Technical Support Document:

Chapter 45
Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for Wyoming

1. Summary

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

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

[1] 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.

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

Wyoming submitted its first recommendation regarding designations for the 2010 1-hour SO_2 NAAQS on May 24, 2011. In this submission, Wyoming asserted that it would recommend an attainment designation for all counties in the state based on available monitoring data, but based on the state's reading of the EPA's March 24, 2011, SO_2 Designations Memo, was left with no option but to recommend a designation of unclassifiable for all counties in the state. The state submitted updated air quality analysis and updated recommendations on January 13, 2017; and as discussed below, on August 10, 2017, submitted revised a revised air quality modeling assessment and related information for the Naughton Power Plant that corrected errors in the emissions from explicitly modeled background sources. These updated recommendations only address the sources in the state which are subject to the DRR, and are described in further detail below. In our intended designations, we have considered all the submissions from the state, except where a later recommendation indicates that it replaces an earlier recommendation.

For the areas in Wyoming 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 Wyoming's current recommendations. The EPA's final designation for these areas will be based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above, and could change based on changes to this information (or the availability of new information) that alters EPA's assessment and characterization of air quality.

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

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

Area/County	Wyoming's Recommended Area Definition	Wyoming's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Campbell County	"Area Around Source"	Attainment	Full County	Unclassifiable/ Attainment
Lincoln County	"Area Around Source"	Attainment	Full County	Unclassifiable/ Attainment
Platte County	Full County	Attainment	Full County	Unclassifiable/ Attainment
Sweetwater County (p)	"Area Around Source"	Attainment	The portion of Sweetwater County east of Highway 191.	Unclassifiable/ Attainment
Remaining Undesignated Areas to Be Designated in this Action*	Full County	Unclassifiable	Full County (apart from Fremont County, where the EPA only intends to designate the portion of the County east of the Wind River Reservation and north of US Highway 26)	Unclassifiable/ Attainment

* Except for areas that are associated with sources for which Wyoming elected to install and began operation of a new, approved SO_2 monitoring network meeting EPA specifications referenced in EPA's SO_2 DRR (*see* Table 2), the EPA intends to designate the remaining undesignated counties (or portions of counties) in Wyoming as "unclassifiable/attainment" as these areas were not required to be characterized by the state under the DRR and the EPA does not have available 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 7 of this TSD.

Areas for which Wyoming elected to install and began operation of a new, approved SO_2 monitoring network are listed in Table 2. The EPA is required to designate these areas, pursuant to a court ordered schedule, by December 31, 2020. Table 2 also lists the SO_2 emissions sources around which each new, approved monitoring network has been established.

Table 2 – Undesignated Areas Which the EPA Is Not Addressing in this Round of Designations (and Associated Source or Sources)

Area	Source(s)
Carbon	Sinclair
Converse	PacifiCorp - Dave Johnston
Freemont	Lost Cabin Gas Plant
Sweetwater	Solvay Chemicals – Solvay Green River TATA Chemicals – Green River Works Westvaco Facility Tronox Alkali – Granger

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.

2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a July 22, 2016, memorandum and a March 20, 2015, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. These memoranda supersede earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and identify factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The documents also contain the factors that the EPA intends to evaluate in determining the boundaries for designated areas. These factors include: 1) air quality characterization via ambient monitoring or dispersion modeling results; 2) emissions-related data; 3) meteorology; 4) geography and topography; and 5) jurisdictional boundaries.

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

Readers of this chapter of this TSD should refer to the additional general information for the EPA's Round 3 area designations in Chapter 1 (Background and History of the Intended Round

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

3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard for States with Sources Not Required to be Characterized).

As specified by the March 2, 2015, court order, the EPA is required to designate by December 31, 2017, all "remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO_2 monitoring network meeting EPA specifications referenced in EPA's" SO_2 DRR. The EPA will therefore designate by December 31, 2017, areas of the country that are not, pursuant to the DRR, timely operating EPA-approved and valid monitoring networks. The areas to be designated by December 31, 2017, include the areas associated with 8 sources in Wyoming meeting DRR emissions criteria that states have chosen to be characterized using air dispersion modeling, and other areas not specifically required to be characterized by the DRR.

Because many of the intended designations have been informed by available modeling analyses, this preliminary TSD is structured based on the availability of such modeling information. There is a section for each county for which modeling information is available. For some counties, multiple portions of the county have modeling information available and the section on the county is divided accordingly. Next, section 6 addresses counties for which no air quality modeling information is available but for which available air quality monitoring data indicate that the NAAQS are already being met at an appropriately sited monitor. The remaining to-be-designated counties are then addressed together in section 7.

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

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

1) 2010 SO_2 NAAQS – The primary NAAQS for SO_2 promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. See 40 CFR 50.17.
2) Design Value - a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.
3) Designated nonattainment area – an area that, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined either: (1) does not meet the 2010 SO_2 NAAQS, or (2) contributes to ambient air quality in a nearby area that does not meet the NAAQS.
4) Designated unclassifiable/attainment area – an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

5) Designated unclassifiable area – an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO2 NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.
6) Modeled violation – a violation of the SO_2 NAAQS demonstrated by air dispersion modeling.
7) Recommended attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as attainment.
8) Recommended nonattainment area – an area that a state, territory, or tribe has recommended that the EPA designate as nonattainment.
9) Recommended unclassifiable area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable.
10) Recommended unclassifiable/attainment area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable/attainment.
11) Violating monitor – an ambient air monitor meeting 40 CFR parts 50, 53, and 58 requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
12) We, our, and us – these refer to the EPA.

3. Technical Analysis for the Lincoln County Area

3.1. Introduction

The EPA must designate the Lincoln County, Wyoming, area by December 31, 2017, because the area has not been previously designated and Wyoming has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any sources in Lincoln County.

3.2. Air Quality Monitoring Data for the Lincoln County Area

There are no SO_2 monitors in Lincoln County.

3.3. Air Quality Modeling Analysis for the Lincoln County Area Addressing Naughton Power Plant

3.3.1. Introduction

This section 3.3 presents all the available air quality modeling information for a portion of Lincoln County that includes Naughton Power Plant. (This portion of Lincoln County will often be referred to as "the Lincoln County area" within this section 3.3.). This area contains the following SO_2 sources, principally the sources around which Wyoming is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tons per year:

- The Naughton Power Plant facility emits 2,000 tons or more annually. Specifically, Naughton Power Plant emitted 6,235 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Wyoming has chosen to characterize it via modeling.

- The Shute Creek Treating Facility, Carter Creek Gas Plant and Pioneer Cryogenic Gas Plant are not on the SO_2 DRR Source list, but were included in this analysis due to their proximity to the Naughton facility.

In its submission, Wyoming recommended that an area that includes the area surrounding the Naughton Power Plant be designated as attainment based in part on an assessment and characterization of air quality impacts from this facility as well as nearby Pioneer Gas, Carter Creek and Shute Creek facilities. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing both actual and allowable emissions. After careful review of the state's assessment, supporting documentation, and all available data, the EPA agrees with the state's conclusion that the area attains the 2010 SO_2 NAAQS, and intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

As seen in Figure 1 below, the Naughton facility is located in southern Lincoln County.

Also included in the figure are other nearby emitters of SO_2.[5] These are Shute Creek Treating Facility (eastern Lincoln County), Carter Creek Gas Plant (northern Uintah County), and Pioneer Cryogenic Gas Plant (eastern Lincoln County).

The state did not recommend a specific boundary for its recommended attainment area, but instead recommended attainment for the area around the source. The EPA's intended unclassifiable/attainment designation boundary, which is formed by the borders of Lincoln County, is shown below.

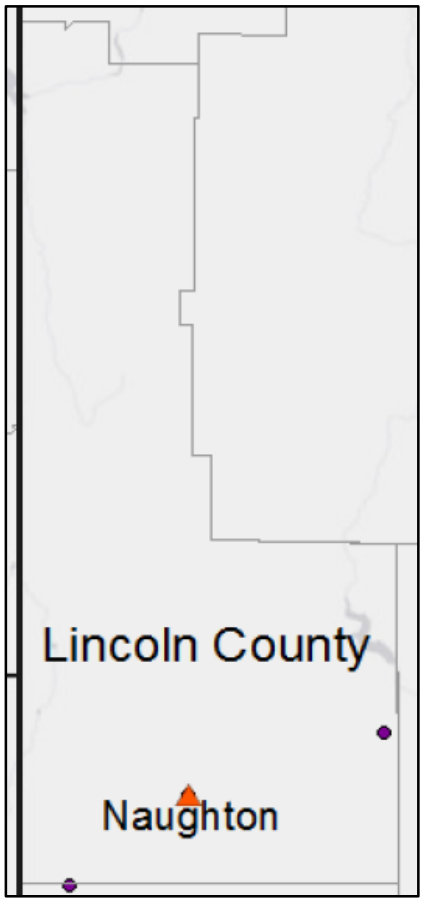


Figure 1. Map of the Lincoln County Area Addressing the Naughton Power Plant

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 and considered one assessment from the state.

[5] SO_2 emitters Shute Creek Treating Facility (361 tons/SO_2 in 2014) and Carter Creek Gas Plant (343 tons/SO_2 in 2014) are shown in Figure 1.

3.3.2. Modeling Analysis Provided by the State

The Wyoming Department of Environmental Quality (WDEQ) provided an air quality modeling assessment for the Naughton Power Plant located about 4 miles southwest of Kemmerer, Wyoming (WY). The Naughton Power Plant is located in Lincoln County, WY.

3.3.2.1.Model Selection and Modeling Components

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

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

In the modeling that the state submitted on January 13, 2017, the state originally used AERMOD version 15181, the most up-to-date version at the time of modeling, using all regulatory default options. The currently approved AERMOD platform is version 16216r that includes updates. At that time, the updates made to the components of AERMOD version 16216r were not utilized in the air quality modeling assessment, such as ADJ_U*. There were no updates from 15181 to 16216r that would significantly affect the concentrations predicted here.

On August 10, 2017, the state informed EPA that the emissions for the background sources were incorrect. In particular, the modeling provided to EPA on January 13, 2017 excluded units and assumed incorrect source parameters for the modeled sources. In the revised modeling submitted to EPA between August 10 and August 15 of 2017, the state used AERMOD version 16216r. Additional details about the errors/updates are outlined below in section 3.3.2.4. 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_2 modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the State determined that it was most appropriate to run the model in rural mode. The site location was classified as rural using the land use procedure specified in Appendix W. The location of the plant is shown in Figure 2. A topographic map of the area surrounding Naughton is provided in Figure 3. As shown in the figures, there is "complex" terrain (with elevations above stack top) within 10 kilometers of the plant. In addition, the area in the immediate vicinity (i.e., within 3 km) of Naughton can be characterized as having a rural land use type because the surrounding land - - as shown in Figures 2 and 3 - - contains less than 50 percent of developed land use categories. EPA's assessment supports the State's analysis on the land use classification.

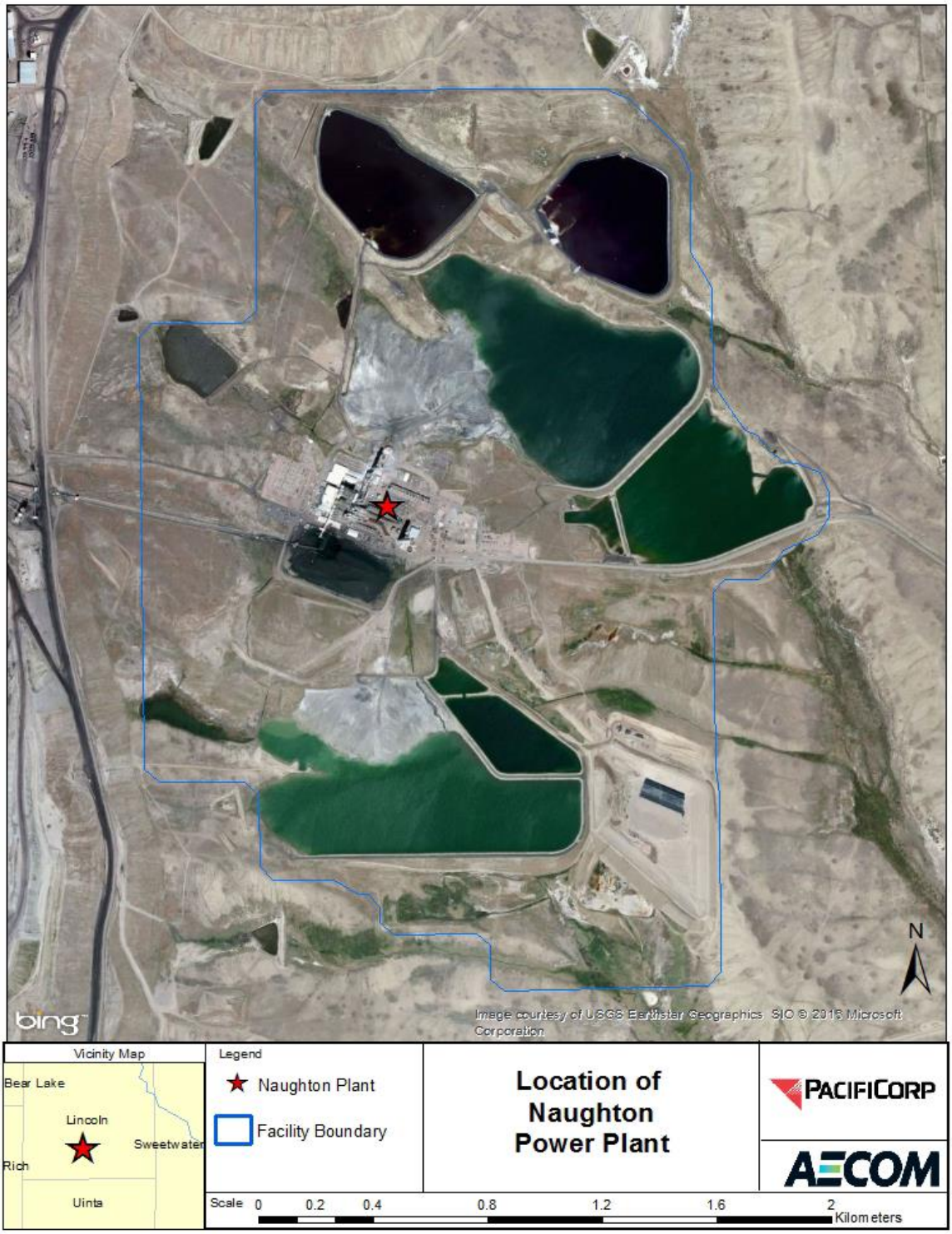


Figure 2. Location of Naughton Power Plant.

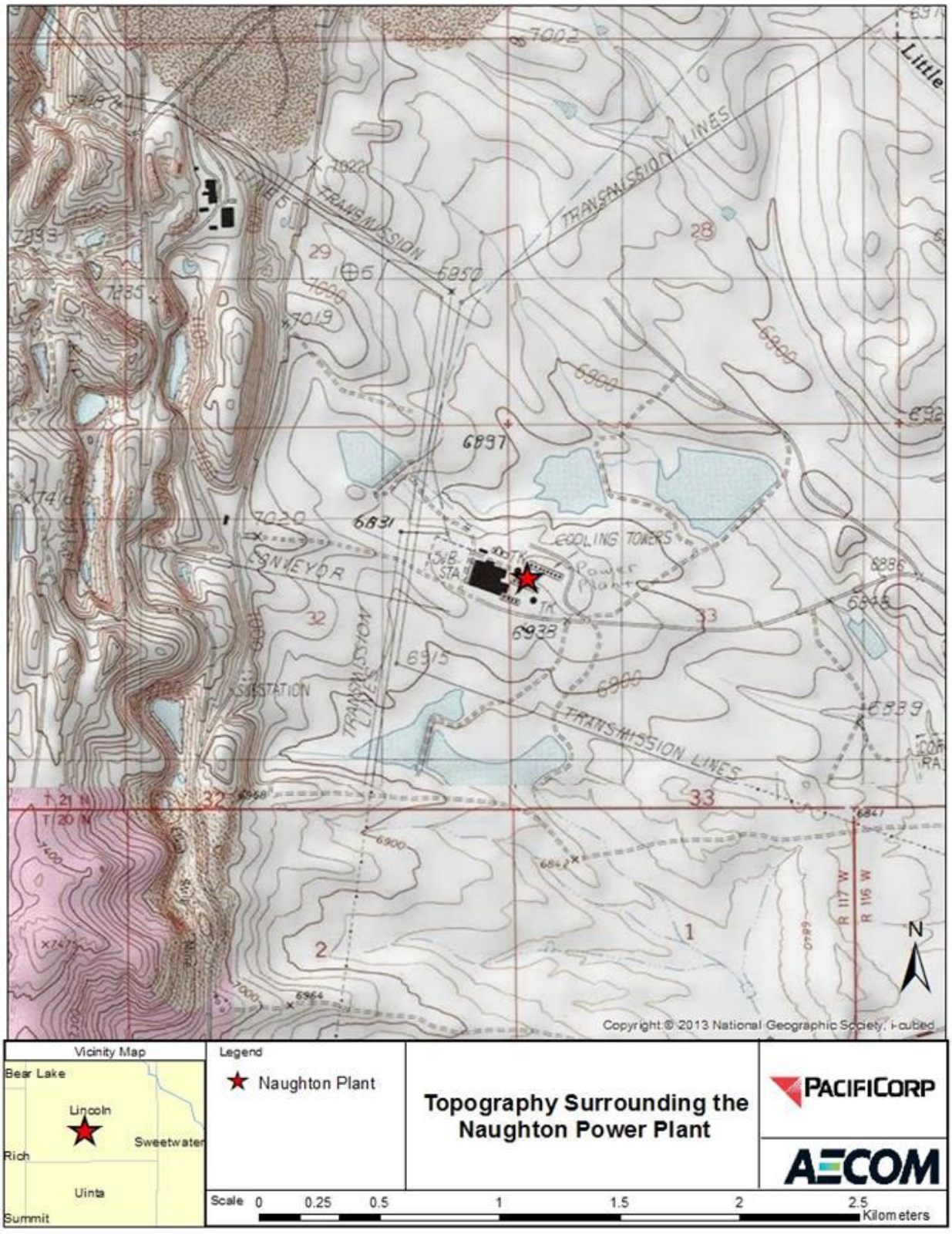


Figure 3. Topography in the Vicinity of Naughton Power Plant.

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

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

The source of SO_2 emissions subject to the DRR in this area are described in the introduction to this section. For the Lincoln County area, the state has included three other emitters of SO_2 within 50 km of the Naughton facility. The facilities included were the Pioneer Gas Plant, Carter Creek Gas Plant, and Shute Creek Treating Facility. The Kemmerer Mine is also located to the west of the facility. However, WDEQ confirmed that Kemmerer Mine, according to the 2011 National Emissions Inventory (2011 NEI), produced only 1.2 tons of annual SO_2 emissions. This emission rate should be captured in ambient background data. Additional information about the Naughton Power Plant is included below. The state determined that this was the appropriate distance to adequately characterize air quality through modeling to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. The state explained that no other sources beyond 25 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis. Any sources outside of the 25 km model domain, such as Carter Creek Gas Plant (33 km from Naughton) and Shute Creek Treating facility (45 km from Naughton), were captured as background sources and explicitly modeled in the AERMOD simulation. The EPA finds the receptor domain, extending to 25 km from the facility, sufficient as it captures all SO_2 sources that might impact SO_2 levels in the area.

A Cartesian modeling receptor array was established to capture the 99^{th} percentiles of the maximum daily one-hour average SO_2 impacts from Naughton. The receptor grid is a relatively dense receptor array with the following spacing beyond the fence line:

- 50-m receptor spacing along the ambient air boundary for the SO_2 characterization (includes boundaries of both Naughton facility and Kemmerer Mine).
- 100-m receptor spacing extending out 1.8 kilometers from the grid center.
- 250-m receptor spacing between 1.8 and 3.0 kilometers from the grid center.
- 500-m receptor spacing between 3.0 and 10 kilometers from the grid center.
- 1000-m receptor spacing beyond 10 kilometers (out to 25 km).

The receptor grid used in the modeling analysis can be seen in Figure 4 and Figure 5 for near-field and far-field views, respectively. It was based on Universal Transverse Mercator (UTM) coordinates referenced to NAD 83 datum and in zone 12. The receptor grid was centered at the approximate mid-point of the modeled facility based on WDEQ Guidance Document. A total of 11,135 receptors were used for the modeling.

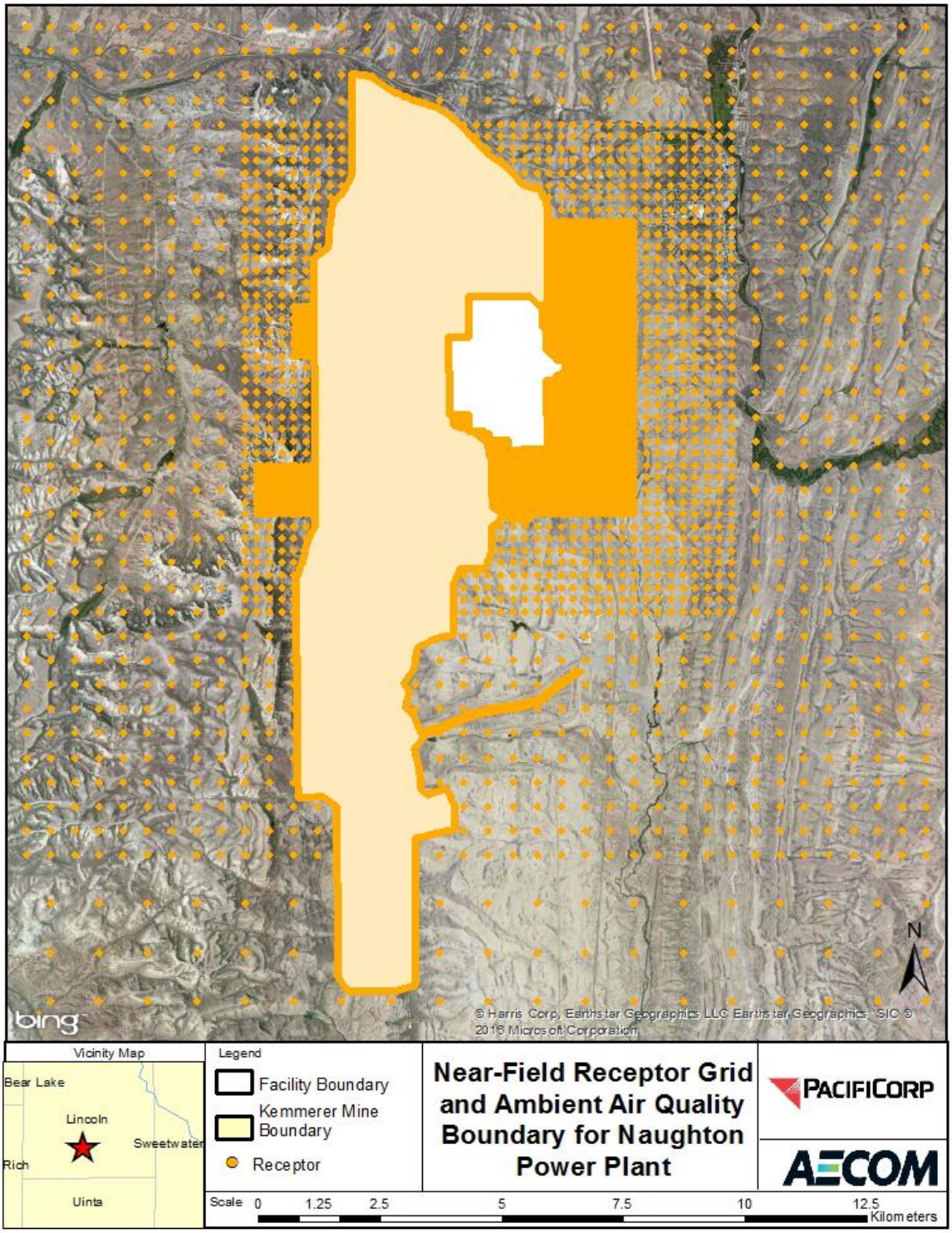


Figure 4. Naughton Near-Field Receptor Array.

