Responses to Significant Comments on 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

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I. Introduction

This supplemental document, together with the preamble to the supplemental final designations action, and the supplemental Technical Support Document (TSD) for the designations for the subject areas, presents the responses of the U.S. Environmental Protection Agency (EPA) to the significant comments we received on our responses to the state designation recommendations regarding four areas in Texas for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS). The public comment period for the EPA's intended designations ended on March 31, 2016. The responses presented in this document are intended to either augment the responses to comments that appear in the preamble to the supplemental final action and the TSDs or to address comments not discussed in those documents. In this document "APC" refers to anonymous public comments.

II. Background

On June 2, 2010, the EPA Administrator signed a notice establishing a new primary 1-hour SO_2 standard at a level of 75 parts per billion (ppb) to protect against health effects associated with SO_2 exposure, including a range of serious respiratory illnesses. The EPA retained the secondary 3-hour SO_2 standard on March 20, 2012, to protect against welfare effects, including impacts on sensitive vegetation and forested ecosystems.

The process for designating areas following promulgation of a new or revised NAAQS is contained in the Clean Air Act (CAA) section 107(d) (42 U.S.C. 7407). After promulgation of a new or revised NAAQS, each governor or tribal leader has an opportunity to recommend air quality designations, including the appropriate boundaries for nonattainment areas, to the EPA. The EPA considers these recommendations as part of its duty to promulgate the formal area designations and boundaries for the new or revised NAAQS. By no later than 120 days prior to promulgating designations, the EPA is required to notify states and tribes, as appropriate, of any intended modifications to an area designation or boundary recommendation that the EPA deems necessary.

The EPA completed an initial round of SO_2 designations for certain areas of the country on July 25, 2013, designating 29 areas in 16 states as nonattainment. Pursuant to a March 2, 2015, court-ordered schedule, the EPA must complete SO_2 designations for the remaining areas of the country by three specific deadlines: July 2, 2016, December 31, 2017, and December 31, 2020. The court order requires the second round of designations that were due July 2, 2016, to address 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/mmBTU. The EPA issued a notice announcing its intended designations for all areas meeting these criteria on March 1, 2016 (81 FR 10564), which included the four Texas areas addressed in this document. However, before meeting the July 2, 2016, deadline for areas meeting these criteria, 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 these four Texas areas. The deadline for issuing designations for these four Texas areas is now November 29, 2016. Areas associated with the other sources required to be designated in the second round of designations were designated on

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June 30, 2016 (81 FR 45039; July 12, 2016), except for the Muskogee, Oklahoma area which has been further extended and is therefore not addressed in this document.

III. General Comments

A. Modeling

1. AERMOD LOWWIND3 Option

Comment: Numerous commenters on the EPA's March 1, 2016, notice announcing the agency's intended designations raised issues and concerns regarding the use of modeling in designations, including the use of the Lowwind3 and Adjusted U* beta options in AERMOD, relying on modeling to determine attainment status, and the use of flagpole receptors, Other commenters addressed the names of EPA's designations categories, the role of monitoring in designations, the relationship of this round of designations to the court order and to EPA's Data Requirements Rule, the need to consider all available information in the administrative record, and other general topics. The EPA summarized and responded to these comments in the June 30, 2016, version of the Response to Comments Document, and stands by those responses, which are in the docket for this supplemental action. For general comments that were addressed by commenters who responded to the EPA's intended designations of the four areas in Texas addressed in this supplemental action, we are repeating the summaries and responses, with some changes to reflect the fact that we are now designating those areas. Some commenters (0296-FirstEnergy, 0299-OH Utilities Group, 0309-DTE Energy, 0310- NAAQS Implementation Coalition, 0314-OH Valley Electric, 0329-UARG, 0328-Luminant) suggested the EPA should allow states to use the LOWWIND3 option in conjunction with ADJ_ U* to provide better performance of the model under low wind speed conditions. Two commenters (0309-DTE Energy, 0329-UARG) stated that the EPA's refusal to accept modeling demonstrations that utilize these more sophisticated options may lead to areas being designated nonattainment for this NAAQS where actual air quality meets this NAAQS due to the default model's over-prediction tendency.

EPA's Response:

The EPA proposed revisions to the *Guideline on Air Quality Models* on July 29, 2015, which include proposed updates to the AERMOD modeling system, the air quality dispersion model recommended for use in the SO_2 NAAQS designation process. Specifically, EPA proposed incorporating two Beta options:

An option in AERMET to adjust the surface friction velocity (u*) to address issues with AERMOD over prediction under stable, low wind speed conditions.

A low wind option, LOWWIND3, to address issues with model over predictions under low wind conditions. This option increases the minimum value of the lateral turbulence intensity (sigma-v) from 0.2 to 0.3 and adjusts the dispersion coefficient to account for the effects of horizontal plume meander on the plume centerline concentrations. It also eliminates upwind dispersion, which is incongruous with a straight-line, steady-state plume dispersion model such as AERMOD.

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These "Beta options" are currently being considered as part of an ongoing rulemaking process and have not been formally adopted into the regulatory version of AERMOD, and pending completion of that rulemaking EPA considers the use of AERMOD run with non-regulatory options as an alternative model. The necessity for this EPA approval of any regulatory application of an alternative model is described in Section 3 of the SO_2 Modeling TAD (first draft available May 2013). Furthermore, the use of AERMOD Beta options was discussed at the 11th Modeling Conference in August 2015 and subsequently clarified in a December 10, 2015, memorandum.[1] The Beta options are also discussed in Section 2 of the latest version of the Modeling TAD (August 2016). In order to obtain EPA approval to run AERMOD using the Beta options, the alternative model demonstrations must first be submitted to the EPA Region for approval and concurred with by the Model Clearinghouse. At this time, EPA will only consider the modeling analyses that used the current regulatory defaults within AERMOD to predict SO_2 design values for the second round of designations, unless an entity seeking to use a Beta option has gained formal approval to use an alternative model consistent with this longstanding process. Where such a request has not been submitted and approved for a specific case, EPA cannot rely upon modeling results that use these Beta options in making its final designation.

Comment: Two commenters (0314-OH Valley Electric, 0327-AEP) recognized that the LOWWIND3 Option is not fully approved as a default option in AERMOD, and an alternative model demonstration is required. The commenters stated that Ohio EPA did perform the necessary study and submitted it as part of their demonstration package. Commenters stated that while the EPA does not discuss the appropriateness of Ohio EPA's alternative model demonstration, it cites a guidance memo to apparently disregard Ohio EPA's demonstration. The memo requires a specific process to use an alternative model, but the memo did not exist at the time the proposed designation modeling was filed. Commenters stated that a guidance memorandum cannot be used to establish legally binding requirements, and retroactive application of any rule is also inappropriate. One commenter (0327-AEP) stated that the EPA should approve the use of the LOWWIND3 Beta Option after considering the study submitted by Ohio EPA on its merits, using the requirements that applied to such demonstrations at the time of the submission.

One commenter (0329-UARG) recognized that in a memorandum from December, the EPA announced that use of proposed "future regulatory options" for AERMOD for SO_2 designations "require[s] formal approval as an alternative model and [is] subject to the requirements of Appendix W, Section 3.2.2." The commenter stated that this memorandum is merely guidance, it is not binding, and it was not issued until after the September 18, 2015, date by which the EPA requested states to provide their updated designations to the Agency. Commenter stated it would be arbitrary and unreasonable for the EPA to expect states' recommendations to have complied with this later guidance.

[1] *See* https://www3.epa.gov/ttn/scram/guidance/clarification/AERMOD_Beta_Options_Memo-20151210.pdf

EPA's Response:

EPA clearly described the necessity for approval of any regulatory application of an alternative model in Section 3 of the SO_2 modeling TAD (first draft available in May 2013). Furthermore, the use of AERMOD Beta options was discussed at the 11th Modeling Conference in August 2015 and subsequently clarified in a December 10, 2015, memorandum. The Beta options are also discussed in Section 2 of the latest version of the modeling TAD (August 2016). In order to obtain EPA approval to run AERMOD using the Beta options, the alternative model demonstrations must first be submitted to the EPA Region for approval and concurred with by the Model Clearinghouse. At this time, EPA will only consider modeling analyses that used the current regulatory defaults within AERMOD to predict SO_2 design values for the second round of designations, unless an entity seeking to use a Beta option has gained formal approval to use an alternative model consistent with this longstanding process. Where such a request has not been submitted and approved for a specific case, EPA cannot rely upon modeling results that use these Beta options in making its final designation. The EPA recognizes that the TAD is not a legally binding, final agency action, and that the other guidance memoranda are similarly non-binding. However, the EPA disagrees that requiring Model Clearinghouse approval in order to use the non-regulatory Beta options in these designations constitutes an impermissible retroactive application of a rule or converts the TAD and the guidance into binding final requirements. That is because these designations themselves are final actions, and the EPA has explained a reasonable basis for not relying upon modeling using the Beta options unless certain processes are followed to ensure that their use is appropriate in a given case. However, these designations do not take final action on the pending rulemaking to revise Appendix W itself, nor do they pre-judge the outcome of that pending rulemaking in any way.

Comment: Some commenters (0314-OH Valley Electric, 0327-AEP, 0329-UARG) supported the EPA's positions that the alternative model formulation is superior to the approved version of the model, and that there is no information available demonstrating that AERMOD with LOWWIND3 provides improved statistical performance on tall stack sources. The commenters stated that the Version 15181 Addendum to the AERMOD User's Guide, Appendix F contains an analysis using the EPA's standard Lovett evaluation database, which is a tall stack case. The commenters stated that this case demonstrates that the LOWWIND3 Beta Option coupled with the Beta U* Option in AERMET shows a statistically better performance than both the base AERMOD Model and the other LOWWIND Beta Options present in AERMOD. Such a finding contradicts the EPA's statement in the TSD. One commenter (0329-UARG) stated that this level of demonstration should suffice to support the use of those techniques in modeling.

EPA's Response:

The commenter is referring to technical information provided by EPA as part of its proposed regulatory revisions to the *Guideline on Air Quality Models* (July 2015). Such information was provided to the public in considering the merits of incorporating the LOWWIND3 and adjusted u* Beta options in the regulatory version of AERMOD. At this time, the EPA is still considering the merits of these options as part of that separate rulemaking process, and these final designations are not taking final action on that pending rulemaking or pre-judging it in any way. Therefore, pending completion of that rulemaking, for these designations we have explained that

it is necessary to gain approval of any regulatory application of an alternative model (i.e. AERMOD with use of LOWWIND3 and/or adjusted u* Beta options) as noted in Section 3 of the SO2 Modeling TAD (first draft available in May 2013). This will ensure that the use of a Beta option in any specific area designation is appropriate, based on its own facts. The use of AERMOD Beta options was discussed at the 11th Modeling Conference in August 2015 and subsequently clarified in a December 10, 2015 memorandum. The Beta options are also discussed in Section 2 of the latest version of the SO2 Modeling TAD (August 2016). While a state or other entity conducting modeling may have run AERMOD using the Beta options, for these designations EPA will only consider modeling analyses that used the current regulatory defaults within AERMOD to predict SO_2 design values, unless an entity seeking to use a Beta option has gained formal approval to use an alternative model.

Comment: Two commenters (0296-FirstEnergy, 0299-OH Utilities Group) stated that Ohio EPA met the recommendation of Appendix W, Section 3.2.2. The commenters stated there is peer-reviewed work published with respect to LOWWIND3 in Paine et.al. (2015).

Another two commenters (0310-NAAQS Implementation Coalition, 0329-UARG) requested that the EPA reopen comment on the Appendix W Proposal for the limited purpose of allowing the public to respond on the record to critical evaluations of LOWWIND3 not available prior to the close of the comment period. One commenter ((0310-NAAQS Implementation Coalition) stated that, in their review of the Appendix W Proposal's official docket, there is just one comment containing specific concerns with the performance of LOWWIND3, while a substantial majority of the comments were generally supportive. The commenter ((0310-NAAQS Implementation Coalition) also stated that the EPA's rationale for not including LOWWIND3 is unclear. According to the commenter, the EPA proposed to include LOWWIND3 in the Appendix W Proposal because it "improve[s] model performance," but then the EPA refused to use LOWWIND3 for SO_2 designations on grounds that it has not been demonstrated to "statistically improve [model] performance."

EPA's Response:
EPA does not consider the request to reopen the public comment period for its proposed revisions to the *Guideline on Air Quality Models* (July 2015) to be within the scope of these final designations. Pending completion of that rulemaking, we have explained that for these designations it is necessary to gain approval of any regulatory application of an alternative model (i.e. AERMOD with use of LOWWIND3 and/or adjusted u* Beta options) as noted in Section 2 of the SO_2 modeling TAD (first draft available in May 2013). The use of AERMOD beta options was discussed at the 11th Modeling Conference in August 2015 and subsequently clarified in a December 10, 2015, memorandum. They are also discussed in Section 2 of the latest version of the SO_2 Modeling TAD (August 2016). The information brought forward by the commenter would need to be formally considered on a case-by-case basis as part of that process. While a state or industry may have run AERMOD using the Beta options, EPA will only consider modeling analyses that used the current regulatory defaults within AERMOD to predict SO_2 design values for the designations due July 2, 2016, unless an entity seeking to use a Beta option has gained formal approval to use an alternative model.

Comment: Two commenters (0329-UARG and 0328-Luminant) explained (that AECOM's recent analyses provide added justification for accepting modeling with the LOWWIND3 option as the basis for an attainment designation. The commenter noted that the EPA explains its reluctance to accept use of the low wind speed options with AERMOD on the basis that it is still reviewing "a number of public comments specific to the LOWWIND3 beta options." According to the commenter however, only one comment by Sierra Club provided a substantive critique of low wind speed options with AERMOD. The commenter attached a report, prepared by Christopher Warren and others at AECOM Environment, which refutes the concerns expressed in Sierra Club's comments and provides further evidence that the LOWWIND3 option improves AERMOD's performance.

EPA's Response:

Pending completion of the separate rulemaking referenced by commenter, the EPA has explained that for these designations it is necessary to gain approval of any regulatory application of an alternative model (i.e. AERMOD with use of LOWWIND3 and/or adjusted u* Beta options) as noted in Section 2 of the SO_2 modeling TAD (first draft available in May 2013). The use of AERMOD beta options was discussed at the 11th Modeling Conference in August 2015 and subsequently clarified in a December 10, 2015, memorandum. They are also discussed in Section 2 of the latest version of the SO_2 Modeling TAD (August 2016). The information brought forward by the commenter would need to be formally considered on a case-by-case basis as part of that process. While a state may have run AERMOD using the Beta options, EPA will only consider modeling analyses that used the current regulatory defaults within AERMOD to predict SO_2 design values for the designations due July 2, 2016 (and as extended), unless an entity seeking to use a Beta option has gained formal approval to use an alternative model.

