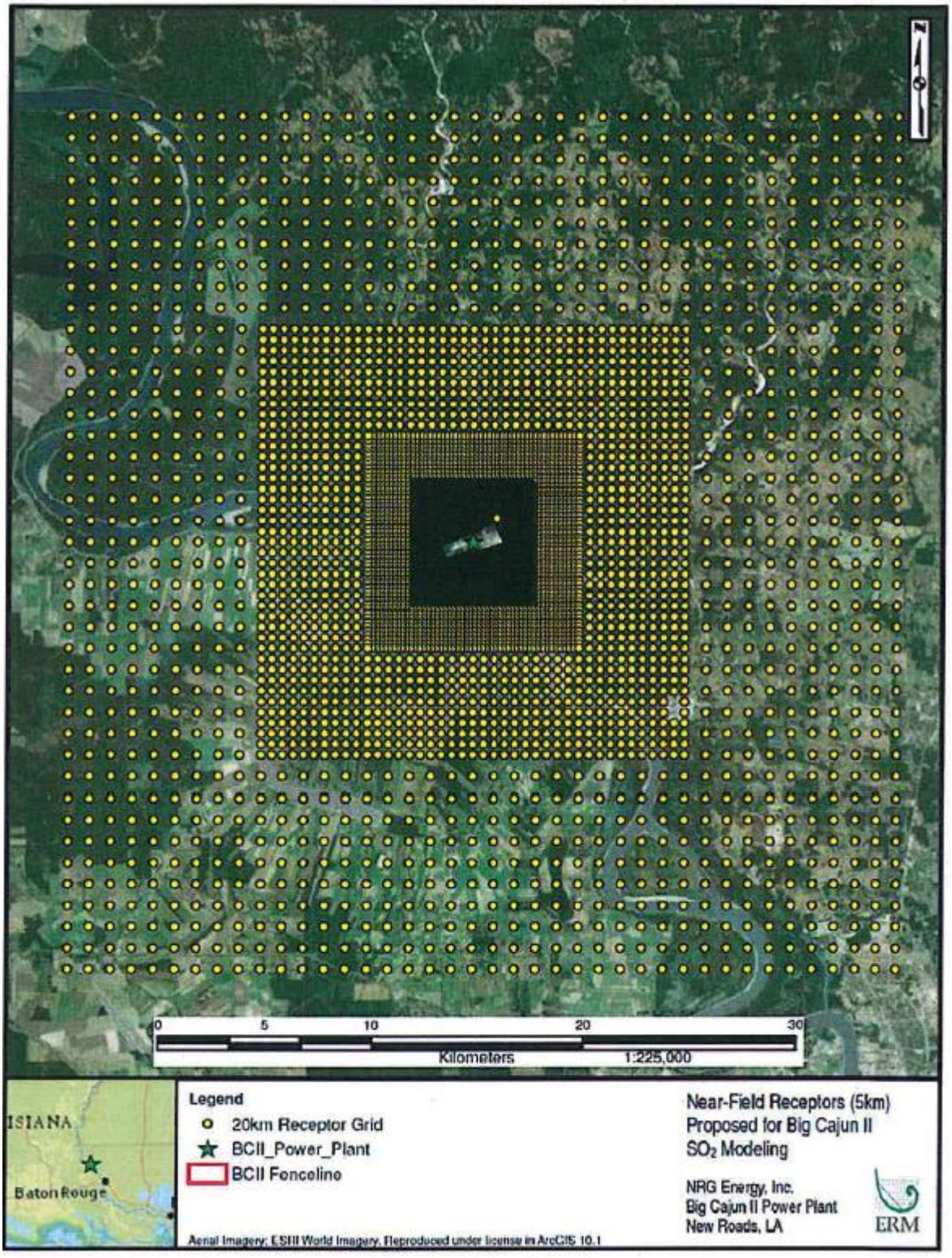
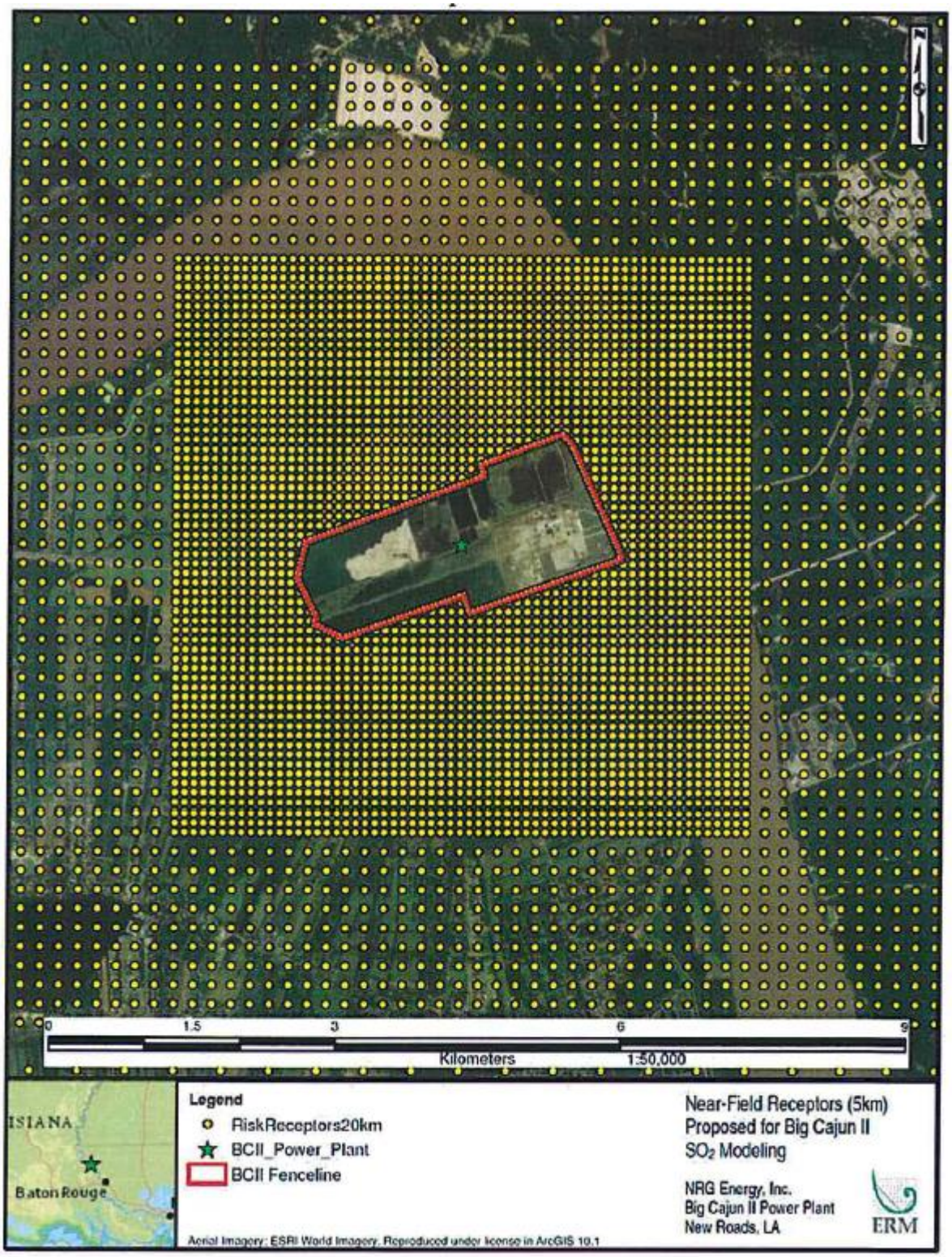


Figure 24. Near Field Receptor Grids for the Big Cajun II Area



6.3.2.4 Modeling Parameter: Source Characterization

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

The state analyzed the GEP stack heights of the three stacks at Big Cajun II and concluded that in each case the actual stack height and the GEP stack height were within 1.4 m or less of each other. The actual stack heights were used in the modeling which is according to the TAD when actual emission rates are modeled.

Emission Source	Actual Stack Height (m)	GEP Height (m)	Difference (m)
UNIT1	182.9	183.1	-0.2
UNIT2	182.9	183.1	-0.2
UNIT3	182.9	181.5	1.4

For Big Cajun II Units 1 and 3, exit temperature and exit velocity varied on an hourly basis based on CEMS data. Unit 2 was modeled with a constant exit temperature and exit velocity based on parameters related to conversion to gas-fired operations that began in June 2015. Since the emissions from Unit #2 are now limited because of the conversion, the modeling used these constant parameters, but even if actuals had been available the emissions are so small the changes would be inconsequential.

Stack parameters from the LDEQ inventory for Georgia Pacific and Oxbow Calcining were incorporated into the final modeling to assess attainment with the NAAQS. Hourly data files for both Georgia Pacific and Oxbow for the 2012 - 2014 period generated using short-term operation data provided in the industry's modeling that LDEQ provided to EPA. Given the amount of effort and time that would have been necessary to collect short-term operations data and generate hourly data files for 2015, the facilities did not update the modeling. However, since the modeling covered the period 2013-2015 these files were used to characterize hourly stack temperatures and exit velocities for Oxbow and Georgia Pacific sources for the 2013-2015 period. For the years 2013 and 2014 the actual stack parameters were used.