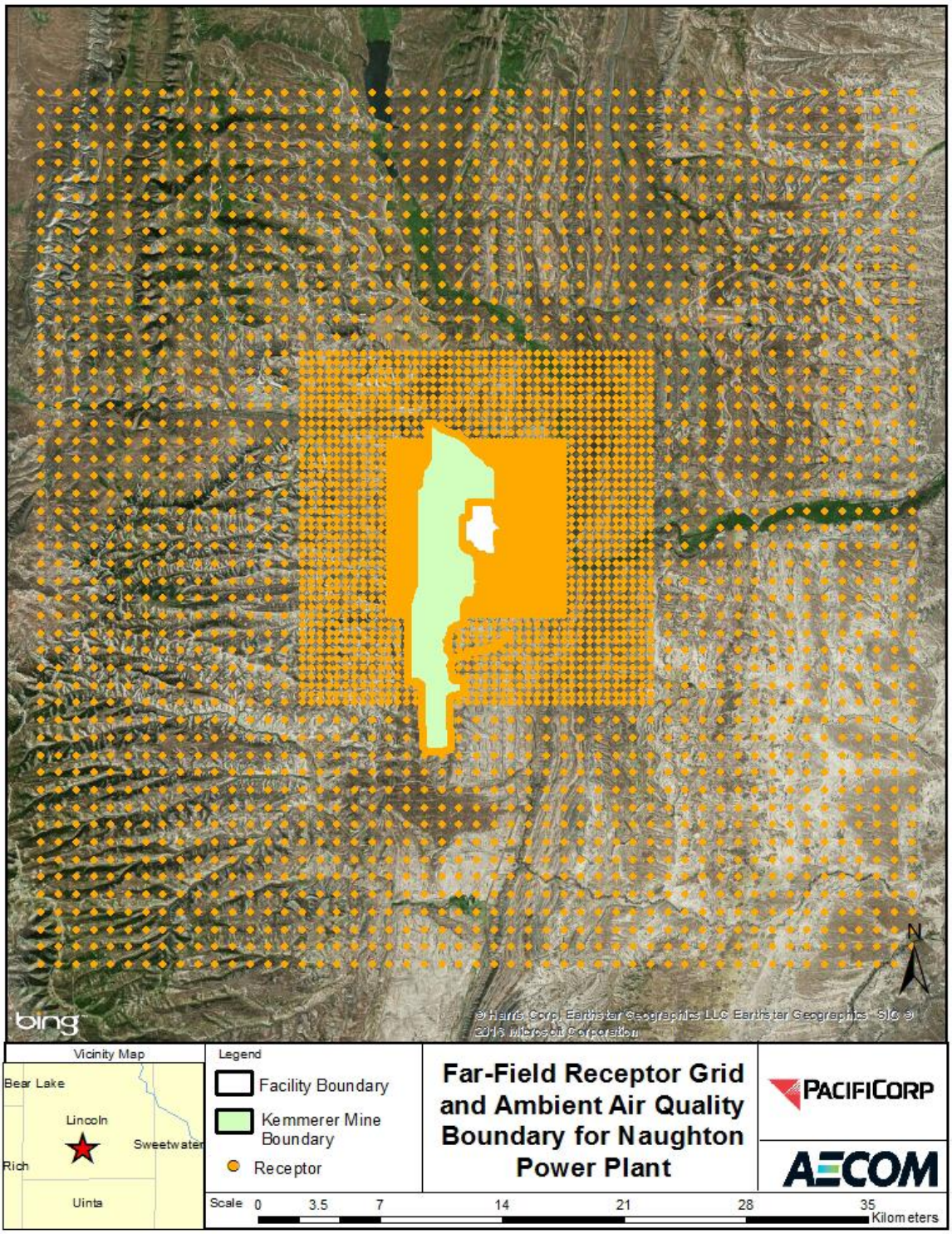


Figure 5. Naughton Far-Field Receptor Array.

WDEQ's modeling analysis excluded receptors within the Naughton facility fence line and at an adjacent property. WDEQ asserted that public access is precluded within the Naughton fenceline by explaining that the property is secured and that the fence line forms an ambient air boundary. In addition, receptors were excluded on the Kemmerer Mine, which is immediately west of Naughton. The justification provided by the state to exclude receptors on the property of the Kemmerer Mine and within the Naughton facility included the following (excerpted from PacifiCorp Naughton Power Plant – SO_2 Modeling Assessment Report, Rev. 1, Dated December 22, 2016. Page 10/24):

> *"For the WDEQ-requested modeling analysis, the areas to consider for receptor placement are those areas that are outside of industrial facilities, within which WDEQ considers that monitoring is not feasible due to access limitations and interferences by industrial equipment and processes. Therefore, for this Naughton Power Plant SO2 characterization modeling, receptors were included in all areas except for: a) inside the secured property of the power plant and over the adjacent Kemmerer mine property…For this application, receptor spacing was consistent with WDEQ guidelines and features the most closely spaced receptors close to the Naughton facility."*

The Modeling TAD states that:

> *"For SO_2 designations modeling, the areas to consider for receptor placement are those areas that would be considered ambient air relative to each modeled facility, including other facilities' property. However, for some limited ambient air locations, such as water bodies, receptors can be excluded or ignored in analyses as monitors could not feasibly be placed in those areas. For the purposes of modeling for designations, power inaccessibility or locations in areas located near roadways are not appropriate rationales for excluding receptors."*

The state's rationale in its quoted report above regarding placement of receptors was inconsistent with the Modeling TAD for the purposes of this designation effort that would be considered ambient air relative to each modeled facility, including other facilities' property. The air over Kemmerer Mine is ambient air relative to Naughton.

The August 2016 Modeling TAD does suggest receptors in some limited ambient air locations may be excluded, such as over water bodies but not over other facilities' property – see Section 4.2 of the Modeling TAD. WDEQ has informed the EPA that the property owner of the Kemmerer mine (Westmoreland Kemmerer) denied the Naughton facility permission to place a monitor on the Kemmerer property.[6] Under the current Modeling TAD, "denial of permission" is not specifically identified as an appropriate rationale for excluding receptors. However, WDEQ was adhering to an earlier (February 2016) version of the TAD which was current at the time of their analysis and which did not contain specific language about whether to consider impacts on other facilities' property. We believe the state was acting in good faith and that the intended clarification in the current TAD version on this issue was not available to the state during modeling.

[6] See July 7, 2017 letter from Shane Gant, President and General Manager of Westmoreland Kemmerer, LLC, to Roger Holt of PacifiCorp Energy, in the docket for this intended designation action.

Therefore, the EPA acknowledges that given the unique circumstances of this case it was not unreasonable for Wyoming to interpret the February 2016 Modeling TAD as supporting its view that it would not be feasible to place a monitor on the adjacent land given that the property owner of the Kemmerer Mine denied the Naughton facility permission to do so. We therefore do not fault the receptor exclusion over the Kemmerer Mine as inappropriate in this instance.

3.3.2.4.Modeling Parameter: Source Characterization

Naughton has three existing coal-fired boilers and based on the current stack configuration, Boilers 1 and 2 exhaust through a combined 476-foot stack. Boiler 3 exhausts through a dedicated 475-foot stack. For the combined flues, the modeling was conducted with a single merged stack. There are other small sources of SO_2 at Naughton. However, these sources are either emergency in nature and thus do not operate routinely or have very low actual SO_2 emissions (less than 1 ton/SO_2 in 2016). In either case, these small sources of SO_2 were not anticipated to have an impact on the results of the 1-hour SO_2 modeling and were not included in the modeling, and so were determined to be accounted for as part of the modeled background.

In accordance with the Modeling TAD for the DRR, three years of actual emissions data from December 2013 to November 2016 were used to conduct the SO_2 designation modeling for the Naughton Power Plant. The state elected to use the most recent emissions data available at the time of their analysis, but could not update the analysis with the most recent available three calendar years (2014-2016) as CEMS data were not available for December 2016 which would allow the state to submit their analysis by January 2017. The state therefore asked the EPA whether they could model based on the most recent 36-month period rather than using full calendar years. The EPA confirmed via email that this was acceptable. Actual stack temperatures and velocities from the Naughton facility were also used in the modeling from the CEMS data. The other sources were explicitly modeled at both actual and current allowable emission rates. For the units modeled at allowable rates, the permit limits are effective and federally enforceable, and the stacks are at or below GEP.

On August 10, 2017, the state informed the EPA that an error had been identified and the emissions for the background sources were incorrect. In particular, the modeling provided to the EPA on January 13, 2017 excluded units and used incorrect source parameters for the following background sources:

1. Pioneer: V2 Thermal Oxidizer – Unit Added
2. Carter Creek: Sulfur Recovery Unit– Unit Added
3. Carter Creek: High Pressure Flare F4401 (FLR001) – Unit Added
4. Carter Creek: Low Pressure Flare F4402 – Updated Emission Rate
5. Shute Creek: 1FL-5901 - Train 1 Process Flare (FLR001) – Unit Added
6. Shute Creek: 1FL-5902 - Train 1 Sulfur Flare (FLR002) – Unit Added
7. Shute Creek: 2FL-5901 - Train 2 Process Flare (FLR003) – Unit Added
8. Shute Creek: FL-5902 - Train 2 Sulfur Flare (FLR004) – Unit Added
9. Shute Creek: Cotur1 - Cogeneration Steam Turbine A – Updated Emission Rate
10. Shute Creek: Cotur2 - Cogeneration Steam Turbine B – Updated Emission Rate
11. Shute Creek: Cotur3 - Cogeneration Steam Turbine C – Updated Emission Rate

The state provided updated spreadsheets outlining the revised list of units and source parameters to the EPA on August 10, 2017, and August 15, 2017. The state also provided the EPA with: an updated modeling analysis correcting these errors; a memorandum explaining the changes implemented in the updated modeling analysis; and a map illustrating the new units added to the modeling, and contour plot of the predicted SO_2 concentrations. Figure 6 depicts the original units and the new units.

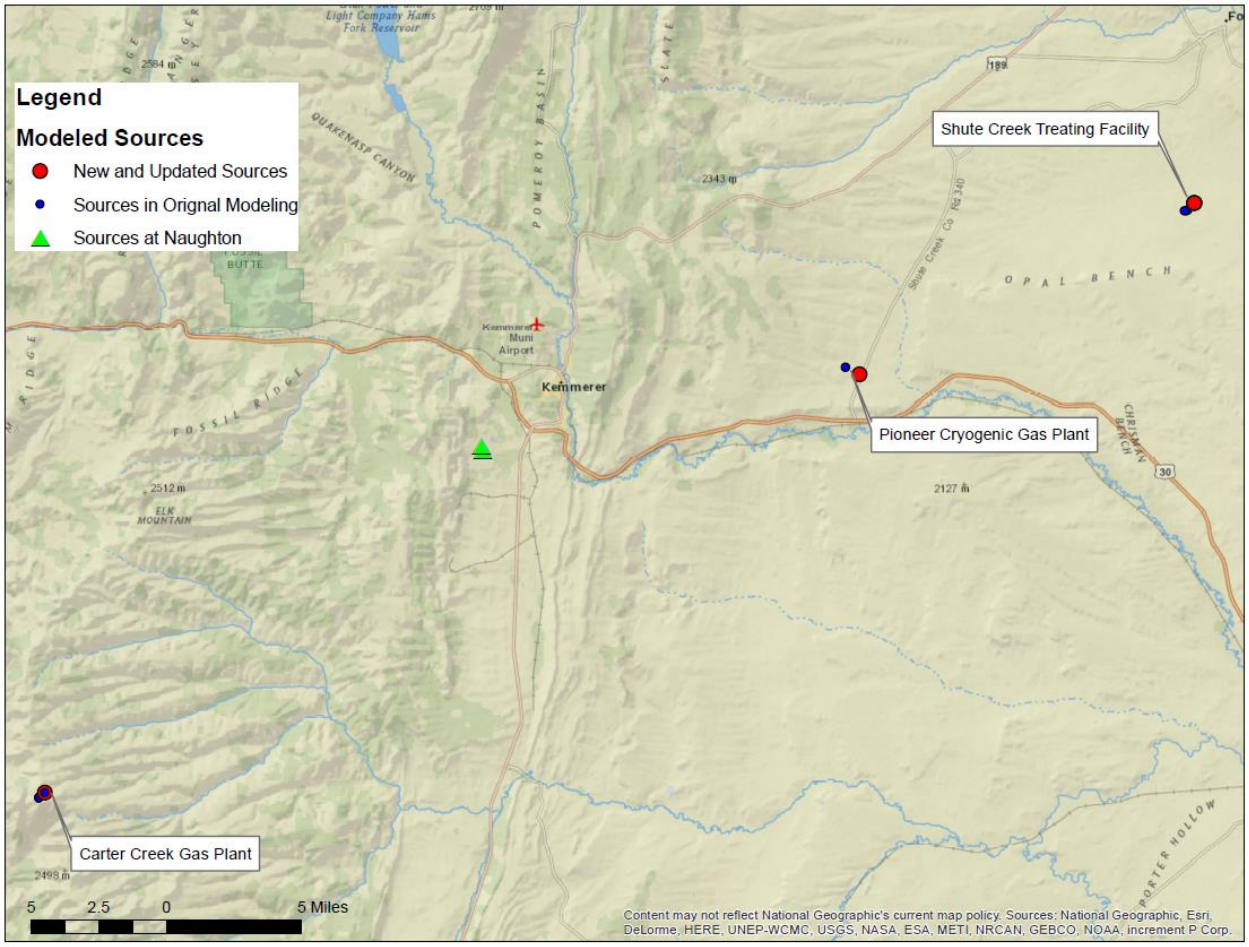


Figure 6. Map illustrating units in the original modeling and units added to the updated modeling.

The stack parameters that were used in the revised modeling for Naughton and the other modeled sources are provided in Table 3. Note that aside from the updated model version (i.e., 16216r) and the updated source parameters, the remaining components remained the same as the initial modeling (i.e., the meteorology, model domain, receptors, and terrain did not change).

Table 3. Stack Parameters for Naughton Power Plant and Nearby/Background Sources.

Stack ID Number	NAD83 Zone 12 UTM Coordinates		Stack Height	Base Elevation	Stack Diameter	Exit Velocity	Exit Temperature	Emission Rate
	Easting [m]	Northing [m]	m	m	M	m/s	K	g/s
Naughton								
Unit 1	533587.5	4622834.4	145.085	2112.874	7.336	Varies	varies	varies
Unit 2						Varies	varies	varies
Unit 3	533493.9	4623087.7	144.78	2113.178	8.735	Varies	varies	varies
Pioneer Gas Plant								
V2 Thermal Oxidizer	555173	4627767	12.2	2034.8	1.2	8.8	1088.7	0.71
V2 Thermal Oxidizer	556015	4627356	12.2	2033.6	1.2	8.8	1088.7	0.71
Carter Creek Gas Plant								
Low Pressure Flare F4402	507556	4602474	91.4	2456.4	0.6	31.4	977	2.10
Boiler A F4201A	507209	4602174	27.4	2475.3	1.5	15.8	418.2	0.06
Boiler B F4201B	507209	4602174	27.4	2475.3	1.5	15.8	418.2	0.06
Boiler C F4201C	507209	4602174	27.4	2475.3	1.5	15.8	418.2	0.06
Sulfur Recovery Unit (SRU006)	575931	4637516	60.96	2477	2.1	6.4	465.9	2.81
High Pressure Flare F4401 (FLR001)	507556	4602474	91.4	2456.4	1.21	19.75	977	6.35
Shute Creek Treating Facility								
Cotur1 - Cogeneration Steam Turbine A	575446.1	4637050.2	30.5	1975.2	3.2	14.6	456.5	10.58
Cotur2 - Cogeneration Steam Turbine B	575394.1	4637050.2	30.5	1974.9	3.2	14.6	456.5	10.58
Cotur3 - Cogeneration Steam Turbine C	575341.1	4637050.2	30.5	1974.7	3.2	14.6	456.5	10.58
Synfr - Syngas unit furnace	575542.1	4637094.2	30.5	1974.8	1.3	13.7	422.0	0.013
1FL-5901 - Train 1 Process Flare (FLR001)	575931	4637516	60.7	1975.1	1.5	60.1	977.1	10.45
1FL-5902 - Train 1 Sulfur Flare (FLR002)	575931	4637516	60.7	1975.1	0.51	53.1	977.1	3.96
2FL-5901 - Train 2 Process Flare (FLR003)	575931	4637516	60.7	1975.1	1.52	60.1	977.1	25.21
FL-5902 - Train 2 Sulfur Flare (FLR004)	575931	4637516	60.7	1975.1	0.51	53.11	977.1	2.31

NAD83 = North American Datum 1983; UTM = Universal Transverse Mercator; m/s = meters per second; K = Kelvin degrees.

The plant structures, buildings, and tanks were included for AERMOD downwash calculations using BPIPPRM. A total of 31 structures were included in the modeling.

The state characterized these sources within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions for the Naughton Power Plant. The state also adequately characterized the sources' 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. EPA supports the state's analysis of the source characterizations.

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

As previously noted, the state included Naughton and three other emitters of SO_2 in the area of analysis. The state has chosen to model the Naughton facility using actual emissions and the surrounding facilities using a blend of PTE emissions where available and actual emissions where no PTE are available (see Table 4, below). For the units modeled using actual emissions, the state elected to model each unit at the highest level of annual emissions which occurred during the 2014-2016 period. The EPA considers this appropriate, as the far right column in Table 4 shows that the modeled emissions were much higher than the actual emissions for each

unit. The facilities in the state's modeling analysis and their associated modeled SO_2 emissions between December 1, 2013, and November 30, 2016, are summarized below.

For the Naughton Power Plant, the state provided actual SO_2 emissions for the 36-month period between December 1, 2013, and November 30, 2016. As noted, this was approved by the EPA in that it contained the most up-to-date emissions information available. This information is summarized in Table 5. A description of how the state obtained hourly emission rates is given below this table.

Table 4. Modeled SO_2 Emissions Between Dec. 1, 2013 – Nov. 30, 2016 from Facilities in the Lincoln County Area

	Modeled SO_2 Emissions (tons per 12-month period)			**Average Annual Emissions, 14-16**
Facility Name	**Dec 13 – Nov 14**	**Dec 14 – Nov 15**	**Dec 15 – Nov 16**	
Naughton Power Plant	6,189.53	5,001.75	4,097.69	
Pioneer Gas Plant	49.06	49.06	49.06	.3 (14 only)
Carter Creek Gas Plant	398.14	398.14	398.14	226.7
Shute Creek Treating Facility	2,561.24	2,561.24	2,561.24	861.97
Total Emissions from All Modeled Facilities in the State's Area of Analysis	9,197.97	8010.19	7106.13	

For Naughton, the actual hourly emissions data were obtained from CEMs.

3.3.2.6.Modeling Parameter: Meteorology and Surface Characteristics

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

Onsite hourly meteorological data was available at Naughton for the 3-year period that was modeled. Concurrent upper-air data was obtained from the closest or most representative National Weather Service site, which was determined to be Salt Lake City, UT. Three years of PSD-quality meteorological data was available from a 50-meter height instrumented tower located approximately 1.5 km east of Naughton (UTM 535081.2E, 4622993.9N, Zone 12) at a base elevation of 2,103 meters. Meteorological data were collected at 2-m, 10-m, and 50-m

levels on the tower. Measurements were obtained for the three-year period from December 1, 2013 to November 30, 2016. Variables measured at the 10-m and 50-m levels on the tower used in the modeling included scalar wind speed (WS), wind direction (WD), the standard deviation of the wind direction (sigma theta = σΘ), and the standard deviation of the vertical wind speed (sigma W = σw). The ambient temperature was measured at all three levels (2, 10, and 50 m). In addition, solar radiation sensors (total and net), relative humidity, and sea level pressure were reported at the tower site. The Bulk Richardson scheme was also used to estimate heat fluxes within AERMET under stable conditions using the on-site data available at Naughton. All quarters for the modeled period (December 2013- November 2016) had data capture statistics that were generally well above 90 percent. Figure 7 shows the location of the precipitation site and upper-air station in relationship to Naughton.

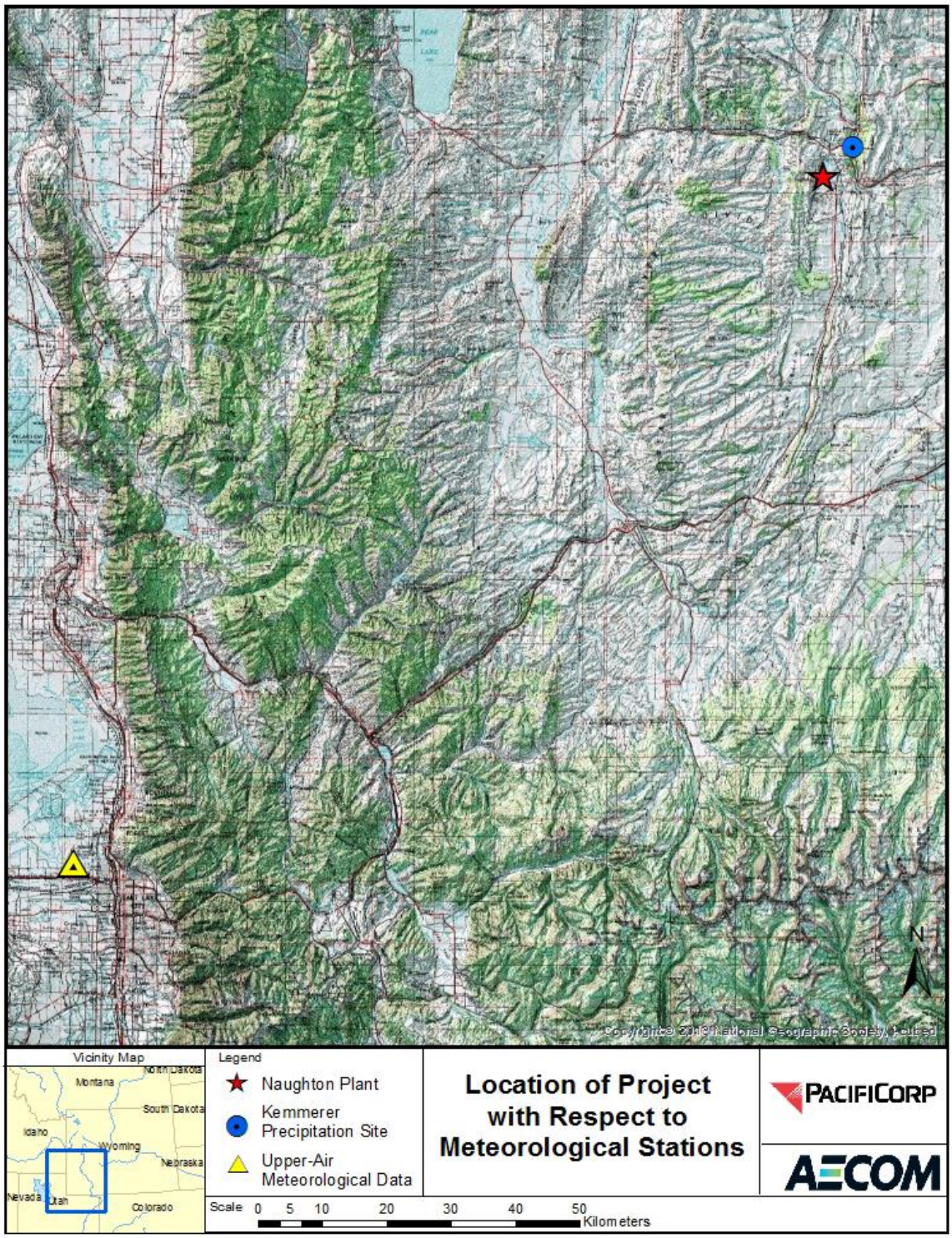


Figure 7. Location of Meteorological Stations Relative to Naughton Plant.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. One-minute ASOS (Automated Surface Observing System) wind data and AERMINUTE was not needed and therefore not used because on-site data were used in the modeling. 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 0.4 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.

A surface wind rose for the entire 3-year period proposed for the modeling time period is shown in Figure 8. The wind rose shows that the dominate wind directions are from the northwest (about 19 percent of the time) and north (about 10 percent of the time). The average wind speed is about 5.38 m s^{-1}, where calm winds are about 9 percent of the time.