Comment: One commenter (0329-UARG) stated there are no legal barriers to EPA's reliance on the ADJ_U* and LOWWIND3 options. Commenter stated that section 3.2.2 of the current regulatory Guideline gives responsibility for approving an alternative model solely to the Regional Office. Commenter also stated that the Guideline does not apply to modeling for initial designations because it applies only to State Implementation Plan revisions for existing sources and to new source reviews. Commenter stated that the Modeling Technical Assistance Document (TAD) specifies that it does not impose binding and enforceable requirements or obligations and is not final agency action.

EPA's Response:
The Beta options are currently being considered as part of an ongoing separate rulemaking process and have not been formally adopted into the regulatory version of AERMOD, and pending completion of that rulemaking EPA considers the use of AERMOD run with non-regulatory options as an alternative model. EPA has discussed the process to gain approval of alternative models in previous responses to comments in this section. The necessity for this EPA approval of any regulatory application of an alternative model is described in Section 2 of the SO_2 Modeling TAD (first draft available May 2013) and the Beta options are discussed in the latest version of the TAD (August 2016). Furthermore, the use of AERMOD Beta options was discussed at the 11th Modeling Conference in August 2015 and subsequently clarified in a December 10, 2015, memorandum. In order to obtain EPA approval to run AERMOD using the

Beta options, the alternative model demonstrations must first be submitted to the EPA Region for approval and concurred with by the Model Clearinghouse. At this time, EPA will only consider the modeling analyses that used the current regulatory defaults within AERMOD to predict SO_2 design values for the designations due July 2, 2016 (and as extended), unless an entity seeking to use a Beta option has gained formal approval to use an alternative model consistent with this longstanding process. Where such a request has not been submitted and approved for a specific case, EPA cannot rely upon modeling results that use these Beta options in making its final designation. The SO_2 Modeling TAD is EPA guidance regarding compliance with the relevant statutory and regulatory requirements, and the TAD recommends that the designations modeling should rely upon the principles and techniques in the *Guideline*, Appendix W.

Comment: One commenter (0332-Sierra Club) stated that ADJ_U* and LOWWIND3 have been shown to decrease model performance and accuracy and should not be relied on by EPA. Commenter provided an attachment to their comments (Exhibit 6) which describes the flaws commenter sees in these options. Commenter stated that use of these options would cripple the efficacy of AERMOD, and lead to significant under-prediction of air pollution impacts. Commenter stated that, to the extent that states or industry submit modeling analyses that incorporate use of these options, EPA should reject them as being inconsistent with regulatory guidance and for the identified issue of inaccuracies flowing from their use. Commenter stated that, in instances where states or industry submit modeling incorporating these options and accompany it with information purporting to justify use of the non-regulatory default configuration of AERMOD, EPA should look very closely at the submissions, the submissions should only be considered as a sensitivity analysis, and the submissions should be accompanied by modeling performed according to EPA's guidance using the regulatory default configuration of AERMOD.

EPA's Response:
EPA clearly described the necessity for approval of any regulatory application of an alternative model in Section 3 of the SO_2 modeling TAD (first draft available in May 2013). Furthermore, the use of AERMOD beta options was discussed at the 11th Modeling Conference in August 2015 and subsequently clarified in a December 10, 2015, memorandum and also discussed in Section 2 of the latest version of the modeling TAD (August 2016). In order to obtain EPA approval to run AERMOD using the Beta options, the alternative model demonstrations must first be submitted to the EPA Region for approval and concurred with by the Model Clearinghouse. At this time, EPA will only consider modeling analyses that used the current regulatory defaults within AERMOD to predict SO_2 design values for the designations due July 2, 2016 (and as extended), unless an entity seeking to use a Beta option has gained formal approval to use an alternative model consistent with this longstanding process. In either granting or not granting such approval, the EPA is not taking final action with respect to the pending separate Appendix W rulemaking, or pre-judging its future outcome in any way.

2. Modeling to determine attainment status

Comment: One commenter (0332-Sierra Club) stated that dispersion modeling is a rigorously verified method for evaluating impacts on the SO_2 NAAQS, and has a lengthy and court-validated history as an appropriate tool for use in designations. Commenter provided a detailed

discussion (pdf pages 6-9 of commenter's letter) to support their position that aerial dispersion modeling is the appropriate approach to ascertaining attainment status under the SO_2 NAAQS. Commenter provided several references to support their position, including: the final SO_2 NAAQS Rule, *Implementation of the 1-Hour SO_2 NAAQS Draft White Paper for Discussion,* EPA's 1994 SO_2 Guideline Document, Respondent's Opposition to Motion of the State of North Dakota for a Stay of EPA's 1-Hour Sulfur Dioxide Ambient Standard Rule (attached to commenter's letter as Exhibit 1), and Sheldon Meyers Memorandum re Section 107 Designation Policy Summary (April 21, 1983) (attached to commenter's letter as Exhibit 2). Commenter also cited several court cases and statements from EPA staff (attached to commenter's letter as Exhibits 3 and 4) to further support their position. Commenter stated that EPA's practice that all nitrogen dioxide, fine particulate matter and SO_2 PSD increment compliance verification analyses are performed with air dispersion modeling demonstrates that modeling is a technically superior approach for ascertaining impacts on NAAQS.

One commenter (0332-Sierra Club) stated that AERMOD accurately models medium-to-large SO_2 sources—even with conditions of low wind speed, the use of off-site meteorological data, and variable weather conditions. Commenter stated that AERMOD has been tested and performs very well during conditions of low wind speeds (see Exhibit 5 attached to commenter's letter). Commenter stated that EPA's use of air dispersion modeling and AERMOD in particular was upheld in the context of a recent CAA section 126 petition for resolution of cross-state impacts.

One commenter (0332-Sierra Club) stated that, by modeling a source to ascertain its impact on the NAAQS, regulators are simultaneously determining how much emissions need to be reduced to avoid causing NAAQS exceedances. Commenter stated that using modeling for and from designations purposes in nonattainment SIP preparation thus can help states and EPA avoid the chronic problem of late NAAQS implementation. Commenter stated it can also be a powerful tool in enabling EPA to prepare federal implementation plans for states that have failed to prepare their SIPs. Commenter stated the EPA should make clear to the states that they can and must submit nonattainment SIPs by the required deadline, and that if not, EPA will use the modeling before it to generate and promulgate federal implementation plans, and will do so far sooner than the expiration of the two-year deadline the Clean Air Act affords EPA.

EPA's Response: EPA appreciates the commenters' support of the use of dispersion modeling for *SO_2 NAAQS* designations. In this action the EPA is not addressing the submission of nonattainment SIPs or federal implementation plans; comments related to these separate issues are out of scope of the current final action

3. AERMOD FLAGPOLE option

Comment: One commenter (0332-Sierra Club) stated that flagpole receptors are part of the regulatory default AERMOD configuration and their use can only make modeling results more relevant. Commenter stated that, since people breathe through their noses and mouths, not through their shoes and socks, modeling impacts at face-height instead of at foot-height is better practice. Commenter stated this is in part why air monitoring sensors are likewise not placed directly on the ground. Commenter stated that criticisms of Sierra Club modeling on the basis of the use of the FLAGPOLE option should be disregarded.

EPA's Response:

EPA disagrees with the statement that the flagpole receptors are part of the regulatory default AERMOD configuration. While not a Beta option, the flagpole receptors must be specified and therefore are not part of the default options. EPA has stated in Section 4.2 of the SO_2 NAAQS Designations Modeling Technical Assistance Document (TAD) that the use of flagpole receptors is not necessary. The TAD also states that Appendix W does not specify receptors be placed at levels other than ground level for comparison to the NAAQS. The use of flagpole receptors in specific cases of modeling is addressed in the Technical Support Document (TSD) for those areas, and/or in responses to comments on the EPA's intended designations for those areas.

B. Designation Categories

Comment: Two commenters (0301-IN Municipal Power, 0302-Duke Energy) supported an "attainment" rather than "attainment/unclassifiable" designation and stated that section 107 of the Clean Air Act does not appear to provide for the "attainment/unclassifiable" designation category. Also see section IX.A. Gibson County in the June 30, 2016, RTC.

One commenter (0329-UARG) stated the CAA does not provide for an unclassifiable/attainment designation and it does not authorize EPA to add to additional designations to those specified in the Act. Commenter stated that, where EPA finds that an area attains the NAAQS, the Agency has no basis for designating it anything other than attainment. Commenter stated that making an attainment designation is important because it conveys to those in the area or who may be considering moving to the area that air quality there meets health-based standards. Commenter stated that a designation of unclassifiable/attainment does not convey that same message and should not be used.

EPA's Response: In the March 20, 2015, guidance memo (Steve Page, Director EPA-OAQPS to Regional Air Directors, Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard) and the August 21, 2015, Data Requirements Rule final rule Federal Register notice the EPA stated that, while states have and may continue to submit designations recommendations identifying areas as ''attainment,'' the EPA expects to continue its traditional approach, where appropriate, of using a designation category of ''unclassifiable/attainment'' for areas that the EPA determines meet the 2010 SO_2 NAAQS. In this action, the EPA is using the designation category of "unclassifiable/attainment" for areas that are meeting the 2010 SO_2 NAAQS, and is using the category ''unclassifiable'' for areas where the EPA cannot determine based on available information whether the area is meeting or not meeting the NAAQS or where the EPA cannot determine whether the area contributes to a violation in a nearby area. The EPA is not establishing an additional designations category with this long-standing approach. Moreover, none of the four areas designated in this supplemental action are being designated "unclassifiable/attainment". The EPA also disagrees that longstanding use of the unclassifiable/attainment designation conveys the negative message claimed by the commenter, as the designation is premised on an EPA finding that the area is meeting the NAAQS. In any event, the EPA notes that there is no difference in terms of

resulting regulatory burden between an unclassifiable, unclassifiable/attainment, or attainment designation, so the use of the unclassifiable/attainment term imposes no injury on any party.

C. Monitoring

Comment: One commenter (0328-Luminant) asserted the EPA's proposal is unlawful and should not be finalized, in part, because EPA has consistently supported monitoring over modeling for NAAQS designation purposes and its new approach here is inconsistent with the statute, regulations, and EPA's prior practice. Commenter claims the EPA should utilize monitoring data, not modeling data if it is going to overturn the State of Texas' recommended designations in favor of its own designations. Commenter supported the TCEQ's (0294-TCEQ) position that monitoring data is necessary to accurately characterize actual air quality for attainment and nonattainment designations. Commenter asserted the EPA has been clear that monitoring data is preferred for NAAQS designations, and EPA's offer for states to use modeling for the SO_2 NAAQS was simply intended to provide states with another option. Commenter claimed that modeling was intended to provide an opportunity for states to avoid the cost and resources associated with siting, installing, and maintaining monitors where the state preferred to rely on modeling. Commenter alleges that the EPA's new approach here to *require* modeling and rely solely on that data for designations is inconsistent with the statute and EPA's prior practice.

One commenter (TX Response) asserted that when modeling and monitoring data conflict, courts have acknowledged that actual air monitoring data is superior to modeling data so long as the monitor is sufficient to accurately represent the area in question. *E.g., Republic Steel Corp. v. Castle,* 621 F.3d 797, 805 (6th Cir.1980); *PPG Industries, Inc. v. Castle,* 630 F.3d 462, 467-68 (6th Cir. 1980).

One commenter (TX Response) stated that a designation of nonattainment has serious consequences to industry, the economy of an area, its citizens, and the state. Commenter claimed that nonattainment designations should only be made based on data from 40 CFR Part 58 compliant (regulatory) monitoring showing a violation of the standard. Commenter stated that using modeling to determine a nonattainment designation could result in major capital expenditures for industry to address an issue that may not be an actual problem. Commenter stated that air modeling analyses are a useful tool in determining the impact of a new or modified facility for permitting purposes but not for predicting future design values to demonstrate attainment of NAAQS. Commenter asserted that, because of the magnitude of the potential impact areas may face due to a nonattainment designation, such a determination should be based only on real world, monitored data, and not predicted values subject to the limitations and flaws of a model.

EPA's Response: The June 30, 2016, version of the Response to Comments document noted that EPA was not at that time taking final action on the Texas areas for which the agency had issued intended nonattainment designations on March 1, 2016 and also the Milam County (Sandow facility), but also provided general responses to the issues raised by commenters who had objected to those intended designations. The EPA is now taking final action in this supplemental action to designate the areas in Texas that had been proposed as nonattainment designations.

The EPA maintains our previous position for the reasons delineated in the preamble to the final rule of the 2010 SO_2 NAAQS rulemaking, the February 2013 Strategy Paper, the proposed and final SO_2 Data Requirements Rule, and in the June 30, 2016, version of the Response to Comments document for why both air quality modeling and ambient monitoring are appropriate tools for characterizing ambient air quality for purposes of informing decisions to implement the SO_2 NAAQS, including designation determinations. The EPA's reliance on modeling to assess SO_2 air quality status, even in the face of conflicting monitoring, where appropriate, has been judicially affirmed. See, e.g., *Montana Sulphur & Chemical Company v. EPA*, 666 F.3d 1174, 1185 (9th Cir. 2012). Moreover, it has long been the EPA's practice to rely upon appropriate modeling when issuing designations under SO_2 NAAQS. See, e.g., 43 FR 8962 (March 3, 1978), 43 FR 40416 (September 11, 1978), 43 FR 40502 (September 12, 1978). The commenters are therefore incorrect to assert that the EPA's use of modeling to support determinations under the 2010 SO_2 NAAQS reflects a change from prior SO_2 practice. EPA has also explained the importance of using modeling information for source-oriented pollutants such as SO_2 in cases where existing monitors do not adequately characterize peak ambient concentrations. See, e.g., Memorandum from Sheldon Myers, Director, EPA Office of Air Quality Planning and Standards, to Regional Office Air Division Directors, "Section 107 Designation Policy Summary," April 21, 1983. All designation determinations made by the EPA in this final action are based on the EPA's complete and thorough review and analysis of all available information, as described in the final technical support document in this docket. Although it is true that the use of modeling can often be more economically efficient than installing and operating monitors, as the commenter observes, it is not true that the EPA's approach to designations under the SO_2 NAAQS represents an outright requirement to model, as the commenter alleges. Instead, where monitors have been shown to be representative of maximum ambient air concentrations, the EPA fully considers the information they provide and may base SO_2 NAAQS designations on such data. But not all monitors are so correctly sited, as the EPA has consistently observed in establishing and implementing this NAAQS. Modeling has proved to be an accurate and reliable tool for remedying the occasional weakness of SO_2 monitoring, and obviously in some cases is the only tool available where there is no SO_2 monitor in place to assess air quality. It is not the use of modeling as a measurement tool, therefore, that may result in adverse economic impacts to areas that are shown to be violating the NAAQS and that are designated nonattainment, as the commenter alleges; rather, it is the fact that the area is shown to be violating the NAAQS based on persuasive available information (whether resulting from monitoring or modeling) and under the CAA must be designated as nonattainment.

