Technical Support Document for the Designation Recommendations for the 2010 Sulfur Dioxide National Ambient Air Quality Standards (NAAQS) – Supplement for Four Areas in Texas Not Addressed in June 30, 2016, Version

Docket Number EPA–HQ–OAR–2014–0464
U.S. Environmental Protection Agency

November 29, 2016

Final Technical Support Document for Supplemental Designations – Four Areas in Texas

Texas
Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard
Supplement for Four Deferred Areas

<u>Summary</u>

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, was the deadline established by the U.S. District Court for the Northern District of California for the EPA to designate certain areas. This deadline was the first of three deadlines established by the court for the EPA to complete area designations for the 2010 SO_2 NAAQS. The EPA notified the areas subject to the July 2, 2016 deadline of its intended designations on March 1, 2016, including the four Texas areas addressed in this supplemental action. The EPA issued final designations for the majority of these areas on June 30, 2016. However, before meeting the July 2, 2016, deadline, the EPA and plaintiffs, who are parties to the consent decree that gave rise to the court order, agreed to extensions for a limited number of the subject areas in Texas: Freestone County – Big Brown Steam Electric Station, Titus County – Monticello Steam Electric Station, Rusk County – Martin Lake Electrical Station, and Milam County – Sandow Power Plant. The deadline for issuing a designation for these four areas was extended to November 29, 2016, and the EPA is now issuing final designations for these areas to supplement the June 30, 2016, designations.

Texas submitted updated recommendations on September 18, 2015. Table 1 below lists Texas' recommendations and identifies the counties in Texas that the EPA is designating in order to meet the November 29, 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: Texas' Recommended and EPA's Final Designations.

Area	Texas' Recommended Area Definition	Texas' Recommended Designation	EPA's Final Area Definition	EPA's Final Designation
Freestone-Anderson Counties, Texas	Freestone County Borders	Unclassifiable/ Attainment	Portions of Freestone and Anderson Counties The area bound by the following UTM coordinates (NAD 83 Datum, UTM Zone 14): 766752.69, 3536333.0 784752.69, 3536333.0 784752.69, 3512333.0 766752.69, 3512333.0	Nonattainment
Titus County, Texas	Titus County Borders	Unclassifiable/ Attainment	Portions of Titus County The area bound by the following UTM coordinates (NAD 83 Datum, UTM Zone 15): X Y 304329.030, 3666971.000 311629.030, 3666971.000 311629.030, 3661870.500 304329.030, 3661870.500	Nonattainment
Rusk-Panola Counties, Texas	Rusk County Borders	Unclassifiable/ Attainment	Portions of Rusk and Panola Counties The area bound by the following UTM coordinates (NAD 83 Datum, UTM Zone 15): X Y 340067.31, 3575814.75 356767.31, 3575814.75 356767.31, 3564314.75 340067.31, 3564314.75	Nonattainment
Milam County, Texas	Milam County Borders	Unclassifiable/ Attainment	Same as State's Recommendation	Unclassifiable

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 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 that not later than 1 year after promulgation of a new or revised NAAQS, state governors must 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, it is 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 the 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.

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

[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. On the effective date of the promulgation of the NAAQS, Texas did not contain any areas subject to the exception.

effort intended to resolve the litigation in one of those cases, plaintiffs, Sierra Club and the 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 had 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. As discussed above, there were four areas in Texas for which extensions to the EPA's July 2, 2016, deadline were issued, and the current deadline is November 29, 2016. At this time, we are supplementing our previous Response to Comments and Technical Support Documents that were signed on June 30, 2016, as part of our final designation action to meet the July 2, 2016, date for the other sources and areas addressed in this round of designations.

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 designations 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 available to states and other interested parties.

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 Texas. However, these 4 sources in the State meet the emissions criteria of the consent decree for which the EPA must complete designations by the extension date of November 29, 2016. In this supplemental final technical support document, the EPA discusses its review and technical analysis of Texas' updated recommendations for the areas that we must designate. The EPA also discusses any intended and 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 less than or equal to 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 is violating the 2010 SO_2 NAAQS or contributes to a violation in a nearby area. 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 it meets the 2010 SO_2 NAAQS or whether it contributes to an area that does not meet the 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 and is not contributing to an area that violates 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 Freestone County, Texas

Introduction

The Freestone County, Texas, 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 had not met the specific criteria in the consent decree for being "announced for retirement." Specifically, in 2012, the Big Brown Steam Electric Station (Big Brown) emitted 60,681 tons of SO_2, and had an emissions rate of 1.59 lbs SO_2/mmBTU. Pursuant to the March 2, 2015, consent decree, the EPA must designate the area surrounding the facility by July 2, 2016. However, before meeting the July 2, 2016, deadline for this area, the EPA and plaintiffs, who are parties to the consent decree that gave rise to the court order, agreed to extensions for a limited number of the subject areas, including this area. The deadline for issuing a designation for this area is now November 29, 2016.

In its September 18, 2015 submission, Texas provided no formal recommendation for the specific area surrounding the Big Brown Steam Electric Station. Instead, as part of its September 18, 2015, submittal, Texas provided a general recommendation of unclassifiable/attainment for the 243 counties located in the State, including Freestone County (and Anderson County), that do not have any operational SO_2 regulatory monitors. This general recommendation for Freestone County was not accompanied by modeling, monitoring, or other technical information to inform our decision regarding the attainment status of the area.

On February 11, 2016, the EPA notified Texas that we intended to designate the portions of Freestone and Anderson Counties, Texas, as nonattainment. Additionally, we informed Texas that our intended boundaries for the nonattainment area comprised of portions of Freestone and Anderson Counties, bound by these UTM coordinates (NAD 83 Datum, UTM Zone 14):

X	Y
762752,	3540333
762752,	3510333
789753,	3510333
789753,	3540333

Our intended designation and associated boundaries were based on, among other things, Sierra Club's modeling of actual emissions reported from both the Big Brown and background source Limestone Electric Generating Stations during the 2013 to 2015 calendar years. An analysis of the modeling data indicates it was performed in accordance with appropriate EPA modeling guidance and using generally conservative assumptions.

The EPA identified aspects of Sierra Club's modeling used for our proposal that were not as refined as possible, but after our analysis of those aspects, we proposed that the modeling was adequate for a determination of nonattainment. The modeling did not include building downwash or variable stack temperature and velocity, since Sierra Club did not have access to information needed to support such inclusion. Including building downwash will generally, though not always, increase the predicted maximum modeled concentrations. Sierra Club used stack velocity and temperatures consistent with 100% load. This, coupled with actual hourly emission rates, should provide conservative estimates of actual concentrations because higher temperatures and velocities of 100% load when paired with lower emissions of less than 100% load should provide an overestimation of the dispersion and thus an underestimation of maximum ambient concentrations at ground level. Given that modeled concentrations are 64% above the standard, the inclusion of building downwash and variable stack parameters, etc. in the modeling would not result in values near or below the standard; therefore, the modeling is sufficient for a determination of nonattainment.

Therefore, EPA's view was that the Sierra Club modeling was relevant information that must be considered in our designation decision. While TCEQ provided comments on Sierra Club's initial modeling submittal, we received no additional relevant technical information from the State or other parties before issuing our intended designation. In response to the TCEQ comments, Sierra Club updated its modeling for the area addressing most of the concerns raised and submitted the results to the EPA on December 15, 2015. Therefore, we found Sierra Club's modeling was sufficient for a proposed determination of nonattainment. It should be noted that Sierra Club took into account emissions from other nearby facilities and background SO_2 concentration. Based on Sierra Club's December 2015 modeling showing the area in the vicinity of Big Brown does not meet the 1-hr SO_2 standard, we intended to designate the area defined above as nonattainment in our proposed designation.

EPA's intended boundaries for the proposed nonattainment area encompassed the area shown to be in violation of the standard and the principal source that contributes to the violation. We indicated that our initial analysis of the maximum impacts around Big Brown indicated that Big Brown was responsible for almost 100% of the impacts on the maximum, and therefore only included the principal source in the intended boundaries.

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

<u>Assessment of New Information</u>

In our February 11, 2016, notification to Texas regarding our intended nonattainment designation for the portions of Freestone and Anderson Counties, Texas, 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 draft 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 supplement to the June 30, 2016, response to comments document (RTC), available in the docket, Docket ID EPA-HQ-OAR-2014-0464, supersede those found in the draft document.

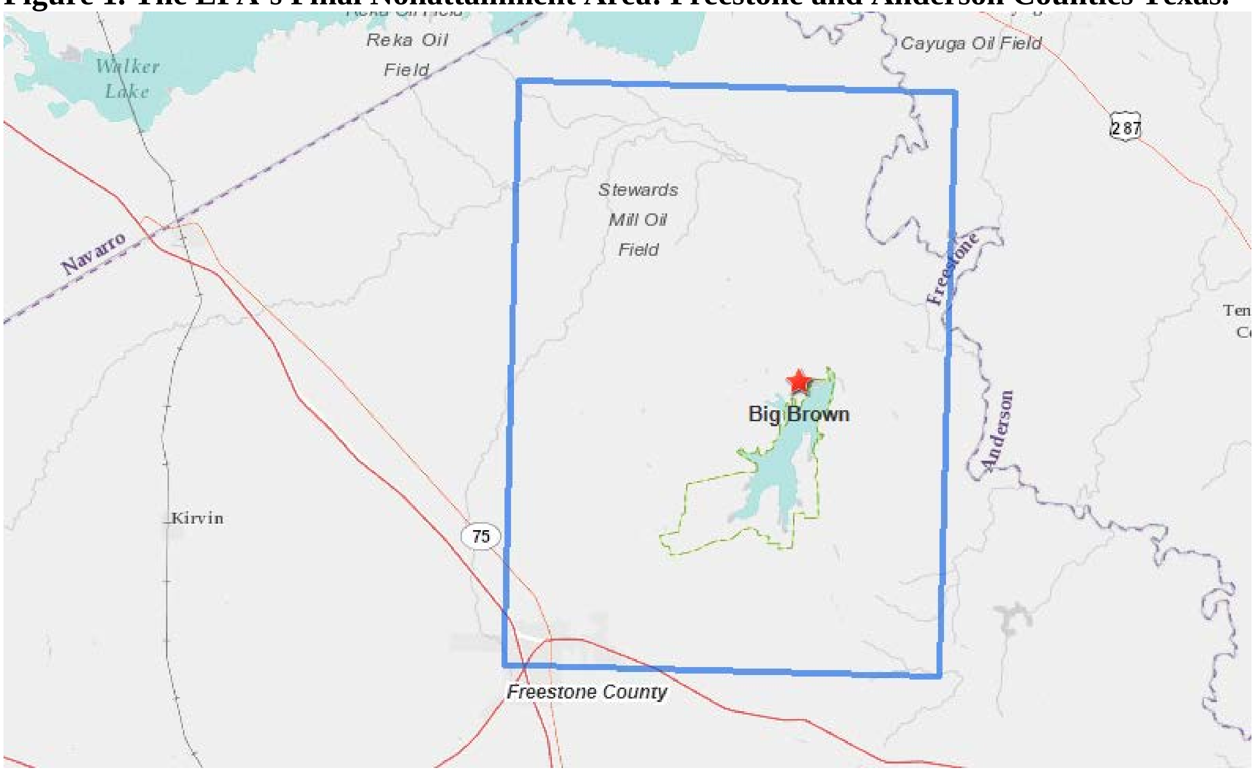
As further detailed below, after carefully considering all available data and information, the EPA is designating portions of Freestone and Anderson Counties, Texas, (to be referred to as the Freestone and Anderson Counties, Texas area) as nonattainment for the 2010 SO_2 NAAQS. This nonattainment area is bound by these UTM coordinates:

X	Y
766752.69,	3536333.0
784752.69,	3536333.0
784752.69,	3512333.0
766752.69,	3512333.0

NAD 83 Datum, UTM Zone 14

and is shown in Figure 1 below:

Figure 1. The EPA's Final Nonattainment Area: Freestone and Anderson Counties Texas.



The EPA received substantive comments from citizens, Sierra Club, Luminant, the Texas Commission on Environmental Quality, and the Governor of the State of Texas regarding our intended nonattainment designation for the Freestone and Anderson Counties, Texas, area, and a comprehensive summary of these comments and our responses can be found in the supplement to the RTC.

Also, additional information, specifically air dispersion modeling, was submitted to the EPA during the state and public comment period in order to characterize air quality in the Freestone and Anderson Counties, Texas, area. Notably, the Sierra Club and Luminant provided additional air dispersion modeling information during the comment period. TCEQ also included Luminant's modeling analysis as an attachment to its comments. The Sierra Club's modeling report asserted that Big Brown is causing nonattainment of the 2010 one-hour SO_2 standard when modeled alone without considering any other nearby contributing sources. The Luminant modeling report asserted that Big Brown, when modeled with several adjustments intended to reduce what Luminant asserts is inappropriate "conservatism" (i.e., alleged overestimation of ambient concentrations, in this use of the term) in the AERMOD model, does not contribute to nonattainment in the Freestone and Anderson Counties, Texas, area. Luminant submitted this information 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.

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

Though new modeling was received from both Luminant and the Sierra Club, the Luminant modeling did not conform to the guidance of the Modeling TAD.

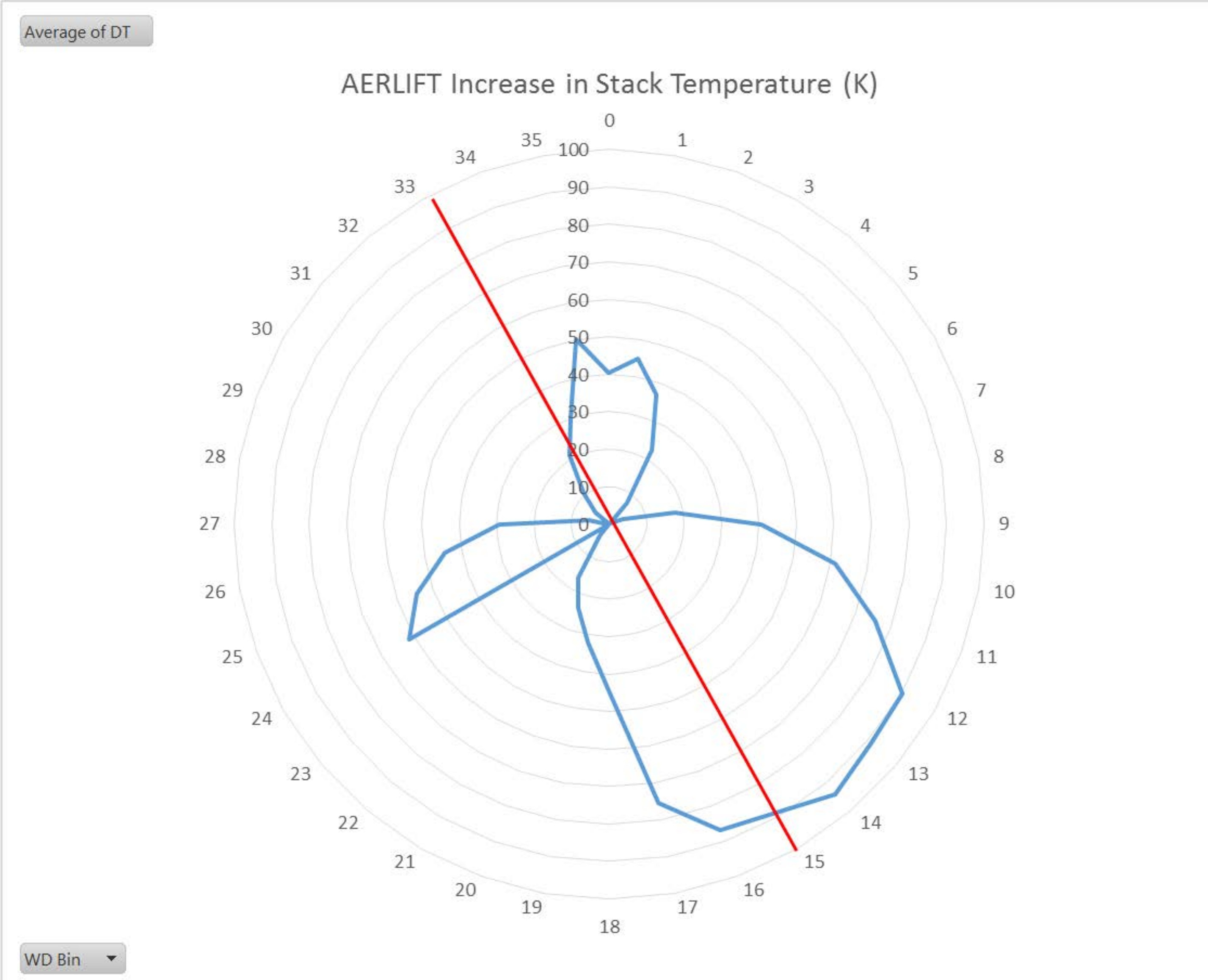
A non-EPA preprocessor model, AERLIFT, was applied by Luminant's contractor to the CEM data to increase the observed temperatures and velocities. AERLIFT is directed toward situations where two or more stacks line up with the wind direction causing the plumes to merge as they rise and reducing the overall entrainment of cooler ambient air.

EPA generally encourages modeling improvements that give more realistic simulations of the dispersion from sources, but there is a process for approval of suggested alternatives. AERMOD has undergone continual development since its introduction. While the phenomena modeled by the AERLIFT technique are theorized and documented from field studies at a few other sources and may affect the dispersion from the modeled source, the implementation of them in a specific case depends on the use of specific algorithms in computer code. However, any model enhancements are required to go through standard EPA model evaluation, review, and approval before being used in regulatory applications as required by 40 CFR Part 51 Appendix W (Guideline on Air Quality Models). Our evaluation of the adjustments that AERLIFT makes in stack parameters at sources indicates the adjustments are large and not consistent with the theory of how the adjustments should be implemented. Regardless, the existing AERMOD model (without AERLIFT adjustments) has been shown to do a good job at modeling impacts of emissions from tall stacks in a number of field studies and such changes to the model would have to be analyzed to ensure the model was still accurate and acceptable for regulatory use with the inclusion of such adjustments. A full review of AERLIFT's coding, applicability of the science and analysis with all the datasets that EPA uses in analyzing changes to the AERMOD system has not yet occurred for AERLIFT.

To get an idea of the degree of changes made by the AERLIFT implementation submitted by Luminant, a review of the modifications made to the observed stack parameters was conducted by EPA Region 6. This review was conducted by comparing the original CEM data to the AERLIFTed parameters. The review showed that the stack temperature can be increased during individual hours by as much as 200 K by the AERLIFT preprocessor. To put this modification to stack gas temperature in context, the wet scrubbed plumes are approximately 80-90 K above ambient conditions, so these adjustments would drastically impact the amount of buoyancy estimated in the model and ultimate plume rise and would result in large differences in modeled ground concentrations around the source.

The figure below of the *average* temperature increase by wind direction demonstrates for some wind directions AERLIFT increases the average stack temperature by over 90K. The AERLIFT model also seems to be increasing the stack temperature for wind directions that are not roughly in line with the stacks (331 and 151 degrees K). These temperature changes with the accompanying stack gas exit velocity increases raise the average buoyancy flux of the emissions by up to 50% for some wind directions. For certain hours the increase is far greater. Such changes in the modeled buoyancy of the plume are expected to have a major effect on the location and concentrations of maximum ground level impact. These changes seem disproportionately large and the impacts they would have on the modeling are very significant. Prior to use in a regulatory setting EPA believes that the particular implementations of AERLIFT needs to undergo extensive review versus test cases previously used for AERMOD model review. While the scientific principles seem like these might be refinements, it has not been substantiated that the implementation of these pre-processors and their coding is a refinement within AERMOD modeling platform and a full review as required by EPA for regulatory models has not been completed. There is no information to support that Luminant's modeling results with the AERLIFT processor meets the requirements for models used in a regulatory decision. It is premature to use AERLIFT in this context for informing our designation decisions.

Figure 2. Increase in stack temperature (degrees K) due to AERLIFT preprocessing for Big Brown. The line of the stacks is denoted by the red line.



As well, the Luminant modeling used a proposed beta option, LOWWIND3, which has not been approved by EPA for regulatory use. The EPA notes that the use of beta options, such as ADJ_U* and LOWWIND3, in AERMOD for any regulatory applications requires adherence with Appendix W, Section 3.2.2. This is further explained in the EPA's December 10, 2015, Memorandum titled, "Clarification on the Approval Process for Regulatory Application of the AERMOD Modeling System Beta Options." Among other conditions, the use of beta options requires consultation with the appropriate EPA Regional Offices. Upon concurrence by the EPA's Modeling Clearinghouse, EPA Regional Offices may approve the use of these beta options for regulatory applications as an alternative model. This process was not initiated or completed in the modeling of Big Brown and thus the modeling based on their use is not acceptable for this regulatory use. We also note that at this point there have been some site specific ADJ_U* approvals through the Model Clearinghouse process, but no LOWWIND3 approvals to date.

The Sierra Club's final modeling (March 2016) followed the guidance in the Modeling TAD subject to the constraints of the data available to them, used the default regulatory options, and used AERMOD version 15181, the most recent available at the time of the modeling. The Sierra Club used the actual 2013-2015 emission rates and hourly velocities based on data from the USEPA Clearinghouse and CAMD databases. The Sierra Club's 2016 modeling departed from the Modeling TAD's general recommendations in that they used 1.5m flagpole receptors. The use of the flagpole receptors is not expected to make a significant difference in the modeled design value concentrations in this case. If this was adjusted to EPA's implied recommended ground level height (0 m), we would expect only a very slight change in the modeled numbers, and the area of exceedances and magnitude of the values would be basically equivalent, and, therefore, not change our final action. Sensitivity modeling conducted by the Sierra Club for Big Brown indicated a 0.2% change in the maximum value. EPA Region 6 also had a sensitivity analyses for another CD source Dolet Hills in northwest Louisiana (further discussed below) and found decreases in modeled SO_2 DV of 0.003 $\mu g/m^3$. Therefore, from these two sensitivities the change in maximum DV was between almost 0% and 0.2% when removing the flagpole receptors and estimating concentrations at ground level. Since Sierra Club's 2016 modeling maximum is on the order of 64% above the standard, the change due to flagpole receptor heights would not decrease the value to below the standard. 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. The facility was evaluated to determine if it should be modeled using the rural or urban dispersion coefficient option in AERMOD. When performing the modeling for the area of analysis, the Sierra Club determined that it was most appropriate to run the model in rural mode for both earlier modeling and the most recent modeling provided to EPA. 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 0.8% 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. The analysis showed that rural dispersion coefficients are appropriate. Based on the AERSURFACE analyses conducted by both Sierra Club (all modeling) and Luminant, they both concluded that the rural option should be used for modeling of this area, and EPA believes this conclusion is appropriate.

Modeling Parameter: Area of Analysis (Receptor Grid)

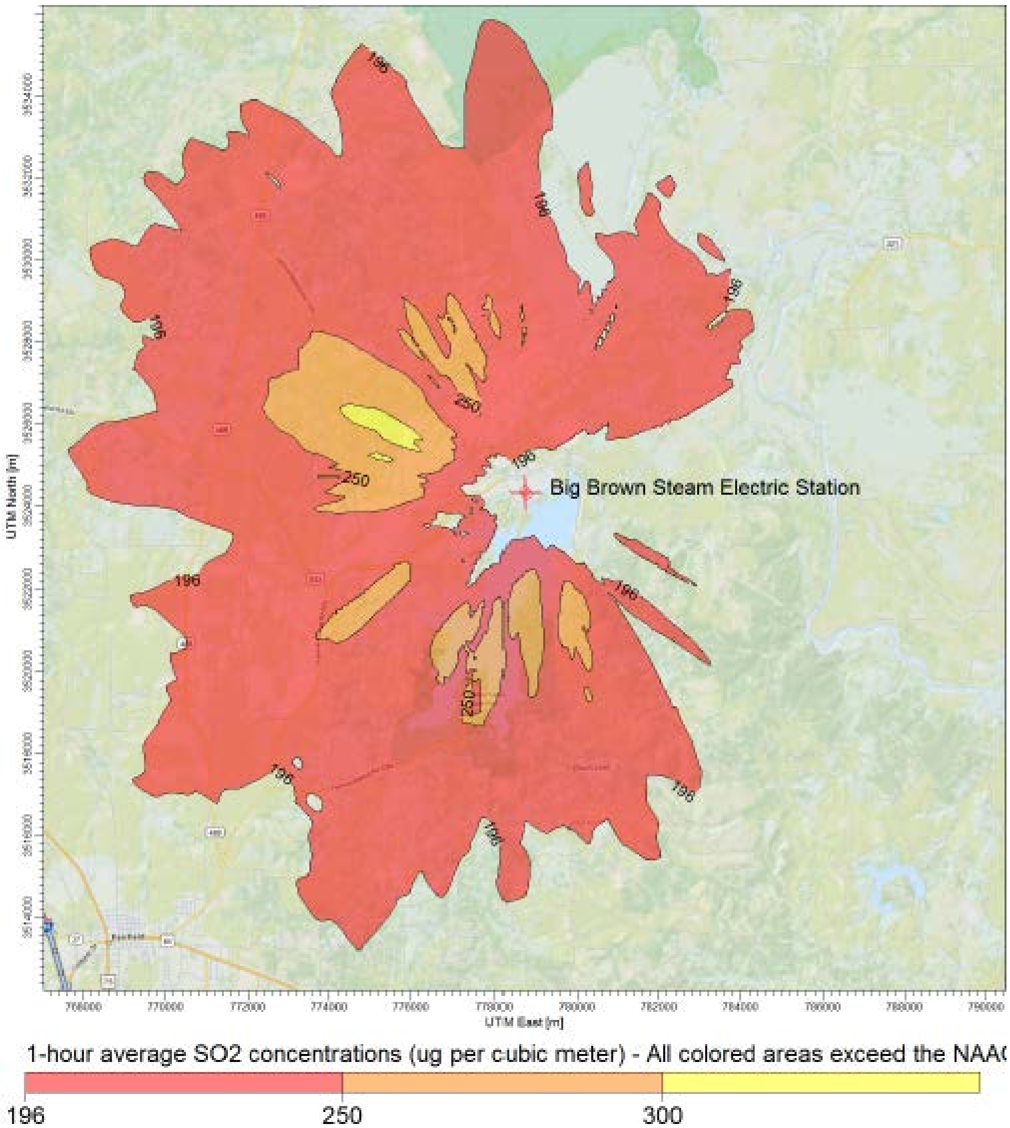
The EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the Big Brown Steam Electric Station is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the 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 the Sierra Club for all their modeling submittals is as follows:

- 100 meter grid from center of Big Brown out to 5 km,
- 500 meter grid centered on Big Brown out to 10 km, and
- 1000 meter (1 km) grid centered on Big Brown out to 50 km.

