Final Technical Support Document

Colorado
Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard

Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (the EPA, or the Agency) must designate areas as either "unclassifiable," "attainment," or "nonattainment" for the 2010 1-hour sulfur dioxide (SO_2) primary national ambient air quality standard (NAAQS). Section 107(d) of the CAA defines a nonattainment area as one that does not meet the NAAQS or that contributes to a NAAQS violation in a nearby area, an attainment area as any area other than a nonattainment area that meets the NAAQS, and an unclassifiable area as any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

July 2, 2016, is the deadline established by the U.S. District Court for the Northern District of California for the EPA to designate certain areas. This deadline is the first of three deadlines established by the court for the EPA to complete area designations for the 2010 SO_2 NAAQS. This deadline applies to certain areas in Colorado because two emission sources meet the conditions of the court's order.

Colorado submitted updated recommendations on April 19, 2016. Table 1 below lists Colorado's recommendations and identifies the areas in Colorado that the EPA is designating in order to meet the July 2, 2016, court-ordered deadline. These final designations are based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1 – Colorado's Recommended and the EPA's Final Designations

Area	State's Recommended Area Definition	State's Recommended Designation	the EPA's Final Area Definition	the EPA's Final Designation
Colorado Springs, Colorado	Manitou Springs Colorado Springs (and certain unincorporated areas) as follows; Areas east of the western city limits of Colorado Springs, north of the southern city limits of Colorado Springs with the addition of the	Unclassifiable	Same as State's Recommendation (Colorado Springs, CO)	Unclassifiable

	area termed "Stratmoor" bounded by South Academy Boulevard, west of Powers Blvd, and south of East Woodman Blvd (east of Academy Blvd. N) and the northern city limits of Colorado Springs (west of Academy Blvd. N).			
Eastern Morgan County, Colorado	Circle with a 10 kilometer radius centered on the Pawnee Power Plant	Unclassifiable	Circle with a 12 kilometer radius centered on the Pawnee Power Plant (Eastern Morgan County, CO)	Unclassifiable

Background

On June 3, 2010, the EPA revised the primary (health based) SO_2 NAAQS by establishing a new 1-hour standard at a level of 75 parts per billion (ppb) which is met at an ambient air quality monitoring site when the 3-year average of the 99th percentile of 1-hour daily maximum concentrations does not exceed 75 ppb. This NAAQS was published in the *Federal Register* on June 22, 2010 (75 FR 35520), and is codified at 40 CFR 50.17. The EPA determined this is the level necessary to protect public health with an adequate margin of safety, especially for children, the elderly, and those with asthma. These groups are particularly susceptible to the health effects associated with breathing SO_2. The two prior primary standards of 140 ppb evaluated over 24 hours, and 30 ppb evaluated over an entire year, codified at 40 CFR 50.4, remain applicable.[1] However, the EPA is not currently designating areas on the basis of either of these two primary standards. Similarly, the secondary standard for SO_2, set at 500 ppb evaluated over 3 hours, codified at 40 CFR 50.5, has not been revised, and the EPA is also not currently designating areas on the basis of the secondary standard.

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

General Approach and Schedule

Section 107(d) of the CAA requires that not later than 1 year after promulgation of a new or revised NAAQS, state governors must submit their recommendations for designations and boundaries to the EPA. Section 107(d) also requires the EPA to provide notification to states no less than 120 days prior to promulgating an initial area designation that is a modification of a state's recommendation. If a state does not submit designation recommendations, the EPA may promulgate the designations that it deems appropriate without prior notification to the state, although it is our intention to provide such notification when possible. If a state or tribe disagrees with the EPA's intended designations, it is given an opportunity within the 120-day period to demonstrate why any proposed modification is inappropriate. The EPA is required to complete designations within 2 years after promulgation of a new or revised NAAQS, unless the EPA determines that sufficient information is not available, in which case the deadline is extended to 3 years. The 3-year deadline for the revised SO_2 NAAQS was June 2, 2013.

On August 5, 2013, the EPA published a final rule establishing air quality designations for 29 areas in the United States for the 2010 SO_2 NAAQS, based on recorded air quality monitoring data from 2009 - 2011 showing violations of the NAAQS (78 FR 47191). In that rulemaking, the EPA committed to address, in separate future actions, the designations for all other areas for which the Agency was not yet prepared to issue designations.

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

According to the court-ordered schedule, the EPA must complete the remaining designations by three specific deadlines. By no later than July 2, 2016 (16 months from the court's order), the EPA must designate two groups of areas: (1) areas that have newly monitored violations of the 2010 SO_2 NAAQS, and (2) areas that contain any stationary sources that had not been announced as of March 2, 2015, for retirement and that, according to the EPA's Air Markets Database, emitted in 2012 either (i) more than 16,000 tons of SO_2, or (ii) more than 2,600 tons of SO_2 with an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, a stationary source with a coal-fired unit that as of January 1, 2010, had a capacity of over 5 megawatts and otherwise meets the emissions criteria, is excluded from the July 2, 2016, deadline if it had announced through a company public announcement, public utilities commission filing, consent decree, public legal settlement, final state or federal permit filing, or other similar means of communication, by March 2, 2015, that it will cease burning coal at that unit.

The last two deadlines for completing remaining designations are December 31, 2017, and December 31, 2020. The EPA has separately promulgated requirements for state and other air agencies to provide additional monitoring or modeling information on a timetable consistent with these designation deadlines. We expect this information to become available in time to help inform these subsequent designations. These requirements were promulgated on August 21, 2015 (80 FR 51052), in a rule known as the SO_2 Data Requirements Rule (DRR), codified at 40 CFR part 51 subpart BB.

Updated designations guidance was issued by the EPA through a March 20, 2015 memorandum from Stephen D. Page, Director, U.S. the EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. the EPA Regions 1-10. This memorandum supersedes earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and it identifies factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The guidance also contains the factors the EPA intends to evaluate in determining the boundaries for all remaining areas in the country, consistent with the court's order and schedule. These factors include: 1) Air quality characterization via ambient monitoring or dispersion modeling results; 2) Emissions-related data; 3) Meteorology; 4) Geography and topography; and 5) Jurisdictional boundaries. This guidance was supplemented by two non-binding technical assistance documents intended to assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling or ambient air quality monitoring for sources that emit SO_2. Notably, the EPA's documents titled, "SO_2 NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) and "SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document" (Monitoring TAD), were available to states and other interested parties. Both of these TADs were most recently updated in February 2016.

Based on complete, quality assured and certified ambient air quality data collected between 2013 and 2015, no violations of the 2010 SO_2 NAAQS have been recorded at ambient air quality monitors in any undesignated part of Colorado. However, there are two sources in the State meeting the emissions criteria of the consent decree for which the EPA must complete designations by July 2, 2016. In this final technical support document, the EPA discusses its review and technical analysis of Colorado's updated recommendations for the areas that we must designate. The EPA also discusses any intended and final modifications from the State's recommendation based on all available data before us.

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

1) 2010 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) Attaining monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value is equal to or less than 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.
3) Design Value – a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.

4) Designated nonattainment area – an area which the EPA has determined has violated the 2010 SO_2 NAAQS or contributed to a violation in a nearby area. A nonattainment designation reflects considerations of the state's recommendations and all of the information discussed in this document. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.
5) Designated unclassifiable area – an area for which the EPA cannot determine based on all available information whether or not it meets the 2010 SO_2 NAAQS.
6) Designated unclassifiable/attainment area – an area which the EPA has determined to have sufficient evidence to find either is attaining or is likely to be attaining the NAAQS. The EPA's decision is based on all available information including the most recent 3 years of air quality monitoring data, available modeling analyses, and any other relevant information.
7) Modeled violation – a violation based on air dispersion modeling.
8) Recommended attainment area – an area a state or tribe has recommended that the EPA designate as attainment.
9) Recommended nonattainment area – an area a state or tribe has recommended that the EPA designate as nonattainment.
10) Recommended unclassifiable area – an area a state or tribe has recommended that the EPA designate as unclassifiable.
11) Recommended unclassifiable/attainment area – an area a state or tribe has recommended that the EPA designate as unclassifiable/attainment.
12) Violating monitor – an ambient air monitor meeting all methods, quality assurance, and siting criteria and requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.

Technical Analysis for the Colorado Springs, Colorado Area

Introduction

The Colorado Springs area contains a stationary source that according to the EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, in 2012, the Martin Drake Power Plant emitted 4,792 tons of SO_2, and had an emissions rate of 0.56 lbs SO_2/mmBTU. The eastern portion of Morgan County, Colorado also contains such a source, as the Pawnee Power Plant emitted 13,510 tons of SO_2, and had an emissions rate of 0.76 lbs SO_2/mmBTU in 2012. As of March 2, 2015, these stationary sources had not met the specific criteria for being "announced for retirement." Pursuant to the March 2, 2015 court-ordered schedule, the EPA must designate the area surrounding these facilities by July 2, 2016. In this section, the EPA is only addressing the Colorado Springs area designation. The EPA will present its analysis for the Eastern Morgan County area in a later section.

In its September 18, 2015 submission, Colorado recommended that the area surrounding the Martin Drake Power Plant electric generating facility be designated as unclassifiable based on an assessment and characterization of air quality from the facility and other nearby sources which

may have a potential impact in the area of analysis where maximum concentrations of SO_2 are expected. This assessment and characterization was based on consideration of the data available to the state, including attaining monitoring data that Colorado did not determine was located in the area of maximum concentration.

On February 16, 2016, the EPA notified Colorado that we intended to designate the Colorado Springs area as unclassifiable, based on our view that available information did not enable us to determine whether the area was meeting the NAAQS. Additionally, we informed Colorado that our intended boundaries for the unclassifiable area consisted of El Paso County, Colorado. Our intended designation and associated boundaries were based on, among other things, the lack of available data sufficient to determine whether the area near the Martin Drake Power Plant is or is not attaining the 2010 SO_2 NAAQS, given the unique circumstances associated with the facility and the missing information needed to characterize its impacts. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Colorado, and this document along with all others related to this rulemaking can be found in Docket ID the EPA-HQ-OAR-2014-0464.

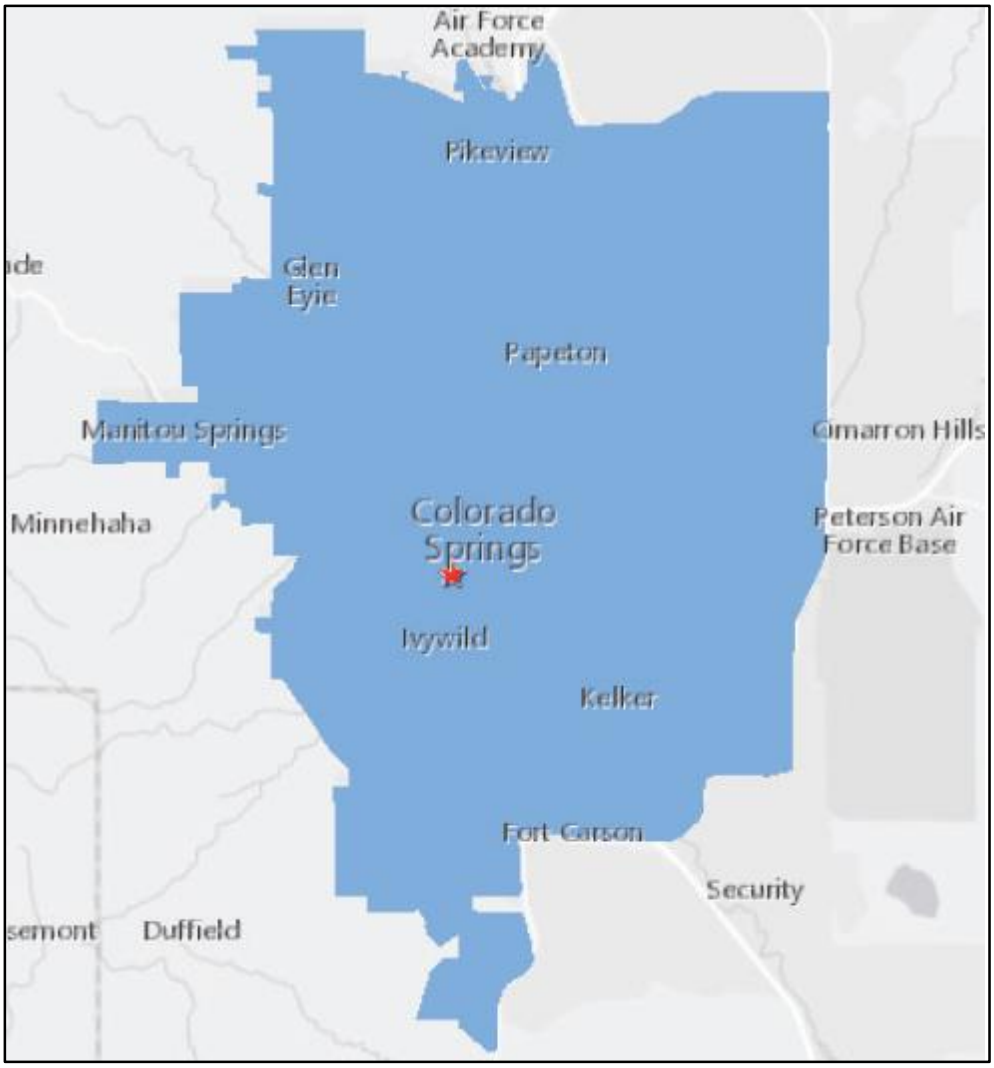
Assessment of New Information

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

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

After carefully considering all available data and information, the EPA finds that it is still unable to determine, based on available information, whether the area is meeting or not meeting the NAAQS, and so is designating the Colorado Springs area as unclassifiable for the 2010 SO_2 NAAQS. The boundaries for this unclassifiable area consist of the city of Manitou Springs, and the majority of the city of Colorado Springs and certain unincorporated areas, as follows; Areas east of the western city limits of Colorado Springs, north of the southern city limits of Colorado Springs with the addition of the area termed "Stratmoor" bounded by South Academy Boulevard, west of North/South Powers Blvd (one continuous street), and south of East Woodman Blvd (east of Academy Blvd. N) and the northern city limits of Colorado Springs (west of Academy Blvd. N). These boundaries are shown in the figure below.

