Final Technical Support Document

Louisiana
Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA, or the Agency) must designate areas as either "unclassifiable," "attainment," or "nonattainment" for the 2010 1-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS). Section 107(d) of the CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to a NAAQS violation in a nearby area, an attainment area as any area other than a nonattainment area that meets the NAAQS, and an unclassifiable area as any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

July 2, 2016, is the deadline established by the U.S. District Court for the Northern District of California for the EPA to designate certain areas. This deadline is the first of three deadlines established by the court for the EPA to complete area designations for the 2010 SO_2 NAAQS. This deadline applies to certain areas in Louisiana because three emission sources meet the conditions of the court's order.

Louisiana submitted updated recommendations on November 17, 2015. Table 1 below lists Louisiana's recommendations and identifies the counties in Louisiana that the EPA is designating in order to meet the July 2, 2016, court-ordered deadline. These final designations are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1 – Louisiana's Recommended and the EPA's Final Designations

Area	Louisiana's Recommended Area Definition	Louisiana's Recommended Designation	EPA's Final Area Definition	EPA's Final Designation
Calcasieu Parish, Louisiana	Within Calcasieu Parish Borders	Attainment	Same as State's Recommendation (Calcasieu Parish)	Unclassifiable
DeSoto Parish, Louisiana	Within the Southeast Quadrant of DeSoto Parish	Attainment	Within DeSoto Parish Borders (DeSoto Parish)	Unclassifiable/ Attainment

Background

On June 3, 2010, the EPA revised the primary (health based) SO_2 NAAQS by establishing a new 1-hour standard at a level of 75 parts per billion (ppb) which is met at an ambient air quality monitoring site when the 3-year average of the 99th percentile of 1-hour daily maximum concentrations does not exceed 75 ppb. This NAAQS was published in the *Federal Register* on June 22, 2010 (75 FR 35520), and is codified at 40 CFR 50.17. The EPA determined that this is the level necessary to protect public health with an adequate margin of safety, especially for children, the elderly, and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO_2. The two prior primary standards of 140 ppb evaluated over 24 hours, and 30 ppb evaluated over an entire year, codified at 40 CFR 50.4, remain applicable.[1] However, the EPA is not currently designating areas on the basis of either of these two primary standards. Similarly, the secondary standard for SO_2, set at 500 ppb evaluated over 3 hours, codified at 40 CFR 50.5, has not been revised, and the EPA is also not currently designating areas on the basis of the secondary standard.

General Approach and Schedule

Section 107(d) of the CAA requires no later than 1 year after promulgation of a new or revised NAAQS for state governors to submit their recommendations for designations and boundaries to the EPA. Section 107(d) also requires the EPA to provide notification to states no less than 120 days prior to promulgating an initial area designation that is a modification of a state's recommendation. If a state does not submit designation recommendations, the EPA may promulgate the designations that it deems appropriate without prior notification to the state, although it is our intention to provide such notification when possible. If a state or tribe disagrees with the EPA's intended designations, they are given an opportunity within the 120-day period to demonstrate why any proposed modification is inappropriate. The EPA is required to complete designations within 2 years after promulgation of a new or revised NAAQS, unless EPA determines that sufficient information is not available, in which case the deadline is extended to 3 years. The 3-year deadline for the revised SO_2 NAAQS was June 2, 2013.

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

Following the initial August 5, 2013 designations, three lawsuits were filed against the EPA in different U.S. District Courts, alleging the Agency had failed to perform a nondiscretionary duty under the CAA by not designating all portions of the country by the June 2, 2013, deadline. In an effort intended to resolve the litigation in one of those cases, plaintiffs, Sierra Club and the

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[1] 40 CFR 50.4(e) provides that the two prior primary NAAQS will no longer apply to an area 1 year after its designation under the 2010 NAAQS, except that for areas designated nonattainment under the prior NAAQS as of August 22, 2010, and areas not meeting the requirements of a SIP Call under the prior NAAQS, the prior NAAQS will apply until that area submits and EPA approves a SIP providing for attainment of the 2010 NAAQS.

Natural Resources Defense Council, and the EPA filed a proposed consent decree with the U.S. District Court for the Northern District of California. On March 2, 2015, the court entered the consent decree and issued an enforceable order for the EPA to complete the area designations according to the court-ordered schedule.

According to the court-ordered schedule, the EPA must complete the remaining designations by three specific deadlines. By no later than July 2, 2016 (16 months from the court's order), the EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO_2 NAAQS, and (2) areas that contain any stationary sources that have not been announced as of March 2, 2015 for retirement; and that, according to the EPA's Air Markets Database, emitted in 2012 either (i) more than 16,000 tons of SO_2, or (ii) more than 2,600 tons of SO_2 with an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, a stationary source with a coal-fired unit that as of January 1, 2010, had a capacity of over 5 megawatts and otherwise meets the emissions criteria, is excluded from the July 2, 2016 deadline if it had announced through a company public announcement, public utilities commission filing, consent decree, public legal settlement, final state or federal permit filing, or other similar means of communication, by March 2, 2015, that it will cease burning coal at that unit.

The last two deadlines for completing remaining designations are December 31, 2017, and December 31, 2020. The EPA has separately promulgated requirements for state and other air agencies to provide additional monitoring or modeling information on a timetable consistent with these designation deadlines. We expect this information to become available in time to help inform these subsequent designations. These requirements were promulgated on August 21, 2015 (80 FR 51052), in a rule known as the SO_2 Data Requirements Rule (DRR) codified at 40 CFR part 51 subpart BB.

Updated designation guidance was issued by the EPA through a March 20, 2015, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions 1-10. This memorandum supersedes earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and it identifies factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The guidance also contains the factors the EPA intends to evaluate in determining the boundaries for all remaining areas in the country, consistent with the court's order and schedule. These factors include: 1) Air quality characterization via ambient monitoring or dispersion modeling results; 2) Emissions-related data; 3) Meteorology; 4) Geography and topography; and 5) Jurisdictional boundaries. This guidance was supplemented by two non-binding technical assistance documents intended to assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling or ambient air quality monitoring for sources that emit SO_2. Notably, the EPA's documents titled, "SO_2 NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) and "SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD), were made available to states and other interested parties. Both of these TADs were most recently updated in February 2016.

Based on complete, quality-assured and certified ambient air quality data collected between 2013 and 2015, no violations of the 2010 SO$_2$ NAAQS have been recorded at ambient air quality monitors in any undesignated part of Louisiana. However, there are 3 sources in the State meeting the emissions criteria of the consent decree for which the EPA must complete designations by July 2, 2016. In this final technical support document, the EPA discusses its review and technical analysis of Louisiana's updated recommendations for the areas that we must designate. The EPA also discusses any final modifications from the state's recommendation based on all available data before us.

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

1) 2010 SO$_2$ NAAQS – the primary NAAQS for SO$_2$ promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. See 40 CFR 50.17.
2) Attaining monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value is equal to or less than 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
3) 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) Designated nonattainment area – an area which the EPA has determined has violated the 2010 SO$_2$ NAAQS or contributed to a violation in a nearby area. A nonattainment designation reflects considerations of the state's recommendations and all of the information discussed in this document. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.
5) Designated unclassifiable area – an area for which the EPA cannot determine based on all available information whether or not it meets the 2010 SO$_2$ NAAQS.
6) Designated unclassifiable/attainment area – an area which the EPA has determined to have sufficient evidence to find either is attaining or is likely to be attaining the NAAQS. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.
7) Modeled violation – a violation based on air dispersion modeling.
8) Recommended attainment area – an area a state or tribe has recommended that the EPA designate as attainment.
9) Recommended nonattainment area – an area a state or tribe has recommended that the EPA designate as nonattainment.
10) Recommended unclassifiable area – an area a state or tribe has recommended that the EPA designate as unclassifiable.
11) Recommended unclassifiable/attainment area – an area a state or tribe has recommended that the EPA designate as unclassifiable/attainment.
12) Violating monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.

