Technical Support Document:

Chapter 16
Final 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). Our Notice of Availability (NOA)[1] and our Technical Support Document[2] for our intended designations for the round of designations we are required to complete by December 31, 2017, provided background on the relevant CAA definitions, and the history of the designations for this NAAQS. Chapter 1 of this TSD for the final designations explains the definitions we are applying in these final designations. The TSD for the intended Round 3 area designations also described Louisiana's recommended designations, assessed the available relevant monitoring, modeling, and any other information, and provided our intended designations.

This TSD for the final Round 3 area designations for Louisiana addresses any change by Louisiana to its recommended designations since we communicated our intended designations for areas in Louisiana. It also provides our assessment of additional relevant information that was submitted too close to the signature of the NOA to have been considered in our intended designations, or that has been submitted by Louisiana or other parties since the publication of the NOA. This TSD does not repeat information contained in the TSD for our intended designations except as needed to explain our assessment of the newer information and to make clear the final action we are taking and its basis, but that information is incorporated as part of our final designations. If our assessment of the information already considered in our TSD for our intended designations has changed based on new information and we are finalizing a designation based on such change in our assessment, this TSD also explains that change. For areas of Louisiana, not explicitly addressed in this chapter, we are finalizing the designations described in our 120-day letters and the TSD for the intended Round 3 area designations as explained in those documents. All the final designations are listed in Table 1 below.

For the areas in Louisiana that are part of the Round 3 designations process, Table 1 identifies the EPA's final designations and the counties or portions of counties to which they apply. It also lists Louisiana's current recommendations. Louisiana has not changed its recommendations for

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

[2] Technical Support Document: Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard, August 2017. https://www.epa.gov/sulfur-dioxide-designations/initial-technical-support-documents-area-designations-round-3.

the designation of areas in the state since our 120-day letter was sent. The EPA's final designations for these areas are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. Summary of the EPA's Final Designations and the Designation Recommendations by Louisiana

Area/Parish	Louisiana's Recommended Area Definition	Louisiana's Recommended Designation	EPA's Intended Designation	EPA's Final Area Definition[1]	EPA's Final Designation[2]
Rapides Parish	Rapides Parish	Unclassifiable	Unclassifiable/ Attainment	Same as State's Recommendation	Attainment/ Unclassifiable
Evangeline Parish (partial)	Evangeline Parish	Unclassifiable	Nonattainment	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	Unclassifiable/ Attainment	Part of Evangeline Parish outside of: 570250m E, 3400300m N 570250m E, 3403300m N 572400m E, 3403300m N 572400m E, 3400300m N NAD83 15R	Attainment/ Unclassifiable
St. Mary Parish	St. Mary Parish	Unclassifiable	Unclassifiable	Same as State's Recommendation	Unclassifiable
Pointe Coupee Parish	Pointe Coupee Parish	Unclassifiable	Unclassifiable	Same as State's Recommendation	Attainment/ Unclassifiable
Remaining Parishes to Be Designated in this Action[3]	Each Parish or Partial Parish as a Separately Designated Area	Nonattainment, Attainment, or Unclassifiable, by Parish	Unclassifiable/ Attainment	Certain Remaining Parishes and the Remaining Portion of Evangeline Parish	Attainment/ Unclassifiable

[1] Our final designated areas include all tribal lands within these counties. The EPA is not determining the boundaries of any area of Indian country in this document, including any area of Indian country located in a larger designation area. The inclusion of any Indian country in the designation area is not a determination that the state has regulatory authority under the Clean Air Act for such Indian country.

[2] Refer to Chapter 1 of Technical Support Document: Final Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for definitions of the designation categories and the terminology change from Unclassifiable/Attainment to Attainment/Unclassifiable

[3] 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 is designating the remaining undesignated parishes (and a portion of Evangeline Parish) in Louisiana as "attainment/unclassifiable." These areas are identified more specifically in Table 17 in section 7 of Chapter 16 of the TSD for the intended designations.

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

2. Technical Analysis of New Information for the Pointe Coupee Parish Area

2.1. Introduction

The EPA must designate the Point Coupee Parish, Louisiana, area by December 31, 2017, because the area has not 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.

Louisiana Generating submitted a comment accompanied by files reflecting revised modeling for Pointe Coupee Parish. The modeling was in response to the EPA's intended designation of the parish as unclassifiable and our reasoning for this designation. The modeling used a higher emission rate for Big Cajun II Unit 1 in response to our comment concerning how the hourly allowable emission input was quantified in light of the applicable 30-day emission limit. The new modeling limited the receptor coverage to only Pointe Coupee Parish, while the original modeling also had included receptors in East Baton Rouge Parish.

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

All the potential violations of the NAAQS that were identified by the state's modeling exercise (dated January 9, 2017, EPA-HQ-OAR-2017-0003-0191) occurred in neighboring East Baton Rouge Parish. The modeling resulted in values that the state asserted show that Pointe Coupee Parish does not have violations of the 1-hour SO_2 standard. However, we stated in the TSD for the intended designations that we could not determine that Pointe Coupee did not have violations nor whether Big Cajun II contributes to a NAAQS violation near Oxbow in East Baton Rouge Parish. While the state had 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 stated that we cannot rely on that limited quantification to reach a conclusion as to whether Big Cajun II contributes to a potential NAAQS violation in East Baton Rouge Parish and that the modeling is not accurate enough to conclude that there are modeled violations in East Baton Rouge Parish.

In the 120-day letter notification to the governor of Louisiana, and further explained in Chapter 16 of the TSD for the intended Round 3 area designations, the EPA proposed a designation of unclassifiable based on all available information, including modeling information and all relevant monitoring information.

The following Table 3 identifies all the modeling assessments evaluated for the 120-day letters and discussed in the TSD for the intended Round 3 area designations. Additional details can be found in the TSD for the Intended Round 3 Area Designations, Chapter 16.

Table 3 –Modeling Assessment Evaluated in the TSD for the Intended Designation for the Pointe Coupee Parish Area

Organization Submitting Assessment	Date of the Assessment	Identifier used in the TSD for the Intended Round 3 Area Designations, Chapter 16	Distinguishing or Otherwise Key Features
State of Louisiana	January 9, 2017 (EPA-HQ-OAR-2017-0003-0191)	State's modeling	Sole modeling received prior to the 120-day letter

The EPA considered all available information for the Pointe Coupee Parish area, including the modeling assessment provided by the state on January 12, 2017. The EPA considered that there was uncertainty in the state's modeling regarding the estimated actual emission rate at Big Cajun II and regarding the occurrence of modeled nonattainment in a neighboring parish, East Baton Rouge Parish. The EPA considered that there was no ambient air monitoring data relevant to the determination of compliance with the NAAQS in Pointe Coupee Parish. Based on the information at hand in August 2017, the EPA proposed to conclude that the state's modeling analysis provided an inconclusive basis on which to determine the attainment status of the area. While no violations of the 2010 SO_2 NAAQS were modeled to occur within Pointe Coupee Parish based on estimated actual emissions at the DRR source in the parish, the source was projected to contribute to a modeled nonattainment area in East Baton Rouge Parish. However, because of uncertainties in the 2015 hourly emission inputs for the two DRR sources in East Baton Rouge Parish (Oxbow and Georgia Pacific), lack of downwash, and limited receptors we stated that we cannot rely on that limited quantification to reach a conclusion that there are modeled violations in East Baton Rouge Parish and because of these issues the EPA also cannot assess whether Big Cajun II contributes to a potential NAAQS violation in East Baton Rouge Parish.

2.3. Assessment of Air Quality Monitoring Data for the Pointe Coupee Parish Area

There is no SO_2 air quality monitoring station in Pointe Coupee Parish, and we have no new monitoring information of any other type.

2.4. Assessment of New Air Quality Modeling Analysis for the Pointe Coupee Parish Area Addressing Big Cajun II Power Plant

2.4.1. Introduction

This section 2.4 presents all the newly available air quality modeling information for a portion of Pointe Coupee Parish and nearby portions of other parishes, which includes Big Cajun II. (This area will often be referred to as "the Pointe Coupee Parish area" within this section 2.4.) This area contains the following SO_2 sources, principally the sources around which Louisiana was required by the DRR to characterize SO_2 air quality:

- 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 together, the area around this group of sources, to the extent it is included in the receptor grid for the new modeling,[3] is being addressed in this section with consideration given to the impacts of all these sources.

The state did not conduct any new dispersion modeling for this area subsequent to the 120-day letter. Please refer to Chapter 16 of the TSD for the intended designations, and the summary above, for a discussion of the January 9, 2017, modeling analysis that the state conducted and submitted prior to the 120-day letter.

However, on October 6, 2017, Louisiana Generating submitted new modeling analyzing air quality in the area surrounding Big Cajun II in Pointe Coupee Parish.[4] This new assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD,

[3] The new modeling did not include any receptors outside Pointe Coupee Parish, but did include some sources outside the parish, as described below.
[4] While the state did not conduct any new modeling itself, Louisiana Generating provided a modeling report and modeling files.

analyzing a mixture of actual emissions and emission values that Louisiana Generating described as allowable emissions that we do not consider to be true allowable emissions (see section 2.4.7). The area that Louisiana Generating has assessed via air quality modeling is located in Pointe Coupee Parish, Louisiana.