The receptor network included 21,201 total receptors and covered the central and southwestern portions of Freestone County, the eastern portion of Anderson County, the southern portion of Henderson County and the central and northeastern portion of Limestone County. Sierra Club modeling used a flagpole receptor height of 1.5m (which they proffered as representative of the ambient air inhalation height of a standing human), rather than ground level more typically used for model receptors. If this was adjusted to EPA's implied recommended ground level height (0 m) we would expect only a very slight change in the modeled numbers and the area of exceedances and magnitude of the values would be basically equivalent, and, therefore, not change our final action. We have evaluated model sensitivity runs at other similar coal-fired EGU facilities in the June 30, 2016, designations that these Texas areas supplement. These runs are available in this docket, Docket ID EPA-HQ-OAR-2014-0464, and the use of flag pole receptors typically result with values that are different by a few percent or less. For example, a modeling sensitivity run for the Dolet Hills facility in Louisiana, resulted in only a 0.003 $\mu g/m^3$ change in the maximum design value. Additionally, Sierra Club conducted sensitivity modeling for Big Brown and found that adjustment for flagpole receptors' impact on the modeled concentrations was negative 0.2 %, reinforcing our expectation of a small change that would not change our final determination, since the modeling values are sufficiently above the standard (maximum value is 64% above the standard) that such adjustment would not be expected to be enough of a decrease to resolve all modeled exceedance values in Freestone County.

Figure 3. Sierra Club's Area of Analysis for Big Brown Station Showing Modeled Impacts using Actual Emissions from 2013 - 2015.



In contrast to its previous modeling for the area around Big Brown, in the most recent modeling Sierra Club included no other emitters of SO_2. The rationale for this choice was that previous modeling had shown minimal impact from the potential contributing sources and that the modeling was to be a demonstration that Big Brown was the sole contributor to areas of modeled nonattainment. Our initial analysis at the time of our intended designation for Freestone County was that Big Brown was the principle source to model, and that Limestone and Streetman likely should also be included in modeling, but that Big Brown likely contributed almost 100% of impact. We maintain that Big Brown is likely contributing almost if not equal to 100% of the impact. Furthermore, Sierra Club's modeling, by not including Limestone and Streetman, is a conservative (in an under-estimating sense) approach to determining whether the area is attaining and the boundaries of such area, as inclusion of these sources should result in either similar impacts and boundaries or slightly increased impacts and possibly slightly larger boundaries, but should not result in decreased impacts or "shrinking" of boundaries from those modeled. EPA believes that this is an acceptable choice in these circumstances.

Modeling Parameter: Source Characterization

Sierra Club characterized the sources within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, it used actual stack heights in conjunction with actual emission rates. Sierra Club characterized the source locations and stack parameters, e.g., exit temperature, exit velocity, and diameter. Variable stack temperatures were not included because they are not publically available for use by Sierra Club. The constant temperature used by Sierra Club for the stack was 458.9K, and when compared to the CEM temperatures furnished by Luminant as part of their modeling analysis was on the average 2.5% higher – the average temperature in the CEM data for near full load (filtered for stack velocity > 25 m/s) was 448K, ranging between 417-465K. This temperature difference in Sierra Club's modeling would cause a 7% increase in buoyancy at 20C ambient temperature. The Sierra Club also used a slightly larger inner stack diameter than did Luminant, 6.77m vs. 6.55m, yielding an area, and thus flow, 4.6% greater in Sierra Club's modeling than if Sierra Club had used the inner diameter of 6.55m (included in comments/modeling during the comment period) when calculating velocities from the actual flow rate from the CAMD database. The combination of these two differences yield, on the average, a buoyancy flux at 20C that is 12% greater than what Luminant has provided for their facility for the period of the model run. This increase in buoyancy in Sierra Club's modeling would tend to reduce modeled concentrations, the amount depending on meteorological conditions, which would make Sierra Club's modeling slightly conservative (i.e., under-estimating of concentrations).

Similar to variable stack parameters, building information was not publically available. Therefore, Sierra Club did not include building downwash in their analysis stating that this was the conservative approach and would likely underestimate impacts from emissions resulting in lower modeled concentrations than modeling that included building downwash. While we do not agree with Sierra Club's assertion that exclusion of downwash is conservative in all cases, in our opinion the inclusion of building information and associated downwash in this analysis would not change our conclusion that the area is violating the NAAQS and the designation of nonattainment. We note that in Luminant's modeling report (which Texas also included in its response) they indicated "We expect that the modeling results are not extremely sensitive to this issue because the stack heights are well above the buildings and there is considerable momentum and buoyancy rise for the stack plumes."[2] The modeling values are sufficiently above the standard and inclusion of downwash often leads to higher concentrations closer to the source. But, even in situations we have seen where this did not occur, any decreases in maximum modeled values from inclusion of downwash were relatively small, and so would not be expected to be enough of a decrease to resolve all modeled exceedance values in Freestone County.

Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purposes of modeling to characterize air quality in designations, the recommended approach is to use the most recent three years of actual emissions

[2] Texas Response to EPA (041916_SO2 Designation 120 Day Response from TX.pdf) PDF page # 69.

data and concurrent meteorological data. However, the TAD also provides for the flexibility of using allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate.

As previously noted, Sierra Club's 2016 modeling included Big Brown and no other emitters of SO_2 within the area of analysis (unlike their previous modeling). Sierra Club wanted to clearly demonstrate that the Big Brown facility results in exceedances of the 2010 SO_2 standard. Their previous modeling had shown small contributions from other nearby sources of SO_2. As discussed above, due to the small impacts from other nearby sources in the area of nonattainment around the Big Brown facility we would expect only slight changes, if any, to the area of nonattainment that we are designating if the other nearby sources were included in the modeling. The facilities in the area of analysis and their associated annual actual SO_2 emissions from 2013 to 2015 are summarized below.

Table 2: Actual SO_2 Emissions in 2013 – 2015 from Facilities in the Big Brown Area of Analysis.

Company ID	Facility Name	SO_2 Emissions (tons per year)		
		2013	2014	2015
Luminant/EFH	Big Brown	62494	57460	49884[3]
Total Emissions	All Facilities Modeled	62494	57460	49884

Based on the small impact of other sources determined in the prior modeling results, EPA determines that the maximum impacts in the Big Brown area are adequately represented for purposes of designating the area without explicitly modeling the contributions from other sources within the area of analysis.

Modeling Parameter: Meteorology and Surface Characteristics

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.

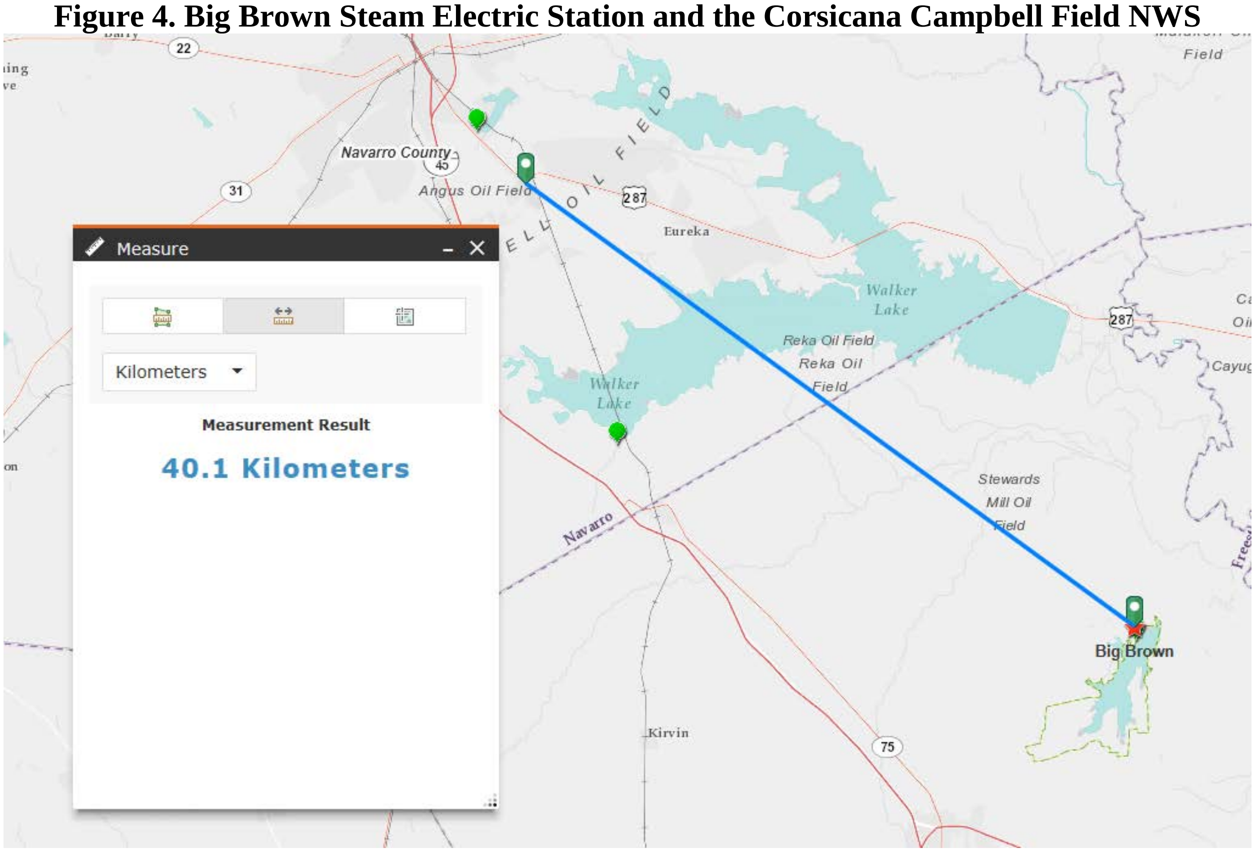
For the Freestone County area of analysis, surface meteorology from the NWS station Corsicana Campbell Field near Corsicana, Texas, approximately 40 km to the northwest, and coincident upper air observations from the NWS station in Fort Worth, Texas, approximately 160 km to the northwest, were selected by Sierra Club as best representative of meteorological conditions

[3] Total emissions for 2015 were not yet available in the Air Markets Program Data reports when this data was retrieved earlier this year. 2015 was calculated from the supplied emissions from the CEM. Final CAMD data is 49837 tpy which is 47 tpy difference or a negligible 0.09 % decrease.

within the area of analysis. EPA agrees that the meteorological sites chosen for the modeling for Big Brown by Sierra Club are appropriate.

Sierra Club used AERSURFACE version 13016 from the NWS station in Corsicana Campbell Field, Texas (located at latitude 32.032 N, longitude 96.399 W) to estimate the surface characteristics of the area of analysis. Sierra Club estimated values for twelve spatial sectors out to 1.0 km at a seasonal temporal resolution for average conditions. Sierra Club also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as "Zo"). In Figure 4, below, the location of the Corsicana Campbell Field, Texas, NWS station is shown relative to the Big Brown facility.

Figure 4. Big Brown Steam Electric Station and the Corsicana Campbell Field NWS



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. The Sierra Club analysis was conducted in adherence to all available USEPA guidance for evaluating source impacts on attainment of the 1-hour SO_2 NAAQS via aerial dispersion modeling, including the AERMOD Implementation Guide; USEPA's Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010; modeling guidance promulgated by USEPA in Appendix W to 40 CFR Part 51; USEPA's March 2011 Modeling Guidance for SO_2 NAAQS Designations; and, USEPA's December 2013 and 2015 SO_2 NAAQS Designations Technical Assistance Document in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

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

Modeling Parameter: Geography and Terrain

The terrain in the area of analysis is best described as gently rolling. To account for these terrain changes, the AERMAP version 11103 terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS National Elevation Database.

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 Freestone County area of analysis, the Sierra Club used for a background concentration the 2012-2014 monitored design value for El Paso, which was 5.2 micrograms per cubic meter ($\mu g/m^3$), or 2 ppb,[4] and that value was incorporated into the final AERMOD results. Many of the SO_2 monitors in Texas are in urban areas and/or near a SO_2 point source, so there is limited data for background values. EPA finds that the lowest SO_2 design value for Texas for the 2013-2015 period was also 2 ppb. Using the El Paso monitor, which is the lowest design value in the state of Texas during this period, is a conservative assumption. Given the amount of SO_2 emissions in East Texas compared to El Paso area this assumption is conservative and likely leads to a small underestimation in the concentrations around these facilities but is within the framework of the TAD's options for inclusion of background monitoring data. Considering the impacts of Big Brown in the area, the

[4] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62$\mu g/m^3$.

background value is on the order of 1.5% of the total maximum values and if background monitoring data existed for east Texas it would be expected to be higher than the El Paso monitor data and would only have a small increase in the concentration levels around the Big Brown facility. Luminant's modeling used a temporally varying background monitor approach of hour of day and season with values ranging from 2-10 $\mu g/m^3$ based on a monitor in Waco. These values are similar to Sierra Club's background monitor data, but the amount of SO_2 emissions in the general Waco area is generally less than that in the general area around the Big Brown facility. Thus, background levels are likely underestimated in both Sierra Club's and Luminant's analyses. We note that in our earlier designations we received analysis of the Shreveport, LA SO_2 monitor to use for background concentration for the Dolet Hills facility in Louisiana. The Dolet Hills background values ranged from 4.88 to 24.85 $\mu g/m^3$. The Shreveport monitor is also generally upwind of Big Brown more often (Waco monitor is not normally upwind of Big Brown) and especially when winds are from the east (blowing westerly) which is when the modeling is predicting values above the standard to the west of the plant.

Summary of Modeling Results

The AERMOD modeling parameters, as supplied by additional information from Sierra Club during the comment period for the Freestone County, Texas, area of analysis are summarized below in Table 3.

Table 3. AERMOD Modeling Parameters for the Freestone County Area of Analysis, Provided by Sierra Club

Freestone County, Texas Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	2
Modeled Structures	0
Modeled Fencelines	0*
Total receptors	21,201
Emissions Type	Actual
Emissions Years	2013-2015
Meteorology Years	2013-2015
Surface Meteorology Station	Corsicana Campbell Field
Upper Air Meteorology Station	Fort Worth, Texas
Methodology for Calculating Background SO_2 Concentration	Design Value
Calculated Background SO_2 Concentration	5.2 $\mu g/m^3$ or 2 ppb

*While the Sierra Club modeling did not specifically include a fenceline in their modeling analysis, the EPA did compare the modeled results with fenceline location information from previous industry dispersion modeling in our proposal and have also evaluated information provided by Luminant in March 2016 to confirm that the modeled exceedances of the NAAQS shown in Sierra Club's analysis did occur in ambient air.

The results presented below in Table 4 show the magnitude and geographic location of the highest predicted modeled SO_2 concentration based on actual emissions.

Table 4: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Freestone County, Texas Area of Analysis Based on actual Emissions (2013-2015). Provided by Sierra Club March 2016.

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	2013-2015	774952.69	3526133.00	321.3	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

The Sierra Club's modeling indicates that the highest predicted 3-year average 99th percentile 1-hour average concentration within the chosen modeling domain is 321 $\mu g/m^3$, or 123 ppb. This modeled concentration included the assumed background concentration of SO_2, and is based on actual emissions from the Big Brown Steam Electric Station. Figure 5 below was included as part of Sierra Club's updated submission and indicates that the predicted value occurred to the WNW of Big Brown. Most of the Sierra Club's chosen receptor grid is also shown in the figure.

Luminant provided a figure in their modeling report indicating the area that they did not think was available for siting a monitor based on exclusion within their property line and also lake/ wetland areas. See Figure 6 below.

Luminant did not provide a detailed analysis of appropriate fencing and limiting of access to their property (necessary to determine if an area is actually not ambient air), nor other material documenting exclusion due to over water, etc. in support of the areas they have excluded. From the information we do have, and evaluation with GIS/aerial data, we have concerns that Luminant has excluded more areas than are appropriate. Regardless, we still have adequate information to conclude whether the area is attaining the 2010 SO_2 NAAQS, given that adequate modeling shows values over the standard outside the areas excluded by Luminant, in undisputed ambient air. We note that Figure 6 also excludes parts of some roadways that are not limited to Luminant access only (appear to be County and Farm to Market Roads 235, 833, 2570) and associated right of ways in their exclusion. These are areas that we would consider to be ambient air and potentially available for monitor siting. Receptors should have been placed between the fenceline and the public road in the right of ways. The maximum modeled values are to the west-northwest of the facility and beyond the area that Luminant/AECOM has excluded. The area of darker orange in Figure 5 is almost entirely ambient based on Luminant's map. There are 8-10 receptors at most that are closest to the facility (east edge of the dark orange receptors) that appear to be potentially within Luminant's property. The maximum and most of the receptors with values above 290 $\mu g/m^3$ are in ambient air. Therefore, there are many receptors well above the standard that are in ambient air.

Figure 5. Sierra Club's Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Freestone County Area of Analysis Based on Actual Emissions

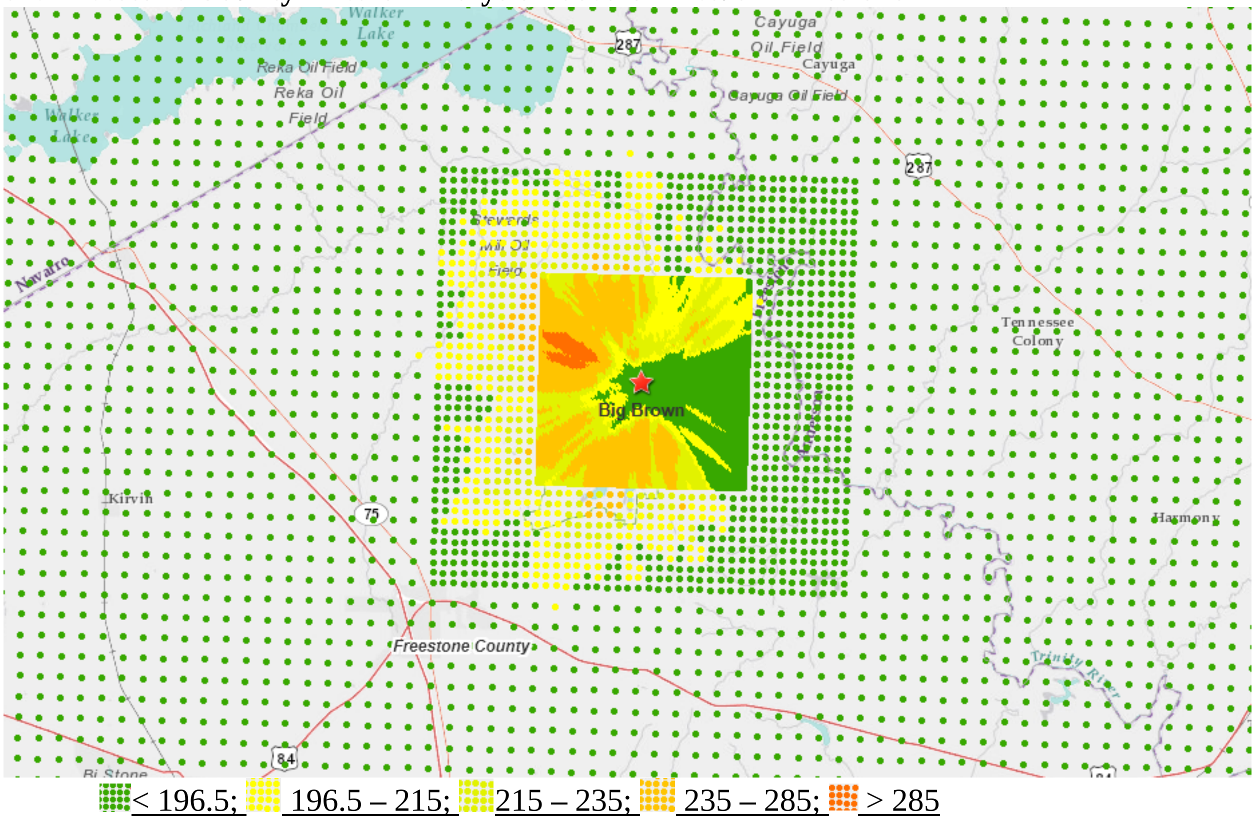
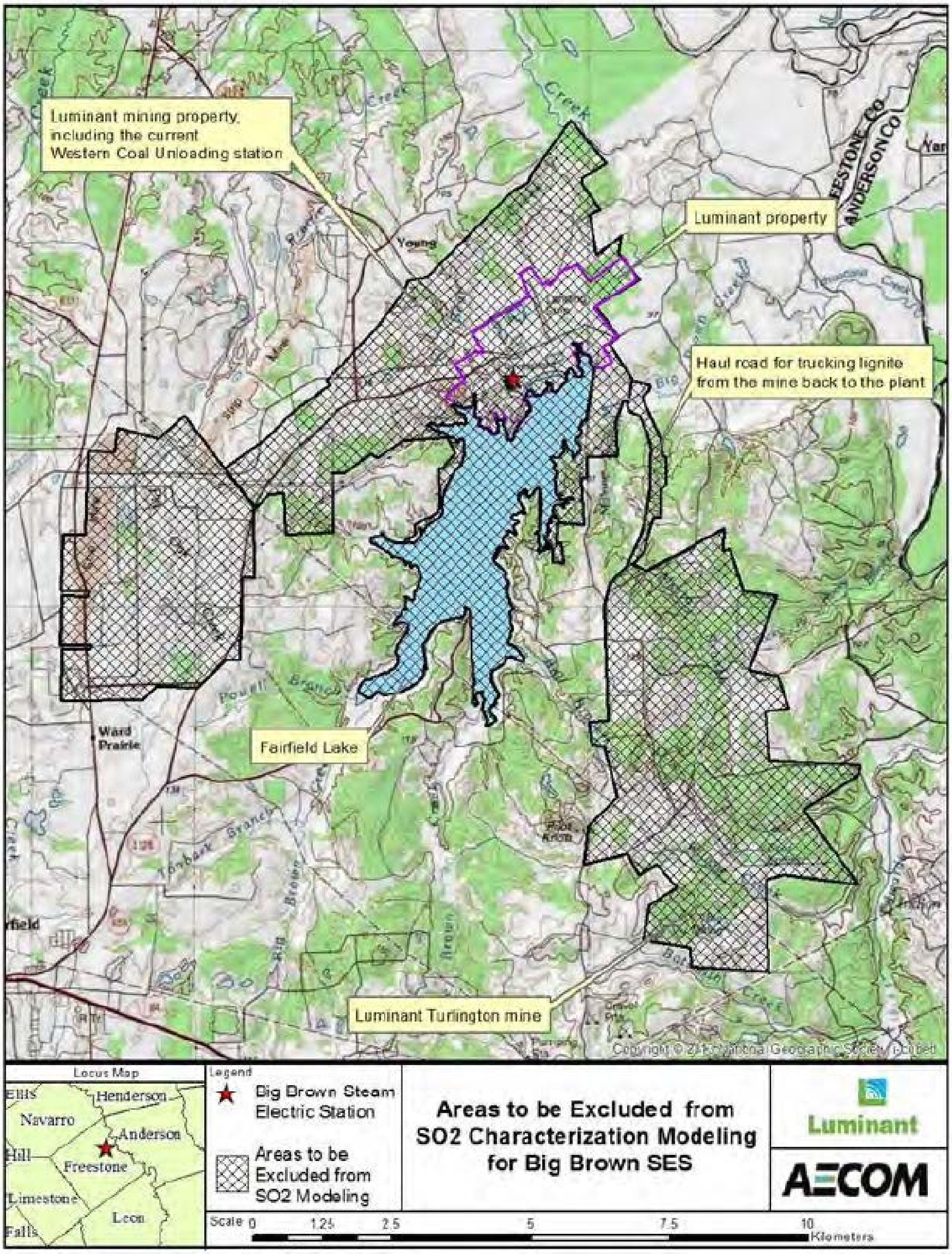


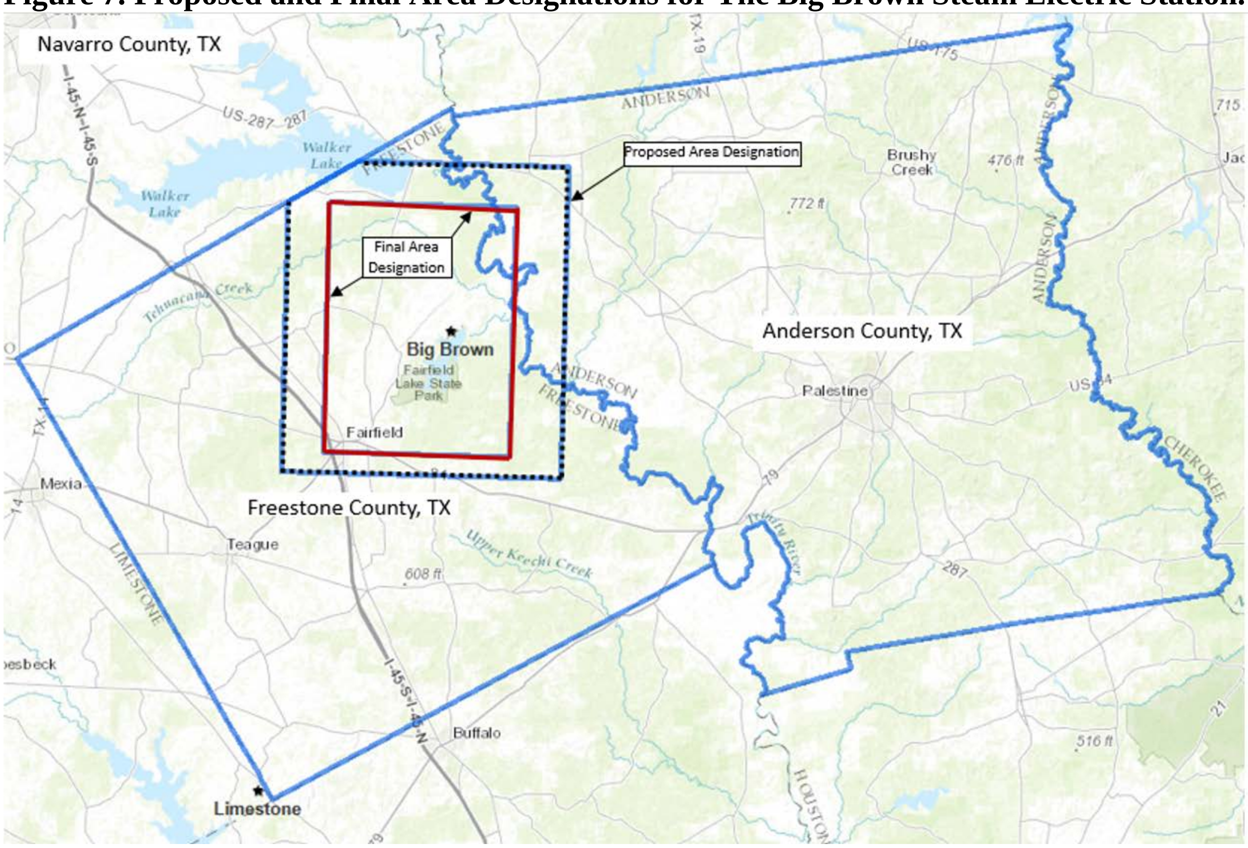
Figure 6. Area excluded by Luminant based on assertion that receptors were within property boundaries or were lake/wetland areas.