Technical Analysis for Calcasieu Parish, Louisiana

Introduction

The Calcasieu Parish area contains two stationary sources that, according to the EPA's Air Markets Database, emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/MmBTU). Specifically, in 2012, the Nelson Electric Generating Plant emitted 12,513 tons of SO_2 with an emissions rate of 0.7 lbs SO_2/MmBTU; and the Nelson Industrial Steam Company emitted 6,706 tons of SO_2 with an emissions rate of 0.7 lbs SO_2/MmBTU. Pursuant to the March 2, 2015, consent decree, the EPA must designate the area surrounding these facilities by July 2, 2016.

In its September 18, 2015, submission, Louisiana recommended that the areas surrounding the Nelson Electric Generating Plant and the Nelson Industrial Steam Company, specifically the entirety of Calcasieu Parish, be designated as attainment. This was based on review of available monitor data, an assessment and characterization of air quality from the facilities, and other nearby sources that may have a potential impact in the area of analysis where maximum concentrations of SO_2 are expected. This air quality assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions by a group of local industries and then provided to the state.

On February 11, 2016, the EPA notified Louisiana that we intended to designate the area surrounding the Nelson Electric Generating Plant and the Nelson Industrial Steam Company as Unclassifiable, due to our view that based on available information we could not determine whether the area is meeting the NAAQS. Additionally, we informed Louisiana that our intended boundaries for the unclassifiable area consisted of the entirety of Calcasieu Parish. Our intended designation and associated boundaries were based on, among other things, that the industry modeling approach was not consistent with the SO_2 Modeling TAD.

Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Louisiana, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment of New Information

In our February 11, 2016, notification to Louisiana regarding our intended unclassifiable designation for the Calcasieu Parish area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register,* inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

The EPA is explicitly incorporating and relying upon the analyses and information presented in the preliminary technical support document for the purposes of our final designation for this

area, except to the extent that any new information submitted to the EPA or conclusions presented in this final technical support document and our response to comments document (RTC), available in the docket, supersede those found in the preliminary document.

As further discussed below, after carefully considering all available data and information, the EPA is still unable to determine based on available information whether the area surrounding the Nelson Electric Generating Plant and the Nelson Industrial Steam Company is meeting the NAAQS, and therefore is designating the area as Unclassifiable for the 2010 SO_2 NAAQS. The boundaries for this Unclassifiable area consist of all area within Calcasieu Parish borders and are shown in the Figure 1 below. Also included in the figure are nearby emitters of SO_2 and Louisiana's recommended area, which is the same as the EPA's recommendation.

Figure 1: The EPA's Intended Unclassifiable Area for Calcasieu Parish with Large Emitters of SO_2
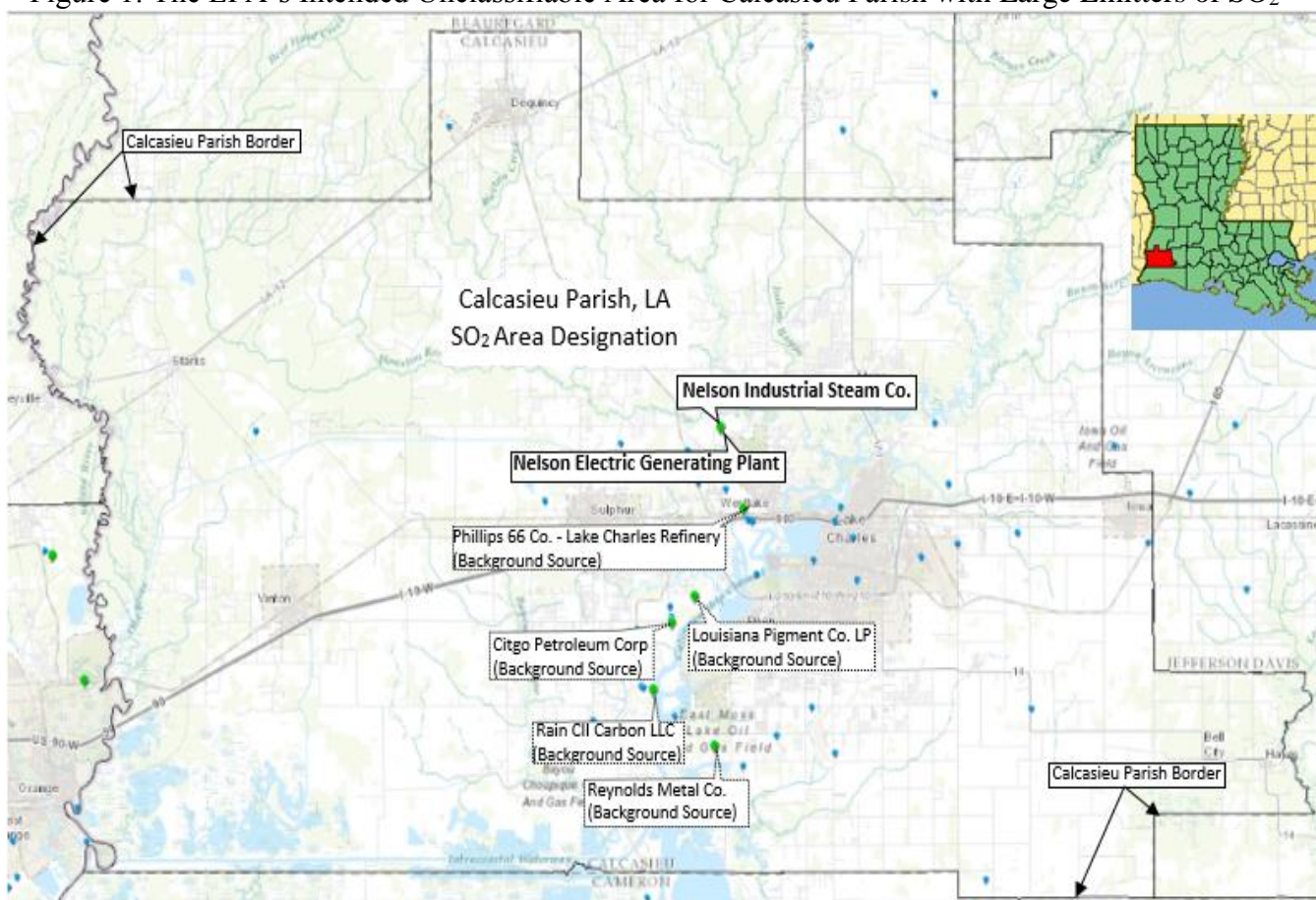
Subsequent to our February 11, 2016, notification, the EPA received comments from Calcasieu SO_2 Stakeholders Group, Entergy, and the Louisiana Department of Environmental Quality (LDEQ) regarding our intended designation for this area. The commenters did not provide new modeling but questioned whether the discrepancies with the Technical Assistance Document and modeling guidance, which we had noted in our proposal, were significant enough to make the previously submitted modeling unreliable for an attainment or nonattainment decision. They also believed that the EPA should have considered the three SO_2 monitors that measured attainment. A comprehensive summary of these comments and our responses can be found in the RTC. The

EPA finds that the following concerns with the modeling make it unsuitable for making a regulatory decision:

- The meteorological data used was not from recommended period 2012-2014. The modeling used data from a weather station in Baton Rouge instead of the closer station in Calcasieu Parish;
- The report incorrectly converted $\mu g/m^3$ to ppb, which resulted in lower reported modeled impacts;
- The modeling for the two sources did not use their CEMS data for the period modeled nor actual variable stack parameters;
- Clear documentation of information for building downwash was not provided for the relevant facilities;
- The background concentration was not calculated correctly and was underestimated as a result of this error;
- The modeling documentation was unclear. First, no map of the modeled receptors was provided. Second, the modeling runs were broken into over forty separate grid areas that made it not feasible to review the accuracy for assessing attainment status.

