Technical Support Document:

Chapter 5
Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for Arkansas

1. Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (the EPA, we, or us) must designate areas as either "nonattainment," "attainment," or "unclassifiable" for the 2010 1-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS) (2010 SO_2 NAAQS). The CAA defines a nonattainment area as an area that does not meet the NAAQS or that contributes to a nearby area that does not meet the NAAQS. An attainment area is defined by the CAA as any area that meets the NAAQS and does not contribute to a nearby area that does not meet the NAAQS. Unclassifiable areas are defined by the CAA as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS. In this action, the EPA has defined a nonattainment area as an area that the EPA has determined violates the 2010 SO_2 NAAQS or contributes to a violation in a nearby area, based on the most recent 3 years of air quality monitoring data, appropriate dispersion modeling analysis, and any other relevant information. An unclassifiable/attainment area is defined by the EPA as an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS[1]. An unclassifiable area is defined by EPA as an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO_2 NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

This technical support document (TSD) addresses designations for nearly all remaining undesignated areas in Arkansas for the 2010 SO_2 NAAQS. In previous final actions, the EPA has

[1] The term "designated attainment area" is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA's approval of a state-submitted maintenance plan.

issued designations for the 2010 SO_2 NAAQS for selected areas of the country.[2] The EPA is under a December 31, 2017, deadline to designate the areas addressed in this TSD as required by the U.S. District Court for the Northern District of California.[3] We are referring to the set of designations being finalized by the December 31, 2017, deadline as "Round 3" of the designations process for the 2010 SO_2 NAAQS. After the Round 3 designations are completed, the only remaining undesignated areas will be those where a state has installed and begun timely operating a new SO_2 monitoring network meeting EPA specifications referenced in the EPA's SO_2 Data Requirements Rule (DRR) (80 FR 51052). The EPA is required to designate those remaining undesignated areas by December 31, 2020.

Arkansas submitted its first recommendation regarding designations for the 2010 1-hour SO_2 NAAQS on March 22, 2011. The state submitted updated air quality analysis and recommendations on January 24, 2017. In our intended designations, we have considered all the submissions from the state, except where a recommendation in a later submission regarding a particular area indicates that it replaces an earlier recommendation for that area we have considered the recommendation in the later submission.

For the areas in Arkansas that are part of the Round 3 designations process, Table 1 identifies the EPA's intended designations and the counties or portions of counties to which they would apply. It also lists Arkansas' current recommendations. The EPA's final designation for these areas will be based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1 - Summary of the EPA's Intended Designations and the Designation Recommendations by Arkansas

Area/County	Arkansas' Recommended Area Definition	Arkansas' Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Benton County, Arkansas	Benton County	Unclassifiable/ Attainment	Same as State's Recommendation	Unclassifiable/Attainment
Mississippi County, Arkansas	Mississippi County	Unclassifiable/ Attainment	Same as State's Recommendation	Unclassifiable/ Attainment
Remaining Counties in Arkansas	Each Remaining County	Unclassifiable	Same as State's Recommendation	Unclassifiable/ Attainment

* The EPA intends to designate the remaining undesignated counties in Arkansas as "unclassifiable/attainment" as these areas were not required to be characterized by the state under the DRR and the EPA does not have available

[2] A total of 94 areas throughout the U.S. were previously designated in actions published on August 5, 2013 (78 FR 47191), July 12, 2016 (81 FR 45039), and December 13, 2016 (81 FR 89870).
[3] *Sierra Club v. McCarthy*, No. 3-13-cv-3953 (SI) (N.D. Cal. Mar. 2, 2015).

information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. These areas that we intend to designate as unclassifiable/attainment (those to which this row of this table is applicable) are identified more specifically in section 5 of this chapter.

2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a July 22, 2016, memorandum and 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 I-X. These memoranda supersede earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and identify factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The documents also contain the factors that the EPA intends to evaluate in determining the boundaries for designated areas. 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.

To assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling for sources that emit SO_2, the EPA released its most recent version of a draft document titled, "SO_2 NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) in August 2016.[4]

Readers of this chapter of this TSD should refer to the additional general information for the EPA's Round 3 area designations in Chapter 1 (Background and History of the Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for States with Sources Not Required to be Characterized).

As specified by the March 2, 2015, court order, the EPA is required to designate by December 31, 2017, all "remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO_2 monitoring network meeting EPA specifications referenced in EPA's" SO_2 DRR. The EPA will therefore designate by December 31, 2017, areas of the country that are not, pursuant to the DRR, timely operating EPA-approved and valid monitoring networks. The areas to be designated by December 31, 2017, include the areas associated with two sources in Arkansas meeting DRR emissions criteria that the state has chosen to be characterized using air dispersion modeling and other areas not specifically required to be characterized by the state under the DRR.

Because many of the intended designations have been informed by available modeling analyses, this preliminary TSD is structured based on the availability of such modeling information. There

[2] https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf. In addition to this TAD on modeling, the EPA also has released a technical assistance document addressing SO_2 monitoring network design, to advise states that have elected to install and begin operation of a new SO_2 monitoring network. *See* Draft SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf.

is a section for each county for which modeling information is available. The remaining to-be-designated counties are then addressed together in section 5.

The EPA does not plan to revise this TSD after consideration of state and public comment on our intended designation. A separate TSD will be prepared as necessary to document how we have addressed such comments in the final designations.

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

1) 2010 SO_2 NAAQS – The primary NAAQS for SO_2 promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. *See* 40 CFR 50.17.
2) 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.
3) Designated nonattainment area – an area that, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined either: (1) does not meet the 2010 SO_2 NAAQS, or (2) contributes to ambient air quality in a nearby area that does not meet the NAAQS.
4) Designated unclassifiable/attainment area – an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.
5) Designated unclassifiable area – an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO_2 NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.
6) Modeled violation – a violation of the SO_2 NAAQS demonstrated by air dispersion modeling.
7) Recommended attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as attainment.
8) Recommended nonattainment area – an area that a state, territory, or tribe has recommended that the EPA designate as nonattainment.
9) Recommended unclassifiable area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable.

10) Recommended unclassifiable/attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable/attainment.
11) Violating monitor – an ambient air monitor meeting 40 CFR parts 50, 53, and 58 requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
12) We, our, and us – these refer to the EPA.

3. Technical Analysis for Benton County, Arkansas

3.1. Introduction

The EPA must designate Benton County, Arkansas, by December 31, 2017, because no portion of the county has been previously designated and Arkansas has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in Benton County area.

3.2. Air Quality Monitoring Data for Benton County, Arkansas

This factor considers the SO_2 air quality monitoring data in the area of Benton County. There are no air monitoring sites in Benton County. The nearest SO_2 monitor to Benton County is located southwest of the plant in Stilwell, in Adair County, Oklahoma (AQS# 40-001-9009). Table 2 shows that this monitor has a 2014-2016 design value well below the level of the 1-hour SO_2 NAAQS. The monitor is not in a location that would be expected to represent the maximum impact of sources in Benton County and so cannot be relied on for designation.

Table 2 - Nearest SO_2 Monitor Information

AQS_ID	Dist. (km)	Monitor State	Monitor County	Monitor City	Address	Latitude	Longitude	2014-2016 Design Value (ppb)
400019009	58	Oklahoma	Adair	Cherry Hill	South Highway 59, RR1, 1795 Dahlonegah Park Road, Stilwell, Oklahoma	35.750735	-94.669697	15.0

There are other monitors in or near Muskogee (40-101-0167), Oklahoma City (40-109-1037), Tulsa (40-143-0175, 401-143-0235, 40-143-1127) and Ponca City (40-071-0604), Oklahoma, and in North Little Rock, Arkansas (41-190-007). These other monitors are not near Benton County, Arkansas. Many of these monitors are located near major SO_2 sources including the coal fired power plants or refineries and therefore do not accurately represent background ambient air conditions around Flint Creek Power Plant in Benton County, Arkansas.

3.3. Air Quality Modeling Analysis for Benton County, Arkansas, Addressing Flint Creek Power Plant

3.3.1. Introduction

This section 3.3 presents all the available air quality modeling information for a portion of Benton County that includes Flint Creek Power Plant (Flint Creek). (This portion of Benton

County will often be referred to as "the Flint Creek area" within this section 3.3). This area contains the following SO_2 source, around which Arkansas is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tons per year:

- The Flint Creek facility emits 2,000 tons or more annually. Specifically, the Flint Creek electric generating units emitted 7,968 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Arkansas has chosen to characterize it via modeling.

There are no other sources of SO_2 greater than 50 tons per year (tpy) within 50 km of Flint Creek.

In its January 24, 2017, submission, Arkansas recommended that an area that includes the area surrounding the Flint Creek, specifically the entirety of Benton County, be designated as unclassifiable/attainment based in part on an assessment and characterization of air quality impacts from this facility. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing allowable emissions. After careful review of the state's assessment, supporting documentation, and all available data, the EPA agrees with the state's recommendation for the area, and intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in section 3.6 of this TSD, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in the northwest corner of Arkansas, approximately 40 kilometers northwest of Fayetteville, Arkansas. Benton County shares it northern border with Missouri, and its western border with Oklahoma.

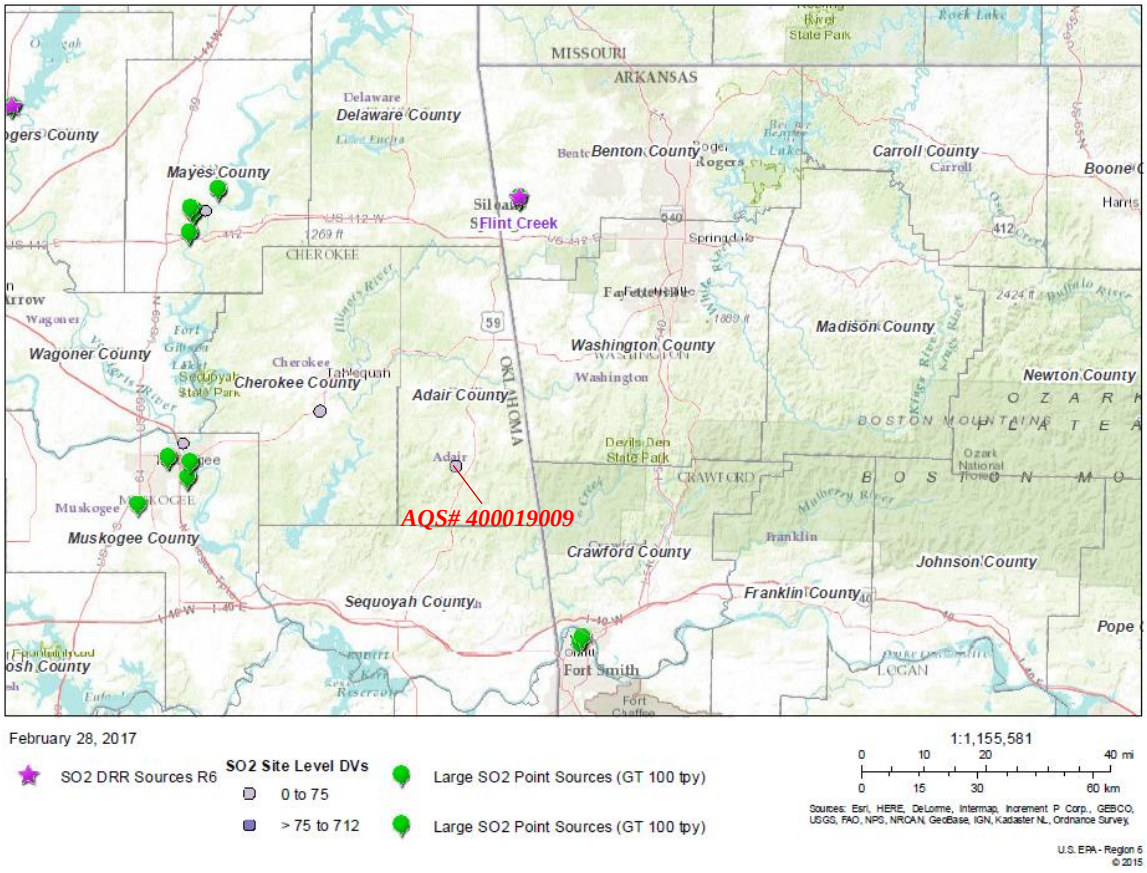
As seen in Figure 1 below, the Flint Creek facility is located in southwest portion of Benton County, approximately 5 miles east of the Oklahoma state line, and 20 miles south of the Missouri state line. The area around the plant is rural; the only incorporated area within 5 km is the town of Gentry, Arkansas.

Also included in Figure 1 are other emitters of SO_2 if they are above 100 tpy.[5] There are no other such sources of SO_2 within 50 km in the area surrounding Flint Creek, and the state included no other SO_2 sources in the DRR modeling demonstration.

The state's recommended boundary for the unclassifiable/attainment is the same as our intended boundary, and is the boundary of Benton County. This boundary is shown in Figure 1, although not highlighted.

[5] All other SO_2 emitters of 100 tpy or more (based on information in the 2014 NEI data) are shown in Figure 1.

Figure 1: Map of Benton County, Arkansas, and Surrounding Area Addressing Flint Creek



The source of this map image is Esri, used by EPA with Esri's permission.

The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

3.3.2. Modeling Analysis Provided by the State

For this area, the EPA received and considered one modeling assessment from the state. American Electric Power Service Cooperation (AEPSC) on behalf of the American Electric Power Subsidiary Southwestern Electric Power Company, performed the modeling and submitted it to the Arkansas Department of Environmental Quality (ADEQ).

3.3.2.1. Model Selection and Modeling Components

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

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD

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

The modeling analyses used AERMOD version 15181, the latest version available at the time of the modeling analysis, in regulatory default mode. We would not expect significant differences in the modeling results using the current AERMOD version, 16216r, since the regulatory default options were used. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate. Version 15181 of AERMOD and AERMET were used and were the current versions of the Appendix A Gaussian Model listed in 40 CFR 51 Appendix W, AERMOD at the time this work was started/ performed. No Beta options available in AERMOD or AERMET were used as part of this modeling. The receptor grid was developed using Version 11103 of AERMAP, the current version of the receptor preprocessor software for the AERMOD Model. In addition, a BPIPPRM analysis of Flint Creek was completed using Version 04274 of BPIPPRM. The EPA concurs that the state's use of AERMOD version 15181 and associated components is appropriate for use in this designation.

3.3.2.2. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the state determined that it was most appropriate to run the model in rural mode. The state selected the rural mode as the source is surrounded by a reservoir and fields and other rural land, and the nearest town is 2 km distant. The EPA agrees that most of the area analyzed is rural in nature and the selection of rural mode for the model is appropriate. *See* Figure 2 in section 3.3.2.3 below.

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

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

The source of SO_2 emissions subject to the DRR in this area, Flint Creek, is described in the introduction to this section. There are no other emitters of SO_2 greater than 1 tpy within 50 kilometers (km) of Flint Creek in any direction, including consideration of sources in nearby Oklahoma. The state determined that 50 km was the appropriate distance to adequately

characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. No other sources beyond 50 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis.

