

# Technical Support Document:

## Chapter 4

### Intended Round 3 Area Designations for the 2010 1-Hour SO<sub>2</sub> Primary National Ambient Air Quality Standard for Arizona

#### 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<sub>2</sub>) primary national ambient air quality standard (NAAQS) (2010 SO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sup>1</sup>. 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<sub>2</sub> 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 all remaining undesignated areas in Arizona for the 2010 SO<sub>2</sub> NAAQS, except for the Navajo Nation areas of Indian

---

<sup>1</sup> The term “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.

country. The Navajo Nation areas of Indian country are geographically located in Arizona, Utah, and New Mexico, and are addressed in Chapter 24 for the Navajo Nation. All other areas of Indian country geographically located in Arizona are addressed in this chapter.

In previous final actions, the EPA has issued designations for the 2010 SO<sub>2</sub> NAAQS for selected areas of the country.<sup>2</sup> The EPA is under a deadline of December 31, 2017, to designate the areas addressed in this TSD as required by the U.S. District Court for the Northern District of California.<sup>3</sup> We are referring to the set of designations being finalized by the deadline of December 31, 2017, as “Round 3” of the designations process for the 2010 SO<sub>2</sub> 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<sub>2</sub> monitoring network meeting EPA specifications referenced in the EPA’s SO<sub>2</sub> Data Requirements Rule (DRR) (80 FR 51052).

On May 25, 2011, Arizona submitted a recommendation that all counties in Arizona, excluding the Hayden and Miami SO<sub>2</sub> Planning Areas, be designated as unclassifiable for the 2010 1-hour SO<sub>2</sub> NAAQS based on the lack of monitoring and modeling information to characterize air quality in those areas.<sup>4</sup> Arizona stated that it did not include any areas of Indian country in its recommendation because the state lacks jurisdiction in Indian country. Arizona Department of Environmental Quality (ADEQ) submitted a list of facilities that emit more than 2,000 tons per year (tpy) of SO<sub>2</sub> on January 15, 2016.<sup>5</sup> On July 1, 2016, Arizona indicated its intent to characterize air quality around those facilities subject to the DRR using air quality modeling and provided modeling protocols to the EPA.<sup>6</sup> Arizona submitted the modeling reports and associated documentation to the EPA on January 12, 2017.<sup>7</sup> Arizona submitted a revised modeling report and additional modeling files on March 3, 2017, March 6, 2017, and July 26, 2017.<sup>8</sup> In its 2017 submittals, Arizona did not submit revised designation recommendations for the 2010 SO<sub>2</sub> NAAQS. In our intended designations, we have considered all the submissions from the state, except where a later submission indicates that it replaces an element of an earlier submission.

For the areas in Arizona 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 Arizona’s 2011 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.

---

<sup>2</sup> 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).

<sup>3</sup> *Sierra Club v. McCarthy*, No. 3-13-cv-3953 (SI) (N.D. Cal. Mar. 2, 2015).

<sup>4</sup> See letter from Janice K. Brewer, Governor of Arizona, to Jared Blumenfeld, EPA Region 9, dated May 25, 2011.

<sup>5</sup> See letter from Eric C. Massey, ADEQ, to Jared Blumenfeld, EPA Region 9, dated January 15, 2016.

<sup>6</sup> See undated letter from Timothy S. Franquist, ADEQ, to Alexis Strauss, EPA Region 9. The EPA received the letter on July 1, 2016.

<sup>7</sup> See letter from Timothy S. Franquist, ADEQ, to Elizabeth Adams, EPA Region 9, dated January 12, 2017.

<sup>8</sup> See electronic mail submissions from Farah Mohammadesmaeli, ADEQ, to Cleveland Holladay, EPA Region IX, dated March 3, 2017, and March 6, 2017; and email from Yi Li, ADEQ, to Rynda Kay, EPA Region IX, dated July 26, 2017.

**Table 1. Summary of the EPA's Intended Designations and the Designation Recommendations by Arizona**

<b>Area/County</b>	<b>Arizona's Recommended Area Definition</b>	<b>Arizona's Recommended Designation</b>	<b>EPA's Intended Area Definition<sup>#</sup></b>	<b>EPA's Intended Designation</b>
Navajo County	Whole County excluding areas of Indian country	Unclassifiable	All of Navajo County, including all lands of the White Mountain Apache Tribe (located in Navajo, Apache, and Gila counties), excluding lands of the Navajo Nation and Hopi Tribe	Unclassifiable/ Attainment
Apache County	Whole County excluding areas of Indian country	Unclassifiable	All of Apache County excluding lands of the Navajo Nation & and the White Mountain Apache Tribe	Unclassifiable/ Attainment
Cochise County	Whole County excluding areas of Indian country	Unclassifiable	All of Cochise County	Unclassifiable/ Attainment

<b>Area/County</b>	<b>Arizona's Recommended Area Definition</b>	<b>Arizona's Recommended Designation</b>	<b>EPA's Intended Area Definition<sup>#</sup></b>	<b>EPA's Intended Designation</b>
Remaining Undesignated Areas to Be Designated in this Action <sup>*</sup>	All Counties except areas of Indian country and nonattainment portions of Gila and Pinal Counties	Unclassifiable	<ul style="list-style-type: none"> <li>• Mohave County</li> <li>• Coconino County (excluding lands of Navajo Nation<sup>&amp;</sup> and Hopi Tribe)</li> <li>• Hopi Tribe<sup>+</sup></li> <li>• Yavapai County</li> <li>• Gila County (excluding lands of the White Mountain Apache Tribe and the Miami and Hayden Nonattainment Areas)</li> <li>• La Paz County</li> <li>• Maricopa County</li> <li>• Pinal County (excluding Hayden Nonattainment Area)</li> <li>• Graham County</li> <li>• Greenlee County</li> <li>• Yuma County</li> <li>• Pima County</li> <li>• Santa Cruz County</li> </ul>	Unclassifiable/Attainment

<sup>#</sup> EPA is not determining the boundaries of any area of Indian country in this document, including any area of Indian country located in the larger designation area. The inclusion of any Indian country in the designation area is not a determination that the state has regulatory authority under the Clean Air Act for such Indian country.

<sup>&</sup> The EPA intends to designate the Navajo Nation as a separate area. The lands of the Navajo Nation are addressed separately in Chapter 24.

<sup>+</sup>No tribal recommendation received

<sup>\*</sup> The EPA intends to designate the remaining undesignated counties (or portions of counties) in Arizona as separate “unclassifiable/attainment” areas as these areas were not required to be characterized by the state under the DRR 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. 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 6 of this chapter.

For states that elect to install and begin timely operation of a new, approved SO<sub>2</sub> monitoring network, the EPA is required to designate these areas, pursuant to a court-ordered schedule, by December 31, 2020. Arizona did not elect to install a new SO<sub>2</sub> monitoring network.

Areas that the EPA previously designated unclassifiable in Round 1 (*see* 78 FR 47191) and Round 2 (*see* 81 FR 45039 and 81 FR 89870) are not affected by the designations in Round 3 unless otherwise noted. The Hayden and Miami areas in Pinal and Gila Counties, Arizona, were designated nonattainment in Round 1. *See* 78 FR 47191 (Aug. 5, 2013), 40 CFR 81.303.

## 2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a memorandum dated July 22, 2016, and a memorandum dated March 20, 2015, 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub>, the EPA released its most recent version of a draft document titled, “SO<sub>2</sub> NAAQS Designations Modeling Technical Assistance Document” (Modeling TAD) in August 2016.<sup>9</sup>

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<sub>2</sub> Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO<sub>2</sub> 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<sub>2</sub> monitoring network meeting EPA specifications referenced in EPA’s” SO<sub>2</sub> 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 all undesignated parts of Arizona, including the areas associated with three sources in Arizona meeting DRR emissions criteria that Arizona has chosen to be characterized using air dispersion modeling, and other areas not specifically required to be characterized by the state under the DRR.

---

<sup>8</sup> <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<sub>2</sub> monitoring network design, to advise states that have elected to install and begin operation of a new SO<sub>2</sub> monitoring network. *See* Draft SO<sub>2</sub> NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, <https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf>.

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 is a section for each of the three counties for which modeling information is available: Navajo, Cochise, and Apache Counties. The remaining to-be-designated counties are then addressed together in section 6.

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<sub>2</sub> NAAQS – The primary NAAQS for SO<sub>2</sub> promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99<sup>th</sup> 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<sub>2</sub> 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<sub>2</sub> 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.<sup>10</sup>
- 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<sub>2</sub> 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<sub>2</sub> 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.

---

<sup>10</sup> 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.

- 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 the Navajo County Area

#### 3.1. Introduction

The EPA must designate the Navajo County area by December 31, 2017, because the area has not been previously designated and Arizona has not installed and begun timely operation of a new, approved SO<sub>2</sub> monitoring network to characterize air quality in the vicinity of any source in Navajo County.

#### 3.2. Air Quality Monitoring Data for the Navajo County Area

There is no approved SO<sub>2</sub> monitoring network in Navajo County, Arizona.

#### 3.3. Air Quality Modeling Analysis for the Navajo County Area Addressing the Cholla Power Plant

##### 3.3.1. *Introduction*

This section presents all the available air quality modeling information for a portion of Navajo County that includes the Cholla Power Plant (Cholla). This modeled portion of Navajo County contains the following SO<sub>2</sub> source around which Arizona is required by the DRR to characterize SO<sub>2</sub> air quality, or alternatively to establish an SO<sub>2</sub> emissions limitation of less than 2,000 tons per year:

- Cholla emits 2,000 tons or more annually. Specifically, Cholla emitted 3,807 tons of SO<sub>2</sub> in 2014. This source meets the DRR criteria and thus Cholla is on the SO<sub>2</sub> DRR Source list, and Arizona has chosen to characterize it with modeling.

In 2011, Arizona recommended that all counties, including Navajo County, be designated as unclassifiable because these areas have no monitored violations, but were at that time without current modeling information.<sup>11</sup> ADEQ submitted modeling reports and analyses for the three sources subject to the DRR in 2017 but did not submit revised recommendations.<sup>12</sup> Arizona submitted additional information on Cholla in July 2017.<sup>13</sup> These modeling assessments and air quality characterizations were performed using air dispersion modeling software, *i.e.*, AERMOD, analyzing actual emissions.

After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to modify the state's recommendation and designate Navajo County as unclassifiable/attainment. In the Navajo County unclassifiable/attainment area, the EPA intends to exclude the reservation lands of the Navajo Nation and the Hopi Tribe, and intends to include

---

<sup>11</sup> See letter from Janice K. Brewer, Governor of Arizona, to Jared Blumenfeld, EPA Region 9, dated May 25, 2011.

<sup>12</sup> See letter from Timothy S. Franquist, ADEQ, to Elizabeth Adams, EPA Region 9, dated January 12, 2017.

<sup>13</sup> See document titled "7-14-2017 SO2-DRR-Updates.docx" submitted by electronic mail from Farah Mohammadesmaeili, ADEQ, to Cleveland Holladay, EPA Region IX, July 14, 2017.

all the reservation lands of the White Mountain Apache Tribe, which spans Navajo, Apache, and Gila counties. Because there are two sources of SO<sub>2</sub> emissions subject to the DRR located on the Navajo Nation, the EPA intends to designate the Navajo Nation separately. We address the Navajo Nation separately in Chapter 24. The EPA intends to designate the Hopi Tribe, which has some lands in Navajo County, separately, as discussed in section 3.7. Our reasoning for these intended designations is explained in a later section, after all the available information is presented.

The area that the state has assessed using air quality modeling is located in Navajo County.

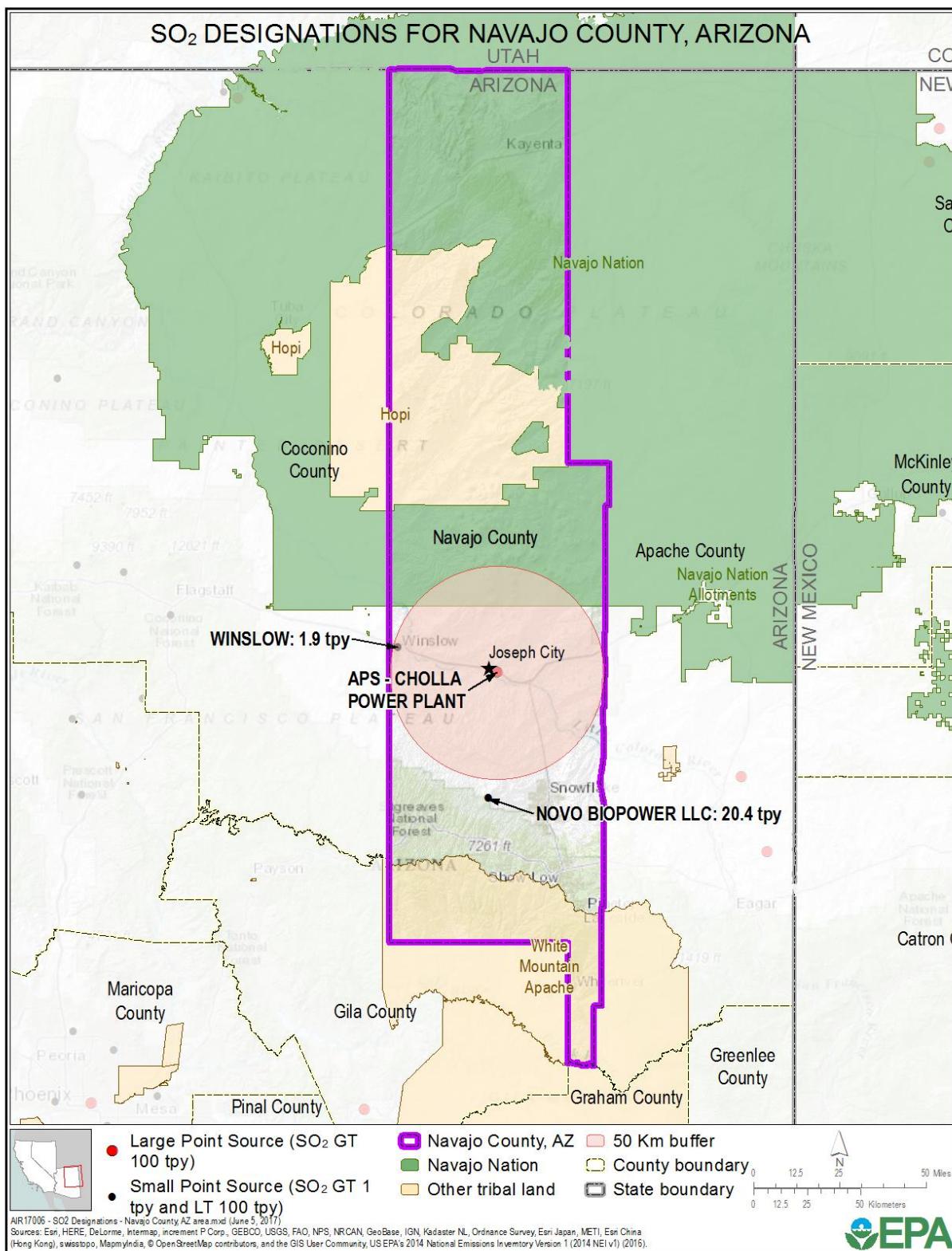
As seen in Figure 1 below, Cholla is located approximately two miles east of Joseph City along Interstate 40 in Navajo County, Arizona. Also included in the figure are two other sources of SO<sub>2</sub>, the Winslow Operating Rail Yard, and Novo Bio-power.<sup>14</sup> The Winslow Rail Yard is within 50 km of Cholla and emitted 1.9 tons of SO<sub>2</sub> in 2014. The Novo Bio-power, LLC emitted 20.4 tons of SO<sub>2</sub> in 2014 and is more than 50 km south of Cholla.

Not reflected in the figure is the state's recommended area for the unclassifiable designation. Arizona recommended Navajo County, excluding areas of Indian country, be designated unclassifiable. The EPA's intended designation boundary for the Navajo County area is all of Navajo County, including all lands of the White Mountain Apache Tribe (including lands of the White Mountain Apache Tribe geographically located in Gila and Apache counties), and excluding the lands of the Navajo Nation and the Hopi Tribe.

---

<sup>14</sup> All other emitters of 1 tpy SO<sub>2</sub> or more (based on the 2014 NEI) are shown in Figure 2.

**Figure 1. Map of Navajo County and Surrounding Areas Addressing Cholla**



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

For this area, the EPA received and considered one modeling assessment from the state. No other assessments were received.

### *3.3.2. Modeling Analysis Provided by the State*

#### *3.3.2.1. Model Selection and Modeling Components*

The EPA's Modeling TAD notes that for area designations under the 2010 SO<sub>2</sub> 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 most up-to-date regulatory model version at the time of submittal, using all regulatory default options.<sup>15</sup> An updated version of AERMOD, version 16216r, was released on January 17, 2017; however, there were no updates that are likely to affect predicted concentrations when using regulatory default options. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

#### *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<sub>2</sub> modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO<sub>2</sub> 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.

---

<sup>15</sup> The AERMOD modeling system is the model identified in 40 CFR Part 51, Appendix A, for use in regulatory applications, for near-field dispersion of emissions for distances up to 50 km. The EPA periodically releases updated versions of AERMOD. At the time of the analysis, Version 15181 was released with several beta options and was the most recent regulatory version of AERMOD. The regulatory default for version 15181 is the use of version 15181, as released by the EPA, without the use of any of the beta options. See <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models>.

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 used the land use method outlined in Appendix W, Section 7.2.3c, where land use within a 3-km radius of the source is analyzed using the meteorological land use scheme described by Auer (1978). Land use land cover data was obtained from the United States Geological Survey at 30-meter resolution under 21 land cover classes. The dominant land type within 3 km of the Cholla Power Plant is mixed shrubland (72 percent) and grasslands/herbaceous (8 percent). The primary land type is considered type A3 (undeveloped), per the Auer classification, and therefore considered rural.

We agree with the state's determination that the facility should be modeled as a rural source.

### *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<sub>2</sub> emission sources or facilities considered for modeling; the extent of 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<sub>2</sub> concentrations.

