

Final Technical Support Document

Missouri Area Designations for the 2010 SO₂ Primary National Ambient Air Quality Standard

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA, or the Agency) must designate areas as either “unclassifiable,” “attainment,” or “nonattainment” for the 2010 1-hour sulfur dioxide (SO₂) primary national ambient air quality standard (NAAQS). Section 107(d) of the CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to a NAAQS violation in a nearby area, an attainment area as any area other than a nonattainment area that meets the NAAQS, and an unclassifiable area as any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

July 2, 2016, is the deadline established by the D.C. District Court for the Northern California District for the EPA to designate certain areas. This deadline is the first of three deadlines established by the court for the EPA to complete area designations for the 2010 SO₂ NAAQS. This deadline applies to certain areas in Missouri because three emission sources meet the conditions of the court’s order.

Missouri submitted updated recommendations on September 25, 2015, and April 18, 2016. Table 1 below lists Missouri’s recommendations and identifies the counties in Missouri that the EPA is designating in order to meet the July 2, 2016 court-ordered deadline. These final designations are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1 – Missouri’s Recommended and the EPA’s Final Designations

Area	State’s Recommended Area Definition	State’s Recommended Designation	EPA’s Final Area Definition	EPA’s Final Designation
Franklin County, Missouri	No recommendation	Unclassifiable	The eastern and western boundaries are Boone and Boles Township boundaries in St. Charles and Franklin Counties respectively. The northern boundary is Missouri Route D and Highway 94	Unclassifiable ²

² EPA notified the State of Missouri on February 16, 2016, that our intended designation for the Franklin County area was nonattainment. Our final designation is different than our intended designation but the same as Missouri’s recommended designation.

			in St. Charles. The southern boundary is Interstate 44 in Franklin. ¹ (Franklin-St. Charles, MO)	
Jackson County, Missouri	Within Jackson County: The northern boundary is the county line separating Jackson County from Clay and Ray Counties. The Eastern boundary is the county line separating Jackson County from Lafayette County. The Southern boundary is Interstate 70 and 470. The Western boundary is Missouri Highway 291.	Attainment	Same as Missouri's Recommendation ³ (Jackson County, MO)	Unclassifiable ⁴
Scott County, Missouri	Scott County	Attainment	Same as Missouri's Recommendation ⁵ (Scott County, MO)	Unclassifiable/Attainment ⁶

¹ EPA notified the State of Missouri on February 16, 2016, that our intended area definition consisted of the following boundaries: (1) the eastern and western boundaries are Boone and Boles Township boundaries in St. Charles and Franklin Counties respectively, (2) the northern boundary is Missouri Route D and Highway 94 in St. Charles, and (3) the southern boundary is Interstate 44 in Franklin. Our final area definition is the same as our intended area definition.

³ EPA notified the State of Missouri on February 16, 2016, that our intended area definition was the same as the area included in Missouri's September 25, 2015 submittal. Our final area definition is the same as our intended area definition.

⁴ EPA notified the State of Missouri on February 16, 2016, that our intended designation for the Jackson County area was unclassifiable. Our final designation is the same as our intended designation.

⁵ EPA notified the State of Missouri on February 16, 2016, that our intended area definition was the same as the area included in Missouri's September 25, 2015 submittal. Our final area definition is the same as our intended area definition.

⁶ EPA notified the State of Missouri on February 16, 2016, that our intended designation for the Scott County area was unclassifiable/attainment. Our final designation is the same as our intended designation.

Background

On June 3, 2010, the EPA revised the primary (health based) SO₂ NAAQS by establishing a new 1-hour standard at a level of 75 parts per billion (ppb) which is met at an ambient air quality monitoring station when the 3-year average of the 99th percentile of 1-hour daily maximum concentrations does not exceed 75 ppb. This NAAQS was published in the *Federal Register* on June 22, 2010 (75 FR 35520), and is codified at 40 CFR 50.17. The EPA determined this is the level necessary to protect public health with an adequate margin of safety, especially for children, the elderly, and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO₂. The two prior primary standards of 140 ppb evaluated over 24 hours, and 30 ppb evaluated over an entire year, codified at 40 CFR 50.4, remain applicable.⁷ However, the EPA is not currently designating areas on the basis of either of these two primary standards. Similarly, the secondary standard for SO₂, set at 500 ppb evaluated over 3 hours, codified at 40 CFR 50.5, has not been revised, and the EPA is also not currently designating areas on the basis of the secondary standard.

General Approach and Schedule

Section 107(d) of the CAA requires that not later than 1 year after promulgation of a new or revised NAAQS, state governors must submit their recommendations for designations and boundaries to EPA. Section 107(d) also requires the EPA to provide notification to states no less than 120 days prior to promulgating an initial area designation that is a modification of a state's recommendation. If a state does not submit designation recommendations, the EPA may promulgate the designations that it deems appropriate without prior notification to the state, although it is our intention to provide such notification when possible. If a state or tribe disagrees with the EPA's intended designations, it is given an opportunity within the 120-day period to demonstrate why any proposed modification is inappropriate. The EPA is required to complete designations within 2 years after promulgation of a new or revised NAAQS, unless EPA determines that sufficient information is not available, in which case the deadline is extended to 3 years. The 3-year deadline for the revised SO₂ NAAQS was June 2, 2013.

On August 5, 2013, the EPA published a final rule establishing air quality designations for 29 areas in the United States for the 2010 SO₂ NAAQS, based on recorded air quality monitoring data from 2009 - 2011 showing violations of the NAAQS (78 FR 47191). In that rulemaking, the EPA committed to address, in separate future actions, the designations for all other areas for which the Agency was not yet prepared to issue designations. The EPA designated a portion of Jackson County, Missouri and Jefferson County, Missouri as nonattainment in this initial set of designations.

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

Following the initial August 5, 2013, designations, three lawsuits were filed against the EPA in different U.S. District Courts, alleging the Agency had failed to perform a nondiscretionary duty under the CAA by not designating all portions of the country by the June 2, 2013 deadline. In an effort intended to resolve the litigation in one of those cases, plaintiffs Sierra Club and the Natural Resources Defense Council and the EPA filed a proposed consent decree with the U.S. District Court for the Northern District of California. On March 2, 2015, the court entered the consent decree and issued an enforceable order for the EPA to complete the area designations according to the court-ordered schedule.

According to the court-ordered schedule, the EPA must complete the remaining designations by three specific deadlines. By no later than July 2, 2016 (16 months from the court's order), the EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO₂ 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 SO₂ or (ii) more than 2,600 tons of SO₂ with an annual average emission rate of at least 0.45 pounds of SO₂ per one million British thermal units (lbs SO₂/MMBtu). Specifically, a stationary source with a coal-fired unit that as of January 1, 2010, had a capacity of over 5 megawatts and otherwise meets the emissions criteria, is excluded from the July 2, 2016, deadline if it had announced through a company public announcement, public utilities commission filing, consent decree, public legal settlement, final state or federal permit filing, or other similar means of communication, by March 2, 2015, that it will cease burning coal at that unit.

The last two deadlines for completing remaining designations are December 31, 2017, and December 31, 2020. The EPA has separately promulgated requirements for state and other air agencies to provide additional monitoring or modeling information on a timetable consistent with these designation deadlines. We expect this information to become available in time to help inform these subsequent designations. These requirements were promulgated on August 21, 2015 (80 FR 51052), in a rule known as the SO₂ Data Requirements Rule (DRR), codified at 40 CFR part 51 subpart BB.

Updated designations guidance was issued by the EPA through a March 20, 2015 memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions 1-10. This memorandum supersedes earlier designation guidance for the 2010 SO₂ NAAQS, issued on March 24, 2011, and it identifies factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO₂ NAAQS. The guidance also contains the factors the EPA intends to evaluate in determining the boundaries for all remaining areas in the country, consistent with the court's order and schedule. These factors include: 1) Air quality characterization via ambient monitoring or dispersion modeling results; 2) Emissions-related data; 3) Meteorology; 4) Geography and topography; and 5) Jurisdictional boundaries. This guidance was supplemented by two non-binding technical assistance documents intended to assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling or ambient air quality monitoring for sources that emit SO₂. Notably, the EPA's documents titled, "SO₂ NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) and "SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD), were

available to states and other interested parties. Both of these TADs were most recently updated in February 2016.

Based on complete, quality assured and certified ambient air quality data collected between 2013 and 2015, no violations of the 2010 SO₂ NAAQS have been recorded at ambient air quality monitors in any undesignated part of Missouri. However, there are three sources in the state meeting the emissions criteria of the consent decree for which the EPA must complete designations by July 2, 2016. In this final technical support document, the EPA discusses its review and technical analysis of Missouri's updated recommendations for the areas that we must designate. The EPA also discusses any final modifications from the state's recommendation based on all available data before us.

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

- 1) 2010 SO₂ NAAQS – the primary NAAQS for SO₂ promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. See 40 CFR 50.17.
- 2) Attaining monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value is equal to or less than 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
- 3) Design Value – a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.
- 4) Designated nonattainment area – an area which the EPA has determined has violated the 2010 SO₂ NAAQS or contributed to a violation in a nearby area. A nonattainment designation reflects considerations of the state's recommendations and all of the information discussed in this document. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.
- 5) Designated unclassifiable area – an area for which the EPA cannot determine based on all available information whether or not it meets the 2010 SO₂ NAAQS.
- 6) Designated unclassifiable/attainment area – an area which the EPA has determined to have sufficient evidence to find either is attaining or is likely to be attaining the NAAQS. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.
- 7) Modeled violation – a violation based on air dispersion modeling.
- 8) Recommended attainment area – an area a state or tribe has recommended that the EPA designate as attainment.
- 9) Recommended nonattainment area – an area a state or tribe has recommended that the EPA designate as nonattainment.
- 10) Recommended unclassifiable area – an area a state or tribe has recommended that the EPA designate as unclassifiable.
- 11) Recommended unclassifiable/attainment area – an area a state or tribe has recommended that the EPA designate as unclassifiable/attainment.

12) Violating monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.