Louisiana Generating submitted its analysis in support of its argument for a different designation than the EPA's intended designation for this area. The EPA expressed an intent to designate the area as unclassifiable, whereas Louisiana Generating asserts that its analysis supports a designation as unclassifiable/attainment. Part of Louisiana Generating's argument is that the possibility of a modeled violation in East Baton Rouge Parish to which Big Cajun II might contribute should be irrelevant to the designation of Pointe Coupee Parish because East Baton Rouge Parish will be designated in Round 4 based on ambient monitoring data. Consistent with its argument, Louisiana Generating did not provide modeling results for any receptors outside Pointe Coupee Parish.

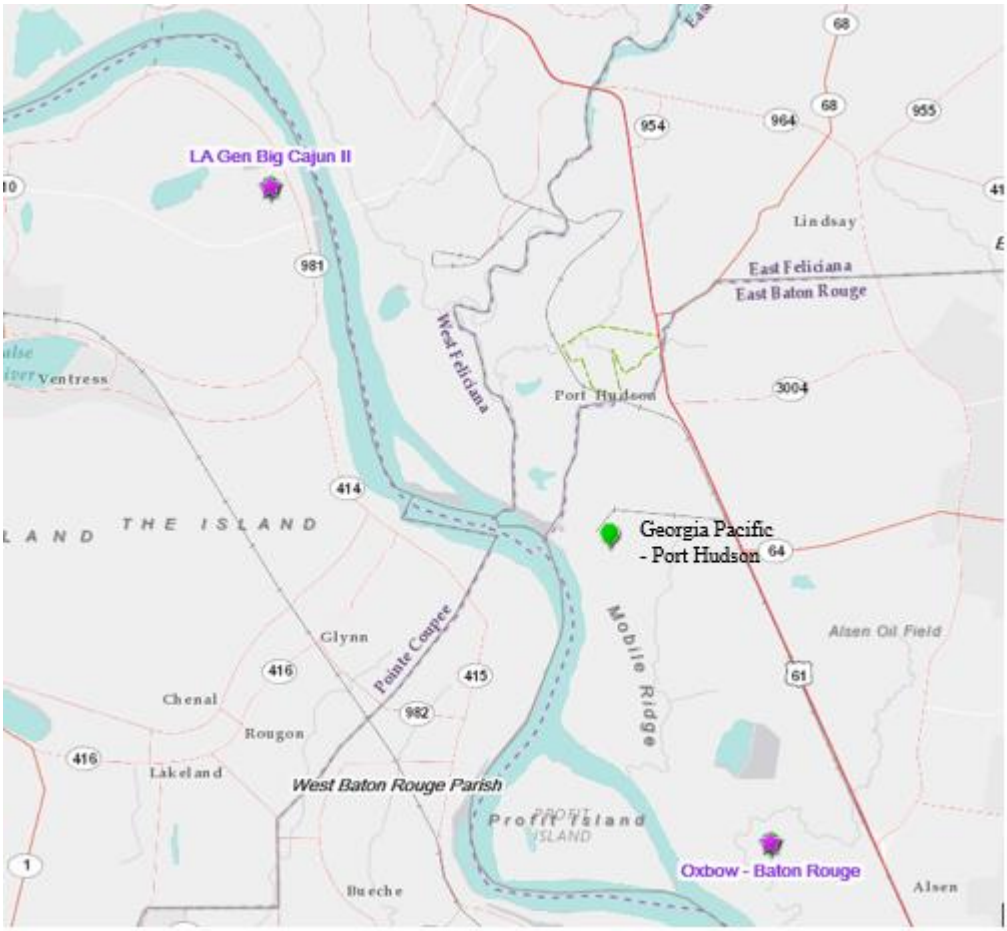
As seen in Figure 1 below, the Big Cajun II facility is located in eastern Pointe Coupee Parish, near State Road 10 and State Highway 964. The Oxbow Calcining LLC facility, another DRR source, is in adjacent East Baton Rouge Parish located just west of the intersection of State Road 964 and State Highway 61, and about 20 km to the SSE of Big Cajun II.

Also included in the figure is one other nearby emitter of SO_2.[5] This is Georgia Pacific – Port Hudson located about midway between Big Cajun II and Oxbow in East Baton Rouge Parish.

The EPA's final designation boundary for the Pointe Coupee Parish attainment/unclassifiable area is not shown in this figure, but is shown in a figure in section 2.8 below that summarizes our final designation.

[5] All other SO_2 emitters of 20 tpy or more (based on information in the 2014 NEI) are shown in Figure 1. 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.

Figure 1. Map of the Pointe Coupee Area Addressing Big Cajun II, Oxbow –Baton Rouge, and Georgia Pacific-Port Hudson Sources



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 cited in Chapter 1 of this TSD, as appropriate.

For this area, the EPA received and considered one new modeling assessment, beyond that identified above in Table 3 that was reviewed in our TSD for our intended designations, submitted by Louisiana Generating. To avoid confusion in referring to these assessments, the following Table 4 describes this assessment, indicating when it was received, providing an identifier for the assessment that is used in the discussion that follows, and identifying any distinguishing features of the modeling assessment.

Table 4 –New Modeling Assessment for the Pointe Coupee Parish Area

Organization Submitting Assessment	Date of the Assessment	Identifier Used in this TSD	Distinguishing or Otherwise Key Features
Louisiana Generating	No date shown. Submitted to docket October 5, 2017 (EPA-HQ-OAR-2017-0003-0524)	Industry's Modeling	Modeling with revised emissions for Big Cajun II Unit 1 and with receptors limited to Pointe Coupee Parish

2.4.2. Differences Among and Relevance of the Modeling Assessments

The industry's modeling used a larger adjustment factor, 1.6, to translate the permitted emission limit based on a 30-day averaging period into the value of the allowable hourly emissions used as input for the modeling, compared to the adjustment factor in the state's modeling. Louisiana Generating provided a spreadsheet-based analysis of historical hourly emissions data to support that this factor of 1.6 reflects a conservative upward adjustment of an estimated 1-hour SO_2 emissions value. Louisiana Generating Units 2 and 3 were modeled the same as previously modeled. Also, as previously mentioned, the industry's modeling did not include receptors outside Pointe Coupee Parish, while the early state modeling included receptors near Oxbow in East Baton Rouge Parish.

2.4.3. Model Selection and Modeling Components

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

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

Louisiana Generating used AERMOD version 15181, the previous version of AERMOD using the regulatory default options. Because the regulatory default options were used in the model, no significant changes in the modeled concentrations would be expected if the more recently

released version 16216r were used, and thus the use of 15181 is acceptable. A discussion of Louisiana Generating's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

Both the State's modeling and newer Industry's modeling used the same version of the model with the same options.

2.4.4. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the determination of whether a source is in an "urban" or "rural" area is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is also important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD cited in Chapter 1 of this TSD 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, Louisiana Generating determined, as had the state, that it was most appropriate to run the model in rural mode.

The area around Big Cajun II is predominantly rural, with agricultural and 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. The EPA agrees that evaluation of the area by the Auer method criteria for 50% or greater agricultural area fraction shows it is appropriate to run the model in rural mode.

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

The Modeling TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

For the Big Cajun II area, industry (and the state) included two other emitters of SO_2 within 20 km of the Big Cajun II facility, located in an adjacent parish. The state's area of analysis included receptors throughout a domain 20 km in all directions from Big Cajun II, approximately a 40 by 40 km domain. However, Louisiana Generating, in contrast to the state, determined that the appropriate area to adequately characterize air quality through modeling was limited to the intersection of the state's domain and Pointe Coupee Parish. Industry excluded receptors located in six additional parishes that were included in the state's analysis to characterize 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. Since Big Cajun II is located near the boundary of Pointe Coupee Parish, the industry analysis excluded some receptors located less than 1.5 km from the stacks that were included within the receptor grid used in the state's analysis. 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 5 lists potentially contributing sources of SO_2 in an area around Big Cajun II, and Figure 2 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 2: Cumulative 2014 Tons of SO_2 Emissions with Increasing Distance from Big Cajun II