To develop the proxy hourly emissions inputs for 2015 for both Oxbow and Georgia Pacific on an hour-by-hour basis, the maximum hourly emission rate and the minimum stack temperature and exit velocity, by hour of the year, from 2012-2014 were used. The state presented annual emission totals, showing that 2015 annual emissions were similar to 2013 and 2014 annual emissions, to support this approach. The state explained that the combination of highest emissions and the lowest buoyancy flux should yield worst-case stack parameters resulting in conservative modeling results (i.e., these parameters would tend to increase the magnitude of the modeled impact from the sources).

The state characterized the emission parameters for the three sources within the Pointe Coupee portion of the area of analysis in a reasonable manner, generally in accordance with the best practices outlined in the Modeling TAD. Specifically, for Big Cajun II the state used actual stack heights in conjunction with a mixture of actual and allowable emissions, and the difference between actual stack heights and the GEP stack heights were less than 1.5 m (less than 1%). Since the modeling results around Big Cajun II are not near the standard, the difference between GEP and actual stack height are not consequential. The state also adequately characterized Big Cajun II's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. The AERMOD component BPIPPRM was used to assist in addressing building downwash for Big Cajun II Units 1-3.

Building downwash was not treated for Georgia Pacific or Oxbow in the East Baton Rouge Parish portion of the area of analysis, and the state did not supply information concerning the actual stack heights relative to GEP heights for these facilities. While actual emission parameters were used for these two sources for 2013 and 2014, for 2015 an estimate of the emission parameters was used which was intended to be conservative. The EPA believes that the use of actual stack heights for these two sources is appropriate in this circumstance for all 3 years. However, the possible issue of building downwash for these sources should have been addressed. Using the minimum stack parameters for Georgia Pacific and Oxbow may be conservative for the 2015 impacts, but also leads to more uncertainty as the higher concentrations may not overlap as much with the higher values in 2013 and 2014 for the areas around Georgia Pacific and Oxbow. In reviewing the modeling submission, we believe the state has adequately addressed each of the above components recommended in the TAD with the exception of building downwash for contributing sources, using actual 2015 emissions. Given the high values around Oxbow and GP, a finer receptor grid would also be needed even if the other concerns with the modeling of Oxbow emissions were addressed.

6.3.2.5 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 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 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 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 Big Cajun II and two other emitters of SO_2 within 20 km in the area of analysis. The state has chosen to model these facilities using a combination of allowable and actual emissions. The facilities in the state's modeling analysis and their associated annual actual SO_2 emissions between 2013 and 2015 are summarized below.

For Big Cajun II, Georgia Pacific – Port Hudson, and Oxbow Calcining the state provided annual actual SO_2 emissions between 2013 and 2015. This information is summarized in Table 11. A description of how the state obtained hourly emission rates is given below and in Table 12.

Table 11 - Actual SO_2 Emissions 2013 – 2015 from Facilities in the Big Cajun II Area

Facility Name	SO_2 Emissions (tpy)		
	2013	2014	2015
Big Cajun II[1]	35,778	34,273	18,281
Georgia Pacific – Port Hudson[2]	613	558	497
Oxbow Calcining[2]	6,697	12,300	11,452
Total Emissions from All Modeled Facilities in the State's Area of Analysis	43,088	47,131	30,230

[1]From CEMs data.
[2]From LDEQ's Emissions Inventory for 2013 and 2014 only

A DSI system was installed on Unit 1 of Big Cajun II in April 2015, and Unit 1 has a new enforceable limit of 0.38 lb/MMBtu on 30-day rolling basis (effective April 15, 2015). Unit 2 converted to natural gas in June 2015. Unit 3 has not been modified during the 2013-2015 period but has been subject to firing with coal with sulfur content less than 0.45% by weight in 2013 and a facility emission limit cap (tpy) that has decreased from 2013 to the current cap in place in 2016.

Estimated emissions based on these current and federally-enforceable limits were developed on an hourly basis as follows:

- Unit 1 modeled emissions were adjusted to reflect the new, federally-enforceable unit limit of 0.38 lb/MMBtu. Since the limit assumes a rolling 30-day average, it was multiplied by 1.2 (giving an adjusted limit of 0.45 lb/MMBtu) before being combined with the actual hourly heat input from each hour of 2013-2015 to simulate hourly emissions that comply with the current permit limit of 0.38 lb/MMBtu.
- Unit 2 emissions were assumed to be constant and set to the maximum hourly SO_2 emission rate recorded by the CEMs data since the unit converted to gas (18.4 tpy).
- Unit 3 emissions were modeled at the actual hourly rate for 2013-2015 as recorded by CEMs, since Unit 3 has not been modified.

The facility also had an SO_2 emission cap of 38,000 tpy in 2013 and 2014 and 33,000 tpy in 2015. Beginning in 2016, Big Cajun II is operating under a consent decree capping facility-wide emissions (Units 1, 2, and 3) at 18,950 tpy or less. The facility-wide emissions used in the modeling accurately reflect actual emissions that, relative to this cap now in place, are conservative by comparison in 2013 and 2014, but not in 2015: Specifically, 20,192 tpy was modeled for 2013; 21,195 tpy was modeled for 2014; and 15,983 tpy was modeled for 2015. The average annual emissions modeled was 19,123 tpy, which is slightly higher than the annual potential emissions (18,950 tpy).

While the state's submission refers to the hourly emission values used for Big Cajun II Unit 1 as actual emissions, we do not consider them to be actual emissions because they do not represent what actually was emitted during all of 2013-2015 period. The emission inputs are also not true allowable emissions reflecting all the emission limits that currently apply to the units and the facility as a whole. Rather, they reflect what emissions would have been through this period if emission reductions measures installed during the period had been in place at the start of the period, assuming actual levels of operation of units 1 and 3. Even so, the 3-year total modeled emissions exceed the facility-wide cap that is now in place. The discussion below details the modeling uncertainties caused by this hybrid approach.

Because the allowable emissions from Unit 2 are now very low and because Unit 3 was modeled using 2013-2015 actual emissions, the situation at Unit 1 is the largest source of the disparity between the modeling inputs and actual emissions or potential emissions, and of the disparity between the modeling inputs and allowable emissions under all the currently applicable emission limits. Table 12 gives the annual actual and modeled emissions for Unit 1 along with the reduction in modeled emission rate from the actual rate as calculated by the EPA from the modeling files submitted by the state.

Table 12. Actual and Modeled Yearly Emission Rates for Big Cajun II Unit 1, in Tons per Year along with the Percent Reduction of the Modeled Rates from the Actual Rates.

	2013	2014	2015
Actual Emission Rate (tpy)	23,840	22,100	9,630
Modeled Emission Rate (tpy)	8,236	9,003	7,313
% Reduction	65%	59%	24%

The state did not report how much lower 2013 and 2014 emission inputs were than the values that would have been calculated if maximum heat input (rather than actual hourly actual heat input, as used by the state) and allowable unit-specific emission rates had been combined, as would be done to calculate allowable emissions as that term is intended to be understood in the modeling TAD. The EPA determined from the modeling files submitted that for hours when the unit was operating the average heat rate for Unit 1 was 5,190 MMBTU/hr while the maximum heat rate reported was 6,625 MMBTU/hr and the 95% heat rate was 6,214 MMBTU/hr. If we take the 95% heat rate as a reasonable maximum heat rate, allowable emissions during those hours would have been 20% higher on the average. As well, an allowable emission rate (one that would not reflect the lower facility wide cap that took effect for 2016) would have included emissions during the over 10,000 hours (out of 26,280 total hours) when the unit was not operating for the hour. Even without the inclusion of emissions during the over 10,000 hours this would result in total emissions (including what was modeled for Units 2 and 3) above the current facility annual cap for 2013 and 2014. The 2015 emissions were below the annual facility cap but the average of the 3 years was above the annual facility cap. So, using these higher heat rates would have resulted in emission totals that are not reflective of current annual limits for 2 of the 3 years. Also, the 3-year average is above the facility cap.

Actual Unit 3 emissions were 11,938 tpy in 2013. Assuming approximately 20 tpy allowed emissions for Unit 2, Unit 1's allowable 2013 emissions, given the now-effective facility-wide cap of 18,950 tpy, would be 6,993 tpy, versus the 8,236 tpy assumed in the modeling. Actual Unit 3 emissions were 12,173 tpy in 2014. Unit 1's allowable 2014 emissions, given the facility-wide cap, would be 6,758 tpy, versus the 9,003 tpy assumed in the modeling. Actual Unit 3 emissions were 8,650 tpy in 2015. Unit 1's allowable 2015 emissions, given the facility-wide cap, would be 10,281 tpy, versus the 7,313 tpy assumed in the modeling.

