Missouri State Implementation Plan Revision

Nonattainment Area Plan for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard

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Jackson County Sulfur Dioxide Nonattainment Area

Missouri Air Conservation Commission

Public Hearing

June 25, 2015

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ACRONYMS & ABBREVIATIONS LIST

AERMET	Aermod Meteorological Preprocessor
AERMOD	AMS/EPA Regulatory Model
AMS	American Meteorological Society
AOC	Administrative Order on Consent
ASOS	Automated Surface Observing Station
BAS	Basic Operating Permit
BPIP PRIME	Building Profile Input Program with Plume Rise Model Enhancements
CAAA	Clean Air Act Amendments of 1990
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
CSR	Code of State Regulations
CCVR	Cloud Cover Measurements
department	Missouri Department of Natural Resources
EGU	Electric Generating Unit
EPA	United States Environmental Protection Agency
FR	Federal Register
GEP	Good Engineering Practice (stack height)
IPL	Independence Power & Light
KCPL	Kansas City Power & Light
KDHE	Kansas Department of Health and Environment
km/m	kilometers/meters
MACT	Maximum Achievable Control Technology
MoEIS	Missouri Emissions Inventory System
MTSP	Mark Twain State Park (monitor)
$\mu g/m^3$	micrograms per cubic meter
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standard
NAD83	North American Datum of 1983
NED	National Elevation Data
NWS	National Weather Service
P70	Part 70 Operating Permit
PM	Particulate Matter
ppb	parts per billion
PSD	Prevention of Significant Deterioration
QAPP	Quality Assurance Project Plan
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
RGS	Richards-Gibaur South (monitor)
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
tpy	tons per year
USGS	United States Geological Survey
UTM	Universal Transverse Mercator

EXECUTIVE SUMMARY

On June 22, 2010, the U.S. Environmental Protection Agency (EPA) established a new 1-hour sulfur dioxide (SO_2) primary National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb), based on the three-year average of the annual 99th percentile of 1-hour daily maximum concentrations (75 FR 35520; June 22, 2010). This new SO_2 standard replaces the previous 24-hour and annual primary SO_2 NAAQS promulgated in 1971 (36 FR 8187; April 30, 1971). Once EPA establishes or revises a NAAQS, EPA must designate as "nonattainment" those areas that violate or contribute to violations of the NAAQS pursuant to section 107(d) of the federal Clean Air Act Amendments of 1990 (CAAA).

On August 5, 2013, the EPA designated a portion of Jackson County, Missouri as nonattainment for the 2010 SO_2 primary NAAQS, effective October 4, 2013. The Jackson County SO_2 Nonattainment Area (NAA) is bounded by I-70 & I-670 to the south, I-435 to the east, the Missouri River to the north, and the state line with Kansas to the west. Air quality data from 2007-2009 as well as monitoring data from 2010-2012 indicated a violation of the NAAQS (78 FR 47191; August 5, 2013). The final boundary designation rule is codified in 40 CFR §81.326 *Missouri*.

The main purpose of this SIP revision is to address CAAA section 172(c) plan requirements applicable to the Jackson County SO_2 NAA. This SIP revision demonstrates attainment for the Jackson County SO_2 NAA using air dispersion modeling that includes the continuation and modification of existing control strategies as well as additional control measures being proposed concurrently with this SIP revision. The main control strategy is the 95% reduction of emissions from the largest SO_2 source in the NAA. Examples of additional controls include fuel switching to burn exclusively natural gas, new lower SO_2 emission limitations, and the delivery of Ultra Low Sulfur Diesel (ULSD) at all facilities currently using diesel fuel (and No.1 or No. 2 distillate fuel oils) that are located within the nonattainment area and throughout Jackson County.

Per section 191(a) of the CAAA, Missouri is required to submit to the EPA a nonattainment area State Implementation Plan (SIP) revision for SO_2 that demonstrates the nonattainment area will reach attainment of the 2010 SO_2 primary NAAQS as expeditiously as practicable, but no later than October 4, 2018, which is five years from the date of the nonattainment designation.

The new emission limits, fuel switches, and fuel sulfur content requirements identified for this SIP revision will be permanent and enforceable through the proposed new state SO_2 rulemaking, 10 CSR 10-6.261 *Control of Sulfur Dioxide Emissions*. The deadline to implement the rule's new requirements is January 1, 2017. This implementation date is required by EPA to demonstrate compliance with the NAAQS prior to the attainment date of October 4, 2018.

This SIP revision also addresses CAAA required elements, including a Reasonably Available Control Measures (RACM) analysis, Reasonable Further Progress (RFP) requirements and contingency requirements. Several iterations resulted in a final compliant model scenario in the determination that the area will demonstrate NAAQS compliance.

1. INTRODUCTION

The federal CAAA require the EPA to establish NAAQS for SO_2 and five other criteria air pollutants impacting public health and the environment. The other criteria pollutants are ozone, particulate matter (including PM_{10} and $PM_{2.5}$), lead, nitrogen dioxide, and carbon monoxide. The CAAA also requires EPA to periodically review the standards and the latest scientific information to ensure they provide adequate health and environmental protection, and to update those standards as necessary.

On June 22, 2010, EPA established a new 1-hour SO_2 NAAQS of 75 ppb, based on the three-year average of the annual 99th percentile of 1-hour daily maximum concentrations (75 FR 35520; June 22, 2010). This new SO_2 standard replaces the previous 24-hour and annual primary SO_2 NAAQS promulgated in 1971 (36 FR 8187; April 30, 1971). Once EPA establishes or revises a NAAQS, EPA must designate as "nonattainment" those areas that violate or contribute to violations of the NAAQS pursuant to section 107(d) of the CAAA.

On August 5, 2013, the EPA designated a portion of Jackson County, Missouri as nonattainment for the 2010 SO_2 primary NAAQS, effective October 4, 2013, based on air quality data from 2007-2009 that indicated a violation of the NAAQS (78 FR 47191; August 5, 2013). This final rule is codified in 40 CFR §81.326 *Missouri*.

Per section 191(a) of the CAAA, Missouri is required to submit to the EPA a nonattainment area SIP revision for sulfur dioxide and to demonstrate the nonattainment area will reach attainment of the 2010 SO_2 primary NAAQS as expeditiously as practicable, but no later than five years from the date of the nonattainment designation.

Clean Air Act Requirements

Section 110 of the CAAA specifies general SIP requirements and Part D of the CAAA includes requirements for nonattainment areas. The department's June 27, 2013 Missouri SO_2 Infrastructure SIP submittal addresses the continued maintenance, or section 110 Infrastructure requirements, of the 2010 SO_2 primary NAAQS for all other portions of the State not designated as nonattainment. This document addresses CAAA Part D requirements for the Jackson County SO_2 Nonattainment area. A separate document, developed concurrent to this one, addresses the Part D SIP requirements for the State's only other SO_2 nonattainment area, called the Jefferson County SO_2 Nonattainment area which includes a portion of Jefferson County, Missouri.