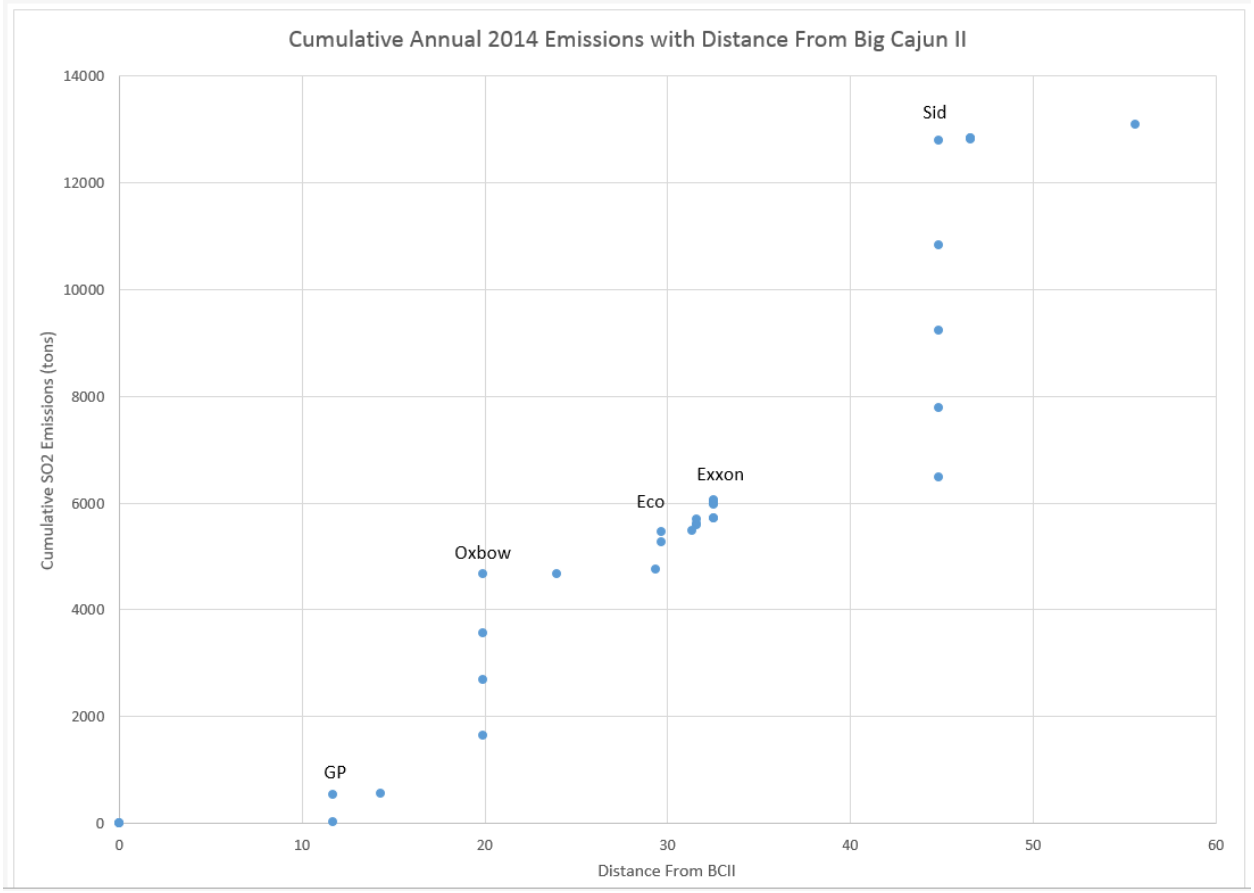


Table 5 - 2014 SO_2 Emissions by Facility with Increasing Distance from Big Cajun II. The facilities in blue font were not included directly in the modeling.

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**

Sources beyond 20 km were determined by the state as part of its modeling effort to not have the potential to cause concentration gradient impacts within the area of analysis. The state also determined that their contribution could be represented through the background SO_2 concentration. Louisiana Generating relied upon this same conclusion in their modeling.

The grid receptor spacing for the area of analysis chosen by Louisiana Generating followed the state's grid given below with the exception that only receptors within Pointe Coupee Parish were included:

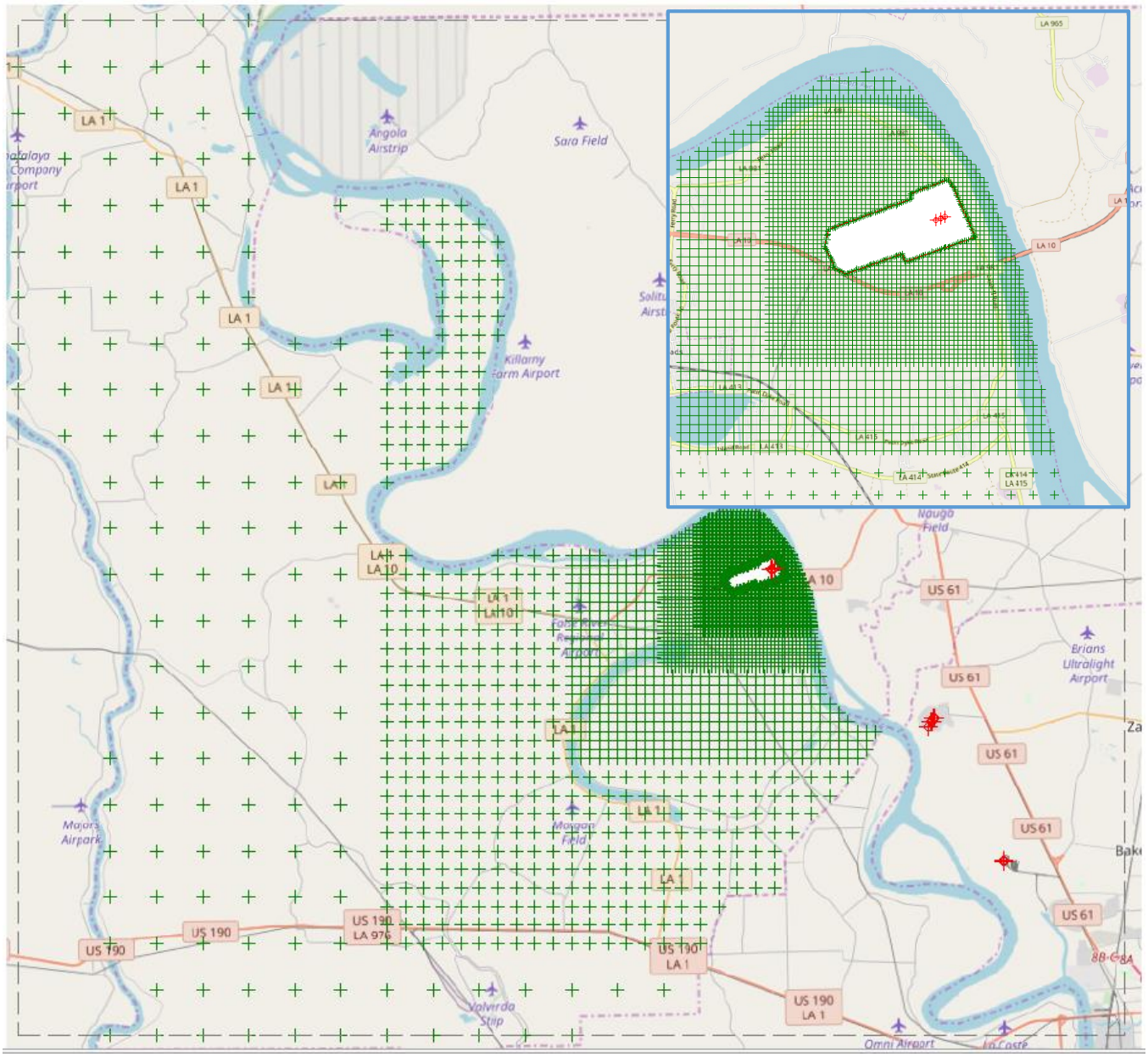
50-meter spacing along the facility fence line;
100-meter spacing extending from the fence line to 3 kilometers;
200-meter spacing extending from 3 to 5 kilometers;
500-meter spacing extending from 5 to 10 kilometers; and
1,000-meter spacing extending from 10 to 20 kilometers.

The receptor network contained 4,657 receptors, and the network covered all of Pointe Coupee Parish except the northernmost tip.

Figure 3, generated by the EPA from the modeling files supplied with the industry's recommendation, show industry's chosen area of analysis surrounding the Big Cajun II, as well as the receptor grid for the area of analysis.

The following discussion relating to placement of receptors is relevant only within Pointe Coupee Parish borders, since the Louisiana Generating analysis excluded receptors outside the parish. Louisiana Generating placed receptors for the purposes of this designation effort in locations that it considered to be ambient air relative to Big Cajun II. Receptors were not placed within the fenceline of Big Cajun II since the facility limits access to the property with a fence. In "Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard" (March 20, 2015), EPA's guidance memo recommends "placing receptors only in locations where a monitor could be placed." The EPA finds that receptors excluded within Pointe Coupee Parish align with the March 20, 2015, Guidance. Industry placed a regular grid of receptors without excluding other locations that one would not place a monitor, such as river locations.

Figure 3: Area of Analysis and Receptor Grid for the Pointe Coupee Area



The justification given by Louisiana Generating for exclusion of receptors outside of Pointe Coupee Parish was that the attainment status of East Baton Rouge Parish (the location of Oxbow and Georgia Pacific sources) will be determined in the Round 4 designations based on 3 years of ambient monitoring data collection that is now underway. However, the state's grid included receptors in five additional parishes other than Pointe Coupee and East Baton Rouge Parish. The exclusion of receptors in these additional parishes is not addressed in Louisiana Generating's comment.

The EPA notes that although Louisiana Generating did not include receptors outside Pointe Coupee Parish, a comparison with the state's modeling shows that the locations of maximum concentration near Big Cajun II predicted in the state's modeling are also included in Louisiana Generating's grid. Because of the similarities with the state's modeling, we believe that Louisiana Generating's grid would encompass the locations of highest concentrations near Big Cajun II in Pointe Coupee Parish even though ambient air locations in five other parishes outside Pointe Coupee Parish were excluded. The high concentration area about 20 km distant around Oxbow shown by the state's modeling, predominantly affected by Oxbow's emissions but also impacted by Big Cajun II's emissions, are not addressed by Louisiana Generating's receptors.