Given these issues, the modeling provided by the industry and state is not sufficient to determine that the area is either above or below the standard. In addition, the monitors in the area are not specifically located to pick up the maximum potential impacts of the two sources when evaluated based on historical modeling in the area and local meteorology data.

Jurisdictional Boundaries:
Existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable area, specifically with respect to clearly defined legal boundaries. Comments regarding our intended boundaries for this area have been addressed in the RTC.

The EPA finds that our final unclassifiable area, consisting of the area within Calcasieu Parish, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final unclassifiable area.

Conclusion

After careful evaluation of the state's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA is unable based on available information to determine whether the area around the Nelson Electric Generating Plant and the Nelson Industrial Steam Company is meeting or not meeting the NAAQS, and therefore is designating the area as unclassifiable for the 2010 SO_2 NAAQS. Specifically, the area is comprised of all area within Calcasieu Parish Borders.

As discussed above, the industry modeling approach is not consistent with the SO_2 Modeling TAD and the discrepancies are such that it is not suitable to make a decision of attainment or nonattainment.

We also do not have information on any potential impacts on the western part of Calcasieu Parish from two large Orange County, Texas, sources near the western border, which also provide some uncertainty in designating Calcasieu Parish.

For these reasons and based on available information, the EPA does not have sufficient information to decide whether the area is attaining or not attaining the 2010 SO_2 NAAQS. Therefore, the EPA's designation for the area within Calcasieu Parish is unclassifiable.

At this time, our final designations for the state only apply to this area and the others contained in this final technical support document. Consistent with the court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Louisiana by either December 31, 2017, or December 31, 2020.

Technical Analysis for DeSoto Parish, Louisiana Area

Introduction

The DeSoto Parish area contains a stationary source that, according to the EPA's Air Markets Database, emitted in 2012 either more than 16,000 tons of SO_2, or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). As of March 2, 2015, this stationary source has not met the criteria for being "announced for retirement." Specifically, the Dolet Hills Power Station emitted 20,887 tons of SO_2 in 2012, and had an emissions rate of 0.80 lbs SO_2/mmBTU in 2012. Pursuant to the March 2, 2015 consent decree, the EPA must designate the area surrounding the facility by July 2, 2016.

In its September 18, 2015, original submission, Louisiana recommended that the area surrounding the Dolet Hills Power Station, specifically the southeast quadrant of DeSoto Parish, be designated as unclassifiable based on information included in a monitoring siting report. The report assessed and characterized air quality for the facility and other nearby sources. The report did not follow the modeling guidelines in certain respects and only provided normalized estimates of impacts rather than absolute results.
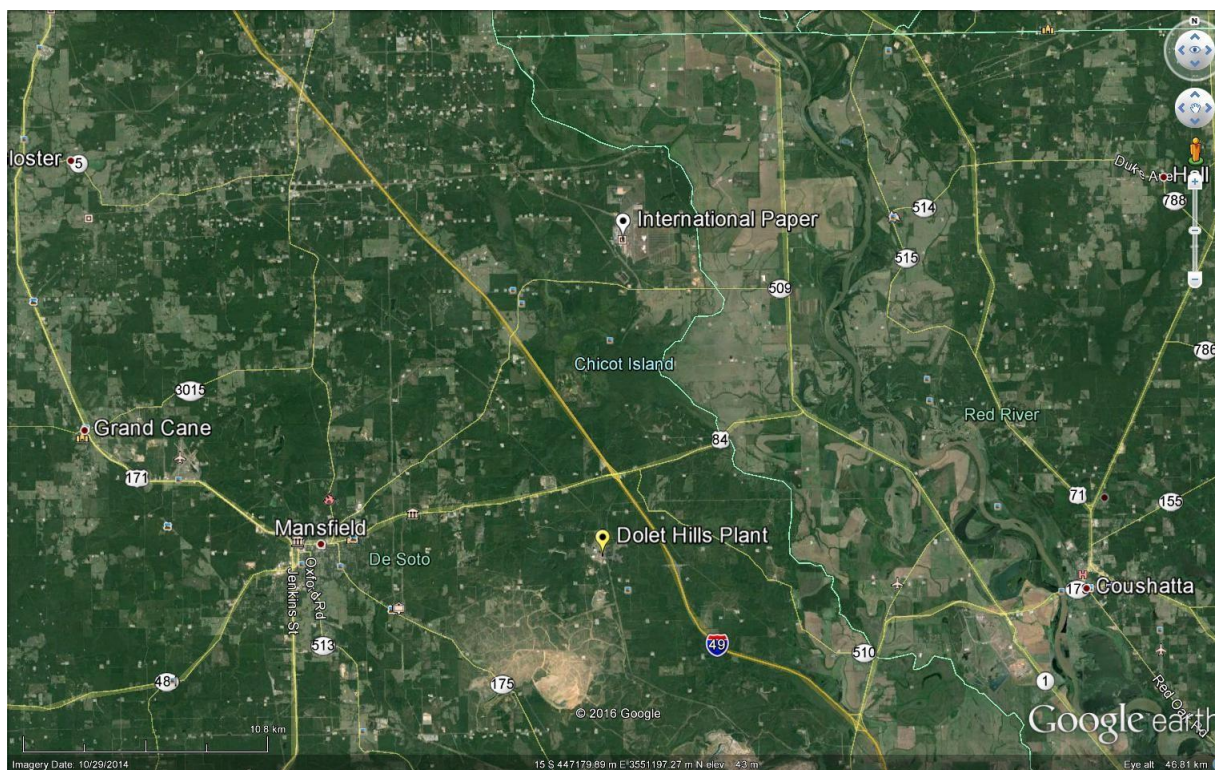
Air modeling by Sierra Club, submitted on August 9, 2015, and discussed below, showed modeled concentrations above the NAAQS. Utilizing this modeling, the state performed modeling in November 2015 using the input parameters provided by Sierra Club and additionally factored in the non-default beta option low wind speed modification (LOWWIND3). This revised modeling using LOWIND3 predicted peak concentrations slightly below the NAAQS. As a result, the state changed their recommended designation from unclassifiable to attainment in November 2015. These assessments and characterization were performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions.