Figure 1: The EPA's final unclassifiable area: Colorado Springs, Colorado



Subsequent to our February 16, 2016, notification to the State, the EPA received substantive comments from the State, Colorado Springs Utilities (CSU), the owner and operator of the Martin Drake Power Plant, Air Expertise Colorado (AEC), the Environmental Defense Fund (EDF), Sierra Club, and several private citizens regarding our intended unclassifiable designation for the Colorado Springs area, and a comprehensive summary of the majority of these comments and our responses can be found in the RTC.

Also, several commenters submitted additional information, specifically air dispersion modeling, to the EPA during the state and public comment period in order to characterize air quality in the Colorado Springs area. Notably, both AEC (modeling conducted by Maureen Barrett, P.E.) and Sky Solutions (modeling conducted by Dr. H. Andrew Gray), supported by the Environmental Defense Fund (EDF), provided additional air dispersion modeling information during the comment period asserting that the modeling indicates violations of the 2010 SO_2 NAAQS in the Colorado Springs area. Note that the Sky Solutions modeling originated from the AEC input meteorological and emissions data and AERMOD configuration. Therefore, there are many similarities between the input data and configuration options used by these two groups. This information was submitted to support a modification to either our proposed designation, our

proposed designation boundaries for the area, or both. The discussion and analysis of this new information that follow reference the Modeling TAD, Monitoring TAD, and the factors for evaluation contained in the EPA's March 20, 2015, guidance, as appropriate and applicable.

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. In some instances the recommended model may be a model other than AERMOD, such as the BLP model for buoyant line sources. The AERMOD modeling system contains the following components:

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

Both AEC and Sky Solutions used AERMOD version 15181, the most recent, and a discussion of the individual components will be referenced in the corresponding discussion that follows, as appropriate.

Modeling Parameter: Rural or Urban Dispersion

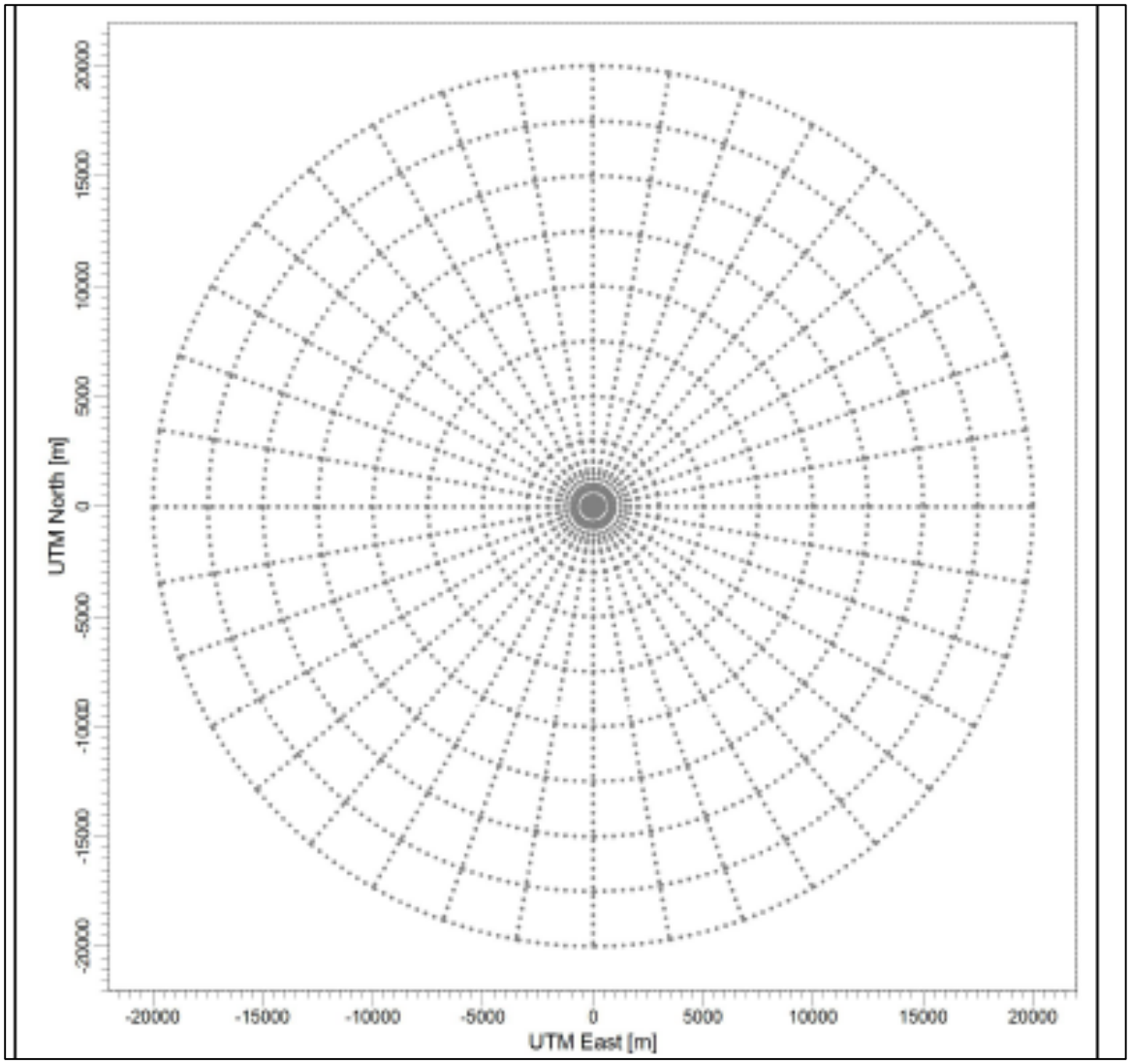
The EPA's recommended procedure for characterizing an area by prevalent land use is based on evaluating the dispersion environment within 3 km of the facility. According to the EPA's modeling guidelines contained in documents such as the Modeling TAD, rural dispersion coefficients are to be used in the dispersion modeling analysis if more than 50% of the area within a 3 km radius of the facility is classified as rural. Conversely, if more than 50% of the area is urban, urban dispersion coefficients should be used in the modeling analysis. When performing the modeling for the area of analysis, AEC and Sky Solutions determined that it was most appropriate to run the model in urban mode. These two groups did not provide justification for the urban classification. However, based on the satellite images of the area and the Auer method, the EPA agrees that urban would be the most appropriate classification for this area. In association with the urban option, AEC and Sky Solutions assumed a population of 668,000 in AERMOD. Justification was not provided to support this assumption. Based on the United States Census Bureau's most recent national census (2010), a population around 416,000 for the Colorado Springs area would be more representative for this area. This difference could have impacts on the model results potentially causing the impacts to be over-predicted relative to a population value that is more representative of the area. Some analyses provided by Sky Solutions assumed a rural classification to demonstrate the model's sensitivity to various land classifications. The details of the results of these analyses are included below, though the EPA considers the urban mode to be the appropriate classification of the area.

Modeling Parameter: Area of Analysis (Receptor Grid)

The EPA believes that a reasonable first step towards characterization of air quality in the area surrounding the Martin Drake Power Plant is to determine the extent of the area of analysis, i.e., 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 of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The AEC and Sky Solutions analyses used a polar grid receptor network. The distances in meters along each direction radial at which the receptors were located, included 100, 200, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 5000, 7500, 10,000, 12,500, 15,000, 17,500, 20,000. The analyses assumed 36 directions, beginning with the 10 degree flow vector and incrementing every 10 degrees clockwise. The receptor network contained 612 receptors and covered a 20 km radius surrounding the facility. Figure 2 illustrates the receptor grid network used in the AEC and Sky Solutions analyses. Based on the review of the AERMOD input files, the AEC and Sky Solution analyses were not consistent with the Modeling TAD for receptor placement, as the TAD recommends exclusion of receptors on the facility's secured property. The Modeling TAD indicates that facility fence lines which exclude public access define a source's ambient air boundary, and that receptors should only be placed in areas that are considered ambient air where the public generally has access. Therefore, the receptors in these analyses that are located on CSU property inside of a fence that excludes public access should be removed. The receptor grid network selected by AEC and Sky Solutions will not represent the impacts of the area appropriately and result in impacts that will most likely be too high or in areas not intended for this effort.

Figure 2: Receptor Grid for the Martin Drake Power Plant Area of Analysis



AEC and Sky Solutions did not include other emitters of SO_2, and instead only modeled impacts from the Martin Drake Power Plant. The EPA has determined that the sources modeled are appropriate for this area.

Modeling Parameter: Source Characterization

AEC and Sky Solutions characterized the source within the area of analysis in accordance with practices outlined as acceptable in the Modeling TAD. Specifically, the two groups used actual stack heights when using actual emissions. Note that in some simulations, the groups assumed allowable emissions. AEC and Sky Solutions also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRIME was used to assist in addressing building downwash. Some analyses provided by Sky Solutions did not incorporate building downwash in order to demonstrate the model's sensitivity to this component. The details of the results of these analyses are included below. However, the EPA does not support

the exclusion of building downwash in this instance given the characteristics of the Martin Drake facility and surrounding area.

Modeling Parameter: Emissions

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

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

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. Specifically, a facility may have recently adopted a new federally enforceable emissions limit, been subject to a federally enforceable consent decree, or implemented other federally enforceable mechanisms and control technologies to limit 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. In these cases, the Modeling TAD notes that the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations should contain the necessary emissions information for designations-related modeling. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, AEC and Sky Solutions only included the Martin Drake Power Plant in their analyses. The two groups assumed three different types of emissions in their analyses, where some of the analyses assumed actual SO_2 concentrations and some analyses assumed future allowable emissions. The future allowable emissions rates were based on information used by the Sierra Club in their modeling submitted in 2015.[2] Table 2 to Table 4 present the emissions data used in the AEC and Sky Solutions analyses.

Table 2: Actual SO_2 Emissions in 2011 – 2013 from the Martin Drake Power Plant

Facility Name	SO_2 Emissions (tons per year)		
	2011	2012	2013
Martin Drake Power Plant	5,659	4,791	4,580
Total Emissions From All Facilities in Area of Analysis	5,659	4,791	4,580

[2] Sierra Club calculated the maximum allowable emission rates in Colorado's Regional Haze State Implementation Plan (SIP) approved by the EPA on December 31, 2013 (77 FR 76871).

Table 3: Actual SO_2 Emissions in between October 18, 2011 to December 31, 2011 from the Martin Drake Power Plant

Facility Name	SO_2 Emissions (tons over period) – AEC Analysis	SO2 Emissions (tons over period) – Most Recent, Consistent with Met. Data Used
	Oct. 18, 2011 to Dec. 31, 2011	Oct. 18, 2015 to Dec. 31, 2015
Martin Drake Power Plant	1,165.67	563.77

Table 4: Future Allowable SO_2 Emission Rates from Each Unit from the Martin Drake Power Plant[3]

Martin Drake Power Plant	Future Allowable SO_2 Emissions (g/s)	Average Actual SO_2 Emissions (g/s), 2011-2013 (only includes operating hours)
Unit 5	17.95	31.57
Unit 6	14.10	52.18
Unit 7	21.88	79.26

For the Martin Drake Power Plant in the area of analysis, actual emissions data were obtained from CEMS. The emissions used in the analyses do not include the most recent available data, and were therefore not as appropriate as actual emissions data from the 2013 – 2015 period. The EPA notes that the more recent and representative 2014 and 2015 annual SO_2 emissions at the Martin Drake Power Plant were both below 4,000 tons. The future allowable emission rates were based on modeling submitted by the Sierra Club in August 2015, and based on the maximum allowable emission rates in Colorado's Regional Haze State Implementation Plan (SIP) as approved by the EPA on December 31, 2012 (77 FR 76871). With regard to the emissions used in an AEC analysis (shown in Table 3, column 2, above), the EPA considers this sample size of emissions inappropriately small based on the recommendations in the Modeling TAD (which recommends three years of data), and notes that emissions from this period in 2011 were over twice as high as emissions from the most recent available period, as shown in column 3 of Table 2.

With regard to the allowable emissions presented in Table 4, the EPA first establishes that we do not consider it appropriate to use allowable emission rates when the emission limits restricting those rates are not yet federally enforceable, as these will not be until the end of 2017. However, because these emission rates were used in several modeling analyses presented to the EPA, the EPA notes that the State recently received a permit modification application from Colorado Springs Utilities which requires the shutdown of unit 5 by end of 2016. Though this application has not yet been acted upon by the State, the EPA notes that future actual and allowable emissions are likely to be further reduced.

[3] The EPA notes that these allowable emission rates were calculated by the Sierra Club, and the EPA is not here verifying their accuracy. The average actual SO_2 emissions in the third column of this table were calculated by the EPA.