2.4.6. Modeling Parameter: Source Characterization

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

Louisiana Generating's modeling analysis characterized the sources with respect to these parameters in the same way as the state's modeling as detailed in Chapter 16 Section 6.3.2.4 of our intended designations TSD. Our observations and comments in that TSD apply also to this modeling.

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. For Unit 3 the modeled stack height was 1.4 meters (less than 1% of stack height) higher than the GEP height – an insignificant difference.

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, even if actual hourly varying stack parameters had been available the emissions are so small the changes would likely 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 were generated using short-term operation data provided in the industry's modeling that LDEQ provided to the 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 2012-2014 files were used to characterize hourly stack temperatures and exit velocities for Oxbow and Georgia Pacific sources for the 2013-2015 period, as follows.

For the years 2013 and 2014 the actual stack parameters were used from the 2012-2014 files.

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 for each hour across the 2012-2014 span of years in the files were used (i.e., whichever year had the maximum emission rate for each given hour of the year, that file's information was 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's perspective was that the combination of highest emissions and the lowest buoyancy flux across 2012-2014 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 EPA notes that these would represent only the highest actual hourly emissions rate and lowest actual hourly stack temperature and exit velocity for the 2012-2014 time frame, rather than, for example, the maximum hourly emissions rate that is allowable.

By copying the approach previously used by the state, Louisiana Generating characterized the emission parameters for the three units at Big Cajun II 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, but with some differences which are detailed in our discussions. Specifically, for Big Cajun II Louisiana Generating used actual stack heights in conjunction with a mixture of actual emissions and emission values that the state and Louisiana Generating described as allowable emissions that we do not consider to be true allowable emissions (see section 2.4.7), 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 likely not consequential. Louisiana Generating 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 Louisiana Generating 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. Louisiana Generating commented that the absence of downwash would not be expected to influence the concentrations in Pointe Coupee Parish from these two sources because of the distance of transport to Louisiana Generating's receptor grid. However, while the effects of building downwash at distances exceeding 5 km could be minor, the EPA believes that the possible issue of building downwash for these sources should have been addressed.

In reviewing the modeling submission, we believe Louisiana Generating has adequately addressed each of the components of source characterization for the sources included in the modeling, generally following the recommendations in the Modeling TAD with the exception of building downwash for contributing sources and a small difference in stack height in one case.

2.4.7. Modeling Parameter: Emissions

The Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the Modeling 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 Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or 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, Louisiana Generating included Big Cajun II and two other emitters of SO_2 within 20 km in the area of analysis. Louisiana Generating has chosen to model these facilities using a combination of what they characterized as allowable emissions and actual emissions. The facilities in the Louisiana Generating'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 6. A description of how the state obtained hourly emission rates is given below and in Table 7.

Table 6 - Actual SO_2 Emissions 2013 – 2015 from Facilities in the Big Cajun II Area

Facility Name	SO_2 Emissions tons/year (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). As discussed below, Unit 1 is also now subject to a limit on its hourly emissions; this restriction has not been fully taken into account in industry's modeling. 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 a permit condition to fire only with coal with sulfur content less than 0.45% by weight in 2013 and a facility emission limit cap (in tpy) that has decreased from 2013 to the current cap in place in 2016. The installation of DSI on Unit 1, conversion of Unit 2 to combust only natural gas, and the facility SO_2 cap were all part of limits taken in a consent decree.[6]

Estimated emissions based on these currently effective and federally-enforceable limits were developed by Louisiana Generating on an hourly basis, differently than in the state's approach, as follows:

- Unit 1 modeled emissions were adjusted to reflect the new, federally-enforceable 30-day unit limit of 0.38 lb/MMBtu. Since the limit assumes a rolling 30-day average, it was multiplied by 1.6 (yielding an estimate that a comparably stringent 1-hour limit would be 0.608 lb/MMBtu) before being combined with the actual hourly heat input

[6] Consent Decree - Louisiana Generating LLC Civil Action No. 09-100-JJB-DLD; March 6, 2013. A copy of this consent decree is available in the docket for this action.

from each hour of 2013-2015 to simulate hourly emissions that comply with the current permit limit of 0.38 lb/MMBtu. This modified rate is in response to the EPA's comment on the state's modeling that its factor of 1.2 (yielding an estimate that a comparably stringent 1-hour limit would be 0.45 lb/MMBtu) was likely too low. This 1.6 factor is further discussed below.

- 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.

In its comment, Louisiana Generating included a spreadsheet containing an analysis of how 30-day average emissions in units of lb/hr compare to hourly emission rates in the same units, which was intended to support the proposition that the adjustment factor of 1.6 used in its modeling to convert the 30-day permit limit (in units of lb/MMBtu) to an hourly allowable emissions input in units of lb/hr. Louisiana Generating used observed data for the period 4/1/2015-12/31/2016 in this analysis. Louisiana Generating's methodology did not follow the methodology of Appendix C of the EPA's April 2014 Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions. In particular, Louisiana Generating did not use as the adjustment factor the ratio of the 99th percentile hourly emission rate across the entire data period to the 99th percentile 30-day emission rate across the same period. Rather, it calculated a ratio for each 30-day period and reported that the minimum, maximum, and average of these ratios were all less than 1.6. In addition, Louisiana Generating's methodology limited the number of operating hours included in the analysis by requiring a continuous operation of 720 hours for each observation of 30-day average, which is more limiting than the EPA's method in Appendix C of the EPA's 2014 SIP guidance. One implication of this more limiting approach is that a day with a startup or shutdown event is excluded from Louisiana Generating's analysis. Because of the differences in the methods of calculating the ratio and the limited period of operational data, we could not determine definitively from Louisiana Generating's analysis that the 1.6 ratio actually used in the modeling is in fact conservative, i.e., that it is not tending to underestimate the true maximum ambient concentrations. As discussed below in section 2.4.12, we have completed an additional analysis to address this issue.

The facility also had an SO_2 emission cap of 38,000 tpy in 2013 and 2014 and a cap of 33,000 tpy in 2015. Beginning in 2016 (after the conversion of Unit 2 to natural gas only and DSI installed on Unit 1), Big Cajun II is operating under a consent decree capping facility-wide SO_2 emissions (Units 1, 2, and 3) at 18,950 tpy or less. The facility-wide hourly emissions used in the modeling sum to values of annual emissions that, relative to this cap now in place, are conservative by comparison in 2013 and 2014, but not in 2015: Specifically, 23,065 tpy was modeled for 2013; 24,337 tpy was modeled for 2014; and 18,532 tpy was modeled for 2015 (2% lower than the allowable annual average). The average annual emissions modeled was 21,978 tpy, which is higher than the currently applicable annual potential emissions (18,950 tpy).

While the industry'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 throughout 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 7 gives the annual actual and modeled emissions using the 1.6 factor 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 7. 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)	11,127	12,164	9,881
% Reduction	53%	45%	-4%

Louisiana Generating did not report how much lower hourly emissions modeling inputs were than the values that would have been calculated if maximum heat input (rather than actual hourly actual heat input, as used by Louisiana Generating) 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 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. Using the maximum heat rate, a constant allowable emission rate during those hours would have been 28% higher than the average of the modeled hourly input values. Using the 95% heat rate, a constant allowable emission rate during those hours would have been 20% higher than the average of the modeled hourly input values. In addition, a constant hourly allowable emission rate would have included emissions during the over 10,000 hours (out of

26,280 total hours in the 3 years) when the unit was not operating for the hour. Even without the inclusion of emissions during the over 10,000 hours use of either the maximum heat input or the 95th percentile heat input would result in total emissions in 2013 and 2014 (including what was modeled for Units 2 and 3) even further above the current facility annual cap of 18,950 tpy that previously noted, and would result in 2015 emissions above the same cap.

The Modeling TAD recommends different approaches than that included in this modeling, and thus does not recommend the approaches to hourly emission inputs used by the state and Louisiana Generating for Big Cajun Unit 1, nor clarify 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 what patterns of emissions are allowable, there are many ways that allowable emissions could have been assigned across units and hours, had the modeling tried to predict future actual, just-complying emissions taking 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.

An issue identified by the EPA with the state's approach to Big Cajun II Unit 1 - the factor of 1.2 used to relate the emission limit based on a 30-day average to hourly emissions – was addressed by Louisiana Generating's modeling submitted in response to our proposal. In this recent modeling Louisiana Generating used a higher 1.6 factor suggested by the EPA as likely more appropriate. As discussed below in 2.4.12, the EPA has conducted our own analysis of the conversion factor issue, and we conclude that a factor of 1.6 is appropriate in this context.

The state and Louisiana Generating's common 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 true 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 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. Louisiana Generating's modeling used the state's emission rates for Unit 3. We consider this common approach acceptable for the purpose of informing our final designation.

For 2013 and 2014 for Georgia Pacific and Oxbow, which are not equipped with CEMS, Louisiana Generating used the same emission rates as used by the state's modeling analysis. The state used other operating data to estimate (or model) hourly emissions and emission parameters. 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 obtained, these files were used to characterize hourly emissions, stack temperatures, and exit velocities for Oxbow and Georgia Pacific sources for 2015 also, as follows.