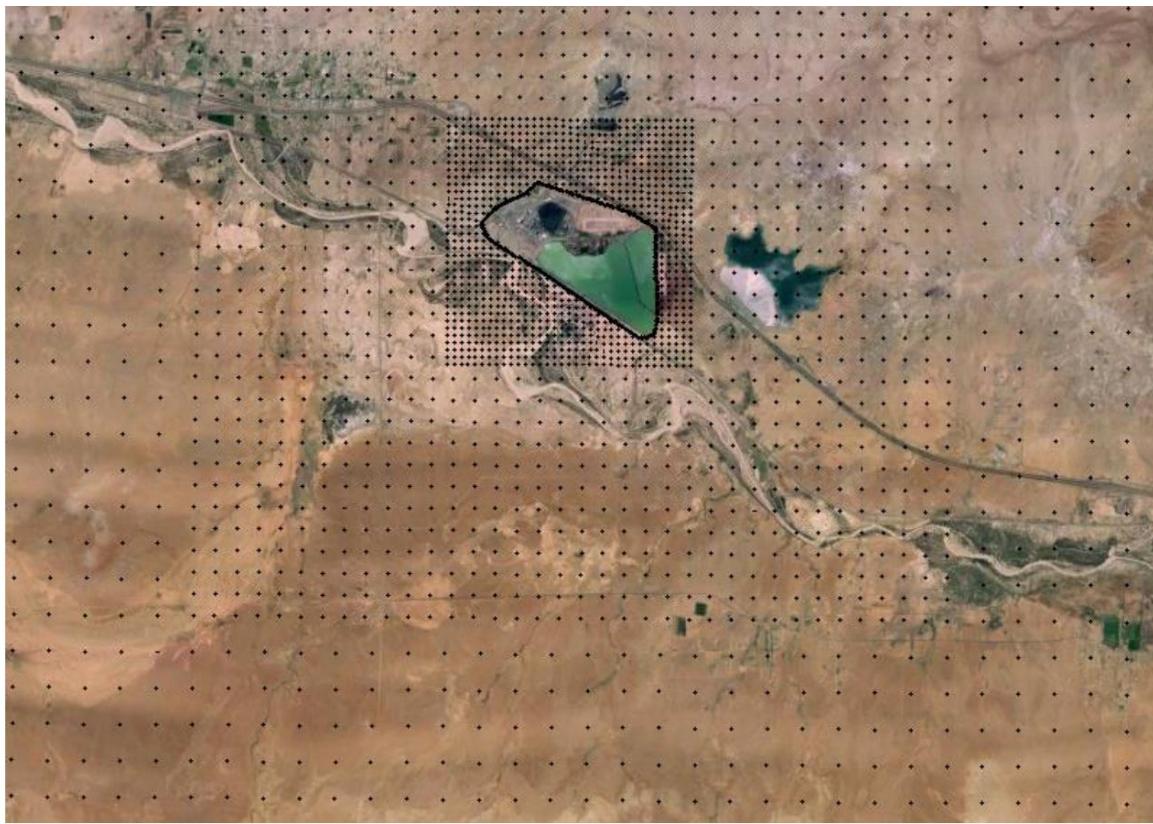
The source of SO<sub>2</sub> emissions subject to the DRR in this area is described in the introduction to this section. For the modeled Navajo County area, the state has included no other emitters of SO<sub>2</sub>. Specifically, the State excluded one source, the Winslow Rail Yard, located within 50 km of Cholla, that emitted 1.9 tons of SO<sub>2</sub> in 2014. The State also excluded one source, Novo Biopower, located just beyond 50 km from Cholla, that emitted 20.4 tons of SO<sub>2</sub> in 2014. (See Figure 1.) The state determined that no other sources 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:

- Receptors along the fence line at a spacing of 25 m;
- Receptors from fence line to 1 km at a spacing of 100 m;
- Receptors from 1 km to 5 km away from fence line at a spacing of 200-500 m;
- Receptors from 5 km to 20 km away from fence line at a spacing of 500-1,000 m;
- Receptors from 20 km to 50 km away from fence line at a spacing of 1,000-2,500 m.

The receptor network contained 12,483 receptors, and covered a domain of 101 km by 103 km centered on Cholla, all within Navajo County. Figure 2 shows the state's chosen area of analysis surrounding Cholla as well as the receptor grid for the area of analysis.

**Figure 2. Receptor Grid for the Navajo County Area of Analysis for Cholla**



Consistent with the Modeling TAD, the state placed receptors for the purposes of this designation effort in locations that would be considered ambient air. The state did not place receptors within Cholla's own fence line; the nearest receptors were placed along Cholla's fence line. Section 4.2 of the Modeling TAD allows for removal of receptors on the basis that it would not be feasible to place a monitor at the receptor location. The state did not delete any receptors on this basis.

We conclude that the state adequately characterized the area of analysis and appropriately placed model receptors.

#### *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.

The state characterized this source within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions. 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. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

For these reasons, we conclude that the state adequately characterized emission sources and building downwash in its modeling.

### *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, for a facility that has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO<sub>2</sub> emissions to a level that indicates compliance with the NAAQS, the state may choose to use PTE. 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<sub>2</sub> 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 previously noted, the state included Cholla but no other emitters of SO<sub>2</sub> in the modeling analysis. The state has chosen to model this facility using actual emissions. The facility in the state's modeling analysis and its associated annual actual SO<sub>2</sub> emissions between 2012 and 2014 are summarized below in Table 2. A description of how the state obtained hourly emission rates is given below this table.

**Table 2. Actual SO<sub>2</sub> Emissions Between 2012 – 2014 from Cholla in the Navajo County Area**

<b>Facility Name</b>	<b>SO<sub>2</sub> Emissions (tpy)</b>		
	<b>2012</b>	<b>2013</b>	<b>2014</b>
Cholla Power Plant	6,174	5,065	3,807

For Cholla, the actual hourly SO<sub>2</sub> emissions data were obtained from CEMS for the years 2012–2014. In 2015, Cholla emitted 3,582 tons of SO<sub>2</sub>, and in 2016, Cholla emitted 1,334 tons of SO<sub>2</sub>.<sup>16</sup> We note that Cholla, which consists of 4 units with a total capacity of 1,150 megawatts (MW), is subject to control measures in the Arizona State Implementation Plan (SIP) to address the Regional Haze Rule. These control measures require the operator of Cholla to close Unit 2 by April 1, 2016, and by April 30, 2025, to permanently cease coal combustion in Units 1, 3, and 4 with the option to repower those units to fire natural gas (limited to a 20 percent capacity factor).<sup>17</sup> Thus, the requirements in the Arizona SIP contributed to the SO<sub>2</sub> emission reductions observed in 2016, and will result in additional reductions of SO<sub>2</sub> by 2025.

We conclude the state adequately characterized emissions for the facility.

---

<sup>16</sup> See <https://ampd.epa.gov/ampd/>.

<sup>17</sup> 82 FR 15139 (March 27, 2017).

### *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, the Federal Aviation Administration (FAA), and military stations.

For the area of analysis for the modeled Navajo County area, the state selected 2012-2014 surface meteorology data from the NWS data collected from the Winslow-Lindbergh Automated Surface Observing System (ASOS) station in Winslow, Arizona. The station is located about 39 km west-northwest of Cholla Generating Station. Coincident upper air observations were taken from Flagstaff, Arizona, located 144 km northwest of Cholla. These stations were chosen as most representative of meteorological conditions within the area of analysis.

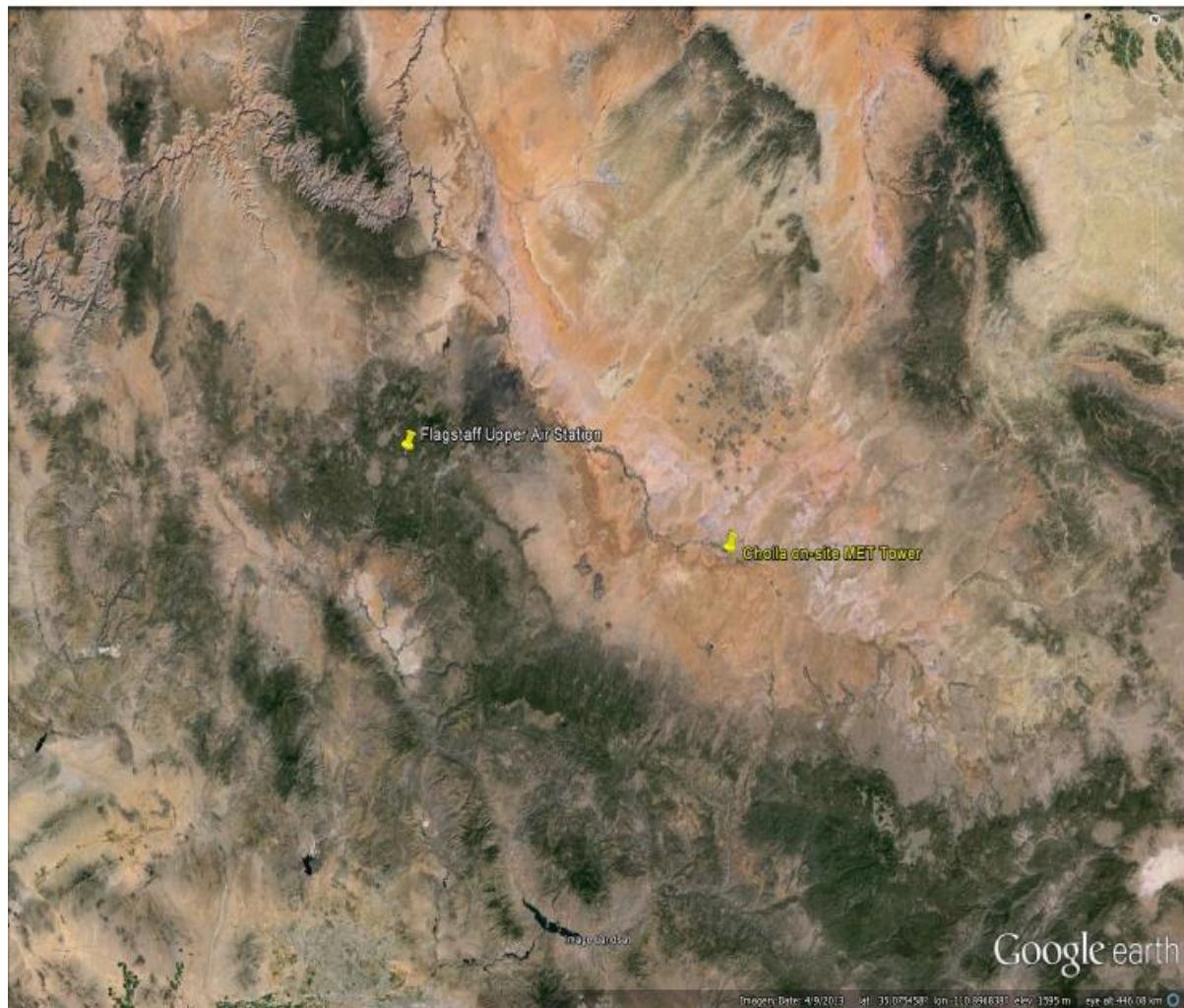
The state ran AERSURFACE version 13016 using data from the proposed site location and from the meteorological station location at Winslow to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness ( $z_o$ )) of the area of analysis. Albedo is the fraction of solar energy reflected 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 dry conditions.

In Figures 3 and 4 below, generated by the state, the locations of the NWS surface and upper air stations are shown relative to the area of analysis.

**Figure 3. Image provided by the State of the Area of Analysis and the NWS stations used in the Navajo County Analysis**

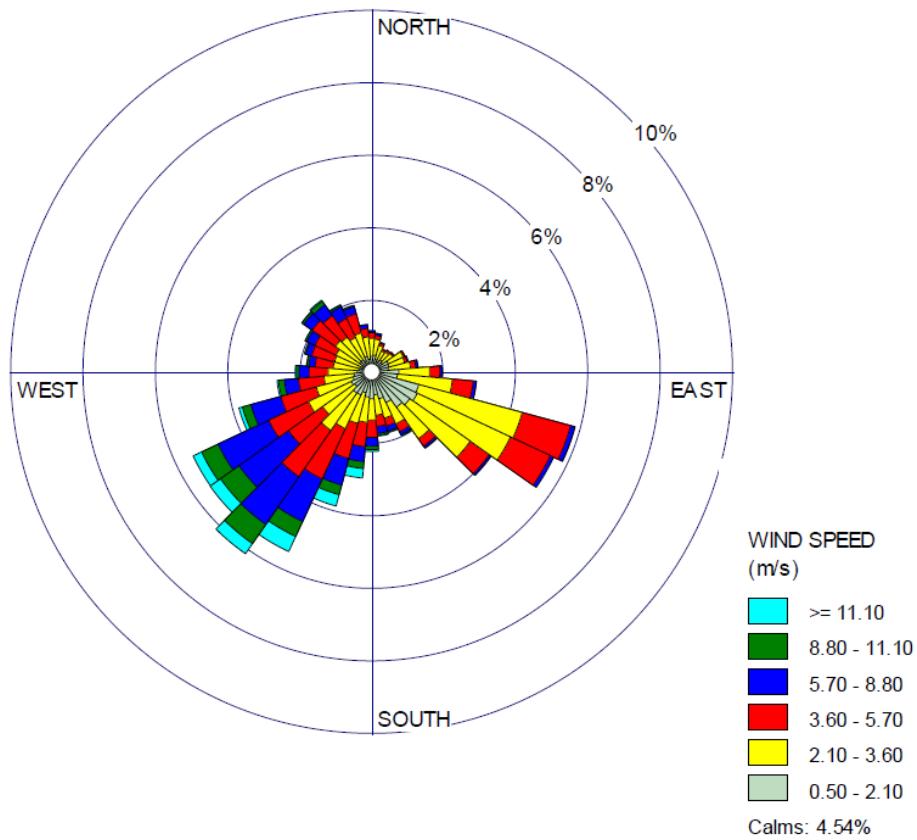


**Figure 4. Image provided by the State showing Location of Upper Air Stations used in the Navajo County Analysis**



As part of its recommendation, the state provided the 3-year surface wind rose for Winslow, Arizona. In Figure 5, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Dominant wind directions are from the southwest and east-southeast. Calm winds occur five percent of the time.

**Figure 5. Cumulative Annual Wind Rose for Winslow Airport, located in Navajo County for 2012-2014**



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 modeling protocol submitted by the state in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET version 15181, and include all the necessary elements for data processing. However, hourly NWS wind data taken may not always portray representative wind conditions for the entire hour, which can be variable in nature. NWS 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 ASOS 1-minute data was provided from the Winslow NWS station, 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.

We conclude that the state selected surface and upper air meteorological sites, processed meteorological data, and estimated surface characteristics consistent with the procedures outlined in the Modeling TAD.

### *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 flat. There are no elevated or complex terrain features within 20-25 km from Cholla. 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.

For these reasons, we conclude the state appropriately accounted for topography in its modeling.

### *3.3.2.8. Modeling Parameter: Background Concentrations of SO<sub>2</sub>*

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO<sub>2</sub> 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 99<sup>th</sup> percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state used a “tier 1” approach to calculate background concentrations using observations from the Central Phoenix monitoring station (AQS ID: 040133002). The Central Phoenix monitor is located in an urban area, surrounded by various anthropogenic sources. In contrast, Cholla is located in a rural area without significant anthropogenic activities. The state asserts the Central Phoenix monitor is a conservative (in the sense of possibly overestimating concentrations) choice for background concentration of SO<sub>2</sub> here because SO<sub>2</sub> concentrations in Central Phoenix are expected to be higher than concentrations in the rural areas surrounding Cholla. The state reported 2010-2012, 2011-2013, and 2012-2014 3-year 1-hour SO<sub>2</sub> design values at the Central Phoenix site as 8 ppb, 8 ppb and 7 ppb, respectively. The single value of the background concentration for this area of analysis was determined by the state to be 20.18 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), equivalent to 7.7 ppb when expressed in two significant figures,<sup>18</sup> and that value was incorporated into the final AERMOD results. AQS shows that the 2010-2012, 2011-2013, and 2012-2014 3-year 1-hour SO<sub>2</sub> design values at the Central Phoenix site are 9 ppb, 8 ppb, and 8 ppb, respectively. Using the AQS data for these years and this monitor, we believe the single value of the background concentration for this area of analysis should be 21.74  $\mu\text{g}/\text{m}^3$ , equivalent to 8.3 ppb when expressed in two significant figures. For comparison, the 2013-2015 and 2014-2016 3-year design values at Central Phoenix were both 7 ppb, equivalent to 18.33  $\mu\text{g}/\text{m}^3$ .

Although the state appropriately relied on a tier 1 approach that was consistent with the Modeling TAD to characterize background concentrations of SO<sub>2</sub>, the design values reported by the state are lower than those reported in AQS by 1 ppb. Although we consider the background concentration used by the state to be in error, we recognize that the error is small, and therefore, we provide further evaluation of the effect on the modeling results of the erroneous background concentration for SO<sub>2</sub> in Section 3.3.2.9.

---

<sup>18</sup> The SO<sub>2</sub> NAAQS level is expressed in ppb but AERMOD gives results in  $\mu\text{g}/\text{m}^3$ . The conversion factor for SO<sub>2</sub> (at the standard conditions applied in the ambient SO<sub>2</sub> reference method) is 1 ppb = approximately 2.619  $\mu\text{g}/\text{m}^3$ .

### 3.3.2.9. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Navajo County area of analysis are summarized below in Table 3.

**Table 3: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Navajo County Area**

<b>Input Parameter</b>	<b>Value</b>
AERMOD Version	15181 (default options)
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	12
Modeled Fence lines	1
Total receptors	12483
Emissions Type	Actual
Emissions Years	2012-2014
Meteorology Years	2012-2014
NWS Station for Surface Meteorology	Winslow
NWS Station Upper Air Meteorology	Flagstaff, Arizona
NWS Station for Calculating Surface Characteristics	Winslow
Methodology for Calculating Background SO <sub>2</sub> Concentration	AQS Site #040133002 for Tier 1 based on design value.
Calculated Background SO <sub>2</sub> Concentration	20.18 µg/m <sup>3</sup>

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

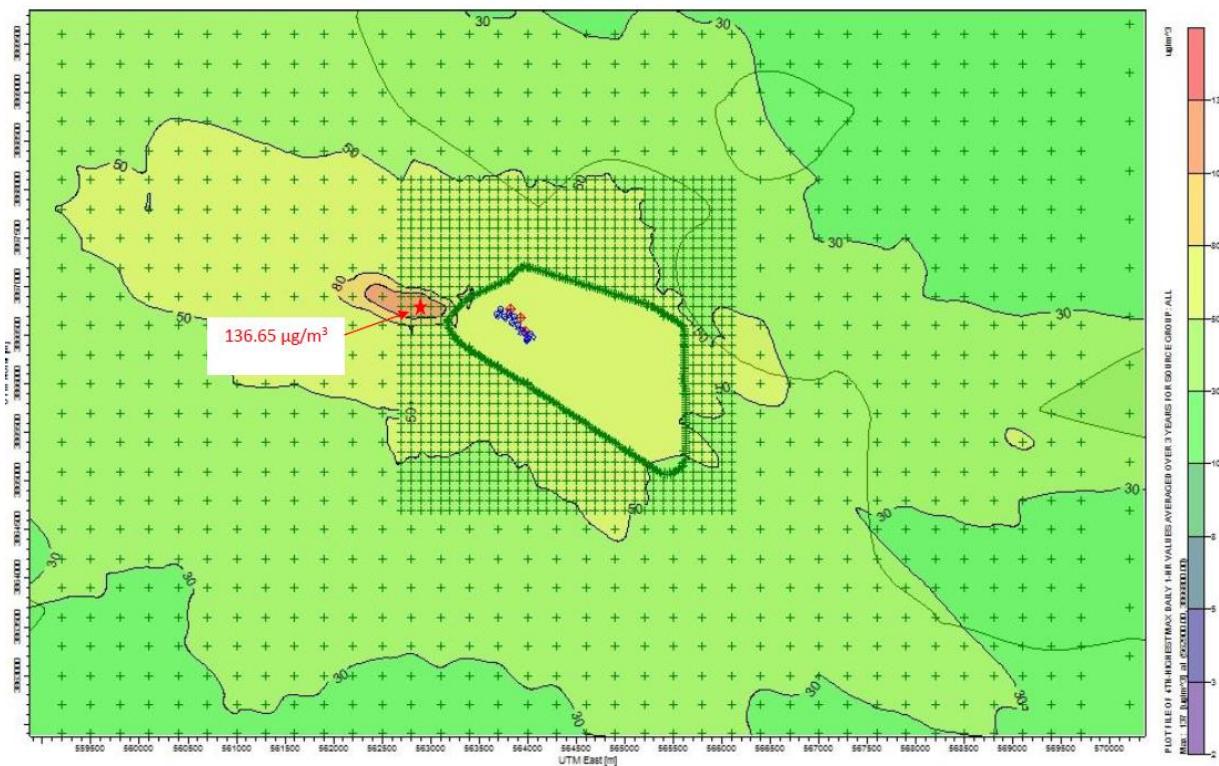
**Table 4. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentration Averaged Over 3 Years for the Area of Analysis for the Navajo County Area**

<b>Averaging Period</b>	<b>Data Period</b>	<b>Receptor Location [UTM Zone 11]</b>		<b>Maximum 99<sup>th</sup> percentile daily maximum 1-hour SO<sub>2</sub> Concentration (µg/m<sup>3</sup>)</b>	
		<b>UTM/Latitude</b>	<b>UTM/Longitude</b>	<b>Modeled concentration (including background)</b>	<b>NAAQS Level</b>
99th Percentile 1-Hour Average	2012-2014	562,900/34.94	3,866,800/- 110.24	156.83	196.4*

\* Equivalent to the 2010 SO<sub>2</sub> NAAQS of 75 ppb using a 2.619 µg/m<sup>3</sup> conversion factor

Figure 6, included as part of the state's recommendation, shows the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration resulting from actual emissions from Cholla is 136.65  $\mu\text{g}/\text{m}^3$ , equivalent to 52.2 ppb, and is located approximately 300 meters from the fence line. This value does not include the background concentration of SO<sub>2</sub>. As shown in Table 4, using the state's calculation of background SO<sub>2</sub> concentrations, the state's modeling indicates that the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration, including background, is 156.83  $\mu\text{g}/\text{m}^3$ , equivalent to 59.9 ppb. Using the background concentration of SO<sub>2</sub> that the EPA has determined to be appropriate based on SO<sub>2</sub> concentrations in AQS for the Central Phoenix monitor, the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration within the modeling domain is 158.39  $\mu\text{g}/\text{m}^3$ , equivalent to 60.5 ppb. We therefore conclude that while the state used erroneous concentrations for the Central Phoenix monitor (that differed from AQS by 1 ppb) to calculate background concentrations of SO<sub>2</sub>, the discrepancy does not change the state's determination that emissions of SO<sub>2</sub> from Cholla are not modeled to cause or contribute to violations of the NAAQS.