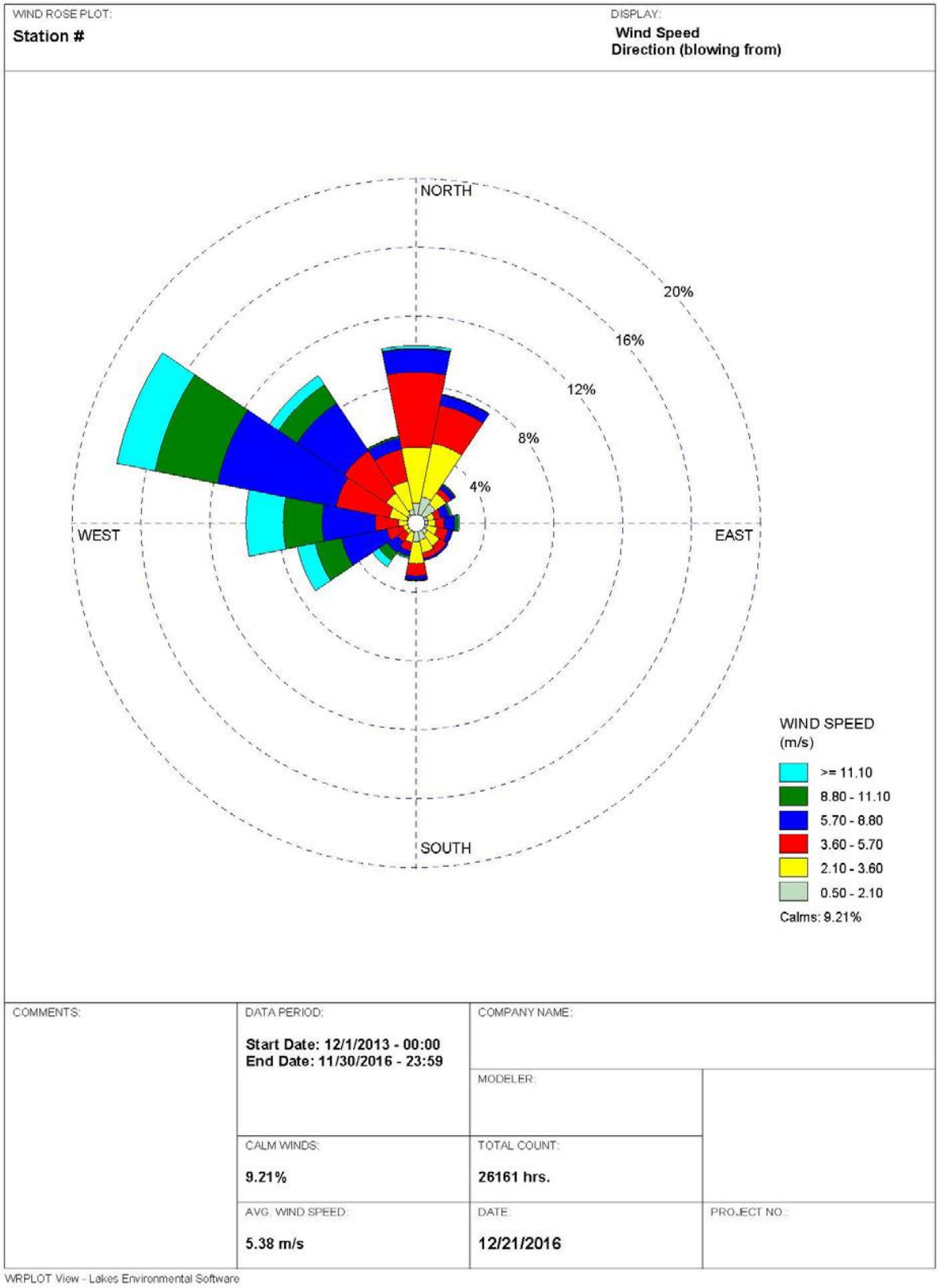


Figure 8. Wind Rose from Naughton On-site Meteorological Tower.

AERSURFACE (version 13016) was used to calculate the surface characteristics values, including albedo, Bowen ratio, and surface roughness length, at the surface meteorological observing site for input into AERMET. The 1992 National Land Cover Dataset (NLCD92) file for input into AERSURFACE was downloaded from the United States Geological Society (USGS) website. Sectors used to define the meteorological surface characteristics for the onsite meteorological tower are shown in Figure 9.

Figure 9. Sectors Used for Surface Characteristics at Naughton Onsite Tower.

In AERSURFACE, the various land cover categories are linked to a set of seasonal surface characteristics. As such, AERSURFACE requires specification of the seasonal category for each month of the year. Each month was assigned to its default season unless evidence of snow cover

changes the default season to winter with snow. The following five seasonal categories, as offered by AERSURFACE, include:

- Midsummer with lush vegetation;
- Autumn with un-harvested cropland;
- Late autumn after frost and harvest, or winter with no snow;
- Winter with continuous snow on ground; and
- Transitional spring with partial green coverage or short annuals.

The following seasonal classifications were used:

- June, July, August = Midsummer with lush vegetation;
- September, October = Autumn with un-harvested cropland;
- April, May = Transitional spring with partial green coverage or short annuals;
- November, December, January, February, March = Late autumn after frost and harvest, or winter with no snow; and
- November, December, January, February, March = Winter with continuous snow on ground.

For the months of November, December, January, February, and March, locally-representative snow cover data records were reviewed for sites near the plant. For each month, if the month had more than 50 percent of the days with a measurable snow depth, then the month was considered "Winter with continuous snow on ground." Otherwise, the month was considered "Late autumn after frost and harvest, or winter with no snow."

For Bowen ratio, the land use values are linked to three categories of surface moisture corresponding to average, wet and dry conditions. The surface moisture condition for the site may vary depending on the meteorological data period for which the surface characteristics will be applied. AERSURFACE applies the surface moisture condition for the entire data period. Therefore, if the surface moisture condition varies significantly across the data period, then AERSURFACE can be applied multiple times to account for those variations. The surface moisture condition for each month was determined by comparing precipitation for the period of data to be processed to the 30-year climatological record, selecting "wet" conditions if precipitation is in the upper 30th-percentile, "dry" conditions if precipitation is in the lower 30th-percentile, and "average" conditions if precipitation is in the middle 40th-percentile. The 30-year precipitation data set used in this modeling was taken from Kemmerer, WY, per guidance from WDEQ.

As part of the AERSURFACE processing, the user is required to provide whether the site is in an arid region. WDEQ has historically used a long-term average of approximately nine inches or less of annual precipitation to be an arid region. In 2013, the annual precipitation met this threshold. As a result, the input to AERSURFACE was set as being arid for 2013. If the location experiences continuous snow cover for at least one month during the year, the program does not offer the arid or non-arid prompt. Since only the month of December for 2013 is included and it was determined to have continuous snow cover, the arid option in AERSURFACE was not applicable.

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 Appendix W and the Modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics. EPA supports the state's analysis as best representative of meteorological conditions within the area of analysis.

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

The latest version of AERMAP (version 15181), the AERMOD terrain preprocessor program, was used to calculate terrain elevations and critical hill heights for the modeled receptors at each of the project facilities using National Elevation Data (NED). The dataset consisted of 1/3 arc second (~10 m resolution) NED. The domain was sufficient to ensure all significant nodes are included such that all terrain features exceeding a 10 percent elevation slope from any given receptor were considered. EPA supports the state's approach for defining the terrain.

3.3.2.8.Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99^{th} percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state utilized the tier 2 approach, where the background concentrations for this area of analysis were determined by the state to vary from seasonally.

Ambient air quality data were used to represent the contribution of non-modeled sources to the total ambient air pollutant concentrations. In order to characterize SO_2 concentrations in the vicinity of each plant, the modeled design concentration must be added to a measured ambient background concentration to estimate the total design concentration. This total design concentration is then used to compare against the 1-hour SO_2 NAAQS. The use of seasonal and hour-of-day varying background concentrations were used. The MOXA monitoring station concentrations observed during the 2012-2014 three-year period are displayed in Figure 10.

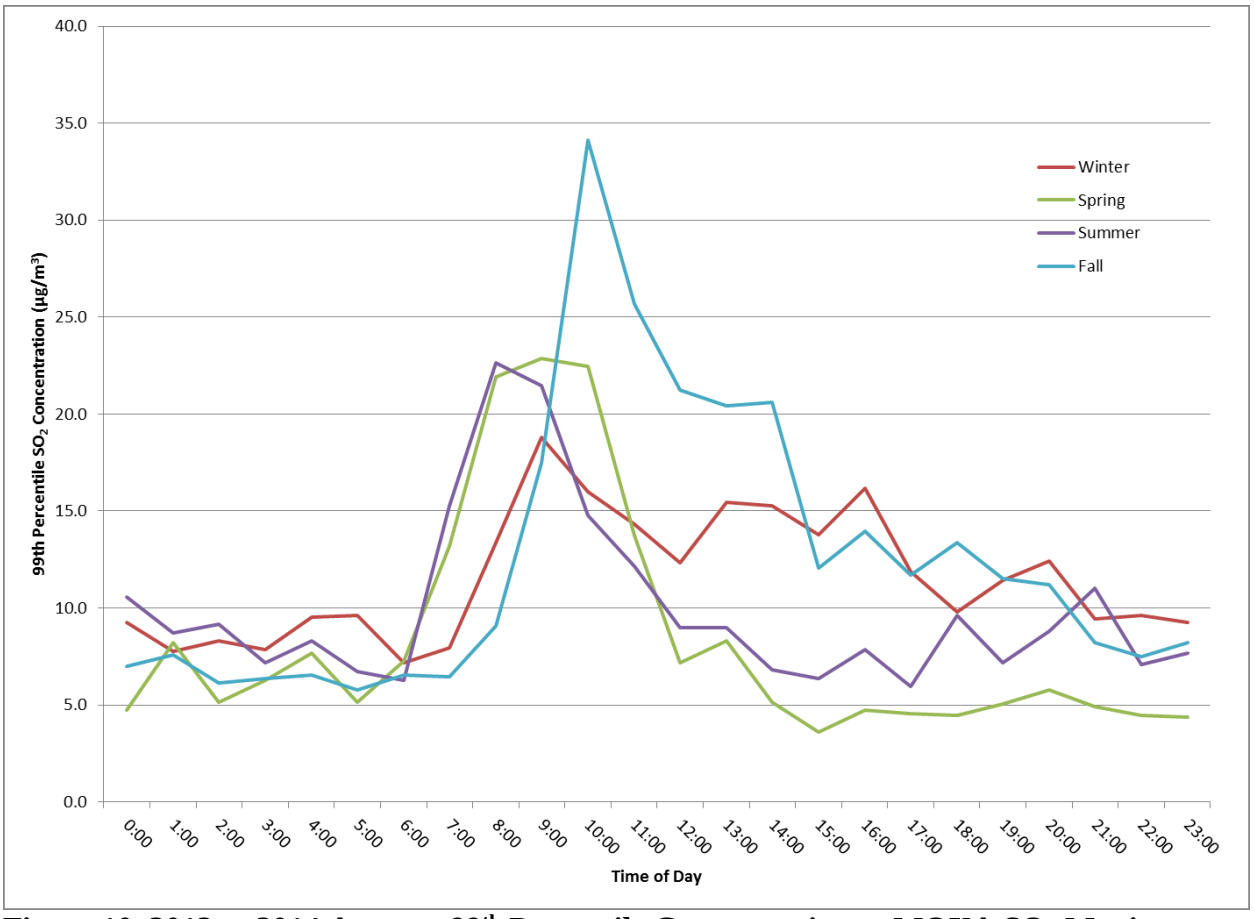


Figure 10. 2012 to 2014 Average 99th Percentile Concentration at MOXA SO_2 Monitor.

EPA supports the state's approach for determining the background concentration.

3.3.2.9.Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Naughton Power Plant of analysis are summarized below in Table 5.

Table 5: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Naughton Power Plant

Input Parameter	Value
AERMOD Version	15181 (regulatory default) Revised Modeling: 16216r
Dispersion Characteristics	Rural
Modeled Sources	19
Modeled Stacks	18
Modeled Structures	31
Modeled Fencelines	1
Total receptors	11,135
Emissions Type	Actual
Emissions Years	2013- 2016
Meteorology Years	2013-2016
NWS Station for Surface Meteorology	Naughton Onsite Tower, WY
NWS Station Upper Air Meteorology	Salt Lake City, UT
NWS Station for Calculating Surface Characteristics	Naughton Onsite Tower, WY
Methodology for Calculating Background SO_2 Concentration	Tier 2 MOXA 2012-2014
Calculated Background SO_2 Concentration	3.58 to 34.15 $\mu g/m^3$

The results presented below in Table 6 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 6. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentration Averaged Over Three Years for the Area of Analysis for the Naughton Power Plant

Averaging Period	Data Period	Receptor Location [UTM zone 12]		99th percentile daily maximum 1-hour SO_2 Concentration ($\mu g/m^3$)	
		UTM	UTM	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013-2016	529911.09	4623847.96	147.49	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 $\mu g/m^3$ conversion factor

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 147.49 $\mu g/m^3$, equivalent to 56.3 ppb. This modeled concentration included the background concentration of SO_2, and is based on actual emissions from the facility and allowable emissions from other SO_2 sources in the area. Figure 11 below was included as part of the state's recommendation, and indicates that the predicted value occurred about 4 km northwest of the Naughton Power Plant. The highest predicted 99th percentile daily maximum 1-hour concentration is predicted on the Kemmerer Mine fenceline.

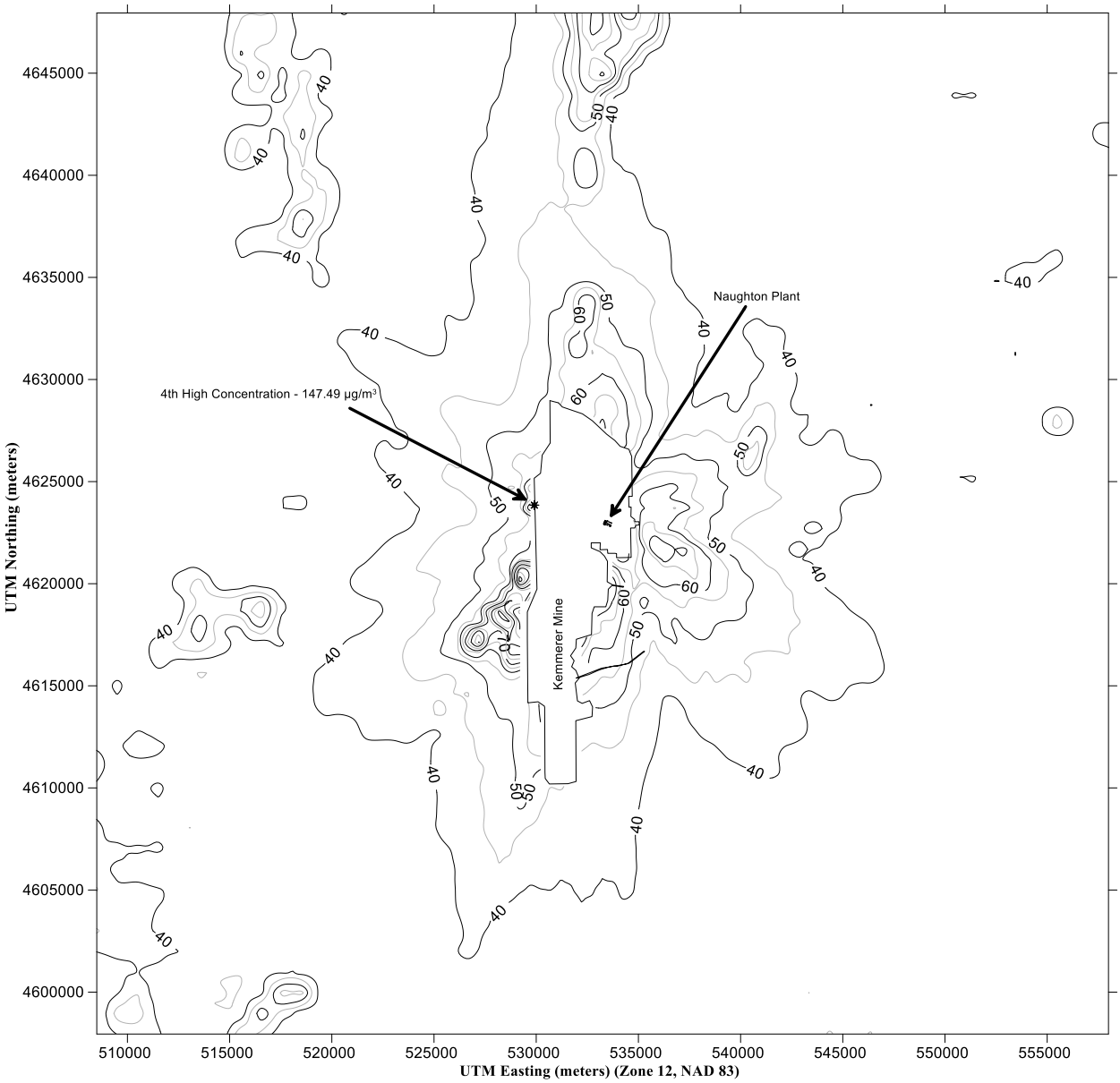


Figure 11: Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Area of Analysis for the Naughton Power Plant

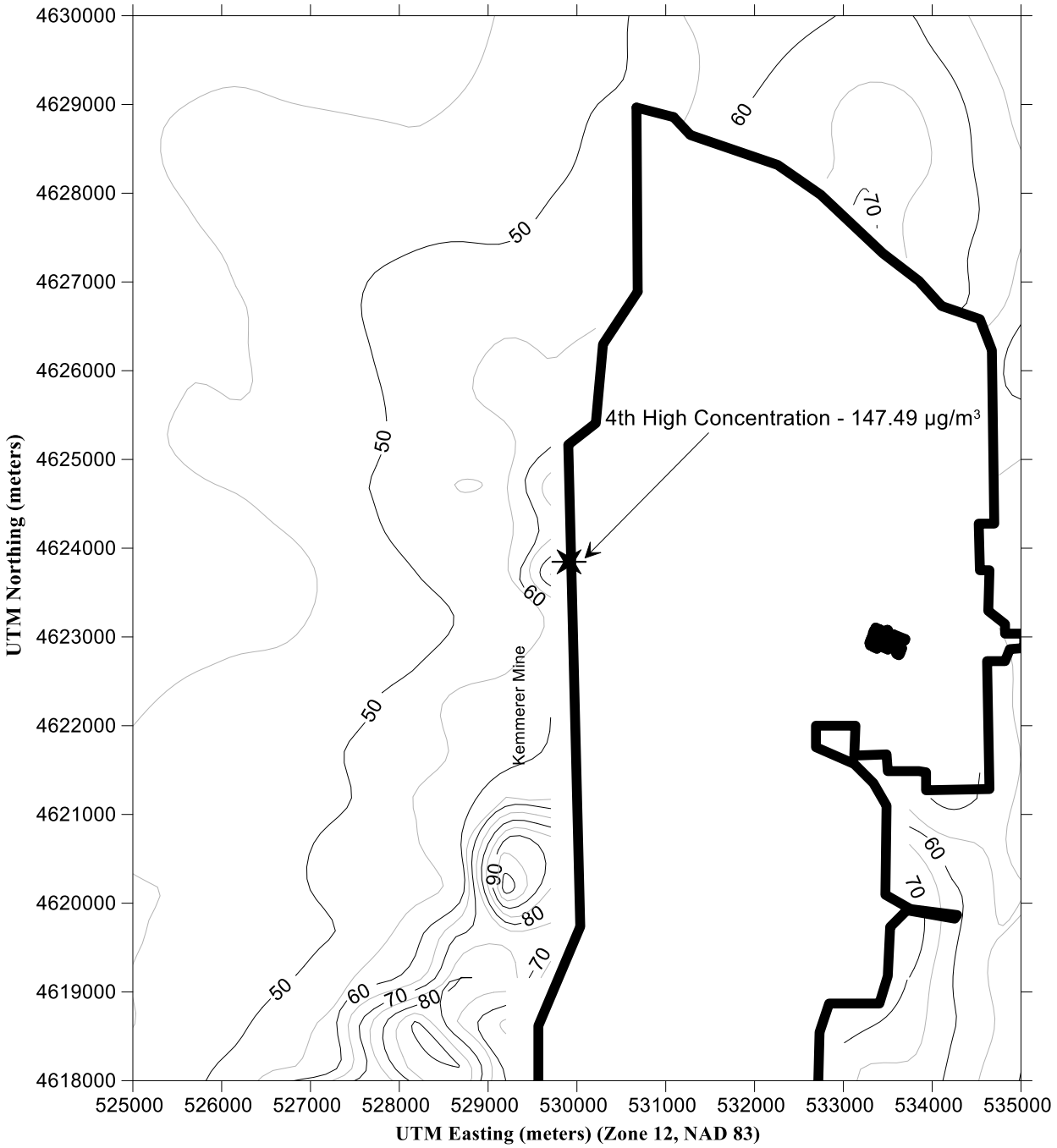


Figure 12: Enhancement image of the predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Area of Analysis for the Naughton Power Plant.

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

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

The state's updated modeling used AERMOD v16216r with regulatory default options (i.e., ADJ_U* was not used in the modeling), which the EPA considers appropriate as it is the most current version. The state's modeling assessment for the Naughton facility excluded receptors in areas considered ambient air as described in the August 2016 Modeling TAD. As noted, the state's approach to conducting the dispersion modeling for EPA's 1-hour SO_2 designations was not consistent with the August 2016 Modeling TAD in that it removed receptors in an area that would be considered ambient air relative to the Naughton facility. However, the EPA acknowledges that given the unique circumstances of the case (i.e. that Westmoreland Kemmerer denied PacifiCorp permission to place a monitor on the Kemmerer Mine property), it was not unreasonable for the state to interpret the February 2016 Modeling TAD as supporting its view that it would not be feasible to place a monitor on the Kemmerer Mine. We therefore do not fault the receptor exclusion over the Kemmerer Mine as inappropriate in this instance.

3.3.3. Modeling Analysis Provided by Other Organizations

The EPA has not received any modeling assessments from a 3rd party.

3.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Lincoln 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.

3.5. Jurisdictional Boundaries in the Lincoln County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for the Lincoln County Area. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable. As noted, the state did not provide a specific designation boundary for this source, but requested that the EPA designate the area around the source as attainment. The Naughton facility is located in southern Lincoln County immediately to the west of the town of Diamondville, Wyoming. The Lincoln County area includes two other emitters of SO_2 within 50 km of the Naughton facility; the Pioneer Gas Plant (23 km) and Shute Creek Treating Facility (45 km). The Carter Creek Gas Plant was also included in the state's modeling analysis, and is located in northern Uinta County, Wyoming, near the southern border of Lincoln County. The Kemmerer Mine is also located to the west of the Naughton facility.

3.6. The EPA's Assessment of the Available Information for the Lincoln County Area

The EPA has determined, based on our review of the modeling data provided by the state, that Lincoln County meets the 2010 SO_2 NAAQS and does not contribute to any nearby area that does not meet the NAAQS. Additionally, the nearest nonattainment area in more than 900 km from Lincoln County. For these reasons, we intend to designate Lincoln County as unclassifiable/attainment.

The EPA believes that our intended unclassifiable/attainment area, bounded by the borders of Lincoln 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.

3.7. Summary of Our Intended Designation for the Lincoln County Area

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

Figure 13 shows the boundary of this intended designated area.

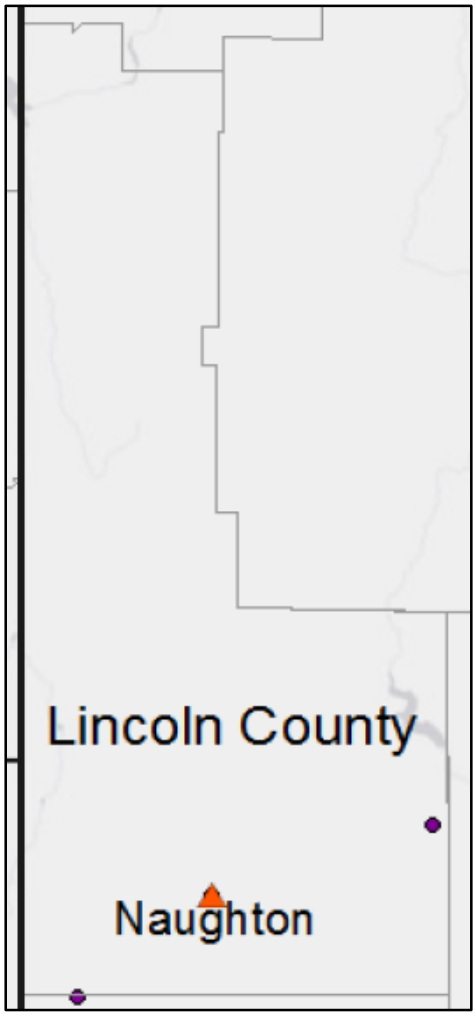


Figure 13. Boundary of the Intended Lincoln County, Wyoming Unclassifiable Area

4. Technical Analysis for the Platte County Area

4.1. Introduction

The EPA must designate the Platte County, Wyoming, area by December 31, 2017, because the area has not been previously designated and Wyoming has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any sources in Platte County.

4.2. Air Quality Monitoring Data for the Platte County Area

There are no SO_2 monitors in Platte County.