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 from 2012-2014 actuals 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 and Louisiana Generating's common approach for 2015 for Georgia Pacific and Oxbow a source of uncertainty for the interpretation of the modeling results near Big Cajun II. With respect to 2015 hourly emissions for Georgia Pacific and Oxbow, using the maximum actuals of 2012 through 2014 for each matching hour of 2015 is likely a conservative representation of the total emissions that were released 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. This approach might assign too much or too little emissions to an hour in 2015 that had favorable transport toward Pointe Coupee Parish. 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 EPA had previously commented on this same approach used in the state's modeling. In the state's modeling, receptors are included around Oxbow which indicate violations of the NAAQS. Due to this uncertainty, the EPA proposed determined in our proposal, and we now determine in our final action, that we cannot use these modeling results to determine whether there is a NAAQS violation in the area around Oxbow in East Baton Rouge Parish, and thus also that the EPA cannot determine whether Pointe Coupee Parish contributes to a violation in East Baton Rouge Parish. Because of the transport distance from the contributing sources and their lower contributions to concentrations found in Pointe Coupee Parish relative to Big Cajun II, the impact of the uncertainty in their emissions on the modeled design value in Pointe Coupee

should likely be correspondingly less severe than the impact of the uncertainty on the modeled design value in East Baton Rouge Parish.

2.4.8. Modeling Parameter: Meteorology and Surface Characteristics

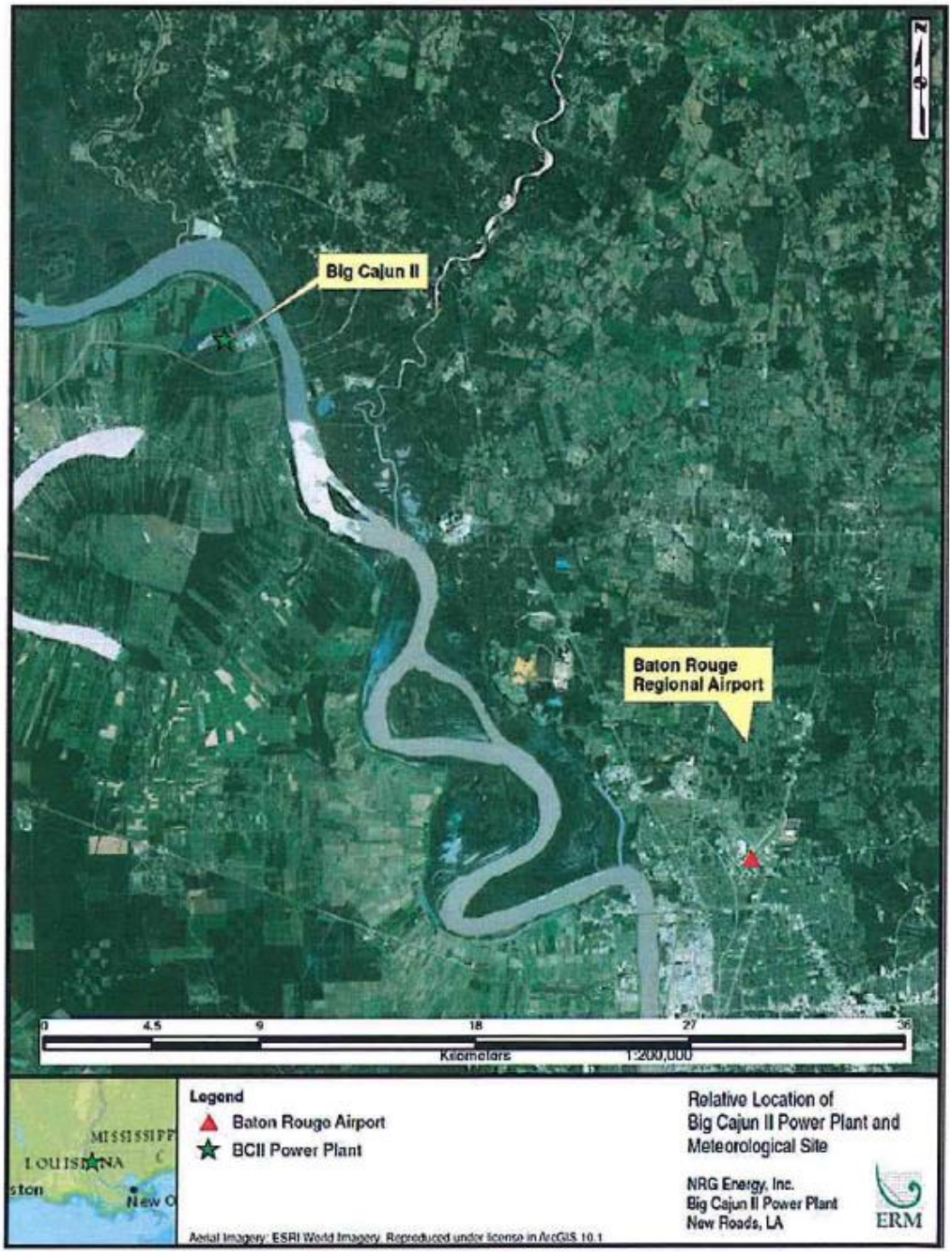
As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of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

For the area of analysis for the Pointe Coupee Parish area, Louisiana Generating used the same meteorology as in the state's modeling. The remainder of this section will discuss the state's meteorological data. 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 4 below, included in the state's recommendation, the location of the NWS surface station is shown relative to the area of analysis.

Figure 4: Area of Analysis and the NWS station in the Big Cajun II Area

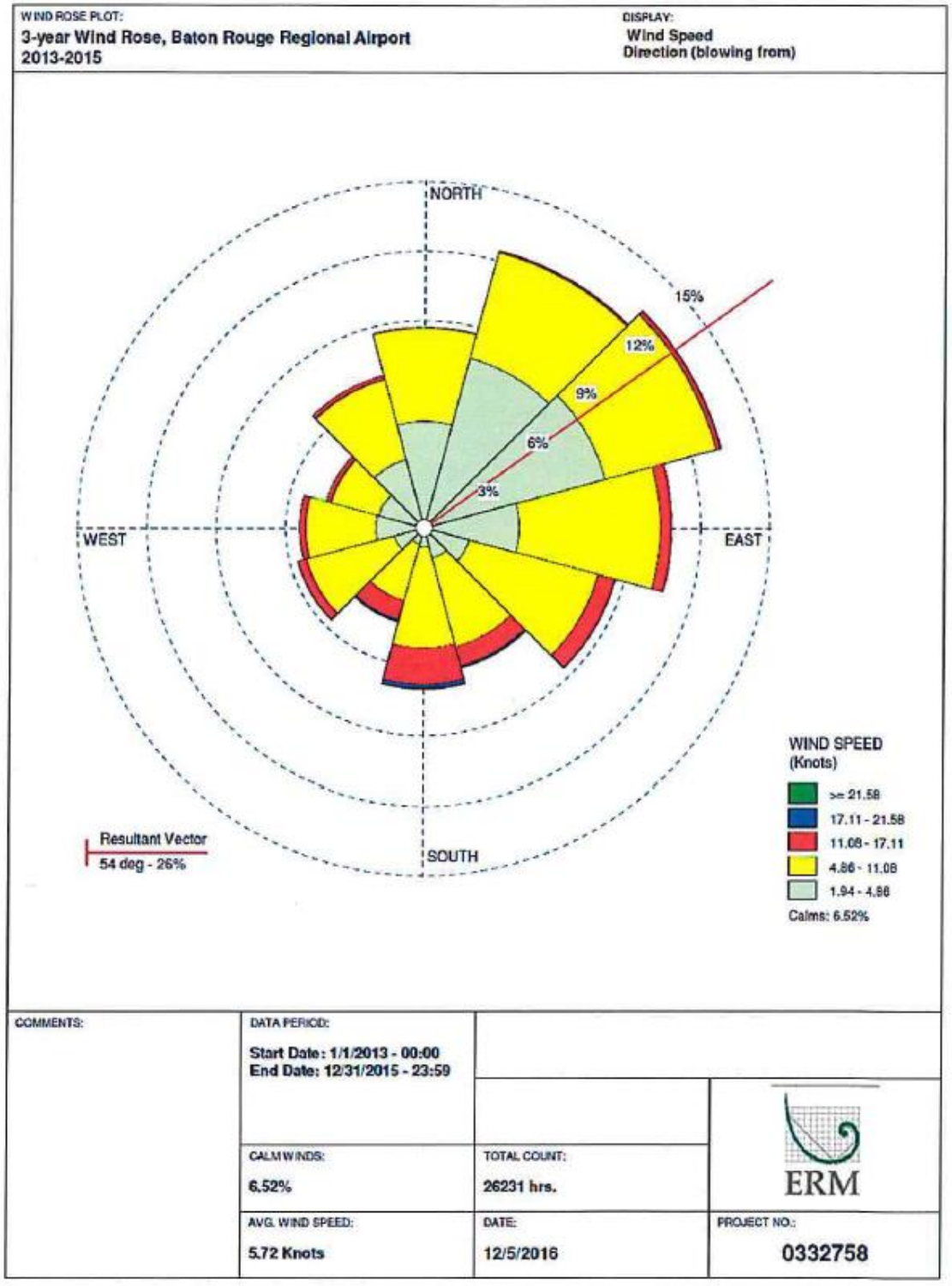


As part of its recommendation, the state provided the 3-year surface wind rose for Baton Rouge Regional Airport. In Figure 5, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The wind rose indicates the winds are predominantly from the north, 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 transport from Big Cajun II toward Georgia Pacific and Oxbow is about 7%.