The EPA's Modeling TAD does not describe the approach to hourly emission inputs used by the state for Big Cajun Unit 1, offer a recommendation as to its appropriateness for purposes of the hourly emission inputs, or offer a recommendation as to whether actual or GEP stack heights should be used if said approach to the hourly emission inputs has been used. Given the facility-wide nature of the cap that may now be the most important factor in determining true allowable

emissions, there are many ways that allowable emissions could have been assigned across units and hours, had the modeling tried to take into account the cap. In any case, since in the case of Unit 1 the actual and GEP stack height are very similar, we believe the use of actual stack height was appropriate.

For reasons presented later, related to the question on contribution in a nearby area, we intend to designate the parish as unclassifiable.

A final issue with the state's approach to Big Cajun II Unit 1 is the factor of 1.2 used to relate the emission limit based on a 30-day average to hourly emissions. The state did not explain why this factor is appropriate. We address this issue in section 6.3.2.10.

The state's approach to the emission inputs for Big Cajun II Unit 2, using the maximum observed hourly emission rate when using natural gas as the input for all hours during 2013, 2014, and 2015, is very similar to the manner we anticipated would be used when we issued the Modeling TAD, because the heat input during the hour of maximum hourly emissions is very likely to be close to the maximum heat input. It is possible that this approach to estimating allowable emissions results in emission values that are below the actual allowable emissions, because it is not documented that Unit 2 actually has operated at it full capacity since it was converted to gas, but the emissions are so small so that the error, if any, does not likely have a large impact. Thus, we consider the state's approach acceptable for the purpose of informing our intended designation.

For Big Cajun II Unit 3, the state used CEMS data to develop hourly emission inputs. We consider the state's approach acceptable for the purpose of informing our intended designation.

For 2013 and 2014 for Georgia Pacific and Oxbow, which are not equipped with CEMS, the state used other operating data to estimate (or model) hourly emissions and emission parameter. Hourly emissions in 2012 were also estimated in this way. These hourly data files for both Georgia Pacific and Oxbow for the 2012 - 2014 period were provided by LDEQ. For the years 2013 and 2014 the actual stack parameters were used. Since the air quality modeling was planned to cover the period 2013-2015 and the 2015 data were not available, these files were used to characterize hourly emissions, stack temperatures, and exit velocities for Oxbow and Georgia Pacific sources for 2015 also.

To develop the proxy hourly emissions inputs for 2015 for both Oxbow and Georgia Pacific on an hour-by-hour basis, the maximum hourly emission rate and the minimum stack temperature and exit velocity, by hour of the year, from 2012-2014 were used. The state presented annual emission totals, showing that 2015 annual emissions were similar to 2013 and 2014 annual emissions, to support this approach. The state explained that the combination of highest emissions and the lowest buoyancy flux should yield worst-case stack parameters resulting in conservative modeling results (i.e., the impacts would likely not be underestimated).

We consider the state's approach for 2015 for Georgia Pacific and Oxbow a source of important uncertainty for the interpretation of the modeling results. With respect to 2015 hourly emissions for Georgia Pacific and Oxbow, using the maximum of 2012 through 2014 for each matching

hour of 2015 is likely a conservative representation of overall emissions in 2015 in the sense that total emissions in 2015 will likely be overstated. However, this approach has the potential for an hour in 2015 in which dispersion conditions were poor and actual emissions high to be assigned a low value of emissions based on the matching hour emissions in 2012 through 2014. This type of disparity can arise, for example, if the load for a particular hour of 2015 is lower than any of the loads for the matching hour of the year in the 2012 to 2014 period, with some other hour have a correspondingly higher load than any of its 2012-2014 counterparts. Thus, a daily exceedance of the NAAQS might not be predicted when one actually occurred in 2015. Conversely, this approach might assign too much emissions to an hour in 2015 that had poor dispersion. Thus, there could be a modeled daily exceedance that did not actually occur. This can happen even though seasonal and diurnal load patterns may be generally similar across the years, without causing total 2015 emissions to contradict the value reported by the state. The use of the minimum velocity and minimum temperature may also move predicted high concentration values closer to the Oxbow facility but could also lower the values at receptors that were the highest in 2013-2014, thus creating further uncertainty. Thus, this approach creates substantial uncertainty in the predictions of 2015 concentrations, and consequently uncertainty in the predictions of 2013-2015 violations, near Georgia Pacific and Oxbow, the implications of which for our intended designation are discussed below.

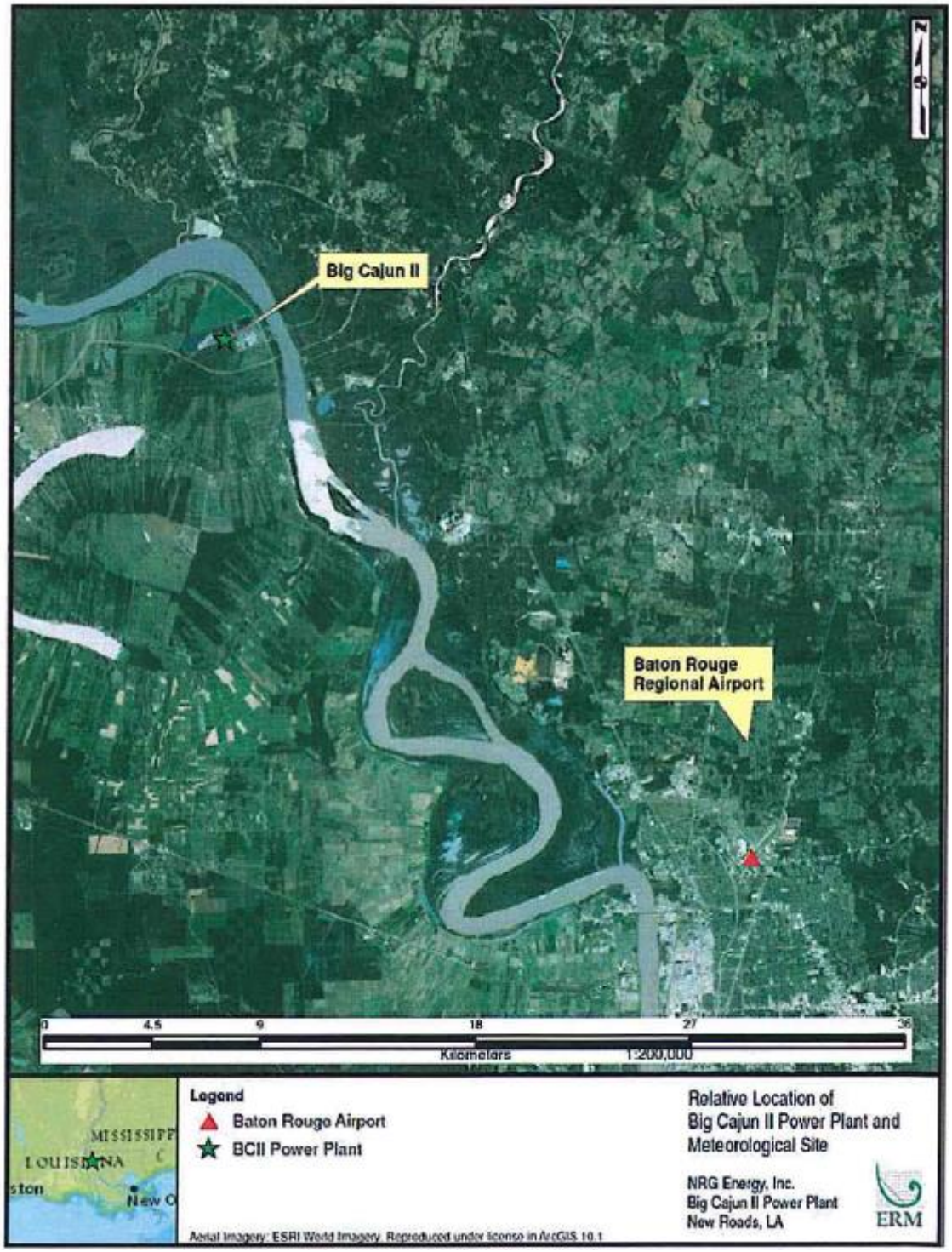
6.3.2.6 Modeling Parameter: Meteorology and Surface Characteristics

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

For the area of analysis for the Big Cajun II area, the state selected the surface meteorology from Baton Rouge Regional Airport, WBAN No. 13970, located at latitude 30.53°N, longitude 91.13°W, approximately 30 km to the southeast of the source, and the coincident upper air observations from Lake Charles, Louisiana WBAN No. 03937, located at latitude 30.13°N, longitude 93.22°W, approximately 180 km to the west southwest of the source as best representative of meteorological conditions within the area of analysis.

The state used AERSURFACE version 13016 using data from Baton Rouge Region Airport weather station to estimate the surface characteristics 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 "Zo." The state estimated surface roughness values for 12 spatial sectors out to 1 km at a monthly temporal resolution for average conditions.
In Figure 25 below, included in the state's recommendation, the locations of these NWS stations is shown relative to the area of analysis.