Technical Analysis for Franklin County, Missouri

Introduction

The Franklin County, Missouri, area contains a stationary source that, according to the EPA's Air Markets Database, emitted, in 2012, either more than 16,000 tons of SO₂ or more than 2,600 tons of SO₂ and had an annual average emission rate of at least 0.45 pounds of SO₂ per one million British thermal units (lbs SO₂/mmBTU). Specifically, in 2012, the Ameren Labadie Energy Center emitted 42,236 tons of SO₂ and had a facility-wide emissions rate of 0.571 lbs SO₂/mmBTU. In addition, as of March 2, 2015, this stationary source had not met the criteria for being "announced for retirement." Therefore, pursuant to the March 2, 2015, court-ordered schedule, the EPA must designate the area surrounding this facility by July 2, 2016.

In its September 25, 2015, designation recommendation submission, Missouri recommended that the area surrounding Ameren Labadie Energy Center be designated as unclassifiable based on varying modeling results performed by Missouri, Ameren Missouri, and the Washington University Environmental Law Clinic on behalf of the Sierra Club, and an analysis of historic and recent monitoring. The modeling assessments included characterization of air quality from the facility and other nearby sources which may have a potential impact in the area of analysis where maximum concentrations of SO₂ are expected. These modeling assessments and characterizations were performed using air dispersion modeling software, specifically AERMOD, analyzing actual emissions for 2012 through 2014. Missouri did not include a boundary with their unclassifiable designation recommendation.

On February 16, 2016, the EPA notified Missouri that we intended to designate portions of Franklin County and St. Charles County, Missouri, area as nonattainment, based on our view that the area was not meeting the NAAQS. Additionally, we informed Missouri that our intended boundaries⁸ for the nonattainment area consisted of the following:

The eastern and western boundaries are Boone and Boles Township boundaries in St. Charles and Franklin Counties respectively. The northern boundary is Missouri Route D and Highway 94 in St. Charles. The southern boundary is Interstate 44 in Franklin.

Our intended designation and associated boundaries were based on a technical evaluation of modeling and related information submitted by Missouri, Ameren, and the Sierra Club. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the February 16, 2016, technical support document for Missouri, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment of New Information

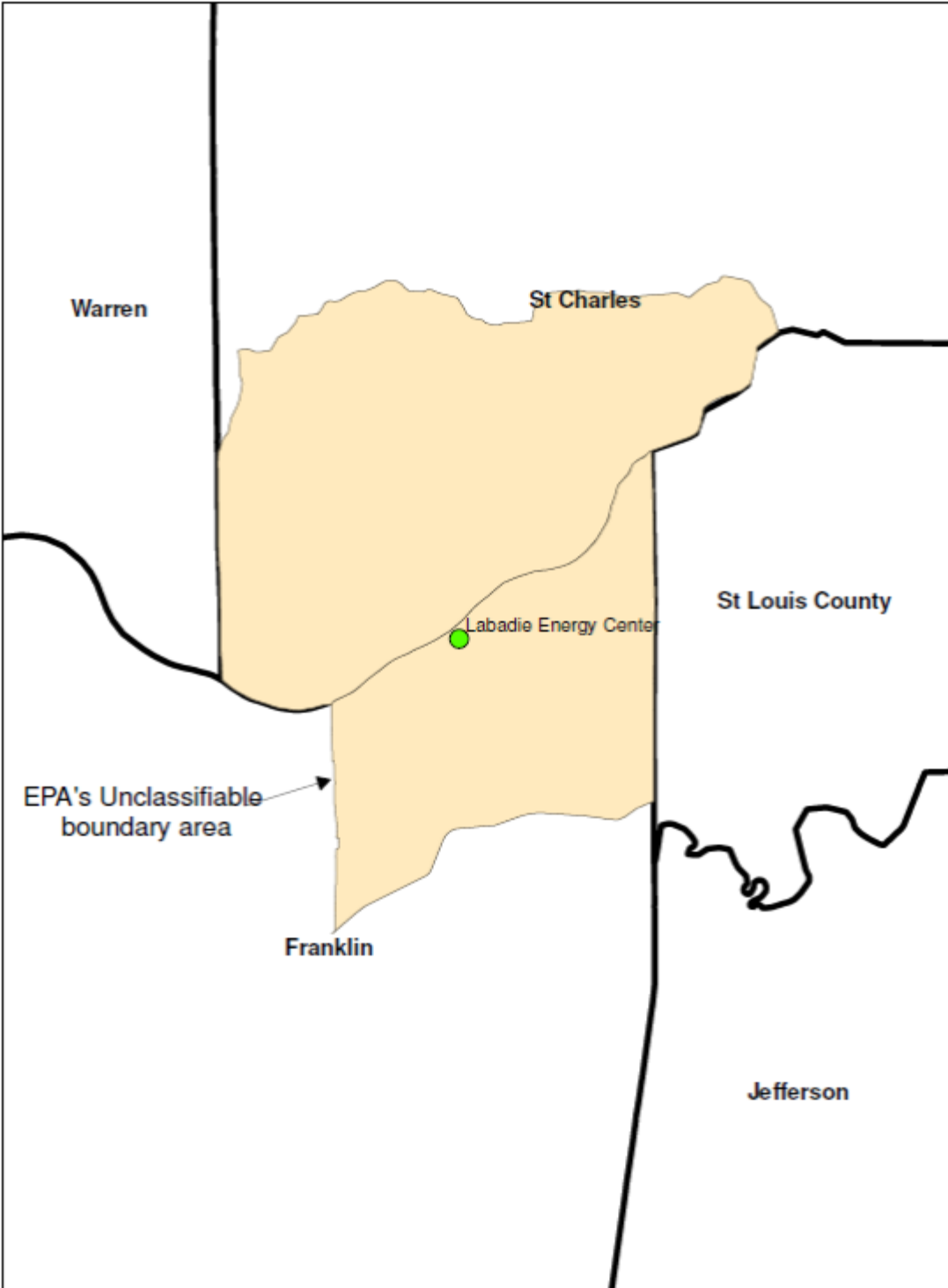
⁸ The proposed boundary was the state's recommended area boundary for the proposed nonattainment designation in Missouri's "Proposed Options for Area Boundary Recommendations" for Missouri's August 27, 2015, public hearing document. This document was provided to EPA, but was not proposed by Missouri as the boundary for the area in its recommendation to EPA.

In our February 16, 2016, notification to Missouri regarding our intended nonattainment designation for the Franklin County, Missouri, area, the EPA requested that any additional information that the Agency should consider, prior to finalizing the designation, should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register*, inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

Except to the extent that any new information submitted to the EPA or conclusions presented in this final technical support document and our responses to comments, available in the docket, supersede those found in the February 16, 2016 technical support document, the EPA is explicitly incorporating and relying upon the analyses and information presented in the February 16, 2016 technical support document for the purposes of our final designation for this area.

Subsequent to our February 16, 2016 notification, the EPA received numerous and substantive comments from citizens, citizen groups, Sierra Club, Associated Industries of Missouri, Missouri state legislators, Ameren, and the State of Missouri regarding our intended designation for this area, including detailed air dispersion modeling information. The Sierra Club provided additional air dispersion modeling information asserting that the area is violating the NAAQS and supporting our proposal that the area be designated as nonattainment. As further detailed below, after carefully considering all available data and information, the EPA now concludes that based on available information the agency is unable to determine whether the area is meeting the NAAQS, and therefore is designating portions of Franklin County and St. Charles County, Missouri area as unclassifiable for the 2010 SO₂ NAAQS. The boundaries for this unclassifiable area, shown in Figure 1 below, consist of the following: (1) the eastern and western boundaries are Boone and Boles Township boundaries in St. Charles and Franklin Counties respectively, (2) the northern boundary is Missouri Route D and Highway 94 in St. Charles, and (3) the southern boundary is Interstate 44 in Franklin. Also included in the figure are nearby emitters of SO₂. The EPA's assessment and evaluation of the available information follow the Modeling TAD, Monitoring TAD, and the factors for evaluation contained in the EPA's March 20, 2015, guidance, as appropriate and applicable.

Figure 1: The EPA's final unclassifiable area: Portions of Franklin County and St. Charles County, Missouri



As noted above, the EPA received substantial new information in the form of air dispersion modeling from a number of parties. This technical support document includes the following: (1) an assessment and evaluation of the Missouri, Ameren, and Sierra Club modeling analyses provided since the February 2016 technical support document was made available, and of its impact on the reliability of the information that was the basis of our proposed nonattainment

designation; (2) an EPA review of model selection and modeling components; and (3) the basis for the Agency’s final unclassifiable designation. All modeling analyses received during the comment period are summarized in Table 2 below. The design values included in the table are in $\mu\text{g}/\text{m}^3$. The design values for certain Ameren modeling analyses in blue were derived from an "extrapolation exercise demonstration"⁹ and are not directly comparable to the NAAQS. Design values in red are above the 2010 SO₂ NAAQS and design values in green are below the 2010 SO₂ NAAQS.

Table 2: Summary of AERMOD model analyses submitted to the EPA in response to the EPA’s proposed designation.