Jurisdictional Boundaries

Once the geographic area of analysis associated with Big Brown, other nearby sources of SO_2, and background concentration is determined, existing jurisdictional boundaries are considered for the purpose of informing our final nonattainment area, specifically with respect to clearly defined legal boundaries. Based on the previous Sierra Club modeling EPA had proposed to designate portions of Freestone and Anderson counties as nonattainment based on receptors which had modeled design values greater than the 1-hour SO_2 NAAQS. Because the most recent Sierra Club model results using 2013-2015 emissions show a more compact area of violation of the 1-hour SO2 NAAQS, we believe it is appropriate to adjust the size of the final nonattainment area accordingly. As we have previously discussed, the most recent Sierra Club modeling included some new refinements not included in their 2015 modeling (which used 2012 - 2014 emissions). These refinements and corrections on stack location and stack parameters with the inclusion of velocities that varied resulted in a better estimate of the concentrations around the Big Brown facility. The final area of modeled nonattainment still falls within Freestone and Anderson counties. The following Figure 7 compares the boundaries of the proposed and final SO_2 nonattainment area designations for Freestone and Anderson Counties.

Figure 7. Proposed and Final Area Designations for The Big Brown Steam Electric Station.



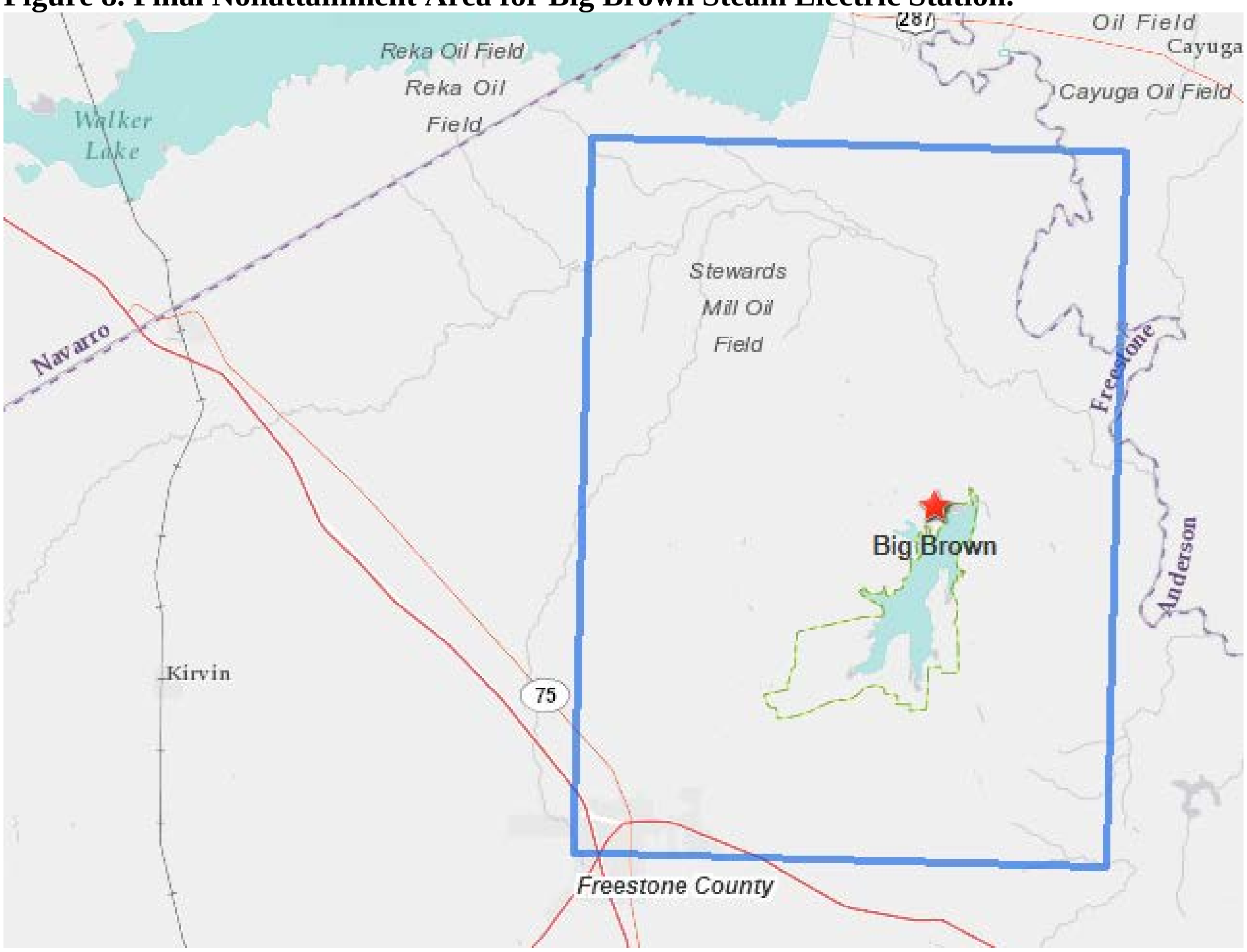
The EPA has determined that our final nonattainment area, consisting of portions of Freestone and Anderson Counties, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final nonattainment area.

Conclusion

After careful evaluation of the information provided by Sierra Club, as well as other available relevant information, the EPA designates the area around Big Brown in Freestone and Anderson Counties, Texas, as nonattainment for the 2010 SO_2 NAAQS. Specifically, the intended nonattainment area is comprised of the portions of Freestone and Anderson Counties, Texas, bounded by the following UTM coordinates in meters (NAD83 Datum, Zone 14):

X	Y
766752.69,	3536333.0
784752.69,	3536333.0
784752.69,	3512333.0
766752.69,	3512333.0

Figure 8. Final Nonattainment Area for Big Brown Steam Electric Station.



Our designation is based on Sierra Club's modeling of actual emissions reported from the facility during the 2013 to 2015 calendar years. The corrections and refinements, including the use of hourly varying stack velocities, resulted in a more accurate assessment than Sierra Club's previous modeling. For the reasons discussed above, Luminant's modeling was not acceptable to use and did not provide an accurate characterization of the impacts of the Big Brown facility on SO_2 levels around the facility.

In contrast, Sierra Club's modeling did follow accepted practices. Exit velocities were derived from the hourly flow rates and heat input in the USEPA Clearinghouse and CAMD databases. The Clearinghouse emissions and exit velocities for 2013-2014 were supplemented with CAMD emissions for 2015. Sierra Club derived the velocities for 2015 were derived from the hourly heat input reported in CAMD. Our assessment of the modeling data indicates it was performed mostly in accordance with appropriate EPA modeling and SO_2 TAD guidance and using generally conservative assumptions.

The latest Sierra Club modeling was conservative in many respects, i.e., included several techniques which generally would tend to underestimate design value concentrations. In sum, as further discussed above:

- The modeling did not include building downwash, since Sierra Club did not have access to information needed to support such inclusion. Building downwash will generally, though not always, increase the predicted maximum modeled concentrations and move the maximum impacts closer to the facility.
- The modeling did not include variable stack temperature, since Sierra Club did not have access to information needed to support such inclusion. Although Sierra Club used a constant stack temperature (459K), it was consistent with 100% load. This, coupled with actual hourly emission rates, should provide conservative estimates of actual concentrations because higher temperatures of 100% load when paired with lower emissions of less than 100% load should provide an overestimation of the dispersion and thus an underestimation of maximum concentrations. EPA compared the constant stack exit temperature used by Sierra Club (459K) to the variable CEM temperatures used by Luminant. The comparison showed that during near-full-load operation the Sierra Club stack temperature is about 10 K higher than the average measured temperature. This difference should lead to higher modeled average plume rise and slightly lower, i.e. underestimation in, maximum concentrations in the Sierra Club modeling.
- The Sierra Club also used a diameter in their modeling of 6.77m rather than the diameter provided by Luminant during the comment period of 6.55m; which resulted in an increase in the stack exit area of 7%, also leading to slightly higher modeled plume rise and a slight underestimation in maximum concentrations. Also see table below, where Sierra Club's sensitivity modeling found a positive impact of 4.4 percent change in concentration in correcting stack diameter.
- The Sierra Club used a very low estimate of background SO_2 based on the lowest monitor in the state of Texas, far from the source and an area with less overall SO_2 emissions. If more representative background monitoring data were available the concentration values would increase some, though should only be a few percent of the maximum estimated value.
- Sierra Club's modeling did not include other sources which could potentially contribute to SO_2 concentrations in the modeled area. The effect of this is expected to be small

based on the small contributions from other sources in the previous modeling but should lead to slightly higher concentrations in some areas around Big Brown facility.

Industry commenters addressed comments toward potential defects in the Sierra Club's previous modeling, some of which are still relevant to the final modeling and which could potentially increase modeled concentrations (the use of flagpole receptors and use of older land use data at the surface meteorological station). We note that Luminant's modeling also used the same 1992 land surface data in their modeling. We note that the other industry comment was corrected by Sierra Club in more recent modeling, the switched stack locations between units 1 and 2. To address the effect on modeled concentrations that might be caused by these various factors the Sierra Club conducted sensitivity modeling (See Table 5) and found both positive and negative impacts on the modeled concentrations – none greater than 4%.

Table 5. Sierra Club Sensitivity Modeling for Big Brown.

Sensitivity Run	Percent Change in Concentrations (- Means Lower Concentrations)
Correcting Stack Positions (corrected in new modeling)	-0.08 % (-0.3 μg/m^3)
Updating Surface Characteristics	-3.6 % (-14 μg/m^3)
Removing Flagpole Receptors	-0.21% (-0.8 μg/m^3)
Adjusting Stack Diameter	4.4 % (16.4 μg/m^3)

Given that modeled concentrations are 64% above the standard and that several factors are conservative and would tend to result in Sierra Club's modeling being biased lower for the maximum modeled concentrations, our technical assessment of the available information concludes that the Sierra Club's modeling results are likely underestimating the maximum impacts. In the modeled values Sierra Club has already included the correction for stack positions, and the net change from updated surface characteristics, removal of flagpole receptors, and correcting stack diameter yield a net 0.59% increase in maximum concentration. Things that were not specifically quantified such as inclusion of downwash, inclusion of other nearby SO_2 sources in the modeling and use of a more representative (higher) background values should overall result in a net increase in the maximum concentration if they were included in the analysis. Overall, inclusion of all potential adjustments, those that should either positively or negatively adjust impacts, should not result in modeled values near or below the standard given the high modeled concentrations above the standard and would not change the conclusion of nonattainment. Therefore, EPA determines that the final Sierra Club modeling submitted in March 2016 (2013-2015) is relevant information that must be considered in our designation decision, and that the modeling is a sufficient basis for a determination of nonattainment.

Based on the information available showing the area in the vicinity of Big Brown does not meet the 1-hr SO_2 standard, we designate the area defined above as nonattainment.

EPA's promulgated boundaries for the nonattainment area encompass the area shown to be in violation of the standard and the principal source that contributes to the violation.

At this time, our final designations for areas in the State of Texas have been completed only for this area, the three other areas contained in this final technical support document supplement and in this supplemental final action, and the other eight areas designated on June 30, 2016. Consistent with the remaining court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Texas by either December 31, 2017, or December 31, 2020.

Technical Analysis for Titus County, Texas

Introduction

The Titus County, Texas, 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 had not met the consent decree's criteria for being "announced for retirement." Specifically, the Monticello Steam Electric Station emitted 31,447 tons of SO_2 in 2012, and had an emissions rate of 0.78 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. However, before meeting the July 2, 2016, deadline for this area, the EPA and plaintiffs, who are parties to the consent decree that gave rise to the court order, agreed to extensions for a limited number of the subject areas, including this area. The deadline for issuing a designation for this area is now November 29, 2016.

In their September 18, 2015, submittal, Texas provided no formal recommendation for the area surrounding the Monticello Steam Electric Station. Instead, as part of its September 18, 2015, submittal, Texas provided a general recommendation of unclassifiable/attainment for the 243 counties located in the State, including Titus County, that do not have any operational SO_2 regulatory monitors. This general recommendation for Titus County was not accompanied by modeling, monitoring, or other technical information to inform our decision regarding the attainment status of the area.

On February 11, 2016, the EPA notified Texas that we intended to designate part of Titus County, Texas, as nonattainment. Additionally, we informed Texas that our intended boundaries for the nonattainment area was comprised of a portion of Titus County bounded by the following UTM Coordinates in meters (NAD83 Datum, Zone 15):

X	Y
302329,	3666971
302329,	3660770
313530,	3660770
313530,	3666971

The nonattainment area excluded the portion of Camp County that fell within the area bounded by the listed UTM coordinates.

Our intended designation and associated boundaries were based on, among other things, Sierra Club's modeling of actual emissions reported from the facilities during the 2012 to 2014 calendar years. An analysis of the modeling data indicated that it was performed substantially in accordance with appropriate EPA modeling guidance and used generally conservative assumptions.

The EPA identified aspects of Sierra Club's modeling used for our proposal that were not as refined as possible but after our analysis of those aspects we concluded that the modeling was adequate for a determination of nonattainment. The modeling did not include building downwash nor variable stack parameters such as temperature and velocity. Including building downwash will generally, though not always, increase the predicted maximum modeled concentrations. Instead of variable stack parameters, the modeling included stack velocity and temperature consistent with 100% load. These parameters, when coupled with actual hourly emission rates, should provide conservative estimates of actual concentrations because higher temperatures and velocities at 100% load were paired with lower emissions at less than 100% load. This combination should provide an overestimation of the dispersion and thus an underestimation of maximum ambient concentrations at ground level. As a result, the modeled concentrations for the intended designations were 17% above the standard. Even with the inclusion of the generally conservative factors building downwash and variable stack parameters the result should still exceed the standard. Therefore, we found Sierra Club's modeling was sufficient for a proposed determination of nonattainment. It should be noted that Sierra Club took into account emissions from other nearby facilities and background SO_2 concentration.

The EPA's view was that the Sierra Club's modeling was relevant information that must be considered in the designation decision. In advance of issuing our intended designation, we received no additional relevant technical information from the State or other parties beyond that previously discussed. Based on the information available showing that the area in the vicinity of Monticello Steam Generating Station does not meet the 1-hr SO_2 standard, we intended to designate the area defined above as nonattainment.

The EPA's intended boundaries for the nonattainment area encompassed the area shown to be in violation of the standard and the source that contributed to the violation. Sierra Club also included individual modeled results for the two facilities (Monticello Station and Welsh) in their 2015 modeling submittals using source group based model outputs. The maximum modeled impacts from Monticello Steam Electric Station alone, not including background, were 229.4 μg/m3, or 87.6 ppb. Based on the fact that impacts from Monticello station alone are only 0.1 μg/m3 lower than the combined impacts at the maximum (229.5 μg/m3, excluding background); the magnitude of modeled impacts from Welsh; and the and the fact the closest receptor showing a modeled NAAQS violation is approximately 16 km from the Welsh facility, it was not clear that Welsh contributes to the modeled NAAQS exceedances. Therefore, our intended nonattainment boundary did not include Welsh and was limited to the immediate area surrounding Monticello station. As discussed later, we are also finalizing a nonattainment boundary that does not include Welsh.

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

Assessment of New Information

In our February 11, 2016, notification to Texas regarding our intended nonattainment designation for the Titus County, Texas 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 draft 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 supplement to the June 30, 2016, response to comments document (RTC), and supplemental RTC available in the docket, Docket ID EPA-HQ-OAR-2014-0464, supersede those found in the draft document.

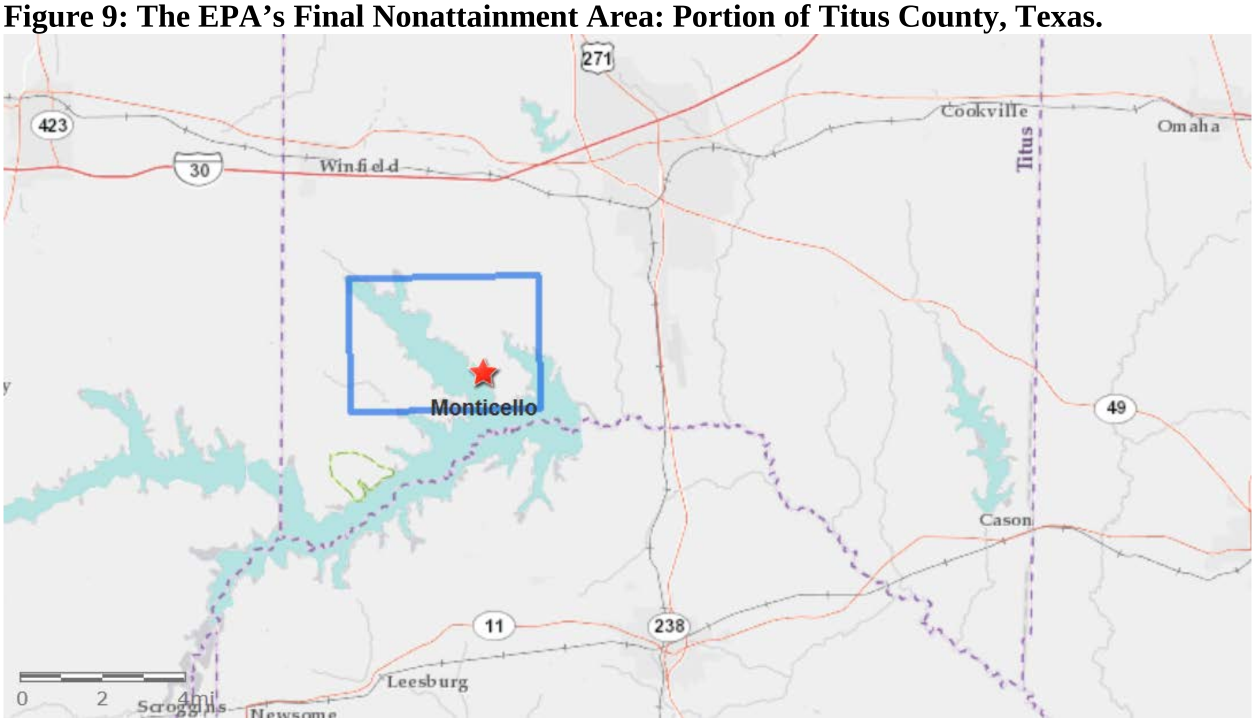
As further detailed below, after carefully considering all available data and information, the EPA is designating a portion of the Titus County, Texas, area as nonattainment for the 2010 SO_2 NAAQS. This nonattainment area is bound by the following UTM coordinates:

X	Y
304329.030,	3666971.000
311629.030,	3666971.000
311629.030,	3661870.500
304329.030,	3661870.500

UTM Zone 15 (NAD83)

and are shown in Figure 9 below.

Figure 9: The EPA's Final Nonattainment Area: Portion of Titus County, Texas.



The EPA received substantive comments from citizens, Luminant, the Sierra Club, the Texas Commission on Environmental Quality, and the Governor of the State of Texas regarding our intended nonattainment designation for the Titus County, Texas, area. A comprehensive summary of these comments and our responses can be found in the supplement to the RTC.

Also, additional information, specifically air dispersion modeling, was submitted to the EPA during the state and public comment period in order to characterize air quality in the Titus County, Texas, area. Notably, the Sierra Club and Luminant provided additional air dispersion modeling information during the comment period. TCEQ also included Luminant's modeling analysis as an attachment to its comments. The Sierra Club's updated modeling report asserted that Monticello is causing nonattainment of the SO_2 standard even when modeled alone without any other contributing sources. The Luminant modeling report asserted that Monticello, when modeled with several adjustments intended to reduce what Luminant asserts is inappropriate conservatism (i.e., alleged overestimation of ambient concentrations, in Luminant's use of the term) in the AERMOD model, does not contribute to nonattainment in Titus County, Texas, area. A supplemental Luminant report showed similar results. It asserted that, even when using what Luminant described as "overly conservative" regulatory options in AERMOD, Monticello will not cause or contribute to nonattainment near the plant when modeled with projected future emissions. These projected emissions were associated with a switch to Powder River Basin coal and the improved SO_2 removal from upgraded equipment planned to be in effect by January 1, 2017. Luminant submitted this information 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.

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

Though new modeling was received from both Luminant and the Sierra Club, the Luminant modeling did not conform to the guidance of the Modeling TAD. In the primary Luminant modeling submittal, non-EPA preprocessor models, AERLIFT and AERMOIST, were applied to the CEM data to increase the observed temperatures and (in the case of AERLIFT) velocities. In the supplemental Luminant modeling submittal, projected future reduced emission rates were used that were based in part on future non-enforceable, voluntary operational changes at Monticello.

AERLIFT is directed toward situations where two or more stack plumes merge as a result of being lined up in the same direction as the wind. The theory is that under such an alignment, the plumes merge as they rise and consequently reduce the overall entrainment of cooler ambient air which would theoretically result with more plume rise.

AERMOIST is for plants which have wet SO_2 scrubbers where the stack gas is saturated with moisture. The moisture may condense on exiting the stack as it cools when mixing with ambient air. AERMOIST is an effort to account for this initial condensation of the plume moisture which liberates the heat of condensation. This additional heat increase is theorized to increase plume buoyancy during the initial rise phase. However, when the liquid water evaporates later on it reduces the buoyancy of the plume by the same amount of the initial increase. This reduction should then act to depress plume rise but it is theorized to occur when the plume is more dilute and may have approached reached final rise – thus minimizing the effect. Luminant asserts that their implementation of the non-EPA AERMOIST model is based on a model evaluated in the peer-reviewed literature, IBJpluris, for moist plumes. AERMOIST uses IBJpluris to determine hourly adjustments in plume rise and then modifies stack temperatures for input to the dry plume rise model in AERMOD to force simulation of increased plume rise. Similar to the AERLIFT model, the AERMOIST model modifies CEM measured data prior to input to the AERMOD system.

To get an idea of the degree of changes made by the AERLIFT implementation submitted by Luminant, a review of the modifications made to the observed stack parameters was conducted by EPA Region 6. This review was conducted by comparing the original CEM data to the AERLIFTed parameters. The review showed that, for Big Brown for example, the stack temperature can be increased during individual hours by as much as 200 K by the AERLIFT preprocessor. To put this modification to stack gas temperature in context, the wet scrubbed plumes are less than 80-90K above ambient conditions, so these adjustments would drastically impact the amount of buoyancy estimated in the model and ultimate plume rise and would result in very large differences in modeled ground concentrations around the source.

Furthermore, we also evaluated the impacts of AERLIFT and AERMOIST in Luminant's modeling for the Martin Lake facility. Our analysis discussed below resulted in similar changes in stack temperature as in our analysis of Big Brown (approximately up to 200K hourly differences). We also saw changes of up to 50% of the magnitude of the AERLIFT impacts. In the case of Martin Lake, the combination of AERLIFT and AERMOIST were resulting in approximately 70 % more plume buoyancy on average and much more under certain situations, which is a very large adjustment to a parameter that drives dispersion and ground concentrations. These changes seem disproportionately large and the impacts they would have on the modeling are very significant. Although we did not do a detailed evaluation of the adjustments that AERLIFT and AERMOIST were making on the temperature and velocities in Luminant's modeling analysis for Monticello, we fully expect similar results of increased plume buoyancy and associated modeled concentrations. Prior to use in a regulatory setting EPA believes that the particular implementations of AERMOIST and AERLIFT need to undergo extensive review versus test cases previously used for AERMOD model review. While the scientific principles seem like these might be refinements, it has not been substantiated that the implementation of these pre-processors and their coding is a refinement within AERMOD modeling platform and a full review as required by EPA for regulatory models has not been completed. There is no information to support that Luminant's modeling results with the AERLIFT and AERMOIST processors meet the requirements for models used in a regulatory decision. It is premature to use AERMOIST and AERLIFT in this context for informing our designation decisions.