On February 11, 2016, the EPA notified Louisiana that we intended to designate the DeSoto Parish area as nonattainment, based on our view that the area was not meeting the NAAQS. Additionally, we informed Louisiana that our intended boundaries for the nonattainment area consisted of the portions of DeSoto Parish bound by the following Universal Transverse Mercator (UTM) Coordinates (NAD 83 Datum, UTM Zone 15):

X	Y
441287	3541019
441287	3562019
450500	3562019
450500	3541019

This intended nonattainment area excluded portions of Red River Parish, Louisiana that fell within this UTM-based boundary (See Figure 1).

Figure 1. The EPA's initially proposed nonattainment area.

The Dolet Hills Power Station is located in northwestern Louisiana in the eastern portion of DeSoto Parish. As seen in Figure 2 below, the facility is located approximately 12.5 km directly east of the center of Mansfield.

Figure 2. Area around the Dolet Hills Power Station

Our proposed designation and associated boundaries were based on, among other things, AERMOD modeling submitted by the Sierra Club and the likelihood that the nearby International Paper Mansfield Mill (IP) could contribute to modeled design value concentrations in excess of the standard. Modeling conducted by LDEQ using the Sierra Club inputs found design value concentrations slightly below the standard, but this modeling used the LOWWIND3 Beta option.

The LOWWIND3 algorithm in LDEQ's adjusted modeling is a Beta version that EPA has proposed and taken comment on as an alternative to the standard AERMOD set up. EPA is reviewing comments received and has not taken final action on the proposed modeling options. Therefore, LOWWIND3 is not approved for general use. LOWWIND3 must be approved through the process in 40 CFR Part 51 Appendix W Section3.2 *Use of Alternative Models*. The LOWWIND3 option may only be appropriate in certain situations. Therefore, use of this option must be justified based on consideration of all the requirements needed to justify using a non-regulatory model option for this specific application of the model. These requirements include scientific peer review, appropriateness of the beta option to the source type and applicable to the problem on a theoretical basis, adequate analysis and performance analysis in comparison to the regulatory model version, adequate analysis to show the beta option is not biased toward underestimates, and a protocol. The State did not include the information necessary regarding evaluation and justification of why the use of this non-default Beta option is appropriate for this situation, and at this time the LOWWIND3 option has not had scientific peer review. As a result, EPA could not consider the State modeling as determinative and the LDEQ revised modeling results cannot be relied upon for this decision. After careful review of the state's assessment,

supporting documentation, and all available data, the EPA did not agree with the state's recommendation for the area when we issued our intended designation.

The Sierra Club modeling used constant stack velocity and temperature and did not include building downwash or the nearby International Paper facility, causing some uncertainty in the modeling results. The lack of variable temperature and velocity, downwash, and the exclusion of the IP source, however, was thought to generally bias the results of Sierra Club's modeling low. As a result, we proposed that Sierra Club's modeling provided sufficient information to determine that the area is not meeting the standard and therefore proposed that the area be designated as nonattainment.

Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Louisiana, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment of New Information

In our February 11, 2016, notification to Louisiana regarding our intended nonattainment designation for the DeSoto Parish, Louisiana, area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register,* inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

The EPA is explicitly incorporating and relying upon the analyses and information presented in the preliminary technical support document for the purposes of our final designation for this area, except to the extent that any new information submitted to the EPA or conclusions presented in this final technical support document and our response to comments document (RTC), available in the docket, supersede those found in the preliminary document.

As further detailed below, after carefully considering all available data and information, the EPA is determining that the DeSoto Parish, Louisiana, area is meeting the 2010 SO_2 NAAQS, and therefore is designating the area as unclassifiable/attainment for the NAAQS. The boundaries for the unclassifiable/attainment area consist of the entire boundary of DeSoto Parish borders and are shown in Figure 3 below. Also included in the figure are nearby emitters of SO_2. Louisiana had recommended that the Parish be designated as attainment.

Figure 3: The EPA's final unclassifiable/attainment area: DeSoto Parish, Louisiana
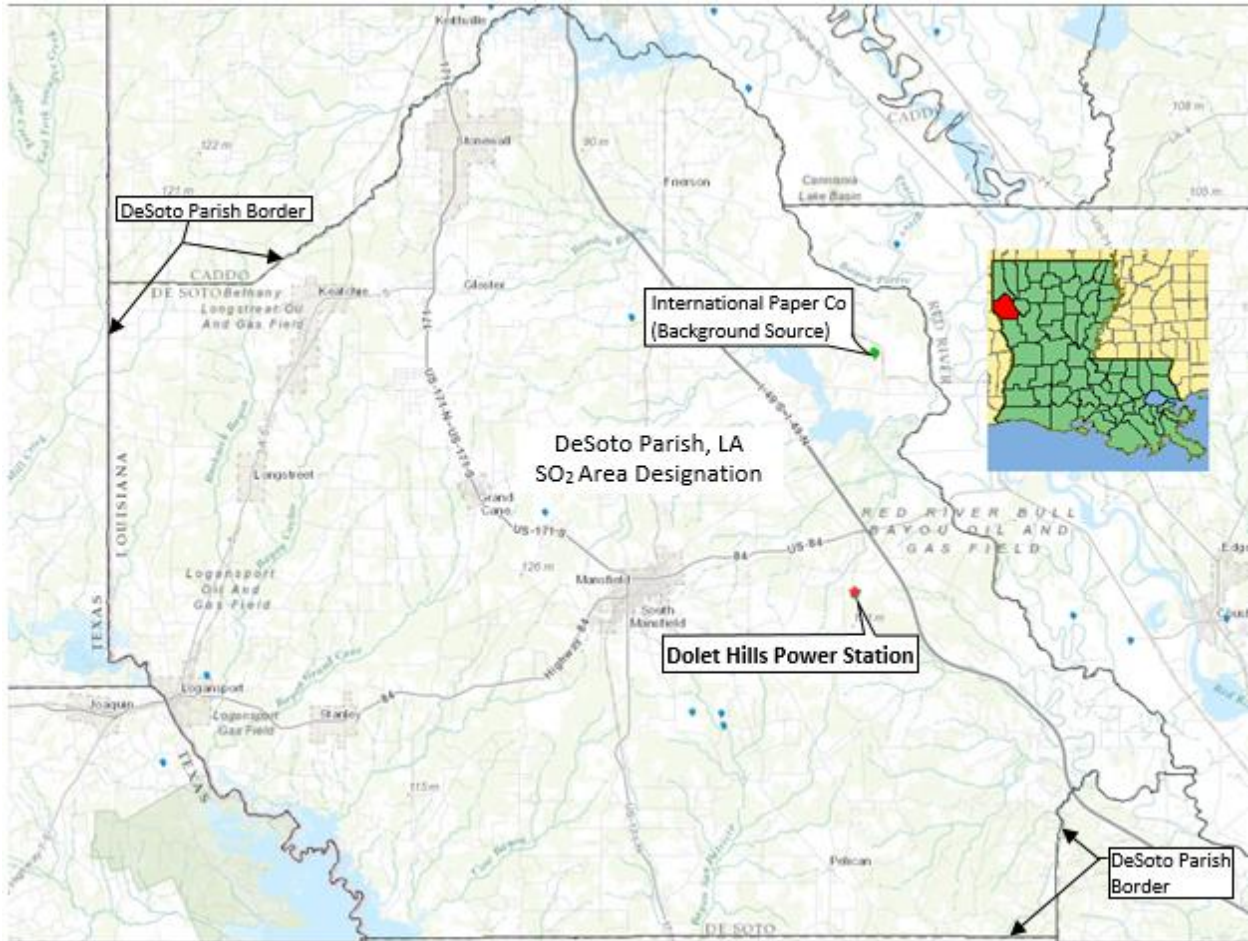
The EPA received substantive comments regarding our proposed nonattainment designation for the DeSoto Parish, Louisiana area, and a comprehensive summary of the significant comments and our responses can be found in the RTC.