Comment: One commenter (0329-UARG) suggested that an area conducting monitoring consistent with EPA Guidance should be designated unclassifiable and allowed to complete three years of monitoring as long as monitored air quality remains below the NAAQS. Commenter stated that awaiting monitoring results would also be appropriate if modeling studies have produced differing predictions regarding NAAQS compliance. Commenter stated that providing the opportunity for such monitoring could allow an area in which monitoring demonstrates that the 1-hour SO_2 standard is attained to avoid costly implementation measures.

EPA's Response: As stated further above, the EPA maintains the position that both air quality modeling and ambient monitoring are appropriate tools for characterizing ambient air quality for purposes of informing decisions to implement the SO_2 NAAQS, including designation

determinations. In response to the commenter's suggestion that designations should await future completion of three years of monitoring, the EPA notes that in the case of the designations subject to the court's order to designate certain areas by July 2, 2016, the agency does not have the discretion to await the results of future monitoring.

Comment: One commenter (0328-Luminant) explained (pdf pages 36-42) why they believe AERMOD is not a reliable approach for NAAQS designations, and cannot substitute for the preferred option of monitoring.

EPA's Response: As stated in a previous response, the EPA maintains the position that both air quality modeling and ambient monitoring are appropriate tools for characterizing ambient air quality for purposes of informing decisions to implement the SO_2 NAAQS, including designation determinations.

D. Consent Decree

Comment: One commenter (0328-Luminant) asserted that the Consent Decree must be read consistently with the May 13, 2014, proposed Data Requirements Rule (DRR). Commenter claimed the EPA cannot now contravene its own regulations and deprive states of the opportunity to utilize monitoring data collected under (or alongside) the rule to inform designations by interpreting the Consent Decree in a manner that forecloses monitoring. Commenter alleged that if EPA interprets the Consent Decree to impermissibly require the use of modeling where sufficient monitoring data is not available, even though monitoring data will be available in the future, its interpretation would effectively abrogate the CAA's unclassifiable designation and EPA's prior statements regarding the importance of the use of monitoring data.

One commenter (0328-Luminant) asserted that, if read to effectively force a certain designation through the application of over-predictive modeling alone, the Consent Decree would not only contravene the CAA, it would also modify the DRR in a manner that deprives the regulated community of its ability to meaningfully comment, which is an improper rulemaking and impermissible under the Administrative Procedure Act. Commenter claimed that the proposed DRR, for instance, did not say the rule's procedures allowing states until 2020 to issue recommendations for areas relying on monitoring did not apply to areas with "large" (as defined specifically for this purpose for the first time in the Consent Decree) stationary sources.

One commenter (0328-Luminant) alleged the Consent Decree imposes impermissible legal obligations on states that did not consent to the decree.

EPA's Response: The EPA noted in the June 30, 2016, version of the Response to Comments document that it was not then taking final action on the areas the commenter was addressing, but explained that the commenter's objections to the consent decree, as well as the commenter's views regarding the Data Requirements Rule, are beyond the scope of the final rule issuing designations of the areas then covered. The comments are also beyond the scope of this supplemental final action designating four additional areas in Texas. EPA notes that our authority for this final action is CAA Section 107(d), which required the EPA to promulgate

designations for the 2010 SO_2 NAAQS no later than three years after the date of promulgation of this NAAQS, as the EPA exercised the available one-year extension available under the Act. As stated further above, the EPA maintains our previous position that both air quality modeling and ambient monitoring are appropriate tools for characterizing ambient air quality for purposes of informing decisions to implement the SO_2 NAAQS, including designation determinations. Furthermore, the Consent Decree referenced by commenter sets dates the EPA must act by, not dates that the EPA must wait until to act, and it in no way prejudges what information may be considered or found to be most persuasive in issuing final designations when EPA does act. Additionally, the SO_2 Data Requirements Rule does not restrict the EPA's CAA Section 107(d) authority, but rather will provide future air quality data developed by air agencies that may be used by the EPA in future actions to evaluate areas' air quality under the 2010 SO_2 NAAQS, including area designations and redesignations, as appropriate. Nothing in either the consent decree or the Data Requirements Rule has determined the substantive outcome of any of the final designations being issued in this final rule. The commenter is clearly incorrect that either the consent decree or its relationship to the Data Requirements Rule precludes EPA from issuing designations other than nonattainment, as was amply shown in the June 30, 2016, designations action and is again shown in this supplemental final action for the additional four areas in Texas. Moreover, the consent decree did not modify the Data Requirements Rule (in fact, it and the court's order were entered before the final Data Requirements Rule was promulgated), so it is impossible to regard the court's order as having unlawfully amended a regulation that did not yet exist. The Data Requirements Rule has now been promulgated, is in effect, was never challenged in court, and states and the EPA are proceeding to implement it.

Comment: One commenter (0332-Sierra Club) stated that, in completing area designations, it is critical that EPA consider all SO_2-emitting sources in the areas under consideration for the 2016 designations round, and not merely the sources who meet the triggering criteria of the Consent Decree. Commenter stated that, because the Consent Decree speaks in terms of *areas* to be evaluated, not *sources,* it would be contrary to the Consent Decree if EPA were to finalize designations based solely on sources fitting the Consent Decree criteria. Commenter stated that the Modeling TAD provides that "all sources expected to cause a significant concentration gradient in the vicinity of the source of interest should be explicitly modeled". Commenter stated that, in performing its own air quality modeling, the Sierra Club and others have used the 50 km modeling domain of AERMOD as a tool in determining what sources to include in area modeling evaluations and the EPA should do the same.

EPA's Response: As explained in each area's Technical Support Document, in this final designations rulemaking the EPA appropriately evaluated all SO_2-emitting sources that were expected to have impacts on the subject area, and the agency refers to those TSD and/or specific responses to comments for those areas for further explanation of the scope of each area's analysis.

E. Consider all information in the record

Comment: One commenter (0332-Sierra Club) supported the EPA's use of a mixture of state, industry, and public health and environmental submissions of data, including modeling data. Commenter stated the EPA has properly elected to consider all information before it in keeping

with foundational principles of administrative law. Commenter expressed concern that, if EPA were to ignore materials it receives from environmental and public health organizations or from concerned citizens while it was simultaneously accepting and considering materials submitted by states, this would arbitrarily skew EPA's analysis—particularly if state comments are responsive to or critique comments submitted by the public.

EPA's Response: As described further in the final technical support documents, EPA reviewed and analyzed all available information in determining designations in this final action.

G. Other Comments

Comment: Some commenters generally supported action for clean air with the following statements: I support clean air (0214-APC); we want clean air and a serious effort to halt climate change (0216-APC); clean, clear, heathy air is needed and has been needed for a long time (0217-APC); it would be a gross miscreance to allow our health to be compromised by classifying the air quality standards "attainment" (0265-APC); pollution matters (0276-APC); rights to clean air should trump these companies rights (0215-APC); As someone with asthma, I need the air to be as clean as possible (0237-APC).

EPA's Response: The EPA notes that the EPA established the 75 parts per billion (ppb) primary 1-hour SO2 standard at issue in this action's designations to protect against health effects associated with SO_2 exposure, including a range of serious respiratory illnesses. As described further in the final technical support documents, EPA reviewed and analyzed all available information in determining appropriate designations in this final action.

Comment: One commenter (0329-UARG) noted that inaccurate "nonattainment" designations lead to unnecessary planning and emission control expenses. Indeed, even an area receiving an unwarranted "unclassifiable" designation may find itself stigmatized when seeking economic growth. The commenter urged EPA to give significant weight to states' designations for areas within their borders and to exercise restraint in modifying those designation recommendations.

EPA's Response: As described further in the final technical support documents, EPA reviewed and analyzed all available information in determining designations in this final action.

Comment: One commenter (0245-APC) supported a designation of nonattainment, but did not identify the area.

EPA's Response: The EPA thanks the commenter for their submission, but was unable to ascertain on the information provided which area commenter was referring to. Regardless, as described further in the final technical support documents, EPA reviewed and analyzed all available information in determining designations in this final action.

Comment: One commenter (0311-APC) stated Ameren should be held to the law and do the right thing for future generations.

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EPA's Response: As described further in the final technical support document for the area at issue in this comment, EPA reviewed and analyzed all available air quality characterization information in determining the appropriate designation in this final action.

Comment: One commenter (0207-APC) suggested the EPA should go after companies who dump illegally around Curtis Bay rather than a high profile power station that keeps utilities affordable.

EPA's Response: The EPA thanks the commenter for this submission but notes this comment is out of scope of the current final action regarding the EPA's mandatory duty to designate areas under the 2010 SO_2 NAAQS.

IV. Texas

General Comments

1. ***Comment:*** Commenter (0294-TCEQ) asserted that the nonattainment designations that the EPA proposes for portions of Freestone, Anderson, Rusk, Gregg, Panola, and Titus Counties appear to have been based solely on third-party, non-peer reviewed modeling that has errors and clearly overestimates actual SO_2 concentrations as evidenced by the actual monitoring data in the proposed Gregg County nonattainment area.

EPA's Response: The EPA disagrees with the commenter's claim that the modeling supporting the nonattainment designations is erroneous and overestimates SO_2 concentrations in these areas. Although it is true that the modeling was provided by a party other than TCEQ and was not peer-reviewed, neither of these facts is relevant to whether the modeling accurately, reliably, and persuasively shows the areas to be violating the NAAQS. The EPA has concluded that, in these cases, the modeling is more informative than the monitoring information. The monitoring information provided is for monitors not sited to monitor the most likely areas of highest impacts around these four sources. Therefore, the monitoring data is of little/no value in determining whether the areas around the source are in attainment or nonattainment. We relied on modeling submitted to us in December 2015 for our proposal. During the comment period, we received additional modeling. The newest Sierra Club modeling includes refined inputs for stack and emissions data and several sensitivity runs that further inform our final decision. The EPA refers the commenter to the TSDs for these areas for our full evaluation of the available information. In our TSDs for our proposal and supplement for this action we explain that we have reviewed the modeling data and concluded that the modeling was of sufficient quality to make a decision regarding whether the area evaluated meets or does not meet the SO_2 NAAQS.

In our proposal, we included a portion of Gregg County in the area intended to be designated as nonattainment. As pointed out by the commenter, a monitor is located in this portion of Gregg County which has not recorded a violation of the SO_2 NAAQS. This monitor is not located in an

area expected to receive the highest impact of SO_2 emissions.as it is approximately 19 km from Martin Lake. As discussed above, during the public comment period, we received revised modeling from Sierra Club with more refined inputs for stack and emissions data. Based on our analysis of this new refined and updated modeling EPA has reduced the geographic scope of the nonattainment area for each of these areas. This modeling showed smaller areas of nonattainment, and we found it to be the best modeling available to serve as the basis for our decision. In particular, in our final action, we are not including the portion of Gregg County in the area designated as nonattainment. In the other two nonattainment designations, we also reduced the size of the nonattainment areas but did not change the counties that were included.

2. ***Comment:*** Commenter (0294-TCEQ) claimed that for Milam County, the State's recommended unclassifiable/attainment designations are more appropriate than the EPA's unclassifiable designation because no SO_2 monitoring data exists for Milam County.

EPA's Response: EPA received no modeling, monitoring, or other information for Milam County. In the absence of information sufficient to determine whether an area is meeting or not meeting the standard or whether it contributes to an area that is not meeting the NAAQS, an unclassifiable designation is appropriate. Under the Data Requirements Rule, Texas will be expected to provide either modeling or monitoring information to further characterize the air quality of Milam County (unless the SO_2 source in Milam County limits the source's SO_2 emissions to less than 2,000 tons per year in lieu of characterization), and after the EPA receives that information the agency has discretion to consider whether to initiate action to redesignate that area based on that information. We proposed designating Milam County as unclassifiable, and we are finalizing the designation of unclassifiable as proposed, in the absence of available information that supports any other designation.

3. ***Comment:*** As described in commenter's (0274-Mann) letter, over 1300 Sierra Club members and supporters in Texas submitted personal comments (attached to commenter's letter) to Administrator McCarthy in support of EPA's proposed SO_2 nonattainment designations near the three Luminant plants (Big Brown, Monticello, and Martin Lake). Commenters generally claimed that the three Luminant power plants in the EPA plan are among the worst polluters in Texas and even in the nation because none of them have modern pollution controls for sulfur dioxide, and asserted that it is time that these old plants are held to the public health standards that exist to ensure healthy air for all.

EPA's Response: EPA appreciates the concerns of the commenters. We note that our proposal was based on the available information regarding SO_2 impacts from the facilities. The EPA takes no position on whether the subject sources are the "worst polluters" either in Texas or nationwide, but instead bases its nonattainment designations for these areas on the available information in the record and the analyses described in our TSDs.

4. ***Comment***: One commenter (0328-Luminant) asserted that the EPA has been clear that monitoring data is preferred for NAAQS designations, and EPA's offer for states to use modeling for the SO_2 NAAQS was simply intended to provide states with another option. EPA's new approach here to *require* modeling and rely solely on that data for designations is inconsistent with the statute and EPA's prior practice.

EPA's Response: EPA does not require modeling as the only option available when conducting SO_2 designations. EPA is considering all information made available to it for all SO_2 designations. For the Luminant facilities, the data included available existing SO_2 monitoring data and modeling conducted by Luminant and other parties. In both cases, the information was evaluated using the guidance provided in the Technical Assistance Documents (TAD) for monitoring and modeling for applicability and representativeness to each source. The submission of the modeling data by other parties for locations that lack adequate and representative monitoring data identifying maximum ambient SO_2 concentrations has provided valuable information that has assisted EPA in SO_2 designations.

5. ***Comment:*** One commenter (0328-Luminant) stated that the EPA should uphold the State of Texas' recommended designations or at most, and as it did for Sandow, designate the areas around Martin Lake and Big Brown unclassifiable and allow the installation of monitoring equipment to properly evaluate and measure actual air quality for the purposes of designating attainment and nonattainment areas. Commenter asserted that, based on conservative modeling of future operating conditions, areas around Martin Lake and Big Brown, which include Rusk, Panola, Freestone, and Anderson Counties, should be designated unclassifiable/attainment, and the area around Monticello, which includes Titus County, should be also be designated attainment, unclassifiable, or unclassifiable/attainment.