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

- The receptor grid consists of a series of nested receptor grids starting at the center of the (363080 E, 4013440 N, Zone 15, NAD 83) and extending out roughly 50 kilometers from that starting point.
- The inner nest around the plant has receptor spacing of 100 meters (m) and extends out 4 kilometers from the stack location in all directions.
- The next nest has a receptor spacing of 250 meters covering the next 5 kilometers (4 to 9 km) out from the stack.
- The third nest has a receptor spacing of 500 meters covering the next 7 kilometers (9 to 16 km).
- The fourth nest has a resolution of 1000 meters and extends out an additional 10 kilometers (16 to 26 km).
- The final receptor field has a resolution of 2000 meters and extends out from 26 kilometers to 52 kilometers from the stack.

Figure 2 (included in the state's recommendation) and Figures 3 and 4 below (mapped by EPA using the state's modeling files), show the property boundary of the facility, the state's chosen area of analysis surrounding the Flint Creek, as well as the receptor grids (fine and coarse grids) for the area of analysis. The state did not exclude receptor placement within the plant property. The modeled maximum concentration is several hundred meters outside the plant property.

Figure 2: Flint Creek and Surrounding Area Showing Outline of Property Owned by Flint Creek

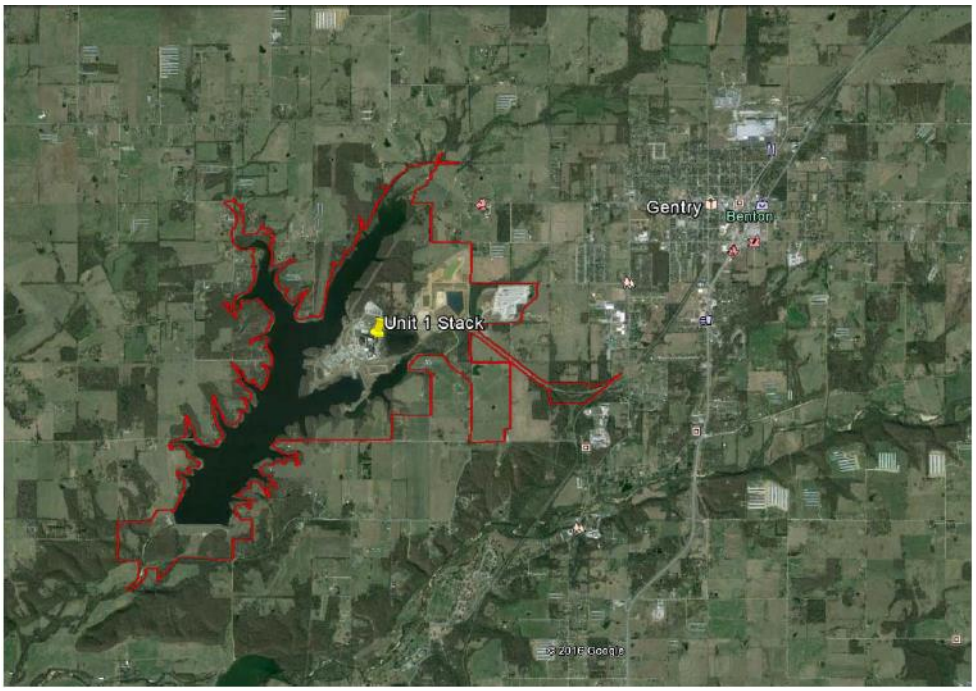


Figure 3: Fine Receptor Grid (100m) Configuration for Flint Creek. The green star is the location of Flint Creek.

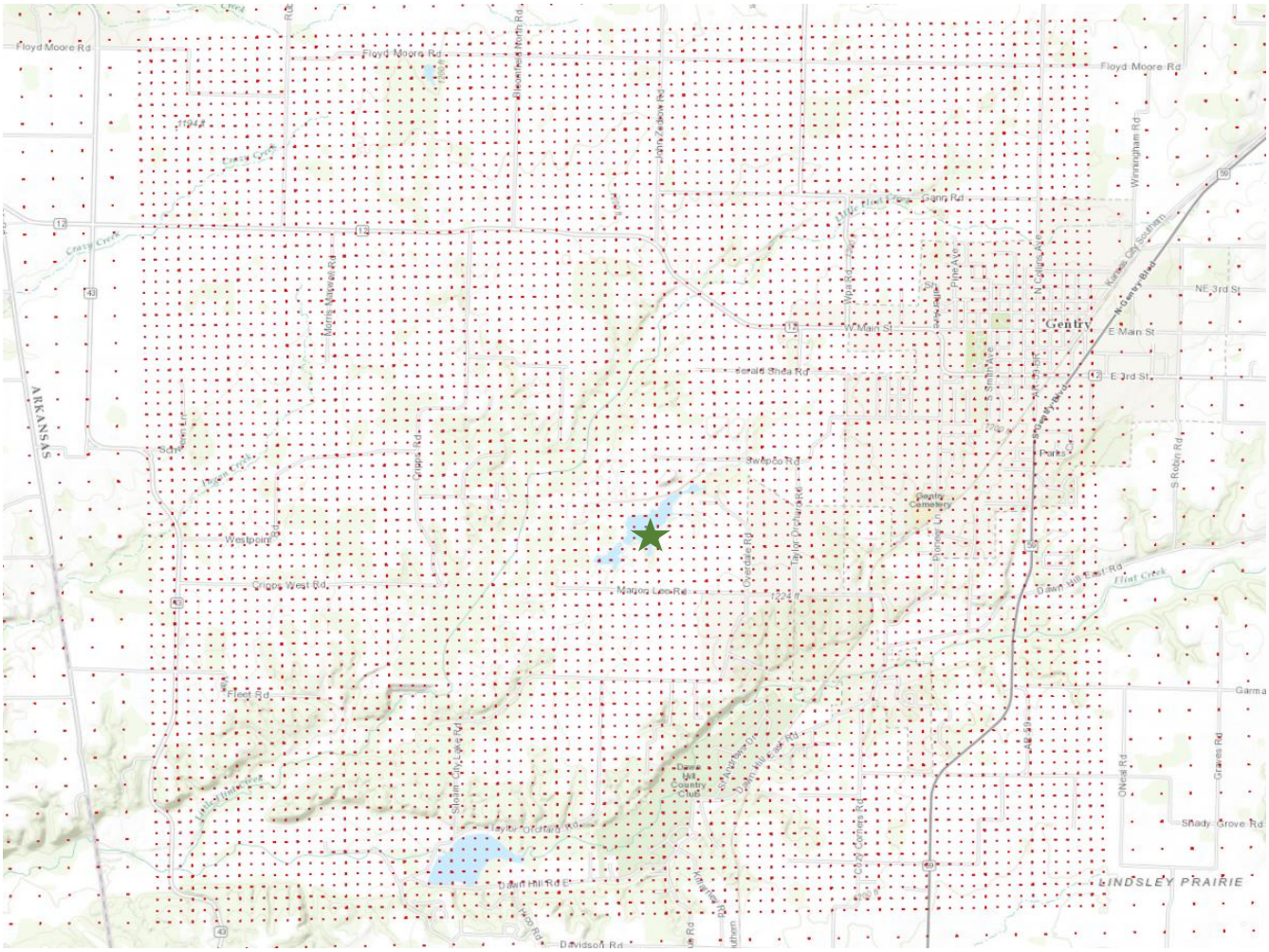
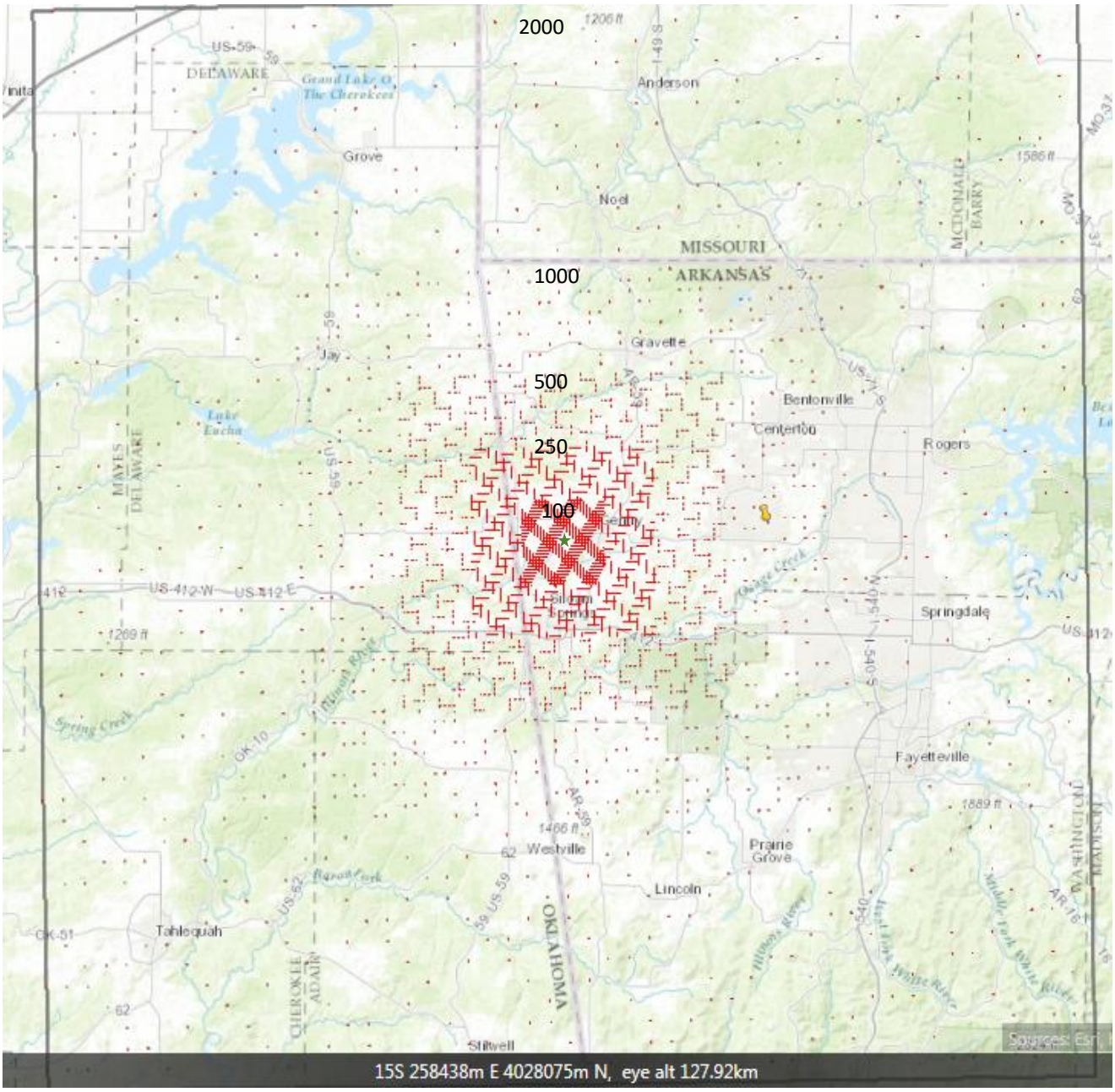


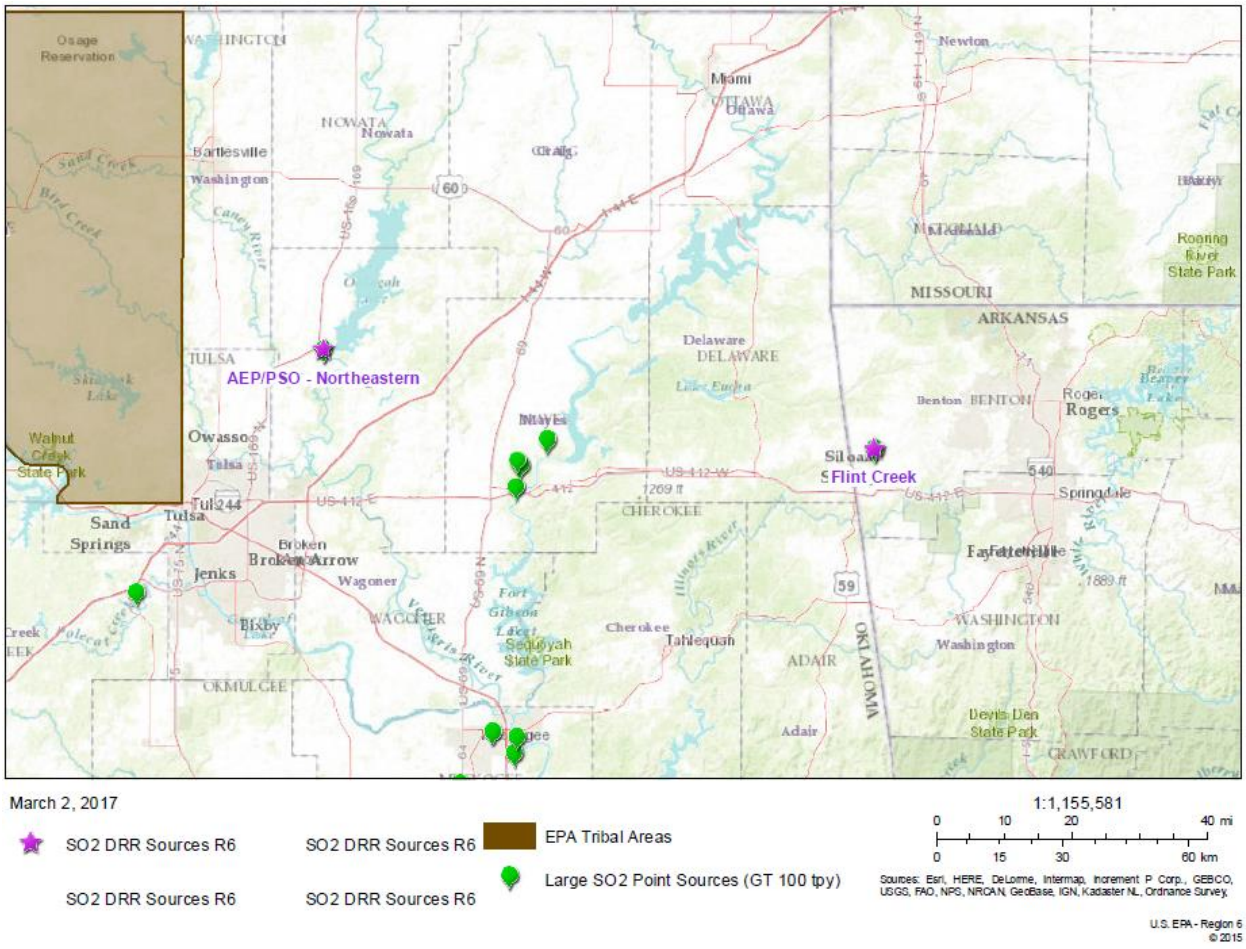
Figure 4: Overall Receptor Grid Configuration for Flint Creek with Receptor Spacings. The gray rectangle defines the model domain and the patterns of red dots denote the zones with different receptor spacings. The yellow pin is the surface meteorological data location.



The state included receptors within the facility property. The fine grid (100m) extends 4 km from the source and the outer grid extends to 50 km from the source. In preparing the modeling grid, the following coarse-grid receptors were classified by AERMAP as being in locations with insufficient data in the geo tiff files to process the receptors: 250-meter grid 358830 E, 4005440 N and 359080 E, 4005440 N; and 1000-meter grid 339080 E, 4035440 N. In the process of performing the modeling, no critical values occurred outside of the 100-meter fine grid and the

maximum modeled concentrations were in the 100 m grid, so the absence of three receptors in the 250 m and 1000 m grid out of 17,543 receptors does not affect the design value for this modeling analysis. Because the omission of the three receptors is a result of an insufficiency in the underlying datasets and is not in an area of concern for being able to designate the area, the EPA finds the overall receptor placement is consistent with the TAD. The EPA concurs that the receptor grid is adequate for the purpose of modeling and making an SO_2 designation for the Benton County area. Figure 5 shows the other sources in the region that are over 100 tpy. All these sources were beyond 50 km and were not included in the modeling.