4.3. Air Quality Modeling Analysis for the Platte County Area Addressing Laramie River Station

4.3.1. Introduction

This section 4.2 presents all the available air quality modeling information for a portion of Platte County that includes Laramie River Station. (This portion of Platte County will often be referred to as "the Platte County area" within this section 4.2). This area contains the following SO_2 sources, principally the sources around which Wyoming is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tons per year:

- The Laramie River Station facility emits 2,000 tons or more annually. Specifically, Laramie River Station emitted 7,950 tons of SO_2 in 2014. This source meets the DRR criteria and thus is on the SO_2 DRR Source list, and Wyoming has chosen to characterize it via modeling.

In its submission, Wyoming recommended that an area that includes the area surrounding the Laramie River Station be designated as attainment based in part on an assessment and characterization of air quality impacts from this facility. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing actual emissions. After careful review of the state's assessment, supporting documentation, and all available data, the EPA is modifying the state's recommendation for the area, and intends to designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in central Platte County, as seen in Figure 14, below. The Laramie River Station is located roughly 7 km northeast of Wheatland, Wyoming.

Also included in the figure are other nearby emitters of SO_2.[7] These are no SO_2 sources near the Laramie River Station, and no sources above 4 tons/SO_2 (apart from the Laramie River facility) in Platte County overall.

As noted, the state did not include a specific designation boundary with their recommendation. The EPA's intended unclassifiable/attainment designation boundary for the Platte County area is shown in this figure, as well as in the section below that summarizes our intended designation.

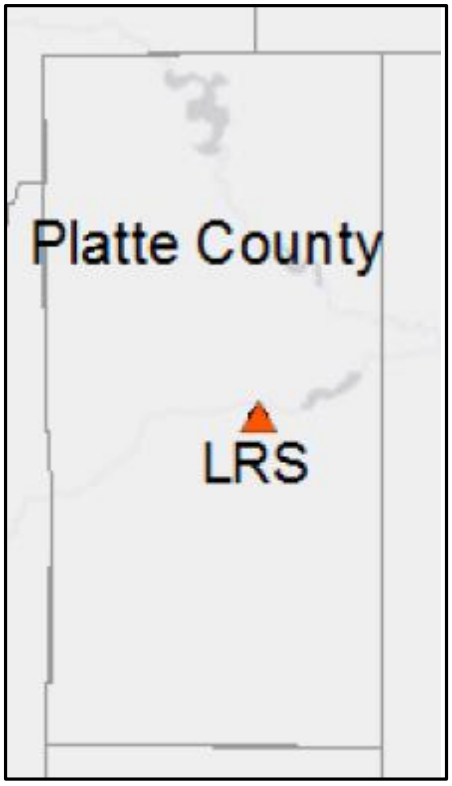


Figure 14. Map of the Platte County Area Addressing the Laramie River Station (LRS)

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 and considered one assessment from the state.

4.3.2. Modeling Analysis Provided by the State

The Wyoming Department of Environmental Quality (WDEQ) provided an air quality modeling assessment for the Basin Electric Cooperative's Laramie River Station (LRS) in Platte County, Wyoming (WY). Figure 15 shows the location of the facility.

[7] There are no additional SO_2 emitters above four tons per year in the vicinity of the Laramie River Station. The nearest source of SO2 is emits one ton per year, and is located 20 km from the Laramie River Station.

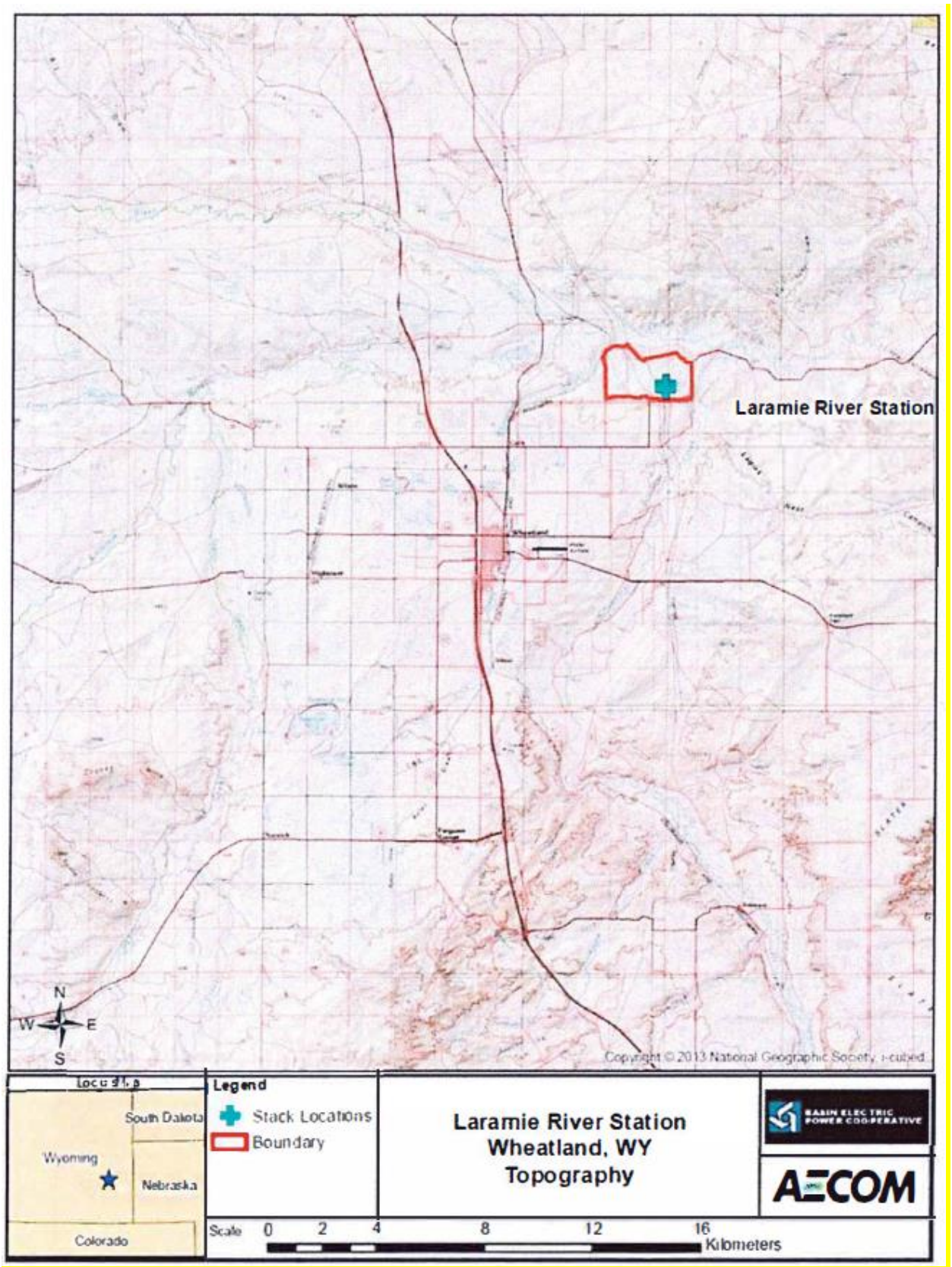


Figure 15. Map of the Laramie River Station.

4.3.2.1.Model Selection and Modeling Components

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

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

The state used AERMOD version 15181, the most up-to-date version at the time of modeling, using all regulatory default options. The currently approved AERMOD platform is version 16216r that includes updates. However, the updates made to components of AERMOD v16216r were not utilized in the air quality modeling assessment, such as ADJ_U*. There were no updates from 15181 to 16216r that would significantly affect the concentrations predicted here. 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_2 modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

LRS is located about 7 kilometers northeast of Wheatland, Wyoming. Figure 16 shows the land cover within a 3-km radius of the facility. 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 site location was classified as rural using the land use procedure specified in Appendix W. The area was clipped to a 3-km ring around the facility. The percent of land classified as developed within this radius was less than 50 percent. By the definition in Appendix W, land that contains less than 50 percent of developed land use categories should be considered rural. EPA's assessment supports the State's analysis of the land use classification.

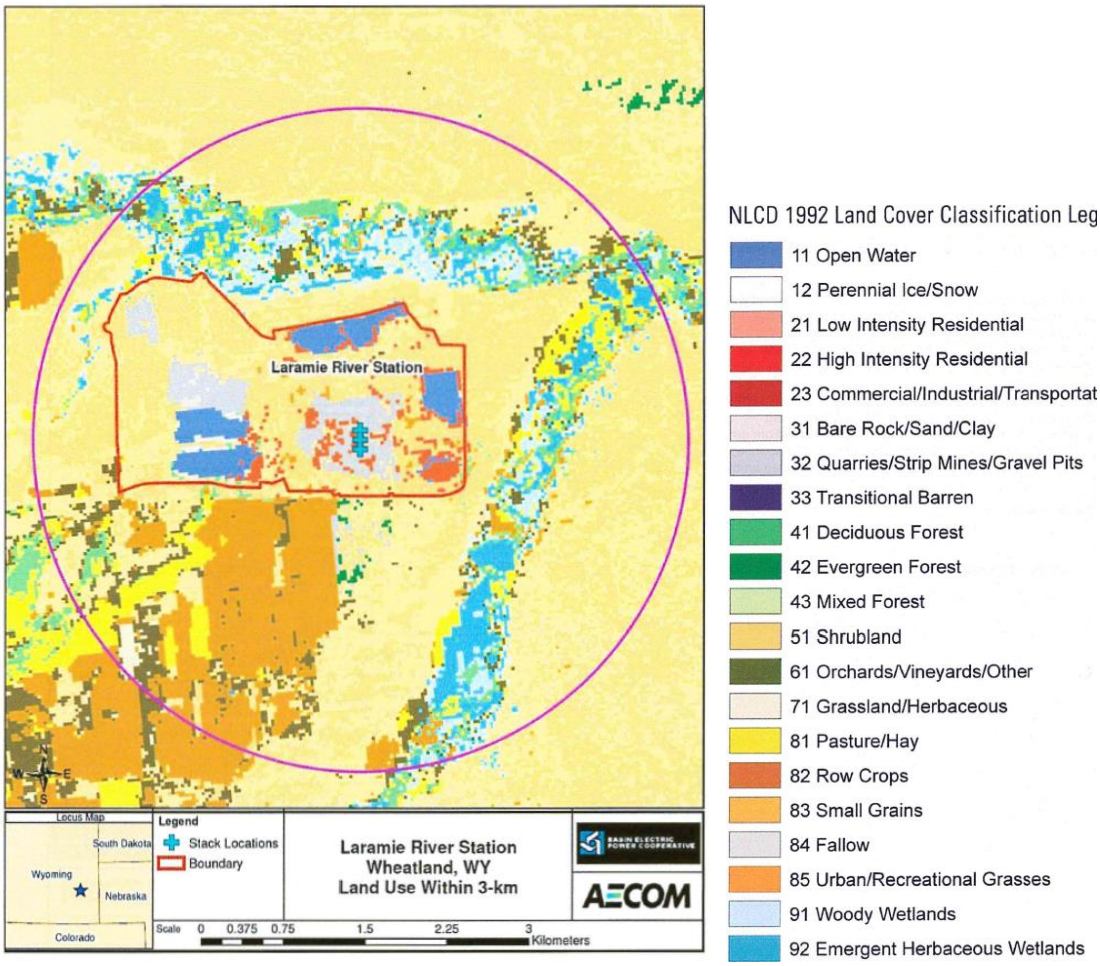


Figure 16. Land Use within 3 km of LRS.

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

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

The source of SO_2 emissions subject to the DRR in this area is described in the introduction to this section. For the Platte County area, WDEQ did not identify any nearby sources to be explicitly modeled as background sources for the LRS facility.

The state determined that the selected modeling domain was appropriate to adequately characterize air quality through modeling, and to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other

sources in nearby areas. No other sources beyond 25 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis.

A Cartesian modeling receptor array was established to capture the 99th percentiles of the maximum daily one-hour average SO_2 impacts from LRS. A two-phased modeling approach was conducted for MRY. The following receptor grid extending from MRY out to 25 kilometers included:

- 25-m receptor spacing along the facility boundaries for the SO_2 characterization.
- 100-m receptor spacing extending out 5 kilometers from the grid center.
- 500-m receptor spacing between 5 and 10 kilometers from the grid center.
- 1000-m receptor spacing was used beyond 10 kilometers (out to 25 km).

The receptor grid used in the modeling analysis was based on Universal Transverse Mercator (UTM) coordinates referenced to NAD 83 datum and in zone 13. Receptors were excluded for the secured area of LRS, which consists of the fenceline boundary shown in Figure 17, per the state's analysis. The extent of this grid sufficiently captured the maximum modeled impacts from the Station. Figure 17 shows the near-field receptor array and Figure 18 shows the far-field receptor array. A total of 13,364 receptors were used for modeling LRS.

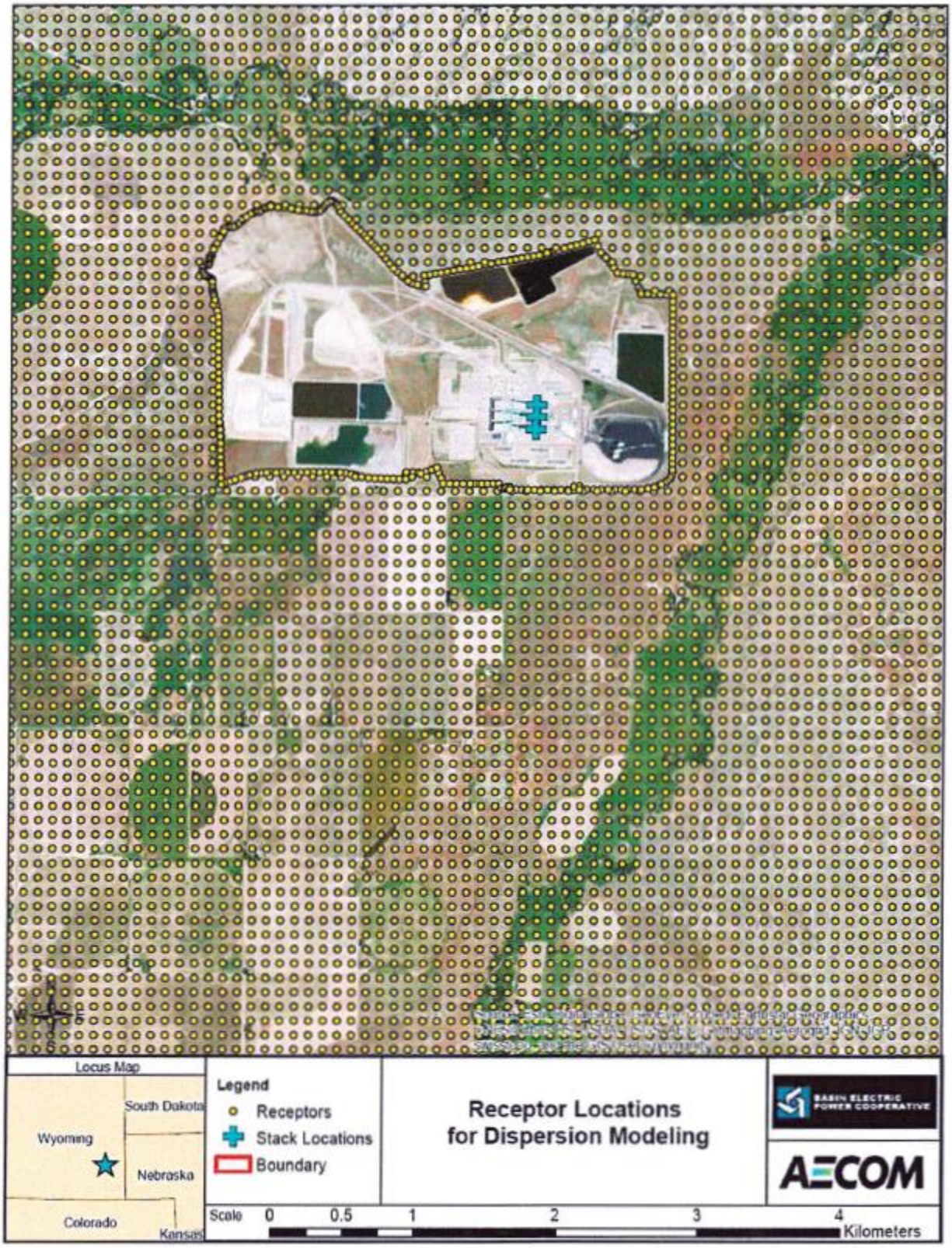


Figure 17. Near-Field Receptor Array.

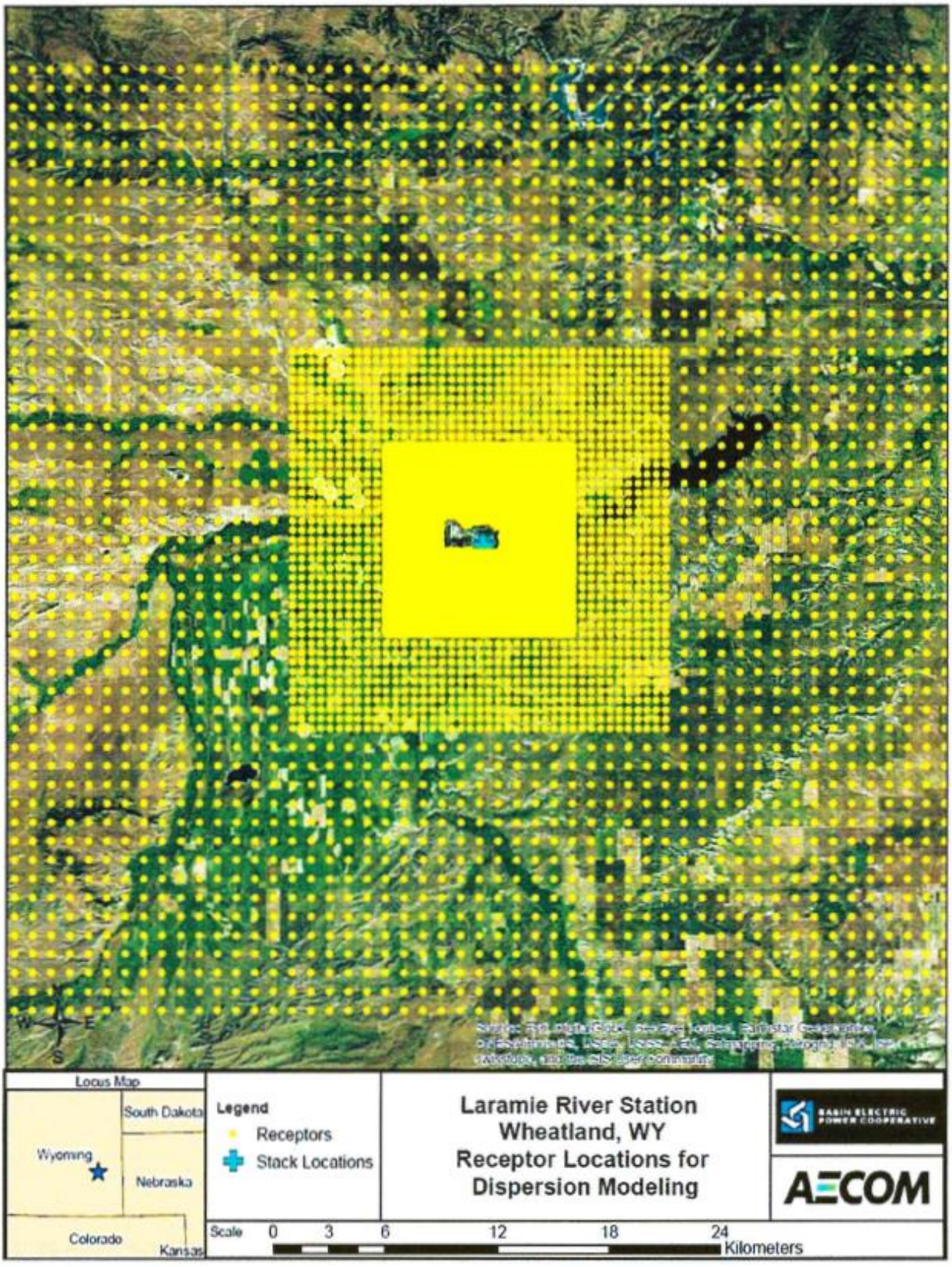


Figure 18. Far-Field Receptor Array.

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. The EPA supports the locations and coverage of receptors used in the state's air quality modeling assessment.

4.3.2.4.Modeling Parameter: Source Characterization

LRS consists of three broiler electric generating units, including a Unit 1, Unit 2, and Unit 3. The total capacity of the units is 1,710 megawatts (MW). All units are pulverized coal-fired (subbituminous) radiant heat boilers. Units 1 and 2 are equipped with wet scrubbers and Unit 3 uses dry scrubber absorbers for SO_2 flue gas desulfurization control. In accordance with the Modeling TAD for the DRR, the analysis used 2013-2015 actual hourly SO_2 emissions, temperature and velocity data collected by the Continuous Emissions Monitoring (CEMs) equipment at each unit and actual stack heights. Table 7 summarizes the stack parameters used in the AERMOD modeling.

The plant structures, buildings, and tanks were included for AERMOD downwash calculations using BPIPPRM (version 04274). A total of 7 structures were included in the modeling.

Table 7. Stack Parameters for LRS Units Explicitly Modeled in the Analysis.

Stack ID Number	NAD83 Zone 13 UTM Coordinates		Stack Height	Base Elevation	Stack Diameter	Exit Velocity	Exit Temperature
	Easting [m]	Northing [m]	M	m	m	m/s	K
LRS							
Unit 1	509853.0	4661802.7	182.1	1391.1	8.69	varies	varies
Unit 2	509855.0	4661888.0	182.1	1391.1	8.69	varies	varies
Unit 3	509857.4	4661973.3	182.1	1391.1	8.69	varies	varies

NAD83 = North American Datum 1983; UTM = Universal Transverse Mercator; m/s = meters per second; K = Kelvin degrees.

The state characterized the 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 sources' 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. The EPA supports the state's analysis of the source characterizations.

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.

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

As previously noted, the state included only the Laramie River Station in the area of analysis. The state has chosen to model these facilities using actual emissions. The facilities in the state's modeling analysis and their associated annual actual SO_2 emissions between 2013 and 2015 are summarized below.

For LRS, the state provided annual actual SO_2 emissions between 2013 and 2015. This information is summarized in Table 8. A description of how the state obtained hourly emission rates is given below this table.

Table 8. Actual SO_2 Emissions Between 2013 – 2015 from Facilities in the Platte County Area

	SO_2 Emissions (tpy)		
Facility Name	**2013**	**2014**	**2015**
Laramie River Station	9,245	7,450	7,677
Total Emissions from All Modeled Facilities in the State's Area of Analysis	9,245	7,450	7,677

For LRS, the actual hourly emissions data were obtained from CEMs.

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.

AERMET version 15181 was used to process the hourly meteorological data for the modeling analysis. Hourly averaged surface observations were processed from the Torrington Municipal Airport (Torrington, WY). Sub-hourly (1-minute/5-minute) wind data were processed from the same airport. Concurrent upper air data were obtained from the most representative NWS site, which was determined to be Riverton, WY. Figure 19 shows the locations of the meteorological stations in relation to the modeled facility.

Figure 19. Map of LRS and Monitoring Locations.

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, one-minute ASOS (Automated Surface Observing System) wind data from Torrington, WY were processed using AERMINUTE (version 15272) into hourly data for input into AERMET (15181). 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.

A surface wind rose for the entire 3-year period proposed for the modeling time period is shown in Figure 20. The wind rose shows that the dominate wind directions are from the northwest or southeast (about 7 percent of the time). The average wind speed is about 4 m/s, where calm winds are about 13.3 percent of the time.