EPA generally encourages modeling improvements that give more realistic simulations of the dispersion from sources, but there is a process for approval of suggested alternatives. AERMOD has undergone continual development since its introduction. While the phenomena modeled by the AERLIFT and AERMOIST techniques are theorized and documented from field studies at a few other sources and may affect the dispersion from the modeled source, the implementation of them in a specific case depends on the use of specific algorithms in computer code. However, any model enhancements are required to go through standard EPA model evaluation, review, and approval before being used in regulatory applications as required by 40 CFR Part 51 Appendix W (Guideline on Air Quality Models). Our evaluation of the adjustments that AERLIFT and AERMOIST makes in stack parameters at sources indicates the adjustments are large and not consistent with the theory of how the adjustments should be implemented. Regardless, the existing AERMOD model (without AERLIFT and AERMOIST adjustments) has been shown to do a good job at modeling impacts of emissions from tall stacks in a number of field studies and such changes to the model would have to be analyzed to ensure the model was still accurate and acceptable for regulatory use with the inclusion of such adjustments. A full review of AERLIFT and AERMOIST's coding, applicability of the science and analysis with all the datasets that EPA uses in analyzing changes to the AERMOD system has not yet occurred for AERLIFT or AERMOIST.

In addition, the primary Luminant modeling used Beta options, LOWWIND3 and ADJ_U*, which require pre-approval from EPA for regulatory use. The EPA notes that the use of beta options, such as ADJ_U* and LOWWIND3, in AERMOD for any regulatory applications requires adherence with Appendix W, Section 3.2.2. This is further explained in the EPA's December 10, 2015, Memorandum titled, "Clarification on the Approval Process for Regulatory Application of the AERMOD Modeling System Beta Options." Among other conditions, the use of beta options requires consultation with the appropriate EPA Regional Offices. Upon concurrence by the EPA's Modeling Clearinghouse, EPA Regional Offices may approve the use of these beta options for regulatory applications as an alternative model. This process was not initiated or completed in the modeling of Monticello and thus the modeling based on their use is not acceptable for this regulatory use. We note that at this point there has been some site specific ADJ_U* approvals through the Model Clearinghouse process but no LOWWIND3 approvals.

The supplemental Luminant modeling using their estimates of future emissions (2017-2019) uses actual hourly stack parameters and adjusted hourly emission rates for 2013-2015 based on actual hourly heat input data and the expected Powder River Basin (PRB) fuel sulfur content. Luminant estimated their operations for 2017-2019 (using 2013-2015 heat input) using PRB at approximately 20-30% lower SO_2 emissions than the 2013-2015 period due primarily to the anticipated fuel switch, plus an improved scrubber efficiency on Unit 3. This projected change would likely have a beneficial effect on lowering the SO_2 concentrations around the Monticello Power Plant, but the lowered emissions including revised stack parameters for Unit 3 would have to be modeled based on enforceable limits that are in effect prior to designation. For the purpose of determining whether the area is currently meeting the NAAQS and designating the area either actual emissions or a currently enforceable reduction in actual emissions should be used. In this case the intended switch to PRB coal at Monticello, whether it has occurred or not is not yet enforceable through any mechanism - such as a permit limit - and Luminant would be free to either not switch or, if it does switch, change back to a higher sulfur content coal in the future, depending on circumstances. Thus the modeling based on the possible future use of PRB fuel is not acceptable for this regulatory use.

The Sierra Club's 2016 modeling mostly followed the Modeling TAD with the level of refinement reflecting the data available to them, used the default regulatory options, and used AERMOD version 15181, the most recent available at the time of the modeling. The Sierra Club's March 2016 modeling did depart from the Modeling TAD general recommendations in that they used 1.5m flagpole receptors. The use of the flagpole receptors is not expected to make a significant difference in the modeled design value concentrations in this case. If this was adjusted to EPA's implied recommended ground level height (0 m) we would expect only a very slight change in the modeled numbers and the area of exceedances and magnitude of the values would be basically equivalent, and, therefore, not change our final action. Sensitivity modeling conducted by the Sierra Club and for another Round 2source (previously mentioned Dolet Hills, Louisiana area) found decreases in modeled SO_2 between almost 0 and 0.2% when removing the flagpole receptors and estimating concentrations at ground level. Since Sierra Club's 2016 modeling maximum is 8% above the standard the change due to flagpole receptor heights would not decrease the value to below the standard. 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. AERSURFACE was used to evaluate surrounding land use within 3 kilometers. Based on the output from the AERSURFACE, approximately 0.04% 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. This is less than the 50% value considered appropriate for the use of urban dispersion coefficients. Based on the AERSURFACE analyses conducted by both Sierra Club (all modeling) and Luminant, they both concluded (and EPA concurs) that the rural option should be used for modeling of this area.

Modeling Parameter: Area of Analysis (Receptor Grid)

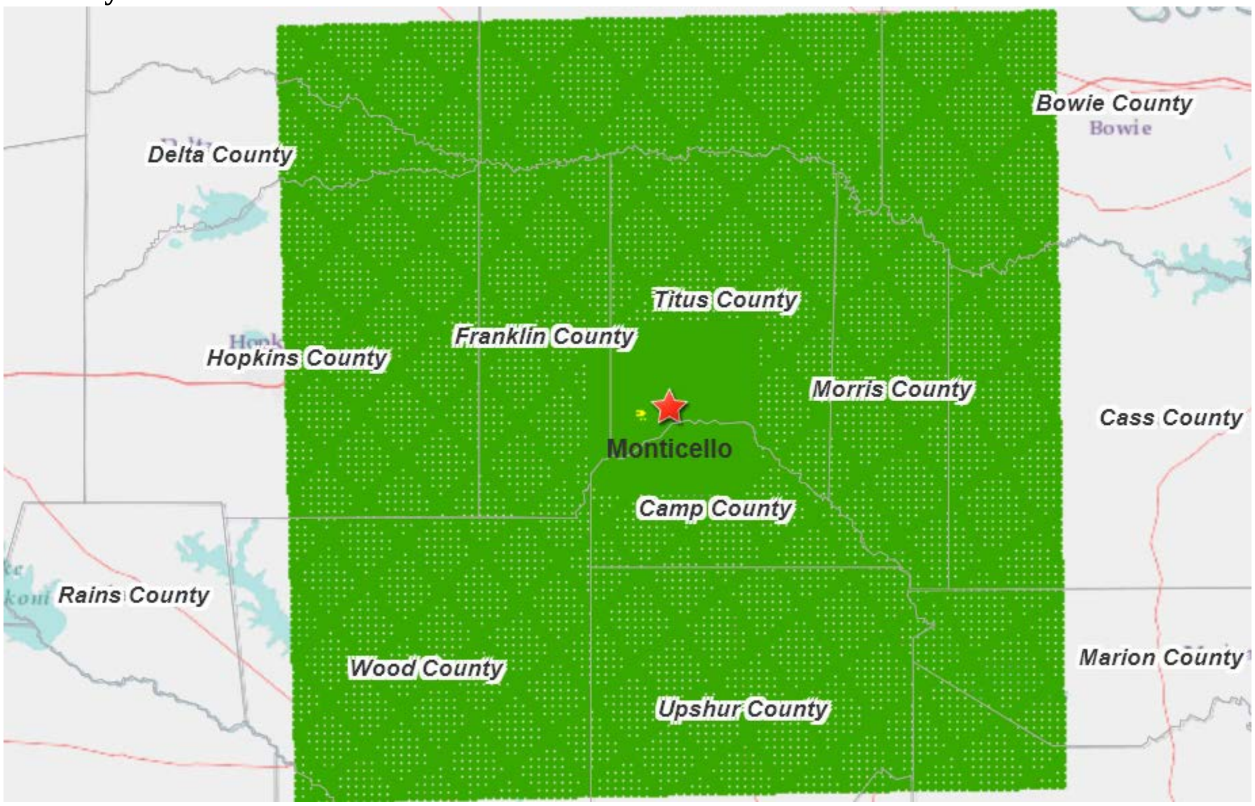
The EPA's position is that a reasonable first step towards characterization of air quality in the area surrounding the Monticello Steam Electric Station is to determine the extent of the area of analysis, i.e., receptor grid. Considerations presented in the Modeling TAD include but are not limited to: 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 Sierra Club in all their modeling is as follows:

- 100-meter spacing out to 5 kilometers
- 500-meter spacing out to 10 kilometers
- 1000-meter spacing out to 50 kilometers

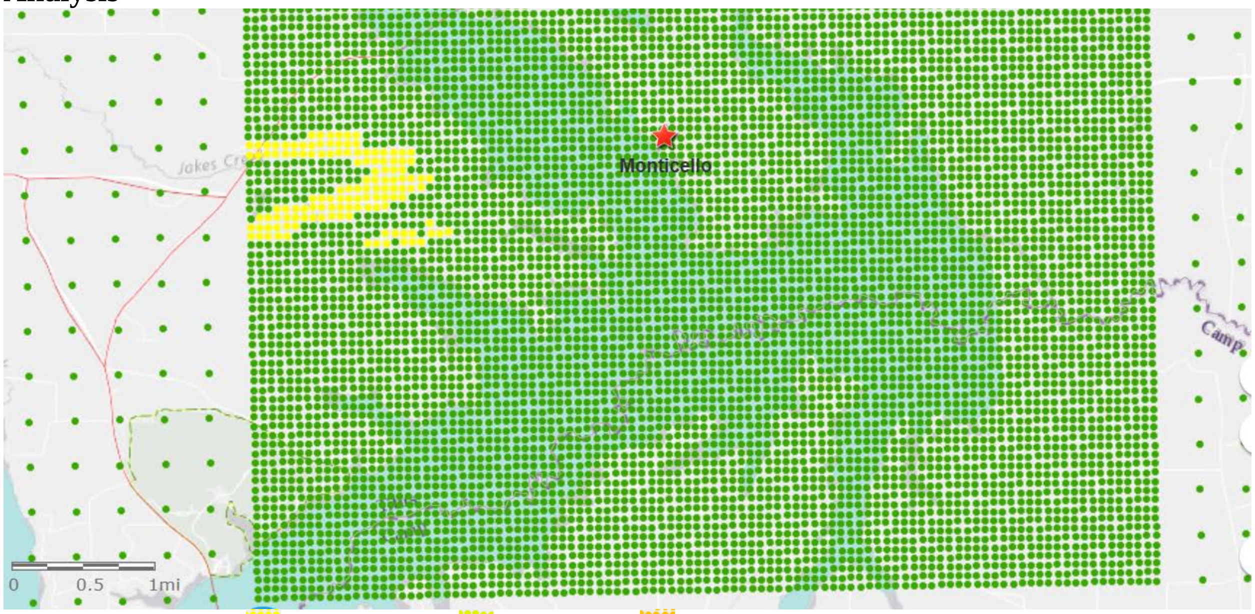
The receptor network contained 21,201 receptors and covered Titus County and portions of surrounding counties. Figure 10, which was generated by the EPA, shows the chosen area of analysis and receptor grid surrounding the Monticello Steam Electric Station, Texas.

Figure 10: Partial Receptor Grid for Sierra Club's Monticello Steam Electric Station Area of Analysis.



To be consistent with the Modeling TAD for the purposes of this designation, we only evaluated concentrations at receptors that represented areas where it would also be feasible to place a monitor and record ambient air impacts. Figure 11 shows the near field receptor grid relative to the lake bordering Monticello Steam Electric Station. The impacts of the area's geography and topography will be discussed later within this document.

Figure 11: Near-field receptor Grid for the Monticello Steam Electric Station Area of Analysis



< 196.5; 196.5 – 215; 215 – 235; 235 – 285; > 285

For the area around Monticello Steam Electric Station, Sierra Club did not include SO_2 emitters within 50 km of the Station in any direction. Although Sierra Club had included another source in their previous modeling, Sierra Club's rationale for omitting it in this modeling was that the previous modeling had shown minimal impact from the potentially contributing sources at the site of maximum concentration and that their modeling was to be a demonstration that Monticello can itself cause modeled nonattainment. The EPA maintains that Monticello is likely contributing almost if not equal to 100% of the impact for the values above the SO_2 NAAQS. Furthermore, Sierra Club's modeling, by not including Welsh, is a conservative (i.e., under-estimating) approach to determining whether the area is attaining and the boundaries of such area, as inclusion of this source should result in either similar impacts and boundaries or slightly increased impacts and possibly slightly larger boundaries, but should not result in decreased impacts or "shrinking" of boundaries from those modeled. The EPA believes that this is an acceptable choice in these circumstances.

Modeling Parameter: Source Characterization

Sierra Club's 2016 modeling characterized the source of Monticello in accordance with the best practices outlined in the Modeling TAD. Specifically, it used actual stack velocities in conjunction with actual emission rates. Sierra Club characterized the source locations and stack parameters, e.g., exit temperature, and diameter. Variable stack temperatures were not included because they were not publicly available for use by Sierra Club. A comparison of the constant stack exit temperatures used by Sierra Club (453K for Units 1-2 and 438K for Unit 3) to the CEM temperatures used by Luminant show that during near maximum load operation (data filtered by stack velocity > 29 m/s) the Sierra Club stack temperature is about 10K lower for Units 1-2 and 58K higher for Unit 3 than the average measured temperature. Sierra Club estimated hourly velocities from the hourly flow rates and heat rates from the USEPA Clearinghouse Database. Comparing these estimated velocities to the CEM velocities furnished by Luminant show that the Sierra Club velocities were slightly higher, about 32.5 m/s compared to 31 m/s for the CEM data for Units 1-2 and 35 m/s compared to 30.6 m/s for unit 3. The Briggs Buoyancy Flux (F_b) takes into account both the velocity and the temperature of the plume and is related to plume rise. To examine the size of the effect of these variations on the buoyancy of the plume, F_b at an assumed ambient temperature of 293K was calculated for each unit for both the Sierra Club stack parameters and the CEM data during those hours where the units were near full load. For Units 1-2 the Sierra Club F_b averaged 0.5% higher than the CEM F_b, but for the scrubbed Unit 3 the Sierra Club F_b was 66% higher.

The higher F_b would be expected to cause in the model higher average plume rise and lower design value concentrations. Thus Sierra Club's stack parameters are conservative and would most likely underestimate the actual concentrations, especially for Unit 3. During the period 2012-2014, Unit 3's emissions comprised 32% of the total plant emissions.

Similar to variable stack temperature, building information was not publicly available when Sierra Club did their modeling for submission during the public comment period. Therefore, Sierra Club did not include building downwash in their analysis stating that this was the conservative approach and would likely underestimate impacts from emissions resulting in lower modeled concentrations than modeling that included building downwash. Luminant did have access to the non-public building downwash information and did include it in the modeling they submitted at the end of the public comment period (March 2016). Luminant also indicated they included it in their modeling but due to the tall stacks at their other two facilities they did not think inclusion of downwash would make much difference for their modeling of Big Brown and Martin Lake. Luminant did not make the same assertion about the minimal impacts of including downwash for Monticello, but the stack heights are similar for all three facilities (Big Brown stack heights – 122 m, Martin Lake 137.7 and 137.8 m, and Monticello 121.9 m and 140.2 m). Overall we agree with Luminant that given these stack heights and the building heights provided by Luminant that inclusion of downwash would likely have a minimal impact on maximum concentrations While we do not agree with Sierra Club's assertion that exclusion of downwash is conservative (in the under-estimating sense of the term) in all cases, our evaluation is that the inclusion of building information and associated downwash in this analysis would not change our conclusion that the area is violating the NAAQS and the designation of nonattainment. The modeling values are sufficiently above the standard and inclusion of downwash often leads to higher concentrations closer to the source but - even in situations we have seen where this did not occur - any decreases in maximum modeled values from inclusion of downwash were relatively small and not expected to be enough of a decrease to resolve all modeled exceedance values near Monticello in Titus County.

Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purposes of modeling to characterize air quality in designations, the recommended approach is to use the most recent three years of actual emissions data and concurrent meteorological data. However, the TAD also provides for the flexibility of using allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate.

As previously noted, Sierra Club's 2016 modeling included Monticello and no other emitters of SO_2 within the area of analysis. This was a change from their previous modeling. Sierra Club wanted to clearly demonstrate that the Monticello facility results in exceedances of the 2010 SO_2 standard. Their previous 2015 modeling had shown minimal contributions to the maximum concentrations around Monticello from other nearby sources of SO_2. As discussed above, due to the small impacts from other nearby sources in the area of nonattainment around the Monticello facility we would expect only slight changes, if any, to the area of nonattainment that we are designating if the other nearby sources were included in the modeling. In this situation EPA believes that this choice of sources may underestimate concentrations slightly but is acceptable for the modeling for designation. Based on the small impact of other sources determined in the prior modeling results, EPA determines that the maximum impacts in the Monticello area are adequately represented for purposes of designating the area without explicitly modeling the contributions from other sources within the area of analysis.

For the single facility modeled in the area of analysis, Sierra Club included actual hourly SO_2 emissions rates between 2012 and 2014 taken from the USEPA Air Markets Program Data. This information is summarized as annual emissions in Table 6 below. These emission rates are considered representative of the emissions from the Monticello Steam Electric Station.

Table 6: Actual SO_2 Emissions in 2012 – 2014 of the Monticello Steam Electric Station, Texas Area of Analysis.

Facility Name	SO_2 Emissions (tons per year)		
	2012	2013	2014
Monticello Steam Electric Station	31,447	24,396	20,438
Total Emissions from All Facilities in Sierra Club's Area of Analysis	31,447	24,396	20,438

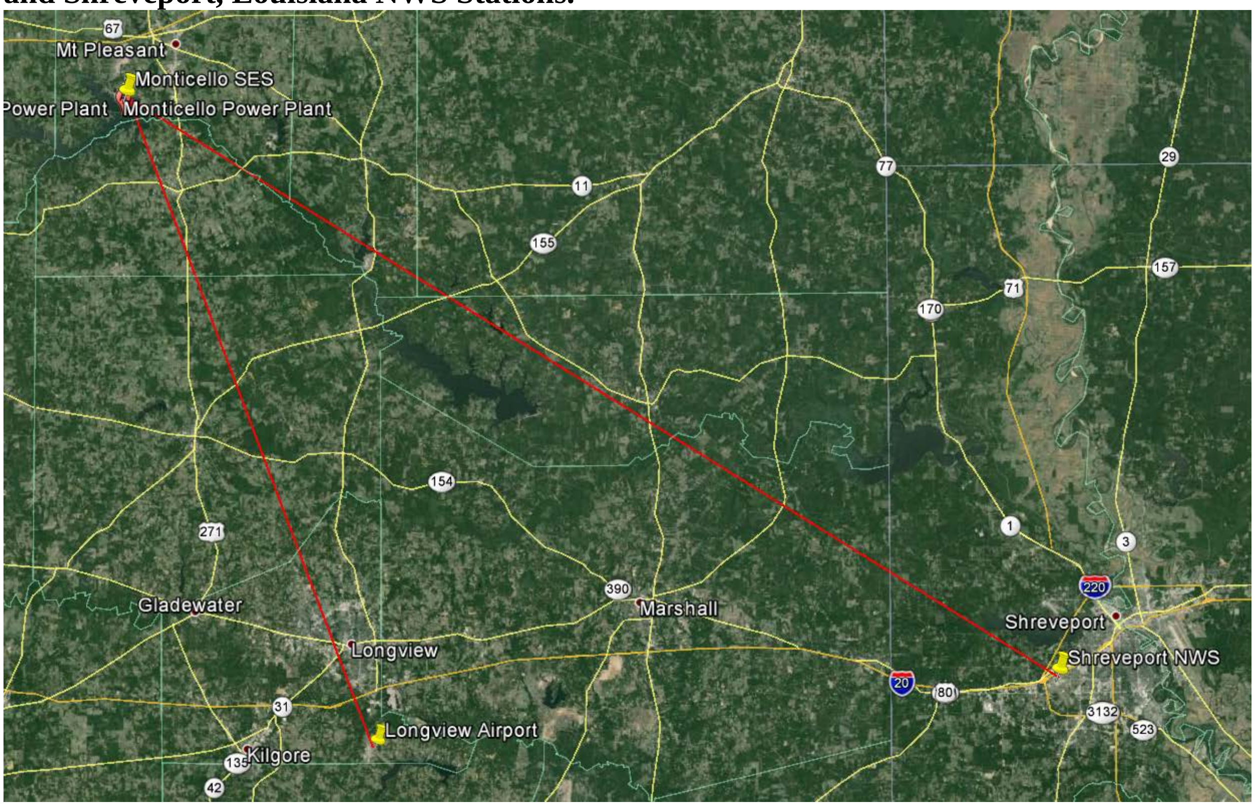
Modeling Parameter: Meteorology and Surface Characteristics

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 Monticello Steam Electric Station (Titus County) area of analysis, surface meteorology from the NWS station in Longview, Texas, approximately 83 km to the SSE, and coincident upper air observations from the NWS station in Shreveport, Louisiana, approximately 132 km to the SE were selected by the Sierra Club as best representative of meteorological conditions within the area of analysis (Figure 12). EPA agrees that the meteorological sites chosen for the modeling for Monticello by Sierra Club are appropriate.

Sierra Club used AERSURFACE version 13016 using data from the NWS station in Longview, Texas located at 32°23'2.00"N, 94°42'41.00"W to estimate the surface characteristics of the area of analysis. Sierra Club estimated values for twelve spatial sectors out to one km at a seasonal temporal resolution for average moisture conditions. Sierra Club also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as “Zo”). In the figure below generated by the EPA, the locations of the Longview, Texas and Shreveport, Louisiana NWS stations are shown relative to the Monticello Steam Electric Station area of analysis.

Figure 12: Monticello Steam Electric Station Area of Analysis and the Longview, Texas and Shreveport, Louisiana NWS Stations.



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. The Sierra Club analysis was conducted in adherence to all available USEPA guidance for evaluating source impacts on attainment of the 1-hour SO_2 NAAQS via aerial dispersion modeling, including the AERMOD Implementation Guide; USEPA's Applicability of Appendix W Modeling Guidance for the 1-hour SO2 National Ambient Air Quality Standard, August 23, 2010; modeling guidance promulgated by USEPA in Appendix W to 40 CFR Part 51;

USEPA's March 2011 Modeling Guidance for SO_2 NAAQS Designations; and, USEPA's December 2013 SO_2 NAAQS Designations Technical Assistance Document in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

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

Modeling Parameter: Geography and Terrain

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

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 Monticello Steam Electric Station area of analysis, Sierra Club chose used the 2012-14 design value for El Paso. The Sierra Club stated that this was the lowest background for the entire state and was therefore a conservative assumption. The background concentration for this area of analysis was determined by the state to be 5.2 micrograms per cubic meter ($\mu g/m^3$), or 2 ppb,[5] and that value was incorporated into the final AERMOD results. Many of the SO_2 monitors in Texas are in urban areas and/or near a SO_2 point source, so there is limited data for background values. Using the El Paso monitor, which is the lowest design value in the State of Texas during this period, is a

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[5] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62$\mu g/m^3$.

conservative (i.e., under-estimating) assumption. Given the amount of SO_2 emissions in East Texas compared to El Paso area this assumption likely leads to an underestimation in the concentrations around these facilities but is within the framework of the TAD's options for inclusion of background monitoring data. Considering the impacts of Monticello in the area, the background value is on the order of 2.4 % of the total maximum values and if background monitoring data existed for east Texas it would be expected to be a higher than El Paso monitor data and would have an increase in the concentration levels around the Monticello facility. Luminant's modeling used a temporally varying background monitor approach of hour of day and season with values ranging from 2-10 $\mu g/m^3$ based on a monitor in Waco. These values are similar to Sierra Club's background monitor data but the amount of SO_2 emissions in the general Waco area is generally less than that of the general area around the Monticello facility; thus, background levels are likely underestimated in both Sierra Club and Luminant's analyses. We note that in our previous designation for the Dolet Hills facility outside Shreveport, LA, we were provided a temporally varying background SO_2 monitor approach for a monitor in Shreveport, LA. The Dolet Hills background values ranged from 4.88 to 24.85 $\mu g/m^3$. The Shreveport monitor is also upwind of Monticello more often (Waco monitor is not normally upwind of Monticello) and especially when winds are from the east (blowing westerly) which is when the modeling is predicting values above the standard to the west of the plant. Given the closer proximity of Shreveport monitor to the Monticello facility than the Waco or El Paso monitors, similar emissions of SO_2 in the area around Shreveport and Monticello, and transport conditions when modeled exceedance occur, the Shreveport background data is more representative than either Luminant's or Sierra Club's proposed values. Comparing to Sierra Club's results, an alternate background would change values from -0.1% to + 11.7% using the time varying data from Shreveport which is significantly closer to Monticello than the Waco monitor. Since the modeling was not conducted with this varying background a direct calculation of the effect of using the Shreveport data can't be performed. For context, taking an average of the minimum and maximum values from the Shreveport data would yield an increase of 9.6 $\mu g/m^3$ above the Sierra Club background value.

Summary of Modeling Results

The AERMOD modeling parameters, as supplied by additional information from Sierra Club during the comment period for the Monticello Steam Electric Station area of analysis are summarized below in Table 7.

Table 7: AERMOD Modeling Parameters for the Monticello Steam Electric Station, Texas, Area of Analysis.

Monticello Steam Electric Station, Texas Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	0
Modeled Fencelines	0*
Total receptors	21,201
Emissions Type	Actual
Emissions Years	2012-2014
Meteorology Years	2012-2014
Surface Meteorology Station	Longview, Texas
Upper Air Meteorology Station	Shreveport, Louisiana
Methodology for Calculating Background SO_2 Concentration	Design Value
Calculated Background SO_2 Concentration	5.2 μg/m^3 or 2 ppb

*While the Sierra Club modeling did not specifically include a fenceline in their modeling analysis, the EPA did compare the modeled results with fenceline information from previous industry dispersion modeling in our proposal and have also evaluated information provided by Luminant in March 2016 to confirm that the modeled exceedances of the NAAQS shown in Sierra Club's analysis did occur in ambient air.

The results presented below in Table 8 show the magnitude and geographic location of the highest predicted modeled concentration based on actual emissions.