Figure 25: Area of Analysis and the NWS stations in the Big Cajun II Area

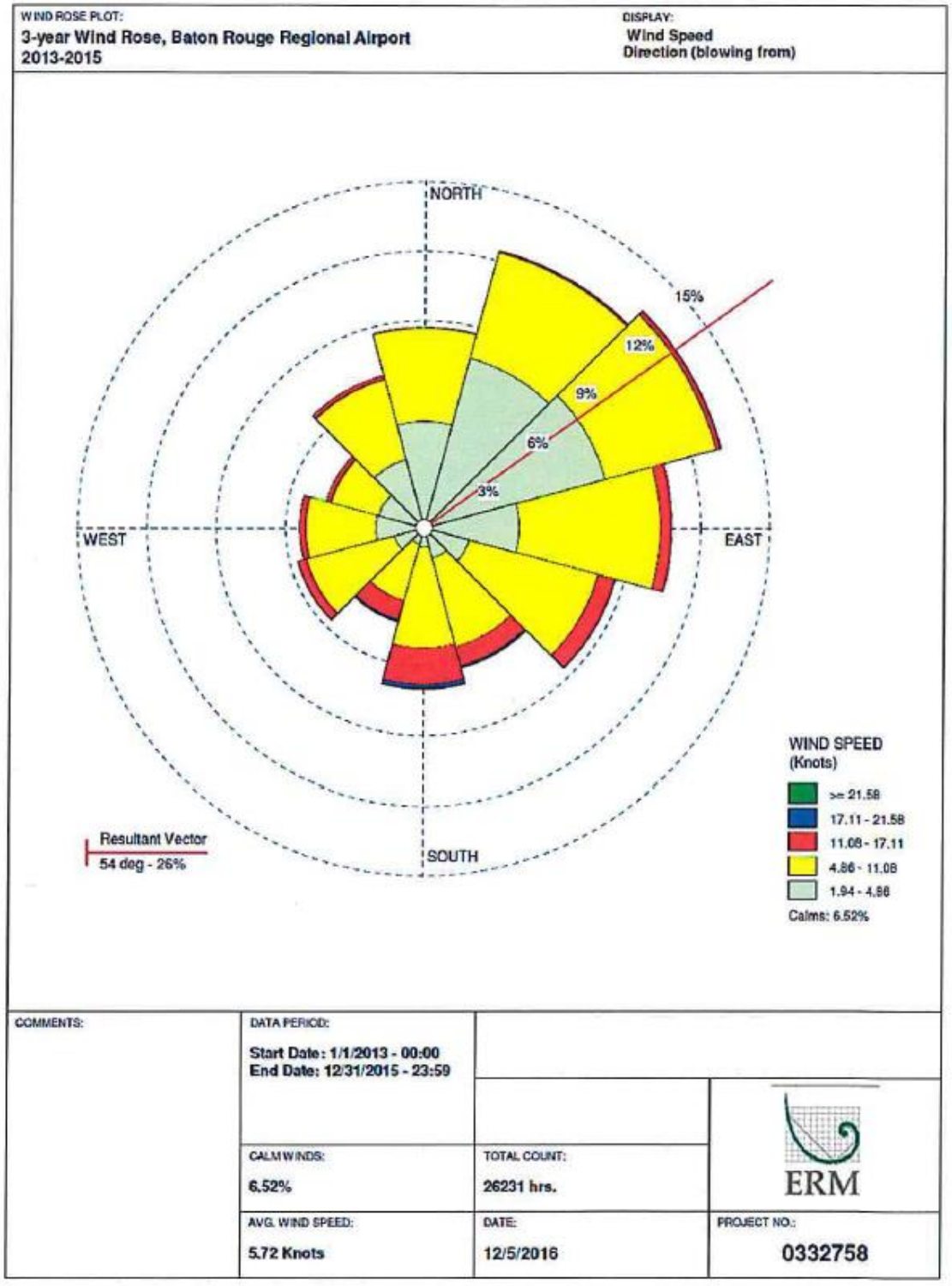


As part of its recommendation, the state provided the 3-year surface wind rose for Baton Rouge Regional Airport. In Figure 26, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The wind rose indicates the winds are predominantly from the north, northeast, and east. The higher frequency of winds from the N and

NE are driven primarily by light winds below 2 knots. There is a low prevalence of winds above 11 knots from any direction. The average overall wind speed was 5.7 knots and the frequency of calm winds was relatively high at 6.5%. The incidence of winds in alignment with the positions of Big Cajun II toward Georgia Pacific and Oxbow is about 7%.

Figure 26: Baton Rouge Region Airport Cumulative Annual Wind Rose for Years 2013 – 2015

Three-year Wind Rose (2013-2015): Baton Rouge Regional Airport



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 User's Guide for the AERMOD Meteorological Preprocessor Guidance, EPA-454/B-03-002 and subsequent clarification, 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 Baton Rouge NWS station, but in a differently 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.

We believe the methods used to process the meteorological data for this model is appropriate to the region. The meteorological data was current and appropriate to the area. The AERMOD, AERMAP, AERSURFACE and supporting software used were all current/recent versions of EPA-approved models.

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

The terrain in the area of analysis is best described as gently rolling to flat. To account for these terrain changes, the AERMAP terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS National Elevation Database. We believe this analysis of the terrain in the area is appropriate.

6.3.2.8 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 chose the tier 2 approach, calculating the background values on a diurnal, seasonal basis using data from the Port Allen monitoring station, AQS site ID No. 22-121-0001. As given in the modeling report and reproduced in Table 13, the background concentrations for this area of

analysis were determined by the state to vary from 8.29 micrograms per cubic meter ($\mu g/m^3$), equivalent to 3.17 ppb when expressed in three significant figures,[11] to 45.37$\mu g/m^3$, equivalent to 17.3 ppb. As previously noted, this site was chosen to represent the contribution of sources near Baton Rouge which were not directly modeled in the assessment to estimate the SO_2 concentrations around Big Cajun II. The Port Allen monitor is located in the city of Baton Rouge in West Baton Rouge Parish near several SO_2 sources located in East Baton Rouge Parish and West Baton Rouge Parish and would be expected to overestimate the actual background contribution of these sources around Big Cajun II, Oxbow, and GP.

Table 13 - 2013 – 2015 Seasonal Diurnal Ambient SO_2 Concentration for the Port Allen Monitor ($\mu g/m^3$)

Hour[1]	Winter	Spring	Summer	Fall
1	26.35	15.71	8.38	18.15
2	28.36	27.22	9.95	26.09
3	21.99	31.85	13.79	20.77
4	22.95	26.79	10.21	20.94
5	23.91	27.05	9.86	21.12
6	20.50	31.06	10.03	19.63
7	22.08	27.22	9.95	30.71
8	32.46	26.26	11.17	31.15
9	29.93	23.03	13.00	21.99
10	30.89	18.41	8.55	17.54
11	31.59	23.12	8.99	27.57
12	36.73	20.24	9.77	17.97
13	42.32	18.85	9.25	22.08
14	34.73	16.32	8.64	19.02
15	45.37	17.01	8.29	18.85
16	34.38	15.09	11.17	19.63
17	30.02	18.58	10.91	16.49
18	26.61	14.75	8.73	23.03
19	28.79	16.49	8.64	16.84
20	19.54	14.57	8.20	16.84
21	21.99	11.95	10.21	14.48
22	22.86	18.15	8.73	18.85
23	22.69	16.23	11.69	16.75
24	26.00	16.05	8.29	18.50

[1]Hours in AERMOD are defined as hour-ending. i.e. Hour 1 is the period from midnight through 1 AM, etc.

We believe the approach the state chose to address background SO_2 values area is appropriate to this situation and conservatively accounts for non-modeled sources of SO_2 emissions beyond 20 km from Big Cajun that may contribute to concentrations in the area being analyzed directly in the modeling.

[11] 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 $\mu g/m^3$.

6.3.2.9 Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Big Cajun II area of analysis are summarized below in Table 14.

Table 14 - Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Big Cajun II Area

Input Parameter	Value
AERMOD Version	V 15181 with regulatory defaults
Dispersion Characteristics	Rural
Modeled Sources	3
Modeled Stacks	14
Modeled Structures	3
Modeled Fencelines	3
Total receptors	7593
Emissions Type	Actual/Potential Hybrid[12]
Emissions Years	2013-2015
Meteorology Years	2013-2015
NWS Station for Surface Meteorology	Baton Rouge Regional Airport (KBTR) WBAN No. 13970
NWS Station Upper Air Meteorology	Lake Charles, Louisiana (KLCH) WBAN No. 03937
NWS Station for Calculating Surface Characteristics	Baton Rouge Regional Airport
Methodology for Calculating Background SO_2 Concentration	Tier 2, hourly seasonal values using data from Port Allen monitor AQS site ID No. 22-121-0001
Calculated Background SO_2 Concentration	8.29 to 45.37$\mu g/m^3$

The state's modeling report presented certain information on the modeling results, which we have supplemented in this section with results we have created using detailed data files provided by the state.