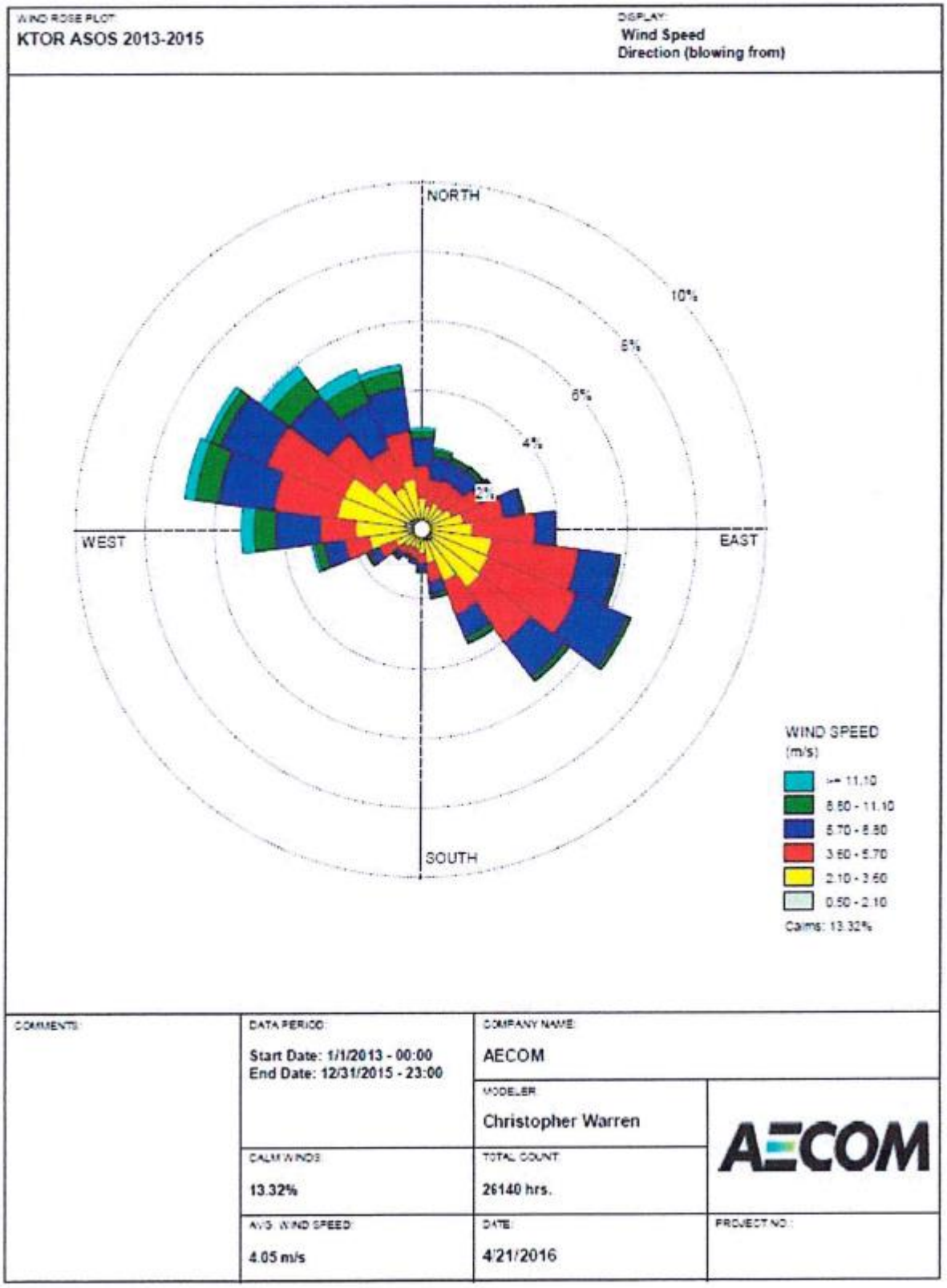


Figure 20. Wind Rose for Torrington, ND, 2013-2015.

AERSURFACE (version 13016) was used to calculate the surface characteristics values, including albedo, Bowen ratio, and surface roughness length, at the surface meteorological observing site for input into AERMET. The 1992 National Land Cover Dataset (NLCD92) file for input into AERSURFACE was downloaded from the United States Geological Society (USGS) website. Figure 21 shows the surface characteristics for the monitoring site.

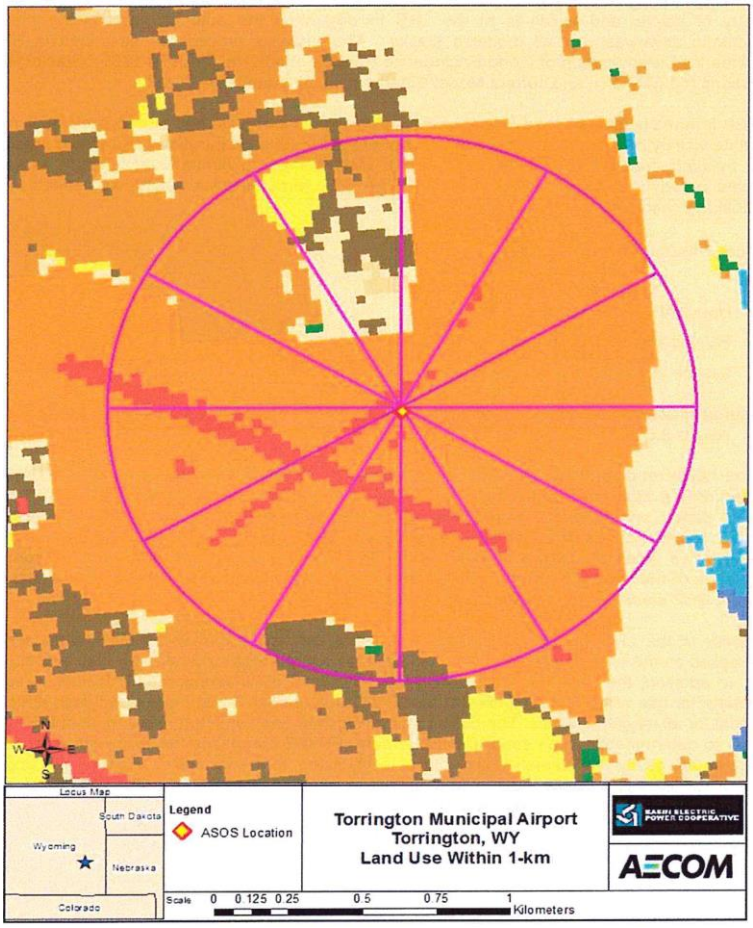


Figure 21. Sectors used for surface characteristics at the Torrington Airport.

The state estimated values in 30 degree sectors, equating to 12 spatial sectors out to a 1 km radius around the monitoring site for surface roughness. The Bowen ratio and albedo were determined based on the average characteristics, over a 10 by 10 km square, centered on the monitoring site. The surface parameters were determined on a monthly basis using default season assignments. The following seasonal classifications were used:

- June, July, August = Midsummer with lush vegetation;
- September, October = Autumn with un-harvested cropland;
- April, May = Transitional spring with partial green coverage or short annuals;
- November, December, January, February, March = Late autumn after frost and harvest, or winter with no snow; and
- November, December, January, February, March = Winter with continuous snow on ground.

For the months of November, December, January, February, and March, locally-representative snow cover data records were reviewed for sites near the plant. For each month, if the month had more than 50 percent of the days with a measurable snow depth, then the month was considered "Winter with continuous snow on ground". Otherwise, the month was considered "Late autumn after frost and harvest, or winter with no snow". Based on daily snow depth data from Old Fort Laramie, WY, there were no months with 50 percent or more days with a measureable snow depth. Therefore, all months were processed as winter with no snow.

For Bowen ratio, the land use values are linked to three categories of surface moisture corresponding to average, wet and dry conditions. The surface moisture condition for the site may vary depending on the meteorological data period for which the surface characteristics will be applied. AERSURFACE applies the surface moisture condition for the entire data period. Therefore, if the surface moisture condition varies significantly across the data period, then AERSURFACE can be applied multiple times to account for those variations. As recommended in the AERSURFACE User's Guide, the surface moisture condition for each season was determined using the Torrington Experimental Farm (1986-1997) and Torrington Airport (1998-2015) precipitation records. This procedure selected "wet" conditions if precipitation was in the upper 30th percentile, "dry" conditions if precipitation was in the lower 30th percentile, and "average" conditions if precipitation was in the middle 40th percentile.

As part of the AERSURFACE processing, the user is required to provide whether the site is in an arid region. WDEQ has historically used a long-term average of approximately nine inches or less of annual precipitation to be an arid region. Therefore, if the annual precipitation meets this threshold, the input to AERSURFACE would be labeled as being arid. For the years 2013 through 2015, the annual precipitation was 13 inches or greater. Therefore, none of these years were processed as arid.

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 Appendix W and the Modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics. EPA supports the state's analysis as best representative of meteorological conditions within the area of analysis.

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

As illustrated above, Platte County is considered to have relative flat terrain in the immediate vicinity, with somewhat elevated terrain to the north and east of the plant. To account for these terrain changes, the AERMAP terrain program (version 11103) 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. EPA supports the state's approach for defining the terrain.

4.3.2.8.Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state utilized the tier 2 approach, where the background concentrations for this area of analysis were determined by the state to vary from seasonally.

Sulfur dioxide background data from the NCORE (Cheyenne) monitoring station was used to determine the appropriate one-hour background concentrations to add to the model predicted concentrations. The background concentrations were calculated as a 3-year (2012-2014) average. More recent data at the time of the initial modeling was not available. Table 9 shows the seasonal and hourly background values in $\mu g/m^3$.

Table 9. NCORE Station 99th Percentile Hour of the Day and by Season Concentrations ($\mu g/m^3$).

Average	**0:00**	**1:00**	**2:00**	**3:00**	**4:00**	**5:00**	**6:00**	**7:00**	**8:00**	**9:00**	**10:00**	**11:00**
Winter	1.48	1.31	1.31	1.31	1.92	1.40	1.48	1.75	2.97	5.76	5.33	6.81
Spring	1.05	1.31	1.31	1.22	1.05	1.40	2.18	3.06	6.72	8.65	5.94	3.58
Summer	4.54	4.02	3.14	1.66	1.66	1.31	6.38	10.39	7.07	6.90	6.38	4.54
Fall	1.83	2.71	3.06	2.18	2.18	2.27	1.92	2.62	8.03	7.77	8.73	7.42
Average	**12:00**	**13:00**	**14:00**	**15:00**	**16:00**	**17:00**	**18:00**	**19:00**	**20:00**	**21:00**	**22:00**	**23:00**
Winter	5.68	5.15	4.45	3.93	3.67	2.10	2.10	2.10	1.92	1.75	1.48	1.48
Spring	2.97	1.83	2.79	2.71	2.88	2.18	3.06	3.14	5.07	3.58	3.41	3.41
Summer	2.71	2.53	2.10	3.32	3.32	2.79	4.98	5.68	2.71	3.49	4.19	3.67
Fall	5.07	4.54	4.10	2.71	3.32	3.23	3.67	3.14	3.14	2.97	2.62	2.01

EPA supports the state's approach for determining the background concentration.

4.3.2.9.Summary of Modeling Inputs and Results

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

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

Input Parameter	Value
AERMOD Version	15181 (regulatory default)
Dispersion Characteristics	Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	7
Modeled Fencelines	1
Total receptors	13,364
Emissions Type	Actual
Emissions Years	2013-2015
Meteorology Years	2013-2015
NWS Station for Surface Meteorology	Torrington Municipal Airport, WY
NWS Station Upper Air Meteorology	Riverton, WY
NWS Station for Calculating Surface Characteristics	Torrington Experimental Farm/Torrington, WY
Methodology for Calculating Background SO_2 Concentration	Tier 2 NCORE (Cheyenne), WY between 2012 and 2014.
Calculated Background SO_2 Concentration	0.40 to 3.97 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.

Table 11. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Platte County Area of Analysis

Averaging Period	Data Period	Receptor Location [UTM zone 13]		99th percentile daily maximum 1-hour SO_2 Concentration ($\mu g/m^3$)	
		UTM	UTM	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2013 - 2015	508185.69	4664568.50	84.9	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 $\mu g/m^3$ conversion factor

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 84.9 $\mu g/m^3$, equivalent to 32.4 ppb. This modeled concentration included the nearby sources and background concentration of SO_2, and is based on actual emissions from the facility. Figure 22 below was included as part of the state's recommendation, and indicates that the predicted value occurred about 3 km northwest of the LRS facility.

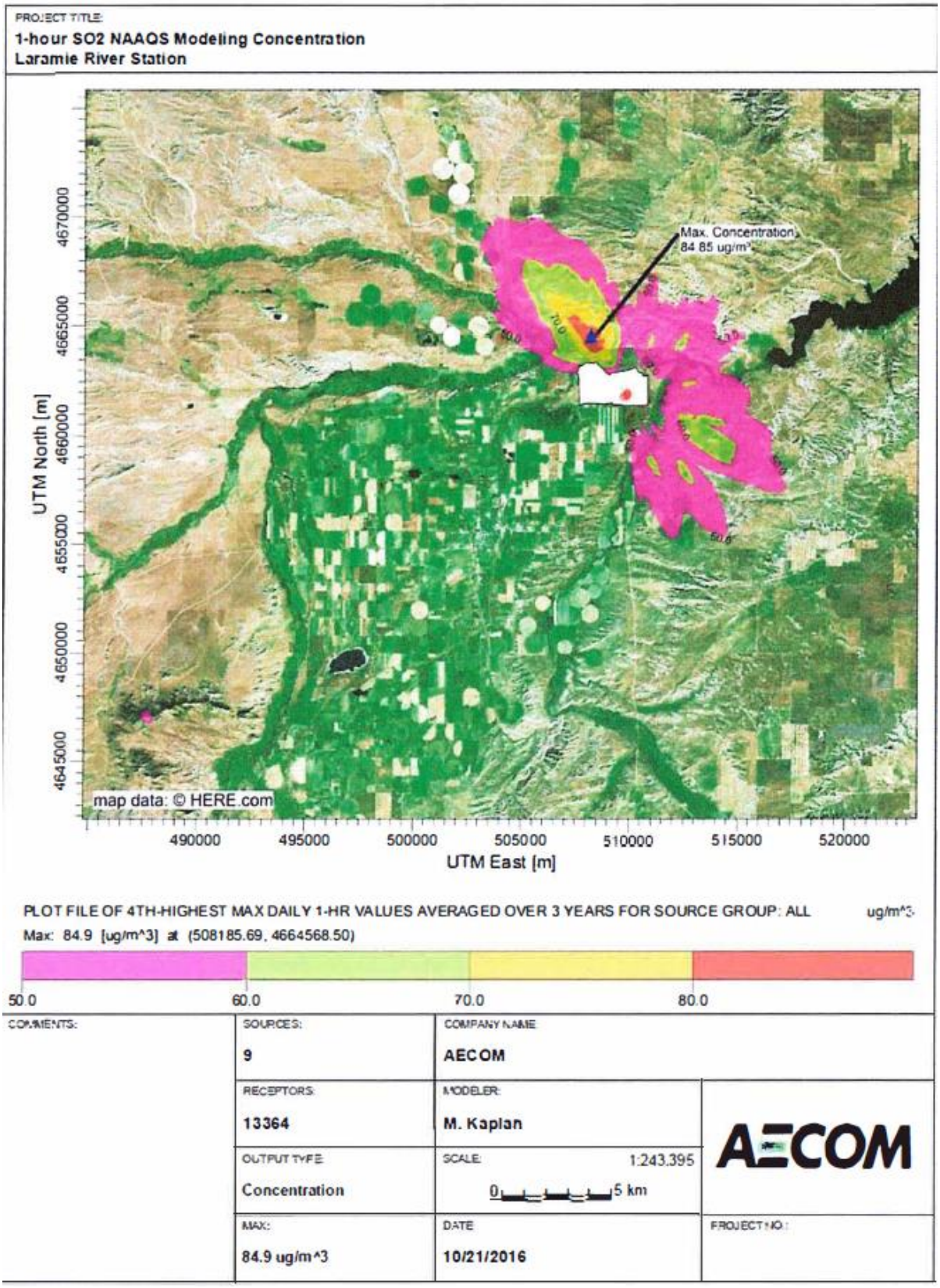


Figure 22: Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Platte County Area of Analysis

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

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

The state's approach to conducting the dispersion modeling for the EPA's 1-hour SO_2 designations appears to align with the TAD. The state has also provided sufficient information to the EPA to determine that the modeling assessment is sufficient for supporting designation decisions. While the state used AERMOD v15181, the state elected to use regulatory default options (i.e., ADJ_U* was not used in the modeling), which should not significantly impact the predicted SO_2 concentrations.

4.3.3. Modeling Analysis Provided by Other Organizations

As of July 2017, EPA has not received any modeling assessments from a 3rd party.

4.4. Emissions and Emissions-Related Data, Meteorology, Geography, and Topography for the Platte 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.

4.5. Jurisdictional Boundaries in the Platte County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Platte County. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable. As noted, the state did not provide a specific boundary, but instead requested that EPA designate the area around the Laramie River Station as attainment.

4.6. The EPA's Assessment of the Available Information for the Platte County, Wyoming Area

The EPA finds that the state's modeling results indicating no violations of the NAAQS from the Laramie River Station are sufficient to show that Platte County meets the 2010 SO_2 NAAQS and does not contribute to any nearby area that does not meet the NAAQS. The nearest nonattainment area is more than 1000 km away from Platte County in Arizona. For these reasons, we intend to designate Platte County as unclassifiable/attainment.

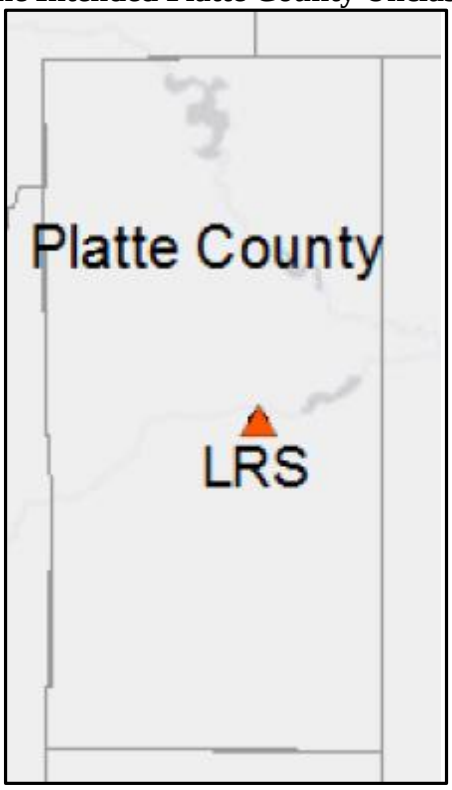
The EPA believes that our intended unclassifiable/attainment area, bounded by the borders of Platte County, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment area.

4.7. Summary of Our Intended Designation for Platte County, Wyoming

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate Platte County, Wyoming as unclassifiable/attainment for the 2010 SO_2 NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined the area (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS, as there are no such areas near the county as described above. Specifically, the boundaries are comprised of the borders of Platte County.

Figure 23 shows the boundary of this intended designated area.

Figure 23. Boundary of the Intended Platte County Unclassifiable/Attainment Area



5. Technical Analysis for the Gillette, Wyoming Area

5.1. Introduction

The EPA must designate the Gillette, Wyoming, area by December 31, 2017, because the area has not been previously designated and Wyoming has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any sources in Gillette.

5.2. Air Quality Monitoring Data for the Gillette Area

This factor considers the SO_2 air quality monitoring data in the area of Gillette, Wyoming. The state included monitoring data from the following monitor(s):

- Air Quality System monitor 560050857. This monitor is located at 44.28, -105.38 in Campbell County, and is located about 1 km southwest of Neil Simpson II facility. Data collected at this monitor indicates that the NAAQS is not close to being violated, with a design value of 21 from 2014-2016. The EPA has not received any information indicating that this monitor is adequately sited for identifying peak concentrations for the purposes of designating this area. Therefore, the EPA is not concluding that this monitor data should be relied upon as the basis for a designation for the Gillette area.

5.3. Air Quality Modeling Analysis for the Gillette Area Addressing Dry Fork Station, WYGEN I, WYGEN II, WYGEN III, Wyodak, and Neil Simpson II

5.3.1. Introduction

This section 5.3 presents all the available air quality modeling information for a portion of Campbell County that includes Dry Fork Station, WYGEN I, WYGEN II, WYGEN III, Wyodak, and Neil Simpson II. This portion of Campbell County will often be referred to as "the Gillette area" within this section 5.3. This area contains the following SO_2 sources, principally the sources around which Wyoming is required by the DRR to characterize SO_2 air quality:

- In 2014, the Dry Fork Station (884 tons/SO_2), WYGEN I (347 tons/SO_2), WYGEN II (192 tons/SO2), WYGEN III (254 tons/SO2), Wyodak (2,374 tons/SO_2), and Neil Simpson II (356 tons/SO2) facilities combined to emit 4,410 tons of SO_2. Considered as a cluster, these sources emit a combined total over 2,000 tpy and thus were added to the SO_2 DRR Source list by Wyoming, and the state has chosen to characterize them via modeling.

In its submission, Wyoming recommended that an area that includes the area surrounding the Dry Fork Station, WYGEN I, WYGEN II, WYGEN III, Wyodak, and Neil Simpson II be designated as attainment based in part on an assessment and characterization of air quality

impacts from these facilities. This assessment and characterization was 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 designate the area as unclassifiable/attainment. Our reasoning for this conclusion is explained in a later section of this TSD, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in central Campbell County, about 4 km east of Gillette, Wyoming. The Dry Fork, WYGEN I, WYGEN II, WYGEN III, Wyodak, and Neil Simpson II facilities are shown in the Figure 24 below.

As noted, the state did not include a specific designation boundary with their recommendation. The EPA's intended unclassifiable/attainment designation boundary for the Platte County area is not shown in Figure 24, but is shown in a figure in the section below that summarizes our intended designation.

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 and considered one assessment from the state.

5.3.2. Modeling Analysis Provided by the State

The Wyoming Department of Environmental Quality (WDEQ) provided an air quality modeling assessment for the Basin Electric Cooperative (Basin Electric; Dry Fork Station), Black Hills Corporation (Black Hills; WyGen I, WyGen II, WyGen III, Neil Simpson 2), and PacifiCorp (Wyodak) in Campbell County, Wyoming (WY). Figure 24 shows the location of the facilities.

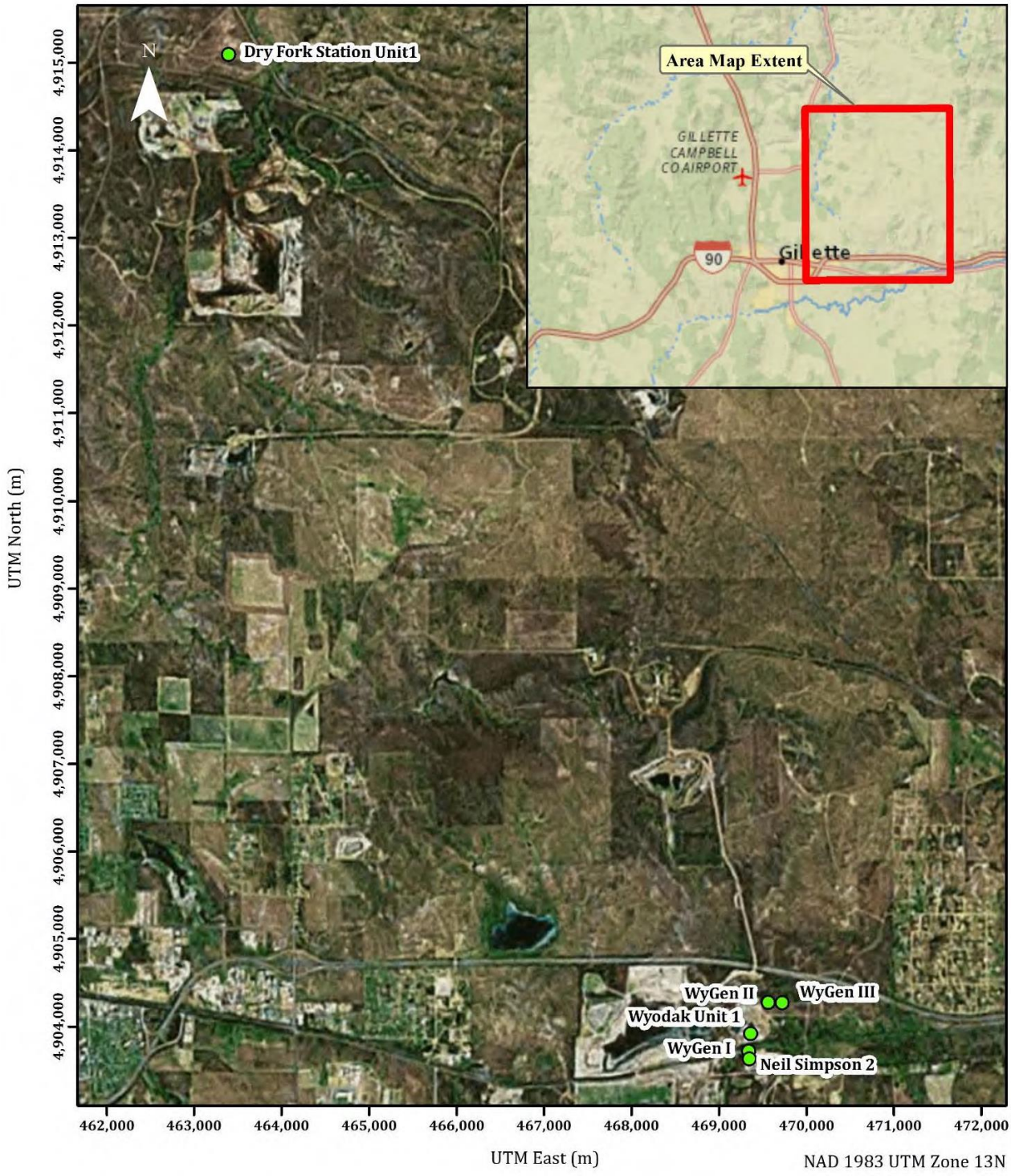


Figure 24. Map of the Dry Fork Station, WYGEN I, WYGEN II, WYGEN III, Wyodak, and Neil Simpson II facilities.