Figure 5: Area of Analysis for the Flint Creek Area



3.3.2.4.Modeling Parameter: Source Characterization

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

Flint Creek contains a coal fired boiler, an emergency generator, and a fire pump. The emergency generator and fire pump are only used for maintenance and testing, and in the event

of an emergency or a loss of power condition. Both engines are classified as emergency engines under the Stationary Reciprocating Internal Combustion Engines hazardous air pollutants rule (40 CFR Part 63 Subpart ZZZZ). Table 3 below summarizes these two sources and shows the SO_2 emissions reported in the Annual Emission Inventory filed with the ADEQ for the years 2013-2015. The emergency generator and fire pump are classified as emergency engines under the RICE rules, which allow up to 100 hours per year of nonemergency operations. Due to limited emissions and operations of both engines at Flint Creek, the main coal fired boiler was the only source included in the modeling and analysis at Flint Creek. As previously discussed, no other sources outside the Flint Creek facility merited explicit inclusion in this modeling.

The air quality modeling was based on allowable emissions from Flint Creek. For Flint Creek's coal fired boiler, the state followed the EPA's good engineering practices (GEP) policy in conjunction with allowable emissions limits. The state also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Using BPIPPRM, the GEP stack height for Flint Creek Plant is 163.85 meters (0.75 meters less than the actual stack height of 164.6 meters). Modeling was performed using the calculated GEP height.

The EPA concludes that the source characterization and sources modeled by the state conform with the guidelines of the modeling TAD.

Table 3 - Minor Sources at Flint Creek Reported 2013 to 2015 Annual SO_2 Emissions in Tons

Equipment	2013	2014	2015
Emergency Generator	0.004	0.010	0.024
Diesel Fire Pump	0.009	0.009	0.014

3.3.2.5. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally enforceable and effective.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the 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 recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally

enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As shown in Table 4 below, the emission rate used in the Flint Creek modeling analysis was 132.8 grams per second (g/sec). This value was derived from the current permitted allowable emissions rate of 948.6 pounds per hour (lb/hr) (Arkansas Title V Permit # 0276-AOP-R7 issued and effective 7/2/2015), which applies on a 3-hour rolling average basis. This limit was divided by a factor of 0.9 in order to estimate the equivalent 1-hour limit resulting in an emission rate of 1,054 lb/hr or 132.8 g/s. EPA analyzed EGU emission variability in the 2014 1-hour SO2 SIP modeling guidance memorandum, where we indicated that the 24-hour value was 0.81 of the 1-hour value for a unit with a dry scrubber.[6] While our guidance does not have an analysis of 3-hour to 1-hour emission rates (3-hour/1-hour), the interpolated value would be between 0.81 (24-hour/1-hour) and 1.0 (3-hour/3-hour). The only EPA guidance with conversions of 1-hour values to 3-hour and 24-hour values is in the 1992 SCREEN2/3 guidance[7] which had conversion values of 0.9 and 0.4 respectively.

We used the 1992 SCREEN2/3 guidance to compare the adjustment for going from 1-hour to 3-hour emission limits to the adjustment for going from a 1-hour to a 24-hour emission limit. Using this guidance, a predicted 100 $\mu g/m^3$ impact for a maximum 1-hour value would be adjusted to a 3-hour value of 90 $\mu g/m^3$ and a 24-hour value of 40 $\mu g/m^3$. The resulting intervals are: 1-hour to 3-hour (100–90=10) and 1-hour to 24-hour (100–40=60). This shows that interval for 1-hour to 3-hour is only 1/6 of that for the 1-hour to 24-hour. Since the newer SIP guidance does not have a 3-hour to 1-hour conversion we are relying upon the SCREEN2/3 guidance to give an indication of the relative difference in adjusting to 3-hour vs. adjusting to 24-hour. In the newer guidance applying 1/6 of the 1-hour to 24-hour adjustment to estimate a 1-hour to 3-hour adjustment would give an estimated adjustment of 0.97 (1.0 – (1/6*(1.0-0.81)). The EPA therefore believes the use of 0.9 for the 3-hour/1-hour factor is reasonable for this specific situation but likely conservative (i.e. overstates the increase in emissions).

The AERMOD component BPIPPRM was also used to assist in addressing building downwash.

[6] EPA Memorandum from Steve Page, Director of Office of Air Quality Planning and Standards to Regional Air Division Directors, Subject: Guidance for 1-Hour SO2 Nonattainment Area SIP Submissions, April 23, 2014. Page D-2. (https://www.epa.gov/sites/production/files/2016-06/documents/20140423guidance_nonattainment_sip.pdf)
[7] In support of the use of the 0.9 factor, the state cited US EPA, Office of Air Quality Planning and Standards, *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised*, October 1992, Page 4-16.

Table 4 - Modeling Inputs for the Flint Creek Plant Simulation

Unit	Flue Easting (m)	Flue Northing (m)	Stack Base (m)	Emission Rate (g/sec)	Stack Height (m)	Exit Temp. (K)	Exit Velocity (m/sec)	Exit Diameter (m)
Unit 1	363080	4013440	341	132.8	163.85	352.6	30.4	6.1

The EPA finds that the state followed the guidance of the Modeling TAD in choosing to use PTE emissions in the modeling analysis.

3.3.2.6. Modeling Parameter: Meteorology and Surface Characteristics

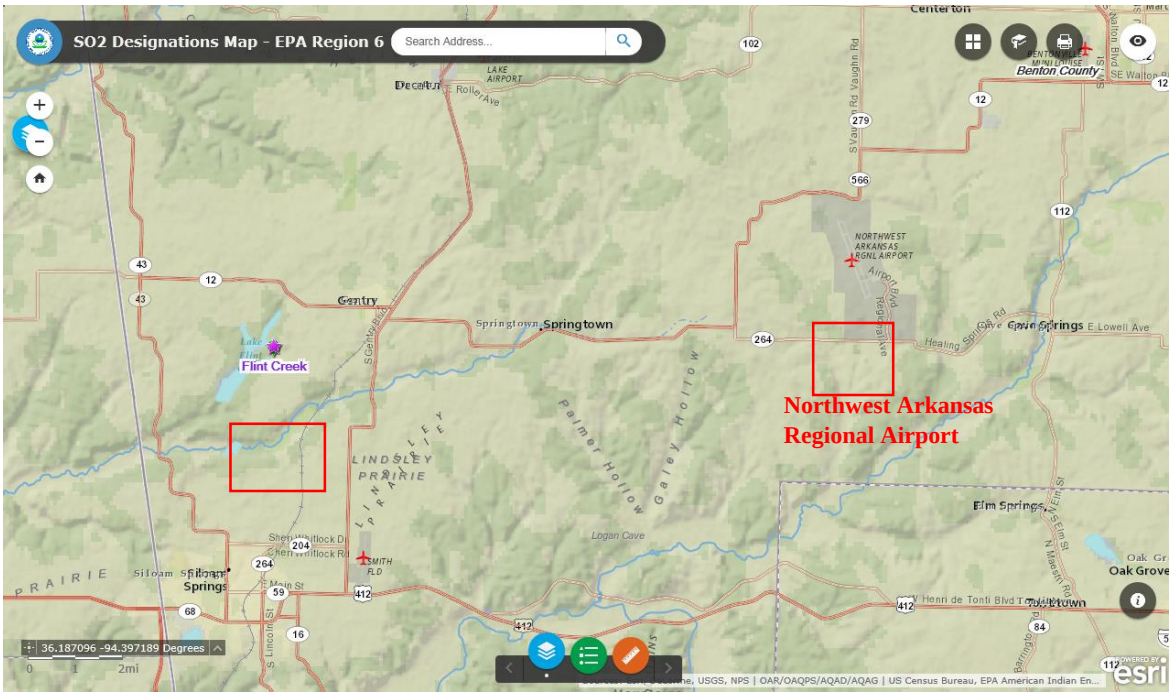
As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of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

For the Flint Creek area, the state selected the surface meteorology from Northwest Arkansas Regional Airport surface data located at 36.2898 lat., -94.3115 long., approximately 19 km northeast of the source and paired with upper air observations from Springfield-Branson Airport located in Springfield, Missouri, located at 37.246415 lat., -93.388406 long., 150 km northeast of the source as best available data that is representative of meteorological conditions within the area of analysis.

The state used AERSURFACE version 13016 using data from Northwest Arkansas Regional Airport site to estimate the surface characteristics of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space, the Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance, and the surface roughness is sometimes referred to as "z_o." The state estimated surface roughness values for 12 spatial sectors out to 1 km at a monthly temporal resolution for average conditions.

In Figure 6 below, generated by the EPA, the location of this NWS station is shown relative to the area of analysis.

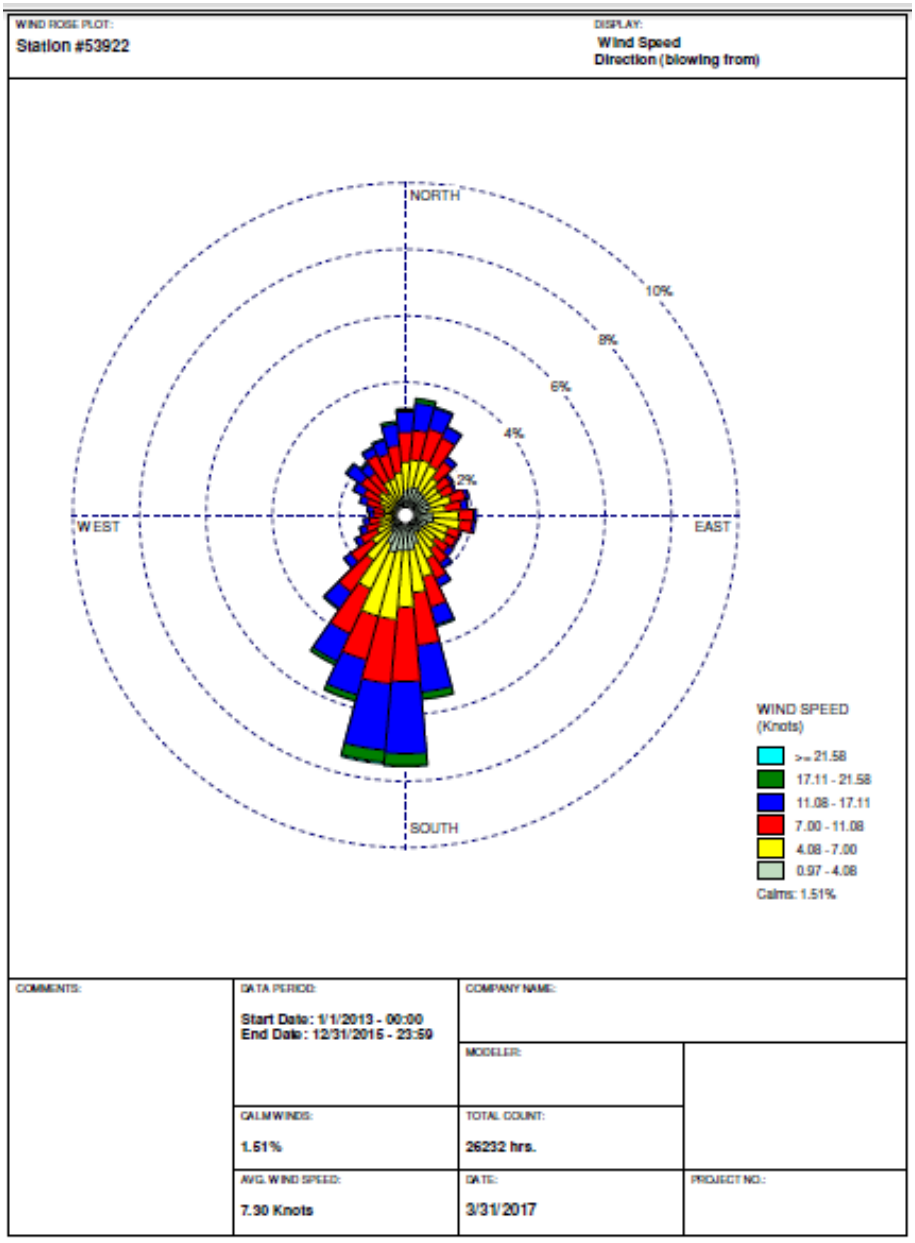
Figure 6: Area of Analysis and the Northwest Arkansas Regional Airport NWS Station in the Flint Creek Area



The source of this map image is Esri, used by EPA with Esri's permission.

In Figure 7 the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Winds are predominately from the south in this area with some winds out of the North but not as much West or East winds.

Figure 7: Benton County Cumulative Annual Wind Rose for Years 2013 – 2015



Meteorological data from the surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The state followed the methodology and settings agreed to in protocol discussions with the EPA on the appropriate met data and processing of met data. The state used acceptable versions of AERMET in the processing of the raw meteorological data into an AERMOD-ready format, and used acceptable version of AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, sub-hourly wind data was provided from Northwest Arkansas Regional Airport site, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the state set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The meteorological data set used for this study was the 2013-2015 Northwest Arkansas Regional Airport surface data, paired with Springfield, Missouri, Upper Air Data. One minute and five-minute surface data for the Northwest Arkansas Regional Airport in Fayetteville for 2013 to 2015 was processed through AERMINUTE version 15272 to augment the hourly surface data in an effort to reduce the number of missing and calm hours in the final meteorological data files for use in AERMOD version 15181. No Beta options were used in the processing of the data. Surface conditions based on the Northwest Arkansas Regional Airport site were developed by AERSURFACE in accordance with USEPA guidance using a 1 km distance from the grid center point. Monthly precipitation data for use in determining the surface moisture levels for the 2013 to 2015 period based on the 30-year historic average for the Northwest Arkansas Regional Airport location was sourced from the National Climatic Data Center. Table 5 shows the monthly precipitation data and classification for the Northwest Arkansas Regional Airport for the period from 2013 to 2015. The classifications were based on average being classified as precipitation being between +/- 20% of the 30-year average precipitation value and the dry and wet classifications being outside of the +/- 20% of the 30-year average range.

Table 5 - Precipitation Data for Northwest Arkansas Regional Airport

		Precipitation				Classification		
Month	**30 Year AVG**	**2013**	**2014**	**2015**		**2013**	**2014**	**2015**
January	2.54	3.20	1.35	0.91		WET	DRY	DRY
February	2.61	2.24	0.48	1.70		AVG	DRY	DRY
March	4.10	4.13	2.85	4.20		AVG	DRY	AVG
April	4.44	5.75	1.98	2.44		WET	DRY	DRY
May	5.82	10.01	1.85	12.26		WET	DRY	WET
June	5.11	2.24	6.61	5.33		DRY	WET	AVG
July	3.42	4.65	1.70	5.71		WET	DRY	WET
August	3.45	6.63	1.70	5.05		WET	DRY	WET
September	4.78	3.25	4.42	1.44		DRY	AVG	DRY
October	4.14	5.4	7.89	3.10		WET	WET	DRY
November	4.25	1.65	2.56	7.52		DRY	DRY	WET
December	3.24	2.85	2.65	12.63		AVG	AVG	WET

In summary, the EPA finds that the state followed the guidance of the Modeling TAD in processing the meteorological data and the site chosen was the closest and representative sites which had both upper air and surface date available. They used the most recent 3 years of meteorological data available.