The general Part D nonattainment SIP provisions are delineated in section 172 of the CAAA. Section 172(c) specifies SIPs submitted to satisfy Part D requirements shall, among other things, provide for attainment of the applicable NAAQS via federally enforceable measures and limitations, include Reasonably Available Control Measures (RACM) [which includes Reasonably Available Control Technology (RACT)], provide for Reasonable Further Progress (RFP), include an emissions inventory, require permits for construction and operation of major new or modified stationary sources, contain contingency measures, and satisfy the applicable provisions of section 110(a)(2) of the CAAA related to the general implementation of a new or revised NAAQS. The following sections of this document address the section 172(c) requirements as specified:

Section 2 (monitoring and ambient air quality data)

Section 3 (emissions inventory)

- Addresses section 172(c)(3) inventory

Section 6 (nonattainment area plan control strategy)

- Addresses section 172(c)(6) enforceable emission limitations, control measures along with schedules and timetables for compliance

Section 7 (RACM & RFP)

- Addresses section 172(c)(1) RACM/RACT
- Addresses section 172(c)(2) reasonable further progress

Section 8 (contingency measures, new source review & conformity)

- Addresses section 172(c)(9) contingency measures and section 172(c)(5) permitting requirements for new & modified major sources

Section 9 (public participation)

In addition to the above, section 172(c)(4) requires the SIP to identify and quantify the emissions of pollutants allowed from the construction and operation of major new or modified stationary sources per section 173(a)(1)(B). The SIP must demonstrate the emissions quantified in this regard will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the sulfur dioxide NAAQS by the required attainment date. Section 172(c)(5) requires permits for the construction and operation of new or modified major stationary sources in the nonattainment area be in accordance with section 173.

Missouri administers a New Source Review permitting program for new or modified major sources of sulfur dioxide per Missouri's approved permit program. Among other requirements, permits issued in Missouri require a demonstration that emissions from the new or modified source will not cause or contribute to a NAAQS violation, including the 2010 1-hour SO_2 NAAQS.

This plan conforms to the CAAA requirements and utilizes existing EPA guidance for sulfur dioxide SIPs. More information on EPA's guidance for sulfur dioxide SIPs developed under the 2010 SO_2 NAAQS are found at: http://www.epa.gov/airquality/sulfurdioxide/implement.html.

The compliant modeling scenario in Section 5 of this plan successfully demonstrates attainment of the 2010 SO_2 NAAQS based on implementation of required control measures described in Section 6. Emission rate reductions associated with each of the required emission limitations and control measures is quantified in Appendix F. Each of the required limitations and control measures (existing, modified and new) are required to reduce emission rates sufficiently to demonstrate 2010 SO_2 NAAQS compliance. The emission rate reductions are expected to result in monitored values of 75 ppb [equivalent to 196.725 $\mu g/m^3$] or less.

1.1. BACKGROUND

Sulfur dioxide (SO_2) is one of a group of highly reactive gasses known collectively as "oxides of sulfur." SO_2 is linked with a number of adverse effects on the respiratory system. In order to reduce ambient air concentrations, SO_2 emission sources are typically restricted by emission limits, control devices or other special conditions in a permanent and enforceable document, such as an air permit, regulation or a legally binding agreement such as a consent judgment or an administrative order on consent (AOC). The total of all SO_2 emission limits and special conditions prescribed by state regulation, construction permits and/or legally binding agreements

is established to ensure 2010 SO_2 NAAQS compliance. The corresponding ambient air concentrations are determined by ambient air quality monitors. This data is the primary basis for the strategy developed for this plan.

1.1.A. Health Effects

Current scientific evidence links short-term exposures to SO_2, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates (e.g., while exercising or playing.)

Studies also show a connection between short-term exposure and increased visits to emergency departments and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly, and asthmatics.

EPA's NAAQS for SO_2 is designed to protect against exposure to the entire group of sulfur oxides (SOx). SO_2 is the component of greatest concern and is used as the indicator for the larger group of gaseous sulfur oxides (SOx). Other gaseous sulfur oxides (e.g. SO_3) are found in the atmosphere at concentrations much lower than SO_2.

Emissions that lead to high concentrations of SO_2 generally also lead to the formation of other SOx. Control measures that reduce SO_2 can generally be expected to reduce people's exposures to all gaseous SOx. This may have the important co-benefit of reducing the formation of fine sulfate particles, which pose significant public health threats.

SOx can react with other compounds in the atmosphere to form small particles. These particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death. EPA's NAAQS for particulate matter (PM_{10} and $PM_{2.5}$) are designed to provide protection against these health effects.

1.1.B. Sources

Nationally, the EPA estimates the largest sources of SO_2 emissions are from fossil fuel combustion at power plants (73%) and other industrial facilities (20%). Smaller sources of SO_2 emissions include industrial processes such as extracting metal from ore and the burning of fossil fuels containing sulfur in locomotives, large ships and other non-road equipment applications.

Per 40 CFR § 80.510, Ultra Low Sulfur Diesel (ULSD), with a maximum fuel sulfur content of 15 ppm, is required for land-based nonroad applications beginning June 1, 2010 and for locomotive and marine applications beginning June 1, 2012, specifically for emission units using diesel or other distillate fuel oils. The department maintains ULSD is currently used in practice throughout Missouri. The department also maintains there are currently no known suppliers distributing higher sulfur diesel (and No.1 fuel oil or No. 2 fuel oil) to the Jackson County SO_2 Nonattainment area. The department modeled certain sources currently using diesel or distillate fuel oils as using fuels with a maximum sulfur content equivalent to ULSD. To make this fuel sulfur content SIP enforceable, EPA requires the use of such fuels in a state regulation or other permanent and enforceable mechanism beyond the requirements for ULSD per 40 CFR Part 80. As a result, the proposed new state SO_2 rule 10 CSR 10-6.261 [Appendix I] requires the delivery

of ultra-low sulfur distillate fuel oils with a maximum fuel sulfur content of 15 ppm with compliance beginning January 1, 2017 for all Jackson County sources.