Figure 5: 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.

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

The terrain in the area of analysis is best described as 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.

2.4.10. Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a

monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, Louisiana Generating used the same background concentrations of SO_2 as developed by the state. The discussion below is of the state's determination of background concentrations. 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 8, 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, [7] 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 8 - 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.

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

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.

2.4.11. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters used by Louisiana Generating for the Big Cajun II area of analysis are summarized below in Table 9.

Table 9 - 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	1
Total receptors	4657
Emissions Type	Actual/Potential Hybrid[8]
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 45.37μg/m^3

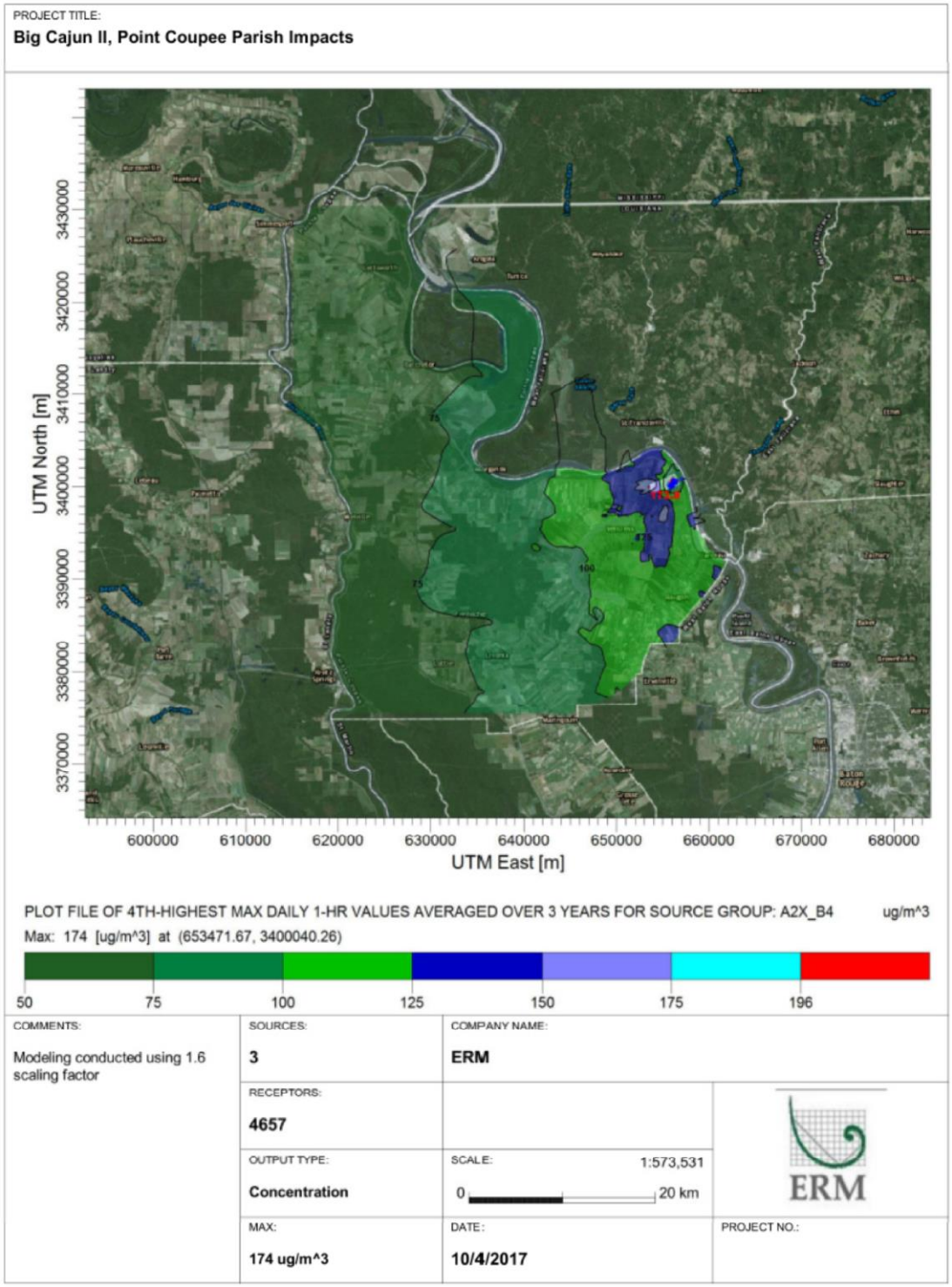
[8] Estimated actual emission rates used for Oxbow for 2015. Combination of actual and new emission limits for Big Cajun II units (*see* emissions discussion above).

Louisiana Generating's modeling comments presented certain information on the modeling results.

Louisiana Generating identified the highest design value within Pointe Coupee Parish due to all three sources combined with the background concentrations. This value was 174 $\mu g/m^3$ which is below the NAAQS. It occurred near the Big Cajun II facility.

Louisiana Generating submitted a map of design value concentrations, provided in Figure 6 below, showing the maximum combined impact due to all sources within the area of analysis and including the hourly seasonal background concentrations provided by the state. This synthesis of the modeling outputs provided by Louisiana Generating provides design value estimates for locations within Pointe Coupee Parish, which were all below the 1-hour standard. The industry's modeling submission is silent on concentrations occurring outside the parish.

Figure 6. Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for Louisiana Generating's Area of Analysis for the Big Cajun II Due to All Sources



The results presented below in Table 10 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 10. Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over Three Years for the Area of Analysis for the Pointe Coupee Parish Area

Averaging Period	Data Period	Receptor Location UTM zone 15		99th percentile daily maximum 1-hour SO_2 Concentration ($\mu g/m^3$)	
		UTM North	UTM East	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013-2015	3400040.26	6553471.67	173.86	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb reflecting a 2.619 $\mu g/m^3$ conversion factor

Louisiana Generating's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration for the included receptors is 173.86 $\mu g/m^3$, equivalent to 70.7 ppb. This modeled concentration included the background concentration of SO_2, and is based on a mixture of actual emissions and emission values that the state and Louisiana Generating described as allowable emissions that we do not consider to be true allowable emissions (see section 2.4.7). Figures 7 and 8 below were generated by the EPA using Louisiana Generating's output modeling file, and indicate that the predicted value occurred immediately to the west of the facility. Louisiana Generating's receptor grid is also shown in the figure.

Figure 7: Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Pointe Coupee Parish Area for the Full-grid Louisiana Generating Modeling Analysis