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

The terrain in the area of analysis is best described as gently rolling to complex. To account for these terrain changes, the AERMAP terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS National Elevation Database 1983. The elevation of the plant site averages 352 m MSL. The area around the plant is classified as rural for purposes of air modeling, as the only significant population area is the town of Gentry, Arkansas.

Terrain data obtained from the United States Geological Survey (USGS) Seamless Data Server at http://viewer.nationalmap.gov/viewer/ was used to determine the receptor base elevation and hill height elevation. The 1/3 arc-second National Elevation Data (NED) was obtained in the GeoTIFF format for use with AERMAP. Interpolation of receptor and source heights from the 1/3 arc-second NED elevation data is based on the current AERMAP guidance in Section 4.4 of the *User's Guide for the AERMOD Terrain Processor (AERMAP)* (EPA-454/B-03-0003, 10/2004). AERMAP uses a distance weighted bilinear interpolation method. This domain falls entirely in UTM Zone 15. All coordinates were based on the North American Datum (NAD) of 1983 (NAD83).

3.3.2.8. Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state used tier 1 approach. The nearest SO_2 monitors to the Flint Creek are located southwest of the plant in Stilwell (40-001-9009), Muskogee (40-101-0167), and Oklahoma City (40-109-1037), west of the plant in Tulsa (40-143-0175, 40-143-0179, 40-143-0235, 40-143-1127) and Ponca City (40- 071-0604), and southeast of the plant in North Little Rock (41-190-007). Upon further investigation, many of these monitors are located near major SO_2 sources including coal fired power plants or refineries and therefore do not accurately represent background ambient air conditions around Flint Creek. The monitors that were clearly source influenced based on proximity (40-071-0604, 40-101-0167, 40-143-0175, 40-143-0179, 40-143-0235) were removed from consideration. As shown in Table 6 below, the high level 1-hour and annual data from the remaining Siltwell, Oklahoma City, Tulsa, and Little Rock monitors were screened to get an indication of the nature of the monitor values in the data set. The Stilwell monitor (40-001-9009) does not show stability throughout the 3 years examined, indicating it is likely affected by a nearby source that is unlikely to affect the area around Flint Creek. The next closest monitor is the Tulsa monitor (40-143-1127). This monitor is fairly consistent and ADEQ did not think it appeared to be largely impacted by nearby sources, making it suitable for use to determine the recommended background value. Since the data at this monitor is stable, the 3-year average of the 99th percentile of the max daily 1-hour values were used for all hours in each year's modeling analysis. Data for these monitors is included in Table 6.

Table 6 - Background Monitors

Monitor	2013			2014			2015			
	1 hr Max	1hr 2nd Max	99th pctle	1 hr Max	1hr 2nd Max	99th pctle	1hr Max	1hr 2nd Max	99th pctle	2013-2015 Design Value
Stilwell 40-001-9009	5.7	4.8	5	43.2	35.4	35	34.8	8.7	6	15
Oklahoma City 40-109-1037	5	3	3	7	4	3	4	4	3	3
Tulsa 40-143-1127	36.3	22.7	20	9.3	9	6	13.7	10	9	12
North Little Rock 51-190-007	8.8	8.5	7	11.1	10.6	10	29.3	28.4	23	13

The single value of the background concentration for this area of analysis was determined by the state to be 30.6 micrograms per cubic meter ($\mu g/m^3$), equivalent to 11.7 ppb when expressed in 3 significant figures,[8] and that value was incorporated into the final AERMOD results.

The EPA has reviewed this monitor and there are sources in the area around this monitor and the monitor is in a much larger urban area, so the background values used for the model analysis is likely higher than the background concentration in Benton County. The EPA concurs with the use of this monitor for background concentration.

[8] The SO_2 NAAQS level is expressed in ppb but AERMOD gives results in $\mu g/m^3$. The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1ppb = approximately 2.619 $\mu g/m^3$.

3.3.2.9. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Gentry, Benton County area of analysis are summarized below in Table 7.

Table 7 - Summary of AERMOD Modeling Input Parameters for the Area of Analysis for Flint Creek Area

Input Parameter	Value
AERMOD Version	version 15181 (regulatory options)
Dispersion Characteristics	Rural
Modeled Sources	Flint Creek
Modeled Stacks	Unit 1- Main coal fired boiler
Modeled Structures	1
Modeled Fencelines	No
Total receptors	17,453
Emissions Type	Allowable (PTE)
Emissions Years	PTE 2013-2015
Meteorology Years	2013-2015
NWS Station for Surface Meteorology	Northwest Arkansas Regional Airport, Fayetteville, Arkansas 19 km east of facility, located at Lat.36.282781 Long.- 94.303147 SF_ID #:53922
NWS Station Upper Air Meteorology	Springfield-Branson Airport located in Springfield, Missouri, located at 37.246415 lat., -93.388406 long., 150 km northeast of the source UA_ID 13995
NWS Station for Calculating Surface Characteristics	Northwest Arkansas Regional Airport, Fayetteville, Arkansas
Methodology for Calculating Background SO_2 Concentration	(2013-2015) 3-year average of the 99th percentile values
Calculated Background SO_2 Concentration	11.7 ppb (30.6 µg/m^3)

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

Table 8 - Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over 3 Years for the Area of Analysis for the Flint Creek Area

		Receptor Location [UTM zone 15]		99th percentile daily maximum 1-hour SO_2 Concentration (µg/m^3)	
Averaging Period	**Data Period**	**UTM/Latitude**	**UTM/Longitude**	**Modeled concentration (including background)**	**NAAQS Level**
3-year average of the 99th percentile of the max daily 1-hour	2013-2015	360780	4012140	63.75	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 µg/m^3 conversion factor.

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 63.75 µg/m^3, equivalent to 24.3 ppb. This modeled concentration included the background concentration of SO_2, and is based on federally enforceable and effective PTE emissions from the facility/facilities. Figures 8 and 9 below were generated by the EPA from the state's modeling files, and indicate that the predicted value occurred to the southwest of the facility, about 300 m from the facility's property. The state's receptor grid is shown in Figure 3. Figure 8 shows the full modeling analysis that covers areas in Oklahoma and Missouri as well as Arkansas. In the lower right portion of the figure there is elevated terrain with some higher impacts but not as high as near the facility. The receptor grid in this figure goes out to 50 km from the source. Figure 9 zooms in to show more detail for a portion of Figure 8.

Figure 8: Contour Plot and Receptor Concentration Plot of Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for the Area of Analysis for the Flint Creek Area (concentrations are in µg/m^3)

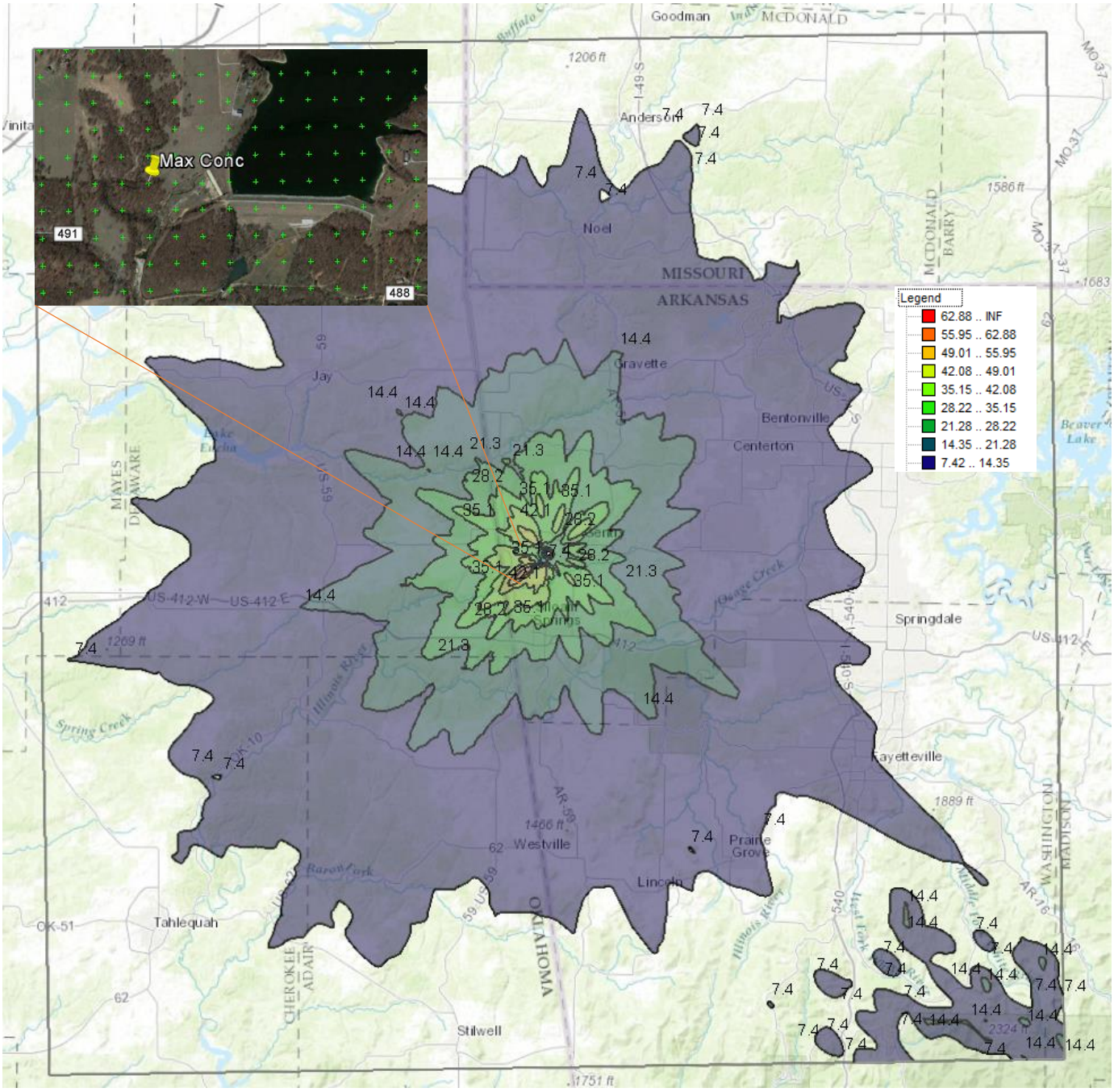
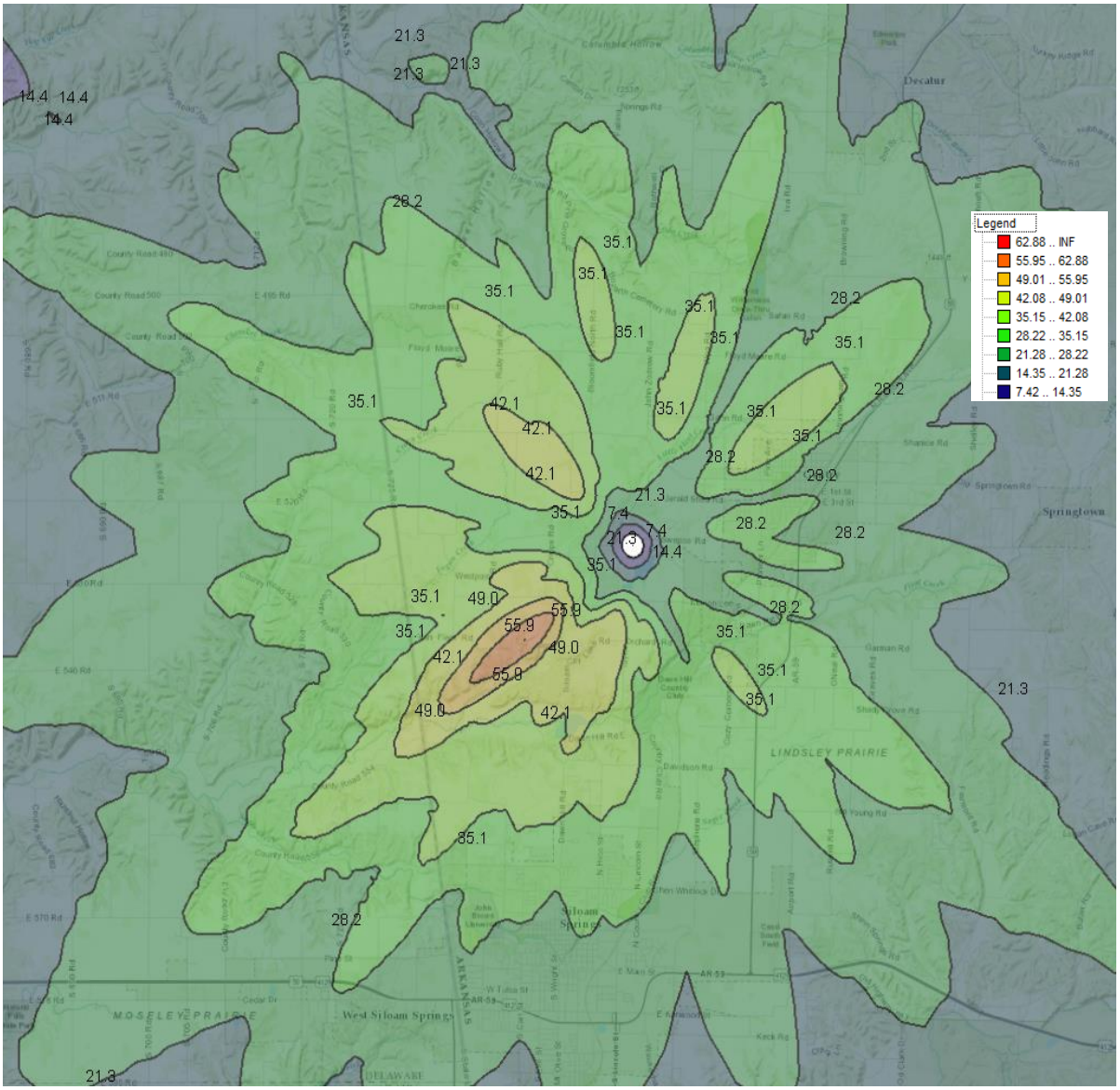


Figure 9: Zoomed in Contour Plot and Receptor Concentration Plot of Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over 3 Years for the Area of Analysis for the Flint Creek Area (concentrations are in µg/m^3). Figure covers the 100 m grid and some of the 250 m grid. (100 m grid extends to 4 km from facility)



The modeling submitted by the state does not indicate that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration. The modeling demonstrates that the area around Flint Creek meets the 1-hour SO_2 standard based on the use of maximum allowable emissions combined with meteorological data from the 3 years (2013-2015).

3.3.2.10. The EPA's Assessment of the Modeling Information Provided by the State

The state followed the EPA guidance contained in the Modeling TAD for receptors, the use of potential emissions with GEP stack height, surface processing, and meteorology. The default options for the version of AERMOD employed were set and conservative methodology for estimating the background concentrations for the facility and an appropriate rural land use characterization were used. The assessment uses a background concentration value that is likely conservative in over-estimating that concentration but even with that, the value is well below the standard.