Since the introduction of federal ULSD beginning in 2004 initially for mobile source applications, SO_2 air pollution is ever more characterized mainly by single, discrete stationary sources of SO_2, primarily pertaining to the combustion of fossil fuels (other than ULSD). Because of its physical and chemical properties, SO_2 is not a typical criteria pollutant. Unlike the gaseous and fine particulate criteria pollutants, areas of maximum SO_2 concentrations tend to be relatively localized and the concentrations do not transport long distances. Consequently, SO_2 settles out of the air over a relatively short distance and has a relatively high concentration gradient. In other words, there is a sharp decrease in SO_2 concentrations as the distance from a large SO_2 source(s) increases.

For SO_2 point sources, there are twenty-four small sources located inside the NAA boundary with each emitting less than 5 tons per year (tpy). These sources include hospitals, distribution centers, water treatment plants, and various small businesses. Also located inside the NAA boundary is one large source, a coal-fired steam generation plant, with baseline emissions greater than 100 tpy. Thirteen interactive sources outside the NAA were included in the modeling analysis. These sources include Electric Generating Units (EGUs), hospitals, a university, and industrial sources. Four sources in Kansas were also included in the modeling analysis. Of the four interactive sources located in Kansas, two are coal-fired EGUs. Both of these plants are subject to upcoming federal regulations or other binding agreements. As a result of these regulations, both plants will be dramatically reducing their SO_2 emissions over the next couple years.

1.1.C. Regulatory History

Pursuant to the requirements of the CAAA, the EPA first promulgated a NAAQS for SO_2 on April 30, 1971. Specifically, EPA initially promulgated a 24-hour primary SO_2 standard of 140 parts per billion (ppb) [not to be exceeded more than once per year] and an annual average primary SO_2 standard of 30 ppb (to protect health) [annual arithmetic average]. EPA also initially promulgated a 3-hour average secondary SO_2 standard of 500 ppb (to protect public welfare). On May 22, 1996, EPA completed a review of the primary SO_2 NAAQS and chose not to revise the standards. Historically, there have been no areas designated as nonattainment per these standards in the entire state of Missouri.

On June 22, 2010, EPA revised the primary SO_2 standards by establishing a new 1-hour standard of 75 ppb [three year average of the 99th percentile of the yearly distribution of 1-hour daily maximum SO_2 concentrations]. EPA also revoked the two existing primary SO_2 standards (24-hour and annual primary SO_2 standards) recognizing that the revised 1-hour standard of 75 ppb will have the effect of generally maintaining 24-hour and annual SO_2 concentrations that are below the levels of the associated primary SO_2 standards, respectively.

On April 3, 2012, EPA took final action to retain the current secondary standard for SO_2 of 500 ppb averaged over three hours, not to be exceeded more than once per year.

Based on ambient monitoring data from 2007 - 2009, as well as additional data from 2010 – 2012, areas in a portion of Jackson County (Kansas City area) and a portion of Jefferson County (Herculaneum area) were in violation of the 2010 1-hour SO_2 NAAQS. Based on the violations recorded at the respective monitors, both areas were designated as nonattainment under the 2010 sulfur dioxide standard effective October 4, 2013. As previously stated, this nonattainment area plan addresses only the Jackson County SO_2 Nonattainment Area. Information on Missouri's 2010 1-hour SO_2 NAAQS area boundary designation recommendations may be found at the Air Program's NAAQS boundary designations webpage:
http://dnr.mo.gov/env/apcp/naaqsboundarydesignations.htm#SO2

1.1.D. Description of Nonattainment Area & Topography

EPA designated the portion of Jackson County, not the entire county, as the Jackson County 2010 1-hour SO_2 nonattainment area on August 5, 2013, effective October 4, 2013 (78 FR 47191). Figure 1 depicts a map of the designated nonattainment area with the location of the violating Troost Avenue monitor. The final SO_2 standard designations were based upon air quality monitoring data from calendar years 2010-2012.

The 2010 1-hour SO_2 Designation and Boundary Recommendation, codified in 40 CFR §81.326 "Missouri – 2010 Sulfur Dioxide NAAQS (Primary)", lists the designated area boundaries comprising the Jackson County nonattainment area-

Jackson County (part) SO_2 Nonattainment Area

Jackson County, MO [1] Jackson County (part)
..... 10–4–13 Nonattainment.

The portion of Jackson County bounded by I-70/I-670 and the Missouri River to the north,; and, to the west of I-435 to the state line separating Missouri and Kansas

[1] Excludes Indian country located in each area, if any, unless otherwise specified.

Per the 2010 1-hour SO_2 NAAQS, the unclassifiable/attainment designations for the remainder of the state are not yet finalized by EPA.

In addition to these considerations, topographical characteristics influence wind speed and direction. Micrometeorological effects are influenced by predominant wind patterns in river basins or valleys. Jackson County is influenced by the Missouri River and its floodplain that make up the northern county boundary. The terrain climbs nearly 100 meters in a short distance at the southern edge of the floodplain. Two channels cut into the higher elevation where rivers flow from south to north to meet the Missouri river. The remainder of Jackson County is not in the floodplain and is fairly uniform in elevation. Near the floodplain edge, wind speed and directions may vary significantly due to the terrain. Winds may channel in an east-west fashion along the Missouri river valley on the scale of hours and several miles, and winds may channel north-south in the channels that cut toward the river over smaller time and distance scales. Wind patterns in the rest of Jackson County will follow the prevailing meteorology of the region, aside from microscale impacts of man-made structures.