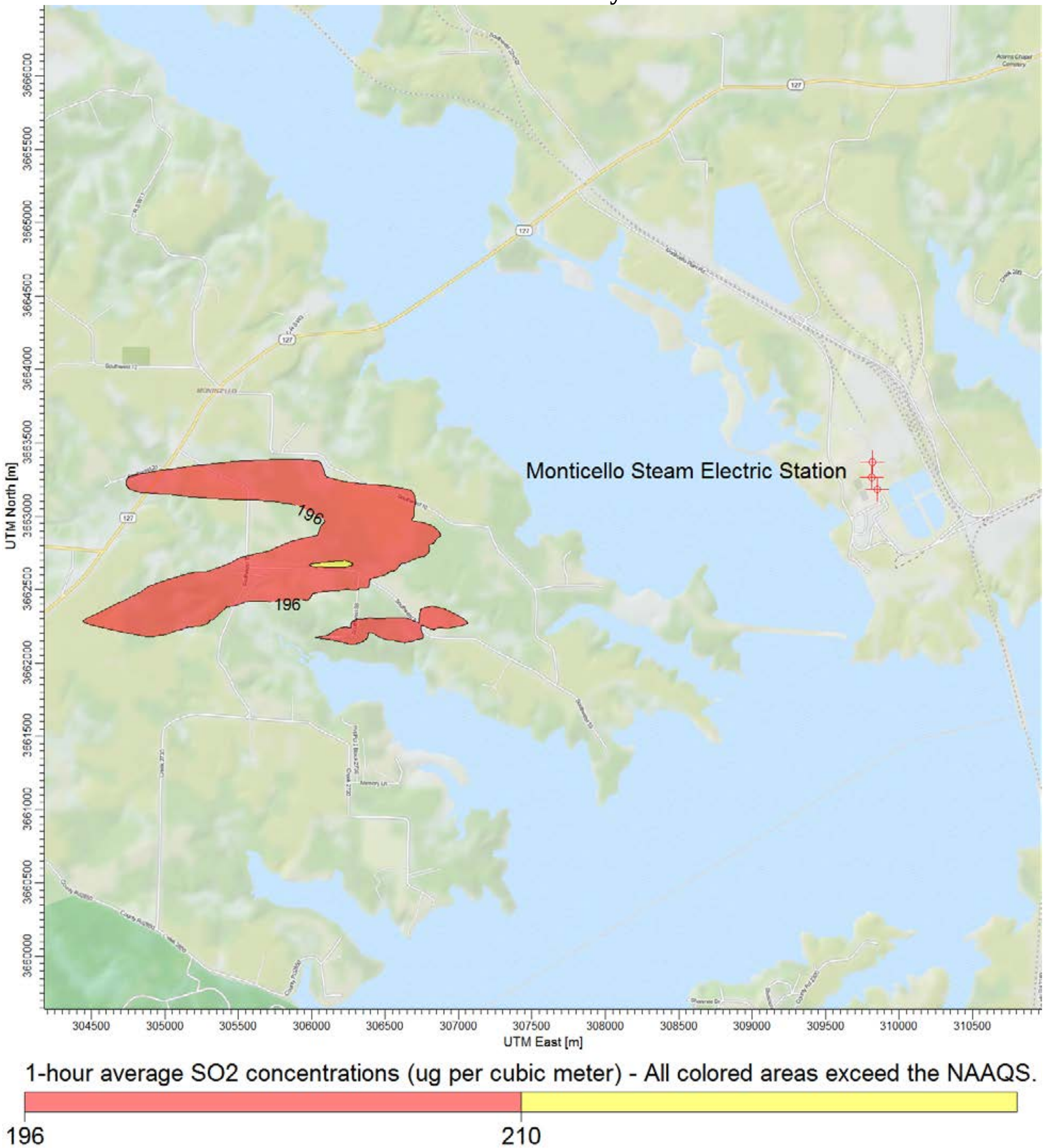
Table 8: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Monticello Steam Electric Station, Texas Area of Analysis Based on Actual Emissions (2012-2014). Provided by Sierra Club March 2016.

	Receptor Location		SO_2 Concentration (μg/m^3)	
Averaging Period	UTM/Latitude	UTM/Longitude	Modeled (including background)	NAAQS
99th Percentile 1-Hour Average	306229.03	3662670.50	212.0	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

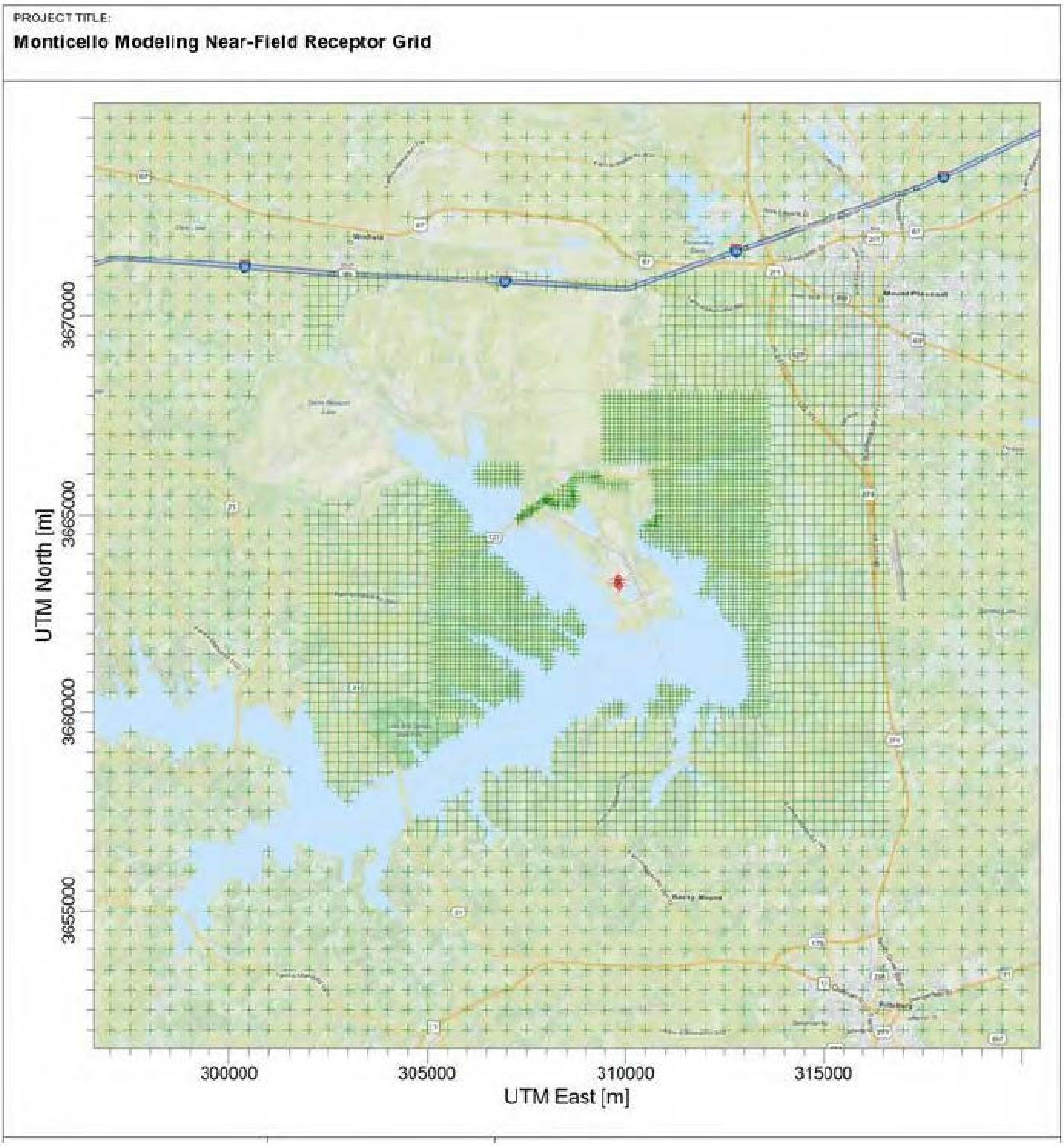
Sierra Club's modeling indicates that the highest predicted 3-year average 99th percentile 1-hour average concentration within the chosen modeling domain is 212.0 μg/m^3, or 80.9 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual 2012-2014 emission rates from the Monticello Steam Electric Station. Figure 13 below was included as part of Sierra Club's submission and indicates that the predicted value occurred to the west of Monticello Steam Electric Station.

Figure 13: Sierra Club's Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Monticello Steam Electric Station Area of Analysis Based on Actual Emissions



We note that Luminant included a figure with their near field receptors grid and they indicated that they excluded areas that were within their property line or lake/wetland areas. Luminant did not provide a detailed analysis of appropriate fencing and limiting of access to their property (necessary to determine if an area is actually not ambient air), nor other material documenting exclusion due to over water, etc. in support of the areas they have excluded. From the information we do have, and evaluation with GIS/aerial data, we have concerns that Luminant has excluded more areas than are appropriate. Regardless, we still have adequate information to conclude whether the area is attaining the 2010 SO_2 NAAQS, given that adequate modeling shows values over the standard outside the areas excluded by Luminant, in undisputed ambient air. We have analyzed the information (See Figure 14) and determined that the area that is shown to be above the standard in the Figure above is all ambient air and not within Luminant's fenceline.

Figure 14. Luminant's Near Field Receptor Grid with Area excluded by Luminant based on property boundaries or lake/wetland areas.



Jurisdictional Boundaries

Once the geographic area of analysis associated with Monticello Steam Electric Station, other nearby sources of SO_2, and background concentration is determined, existing jurisdictional boundaries are considered for the purpose of informing our final nonattainment area, specifically with respect to clearly defined legal boundaries. Modeling provided by the Sierra Club shows portions of Titus County to be in exceedance of the 2010 SO_2 1-hr standard.

There is one other source located in Titus County with emissions greater than 100 tons of SO_2 in 2011, the Welsh Power Plant. The previous 2015 Sierra Club modeling included estimates of impacts from the Welsh facility for the same years modeled in the updated modeling; in the following discussion this modeling is considered for assessing whether Welsh may contribute to the nonattainment area found in the updated modeling for Monticello. The maximum modeled impacts from Welsh alone, not including background, were 124.2 μg/m3, or 47.4 ppb, below the 1-hour SO2 standard. Therefore, according to the previous Sierra Club modeling, Welsh does not independently cause nonattainment. To look for its potential to contribute to the nonattainment area impacted by Monticello, the maximum modeled impact from Monticello station alone, not including background, of 229.4 μg/m3 was compared to the combined impact of Welsh and Monticello together of 229.5. Based on the fact that impacts from Monticello station alone are only 0.1 μg/m3 lower than the combined impacts; the magnitude of modeled impacts from Welsh; and the fact that the closest receptor showing a modeled NAAQS violation was approximately 16 km from the Welsh facility, it is not clear from the previous modeling that Welsh contributes to the modeled NAAQS exceedances. While Sierra Club's previous 2015 submittal did include information about the overall maximum impacts from Welsh, it did not include a source contribution analysis or model output necessary to further examine the magnitude of contributions from this facility to each of the modeled violations surrounding Monticello station. Therefore, based on the lack of evidence of contribution from either Sierra Club's 2016 or previous 2015 modeling of Welsh, our final nonattainment boundary does not include Welsh and is limited to the immediate area surrounding Monticello station where the 2016 modeling indicated design values exceeding the standard.

Based on actual emissions, Welsh is considered a Data Requirements Rule source and the area surrounding it will be further addressed during the upcoming rounds of SO_2 designations.

The EPA has determined that our final nonattainment area, consisting of portions of Titus County, Texas, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final nonattainment 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 designating the area around Monticello Steam Electric Station, Texas, as nonattainment for the 2010 SO_2 NAAQS. Specifically, the area is comprised of portions of Titus County, Texas bounded by:

X Y
304329.03, 3666971.0
311629.03, 3666971.0
311629.03, 3661870.5
304329.03, 3661870.5

UTM Zone 15 (NAD83)

Our final designation is based on Sierra Club's 2016 and previous 2015 modeling of actual emissions reported from the facilities during the 2012 to 2014 calendar years. To more accurately predict the dispersion of emissions, estimates of hourly exit velocities were used in Sierra Club's 2016 modeling. Exit velocities were derived from the hourly flow rates and heat input in the USEPA Clearinghouse and CAMD databases. Comparing these estimated velocities to the CEM velocities furnished by Luminant show that the Sierra Club velocities were slightly higher, about 32.5m/s compared to 31 m/s for the CEM data for Units 1-2 and 35m/s compared to 30.6 m/s for unit 3. An analysis of the modeling data indicates it was mostly performed in accordance with appropriate EPA modeling guidance and using generally conservative assumptions.

The Sierra Club modeling was deliberately conservative in many respects, i.e., included several techniques which generally would tend to underestimate design value concentrations from the model. Specifically, as further discussed above:

- The modeling did not include building downwash, since Sierra Club did not have access to information needed to support such inclusion. Building downwash will generally, though not always, increase the predicted maximum modeled concentrations and move the maximum impacts closer to the facility.
- The modeling did not include variable stack temperature, since Sierra Club did not have access to information needed to support such inclusion. Although Sierra Club used constant stack temperatures, it was consistent with 100% load. This, coupled with actual hourly emission rates, should provide conservative estimates of actual concentrations because higher temperatures of 100% load when paired with lower emissions of less than 100% load should provide an overestimation of the dispersion and thus an underestimation of maximum concentrations in Sierra Club's 2016 modeling.
- A comparison of the constant stack exit temperatures used by Sierra Club (453K for Units 1-2 and 438K for Unit 3) to the CEM temperatures used by Luminant show that during near-full-load operation (data filtered by stack velocity > 29 m/s) the Sierra Club stack temperature is about 10 degrees K lower for Units 1-2 and 58K higher for Unit 3 than the average measured temperature. The much greater temperature overestimate for Unit 3 relative to the underestimate Units 1-2 would tend to decrease the overall combined plant impact, thus underestimating the maximum concentrations.
- The Sierra Club used a very low estimate of background SO_2 based on the lowest monitor design value in the State of Texas, far from the source and an area with less overall SO_2 emissions. If more representative background monitoring data were used the concentration values would increase some, though should be less than 12 percent of the maximum estimated value based on evaluating the use of Shreveport monitoring data.

- Sierra Club's modeling did not include other sources which could potentially contribute to SO_2 concentrations in the modeled area. The effect of this is expected to be small based on the small contributions from other sources in the previous modeling but should lead to slightly higher concentrations in some areas around Monticello facility.

Industry commenters provided comments about potential defects in the Sierra Club's previous modeling which are still relevant to the final modeling and which could potentially increase/decrease modeled concentrations: the use of flagpole receptors, differing and non-varying stack temperatures, no building downwash inclusion, use of refined background, and use of older land use data at the surface meteorological station. To address the effect on modeled concentrations that might be caused by these various factors the Sierra Club conducted sensitivity modeling on Big Brown for some of these issues and found both positive and negative impacts on the modeled concentrations. While the modeling for other sources is not an exact analysis of change that would occur if these differences were assessed using the Monticello modeling, we can use the analyses from Big Brown and Dolet Hills to inform the amount of change that might happen in factually similar situations. In looking at the other information discussed previously we should expect a decrease in maximum concentrations of change of maybe 3.6 to 3.8% (7.6 - 8 $\mu g/m^3$) due to the use of flagpole receptors (0-0.2%) and Surface Characteristics update (-3.6%). We note that the background used is low for what we would expect for East Texas and using the data from Shreveport (Dolet Hills Analysis) the background could be 4.88-24.85 $\mu g/m^3$ compared to the constant of 5.2 $\mu g/m^3$ used by Sierra Club. An alternate background would change values from -0.1% to + 11.7% using the time varying data from Shreveport which is significantly closer to Monticello than the Waco monitor (Waco – 250 km, Shreveport – approx. 135 km). The Shreveport monitor is also generally upwind of Monticello more often and especially when winds are from the east (blowing westerly) which is when the modeling is predicting values above the standard to the west of the plant. An average of the minimum and maximum change would add 9.6 $\mu g/m^3$ to the exiting Sierra Club background concentration. For further context, we also looked at the seasonal average value (averaging all hours) and it ranged from 7.97 $\mu g/m^3$ to 10.83 $\mu g/m^3$ with an annual average of 9.1 $\mu g/m^3$. These issues combined with lack of any background sources in the modeling further support the use of the Shreveport monitor data for background. Without a direct analysis we do not know the exact impact but the net difference to the exceedance values due to flagpole height, updated surface characteristics, and more representative background would be an overall increase to the exceedance values.

The modeling did not include building downwash or variable stack temperature, since Sierra Club did not have access to information needed to support such inclusion. As previously discussed, building downwash will generally, though not always, increase the predicted maximum modeled concentrations. As previously discussed we also evaluated Sierra Club 2016 modeling's stack temperatures and use of varying velocities in our analysis of the Buoyancy Flux (F_b) in comparison to the data provided by Luminant in their modeling. For Units 1-2 the Sierra Club F_b averaged 0.5% higher than the CEM F_b, but for the scrubbed Unit 3 the Sierra Club F_b was 66% higher. The higher buoyancy fluxes would be expected to cause in the model higher average plume rise, increased dispersion, and lower design value concentrations. Thus Sierra Club's stack parameters are conservative and would most likely underestimate the actual concentrations, especially for Unit 3. During the period 2012-2014 Unit 3's emissions comprised 32% of the total plant emissions.

Furthermore, consideration of downwash, non-varying and differences in temperature, and not including other background sources in the modeling, would also likely result in an underestimation of values, thus further supporting the conclusion that the modeling when weighing all the factors is showing values exceeding the standard.
Given that Sierra Club's modeled concentrations (with a low background) are 8% above the standard and that several factors are deliberately conservative in under-estimating impacts and would tend to reduce the modeled concentrations (and actual modeled concentrations with appropriate background would be higher), our technical assessment of the available information concludes that the differences/changes to the Sierra Club modeling suggested by industry would not result in modeled values near or below the standard; therefore, EPA considers the final Sierra Club modeling submitted March 2016 to be relevant information that must be considered in our designation decision and finds that the modeling is a sufficient basis for a determination of nonattainment.

Based on the information available showing the area in the vicinity of Monticello does not meet the 1-hr SO_2 standard, we designate the area defined above as nonattainment.

EPA's boundaries for the nonattainment area encompass the area shown to be in violation of the standard and the principal source that contributes to the violation. No other potentially contributing sources were included in the Sierra Club 2016 modeling; Monticello was modeled to cause nonattainment of the 2010 SO_2 standard in the area.

At this time, our final designations for areas in the State of Texas have been completed only for this area, the three other areas contained in this final technical support document supplement and in this supplemental final action, and the other eight areas designated on June 30, 2016. Consistent with the remaining court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Texas by either December 31, 2017, or December 31, 2020.

Technical Analysis for Rusk County, Texas

Introduction

The Rusk County 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 had not met the consent decree's criteria for being "announced for retirement." Specifically, in 2012, the Martin Lake Electrical Station (Martin Lake station) emitted 43,093 tons of SO_2, and had an emissions rate of 0.5504 lbs SO_2/mmBTU. Pursuant to the March 2, 2015, consent decree, the EPA must designate the area surrounding the facility by July 2, 2016. However, before meeting the July 2, 2016, deadline for this area, the EPA and plaintiffs, who are parties to the consent decree that gave rise to the court order, agreed to extensions for a limited number of the subject areas, including this area. The deadline for issuing a designation for this area is now November 29, 2016.

In its September 18, 2015 submission, Texas provided no formal recommendation for the specific area surrounding the Martin Lake Power Plant. Instead, as part of their September 18, 2015, submittal, Texas provided a general recommendation of unclassifiable/attainment for the 243 counties located in the state, including Rusk (and Panola) County, that do not have any operational SO_2 regulatory monitors. This general recommendation for Rusk County was not accompanied by modeling, monitoring, or other technical information to inform our decision regarding the attainment status of the area. Texas recommended that Gregg County be designated attainment based on certified monitoring data showing no violations.

On February 11, 2016, the EPA notified Texas that we intended to designate portions of Rusk, Panola, and Gregg counties as nonattainment. Additionally, we informed Texas that our intended boundaries for the nonattainment area consisted of (NAD83 Datum, Zone 15):

X	Y
336067,	3585315
336067,	3558314
361568,	3558314
361568,	3585315

Our intended designation and associated boundaries were based on, among other things, Sierra Club's modeling of actual emissions reported from both the Martin Lake and Pirkey Electric Generating Stations during the 2012 to 2014 calendar years. An analysis of the modeling data indicates it was performed in accordance with appropriate EPA modeling guidance and using generally conservative assumptions. As discussed later, based on updated modeling provided by Sierra Club during the comment period and past modeling we are also finalizing a nonattainment boundary that does not include Pirkey and does not include any portions of Gregg County.

The EPA identified aspects of Sierra Club's 2015 modeling used for our proposal that were not as refined as possible but after our analysis of those aspects we concluded that the modeling was adequate for a determination of nonattainment. The modeling did not include building downwash or variable stack temperature and velocity, since Sierra Club did not have access to information needed to support such inclusion. Including building downwash will generally, though not always, increase the predicted maximum modeled concentrations. Sierra Club used stack velocity and temperatures consistent with 100% load. This, coupled with actual hourly emission rates, should provide conservative estimates of actual concentrations because higher temperatures and velocities of 100% load when paired with lower emissions of less than 100% load should provide an overestimation of the dispersion and thus an underestimation of maximum ambient concentrations at ground level. Given that modeled concentrations for the intended designations were 73% above the standard, the inclusion of building downwash and variable stack parameters, etc. in the modeling would not result in values near or below the standard; therefore, the modeling is sufficient for a determination of nonattainment. In addition to adequately characterizing Martin Lake station, the Sierra Club modeling took into account emissions from other nearby facilities as well as a background concentration of SO_2.

The EPA's view was that Sierra Club's modeling was relevant information that must be considered in our designation decision. While TCEQ did provide comments on Sierra Club's initial modeling submittal, we received no additional relevant technical information from the State or other parties before issuing our intended designation. In response to the TCEQ comments, Sierra Club updated its modeling for the area addressing most of the concerns raised and submitted the results to the EPA on December 15, 2015. Based on the information available showing the area in the vicinity of Martin Lake does not meet the 1-hr SO_2 standard, we intended to designate the area defined above as nonattainment.

The EPA's intended boundaries for the nonattainment area encompassed the area shown to be in violation of the standard and the source that contributed to the violation. Sierra Club also included individual modeled results for the two facilities (Martin Lake Station and Pirkey) in their 2015 modeling submittals using source group based model outputs. The maximum modeled impacts from Martin Lake station alone, not including background, were 339.8 $\mu g/m^3$. Based on the fact that impacts from Martin Lake station alone are only 0.1 μg/m3 lower than the combined impacts at the maximum (339.9 $\mu g/m^3$ or 129.7 ppb, excluding background); the magnitude of modeled impacts from Pirkey; and the fact the closest receptor showing a modeled NAAQS violation which Pirkey could have contributed given transport winds is approximately 23.7 km from the Pirkey facility, it was not clear that Pirkey contributes to the modeled NAAQS exceedances (Pirkey's domain wide maximum impacts were 40.9 $\mu g/m^3$). Therefore, our intended nonattainment boundary did not include Pirkey and was limited to the immediate area surrounding Martin Lake station. As discussed later, we are also finalizing a nonattainment boundary that does not include Pirkey.

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

Assessment of New Information

In our February 11, 2016, notification to Texas regarding our intended nonattainment designation for the Rusk County, Texas 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 draft 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 supplement to the June 30, 2016, response to comments document (RTC), available in the docket, Docket ID EPA-HQ-OAR-2014-0464, supersede those found in the draft document.

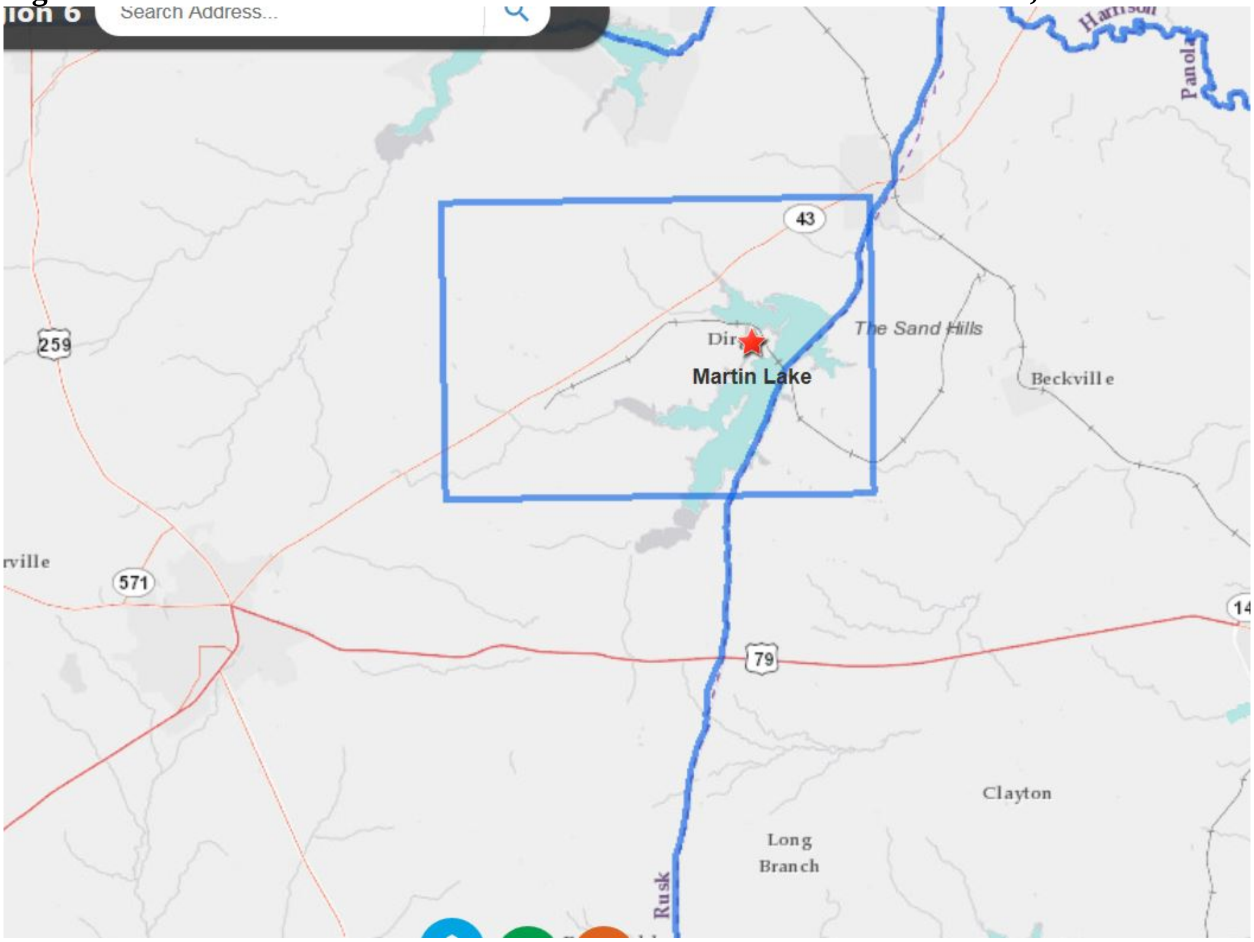
As further explained below, after carefully considering all available data and information, the EPA is designating portions of Rusk and Panola Counties, Texas, area as nonattainment for the 2010 SO_2 NAAQS. The boundaries for this nonattainment area consist of:

X	Y
340067.31,	3575814.75
356767.31,	3575814.75
356767.31,	3564314.75
340067.31,	3564314.75

NAD83 Datum, Zone 15

and are shown in the figure below.