3.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for Benton County, Arkansas

These factors have been incorporated into the air quality modeling efforts and results discussed above. The EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the modeling.

3.5. Jurisdictional Boundaries in Benton County, Arkansas

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for city/county/parish. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

The modeling submitted by the state does not indicate that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration. Based on modeling analysis prepared by or for the Arkansas Department of Environmental Quality (ADEQ), the state recommended that the entirely of Benton County be designated "unclassifiable/attainment.".

3.6. The EPA's Assessment of the Available Information for the Benton County, Arkansas, Area

The EPA intends to designate Benton County, Arkansas, in its entirety as unclassifiable/attainment, based on our view that the area is not violating the NAAQS and is not contributing to air quality in a nearby area that violates the NAAQS. Our intended designation and associated boundaries are based on, among other things, our evaluation of the state's modeling that showed attainment, the decline of concentrations with distance from the maximum modeled concentration, the absence of large SO_2 sources in neighboring counties/areas. Furthermore, as previously discussed there are no large SO2 sources in the surrounding counties, so violations of the standard are not expected to exist in these surrounding counties. Thus the Flint Creek source could not contribute to SO_2 exceedances. ion The modeling generally followed EPA guidance, including the Modeling TAD. The modeling did not have receptors over the entire Benton County area, but it was a large receptor grid that did assess ambient concentrations for much of the county and the area that was not directly modeled does not

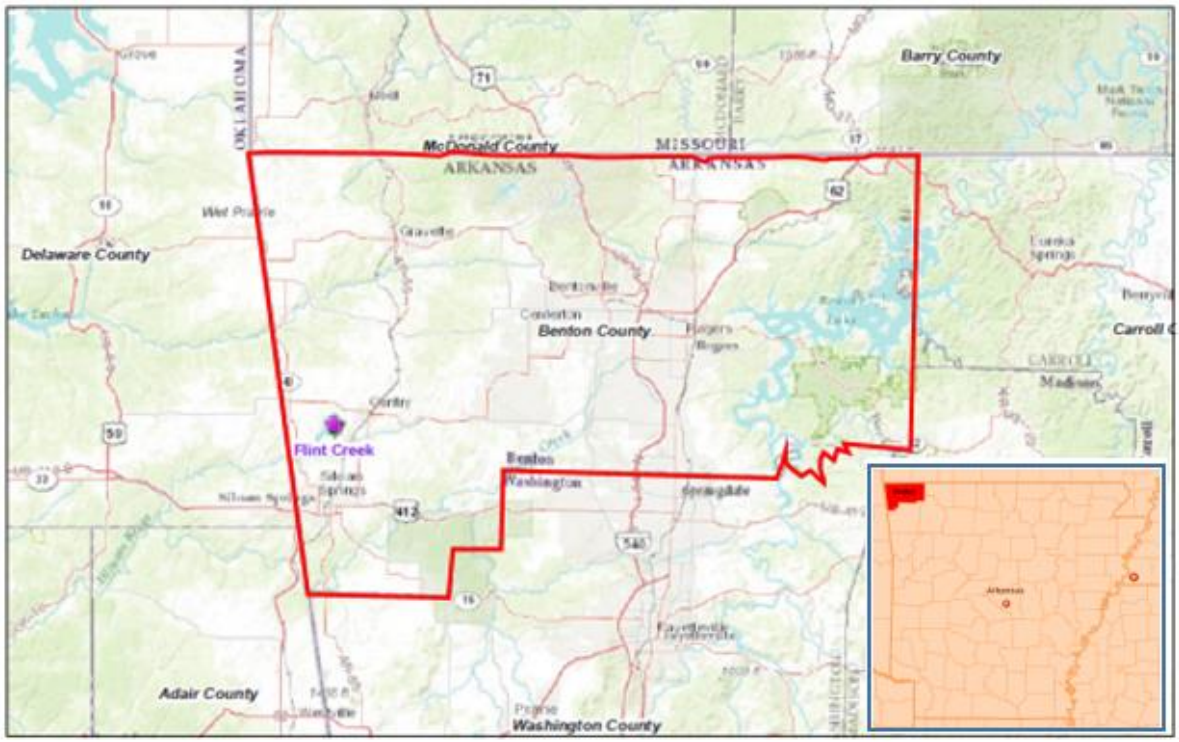
contain any SO_2 sources over 100 tons per year and the EPA does not have any information that suggests would be violating the NAAQS.

The EPA believes that our intended unclassifiable/attainment area, bounded by Benton County boundaries, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment area.

3.7. Summary of Our Intended Designation for the Benton County, Arkansas, Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate Benton County, Arkansas, as unclassifiable/attainment for the 2010 SO_2 NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined the area (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundaries for the area are the boundaries of Benton County, Arkansas, and are shown in Figure 10 below.

Figure 10: Boundary of the Intended Benton County Unclassifiable/Attainment Area



The source of this map image is Esri, used by EPA with Esri's permission.

4. Technical Analysis for Mississippi County, Arkansas

4.1. Introduction

The EPA must designate Mississippi County, Arkansas, by December 31, 2017, because no portion of the county has been previously designated and Arkansas has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in Mississippi County.

4.2. Air Quality Monitoring Data for Mississippi County, Arkansas

The nearest SO_2 monitoring station to Mississippi County, Arkansas, is in Shelby County, Tennessee, and is more than 50 km from Plum Point Energy Station in Mississippi County. The Shelby monitor is located in the Memphis metropolitan area but not near large SO_2 sources. The EPA does not consider this Shelby County monitoring station to be informative for the purpose of the intended designation for Mississippi County because of the distance between the monitor and the Plum Point Energy Station.

4.3. Air Quality Modeling Analysis for Mississippi County, Arkansas, Addressing Plum Point Energy Station

4.3.1. Introduction

This section 4.3 presents all the available air quality modeling information for a portion of Mississippi County that includes Plum Point Energy Station (Plum Point). (This portion of Mississippi County will often be referred to as "the Plum Point area" within this section 4.3.) This area contains the following SO_2 source around which Arkansas is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tons per year:

- The Plum Point facility emits 2,000 tons or more annually. Specifically, Plum Point emitted 2,549.46 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Arkansas has chosen to characterize it via modeling.

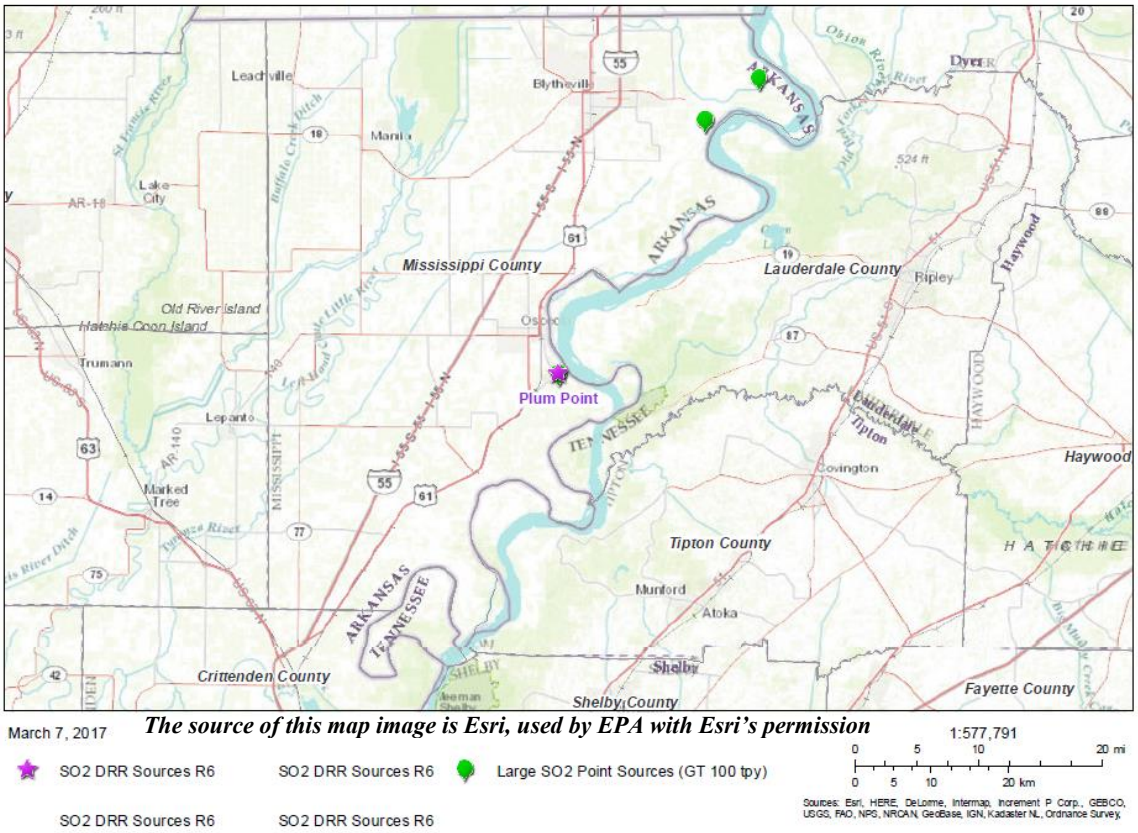
There are two other sources in Mississippi County that are 31 and 37 km away that had 2014 SO_2 emissions of 393 tpy and 172 tpy respectively. Based on EPA's modeling guidance for permits (2010 SO_2 modeling guidance and 2011 NO_2 modeling guidance) addressing what sources to include in a cumulative assessment, these sources are small enough and distant enough (over 30 km away) that it is reasonable to exclude them as they would not be expected to cause concentration gradients around the higher impact areas from Plum Point. We also consider the background monitoring data used in this analysis (from a monitor in the Little Rock area) as representative, such that these two sources that have not been directly modeled are adequately represented by the background data. There are no other SO_2 emission sources above 100 tpy in nearby areas of surrounding counties. Therefore, the EPA concludes that there are no other sources of SO_2 in the area surrounding Plum Point facility that need to be included in the DRR modeling demonstration.

In its January 24, 2017, submission, Arkansas recommended that an area that includes the area surrounding the Plum Point, specifically the entirety of Mississippi County be designated as unclassifiable/attainment based in part on an assessment and characterization of air quality impacts from this facility. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing allowable emissions. After careful review of the state's assessment, supporting documentation, and all available data, the EPA agrees with the state's recommendation for the area, and intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in section 4.6 of this TSD, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in approximately 4.2 kilometers (km) south of Osceola in Mississippi County, Arkansas.

As seen in Figure 11 below, the Plum Point facility is located on the eastern edge of Mississippi County, approximately 2 km west of the Tennessee state line and the Mississippi River.

Figure 11: Map of the Plum Point Area with other SO_2 sources



Also included in Figure 11 are other nearby emitters of SO_2.[9] These are NUCOR-YAMATO Steel Company (emits 393 tons in 2014), 31 km northeast of Plum Point, and NUCOR Corporation -NUCOR Steel Arkansas (emitted 172.26 in 2014), 37 km Northeast the facility. Figure 12 gives an overall orientation of Mississippi County in context of Arkansas.

Figure 12: Map of the Mississippi County Area Addressing Plum Point Energy Station

The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

4.3.2. Modeling Analysis Provided by the State

For this area, the EPA received and considered one modeling assessment which was submitted by the state (ADEQ). The Plum Point facility conducted this modeling. No one else submitted modeling.

[9] All other SO_2 emitters of 100 tpy or more (based on information in the 2014 National Emission Inventory Data are shown in Figure 11. If no sources not named previously are shown, there are no additional SO_2 emitters above this emission level in the vicinity of the named source(s).

4.3.2.1. Model Selection and Modeling Components

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

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

The state used AERMOD version 15181, the latest version available at the time of the modeling analysis, in regulatory default mode. We would not expect significant differences in the modeling results using the current AERMOD version, 16216r, since the regulatory default options were used. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate. Version 15181 of AERMOD and AERMET were used and were the current versions of the Appendix A Gaussian Model listed in 40 CFR 51 Appendix W, AERMOD at the time this work was started/performed. No Beta options available in AERMOD or AERMET were used as part of this modeling. The receptor grid was developed using Version 11103 of AERMAP, the current version of the receptor preprocessor software for the AERMOD Model. In addition, a BPIPRM analysis of Flint Creek Power Plant was completed using Version 04274 of BPIPPRM. The EPA concurs that the state's use of AERMOD version 15181 and associated components is appropriate for use in this designation

4.3.2.2. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the state determined that it was most appropriate to run the model in rural mode. The state selected the rural mode as the source is surrounded by the Mississippi river and fields and other rural land with flat terrain, and the nearest populated area, Osceola, is more than 3 km distant. Well over 50% of the land in the modeled areas is rural and Memphis is the nearest urban area at over 50 km away. The EPA agrees that the area analyzed is rural in nature and that using a rural determination in the modeling analysis was appropriate for this area. See Figure 13 in section 4.3.2.3 below.

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

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the

spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

As discussed above and shown in the Figure 11, there are other nearby emitters of SO_2. These are NUCOR-YAMATO Steel Company (emits 393 tons in 2014), 31 km northeast of Plum Point, and NUCOR Corporation -NUCOR Steel Arkansas (emitted 172.26 in 2014), 37 km Northeast the facility. As discussed above, these sources are small enough and far enough away that they were not included in the modeling, and any potential impacts from these sources are adequately represented by the use of a representative background monitor. There are no other SO_2 emission sources above 100 tpy in nearby areas of surrounding counties. Therefore, the EPA agrees that there are no other sources of SO_2 in the area surrounding Plum Point facility that should have been included in the modeling for it to be informative for the intended designation.

The grid receptor spacing for the area of analysis chosen by the state is as follows:
The state used a comprehensive Cartesian receptor grid extending out 20 kilometers (km) from Plum Point, with near-field (within 5 km) and far-field (out to 20 km) receptor grids. The Cartesian receptor grid consisted of the following receptor spacing:

- 50 m spacing along the Plum Point fence line;
- 100 m spacing extending from the Plum Point main emission point to 5 km;
- 500 m spacing extending from 5 km to 10 km; and
- 1,000 m spacing extending from 10 km to 20 km

Figures 13, 14, and 15, included with the state's recommendation, show the state's chosen area of analysis surrounding Plum Point, as well as the receptor grid for the area of analysis.

Consistent with the Modeling TAD, the state placed receptors for the purposes of this designation effort in locations that would be considered ambient air. No receptors were placed within the fence lines of the Plum Point facility that the State asserted are not ambient air. The Plum Point facility consists of three polygons with some ambient air locations between the polygons. The modeling included receptors in the areas that are not fenced and where access therefore is not limited. Although the SO_2 Modeling TAD allows for excluding or ignoring receptors from over bodies of water and the Mississippi River occurs immediately to the east of Plum Point, no receptors over the river were excluded or ignored in this analysis.