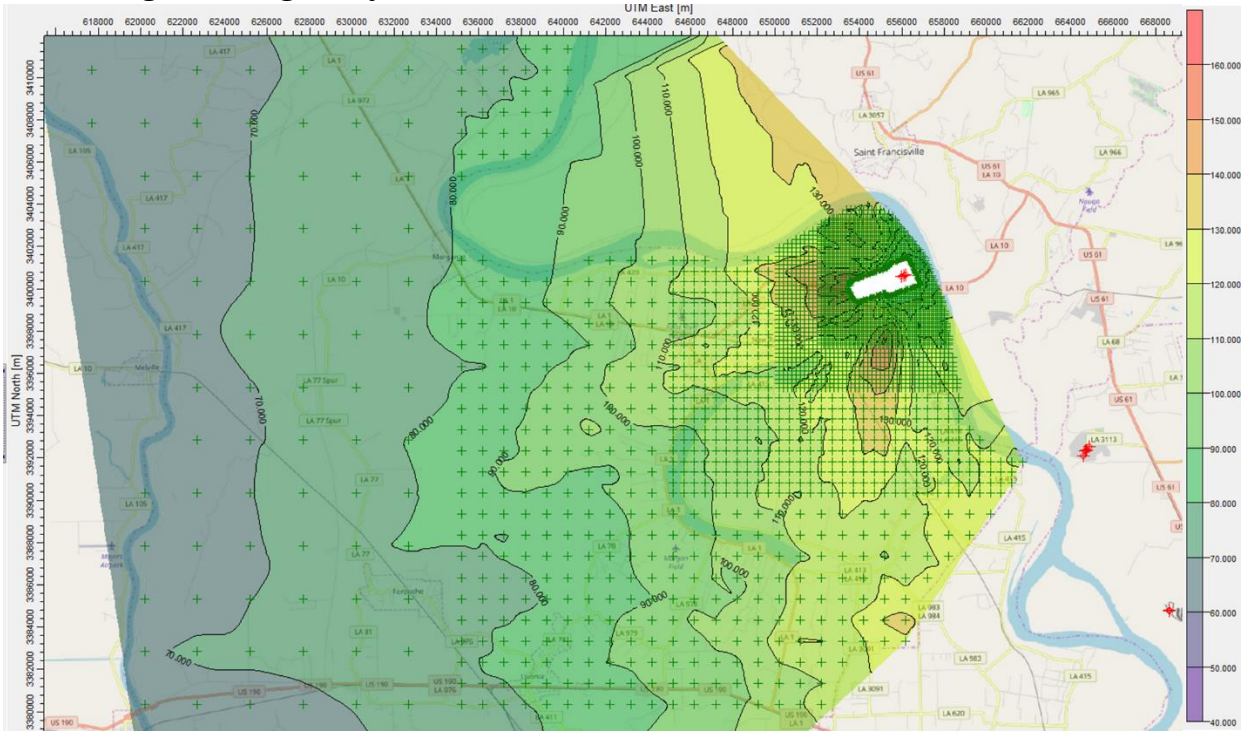
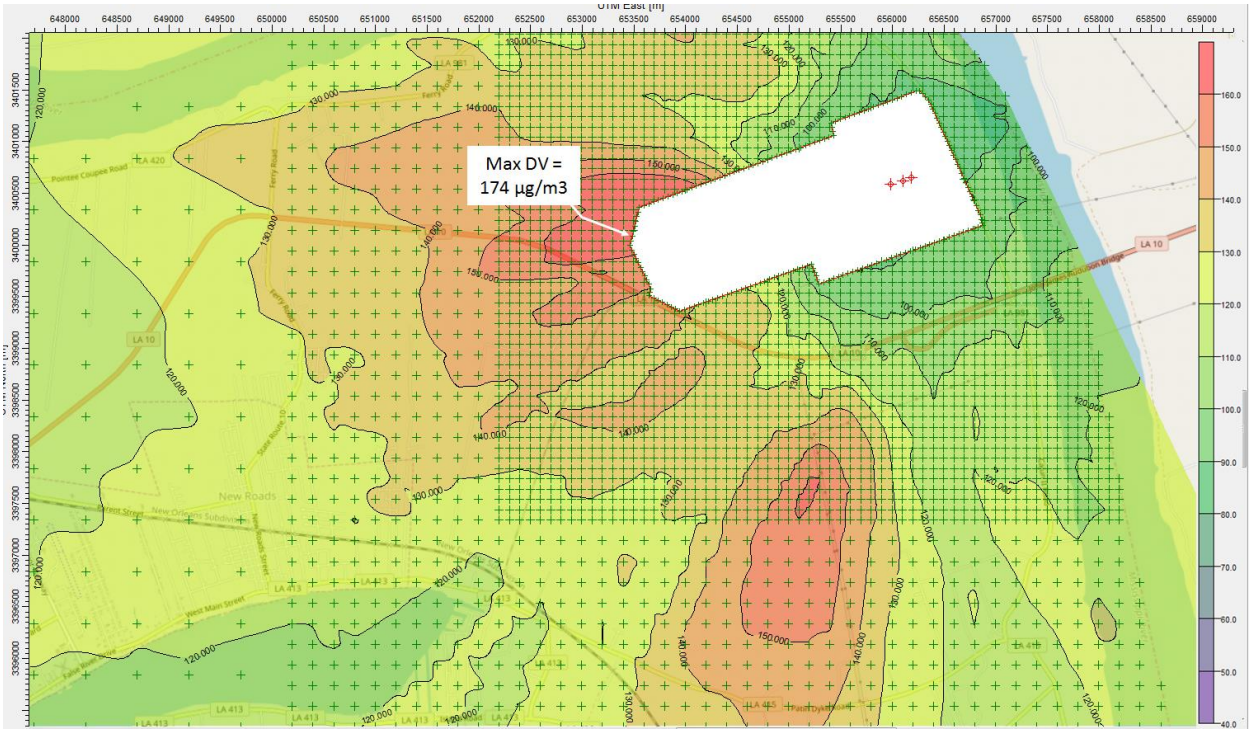


Figure 8: Zoomed-in Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Pointe Coupee Parish Area for the Louisiana Generating Modeling Analysis



The modeling submitted by Louisiana Generating indicates that the 1-hour SO_2 NAAQS is attained at all receptors in the parish but did not address attainment in the portions of the area located outside the parish.

The state's modeling had previously shown that Big Cajun II could potentially contribute to modeled potential nonattainment in the area around Oxbow. However due to the uncertainties in the emission rates and source characterization for Oxbow, the EPA could not determine on the basis of the state's modeling whether the area around Oxbow is experiencing a NAAQS violation. Oxbow is a Round 4 source and a recently installed monitor is operating. The area around Oxbow will be designated based on the measurements from this monitor by December 31, 2020.

2.4.12. The EPA's Assessment of the Modeling Information Provided by Louisiana Generating

As discussed above, Louisiana Generating's modeling indicates a higher maximum design value (173.86 µg/m^3) than the past modeling that the state provided and we considered in formulating our intended designations. This modeling includes using a factor of 1.6 times the 0.38 lb/MMBtu (30-day average limit) multiplied times the actual hourly heat rate during each hour of actual operation. As discussed above, there are a couple aspects of the industry's modeling that have

uncertainties that we are assessing to inform our final designation action. There are several limits that impact the operation and emission levels of Big Cajun II Units 1 and 2. The installation of DSI on Unit 1, the conversion of Unit 2 to combust only natural gas, and the facility SO_2 cap were all part of limits taken in a consent decree.[9] In addition, a 24-hour SO_2 emission limit has very recently become federally enforceable, as discussed below, and was not considered by the state or Louisiana Generating in their modeling analyses.

Because of the differences in the methods of calculating the ratio (Louisiana Generating vs. the EPA's guidance) and the limited period of operational data, we could not determine definitively from Louisiana Generating's analysis that the 1.6 ratio used in the modeling is in fact conservative, i.e. that it is not tending to underestimate the true maximum ambient design values. To answer this question, the EPA analyzed the Unit 1 data furnished by Louisiana Generating covering the period of DSI operation through the end of 2016 (4/1/15-12/30/16) and retrieved additional data from the EPA's CAMD database through 9/30/17, yielding a period of record of 2 ½ years, by a method consistent with Appendix C and not restrictive of the hours included. The resulting ratio was 1.586[10] showing that, by this measure, the 1.6 ratio used for the modeling, 1.6, was in fact conservative by 1%. Examination of the observed daily emission rates by EPA Region 6 also showed that the top 10 emitting days, and 16 of the top 25 emitting days, were in the first month of DSI operation (April 2015) indicating that the frequency of high emission values recorded in the beginning month are not typical of routine operations. The EPA also noted that the Consent Decree did not require DSI to be in place until April 15, 2015, so some of period in the analysis may be prior to the actual operation of the DSI control requirement. Further examination indicates that the first 15 days of April and April 28 are the 16 days in April with the highest emission rates. Fourteen of these days are prior to compliance requirement period and the two other days are likely related to shakedown of the DSI controls. Therefore, we decided to also evaluate the data without April 2015 data in case inclusion of April 2015 data was skewing the ratio. We removed the April 2015 and analyzed the data from May 1, 2015, thru September 30, 2017, and the revised ratio was 1.47.[11] Therefore the actual modeled rate that includes the 1.6 factor is definitely conservative compared to both of the EPA-calculated ratios based on longer periods of DSI data (May 1, 2015 thru September 30, 2017).

It was not raised by Louisiana Generating, but there is another limit that was recently put in place on Unit 1 at Big Cajun. Big Cajun II is also under a separate daily (i.e., 24-hour) SO_2 emissions limit put in place for Regional Haze considerations.[12] Because this is a daily limit the ratio for adjusting emissions to an hourly equivalent emissions rate would be lower than the monthly to hourly ratio discussed above. This limit is based on the maximum rated heat rate of Unit 1 and an emission factor of 0.38 lb/MMBtu, expressed in terms of maximum daily emissions of 29.275 tons per day. This new limit was put in place on February 9, 2017. The modeled daily emission

[9] Consent Decree - Louisiana Generating LLC Civil Action No. 09-100-JJB-DLD; March 6, 2013.

[10] BCII Unit 1 - 99th percentile values were 2122.69 lb/hr for the 30-day average and 3364.9 lb/hr for the 1-Hour average, yielding a 1.586 value.

[11] BCII Unit 1 - 99th percentile values were 1777.1 lb/hr for the 30-day average and 2605.9 lb/hr for the 1-Hour average, yielding a 1.47 value.

[12] Administrative Order on Consent – Louisiana Generating LLC Pointe Coupee Parish Big Cajun II Power Plant-Regional Haze State Implementation Plan EGU BART Analysis; Agency Interest No. 38867. February 9, 2017

rate for Unit 1 was compared to this new SO_2 emission limit on a daily basis. Of the 1,098 days modeled, the daily emissions with the 1.6 factor applied exceeded the allowable rate of 29.275 tons per day on 574 days (52%). The modeled daily emission rate fell below the daily allowable rate on only 24 of the days when the plant was operating for the full 24 hours. This indicates that the modeled emissions on a daily basis were consistently higher than the allowable daily emission rate and by this measure the modeled hourly emissions are conservative.

This additional information about the new daily limit helps address whether the modeled emission rates for Unit 1 are conservative and protective of the NAAQS. The EPA concludes that the daily limit combined with the existing 30-day unit-level emission rate limits and annual facility-level emissions cap indicate that the modeling of emissions from Louisiana Generating is conservative and protective.