**Figure 6. Predicted 99<sup>th</sup> Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentrations without Background, Averaged Over 3 Years, for the Area of Analysis for the Navajo County Area**



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

The state performed modeling for a portion of Navajo County that includes Cholla using AERMOD version 15181, the most up-to-date version at the time of submittal, and using all regulatory default options. AERMOD version 16216r has since become the regulatory model version.

There were no updates from 15181 to 16216r that would affect the concentrations predicted here. Based on the information provided by the state and summarized in section 3.3, we conclude that the state adequately examined and characterized sources within the area of analysis and appropriately placed receptors in the modeling domain; appropriately accounted for modeled emission sources and building downwash; correctly selected meteorological sites and properly processed the data; adequately estimated surface characteristics; and appropriately calculated background concentrations of SO<sub>2</sub> to add to modeled design values.

Based on this assessment, we conclude the modeling provided by the state accurately characterizes air quality in the area of analysis for the Navajo County Area.

## **3.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Navajo County Area**

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.

For determining the appropriate boundaries for the Navajo County unclassifiable/attainment area, it is useful to also consider emissions of SO<sub>2</sub> in other areas of the county, beyond the area used in the modeling analysis. Based on the National Emissions Inventory (NEI) for 2014, SO<sub>2</sub> emissions in Navajo County totaled 3,938 tpy. This county-level emission estimate includes emissions from point, nonpoint, on-road, non-road, and event emissions.<sup>19</sup> Cholla, which emitted 3,807 tpy of SO<sub>2</sub> according to the 2014 NEI, contributes approximately 95 percent of the county-level emissions.

## **3.5. Jurisdictional Boundaries in the Navajo County Area**

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

---

<sup>19</sup> Event emissions in the NEI include wildfires and prescribed burns. See <https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei>.

In its 2011 submission, Arizona recommended that all counties in the state, including Navajo County, be designated unclassifiable based on an absence of information. The state also recommended excluding areas of Indian country, over which Arizona does not have jurisdiction.

Portions of the reservation lands of the Hopi Tribe, the Navajo Nation, and the White Mountain Apache Tribe are located within Navajo County. ADEQ has jurisdiction to administer air quality programs in Navajo County, excluding those portions of Navajo County located in Indian Country. There are no known stationary sources that emit over 1 ton of SO<sub>2</sub> emissions per year located in any of the areas of Indian country geographically located in Navajo County.

### 3.6. Other Information Relevant to the Designations for the Navajo County Area

In 2011, the EPA issued a memorandum outlining the EPA's approach for designating areas of Indian country. If the EPA either does not receive an initial designation recommendation from a tribe, or receives a recommendation that does not specify designation of a separate area, the EPA intends to designate the relevant tribe's area of Indian country as part of the surrounding area, and to the extent possible, to ensure that a single tribe's areas of Indian country are not inadvertently split based on the use of other jurisdictional boundaries (*e.g.*, county boundaries) when designating the surrounding state areas.<sup>20</sup>

In recent designations, the EPA has designated Navajo County as a separate area that has included areas of Indian country geographically located within the county (*e.g.*, 1997 and 2012 Annual PM<sub>2.5</sub>, 1997 and 2006 24-hour PM<sub>2.5</sub>, 2010 NO<sub>2</sub>, 1997 and 2008 8-hour ozone).<sup>21</sup>

As previously stated in section 3.3.2.5, the Arizona SIP required permanent closure of one unit (Cholla Unit 2) by April 1, 2016; and by April 30, 2025, permanent cessation of coal burning in the three units (Cholla Units 1, 3 and 4) with the option to convert those units to natural gas (limited to a 20 percent annual average capacity factor) by July 31, 2025.

### 3.7. The EPA's Assessment of the Available Information for the Navajo County Area

There is no approved SO<sub>2</sub> monitoring network in Navajo County and Arizona has chosen to characterize air quality in the area surrounding Cholla using air quality modeling. Using actual emissions from 2012-2014, Arizona's analysis indicates that Cholla does not cause or contribute to a violation of the 2010 SO<sub>2</sub> NAAQS in the surrounding area or contribute to air quality in a nearby area that does not meet the NAAQS. In addition, as noted in section 3.3.2.5, federally-enforceable operational changes at Cholla in 2016 resulted in SO<sub>2</sub> reductions compared to the

<sup>20</sup> Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, to Regional Air Directions, Regions I-X, dated December 20, 2011.

<sup>21</sup> 40 CFR 81.303 – Arizona.

2012-2014 actual emissions used in the modeling analysis, and federally-enforceable operational changes required by 2025 will result in additional SO<sub>2</sub> emission reductions in the future.

Although the area of analysis in the modeling was represented by a grid extending about 50 km from Cholla, emissions from Cholla represented approximately 95 percent of SO<sub>2</sub> emissions in Navajo County in 2014. Therefore, the EPA anticipates that the modeling analysis for Cholla, which shows no violations of the 2010 SO<sub>2</sub> NAAQS, would conservatively represent other areas of Navajo County, in which there are no other large sources (sources that emit in excess of 100 tpy) of SO<sub>2</sub>.

Navajo County is located in the north-central portion of Arizona, adjacent to the border with Utah, and includes areas of Indian country (reservation lands of the Navajo Nation, Hopi Tribe, and White Mountain Apache Tribe). Although Arizona only has jurisdiction to administer air quality programs in the areas of Navajo County that are not areas of Indian country, for previous recent NAAQS, the EPA has designated areas of Indian country geographically located in Navajo County with the surrounding Navajo County area. We have not received recommendations from the White Mountain Apache Tribe or the Hopi Tribe.

The White Mountain Apache Tribe has reservation lands that span Navajo, Apache, and Gila counties in Arizona. The Hopi Tribe has reservation lands that span Navajo and Coconino Counties, and the Navajo Nation has reservation lands that span several counties in Arizona, New Mexico, and Utah. Because there are two sources of SO<sub>2</sub> emissions subject to the DRR located on the Navajo Nation, we have received modeling analyses from the Navajo Nation and we intend to designate the Navajo Nation separately from areas of Arizona, New Mexico, and Utah (*see Chapter 24 for the Navajo Nation*). Because there are no known stationary sources of SO<sub>2</sub> emissions exceeding 1 tpy located on the reservation lands of the White Mountain Apache Tribe and the Hopi Tribe, and because there are no separate analyses related to these areas of Indian country, the EPA intends to address the designation of these areas of Indian country in this TSD chapter for Arizona.

Based on our review of the modeling analysis for Cholla submitted by Arizona, and our consideration of county-wide emissions, we intend to designate Navajo County as unclassifiable/attainment for the 2010 SO<sub>2</sub> NAAQS.

For the White Mountain Apache Tribe, which has no known stationary sources of SO<sub>2</sub> exceeding 1 tpy located on the reservation lands, the EPA intends to designate all of the White Mountain Apache Tribe's reservation lands (which includes reservation lands located in Navajo, Apache, and Gila counties) with the Navajo County unclassifiable/attainment area. This is consistent with the EPA's 2011 designations policy related to areas of Indian country that states, to the extent possible, the EPA will not split a single tribe's areas of Indian country based on the use of other jurisdictional boundaries.

The Hopi Tribe has reservation lands that are located in Navajo and Coconino counties. There are no known stationary sources of SO<sub>2</sub> emissions exceeding 1 tpy located on reservation lands of the Hopi Tribe. Because the lands of the Hopi Tribe are surrounded by the reservation lands of

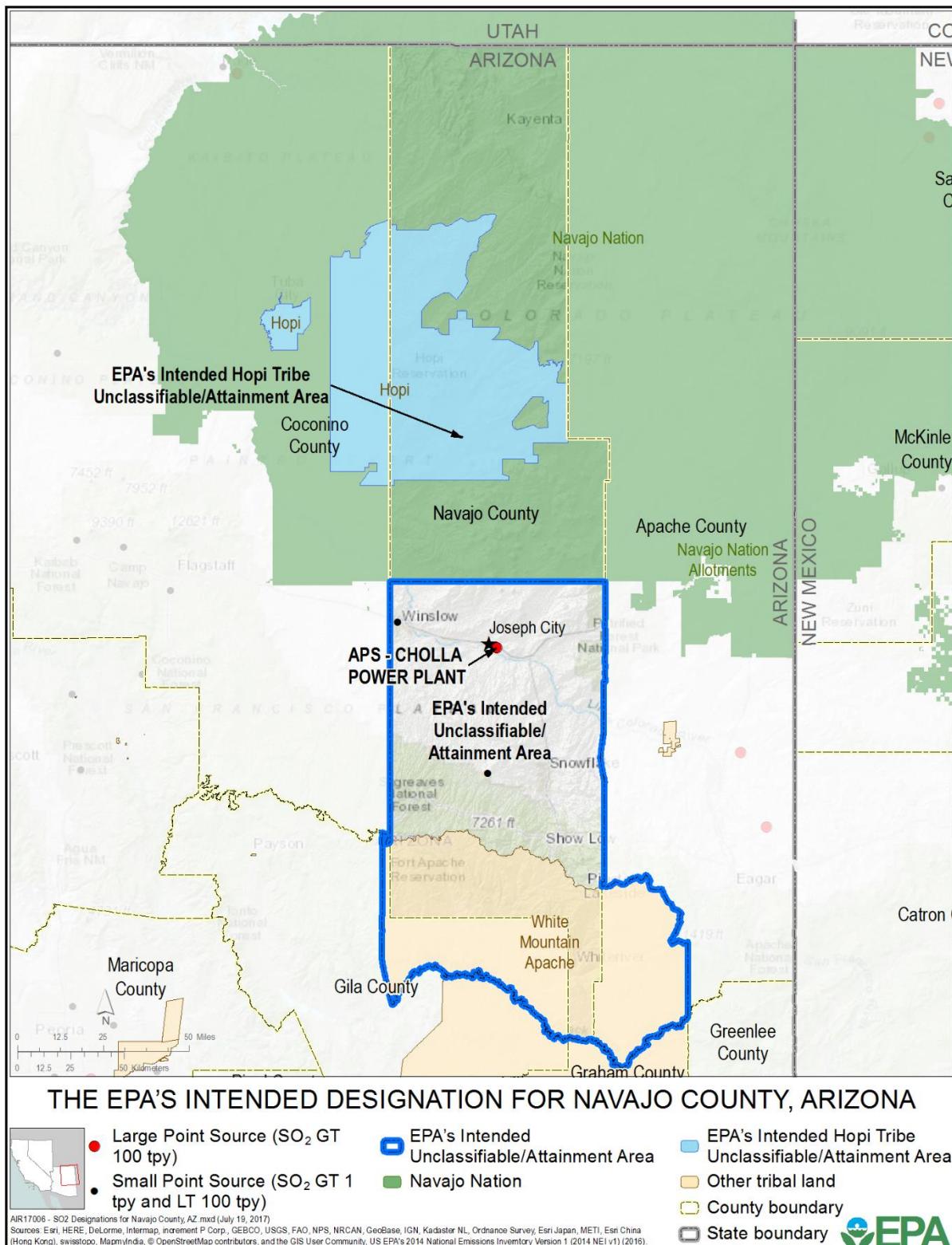
the Navajo Nation (*see* Figure 1), the Hopi Tribe does not share any boundaries with Navajo or Coconino Counties. Because the Hopi Tribe does not share any borders with Navajo or Coconino Counties, and based on the EPA’s intended separate designation for the Navajo Nation, the EPA considers a separate area designation to be appropriate for the Hopi Tribe. The EPA intends to designate a small portion of the reservation lands of the Navajo Nation as unclassifiable, and the remaining areas of the Navajo Nation, including areas that are adjacent to the Hopi Tribe, as unclassifiable/attainment (*see* Chapter 24 for Navajo Nation). As discussed in Section 6, the EPA intends to designate as unclassifiable/attainment, areas that were not required to be characterized under 40 CFR 51.1203(c) or (d), and for which 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; therefore, although the Hopi Tribe did not submit a recommendation or request to be designated as a separate area, and although lands of the Hopi Tribe have been designated for previous NAAQS with Navajo and Coconino Counties, based on the aforementioned information the EPA intends to designate all reservation lands of the Hopi Tribe as unclassifiable/attainment.

The EPA believes that our intended Navajo County unclassifiable/attainment area, bounded by the boundaries of Navajo County, and including the portion of the reservation lands of the White Mountain Apache Tribe located in Navajo County and the portions of the reservation lands of the White Mountain Apache Tribe located in Gila and Apache counties,, but excluding the Navajo Nation and Hopi Tribe areas of Indian country, 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.

### 3.8. Summary of Our Intended Designation for the Navajo County Area

After careful evaluation of the state’s recommendation and supporting information, as well as all available relevant information, the EPA concludes that the Navajo County area meets the 2010 SO<sub>2</sub> NAAQS, and does not contribute to a violation of the 2010 SO<sub>2</sub> NAAQS in another nearby area. Therefore, the EPA intends to designate the Navajo County area as unclassifiable/attainment for the 2010 SO<sub>2</sub> NAAQS. Specifically, the boundaries are comprised of all of Navajo County, including the portion of the reservation lands of the White Mountain Apache Tribe located in Navajo County and the portions of the reservation lands of the White Mountain Apache Tribe located in Gila and Apache counties, but excluding reservation lands of the Navajo Nation and the Hopi Tribe. Figure 7 shows the boundary of this intended unclassifiable/attainment area.

**Figure 7. Boundary of the Intended Navajo County Unclassifiable/Attainment Area**



## 4. Technical Analysis for the Cochise County Area

### 4.1. Introduction

The EPA must designate the Cochise County area by December 31, 2017, because the area has not been previously designated and Arizona has not installed and begun timely operation of a new, approved SO<sub>2</sub> monitoring network to characterize air quality in the vicinity of any source in Cochise County.

### 4.2. Air Quality Monitoring Data for the Cochise County Area

There is no approved SO<sub>2</sub> monitoring network in Cochise County, Arizona.

### 4.3. Air Quality Modeling Analysis for the Cochise County Area Addressing Apache Generating Station

#### 4.3.1. *Introduction*

This section presents all the available air quality modeling information for a portion of Cochise County that includes the Arizona Electric Power Cooperative (AEPCO) Apache Generating Station (Apache). (This portion of Cochise County will often be referred to as “the Cochise County area” within this section.) The modeled portion of Cochise County contains the following SO<sub>2</sub> source around which Arizona is required by the DRR to characterize SO<sub>2</sub> air quality, or alternatively to establish an SO<sub>2</sub> emissions limitation of less than 2,000 tons per year:

- Apache emits 2,000 tons or more annually. Specifically, Apache emitted 4,812 tons of SO<sub>2</sub> in 2014. This source meets the DRR criteria and thus is on the SO<sub>2</sub> DRR Source list, and Arizona has chosen to characterize it with modeling.

In 2011, Arizona recommended that all counties, including Cochise County, be designated as unclassifiable because these areas have no monitored violations, but were at that time without current modeling information.<sup>22</sup> The state did not revise its recommendation in 2017 following its assessment and characterization of air quality impacts from Apache.<sup>23</sup> In March and July of 2017, the state submitted additional information and modeling assessments for Apache.<sup>24</sup> These assessments and characterizations were performed using air dispersion modeling software, *i.e.*, AERMOD, analyzing actual emissions. After careful review of the state’s assessments, supporting documentation, and all available data, the EPA intends to modify the state’s recommendation and designate Cochise County as unclassifiable/attainment. Our reasoning for

<sup>22</sup> See letter from Janice K. Brewer, Governor of Arizona, to Jared Blumenfeld, EPA Region 9, dated May 25, 2011.

<sup>23</sup> See letter from Timothy S. Franquist, ADEQ, to Elizabeth Adams, EPA Region 9, dated January 12, 2017.