Modeling Parameter: Meteorology and Surface Characteristics

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

For the Colorado Springs area of analysis, AEC and Sky Solutions used surface meteorology from the NWS station at the Colorado Springs Airport, approximately 11.5 km to the east, and coincident upper air observations from the NWS station in Denver, Colorado, approximately 115 km to the north were selected as best representative of meteorological conditions within the area of analysis (Figure 4). The AEC analysis also used meteorological data collected onsite by the Colorado Springs Utilities sound detection and ranging (SODAR) tower just south of Martin Drake in fall 2015. This tower began collecting onsite meteorological data on October 18, 2015. This set of surface meteorological data also used the upper air observations from the NWS station in Denver, Colorado (Figure 4). The Sky Solutions analysis also used meteorological data from eight stations across the country to illustrate AERMOD's sensitivity to the use of different meteorological data, including:

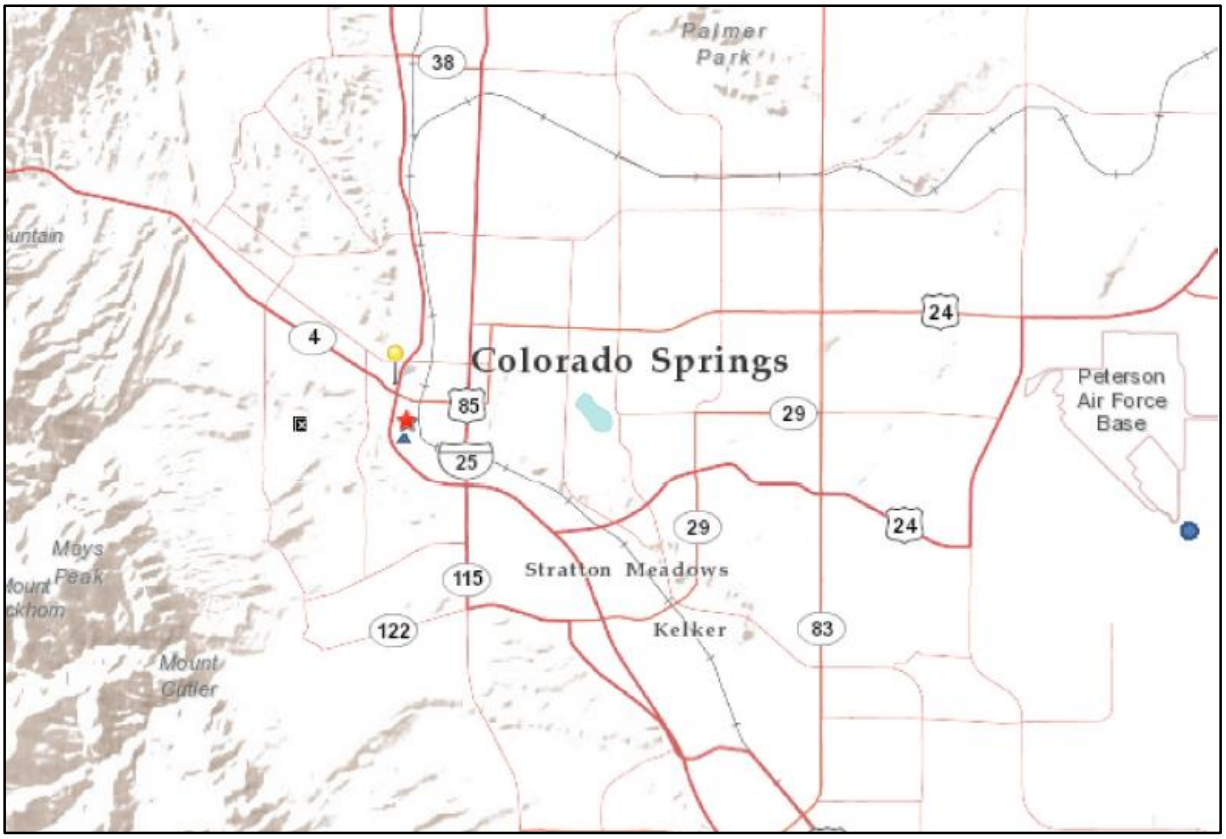
1. Albuquerque, NM (2001-2005);
2. Bakersfield, CA (2009-2013);
3. Columbus, OH (2009-2013);
4. Jefferson County, MO (2007-2011);
5. Rochester, MN (2006-2010); and
6. Rome, GA (2007-2011);
7. Colorado Springs Airport, CO (2011-2013); and
8. Colorado Springs Highway Monitor, CO (2011-2013).

The most recent version of AERMET, version 15181, was only used to process the meteorological data collected from the sites in Colorado (i.e., Colorado Springs Airport and Colorado Springs Highway Monitor) in the AEC and Sky Solutions analyses. Older versions of AERMET were used to process the meteorological data from the other sites (i.e., Georgia and Minnesota used version 12345, Missouri used 13350, and California, New Mexico and Ohio used version 14134). The use of the older AERMET versions could have impacts on the quality of the meteorological data because these versions do not include bug fixes and enhancements that improve the performance of AERMET (e.g., mixing heights, minimum wind thresholds, cloud cover values, bulk Richardson scheme).

AEC and Sky Solutions used AERSURFACE version 13016 using data from the NWS station in Colorado Springs located at 38.810000, -104.688000 to estimate the surface characteristics of the area of analysis. AEC estimated values for 12 spatial sectors out to 1 km at a seasonal temporal resolution for dry conditions. AEC also estimated values for albedo (the fraction of solar energy

reflected from the earth back into space), the Bowen ratio (the method generally used to calculate heat lost or heat gained in a substance), and the surface roughness (sometimes referred to as "Zo"). Figure 3 presents the locations of the meteorological stations in Colorado (i.e., Colorado Springs Airport station (blue circle), Colorado Springs Highway Monitor (yellow pin), and SODAR tower (green triangle)) relative to the Martin Drake Power Plant (red star) area used in the AEC and Sky Solutions analyses.

Figure 3: Martin Drake Power Plant Area of Analysis and the Colorado Springs Airport station, Colorado Springs Highway Monitor, and SODAR tower.



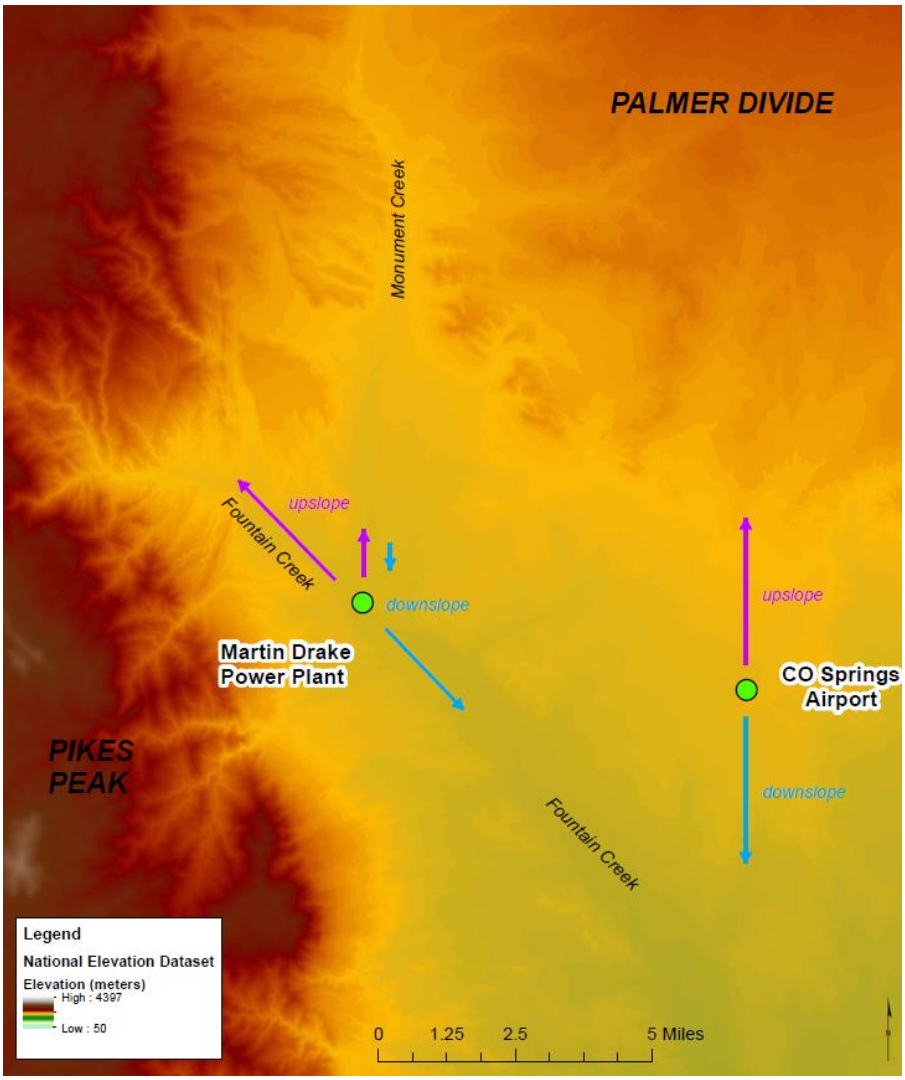
Meteorological data from the above surface and upper air stations were used in generating AERMOD-ready files with the AERMET processor. The output meteorological data created by the AERMET processor is suitable for being applied with AERMOD input files for AERMOD modeling runs. AEC and Sky Solutions followed the methodology and settings presented in the AERMET and AERSURFACE User's Guides in the processing of the raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics. While AEC and Sky Solutions followed the recommend guidance to generate AERMOD-ready files, the EPA has determined that the meteorological data sets used in these analyses are not representative for the area surrounding Martin Drake for several reasons. Discussion on the representativeness of the meteorological data sets used by AEC and Sky Solutions is provided below.

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. In order to better represent actual wind conditions at the meteorological tower, wind data of 1 minute duration was provided from the same instrument tower, but in a different formatted file to be processed by a separate preprocessor, AERMINUTE. These data were subsequently integrated into the AERMET processing to produce final hourly wind records of AERMOD-ready meteorological data that better estimate actual hourly average conditions and that are less prone to over-report calm wind conditions. This allows AERMOD to apply more hours of meteorology to modeled inputs, and therefore produce a more complete set of concentration estimates. As a guard against excessively high concentrations that could be produced by AERMOD in very light wind conditions, AEC and Sky Solutions used AERMINUTE (version 14337). However, AEC and Sky Solutions did not set a minimum threshold of 0.5 meters per second in processing NWS meteorological data for use in AERMOD. In addition, AEC assumed a value of 0.1 meters per second threshold in processing the on-site data.

As discussed in the preliminary technical support document, Colorado has concluded that there are no available representative meteorological data sets for the transport and dispersion conditions at the Martin Drake Power Plant. The State submitted to the EPA a document describing why it did not consider the nearest available meteorological data, at the Colorado Springs Airport over 11 kilometers east of the Martin Drake Power Plant, to be representative of the EPA's Guideline on Air Quality Models (40 CFR Part 51 Appendix W; November 2005). This document, "Meteorological Determination for the Martin Drake Power Plant," was submitted to the EPA on October 6, 2015.

In its "Meteorological Determination" document, Colorado noted that winds at/near Martin Drake are expected to flow up the valley of Fountain Creek during most daytime hours and up the valley of Monument Creek at a much lower frequency due to differential heating and the proximity of the power plant to Pikes Peak (see Figure 2, below). During nighttime and early morning hours, drainage winds flowing from the valleys of Fountain Creek and Monument Creek towards the power plant are expected.

Figure 4: Expected Wind Directions at the Martin Drake Power Plant and Colorado Springs Airport



By contrast, the State determined that the upslope and downslope winds at the Colorado Springs Airport are driven by the higher terrain to the north of the airport, the Palmer Divide. The elevation gain from the airport to the Palmer Divide is moderate, especially when compared to the steep elevation increase from Martin Drake to the Rocky Mountain Front Range.[4] There are no other significant terrain features that influence the winds at the airport. This makes the wind directions at the airport predominantly northerly (downslope) and southerly (upslope).

The State also indicated that during inversion conditions with light surface winds during which the highest impacts from the power plant are expected to occur, the light drainage winds transporting the plumes from Martin Drake are especially likely to follow along Fountain Creek.

[4] The highest elevation increase near the airport is of roughly 600 feet, which is at a peak about 10 kilometers to the northeast. These and other peaks further to the north and east are relatively isolated, as the terrain around them is generally flat and similar in elevation to that at the airport. At 5 kilometers west of the Martin Drake Power Plant, the elevation has already increased by roughly 2,000 feet, and increases an additional 2,000 feet at 9 kilometers distance.

Finally, Colorado stated that wind speeds at the airport are expected to be higher than at the Martin Drake Power Plant.

All of these factors led Colorado to conclude that there are no available meteorological datasets that are representative of transport and dispersion conditions of the Martin Drake Power Plant plumes due to the differences in meteorological conditions between the Colorado Springs Airport and the Martin Drake Power Plant. As a result, Colorado Springs Utilities erected an onsite sound detection and ranging (SODAR) tower just south of Martin Drake in Fall 2015 in order to gather representative meteorological data to more accurately inform future modeling. This tower began collecting onsite meteorological data on October 18, 2015.