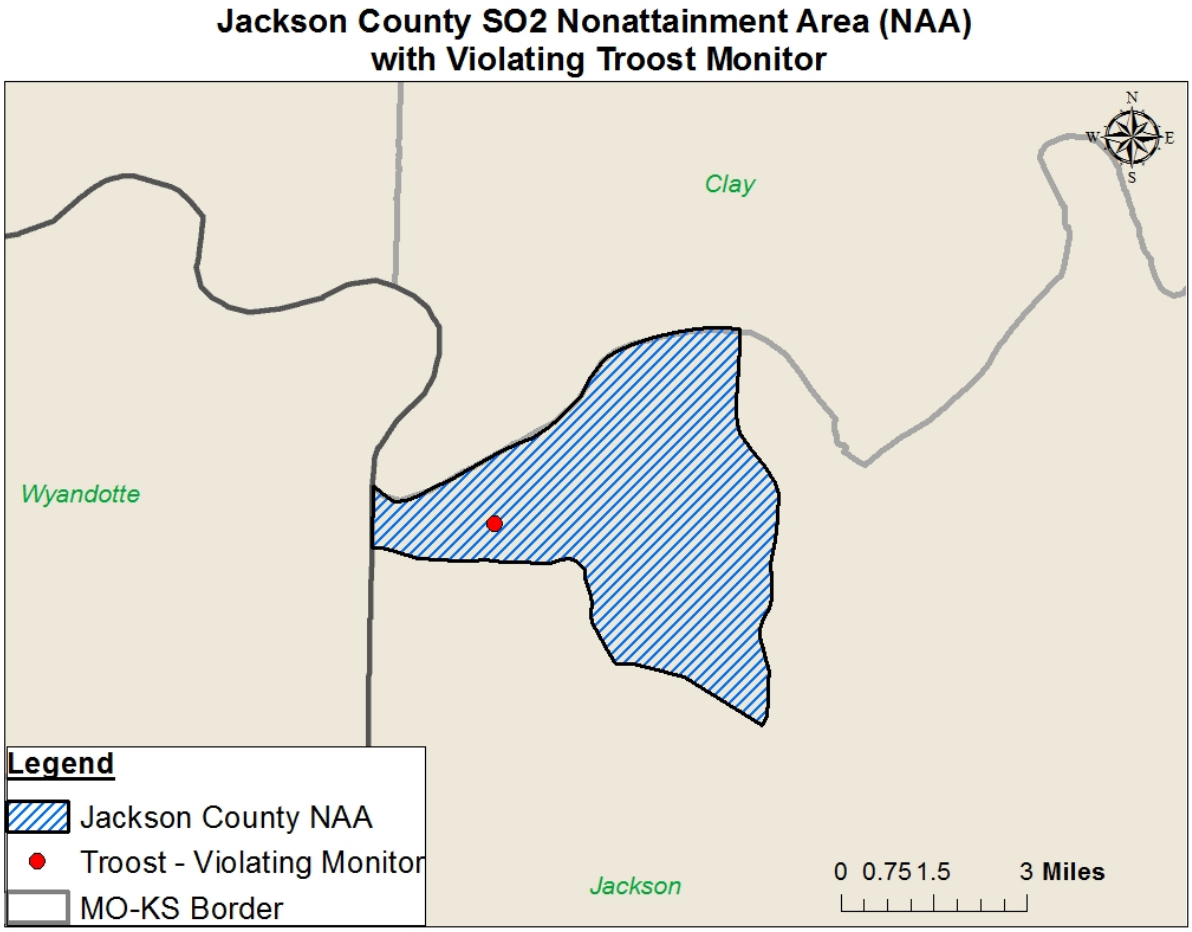

Figure 1 – Jackson County 2010 1-hour SO_2 Nonattainment Area Boundary

2. MONITORING & AMBIENT AIR QUALITY DATA

The ambient air monitoring networks were established under the CAAA to protect and assess air quality. One of the main purposes of collecting air samples is to assess compliance with and progress made towards meeting ambient air quality standards. The department summarizes its statewide monitoring network, and any changes to it, in its annual air quality monitoring network plan in accordance with 40 CFR 58 Part B. Missouri's 2014 air quality monitoring network plan was approved by the EPA in a letter dated October 23, 2014 and is available at: http://dnr.mo.gov/env/apcp/docs/2014monitoringnetworkplan.pdf

Also, visit EPA Region 7's Air Quality Monitoring Network plan site for more information or to review Missouri's previous approved network plans: http://www.epa.gov/region07/air/quality/quality.htm#mo_air

2.1. AIR QUALITY MONITORING NETWORK

The department maintains a monitoring network satisfying all EPA requirements for NAAQS criteria pollutants, including SO_2. As documented in the 2013 SO_2 Infrastructure SIP, there is an active network of state operated air quality monitoring sites, located throughout Missouri, tasked with collecting data on SO_2 in the ambient air. Monitoring is conducted pursuant to a

department-approved Quality Assurance Project Plan (QAPP). Statewide SO_2 monitoring locations are shown in Figure 2.

Prior to the June 22, 2010 promulgation of the 1-hour SO_2 primary NAAQS, all of Missouri maintained compliance with the previous primary and secondary SO_2 NAAQS based on the statewide SO_2 monitoring network operating at the time. In fact, monitored values of the previous primary SO_2 NAAQS (both 3-hour and 24-hour averaging periods) were historically recorded well below the standard which enabled the Air Program to discontinue operation [prior to 2007] of several SO_2 monitoring sites where violations were not an issue. Further, in 2010, five additional SO_2 monitoring sites that were not recording violations of the 2010 1-hour SO_2 NAAQS were temporarily discontinued primarily due to state budgetary concerns. Of these five SO_2 monitoring sites, the Mark Twain State Park (MTSP) site resumed SO_2 monitoring on July 1, 2012. The highest concentration recorded at the MTSP site in all of calendar year 2014 was 13 parts per billion (ppb). The MTSP site is generally considered a good benchmark for background concentrations due to its remote location in the state.

After promulgation of the 2010 1-hour SO_2 standard, a portion of Jackson County was one of two areas in Missouri designated as nonattainment in August 2013. This designation was based on monitoring data from the existing SO_2 monitoring network for calendar years 2007 through 2009, as well as later data from calendar years 2010 through 2012. Monitoring network data is also needed to analyze the performance of the refined dispersion model used to demonstrate NAAQS compliance and track progress toward attainment.

Missouri has operated an air monitor for SO_2 at the Troost Avenue monitor in Kansas City since 1993. Currently, the Troost Avenue location also monitors Nitrogen Dioxide since 2002 and Particulate Matter (PM10 and PM2.5) since 2003.

In addition to Missouri operated monitors, the Kansas Department of Health and Environment (KDHE) operates one SO_2 air quality monitor in the Kansas City area known as the JFK monitor.