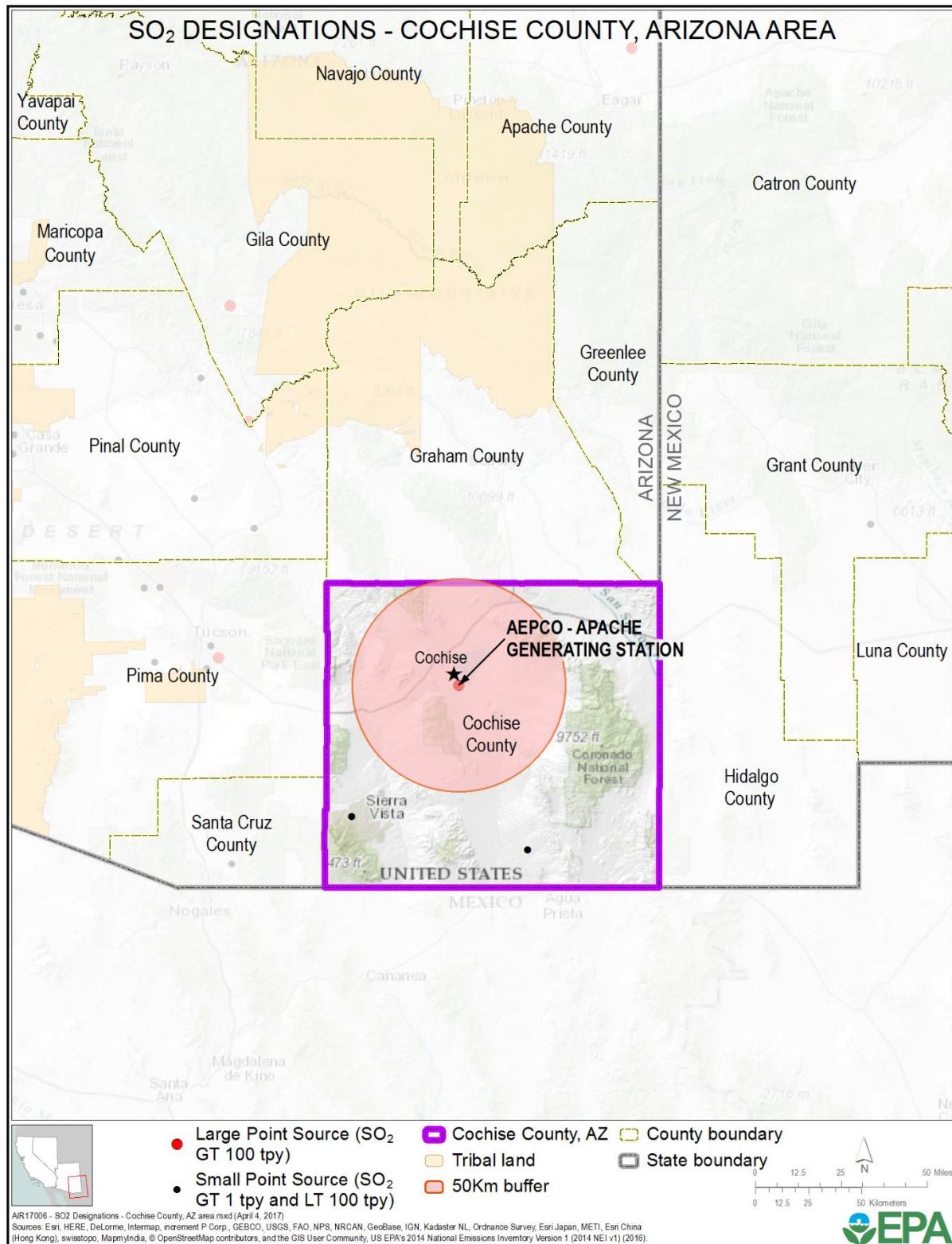
<sup>24</sup> See electronic mail submissions from Farah Mohammadesmaeili, ADEQ, to Cleveland Holladay, EPA Region 9, dated March 3, 2017, March 6, 2017, July 14, 2017, and July 17, 2017.

this intended designation is explained in a later section, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in Cochise County.

As seen in Figure 8 below, Apache is located approximately 3 miles south of the town of Cochise. Figure 8 also shows a 50-km radius around Apache, representing the modeling domain of Arizona's analysis. No other facility within 50 km of Apache emits more than 1 tpy SO<sub>2</sub> (2014 NEI).

**Figure 8. Map of Cochise County and Surrounding Area Addressing Apache Generating 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.

For this area, the EPA received three modeling assessments from the state; however, the EPA is basing our intended designation for Apache on the one modeling assessment that most closely follows the Modeling TAD. On January 12, 2017, Arizona submitted a modeling report and modeling files for Apache that relied on AERMOD version 15181 using a beta option for the surface friction velocity (adjust  $u^*$ , or ADJ\_U\*) parameter.<sup>25</sup> Because this submittal did not rely on the regulatory default version of AERMOD,<sup>26</sup> Arizona submitted supplemental modeling and information in March and July of 2017.<sup>27</sup> Arizona's supplemental modeling included two additional modeling runs: the use of default options with AERMOD version 15181 using future allowable emissions, and the use of AERMOD version 16216r with the (now regulatory) ADJ\_U\* formulation option and actual emissions. Version 15181 without use of the beta option for the surface friction velocity was still appropriate for use in the supplemental modeling, however, the regulatory version of AERMOD at the time of the March 2017 submittal was version 16216r (released December 20, 2016). Because the EPA has concerns about the state's calculation of future allowable emissions used in the version 15181 modeling (submitted in March 2017),<sup>28</sup> the EPA is focusing our discussion and consideration in this section on the modeling results that use actual emissions and the current regulatory version of AERMOD (version 16216r) with the now regulatory ADJ\_U\* formulation option (July 2017 submittal).<sup>29</sup> (The ADJ\_U\* formulation option with version 16216r is further discussed in section 4.3.2.6 below.) The July 2017 supplemental modeling used an updated and confirmed physical fence line, which exists around the perimeter of the facility and also added receptors for US Highway 191 which runs through the facility.<sup>30</sup>

#### *4.3.2. Modeling Analysis Provided by the State*

##### *4.3.2.1. Model Selection and Modeling Components*

The EPA's Modeling TAD notes that for area designations under the 2010 SO<sub>2</sub> 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:

---

<sup>25</sup> See letter from Timothy S. Franquist, ADEQ, to Elizabeth Adams, EPA Region 9, dated January 12, 2017.

<sup>26</sup> The final rule revision to the "Guideline on Air Quality Modeling" (Appendix W to 40 CFR Part 51) was published in the Federal Register on January 17, 2017 (82 FR 5182). On January 26, 2017 (82 FR 8949), the EPA extended the effective date of this final rule from February 16, 2017, to March 21, 2017, consistent with the Presidential directive as expressed in the memorandum of January 20, 2017, from the Assistant to the President and Chief of Staff, entitled "Regulatory Freeze Pending Review." On March 20, 2017, the EPA delayed the effective date from March 21, 2017, to May 22, 2017 (82 FR 14324).

<sup>27</sup> See electronic mail submissions from Farah Mohammadesmaeli, ADEQ, to Cleveland Holladay, EPA Region 9, dated March 3, 2017, March 6, 2017, July 14, 2017, and July 17, 2017.

<sup>28</sup> The state calculated future allowable emissions using an emission limit based on a 30-day averaging time, rather than a 1-hour averaging time.

<sup>29</sup> <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models>.

<sup>30</sup> See electronic mail from Farah Mohammadesmaeli, ADEQ, to Cleve Holladay and Rynda Kay, EPA Region IX, dated July 14, 2017. Attachment "7-14-2017-SO2-DRR-Updates.docx", page 4.

- 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 16216r with the ADJ\_U\* formulation option. Version 16216r is currently the regulatory model version of AERMOD. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

#### *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<sub>2</sub> modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO<sub>2</sub> 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 used the land use method outlined in Appendix W, Section 7.2.3c, where land use within a 3 km radius of the source is analyzed using the meteorological land use scheme described by Auer (1978). Land use land cover data was obtained from the United States Geological Survey at 30-meter resolution under 21 land cover classes. The dominant land type within 3 km of Apache is shrubland (60 percent), grasslands/herbaceous (13 percent) and recreational grasses (7.6 percent) for a total of 81.3 percent rural. The primary land type is considered type A3 (undeveloped), per the Auer classification, and therefore considered rural. For these reasons, we agree with the state’s determination that the facility should be modeled as a rural source.

#### *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<sub>2</sub> emission sources or facilities considered for modeling; the extent of 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<sub>2</sub> concentrations.

The source of SO<sub>2</sub> emissions subject to the DRR in this area is described in the introduction to this section. For the Cochise County area, the state has included no other emitters of SO<sub>2</sub> within 50 kilometers (km) of Apache in any direction. The state determined that this was the appropriate

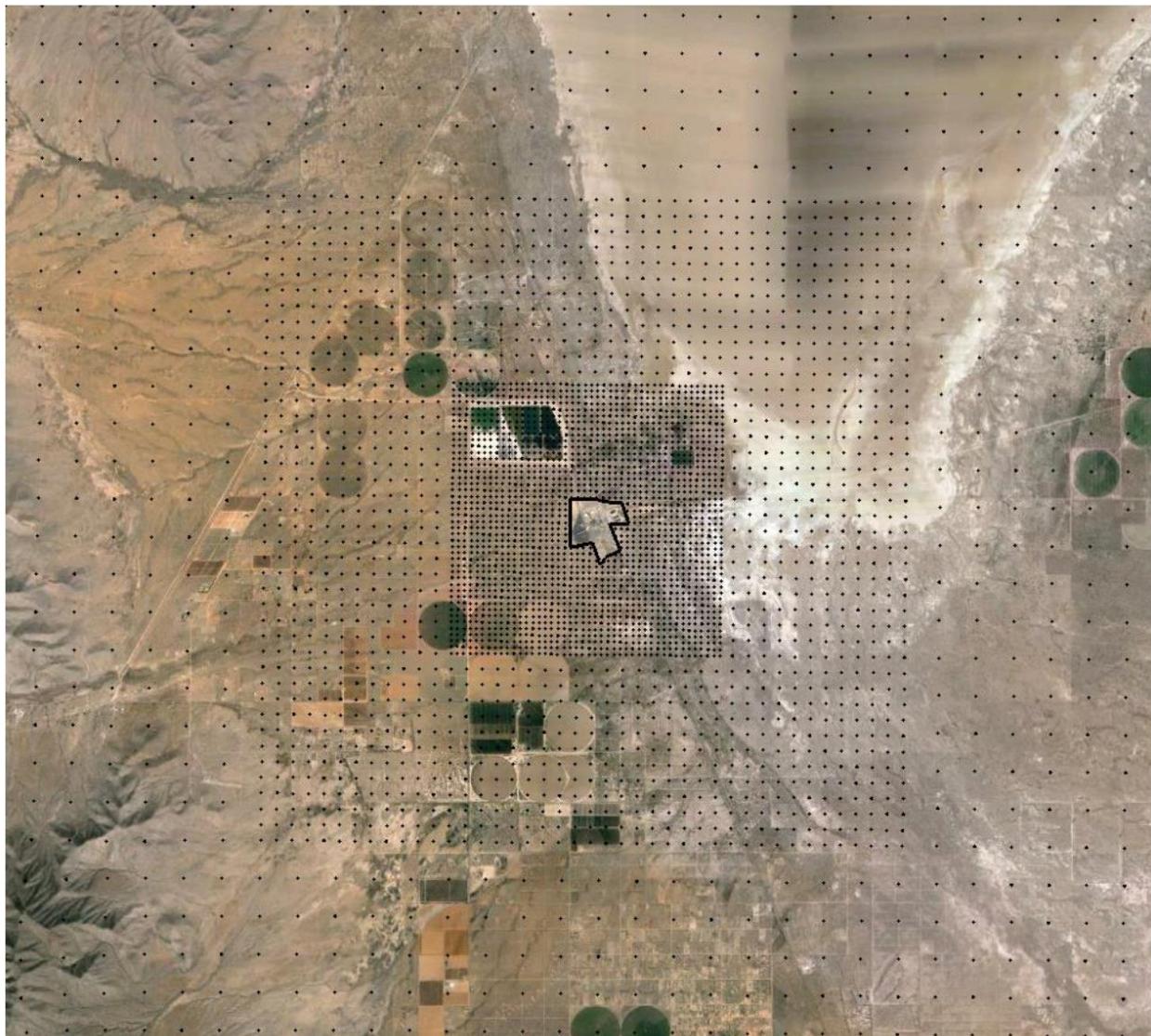
distance to adequately characterize air quality through modeling to include the potential extent of any SO<sub>2</sub> NAAQS violations in the area of analysis and any potential impact on SO<sub>2</sub> air quality from other sources in nearby areas. No other sources beyond 50 km were determined by the 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:

- Receptors along the fence line at a spacing of 25 m;
- Receptors along US Highway 191 which crosses the facility;
- Receptors from the fence line to 1 km at a spacing of 100 m;
- Receptors from 1 km to 5 km away from the fence line at a spacing of 200-500 m;
- Receptors from 5 km to 20 km away from the fence line at a spacing of 500-1,000 m;
- Receptors from 20 km to 50 km away from the fence line at a spacing of 1,000-2,500 m.

The receptor network contained 11,505 receptors, and covered a domain of 104 km by 112 km centered on Apache. Figure 9, generated by the state, shows Arizona's chosen area of analysis surrounding Apache, as well as the receptor grid for the area of analysis.

**Figure 9: Image provided by the State showing Modeled Receptors in Cochise County for Apache**



Consistent with the Modeling TAD, the state placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility, including other facilities' property. The state did not place receptors within Apache's own fence line; the nearest receptors were placed along Apache's fence line.<sup>31</sup> Section 4.2 of the Modeling TAD allows for removal of receptors on the basis that it would not be feasible to place a monitor at the receptor location. The state did not delete any receptors on this basis.

---

<sup>31</sup> See electronic mail from Farah Mohammadesmaeli, ADEQ, to Cleveland Holladay and Rynda Kay, EPA Region IX, dated July 14, 2017. Attachment "7-14-2017-SO2-DRR-Updates.docx", page 2.

We conclude that the state adequately characterized the area of analysis and appropriately placed model receptors.

#### *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 state modeled emissions from Apache and did not include additional sources within the area of analysis to model explicitly. No sources emitting above 1 tpy SO<sub>2</sub> in 2014 (based on the 2014 NEI) are located within 50 km of the facility.<sup>32</sup> 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 state characterized this source within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions. 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. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

For these reasons, we conclude that the state adequately characterized emission sources and building downwash in its modeling.

#### *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).

---

<sup>32</sup> Although Arizona identified one source located nearly 50 km away from the facility that emitted 1.13 tpy in 2012, the source only emitted 0.239 tpy in 2014.

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<sub>2</sub> 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<sub>2</sub> 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 previously noted, the state included Apache and no other emitters of SO<sub>2</sub> within 50 km in the area of analysis. The values of the actual annual SO<sub>2</sub> emissions between 2012 and 2014 are summarized below in Table 5.

**Table 5. Annual Actual SO<sub>2</sub> Emissions Between 2012 – 2014 from Apache Generating Station**

Facility Name	SO <sub>2</sub> Emissions (tpy)		
	2012	2013	2014
Apache Generating Station	2,090	3,744	4,812

For Apache, the actual hourly emissions were obtained from CEMS for the years 2012-2014. The CEMS data were obtained from AEPCO. The hourly SO<sub>2</sub> emissions data being modeled are consistent with those reported from the EPA’s Air Markets Program database.<sup>33</sup> In 2015, Apache emitted 2,562 tons of SO<sub>2</sub>, and in 2016, Apache emitted 956 tons of SO<sub>2</sub>.<sup>34</sup> Apache consists of three units with a total capacity of 493 MW. Apache Unit 1 (85 MW) is fired on natural gas, and Units 2 and 3 (204 MW each) are coal-fired units. The Arizona regional haze SIP for Apache requires the operator of Apache, by December 5, 2017, to convert Unit 2 to combust natural gas and establishes emission limitations for SO<sub>2</sub>, oxides of nitrogen, and particulate matter consistent with natural gas combustion.<sup>35</sup> Therefore, we expect future emissions of SO<sub>2</sub> from Apache to be reduced compared to emissions levels over the modeled period, 2012-2014.

We conclude the state adequately characterized emissions for the facility.

---

<sup>33</sup> See <https://ampd.epa.gov/ampd/>.

<sup>34</sup> *Id.*

<sup>35</sup> See proposed rule at 79 FR 53622 (September 19, 2014), and final rule at 80 FR 19220 (April 10, 2015).

#### **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 area of analysis for the Cochise County area, the state selected the site-specific surface meteorological data from Apache, and coincident upper air observations from Tucson, Arizona, (Station ID:23160, Latitude/Longitude: 32.23 N/110.96 W), which is 101 km north-west of Apache, as being most representative of meteorological conditions within the area of analysis. AEPCO provided 2012-2014 site-specific meteorological data collected from a 10-m meteorological tower. However, these data have not gone through quality assurance. AEPCO provided additional 2008-2011 meteorological data collected from a 10-m meteorological tower. Arizona's records indicate that the 2008-2011 data were subject to a quality assurance audit and met EPA Prevention of Significant Deterioration (PSD) quality assurance requirements. Arizona consulted with the EPA and determined that the meteorological data collected during 2009-2011 were representative of the most recent 3 years (2012-2014) of meteorological conditions. These data also met EPA's data completeness requirements. The EPA concurred and therefore, Arizona used the 2009-2011 site-specific data for AEPCO designation modeling.

As discussed earlier, the state used the 2009-2011 site-specific meteorological data for Apache designation modeling. Because hourly emissions for the most recent 3 years (2012-2014) were modeled, the state modified the years of the meteorological datasets to match the most recent 3 years of emissions (*i.e.*, change 2009 to 2012, 2010 to 2013, and 2011 to 2014), as recommended in section 7.4 of the Modeling TAD. Months, days, and hours remained unchanged. Since the year of 2012 contains emissions for February 29 but the meteorological data does not cover leap years, the state substituted meteorological data collected on February 28 for February 29.

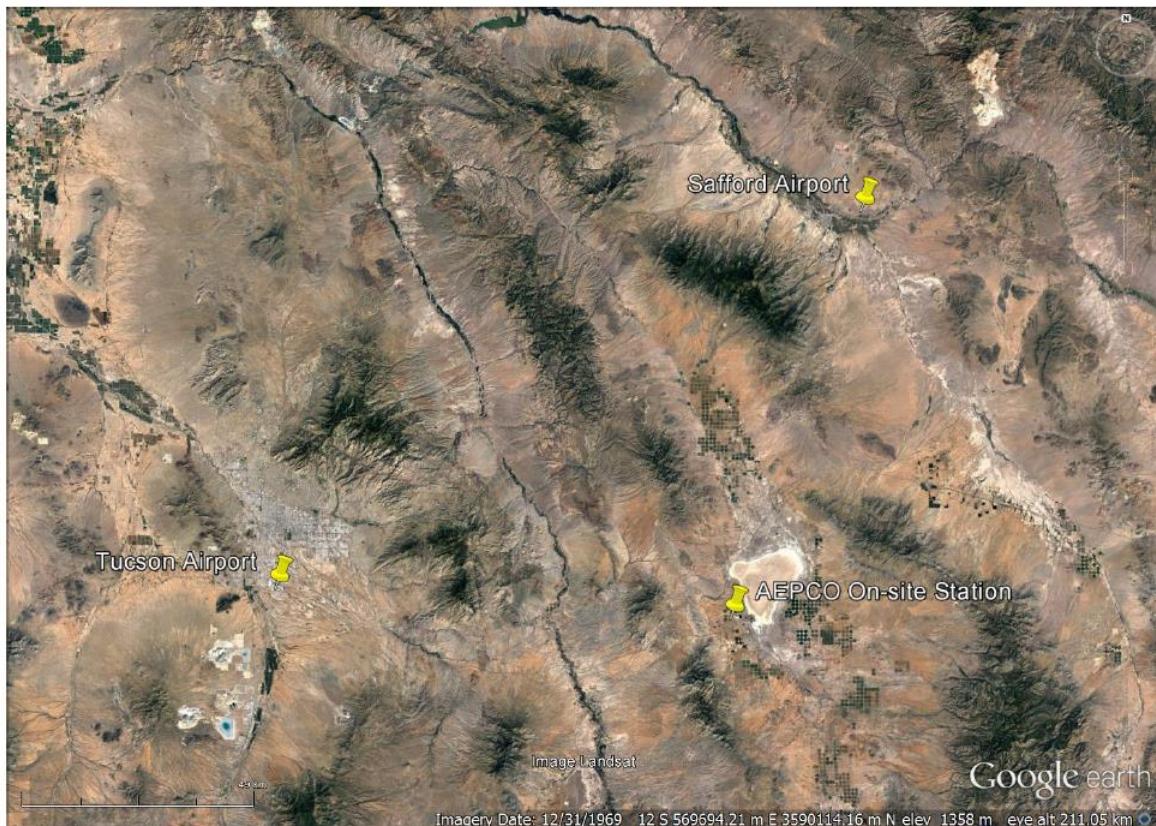
The state used AERMOD (version 16216r; U.S. EPA, 2016) to predict ambient concentrations in simple, complex and intermediate terrain. AERMOD version 16216r was issued on December 20, 2016 (U.S. EPA, 2016b). In the new 16216r version, some beta options become regulatory default options. For example, the adjusted surface friction velocity option (ADJ\_U\*) is no longer flagged as a beta option in cases where measured turbulence data are not included. The state used the ADJ\_U\* option without including any turbulence data. No turbulence data was collected at the site; therefore, no turbulence data was included in the modeling.