5.3.2.1.Model Selection and Modeling Components

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

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

The state used AERMOD version 15181, which was the most recent platform that was available to use at the time of the modeling. The currently approved AERMOD platform is version 16216r that includes updates. However, the updates made to components of AERMOD v16216r were not utilized in the air quality modeling assessment, such as ADJ_U*. There were no updates from 15181 to 16216r that would significantly affect the concentrations predicted here. 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_2 modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

The Campbell County facilities are located about 5-10 km from the city of Gillette, WY. In order to categorize the area as rural or urban for modeling purposes, National Land Cover Dataset (NLCD) 1992 (CONUS) Land Cover data was obtained from the Multi-Resolution Land Use Consortium (MRLC). Based on the analysis using NLCD 1992 Land Cover data, less than 5 percent of the land within 3 km of each source falls into the land use type categories listed above. Although some land development has occurred in the area since the 1992 data was published, it is clear from the aerial images provided in Figures 25 to 26 that significantly less than 50 percent of the land within 3 km of the sources can be considered urban. As such, the sources were considered rural for the modeling analysis.

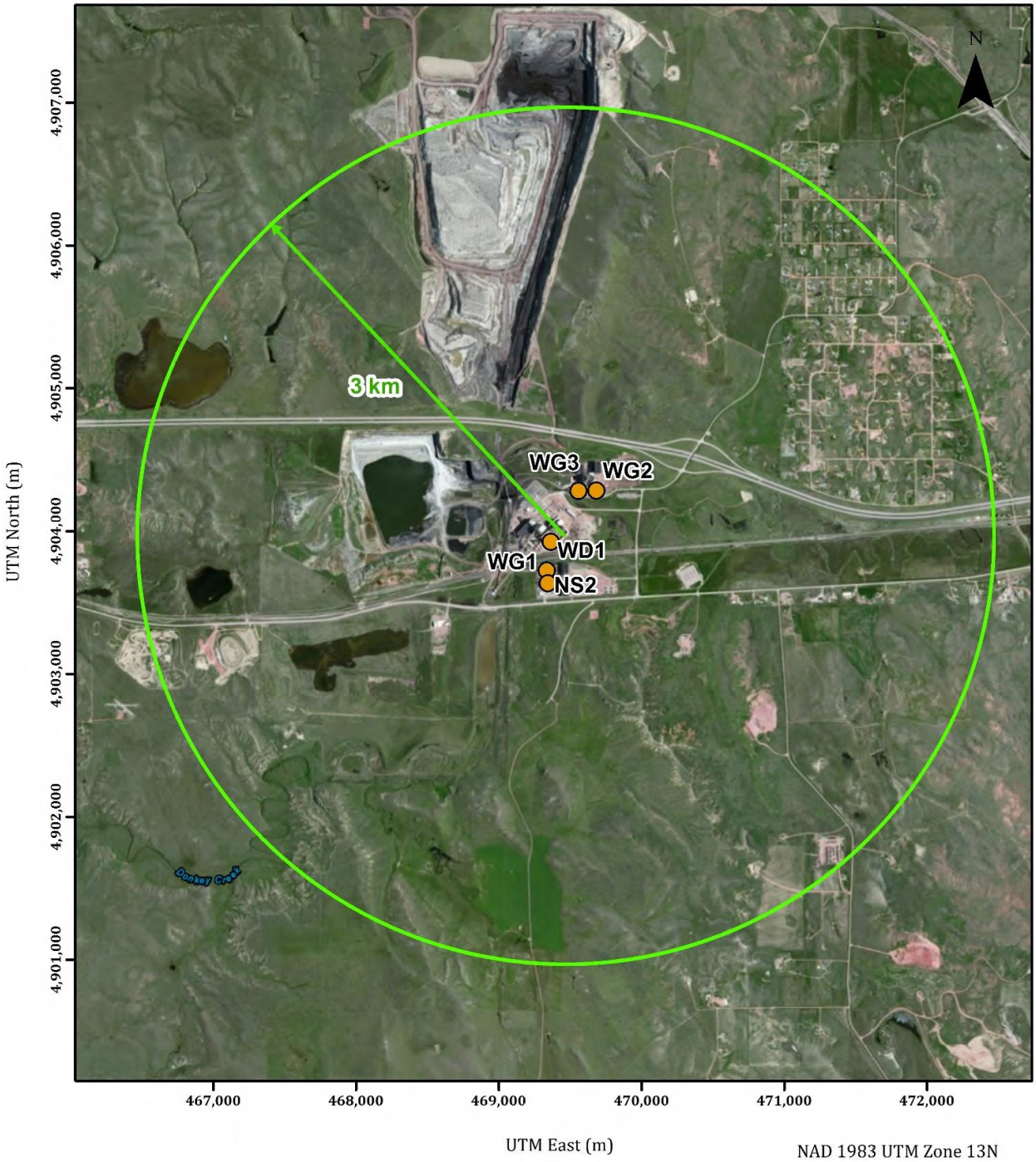


Figure 25. Aerial Image – Wygen, Wyodak, and Neil Simpson Area.

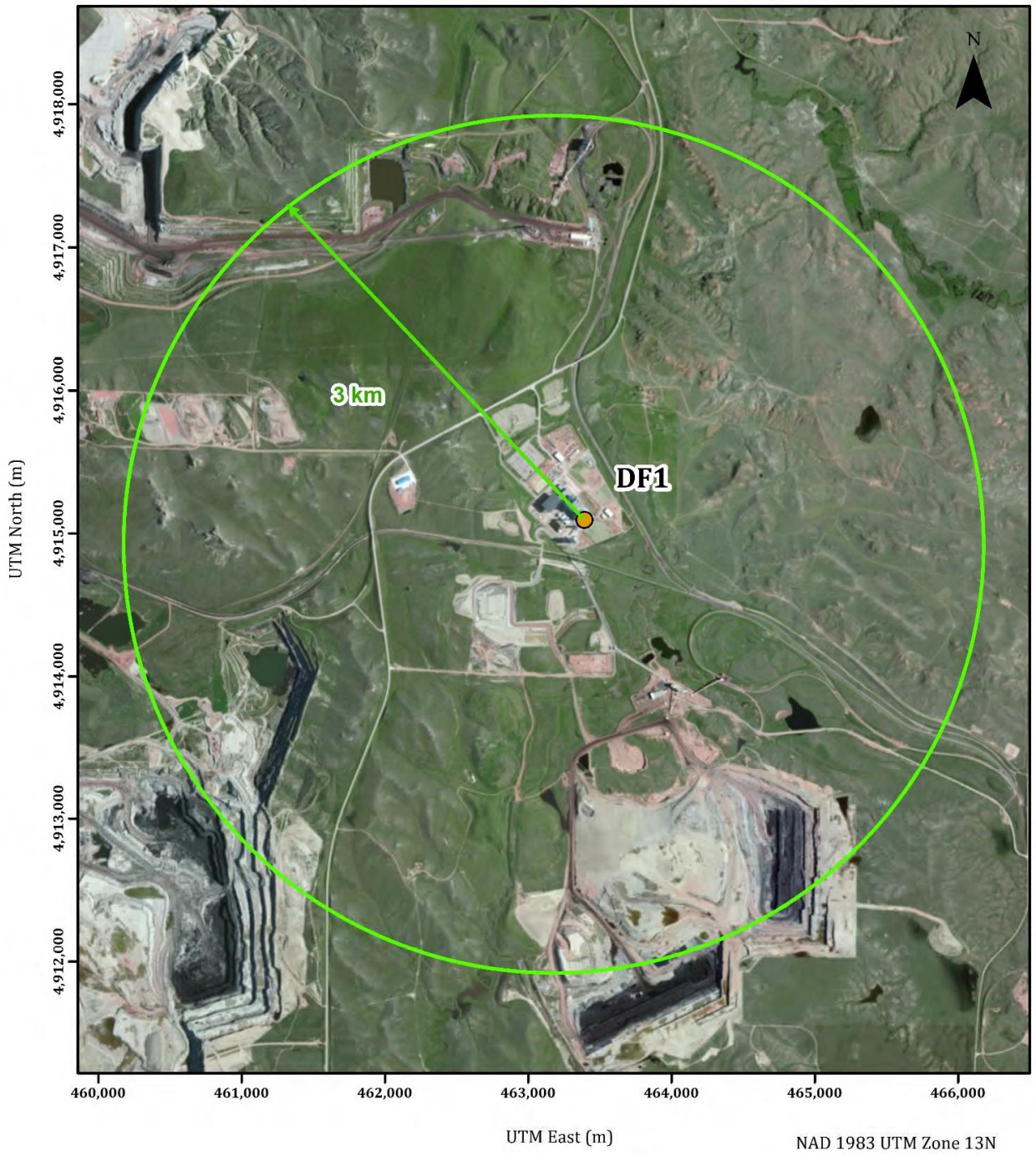


Figure 26. Aerial Image – Dry Fork Area.

The site locations were classified as rural using the land use procedure specified in Appendix W. The area was clipped to a 3-km ring around the facilities. The percent of land classified as developed within this radius was much than 50 percent. By the definition in Appendix W, land that contains less than 50 percent of developed land use categories should be considered rural. EPA's assessment supports the state's analysis on the land use classification.

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_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The sources of SO_2 emissions subject to the DRR in this area are described in the introduction to this section. For the Campbell County area, WDEQ did not identified any nearby sources to be explicitly modeled as background sources for this area.

The state determined that the selected modeling domain was appropriate to adequately characterize air quality through modeling, and to include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. No other sources beyond 25 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis. The EPA supports the states analysis based on EPA's review of the area.

A Cartesian modeling receptor array was established to capture the 99^{th} percentiles of the maximum daily one-hour average SO_2 impacts from the Campbell County area. The following receptor grid extending from the center of the six facilities out to 25 kilometers included:

- Receptors placed at 25 meter intervals along the fence line;
- For each facility, 100 meter intervals out to a distance of at least 2.5 km from each facility, and at 500 meter intervals out to at least 10 km or further from each facility if needed;
- Receptor grid covers the entire modeling domain.

The modeled receptor grids and property fence lines utilized in the receptor grid for the six facilities are depicted in Figures 27 to Figure 28. As shown in the figures, o onsite receptors for neighboring facilities were included in this analysis. Since the area within each facility's fenceline is considered ambient air relative to emissions generated at the other modeled facility, no onsite receptors were removed in this analysis, including the receptors located within each facility's fenceline.

The receptor grid used in the modeling analysis was based on Universal Transverse Mercator (UTM) coordinates referenced to NAD 83 datum and in zone 13. The extent of this grid sufficiently captured the maximum modeled impacts from the facilities. A total of 12,871 receptors were used for modeling.

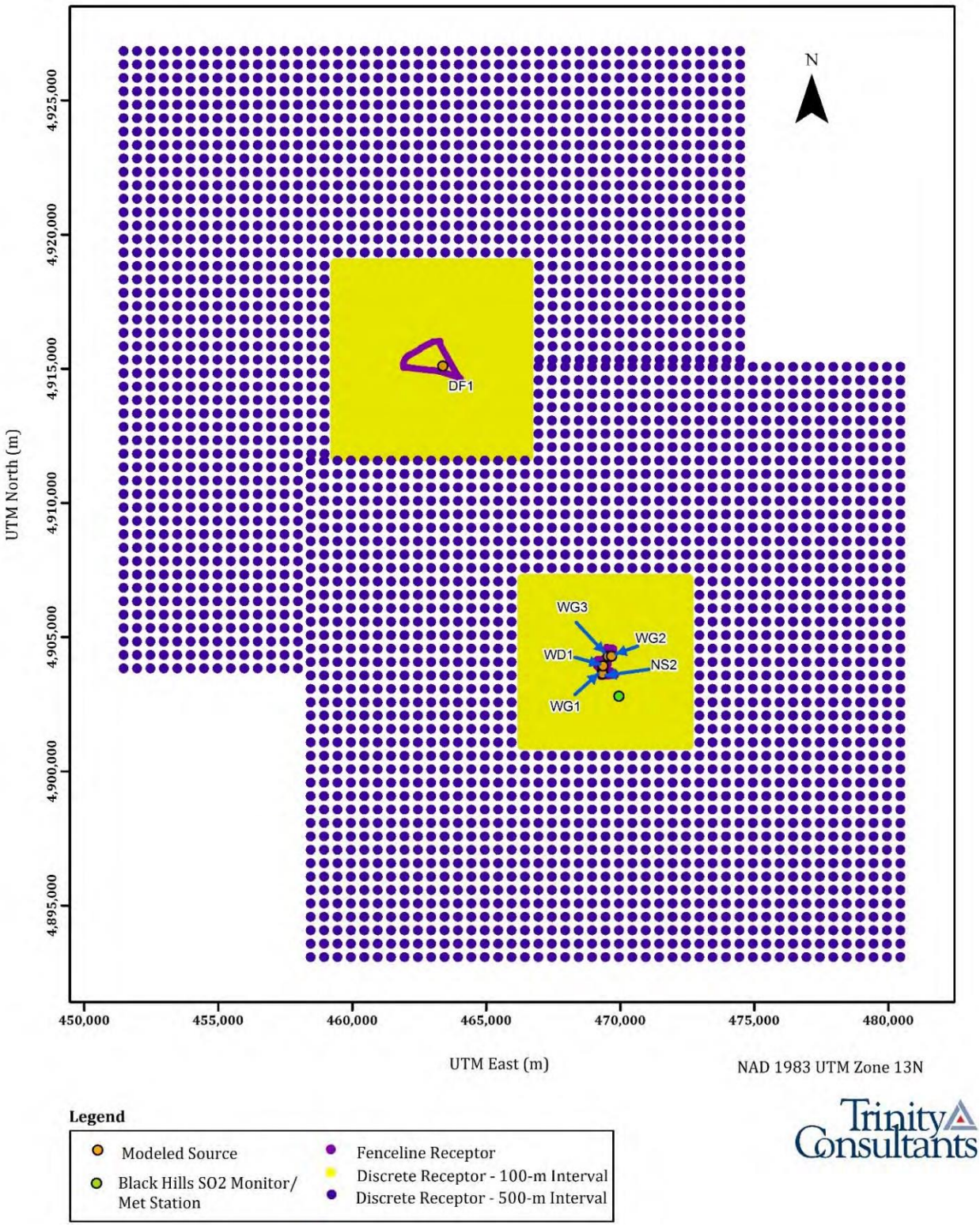


Figure 27. Receptor locations – Full Extent.

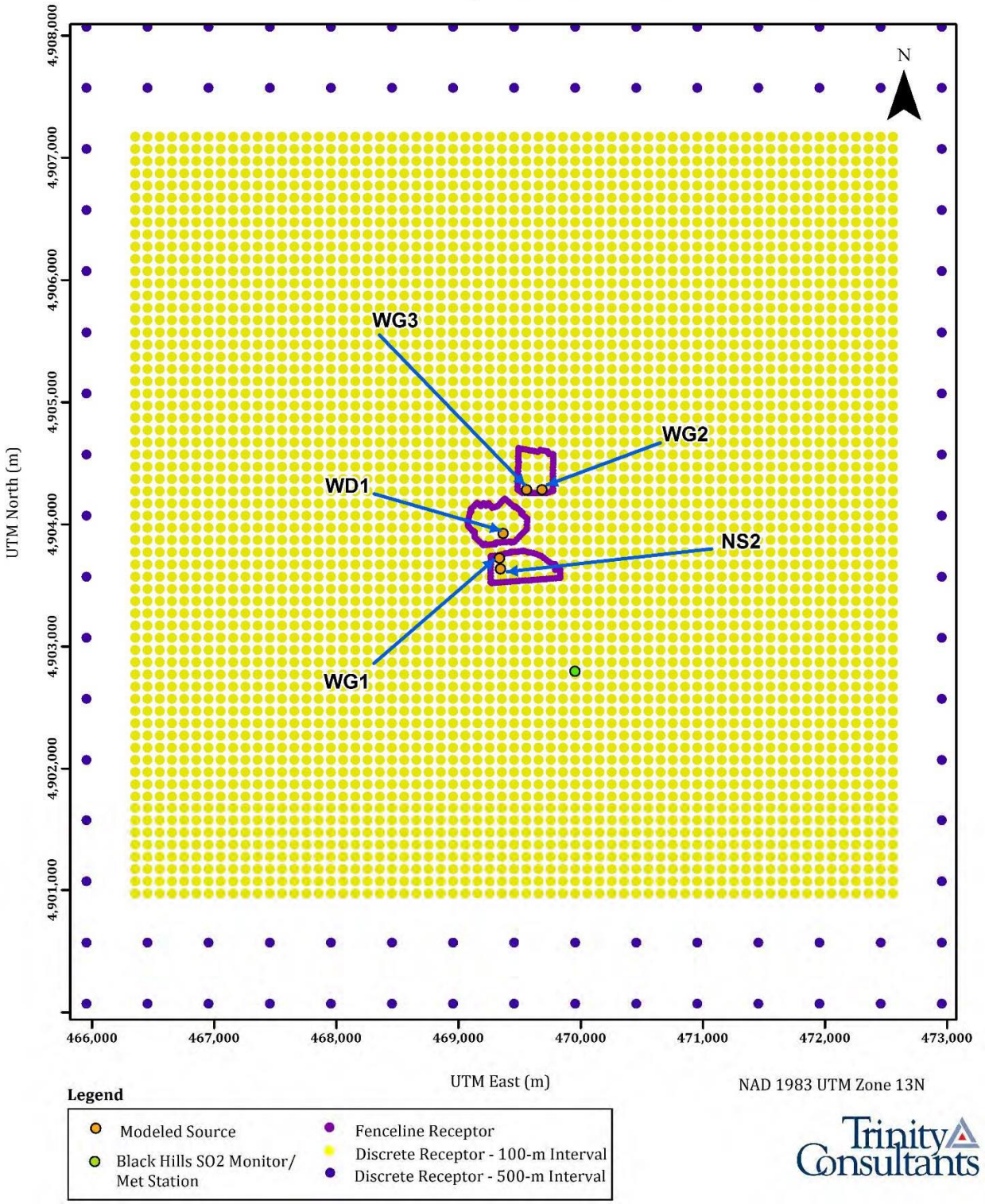


Figure 28. Receptor locations – WYGEN 1-3, Wyodak, and Neil Simpson.

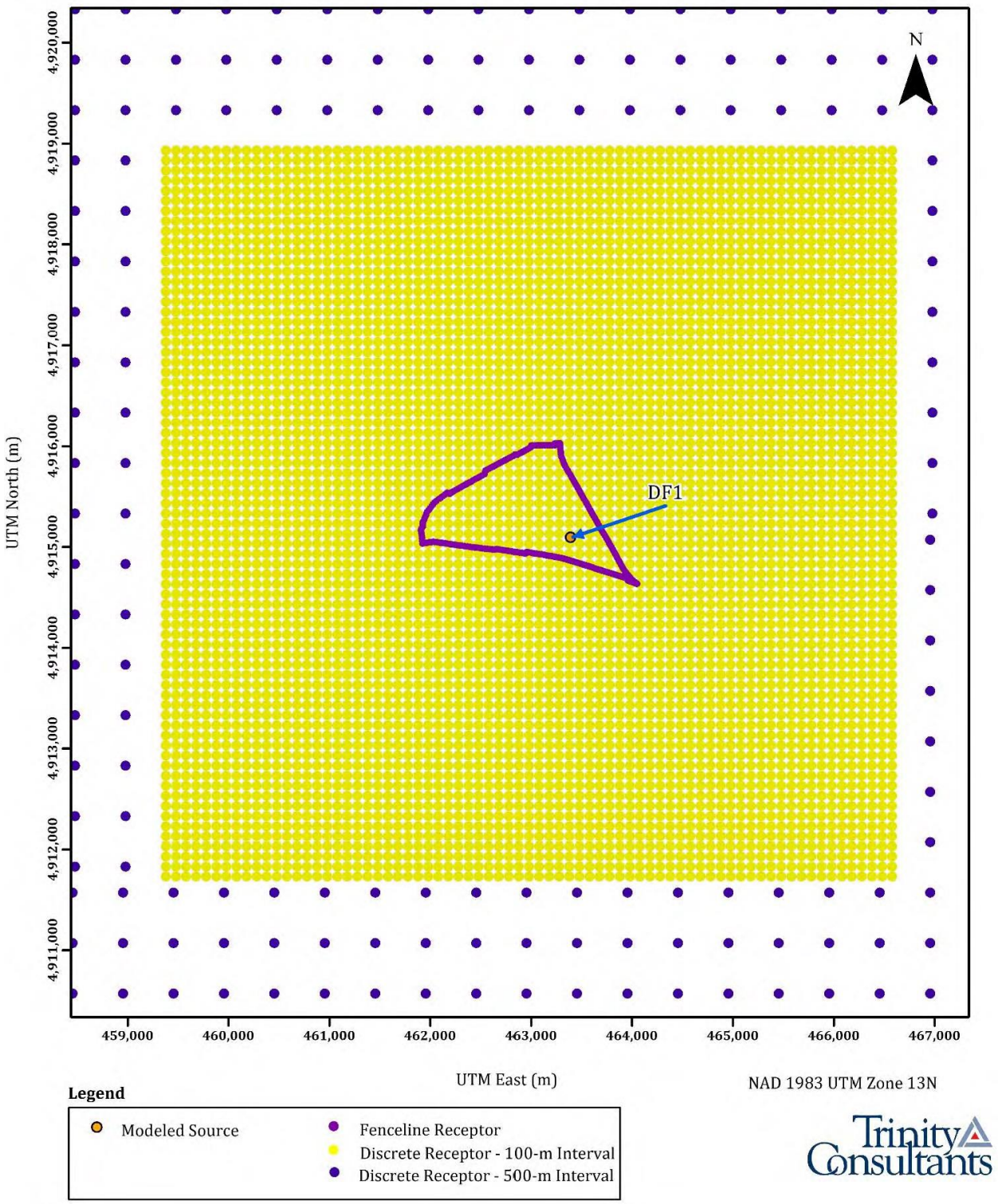


Figure 29. Receptor locations – Dry Fork Area.

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. EPA supports the locations and coverage of receptors used in the state's air quality modeling assessment.

5.3.2.4.Modeling Parameter: Source Characterization

The Campbell County area consists of six coal-fired generating utility units that have SO_2 air pollution control systems. In accordance with the Modeling TAD for the DRR, the analysis used 2012-2014 actual hourly SO_2 emissions, temperature and velocity data collected by the Continuous Emissions Monitoring (CEMs) equipment at each unit and actual stack heights. The 2012-2014 data used for the modeling assessment was the most complete data at the time the modeling was conducted and the use of more recent data is not anticipated to cause significant differences in the model results, as the average combined SO_2 emissions for all facilities from 2012-2014 was 4,444 tpy, and the average combined SO_2 emissions from 2015-2016 was 4,267 tpy. Table 12 and Table 13 summarize the control equipment and stack parameters used in the AERMOD modeling.

The plant structures, buildings, and tanks were included for AERMOD downwash calculations using BPIPPRM (version 04274). A total of 67 structures were included in the modeling.

Table 12. Utility Units Included in Modeling Analysis.

Utility	Plant/Unit	Size (MW)	Control Equipment
Basin Electric	Dry Fork Station Unit 1	385	Circulating Dry Scrubber and Fabric Filter
Black Hills	WyGen I	80	Dry Scrubber and Fabric Filter
Black Hills	WyGen II	95	Dry Scrubber and Fabric Filter
Black Hills	WyGen III	110	Dry Scrubber and Fabric Filter
Black Hills	Neil Simpson 2	90	Circulating Dry Scrubber and ESP
PacifiCorp	Wyodak Unit 1	335	Dry Scrubber and Fabric Filter

MW = Megawatts.

Table 13. Stack Parameters for Units Explicitly Modeled in the Analysis.