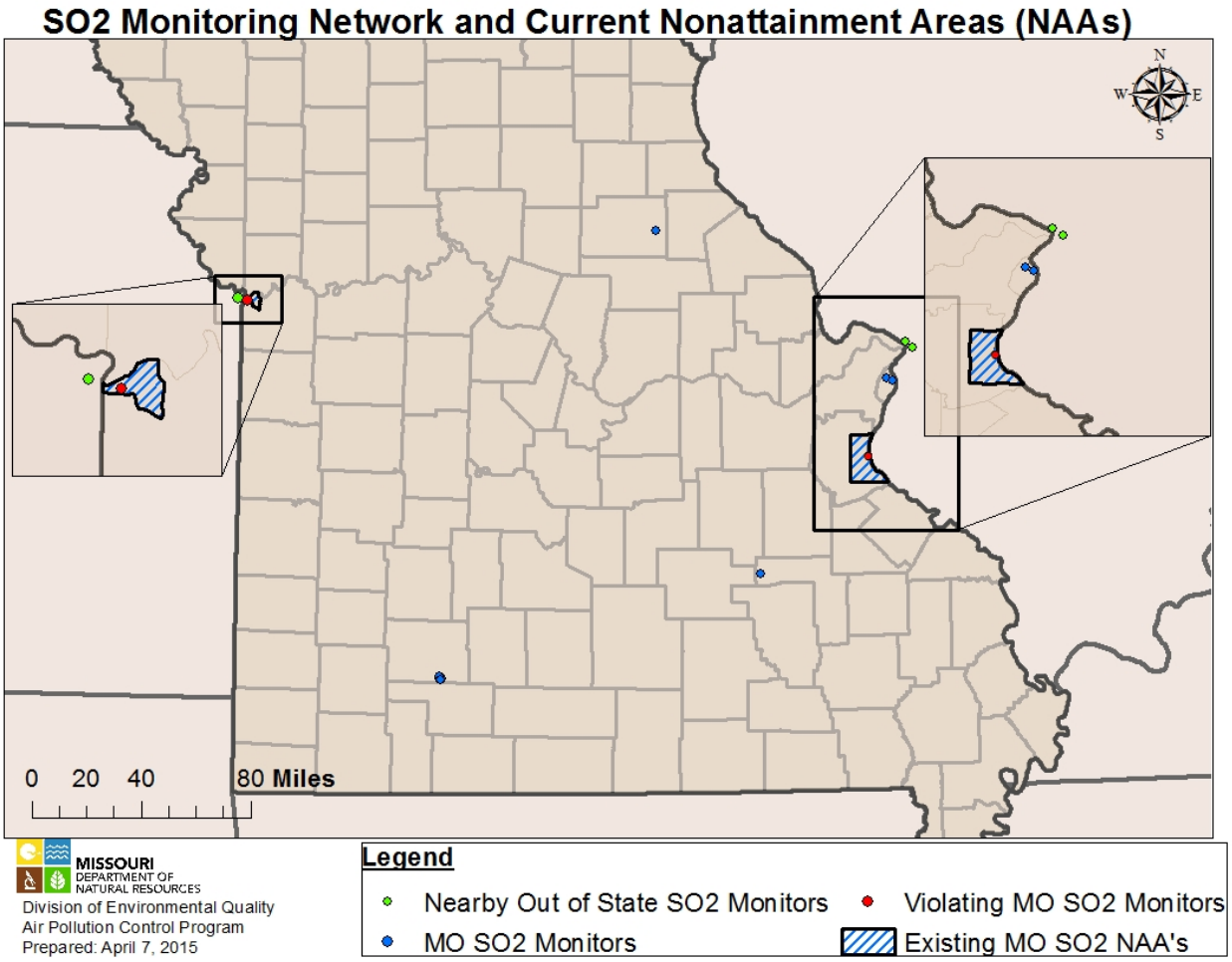

Figure 2 – Monitoring Sites - SO_2 Ambient Monitoring Network Showing Monitors in MO, KS, IL

2.2. MONITORING DATA

Monitored data recorded at the Troost Avenue ambient monitor includes values such that the fourth high (99th percentile of the daily 1-hour maximum) annual SO_2 concentrations have been as high as 308 ppb in calendar year 2004. Further, the three-year design value (2007-2009) for the Troost Avenue monitor at 171 ppb was used in initially assessing the nonattainment status of the Jackson County SO_2 NAA. The Troost Avenue SO_2 monitor's three-year design values for 2010-2012 [157 ppb] and 2011-2013 [162 ppb] and 2012-2014 [150 ppb] are also noncompliant with the 2010 1-hour SO_2 NAAQS.

Based on the recorded monitor values as well as modeled concentrations, SO_2 NAAQS violations at the Troost Avenue monitor are predominantly attributable to several large stationary sources.

Figure 3 displays the fourth high (99th percentile of the daily 1-hour maximum) annual SO_2 concentrations recorded at the Troost Avenue monitor, as well as the corresponding three-year design values based on quality assured data through December 31, 2014 and preliminary data through the development date of this SIP revision submittal. Monitoring data trend information,

starting with 2011, for the violating Troost Avenue monitor is included in Appendix A of this plan. A summary of current preliminary SO_2 monitoring data recorded in 2015 (updated twice monthly) is available at http://dnr.mo.gov/env/apcp/docs/so2monitoringdata.pdf