Submitter	Model Options	Background Site ^A	Units 3&4 Merged	Meteorological Data Site ^B	Design Value Result ^C	Date Submitted
Sierra Club	adj_u ^D +low3 ^E	Nilwood,IL - vary	Yes	Jeff	193	3/31/2016
Sierra Club	adj_u+low3	Nilwood,IL - vary	No	Jeff	225.2	3/31/2016
Sierra Club	adj_u+low3	Nilwood,IL - vary	Yes	Jeff	226.4	3/31/2016
Sierra Club	adj_u+low3	East St. Louis - fixed	Yes	Jeff	198	3/31/2016
Sierra Club	Default	Nilwood,IL - vary	Yes	SOS	198.8	4/19/2016
Sierra Club	Default	East St. Louis - fixed	Yes	SOS	209.5	4/19/2016
Sierra Club	Default	Nilwood,IL - vary	Yes	Jeff	196.9	4/19/2016
Sierra Club	Default	East St. Louis - fixed	Yes	Jeff	207.4	4/19/2016
Sierra Club	Default	Nilwood,IL - vary	No	SOS	204.5	4/19/2016
Sierra Club	Default	East St. Louis - fixed	No	SOS	216.2	4/19/2016
Sierra Club	Default	Nilwood,IL - vary	No	Jeff	202.4	4/19/2016
Sierra Club	Default	East St. Louis - fixed	No	Jeff	213.7	4/19/2016
Sierra Club	Default	East St. Louis - fixed	No	SOS	252.2	4/19/2016
Sierra Club	adj_u+low3	East St. Louis - fixed	No	SOS	208.2	4/19/2016

⁹ Ameren provided modeling of two different periods, one for 1995 -1998 and one for 2013-2015, and took a ratio of modeled design values from the two periods, and using this ratio of modeling runs attempted to extrapolate a monitored design value from the Augusta Quarry monitor that operated in 1995-1998. The extrapolation was an attempt to demonstrate a monitor in the current Augusta Quarry location would have met the NAAQS based on historic monitoring adjusted to 2013-2015 emissions. This is not a method directly comparable to the NAAQS nor does it demonstrate attainment in all modeled areas.

Sierra Club	Default	Nilwood,IL - vary	No	SOS	242.5	4/19/2016
Sierra Club	adj_u+low3	Nilwood,IL - vary	No	SOS	198.3	4/19/2016
Sierra Club	Default	East St. Louis - fixed	No	Jeff	235.8	4/19/2016
Sierra Club	adj_u+low3	East St. Louis - fixed	No	Jeff	201.3	4/19/2016
Sierra Club	Default	Nilwood,IL - vary	No	Jeff	225.9	4/19/2016
Sierra Club	adj_u+low3	Nilwood,IL - vary	No	Jeff	189.3	4/19/2016
Missouri	Default	East St. Louis - fixed	No	Jeff	201	4/18/2016
Missouri	Default	East St. Louis - fixed	Yes	Jeff	175	4/18/2016
AMEREN	Default	Nilwood,IL - vary	Yes	SOS	167.6	3/29/2016
AMEREN	adj_u+low3	Nilwood,IL - vary	Yes	SOS	149.4	3/29/2016
AMEREN	Default	East St. Louis - fixed	Yes	SOS	179.0	3/29/2016
AMEREN	adj_u+low3	East St. Louis - fixed	Yes	SOS	159.5	3/29/2016
AMEREN	Default	Nilwood,IL - vary	Yes	Jeff	171.1	3/29/2016
AMEREN	adj_u+low3	Nilwood,IL - vary	Yes	Jeff	150.7	3/29/2016
AMEREN	Default	East St. Louis - fixed	Yes	Jeff	181.3	3/29/2016
AMEREN	adj_u+low3	East St. Louis - fixed	Yes	Jeff	161.4	3/29/2016
Sierra Club	Default	East St. Louis - fixed	Yes	Jeff	203.7	4/29/2016
AMEREN	Default	Nilwood,IL - vary	Yes	Jeff	177.5	5/2/2016
AMEREN	adj_u+low3	Nilwood,IL - vary	Yes	Jeff	155.6	5/2/2016
AMEREN	Default	Nilwood,IL - vary	Yes	Jeff	187.2	5/2/2016
AMEREN	adj_u+low3	Nilwood,IL - vary	Yes	Jeff	159.4	5/2/2016
AMEREN	Default	Nilwood,IL - vary	Yes	SOS	271.3	3/29/2016
AMEREN	Default	Nilwood,IL - vary	Yes	SOS	167.6	3/29/2016
AMEREN	Default	Nilwood,IL - vary	Yes	Jeff	171.1	3/29/2016
AMEREN	adj_u+low3	Nilwood,IL - vary	Yes	SOS	250.1	3/29/2016
AMEREN	adj_u+low3	Nilwood,IL - vary	Yes	SOS	149.4	3/29/2016

AMEREN	adj_u+low3	Nilwood,IL - vary	Yes	Jeff	150.7	3/29/2016
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^A Two background sites are generally being used. A calculated season by hour varying value derived from the Nilwood, Illinois monitor and the East St. Louis monitor (fixed 9ppb value).

^B Two meteorological sites are generally being used, Jefferson City Airport which Missouri contends is most representative; Spirit of St. Louis Airport which Sierra Club contends is more representative.

^C Design Values in $\mu\text{g}/\text{m}^3$ for all the runs. Note that the Ameren design values in Blue are from an "extrapolation exercise demonstration" and are not directly comparable to the NAAQS in the form presented here; Red > NAAQS; Green < NAAQS.

^D adj_u refers to the AERMET beta option to adjust surface friction velocity.

^E low3 refers to the AERMOD low wind (LOWWIND3) beta option designed to address low wind speed conditions.

Missouri modeling:

On April 19, 2016, Missouri submitted additional information to the EPA regarding the EPA's intended designation of Ameren Labadie as nonattainment. As part of this submittal, Missouri included two new modeling scenarios to characterize the air quality around the Labadie facility to support their recommendation of unclassifiable.

In the first scenario, Missouri indicated that the only change made to the modeling submitted in the state's original recommendation was to use 2013-2015 hourly emissions and meteorological data rather than 2012-2014 data. This scenario resulted in a decrease in the approximate design value of the area from 234 $\mu\text{g}/\text{m}^3$ (or 90 ppb) to 201 $\mu\text{g}/\text{m}^3$ (or 77 ppb).

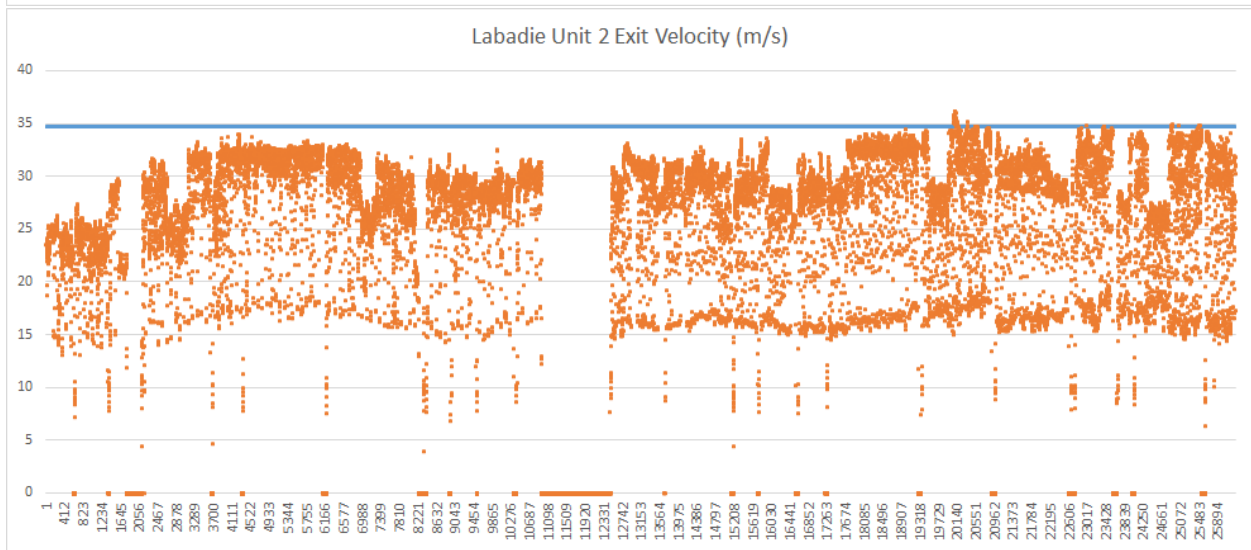
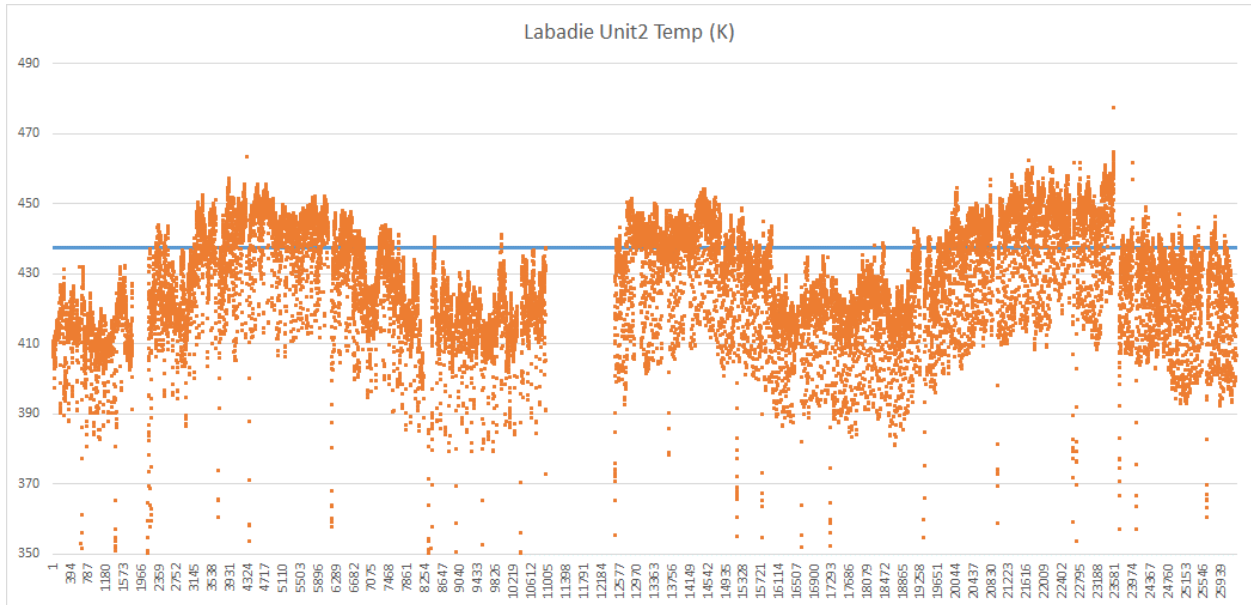
In the second scenario, Missouri modeled units 3 and 4 as described above but with a single release point as a merged plume. This modeling scenario resulted in an approximate design value of 175 $\mu\text{g}/\text{m}^3$ (or 67 ppb) which is less than the 2010 1-hour NAAQS of 75 ppb. Missouri justified using a merged plume for units 3 and 4 by citing two EPA Model Clearinghouse Information Storage and Retrieval System records (MCHISRS), 91-II-01 and 96-V-10, which describe situations in which multiple stacks/flues were allowed to be modeled as a single source. Because units 3 and 4 at Labadie are vented through two flues contained in a singular outer annulus or stack, Missouri believes these flues are similar to those addressed in these two MCHISRS records. These two MCHISRS records suggest that if the flues/stacks are closer together than their respective widths/diameters they may be treated as a single source. This is based on the rationale included in the GEP stack height guideline regarding treating buildings that are closer than their individual widths as a single building when using the stack height formula. EPA concurs that modeling that uses merged the plumes for unit 3 and 4 can be used to inform our designation decision. A detailed discussion of Missouri's merged plume calculations is available in the Missouri April 19, 2016, comment letter and attachments. This information is included in the docket to this action.