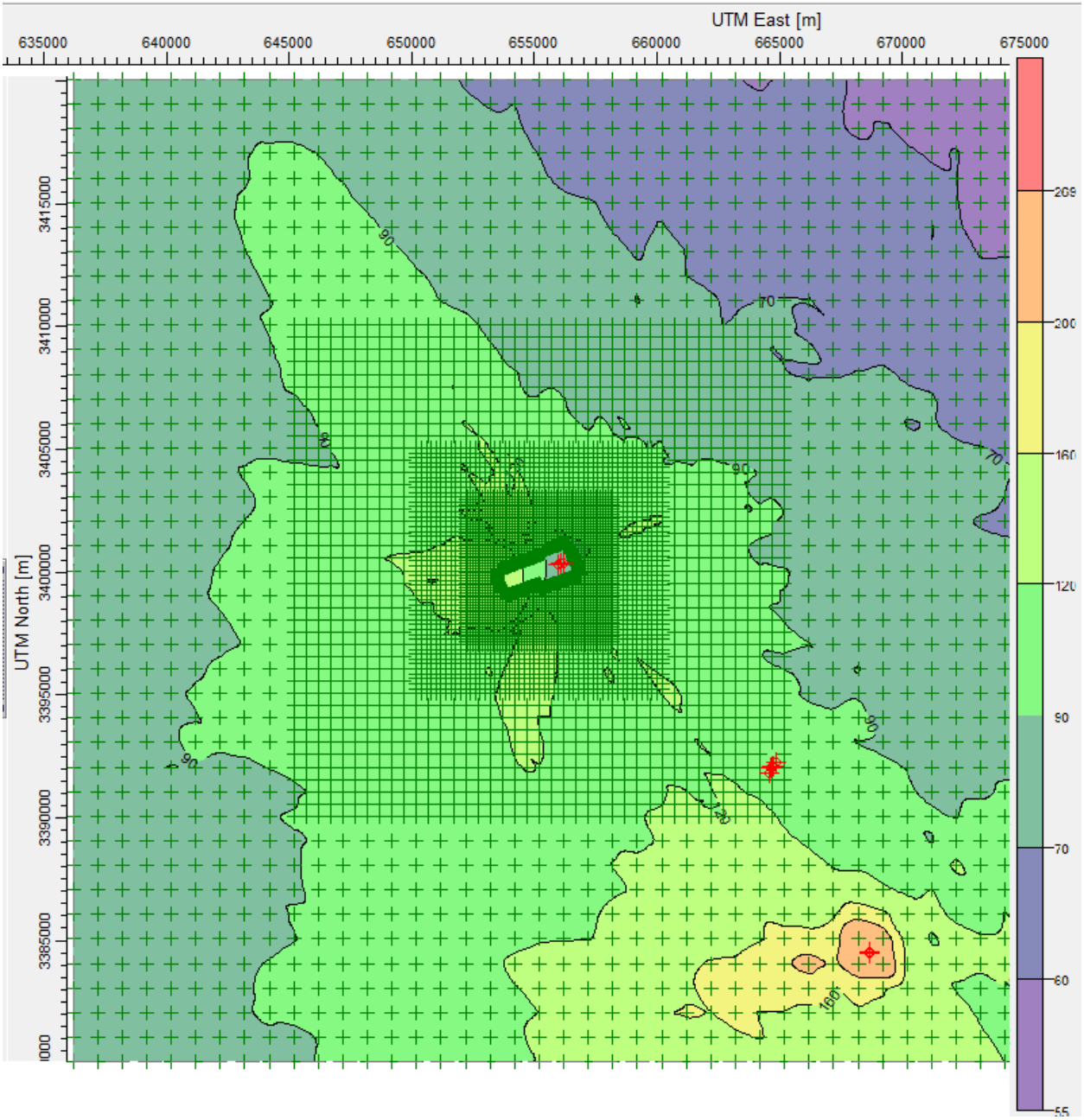
[12] Estimated actual emission rates used for Oxbow for 2015. Combination of actual and new emission limits for Big Cajun II units (*see* emissions discussion above).

The state identified the highest design value due to all three sources combined with the background concentrations. This value was 269.5 $\mu g/m^3$ which is above the NAAQS. It occurred near the Oxbow facility. Other design values above the NAAQS in this vicinity were also predicted, and were presented in the state's submission in tabular form with locations indicated in UTM coordinates. The state's submission says that some of these design values above the NAAQS were at receptors within the fenceline of Oxbow.

The state did not submit a map of design value concentrations. Figure 27 below, produced by the EPA using the modeling outputs provided by the state, shows the maximum combined impact due to all sources within the area of analysis and including the state's hourly seasonal background concentrations. This synthesis of the modeling outputs provided by the state provides design value estimates for locations within the fenceline and near Oxbow (approximately 20 km from Big Cajun II), which were in excess of the 1-hour standard.

The EPA's assessment is that because Oxbow was modeled with uncertain hourly emissions values for 2015, the model results are not conclusive as to whether a NAAQS violation occurs near that facility, or that daily exceedances of the NAAQS occur on the days and at the receptor locations where they appear to occur. With respect to air quality in Pointe Coupee Parish, the modeling results do not indicate there is a NAAQS violation in that parish, however because of the use of hybrid emissions for Big Cajun II there is some uncertainty in this assessment.

Figure 27: Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for the Area of Analysis for the Big Cajun II Due to All Sources



The state's submission concludes that the modeling results indicating NAAQS violations near Oxbow are overly conservative because the monitor selected as the source of the background concentration values is influenced at times by the sources explicitly included in the modeling. While we agree that in certain respects the state's approach is more conservative than other approaches that could have been taken, we do not believe that overall it can be considered conservative because it is plausible that modeling with more accurate estimates of 2015 hourly emissions and stack parameters from Oxbow could have resulted in a more extensive and/or higher level NAAQS violation.

The state conducted further exploratory analysis to assess the potential impacts of Big Cajun II at the receptors around Oxbow for the specific locations and periods with predicted hourly concentrations above the level of the NAAQS. It did this according to the procedure for determining significant impacts on locations of nonattainment as given in the EPA's NO_2 Clarification Memo, which was issued as EPA guidance for the Prevention of Significant Deterioration (PSD) program.[13] Although the PSD memo does not say that it applies to NAAQS designations, as applied to the 1-hour SO_2 standard, a similar significant contribution analysis examines all cases where the cumulative concentration exceeds the NAAQS at or below the 99th percentile. Therefore, the significant contribution analysis examines every multiyear average of same-rank daily maximum 1-hour values, beginning with the 4th-highest (99th-percentile), continuing down the ranked distribution at each receptor until the cumulative concentration is below the NAAQS.

In accordance with this PSD procedure, the state looked at Big Cajun II's impacts at the same location and hours where the modeled concentrations ranked 4th highest and higher were at or above the NAAQS. LDEQ indicated that the impact of Big Cajun II was below the level of the EPA's recommended interim SO_2 SIL for the PSD program,[14] which is 3 ppb/7.8 µg/m^3, and that in its assessment the Big Cajun II impacts would not be significant even if the locations around Oxbow were determined to be nonattainment. However, such application of the PSD SIL is not appropriate outside of the PSD context to designations in which the EPA does not employ any bright line test for whether an area contributes to a NAAQS violation in another area, and therefore the EPA is not persuaded by the state's assertion. The EPA's position in this respect has been affirmed by the U.S. Court of Appeals for the D.C. Circuit.

Table 15 is taken from Table 4.1 in the state's modeling report (note that Table 4.1 included modeled design values down to 196.0 µg/m^3, but the standard is defined as 196.4 µg /m^3).

Table 15 - The Contribution of Big Cajun II to Modeled Concentrations Greater Than the NAAQS

Receptor Location		Design Concentration	Receptor-Year Rank	Big Cajun II Contribution
X	Y	µg/m^3		µg/m^3
668194.8	3385338	269.2	4TH	0.06
669194.8	3384338	256.3	4TH	4.86
668194.8	3384338	251.4	4TH	0.12
669194.8	3385338	234.6	4TH	0.08

[13] *See* Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2, National Ambient Air Quality Standard, March 1, 2011, https://www3.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf.

[14] *See* Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program, June 29, 2010, https://www.epa.gov/sites/production/files/2015-07/documents/appwno2.pdf.