   One commenter (TX Response) stated the recent Luminant (March 2016) modeling analyses use source characterization techniques (AERLIFT and AERMOIST) as well as the low wind options (ADJ_u* and LOWWIND3) to address several technical issues related to AERMOD. Commenter stated the EPA and stakeholders discussed some of these technical issues during the 10th Modeling Conference, 11th Modeling Conference and the Regional, State, and Local Modeling Workshops in 2012, 2013, and 2014. Commenter stated that, while TCEQ did not have time to review the appropriateness of the source characterization techniques, Luminant provided documentation of peer-reviewed and published scientific literature to support the use of each technique and option (included in TX Response, Attachment 5). Commenter stated that the report states that the modeling results do not account for the penetrated plume over-prediction, which could easily result in lower predicted concentrations.

   One commenter (TX Response) asserted that air quality monitoring is the only way to accurately characterize air quality. Commenter stated that, while AERMOD is a useful tool in certain situations, it does have known technical issues and the information provided by Luminant should be considered as additional support for the unclassifiable/attainment designations recommended by Texas for Titus, Freestone, and Rusk Counties.

EPA's Response:
EPA must consider all valid information in making our designation decisions. As discussed elsewhere, EPA believes valid modeling and appropriate monitoring can inform our decision. In the case of Sandow, neither monitoring nor modeling was provided, so an unclassifiable designation was appropriate. For the areas around Big Brown, Martin Lake, and Monticello,

EPA was provided valid modeling by Sierra Club, based on recent actual emissions which showed areas above the SO_2 standard. For a complete review of this modeling see the TSD for this action. EPA also evaluated available monitoring data for Gregg County, and determined it was not representative of the maximum impacts around Martin Lake. The closest monitoring data around Monticello or Big Brown were in nearby counties and were not representative to inform designation for these two sources.

The commenter further refers to modeling provided by Luminant to support their view that based on future emission levels (estimated 2017-2019 emissions), the area will continue to meet the standard. even if it does not meet it now. While the commenter indicates that emissions will continue to drop in the future compared to recent actuals, no permanently enforceable limits have been taken that would make such emission reductions enforceable. Furthermore, EPA cannot make its designation decision based on future conditions but must make its decision based on the state of air quality at the time of designation. Finally, as discussed in more detail later, EPA does not believe the Luminant modeling is valid because it relies on unapproved modeling options and processes.

The term "conservative" is frequently used in discussions of modeling possibly either over-predicting or under-predicting ambient pollution concentrations. Thus, the term is often used to mean the opposite of what it may mean in another case. We have tried in this document and in the TSD to make clear when we are using the term in either sense. In the case of this comment, the term "conservative" was being used to describe the commenter's view that modeling is over-predictive of concentrations. EPA does not agree that the modeling analysis from Sierra Club that we utilized in our proposal necessarily is "conservative" in the sense that it overestimates impacts. We also note that we have more refined modeling with sensitivity analyses provided by Sierra Club in March 2016 that we analyzed and are utilizing to inform our final decision. As discussed elsewhere in this RTC and the supplemental TSD, we do not find the latest Sierra Club modeling to overestimate impacts and find that the March 2016 modeling is more refined than the modeling we utilized in our proposal. Our evaluation indicates that it may actually have a slight underestimation bias since, for example, the modeling did not include surrounding SO_2 sources and used a very low background concentration. A more complete discussion of EPA's technical evaluation of the adequacy of AERMOD and the modeling submitted by Sierra Club and Luminant and any available monitoring data for these areas is found in the TSD for this supplemental final action, and in the draft TSDs for the intended Texas designations.

In regards to Texas referring to the Luminant modeling supporting a designation other than nonattainment, we have analyzed the Luminant modeling and found it to be unacceptable and not useful for informing our designation decisions. See other responses in this document and our supplemental TSD for this action for our full analysis and conclusions. In regards to the comment about using monitoring data only for designations, see response in III. C. and elsewhere in this RTC and TSD for this action.

6. ***Comment:***
One commenter (0328-Luminant) stated that, in a similar situation, EPA rejected modeling prepared by Sierra Club for the Gibson Station in Indiana. Commenter asserted that 1) Luminant has applied a similar analysis to the Sierra Club modeling submitted for its Big

Brown, Martin Lake, and Monticello facilities, 2) Sierra Club has likely over-predicted the concentrations of SO_2 in the area around those facilities, and 3) the modeling does not "clearly demonstrate" nonattainment.

EPA's Response:
In Gibson, EPA reviewed modeling from Sierra Club and the state, and historic and current monitoring data. EPA did not "reject" Sierra Club's modeling but rather concluded that the state's modeling, which incorporated downwash effects and variable stack parameters, was more representative than Sierra Club's. The state's modeling indicated areas of elevated concentration that directionally aligned with historic monitoring network sites that had been sited based on previous modeling to pick up high values around the source, which was unusually broad in scope and duration, and with the current monitors. EPA concluded that a considerable historical monitoring record, the best available modeling information, and other information indicate that the two current monitors in the area are operating where the EPA expects that the sub-areas of maximum concentrations are located, and thus that the two monitors are the best indicators of air quality in those sub-areas and that attainment in these sub-areas suggests that the entire area around Gibson is attaining the SO_2 standard.
In the case of the Big Brown, Martin Lake, and Monticello facilities, no such well-sited monitoring data exists. The closest monitor to Martin Lake is approximately 19 km from the source and the closet monitor to Big Brown is approximately 40 km, therefore they are clearly not sited to pick up the maximum impacts of these two facilities. No monitor exists near to the Monticello facility. Sierra Club provided additional modeling during the comment period that estimated a smaller exceedance area and lower overall maximum values for these three facilities that we have additionally reviewed to inform our supplemental final action. We have evaluated the more recent Sierra Club modeling and do not agree with the commenter that it over-predicts concentrations in the areas of these three facilities. As discussed in our final TSD of this supplemental action, the Sierra Club modeling followed our guidance in the Technical Assistance Document in most respects. The final Sierra Club modeling provided during the comment period included additional refinements by including the variation in stack velocity for the three-year period that were modeled and a number of model sensitivity runs. In fact, our analysis is that the final Sierra Club modeling is likely conservative in the area and magnitude of the projected nonattainment because, for example, some nearby large sources were not included in the model and a low background concentration was utilized. As a result, we are concluding from our evaluation that the modeling clearly demonstrates there is an area of nonattainment around each of these three facilities, in the boundaries finalized in this supplemental action. For more information, see the responses to other comments and the final TSD for this supplemental final action.

7. ***Comment:*** EPA rejects Sierra Club's modeling for the Gibson area for the lack of "[u]se of hourly stack parameters more accurately characterize plume characteristics, which will provide greater reliability both in the estimated concentration and in the geographical distribution of concentrations." But for the same error in Sierra Club's modeling of the Martin Lake area, for example, EPA simply states that Sierra Club did not use variable stack temperatures and velocities "because they [we]re not publically (sic) available."

EPA's Response:

As discussed in response to comment 5 above, there are major differences between the monitoring data available for the Gibson source area and for the three Luminant sources (Martin Lake, Big Brown and Monticello).

Unlike for the Gibson area, Martin Lake, Monticello, and Big Brown did not have such monitoring data from well-sited monitors in the expected areas of maximum ambient concentrations. Therefore, we have only the available modeling data on which to base our final designations of these areas. Luminant did not provide acceptable modeling that followed the TAD. See elsewhere in this supplemental Response to Comments and in the supplemental TSD for our evaluation of the Luminant modeling for their Texas sources and why it was not acceptable. Based on our evaluation of the available data, Sierra Club's more recent modeling is mostly consistent with our guidance and provides the best assessment of air quality around these Luminant sources and informs our final designation.

We specifically note that Sierra Club provided modeling during the comment period that did factor in the hourly stack velocities for these Luminant sources. This refinement along with other adjustments such as the removal of some nearby sources from the model, using a lower background concentration and updating the years modeled for two of the sources resulted in a smaller estimate of the area and magnitude of nonattainment. EPA concludes that the modeling provides reliable information to inform our decision.

Furthermore, there were other issues in the Sierra Club modeling for Gibson in addition to the lack of hourly stack parameters. As explained in the proposed TSD materials for Gibson County, Indiana had identified a number of issues with modeling parameters used by Sierra Club to characterize the meteorological and surface conditions of the Gibson area. With respect to surface characterization, Sierra Club used average seasonal moisture conditions, instead of adjusting the surface characteristics based on the number of days with snow cover on the ground during the winter months. Sierra Club also did not adjust the Bowen ratio adjustment based on soil moisture and precipitation, an adjustment recommended in 'Regional Meteorological Data Processing Protocol EPA Region V and States.' Thus the non-use of variable actual stack temperature and velocity was just one of several factors that EPA weighed at proposed designation. In the Gibson case, the State had provided more refined modeling (compared to Sierra Club's modeling of Gibson) that did include the variable stack parameters, but neither the state of Texas nor Luminant has provided such acceptable modeling to EPA. As discussed in other responses and in the supplemental TSD, Luminant's modeling included modifications to inputs using non-approved pre-processors (AERLIFT and/or AERMOIST) as well as some beta options (LOWWIND3) that EPA has not approved for use in modeling the Luminant sources.

EPA also noted in the proposed TSD for Gibson that Indiana's modeling, instead, used hourly data for stack gas temperatures and flow rates. In reference to Indiana Department of Environmental Management's (IDEM) modeling, we noted that in important respects, the state characterized the source within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the submitted modeling reflected actual emissions for Gibson. The state also adequately characterized Gibson's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where

appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash.

Although EPA did not rely on the IDEM modeling as the primary basis for its final designation of Gibson, we note that the impact of the use of the variable hourly temperature and velocity on the model-estimated design values in that situation resulted in higher predicted concentrations than did the inputs used by Sierra Club there. We note that there were some concerns that the meteorology data used may not be entirely representative for local transport winds as one of the potential reasons for differences between modeled and monitored values at Gibson. IDEM modeling found that the design value within the chosen modeling domain was 323 μg/m3, or 123 ppb. This modeled concentration did not include any background concentration of SO_2, and was based on actual emissions from Gibson. The Sierra Club modeling in Gibson found a maximum concentration of 276.8 ug/m3 or 105.6 ppb *including background*. Thus, the State's modeling adhering more closely to the TAD indicated even higher concentrations than the more "conservative" Sierra Club modeling. Our analysis of these three Texas areas, as further detailed in the proposed and final TSDs for this supplemental action, showed similar under-prediction in the modeling not using variable stack parameters. Therefore, the objections raised by the commenter, alleging that Sierra Club's similar modeling is "conservative" and likely over-predicting in the Texas areas, actually suggests that the Sierra Club modeling in Texas may be underestimating the maximum SO_2 concentrations relative to a more refined approach.

8. ***Comment:*** One commenter (328-Luminant) stated that for Gibson, there were several ambient monitors located near the source, including monitors near the highest projected concentrations. However, the peak modeled concentration from the State of Indiana's modeling was approximately two times higher than the monitored concentrations from the two monitoring stations near Gibson when excluding background. Based on this, Luminant provided an equation which among other factors attempted to adjust the Sierra Club modeling yearly design values from the proposal modeling down by a factor of 2 for Big Brown, Martin Lake, and Monticello in estimating an overall 2013-2015 design value for the sources.

EPA's Response:
Although EPA based its final designation for Gibson primarily on monitoring data (due to the existence of reliable monitoring in the area of expected maximum concentrations), the State of Indiana's modeling gave significantly higher concentrations for Gibson than did Sierra Club's modeling (323 $\mu g/m^3$ vs <276.8 $\mu g/m^3$) and also higher than the monitored design values. We note that there were some concerns that the meteorology data used may not be entirely representative for local transport winds as one of the potential reasons for differences between modeled and monitored values at Gibson. These differences in a situation with a couple of monitors compared to modeled values does not imply that making the commenter's suggested adjustment to Sierra Club's modeling of the Texas areas would yield a more accurate depiction of ambient concentrations in Texas areas. First, adjusting modeling results based on a one modeling scenario comparison to a few monitors is not appropriate and such approaches of attempting to calibrate the model results are prohibited by the **Guideline on Air Quality Models {GAQM}** (40 CFR Part 51 App. W 7.2.9 Calibration of Models; November 9, 2005). All modeling needs to be evaluated on a case-by-case basis and a scaling factor estimated from one

scenario cannot be extrapolated to another. In this case, since the methodology of the State of Indiana's modeling differed from that used by Sierra Club for the Luminant plants that is another complicating factor. Furthermore, it is even more inappropriate to assume that such an estimated calibration value from Gibson, though not allowed by GAQM, could be used to adjust modeling for the facilities in Texas. The meteorology, emissions, stack parameters, building downwash, property boundaries, and potential distance to receptors are all different for the Luminant sources in comparison to the Gibson source and would result in different dispersion and modeled concentrations.

9. ***Comment:*** One commenter (0328-Luminant) stated the EPA's proposal is unlawful and should not be finalized, in part, because EPA's proposal relies solely on over-predictive Sierra Club modeling of Luminant's facilities. Commenter stated the flaws in Sierra Club's modeling arise from both the over-predictive aspects of its dispersion model and from errors in assessing source characteristics and, once corrected for those flaws, Sierra Club's modeling would show attainment with the standard and therefore should not be relied upon to overturn Texas's recommended designations. Commenter's letter (pdf pages 27-36) details why they believe the Sierra Club's modeling is biased, flawed, and unreliable for the three Luminant plants. Commenter's letter (pdf pages 43-49) details why they believe the areas around Luminant's plants show attainment when Sierra Club's modeling errors are corrected. The commenter made a number of technical comments about the 2015 Sierra Club modeling that EPA evaluated for our proposal. We have broken these technical comments up into sub-comments with individual responses.

   - ***Sub-Comment 9.1:*** One commenter (Luminant) recommended the use of source characterization techniques to improve the realism of modeling. According to the commenter, the Luminant plants at issue here all involve multiple stacks that the commenter asserted would be more accurately modeled through the application of AERLIFT. Also, commenter asserted the Luminant plants with flue gas desulfurization controls that result in moist plumes would be more accurately modeled through the application of the AERMOIST preprocessor.