Also, additional information, specifically air dispersion modeling and ambient monitoring data, were submitted to the EPA during the state and public comment period in order to characterize air quality in the DeSoto Parish, Louisiana area. Notably, American Electric Power Service Corporation (AEP), on behalf of Operating Owner Cleco Power LLC (Cleco), provided additional air dispersion modeling information for Dolet Hills using continuous emission monitoring system (CEMS) data for emission rate, temperature, and velocity. AEP followed the Modeling TAD and used more realistic inputs than were available to Sierra Club. AEP also modeled with the contributing IP source, Mansfield Mill. AEP used full regulatory options.

International Paper also submitted modeling for Mansfield Mill using a hybrid of actual and potential to emit emission rates. AEP asserted that Dolet Hills does not cause or contribute to SO_2 nonattainment for the area and International Paper asserted that Mansfield Mill does not cause or substantially contribute to any exceedances of the SO_2 standard.

Cleco stated that the EPA should accept the Louisiana Department of Environmental Quality's (LDEQ) recommendation to designate DeSoto Parish as attainment for the 1-hour SO_2 NAAQS. LDEQ submitted the updated modeling and monitoring information provided from Cleco and IP and reaffirmed their recommendation that we designate the DeSoto Parish as attainment.

This information was submitted to support a modification to either our proposed designation, our proposed designation boundaries for the area, or both. The discussion and analysis of this new information that follow reference the Modeling TAD, Monitoring TAD, and the factors for evaluation contained in the EPA's March 20, 2015 guidance, as appropriate and applicable.

The Sierra Club did not submit new modeling but asserted that the conservative assumptions in its previous modeling demonstrated that Dolet Hills does cause nonattainment of the standard. Sierra Club supported EPA's proposed classification of the area around Dolet Hills as nonattainment and opposed the state's use of the LOWWIND3 option. Sierra Club did provide additional information in their report concerning their previous analysis for Mansfield Mill, finding that it caused less than 0.03 ug/m^3 increase in modeled high design value concentrations near Dolet Hills. Sierra Club's previous modeling used actual emission rates but used fixed velocities and temperatures because of unavailability of this information, did not use building downwash due to lack of building information, and used flagpole receptors.

Model Selection and Modeling Components

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

The AEP used AERMOD version 15181, the most recent, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion
The EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 3 km of the facility. According to the EPA's modeling guidelines contained in documents such as the Modeling TAD, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50% of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50% of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area of analysis, AEP determined that it was most appropriate to

run the model in rural mode. This choice was based on the analysis done previously by the Sierra Club for their modeling. USEPA's AERSURFACE v. 13016 was used to develop the meteorological data for the modeling analysis. This model was also used to evaluate surrounding land use within 3 kilometers. Based on the output from the AERSURFACE, approximately 0.02% of surrounding land use around the modeled facility was of urban land use types including Type 21 – Low Intensity Residential, Type 22 – High Intensity Residential and Type 23 – Commercial / Industrial / Transportation.

*Modeling Parameter: Area of Analysis (Receptor Grid)*

The EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the Dolet Hills Power Station is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The grid receptor spacing for the area of analysis chosen by AEP is identical to the Sierra Club's receptor spacing and is as follows:
- A 100-meter Cartesian receptor grid centered on Dolet Hills Power Station and extending out 5 km
- A 500-meter Cartesian receptor grid centered on Dolet Hills Power Station and extending out 10 kilometers.
- A 1,000-meter Cartesian receptor grid centered on Dolet Hills Power Station and extending out 50 kilometers. 50 kilometers is the maximum distance accepted by USEPA for the use of the AERMOD dispersion model.
- A flagpole height of 1.5 meters was used for all these receptors.

The receptor network contained 21201 receptors and covered portions of DeSoto, Red River, Sabine and Natchitoches Parishes in Louisiana and Panola County in Texas. Figure 4, generated by EPA, shows the chosen area of analysis surrounding the Dolet Hills Power Station, as well as the receptor grid for the area of analysis. The concentrations shown are those from the Sierra Club modeling which was the basis for the proposed SO_2 nonattainment designation. The impacts of the area's geography and topography will be discussed later within this document.

Figure 4: Receptor Grid for the Dolet Hill Power Station with Sierra Club modeled design values.
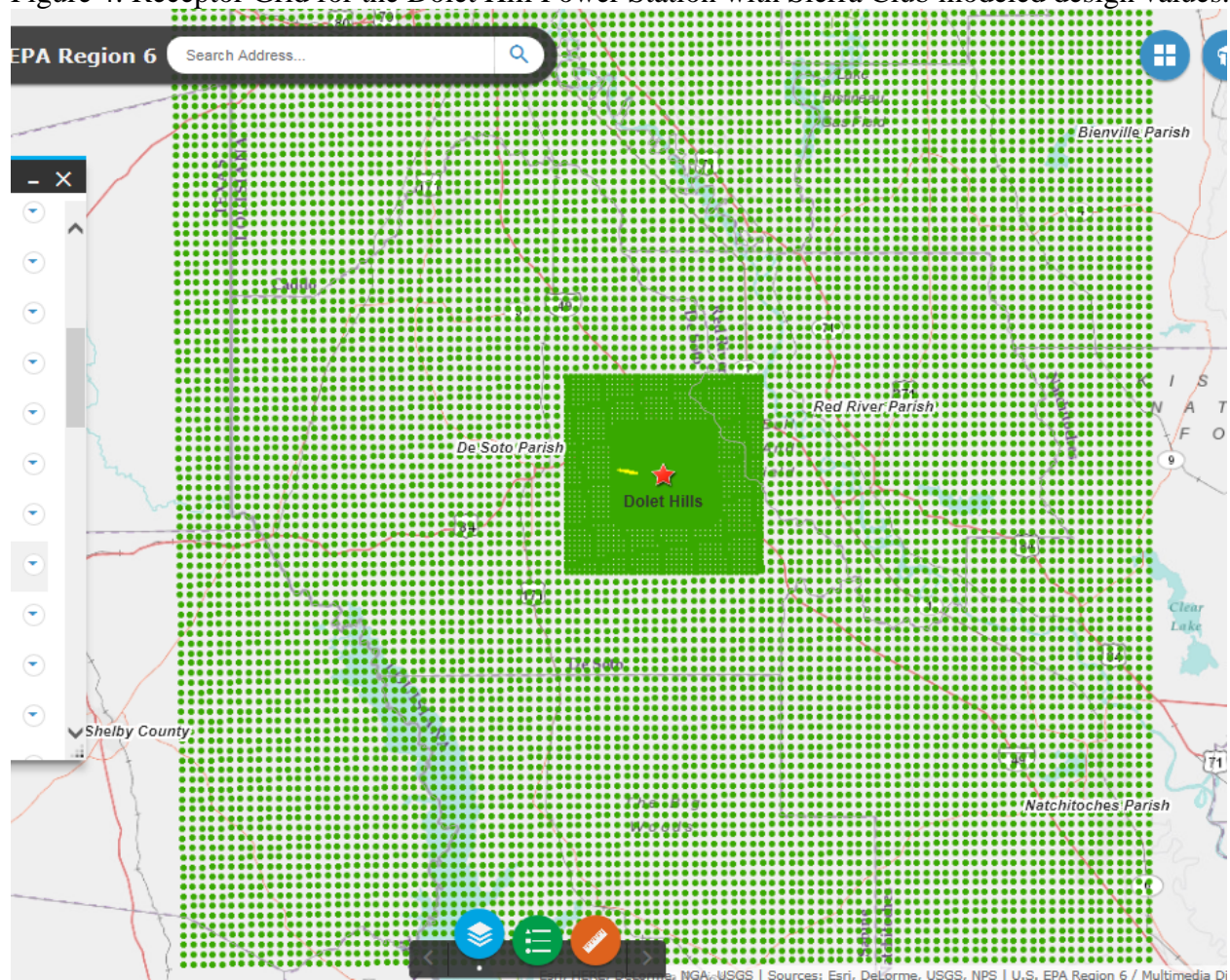
For the area around Dolet Hills Power Station, AEP included the one other emitter of SO$_2$ within 20 km of the Dolet Hills Power Station in any direction. Per the comments from EPA on the original Sierra Club modeling, AEP determined that this was the appropriate distance in order to adequately characterize air quality from the Dolet Hills Power Station and other nearby sources which may have a potential impact in the area of analysis where maximum concentrations of SO$_2$ are expected. In addition to Dolet Hills Power Station, the other emitter of SO$_2$ included in the area of analysis is the International Paper Mansfield Mill. AEP also provided a sensitivity analysis of the flagpole receptor and showed that it had minimal impact on concentrations and then did not use the 1.5 m flagpole height in further runs.