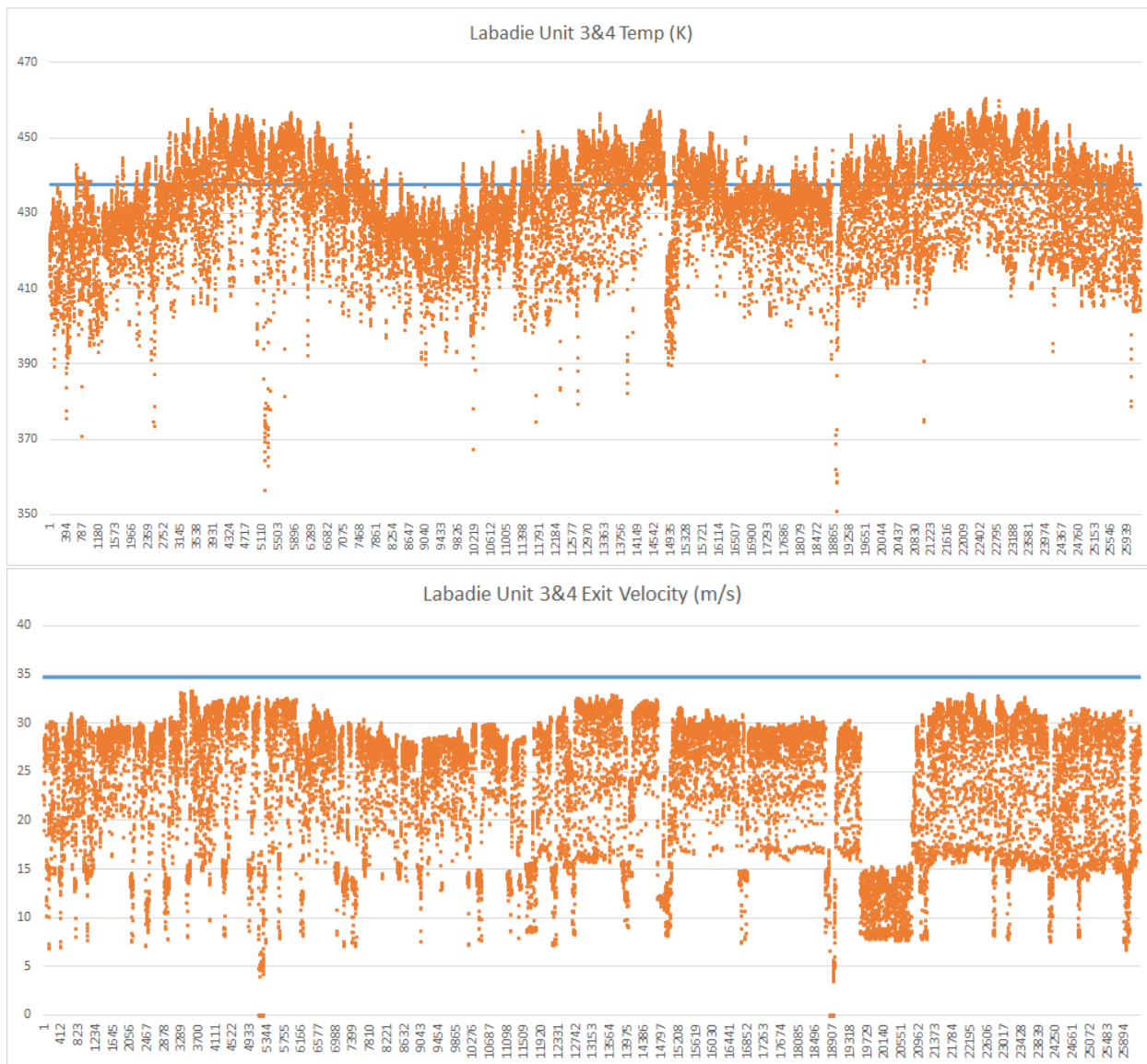
In its new modeling analyses and the modeling analysis included in its September 25, 2015, submittal, Missouri used fixed inputs for the stack temperature and exit velocity. Ameren, during the comment period for the EPA's intended designation, provided hourly varying temperatures and corresponding exit velocities for 2013-2015. The EPA compared the hourly varying temperatures and exit velocities provided by Ameren to the fixed values used by Missouri and

determined that the fixed temperatures and exit velocities used by Missouri were generally higher than the actual stack temperatures and exit velocities during that period.

Because plume rise is dependent on temperature for buoyancy calculations and exit velocity for momentum calculations, Missouri's use of temperatures and exit velocities that were higher than the actual values reported by Ameren likely led to an overestimated modeled plume rise during most hours and could possibly under-predict concentrations. To compare the fixed values Missouri used in their modeling to the actual values reported by Ameren, the EPA developed the plots below. The blue line represents the fixed values used by Missouri and the orange dots represent Ameren's hourly varying values from their May 2, 2016 modeling analyses.







In summary, Missouri’s first modeling approach in their April 19, 2016, submittal was similar to their original September 25, 2015, modeling submittal. Missouri’s approach relies upon varying emissions hourly, using fixed stack parameters for temperature and exit velocity, and processing the surface characteristic parameters on a seasonal (e.g., fall, winter, spring, summer) basis. Missouri’s full modeling approach is described in the original submittal, and the only changes in the updated MNR modeling include using 2013-2015 emissions and meteorology along with the merging of Units 3 and 4. The EPA notes that, while Missouri’s newest modeling and their approach attempts to follow the EPA modeling TAD, the EPA questions the validity of the magnitudes for the fixed stack parameters currently being used, especially the exit velocity values for the merged Units 3 and 4, which appear to be overestimated on average by 25%. The overestimation results in a likely significant overestimation of the plume rise of emissions from Labadie and, consequently, a likely under-prediction of the ambient concentrations. While the modeling TAD generally supports the use of fixed stack parameters where appropriate, the fixed parameters should be representative of actual conditions, and in this case, the values used in the

Missouri modeling appear higher than the actual hourly values provided by Ameren. Consequently, the EPA does not believe that Missouri’s modeling provides sufficient information to determine whether the area is meeting the NAAQS, and it is not certain that correction of the fixed parameters would yield a clear indication of whether the area is meeting the NAAQS.

Ameren modeling:

On March 29, 2016, and May 2, 2016, Ameren submitted several model runs supporting their position that an attainment or unclassifiable designation would be appropriate for the Labadie Energy Center. Ameren’s first set of modeling was submitted on March 29, 2016, and contained eight modeling runs. However, Sierra Club identified that, in their view, all eight runs contained errors. The Sierra Club noted that Ameren did not calculate the exit velocities from the merged plume for Labadie Units 3 and 4 correctly. The EPA agrees with Sierra Club’s assessment regarding these eight runs. This calculation error overstated the exit velocities for 2015 for Labadie Units 3 and 4. The error for exit velocity appears to lead to an underestimation of the design value, as the plume rise calculations for Labadie Units 3 and 4 are likely overestimated. The Sierra Club provided information (Figure 2) to show this exit velocity error for the 2015 year, and Ameren verified in their May 2, 2016, submittal that a mistake was made in this exit velocity calculation. This exit velocity error was later corrected by Ameren and included in a May 2, 2016, submittal and resulted in a design value increase of 6.4 $\mu\text{g}/\text{m}^3$ (as shown in Table 3).

Figure 2: Hourly Varying Exit Velocities for the Merged Units 3 and 4 Used in Ameren modeling submitted on March 29, 2016. (Figure 3 in the Sierra Club’s April 19, 2016 Submittal)