     EPA's Response 9.1:
     The AERLIFT and AERMOIST preprocessor models have not been subject to the required EPA model evaluation, review, and approval for use in regulatory applications. AERLIFT (a non-EPA preprocessor) 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. It is implemented as a preprocessor which estimates a buoyancy flux enhancement attributed to the merged stack plumes. These calculations are done for each source, for each hour. Based on several key factors, each source is tested to determine if enhancement (or partial enhancement) should occur. This enhancement is performed by modifying the hourly stack temperature and exit velocity prior to being input to AERMOD. The technique as implemented would change actual measurements of the stack parameters.

AERMOIST is an effort to account for the initial condensation of the plume moisture in a wet scrubbed plume that 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 will reduce 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 reached final rise – thus minimizing the effect. Luminant asserts that their implementation of the non-EPA AERMOIST preprocessor 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 an increased plume rise. Similar to the AERLIFT preprocessor the AERMOIST processor modifies actual measured data for input to the AERMOD system.

These two modeling approaches are not approved approaches for regulatory use. Based on our review, the use of these two preprocessors results in very large changes to inputs into AERMOD and the resulting concentrations estimated by AERMOD. Without a full evaluation of these preprocessors and resulting AERMOD modeled values including evaluation of the model performance with modeling datasets used to originally certify and promulgate AERMOD as acceptable for determining source impacts, the use of these preprocessors can't be used for regulatory purposes. The implementation of these two models as preprocessors does not remove them from the requirement of model validation and approval, especially considering the large changes to model concentrations that result from use of these preprocessors. 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 as required by 40 CFR Part 51 Appendix W (Guideline on Air Quality Models). 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. Clearly, the same techniques could have been implemented within the AERMOD system itself - removing the need for the preprocessing steps. If implemented within AERMOD it is apparent that any such modification of the plume rise calculations would require a full review. Placing these models outside AERMOD does not eliminate this prerequisite to regulatory use.

- ***Sub-Comment 9.2:*** According to a commenter (Luminant), the AERMOD model mishandles a penetrated plume causing overestimates of 50%. Luminant asserted that their Analysis of enhanced AERMOD debugging output confirmed that peak concentrations predicted by Sierra Club's modeling are caused by the failure to properly simulate a penetrated plume. Luminant used this 50% discount approach in manipulating Sierra Club's proposed modeling information to calculate a 2013-2015 DV for their Big Brown and Martin Lake facilities.

EPA's Response 9.2:
In support of this comment a reference was provided to a presentation[2]. Though not a peer-reviewed publication, the presentation was reviewed for relevancy to the current regulatory use of AERMOD. The supplied reference presentation cited an additional presentation which was also examined.

In the referenced presentation, a graph depicted a 50% over-prediction during penetrated plume dispersion. However, the same graph also noted an under-prediction of 30% when zeroing out the contribution of penetrated plumes. Based on this, penetrated plumes could potentially contribute to high one-hour ground-level SO_2 concentrations. The graph was based on work from the sub-referenced presentation.

EPA reviewed the sub-referenced presentation[3] in which a case was made for the over-prediction of concentrations by AERMOD during dispersion of a penetrated plume. This study involving three power plants' impacts on several monitors occurred in a complex airshed with sharp terrain relief. Such terrain likely affected dispersion from the power plants through effects such as enhancements of vertical mixing, channeling of flows, and divided flows that is not present for the Luminant plants in the relatively flat terrain of northeast Texas. Because of the complexity of the situation modeled in the study it is not clear whether the findings would apply to the Luminant plants - all of which are located in relatively flat terrain. Whether a finding of over-prediction of concentrations during this specific dispersion regime in this complex situation can be generalized to other locations is not known. However, the presentation indicates that *overall* the AERMOD estimations of ranked concentrations, even in this complex situation, are accurate. The correct conclusion relevant to the current use of AERMOD is that the model did an excellent job in estimating the ranked maximum concentrations at all locations where monitors were present. As stated in Paine et.al.[4] concerning the use of Q-Q plots:

> Such plots are useful for answering the question, "Over a period of time evaluated, does the distribution of the model predictions match those of observations?" Therefore, the Q-Q plot instead of the scatterplot is a pragmatic procedure for demonstrating model performance of applied models, and it is widely used by EPA (e.g., Perry et al. 2005). Venkatram et al. (2001) support the use of Q-Q plots for evaluating regulatory models.

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[2] Robert Paine, AECOM, *AERMOD Issues for Design Concentrations Due to Penetrated Plume*, EPA's 11th Modeling Conference (Aug. 12, 2015), *available at* https://www3.epa.gov/ttn/scram/11thmodconf/presentations/2-4_Penetrated_Plume_Issues.pdf (hereinafter, "Paine 2015 presentation").

[3]http://www.casanz.org.au/sigs/ModSIG%20Workshop%20Sydney%20Conference%20%208%20September%2020 1/Rayner_2013ModSIG_Workshop.pdf)

[4] Robert Paine, Olga Samani, Mary Kaplan, Eladio Knipping & Naresh Kumar (2015) Evaluation of low wind modeling approaches for two tall-stack databases, Journal of the Air & Waste Management Association, 65:11, 1341-1353, DOI:10.1080/10962247.2015.1085924

Since correctly estimating the ranked maximum 1-hour concentrations is the primary requirement for model performance in SO_2 nonattainment designations, the presentation supports the adequacy of the model for this use rather than the contrary. A Q-Q graph from the presentation for the same monitor that was noted in the primary reference is given below which demonstrates the excellent overall agreement of the AERMOD results.

The alternate DV calculations Luminant included that used Sierra Club's 2015 modeling for 2012-2014 is fundamentally flawed by their use of the 50% discounting factor. Luminant took 2012 maximum values and scaled the value down using a ratio of 2015 SO2 emissions divided by 2012 SO2 emissions (used the emission ratio times the 2012 Highest 4th High). Luminant then used this scaled 2015 estimate based on Sierra Club modeling results for 2012 to estimate a new DV using the 2013 and 2014 Sierra Club results to estimate an artificial DV value for 2013-2015 for Big Brown and Martin Lake. These values were above the NAAQS, so Luminant utilized their proposed 50% discounting factor to further adjust these back of the envelope type estimates. The use of the 50% discount factor is not appropriate and the unadjusted DV was above the standard for Big Brown and Martin Lake.

The commenter is also not considering that the same times that they have identified are some of the meteorological conditions that do result in higher ground level impacts. So to identify all of these occurrences using the debugging output tool blankets all such conditions as suspect, when in reality this is one of the types of meteorological/dispersion situations that leads to higher impacts that can impact the DV.

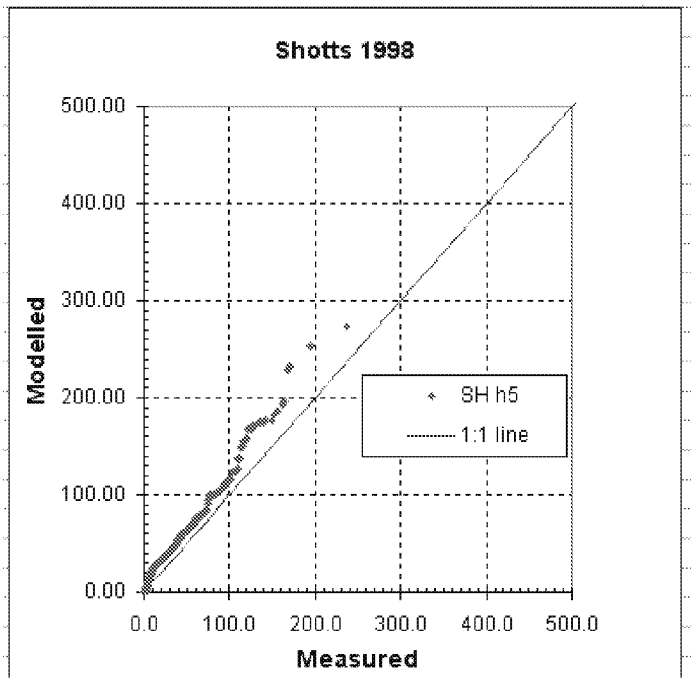

Figure 1. Overall good agreement for all hours by AERMOD for the Shotts Monitor

Furthermore, adjusting modeling results based on a one or two modeling scenario comparisons to a few monitors is not appropriate and such approaches of attempting to calibrate the model results are prohibited by the **Guideline on Air Quality Models {GAQM}** (40 CFR Part 51 App. W 7.2.9 Calibration of Models; November 9, 2005).

- ***Sub-Comment 9.3:*** AERMOD can over-predict ambient concentrations during periods of low wind conditions because it rigidly assumes that low wind speeds remain unidirectional for every hour.

  EPA's Response 9.3:
  The general phenomena issues related to estimation of dispersion that occur with low wind speeds and AERMOD are being studied and EPA addresses the potential use of a LOWWIND3 beta option in previous responses to comments. The commenter did not provide evidence of any specific modeled concentrations that exist in the Sierra Club modeling that result in overestimation of specific modeled values. There are no monitors near the maximum ambient concentrations or in the areas that are predicted to be above the standard so no comparisons to monitored values can be made for these Luminant sources. We further note that the area of predicted nonattainment is on the order of square miles at distances ranging from the facility fenceline to several miles from the fenceline and is not just one or two receptors that are just above the standard near the facility. Based on the maximum distances from the facilities to the receptors with exceedance values, there are many receptors that are too far away from the emissions stacks to be a result of low wind speed transport. The commenter did not provide an analysis showing that all the modeled exceedances were a result of transport and dispersion during low wind situations and that all predicted exceedances were directly a

result of the alleged overestimation by AERMOD with low wind speeds. Since many of the receptors are at distances that would require transport winds higher than a 'low wind' situation, the commenter has not provided evidence that the area would be modeled into attainment but for a potential low wind bias. Therefore, any potential overestimation under a low wind condition does not change the overall conclusions from the modeling results that there are large areas of nonattainment around these facilities based on recent actual emissions.

- ***Sub-Comment 9.4:*** General comment applicable to Big Brown, Monticello, and Martin Lake - One commenter (Luminant) stated that the EPA improperly accepted the Sierra Club modeling of the Martin Lake and Monticello facilities on the basis of it being a conservative representation of 100% load when the modeled fixed stack parameters (i.e., temperature and velocity) do not accurately represent 100% load. In addition, the commenter stated that EPA's review of the Sierra Club modeling for the three Luminant facilities is not consistent with the EPA's position that taken on the modeling analysis conducted for the Fort Gibson Plant in Indiana, in which EPA stated the greater reliability of modeling results from analyses using hourly stack parameters.

  EPA's Response 9.4:
  As detailed in the supplemental TSD accompanying the final designations for the Big Brown, Martin Lake, and Monticello facilities, the EPA received additional modeling analyses from Sierra Club during the public comment period on our intended designations. As part of the revised, modeling Sierra Club included hourly inputs to account for variable stack velocities to more accurately represent stack parameters in the model but they did not have include variable temperatures because they did not have the data. EPA evaluated the latest modeling in the supplemental TSD and compared stack parameters to Luminant data provided. See other RTC related to the Fort Gibson comment.

- ***Sub-Comment 9.5:*** General comment applicable to Big Brown, Monticello, and Martin Lake - One commenter (Luminant) stated that EPA did not fully explain their basis for accepting the Sierra Club modeling that did not include building downwash for the three Luminant facilities or their conclusion that any change in modeled maximum valued would be "relatively small" if downwash were included.

  EPA's Response 9.5:
  The Sierra Club's modeling analysis for the three Luminant facilities did not include building downwash since they did not have access to the information necessary to include downwash within in the modeling. As stated in the supplemental Technical Support Document accompanying our intended designations of the areas surround the Big Brown, Martin Lake, and Monticello facilities, the EPA does not believe that the inclusion of building downwash would significantly impacts modeled results nor change our determination that impacts in the areas surrounding these three facilities violates the NAAQS. The inclusion of building downwash accounts for the potential impacts on the plume rise and dispersion resulting from the presence of buildings and their wakes relative to stack releases and plumes. As stated in our original TSD, the inclusion of

building downwash often leads to higher modeled concentrations at receptors close to the source and even in situations where these nearby increases did not occur, any decreases in maximum modeled values were relatively small. In Luminant's own modeling reports they also indicated for two of the three facilities that they did not expect inclusion of downwash to make a significant impact in model concentrations. As discussed in the TSD all three facilities have similar stack heights and building heights, so inclusion of downwash would not be expected to lower the DVs. If downwash did have some impact it would most likely move the maximum concentrations closer to the facility and actually increase the maximum values. Given current exceedance levels are out from the facility several kilometers and there are many ambient air receptors between the exceedance values and the facility's restricted access (non-ambient air), inclusion of down wash would most likely result in higher ambient DVs.

- ***Sub-Comment 9.6:*** General comment applicable to Big Brown, Monticello, and Martin Lake - One commenter (Luminant) stated that EPA did not fully explain their claims that with the correction to the Sierra Club modeling to remove elevated flagpole receptors the EPA would "expect" only a slight change in the modeled concentrations.

  EPA's Response 9.6:
  Based on general experience and discussions between some of the modelers within EPA, the sensitivity analyses we had seen in other actions informed us that changing the receptor height from 1.5 meter to near 0 meter would not result in a significant change, especially for elevated point sources. Given that the plume may have traveled for a kilometer or two before touching down at either height, the actual difference of dispersion would be minimal between 1 km for a plume at 1.5 m above ground or a plume that touched the ground within 5-50 meters further downwind. As discussed in elsewhere and in our TSD, Sierra Club provided a sensitivity run showing only a 0.2% change in the maximum DV for Big Brown and we also had a similar sensitivity for Dolet Hills power plant in Louisiana showing only a 0.003 μg/m3 change in maximum DV. As stated in the TSD accompanying our intended designations for the areas surrounding the Big Brown, Martin Lake, and Monticello facilities, the EPA does not expect the removal of the flagpole height receptors to greatly impact the maximum modeled concentrations at any of Luminant's facilities as all of the stacks are similar height and similar dispersion patterns. These sensitivity results show the impact of the flagpole receptors on modeled results is almost 0% to 0.2%. We would expect the impacts of flagpole receptor heights to be similar small for the other facilities and not impact our determination of whether or not impacts from the facilities violate the NAAQS.

- ***Sub-Comment 9.7:*** General comment applicable to Big Brown, Monticello, and Martin Lake - One commenter (Luminant) stated that background monitored design value taken from the El Paso monitor, which was included in the Sierra Club modeling analysis for all three Luminant facilities is not the most accurate representation of the area surrounding the modeled facilities. The commenter suggested that a more accurate representation of background concentration should be based on the temporally varying background concentrations by hour of day and season or month from the Waco monitor.