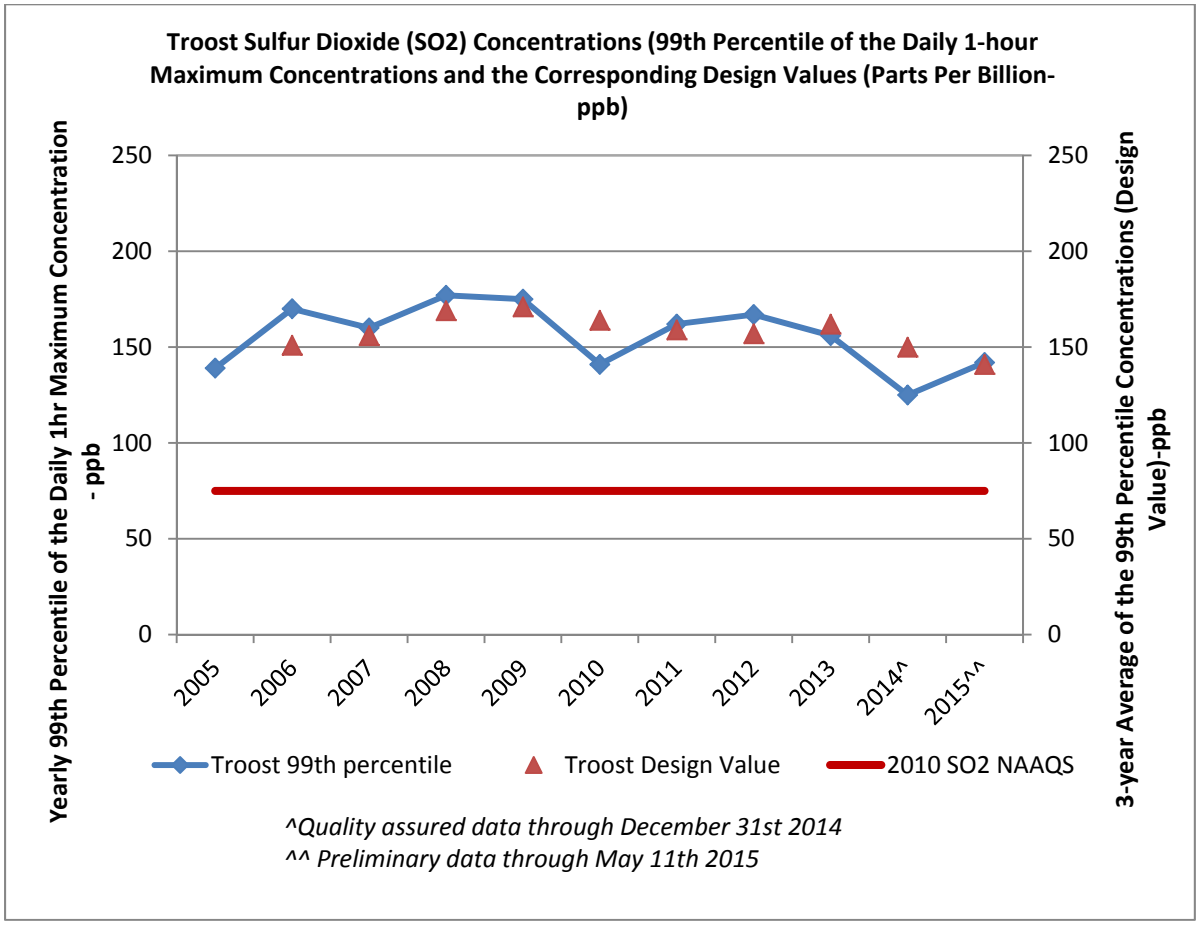

Figure 3 – Troost Avenue SO2 Monitoring Data & Design Values

3. EMISSIONS INVENTORY

The Air Program creates air emission inventories for criteria pollutants and hazardous air pollutants to meet federal reporting requirements under EPA's Air Emissions Reporting Rule, and to provide data that supports the functions of the Air Program, including SIP inventory needs. The SO_2 emissions inventory includes anthropogenic emissions from point source facilities like industrial plants, mobile source emissions from diesel powered vehicles, and nonpoint sources of emissions where many small sources are estimated at the county level (household fuel combustion emissions are combined). Point source facility emissions are reported directly by permitted sources in Missouri, while nonpoint and mobile source emissions are estimated using EPA guidelines and state-specific data.

Nonpoint sources of SO_2 include the small emitting sources that are not inventoried by collecting site specific data; their emissions are estimated based on activity surrogates at the county level. For Jackson county including portions outside the nonattainment area, the most recently available nonpoint inventory in 2011 shows that residential fuel combustion, diesel fuel distribution, open burning, wildfires, and all other emissions of SO_2 total to 92.09 tons. Mobile

sources of SO_2 emissions are piston-driven engines using sulfur containing fuel, and the county total, including areas outside the nonattainment area, is 92.22 tons per year (tpy) of SO_2. The nonpoint and mobile emissions combined (Table 1) are less than 0.66% when compared to point source facility emissions, and they are not modeled as explicit point sources in the modeling demonstration for this SIP revision. Nonpoint and mobile source SO_2 emissions are included as part of the background concentration discussed in Section 4.3.

Table 1 - Jackson County (entire county) 2011 SO_2 Emissions Summary

Emission Category	2011 SO_2 Emissions (tpy)	Percent of Total Point Source Emissions
Point Source Total	27,512.81	100%
Nonpoint Total	92.09	0.33%
Mobile Source Total	92.22	0.33%

SO_2 emissions in the Jackson County SO_2 nonattainment area are driven by point sources, the large stationary industrial sources related to electric generation and other industrial sources using coal and other sulfur containing fuels. These sources are required to obtain construction and/or operating permits from the Air Pollution Control Program, and these permits are subject to the Missouri Emission Inventory Reporting Rule, 10 CSR 10-6.110. The rule requires that sources characterize their total annual actual facility emissions by describing the equipment generating the emissions, emission estimation methods, emission control devices, and release parameters. At a point source facility, emissions are generated by many types of equipment and processes, including but not limited to electric generating units, boilers, and other fossil fuel combustion equipment; emissions are characterized for modeling using their release parameters as stack, vent, or fugitive emissions. These data elements are used in SIPs to characterize current emissions and evaluate future scenarios that may include amended emission limits.

Point source emission data is collected via online submission or paper forms depending on facility choice. Over 90% of facilities choose the online submission of data, though all data, whether received electronically or hard copy, is entered to our emissions database called the Missouri Emissions Inventory System (MoEIS). MoEIS performs the initial quality assurance steps by ensuring minimum data fields are included and data is within acceptable ranges. Additional quality assurance is performed including, but not limited to the following: year-to-year variance, industry-type comparisons, and external data source verification. Corrections are made to emissions data with the acknowledgement of the facility representative.

The sources with a Part 70 (P70) operating permit type characterize their emissions annually by providing updated emission totals based on each year's activity, therefore their emissions vary year-to-year. The sources with a Basic (BAS) operating permit type characterize their emissions by detailing year-specific data only when new permitted equipment starts up or if total emissions change by 5 tons or more from a previous year. Basic permit facilities may show the same emission total if they were not required to fully detail their emissions for each year – they roll forward the emission total.

Two required elements of nonattainment plans are a baseline emission inventory and an attainment year inventory. The 2011 baseline emission inventory is included in Appendix B. The baseline emissions inventory was taken from the 2011 National Emissions Inventory (NEI) database. The Air Program developed a comprehensive statewide emissions inventory for 2011, as described above and as required by the EPA's Air Emissions Reporting Requirements (AERR) rule published December 17, 2008. The inventory was submitted to the National Emissions Inventory (NEI) through the EPA's Emission Inventory System (EIS). The inventory includes point, nonpoint, onroad mobile, and nonroad mobile source emissions. The supporting documentation and sources of information used to develop the 2011 NEI can be found in the associated technical support document and appendices.

October 4, 2018 is the attainment date for the 2010 SO_2 standard; therefore, 2018 was selected as the future year and the projected inventory is being submitted to U.S. EPA with this document to fulfill the projected year emissions inventory requirements under the 2010 SO_2 standard. The 2018 attainment year inventory for this plan submittal is included in Appendix C. Emissions for non-point, area and mobile sources are presented at the county level and are not adjusted for the partial county nonattainment area. The emissions inventory was taken from the 2018 emissions modeling platform developed by the U.S. EPA. The point sources emissions inventory was modified to include the actual reductions of emissions from the new emission limits and requirements implemented by state rule no later than January 1, 2017. The emissions in this inventory reflect what the expected actual emissions will be in the attainment year of 2018.

4. AIR DISPERSION MODELING

As outlined in the preamble of the final 1-hour SO_2 NAAQS rule, dispersion modeling is required to demonstrate compliance with the 1-hour SO_2 NAAQS in nonattainment areas. The U.S. Environmental Protection Agency (EPA) document entitled *"Guidance for 1-hour SO_2 NAAQS SIP Submissions"* recommends the use of the AERMOD modeling system, EPA's preferred near-field dispersion model, for the SO_2 analysis.