In the state's initial modeling approach, provided to the EPA in January 2017, the real-time 2012-2014 SO<sub>2</sub> emissions and stack parameter data measured by CEMS were applied in AERMOD v15181 using ADJ\_U\* to obtain modeling results. This approach used AERMET data files that were processed using the beta alternative formulation of surface friction velocity ( $u^*$ ) as a non-regulatory option (ADJ\_U\*). However, after its initial submittal, the state provided results in July 2017 from another set of modeling runs using the new, approved version 16216r with the approved regulatory ADJ\_U\* formulation. Therefore, in this chapter, we focus our review on the modeling results from the current regulatory version 16216r with the approved ADJ\_U\* formulation.

The state used AERSURFACE version 13016 using data from the onsite meteorological station along with a 1 km per radius per EPA guidance to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness ( $z_o$ )) 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.

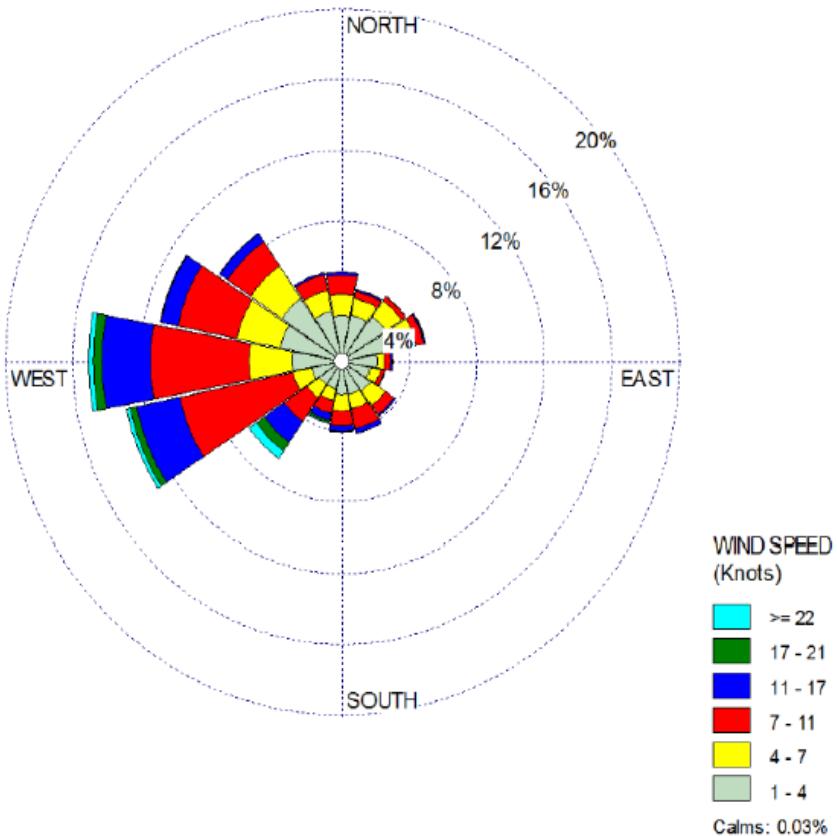
Figure 10 below, from the state's report, shows the location of this meteorological station relative to the area of analysis.

**Figure 10. Image from the State showing Meteorological sites in the Cochise County Area**



As part of its recommendation, the state provided the 3-year surface wind rose for the site specific meteorological station. In Figure 11, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The wind blows out of the west and west southwest about 30 percent of the time. Wind velocities over 11 knots mostly occur when winds are from the west or west southwest.

**Figure 11. Cochise County Cumulative Annual Wind Rose for Years 2009-2011**



Meteorological data from the above site-specific surface station and NWS upper air station were used in generating AERMOD-ready files with the AERMET version 15181 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 procedures and settings presented in the July 1, 2016, *Modeling Protocol for SO<sub>2</sub> NAAQS Designation for Arizona Electric Power Cooperative (AEPCO)-Apache Generating Station* submitted by the state to the EPA, in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. However, there were only 0.03 percent calms in the 2009-2011 data set, so no special AERMINUTE processing was required nor could it have been since the surface meteorological station was not a NWS site. In setting this threshold, no wind speeds lower than this value would be used for determining concentrations.

We conclude that the state selected meteorological sites, processed meteorological data, and estimated surface characteristics consistent with the procedures outlined in the Modeling TAD.

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

There are no elevated terrain features in the immediate vicinity of Apache. The Dragoon Mountains are located about 8 km south-west of the facility. The terrain in the area of analysis is best described as 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.

We conclude the state appropriately accounted for topography in its modeling, consistent with the procedures outlined in the Modeling TAD.

#### *4.3.2.8. Modeling Parameter: Background Concentrations of SO<sub>2</sub>*

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO<sub>2</sub> that are ultimately added to the modeled design values (DVs): 1) a “tier 1” approach, based on a monitored design value, or 2) a temporally varying “tier 2” approach, based on the 99<sup>th</sup> percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state used a “tier 1” approach to calculate background concentrations using observations from the Central Phoenix monitoring station (AQS ID: 040133002). The Central Phoenix monitor is located in an urban area, surrounded by various anthropogenic sources. In contrast, Apache is located in a rural area without significant anthropogenic activities, so the state asserts it is a conservative choice for background concentration of SO<sub>2</sub> here. The state reported 2010-2012, 2011-2013, and 2012-2014 3-year 1-hour SO<sub>2</sub> design values at the Central Phoenix site as 8 ppb, 8 ppb and 7 ppb, respectively. The single value of the background concentration for this area of analysis was determined by the state to be 20.18 µg/m<sup>3</sup>, equivalent to 7.7 ppb when expressed in two significant figures,<sup>36</sup> and that value was incorporated into the final AERMOD results. As noted in Section 3.3.2.8, the state relied on design values that differ from values reported in AQS. However, we also note that subsequent 3-year design values (2013-2015 and 2014-2016), at Central Phoenix were both 7 ppb, equivalent to 18.33 µg/m<sup>3</sup>.<sup>37</sup> We also note that while the state used a monitor located in Phoenix, Arizona, for the background concentration for all three DRR-sources, there is a monitor located closer to Apache, in Tucson, Arizona. Similar to the Central Phoenix monitor, the Tucson Children’s Park monitor (AQS ID: 040191028) is located in an urban area, surrounded by various anthropogenic sources. While it does not have a valid design value for 2010-2012, its 2011-2013, 2012-2014, 2013-2015 and 2014-2016 design values are 6 ppb, 6 ppb, 6 ppb, and 4 ppb, respectively. Based on 2011-2013, 2012-2014, and 2013-2015, a single value of the background concentration near the Tucson Children’s Park monitor would be 6 ppb (equivalent to 15.71 µg/m<sup>3</sup>).

---

<sup>36</sup> The SO<sub>2</sub> NAAQS level is expressed in ppb but AERMOD gives results in µg/m<sup>3</sup>. The conversion factor for SO<sub>2</sub> (at the standard conditions applied in the ambient SO<sub>2</sub> reference method) is 1ppb = approximately 2.619 µg/m<sup>3</sup>.

Although the state appropriately relied on a tier 1 approach that was consistent with the Modeling TAD to characterize background concentrations of SO<sub>2</sub>, the design values reported by the state for the Central Phoenix monitor are lower than those reported in AQS by 1 ppb. Although we consider the background concentrations based on the Central Phoenix monitor used by the state to be in error, we recognize the error is small. In addition, because the Tucson Children's Park monitor is closer than the Central Phoenix monitor to Apache, we consider the Tucson monitor to be a more representative monitor for determining background concentrations for SO<sub>2</sub> for the Cochise County area. Therefore, we provide further evaluation of the effect on the modeling results of the erroneous background concentration for SO<sub>2</sub> and the more appropriate use of the Tucson Children's Park monitor in Section 4.3.2.9.

#### *4.3.2.9. Summary of Modeling Inputs and Results*

The AERMOD modeling input parameters for the Cochise County area of analysis are summarized below in Table 6.

---

<sup>37</sup> AQS shows that the 2010-2012, 2011-2013, and 2012-2014 3-year 1-hr SO<sub>2</sub> design values at the Central Phoenix site are 9 ppb, 8 ppb and 8 ppb, respectively. Using these years and this monitor, we therefore believe the single value of the background concentration for this area of analysis should be 21.74 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), equivalent to 8.3 ppb when expressed in two significant figures.

**Table 6: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Cochise County Area**

<b>Input Parameter</b>	<b>Value</b>
AERMOD Version	16216r (with ADJ_U*)
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	12
Modeled Fence lines	1
Total receptors	11,505
Emissions Type	Actual
Emissions Years	2012-2014
Meteorology Years	2009-2011
NWS Station for Surface Meteorology	Site Specific non-NWS
NWS Station Upper Air Meteorology	Tucson, AZ
NWS Station for Calculating Surface Characteristics	Site Specific
Methodology for Calculating Background SO <sub>2</sub> Concentration	Central Phoenix monitoring station (AQS ID: 040133002) Tier 1 based on design value
Calculated Background SO <sub>2</sub> Concentration	20.18 µg/m <sup>3</sup>

The results presented below in Table 7 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

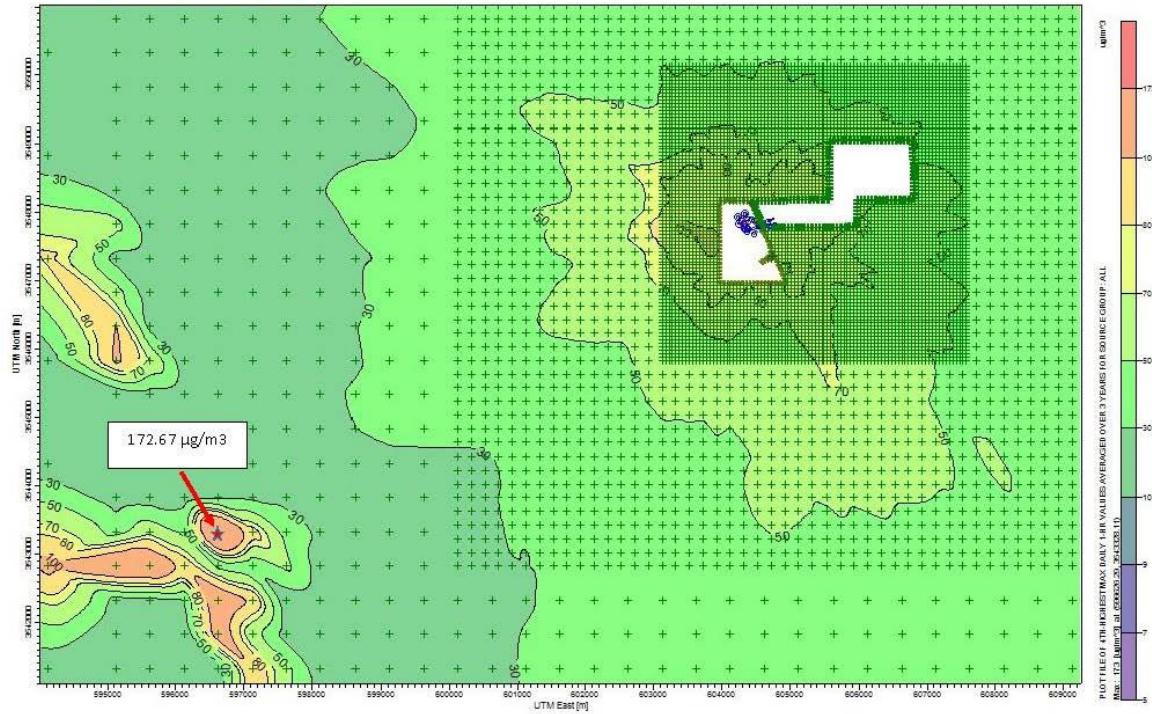
**Table 7. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentration Averaged Over 3 Years for the Area of Analysis for the Cochise County Area**

<b>Averaging Period</b>	<b>Data Period</b>	<b>Receptor Location [UTM zone 12]</b>		<b>Maximum 99<sup>th</sup> percentile daily maximum 1-hour SO<sub>2</sub> Concentration (µg/m<sup>3</sup>)</b>	
		<b>UTM/Latitude</b>	<b>UTM/Longitude</b>	<b>Modeled concentration (including background)</b>	<b>NAAQS Level</b>
99th Percentile 1-Hour Average	2012-2014	597300.00 E/32.064N	3542700.00 N/-109.893W	192.85	196.4*

\* Equivalent to the 2010 SO<sub>2</sub> NAAQS of 75 ppb using a 2.619 µg/m<sup>3</sup> conversion factor

As shown in Figure 12, included as part of the Arizona's recommendation, the state's modeling indicates that the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration within the modeling domain resulting from actual emissions from Apache is 172.67  $\mu\text{g}/\text{m}^3$ , equivalent to 65.9 ppb, located 6.8 km south-west of the facility fence line. This modeled concentration does not include the background concentration of SO<sub>2</sub>. Using the background concentration calculated by the state of 20.18  $\mu\text{g}/\text{m}^3$ , the state reported the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration, including background SO<sub>2</sub>, is 192.85  $\mu\text{g}/\text{m}^3$ . If we apply a background concentration based on the SO<sub>2</sub> concentrations in AQS for the Central Phoenix monitor, of 21.74  $\mu\text{g}/\text{m}^3$ , the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration would be 194.41  $\mu\text{g}/\text{m}^3$ . Using the background concentration of SO<sub>2</sub> using the Tucson Children's Park monitor of 15.7  $\mu\text{g}/\text{m}^3$ , the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration, including background SO<sub>2</sub>, would be 188.38  $\mu\text{g}/\text{m}^3$ . Despite the state's use of erroneous background concentrations for SO<sub>2</sub>, we conclude that the use of more appropriate background concentrations of SO<sub>2</sub> would not change the state's conclusion that emissions of SO<sub>2</sub> from Apache are not modeled to cause or contribute to violations of the NAAQS.

**Figure 12. Predicted 99<sup>th</sup> Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentrations Averaged Over 3 Years for the Area of Analysis for the Cochise County Area**



The modeling submitted by the state indicates that the 1-hour SO<sub>2</sub> NAAQS is not 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

The state performed modeling for a portion of Cochise County that includes Apache using AERMOD version 16216r, the current regulatory version, with the use of the regulatory ADJ\_U\* option.

Based on the information provided by the state and summarized in Section 4.3, we conclude that the state adequately examined and characterized sources within the area of analysis and appropriately placed receptors in the modeling domain; appropriately accounted for modeled emission sources and building downwash; correctly selected meteorological sites and properly processed the data; and adequately estimated surface characteristics. Although the state did not use appropriate background concentrations of SO<sub>2</sub> to add to modeled design values, the use of background concentrations of SO<sub>2</sub> calculated from accurate values from AQS for the Central Phoenix monitor, or values for the Tucson Children's Park monitor, would not change the modeling results that indicate that emissions from Apache do not cause or contribute to violations of the 2010 SO<sub>2</sub> NAAQS. Although the modeled 99<sup>th</sup> percentile daily maximum 1-hour SO<sub>2</sub> concentration was close to the 2010 SO<sub>2</sub> NAAQS, the emissions over 2012-2014 used by the state to characterize air quality effects on Apache are significantly higher than more recent emissions in 2015 and 2016. In addition, based on federally-enforceable emission limits in the Arizona SIP that apply on December 5, 2017, the EPA anticipates that emissions in the future from Apache will remain below emissions over the modeled period, 2012-2014. Based on this assessment, we conclude the modeling provided by the state accurately characterizes air quality in the area of analysis for the Apache Generating Station area.

#### 4.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Cochise County Area

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.

For determining the appropriate boundaries for the unclassifiable/attainment area of Cochise County, it is useful to also consider emissions of SO<sub>2</sub> within the county but beyond the area used in the modeling analysis. Based on the National Emissions Inventory (NEI) for 2014, SO<sub>2</sub> emissions in Cochise County totaled 4,928 tons. This county-level emission estimate includes emissions from point, nonpoint, on-road, non-road, and event emissions.<sup>38</sup> Apache, which emitted 4,812 tons of SO<sub>2</sub> according to the 2014 NEI, contributes approximately 98 percent of the county-level emissions.

---

<sup>38</sup> Event emissions in the NEI include wildfires and prescribed burns. See <https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei>.

#### 4.5. Jurisdictional Boundaries in the Cochise County

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

In its 2011 submission, Arizona recommended that all counties in the state, including Cochise County, be designated unclassifiable based on an absence of information. The state also recommended excluding areas of Indian country, over which Arizona does not have jurisdiction. There are no areas of Indian country geographically located in Cochise County.

#### 4.6. Other Information Relevant to the Designations for the Cochise County Area

In recent designations, the EPA has designated Cochise County as a separate area for various NAAQS (*e.g.*, 1997 and 2012 Annual PM<sub>2.5</sub>, 1997 and 2006 24-hour PM<sub>2.5</sub>, 2010 NO<sub>2</sub>, 1997 and 2008 8-hour ozone).<sup>39</sup> Footnotes to the tables in 40 CFR Part 81 note that the designations include areas of Indian country located in each county or area, except as otherwise specified. We note that there are no areas of Indian country located in Cochise County.

As discussed previously, Apache is subject to the Best Available Retrofit Technology (BART) requirement of the Regional Haze Rule based on its age and effects on visibility in national parks and wilderness areas. In 2015, the EPA approved a revision to the Arizona SIP for Apache that replaces a Federal Implementation Plan (FIP) promulgated in 2012 by the EPA for this facility.<sup>40</sup> Arizona's SIP revision for Apache requires the conversion of one unit from a primarily coal-fired unit to a unit that exclusively combusts pipeline-quality natural gas. The compliance date for the SIP requirement is December 5, 2017. We also note that emissions in recent years, *e.g.*, 2015 and 2016, as discussed in section 4.3.2.5, were significantly lower than the modeled emission rates based on 2012-2014. Based on the trend in recent emissions from Apache and the SIP requirement to convert one unit at Apache from a coal-fired unit to a natural gas-fired unit, we expect future emissions from Apache to be lower than the emission levels used in the modeling.