Figure 15: The EPA's final nonattainment area: Rusk and Panola Counties, Texas.



The EPA received substantive comments from citizens, Luminant, the Sierra Club, TCEQ, and the Governor of the State of Texas regarding our intended nonattainment designation for portions of the Rusk, Panola, and Gregg counties, Texas, area, and a comprehensive summary of these comments and our responses can be found in the supplement to the RTC.

Also, additional information, specifically air dispersion modeling, were submitted to the EPA during the state and public comment period in order to characterize air quality in the Rusk County, Texas, area. Notably, Luminant and Sierra Club provided additional air dispersion modeling information during the comment period. Texas also included Luminant's modeling analysis as an attachment to their comments. The Sierra Club's modeling report asserted that Martin Lake is causing nonattainment of the 2010 one-hour SO_2 standard even when modeled alone without any other contributing sources. The Luminant modeling report asserted that Martin Lake when modeled with several adjustments intended to reduce what Luminant asserts is inappropriate conservatism (i.e. alleged overestimation of concentrations, in Luminant's use of the term) in the AERMOD model, does not contribute to nonattainment in the Rusk County, Texas, area. Based on 2012-2014 model results and adjustment to the model for lower 2015 emissions etc., Luminant estimated (not actually modeled) 156 µg/m^3.[6] This estimate was not well documented and not directly modeled by Luminant. Luminant's report also showed similar conclusions for a future emission estimate scenario (2017-2019 estimated emissions). It asserted that, even when using what Luminant described as "overly conservative" regulatory options in AERMOD, Martin Lake will not cause or contribute to nonattainment near the plant when modeled with Luminant's projected future emissions (Maximum value of 192.1 µg/m^3). These projected emissions were associated with potentially improving scrubber efficiency, fuel switches, and potentially collateral benefits with reductions of SO_2 from the facility complying with the Mercury Air Toxics Rule (MATS).

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.

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

Though new modeling was received from both Luminant and the Sierra Club, the Luminant modeling did not conform to the guidance of the Modeling Technical Advisory Document. In the Luminant modeling submittal, non-EPA preprocessor models, AERLIFT and AERMOIST, were applied to the CEM data to increase the observed temperatures and (in the case of AERLIFT) velocities. In the 2017-2019 emission modeling submission, Luminant projected future reduced emission rates were used that were based in part on future non-enforceable, voluntary operational changes at Martin Lake. However, for the purpose of determining whether the area is currently meeting the NAAQS and designating the area either actual emissions or a currently enforceable reduction in actual emissions should be used. Neither the efficiency improvements in operation of existing scrubbers or fuel switches were reflected in

[6] Included in Luminant's comments. (Estimated a 2015 DV by multiplying 2012 DV by ratio of 2015 SO2 emissions/2012 SO2 emissions yielding an estimated DV of 312 µg/m^3 and then they did a 50% reduction in the value based on perceived overestimation bias due to plume penetrations issues to estimate the 156 µg/m^3 value). We note that neither of these approaches are acceptable, especially not the 50% reduction. See our RTC for this supplement for more discussion.

a permanently enforceable situation. This means that they could change, and are not a certain and effective limitation on either current or future emissions. Compliance with MATS does allow for using SO_2 limits as surrogates for other pollutants, but how a facility meets the MATS requirements can be changed by fuel switching/blending and testing directly for the MATS pollutants. In this case the intended switching of fuel and increases in scrubber efficiency, whether they have occurred or not, are not yet enforceable through any mechanism provided by Luminant - such as a permit limit - and Luminant would be free to either not switch or, if it does switch, change back to a higher sulfur content coal in the future, depending on circumstances. Thus the modeling based on possible future changes at the facility, rather than on actual emissions, is not acceptable for this regulatory use.

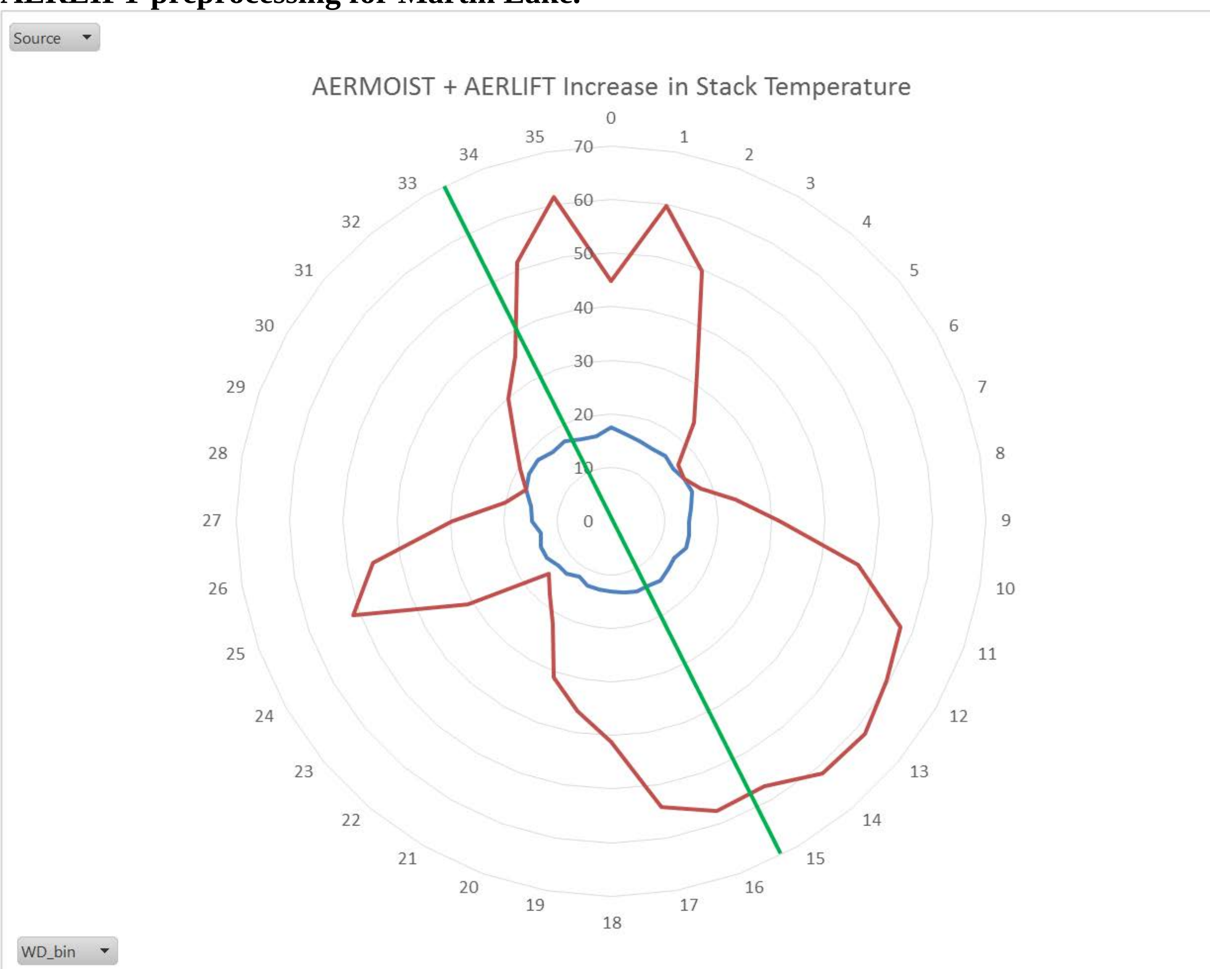
Preprocessor models, AERLIFT and AERMOIST, were applied to the CEM data to increase the observed temperatures and (in the case of AERLIFT) velocities.

AERLIFT is directed toward situations where two or more stack plumes merge as a result of being lined up in the same direction as the wind. The theory is that under such an alignment, the plumes merge as they rise and consequently reduce the overall entrainment of cooler ambient air which would theoretically result with more plume rise.

AERMOIST is for plants which have wet SO_2 scrubbers where the stack gas is saturated with moisture. The moisture may condense on exiting the stack as it cools when mixing with ambient air. AERMOIST is an effort to account for this initial condensation of the plume moisture which liberates the heat of condensation. This additional heat increase is theorized to increase plume buoyancy during the initial rise phase. However, when the liquid water evaporates later on it reduces the buoyancy of the plume by the same amount of the initial increase. This reduction should then act to depress plume rise but it is theorized to occur when the plume is more dilute and may have approached reached final rise – thus minimizing the effect. Luminant asserts that their implementation of the non-EPA AERMOIST model is based on a model evaluated in the peer-reviewed literature, IBJpluris, for moist plumes. AERMOIST uses IBJpluris to determine hourly adjustments in plume rise and then modifies stack temperatures for input to the dry plume rise model in AERMOD to force simulation of increased plume rise. Similar to the AERLIFT model, the AERMOIST model modifies CEM measured data prior to input to the AERMOD system.

To get an idea of the degree of changes made by the AERMOIST and AERLIFT implementations submitted by Luminant, a review of the modifications made to the observed stack parameters was conducted by EPA Region 6. This review was conducted by comparing the original CEM data to the AERMOIST and AERLIFT adjusted temperatures and velocities provided by Luminant. The review showed that the stack temperature can be increased during individual hours as much as 300K by the combination of the AERMOIST preprocessor followed by the AERLIFT preprocessor. In Figure 16 below a plot of the *average* temperature increase by wind direction for each preprocessor demonstrates for some wind directions AERMOIST+AERLIFT increases the average stack temperature by over 60K. The AERLIFT model also seems to be increasing the stack temperature for wind directions that are not roughly in line with the stacks (334 and 154 degrees). These temperature changes with the accompanying stack gas exit velocity increases raise the average buoyancy flux of the emissions by 70% for some wind directions. For certain hours the increase is far greater. Such changes in the buoyancy of the plume are expected to have a major effect on the location and concentrations of maximum ground level impact. These changes seem disproportionately large and the impacts they would have on the modeling are very significant. Prior to use in a regulatory setting EPA believes that the particular implementations of AERMOIST and AERLIFT need to undergo extensive review versus test cases previously used for AERMOD model review. While the scientific principles seem like these might be refinements, it has not been substantiated that the implementation of these pre-processors and their coding is a refinement within AERMOD modeling platform and a full review as required by EPA for regulatory models has not been completed. There is no information to support that Luminant's modeling results with the AERLIFT and AERMOIST processors meet the requirements for models used in a regulatory decision. It is premature to use AERMOIST and AERLIFT in this context for informing our designation decisions.

Figure 16: The average increase in stack temperature (degrees K) due to AERMOIST and AERLIFT preprocessing for Martin Lake.



The AERMOIST increase is in blue, the total increase by AERMOIST+AERLIFT is in red. The line of the stacks is denoted by the green line.

EPA generally encourages modeling improvements that give more realistic simulations of the dispersion from sources, but there is a process for approval of suggested alternatives. AERMOD has undergone continual development since its introduction. While the phenomena modeled by the AERLIFT and AERMOIST techniques are theorized and documented from field studies at a few other sources and may affect the dispersion from the modeled source, the implementation of them in a specific case depends on the use of specific algorithms in computer code. However, any model enhancements are required to go through standard EPA model evaluation, review, and approval before being used in regulatory applications as required by 40 CFR Part 51 Appendix W (Guideline on Air Quality Models). Our evaluation of the adjustments that AERLIFT and AERMOIST makes in stack parameters at sources indicates the adjustments are large and not consistent with the theory of how the adjustments should be implemented. Regardless, the existing AERMOD model (without AERLIFT and AERMOIST adjustments) has been shown to do a good job at modeling impacts of emissions from tall stacks in a number of field studies and such changes to the model would have to be analyzed to ensure the model was still accurate and acceptable for regulatory use with the inclusion of such adjustments. A full review of AERLIFT and AERMOIST's coding, applicability of the science and analysis with all the datasets that EPA uses in analyzing changes to the AERMOD system has not yet occurred for AERLIFT or AERMOIST.

In addition, the Luminant modeling used Beta options, LOWWIND3 and ADJ_U*, which require pre-approval from EPA for regulatory use. The EPA notes that the use of beta options, such as ADJ_U* and LOWWIND3, in AERMOD for any regulatory applications requires adherence with Appendix W, Section 3.2.2. This is further explained in the EPA's December 10, 2015, Memorandum titled, "Clarification on the Approval Process for Regulatory Application of the AERMOD Modeling System Beta Options." Among other conditions, the use of beta options requires consultation with the appropriate EPA Regional Offices. Upon concurrence by the EPA's Modeling Clearinghouse, EPA Regional Offices may approve the use of these beta options for regulatory applications as an alternative model. This process was not initiated or completed in the modeling of Martin Lake and thus the modeling based on their use is not acceptable for this regulatory use. At this point there have been some site specific ADJ_U* approvals through the Model Clearinghouse process, but no LOWWIND3 approvals to date.

The Sierra Club's 2016 modeling mostly followed the Modeling TAD as with the level of refinement reflecting the data available to them, used the default regulatory options, and used AERMOD version 15181, the most recent available at the time of the modeling. The Sierra Club's 2016 modeling used the actual 2013-2015 emission rates and hourly velocities based on data from the USEPA Clearinghouse and CAMD databases. The Sierra Club's modeling did depart from the Modeling TAD in that they used 1.5m flagpole receptors. The use of the flagpole receptors is not expected to make a significant difference in the modeled design value concentrations in this case. If this was adjusted to EPA's implied recommended ground level height (0 m) we would expect only a very slight change in the modeled numbers and the area of exceedances and magnitude of the values would be basically equivalent, and, therefore, not change our final action. Sensitivity modeling conducted by the Sierra Club and for another CD source (Dolet Hills in northwest Louisiana dv change of 0.003 μg/m^3 facility) found decreases in modeled SO_2 between almost 0 and 0.2% when removing the flagpole receptors and estimating concentrations at ground level. Since Sierra Club's 2016 modeling maximum (in ambient air) is at least 14% above the standard the change due to flagpole receptor heights would not decrease the value to below the standard. 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, Sierra Club determined that it was most appropriate to run the model in rural mode. The facility was evaluated to determine if it should be modeled using the rural or urban dispersion coefficient option in AERMOD. USEPA guidance states that urban dispersion coefficients are used if more than 50% of the area within 3 kilometers has urban land uses. Otherwise, rural dispersion coefficients are appropriate. 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 6.4% 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. The analysis showed that rural dispersion coefficients are appropriate. This is less than the 50% value considered appropriate for the use of urban dispersion coefficients. Based on the AERSURFACE analyses conducted by both Sierra Club (all modeling) and Luminant, they both concluded (and EPA concurs) that the rural option should be used for modeling of this area.

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 Martin Lake facility 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.

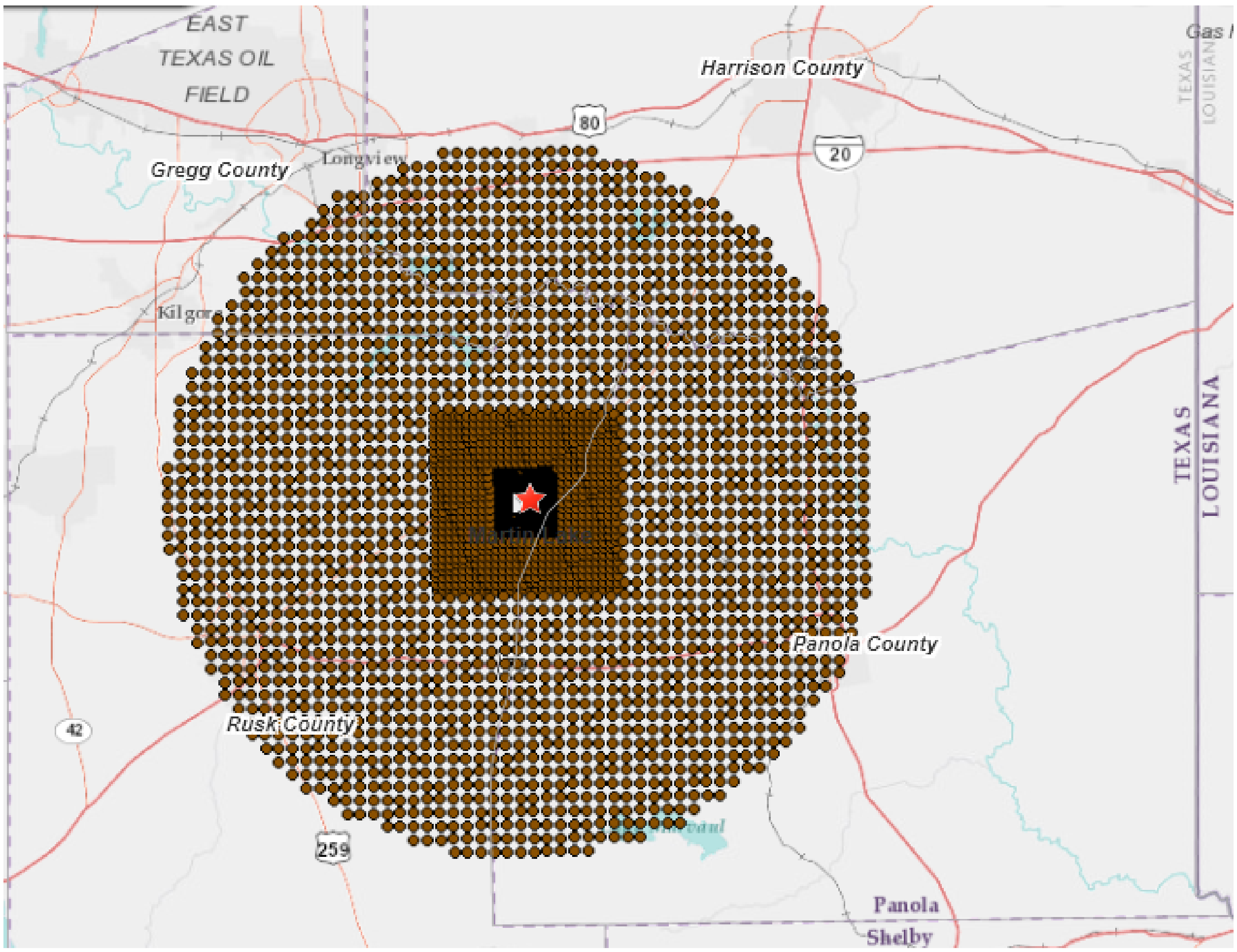
The grid receptor spacing for the area of analysis chosen by Sierra Club is as follows:

- 100-meter spacing out to 5 kilometers
- 500-meter spacing out to 10 kilometers
- 1000-meter spacing out to 50 kilometers
- The receptor network contained 21,201 receptors and covered portions of Rusk, Panola, Gregg, and Harrison counties.

Figure 17, shows the chosen area of analysis surrounding the Martin Lake facility, as well as the receptor grid for the area of analysis. Sierra Club modeling used a flagpole receptor height of

1.5m (intended to represent the ambient air inhalation height of a standing human), rather than ground level more typically used for model receptors. As discussed elsewhere, if this was corrected to EPA's recommended 0m height (ground level) we would expect only a slight change in the modeled numbers and the area of exceedances and magnitude of the values would be basically the equivalent, and, therefore not change our final action. The design value with flagpole receptors was 0 to 0.2% higher than without flagpole receptors.

Figure 17: Sierra Club's Area of Analysis for Martin Lake Station.



To be consistent with the Modeling TAD for the purposes of this designation, we only evaluated concentrations at receptors that represented areas where it would also be feasible to place a monitor and record ambient air impacts. We will discuss this in further detail below. The impacts of the area's geography and topography will also be discussed later within this document.

For the area around Martin Lake Steam Electric Station, Sierra Club did not include SO_2 emitters within 50 km of the Station in any direction. Although Sierra Club had included another source in their previous modeling, Sierra Club's rationale for omitting it in this modeling was that the previous modeling had shown minimal impact from the potential contributing sources at the maximum concentration and that their modeling was to be a demonstration that Martin Lake can itself cause modeled nonattainment. Since Sierra Club's most recent modeling does not include Pirkey, we do not have model run evidence using 2013-2015 emissions that Pirkey would contribute. We maintain that Martin Lake is likely contributing almost if not equal to 100% of the impact for the values above the SO_2 NAAQS. Furthermore, Sierra Club's modeling, by not including Pirkey, is a conservative (i.e., under-estimating) approach to determining whether the area is attaining and to identifying the boundaries of such area, as inclusion of this source should result in either similar impacts and boundaries or slightly increased impacts and possibly slightly larger boundaries, but should not result in decreased impacts or "shrinking" of boundaries from those modeled. EPA believes that this is an acceptable choice in these circumstances.

Modeling Parameter: Source Characterization

Sierra Club's 2016 modeling characterized the source of Martin Lake in accordance with the best practices outlined in the Modeling TAD. Specifically, it used actual stack velocities in conjunction with actual emission rates. Sierra Club characterized the source locations and stack parameters, e.g., exit temperature, and diameter. Variable stack temperatures were not included because they were not publicly available for use by Sierra Club. The constant temperature used by Sierra Club for the stacks was 449.3K[7] and when compared to the CEM temperatures furnished by Luminant as part of their modeling analysis was on the average 21% higher – the average temperature in the CEM data for near full load (filtered for stack velocity > 25 m/s) was 356K, ranging between 338-478K. This temperature difference would cause on the average a 196% increase in buoyancy flux versus using the CEM temperature when operating near full load. On the average this increase in buoyancy is larger than the increase occasioned by the use of the AERMOIST and AERLIFT preprocessors. However, it is not explicitly varied with wind direction and does not have the extreme changes of up to 300K for certain hours as seen with the preprocessors. Since the 2010 SO_2 standard is a one-hour standard, the buoyancy enhancements for critical hours would be the controlling factor in modifying the modeled design values. This increase in buoyancy would tend to reduce modeled concentrations, the amount depending on meteorological conditions. Thus the use of the Sierra Club's higher-than-actual constant temperature is conservative and would most likely underestimate the actual concentrations.

Similar to variable stack temperature, building information was not publicly available. Therefore, Sierra Club did not include building downwash in their analysis stating that this was the conservative approach and would likely underestimate impacts from emissions resulting in lower modeled concentrations than modeling that included building downwash. While we do not agree with Sierra Club's assertion that exclusion of downwash is conservative in all cases, in our evaluation the inclusion of building information and associated downwash in this analysis would not change our recommended designation of nonattainment. We note that Luminant's modeling report (which Texas also included in their response) indicated "We expect that the modeling results are not extremely sensitive to this issue because the stack heights are well above the buildings and there is considerable momentum and buoyancy rise for the stack plumes."[8] The modeling values are sufficiently above the standard and inclusion of downwash often leads to

[7] Exit temperatures were obtained from Environ, 2018 Base Case CAMx Simulation, Texas Haze Evaluation, Appendix A: Stack Parameters of Major Units at the Selected 38 Facilities, September 7, 2013.

[8] Texas Response to EPA (041916_SO2 Designation 120 Day Response from TX.pdf) PDF page # 69.

higher concentrations closer to the source but - even in situations we have seen where this did not occur - any decreases in maximum modeled values from inclusion of downwash were relatively small and not expected to be enough of a decrease to resolve all modeled exceedance values near Martin Lake.

Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purposes of modeling to characterize air quality in designations, the recommended approach is to use the most recent three years of actual emissions data and concurrent meteorological data. However, the TAD also provides for the flexibility of using allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate.

As previously noted, Sierra Club's 2016 modeling included Martin Lake and no other emitters of SO_2 within the area of analysis (unlike their previous modeling). Sierra Club wanted to clearly demonstrate that the Martin Lake facility results in exceedances of the 2010 SO_2 standard. Their previous modeling had shown small contributions from other nearby sources of SO_2. As discussed above, due to the small impacts from other nearby sources in the area of nonattainment around the Martin Lake facility we would expect only slight changes, if any, to the area of nonattainment that we are designating if the other nearby sources were included in the modeling. The facilities in the area of analysis and their associated annual actual SO_2 emissions from 2013 to 2015 are summarized below.