In the preliminary technical support document, the EPA agreed with Colorado's determination that the meteorological data from the Colorado Springs Airport are not representative of meteorological conditions at the Martin Drake Power Plant. Without representative meteorological data, the modeling analyses that use airport data or non-site-specific meteorological data are unreliable because this particular model input is imperative for predicting plume transport and dispersion accurately. The EPA therefore proposed to conclude that modeling which relied on meteorological data from the Colorado Springs Airport was not sufficient as the sole basis for a designation of the area impacted by emissions from the Martin Drake Power Plant.

AEC disagreed with this conclusion in its March 31, 2016, comment document which accompanied the modeling demonstrations. To demonstrate its point, AEC conducted two comparative short-term modeling demonstrations. The first used the meteorological data collected at the on-site SODAR tower from October 18, 2015, to December 31, 2015, and modeled emissions from the same period (Oct. 18 – Dec. 31) in 2011. The second used meteorological data from the Colorado Springs Airport from October 18, 2015 to December 31, 2015 with emissions data from the same period in 2011. The details of the model results from these test cases and the EPA's concerns with the analysis are discussed below. However, in the EPA's analysis of the meteorological data from the SODAR tower and corresponding data from the Colorado Springs Airport, the EPA identified significant differences among the two data sets. In particular, wind rose plots show that the dominate wind direction of the SODAR data during this timeframe is from the north-west, with speeds of up to about 10 meters per second, while the dominant wind directions of the airport data are generally from the north and south, with wind speeds of up to about 10 meters per second and greater than 10 meters per second, respectively. In other words, the SODAR (on-site data) is generally measuring slower wind speeds from the north-west, while the airport is generally measuring higher wind speeds from two dominant directions (i.e., the north and south). Figure 3 presents the wind rose plot of the SODAR data and Figure 4 presents the wind rose plot if the airport data.

Figure 5: Meteorological Data collected from the SODAR tower locate at the Martin Drake Power Plant between October 18, 2015 and December 31, 2015.

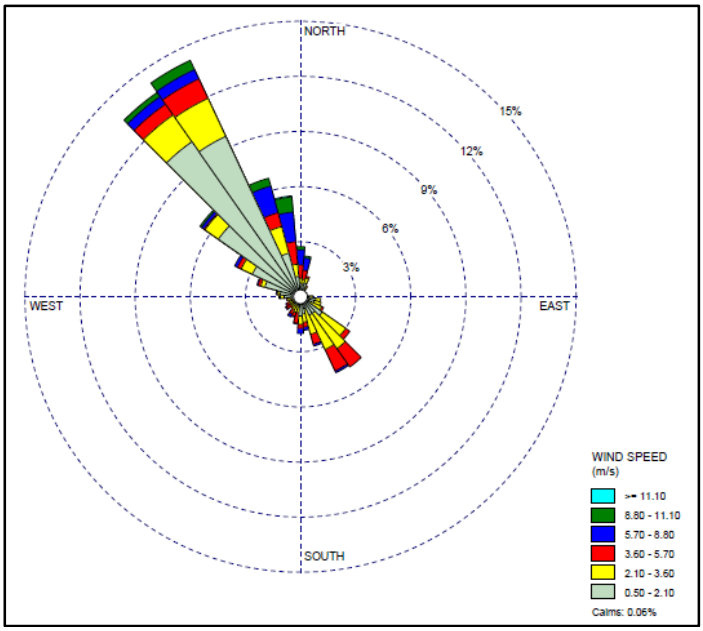
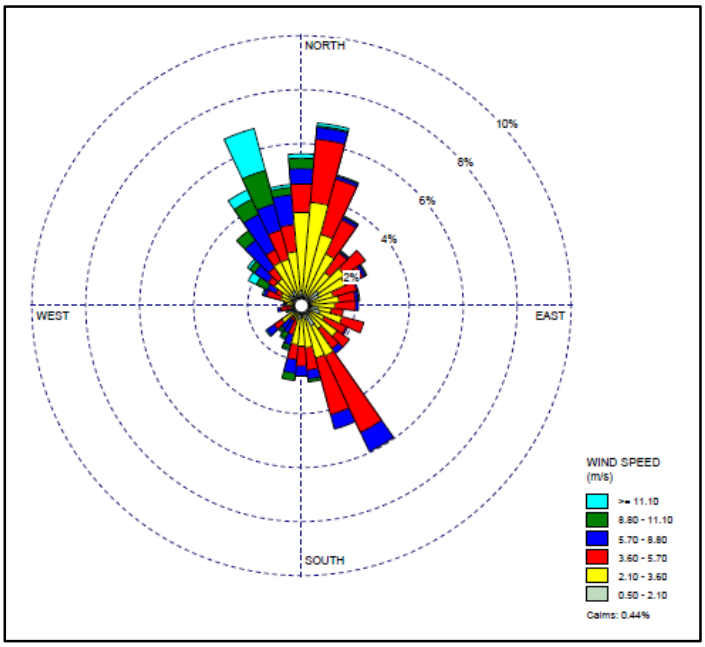


Figure 6: Meteorological Data collected from the Colorado Springs airport between October 18, 2015 and December 31, 2015.



Sky Solutions also disagreed with this conclusion in its March 31, 2016, comment document which accompanied the modeling demonstrations. To demonstrate its point, Sky Solutions conducted multiple simulations using meteorological data sets across the country and two sites within Colorado (listed above). The Colorado sites included data collected from the Colorado Springs Airport and the Colorado Springs Highway 24 monitor. The simulations that used the Colorado data sets covered a period of three years from 2011 to 2013, while the remaining

simulations covered a five-year period. All of the simulations modeled future allowable emissions. The details of the model results from these test cases and the EPA's concerns with the analysis are discussed below. While not shown, the EPA identified significant differences among the data sets in their analysis of wind rose plots of the various meteorological data sets.

Note that the SODAR data were only collected for a short time period, where the differences in meteorological conditions among the SODAR and airport meteorological data sets are likely to be even more evident during other times of the year. For instance, the terrain features near the Martin Drake Power Plant will most likely generate more variable wind patterns during the summer. While acknowledging the small sample size (less than 2.5 months), the difference in plots based solely on the two different meteorological data sets appears to confirm the EPA's conclusion that there are significant differences between the meteorological data collected at the Colorado Springs Airport and that collected at the Martin Drake Power Plant. In particular, wind speeds tend to be much higher at the Colorado Springs Airport than that at the Martin Drake Power Plant, and the prominent wind directions are significantly different. This could result in the plume being dispersed more rapidly from the source location to farther distances, and could disperse the plume in the wrong directions. Further, the EPA does not support the use of meteorological data sets collected from sites across the country for this designation because of the significant differences in the predicted modeled design values of SO_2 concentrations shown in the Sky Solutions analysis. The Sky Solutions analysis concludes that the model is not sensitive to different meteorological data sets. However, the EPA finds that the predicted modeled design values of SO_2 concentrations range from about 190 $\mu g/m^3$ to 402 $\mu g/m^3$, and the receptor locations associated to those values change based on the data set. This suggests that the modeled design values of SO_2 concentrations could change by a factor of two depending on the meteorological data set. Given these results, the EPA has determined that the model is sensitive to which meteorological data set is used. Therefore, modeling which relies on meteorological data from the Colorado Springs Airport or other stations across the country are not sufficient to supply a basis for a determining whether the area is meeting or not meeting the NAAQS and supporting an attainment or nonattainment designation of the area impacted by emissions from the Martin Drake Power Plant.

Modeling Parameter: Geography and Terrain

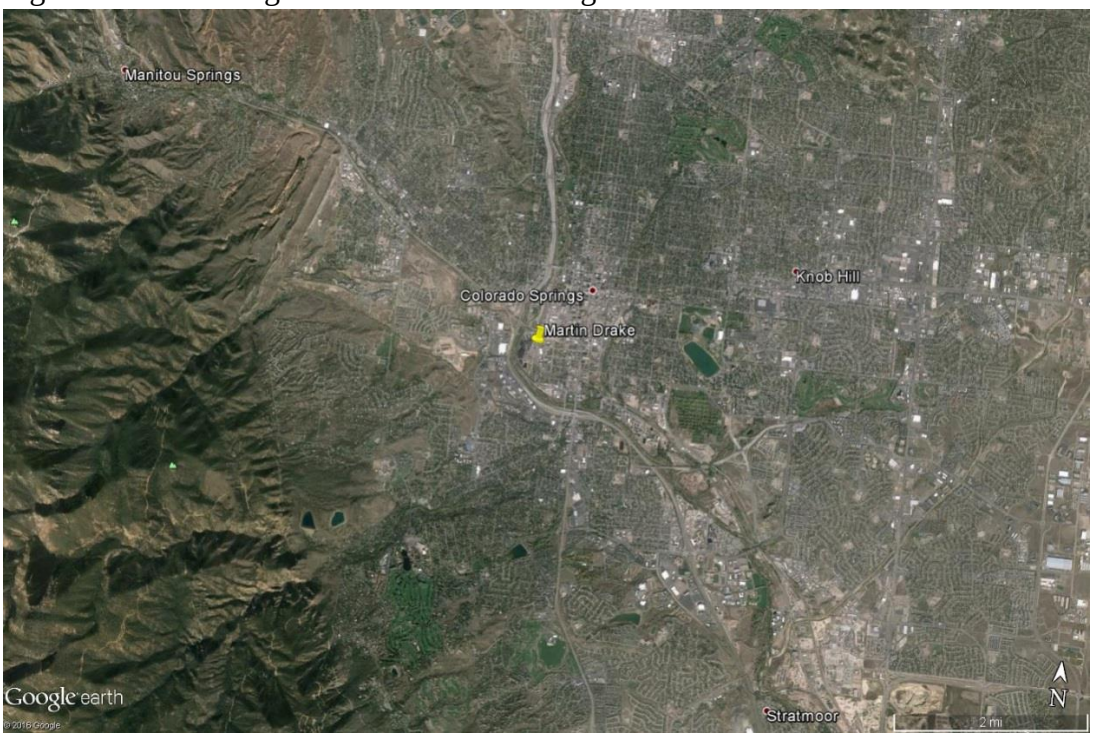
The terrain in the area of analysis is best described as heavily influenced by the front range of the Rocky Mountains. To account for these terrain changes, the AERMAP (version 11103) terrain program within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model was the USGS National Elevation Database.

The Martin Drake Power Plant is about two miles east of the Rocky Mountain foothills, which rise dramatically in elevation.[5] The facility is located near the confluence of two large creek drainages; Fountain Creek and Monument Creek. The wind flows impacting the plumes at Martin Drake Power Plant generally follow Fountain Creek. The Fountain Creek drainage is

[5] The elevation roughly 5 km west of the Martin Drake Power Plant is up to 2,000 feet higher than that at the facility. At 9 km west of the facility, the elevation is over 10,000 feet, while the elevation at the Martin Drake Power Plant is roughly 6,000 feet.

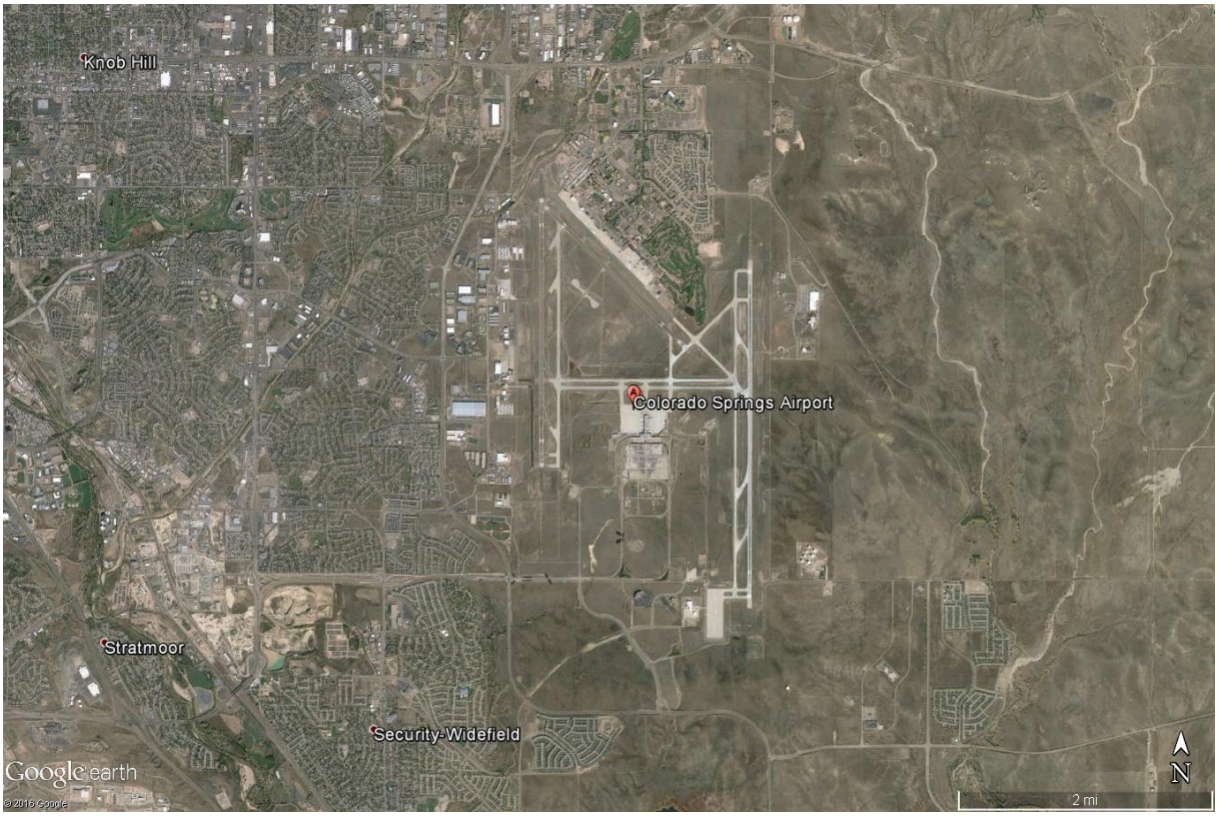
displayed in Figure 4, above. The wind rose presented at Figure 5 above, taken at from SODAR tower located at the Martin Drake Power Plant, verifies that the wind direction at the facility follows Fountain Creek's northwest-southeast pattern. Figure 7 also presents the unique terrain, surface characteristics, and urban development surrounding the Martin Drake Power Plant. This image illustrates the mountains to the west and urban development in the immediate vicinity of the plant, which will impact the meteorological conditions in this area

Figure 7. Aerial Image of the Area Containing the Martin Drake Power Plant.