#### 4.7. The EPA's Assessment of the Available Information for the Cochise County Area

There are no regulatory SO<sub>2</sub> monitors located in Cochise County and Arizona has chosen to characterize air quality in the area surrounding Apache using air quality modeling. Using actual emissions from 2012-2014, Arizona's analysis indicates that concentrations of SO<sub>2</sub> in the Cochise County area resulting from Apache are below the 2010 SO<sub>2</sub> NAAQS. In addition,

---

<sup>39</sup> 40 CFR 81.303 – Arizona.

<sup>40</sup> 69 FR 19220 (April 10, 2015).

federally-enforceable operational changes at Apache that will be implemented by December 5, 2017, will result in significant SO<sub>2</sub> emission reductions compared to the 2012-2014 actual emissions levels in the modeling analysis. We also note that emissions in recent years, *e.g.*, 2015 and 2016, as discussed in section 4.3.2.5, were significantly lower than the modeled emission rates based on 2012-2014.

Although the area of analysis in the modeling, represented by a grid extending about 50 km from Apache, was only a portion of Cochise County, emissions from Apache represented approximately 98 percent of SO<sub>2</sub> emissions in Cochise County in 2014. Therefore, the EPA anticipates that the modeling results for Apache, which shows no violations of the 2010 SO<sub>2</sub> NAAQS, would conservatively represent other areas of Apache County, in which there are no other large sources (sources that emit in excess of 100 tpy) of SO<sub>2</sub>.

Cochise County is located in the southeastern corner of Arizona, adjacent to the U.S. – Mexico border. There are no areas of Indian country located within Cochise County.

Based on our review of the modeling analysis for Apache submitted by Arizona, and our consideration of county-wide emissions, we intend to designate Cochise County as unclassifiable/attainment for the 2010 SO<sub>2</sub> NAAQS.

The EPA believes that our intended unclassifiable/attainment area, bounded by the boundaries of Cochise County, 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.

#### 4.8. Summary of Our Intended Designation for the Cochise County Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA concludes that Apache does not cause a violation of the 2010 SO<sub>2</sub> NAAQS in the Cochise County area, or contribute to a violation in a nearby area. Therefore, the EPA intends to designate Cochise County as unclassifiable/attainment for the 2010 SO<sub>2</sub> NAAQS. Specifically, the boundaries are comprised of the county boundaries for Cochise County. Figure 8, above, shows the boundary of this intended unclassifiable/attainment area.

## 5. Technical Analysis for the Apache County Area

### 5.1. Introduction

The EPA must designate the Apache County area by December 31, 2017, because the area has not been previously designated and Arizona has not installed and begun timely operation of a new, approved SO<sub>2</sub> monitoring network to characterize air quality in the vicinity of any source in Apache County.

### 5.2. Air Quality Monitoring Data for the Apache County Area

There is no approved SO<sub>2</sub> monitoring network in Apache County.

### 5.3. Air Quality Modeling Analysis for the Apache County Area Addressing Springerville Generating Station

#### 5.3.1. *Introduction*

This section presents all the available air quality modeling information for a portion of Apache County that includes the Tucson Electric Power Company's Springerville Generating Station (TEP-Springerville). This portion of Apache County will often be referred to as "the Apache County area" within this section. This area contains the following SO<sub>2</sub> source around which Arizona is required by the DRR to characterize SO<sub>2</sub> air quality, or alternatively to establish an SO<sub>2</sub> emissions limitation of less than 2,000 tons per year:

- The TEP-Springerville facility emits 2,000 tons or more annually. Specifically, TEP-Springerville emitted 6,221 tons of SO<sub>2</sub> in 2014. This source meets the DRR criteria and thus is on the SO<sub>2</sub> DRR Source list, and Arizona has chosen to characterize it with modeling.

In 2011, Arizona recommended that all counties, including the entirety of Apache County, be designated as unclassifiable because these areas have no monitored violations,<sup>41</sup> but were at that time without current modeling information. Arizona did not update its recommendations after submitting, in 2017, its assessment and characterization of air quality impacts from this facility and other nearby sources that may have a potential impact in the area where the 2010 SO<sub>2</sub> NAAQS may be exceeded.<sup>42</sup> Arizona submitted additional information and modeling analyses for the Apache County area in July 2017.<sup>43</sup>

---

<sup>41</sup> See letter from Janice K. Brewer, Governor of Arizona, to Jared Blumenfeld, EPA Region 9, dated May 25, 2011.

<sup>42</sup> See letter from Timothy S. Franquist, ADEQ, to Elizabeth Adams, EPA Region 9, dated January 12, 2017.

<sup>43</sup> See electronic mail submissions from Farah Mohammedesmaeili, ADEQ, to Cleveland Holladay and Rynda Kay, July 14, 2017, from Yi Li, ADEQ, to Cleveland Holladay and Rynda Kay, dated July 18, 2017, and from Yi Li, ADEQ, to Rynda Kay, dated July 26, 2017.

Arizona's assessment and characterization was performed using air dispersion modeling software, *i.e.*, AERMOD, analyzing actual emissions. The area that the state has assessed via air quality modeling is located in Apache County, Arizona, and Cibola and Catron Counties, New Mexico, centered on TEP-Springerville. After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to modify the state's recommendation and designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section, after all the available information is presented.

As seen in Figure 13 below, the TEP-Springerville facility is located approximately 15 miles north of Springerville, Arizona, at 34.312N, 109.172W.

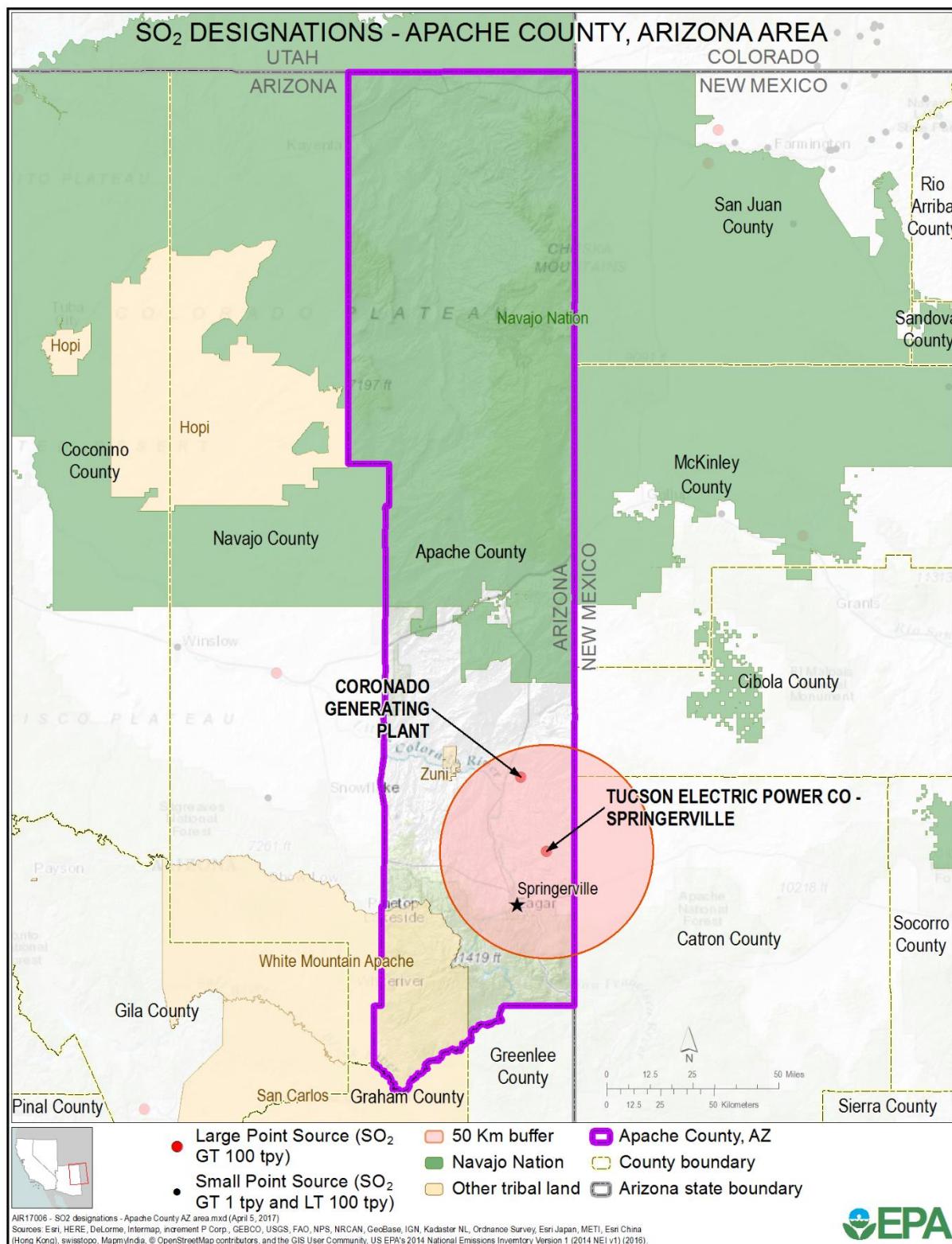
Figure 13 also includes other nearby emitters of SO<sub>2</sub>.<sup>44</sup> Only one facility within 50 km of TEP-Springerville emits more than 1 tpy SO<sub>2</sub>. Coronado Generating Station (Coronado) emitted 908 tpy SO<sub>2</sub> in 2014 and is located 18 miles northwest of TEP-Springerville. Coronado is not a DRR source, but Arizona included it in its modeling for the Apache County area.

The figure highlights Apache County, which is generally consistent with the state's recommended boundary for the unclassifiable area, except that the state recommended excluding areas of Indian country. The EPA's designation boundary is generally consistent with the state's recommended boundary, except that the EPA's intended boundary includes areas of Indian country, except the lands of the Navajo Nation, which the EPA intends to address separately (*see* Chapter 24 for the Navajo Nation), and also excludes the lands of the White Mountain Apache Tribe, because the EPA intends to include all lands of this tribe in the Navajo County unclassifiable/attainment area (*see* section 3 of this chapter).

---

<sup>44</sup> All other SO<sub>2</sub> emitters of 1 tpy or more (based on information in the 2014 NEI) are shown in Figure 13.

**Figure 13. Map of Apache County and Surrounding Areas Addressing TEP-Springerville**



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.

For this area, the EPA initially received a modeling assessment from the state addressing Springerville and Coronado on January 12, 2017.<sup>45</sup> Arizona submitted additional supplemental information and modeling analyses addressing Coronado in July 2017.<sup>46</sup> No other assessments were received.

### *5.3.2. Modeling Analysis Provided by the State*

#### *5.3.2.1. Model Selection and Modeling Components*

The EPA's Modeling TAD notes that for area designations under the 2010 SO<sub>2</sub> 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 initially used AERMOD version 15181, the most up-to-date version at the time of submittal, using regulatory default options. On July 26, 2017, the state submitted revised modeling using AERMOD version 16216r, the current regulatory model version using default options. The revision addressed source characterization, downwash, and emissions for Coronado. All other inputs remained the same. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

#### *5.3.2.2. 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<sub>2</sub> modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO<sub>2</sub> sources. Section 6.3 of the Modeling TAD

---

<sup>45</sup> See letter from Timothy S. Franquist, ADEQ, to Elizabeth Adams, EPA Region 9, dated January 12, 2017.

<sup>46</sup> See electronic mail submissions from Farah Mohammedesmaeili, ADEQ, to Cleveland Holladay and Rynda Kay, July 14, 2017, from Yi Li, ADEQ, to Cleveland Holladay and Rynda Kay, dated July 18, 2017, and from Yi Li, ADEQ, to Rynda Kay, dated July 26, 2017.

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 used the land use method outlined in Appendix W, Section 7.2.3c, where land use within a 3-km radius of the source is analyzed using the meteorological land use scheme described by Auer (1978). Land use land cover data was obtained from the United States Geological Survey National Land Cover Data (NLCD) 1992 archives. The dominant land type within 3 km of TEP-Springerville is shrubland (84 percent). The primary land type is considered type A3 (undeveloped), per the Auer classification, and therefore considered rural.

For these reasons, we agree with the state's determination that the facility should be modeled as a rural source.

#### *5.3.2.3. 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<sub>2</sub> emission sources or facilities considered for modeling; the extent of 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<sub>2</sub> concentrations.

The source of SO<sub>2</sub> emissions subject to the DRR in this area is described in the introduction to this section. For the Apache County area, the state has included one other emitter of SO<sub>2</sub> within 50 km of TEP-Springerville in any direction. The state determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO<sub>2</sub> NAAQS violations in the area of analysis and any potential impact on SO<sub>2</sub> air quality from other sources in nearby areas. In addition to TEP-Springerville, the other emitter of SO<sub>2</sub> included in the area of analysis is Coronado. 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:

- Receptors along the fence line at a spacing of 25 m
- Receptors from the fence line to 1 km at a spacing of 100 m
- Receptors from 1 km to 5 km away at a spacing of 200 - 500 m
- Receptors from 5 km to 20 km away at a spacing of 500 - 1,000 m
- Receptors from 20 km to 50 km away at a spacing of 1,000 – 2,500 m

The receptor network contained 8,237 receptors, and the network covered 102 km by 102 km centered on the TEP-Springerville facility in the southern portion of Apache County in Arizona, extending into Cibola and Catron counties in New Mexico.

Figure 13 above shows the state's chosen area of analysis surrounding TEP-Springerville. Figure 14 below, provided by the state, shows 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 relative to each modeled facility, including other facilities' property with the exceptions of locations described in Section 4.2 of the Modeling TAD as not being feasible locations for placing a monitor. The state excluded receptors inside the fence line of TEP-Springerville and confirmed that a physical fence line exists around the perimeter of the facility, as modeled.<sup>47</sup> The receptors were placed along the facility fence line and outward as described above.

We conclude that the state adequately characterized the area of analysis and appropriately placed model receptors.

---

<sup>47</sup> See electronic mail from Farah Mohammadesmaeili, ADEQ, to Cleve Holladay and Rynda Kay, EPA Region IX, dated July 14, 2017. Attachment “7-14-2017-SO2-DRR-Updates.docx”, page 1.

**Figure 14. Receptor Grid for the Apache County Area**



#### *5.3.2.4. 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 state modeled emissions from TEP-Springerville and included one additional source within the area of analysis to model explicitly, Coronado. Coronado is located 18 miles northwest of TEP-Springerville and emitted 908 tpy SO<sub>2</sub> in 2014, primarily from two coal-fired boilers. No other SO<sub>2</sub> sources above 1 tpy SO<sub>2</sub> are located within 50 km of TEP-Springerville. No sources beyond 50 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis.

The state characterized the DRR source, TEP-Springerville, in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions for TEP-Springerville. The state also adequately characterized TEP-Springerville'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 address building downwash.

Arizona initially modeled Coronado using actual stack heights and allowable emissions. Section 6.1 of the Modeling TAD describes that if allowable emissions are used, the stack height should follow the GEP policy. In July 2017, the state submitted revised modeling to use actual stack heights in conjunction with actual emissions for Coronado, consistent with the Modeling TAD.<sup>48</sup> The state adequately characterized other stack parameters, *e.g.*, exit temperature, exit velocity, location, and diameter for this source. Initially, building downwash was not included in the modeling for Coronado. Section 6.1 of the Modeling TAD specifies that if downwash is considered, the BPIPPRM program (U.S. EPA, 2004d) should be used to input building parameters for AERMOD. The state subsequently added buildings/structures and downwash for the Coronado facility to its modeling, consistent with the Modeling TAD.<sup>49</sup>

We conclude that, consistent with the Modeling TAD, the state adequately characterized emission sources and building downwash for TEP-Springerville and Coronado in its latest modeling.

#### *5.3.2.5. 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.

---

<sup>48</sup> See electronic mail submissions from Yi Li, ADEQ, to Rynda Kay, dated July 26, 2017.

<sup>49</sup> *Id.*

The EPA believes that 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, for a facility that has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO<sub>2</sub> 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<sub>2</sub> 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 previously noted, the state included TEP-Springerville and Coronado, the one other emitter of SO<sub>2</sub> within 50 km in the area of analysis. For this area of analysis, the state modeled emissions from TEP-Springerville and Coronado using actual emissions. The facilities in the state's modeling analysis and their associated actual emission rates are summarized below.

For TEP-Springerville and Coronado the state provided annual actual SO<sub>2</sub> emissions between 2012-2014 obtained from CEMS for the modeled units. This information is summarized in Table 9. In 2015, TEP-Springerville emitted 5,780 tons of SO<sub>2</sub>, and in 2016, TEP-Springerville emitted 6,341 tons of SO<sub>2</sub>.<sup>50</sup> In 2015, Coronado emitted 682 tons of SO<sub>2</sub>, and in 2016, Coronado emitted 589 tons of SO<sub>2</sub>.<sup>51</sup>

**Table 9. Actual SO<sub>2</sub> Emissions Between 2012-2014 from Facility in the Area of Analysis for the Apache County Area**

Facility Name	SO <sub>2</sub> Emissions (tpy)		
	2012	2013	2014
TEP-Springerville	6,160	7,945	6,221
Coronado	1,219	843	908

<sup>50</sup> See <https://ampd.epa.gov/ampd/>.

<sup>51</sup> *Id.*

The state initially modeled Coronado using a federally enforceable rolling 30-day emission limit of 0.08 lb SO<sub>2</sub> /MMBtu for the facility's two coal-fired boilers (77 FR 72512). Section 5.2.3 of the Modeling TAD notes that given the short-term nature of the SO<sub>2</sub> standard, it is important to characterize peak emissions. To be consistent with the Modeling TAD, in July 2017, the state submitted revised modeling using actual hourly emissions for Coronado, as described above. We therefore conclude that the state adequately characterized emissions for both TEP-Springerville and Coronado in its modeling.

#### *5.3.2.6. 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 area of analysis for the Apache County area, the state selected surface meteorology from the NWS station located at St. Johns Industrial Air Park in St. Johns, Arizona (St. Johns Industrial Air Park) located at 34.518° N, 109.379° W, 29 km to the northwest of TEP-Springerville and 11 km southwest of Coronado. Upper air observations were taken from a different NWS station in Albuquerque, New Mexico located at 35.05N, 106.62W, 240 km northeast of TEP-Springerville. These stations were determined to be best representative of meteorological conditions within the area of analysis.

The state used AERSURFACE version 13016 using data from St. Johns Industrial Air Park to estimate the surface characteristics (albedo, Bowen ratio, and surface roughness ( $z_0$ )) 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 " $z_0$ ." The state estimated surface roughness values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for average conditions.