Receptor Location		Design Concentration	Receptor-Year	Big Cajun II Contribution
X	Y	µg/m^3	Rank	µg/m^3
666194.8	3384338	216.5	4TH	1.06
665194.8	3384338	197.5	4TH	0.58
667194.8	3384338	196.6	4TH	0.61
668194.8	3385338	252.2	5TH	0.1
669194.8	3384338	251.3	5TH	2.66
668194.8	3384338	244.3	5TH	0.09
669194.8	3385338	225.4	5TH	0.12
668194.8	3385338	248.8	6TH	0.07
669194.8	3384338	245.1	6TH	7.5
668194.8	3384338	238.6	6TH	0.13
669194.8	3385338	217	6TH	0.16
668194.8	3385338	240.6	7TH	0.11
669194.8	3384338	232.3	7TH	3.76
668194.8	3384338	220.7	7TH	0.11
669194.8	3385338	215.2	7TH	0.08
668194.8	3385338	233.6	8TH	0.06
669194.8	3384338	220.6	8TH	3.03
668194.8	3384338	218.5	8TH	0.24
669194.8	3385338	206	8TH	0.23
668194.8	3385338	230	9TH	0.07
669194.8	3384338	216.6	9TH	5.99
668194.8	3384338	211.7	9TH	0.25
669194.8	3385338	203.1	9TH	0.19
668194.8	3385338	219.9	10TH	0.09
668194.8	3384338	207.1	10TH	0.12
669194.8	3384338	205	10TH	4.81
669194.8	3385338	198.1	10TH	0.53

Receptor Location		Design Concentration	Receptor-Year	Big Cajun II Contribution
X	Y	µg/m^3	Rank	µg/m^3
668194.8	3385338	217.2	11TH	0.04
668194.8	3384338	203.7	11TH	0.25
669194.8	3384338	200.2	11TH	3.36
668194.8	3385338	207.9	12TH	0.1
668194.8	3384338	202.6	12TH	0.32
668194.8	3385338	207.1	13TH	0.05
668194.8	3384338	199.9	13TH	0.19
668194.8	3385338	199.1	14TH	0.09
668194.8	3384338	196.8	14TH	0.14
668194.8	3385338	197.7	15TH	0.08

The state also presented information on the highest predicted modeled concentration from Big Cajun II in the absence of other sources or background based on the input parameters. This information is reproduced in in Table 16.

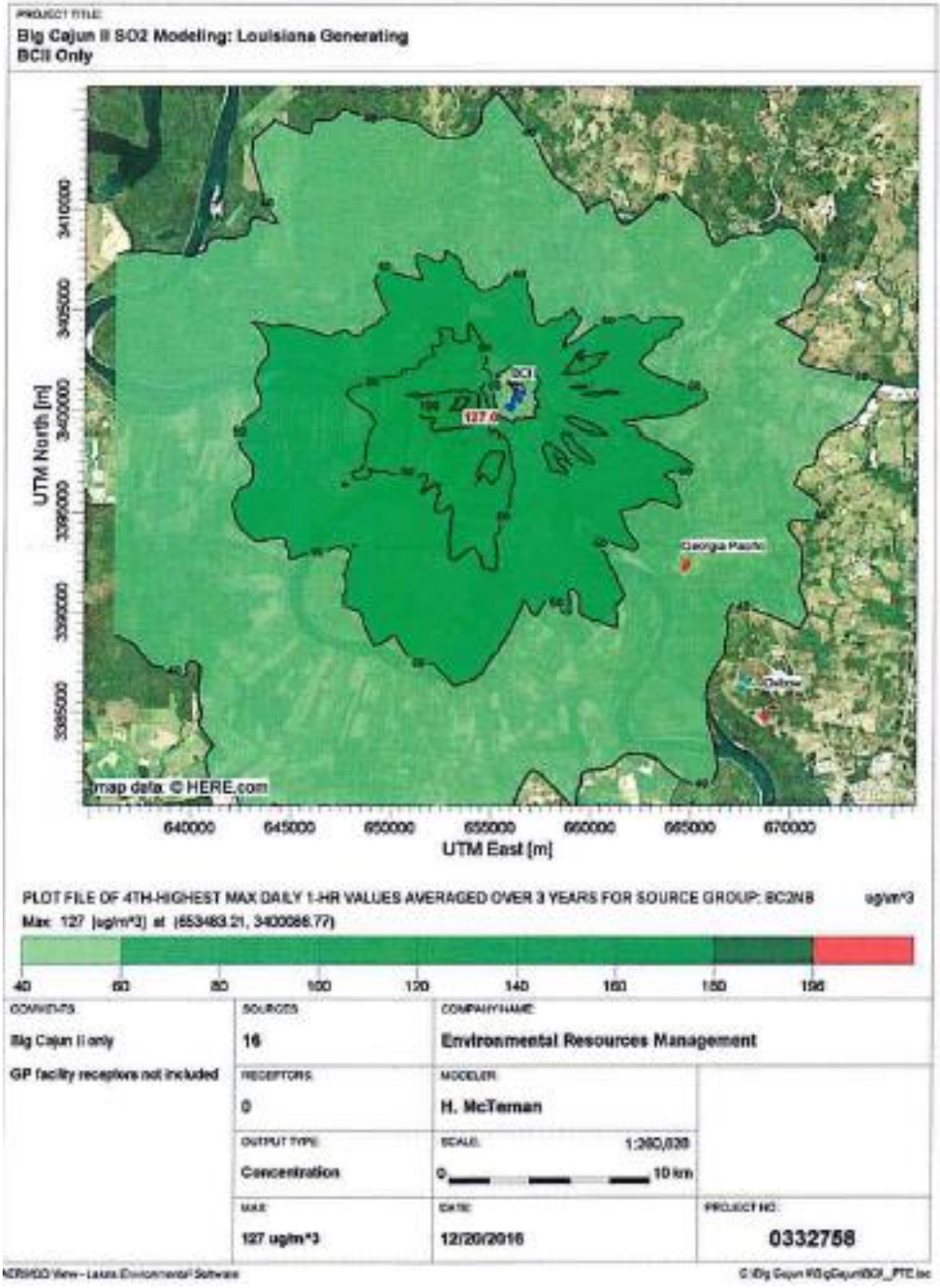
Table 16 - Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over 3 Years for the Big Cajun II Contribution Alone to the Area of Analysis for the Big Cajun II Area

Averaging Period	**Data Period**	**Receptor Location UTM zone 15**		**99th percentile daily maximum 1-hour SO_2 Concentration (µg/m^3)**	
		UTM	**UTM**	**Modeled concentration**	**NAAQS Level**
99th Percentile 1-Hour Average	2013-2015	653483.21 E	3400086.77 N	127	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 µg/m^3 conversion factor

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration caused only by emissions from the Big Cajun II facility within the chosen modeling domain is 127 µg/m^3, equivalent to 48.5 ppb. This modeled concentration does not include the background concentration of SO_2, and is based on a combination of actual and allowable emissions only from the Big Cajun II facility. Figure 28 below was included as part of the state's recommendation, and indicates that the predicted value occurred 2 km to the southwest of Big Cajun II's property.

Figure 28: Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for the Area of Analysis for the Big Cajun II Area Due to Big Cajun II



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

The state's modeling examines the emissions from Big Cajun II, and other nearby facilities located in East Baton Rouge Parish, Louisiana, and the potential for those emissions to cause a violation of the 2010 SO_2 NAAQS. The detailed modeling considered the impacts of smaller sources of SO_2 emissions in the form of background data derived from a monitor located in East Baton Rouge Parish. The procedures used were mostly in accord with the EPA guidance (or, with respect to actual versus GEP stack heights, were only trivially different) and for certain aspects considered worst case scenarios when estimation of emissions were necessary. However, there are issues regarding the emissions from Big Cajun II and other sources, and with the receptor grid that lead to uncertainty regarding Big Cajun II's contribution to a potential nonattainment area in another parish and also in the modeling results (maximum DV) in Pointe Coupee parish.

Another issue with the state's approach to Big Cajun II Unit 1, not yet discussed, is the factor of 1.2 used to relate the emission limit based on a 30-day average to hourly emissions. The state did not explain why this factor is appropriate. Our guidance on this topic is that a higher factor (1.6) may be appropriate for a coal-fired source equipped with post-combustion dry or wet scrubber controls.[15] Unit 1 is equipped with a DSI system, not a scrubber. We evaluated hourly emission factors from limited CEM data available for the first year of operation of the DSI system and the 99th percentile of the available data yields a value of 1.23[16] which is similar but slightly higher than the factor of 1.2 used. A more robust data set of multiple DSI installs and a number of years of operation would give a more accurate potential adjustment value. Given that the 1.6 factor in our guidance is based on a very highly controlled facility, the variation in lb/MMBtu emission factor could be much higher in magnitude than for a DSI controlled facility.[17] It is likely that the appropriate adjustment factor for DSI is less than the appropriate adjustment factor for a scrubbed unit But potentially larger than 1.2 factor The 1.23 factor is only for one year of operation with just over 5000 hours of operation and does not take into account any variability between DSIs. We also note that the predicted concentrations near Big Cajun II are below the NAAQS. Our assessment is that the use of the 1.2 factor adds uncertainty to the modeling results as to whether there are NAAQS violations in Pointe Coupee Parish. We intend to determine that because of the several emission issues that result in uncertainties we cannot clearly determine that there are not NAAQS violations in Pointe Coupee Parish.