By contrast, the Colorado Springs Airport does not have urban development in the immediate vicinity (i.e., closest development about 3 kilometers), and higher terrain (though to a much lesser extent than the elevation gain west of Martin Drake) lies to the north as shown in Figure 4. There are no other significant terrain features that influence the winds at the airport.

Figure 8. Aerial Image of the Area Containing the Colorado Springs Airport.



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 "first tier" approach, based on monitored design values, or 2) a temporally varying approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For the Martin Drake Power Plant area of analysis, AEC and Sky Solutions did not characterize a background concentration of SO_2, and did not incorporate a value into the final AERMOD results. While the Modeling TAD recommends the characterization of background concentrations, the EPA has determined that it is not important to include background concentrations in the AEC and Sky Solutions analyses because most of the results predict SO_2 concentrations well above the NAAQS and some of the analyses were only used to demonstrate the model's sensitivity to certain model parameters.

Summary of Modeling Results

The AERMOD modeling parameters, as supplied by additional information from AEC and Sky Solutions during the comment period for the Martin Drake Power Plant area of analyses, are outlined below. The model results and the EPA's concerns with the analyses provided by AEC and Sky Solutions are also summarized below. To efficiently address all of the analyses provided to the EPA, each analysis provided by AEC and Sky Solutions is organized by the following sections:

1. AEC 2011 to 2013 Modeling Analysis: AEC analysis that used actual emissions and Colorado Springs Airport meteorological data between 2011 and 2013.
2. AEC On-site vs NWS Meteorological Data Modeling Analysis: AEC analysis that used actual emissions from October 18, 2011 to December 31, 2011 and meteorological data collected by a SODAR Tower located at the Martin Drake facility (i.e., on-site data) and collected at the Colorado Springs Airport (i.e., NWS data) between October 18, 2015 and December 31, 2015.
3. Sky Solutions Meteorological Sensitivity Modeling Analysis: Sky Solution analysis that used future allowable emissions and meteorological data sets collected from eight stations across the country.
4. Sky Solutions Land Classification Sensitivity Modeling Analysis: Sky Solution analysis that used future allowable emissions, Colorado Springs Airport data, and rural or urban land classifications for a period between 2011 and 2013.
5. Sky Solutions Building Downwash Sensitivity Modeling Analysis: Sky Solution analysis that used future allowable emissions, Colorado Springs Airport data, and building downwash or no building downwash assumptions for a period between 2011 and 2013.

AEC 2011 to 2013 Modeling Analysis

Briefly, this analysis used actual emissions and Colorado Springs Airport meteorological data between 2011 and 2013. The AERMOD modeling parameters, as supplied by additional information from AEC during the comment period for the Martin Drake Power Plant area of analysis are summarized below in Table 5.

Table 5: AERMOD Modeling Parameters for the Colorado Springs Area of Analysis

Colorado Springs Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Urban
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	3
Modeled Fence lines	None
Total receptors	612
Emissions Type	Actuals
Emissions Years	2011-2013
Meteorology Years	2011-2013
Surface Meteorology Station	Colorado Springs, CO
Upper Air Meteorology Station	Denver, CO
Calculated Background SO_2 Concentration	Not Included

The results presented below in Table 6 show the magnitude and geographic location of the modeled design value SO_2 concentration based on actual emissions.

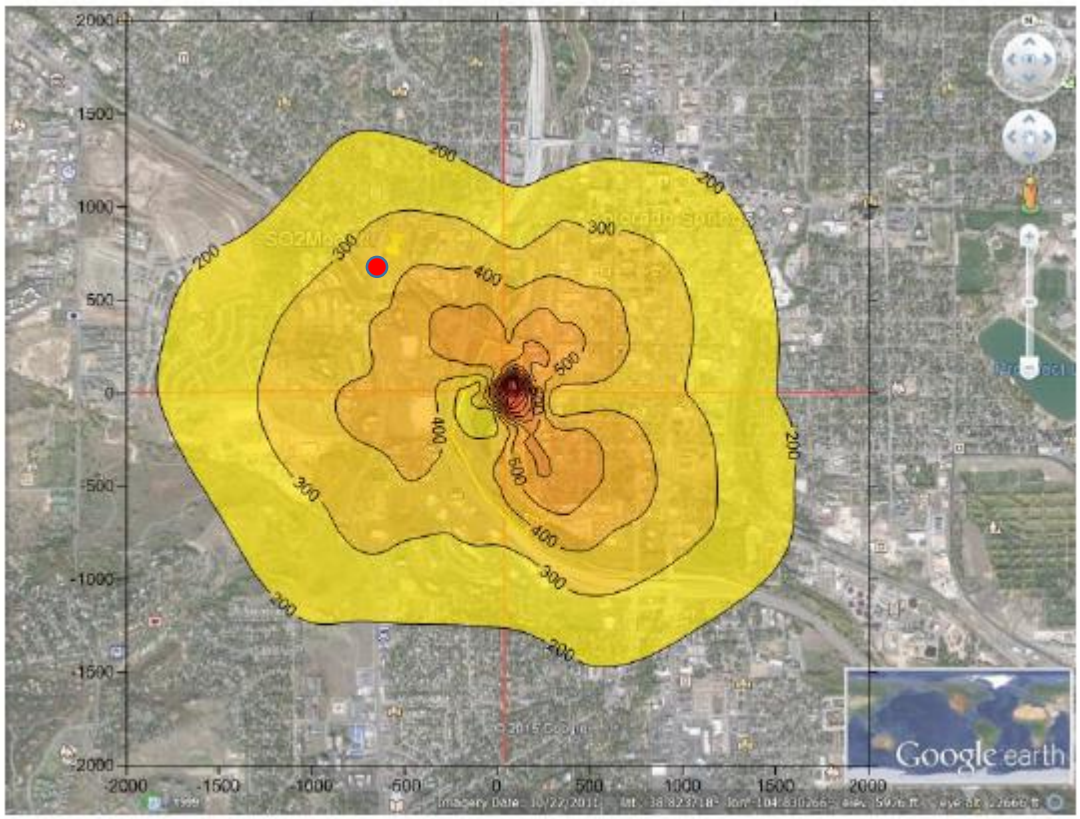
Table 6: Modeled Design Value SO_2 Concentration in the Colorado Area of Analysis Based on Actual Emissions

Averaging Period	Data Period	Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
		X	Y	Modeled (excluding background)	NAAQS
99th Percentile 1-Hour Average	2011-2013	86.6	1818.7	1818.8	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

AEC's modeling indicates that the predicted 3-year average 99th percentile 1-hour average concentration within the chosen modeling domain is 1818.76 $\mu g/m^3$, or about 694.2 ppb. This modeled concentration does not include a background concentration of SO_2, and is based on actual emissions from the Martin Drake Power Plant. Figure 9 below was included as part of group's submission and indicates that the predicted value occurred about 0.1 kilometers to the east-northeast of the Martin Drake Power Plant.

Figure 9: 4th Highest 1-hour Daily Maximum 1-Hour SO_2 Concentrations in the Martin Drake Power Plant Area of Analysis Based on Actual Emissions.



The EPA's primary concern with this analysis is that it was conducted using meteorological data that are not representative of the meteorological conditions at the Martin Drake Plant. In addition, the EPA also notes the following concerns with this analysis:

- Emissions between 2011 and 2013 are much higher than the most recent three years of SO_2 emissions data from the facility. Total emissions from 2013 to 2015 were 79.77 percent of the total emissions from 2011 to 2013.
- Analysis assumed an unsupported population density of 668,000, which based on United States Census Bureau reports should be around 416,000 people. Assuming a higher population density could potentially over-estimate the modeled impacts because the model would be less dispersive based on the parameterization associated with the urban option.
- Analysis includes receptors on the Martin Drake property. The EPA air quality modeling guidance states that placement of receptors should be in areas where it is feasible to place a monitor. This would exclude receptors in areas on secured property, i.e. fenced property that restricts any public access. As shown in Table 6 and Figure 9, the predicted SO_2 concentrations that are well above the NAAQS are located at or in close proximity of the Martin Drake Power Plant, or located in areas that would typically be excluded based on the EPA's guidance. If receptors were excluded from the facility's secured property to which the public does not have access, the magnitude of impacts would be lower and the location of the impacts would be different. AEC's modeling analysis still predicts modeled violations of the 2010 SO_2 NAAQS beyond the company's fence line, but for the reasons discussed above (most importantly the lack of representative meteorological data), the EPA does not consider the AEC analysis adequate to determine whether the impacted area is meeting the NAAQS.

Based on the lack of representative meteorological data and our additional concerns, the EPA is not able to determine whether the area impacted by emissions from the Martin Drake Power Plant is meeting or not meeting the NAAQS. Therefore, this analysis by AEC is not sufficient to support a designation of the area as either attainment or nonattainment.

AEC On-site vs NWS Meteorological Data Modeling Analysis

Briefly, this analysis used actual emissions from October 18, 2011 to December 31, 2011 and meteorological data collected by a SODAR Tower located at the Martin Drake facility (i.e., on-site data) and collected at the Colorado Springs Airport (i.e., NWS data) between October 18, 2015 and December 31, 2015. The AERMOD modeling parameters, as supplied by additional information from AEC during the comment period for the Martin Drake Power Plant area of analysis are summarized below in Table 7.

Table 7: AERMOD Modeling Parameters for the Colorado Springs Area of Analysis

Colorado Springs Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Urban
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	3
Modeled Fence lines	None
Total receptors	612

Emissions Type	Actuals
Emissions Years	Oct 18-Dec 31, 2011
Meteorology Years	Oct 18-Dec 31, 2015
Surface Meteorology Station	SET #1: SODAR Tower at Martin Drake Power Plant, Colorado Springs, CO
	SET #2: Colorado Springs Airport, Colorado Springs, CO
Upper Air Meteorology Station	Denver, CO
Calculated Background SO_2 Concentration	Not Included

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

Table 8: Maximum 1-Hour SO_2 Concentration in the Colorado Area of Analysis Based on Actual Emissions from 2011 and Meteorological Data from 2015 modeled between October 18 and December 31.

Model Case	Averaging Period	Data Period	Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
			X	Y	Modeled (excluding background)	NAAQS
Onsite Met. Data	Maximum 1-Hour Average	Oct 18-Dec 31 Emissions: 2011 Met: 2015	86.6	50	2070.5	196.5*
Airport Met. Data	Maximum 1-Hour Average	Oct 18-Dec 31 Emissions: 2011 Met: 2015	86.6	50	2198.4	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

AEC's modeling indicates that the highest predicted 1-hour average concentration within the chosen modeling domain is 2070.5 $\mu g/m^3$ when using onsite meteorological data and 2198.4 $\mu g/m^3$ when using airport meteorological data. These modeled concentrations do not include a background concentration of SO_2, and are based on actual emissions from the Martin Drake Power Plant between October 18 and December 31, 2015. Figure 10 and Figure 11 below were included as part of group's submission and indicates that the predicted value occurred about 0.1 kilometers to the east-northeast of the Martin Drake Power Plant.

Figure 10: AEC Modeled Plot Based on Oct. 18 – Dec. 31, 2015 Onsite Meteorological Data and 2011 Emissions Data.