EPA's Response 9.7:
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 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 in a conservative/underestimating conclusion. Considering the impacts of Big Brown, Monticello, and Martin Lake in the area, the background value is on the order of 2.4% or less 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 and upwind of the three Luminant facilities; 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 and did not consider what the wind directions/transport when maximum DVs were modeled in support of their assertion that the Waco monitor is more representative and should be used.

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 the three Luminant facilities more often (Waco monitor is not normally upwind) and the maximum DVs in modeling for all three facilities are were when winds were from some general easterly direction (blowing to in a generally southwesterly to northwesterly direction). Given the closer proximity of Shreveport monitor to the Martin Lake and Monticello facilities than the Waco or El Paso monitors, similar emissions of SO_2 in the area around Shreveport and Martin Lake/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. Big Brown is further from Shreveport, but transport indicates Shreveport is generally more upwind when the highest values are modeled for Big Brown. 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 and the annual average value is approximately 4 $\mu g/m^3$ higher than El Paso. As further discussed in our supplemental TSD for this action we think both the Waco monitor and El Paso monitor underestimate background concentrations for the three Luminant facilities.

- ***Sub-Comment 9.8:*** General comment applicable to Big Brown, Monticello, and Martin Lake - One Commenter (Luminant) stated that the Sierra Club modeling for the three Luminant facilities includes receptors that are inconsistent with the EPA's Modeling TAD. Specifically, the commenter claims that a portion of the modeled receptors are located on plant property, industrial property, and in water bodies. The commenter also points out that the EPA previously noted that the receptor grids included by Sierra Club were larger than those recommended by the EPA and that in the case of Monticello the erroneous inclusion of on property receptors was raised to Sierra Club in response to their September 11, 2015 submittal. Commenter also indicated that some sources were far away and should not have been included in the modeling (Limestone). The commenter made reference that the Limestone power plant was approximately 48 km from Big Brown and EPA guidance was that 20 km was the appropriate cut off distance for inclusion of nearby sources.

EPA's Response 9.8:
EPA had information from facility permitting in 2006 timeframe that had some plant boundaries in the modeling for the permit. In our proposal we did evaluate the information and try to limit the evaluation of concentrations from Sierra Club's modeling to only receptors that did not appear to be on Luminant's property. As we discuss in detail we have evaluated the information provided by Luminant for each of their three facilities and the areas they are asserting should be excluded either due to being plant property on a wetland or waterbody. We note in our TSD that Luminant has not provided information for review to show that all plant property should be classified as non-ambient air. Documentation from Luminant demonstrating appropriate fencing and limiting general public from accessing their property would be necessary to support a determination that a potential receptor is non-ambient. With the caveat that Luminant has not supplied sufficient information, we have conducted our evaluation including an analysis that assumes all receptors that Luminant proposes to exclude are not viable receptors. See our TSD for specific analyses for each area and our conclusions. It is not clear from the materials provided by Luminant that the maximum design receptor should have been excluded (being on Luminant property does not guarantee exclusion), but we have utilized all information provided and evaluated aerial and satellite information for the area to completer our final review and designation.
In our proposal materials we did note that the receptor grid was large but we didn not conclude that it was inappropriate. While the receptor grid was large and the area for inclusion of nearby sources was large than many modeling runs it was necessary and informative for the designation of the areas around these three very large facilities. EPA modeling guidance and the TAD both balance the distance to have receptor grids and inclusion of nearby sources with the impacts of the primary source being modeled. The commenter made reference that the Limestone power plant was approximately 48 km

from Big Brown. We note that Limestone and Big Brown are very large emission sources that have impacts a long way from their facilities. Also given the very low background value being used it was reasonable to include Limestone in the modeling to evaluate if Limestone contributed to exceedance values around Big Brown. We note that EPA's guidance is that you can go less than 50 km from a source much of the time, but that is dependent on the size of the source being modeled and how far it's impacts go out from the source. EPA's guidance is not prescriptive to only 20 km but has to be weighted with the individual situation. In this case Big Brown and Limestone both have a very large area that they impact and there was a possibility for alignment and accumulation of their emissions to values around Big Brown. Therefore, we disagree with Luminant's assertions about receptor grids and inclusion of nearby sources.

- ***Sub-Comment 9.9:*** Comment applicable to Big Brown - One commenter (Luminant) stated that the Sierra Club modeling for the Big Brown facility contained errors in modeled stack locations that were noted by the EPA and claimed that this error alone is grounds to invalidate the modeling results. The commenter also stated that the EPA did not adequately explain their determination that the correction of this stack location error would not significantly change the modeled results or change the resulting design value from violating to not violating the NAAQS.

  EPA's Response 9.9:
  As discussed in the TSD accompanying our final designation of the area surrounding Big Brown, Sierra Club provided additional information during the public comment period for the intended designations. This information included the corrected stack locations for the two main stacks at the Big Brown facility. The modeled impacts in the area surrounding the Luminant facility still show modeled violations of the NAAQS when the corrections to the stack locations were made. In addition, Sierra Club provided sensitivity testing results comparing initial modeling results (with stack coordinates switched) with the results from the stack location correction model test that show a minor change in modeled design values consistent with the EPA's initial determination documented in our intended designation that the switch in coordinates would have little impacts on design value based on the close proximity of the two stack.

- ***Sub-Comment 9.10:*** Comment applicable to Martin Lake - One commenter (Luminant) stated that the Sierra Club modeling for the Martin Lake facility was completed using an older version of AERMOD and cited the EPA's statement that they do not believe that completing the modeling using the newer version of AERMOD would result in "significantly different modeling impacts.".

  EPA's Response 9.10:
  As discussed in the TSD accompanying our intended designation for the area surrounding Martin Lake, the EPA reviewed the AERMOD test case results for the older version (14134) used by Sierra Club and the newer model version (15181) and determined that only a small subset of the test scenarios (capped and horizontal stack and multiple urban areas) show difference in modeled impacts. These identified test scenarios are not

applicable to the Martin Lake station. Therefore, a rerunning of the modeling analysis using the later model version would not significantly impact the modeled maximum concentrations or our determination of the area's designation of nonattainment.
In addition, and as we discuss in the TSD accompanying the final designation of the area surrounding Martin Lake, Sierra Club provided additional modeling analysis for this area using the more recent version of AERMOD (15181), which still shows modeled violations of the NAAQS.

- ***Sub-Comment 9.11:*** Comment applicable to Monticello - One commenter (Luminant) stated that in addition to the Sierra Club inaccurately representing 100% load in the analysis for the Monticello facility, the modeled stack temperature and velocity were incorrect. The commenter states that the modeled stack parameters included in the modeling files did not match the parameters represented in the Sierra Club modeling report and did not accurately represent the actual stack parameters. The commenter claims that this discrepancy is sufficient to invalidate the Sierra Club modeling analysis for the Monticello facility.

  EPA's Response 9.11:
  As discussed in the supplemental TSD for these designations, we did receive updated modeling from Sierra Club with varying velocities and non-varying temperatures. We have evaluated these new inputs in the new modeling from Sierra Club with the information provided by Luminant in their modeling. Sierra Club did not have the varying stack parameters in previous modeling and used standard temperatures that they thought were appropriate and followed EPA's guidance on modeling for new sources when you don't have actual data for temperature or velocity. We do not find fault with Sierra Club's modeling for not having these time varying inputs in the proposal modeling and it is not a requirement that the temperature and velocity have to vary hourly in the modeling for these SO2 sources. If available it is generally preferred from the standpoint of modeling actual emissions and the resulting impacts, but it is not a requirement. The proposal modeling was deemed sufficient for our proposal. For our full review of the latest modeling from Sierra Club and Luminant see our TSD for this action. We do not agree with the commenter that the modeling should have been consider insufficient for our proposal. Regardless we have better information for our final designation.

- ***Sub-Comment 9.12:*** One commenter (Luminant) stated that the Sierra Club modeling for the Monticello facility modeled an allowable emission rate of 3.0 lb/MMBtu (23,790 lb/hr) for Unit 3 when the permit limit is actually 9,468 lb/hr.

  EPA's Response 9.12:
  We note that Sierra Club's modeling used in the proposal included modeling for both actuals and allowables. In the Sierra Club modeling scenario of allowables, they may not have been aware of the permit limit, but it did not make a difference in the modeling of actual emissions scenario. In our evaluation of the Sierra Club modeling in our proposed designations we relied on modeling representing actuals based on CEM data. Regardless we have more refined modeling using CEM based actual emissions data that we are relying upon in this final designation.

- ***Sub-Comment 9.13:*** One commenter (Luminant) stated that the EPA had erroneously indicated Monticello was modeling almost double the standard but elsewhere we discussed modeling results being 20% over the standard.

  EPA's Response 9.13:
  If there was an error in some of the language it has been corrected with our evaluation of the latest modeling.

- ***Sub-Comment 9.14:*** One commenter (Luminant) stated that the CAMD CEM data is always biased high because of the bias adjustment factor so modeled impacts are overestimate/conservative.

  EPA's Response 9.14:
  The purpose of the bias adjustment factor (BAF) is to correct "out of control" SO2, NOx, and flow measurements relative to standard reference methods as recorded during periodic stack tests. The bias adjustment factor is only applied to SO2 data when the CEM data are biased low; the BAF is intended to correct the CEM data in those cases where the CEM is reading low to adjust to what are the actual emissions. However, if Luminant wanted to use the CEM data without any bias adjustment, there would likely be times when the CEM is biased low, so the emission rates being modeled would actually under predict what is really occurring. The overall bias should be near 0% most of the time since that is the purpose of running audits and adjusting the raw CEM data. Ultimately, the CEM data is the best emission data available and it is somewhat up to the operator to ensure that they are not overestimating/underestimating emissions pursuant to EPA's QA/QC and reporting requirements for EGUs. Overestimation of emissions would also be detrimental to compliance with emission limits, emission caps or annual emission inventory fees. Luminant has not quantified this as a significant error in the emissions from the source and our expectation is that this would not be a significant error and is likely only a 1-2 % change in annual emissions at most under unusual situation. Without further information documenting the level of emissions overestimation as asserted by the commenter the comment is more of an accusation than proof of a bias that would impact our decision.

10. ***Comment:*** Commenter (0328-Luminant) stated that, while the Sierra Club submitted 27 AERMOD modeling evaluations alleging violations for specific locations addressed in EPA's March 2016 proposed designations, the EPA accepted only ten of these evaluations – including the three Luminant locations model evaluations – and disregarded approximately 63% of the Sierra Club AERMOD evaluations because of the same errors present in Sierra Club's modeling of Luminant's plants. Commenter stated the EPA should likewise disregard Sierra Club's modeling here.

EPA's Response:
EPA did not disregard any of Sierra Club's submitted modeling evaluations. Instead, EPA reached different conclusions for different areas based on the available evidence for each area after evaluating the information consistent with our national interpretation of the statute, regulations, and guidance, and making judgments in each case regarding how it supported finding whether areas were meeting the NAAQS or could not be determined as meeting or not meeting the NAAQS. The designation of attainment or nonattainment in each area is based on a weight of evidence approach considering all of the applicable monitoring and modeling data. Each area has to be treated individually in considering the available evidence. In some cases, acceptable monitoring data were available and in others more representative/refined modeling data were available which may have differed from the modeling results provided by Sierra Club. EPA must weigh the best available evidence in its designation determinations. One aspect of the fitness of the modeling is its adherence to the Modeling TAD.

EPA evaluated the Sierra Club modeling as documented in the TSD and found that the Sierra Club modeling closely followed the TAD and was adequate to inform our nonattainment decision. Our analysis, as more fully detailed in the final TSD of this supplemental action, shows that the Sierra Club modeling likely represents a conservative estimate (in an under-estimating sense) of the pollution concentrations in the area and magnitude of nonattainment because, for example, the final Sierra Club modeling did not include some large nearby sources of SO_2 and used a low background concentration.

In contrast, the Luminant modeling did not closely follow the TAD. In the current three areas in Texas, the Luminant modeling used several beta options for modeling that require review and approval from EPA before their 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." These options require special review and attention because EPA does not yet have sufficient information to determine their suitability for all conditions and thus their use must be evaluated on a case by case basis. Among other conditions, the use of beta options requires consultation with and receiving approval from 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 the three Texas Luminant plants.

In addition, the Luminant modeling used two source parameter modification techniques. These techniques, AERLIFT and AERMOIST, attempt to implement the findings of prior peer-reviewed research in buoyant plume rise. While there is some evidence for the phenomena the technique attempts to simulate, the implementation of the source parameter modifications depends on the use of models. These models must be required to go through the standard EPA model evaluation, review, and approval before being used in regulatory applications. Without this review process, the validity of the models and resulting concentrations is not known.

AERLIFT (a non-EPA preprocessor) 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. It is implemented as a preprocessor which estimates a buoyancy flux enhancement attributed to the merged stack plumes. These calculations are done for each source, for each hour. Based on several key factors, each source is tested to determine if enhancement (or partial enhancement) should occur. This enhancement is performed by modifying the hourly stack temperature and exit velocity prior to being input to AERMOD. The technique as implemented would change actual measurements of the stack parameters.

AERMOIST is an effort to account for the initial condensation of the plume moisture in a wet scrubbed plume that 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 will reduce 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 preprocesser 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 an increased plume rise. Similar to the AERLIFT preprocessor, the AERMOIST processor modifies actual measured data for input to the AERMOD system.

A review by EPA of the model input files for AERMOD before and after modification by the preprocessors shows that for some wind directions the average Briggs buoyancy flux of the plume can be increased by up to 50% by AERLIFT alone and by up to 75% through pre-processing by AERMOIST and then AERLIFT. For some hours the measured stack temperature was increased by over 300 degrees Kelvin for input to AERMOD. Obviously, this degree of modification can have significant effects on AERMOD performance. As well, AERLIFT routinely enhanced plume buoyancy for directions which were not roughly aligned with the stacks.

The implementation of these two models as preprocessors does not remove them from the requirement of model validation and approval. 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 as required by 40 CFR Part 51 Appendix W (Guideline on Air Quality Models). 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. Clearly, the same techniques could have been implemented within the AERMOD system itself removing the need for the preprocessing steps. If implemented within AERMOD it is apparent that any such modification of the plume rise calculations would require a full review. Placing these models outside AERMOD does not eliminate this prerequisite to regulatory use.

11. ***Comment:*** Commenter (0328-Luminant) stated that the EPA's reliance on the Sierra Club modeling would deny Luminant and the State of Texas the opportunity to gather actual monitoring data to use for determining attainment status and is inconsistent with the CAA, EPA's regulations, and EPA's prior practice. Commenter stated that correcting the problems with that modeling demonstrates that modeling is inexact and cannot be used to demonstrably determine the attainment or nonattainment status of any area with the SO_2 standard, and specifically undermines any reliance on Sierra Club's overstated modeling.