As currently formulated, EPA's guideline models yield concentration impacts in units of micrograms per cubic meter (µg/m³) and do not yield results in the dimensionless levels of parts per volume of the NAAQS for gaseous air pollutants (i.e., O3, NO2, SO2, and CO). In all modeling analyses and results contained as part of this attainment demonstration, modeled concentrations are taken at ambient conditions of 25º C. and 760 mm Hg and were converted as: 1 ppb SO_2 = 2.623 µg/m³. [1] Based on the above conversion, the 75 ppb 1-hour standard = 196.725 µg/m³. These estimates originate from the online calculator at http://www.lenntech.com/calculators/ppm/converterparts-per-million.htm

The AERMOD system was developed through a collaborative effort between the American Meteorological Society (AMS) and the EPA. AERMOD is a steady-state plume model that employs Gaussian and bi-Gaussian probability density functions to characterize the structure of the planetary boundary layer. AERMOD can predict the concentration distribution of pollutants

[1] **http://www.epa.gov/region1/communities/pdf/CapeWind/CapeWindModelingReview.pdf**

from surface and elevated releases located within simple or complex terrain. The model allows for the input of multiple sources, terrain elevations, structure effects, various grid receptors, wet and dry depletion calculations, urban or rural terrain, and averaging periods ranging from one hour to one year.

The AERMOD modeling system was used to determine compliance with the 1-hour SO_2 NAAQS. AERMOD is the preferred model for determining pollutant impacts from industrial source complexes where emissions are released from a variety of source types. The most recent version (version 14134) of the AERMOD dispersion model, as well as the preprocessors, was used to perform the air quality analyses necessary to ultimately demonstrate attainment in the designated nonattainment area. AERMOD was also used to determine specific control strategies that result in NAAQS compliance. Staff executed AERMOD and its corresponding preprocessors in a dos windows interface.

The regulatory default options within the modeling system were set through the use of the MODELOPT keyword contained within the control pathway of the air quality model. Staff included terrain elevation data and stack-tip downwash calculations. Urban/rural site determinations were made for the nonattainment area to account for differences in boundary layer concentrations and to employ the 4-hour half-life option for urban SO_2 sources. Department staff considered both land-use and population density procedures to determine the Jackson County NAA is primarily urban in character, rather than rural. Per 40 CFR Part 51, Appendix W, subsection 7.2.3, urban dispersion coefficients were used in all modeling analyses for this NAA plan. The model input files [Appendix D] include details regarding the use of urban dispersion parameters and utilize recent metropolitan population census data.

4.1 MODELING DATABASE DEVELOPMENT

Refined air quality analyses include SO_2 sources contained within the modeling domain that are determined to have an impact within the nonattainment area boundaries that are not included as part of the established background concentration. Sources outside the NAA boundary were evaluated based on proximity to the NAA, as well as the magnitude of potential and actual SO_2 emissions, to determine potential impacts on receptors within the NAA. Department staff developed ambient air quality inputs based upon the criteria outlined in 40 CFR Part 51 Appendix W, "Guideline on Air Quality Models." The following paragraphs outline the procedures that were used to ensure that consistent and comprehensive air quality reviews were conducted. The full modeled source inventory is included in Appendix F.

4.1.A. Site Specific Data Collection

Detailed information characterizing sources deemed as having the potential to impact the nonattainment area was collected from the facilities on an individual basis and verified. This information included but is not limited to the following:

1. Facility wide SO_2 equipment list,
2. Potential to Emit (PTE) and reported actual emission rates for each piece of equipment identified in item #1, including information regarding varying load scenarios, if applicable,

3. A description of equipment usage in order to identify sources that fall into the intermittent source category,
4. Identification of federally enforceable limits contained within construction permits, operating permits, consent decrees or other state and federal rules,
5. Release parameters and source locations for each process unit or stack,
6. Property boundary, and
7. Building locations and heights.

4.1.B. Source Emission Rates

As mentioned previously, the emission rates input into the air quality model reflect current permanent and enforceable emissions for each SO_2 source included in the model unless otherwise noted. EGUs are one of the major source categories of SO_2 emitters, which have different peak concentration impact levels depending on the percent load assumed in the modeled emission rates. After analysis of base load impacts at varying loads, staff determined 100% load would account for the maximum impact for all sources.

4.2 EMISSION RELEASE PARAMETERS

In order to accurately predict the dispersion of pollutants within the atmosphere, the air quality model must have information that describes how the emissions are released into the atmosphere. The document entitled "User's Guide for the AMS/EPA Regulatory Model AERMOD" outlines the source classification system that is used by the AERMOD modeling system in order to characterize emission releases within the input file.

For the SO_2 modeling demonstration, the majority of the emissions releases are stack driven releases with parameters based upon information provided by the facility or obtained from information contained within the Missouri Emissions Inventory System (MoEIS).

If and when stack data was unavailable, the release point was characterized as a volume source within the model input file. Each volume source release was limited to the size of openings from which emissions escape, such as doorways. If no release characteristics were provided, default parameters for volume sources were assigned.

4.2.A. Point Source Release (Stack Driven)

Point source emissions are vented through stacks or isolated vents. Any stack that vents horizontally, is equipped with a rain cap or that does not provide an exit velocity, was modeled with a reduced exit velocity of 0.001 meters per second to account for the restriction of vertical flow. In order to assign the point source release parameters, the facility was requested to provide information regarding the location and the nature of the release as follows:

1. Stack height,
2. Stack exit temperature,
3. Stack exit velocity, and
4. Stack diameter.

4.2.B. Volume Source Release (Non-stack Driven)

Any emission release point that is not routed through a stack was classified as a volume source release. Additionally, any emission release vented inside an enclosed structure, without a stack, was characterized as a volume source with release parameters equivalent to the size of the openings that allow for the escape of fugitive emissions.

In order to assign the volume source release parameters, the facility must provide information regarding the location and the nature of the release. The type of release plays an important role in the calculation of the initial lateral and vertical dimensions that are input into the air quality model. At a minimum, the facility was requested to provide the following data:

1. Description of the release,
2. Release height (center of the volume),
3. X-dimension, and
4. Y-dimension.

The information described above must be provided for each opening from which emissions may escape. If volume source data was unavailable, default release parameters were assumed based on the type of source being modeled.

4.3 MODEL DOMAIN & RECEPTOR GRID

The modeling domain is centered on the nonattainment area boundary. The modeling domain extends a sufficient distance, up to 50 kilometers (km), in an effort to define the impact from any source that may cause or contribute to a violation of the 1-hour SO_2 NAAQS within the nonattainment area. The AERMOD model is a near-field model that does not reliably extend beyond 50 km, which was then used as the absolute maximum distance within which to evaluate interactive sources.