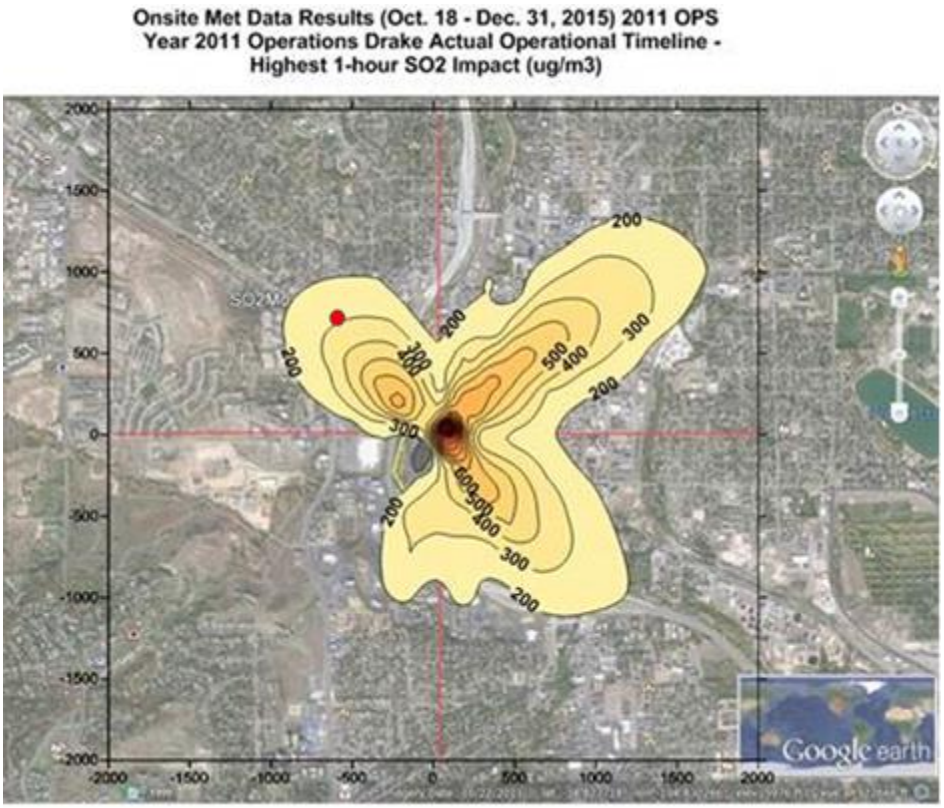
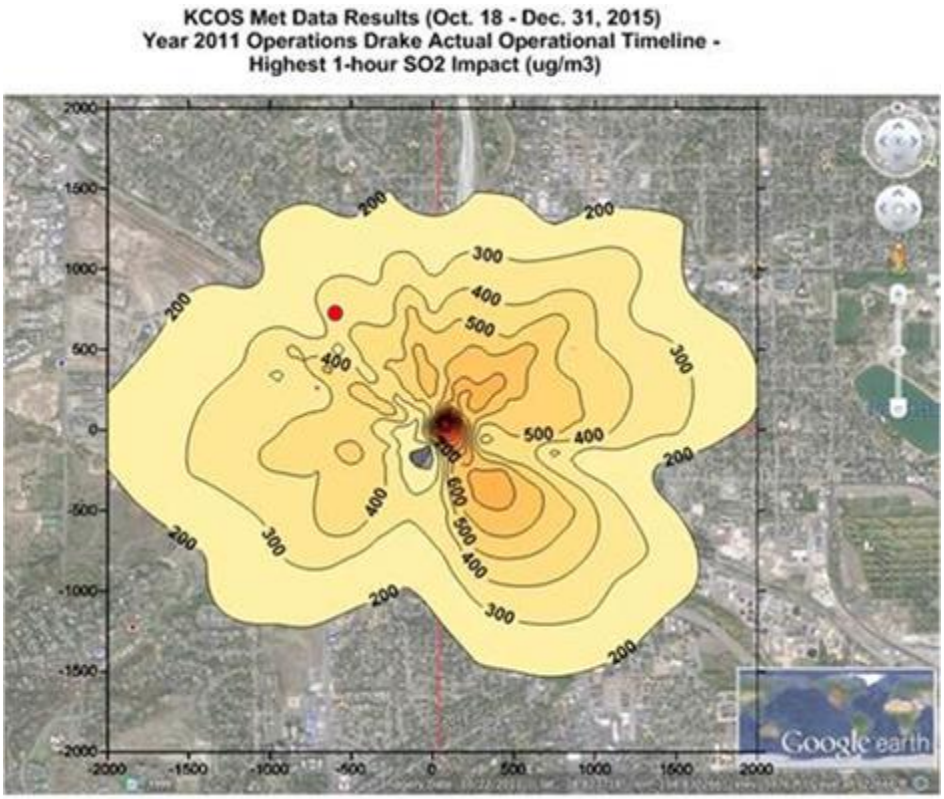


Figure 11: AEC Modeled Plot Based on Oct. 18 – Dec. 31, 2015 Colorado Springs Airport Meteorological Data and 2011 Emissions Data.



While acknowledging the small sample size (less than 2.5 months), the difference in modeled plots (magnitude and spatial distribution of the plume) based solely on the two different meteorological datasets appears to confirm the EPA's conclusion that there are significant differences between the meteorological data collected at the Colorado Springs Airport and that collected at the Martin Drake Power Plant.

While our primary conclusion from this analysis is in regard to the difference between the two meteorological data sets, the EPA also notes the following concerns with this comparative demonstration;

- Emissions from 2011 during this date range are higher than every more recent year of SO_2 emissions data from the facility. Notably, total emissions from October 18, 2015 to December 31, 2015 (563.77 tons/SO_2) were 48 percent of the total emissions from the same date range in 2011 (1,165.7 tons/SO_2). Emissions from 2015 would also match the meteorological data used.
- Analysis includes receptors on the Martin Drake secured property. The EPA air quality modeling guidance states that placement of receptors should be in areas where it is feasible to place a monitor. This would exclude receptors in areas such as on secured property, i.e. fenced property that restricts any public access. As shown in Table 8 and Figures 10 and 11, the predicted SO_2 concentrations that are well above the NAAQS are located at or in close proximity of the Martin Drake Power Plant, or located in areas that would typically be excluded based on the EPA's guidance. If receptors were excluded from the facility's secured property to which the public does not have access, the magnitude of the impacts would be lower and location of the impacts would be different. AEC's modeling analysis still predicts modeled violations of the 2010 SO_2 NAAQS

beyond the company's fence line, but for the reasons discussed above, the EPA does not consider the AEC analysis adequate to determine whether the impacted area is meeting the NAAQS.

- Analysis assumed an unsupported population density of 668,000, which based on United States Census Bureau reports should be around 416,000 people. Assuming a higher population density could potentially over-estimate the modeled impacts.
- Analysis only evaluated the highest 1-hour impacts, instead of the 99th percentile of 1-hour daily maximum concentrations.

The EPA does not consider the comparative plots provided by AEC to demonstrate that the Colorado Springs Airport meteorological data to be representative of the conditions at the Martin Drake Power Plant. As a result, the EPA is not able to determine based on this analysis by AEC whether the area impacted by emissions from the Martin Drake Power Plant is meeting or not meeting the NAAQS.

Sky Solutions Meteorological Sensitivity Modeling Analysis

Briefly, this analysis used future allowable emissions used modeling submitted by the Sierra Club in August 2015[6] and meteorological data sets collected from eight stations across the country to illustrate AERMOD's sensitivity to the use of different meteorological data, including:

1. Albuquerque, NM (2001-2005);
2. Bakersfield, CA (2009-2013);
3. Columbus, OH (2009-2013);
4. Jefferson County, MO (2007-2011);
5. Rochester, MN (2006-2010); and
6. Rome, GA (2007-2011);
7. Colorado Springs Airport, CO (2011-2013); and
8. Colorado Springs Highway Monitor, CO (2011-2013).

The AERMOD modeling parameters, as supplied by additional information from Sky Solutions during the comment period for the Martin Drake Power Plant area of analysis are summarized below in Table 9.

Table 9: AERMOD Modeling Parameters for the Colorado Springs Area of Analysis

Colorado Springs Area of Analysis	
AERMOD Version	15181[7]
Dispersion Characteristics	Urban
Modeled Sources	1

[6] Sierra Club calculated the maximum allowable emission rates in Colorado's Regional Haze State Implementation Plan (SIP) approved by the EPA on December 31, 2012 (77 FR 76871).

[7] The most recent version of AERMET, version 15181, was only used to process the meteorological data collected from the sites in Colorado (i.e., Colorado Springs Airport and Colorado Springs Highway Monitor). Older versions AERMET were used to process the meteorological data from the other sites (i.e., Georgia and Minnesota used version 12345, Missouri used 13350, and California, New Mexico and Ohio used version 14134).

Modeled Stacks	3
Modeled Structures	3
Modeled Fence lines	None
Total receptors	612
Emissions Type	Allowables
Emissions Years	Future Year
Meteorology Years	Varied (see list above)
Surface Meteorology Station	Varied (see list above)
Upper Air Meteorology Station	Varied (see list above)
Calculated Background SO_2 Concentration	Not Included

The results presented below in Table 10 show the magnitude and geographic location of the highest predicted modeled concentration based on allowable emissions.

Table 10: Modeled Design Value SO_2 Concentration in the Colorado Springs Area of Analysis Based on Future Allowable Emissions

Model Case	Averaging Period	Data Period	Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
			X	Y	Modeled (excluding background)	NAAQS
Albuquerque, NM	99th Percentile 1-Hour Average	Allowables	86.6	50	395.4	196.5*
Bakersfield, CA	99th Percentile 1-Hour Average	Allowables	94.0	-34.2	189.9	196.5*
Columbus, OH	99th Percentile 1-Hour Average	Allowables	86.6	50	393.7	196.5*
Jefferson County, MO	99th Percentile 1-Hour Average	Allowables	86.6	50	376.8	196.5*
Rochester, MN	99th Percentile 1-Hour Average	Allowables	86.6	50	402.2	196.5*
Rome, GA	99th Percentile 1-Hour Average	Allowables	94.0	34.2	291.3	196.5*
Colorado Springs Airport, CO	99th Percentile 1-Hour Average	Allowables	86.6	50	399.36	196.5*
Colorado Springs Highway Monitor, CO	99th Percentile 1-Hour Average	Allowables	NA	NA	399.41	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb
NA = Not Available

Sky Solution's modeling indicates that the modeled design value SO_2 concentration within the chosen modeling domain ranges from 189.9 $\mu g/m^3$ to 402.2 $\mu g/m^3$ depending on the meteorological data set. These modeled concentrations do not include a background concentration of SO_2, and are based on future allowable emissions from the Martin Drake Power Plant. Spatial figures of the model results were not included as part of group's submission to illustrate the location of the predicted impacts relative to the Martin Drake Power Plant.

With regard to this analysis, the EPA notes the following concerns;

- In every case, the analysis uses meteorological data that are not representative of the meteorological conditions at the Martin Drake Power Plant.
-
- Analysis assumed an unsupported population density of 668,000, which based on United States Census Bureau reports should be around 416,000 people. Assuming a higher population density could potentially over-estimate the modeled impacts.
- Analysis includes receptors on the Martin Drake secured property. The EPA air quality modeling guidance states that placement of receptors should be in areas where it is feasible to place a monitor. This would exclude receptors in areas such as on secured property, i.e. fenced property that restricts any public access. As shown in Table 10, the predicted SO_2 concentrations that are well above the NAAQS are located at or in close proximity of the Martin Drake Power Plant, or located in areas that would typically be excluded based on the EPA's guidance. If receptors were excluded from the facility's secured property to which the public does not have access, the magnitude of the impacts would be lower and location of the impacts would be different.
- The most recent version of AERMET, version 15181, was only used to process the meteorological data collected from the sites in Colorado (i.e., Colorado Springs Airport and Colorado Springs Highway Monitor) in the analyses. Older versions AERMET were used to process the meteorological data from the other sites (i.e., Georgia and Minnesota used version 12345, Missouri used 13350, and California, New Mexico and Ohio used version 14134). The use of the older AERMET versions could have impacts on the quality of the meteorological data because these versions do not include bug fixes and enhancements that improve the performance of AERMET (e.g., mixing heights, minimum wind thresholds, cloud cover values, bulk Richardson scheme).
- In merely reviewing the modeled design values of SO_2 concentrations from the various AERMOD simulations, the modeled results are indeed significantly sensitive to the meteorological data sets given that the modeled design values of SO_2 concentrations range from 190 $\mu g/m^3$ and 402 $\mu g/m^3$ (Table 10). This suggests that the modeled design values of SO_2 concentrations could change by a factor of two depending on the meteorological data set. This basic comparison illustrates the model's sensitivity to various input data to support that representative meteorological data are necessary to ensure accurate predictions of the modeled design values of SO_2 concentrations.

The EPA does not consider the analysis provided by Sky Solutions to demonstrate that the Colorado Springs Airport meteorological data sets, nor meteorological data sets from stations across the country, are representative of the conditions at the Martin Drake Power Plant. The main assertion from this sensitivity analysis is that the Martin Drake Power Plant would be nonattainment regardless of the meteorological data used in a modeling demonstration. The EPA does not agree with this conclusion because one of the eight meteorological data sets used in the Sky Solutions analysis does predict that the area could be in attainment. Furthermore, the modeled design values of SO_2 concentrations could change by a factor of two depending on the meteorological data set based on the Sky Solutions analysis. Therefore, the EPA cannot determine whether the area can be assumed to be violating regardless of the meteorological data set. Despite Sky Solutions' assertion, the EPA notes that we do not consider any of the meteorological data sets used in this sensitivity analysis to be representative of the unique

characteristics associated with the Martin Drake Power Plant, including its close proximity to the Front Range of the Rocky Mountains. On this basis alone, the EPA is not able based on any of these individual modeling analyses to determine whether the Colorado Springs area is meeting or not meeting the NAAQS. As a result, the EPA does not consider this analysis by Sky Solutions to be sufficient as a basis for a nonattainment designation of the area impacted by emissions from the Martin Drake Power Plant.

Sky Solutions Land Classification Sensitivity Modeling Analysis

Briefly, this analysis used future allowable emissions used in modeling submitted by the Sierra Club in August 2015,[8] meteorological data sets collected from the Colorado Springs Airport data, and different land classifications for a period between 2011 and 2013 to illustrate AERMOD's sensitivity to the use of rural and urban land classifications.

The AERMOD modeling parameters, as supplied by additional information from Sky Solutions during the comment period for the Martin Drake Power Plant area of analysis are summarized below in Table 11. Note that the analysis discussed below is based on the Sky Solutions analysis with building downwash, which the EPA considers the most appropriate.