Utility	Plant/Unit	Coordinates		Stack Height	Base Elevation	Stack Diameter	Exit Velocity	Exit Temperature
		Latitude	Longitude	feet	feet	feet	m/s	K
Basin Electric	Dry Fork Station Unit 1	44.3882	-105.4596	500	4250	19.50	varies	varies
Black Hills	WyGen I	44.2861	-105.3843	295	4420	9.25	varies	varies
Black Hills	WyGen II	44.2911	-105.3815	397	4420	10.25	varies	varies
Black Hills	WyGen III	44.2911	-105.3800	397	4420	10.25	varies	varies
Black Hills	Neil Simpson 2	44.2853	-105.3842	295	4420	9.25	varies	varies
PacifiCorp	Wyodak Unit 1	44.2879	-105.3840	400	4430	20.00	varies	varies

m/s = meters per second; K = Kelvin degrees.

The state characterized these sources 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 sources' 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. EPA supports the state's analysis of the source characterizations.

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.

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 sources.

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

As previously noted, the state included the Dry Fork, WYGEN I, WYGEN II, WYGEN III, Wyodak, and Neil Simpson II facilities in the area of analysis. The state has chosen to model these facilities using actual emissions. The facilities in the state's modeling analysis and their associated annual actual SO_2 emissions between 2012 and 2014 are summarized below.

For these facilities, the state provided annual actual SO_2 emissions between 2012 and 2014. This information is summarized in Table 14. A description of how the state obtained hourly emission rates is given below this table.

Table 14. Actual SO_2 Emissions Between 2012 – 2014 from Facilities in the Gillette Area

Facility Name	SO_2 Emissions (tpy)		
	2012	2013	2014
Dry Fork Station Unit 1	691	829	884
WyGen I	394	566	347
WyGen II	164	171	192
WyGen III	325	315	254
Neil Simpson 2	419	511	357
Wyodak Unit 1	2,297	2,235	2,374
Total Emissions from All Modeled Facilities in the State's Area of Analysis	4,290	4,627	4,154

For each of these facilities, the actual hourly emissions data were obtained from CEMs.

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.

AERMET version 15181 was used to process the hourly meteorological data for the modeling analysis. Hourly averaged surface observations were processed from the Black Hills Power 30-meter meteorological tower. The tower is equipped with sensors at the 2-meter, 10-meter, and 30-meter levels. The hourly data from the tower were for the years 2012 to 2014, which is consistent with the actual emissions data. Concurrent upper air data were obtained from the most representative NWS site, which was determined to be Rapid City, South Dakota.

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, one-minute ASOS (Automated Surface Observing System) wind data from the Gillette-Campbell County Airport in Gillette, WY (KGCC) were processed using AERMINUTE (version 15272) into hourly data for input into AERMET (15181). 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.

A surface wind rose for the entire 3-year period proposed for the modeling time period is shown in Figure 30. The wind rose shows that the dominate wind directions are from the south or northwest (about 5 percent of the time). The average wind speed is about 5.5 m/s, where calm winds are about 0.18 percent of the time.

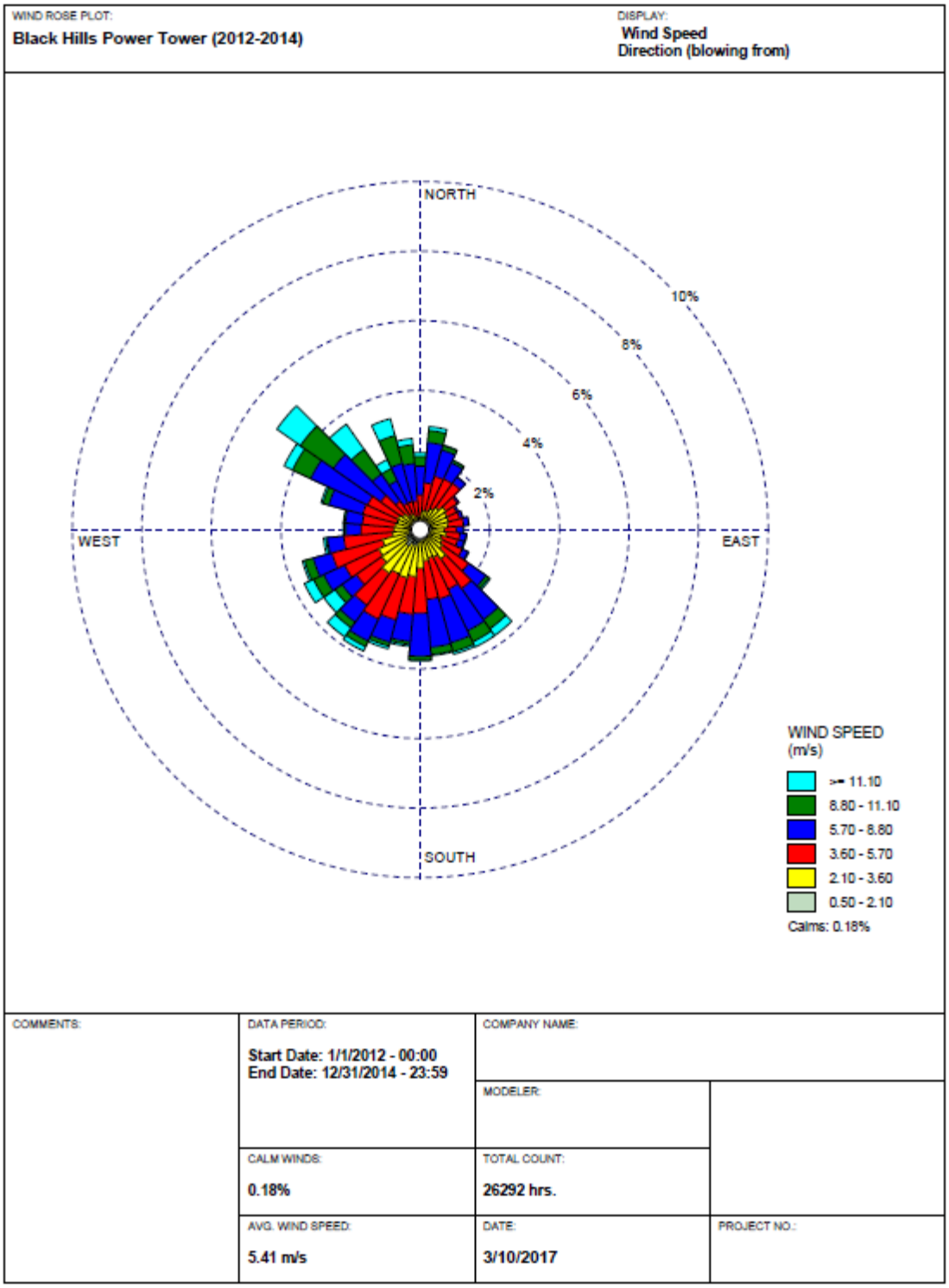


Figure 30. Wind Rose for the Black Hills Tower, 2012-2014.

AERSURFACE (version 13016) was used to calculate the surface characteristics values, including albedo, Bowen ratio, and surface roughness length, at the surface meteorological observing site for input into AERMET. The 1992 National Land Cover Dataset (NLCD92) file for input into AERSURFACE was downloaded from the United States Geological Society

(USGS) website. EPA guidance dictates that on at least an annual basis, precipitation at a surface site should be classified as wet, dry, or average in comparison to the 30-year climatological record at the site. This determination is used to set the Bowen ratio estimated by AERSURFACE. To make the determination, seasonal precipitation in each modeled year (2012-2014), as measured at the Black Hills 30-meter tower, was compared to the historical climatological record for the area surrounding the Black Hills 30-meter tower. A 30-year record (1981-2010) is available from the NWS Sheridan Wyoming site; however, data has been collected at the Gillette Campbell County Airport site since July 1998. Based on the close proximity to the Black Hills 30-meter tower location, this dataset (July 1998 – May 2015) was used for the comparison. The 30th and 70th percentile values of the seasonal precipitation distribution from the dataset were calculated. Per EPA guidance, each modeled year was classified for AERSURFACE processing as "wet" if its seasonal precipitation was higher than the 70th percentile value, "dry" if its seasonal precipitation was lower than the 30th percentile value, and "average" if it was between the 30th and 70th percentile values. Snow records for 2012-2014 were reviewed to determine whether the area had continuous winter snow cover. If all three months in a given year indicated that at least 50% of days had a snow depth of at least one inch, then continuous winter snow cover was assumed.

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 Appendix W and the Modeling TAD in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics. EPA supports the state's analysis as best representative of meteorological conditions within the area of analysis.

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

As illustrated above, Campbell County is considered to have relatively flat terrain in the Powder River Basin between the Big Horn Mountains and the Black Hills. To account for these terrain changes, the AERMAP terrain program (version 11103) 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. The EPA supports the state's approach for defining the terrain.

5.3.2.8.Modeling Parameter: Background Concentrations of SO_2

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state utilized the tier 1 approach, where the background concentrations for this area of analysis were determined by the design value from the NCORE site near Cheyenne, WY. The design value from the NCORE site represented the 99th percentile three-year average (2012-2014) and equated to 5.98 ppb (15.66 $\mu g/m^3$). The background concentration was added to the modeling results, and the resulting concentration was compared to the 1-hour SO_2 NAAQS.

The EPA supports the state's approach for determining the background concentration.

5.3.2.9.Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the Campbell County area of analysis are summarized below in Table 15.

Table 15: Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the Campbell County Area

Input Parameter	Value
AERMOD Version	15181 (regulatory default)
Dispersion Characteristics	Rural
Modeled Sources	4
Modeled Stacks	6
Modeled Structures	67
Modeled Fencelines	4
Total receptors	12,871
Emissions Type	Actual
Emissions Years	2012-2014
Meteorology Years	2012-2014
NWS Station for Surface Meteorology	Black Hills Power Tower, WY
NWS Station Upper Air Meteorology	Gillette-Campbell County Airport, WY
NWS Station for Calculating Surface Characteristics	Gillette-Campbell County Airport, WY
Methodology for Calculating Background SO_2 Concentration	Tier 1 NCORE (Cheyenne), WY between 2012 and 2014.
Calculated Background SO_2 Concentration	5.98 ppb

The results presented below in Table 16 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.

Table 16. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Area of Analysis for the Campbell County Area

Averaging Period	Data Period	Receptor Location [UTM zone 13]		99th percentile daily maximum 1-hour SO_2 Concentration ($\mu g/m^3$)	
		UTM	UTM	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2012 – 2014	470257.00	4903270.0	93.7	196.4*

*Equivalent to the 2010 SO_2 NAAQS of 75 ppb using a 2.619 $\mu g/m^3$ conversion factor

The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 93.7 $\mu g/m^3$, equivalent to 35.8 ppb. This modeled concentration included the nearby sources and background concentration of SO_2, and is based on actual emissions from the facilities. Figure 31 below was included as part of the state's recommendation, and indicates that the predicted value occurred about 1.2 km southeast of the Black Hills and PacifiCorp facilities.

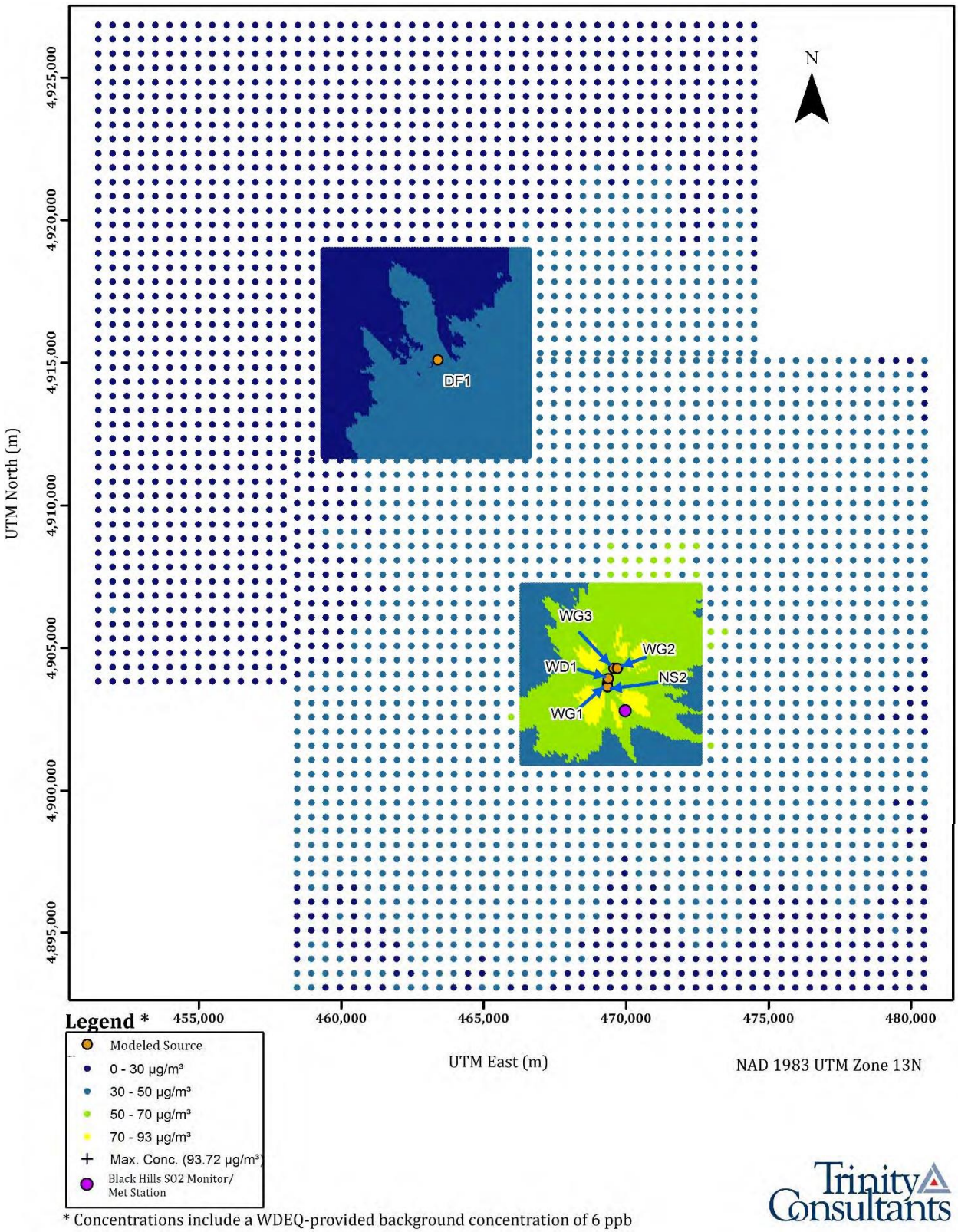


Figure 31: Predicted 99th Percentile Daily Maximum 1-Hour SO_2 Concentrations Averaged Over Three Years for the Campbell County Area of Analysis

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

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

The state's approach to conducting the dispersion modeling for EPA's 1-hour SO_2 designations appears to align with the TAD. The state has also provided sufficient information to the EPA to determine that the modeling assessment is sufficient for supporting designation decisions. While the state used AERMOD v15181, the state elected to use regulatory default options (i.e., ADJ_U* was not used in the modeling), which should not significantly impact the predicted SO_2 concentrations. The state also used data collected between 2012 and 2014, which are not the most recent years. However, the EPA supports the data used for the modeling assessment because it was the most complete data at the time the modeling was conducted and the use of more recent data is not anticipated to cause significant differences in the model results, as noted in Section 5.3.2.4.

5.3.3. Modeling Analysis Provided by Other Organizations

As of July 2017, the EPA has not received any modeling assessments from a 3rd party.

5.4. Jurisdictional Boundaries in the Gillette, Wyoming Area

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

As noted, the state did not include a specific designation boundary with their recommendation.

5.5. The EPA's Assessment of the Available Information for the Gillette, Wyoming Area

The EPA has determined, based on our review of the modeling data provided by the state, that Campbell County meets the 2010 SO_2 NAAQS and does not contribute to any nearby area that does not meet the NAAQS as there are no such areas near Campbell County. The nearest nonattainment area is over 1,200 km away from Campbell County. For these reason, we intend to designate Campbell County as unclassifiable/attainment. The results of the monitoring data available for the area indicate an SO_2 design value below the NAAQS. These monitoring data were also available to EPA for consideration in the designations process, however, since it is unclear if these monitors are located in areas of maximum concentration, it is unclear if the data are representative of the area's actual air quality.

The EPA believes that our intended unclassifiable/attainment area, bounded by the borders of Campbell County, Wyoming, 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.

5.6. Summary of Our Intended Designation for the Gillette, Wyoming Area

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

Figure 32 shows the boundary of Campbell County, Wyoming.

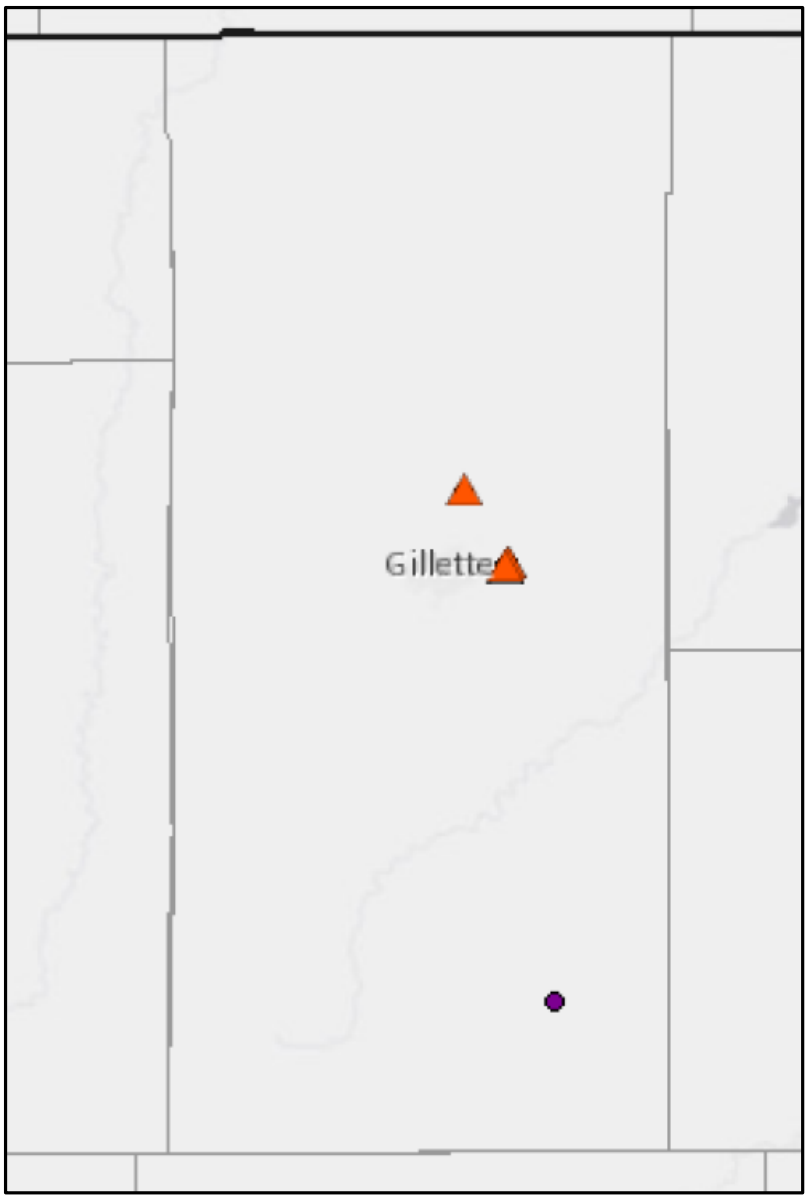


Figure 32. Campbell County, Wyoming

6. Technical Analysis for the Eastern Sweetwater County Area

6.1. Introduction

The EPA must designate the area surrounding the Jim Bridger Power Plant in Eastern Sweetwater County, Wyoming, by December 31, 2017, because the area has not been previously designated and Colorado has not installed and begun timely operation of a new, approved SO_2 monitoring network for the area surrounding the source. Rather, the state has justified the placement of its existing monitoring network, which indicates attainment of the 2010 SO_2 NAAQS for emissions from Jim Bridger for the 2013-2015 design value period.

In its recommendation, the state recommended that the area around the Jim Bridger Power Plant be designated as attainment for the 2010 SO2 NAAQS, based on monitored air quality for 2013-2015. The state also submitted technical information to verify that the monitoring network sufficiently characterizes ambient SO2 air quality conditions from the Jim Bridger facility, which we'll discuss in detail later in this section. The EPA agrees with Wyoming's conclusion that the monitor is adequately sited and indicates compliance with the NAAQS, and intends to designate the area as unclassifiable/attainment based upon currently available information for the period 2013-2015. Our intended designation boundaries for the area are described below.

6.2. Air Quality Monitoring Data for the Eastern Sweetwater County Area

AQS monitor 560370020 located at N414447.37, W1084813.44 in the area has sufficient valid data for 2013-2015 and these data indicate that there was no violation of the 2010 SO_2 NAAQS at the monitoring site in that period. For the reasons provided below, the EPA intends to determine that these data are sufficient to support a conclusion that there is no NAAQS violation in any other portion of the area, and that the area is not contributing to a violation in a nearby area.

The state conducted air quality modeling to determine the appropriate location to place an ambient monitor. The state's modeling was primarily conducted utilizing beta options ADJ_U* and LOWWIND3, and normalized emissions in which they dividing by an emission rate of 5 g/s. LOWWIND3 is a non-regulatory default option, or beta option, has not yet been incorporated for use under Appendix W, and still requires both scientific evaluation and peer review. Until such time that a scientific evaluation and peer review of LOWWIND3 has occurred, extra scrutiny and more thorough alternative model justification per Appendix W, Section 3.2.2 will be necessary. In addition, for use of ADJ_U* it is imperative that the latest version of the AERMOD platform (16216r) released in December 2016 be used instead of version 15181. The latest version of the AERMOD platform (16216r) addresses issues/bugs identified with the use of AERMOD version 15181 specific to ADJ_U*. For these reasons, the EPA cannot evaluate the results of modeling which used these non-default options as justification for the placement of the current monitor. However, the state also submitted modeling conducted using regulatory default options (see Figure 34, below) and normalized emissions, which indicated that maximum

impacts were modeled to occur to the north and west of the Jim Bridger facility in close proximity to the source. The current monitor is located about 1 km northwest of the Jim Bridger facility, less than ½ of a km from the projected area of maximum impact shown in Figure 34. Based on the results of this modeling analysis, the EPA finds that this monitor is adequately sited to record maximum impacts.

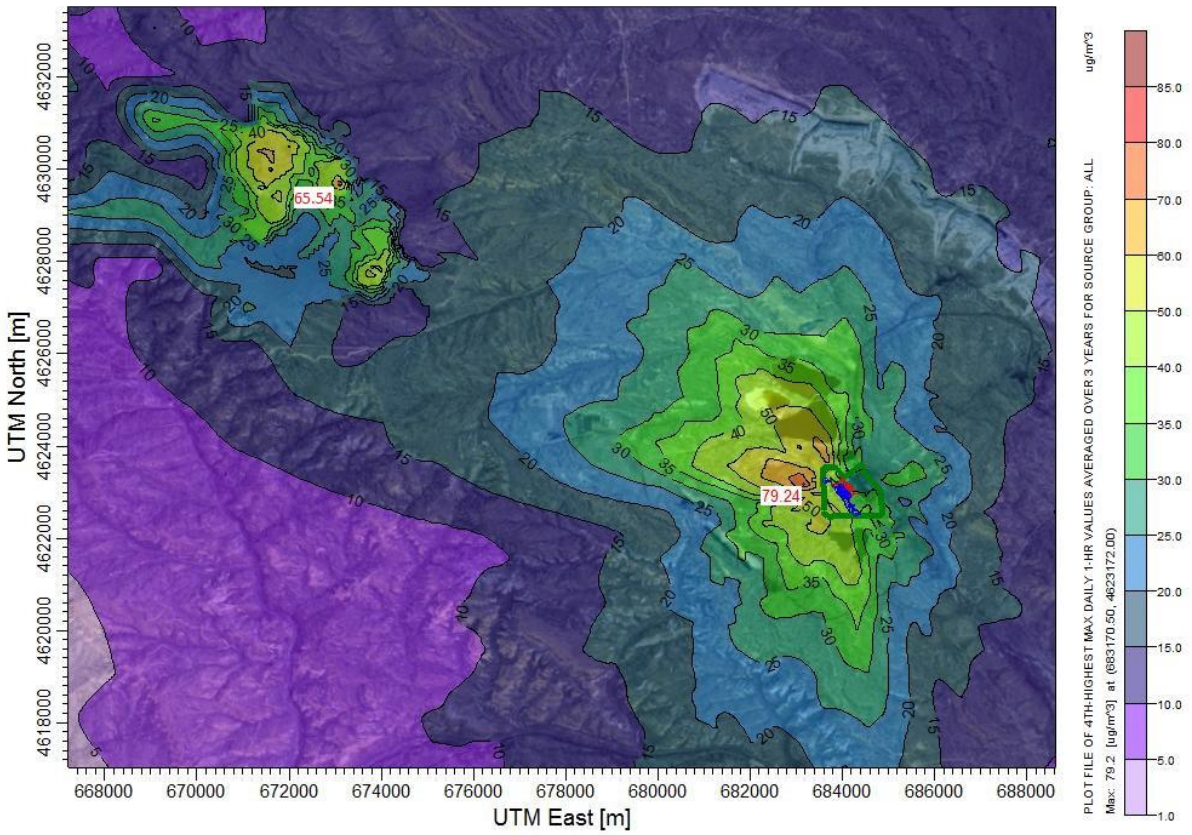


Figure 34: Isopleth Map of the 99th Percentile Normalized SO2 Concentrations Using AERMET/AERMOD Default options for Jim Bridger (Jim Bridger facility is outlined in green)

The state also provided information regarding the modeled impacts at the area 10 km to the northwest of the facility (also shown in Figure 33). The state indicated that this area would not be appropriate for monitor siting due to complex terrain (see Figure 35, below) and inaccessibility of power with which to operate a monitoring station. The EPA is not here proposing to concur with the state's assessment that it is infeasible to place a monitor in the area they've listed as an "exclusion zone" in Figure 35, but finds that it is not necessary to place a secondary monitor at this location because the higher impacts are modeled to occur to the west in close proximity to the Jim Bridger facility, where the current SO_2 ambient monitor is located.