Table 9: Actual SO_2 Emissions in 2013-2015 from Facilities in the Martin Lake Area of Analysis

Facility Name	SO_2 Emissions (tons per year)		
	2013	2014	2015
Martin Lake	62,735	53,656	22,927[9]
Total Emissions from All Facilities in Sierra Club's Area of Analysis	62,735	53,656	22,927

Modeling Parameter: Meteorology and Surface Characteristics

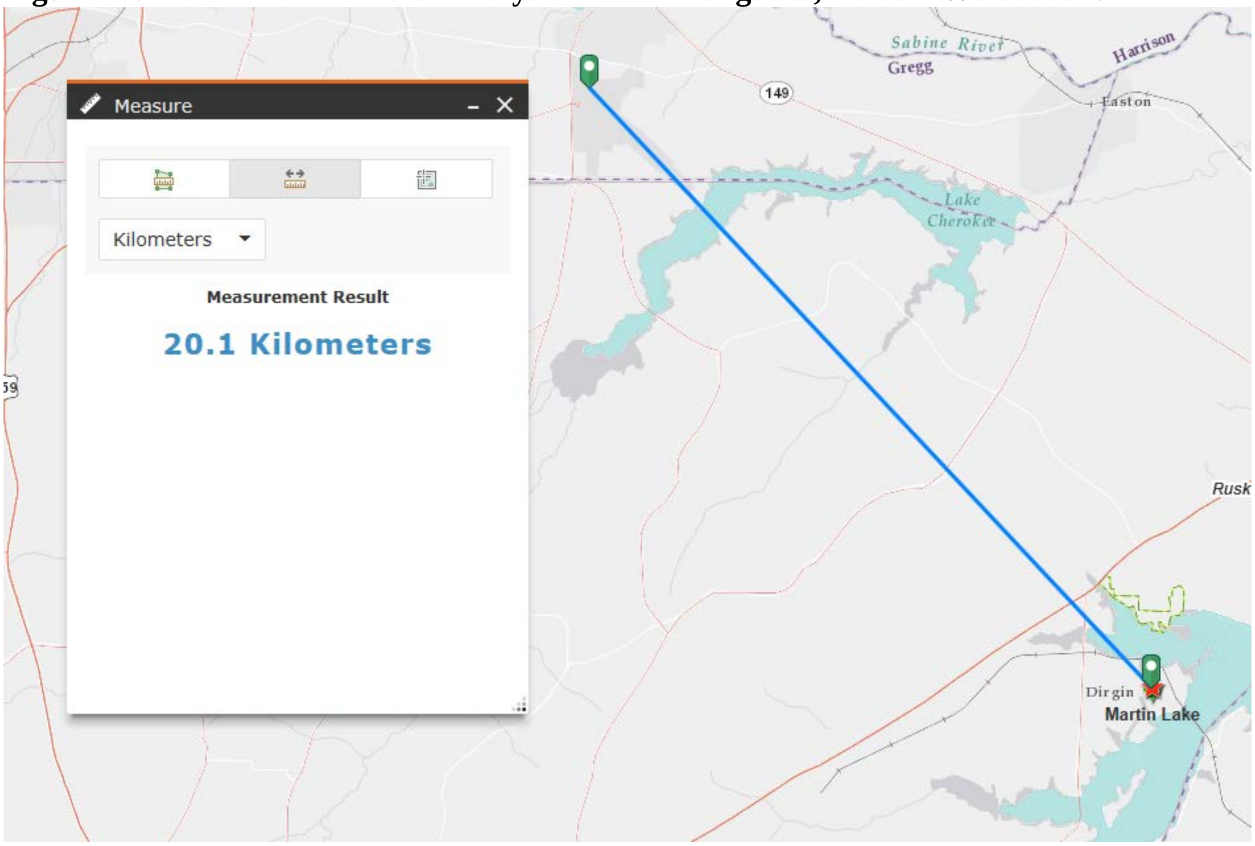
The most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. As noted in the Modeling TAD, the selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of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

[9] Total emissions for 2015 were not yet available in the Air Markets Program Data reports. 2015 was calculated from the supplied emissions from the CEM data. Final CAMD data is 22928.3 tpy which is 1.3 tpy difference or a negligible 0.0057 % increase.

For the Martin Lake area of analysis, surface meteorology from the NWS station in Longview Texas Regional Airport, approximately 19 km to the NW, and coincident upper air observations from the NWS station in Shreveport Louisiana, approximately 92 km to the east were selected as best representative of meteorological conditions within the area of analysis (Figure 18). EPA agrees that the meteorological sites chosen for the modeling for Martin Lake by Sierra Club are appropriate.

Sierra Club used AERSURFACE version 13016 from the NWS station in in Longview, Texas, located at 32° 23′ 2″ N, 94° 42′ 41″ W to estimate the surface characteristics of the area of analysis. Sierra Club estimated values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions. Sierra Club also estimated values for albedo (the fraction of solar energy reflected from the earth back into space), the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as "Zo"). In Figure 18 below, generated by the EPA, the location of the Longview, Texas NWS station is shown relative to the Martin Lake area of analysis.

Figure 18: Martin Lake Area of Analysis and the Longview, Texas NWS Station.



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. The Sierra Club analysis was conducted in adherence to all available USEPA guidance for evaluating source impacts on attainment of the 1-hour SO_2 NAAQS via aerial dispersion modeling, including the AERMOD Implementation Guide; USEPA's Applicability of

Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard, August 23, 2010; modeling guidance promulgated by USEPA in Appendix W to 40 CFR Part 51; USEPA's March 2011 Modeling Guidance for SO_2 NAAQS Designations; and, USEPA's December 2013 and 2015 SO_2 NAAQS Designations Technical Assistance Document in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

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

Modeling Parameter: Geography and Terrain

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

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 Martin Lake area of analysis, Sierra Club chose to use the lowest SO_2 design value for Texas for the years 2012-2014. The background concentration for this area of analysis was determined by Sierra Club to be 5.2 micrograms per cubic meter ($\mu g/m^3$), or 2 ppb,[10] and that value was incorporated into the final AERMOD results. EPA finds that the lowest SO_2 design value for Texas for the 2013-2015 period was also 2 ppb.

[10] The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.62 $\mu g/m^3$.

Many of the SO_2 monitors in Texas are in urban areas and/or near a SO_2 point source, so there is limited data for background values. Using the El Paso monitor, which is the lowest design value in the State of Texas during this period, is a conservative (i.e., under-estimating) assumption. Given the amount of SO_2 emissions in East Texas compared to El Paso area this assumption likely leads to an underestimation in the concentrations around these facilities but is within the framework of the TAD's options for inclusion of background monitoring data. Considering the impacts of Martin Lake in the area, the background value is on the order of 2.2 % of the total maximum values and if background monitoring data existed for east Texas it would be expected to be a higher than El Paso monitor data and would have an increase in the concentration levels around the Martin Lake facility. Luminant's modeling used a temporally varying background monitor approach of hour of day and season with values ranging from 2-10 $\mu g/m^3$ based on a monitor in Waco. These values are similar to Sierra Club's background monitor data but the amount of SO_2 emissions in the general Waco area is generally less than general area around the Martin Lake facility; thus, background levels are likely underestimated in both Sierra Club and Luminant's analyses. Luminant only went out to 50 km in their analysis of emissions around the monitor to support their conclusion of representativeness.

In looking at greater distances and transport patterns (what area is upwind) during the directions with the highest values a greater distance than 50 km and transport patterns should also be considered. We note that in our previous designation for the Dolet Hills facility outside Shreveport, LA, we were provided a temporally varying background SO_2 monitor approach for a monitor in Shreveport, LA. The Dolet Hills background values ranged from 4.88 to 24.85 $\mu g/m^3$. The Shreveport monitor is closer and also upwind of Martin Lake more often (Waco monitor is not normally upwind of Martin Lake) and especially when winds are from the east (blowing westerly) which is when the modeling is predicting values above the standard to the west of the plant. Given the closer proximity of Shreveport monitor to the Martin Lake facility than the Waco or El Paso monitors, similar emissions of SO_2 in the area around Shreveport and Martin Lake, and transport conditions when modeled exceedance occur, the Shreveport background data is more representative than either Luminant's or Sierra Club's proposed values. Comparing to Sierra Club's results, an alternate background would change values from -0.1% to + 11.7% using the time varying data from Shreveport which is significantly closer to Martin Lake than the Waco monitor. Since the modeling was not conducted with this varying background a direct calculation of the effect of using the Shreveport data can't be performed. For context, taking an average of the minimum and maximum values from the Shreveport data would yield an increase of 9.6 $\mu g/m^3$ above the Sierra Club background value.

Summary of Modeling Results

The AERMOD modeling parameters, as supplied by additional information from Sierra Club during the comment period for the Martin Lake area of analysis are summarized below in Table 10.

Table 10: AERMOD Modeling Parameters for the Martin Lake, Texas Area of Analysis.

Martin Lake, Texas Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	0
Modeled Fencelines	0*
Total receptors	21,201
Emissions Type	Actual
Emissions Years	2013-2015
Meteorology Years	2013-2015
Surface Meteorology Station	Longview, TX
Upper Air Meteorology Station	Shreveport, Louisiana
Methodology for Calculating Background SO_2 Concentration	Design Value
Calculated Background SO_2 Concentration	5.2 $\mu g/m^3$ or 2 ppb

*While the Sierra Club modeling did not specifically include a fenceline in their modeling analysis, the EPA did compare the modeled results with fenceline information from previous industry dispersion modeling in our proposal and have also evaluated information provided by Luminant in March 2016 to confirm that the modeled exceedances of the NAAQS shown in Sierra Club's analysis did occur in ambient air.

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

Table 11: Maximum Predicted 99th Percentile 1-Hour SO_2 Concentration in the Martin Lake, Texas Area of Analysis Based on Actual Emissions (2013-2015) Provided by Sierra Club March 2016.

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	2013-2015	354267.31	3567914.75	249.3	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

The Sierra Club's modeling indicates that the highest predicted 3-year average 99th percentile 1-hour average concentration within the chosen modeling domain is 249.3 $\mu g/m^3$, or 95.2 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the Martin Lake. Figure 19 was included as part of Sierra Club's submission and indicates that the predicted value occurred to the SW of Martin Lake.

Luminant provided a figure in their modeling report indicating the area that they did not think was available for siting a monitor based on exclusion within their property line and also lake/ wetland areas. See Figure 20 below. Luminant did not provide a detailed analysis of appropriate fencing and limiting of access to their property (necessary to determine if an area is actually not ambient air), nor other material documenting exclusion due to over water, etc. in support of the areas they have excluded. From the information we do have, and evaluation with GIS/aerial data, we have concerns that Luminant has excluded more areas than are appropriate. Regardless, we still have adequate information to conclude whether the area is attaining the 2010 SO_2 NAAQS, given that adequate modeling shows values over the standard outside the areas excluded by Luminant, in undisputed ambient air. We note that Figure 20 also excludes parts of some roadways that are not limited to Luminant access only (appear to be Farm to Market 2658 and County Roads 3231, 2144, 2145, 2126, 2138, etc.) and associated rights of way in their exclusion. We also note that it appears that there are houses in some areas that are excluded in the figure provided by Luminant (personal property along FM 2658 etc.) that Luminant could not control access to and has erroneously marked as not available for monitor siting. These are areas that we would consider to be ambient air and potentially available for monitor siting. Receptors should also have been placed between the fenceline and the public road (in the rights of way). The maximum modeled values are to the west (areas that Luminant did not exclude) and southwest of the facility where Luminant have excluded but have not provided sufficient information to verify the property (if owned) is truly limited access/non-ambient air. The maximum value (249.3 $\mu g/m^3$) in the Sierra Club modeling is in this area to the southwest that Luminant has excluded. Regardless there are exceedance areas in multiple directions from Martin Lake units that are not contested by Luminant and are clearly ambient:

- The area to the northwest of the facility has a number of exceedance values up to 222 $\mu g/m^3$.
- The area due West of the facility has values up to at least 224 $\mu g/m^3$.
- The area to the east of the facility has exceedance values.

The area of yellow contour values (above 225 $\mu g/m^3$) in Figure 19 appear to be mostly in areas excluded by Luminant. As discussed before it is unclear if all of these are truly non-ambient receptors.

In Figure 21, we have indicated the two areas where the highest values appear in the area Northwest and West of the facility and are in areas not contested by Luminant. Overall, there are several areas with many receptors up to 14% (224 $\mu g/m^3$) above the standard that Luminant does not claim as excluded areas. We do not concur with Luminant that all the areas they excluded in Figure 20 should be excluded, but even if we evaluate just the areas that Luminant does not contest, there are many receptors well above the standard. Figures 22-24 zoom in to where the 2016 Sierra Club modeling results have been overlaid on the Luminant map areas they indicated should be excluded. We note the maximum values in the uncontested area is actually as high as 239.1 $\mu g/m^3$. For our analysis, we conservatively used 224 $\mu g/m^3$ to evaluate the modeling but the analysis could also be done based on the 239.1 μg/m^3 value. This would even more clearly demonstrate the area around Monticello is nonattainment.

Figure 19. Maximum Predicted 99th Percentile 1-Hour SO_2 Concentrations in the Martin Lake Area of Analysis Based on Actual Emissions

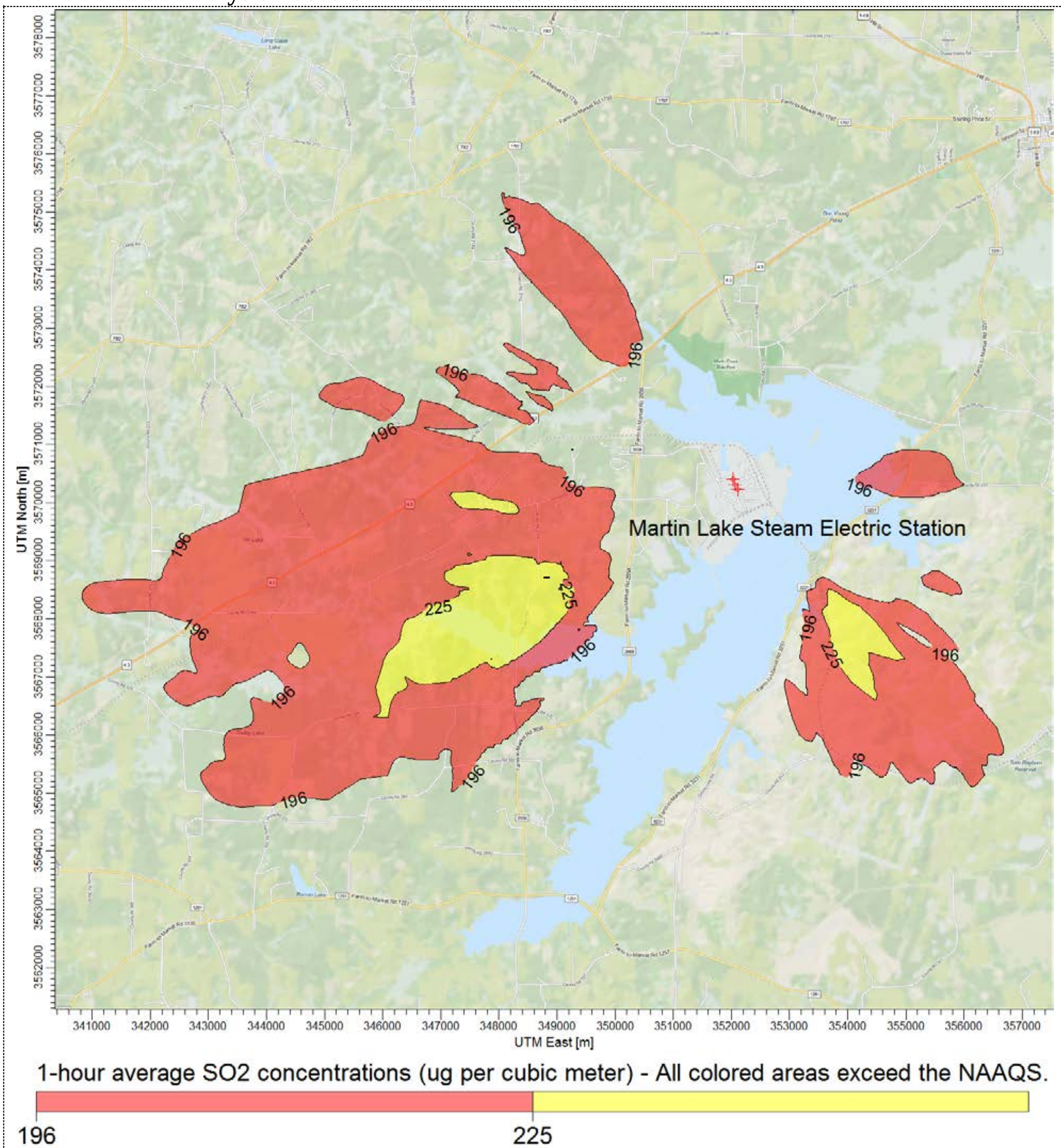


Figure 20. Area excluded by Luminant based on assertion that receptors were within property boundaries or were lake/wetland areas.

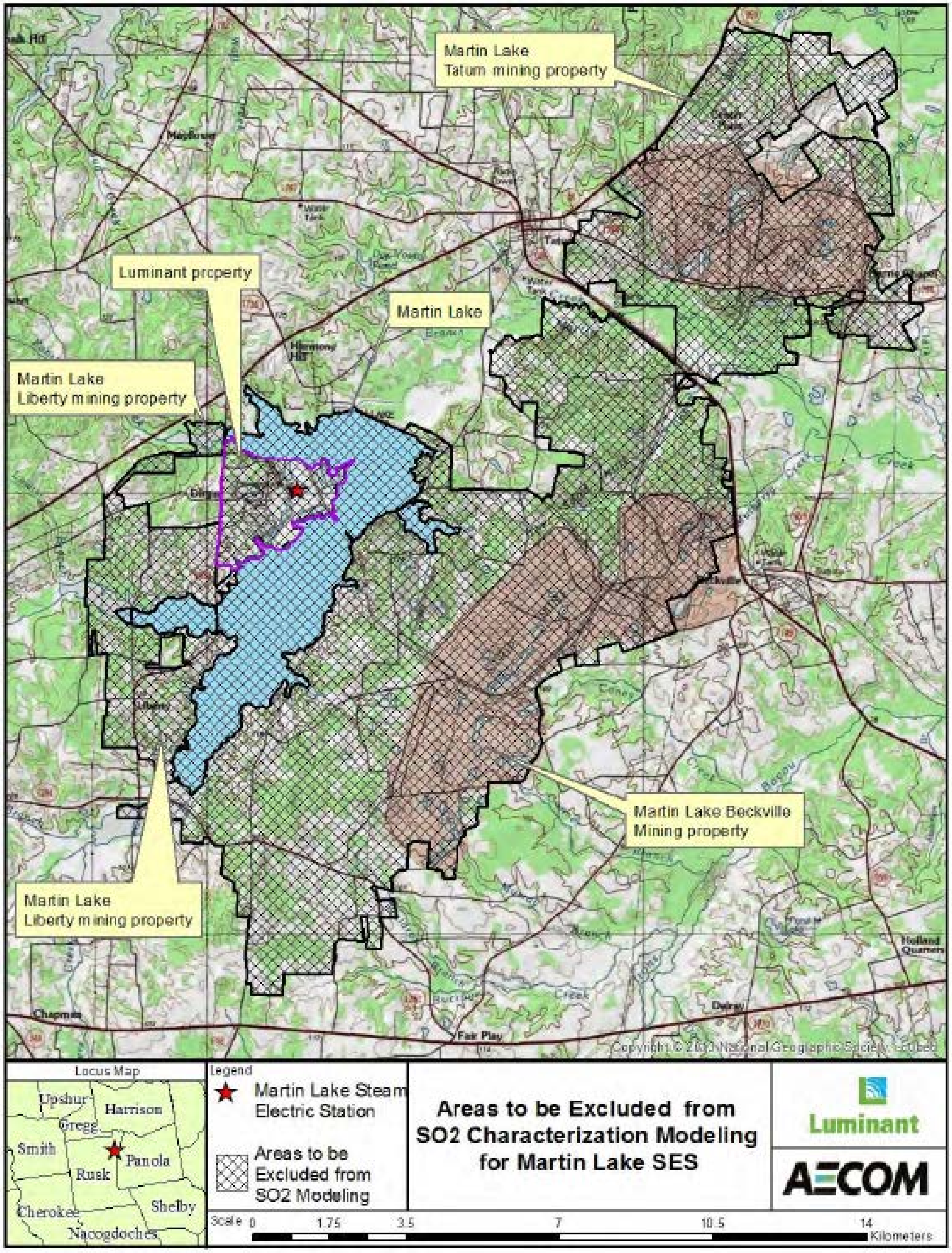


Figure 21. Area excluded by Luminant based on assertion that receptors were within property boundaries or were lake/wetland areas.

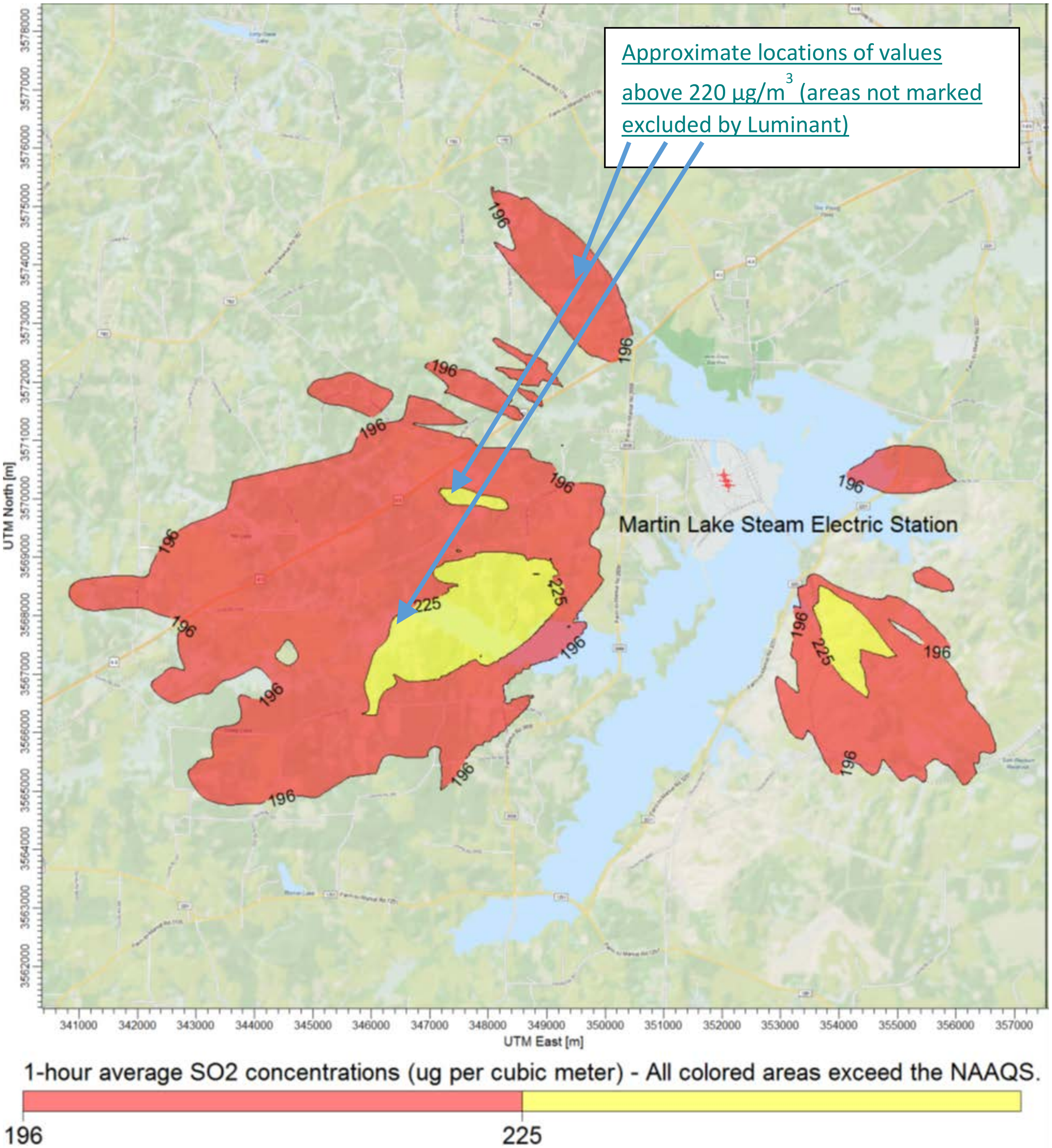


Figure 22. Area 1 of 3 - Showing Sierra Club 2016 modeling (2013-2015) results overlaid with Area excluded by Luminant based on assertion that receptors were within property boundaries or were lake/wetland areas. (Maximum value of 229.1 μg/m^3).

Figure 23. Area 2 of 2 – Showing Sierra Club 2016 modeling (2013-2015) results overlaid with Area excluded by Luminant based on assertion that receptors were within property boundaries or were lake/wetland areas. (Maximum value of 229.1 μg/m^3).