Based on these analyses, the EPA determines that the uncertainties in the modeled emissions do not undermine the conclusion that the area within Pointe Coupee Parish boundaries is in attainment with the NAAQS.

Louisiana Generating's modeling generally replicated the state's modeling, only modifying the emissions from Big Cajun II and the receptor grid. As in the state's modeling, Louisiana Generating's modeling followed most aspects of the Modeling TAD. Common potential issues affecting reliability of the modeling for characterizing the area's air quality are the use of hybrid of actual emissions and emission values that the state and Louisiana Generating described as allowable emissions that we do not consider to be true allowable emissions (see section 2.4.7) for Big Cajun II, and the invention of substituted actual emissions data for 2015 for the contributing nearby sources. An additional weakness is that Louisiana Generating's modeling excludes ambient air locations outside Pointe Coupee Parish from its receptor grid, narrowing the scope of the area analyzed. The EPA concludes that Louisiana Generating's receptor grid encompasses the maximum impact near Big Cajun II but does not address an area of potential nonattainment near Oxbow that was modeled by the state. Louisiana Generating's modeling did address one of the EPA's comments on the state's modeling – that the peak to mean ratio (1.2) used to estimate the hourly emissions for Big Cajun II Unit 1 was too low. Louisiana Generating used the ratio (1.6) suggested by the EPA as more appropriate and was still able to demonstrate modeled attainment within the parish. Consideration of both the EPA-calculated pre-compliance and shakedown ratio of 1.586 and the more representative of normal operations non-shakedown period ratio of 1.47, also calculated by the EPA, are both lower than 1.6 leads to a conclusion that the area is attaining and the modeling is conservative/protective.

The EPA's general conclusion is that the combination of the state's and Louisiana Generating's modeling has demonstrated attainment of the NAAQS within Pointe Coupee Parish and that attainment of the standard in neighboring East Baton Rouge Parish remains to be determined through the DRR monitor near Oxbow.

2.5. 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.

2.6. 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.

The state recommended that Pointe Coupee Parish be designated as attainment. Based on its modeling, the state asserted that no violations of the standard occurred within Pointe Coupee Parish and that Big Cajun II did not contribute above the PSD significant impact level at a modeled potential nonattainment area in an adjacent parish (see section 6.3.2.9 of chapter 16 of the TSD for the intended designations). Louisiana Generating's modeling confirmed that no violations are modeled within Pointe Coupee Parish but did not address the magnitude of contribution of Pointe Coupee sources on a potential nonattainment area in neighboring East Baton Rouge Parish.

2.7. The EPA's Assessment of the Available Information for the Pointe Coupee Parish Area

Consideration of the supplemental modeling analysis furnished by Louisiana Generating has led the EPA to modify a portion of our prior assessment of the state's modeling covered in the 120-day TSD. We now believe that concentrations within Pointe Coupee Parish have been demonstrated to be below the NAAQS. The previous likely underestimation of the peak emissions from Unit 1 of Big Cajun II has been remedied.

While Louisiana Generating's analysis excluded ambient air receptors within the modeling domain that are outside Pointe Coupee Parish in a manner that does not align with the Modeling TAD, the state's previous modeling had shown that the maximum concentrations in the immediate surroundings of Big Cajun II fell within the parish. However, the attainment status of the adjacent parish, East Baton Rouge Parish, which is a Round 4 area, is currently undetermined and awaits the results of the new ambient monitoring. The state's modeling indicated an impact by Big Cajun II on the area around Oxbow but the EPA noted in our proposal and in our final action, the modeling had flaws and there was enough uncertainty that the EPA could not

conclude that there were modeled violations. Therefore, the EPA cannot determine whether Louisiana Generating's impacts could contribute to a potential violation of the NAAQS in East Baton Rouge Parish.

Louisiana Generating justified the exclusion of receptors near Oxbow on the basis that Oxbow is a Round 4 source and that the designation of that area will be based on a DRR-compliant monitor currently in operation, saying, "EPA's expressed concern over the contribution that emissions from Big Cajun II may have to potential violations of the 1-hour SO_2 standard in East Baton Rouge Parish should have no bearing on the designation for Pointe Coupee Parish since a monitor has be set out to collect data in support of the Round 4 designation process required for East Baton Rouge Parish." The EPA confirms that we are not making a determination at this time as to whether a NAAQS violation is occurring in East Baton Rouge Parish and that the EPA will designate the area around Oxbow by December 31, 2020. The EPA is generally concluding that where areas that were required to be characterized under the DRR are demonstrated to be attaining the NAAQS, if available information does not indicate that they contribute to a violation in a nearby area, they can be designated as attainment/unclassifiable. Because we are unable to determine whether a NAAQS violation exists in East Baton Rouge Parish, the criteria for a designation of attainment/unclassifiable are met, and the final designation is attainment/unclassifiable, although we proposed unclassifiable in the notification to the Governor.

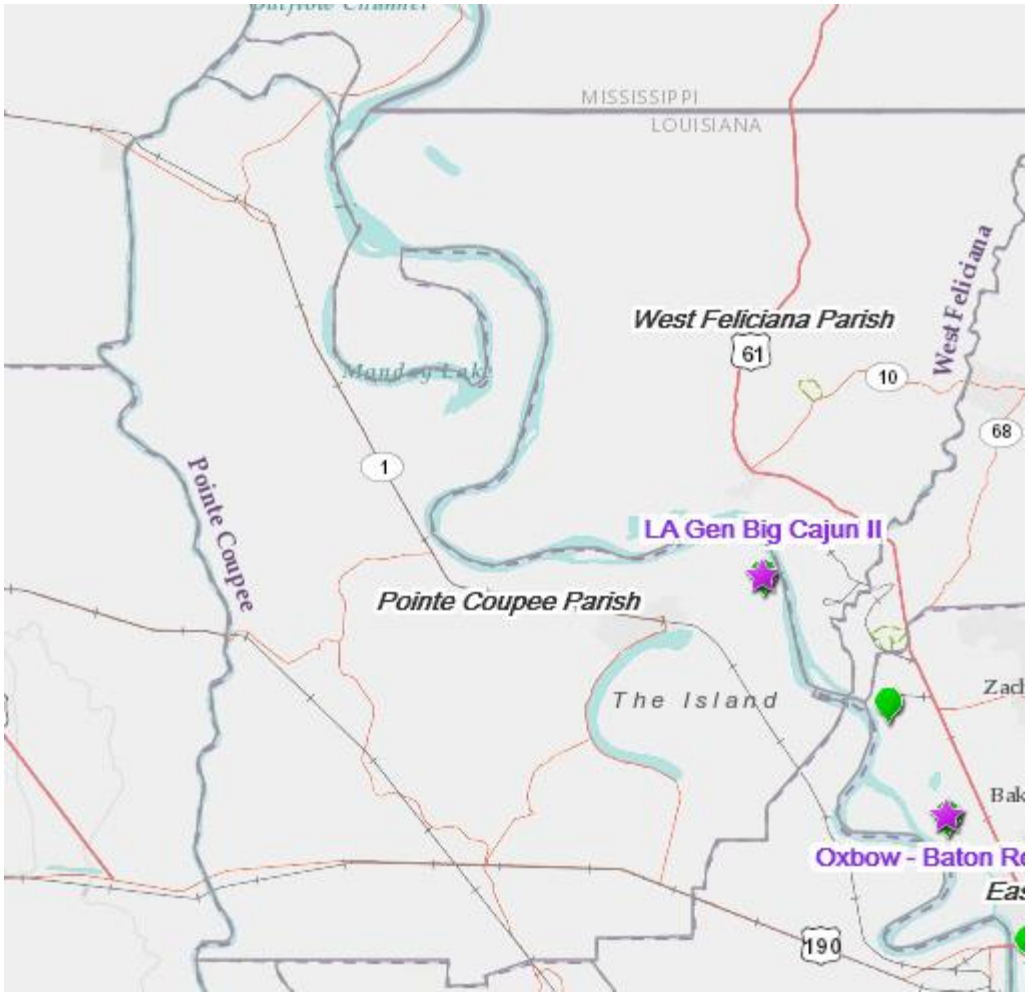
The EPA believes that our final attainment/unclassifiable area, bounded by the jurisdictional boundaries of Pointe Coupee Parish, Louisiana, has clearly defined legal boundaries, and is a suitable basis for defining our final attainment/unclassifiable area.

2.8. Summary of Our Final Designation for the Pointe Coupee Parish Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA is designating Pointe Coupee Parish as attainment/unclassifiable for the 2010 SO_2 NAAQS. The area was required to be characterized by the state under 40 CFR 51.1203(c) or (d), we are determining that Pointe Coupee Parish does not violate the NAAQS, and the available information does not indicate that it is 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 10 shows the boundary of this final designated area.

Figure 10. Boundary of the Final Pointe Coupee Parish, Louisiana Attainment/Unclassifiable Area



At this time, our final designations for the state only apply to this area and the other areas presented in Table 1 of this chapter. The EPA intends in a separate action to evaluate and designate all remaining undesignated areas in Louisiana, as listed in Table 2, by December 31, 2020.