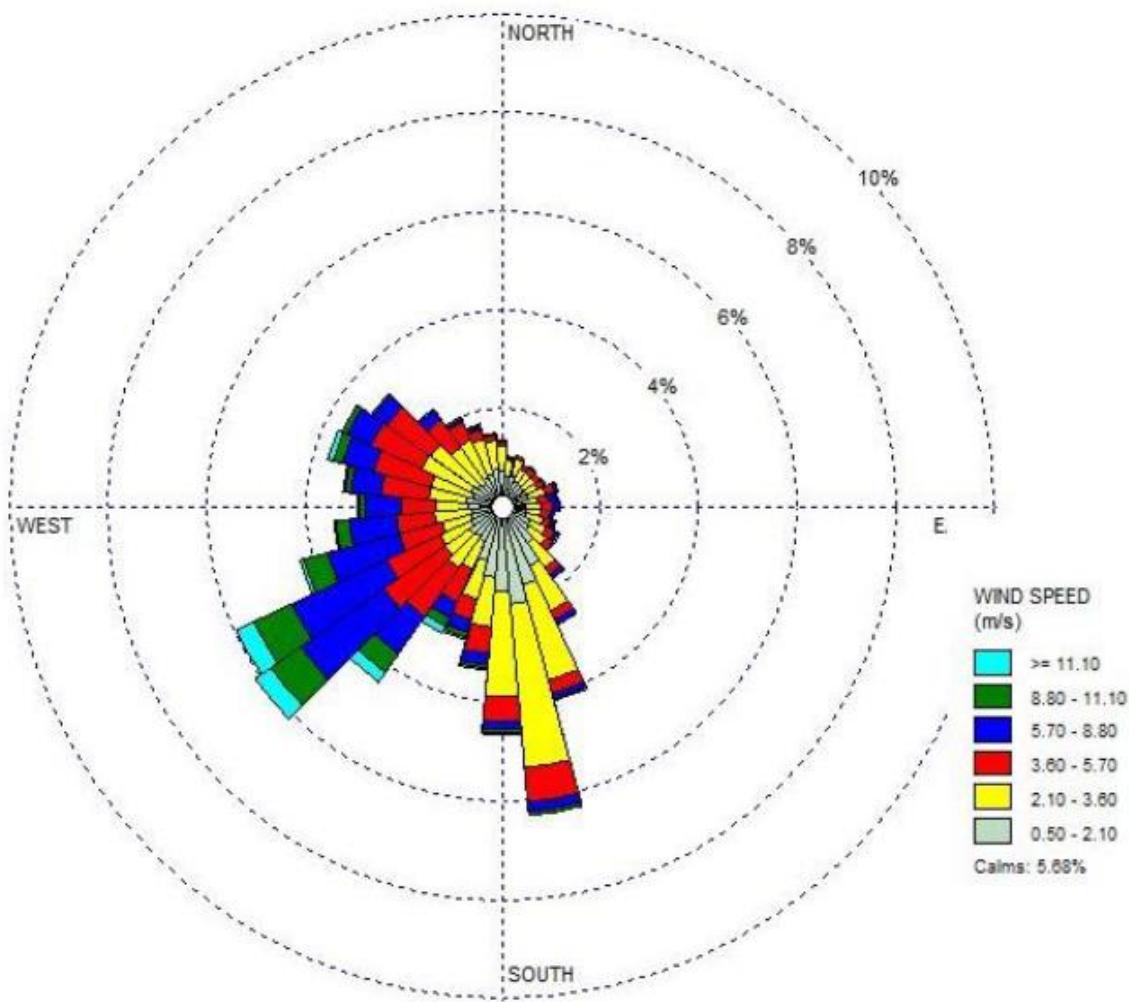
Figure 15 below, included in the state's submittal, shows the NWS stations relative to the area of analysis.

**Figure 15. Area of Analysis and the NWS station at St. Johns Industrial Air Park in the Apache County Area and upper-air observations from Albuquerque, NM**



As part of its recommendation, the state provided the 3-year surface wind rose for St. Johns Industrial Air Park. In Figure 16, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. Dominant wind directions are from the south and southwest at variable wind speeds. Calm conditions occur 5.7 percent of the time

**Figure 16. Apache County, Arizona Cumulative Annual Wind Rose for Years 2012 – 2014**



Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor version 15181. 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 modeling protocol submitted by the state in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration was provided from St. John's Industrial Airpark, 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 state selected meteorological sites, processed meteorological data, and estimated surface characteristics consistent with the procedures outlined in the TAD.

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

The terrain in the area of analysis is best described as mostly flat within 50km of the facility, except for the Escudilla Mountains located about 40 km south of the facility. 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.

We conclude the state accounted for topography in its modeling, consistent with the procedures outlined in the TAD.

#### *5.3.2.8. Modeling Parameter: Background Concentrations of SO<sub>2</sub>*

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO<sub>2</sub> 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 99<sup>th</sup> percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state used a “tier 1” approach to calculate background concentrations using observations from the Central Phoenix monitoring station (AQS ID: 040133002). The Central Phoenix monitor is located in an urban area, surrounded by various anthropogenic sources. In contrast, TEP-Springerville is located in a rural area without significant anthropogenic activities, so the state asserts it is a conservative choice for background concentration of SO<sub>2</sub> here. The state reported 2010-2012, 2011-2013, and 2012-2014 3-year 1-hour SO<sub>2</sub> design values at the Central Phoenix site as 8 ppb, 8 ppb and 7 ppb, respectively. The state determined the single value of the background concentration for this area of analysis to be 20.18 µg/m<sup>3</sup>, equivalent to 7.7 ppb when expressed in two significant figures,<sup>52</sup> and that value was incorporated into the final AERMOD results. AQS shows that the 2010-2012, 2011-2013, and 2012-2014 3-year 1-hour SO<sub>2</sub> design values at the Central Phoenix site are 9 ppb, 8 ppb and 8 ppb, respectively. Using these years and this monitor, we believe the single value of the background concentration for this area of analysis should be 21.74 µg/m<sup>3</sup>, equivalent to 8.3 ppb when expressed in two significant figures. For comparison, the 2013-2015 and 2014-2016 3-year design values at Central Phoenix were both 7 ppb, equivalent to 18.33 µg/m<sup>3</sup>.

Although the state appropriately relied on a tier 1 approach that is consistent with the Modeling TAD to characterize background concentrations of SO<sub>2</sub>, the design values reported by the state for the Central Phoenix monitor are lower than those reported in AQS by 1 ppb. Although we consider the background concentration used by the state to be in error, we recognize that the error is small. Therefore, we provide further evaluation of the effect on the modeling results of the erroneous background concentration for SO<sub>2</sub> in Section 5.3.2.9.

#### *5.3.2.9. Summary of Modeling Inputs and Results*

The AERMOD modeling input parameters for the Apache County area of analysis are summarized below in Table 10.

---

<sup>52</sup> The SO<sub>2</sub> NAAQS level is expressed in ppb but AERMOD gives results in µg/m<sup>3</sup>. The conversion factor for SO<sub>2</sub> (at the standard conditions applied in the ambient SO<sub>2</sub> reference method) is 1 ppb = approximately 2.619 µg/m<sup>3</sup>.

**Table 10: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Apache County Area**

<b>Input Parameter</b>	<b>Value</b>
AERMOD Version	16216r (with default options) <sup>53</sup>
Dispersion Characteristics	Rural
Modeled Sources	2
Modeled Stacks	6
Modeled Structures	20
Modeled Fencelines	1
Total receptors	8,237
Emissions Type	Actual
Emissions Years	2012-2014 for TEP-Springerville and Coronado
Meteorology Years	2012-2014
NWS Station for Surface Meteorology	St. Johns Industrial Air Park
NWS Station Upper Air Meteorology	Albuquerque, New Mexico
NWS Station for Calculating Surface Characteristics	St. Johns Industrial Air Park
Methodology for Calculating Background SO <sub>2</sub> Concentration	Central Phoenix monitoring station (AQS ID: 040133002) Tier 1 based on design value
Calculated Background SO <sub>2</sub> Concentration	7.7 ppb

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

---

<sup>53</sup> The state initially used AERMOD version 15181, the most up-to-date version at the time of submittal. On July 26, 2017, the state submitted revised modeling using AERMOD version 16216r, the regulatory model version, using all regulatory default options.

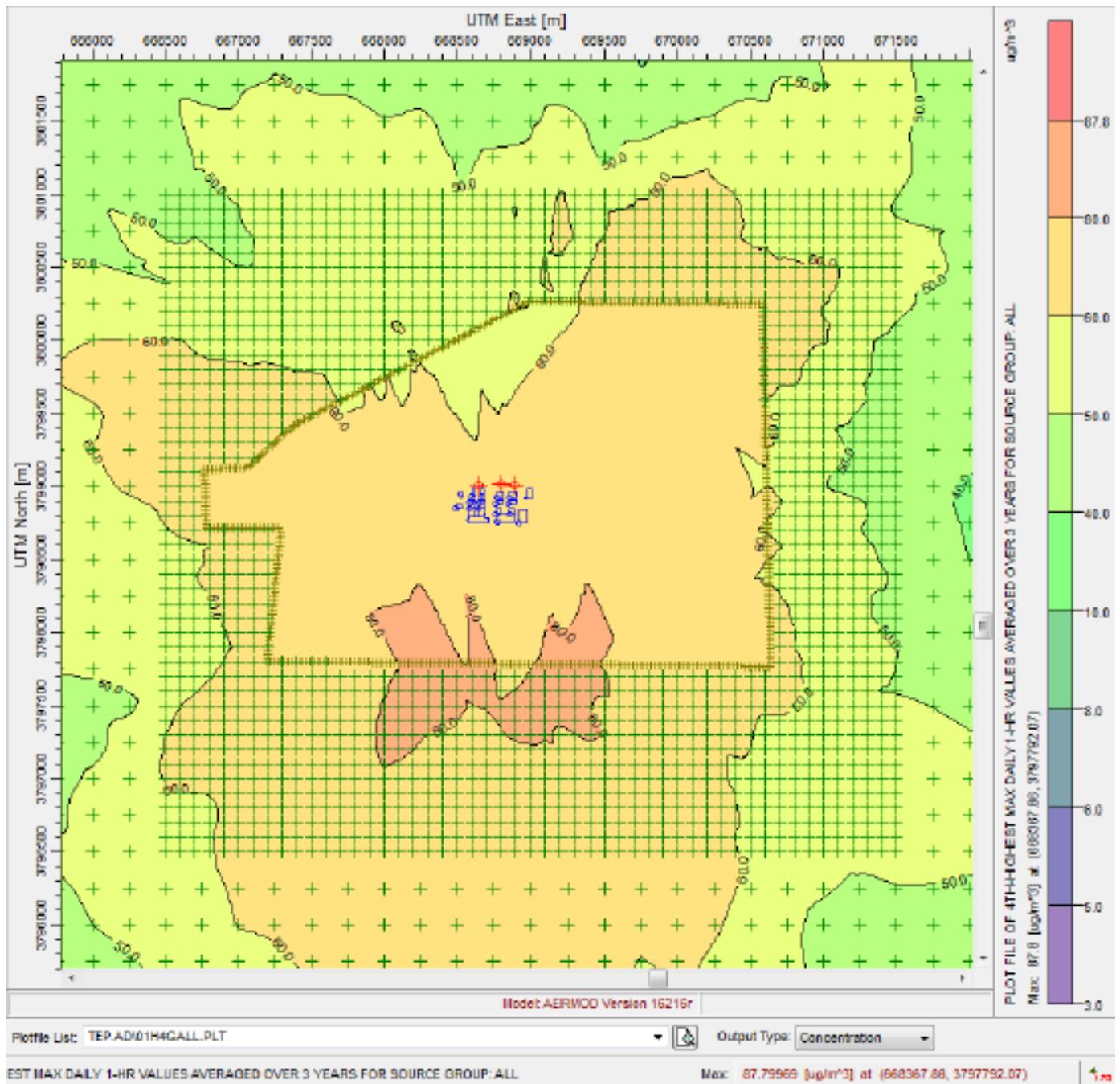
**Table 11. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentration Averaged Over 3 Years for the Area of Analysis for the Apache County Area**

Averaging Period	Data Period	Receptor Location [UTM zone 12]		Maximum 99 <sup>th</sup> percentile daily maximum 1-hour SO <sub>2</sub> Concentration ( $\mu\text{g}/\text{m}^3$ )	
		UTM/Latitude	UTM/Longitude	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2012-2014	3,797,792m / 34.308°N	668,368m /109.170°W	108.1	196.4*

\* Equivalent to the 2010 SO<sub>2</sub> NAAQS of 75 ppb using a 2.619  $\mu\text{g}/\text{m}^3$  conversion factor

As shown in Figure 17, the state's modeling indicates that the highest predicted 99<sup>th</sup> percentile daily maximum 1-hour concentration within the modeling domain resulting from actual emissions from TEP-Springerville and Coronado is 87.8  $\mu\text{g}/\text{m}^3$ , equivalent to 33.6 ppb, and is located along the fence line of TEP-Springerville. This modeled concentration does not include the background concentration of SO<sub>2</sub>. Using the background concentration for SO<sub>2</sub> calculated by Arizona, the maximum predicted concentration, with background, is 108.1  $\mu\text{g}/\text{m}^3$  (41.8 ppb), well below the level of the NAAQS. Using a background concentration, based on SO<sub>2</sub> concentrations in AQS for the Central Phoenix monitor of 21.74  $\mu\text{g}/\text{m}^3$  (8.3 ppb) would result in a maximum predicted concentration of 109.6  $\mu\text{g}/\text{m}^3$  (41.9 ppb). We therefore conclude that the while the state used erroneous 1-hour SO<sub>2</sub> design values (which differed from AQS by 1 ppb) to calculate background concentrations of SO<sub>2</sub>, this discrepancy would not change the state's determination that emissions of SO<sub>2</sub> from TEP-Springerville are not modeled to cause or contribute to violations of the NAAQS.

**Figure 17: Predicted 99<sup>th</sup> Percentile Daily Maximum 1-Hour SO<sub>2</sub> Concentrations Averaged Over 3 years for the Area of Analysis for the Apache County Area**



The modeling submitted by the state indicates that the 1-hour SO<sub>2</sub> NAAQS is not violated at the receptor with the highest modeled concentration.

#### *5.3.2.10. The EPA's Assessment of the Modeling Information Provided by the State*

The state initially performed modeling for a portion of Apache County that includes TEP-Springerville using AERMOD version 15181. On July 26, 2017, the state submitted revised modeling using AERMOD version 16216r, the regulatory model version, using all regulatory default options. The revision addressed source characterization, downwash, and emissions for Coronado. All other inputs remained the same.

Based on the information provided by the state and summarized in Section 5.3, we conclude that the state adequately examined and characterized sources within the area of analysis and appropriately placed receptors in the modeling domain; adequately characterized stack parameters and accounted for building downwash; correctly selected meteorological sites and properly processed the data; adequately estimated surface characteristics; and appropriately characterized emissions from TEP-Springerville and Coronado. Although the state calculated background concentrations of SO<sub>2</sub> using erroneous SO<sub>2</sub> concentrations for the Central Phoenix monitor that are lower than those reported in AQS, the discrepancy would not change the state's conclusion that emissions from TEP-Springerville and Coronado do not cause or contribute to violations of the NAAQS.

Based on this assessment, we conclude the modeling provided by the state accurately characterizes air quality in the area of analysis for the Apache County area.

### **5.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Apache County Area**

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.

For determining the appropriate boundaries for the unclassifiable/attainment area of Apache County, it is useful to also consider emissions of SO<sub>2</sub> within the county but beyond the area used in the modeling analysis. Based on the National Emissions Inventory (NEI) for 2014, SO<sub>2</sub> emissions in Apache County totaled 7,365 tpy. This county-level emission estimate includes emissions from point, nonpoint, on-road, non-road, and event emissions.<sup>54</sup> TEP-Springerville, which emitted 6,221 tpy of SO<sub>2</sub> according to the 2014 NEI, combined with Coronado, which emitted 908 tpy of SO<sub>2</sub> according to the 2014 NEI and was also included in the modeling analysis, together contribute approximately 97 percent of the county-level emissions.

---

<sup>54</sup> Event emissions in the NEI include wildfires and prescribed burns. See <https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei>.

## 5.5. Jurisdictional Boundaries in the Apache County Area

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

In its 2011 submission, Arizona recommended that all counties in the state, including Apache County, be designated unclassifiable based on an absence of information. The state also recommended excluding areas of Indian country, over which Arizona does not have jurisdiction.

Portions of the reservations lands of the Navajo Nation, the White Mountain Apache Tribe, and the Zuni Tribe are located within Apache County. ADEQ has jurisdiction to administer air quality programs in Apache County, excluding those portions of Apache County located in Indian country. There are no sources of SO<sub>2</sub> emissions located in any of the areas of Indian country geographically located in Apache County.

## 5.6. Other Information Relevant to the Designations for the Apache County Area

In 2011, the EPA issued a memorandum outlining the EPA's approach for designating areas of Indian country. If the EPA either does not receive an initial designation recommendation from a tribe, or receives a recommendation that does not specify designation of a separate area, the EPA intends to designate the relevant tribe's area of Indian country as part of the surrounding area, and to the extent possible, to ensure that a single tribe's areas of Indian country are not inadvertently split based on the use of other jurisdictional boundaries (*e.g.*, county boundaries) when designating the surrounding state areas.<sup>55</sup>

The EPA did not receive recommendations from the White Mountain Apache Tribe or the Zuni Tribe. The Zuni Tribe has areas of Indian country geographically located in Arizona, as well as larger land areas geographically located in New Mexico that are not contiguous to its lands located in Arizona. Because there are sources of SO<sub>2</sub> emissions located on the Navajo Nation that are subject to the DRR, the EPA is addressing the Navajo Nation in Chapter 24 of this TSD.

In recent designations, the EPA has designated Apache County as a separate area that has included areas of Indian country within the county (*e.g.*, 1997 and 2012 Annual PM<sub>2.5</sub>, 1997 and 2006 24-hour PM<sub>2.5</sub>, 2010 NO<sub>2</sub>, 1997 and 2008 8-hour ozone).<sup>56</sup>

---

<sup>55</sup> Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, to Regional Air Directions, Regions I-X, dated December 20, 2011.

<sup>56</sup> 40 CFR 81.303 – Arizona.

## 5.7. The EPA’s Assessment of the Available Information for the Apache County Area

There is no approved regulatory SO<sub>2</sub> monitoring network located in Apache County and Arizona has chosen to characterize air quality in the area surrounding TEP-Springerville using air quality modeling. Using actual emissions from 2012-2014 for TEP-Springerville and Coronado, Arizona’s analysis indicates that combined emissions of TEP-Springerville and Coronado do not cause a violation of the 2010 SO<sub>2</sub> NAAQS in the surrounding area or contribute to a nearby area that does not meet the NAAQS. We also note that emissions in recent years, *e.g.*, 2015 and 2016, as discussed in section 5.3.2.5, were consistent or lower than the emissions in the modeled period of 2012-2014. In 2015, TEP-Springerville emitted 5,780 tons of SO<sub>2</sub>, and in 2016, TEP-Springerville emitted 6,341 tons of SO<sub>2</sub>.<sup>57</sup> In 2015, Coronado emitted 682 tons of SO<sub>2</sub>, and in 2016, Coronado emitted 589 tons of SO<sub>2</sub>.<sup>58</sup>

The area of analysis in the modeling was represented by a grid extending about 50 km from TEP-Springerville and included emissions from Coronado. Emissions from TEP-Springerville and Coronado, combined, represented approximately 97 percent of SO<sub>2</sub> emissions in Apache County in 2014. Therefore, the EPA anticipates that the modeling results for TEP-Springerville combined with Coronado, which show no violations of the 2010 SO<sub>2</sub> NAAQS, conservatively represent air quality in other areas of Apache County, in which there are no other large sources (sources that emit in excess of 100 tpy) of SO<sub>2</sub>.