The approach to the hourly emission inputs for Georgia Pacific and Oxbow for 2015, lack of downwash, limited receptors around Georgia-Pacific and Oxbow, and use of a conservative background concentration taken from a monitor that is sometimes influenced by the same sources as included in the modeling create significant uncertainty as to the reliability of the prediction that there are locations near Oxbow in East Baton Rouge Parish that violate the

[15] *See* Table 1 on page D-2 of Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, April 23, 2014, https://www.epa.gov/sites/production/files/2016-06/documents/20140423guidance_nonattainment_sip.pdf. The 0.71 and 0.63 values in this table are the reciprocals of the factors (1.4 and 1.6, respectively) that would adjust a 30-day limit to 1-hour basis.

[16] Big_Cajun_II_DSI.xlsx

[17] Example: For a scrubbed unit the difference between 97.5% control and 95% control would be a factor of 2 going from the higher efficiency to lower efficiency for a relatively small change in removal efficiency. For a DSI unit that went from 60% control to 40% control would be a factor of 1.33.

NAAQS, for reasons explained in section 6.3.2.4. East Baton Rouge Parish will not be designated in Round 3, and accordingly we are not intending to make a determination as to whether there are NAAQS violation in that parish based on the currently available modeling results.

We have considered the issue of whether Pointe Coupee Parish can be determined to not contribute to air quality in a nearby area that does not meet the NAAQS. The state asserts that Pointe Coupee Parish should be determined to not contribute to a NAAQS violation on the basis of the state's PSD-like analysis of the impact of Big Cajun II emissions at the specific locations of predicted NAAQS violations in the area new Oxbow. Because we believe that the uncertainties in the 2015 hourly emissions for Oxbow, lack of downwash, and limited receptor grid mean that the predicted hours and locations of NAAQS violations near Oxbow are not reliable, and because we do not concur with the state's assertion that the PSD SILs are appropriately used to determine contribution in the designations context, we do not intend to agree with the state's assertion.[18]

The meteorological data was current and appropriate to the area. The AERMOD, AERMAP, AERSURFACE, and supporting software used were all current/recent versions of EPA-approved models.

6.4 Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for Pointe Coupee Parish, Louisiana

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 Pointe Coupee Parish, Louisiana

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

6.6 The EPA's Assessment of the Available Information for Pointe Coupee Parish, Louisiana

Based on the modeled impacts and a careful examination of the contribution of emissions to potential violations of the 2010 SO_2 NAAQS, as discussed in section 6.3.2, we believe it is appropriate to designate Pointe Coupee Parish as unclassifiable. Pointe Coupee Parish is required

[18] We are not further addressing here the merits of using the PSD-like approach to make the determination as to contribution, in a hypothetical situation in which the locations of predicted NAAQS violations are not uncertain, but we note that reviewing courts have endorsed EPA's approach of not employing any bright line test for determining contribution in the designations context.

to be characterized under the DRR and we are unable to conclude that sources in the Pointe Coupee Parish do not contribute to air quality in a nearby area that violates the NAAQS.

Potential violations of the NAAQS that were identified by the model exercise occurred in neighboring East Baton Rouge Parish. The model results in values that the state asserts show that Pointe Coupee Parish will attain the 1-hour SO_2 standard. However, we cannot determine that Big Cajun II does not contribute to a NAAQS violation near Oxbow in East Baton Rouge Parish. While the state has quantified the impact of Big Cajun II at the locations in East Baton Rouge where the modeling predicts a NAAQS violation, because of uncertainties in the 2015 hourly emission inputs for Oxbow, lack of downwash, and limited receptors we cannot rely on that limited quantification to reach a conclusion that Big Cajun II does not contribute.

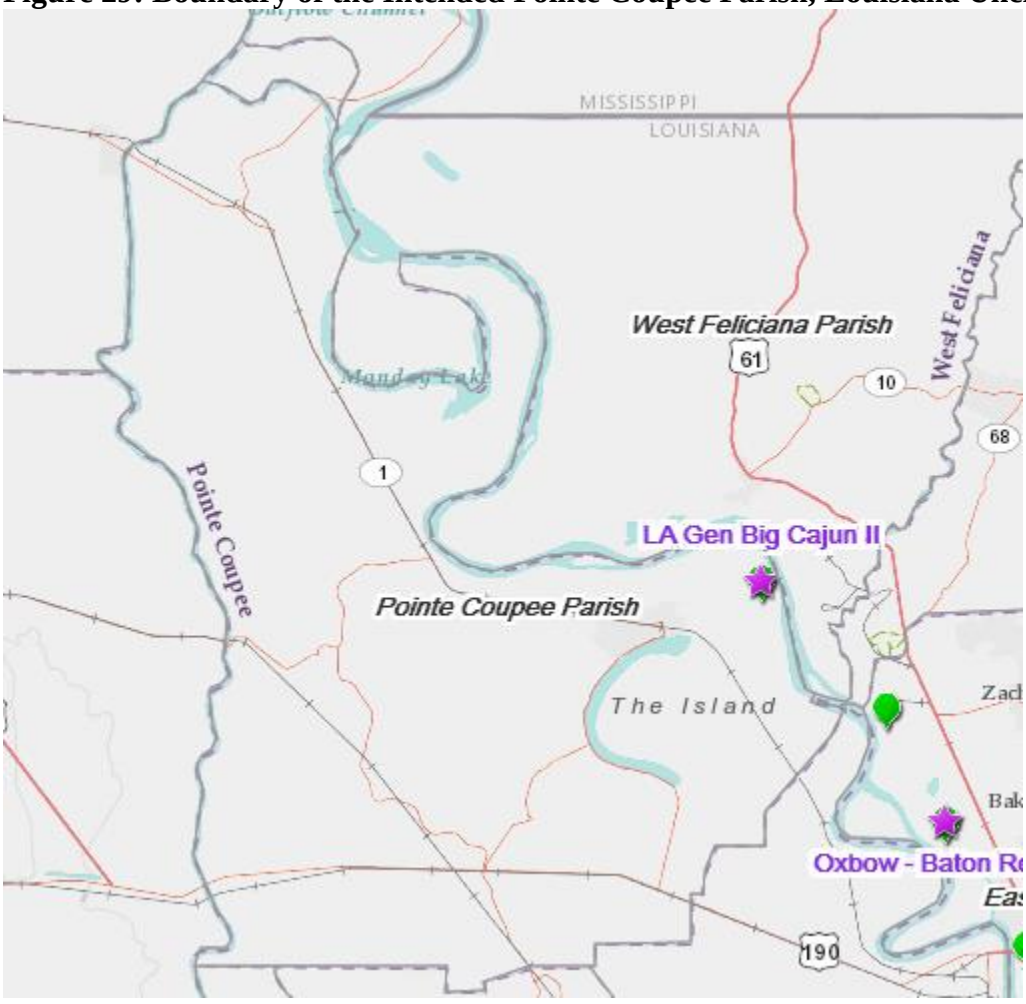
The EPA believes that our intended unclassifiable area, bounded by the jurisdictional boundaries of Pointe Coupee Parish, Louisiana, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment area.

6.7 Summary of Our Intended Designation for Pointe Coupee Parish, Louisiana

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate Pointe Coupee Parish, Louisiana, as unclassifiable for the 2010 SO_2 NAAQS because the area 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 SO_2 NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundaries are comprised of the jurisdictional boundaries of Pointe Coupee Parish, Louisiana.

Figure 29 shows the boundary of this intended designated area.

Figure 29: Boundary of the Intended Pointe Coupee Parish, Louisiana Unclassifiable 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 Louisiana by December 31, 2020.

7. Technical Analysis for Remainder of the State (Excluding Areas with New, Approved SO_2 Monitors)

7.1 Introduction

The state of Louisiana consists of 64 parishes of which three parishes (St. Bernard, Calcasieu, and DeSoto Parishes) have previously been designated either based on a monitored design value greater than the 1-hour standard or based on air quality modeling conducted for Round 2. Intended designations for Rapides Parish, a portion of Evangeline Parish, St. Mary Parish, and Pointe Coupee Parish are addressed in sections 3 through 6 of this TSD. Areas for which the state has installed and begun operation of new, approved SO_2 monitoring networks meeting EPA specifications referenced in the EPA's DRR (see Table 2) must be designated by December 31 2020. Accordingly, the EPA must designate the remaining areas by December 31, 2017. At this time, there are no air quality modeling results available to the EPA for these areas. In addition, there is no air quality monitoring data that indicate any violation of the 1-hour SO_2 NAAQS in any of these areas. The EPA is intending to designate the parishes and portion of a parish in Table 17 in the state as "unclassifiable/attainment" because they were 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 any of these areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. The EPA intends to designate each listed parish and portion of a parish as a separately designated area.