Figure 13: Area of Analysis for the Plum Point Area

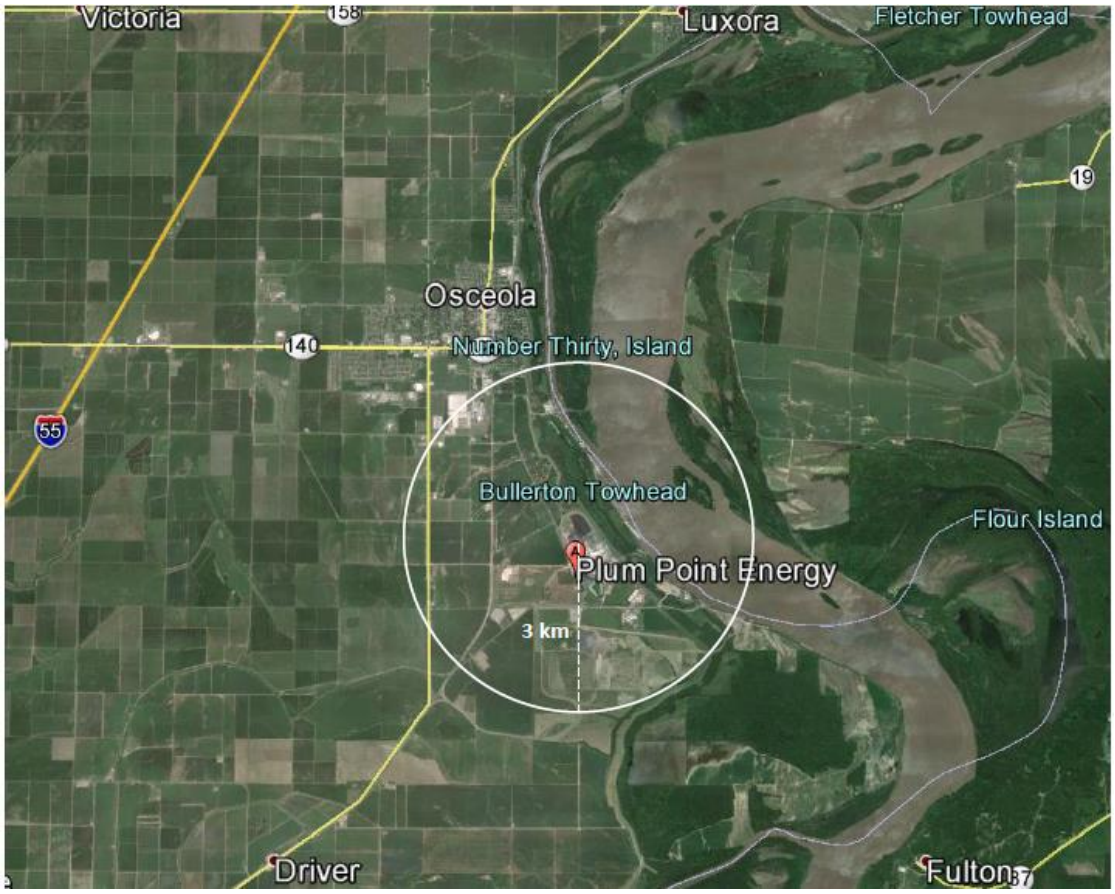


Figure 14: Receptor Grid for the (Near-field 5 km) Plum Point Area. The red crosses in the center are the location of the Plum Point Sources. The fencelines are indicated by the closely spaced receptors surrounding the three polygons.

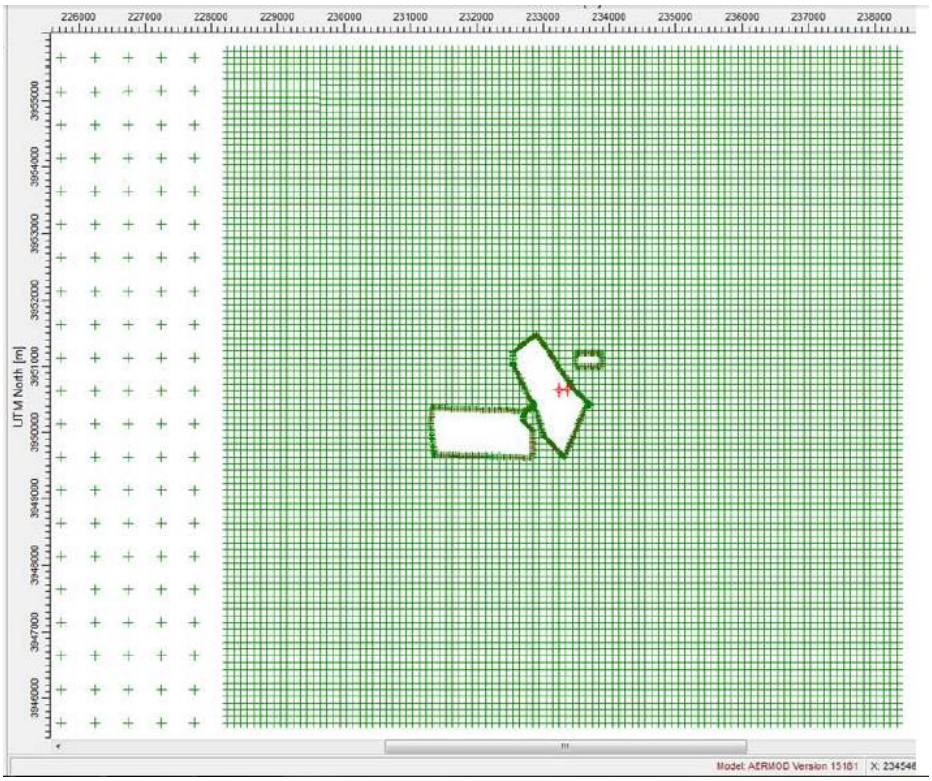
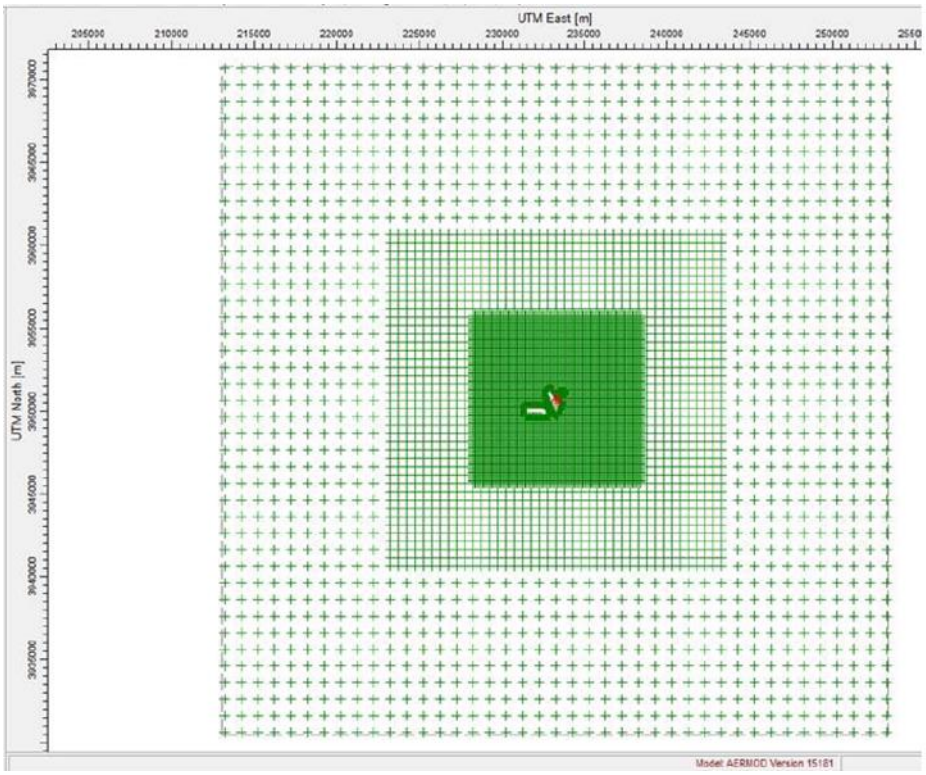


Figure 15: Overall Receptor Grid Configuration for the Plum Point Area. The red cross in the center is the location of Plum Point.



The EPA concurs that the receptor network adequately covers the modeling domain for the purpose of modeling to inform the SO_2 designation for the area around Plum Point. The state followed the TAD guidance to apply regular grid of receptors. The receptor placement is of sufficient density to provide the resolution needed.

4.3.2.4. Modeling Parameter: Source Characterization

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

The modeled sources at Plum Point (Unit #1 Boiler [SN-01] and Auxiliary Boiler [SN-051]) account for 99.9% of the permitted allowable SO_2 emissions from the Plum Point facility. It should be noted that although the Unit #1 Boiler and Auxiliary Boiler are capable of operating simultaneously, since the Auxiliary Boiler's commission the Auxiliary Boiler has been operated for testing purposes and is limited to 500 hours of operation annually per Permit # 1995-AOP-R8 (Issued October 31, 2016; p.47). Table 9 shows all SO_2 emitting sources in the facility and whether they were included in the modeling analysis. All SO_2 emitting sources at Plum Point were modeled except for the three very small intermittent emergency SO_2 sources (Emergency Generator #1 [SN-06], Emergency Diesel Generator #1 [SN-07], and Emergency Diesel Fire Booster Pump #1 [SN-47]) with a combined allowable total SO_2 emissions of 0.8 lb/hr (0.4 tpy).

Table 9 - SO_2 Emissions Based on PTE for Plum Point

Source Number	Source Description	Permitted Allowable SO_2 Emission Rate lb/hr (tpy)	Included in /Excluded from Model
SN-01	Unit #1 Boiler	1069.0 (4684)	Included
SN-05	Auxiliary Boiler	0.5 (0.2)	Included
SN-06	Emergency Diesel Generator #1	0.5 (0.2)	Excluded
SN-07	Emergency Diesel Fire Pump #1	0.2 (0.1)	Excluded
SN-47	Emergency Diesel Fire Booster Pump #1	0.1 (0.1)	Excluded

NOTE: For Auxiliary Boiler and Emergency Equipment the annual tpy value is based on limited hours of operation. Maximum lb/hr is given for Emergency Equipment to give context that the maximum hourly emissions are small and would not be consequential to the analysis. The Auxiliary Boiler was modeled at its short term allowable emission rate in order to account for its emissions in the modeling.

The state characterized these sources within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the state followed the EPA's good engineering practices (GEP) policy in conjunction with allowable emissions limits and used the GEP height as determined by formula which is also the actual stack height (144.78 m for Unit #1). The state also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. The AERMOD component BPIPPRM was used to assist in addressing building downwash.

The EPA concludes that the state provided adequate information to determine the source configuration and source type at Plum Point Energy Plant.

4.3.2.5. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally enforceable and effective.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the 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 recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, where a facility has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most recent 3 calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

The federally enforceable and effective PTE in tons per year for each of the modeled sources at Plum Point was determined by the state based on Permit # 1995-AOP-R8, which was issued and effective October 31, 2016. The permitted allowable SO_2 emissions for Unit #1 Boiler are 4,684 tpy and 1,069 lb/hr. The permitted allowable emissions for the Auxiliary Boiler are 0.2 tpy (limited to 500 hours of operation per year) and 0.5 lb/hr. Both sources were modeled simultaneously at their short term maximum emission rate (lb/hr) and constantly throughout the 2013-2015 period.

The EPA concludes that use of the new short–term maximum lb/hr emission rates (PTE) in the October 31, 2016, permit was appropriate and in accordance with the Modeling TAD.

4.3.2.6. Modeling Parameter: Meteorology and Surface Characteristics

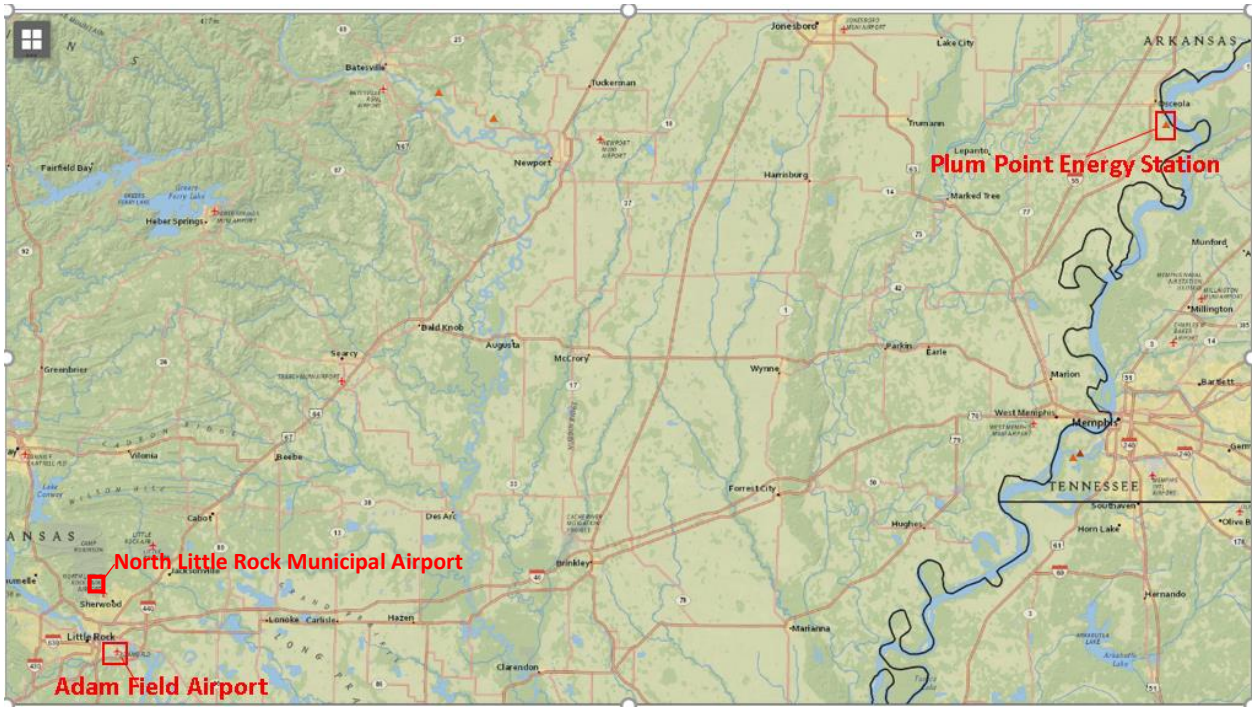
As noted in the Modeling TAD, the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of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

For the Plum Point area, the state selected the surface meteorology from National Weather Service (NWS) in Adam Field Airport in Little Rock (WBAN No. 13963), Arkansas, located at lat. 34.7267N, long 92.2361W, 232.4 km southwest of the facility, and coincident upper air observations from North Little Rock Municipal Airport (WBAN No. 03952) in North Little Rock, Arkansas, located at lat. 34.833718, long.-92.254600, 229 km southwest of facility as best representative of meteorological conditions within the area of analysis.

The state used AERSURFACE version 13016 using data from Adam Field Airport in Little Rock, Arkansas to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness (zo)) of the area of analysis. Albedo is the fraction of solar energy reflected from the earth back into space, the Bowen ratio is the method generally used to calculate heat lost or heat gained in a substance, and the surface roughness is sometimes referred to as "z_o." The state estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions.

In Figure 16 below, generated by the EPA, the location of this NWS station is shown relative to the area of analysis.