Modeling Parameter: Source Characterization

AEP characterized the sources within the area of analysis in accordance with practices outlined as acceptable in the Modeling TAD. Specifically, AEP used actual stack heights, diameter, and location in conjunction with actual emissions. AEP also adequately characterized the source's building layout and location, as well as using CEMS data for the stack parameters exit

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temperature and exit velocity. The AERMOD component BPIPPRIME was used to assist in addressing building downwash.

EPA conducted a comparison of the actual operating data used by AEP to the values used by the Sierra Club and it became apparent that the actual full load operating conditions were significantly different than those used by the Sierra Club. The Sierra Club used a constant temperature of 345.93 K and a constant velocity of 25.84 m/s. AEP's temperature and velocity varied each hour from the measurements in the CEMS. To give an idea of the relative temperature and velocity of the measurements versus the Sierra Club values an analysis of the CEMS data found that for hours when the plant's emission rate was 600 gm/s or greater (indicating normal operating conditions) that the average temperature was 362.95 K and the average velocity was 28.85. These are 4.9% and 11.6% respectively greater than used by the Sierra Club. A comparison of the Briggs buoyancy factor determines the plume rise trajectory. The Dolet Hills plume rise would have 40% greater buoyancy at 293K ambient temperature. This greater buoyancy will give higher plume rise and increased dispersion of the plume before reaching the surface.

Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purposes of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. The EPA's view is that CEMS data provide acceptable historical emissions information when it is available and that these data are available for many electric generating units. The characterization of the emissions from Dolet Hills in the most recent modeling was processed by AEP from data provided by Cleco. AEP filled in missing values and screened for bad values. Examining the data EPA noted that during start up the SO_2 emissions from Dolet Hills units were near zero in the CEMS data. Figure 5 gives an example of the emission rate (g/s), temperature (K), and velocity (m/s) during a start up on September 15, 2012.

Figure 5. Example start up emissions for Dolet Hills.
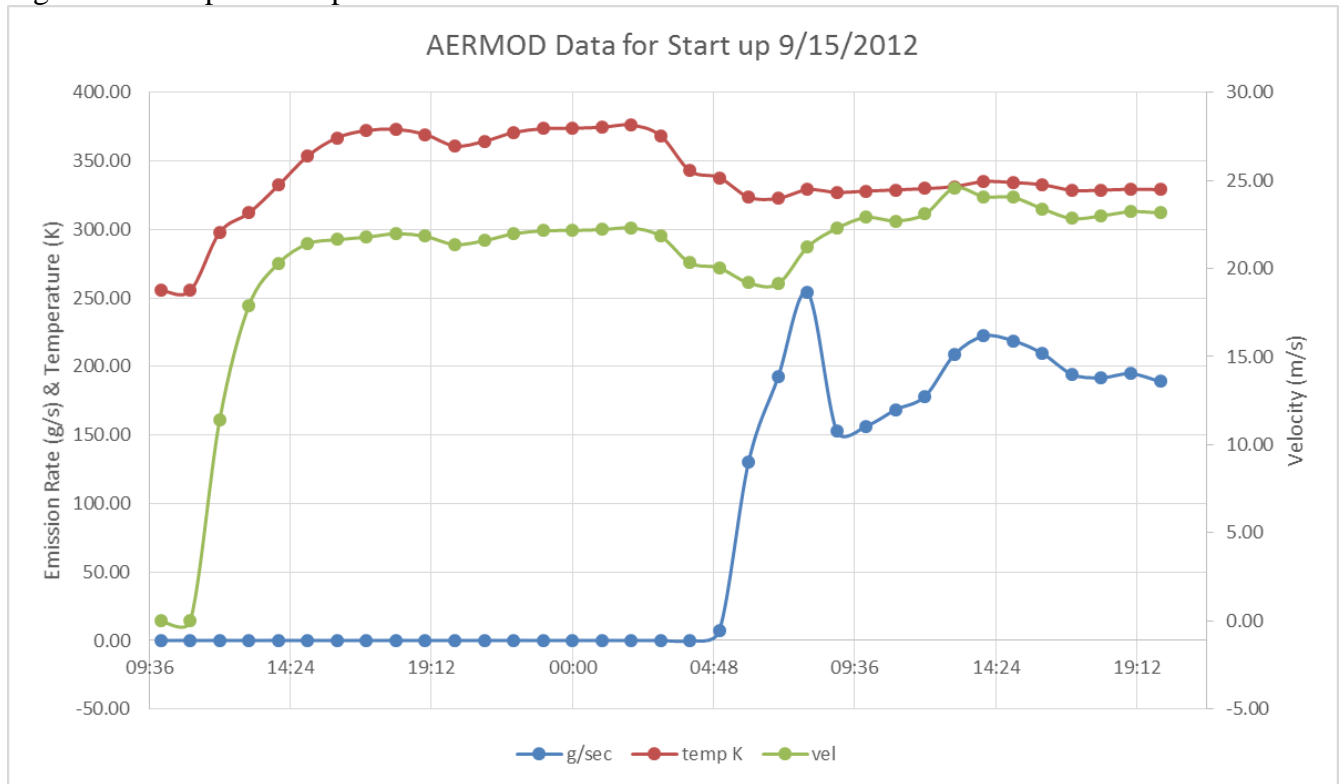
AEP stated that during these periods of very low SO_2 emissions that the units were starting up using natural gas. The emission rates used by AEP differed slightly from those found from the CAMD database by the Sierra Club. The AEP emission rates were processed directly from the CEMS data and no bias estimates were applied to them. AEP certified that Dolet Hills follows 40 CFR Part 75 and Appendix to Part 75 for CEMS Quality Assurance and data reporting. Before data are reported to CAMD a bias is applied based on the results of a relative accuracy test audit (RATA) conducted annually. The bias factor applied to the CAMD data over the period of the modeling was as follows:

1. 3.2% - 1/1/2012 0000 – 2/21/2012 2000
    A 3.2% flow monitor bias adjustment factor is applied to the CEMS measured hourly flow data. The bias adjustment factor was applied from the 2011 Flow RATA.
2. 5% - 2/21/2012 2100 – 2/21/2013 2000
    The 2012 Flow RATA was conducted on 2/21/2012. The 5% bias adjustment factor is applied the hour following the testing completion (hour 21:00) replacing the 2011 3.2% bias factor. This bias factor is applied to the CEMS hourly flow data until the next RATA test is performed.
3. 0% - 2/21/2013 2100 – 7/1/2014 1400
    The 2013 Flow RATA was conducted on 2/21/2013. The 0% bias adjustment factor is applied the hour following the testing completion (hour 22:00) replacing the 2012 5% bias factor. This bias factor is applied to the CEMS hourly flow data until the next RATA test is performed.
4. 3.2% - 7/1/2014 1500 – 12/31/2014 2300

The 2014 Flow RATA was conducted on 7/01/2014. The 3.2% bias adjustment factor is applied the hour following the testing completion (hour 15:00) replacing the 2013 0% bias factor. This bias factor is applied to the CEMS hourly flow data until the next RATA test is performed.

The sum of Sierra Club's SO_2 emissions was 3.4% greater over the 3-year period than AEP's emissions as a result of the application of the bias factor to the CAMD data.

As previously noted, AEP included Dolet Hills Power Station and one other emitter of SO_2 within 20 km in the area of analysis. This distance and these facilities were selected because AEP believes that this area of analysis adequately represents the area where maximum concentrations of SO_2 are expected and adequately includes the sources which might contribute to those concentrations. No other sources beyond 20 km were determined by AEP to have the potential to cause significant concentration gradient impacts within the area of analysis. The facilities in the area of analysis and their associated annual actual SO_2 emissions from 2012 to 2014 are summarized below. For this area of analysis, AEP opted to use a hybrid approach, where emissions from certain facilities are expressed as actual emissions, and those from other facilities are expressed as PTE rates.

For Dolet Hills Power Station in the following area of analysis, AEP included annual actual SO_2 emissions between 2012 and 2014. This information is summarized below.

Table 2: Actual SO_2 Emissions in 2012-2014 from Facilities in the Dolet Hills Power Station

Facility Name	SO2 Emissions (tpy)		
	2012	2013	2014
Dolet Hills Power Station	20,887	14,612	14,177
International Paper, Mansfield Mill	1,569	1,296	1,557
Total Emissions From All Facilities	24,468	17,921	17,748

For the IP Mansfield Mill facility in the above area of analysis, AEP used emissions from the 3-year period 2012–2014 as developed by IP through a hybrid approach. The modeling TAD allows for use of actual hourly emissions as well as the very conservative approach of using maximum potential emission rates. A hybrid approach was used for the Mansfield Mill facility by using a conservative, constant, and representative maximum hourly SO_2 emission rate for Power Boilers Nos. 1 and 2, while all other facility sources were modeled with maximum permitted emission rates. Maximum actual SO_2 emission factors (lbs/mmBTU) from the Power Boilers Nos. 1 and 2 were developed from a statistical evaluation of the hourly SO_2 CEMS data for the period 2012-2014. These maximum actual emission factors were multiplied by the maximum heat input of each boiler (760 mmBTU/hr) to obtain the maximum actual SO_2 emission rate for the Nos. 1 and 2 Power Boilers. These rates were then conservatively modeled for every hour for the period 2012-2014. The exhaust parameters were taken from the facility's Title V operating permit.

All other Mansfield Mill sources were modeled with potential to emit (PTE) emission rates.

Table 3: SO$_2$ Emissions based on PTE from Facilities in the Dolet Hills Power

Facility Name	SO$_2$ Emissions (tpy)
Mansfield Mill Nos. 1 and 2 Power Boilers	3,014
All other Mansfield Sources	1,972
Total Emissions From All Facilities	4,986

For 2012-2014 the average annual actual emissions were 1,474 tpy. The modeled hybrid emissions for Mansfield Mill are more than three times greater than the actual emissions.

*Modeling Parameter: Meteorology and Surface Characteristics*

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

For the Dolet Hills Power Station area of analysis, surface meteorology was obtained for Shreveport Regional Airport located near the Dolet Hills Power Station. Integrated Surface Hourly (ISH) data for the 2012-2014 period were obtained from the National Climatic Data Center (NCDC). Since the Sierra Club's meteorological data were used for the AEP modeling and the Sierra Club meteorology was developed before the end of 2015, the most recent data available to them was 2014.

The Sierra Club used AERSURFACE version 13016 to develop surface roughness, albedo, and daytime Bowen ratio values in a region surrounding the meteorological data collection site. AERSURFACE was used to develop surface roughness in a one kilometer radius surrounding the data collection site. Bowen ratio and albedo was developed for a 10 kilometer by 10 kilometer area centered on the meteorological data collection site. These micrometeorological data were processed for seasonal periods using 30-degree sectors. Seasonal moisture conditions were considered average with winter months having no continuous snow cover.

In Figure 6 below generated by the EPA, the location of the Shreveport NWS station is shown relative to the Dolet Hills Power Station area of analysis. The NWS site is located 53 km to the NNW.