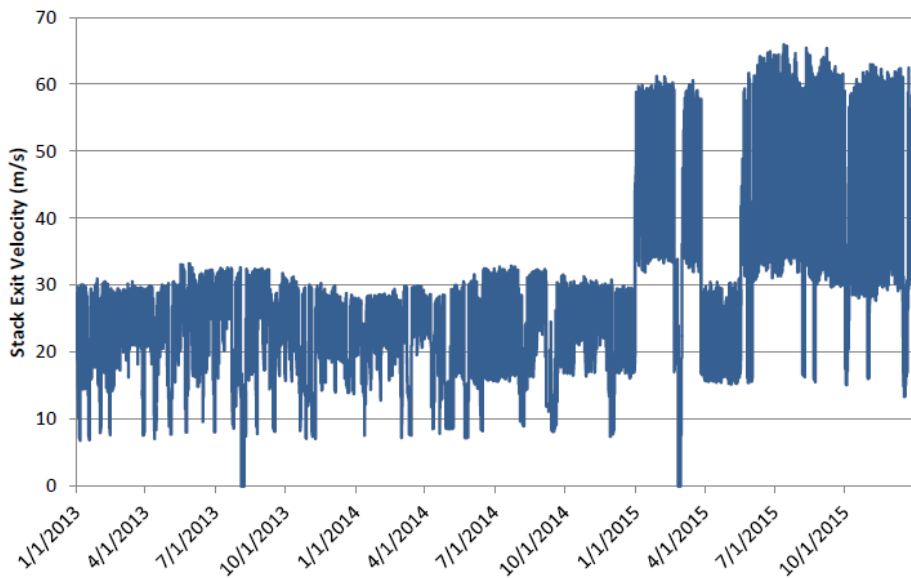
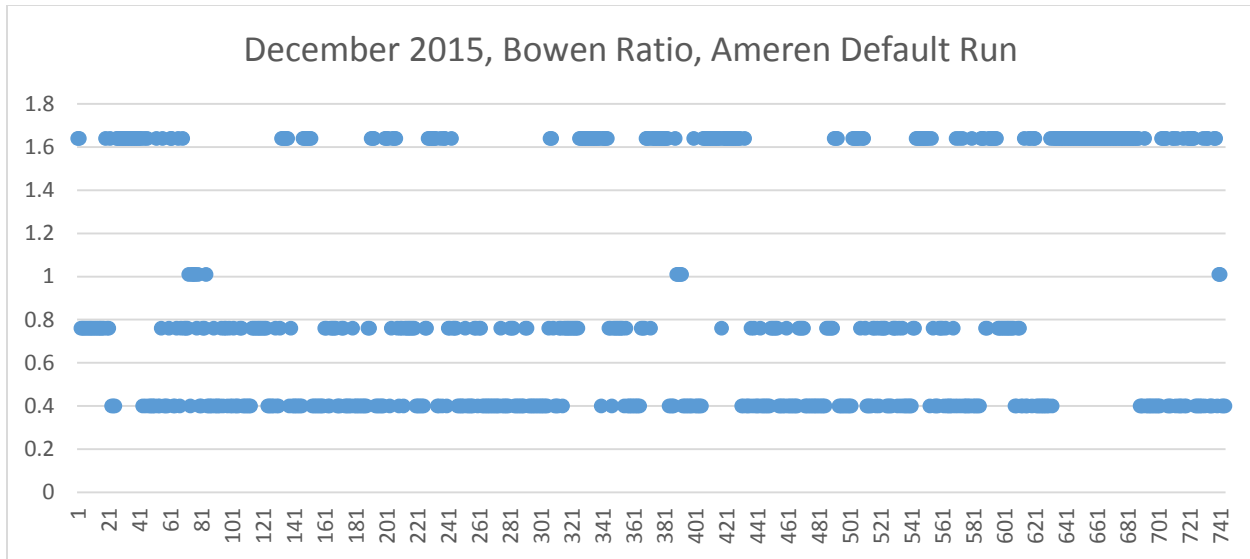


Figure 3. 2013-2015 exit velocities for merged unit 34.

Ameren's May 2, 2016 submittal included four additional modeling runs that corrected the 2015 exit velocity error and also addressed other comments Sierra Club made on surface meteorological data characteristics.

The EPA reviewed these four additional Ameren modeling runs. Unlike the uncorrected State modeling for which it is uncertain whether corrected stack parameters would indicate whether the area is meeting the NAAQS, Ameren's corrections resulted in a specific design value increase that still suggested NAAQS attainment. However, the EPA's review of Ameren's updated modeling discovered an additional error related to the processing of surface parameters that was included in all 18 modeling runs that Ameren submitted in response to our proposed designation of nonattainment. Ameren attempted to process AERSURFACE on a monthly basis for 12 spatial sectors to estimate the surface characteristics for the 2013-2015 modeling period. However, during the AERSURFACE processing of the monthly by sector data, Ameren erred in the processing of the monthly data for the output of the Bowen Ratio. This error is related to the Bowen ratio lookup for a wet, dry, or average period. The monthly temporal resolution approach Ameren attempted to implement is acceptable, and, if performed correctly, is likely more representative than assuming average moisture conditions across the year. However, this error caused the monthly Bowen ratio to be incorrect for many hours in each month. The daytime Bowen ratio, an indicator of surface moisture, is the ratio of sensible heat flux to latent heat flux and, together with albedo and other meteorological observations, is used for determining planetary boundary layer (PBL) parameters for convective conditions driven by the surface sensible heat flux. Errors in the PBL parameters will result in inappropriate dispersion calculations invalidating all modeling with this error. This error can be graphically visualized by plotting the Bowen ratio for any given month in the Ameren AERMET surface file. An example is given below in Figure 3 for the month of December 2015 from the Ameren May 2, 2016 modeling submittal.

Figure 3: The Hourly Bowen Ratio for the Month of December, 2015 Used in Ameren's Modeling Submitted on May 2, 2016.



For December 2015, Ameren determined this was a wet month and the output of their AERSURFACE run for a wet month is shown below in Figure 4.

Figure 4: AERSURFACE output from Ameren’s modeling for the month of December, 2015 submitted on May 2, 2016.

```
** Month Sect Alb Bo Zo
SITE_CHAR 12 1 0.17 0.40 0.030
SITE_CHAR 12 2 0.17 0.40 0.032
SITE_CHAR 12 3 0.17 0.40 0.022
SITE_CHAR 12 4 0.17 0.40 0.030
SITE_CHAR 12 5 0.17 0.40 0.020
SITE_CHAR 12 6 0.17 0.40 0.021
SITE_CHAR 12 7 0.17 0.40 0.020
SITE_CHAR 12 8 0.17 0.40 0.019
SITE_CHAR 12 9 0.17 0.40 0.025
SITE_CHAR 12 10 0.17 0.40 0.023
SITE_CHAR 12 11 0.17 0.40 0.020
SITE_CHAR 12 12 0.17 0.40 0.019
```

As can be seen in this AERSURFACE output, the “Bo” or Bowen Ratio is fixed at 0.40 for all sectors for this entire month whereas Figure 3 above shows varying values of Bowen Ratio for this same month in the surface output file Ameren used for all their 2013-2015 runs. This is an indication that a processing error was made. The EPA also found the error in the spreadsheet Ameren provided. The Bowen ratio should be a fixed value for this month (and other months) at a value equal to the moisture conditions that existed during this month (e.g., wet, dry, average). The Bowen ratios are not fixed for individual months in the Ameren meteorological surface datasets. As such, the 18 Ameren modeling runs using the 2013-2015 meteorological data cannot be relied upon for designation purposes because of this AERSURFACE processing error. Consequently, the 18 modeling runs containing this error are not sufficient information to

determine whether the area is meeting the NAAQS. Moreover, it is not clear what result correction of this error would have on modeled design values, such that the correction would enable a determination of whether the area is meeting the NAAQS based on Ameren's modeling. In the absence of this error, the processing approach Ameren used for the monthly moisture is still not sufficient to resolve this uncertainty, since there were periods where continuous monthly snow cover was assumed. Continuous multi-month snow cover is not supported by the snow cover record Ameren provided.

Sierra Club modeling:

On March 31, 2016, and April 19, 2016, Sierra Club submitted comments on the EPA's intended designation. These comments included 21 modeling runs in response to our proposed designation. Four of these runs were received on March 31, 2016, and use 2012-2014 emissions data. Sixteen runs were received on April 19, 2016, and use 2013-2015 emissions data. One run was received on April 29, 2016, and used 2013-2015 augmented emissions to account for several extended unit outages during the modeling period. Substitute emissions and stack parameter data were used during these prolonged outages that Sierra Club believe are not representative of normal plant operations (e.g., for the recent ESP upgrades). The following substitutions were made:

- a. Unit 1: 9/6/15 through 12/4/15 data substituted for 9/6/14 through 12/4/14 outage
- b. Unit 2: 4/2/15 through 6/4/15 data substituted for 4/2/14 through 6/4/14 outage
- c. Unit 3: 3/28/14 through 5/18/14 data substituted for 3/28/15 through 5/18/15 outage

The EPA is not relying on any Sierra Club modeling using beta options or with Unit 3 and 4 modeled as separate emission points to inform our designations for reasons discussed elsewhere in this TSD. In addition, while we agree that the recent outages at Labadie for installation of PM control equipment are likely unusual and not likely to occur on a regular basis, the EPA could not verify the emissions that Sierra Club used to augment for the extended outages, and they do not represent what a monitor would have recorded in this period. Thus, we do not conclude that the augmented emissions modeling run submitted on April 29, 2016 provides sufficient information to determine whether the area is meeting the NAAQS.

For the modeling runs submitted by Sierra Club on April 19, 2016, the runs utilized Ameren's varying inputs for emissions, stack temperatures, and exit velocities. The Sierra Club used meteorological datasets from both the Jefferson City and Spirit of St. Louis Airports and background values from both East St. Louis and Nilwood, Illinois. Sierra Club modeling used all these numerous input variations originating from Ameren data.

The Sierra Club disagreed with the approach Ameren used in its surface characteristic calculations and provided corrections to what they perceived as errors in Ameren's modeling. As indicated above, the EPA also determined that Ameren data had surface assumption issues, including the continuous snow cover issue identified by Sierra Club and the error in the processing of surface parameters.

Sierra Club attempted to address Ameren’s surface errors by using Ameren’s prior modeling for the 2012-2014 timeframe. Sierra Club used Ameren’s 2013 and 2014 meteorological data and then developed their own 2015 meteorological data using a similar processing approach as Ameren used in its 2012-2014 modeling where there were no surface characteristic processing errors. The Sierra Club then used this 2013-2015 meteorological dataset for all their runs.

As discussed above, Ameren’s exit velocities were mistakenly overstated for most of 2015. Sierra Club discovered and pointed out this error in their comments but also noted that they did not correct this error as the correction would likely lead to a higher model design value. Information in Ameren’s April 29, 2016, submittal appears to support Sierra Club’s claim of a higher design value as shown in Table 3 below.