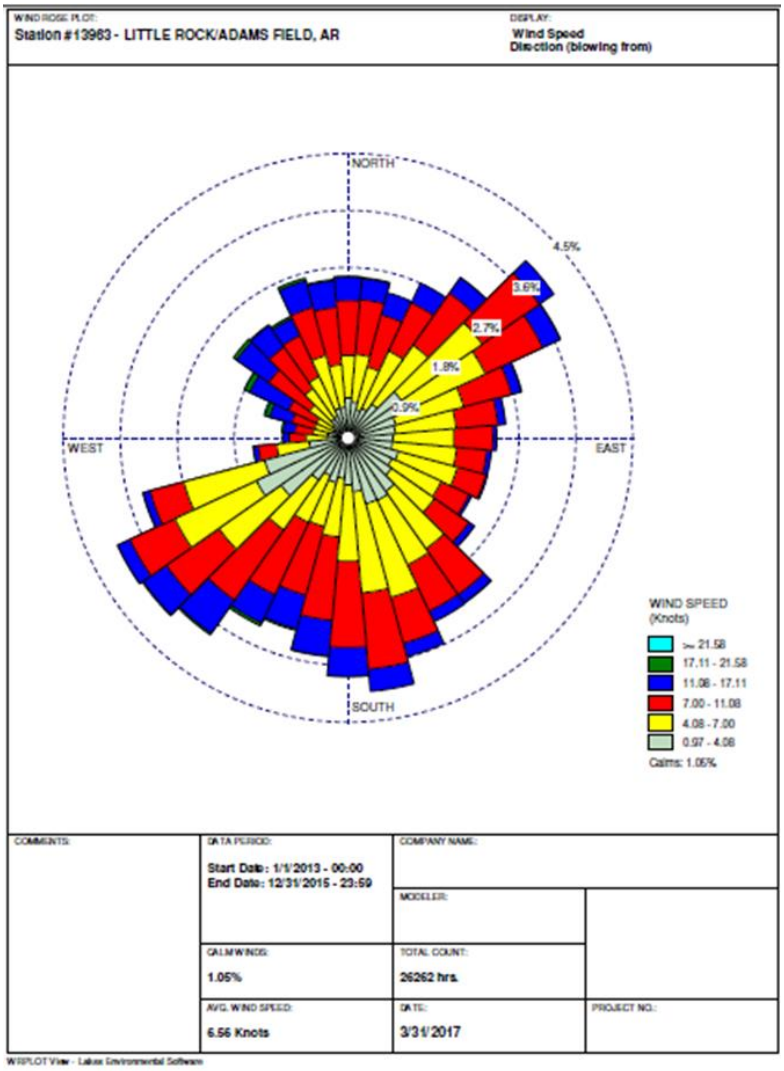
Figure 16: Area of Analysis and the NWS Stations in the Plum Point Area



The source of this map image is Esri, used by EPA with Esri's permission

As part of its recommendation, the state provided the 3-year surface wind rose for (WBAN No. 13963) In Figure17, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Winds are from a variety of directions ranging from Northeasterly through Southerly to West-Southwesterly with less frequent winds from the West through Northeasterly direction.

Figure 17: Little Rock Area Meteorology Data Used for the Plum Point Area Cumulative Annual Wind Rose for Years 2013 – 2015



Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. The state followed the methodology and settings presented in the guidance provided by the EPA in the AERMOD Implementation Guide (AIG)[10] using AERMET in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics. In addition, a seasonal distribution was used: December, January, and February were categorized as winter with no snow; March, April, and May as spring; June, July, and August as summer; and September, October, and November as fall. The precipitation was assumed to be average over the 3-year period. Data completeness of Adams Field Airport in Little Rock, Arkansas for 2013-2015 was 99.62%.

[10] https://www3.epa.gov//ttn/scram/7thconf/aermod/aermod_implmtn_guide_3August2015.pdf

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration was provided from the first NWS station mentioned above, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, the state set a minimum threshold of 0.5 meters per second in processing meteorological data for use in AERMOD. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations. This threshold was specifically applied to the 1-minute wind data.

The EPA concludes that the state used acceptable surface characteristics and meteorology in the modeling analysis for facility.

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

The terrain in the area of analysis is best described as flat to gently rolling. To account for these terrain changes, the AERMAP terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the USGS National Elevation Database in conformance with the North American Datum of 1983 (NAD83).

The EPA concludes that terrain and elevation were appropriately characterized for modeling around the plant.

4.3.2.8. Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state used the closest Arkansas SO_2 monitor located in North Little Rock, Arkansas (Monitor ID # 05-119-0007) to represent the background concentrations of SO_2 and used the tier 2 Seasonal-Hourly approach, *see* Table 10. The modeled concentrations were paired with a set of 2013-2015 seasonal diurnal values that was developed using methodology described in Section 8.1 of SO_2 Modeling TAD and the NO_2 Memorandum, which address NO_2 modeling and is applicable for developing seasonal diurnal background values for SO_2. Figure 18 shows the geographical relationship of this air monitoring site, the meteorological site, and Plum Point.

Figure 18: Relative Locations of Plum Point, North Little Rock SO_2 Monitor ID # 05-119-0007, and Airport Meteorological Site.

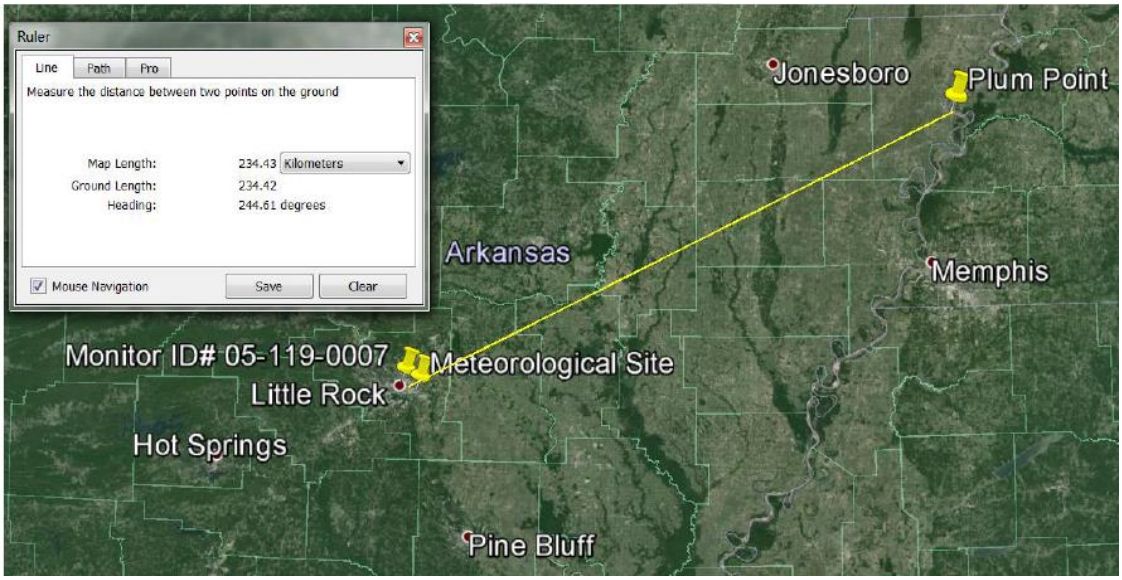


Table 10 - 2013-2015 Seasonal Diurnal SO_2 Concentrations (µg/m^3) at North Little Rock Monitor (Monitor ID 05-119-0007)

Hour[1]	Winter	Spring	Summer	Fall
1	8.5	6.6	6.6	13.1
2	9.3	6.7	7.6	16.1
3	9.2	7.4	7.7	18.7
4	9.3	7.0	7.2	20.8
5	9.4	5.4	7.6	20.2
6	10.1	5.9	7.9	22.3
7	9.7	7.3	7.2	25.9
8	9.6	6.4	8.5	26.8
9	9.0	7.6	9.3	21.0
10	9.5	8.3	8.6	16.6
11	10.4	8.6	10.4	14.0
12	11.8	12.1	9.0	12.3
13	9.3	10.1	10.6	15.1
14	10.5	10.2	9.3	13.1
15	10.9	9.0	13.4	12.2
16	10.2	9.7	9.0	12.0
17	8.2	10.1	10.7	10.7
18	7.8	8.9	10.6	10.3
19	10.3	6.0	12.3	8.2
20	11.3	7.1	10.2	7.4
21	9.3	7.2	7.6	7.6
22	7.0	6.8	6.9	7.7
23	7.6	6.8	6.9	10.1
24	8.6	8.0	7.3	11.9
Average	9.5	7.9	8.9	14.8

[1]Hours in AERMOD defined as hour-ending. (i.e., Hour 1 is midnight through 1 AM).

Table 10 gives the hour-of-day seasonal values for the background monitor for the maximum modeled impacts (99th percentile value for each year modeled at the highest DV receptor) incorporated into the final AERMOD results. The background concentrations for this area of analysis were determined by the state to vary from 5.4 micrograms per cubic meter (µg/m3), equivalent to 2.06 ppb when expressed in three significant figures, to 26.8 µg/m3 (10.2 ppb), with an average value of 10.2 µg/m3 (3.89 ppb). The EPA concludes that background approach is appropriate and in accordance with the modeling TAD.

The North Little Rock SO2 monitor is in Pulaski County which had total 2014 SO2 emissions of 239 tons. The non-modeled SO2 emissions in Mississippi County were 631 tpy. While not conservative (i.e. not likely to underestimate the background concentration), from the available monitors the North Little Rock SO_2 monitor is an adequate monitor to use in the modeling to represent the background for the purposes of modeling attainment of the 2010 1-hour SO_2 sources. We note that the design value for the period used for the background determination, 2013-2015, was 22.7 and is more than double the previous period (2012-2014: 10.4) and the subsequent period (2014-2016: 7.2).

4.3.2.9. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Plum Creek area of analysis are summarized below in Table 11.

Table 11 - Summary of AERMOD Modeling Input Parameters for the Area of Analysis Addressing Plum Creek

Input Parameter	Value
AERMOD Version	version 15181 (regulatory options)
Dispersion Characteristics	Rural
Modeled Sources	2
Modeled Stacks	2
Modeled Structures	Yes
Modeled Fence Lines	Yes
Total receptors	13,106
Emissions Type	Allowable (PTE)
Emissions Years	PTE 2013-2015
Meteorology Years	2013-2015
NWS Station for Surface Meteorology	Adam Field Airport in Little Rock (WBAN No. 13963), Arkansas, located at lat. 34.7267N, long 92.2361W, 232.4 km southwest of the facility
NWS Station Upper Air Meteorology	North Little Rock Municipal Airport (WBAN No. 03952) in North Little Rock, Arkansas, located at lat. 34.833718, long.-92.254600, 229 km southwest of facility
NWS Station for Calculating Surface Characteristics	Adam Field Airport
Methodology for Calculating Background SO_2 Concentration	Ambient background data from North Little Rock, Arkansas monitor #05-119-0007, using 2013-2015 hourly varying and seasonal values.
Calculated Background SO_2 Concentration	Seasonal hourly values were added to modeled concentration. At the hour and location of the maximum predicted concentration, the background value was 19.52 $\mu g/m^3$

The results presented below in Table 12 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

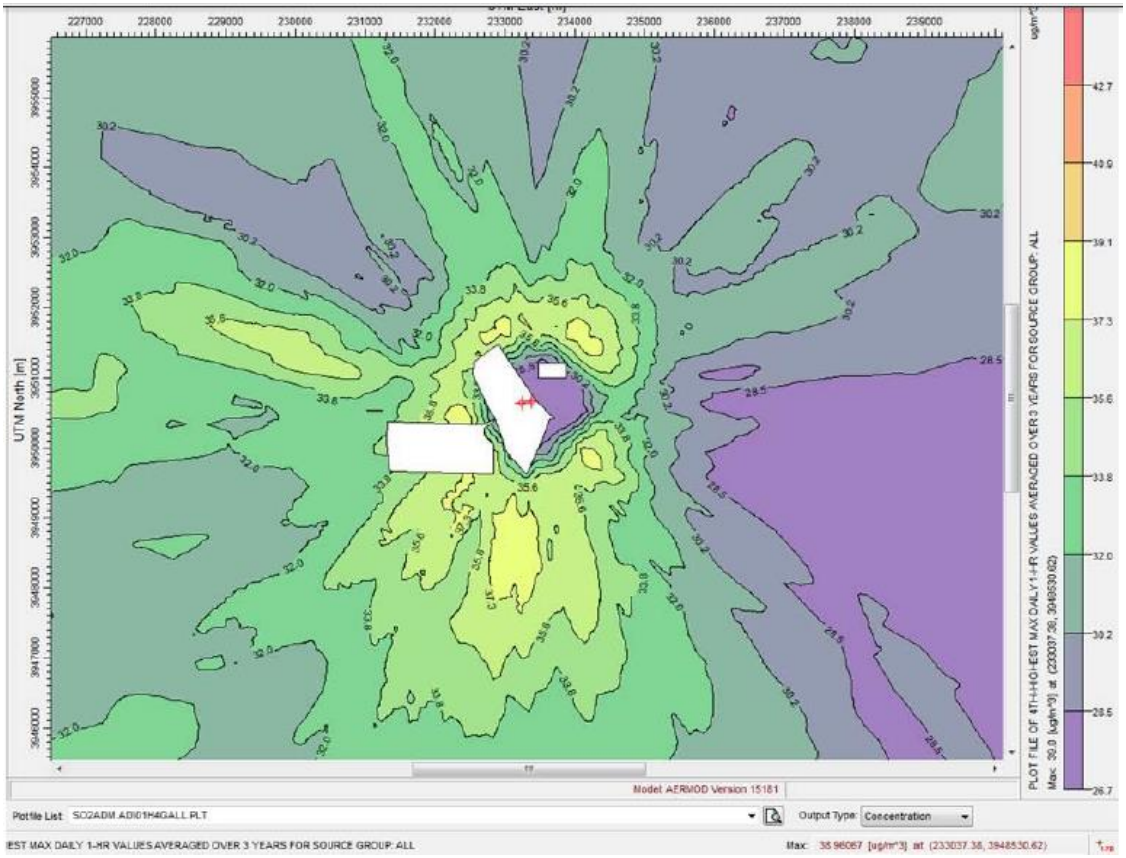
Table 12 - Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration for the Area of Analysis for the Mississippi County, Arkansas, Area*

Averaging Period	Data Period	Receptor Location UTM zone 16		99th percentile daily maximum 1-hour SO_2 Concentration (µg/m^3)	
		UTM	UTM	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013-2015	233037.38 E	3948530.62 N	38.96	196.4**

* Table 4 and Figures 6 and 7 in the state's submission are not clearly titled as to the metric being presented. The EPA has verified with the state that the values presented in that table match the description in the title to this table.
**Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 µg/m^3 conversion factor.

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 38.96 µg/m^3, equivalent to 14.9 ppb. This modeled concentration included the background concentration of SO_2, and is based on federally enforceable and effective PTE emissions from the facility. Figure 19 below was included as part of the state's recommendation, and indicates that the predicted value occurred about 1 km to the south of the facility. The state's receptor grid is also shown in the Figures 14 and 15 above.

Figure 19: Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations for the Area of Analysis for the Mississippi County, Arkansas, Area



The modeling submitted by the state does not indicate that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration.

4.3.2.10. The EPA's Assessment of the Modeling Information Provided by the State

When evaluating the modeling that came in from the state, no major issues with the state modeling were identified. The modeling shows attainment, and the modeling followed the TAD and EPA guidance.

4.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for Mississippi County, Arkansas

These factors have been incorporated into the air quality modeling efforts and results discussed above. The EPA is giving consideration to these factors by considering whether they were properly incorporated and by considering the air quality concentrations predicted by the modeling.