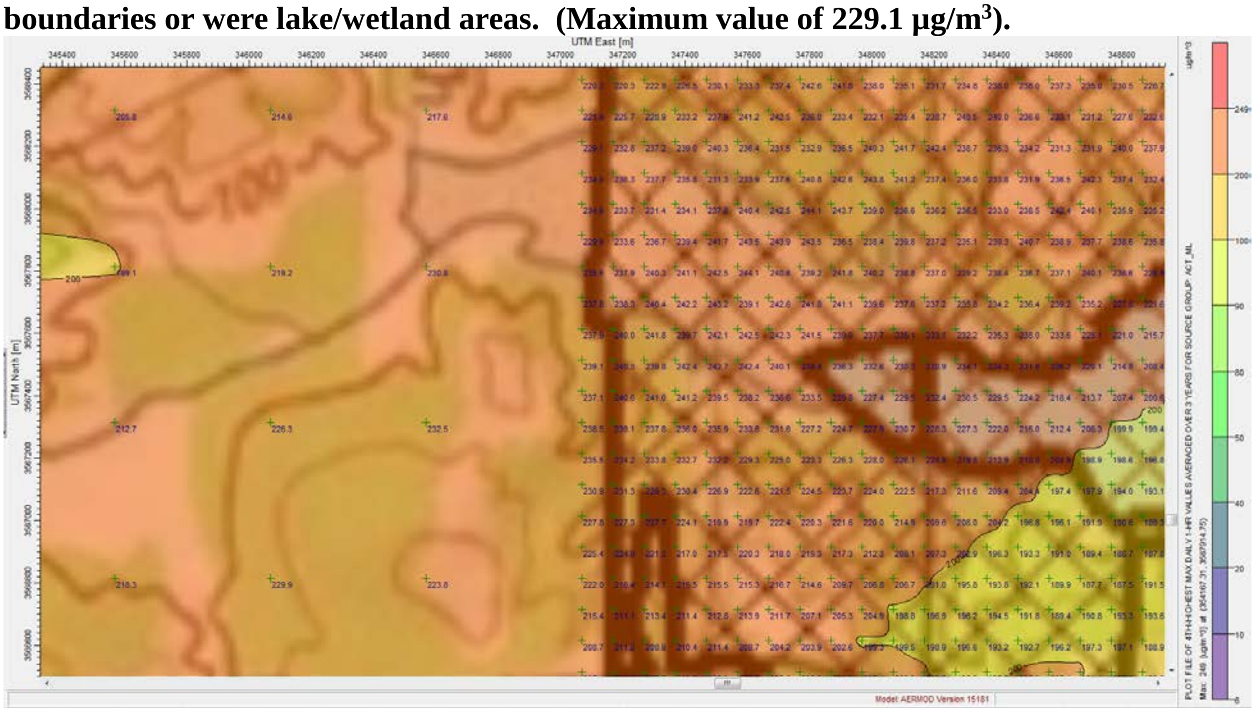
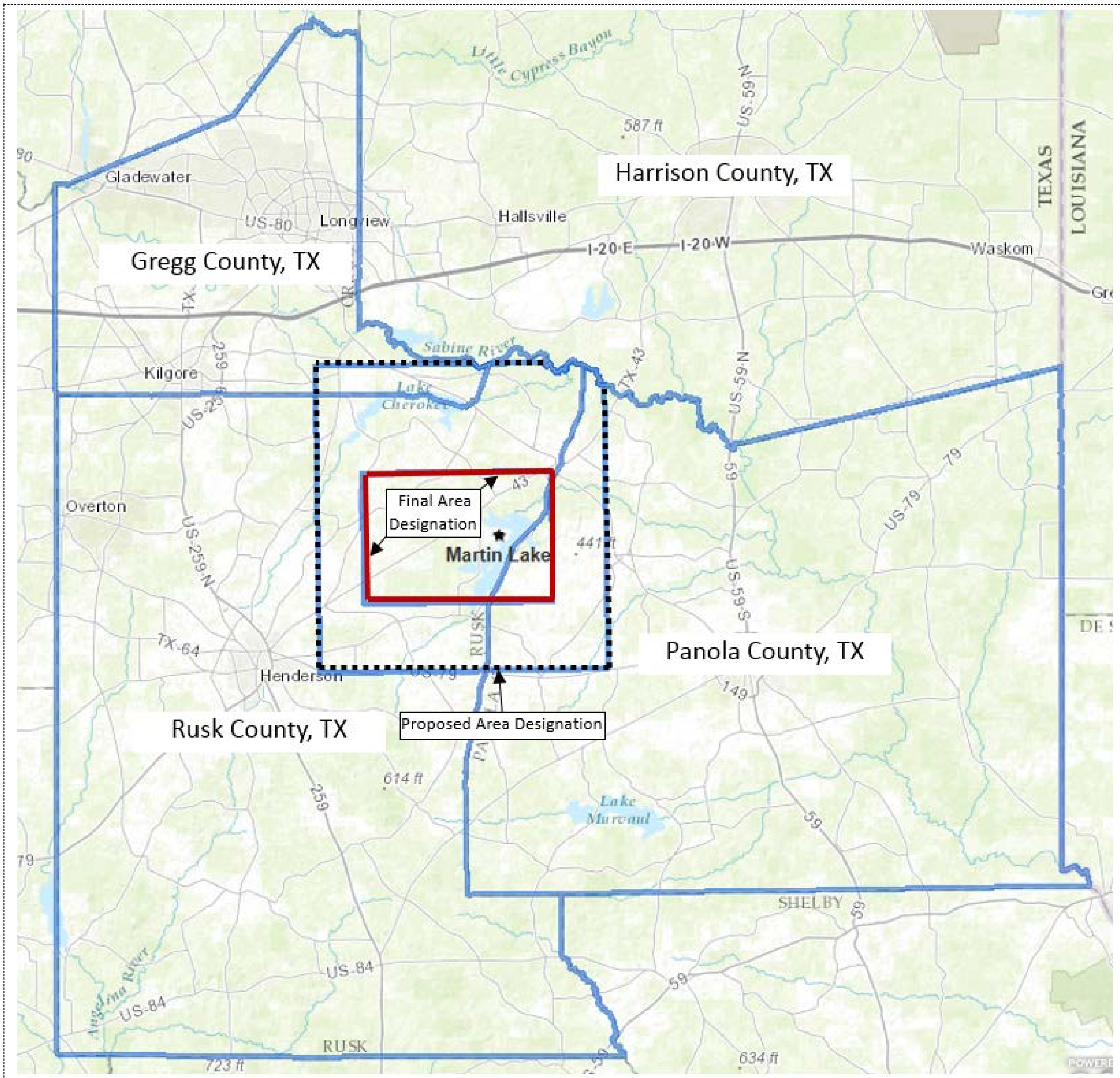


Figure 24. Area 3 of 3 – Showing Sierra Club 2016 modeling (2013-2015) results overlaid with Area excluded by Luminant based on assertion that receptors were within property boundaries or were lake/wetland areas. (Maximum value of 222.5 μg/m³).

Jurisdictional Boundaries

Once the geographic area of analysis associated with Martin Lake, other nearby sources of SO_2, and background concentration is determined, existing jurisdictional boundaries are considered for the purpose of informing our final nonattainment area, specifically with respect to clearly defined legal boundaries. Based on the previous Sierra Club modeling EPA had excluded Harrison County from the proposed nonattainment area since no receptors in Harrison County were found to be above the standard and the modeling did not demonstrate that Pirkey Power Plant, located in Harrison County, had a sizeable impact on the nonattainment near Martin Lake. Receptors in Rusk, Panola, and Gregg Counties were found to have modeled design values above the standard and were included in the proposed nonattainment area. The most recent Sierra Club modeling includes receptors with design values above the standard in Rusk and Panola counties but not in Gregg County. The final area of modeled nonattainment still falls within Harrison and Panola counties. The following Figure 25 shows the proposed nonattainment area and the final nonattainment area.

Figure 25. Proposed and Final Nonattainment Areas Near Martin Lake Steam Electric Station, Texas.



Existing jurisdictional boundaries are considered for the purpose of informing our final nonattainment area, specifically with respect to clearly defined legal boundaries. Comments regarding our intended boundaries for this area have been addressed in the supplement to the RTC or in this TSD.

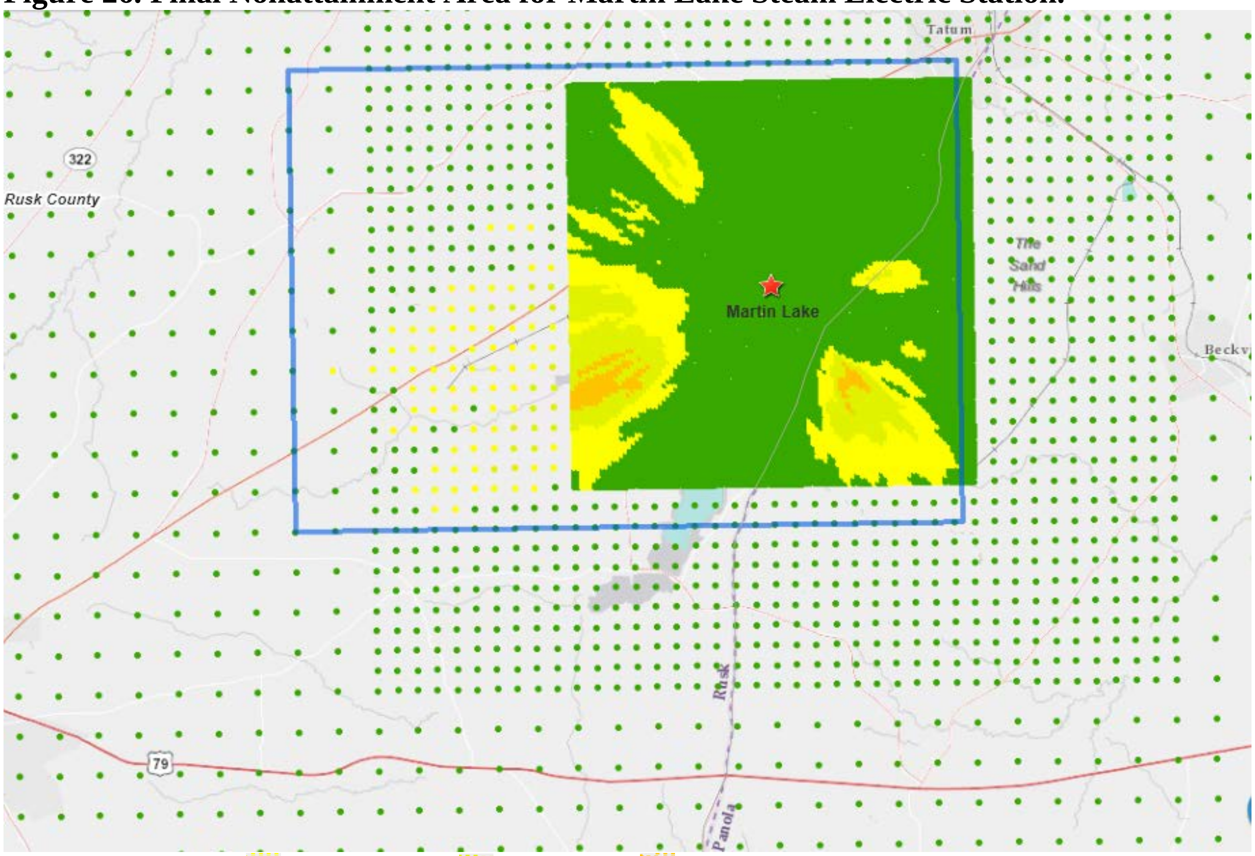
The EPA has determined that our final nonattainment area, consisting of portions of Rusk and Panola counties, Texas, are comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final nonattainment area.

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 designating the area around Martin Lake Steam Electric Station as nonattainment for the 2010 SO_2 NAAQS. Specifically, the area is comprised of (NAD83 Datum, Zone 15):

X	Y
340067.31,	3575814.75
356767.31,	3575814.75
356767.31,	3564314.75
340067.31,	3564314.75

Figure 26. Final Nonattainment Area for Martin Lake Steam Electric Station.



< 196.5; 196.5 – 215; 215 – 235; 235 – 285; > 285

Our final designation is based on Sierra Club's updated (March 2016) modeling of actual emissions reported from the facility during the 2013 to 2015 calendar years. To more accurately predict the dispersion of emissions, hourly exit velocities were used. Exit velocities were derived from the hourly flow rates and heat input in the USEPA Clearinghouse and CAMD databases. The Clearinghouse emissions and exit velocities for 2013-2014 were supplemented with CAMD emissions for 2015. The velocities for 2015 were derived from the hourly heat input reported in CAMD. An analysis of the modeling data indicates it was performed in accordance with appropriate EPA modeling guidance and using generally conservative assumptions.

The Sierra Club modeling was deliberately conservative (in an under-estimating sense) and included several techniques which generally would tend to reduce/underestimate design value concentrations from the model. Specifically, as further discussed above:

- The modeling did not include building downwash, since Sierra Club did not have access to information needed to support such inclusion. Building downwash will generally, though not always, increase the predicted maximum modeled concentrations. It may move maximum concentrations closer to the source but we would expect this to have negligible impact on our decision since there are currently modeled exceedances well beyond the property of the facility.
- The modeling did not include variable stack temperature, since Sierra Club did not have access to information needed to support such inclusion. Sierra Club used a constant stack temperature (449 K[11]) and when compared to the CEM temperatures furnished by Luminant as part of their modeling analysis was on the average 21% higher – the average temperature in the CEM data for near full load (filtered for stack velocity > 25 m/s) was 356K, ranging between 338-478K. This temperature difference would cause on the average a 196% increase in buoyancy flux versus using the CEM temperature when operating near full load. Overall this would move exceedances further out from the facility but also yield smaller DV's. So the overall impact of these differences if remodeled with Luminant's temperature data would most likely be larger impacts closer into the facility but we would still expect the area have exceedance areas at ambient air receptors. Based on our evaluation we consider the use of higher temperatures by Sierra Club to be a net conservative (under estimation of maximum concentrations) factor.
- The Sierra Club used a very low estimate of background SO_2 based on the lowest monitor in the State of Texas, far from the source and an area with less overall SO_2 emissions. If more representative background monitoring data were used the concentration values would increase some, though should be less than 12 percent of the maximum estimated value based on evaluating the use of Shreveport monitoring data.
- Sierra Club's modeling did not include other sources which could potentially contribute to SO_2 concentrations in the modeled area. The effect of this is expected to be small based on the small contributions from other sources in the previous modeling but should lead to slightly higher concentrations in some areas around Martin Lake facility.

Industry commenters provided comments about potential defects in the Sierra Club's previous modeling which are still relevant to the final modeling and which could potentially increase/decrease modeled concentrations: the use of flagpole receptors, differing and non-varying stack temperatures, no building downwash inclusion, use of refined background, and use of older land use data at the surface meteorological station. To address the effect on modeled concentrations that might be caused by these various factors the Sierra Club conducted sensitivity modeling on Big Brown for some of these issues and found both positive and negative

[11] Exit temperatures were obtained from Environ, 2018 Base Case CAMx Simulation, Texas Haze Evaluation, Appendix A: Stack Parameters of Major Units at the Selected 38 Facilities, September 7, 2013.

impacts on the modeled concentrations. While the modeling for other sources is not an exact analysis of change that would occur if these differences were assessed using the Martin Lake modeling, we can use the analyses from Big Brown and Dolet Hills to inform the amount of change that might happen in factually similar situations. As discussed before the uncontested maximum is 224 μg/m^3 and could be higher based on further evaluation of receptors that Luminant excluded. For the sake of this comparison analysis we are using the conservative approach of 224 μg/m^3 as the maximum value in the following analysis. In looking at the other information discussed previously we should expect a decrease in maximum concentrations of change of maybe 3.6 to 3.8% (8 – 8.5 μg/m^3) due to the use of flagpole receptors (0-0.2%) and Surface Characteristics update (-3.6%). We note that the background used is low for what we would expect for East Texas and using the data from Shreveport (Dolet Hills Analysis) the background could be 4.88-24.85 μg/m^3 compared to the constant of 5.2 μg/m^3 used by Sierra Club. An alternate background would change values from -0.1% to + 11.7% using the time varying data from Shreveport which is significantly closer to Martin Lake than the Waco monitor (Waco – 245 km, Shreveport – approx. 73 km). The Shreveport monitor is also generally upwind of Martin Lake more often and especially when winds are from the east-northeast (blowing westerly-southwesterly) which is when the modeling is predicting values above the standard to the west-southwest of the plant. An average of the minimum and maximum change would add 9.6 μg/m^3 to the exiting Sierra Club background concentration. For further context, we also looked at the seasonal average value (averaging all hours) and it ranged from 7.97 μg/m^3 to 10.83 μg/m^3 with an annual average of 9.1 μg/m^3. These issues combined with lack of any background sources in the modeling further support the use of the Shreveport monitor data for background. Without a direct analysis we don't know the exact impact but the net difference to the exceedance values due to flagpole receptor height, updated surface characteristics, and more representative background would be an overall increase to the exceedance values.
The modeling did not include building downwash or variable stack temperature, since Sierra Club did not have access to information needed to support such inclusion. As previously discussed, building downwash will generally, though not always, increase the predicted maximum modeled concentrations. As previously discussed we also evaluated Sierra Club 2016 modeling's stack temperatures and use of varying velocities in our analysis of the Buoyancy Flux (F_b) in comparison to the data provided by Luminant in their modeling. Sierra Club used a constant stack temperature and when compared to the CEM temperatures furnished by Luminant as part of their modeling analysis was on the average 21% higher. This temperature difference would cause on the average a 196% increase in buoyancy flux versus using the CEM temperature when operating near full load. Overall Sierra Club's Temperatures/buoyancy flux would move exceedances further out from the facility but also yield smaller DV's. So the overall impact of these differences (building downwash and Luminant's temperature data instead of Sierra Club's temperatures) if remodeled would be larger impacts closer into the facility but we would still expect the area have exceedance areas at ambient air receptors. Based on the current locations of the values over 220 μg/m^3 in the most recent Sierra Club modeling and the amount of non-contested ambient air receptors between the current highs and the excluded areas in alignment towards Martin Lake inclusion of downwash and use of Luminant's temperatures would not change our conclusions.

Given that Sierra Club's modeled concentrations (with a low background and no nearby sources) are 14 % above the standard using 224 μg/m^3 and 22% above the standard using 239.1 μg/m^3 as the maximum and that several factors are deliberately conservative in under-estimating impacts and would tend to reduce the modeled concentrations (and actual modeled concentrations with appropriate background would be higher), our technical assessment of the available information concludes that the differences/changes to the Sierra Club modeling suggested by industry would not result in modeled values near or below the standard; therefore, EPA considers the final Sierra Club modeling submitted March 2016 to be relevant information that must be considered in our designation decision and finds that the modeling is a sufficient basis for a determination of nonattainment and clearly demonstrates the area around Martin Lake is nonattainment.

At this time, our final designations for areas in the State of Texas have been completed for this area, the three other areas contained in this final technical support document supplement and in this supplemental final action, and the other eight areas designated on June 30, 2016. Consistent with the remaining court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Texas by either December 31, 2017, or December 31, 2020.

Technical Analysis for Milam County, Texas

Introduction

The Milam County, Texas, area contains a stationary source (Sandow 4 – "Sandow") 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 had not met the consent decree's criteria for being "announced for retirement." Specifically, in 2012, the Sandow Power Plant emitted 22,511 tons of SO_2, and had an emissions rate of 1.00 lbs SO_2/mmBTU. Pursuant to the March 2, 2015, consent decree, the EPA must designate the area surrounding the facility by July 2, 2016. However, before meeting the July 2, 2016, deadline for this area, the EPA and plaintiffs, who are parties to the consent decree that gave rise to the court order, agreed to extensions for a limited number of the subject areas, including this area. The deadline for issuing a designation for this area is now November 29, 2016.

In its September 18, 2015 submission, Texas provided no formal recommendation for the specific area surrounding the Sandow Power Plant. Instead, as part of its September 18, 2015, submittal, Texas provided a general recommendation of unclassifiable/attainment for the 243 counties located in the state, including Milam County, that do not have any operational SO_2 regulatory monitors. This general recommendation for Milam County was not accompanied by modeling, monitoring, or other technical information to inform our decision regarding the attainment status of the area.

On February 11, 2016, the EPA notified Texas that we intended to designate the area surrounding the Sandow Power Plant as unclassifiable. Additionally, we informed Texas that our intended boundaries for the unclassifiable area consisted of the entirety of Milam County. Our intended designation and associated boundaries were based on, among other things, the lack of information regarding the attainment status of the area surrounding the Sandow Power Plant. The EPA could not agree with the state's recommendation for the area, since the area could not be classified on the basis of available information as meeting or not meeting the NAAQS.

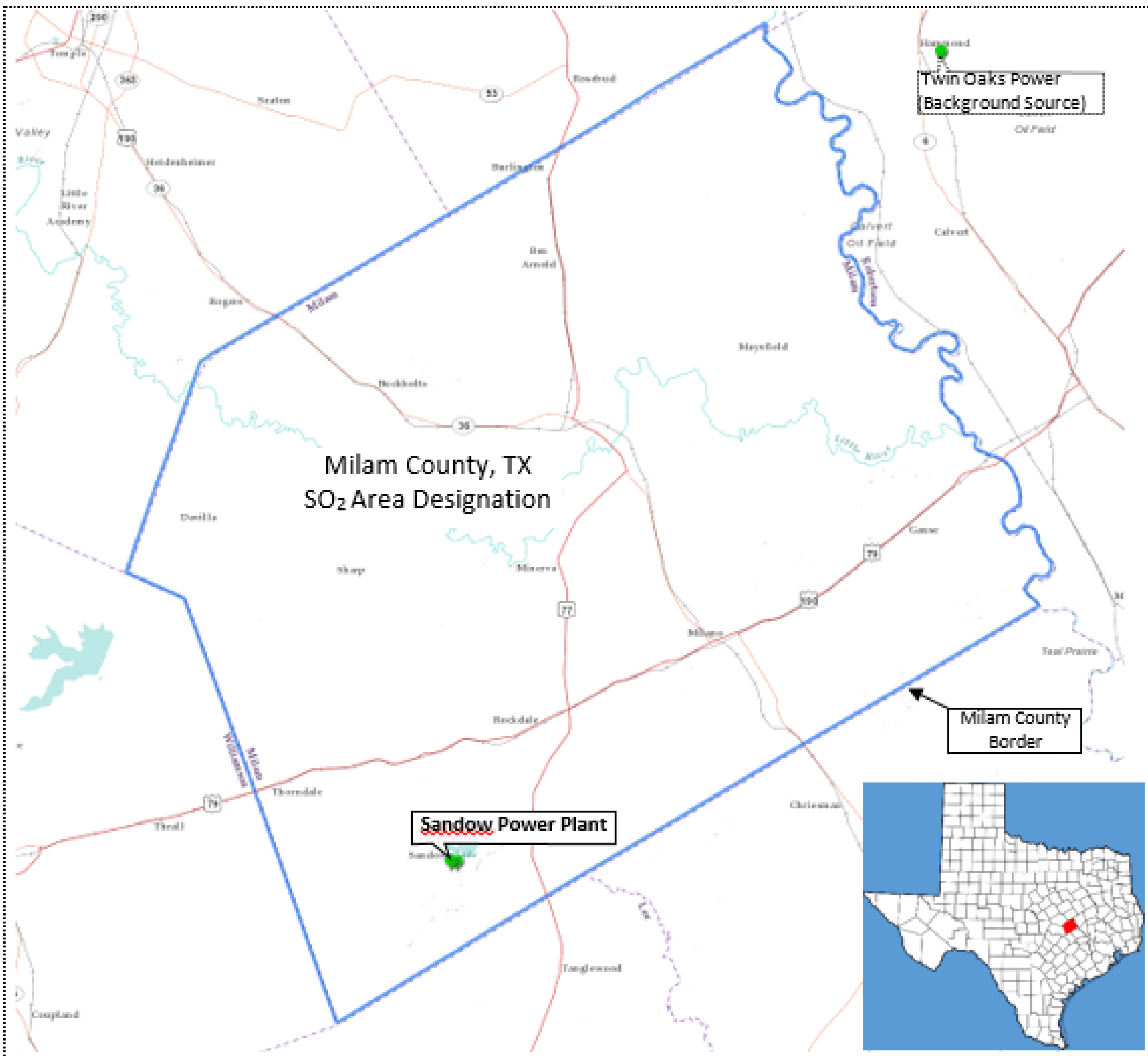
Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the draft technical support document for Texas, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment of New Information

In our February 11, 2016, notification to Texas regarding our intended unclassifiable designation for the Milam County 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 draft 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 supplement to the June 30, 2016, response to comments document (RTC), available in the docket, Docket ID EPA-HQ-OAR-2014-0464, supersede those found in the draft document.

As further detailed below, after carefully considering all available data and information, the EPA is designating the area surrounding the Sandow Power Plant as unclassifiable for the 2010 SO_2 NAAQS. The boundaries for this unclassifiable area consist of all areas within Milam County borders and are shown in the Figure 27 below. Also included in Figure 27 are a nearby emitter of SO_2 and Texas's recommended area, which is the same as the EPA's recommendation.

Figure 27: EPA's Final Unclassifiable Area for Milam County with Large Emitters of SO_2



The EPA received substantive comments from citizen letters, Sierra Club, Luminant, the Texas Commission on Environmental Quality, and the Governor of the State of Texas regarding our intended unclassifiable designation for the Milam County, Texas, area. The commenters indicated that because there was no monitoring or modeling data for the areas, the area should be designated unclassifiable or unclassifiable/attainment. However, to designate an area as unclassifiable/attainment under the 2010 SO_2 NAAQS, EPA would need to have a technical basis to conclude that the area is in fact meeting the NAAQS and is not contributing to a nearby area that is not meeting the NAAQS. The absence of monitoring data is not a sufficient basis for EPA to determine an area is meeting the standard, particularly an area with a large SO_2 emissions source. Therefore, EPA does not have a technical basis to find the area is in attainment or unclassifiable/attainment. A comprehensive summary of these comments and our responses can be found in the supplement to the RTC.

Jurisdictional Boundaries

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

The EPA has determined that the final unclassifiable area, consisting of the area within Milam County, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining the 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 to determine whether the area around the Sandow Power Plant (Unit 4) is meeting the 2010 SO_2 NAAQS or is contributing to an area that does not meet the NAAQS, and therefore is designating the area as unclassifiable. Specifically, the area is comprised of all area within Milam County borders.

At this time, our final designations for areas in the State of Texas have been completed only for this area, the three other areas contained in this final technical support document supplement and in this supplemental final action, and the other eight areas designated on June 30, 2016. Consistent with the conditions in the March 2, 2015, consent decree, the EPA will evaluate and designate all remaining undesignated areas in Texas by either December 31, 2017, or December 31, 2020.

Note: Modeling files provided by Luminant and Sierra Club are large and cannot be added to the electronic docket. Electronic files are available upon request. Contact Erik Snyder (Snyder.erik@epa.gov 214-665-7305) or alternate Bob Imhoff (Imhoff.robert@epa.gov 214-665-7262).