Table 3: Ameren Modeling Results Indicating that Correcting the 2015 Exit Velocity Error for Units 1 and 2 Lead to a Higher Modeled Design Concentration. (Table 1 of Ameren’s April 29, 2016 Submittal to the EPA)

Table 1: Comparison of Updated Modeling Results After Correcting for Exit Velocities and Including Alternative Snow Cover Assignment to AERMOD Modeling Submitted on March 31, 2016:

Modeling Results Submitted on March 31, 2016:

Model Options	Ambient Background	Meteorological Station	Modeled Design Concentration ($\mu\text{g}/\text{m}^3$)	% of NAAQS
Default	Nilwood, IL	Jefferson City	171.1	87%
ADJ_U* and LOWWIND3	Nilwood, IL	Jefferson City	150.7	77%

Updated Modeling Results Changing Only 2015 Exit Velocities for Units 3 and 4:

Model Options	Ambient Background	Meteorological Station	Modeled Design Concentration ($\mu\text{g}/\text{m}^3$)	% of NAAQS
Default	Nilwood, IL	Jefferson City	177.5	90%
ADJ_U* and LOWWIND3	Nilwood, IL	Jefferson City	155.6	79%

The EPA notes that solely correcting Ameren’s exit velocity overstatement increases the design value from $171.1 \mu\text{g}/\text{m}^3$ to $177.5 \mu\text{g}/\text{m}^3$, or by $6.4 \mu\text{g}/\text{m}^3$, which is nevertheless under the NAAQS value. Although all of Sierra Club’s April 19, 2016 submitted runs that do not use unapproved beta options indicate NAAQS violations, it is not certain what effect correcting Sierra Club’s use of Ameren’s overstated exit velocities would have on the resulting design value (given the interactions of meteorology, building downwash and the statistical form of the standard), as the difference in the choice of meteorological stations and background values could impact the correction and the magnitude of any concentration change. Further, we did not receive a modeling analysis from the Sierra Club that did not use the overstated exit values, and so are unable to determine whether the area is or is not meeting the NAAQS. Consequently, the Sierra

Club modeling as currently configured is not sufficient information to enable the EPA to determine whether the area is meeting the NAAQS, and it is not certain that a correction of the modeling's overstatement of exit velocities without model results to confirm the correction would confirm Sierra Club's assertion that the area is not meeting the NAAQS.

EPA Review of Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO₂ NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. The AERMOD modeling system contains the following components:

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

In the case of Ameren's Labadie Energy Center, all of the modeling runs submitted in response to our proposed designation used the latest version of AERMOD/AERMET, version 15181.

Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purposes of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also provides for the flexibility of using allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information when it is available and that these data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA believes that detailed throughput, operating schedules, and emissions information from the impacted source(s) should be used.

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit SO₂ emissions to a level that indicates compliance with the NAAQS. These

new limits or conditions may be used in the application of AERMOD. In these cases, the Modeling TAD notes that the existing SO₂ emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, “Guideline on Air Quality Models.”

For the 2013-2015 modeling conducted for Ameren’s Labadie Energy Center, most, but not all of the additional runs used the most recent variable hourly emissions for the 2013-2015 period. There were two exceptions to the 2013-2015 emissions. Sierra Club’s submittals received on 3/31/2016 continued to use the 2012-2014 varying emissions, and Ameren’s 6 runs supporting an extrapolation exercise, which are shown with the blue highlighted design values in Table 2, used a combination of 2013-2015 and 1995-1997 emissions. Because of the importance of characterizing emissions appropriately, the EPA reviewed the 2013-2015 emissions calculations and the EPA did not find any errors in the varying hourly emissions. The EPA finds that the varying 2013-2015 emissions is supported by the EPA’s Modeling TAD.

Modeling Parameter: Meteorology and Surface Characteristics

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

All of the modeling runs used either the Jefferson City Airport or the Spirit of St. Louis Airport for their meteorological inputs. As described in our February 16, 2016, technical support document, the EPA did not determine that one of the sites is more representative than the other and noted that the general modeled design values using each of the datasets generally showed similar magnitudes but at different locations and complemented each other. An evaluation of the evidence in the record of both NWS sites still does not, at this time, lead the EPA to determine that one is generally more representative than the other regarding the meteorological conditions in the area, and modeling utilizing either the Jefferson City Airport or Spirit of St. Louis Airport meteorological data might be sufficient, but/for the other errors they contain as discussed above that make them insufficient information to enable the EPA to determine whether the area is meeting the NAAQS. Further discussion of the site specific performance evaluation for the beta request is found in the RTC.

Modeling Parameter: Background Concentrations of SO₂

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO₂ that are ultimately added to the modeled design values: 1) a “first tier” approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month.

For background concentrations of SO₂, Missouri used the design value from the East St. Louis monitor while Ameren used a seasonal by hour value from a monitor in Nilwood, Illinois.

The EPA believes that the background value does vary but not necessarily by season or hour, and the recent onsite monitoring data suggest background values, i.e. not direct Labadie impacts, can approach or even exceed 9 ppb, thus we find that the Missouri recommendation of a fixed 9 ppb is reasonable. Further, the 4 ppb background value Ameren asserts in their site specific beta request evaluation is often higher than the Nilwood, Illinois, hourly data which Ameren suggests is the most appropriate. In addition, Missouri’s Mark Twain State Park monitor, which is also a rural monitor northwest of the Labadie Energy Center, had a 2013-2015 design value of 8 ppb.

Sierra Club opposes using the Nilwood, Illinois, monitor site because they feel that Labadie is located close to an urban setting and as such the East St. Louis monitor would best represent the background value. EPA finds that the Missouri recommendation of a fixed 9 ppb value is reasonable, supportable, and representative of the area, and therefore agree that a fixed background value of 9 ppb is appropriate. Further discussion of background is found in the RTC. However, due to the problems in the various modeling runs discussed above, EPA is not able based on available information to determine whether the area is meeting the NAAQS.

Modeling Parameter: Options

Whether to model Labadie Units 3 and 4 as a merged plume or to model the each unit as distinct emission points was an area where the EPA received numerous comments. In their September 2015 recommendation, Missouri modeled the emission points for Labadie Units 3 and 4 as separate plumes, and this approach was based on discussions Missouri had with EPA Region 7. Ameren contended that Labadie Units 3 and 4 were in a dual flue configuration and that the plumes merge and should be modeled as such. Ameren provided prior EPA guidance that supports this position. Sierra Club submitted comments opposing merging the plumes, but nevertheless used merged plumes in some of its modeling runs. Based on consideration of the comments received and justification provided, the EPA has determined that modeling merged plumes for Labadie Units 3 and 4 is appropriate in this case and Ameren has provided adequate justification and data inputs and calculations to support merging within the dispersion model. Therefore, the EPA’s view is that modeling runs that do not merge Units 3 and 4 are less representative in making our final designation, and treating the flues as one stack is reasonable for designation purposes in order to better approximate actual dispersion conditions, even if ultimately the resulting modeling still contains errors that render it insufficient information to enable the EPA to determine whether the area is meeting the NAAQS.

At the time that the EPA proposed a nonattainment designation for the area, the agency did not have actual stack data (i.e. the calculations or underlying temperature and exit velocity data for the calculations) to review or all the additional justification for merging Units 3 and 4 from Ameren. Thus, we did not further pursue this analysis because it did not impact our recommendation at that time. Since then, necessary additional justification for the merging of the flues at the single stack has now been provided. We also note that the default merged plume run from Ameren showed nonattainment for 2012-2014. However, as detailed below, the currently available information for the most recent 3-year period of 2013-2015 is not sufficient to enable the agency to determine whether the area is meeting or not meeting the NAAQS in that 3-year period, but, nevertheless, in light of the more recent, and more representative, information utilized in parts within these various 2013-2015 modeling analyses, the EPA does not consider it appropriate to base a determination on the older, proposed designation information that no longer reflects current conditions or best available information.

The EPA also received comments related to the appropriateness of using various beta options including adj_U* and LOWWIND3. The Sierra Club asserted in their comments that these beta options are not allowed or representative. Ameren asserted in their comments that these beta options should be allowed and are more representative of actual conditions and correct model over-predictions. The EPA provided a detailed discussion of beta options based on Ameren's data and Ameren's submittals in the February 16, 2016, technical support document. The EPA has determined that the beta option combination of adj_U* and LOWWIND3 has not been approved by the Model Clearinghouse. Therefore, the EPA will not rely on any modeling run that uses the beta option of both adj_U* and LOWWIND3. Further discussion and analysis is found in the February 16, 2016, technical support document.

Summary of Modeling Results:

As discussed above, the EPA considers most representative model inputs to replicate actual conditions under the current record to include: 2013-2015 varying emissions and corresponding varying stack parameters, 2013-2015 Jefferson City or Spirit of St. Louis NWS meteorology, a fixed East St. Louis background value, AERMOD and AERMET default model options, and merged plumes for Labadie Units 3 and 4.

The EPA received numerous modeling runs with varying degrees of representativeness, but overall they are insufficient to enable the EPA to determine whether the area is meeting the NAAQS. The EPA determined none of the Ameren modeling analyses for the 2013-2015 period were reliable for our determination because of the meteorological modeling errors surrounding surface characterizations. The EPA also determined that the Missouri modeling is not reliable for our determination because the fixed values for temperature and exit velocity appear higher than the actual values reported by Ameren during 2013-2015, and the EPA does not have sufficient information to conclude whether correction of the fixed values would cause the area to meet or not meet the NAAQS. The Sierra Club provided modeling using varying temperatures and exit velocities coupled with valid meteorological data. However, the 2013-2015 Sierra Club

modeling does contain an overestimation of the exit velocities for the 2015 period, based upon information provided by Ameren and identified but not corrected by Sierra Club. Ameren has demonstrated that correcting this error would lead to a higher predicted nonattainment modeled design value in their own modeling, but it is not certain what impact the use of proper velocities would have on the design values in this specific area because Sierra Club used different meteorology. Although a lower plume could result in higher concentrations, the design value is based on multiple factors, including meteorology, building downwash, topography, and other parameters, as well the statistical form of the NAAQS, which is based on distributions of daily 1-hour maximum concentrations. Changing stack parameters such as exit velocity and temperature can change the distribution of daily 1-hour maximum concentrations, thus affecting the design values and critical receptors. For these reasons, none of the information available provides a basis upon which the EPA can reasonably rely to determine whether the area is meeting or not meeting the 2010 SO₂ NAAQS.