4.5. Jurisdictional Boundaries in Mississippi County, Arkansas

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for city/county/parish. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

The modeling submitted by the state does not indicate that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration. Based on modeling analysis prepared by or for the ADEQ, the state recommends that Mississippi County be designated "unclassifiable/attainment."

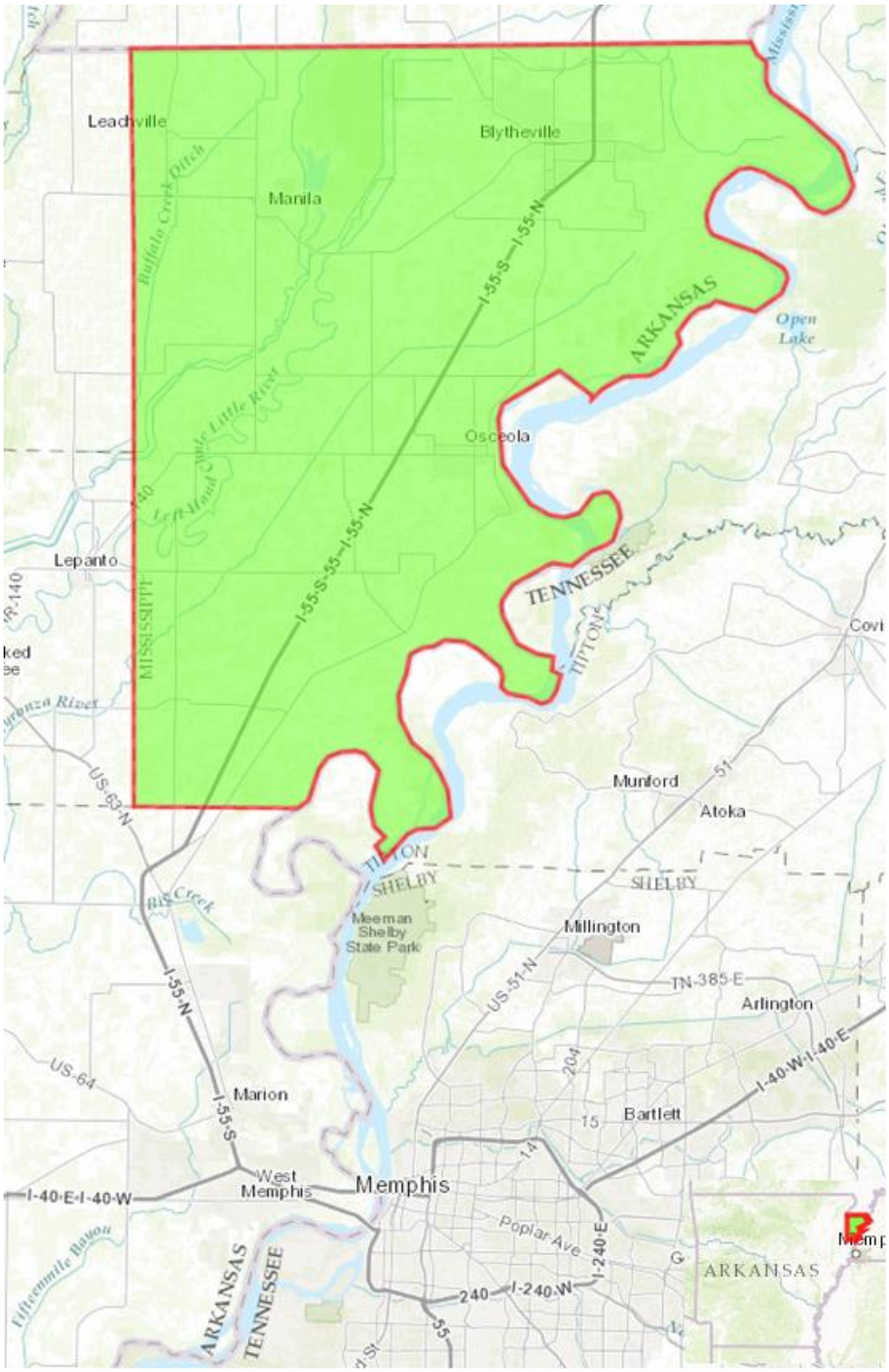
4.6. The EPA's Assessment of the Available Information for Mississippi County, Arkansas

The EPA intends to designate Mississippi County, Arkansas, area in its entirety as unclassifiable/attainment, based on our view that the area is meeting the NAAQS and does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Our intended designation and associated boundaries are based on, among other things, our evaluation of the State's modeling that showed attainment, the decline of concentrations with distance from the maximum modeled concentration, and the absence of SO_2 sources greater than 100 tpy in neighboring counties/areas which supports the conclusions that there are no areas in neighboring counties where SO_2 exceedance levels might occur and thus that the Plum Point source could not contribute to SO_2 exceedance levels. We intend to conclude that the modeling generally followed EPA guidance, including the Modeling TAD. The modeling did not have receptors over all the entire Mississippi County area, but it had a large receptor grid that did assess ambient concentrations for much of the county. For the portion of the county that was not directly modeled the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. The EPA believes that our intended unclassifiable/attainment area, based on Mississippi County boundaries, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment area.

4.7. Summary of Our Intended Designation for the Mississippi County, Arkansas, Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate Mississippi County, Arkansas, as unclassifiable/attainment for the 2010 SO_2 NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined the area (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundaries are comprised of the boundaries of Mississippi County, Arkansas, and are shown in Figure 20 below.

Figure 20: Boundary of the Intended Mississippi County Unclassifiable/Attainment Area



5. Technical Analysis for All Remaining Counties

5.1. Introduction

The state has not timely installed and begun operation of a new, approved SO_2 monitoring network meeting EPA specifications referenced in the EPA's SO_2 DRR for any sources of SO_2 emissions in the counties identified in Table 13. Accordingly, the EPA must designate these counties by December 31, 2017. At this time, there are no air quality modeling results available to the EPA for these counties. In addition, there is no air quality monitoring data that indicate any violation of the 1-hour SO_2 NAAQS. The EPA is designating the counties in Table 13 in the state as "unclassifiable/attainment" since these areas were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Table 13 – Remaining Counties that the EPA Intends to Designate Unclassifiable/Attainment

County	Arkansas' Recommended Area	Arkansas' Recommended Designation	EPA's Intended Area Designation	EPA's Intended Designation
Arkansas	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Ashley	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Baxter	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Boone	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Bradley	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Calhoun	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Carroll	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Chicot	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Clark	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Clay	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Cleburne	County	Unclassifiable	Same as State	Unclassifiable/Attainment

County	Arkansas' Recommended Area	Arkansas' Recommended Designation	EPA's Intended Area Designation	EPA's Intended Designation
Cleveland	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Columbia	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Conway	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Craighead	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Crawford	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Crittenden	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Cross	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Dallas	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Desha	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Drew	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Faulkner	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Franklin	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Fulton	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Garland	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Grant	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Greene	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Hempstead	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Hot Spring	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Howard	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Izard	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Jackson	County	Unclassifiable	Same as State	Unclassifiable/Attainment

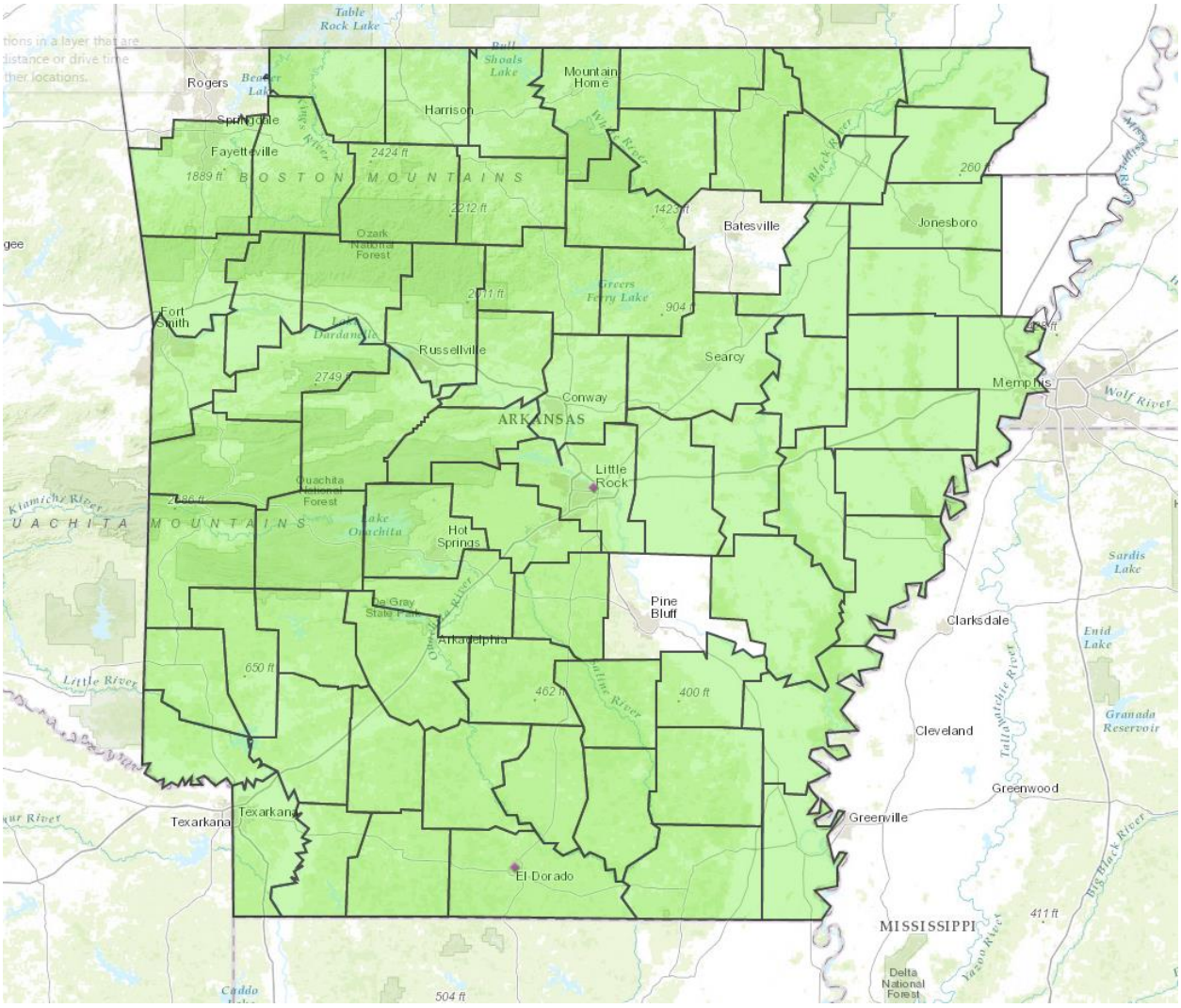
County	Arkansas' Recommended Area	Arkansas' Recommended Designation	EPA's Intended Area Designation	EPA's Intended Designation
Johnson	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Lafayette	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Lawrence	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Lee	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Lincoln	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Little River	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Logan	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Lonoke	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Madison	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Marion	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Miller	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Monroe	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Montgomery	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Nevada	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Newton	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Ouachita	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Perry	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Phillips	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Pike	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Poinsett	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Polk	County	Unclassifiable	Same as State	Unclassifiable/Attainment

County	Arkansas' Recommended Area	Arkansas' Recommended Designation	EPA's Intended Area Designation	EPA's Intended Designation
Pope	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Prairie	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Pulaski	County	Attainment	Same as State	Unclassifiable/Attainment
Randolph	County	Unclassifiable	Same as State	Unclassifiable/Attainment
St. Francis	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Saline	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Scott	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Searcy	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Sebastian	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Sevier	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Sharp	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Stone	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Union	County	Attainment	Same as State	Unclassifiable/Attainment
Van Buren	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Washington	County	Unclassifiable	Same as State	Unclassifiable/Attainment
White	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Woodruff	County	Unclassifiable	Same as State	Unclassifiable/Attainment
Yell	County	Unclassifiable	Same as State	Unclassifiable/Attainment

Table 13 also summarizes Arkansas' recommendations for these areas. Specifically, the state recommended that the entirety of all of the listed counties except for the two counties containing ambient SO_2 monitors, Pulaski County and Union County, be designated as unclassifiable based on the lack of available air quality information. The state recommended a designation of

attainment for Pulaski County and Union County. After careful review of the Arkansas assessment, supporting documentation, and all available data, the EPA intends to designate all the areas listed in Table 13 as unclassifiable/attainment. We intend to designate each county as a separate unclassifiable/attainment area. Figure 21 shows the locations of these areas within Arkansas.

Figure 21: The EPA's Intended Unclassifiable/Attainment Designation(s) for All Remaining Counties in Arkansas and the Locations of Existing SO_2 Monitors



As referenced in the Introduction, no areas in Arkansas are associated with sources for which Arkansas has installed and begun timely operation of a new, approved SO_2 monitoring network. Therefore, all areas in Arkansas that were not previously designated in Round 1 or Round 2 are being addressed at this time. Following the completion of these Round 3 designations, there will be no remaining undesignated areas in Arkansas.

5.2. Air Quality Monitoring Data for All Remaining Counties

AQS monitors 05-119-0007 and 05-139-0006 located at Little Rock in Pulaski County and El Dorado in Union County, respectively, have sufficient valid data for 2014-2016 and as shown in Table 14 these data indicate that there was no violation of the 2010 SO_2 NAAQS at the monitoring sites in that period. These data were available to EPA for consideration in the designations process, however, since it is unclear if these monitors are located in areas of maximum concentration, it is unclear if the data are representative of the area's actual air quality.

Table 14 - SO_2 Monitor Sites in Arkansas with Sufficient Data to Calculate a 2014-2016 Design Value

SO_2 Monitor Information					
AQS_ID	**State**	**County**	**CBSA**	**Address**	**2014-16 Design Value (ppb**
05-119-0007	Arkansas	Pulaski	Little Rock-North Little Rock-Conway, Arkansas	PIKE AVE AT RIVER ROAD	13
05-139-0006	Arkansas	El Dorado	El Dorado, Arkansas	UNION MEMORIAL HOSPITAL, ELDORADO	26

5.3. Jurisdictional Boundaries for All Remaining Counties

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for the remaining counties. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

The State of Arkansas recommended designation of separate areas using county boundaries. We intend to designate each of the remaining counties in its entirety, using the county boundary for each area.

5.4. The EPA's Assessment of the Available Information for All Remaining Counties

These counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. These counties therefore meet the definition of an "unclassifiable/attainment" area.

Our intended unclassifiable/attainment areas, bounded by county boundaries, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment area.

5.5. Summary of Our Intended Designation for All Remaining Counties

After careful evaluation of the Arkansas' recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the counties listed in Table 13 as separate unclassifiable/attainment areas for the 2010 SO_2 NAAQS. Specifically, the boundaries are comprised of the county boundaries of the counties listed in Table 13.

Figure 21 above shows the location of these areas within Arkansas.

For the counties listed in Table 13, the boundary of the unclassifiable/attainment area is the county boundary.

At this time, our intended designations for the state only apply to these areas and the other areas presented in this technical support document. Following the completion of these Round 3 designations, there will be no remaining undesignated areas in Arkansas.