Figure 6: Dolet Hills Power Station Area of Analysis and the Shreveport NWS Station
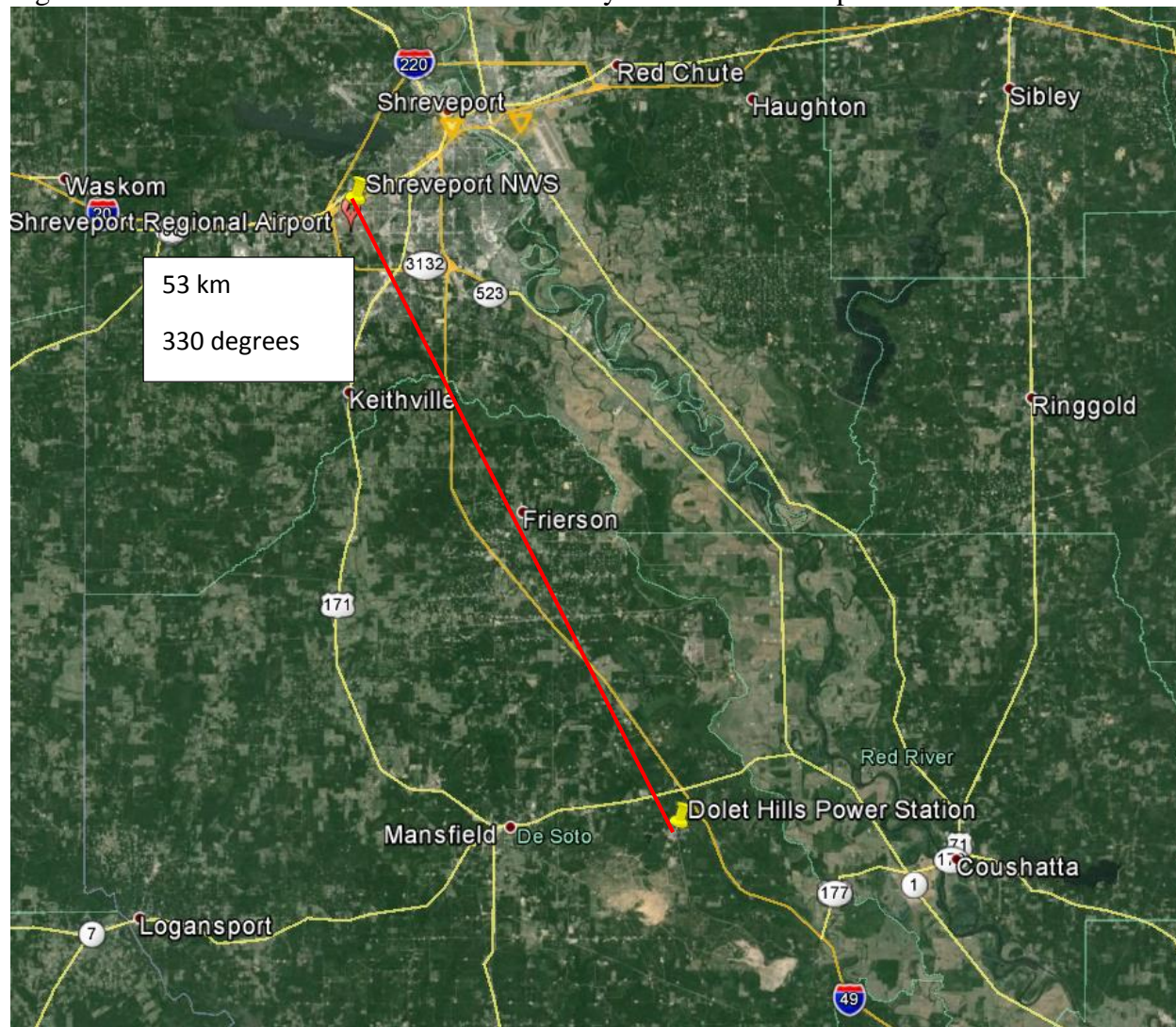
For Dolet Hills Power Station, the concurrent 2012-2014 upper air data from twice-daily radiosonde measurements obtained at the most representative location were used. This location was the Shreveport, Louisiana measurement station. These data are in Forecast Systems Laboratory (FSL) format and were downloaded in ASCII text format from NOAA's FSL website. All reporting levels were downloaded and processed with AERMET.

Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. Sierra Club 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 same instrument tower, 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, Sierra Club set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. This approach is consistent with a March 2013 EPA memo titled, "Use of ASOS meteorological data in AERMOD dispersion Modeling." 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 evaluating the above discussed decisions, EPA has determined that the meteorological data inputs used by Sierra Club for its modeling were appropriate. Since the Sierra Club's meteorological data were used for the AEP modeling, the same decision applies to the meteorological data used by AEP.

Modeling Parameter: Geography and Terrain

The Universal Transverse Mercator (UTM) NAD83 coordinate system (Zone 15) was used for identifying the easting (x) and northing (y) coordinates of the modeled sources and receptors. Stack locations were obtained from facility permits and prior modeling files provided by the state regulatory agency. The stack locations were then verified using aerial photographs and confirmed with GIS.

Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For the Dolet Hills Power Station area of analysis, AEP chose to use a seasonal hourly SO_2 background developed from the 2013-2015 Shreveport SO_2 Monitor data by AECOM on behalf of International Paper. The background concentration for this area of analysis was determined by AECOM as follows:

Table 4. Seasonal hourly background SO$_2$ concentrations (ppb) as developed by AECOM for International Paper.

Hour	Season			
	Winter	Spring	Summer	Fall
1	2.5	2.6	2.6	2.1
2	2.8	2.6	2.9	1.9
3	3	2.5	2.6	2.1
4	2.9	2.4	2.7	2.4
5	2.9	2.4	2.6	2.1
6	2.7	2.5	2.6	2
7	2.3	2.7	2.8	1.9
8	2.4	3.2	5.2	2.7
9	3.2	3.8	9.3	3.8
10	2.7	4.4	9.5	5.3
11	5.1	4.3	6.9	7
12	6.1	4.5	6.2	4.6
13	6.4	4.1	4.7	3.7
14	5.1	3.7	3.8	4.2
15	4.2	3.3	3.7	3.1
16	4.1	3	4.5	3.8
17	3.7	3.2	3.7	3
18	3.1	3.1	3.6	3.4
19	3.1	2.9	4.2	3.3
20	2.8	2.7	3.5	2.7
21	3.7	2.7	3.1	2.1
22	3.2	3.1	2.7	2
23	3.9	3.5	3.8	2.1
24	3.1	2.9	2.8	2.3

The Sierra Club found a background concentration of 12.0 ppb using the Tier 1 approach for the years 2011-2013. The seasonal hourly background concentrations were incorporated into AEP's final AERMOD results, as allowed by EPA's modeling TAD and guidance.

Summary of Modeling Results

The AERMOD modeling parameters, as supplied by additional information from AEP during the comment period for the Dolet Hills Power Station area of analysis are summarized below in Table 5.

Table 5. AERMOD Modeling Parameters for the DeSoto Parish, Louisiana Area of Analysis

Dolet Hills, Texas Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Rural
Modeled Sources	2
Modeled Stacks	6
Modeled Structures	1
Modeled Fence lines	0
Total receptors	21,201
Emissions Type	Hybrid
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Shreveport, Louisiana
Upper Air Meteorology Station	Shreveport, Louisiana
Methodology for Calculating Background SO_2 Concentration	Seasonal hourly
Calculated Background SO_2 Concentration	Seasonal hourly

The results presented below in Table 6 show the magnitude and geographic location of the highest predicted modeled concentration based on hybrid emissions, with Dolet Hills being modeled with actual emissions.

Table 6. Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Dolet Hills Area of Analysis Based on Hybrid Emissions

Averaging Period	Data Period	Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
		UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	2012-2014	442987.0	3544319.0	170.5	196.2*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

AEP's modeling indicates that the highest predicted 3-year average 99th percentile 1-hour average design value within the chosen modeling domain is 170.5 $\mu g/m^3$, or 65.1 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the Dolet Hills Power Station.

Jurisdictional Boundaries:
Once the geographic area of analysis associated with Dolet Hills Power Station, other nearby sources of SO_2, and background concentration is determined, existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries. The jurisdictional boundaries of the unclassifiable/attainment are those of DeSoto Parish, Louisiana.

The EPA finds that our final unclassifiable/attainment area, consisting of DeSoto Parish, Louisiana, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final unclassifiable/attainment area.

Conclusion

After careful evaluation of the state's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA has determined that the area around Dolet Hills Power Station is meeting the 2010 SO_2 NAAQS and is therefore designating the area as unclassifiable/attainment for the NAAQS. Specifically, the area is comprised of DeSoto Parish, Louisiana.

This designation is based on the modeling submitted by AEP which appropriately followed the Modeling TAD, used actual emission rates, stack temperatures, and velocities, downwash, seasonal/hourly SO_2 background, included emissions from potentially contributing sources, and showed attainment with the 2010 primary SO_2 standard. With the inclusion of more accurate stack parameters and downwash, this modeling more closely follows the Modeling TAD than previous Sierra Club modeling that EPA relied upon to propose the area around Dolet Hills as nonattainment and is therefore the best available information on which to base the EPA's designation determination.

At this time, our final designations for the state only apply to this area and the others contained in this final technical support document. Consistent with the court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Louisiana by either December 31, 2017, or December 31, 2020.