Jurisdictional Boundaries:

Existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable area, specifically with respect to clearly defined legal boundaries.

The EPA believes that our final unclassifiable area, consisting of the following boundary area: (1) the eastern and western boundaries are Boone and Boles Township boundaries in St. Charles and Franklin Counties respectively, (2) the northern boundary is Missouri Route D and Highway 94 in St. Charles, and (3) the southern boundary is Interstate 44 in Franklin, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final unclassifiable area.

Conclusion

After careful evaluation of all the information provided including the comments and information received from the state and public, and additional relevant information as discussed in this document, the EPA finds that it is unable based on available information to determine whether the area around Labadie Energy Center is meeting the NAAQS, and therefore is designating the area as unclassifiable for the 2010 SO₂ NAAQS. Specifically, the area is comprised of the following boundary:

The eastern and western boundaries are Boone and Boles Township boundaries in St. Charles and Franklin Counties respectively. The northern boundary is Missouri Route D and Highway 94 in St. Charles. The southern boundary is Interstate 44 in Franklin.

This unclassifiable designation is based on an analysis of all modeling received from the state of Missouri, Ameren, and the Sierra Club. As outlined in the EPA's SO₂ NAAQS Designations Modeling Technical Assistance Document, the EPA supports the use of modeling as a surrogate to ambient monitoring to characterize air quality for the designations process, and the EPA recommends modeling the most recent 3 years of actual emissions. These data will generally best represent the emissions that would cause the impacts monitored in a 3-year monitoring data set

under most circumstances. Consistent with this approach, the EPA has determined that it is appropriate to consider 2013-2015 modeling analyses, and that we should no longer rely upon modeled violations from the 2012-2014 period as the basis for issuing a final nonattainment designation for the area. Based on this new, 2013-2015 modeling, the EPA's view is that the modeling results widely vary and greatly depend upon how the modeling was conducted, as discussed in this Technical Support Document. Because of the issues present in the modeling methodologies, the EPA does not have a clear basis to determine whether the area currently meets or does not meet the 2010 SO₂ NAAQS based on all currently available information.

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

Technical Analysis for Jackson County, Missouri

Introduction

The Jackson County, Missouri area contains a stationary source that according to the EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO₂ or more than 2,600 tons of SO₂ and had an annual average emission rate of at least 0.45 pounds of SO₂ per one million British thermal units (lbs SO₂/MMBtu). Specifically, in 2012, the Sibley Generating Station emitted 6,095 tons of SO₂ and had a facility wide emissions rate of 0.550 lbs SO₂/MMBtu. As of March 2, 2015, this stationary source had not met the criteria for being "announced for retirement." Pursuant to the March 2, 2015 court-ordered schedule, the EPA must designate the area surrounding this facility by July 2, 2016.

In its submission, Missouri recommended that the area surrounding Sibley Generating Station facility, specifically a portion of Jackson County, be designated as attainment based on an assessment and characterization of air quality from the Sibley Generating Station and other nearby sources which may have a potential impact in the area of analysis where maximum concentrations of SO₂ are expected. This assessment and characterization was performed using air dispersion modeling software, specifically AERMOD, analyzing actual (Sibley) and allowable (other sources) emissions.

On February 16, 2016, the EPA notified Missouri that we intended to designate the Jackson County, Missouri (Sibley) area as unclassifiable, due to our view that based on available information the area could not be classified as meeting or not meeting the NAAQS. Additionally, we informed Missouri that our intended boundaries for the unclassifiable area consisted of the Jackson County line on the north from Clay and Ray Counties, the county line separating Jackson County from Lafayette County on the east, Interstate 70 and 470 on the south, and Missouri Highway 291 on the west. Our intended designation and associated boundaries were based on, among other things, an evaluation of the Missouri modeling submitted in support of an attainment recommendation with additional consideration of Sierra Club modeling that also supported the Missouri conclusion regarding the impacts extending out 20 km around the Sibley Generating Station but not elsewhere. EPA believes all contributing sources are addressed in the Missouri modeling and that the boundary area proposed by Missouri is appropriate. However, although Missouri modeling indicates attainment, not all sources have federally enforceable limits for the emission rates assumed in Missouri's modeling. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Missouri, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment of New Information

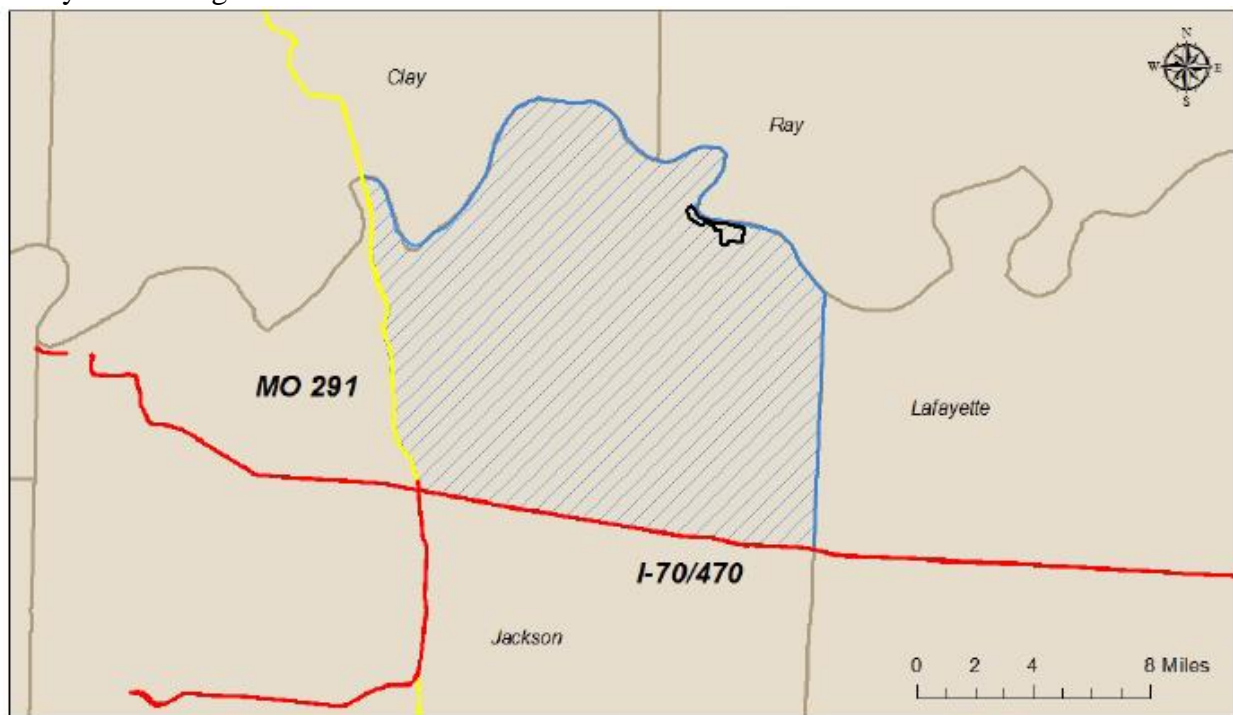
In our February 16, 2016 notification to Missouri regarding our intended unclassifiable designation for the Jackson County, Missouri area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability

and public comment period in the *Federal Register*, inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

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

After carefully considering all available data and information, the EPA is still unable based on available information to determine whether the Jackson County, Missouri area is meeting the NAAQS, and therefore is designating the area as unclassifiable for the 2010 SO₂ NAAQS. The boundaries for this unclassifiable area consist of the Jackson County line on the north from Clay and Ray Counties, the county line separating Jackson County from Lafayette County on the east, Interstate 70 and 470 on the south, and Missouri Highway 291 on the west, and are shown in the figure below. Also included in the figure are nearby emitters of SO₂ and Missouri's recommended area.

Figure 1: The EPA's Final Unclassifiable Area: Jackson County, Missouri Area around the Sibley Generating Station



Subsequent to our February 16, 2016, notification, the EPA received substantive comments regarding our intended unclassifiable designation for the Jackson County, Missouri, area.

Comments and additional information, specifically air dispersion modeling, were submitted to the EPA during the state comment period in order to characterize air quality in the Jackson County, Missouri, area. Notably, Missouri provided additional air dispersion modeling information during the comment period asserting that 2013-2015 modeling shows attainment of the NAAQS. This information was submitted to support a modification to our proposed designation of unclassifiable for the area. The discussion and analysis of this new information that follow reference the Modeling TAD, Monitoring TAD, and the factors for evaluation contained in the EPA's March 20, 2015, guidance, as appropriate and applicable.

The Missouri modeling generally followed the same approach as the prior modeling except that Missouri updated the version of the model to the latest model version, version 15181, and updated the emissions and meteorology inputs to reflect the latest 2013-2015 hourly emissions from the Sibley Generating Station. The new modeling continued to indicate attainment with the NAAQS although there was an increase in the predicted design value from 63.8 ppb to 72.7 ppb in the updated modeling.

Missouri continues to rely in their updated modeling analysis upon the assumption that Blue Valley will combust only natural gas and no coal in order to meet the applicable boiler MACT and MATS requirements. Missouri provides their justification that the fuel switch has already occurred and is permanent and enforceable based on an application for a Title V permit renewal submitted June 17, 2015, and an email from the facility on September 30, 2015, confirming the facility's intent to meet the boiler MACT and MATS with a fuel switch to natural gas only. However, EPA's position is that there is no permanent and enforceable limit requiring combustion of natural gas only until the date of January 31, 2017, when Missouri Rule 10 CSR 10-6.261 requires the Blue Valley Units to switch to natural gas combustion only. Therefore, as the future expected switch to natural gas and attendant future air quality improvements cannot be used to determine current air quality status in the area, EPA is not relying on the MDNR modeling that makes this fuel switch assumption to support a determination that the area is currently meeting the NAAQS and eligible for an unclassifiable/attainment designation.

Jurisdictional Boundaries:

Existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable area, specifically with respect to clearly defined legal boundaries. The EPA did not receive any comments regarding the intended boundaries for this area.