EPA's Response:
In making a designation, EPA may consider all available information, as stated in CAA section 107(d)(1)(A), and modeling is not excluded. In evaluating attainment status under prior versions of the primary SO_2 NAAQS, EPA's consideration of dispersion modeling has been explicitly upheld when challenged in court. *Montana Sulphur & Chemical Co. v. EPA*, 666 F.3d 1174 (9th Cir. 2012). Moreover, nothing about EPA's action to designate these areas, in compliance with the court order, precludes Luminant or Texas from additionally taking the opportunity to gather additional monitoring data regarding the impacts of SO_2 pollution from these power plants. In fact, the EPA encourages states and sources to cooperate to establish and continuously conduct such monitoring, in situations where, as here, there are no monitors that are properly sited to characterize maximum ambient SO_2 concentrations and the only recourse is to conduct modeling on a one-time or recurring basis. EPA has carefully considered the modeling provided by Sierra Club and Luminant and determined that the information indicates that the area is not in attainment of the SO_2 standard. As discussed above and in the TSD for this supplemental action, the Luminant modeling utilized several unproven techniques, while the Sierra Club modeling generally followed EPA's modeling guidance and provided a conservative estimate of the ambient concentrations in the areas. For example, the Sierra Club's modeling did not include some nearby large sources and included a low estimate of background conditions, so it is expected that the modeling would tend to underestimate rather than overestimate concentrations, indicating that the areas are not meeting the standard.

12. ***Comment:*** One commenter (0328-Luminant) asserted the EPA's proposal is unlawful and should not be finalized, in part, because Luminant is submitting with their comments a modeling analysis for Freestone, Rusk, Titus, Anderson, and Panola Counties that supports an attainment or unclassifiable designation for each of these counties. Commenter claimed that, in the face of conflicting analyses, EPA should either retain Texas's recommended designations or utilize the unclassifiable designation, or the unclassifiable/attainment designation, until monitoring data can be obtained.

EPA's Response:
The concerns with the modeling analysis submitted by the commenter have been reviewed in response to previous comments and in EPA's TSD for this supplemental action. In brief, the use of non-reviewed, unapproved techniques to modify the inputs to AERMOD is not acceptable in a regulatory context especially given the erratic and sizeable changes in modeled concentrations. As detailed further in the final TSD for these areas, the most representative modeling that has been submitted to EPA for these three nonattainment areas that generally meets the requirements

of the Modeling TAD and is most informative in this designation process is the revised Sierra Club AERMOD modeling.

13. ***Comment:*** One commenter (0328-Luminant) stated the EPA's proposal is unlawful and should not be finalized, in part, because EPA has not demonstrated that its proposed changes to Texas's designations are "necessary" as it is required to do under the CAA. Commenter's letter (pdf pages 50-57 and attachments 1, 2 and 4) details why they believe Luminant's forecasted operations confirm that a modification of Texas' designation recommendations for the areas around these plants is not "necessary." Commenter stated that additional modeling, based on reasonable assumptions of future operating conditions, submitted with their comments demonstrates that the affected counties will not exceed the NAAQS in the future. Commenter stated that changes to Texas's proposed designations are not "necessary" when modeling of future operating conditions during the period of evaluation show attainment and, thus, EPA has no authority under the CAA to, and should not, finalize these designations. Commenter stated that a designation of nonattainment as EPA proposes for these areas would not serve the purposes of section 110 or 107 in any event because it would not accelerate attainment of the NAAQS for these areas.

EPA's Response:
During the comment period in the spring of 2016 we received modeling from Luminant and additional modeling from Sierra Club for these three Luminant facilities (Big Brown, Martin Lake and Monticello). Our review and evaluation of these modeling evaluations is addressed in more detail in other responses and in the TSDs for this supplemental action. The Luminant modeling was determined to use both non-approved beta options in AERMOD and some preprocessors that drastically changed the modeling results and have not been approved for use in modeling of these sources. In addition, the Luminant modeling relies on forecasted emissions. Therefore, we do not agree that Luminant's modeling analysis demonstrates the area is currently in attainment, and EPA designations determination under CAA section 107(d)(1)(A) are to be whether an area currently "does not meet" or "meets" a NAAQS or currently "cannot be classified [...] as meeting or not meeting" the NAAQS. The statutory language is stated in the present tense, not the future conditional, and therefore a designations decision is not based on whether EPA predicts that an area would meet or would not meet a NAAQS at some distant point in the future notwithstanding current conditions. EPA's approach regarding this issue for the three Texas areas is consistent with how EPA has faced similar situations involving the use of unapproved alternative modeling options and recently changed or future expected emissions reductions in the March 2016 proposed designations and the June 30, 2016, designations. In each case, where a source had not obtained advance approval of an alternative model, EPA was able to evaluate only the regulatory modeling, if it was submitted. Where a source had taken an effective and enforceable limit to reduce emissions from recent actual levels, EPA was able to evaluate those limits for purposes of a designations decision. But where, like here, no such effective and presently enforceable limit was in place, EPA could only base its decisions on actual emissions information. The commenter reads Clean Air Act section 107(d)(1)(B)(ii) as imposing a burden on EPA to prove that any modification to a state's designation recommendation is "necessary," but this reads the word out of its larger context within that subsection, which confers broad technical discretion on EPA in promulgating final designations.

See, *Catawba Cnty., N.C. v. EPA*, 571 F.3d 20 (D.C. Cir. 2009). The EPA reasonably and consistently concludes that where a recommendation of a designation is based on future emissions limits that are not enforceable and may not in fact occur, it is clearly "necessary" to modify the designation to account for current actual information.

The commenter also incorrectly asserts that our action does not serve the purpose of section 110 because the commenter is incorrectly assuming that the Luminant modeling is both acceptable and accurate. We note that Sierra Club's more recent modeling followed the TAD and has been determined to be acceptable for informing EPA's designation of these three sources and the area around the sources. The more recent Sierra Club modeling used recent actual emissions (2013-2015). Luminant indicates that future emissions, well after the date of EPA's designation, will be lower than recent actuals, but has not entered into any agreements to make such lower emissions presently enforceable and permanent and therefore reliable as a basis for concluding that the areas currently "meet" the NAAQS. Without such enforceable limits further lowering emissions, EPA is reasonably relying on recent actual emissions and resulting modeled concentrations in this designation.

As mandated under Clean Air Act section 107, EPA must designate as nonattainment areas that are violating the standard or that contribute to nonattainment of the standard in a nearby area. EPA has evaluated the area that is violating the air quality standard. Through this evaluation, EPA reviewed modeled violations in the immediate vicinity of Big Brown, Martin Lake, and Monticello. Pursuant to section 107(d) of the Clean Air Act, EPA must designate areas for the 2010 1-hour SO_2 primary NAAQS. EPA is under an enforceable order to complete the area designations according to the court-ordered schedule. As is discussed elsewhere, EPA has to designate the area associated with these sources by November 29, 2016. EPA considered all available, relevant data in making the final designation. For further discussion on utilizing modeling to inform designation decisions, see section (III)(A)(2) of this RTC and elsewhere in this section (IV).

14. ***Comment:*** One commenter (0328-Luminant) stated the EPA's proposal is unlawful and should not be finalized, in part, because, in the face of inconsistent modeling results, the record before EPA does not "clearly demonstrate" nonattainment of the SO_2 standard as is required under the CAA and, thus, the EPA has no authority under the CAA to, and should not, finalize these designations.

EPA's Response:
The concerns with the modeling analysis submitted by the commenter have been reviewed in response to previous comments and in EPA's TSDs. In brief, the use of non-reviewed, unapproved techniques to modify the inputs to AERMOD is not acceptable in a regulatory context. Therefore, there are not inconsistent acceptable modeling results at issue here. EPA has also determined that Sierra Club's most recent modeling is representative and reliable, and that the modeling demonstrates nonattainment, as further detailed in the supplemental final TSD. The AERMOD modeling that has been submitted to EPA that generally meets the requirements of the Modeling TAD remains the revised Sierra Club AERMOD modeling. The Sierra Club modeling used the default regulatory AERMOD options and followed the Modeling TAD guidelines on meteorology, land surface, and receptors. In an effort to increase the realism of the simulation

and in response to comments provided by TCEQ on 11/17/15 on their earlier (9/11/2015) modeling, Sierra Club conducted a third round of modeling (3/31/2016) which used data from CAMD for emission rate; velocities were estimated from the stack flow rates (when available) and heat rate. For temperature, a constant temperature corresponding to full load was used since CAMD does not receive any stack temperature data. The EPA review based on the 3/31/2016 modeling indicates SO_2 emissions from Martin Lake, Monticello and Big Brown Steam Electric Stations have associated impacts that exceed the 1-hr NAAQS. We note in particular that Sierra Club's March 2016 modeling did not include nearby sources and also used a very low background concentration, which leads to the modeling likely underestimating actual concentrations around these three Luminant facilities, further supporting EPA's designations.

15. ***Comment:*** One commenter (0328-Luminant) stated that, if EPA will not reinstate Texas' recommendation of attainment for each of these counties, then, in light of the lack of monitored data and conflicting modeling assessments, EPA must designate the areas around these facilities as "unclassifiable." Commenter stated the CAA provides this classification option, and EPA has confirmed that it should apply this designation wherever available information is insufficient or does not clearly demonstrate that a nonattainment or attainment designation is warranted.

    Commenter stated that, because of all the factors that influence modeling, modeling results in this case cannot "clearly demonstrate" that a nonattainment designation is warranted and should not be relied on for such purposes. Commenter stated the only monitoring data available shows attainment of the standard and Luminant's modeling shows that any monitor sited near one of its locations will also be attaining the standard. Commenter stated that, accordingly, EPA must designate the areas around Luminant's plants as unclassifiable and allow for monitors to be placed into service to acquire three years of data to accurately characterize actual air quality for attainment and nonattainment designations.

EPA's Response:
EPA addressed this issue with the Indiana-based Gibson power plant, where both monitoring and modeling assessments were available from Sierra Club and Indiana, and noted in the TSD for that designation that "[a]s a general matter, monitoring at a monitoring site provides a more reliable indication of concentrations *at a single specific location*... Thus, each monitoring site provides data only for the specific location of the monitor, while modeling provides a more direct estimate of concentrations at a range of receptor locations, commonly estimating concentrations at thousands of receptor points. Even if an area has multiple monitors, modeling will often provide more reliable information on the spatial distribution of SO_2 concentrations and on the magnitude of SO_2 concentrations at unmonitored locations."

Clearly, a monitor must be well-sited to characterize attainment for a region. In the case of the Gibson plant a modeling study and an analysis of wind rose data both confirmed that the monitors used to assess attainment status for Gibson were well-sited. No such characterization has been done for the Luminant plants and there are no monitors in the areas of the maximum modeled values from Sierra Club's most recent modeling. The simple availability of data from a monitor in the county or a nearby county is not sufficient to demonstrate attainment. We have responded elsewhere in this supplemental RTC and EPA's TSD about our evaluation of both the

flawed modeling provided by Luminant and the most recent Sierra Club modeling that is acceptable for using in this action. We are concluding that there is sufficient data to make a determination of nonattainment for the areas around three of Luminant's sources (Big Brown, Martin Lake and Monticello). The presence of conflicting information submitted between Luminant and Sierra Club alone does not compel that EPA conclude it does not have sufficient available information to make a determination of attainment status. Each area, and the information available for it, requires an independent analysis consistent with our national approach and based on the specific facts. In some cases, such conflicting information involves multiple sets of information, none of which are individually persuasive and cannot be reconciled to arrive at a sufficient basis for reaching a conclusion, i.e., are insufficiently reliable for EPA to reach a conclusion regarding NAAQS attainment status. In other cases, such as here and in the Gibson case, it has been possible for EPA even in the face of conflicting information to make a judgment based on our technical expertise that some of the available information is sufficient to enable an attainment or nonattainment determination.

16. ***Comment:*** One commenter (0328-Luminant) stated that, although the Consent Decree requires EPA to complete designations of certain areas before monitoring data can be collected, it does not compel or authorize EPA to rely on questionable modeling and, therefore, where EPA lacks monitoring data, and modeling data is uncertain, EPA must use the unclassifiable designation. Commenter's letter (pdf pages 57-61) details why they believe that, to avoid a conflict between the Consent Decree, the DRR, and CAA's cooperative federalism system, EPA should designate the areas around Luminant's facilities as unclassifiable/attainment or unclassifiable until additional, reliable information is available to inform some other designation.

EPA's Response:
EPA does not view AERMOD modeling following acceptable protocols, as performed by Sierra Club, as questionable. Nor does EPA agree that using this well-established analytical tool conflicts with either the consent decree, the Data Requirements Rule, or cooperative federalism. The concerns with the modeling analysis submitted by the commenter have been reviewed in response to previous comments and EPA's TSDs. In brief, the use of non-reviewed, unapproved techniques to modify the inputs to AERMOD is not acceptable in a regulatory context. In contrast, the AERMOD modeling that has been submitted to EPA Region 6 that best meets the Modeling TAD and EPA's modeling guidance remains the revised Sierra Club AERMOD modeling. EPA has also determined that Sierra Club's most recent modeling is representative and reliable, provides information that must be considered in a designation decision, and that the modeling demonstrates nonattainment, as further detailed in the final supplemental TSD. The Sierra Club modeling used the default regulatory AERMOD options and followed the Modeling TAD guidelines on meteorology, land surface, and receptors. In an effort to increase the realism of the simulation and in response to comments provided by TCEQ on 11/17/15 on their earlier (9/11/2015) modeling, Sierra Club conducted a third round of modeling (3/31/2016) which used data from CAMD for emission rate; velocities were estimated from the stack flow rates (when available) and heat rate. For temperature a constant temperature corresponding to full load was used since CAMD does not receive any stack temperature data. The EPA Region 6 review based on the 3/31/2016 modeling from Sierra Club indicates SO_2 emissions from Martin Lake,

Monticello and Big Brown Steam Electric Station have associated impacts that exceed the 1-hr NAAQS.