Table 11: AERMOD Modeling Parameters for the Colorado Springs Area of Analysis

Colorado Springs Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	SET #1: Urban
	SET #2: Rural
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	3
Modeled Fence lines	None
Total receptors	612
Emissions Type	Allowables
Emissions Years	Future Year
Meteorology Years	2011-2013
Surface Meteorology Station	Colorado Springs Airport, CO
Upper Air Meteorology Station	Denver, CO
Calculated Background SO_2 Concentration	Not Included

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

Table 12: Modeled Design Value SO_2 Concentration in the Colorado Springs Area of Analysis Based on Future Allowable Emissions

[8] Sierra Club calculated the maximum allowable emission rates in Colorado's Regional Haze State Implementation Plan (SIP) approved by the EPA on December 31, 2012 (77 FR 76871).

Model Case	Unit	Averaging Period	Data Period	Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
				X	Y	Modeled (excluding background)	NAAQS
Urban	Unit 5	99th Percentile 1-Hour Average	Allowables	86.6	50	259.8	196.5*
	Unit 6	99th Percentile 1-Hour Average	Allowables	86.6	50	140.0	196.5*
	Unit 7	99th Percentile 1-Hour Average	Allowables	649.5	-375	27.0	196.5*
	All Units	99th Percentile 1-Hour Average	Allowables	86.6	50	399.4	196.5*
Rural	Unit 5	99th Percentile 1-Hour Average	Allowables	86.6	50	258.7	196.5*
	Unit 6	99th Percentile 1-Hour Average	Allowables	86.6	50	138.8	196.5*
	Unit 7	99th Percentile 1-Hour Average	Allowables	0	-7500	72.9	196.5*
	All Units	99th Percentile 1-Hour Average	Allowables	86.6	50	395.3	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

Sky Solution's modeling indicates that the modeled design value SO_2 concentration within the chosen modeling domain only significantly impacts unit 7, where the modeled design value changes from 27 using the urban option to 72.9 $\mu g/m^3$ using the rural option. Otherwise, the model results are not especially sensitive to the land classification. These modeled concentrations do not include a background concentration of SO_2, and are based on future allowable emissions from the Martin Drake Power Plant. Spatial figures of the model results were not included as part of group's submission to illustrate the location of the predicted impacts relative to the Martin Drake Power Plant.

- The EPA's primary concern with this analysis is that it was conducted using meteorological data that are not representative of the meteorological conditions at the Martin Drake Plant. In addition, the EPA also notes the following concerns with this analysis: Analysis assumed an unsupported population density of 668,000, which based on United States Census Bureau reports should be around 416,000 people. Assuming a higher population density could potentially over-estimate the modeled impacts.
- Analysis includes receptors on the Martin Drake secured property. The EPA air quality modeling guidance states that placement of receptors should be in areas where it is feasible to place a monitor. This would exclude receptors in areas such as on secured property, i.e. fenced property that restricts any public access. As shown in Table 12, the predicted SO_2 concentrations that are above the NAAQS are located at or in close proximity of the Martin Drake Power Plant, or located in areas that would typically be excluded based on the EPA's guidance. If receptors were excluded from the facility's secured property to which the public does not have access, the magnitude of the impacts would be lower and location of the impacts would be different.

- In merely reviewing the modeled design values of SO_2 concentrations from the various AERMOD simulations, the modeled results do not appear to be significantly sensitive to the land classification, with the exception of unit 7 (Table 12). For unit 7, the modeled design values of SO_2 concentrations could change by a factor of about three depending on whether rural or urban characteristics are selected in AERMOD. However, this basic analysis cannot properly illustrate the model's sensitivity to land classification, or support whether refined model assumptions are necessary to ensure accurate predictions of the modeled design values of SO_2 concentrations. A more detailed evaluation is needed to more accurately interpret the model results.
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For these reasons, the EPA is not able based on this analysis by Sky Solutions to determine whether the area impacted by emissions from the Martin Drake Power Plant is meeting or not meeting the NAAQS.

Sky Solutions Building Downwash Sensitivity Modeling Analysis

Briefly, this analysis used future allowable emissions used modeling submitted by the Sierra Club in August 2015,[9] meteorological data sets collected from the Colorado Springs Airport data, and different building downwash assumptions for a period between 2011 and 2013 to illustrate AERMOD's sensitivity to the impacts of building downwash.

The AERMOD modeling parameters, as supplied by additional information from Sky Solutions during the comment period for the Martin Drake Power Plant area of analysis, are summarized below in Table 13. Note that the analysis discussed below is based on the Sky Solutions analysis with urban components, which the EPA considers the most appropriate.

Table 13: AERMOD Modeling Parameters for the Colorado Springs Area of Analysis

Colorado Springs Area of Analysis	
AERMOD Version	15181
Dispersion Characteristics	Urban
Modeled Sources	1
Modeled Stacks	3
Modeled Structures	3
Modeled Fence lines	None
Total receptors	612
Emissions Type	Allowables
Emissions Years	Future Year
Meteorology Years	2011-2013
Surface Meteorology Station	Colorado Springs Airport, CO
Upper Air Meteorology Station	Denver, CO

[9] Sierra Club calculated the maximum allowable emission rates in Colorado's Regional Haze State Implementation Plan (SIP) approved by the EPA on December 31, 2012 (77 FR 76871).

Calculated Background SO_2 Concentration	Not Included

The results presented below in Table 14 show the magnitude and geographic location of the highest predicted modeled concentration based on allowable emissions.

Table 14: Modeled Design Value SO_2 Concentration in the Colorado Area of Analysis Based on Future Allowable Emissions

Model Case	Unit	Averaging Period	Data Period	Receptor Location		SO_2 Concentration ($\mu g/m^3$)	
				X	Y	Modeled (excluding background)	NAAQS
Building Downwash	Unit 5	99th Percentile 1-Hour Average	Allowables	86.6	50	259.8	196.5*
	Unit 6	99th Percentile 1-Hour Average	Allowables	86.6	50	140.0	196.5*
	Unit 7	99th Percentile 1-Hour Average	Allowables	649.5	-375	27.0	196.5*
	All Units	99th Percentile 1-Hour Average	Allowables	86.6	50	399.4	196.5*
Without Building Downwash	Unit 5	99th Percentile 1-Hour Average	Allowables	-102.6	281.9	17.9	196.5*
	Unit 6	99th Percentile 1-Hour Average	Allowables	-250	433	11.2	196.5*
	Unit 7	99th Percentile 1-Hour Average	Allowables	-1969	347	13.8	196.5*
	All Units	99th Percentile 1-Hour Average	Allowables	-250	433	41.2	196.5*

*Equivalent to the 2010 SO_2 NAAQS set at 75 ppb

Sky Solution's modeling indicates that the modeled design value SO_2 concentration within the chosen modeling domain changes significantly by individual units or total units depending on the building downwash assumptions. These modeled concentrations do not include a background concentration of SO_2, and are based on future allowable emissions from the Martin Drake Power Plant. Spatial figures of the model results were not included as part of group's submission to illustrate the location of the predicted impacts relative to the Martin Drake Power Plant.

The EPA's primary concern with this analysis is that it was conducted using meteorological data that are not representative of the meteorological conditions at the Martin Drake Plant. In addition, the EPA also notes the following concerns with this analysis:

- Analysis assumed an unsupported population density of 668,000, which based on United States Census Bureau reports should be around 416,000 people. Assuming a higher population density could potentially over-estimate the modeled impacts.
- Analysis includes receptors on the Martin Drake secured property. The EPA air quality modeling guidance states that placement of receptors should be in areas where it is feasible to place a monitor. This would exclude receptors in areas such as on secured

property, i.e. fenced property that restricts any public access. As shown in Table 14, the predicted SO_2 concentrations that are above the NAAQS are located at or in close proximity of the Martin Drake Power Plant, or located in areas that would typically be excluded based on the EPA's guidance. If receptors were excluded from the facility's secured property to which the public does not have access, the magnitude of the impacts would be lower and location of the impacts would be different.

- In merely reviewing the modeled design values of SO_2 concentrations from the various AERMOD simulations, the modeled results are indeed significantly sensitive to the land classification given that the modeled design values of SO_2 concentrations range from 11.2 $\mu g/m^3$ to 399.4 $\mu g/m^3$ (Table 14). This suggests that the modeled design values of SO_2 concentrations could change by a factor of 35 depending on whether building downwash is assumed in AERMOD. Note that a more detailed evaluation is needed to more accurately interpret the model results. However, this basic analysis illustrates the model's sensitivity to various input data to support that refined model assumptions are necessary to ensure accurate predictions of the modeled design values of SO_2 concentrations.
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For these reasons, the EPA is not able based on this analysis by Sky Solutions to determine whether the area impacted by emissions from the Martin Drake Power Plant is meeting or not meeting the NAAQS.

Jurisdictional Boundaries:

Once the geographic area of analysis associated with the Martin Drake Power Plant, other nearby sources of SO_2, and background concentration is determined, existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable area, specifically with respect to clearly defined legal boundaries. The EPA initially proposed a designation of El Paso County as a whole. In its April 19, 2016, updated designation recommendation, the State requested that the EPA reduce the designation boundary for the unclassifiable area from all of El Paso County to the areas and populations impacted by the Martin Drake Power Plant. Specifically, the State requested that the unclassifiable area consist of the city of Manitou Springs, and the majority of the city of Colorado Springs (and certain unincorporated areas) as follows; areas east of the western city limits of Colorado Springs, north of the southern city limits of Colorado Springs with the addition of the area termed "Stratmoor" bounded by South Academy Boulevard, west of North/South Powers Blvd (one continuous street), and south of East Woodman Blvd (east of Academy Blvd. N) and the northern city limits of Colorado Springs (west of Academy Blvd. N). These boundaries are shown in the Figure 1, above. The State did not include certain areas in east Colorado Springs based on its assertion that historic monitoring, meteorological, and topographical analyses indicate that these areas are not impacted by the Martin Drake Power Plant. The State's recommended boundary also included unincorporated areas which were completely surrounded by the City of Colorado Springs. Colorado requested that we include these unincorporated areas which fell within the boundaries they suggested were impacted by the Martin Drake Power Plant. Colorado also noted that some of these unincorporated areas included

sensitive populations, which justified their inclusion in the final designation boundary. The EPA has reviewed Colorado's analysis, and finds that the updated boundary for the unclassifiable area is appropriate.

The EPA believes that our final unclassifiable area, consisting of the City of Manitou Springs, and the majority of the city of Colorado Springs and certain unincorporated areas (as detailed in Table 1), is comprised of clearly defined legal boundaries, and we find these boundaries to be a suitably clear basis for defining our final unclassifiable area.

Conclusion

After careful evaluation of the State's recommendation, all timely comments and information received during the state and public comment period, and additional relevant information as discussed in this document, the EPA is unable based on available information to determine whether the area around the Martin Drake Power Plant is meeting or not meeting the 2010 SO_2 NAAQS. Therefore, the EPA is designating the area as unclassifiable under the NAAQS. Specifically, the area is comprised of the city of Manitou Springs, and the majority of the city of Colorado Springs (and certain unincorporated areas) as follows; areas east of the western city limits of Colorado Springs, north of the southern city limits of Colorado Springs with the addition of the area termed "Stratmoor" bounded by South Academy Boulevard, west of North/South Powers Blvd (one continuous street), and south of East Woodman Blvd (east of Academy Blvd. N) and the northern city limits of Colorado Springs (west of Academy Blvd. N).

At this time, our final designations for the state only apply to this area and the Eastern Morgan County, Colorado area discussed below. Consistent with the court-ordered schedule, the EPA will evaluate and designate all remaining undesignated areas in Colorado by either December 31, 2017, or December 31, 2020.

Technical Analysis for Eastern Morgan County, Colorado

Introduction

As noted, the Morgan County, Colorado, area contains a stationary source that according to the EPA's Air Markets Database emitted in 2012 either more than 16,000 tons of SO_2 or more than 2,600 tons of SO_2 and had an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU). Specifically, in 2012, the Pawnee Power Plant emitted 13,510 tons of SO_2, and had an emissions rate of 0.76 lbs SO_2/mmBTU in 2012. As of March 2, 2015, this stationary source had not met the specific requirements for being "announced for retirement." Pursuant to the March 2, 2015, court-ordered schedule, the EPA must designate the area surrounding this facility by July 2, 2016.

In its September 18, 2015 submission, the State recommended that the area surrounding the Pawnee Power Plant electric generating facility be designated as unclassifiable based on an assessment and characterization of air quality from the facility and other nearby sources which

may have a potential impact in the area of analysis where maximum concentrations of SO_2 are expected. This assessment and characterization was based on consideration of the data available to the state.

On February 16, 2016, the EPA notified Colorado that we intended to designate the Eastern Morgan County area as unclassifiable, due to our not being able based on available information to determine whether the area is meeting or not meeting the NAAQS. Additionally, we informed the State that our intended boundaries for the unclassifiable area consisted of the entirety of Morgan County. Our intended designation and associated boundaries were based on the lack of sufficient technical information on which to base a determination regarding whether the area is meeting or not meeting the NAAQS. No modeling has been conducted for the purpose of determining whether the source attains the NAAQS. Further, ambient air quality data that properly represents the areas of predicted maximum concentrations in the vicinity of Pawnee Power Plant is not available. Detailed rationale, analyses, and other information supporting our intended designation for this area can be found in the preliminary technical support document for Colorado, and this document along with all others related to this rulemaking can be found in Docket ID the EPA-HQ-OAR-2014-0464.