Apache County is located in the northeastern portion of Arizona, adjacent to the border with New Mexico, and includes areas of Indian country (reservation lands of the Navajo Nation, Zuni Tribe, and White Mountain Apache Tribe). Although Arizona only has jurisdiction to administer air quality programs in the areas of Apache County that are not areas of Indian country, the EPA has designated Apache County (including areas of Indian country) as a separate area for other NAAQS.

We have not received recommendations from the White Mountain Apache Tribe or the Zuni Tribe. The White Mountain Apache Tribe has reservation lands that span Navajo, Apache, and Gila counties in Arizona, and as discussed in section 3, the EPA intends to include all areas of the White Mountain Apache Tribe in the intended Navajo County unclassifiable/attainment area. The EPA intends to include the lands of the Zuni Tribe within Apache County in the intended Apache County unclassifiable/attainment area.<sup>59</sup> This is generally consistent with recent designations where all areas of Indian country within Apache County have been designated with Apache County. However, the result of this intended designation is that the Zuni Tribe’s areas of Indian country geographically located in New Mexico would be designated separately from its non-contiguous area in Arizona.

The Navajo Nation has reservation lands that span several counties in Arizona, New Mexico, and Utah. Because there are two sources of SO<sub>2</sub> emissions subject to the DRR, we have received

---

<sup>57</sup> See <https://ampd.epa.gov/ampd/>.

<sup>58</sup> *Id.*

<sup>59</sup> The Zuni Tribe also has areas of Indian country geographically located in New Mexico.

modeling analyses from the Navajo Nation, and we intend to designate the Navajo Nation separately from areas of Arizona, New Mexico, and Utah (*see chapter 24 for the Navajo Nation*).

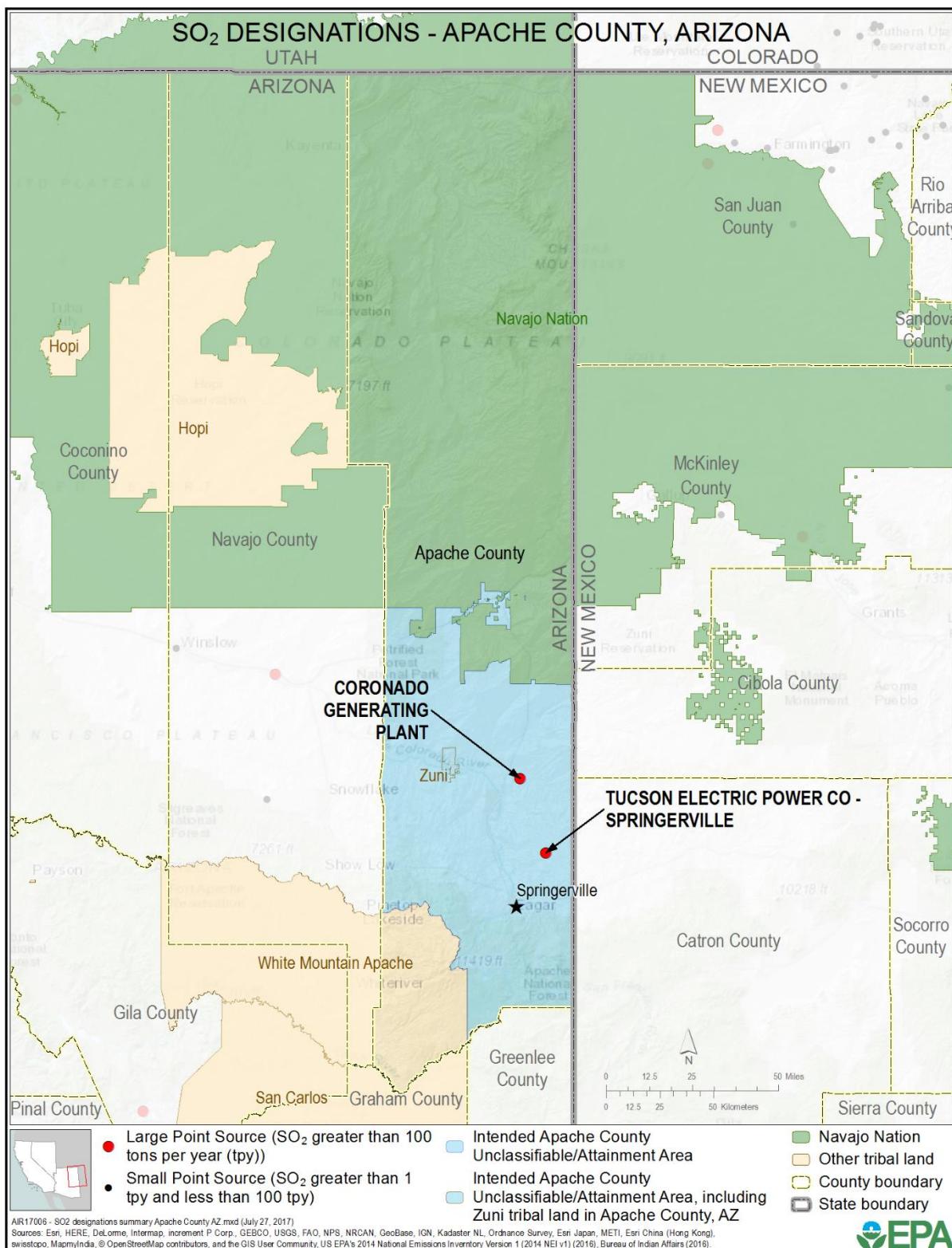
Based on our review of the modeling analysis for TEP-Springerville and Coronado submitted by Arizona, and our consideration of county-wide emissions, we intend to designate Apache County, including areas of Indian country but excluding the Navajo Nation and the White Mountain Apache Tribe, as unclassifiable/attainment for the 2010 SO<sub>2</sub> NAAQS.

The EPA believes that our intended unclassifiable/attainment area, bounded by the boundaries of Apache County, excluding the Navajo Nation and White Mountain Apache Tribe areas of Indian country, 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.

## 5.8. Summary of Our Intended Designation for the Apache County Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the Apache County area does not violate the 2010 SO<sub>2</sub> NAAQS and does not contribute to a nearby area that does not meet the NAAQS, and the EPA intends to designate Apache County as unclassifiable/attainment for the 2010 SO<sub>2</sub> NAAQS. Specifically, the boundaries are comprised of all of Apache County, including any areas of Indian country except the Navajo Nation and White Mountain Apache areas of Indian country. Figure 18 shows the boundary of this intended designated area. The Navajo Nation portion of Apache County is addressed in Chapter 24 for the Navajo Nation.

**Figure 18. Boundary of the Intended Apache County Unclassifiable/Attainment Area**



## 6. Technical Analysis for the Rest of Arizona

### 6.1. Introduction

The state has not timely installed and begun operation of a new, approved SO<sub>2</sub> monitoring network meeting EPA specifications referenced in the EPA's SO<sub>2</sub> DRR for any sources of SO<sub>2</sub> emissions in the counties and portions of counties identified in Table 12. 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 and portions of counties. In addition, there is no air quality monitoring data that indicate any violation of the 1-hour SO<sub>2</sub> NAAQS. The EPA is designating the counties and portions of counties in Table 12 in the state as "unclassifiable/attainment" since 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.

**Table 12. Counties, Portions of Counties, and Areas of Indian Country that the EPA Intends to Designate Unclassifiable/Attainment**

County or Partial County (p)	Arizona's Recommended Area Definition	Arizona's Recommended Designation	EPA's Intended Area Definition*	EPA's Intended Designation
Mohave County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Coconino County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country and excluding lands of the Navajo Nation and Hopi Tribe	Unclassifiable/Attainment
La Paz County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Yavapai County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Gila County (p)	Whole County excluding areas of Indian country and Miami and Hayden	Unclassifiable	Whole County including areas of Indian country with the exception of excluding lands of the White	Unclassifiable/Attainment

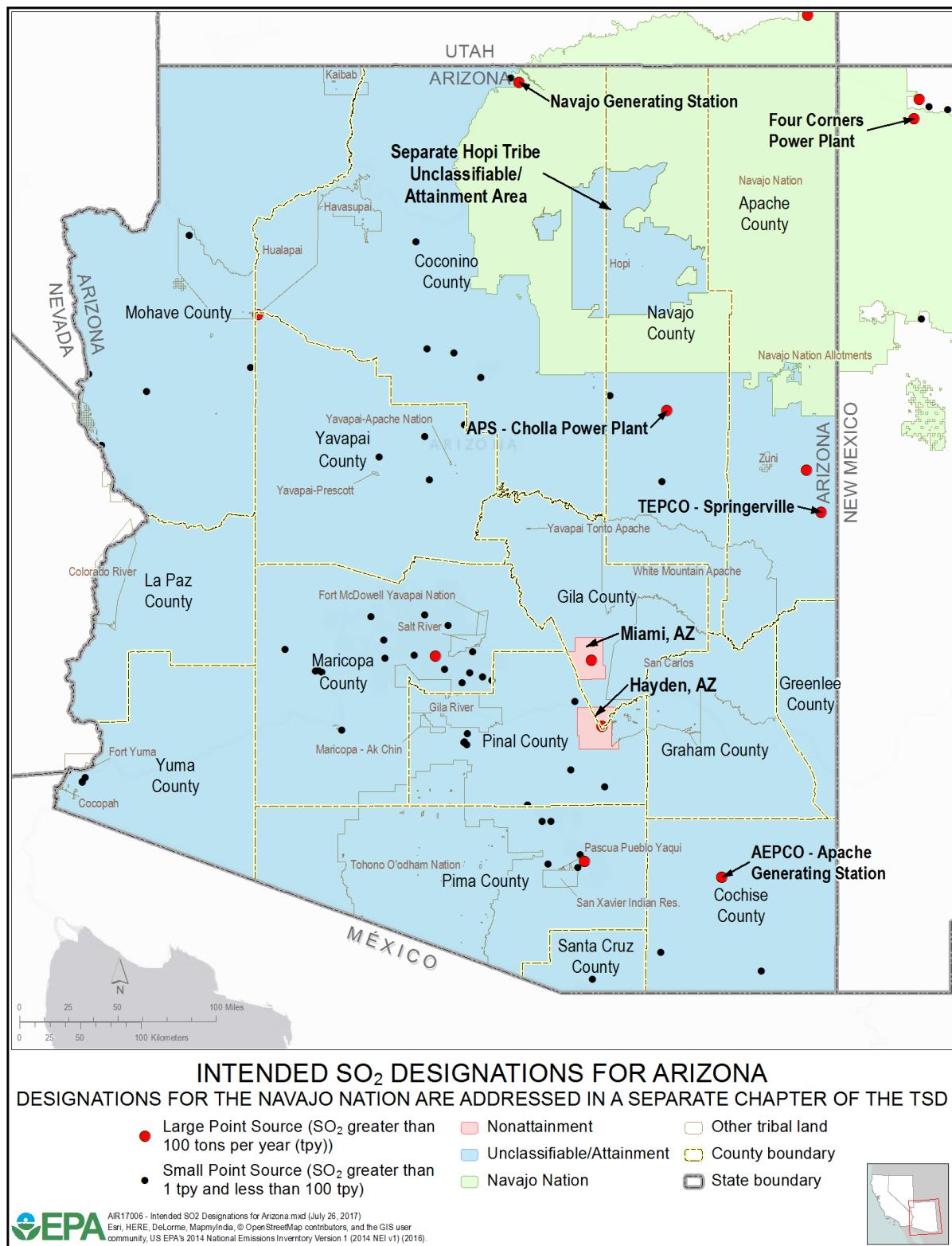
<b>County or Partial County (p)</b>	<b>Arizona's Recommended Area Definition</b>	<b>Arizona's Recommended Designation</b>	<b>EPA's Intended Area Definition*</b>	<b>EPA's Intended Designation</b>
	Nonattainment Areas		Mountain Apache Tribe and excluding the Miami and Hayden Nonattainment Areas	
Graham County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Greenlee County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Maricopa County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Pinal County (p)	Whole County excluding areas of Indian country and Hayden Nonattainment Area	Unclassifiable	Whole county including areas of Indian country excluding Hayden Nonattainment Area	Unclassifiable/Attainment
Yuma County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Pima County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Santa Cruz County	Whole County excluding areas of Indian country	Unclassifiable	Whole county including areas of Indian country	Unclassifiable/Attainment
Hopi Tribe	No Tribal Recommendation Received	No Tribal Recommendation Received	Hopi Tribe	Unclassifiable/Attainment

\* EPA is not determining the boundaries of any area of Indian country in this document, including any area of Indian country located in the larger designation area. The inclusion of any Indian country in the designation area is not a determination that the state has regulatory authority under the Clean Air Act for such Indian country.

Table 12 also summarizes Arizona's recommendations for these areas. Specifically, the state recommended that all counties in Arizona (excluding the Hayden and Miami areas that the EPA has since designated as nonattainment in Round 1), except for areas of Indian country, be designated as unclassifiable, based on an absence of information. After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to modify the state's recommendation and designate these areas as unclassifiable/attainment. Figure 19 shows the locations of these areas within Arizona. Note that, as described in Table 12, the

boundaries of these unclassifiable/attainment areas do not all follow county boundaries. For example, the boundaries of the Navajo County unclassifiable/attainment area exclude the Navajo Nation and Hopi Tribe's portions of Navajo County but includes all lands of the White Mountain Apache Tribe, including those lands that are geographically located in Gila and Apache Counties. The EPA intends to designate the Hopi Tribe as a separate unclassifiable/attainment area, and the EPA is addressing the Navajo Nation in chapter 24 of the TSD.

**Figure 19. The EPA's Intended Unclassifiable/Attainment Designations for Counties and Partial Counties in Arizona**



## 6.2. Air Quality Monitoring Data for the Rest of Arizona

SO<sub>2</sub> data collected between 2014 and 2016 for each monitor listed in Table 13 below is available in AQS, is certified, and meets completeness requirements outlined in 40 CFR 50 Appendix T. The three Maricopa County monitors are located within the city of Phoenix. The other monitor is in the city of Tucson, in Pima County. Besides monitors located within the existing Miami and Hayden 2010 SO<sub>2</sub> NAAQS nonattainment areas, these four monitors are the only regulatory SO<sub>2</sub> monitors within the state. Design values for this period at these four sites were below the NAAQS. These data were available to the EPA for consideration in the designations process, however, since it is unclear if these monitors are located in the areas of maximum concentration, it is unclear if the data are representative of the area's actual air quality.

**Table 13. Air Quality Data in the Rest of Arizona**

<b>State</b>	<b>County</b>	<b>AQS ID</b>	<b>Address</b>	<b>2014-2016 Design Value (ppb)</b>
AZ	Maricopa	04-013-3002	1645 E Roosevelt St.-Central Phoenix Station	7
AZ	Maricopa	04-013-9812	2702 AC Ester Brook Boulevard	8
AZ	Maricopa	04-013-9997	4530 N 17 <sup>th</sup> Avenue	5
AZ	Pima	04-019-1028	400 W River Road	4

## 6.3. Jurisdictional Boundaries in the Rest of Arizona

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

In its 2011 submission, Arizona recommended that all counties in the state, excluding the partial counties with violating monitors in the Hayden and Miami areas, be designated unclassifiable based on an absence of information. The state also recommended excluding areas of Indian country, over which Arizona does not have jurisdiction.

## 6.4. Other Information Relevant to the Designations for the Rest of Arizona

In 2011, the EPA issued a memorandum outlining the EPA's approach for designating areas of Indian country. If the EPA either does not receive an initial designation recommendation from a tribe, or receives a recommendation that does not specify designation of a separate area, the EPA intends to designate the relevant tribe's area of Indian country as part of the surrounding area, and, to the extent possible, to ensure that a single tribe's areas of Indian country are not

inadvertently split based on the use of other jurisdictional boundaries (*e.g.*, county boundaries) when designating the surrounding state areas.<sup>60</sup>

The EPA did not receive designation recommendations from any tribes geographically located in the rest of Arizona.

In recent designations, the EPA has generally designated these counties as separate areas that have included areas of Indian country within the county (*e.g.*, 1997 and 2012 Annual PM<sub>2.5</sub>, 1997 and 2006 24-hour PM<sub>2.5</sub>, 2010 NO<sub>2</sub>, 1997 and 2008 8-hour ozone).<sup>61</sup>

## 6.5. The EPA's Assessment of the Available Information for the Rest of Arizona

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, generally 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 areas.

Because the EPA did not receive designation recommendations from tribes geographically located in the counties listed in Table 12, consistent with our tribal designation policy, the EPA intends in most cases to designate the areas of Indian country with the surrounding county. However, for the Navajo Nation, with two sources subject to the DRR and lands in the Arizona counties of Coconino, Navajo, and Apache (as well as lands in the states of New Mexico and Utah), the EPA intends to designate this area separately (*see* chapter 24 for the Navajo Nation). As discussed in section 3, the EPA intends to include all lands of the White Mountain Apache Tribe, including those geographically located in Gila and Apache counties, within the Navajo County unclassifiable/attainment area, and the EPA intends to designate the lands of the Hopi Tribe, located in Navajo and Coconino counties, as a separate unclassifiable/attainment area.

The Hopi Tribe has reservation lands that are located in Navajo and Coconino counties. There are no known stationary sources of SO<sub>2</sub> emissions exceeding 1 tpy located on reservation lands of the Hopi Tribe, and the Hopi Tribe reservation lands 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. Because the lands of the Hopi Tribe are surrounded by the reservation lands of the Navajo Nation (*see* Figure 1), the Hopi Tribe does not share any boundaries with Navajo or Coconino Counties. Because the Hopi Tribe does not share any

---

<sup>60</sup> Memorandum from Stephen D. Page, Director, Office of Air Quality Planning and Standards, to Regional Air Directions, Regions I-X, dated December 20, 2011.

<sup>61</sup> 40 CFR 81.303 – Arizona.

borders with Navajo or Coconino Counties, and based on the EPA's intended separate designation for the Navajo Nation, the EPA considers a separate area designation to be appropriate for the Hopi Tribe. Although the Hopi Tribe did not submit a recommendation or request to be designated as a separate area, and although lands of the Hopi Tribe have been designated for previous NAAQS with Navajo and Coconino Counties, based on the aforementioned information the EPA intends to designate all reservation lands of the Hopi Tribe as a separate unclassifiable/attainment area.

Following the completion of these Round 3 designations, there will be no remaining undesignated areas in Arizona that will be addressed in Round 4.

#### 6.6. Summary of Our Intended Designation for the Rest of Arizona

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate each county or partial county in the rest of Arizona, including areas of Indian country unless otherwise noted, as a separate unclassifiable/attainment area for the 2010 SO<sub>2</sub> NAAQS.

Figure 19 above shows the location of these unclassifiable/attainment areas.