EPA's action here is fully consistent with the Consent Decree (which requires us to issue a designation of some kind), the Clean Air Act (which requires us to issue designations of certain kinds based on the quality of available information), and cooperative federalism (which preserves EPA's duty to issue the final designation, after review of available information). Under the Clean Air Act, the agency must consider available valid information. The concept of cooperative federalism does not preclude EPA's responsibility to consider all available valid information in making our decision, and clearly the Clean Air Act envisions the possibility that EPA will not agree with the State's recommendations. It is true that states are directed under CAA section 107 to recommend designations to EPA, implementing the Act's scheme of cooperative federalism. But it is also true that the EPA, in acting in response to a state's recommendation, must consider all valid submitted data and information, some of which may support a state's recommendation and some of which may not. It remains EPA's duty to make a final decision regarding what designation all of the data and information best supports. Further, nothing in the agency's Data Requirements Rule modifies EPA's duty or discretion in making designations determinations based on available information. As the court order requires EPA to issue the designations for these four Texas areas at this time, we cannot simply defer to the future implementation of the DRR as a basis for rejecting available information and not making decisions where it is sufficient to demonstrate either attainment or nonattainment. By the commenter's reasoning, not only should EPA not at this time determine that areas are not meeting the NAAQS, we should also not conclude that they are meeting it, even in the face of persuasive current information. This would clearly be unreasonable.

17. Comment: One commenter (0332-AI-Sierra Club {App. I}) supported the EPA's proposal to designate areas surrounding the Big Brown power plant in Freestone County, Texas, the Martin Lake power plant in Rusk County, Texas, and the Monticello power plant in Titus County, Texas as nonattainment areas for purposes of compliance with the 2010 1-hour SO_2 NAAQS. Commenter stated that there are no monitoring stations located close to these three plants, and both the State of Texas and the plants' owner chose not to submit any modeling. Commenter stated the only evidence before EPA is the modeling submitted by the Sierra Club, which supports EPA's proposed nonattainment designation. Commenter stated that, with the updated modeling and analysis attached to their comments, three separate rounds of modeling (September 2015, December 2015, and March 2016) have now reached the same result: Big Brown, Martin Lake, and Monticello cause the areas surrounding each facility to be in nonattainment of the 1-hour SO_2 NAAQS.

> Commenter stated that September 2015 modeling by Wingra Engineering demonstrates the areas surrounding Big Brown, Martin Lake, and Monticello should be designated as nonattainment areas. Commenter stated that, on December 14, 2015, Sierra Club submitted updated modeling analyses for Big Brown and Monticello which demonstrated that even using the most recent emission data and adjusting certain emissions and stack parameter assumptions, as suggested by TCEQ, Big Brown, Monticello, and Martin Lake caused significant exceedances of the 1-hour standard in the surrounding areas.

Commenter stated that, as explained in detail in comments prepared by Dr. H. Andy Gray (Exhibits 1 and 2 to commenter's 0332-AI-Sierra Club letter), making adjustments to Wingra Engineering's 2015 modeling, as suggested in the EPA TSD, would not change the outcome from nonattainment to attainment, given the large margin by which emissions from these plants exceed the NAAQS and the minor differences expected from these adjustments. Commenter stated that, in response to the issues raised in EPA's TSD for Texas, Sierra Club retained Wingra Engineering and Dr. H. Andrew Gray to update the modeling for Big Brown, Martin Lake, and Monticello. Commenter stated the March 31, 2016 modeling confirms that even after making all of the potential adjustments identified by EPA, the SO_2 concentrations in the areas surrounding Big Brown, Martin Lake, and Monticello exceed the 1-hr SO_2 NAAQS. These modeling analyses are in Exhibits 3-5 attached to commenter's (0332-AI-Sierra Club) letter.

EPA's Response:
EPA has reviewed each of the successive submissions of the Sierra Club's modeling and has reviewed the report summarizing sensitivity runs for Martin Lake, Monticello, and Big Brown Power Plants. The most recent modeling incorporated more realistic stack parameters using estimated hourly velocities in addition to the hourly SO_2 emission rate. All rounds found modeled design values in excess of the 1-hour SO_2 standard.

Sensitivity Tests

Sensitivity testing was carried out varying one parameter at a time to determine the effect of the proposed changes.

- **Stack Positions -** The first is that the stack positions for Units 1 and 2 were reversed. EPA's judgment is that because the two stacks are in such close proximity that the design value concentrations would be little affected.
- **Stack Diameter -** There is an error in the stack diameter for Big Brown in the Sierra Club's modeling for Units 1 and 2. The Sierra Club used 6.77m and the diameter derived from satellite photographs is 6.553m. Assuming the same velocity, buoyancy flux would decrease about 6.7% resulting in lower plume rise and an expected somewhat higher predicted design value.
- **Flagpole Receptors -** The Modeling TAD recommends the use of ground surface elevation for the receptors whereas the Sierra Club used flagpole receptors at 1.5m height in an attempt to model concentrations at the height of a person's head. The EPA believes that the small change in height would have a very small effect on modeled concentrations. This had been borne out in previous sensitivity studies.
- **Tier 2 Background** - The Sierra Club used tier 1 estimates of the SO_2 background concentration whereas tier 2 seasonal-hourly estimates of SO_2 background were used by Luminant for their modeling. Tier 2 estimates are considered more realistic than tier 1 estimates which may be over-conservative. The change in background occasioned by the use of tier 2 estimates may be either higher or lower for any given hour of simulation than the tier 1 estimate, though on the average would be lower. This change could make

a difference if the direct contribution modeled for a source were very near the 1-hour SO_2 standard level.

- **Surface** – Sierra Club used alternative surface land use data from work performed by NRG for their Limestone facility to model the Big Brown area. This alternate surface data changed the surface land-use characteristics data used for Corsicana airport met data that is used by AERMET to develop the meteorological data necessary for running the AERMOD model. The changes involved displacing the center of the AERMET grid from the recommended location of the meteorological measurements to the location of the source. In effect, NRG used surface data around NRG Limestone instead of the surface data at the Corsicana airport and this impacted the surface roughness value. The updated surface roughness data are generally much higher than the original data set for Corsicana, which results in increased dispersion (including higher mixing heights) and lower peak modeled concentrations. It is not clear that the NRG methodology is preferable or even acceptable. Sierra Club used this alternate NRG met data as a sensitivity analysis in modeling the area around Big Brown.

Dr. Gray's report examined the sensitivity of the model design value concentrations to each of these factors individually to get an idea of the size of the effect for Big Brown Power Plant. The results are summarized in the table below.

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

The largest changes noted in the sensitivity runs were decreases of about 4%. In order to bring the modeled design value to the threshold of attainment a much large decrease would be required – an order of magnitude greater than the effects noted in the sensitivity tests. Therefore, we conclude that Sierra Club's modeling remains persuasive in showing violations of the NAAQS for the period addressed.

Sierra Club Round March 2016 (Round 3) Modeling

Sierra Club has conducted a third round of modeling. To improve the realism, this analysis used actual hourly emissions and stack exhaust flow rates for the 2013-15 period for Big Brown and Martin Lake. This analysis also incorporates a lower background concentration than the previous December 2015 modeling. We note these are the maximum impacts from

the receptors that Sierra Club modeled. We have done further analysis based on information provided by Luminant and the values in the table below may or may not be the actual ambient air maximum for where a monitor could be sited. For a specific analysis for each area see our supplemental TSD.

Sierra Club Modeling Design Values

	Modeled Design Value (ug/m3)		
Source	**Round 1**	**Round 2**	**Round 3**
Big Brown		387.9	321.3
Martin Lake	347.7		249.3
Monticello		237.3	212.0

Sierra Club's use of hourly velocities and a reduced background lowered the modeled impact at all three plants. This had its largest effect on Martin Lake, though all plants remain above the standard level of 196.5 ug/m3. In examining the Martin Lake stack parameters used in the first set of modeling (Round 1), it is noted that the velocities used there (~28 m/s) are much smaller than those when using the CEM hourly data (~45 m/s) near 100% load. Luminant's comment would seem to be substantiated that the Sierra Club stack velocities for the first set of modeling - purported to represent 100% load - were less than those characteristic of 75% load. The constant temperature (449 K) used for Martin Lake's most recent modeling (Round 3) was the same as that used for earlier sets (Rounds 1 and 2) and so was not a factor in the reduced modeled impacts.

A. Freestone-Anderson County

Comment: Commenter (0294-TCEQ) stated that Anderson and Panola Counties should be designated as unclassifiable/attainment because their SO_2 emissions contributions to their respective proposed nonattainment areas are negligible, and therefore including portions of these counties is unnecessary to control additional SO_2 sources.

EPA's Response: The EPA disagrees with the comment and refers the commenter to the proposed TSD and our final supplemental TSD for our full evaluation. In the revised modeling from Sierra Club, there are still a number of receptors with values above the NAAQS, therefore part of these counties have modeled nonattainment and part of the county is being designated as nonattainment.

Comment: Also see General comments above and EPA's Responses.

B. Gregg County

Comment: Commenter (0294-TCEQ) stated the EPA should revise its proposed designation for Gregg County to attainment to comply with federal regulations at 40 CFR 50.17(b) and to reflect the observed air quality data from the regulatory monitor located in that portion of the county which has shown attainment since 2010.

Commenter (0285-Stoudt) requested that the EPA designate Gregg County as attainment. The commenter stated the EPA's proposal to designate portions of Gregg County as nonattainment disregards the certified monitoring data that are below the standard and relies instead on air quality modeling data of questionable origin and reliability. Commenter stated that the model's level of over-prediction should not be acceptable as the basis for a decision as significant as an attainment designation, particularly when certified monitoring data is available. The commenter stated that the proposed nonattainment area boundaries went beyond the receptors identified in the model as impacted by the Martin Lake Steam Electric Station., most of these receptors were over Lake Cherokee where potential exposure would be intermittent, and as a result, these boundaries include additional area in Gregg County for which there is no basis for a designation. The commenter stated that it seems questionable for a party who initiated the litigation, the Sierra Club, leading to an agreement concerning the designation process to provide the government with which it reached an agreement the data on which designations would be made.

One commenter (0328-Luminant) stated the EPA's proposal is unlawful and should not be finalized, in part, because the portion of Gregg County designated nonattainment contains a monitor that has collected actual data demonstrating attainment with the standard; thus a nonattainment designation for this area is wholly unsupported. Commenter stated the EPA should designate Gregg County as attainment because the design value for the monitor in the county is well below the SO_2 NAAQS.

EPA's Response:
Regarding the claim that EPA's regulations at 40 CFR 50.17(b) restrict EPA's authority to base designations only on monitoring data, the EPA disagrees that it is so limited. That section simply states how the NAAQS is shown to be met at a monitoring site, but it does not by its terms preclude EPA's evaluation of and reliance upon additional kinds of information when issuing designations under CAA section 107. In fact, when EPA promulgated that section, it explained in the preamble to the rule that EPA expected to continue its historical practice of also basing designations under SO_2 NAAQS, where appropriate, on modeling information. Therefore, EPA concludes that it may, as indicated in sections 107(d)(1)(A)-(B) of the statute, base its designations on a broader set of "available information" as it "deems necessary" or "deems appropriate" to best support its technical conclusion.

In response to the comment arguing that it is inappropriate for EPA to consider and rely upon information submitted by a litigant who filed suit to compel EPA to act in the first instance, EPA notes that the commenters logic would compel that the agency also reject all information submitted by the State of Texas, who has also filed such suit against EPA in a separate case and who intervened as a plaintiff in the same suit filed by Sierra Club. EPA notes that the agency often is presented with information and data in rulemaking actions from entities that had previously filed suit to compel the subject agency action. Nothing in the Clean Air Act suggests that such litigants are subsequently precluded from submitting information to support an

advocated regulatory outcome. Consequently, in this case, both the State of Texas and Sierra Club have properly submitted information for EPA to consider in this supplemental final action, and EPA has reasonably evaluated it.

As discussed in previous comments, EPA received additional modeling from Sierra Club with hourly emission rates and revised background levels. With these refinements the area modeled as nonattainment became smaller and no longer includes portions of Gregg County. As a result, EPA will finalize a boundary that does not include Gregg County and should address the commenters concerns.

Comment: Also see General comments above and EPA's Responses.

C. Milam County

Comment: See General comments above and EPA's Responses.

D. Panola County

Comment: Commenter (0294-TCEQ) stated that Anderson and Panola Counties should be designated as unclassifiable/ attainment because their SO_2 emissions contributions to their respective proposed nonattainment areas are negligible, and therefore including portions of these counties is unnecessary to control additional SO_2 sources.

EPA's Response: The EPA disagrees with the comment and refers the commenter to the final supplemental TSD for our full evaluation. In our final supplemental TSD we have decreased the nonattainment area, but it still includes parts of Anderson and Panola Counties. In particular, EPA is required under the Clean Air Act to designate areas that have air quality that is not meeting the standard and that have emissions that contribute to nonattainment. In this case, EPA is finding that available information indicates that some portions of these counties are experiencing air quality that is in excess of the standard.

Comment: Also see General comments above and EPA's Responses.

E. Rusk County

Comment: See General comments above and EPA's Responses.

F. Titus County

Comment: One commenter (0328-Luminant) stated that Luminant has provided to TCEQ a modeling report (attachment 3 to their comment letter) which supports a NAAQS attainment demonstration for the plant. Commenter stated this report documents the use of AERMOD

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modeling to characterize the SO_2 concentrations around the Monticello Steam Electric Station using the 2012-2014 actual hourly emissions. Commenter stated the use of source characterization techniques (AERLIFT and AERMOIST) as well as the low wind options (ADJ_U* and LOWWIND3) are supported by EPA's Appendix W proposals as well as peer-reviewed papers available for each option. Commenter stated that the modeling results remain highly conservative (by maximizing concentration estimates) because they do not account for the penetrated plume over-prediction, which could easily result in a much lower actual concentration, as was found by EPA for the Gibson Generating Station.

EPA's Response:

As discussed in more detail in other comments, Luminant has combined the use of several unapproved modeling techniques and unproven contentions about the approved model to conclude that the area around Monticello is showing attainment. In contrast, Sierra Club has used approved approaches to modeling and provided additional modeling during the comment period to address concerns raised regarding their first two modeling submissions. EPA's view is that we must consider such modeling information using accepted methods in making our decision. As also explained elsewhere, the situations for these Texas areas are different from the Gibson situation, where the siting of the monitors was in the areas of expected maximum ambient concentrations. No such showing has been made for monitors near these Texas areas and the closest monitors are 19 and 40 kilometers from Martin Lake and Big Brown respectively. EPA's evaluation is that the monitors are not near the sources and are not in or near the areas with the highest modeled impacts. We have discussed elsewhere in this RTC and the supplemental Final TSD the inappropriateness of modeling using AERLIFT and AERMOIST and the proposed beta options of ADJ_U* and LOWWIND3. As to any potential plume penetration over-prediction we also discuss in another response and in our supplemental TSD, but we note the values are above the standard and any impacts from such a phenomenon (if they exist at all) have not been shown by the commenter and would not be expected to result in values large enough to result in no modeled values above the SO_2 NAAQS.

Comment: Also see General comments above and EPA's Responses.