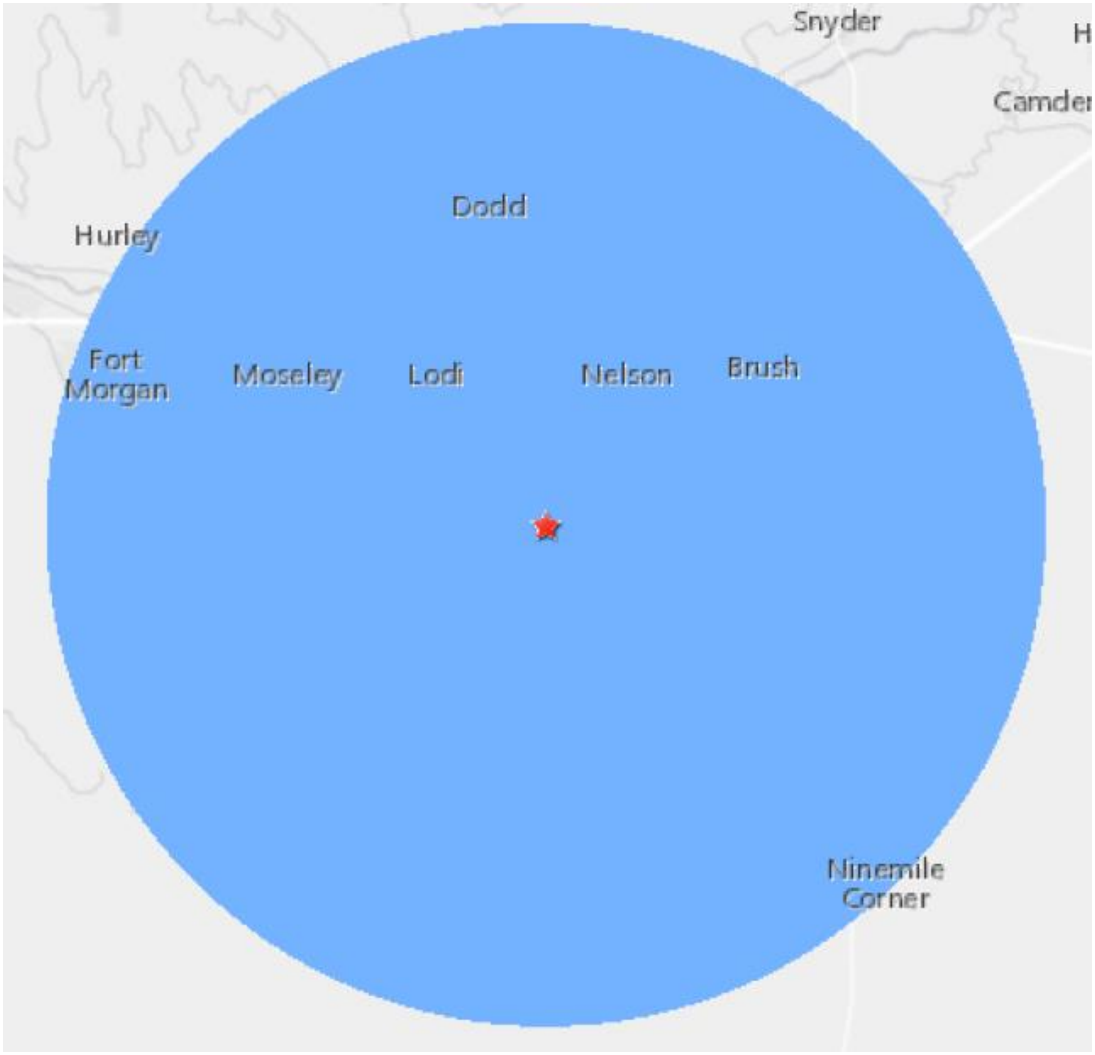
Assessment of New Information

In our February 16, 2016, notification to Colorado regarding our intended unclassifiable designation for the Eastern Morgan County area, the EPA requested that any additional information that the Agency should consider prior to finalizing the designation should be submitted by April 19, 2016. On March 1, 2016, the EPA also published a notice of availability and public comment period in the *Federal Register,* inviting the public to review and provide input on our intended designations by March 31, 2016 (81 FR 10563). On April 19, 2016, the EPA received comments from the State regarding our intended designation for this area. Specifically, the State submitted an updated designation boundary based on the recommendations in the EPA's March 20, 2015 "Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standards."

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

As further discussed below, after carefully considering all available data and information, the EPA is still unable to determine whether the Eastern Morgan County area is meeting or not meeting the 2010 SO_2 NAAQS, so is designating the area as unclassifiable under the NAAQS. The boundaries for this unclassifiable area consist of a circle with a 12 km radius centered on the Pawnee Power Plant, and are shown in figure 12 below. This designation boundary differs from the State's updated boundary recommendation, which was also a circle centered on the Pawnee Power Plant, because the State recommended a radius of 10 km.

Figure 12: The EPA's final unclassifiable area: Eastern Morgan County, Colorado



Jurisdictional Boundaries:

Once the geographic area of analysis associated with the Pawnee Power Plant, other nearby sources of SO_2, and background concentration is determined, existing jurisdictional boundaries are considered for the purpose of informing our final unclassifiable area, specifically with respect to clearly defined legal boundaries. The Pawnee Power Plant is not located within an incorporated city. The closest cities are Brush (pop. 5,501), located approximately three miles (4.8 km) to the northeast of the facility, and Fort Morgan (pop. 11,407), and approximately five miles (8 km) northwest of the facility.

The State has indicated to the EPA its intention to conduct air dispersion modeling of the Pawnee Power Plant in order to meet the requirements of the DRR applicable to that source.[10] Colorado

[10] Colorado anticipates that the EPA will ultimately designate the Pawnee Power Plant as unclassifiable by the July 2, 2016 deadline. The State therefore also anticipates being obligated to meet the Data Requirements Rule for this source despite the facility's having been designated.

therefore recommended a designation boundary that was reflective of the anticipated modeling domain for the facility in its April 19, 2016, comments. The State cited the Modeling TAD in its justification of the anticipated modeling domain (and therefore, recommended designation boundary). Specifically, the State cited the section of the Modeling TAD titled "Determining Sources to Model," which recommends consideration of a previous the EPA guidance document specific to the 2010 Nitrogen Dioxide (NO_2) NAAQS.[11] Colorado cited the following language from this guidance document;

"Even accounting for some terrain influences on the location and gradients of maximum 1-hour concentrations, these considerations suggest that the emphasis on determining which nearby sources to include in the modeling analysis should focus on the area within about 10 kilometers of the project location in most cases." (March 1, 2011 Guidance at 16).

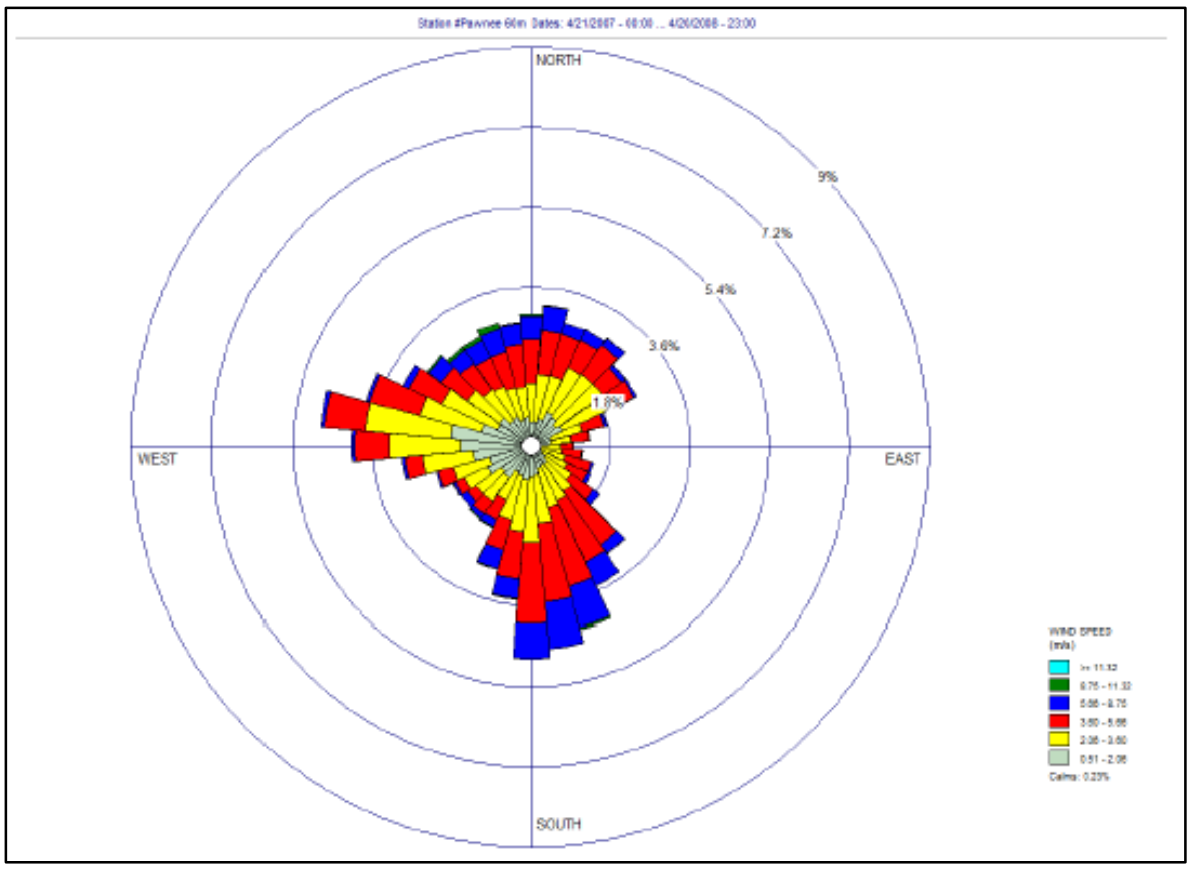
The State also conducted preliminary modeling, and superimposed a circle with a 10 km radius from the source over the modeling results to determine whether this boundary would appropriately accounted for nearby sources. The State has had an opportunity to conduct quality analysis for the modeling demonstration,[12] and has provided the EPA various input and output files from their modeling demonstration. However, the EPA is unable to verify all of the input assumptions used in the State's modeling demonstration at this point, and so must designate without consideration of this information.

In addition to consideration of jurisdictional boundaries and its anticipated modeling analysis, the State also addressed meteorological, geographical, and topographical considerations in the area surrounding the Pawnee Power Plant in accordance with the EPA's March 20, 2015 designations guidance for the 2010 SO_2 NAAQS. The State indicated that the source is impacted by the wind patterns of both the South Platte River Valley and the Beaver Creek Valley. This is reflected in annual wind rose presented as Figure 13 below.

Figure 13: Wind Rose for the Pawnee Facility: April 2007 – April 2008

[11] Modeling TAD at 7-8, which recommends consideration of the following document: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard" March 1, 2011 -- (U.S. the EPA, 2011b) provides additional guidance regarding NO_2 permit modeling and is also relevant to SO_2.

[12] The State has indicated that this modeling data utilized a recent set of stack tests from the Western Sugar facility in order to model that source's emissions. Colorado had asserted in its September 18, 2015 initial designation recommendation that sufficient emissions data for Western Sugar were unavailable. The facility's owners have since conducted three stack tests on the facility, and Colorado used the most conservative of the three stack tests as the Western Sugar emission rate in its preliminary modeling. The State has not yet submitted a modeling protocol to the EPA discussing this information.



On June 6, 2016, the State submitted a preliminary SO_2 modeling protocol for the Pawnee facility to the EPA for review. In this modeling protocol, the State noted that it expects both the Cargill Meat Solutions and Western Sugar Company facilities to cause a significant concentration gradient in the vicinity of the Pawnee Station. The State also included both of these sources (in addition to Pawnee) in its proposed receptor grid in the preliminary protocol. The EPA has previously indicated that source impacts can be anticipated to occur within 10 to 20 km of a source.[13] For these reasons, the EPA finds it appropriate to expand Colorado's requested designation boundary to 12 km in order to include the Western Sugar facility.

The EPA finds that our final unclassifiable area, consisting of a circle with a 12 km radius centered on the Pawnee Power Plant, is comprised of appropriate boundaries, and we find these boundaries to be a suitably clear basis for defining our final unclassifiable area.

Conclusion

After careful evaluation of the State's recommendation, all timely comments and information received during the state and public comment periods, and additional relevant information as discussed in this document, the EPA is unable based on available information to determine whether the area around the Pawnee Power Plant is meeting or not meeting the NAAQS, and is

[13] See the EPA's "Revision to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter; Proposed Rule," at 80 FR 45361, July 29, 2015.

designating the area as unclassifiable for the 2010 SO_2 NAAQS. Specifically, the area is comprised of a circle with a 12 km radius centered on the Pawnee Power Plant.

The EPA is basing this conclusion on the lack of sufficient technical information on which to base a determination regarding whether the area is meeting or not meeting the NAAQS. As indicated, no modeling has been conducted and submitted to the EPA specific to the area's attainment status. Further, as discussed in our preliminary technical support document, ambient air quality data that properly represents the areas of predicted maximum concentrations in the vicinity of Pawnee Power Plant is not available. Without adequate technical information sufficient to inform a decision regarding whether the area meets or does not meet the NAAQS, the EPA finds an unclassifiable designation appropriate for this source.

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