Table 17 - Parishes and Portions of Parishes that the EPA Intends to Designate Unclassifiable/Attainment

Parish	Louisiana's Recommended Area Definition	Louisiana's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Acadia Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Allen Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Ascension Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Assumption Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Avoyelles Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Beauregard Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Bienville Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Bossier Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment

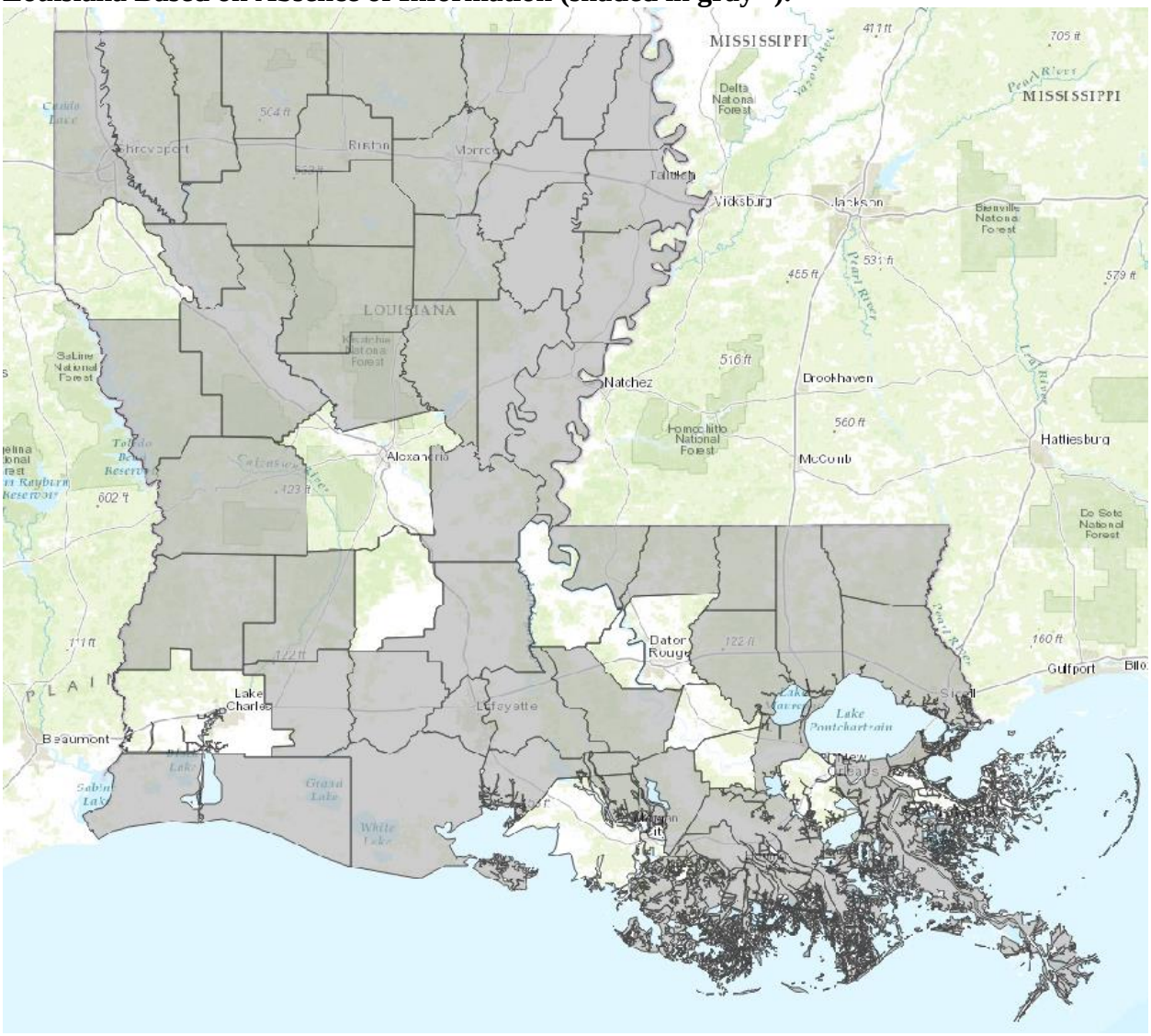
Parish	Louisiana's Recommended Area Definition	Louisiana's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Caddo Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Caldwell Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Cameron Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Catahoula Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Claiborne Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Concordia Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
East Carroll Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
East Feliciana Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Evangeline Parish	Entire Parish	Unclassifiable	The portion of the Parish outside of the rectangle defined by the following UTM coordinates: 570250m E, 3400300m N; 570250m E, 3403300m N; 572400m E, 3403300m N; 572400m E, 3400300m N	Unclassifiable/ attainment
Franklin Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Grant Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Iberia Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Iberville Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Jackson Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Jefferson Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment

Parish	Louisiana's Recommended Area Definition	Louisiana's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Jefferson Davis Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Lafayette Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Lafourche Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
La Salle Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Lincoln Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Livingston Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Madison Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Morehouse Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Natchitoches Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Orleans Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Ouachita Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Plaquemines Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable /attainment
Red River Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Richland Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Sabine Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
St. Helena Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
St. John the Baptist Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable
St. Landry Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
St. Martin Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
St. Tammany Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Tangipahoa Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment

Parish	Louisiana's Recommended Area Definition	Louisiana's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Tensas Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Terrebonne Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Union Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Vermilion Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Vernon Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Washington Parish	Entire Parish	Unclassifiable	Same as State's	Unclassifiable/ attainment
Webster Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
West Carroll Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
West Feliciana Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment
Winn Parish	Entire Parish	Attainment	Same as State's	Unclassifiable/ attainment

Table 17 also summarizes Louisiana's most recent recommendations for designating these areas. After careful review of the all available data, the EPA intends to designate the areas as unclassifiable/attainment. Figure 30 shows the locations of these areas within Louisiana.

Figure 30: The EPA's Intended Unclassifiable/Attainment Designations for Parishes in Louisiana Based on Absence of Information (shaded in gray[19]).



As referenced in the Introduction (*see* Table 2), the counties associated with sources for which Louisiana has installed and begun timely operation of a new, approved SO_2 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.

[19] A small area in Evangeline Parish which is intended to be designated as nonattainment is not distinguished in this graphic. See Section 4 for the boundaries of the nonattainment area within the Evangeline Parish unclassifiable/attainment area.

7.2 Air Quality Monitoring Data for the Bossier, East Baton Rouge, West Baton Rouge, and Calcasieu Areas

Louisiana operated six SO_2 monitors which reported sufficient data to the EPA's AQS to calculate a 3-year design value for the 1-hour SO_2 standard which are listed in Table 18 below. The only monitor (AQS site 220870007) recording a NAAQS violation in 2014-2016 is located in St. Bernard Parish which is currently designated as nonattainment. Portions of Orleans, Jefferson, and Plaquemines Parishes are near this monitoring site. In the absence of modeling information, the EPA is unable to determine whether sources in these nearby parishes contribute to monitored violations in St Bernard Parish, but we do not have any information suggesting that they do.

Table 18 - SO_2 Monitor Sites in Louisiana with Sufficient Data to Calculate a 2014-2016 Design Value

SO_2 Monitor info					
AQS_ID	**State**	**Parish**	**CBSA**	**Address**	**2014-16 Design Value (ppb)**
220150008	Louisiana	Bossier	Shreveport-Bossier City, Louisiana	1425 Airport Drive	12
220190008	Louisiana	Calcasieu	Lake Charles, Louisiana	2646 John Stine Road	34
220330009	Louisiana	East Baton Rouge	Baton Rouge, Louisiana	1061-A Leesville Ave	16
220870004	Louisiana	St. Bernard	New Orleans-Metairie-Kenner, Louisiana	4101 Mistrot Dr. Meraux, LA 70075	16
220870007	Louisiana	St. Bernard	New Orleans-Metairie-Kenner, Louisiana	24 E. Chalmette Circle	82
221210001	Louisiana	West Baton Rouge	Baton Rouge, Louisiana	1005 Northwest Drive, Port Allen	22

These data were available to the EPA for consideration in the designations process. However, the EPA does not have information indicating that these monitoring sites are in areas of maximum concentration, so this data cannot be used as the basis for designation.

7.3 Jurisdictional Boundaries in the Remainder of Louisiana

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

Louisiana recommended designations on the basis of the entirety of individual parishes, as summarized in Table 17. Except for the intended rectangular nonattainment area in Evangeline Parish and the intended unclassifiable/attainment area in the portion of the Evangeline Parish outside this rectangle, we intend to designate each parish as a separate designated area, using parish boundaries.

7.4 The EPA's Assessment of the Available Information for the Remainder of the State (Excluding the Areas with New, Approved SO_2 Monitors)

The parishes and partial parish in Table 17 were 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 areas 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.

With the exception of the rectangular area in Evangeline Parish that we intend to designate as a nonattainment area, which will serve as the inner boundary of the Evangeline Parish unclassifiable area/attainment area, our intended unclassifiable areas are bounded by the parish boundaries. This rectangular area will be well defined by UTM coordinates. Thus our intended unclassifiable/attainment areas would have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment areas.

7.5 Summary of Our Intended Designation for the Remainder of Louisiana 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 54 parishes or portions of parishes identified in Table 17 as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the boundaries are comprised of the boundaries of the individual parishes and the intended boundary of the Evangeline Parish nonattainment area.

Figure 30 above gives the location of the individual parishes to be designated as unclassifiable/attainment.

At this time, our intended designations for the state only apply to these areas and the other areas presented in this technical support document. The EPA intends to evaluate and designate all remaining undesignated areas in Louisiana by December 31, 2020.