The EPA believes that our final unclassifiable area, consisting of the Jackson County line on the north from Clay and Ray Counties, the county line separating Jackson County from Lafayette County on the east, Interstate 70 and 470 on the south, and Missouri Highway 291 on the west are comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final unclassifiable area.

Conclusion

After careful evaluation of the state's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA is unable to determine whether the area around the Sibley

Generating Station is meeting or not meeting the NAAQS, and therefore is designating the area as unclassifiable for the 2010 SO₂ NAAQS. Specifically, the area is comprised of the Jackson County line on the north from Clay and Ray Counties, the county line separating Jackson County from Lafayette County on the east, Interstate 70 and 470 on the south, and Missouri Highway 291 on the west.

This conclusion is based on an evaluation of all the Missouri modeling submitted in support of an attainment designation recommendation. EPA believes all contributing sources are addressed in the Missouri modeling and that the boundary area proposed by Missouri is appropriate. However, although all Missouri modeling indicates attainment, not all sources have federally enforceable limits for the emission rates assumed in Missouri's modeling and EPA therefore is unable to conclude whether the area is meeting the NAAQS and is designating this area as unclassifiable.

Other than Missouri's April 18, 2016, submittal, the EPA did not receive any new information during the public comment period for our intended designation for this area. As fully discussed in our February 16, 2016, preliminary technical support document, modeling submitted by the Sierra Club supported Missouri's conclusion regarding the impacts extending out 20 km around the Sibley Generating Station, and did not provide enough information for EPA to determine the Sibley Station's and other nearby sources' impact on the area 20+ km southwest of the Sibley Station. For all the reasons discussed in that document, the EPA maintains that it is not appropriate to rely upon the Sierra Club modeling for determining contributions outside the boundary for the Sibley area.

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

Technical Analysis for Scott County, Missouri

Introduction

The Scott County area contains a stationary source that according to the EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO₂ or more than 2,600 tons of SO₂ and had an annual average emission rate of at least 0.45 pounds of SO₂ per one million British thermal units (lbs SO₂/mmBTU). Specifically, in 2012, the Sikeston Power Station emitted 5,242 tons of SO₂ and had a facility wide emissions rate of 0.620 lbs SO₂/mmBTU. As of March 2, 2015, this stationary source had not met the criteria for being "announced for retirement." Pursuant to the March 2, 2015 court-ordered schedule, the EPA must designate the area surrounding this facility by July 2, 2016.

In its submission, Missouri recommended that the area surrounding Sikeston Power Station, specifically the entirety of Scott County, be designated as attainment based on an assessment and characterization of air quality from the facility and other nearby sources which may have a potential impact in the area of analysis where maximum concentrations of SO₂ are expected. This assessment and characterization was performed using air dispersion modeling software, specifically AERMOD, analyzing actual emissions.

On February 16, 2016, the EPA notified Missouri that we intended to designate the Scott County, Missouri area as unclassifiable/attainment, based on our view that the area was meeting the NAAQS. Additionally, we informed Missouri that our intended boundaries for the unclassifiable/attainment area consisted of the entirety of Scott County, Missouri. Our intended designation and associated boundaries were based on, among other things, the state's modeling that indicated that the predicted 99th percentile 1-hour average concentration within the chosen modeling domain was 97.6 µg/m³, or 37.2 ppb. This modeled concentration included the background concentration of 9 ppb SO₂, and is based on actual emissions from the facilities modeled, except for Noranda which used allowable emissions. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Missouri, and this document along with all others related to this rulemaking can be found in Docket ID EPA-HQ-OAR-2014-0464.

Assessment and Conclusion

In our February 16, 2016, notification to Missouri regarding our intended unclassifiable/attainment designation for the Scott County area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register*, inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563).

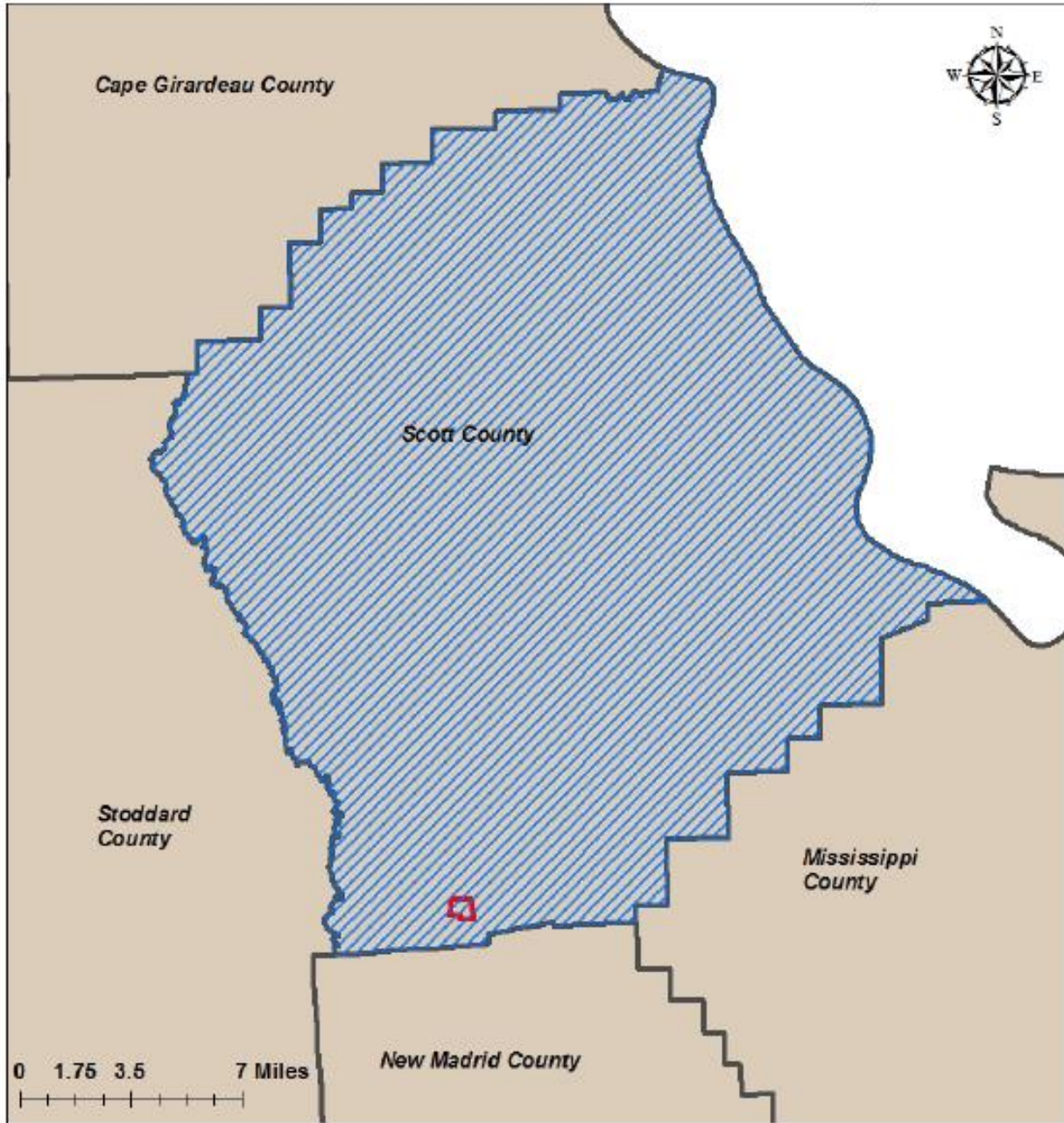
The EPA is explicitly incorporating and relying upon the analyses and information presented in the preliminary technical support document for the purposes of our final designation for this area, except to the extent that any new information submitted to the EPA or conclusions

presented in this final technical support document and our response to comments document (RTC), available in the docket, supersede those found in the preliminary document.



Subsequent to our February 16, 2016, notification, the EPA received a response from Missouri supporting our intended designation for the area, and we did not receive any comments from the public. The state response included updated modeling using the latest available emissions and meteorology (2015) that was not available at the time Missouri submitted their original recommendation. The updated modeling continued to support the Missouri recommendation of attainment, with a modeled design value of $96 \mu\text{g}/\text{m}^3$, or 37 ppb.

Therefore, based on the information available to the EPA at this time including the analyses performed for the purposes of the preliminary technical support document and in the absence of any new information that would otherwise lead to a different conclusion regarding air quality in the area or any new information that would otherwise lead to a different conclusion regarding the area boundaries, the EPA determined that the Scott County, Missouri area is meeting the NAAQS, and is designating the area as unclassifiable/attainment for the 2010 SO₂ NAAQS. The boundaries for this unclassifiable/attainment area consist of the entirety of Scott County, Missouri, and are shown in the figure below. Also included in the figure are nearby emitters of SO₂ and Missouri's recommended area.

Figure 2: The EPA's Final Unclassifiable/Attainment Area: Scott County, Missouri



Legend

-  Recommended Attainment Boundary
-  Sikeston Property Boundary



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES
Division of Environmental Quality
Air Pollution Control Program
Prepared: September 2, 2015

Jurisdictional Boundaries:

Existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable/attainment area, specifically with respect to clearly defined legal boundaries. The EPA did not receive any comments regarding the intended boundaries for this area.

The EPA believes that our final unclassifiable/attainment area, consisting of the entirety of Scott County, Missouri, is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final unclassifiable/attainment area.

Conclusion

After careful evaluation of the state's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA determines that the area around Sikeston Power Station is meeting the 2010 SO₂ NAAQS, and is designating the area as unclassifiable/attainment for the NAAQS. Specifically, the area is comprised of the entirety of Scott County.

The rationale for this conclusion is based on both the original Missouri modeling submittal in their initial recommendation and the updated Missouri modeling using a combination of actual 2013-2015 and allowable emissions which demonstrates attainment throughout the entirety of Scott County. This demonstration includes all surrounding SO₂ sources, including sources just outside of Scott County that could potentially contribute significantly to SO₂ concentrations within Scott County. EPA did not receive any other information for this area.

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