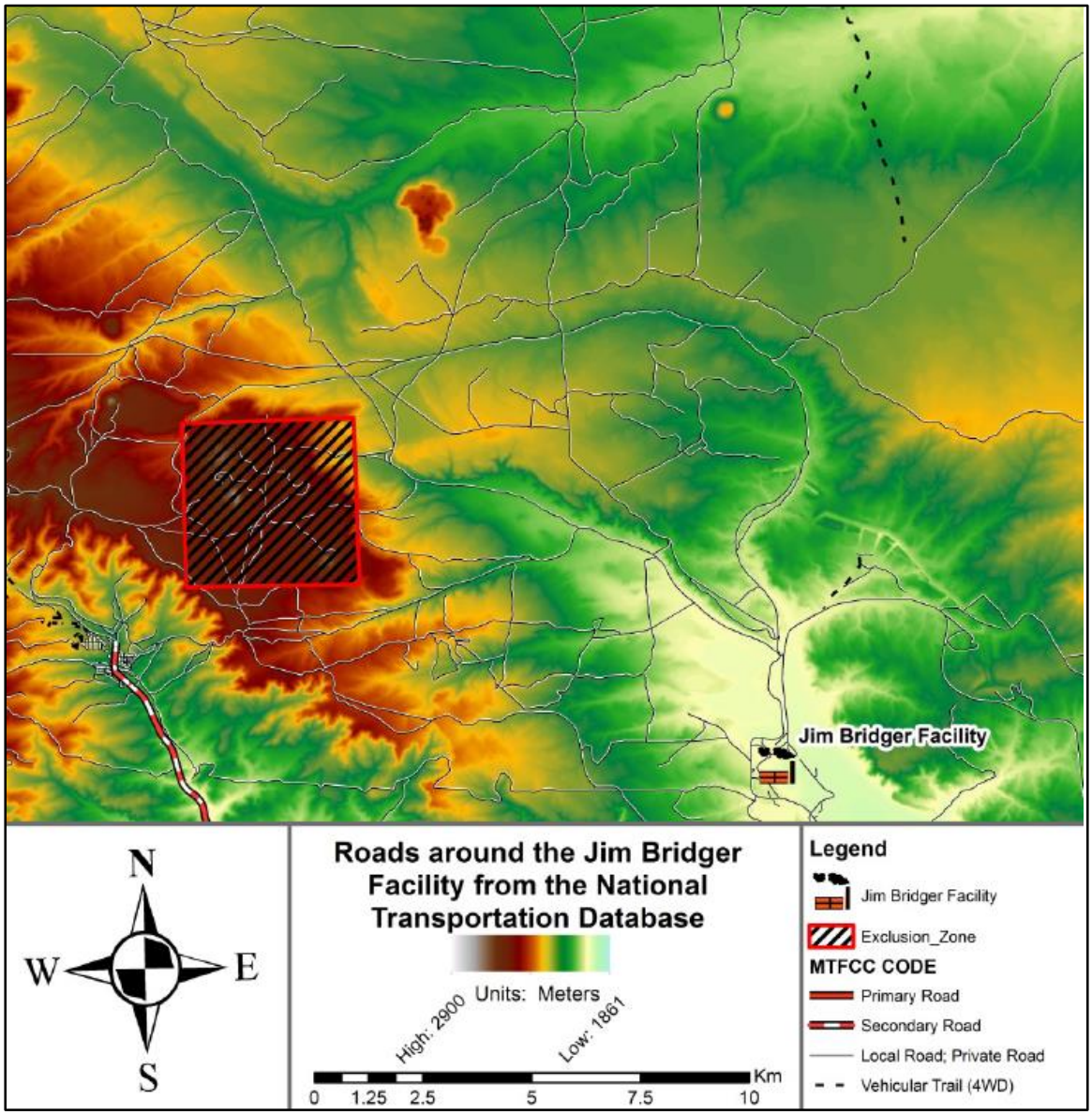


Figure 35. Aerial view of a portion of the excluded receptor area located 10 km west of the facility.

Figure 36. The location of the Ambient SO_2 Monitor (green dot) in relation to the Jim Bridger facility.

Table 18 shows the 4th maximum value at the source-oriented Jim Bridger SO_2 monitor between 2013 and 2015.

Table 18. Jim Bridger SO_2 Monitor Design Values

Year	2013	2014	2015	2013-2015 dv
SO2 4th Maximum Value (ppb)	29	32	31	30.7

The state has recommended a designation of attainment for the area surrounding the Jim Bridger facility on the basis that this monitor is adequately sited to record maximum impacts, and that the monitor indicates attainment well below the 2010 SO_2 NAAQS. Based on the information provided here, the EPA agrees with the state's recommended designation of attainment and intends to designate the eastern portion of Sweetwater County as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, our intended designation applies to the portion of Sweetwater County located east of Highway 191. Western Sweetwater County contains a number of facilities subject to the DRR which have installed an SO_2 ambient monitoring network and the EPA will designate that portion of Sweetwater County located west of Highway 191 by December 31, 2020.

6.3. Emissions and Emissions-Related Data for the Eastern Sweetwater County Area

Table 19 identifies the emissions of sources in eastern Sweetwater County. The Rock Springs Coal Calcining Plant is located roughly 42 km southwest of the Jim Bridger facility, and was therefore not considered in the modeling analysis to determine appropriate placement for the monitor associated with Jim Bridger. The Rock Springs Fertilizer Complex is located roughly 35 km southwest of the Jim Bridger facility, and so was also not included in the modeling analysis to determine monitor placement. Since the areas impacted by these two sources were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the areas may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS, the EPA intends to include these areas in the larger Eastern Sweetwater County unclassifiable/attainment area.

Table 19. Emissions Information for SO_2 Sources in Eastern Sweetwater County

Facility	2014 SO_2 Emissions
Jim Bridger Power Plant	10,724
Rock Springs Coal Calcining Plant	753
Rock Springs Fertilizer Complex	1,153

6.4. Meteorology, Geography, and Topography for the Eastern Sweetwater County Area

As shown in Figure 35, above, the terrain near the Jim Bridger facility is relatively flat, with higher elevation beginning roughly 8 kilometers west/northwest of the facility. Figure 37, below, shows a wind rose for the meteorological station at the Jim Bridger facility. Though this wind rose indicates that it is common for winds at high speeds to be coming from the west of the facility, the modeled peak concentrations near west of the facility using these meteorological data with normalized emissions were attributed to building downwash occurring during periods with stable conditions and low winds. The EPA is giving consideration to these factors by

determining whether they were properly incorporated into the modeling analysis which predicted an area of maximum concentration, and we are here finding that these factors have been adequately considered.

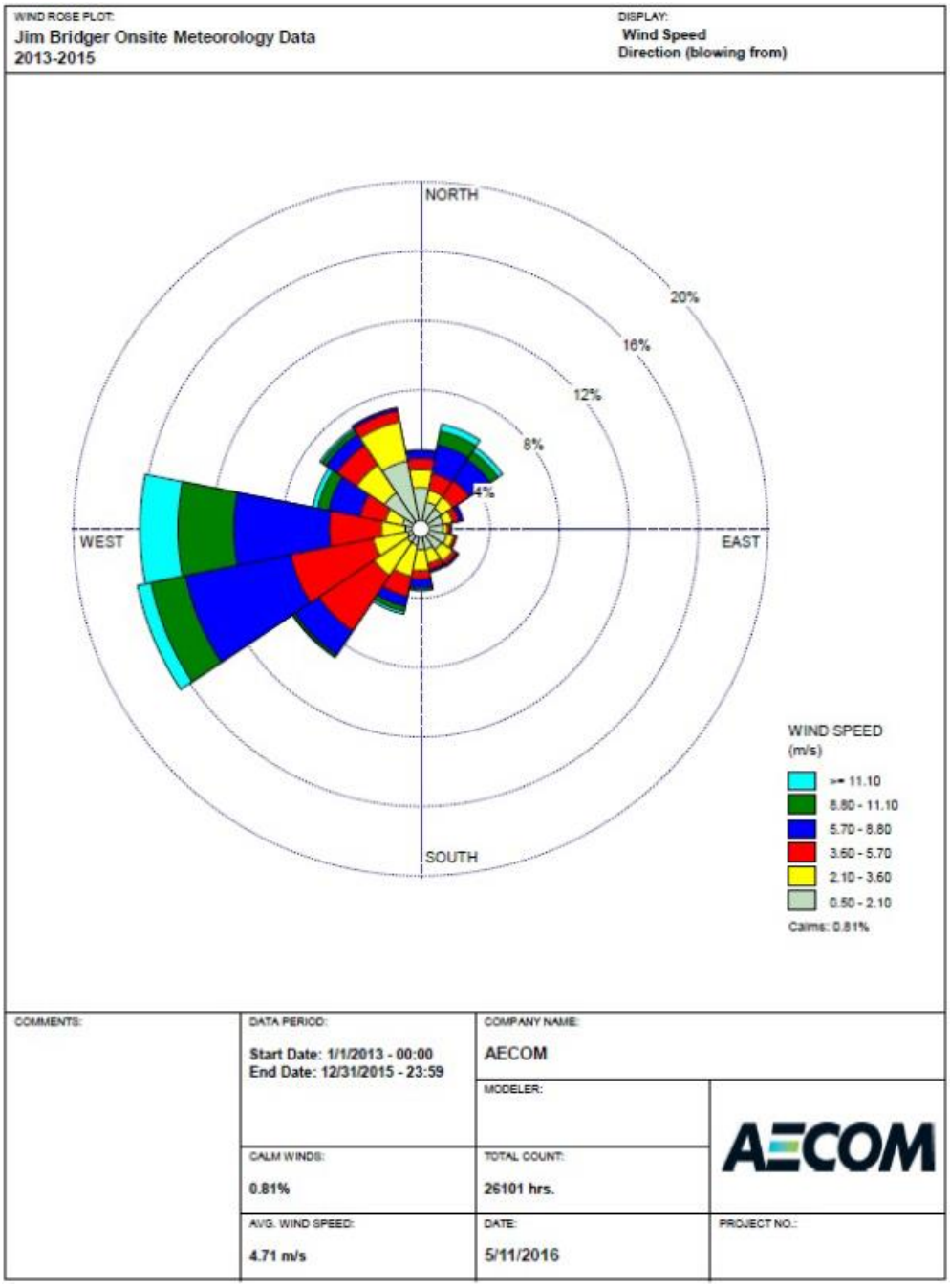


Figure 37: Wind Rose for the Jim Bridger Power Plant

6.5. Jurisdictional Boundaries in the Eastern Sweetwater County Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for Eastern Sweetwater County. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable. As noted, the state did not provide a specific boundary, but instead requested that EPA designate the area around the Jim Bridger Power Plant as attainment.

6.6. The EPA's Assessment of the Available Information for the Eastern Sweetwater County, Wyoming Area

The EPA finds that the state has provided sufficient data to show that the monitoring network surrounding the Jim Bridger Power Plant is adequately sited to determine maximum concentrations in this area. For this reason, we intend to use the 2013-2015 design value at AQS monitor 560370020 as a valid means by which to designate this area. As shown in Table 18, above, this monitor indicates that emissions from the Jim Bridger facility are below the 2010 SO_2 NAAQS. For these reasons, the EPA finds that the Eastern Sweetwater County area meets the 2010 SO_2 NAAQS and does not contribute to any nearby area that does not meet the NAAQS, as there are no such areas nearby. We therefore intend to designate this area as unclassifiable/attainment.

The EPA believes that our intended unclassifiable/attainment area, bounded by the borders of Sweetwater County to the north, east and south, and by Highway 191 to the west (see Figure 38 below), 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.

6.7. Summary of Our Intended Designation for Eastern Sweetwater County, Wyoming

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate Eastern Sweetwater County, Wyoming as unclassifiable/attainment for the 2010 SO_2 NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined the area (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS. Specifically, the boundaries are comprised of the borders of Sweetwater County to the north, east and south, and by Highway 191 to the west.

Figure 38 shows the boundary of this intended designated area.

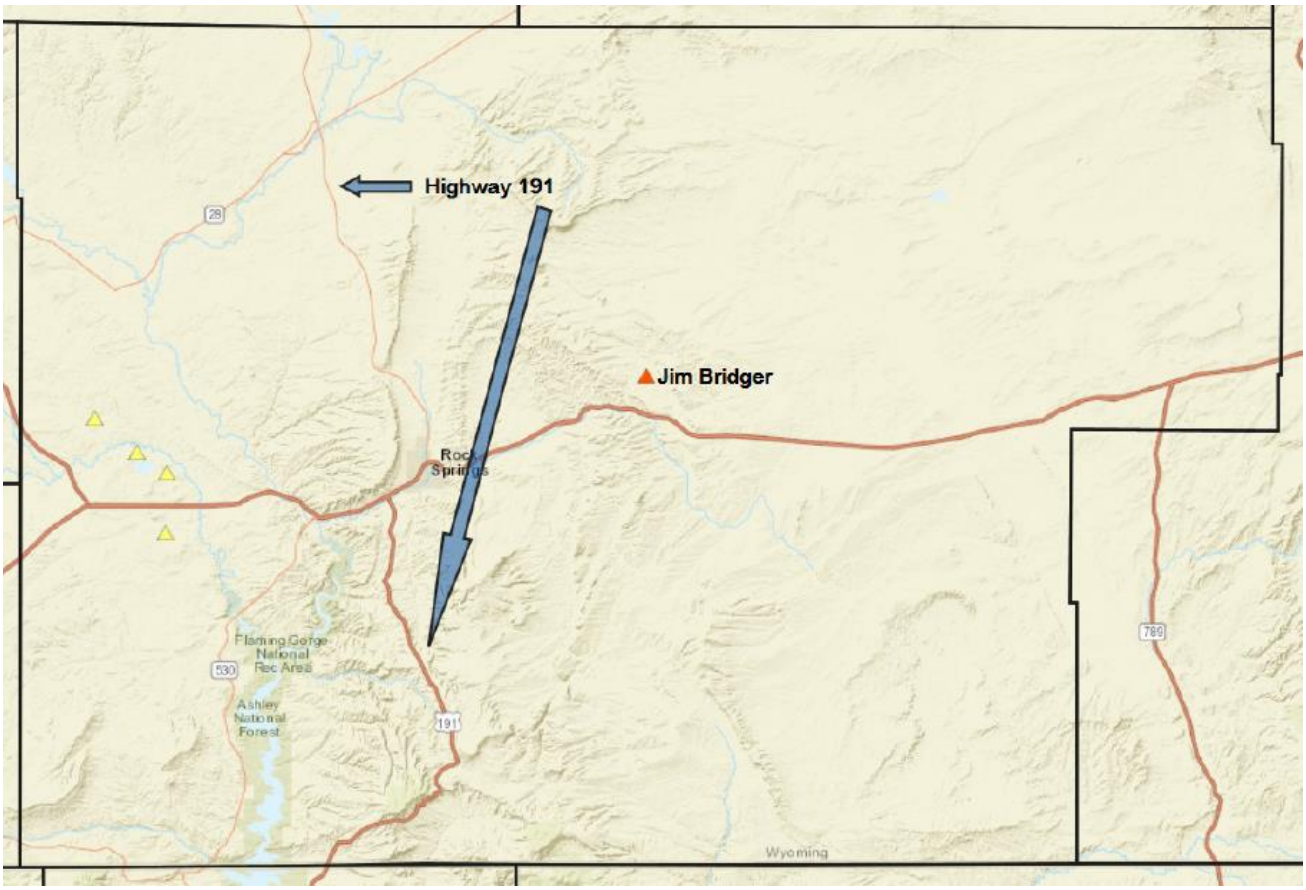


Figure 38. Boundary of the Intended Eastern Sweetwater County Unclassifiable/Attainment Area

7. Technical Analysis for All Other Counties in Wyoming

7.1. Introduction

The state has not installed and begun timely operation of a new, approved SO_2 monitoring network meeting EPA specifications referenced in EPA's SO_2 DRR for any sources of SO_2 emissions in the counties and portions of counties identified in Table 23. 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_2 NAAQS. The EPA is designating the counties and portions of counties in Table 20 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 20. Counties and Portions of Counties that the EPA Intends to Designate Unclassifiable/Attainment

County or Partial County (p)	Wyoming's Recommended Area Definition	Wyoming's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Albany	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Big Horn	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Campbell	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Crook	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Fremont (p)	Full County	Unclassifiable	Partial County[1]	Unclassifiable/ Attainment
Goshen	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Hot Springs[2]	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Johnson	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Laramie	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Natrona	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Niobrara	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment

County or Partial County (p)	Wyoming's Recommended Area Definition	Wyoming's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Park	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Sheridan	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Sublette	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Teton	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Uinta	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Washakie	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment
Weston	Full County	Unclassifiable	Full County	Unclassifiable/ Attainment

[1] The EPA intends to designate all of Fremont County apart from the area north of Highway 20 and east of the Wind River Reservation. The EPA must designate this area by December 31, 2020.
[2] Includes areas of Indian country located in the county

Table 20 also summarizes Wyoming's recommendations for these areas. Specifically, in May 2011 the state recommended that the entirety of all counties in the state be designated as unclassifiable based on the EPA's March 24, 2011, Steve A. Page memo, which the state asserted left them no other option. The state also stated that "there are portions of the above mentioned counties which are under the jurisdiction of Tribal Authorities," and their understanding was that "Tribal designations will be made separate from State designations." There were no designation recommendations submitted by tribes located within the state.

7.1. Air Quality Monitoring Data for all other Counties in Wyoming

AQS monitor 560252601 located in Natrona County, WY, and AQS monitor 560210100 in Laramie County both have sufficient valid data for 2014-2016 design value period and these data indicate that there was no violation of the 2010 SO_2 NAAQS at either monitoring site in that period. These data were available to the EPA for consideration in the designations process. However, the EPA does not have information indicating this data is in an area of maximum concentration, so this data cannot be used as the basis for designation.

After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to modify the state's recommendation for these areas, and intends to designate the areas as unclassifiable/attainment.

As referenced in the Introduction (see Table 2), the counties associated with sources for which Wyoming has installed and begun timely operation of a new, approved SO_2 monitoring network are required to be designated by December 31, 2020, but are not being addressed at this time.

7.2. The EPA's Assessment of the Available Information All Other Areas in Wyoming

The counties listed in Table 20 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 for this action. Therefore, the EPA intends to designate the areas in the above Table 20 as unclassifiable/attainment for the 2010 SO_2 NAAQS.

Our intended unclassifiable/attainment area, bounded by the borders of each of the counties listed (with exceptions as noted), 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.

7.3. Summary of Our Intended Designation for all Other Areas in Wyoming

The EPA intends to designate all areas listed in Table 20, and shown in Figure 39, below, as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the boundaries of these intended unclassifiable/attainment areas are comprised of the county borders with the exception of Fremont County described in Table 20. In Figure 39, all of these unclassifiable/attainment areas are those not shown in blue.

At this time, our intended designations for the state only apply to these areas and the other areas presented in this technical support document. The EPA intends to evaluate and designate all remaining undesignated areas in Wyoming by December 31, 2020.

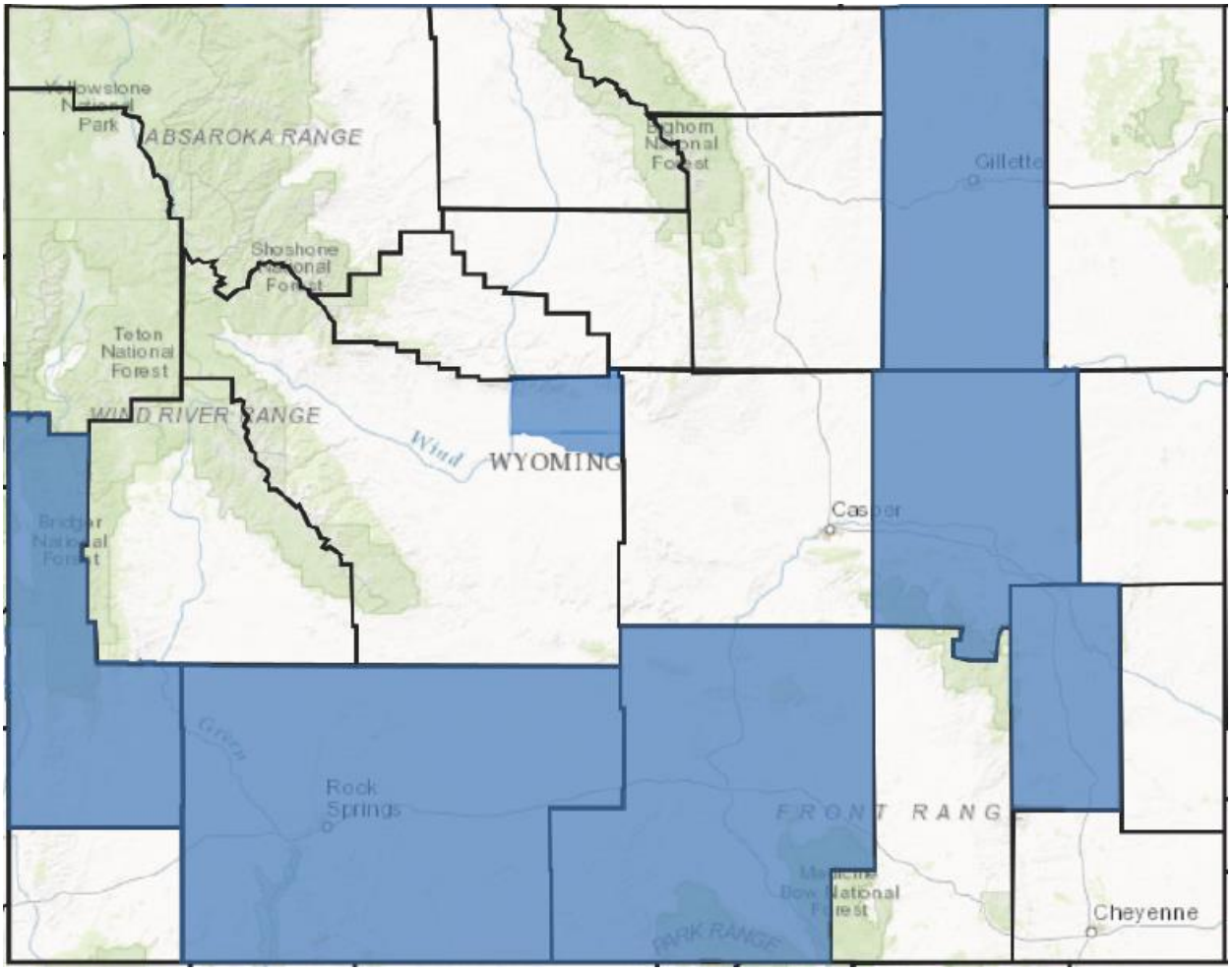


Figure 39. Map of All Other Wyoming Areas