The receptor grid developed for input into the air quality model is a fine resolution grid that adequately identifies the area of maximum impact from fugitive and point source releases and encompasses the full extent of any modeled NAAQS violations. For the nonattainment area, receptors are placed at 100-meter intervals along the perimeter with receptors within the nonattainment boundary also spaced at 100-meter intervals.

When determining compliance with the NAAQS, the EPA requires that, at a minimum, all nearby sources be modeled. All SO_2 emission sources located within the NAA boundary were explicitly modeled. The Air Program evaluated all sources of SO_2 emissions identified in the MoEIS emission reporting system up to 50 km from the border of the NAA. Sources were evaluated based on the level of their potential and actual emissions, as well as proximity to the boundary. A 100 ton per year emissions threshold was used to determine inclusion in the model. Sources with either actual or potential emissions greater than this emissions threshold, depending on proximity to the boundary, were included in the model inventory. For example, sources with potential emissions greater than the threshold within 20 km of the NAA boundary were included unless their actual emissions were less than 1 ton per year based on data collected in MOEIS. Sources included as part of the background concentration were not explicitly included in the modeling analysis. The entire modeled source inventory, based on emission year 2012, is contained in Appendix F.

The data needed to execute the air quality analysis originated from the MoEIS emission reporting system for the state of Missouri. Since the model domain extends beyond the state boundary, an interactive source inventory was obtained from KDHE, and data was incorporated into the air quality analysis.

If and when interactive sources were shown to contribute to a violating receptor within the NAA, they were brought into control option discussions with the department. Further modeling of one or more control scenarios to mitigate this interactive contribution on peak SO_2 concentrations was conducted to facilitate the control option discussions.

4.4 TERRAIN ELEVATIONS

In addition to assigning receptor locations, the receptor options within the AERMOD system allow the user to input information regarding the terrain surrounding the facility. AERMOD is capable of calculating air pollutant concentrations in terrain that can be classified as simple, flat, complex or mountainous land. In order to calculate concentrations in complex or mountainous terrain situations, AERMOD must have information about the surrounding terrain and its features. To aid in the definition of the terrain features, EPA developed a pre-processor, AERMAP (version 11103) to search terrain data for base elevations and features that may influence the dispersion of pollutants within the modeling domain. Outstanding features are assigned an elevation that is referred to as the hill height scale; a value that must be included in the AERMOD input file.

National Elevation Data (NED) in the GeoTIFF format from the United States Geological Survey Seamless Data Server was processed through the AERMAP program in order to obtain the base elevation for each receptor and source within the modeling domain. In addition, the hill height scale for each receptor was extracted as required by the AERMOD system in order to determine terrain influences within the modeling domain.

All source, receptor, and terrain elevation data was converted to UTM Zone 15 in the NAD83 geodetic datum.

4.5 DETERMINATION OF SURFACE CHARACTERISTICS & AIRPORT SELECTION

To accurately calculate the boundary layer parameters in AERMET, the meteorological model must have information about the land use that surrounds the meteorological site: surface roughness, albedo and Bowen ratio. In order to provide a consistent method for determining surface characteristics, the EPA developed a mathematical tool, AERSURFACE, to determine surface roughness, Bowen ratio, and albedo values for input into AERMET. The department executed AERSURFACE (version 13016) using the default values described below:

Bowen ratio

- Ten kilometer by ten kilometer domain centered on the site.

Albedo

- Ten kilometer by ten kilometer domain centered on the site.

Surface roughness length

- Default upwind distance of one kilometer centered on the site.

- Twelve, 30 degree meteorological sectors.

Because these surface characteristics influence the similarity profiles that are utilized by the dispersion model, AERMOD, the user must determine if the surface characteristics at the meteorological site accurately represent the conditions that are present at the facility site. In order to determine if the differences in surface conditions will significantly impact the AERMOD predictions, a direct comparison between the meteorological site and the facility site was necessary.

The department has developed surface characteristics for multiple airports across the State for each moisture condition: average, dry, and wet. The results from the AERSURFACE analysis for each airport have been summarized in an excel template. This template enables the user to input facility/area surface characteristics from AERSURFACE for comparison to each airport based upon characteristics of surface roughness, albedo, Bowen ratio, land use classifications, proximity and aerial photography.

4.6 METEOROLOGICAL DATA

The meteorological data utilized in the air quality model was selected based upon the spatial and temporal characteristics of each nonattainment area. Ultimately, site selection considered the proximity of the collection site to the area of interest, the complexity of the terrain in the area surrounding the monitor, the exposure of the meteorological sensor, and temporal variations in the local climate.

Because AERMOD does not accept raw meteorological data, it must be processed through AERMET (version 14134), the meteorological data pre-processor for the AERMOD modeling system. AERMET extracts and processes meteorological data in order to calculate the boundary layer parameters that are ultimately necessary for the calculation of pollutant concentrations within the atmosphere.

Most NWS stations record 1-minute Automated Surface Observing System (ASOS) wind data. The 1-minute ASOS data was obtained from the National Climatic Data Center in the TD-6405 data format that includes the 2-minute average wind speed and direction for each minute within an hour. The use of 1-minute ASOS data more accurately depicts the average hourly wind flow than single instantaneous readings of wind speed and direction that are used in other air quality modeling analyses. The 1-minute ASOS data is processed through AERMINUTE (v14237) in order to be input into the AERMET processor.

It is important to note that the Bowen ratio characteristics applied in Stage 3 AERMET processing are determined based upon the precipitation totals from the meteorological record for the time period being processed. For example, if the meteorological period reported above-average precipitation totals for 2010, the Bowen ratio values for wet surface moisture are chosen for Stage 3 processing in AERMET for 2010.

The discussion below is based on comparisons of surface characteristics and proximity to the nonattainment area boundary resulting from the AERSURFACE analysis spreadsheet mentioned above.

For upper air data, the Topeka upper air station is closest to the nonattainment area at 100 km and best represents the vertical atmospheric characteristics of the region. The next closest upper air stations are Springfield, MO, at 225 km, and Lincoln, IL, at 450 km.

For surface data, the Kansas City Downtown (1 km), Lee's Summit (15 km), and Kansas City International (23 km) airports are the closest to the nonattainment boundary.

Kansas City Downtown: The surface roughness values for the NAA and Kansas City Downtown are most similar. The driver for similar surface roughness is the similar land cover, with 30% developed cover in the NAA and 44% at Downtown. Similarly, the NAA has 21% water within the 1 km radius, and Downtown has 13%. Albedo's agree within 7% for each season.

Lee's Summit: The surface roughness values differ by 70% in winter and spring, but only differ by 14% in summer and fall. Surface cover is majority planted/cultivated within 1 km of Lee's Summit, but land cover is a distributed mix of water, developed, wetland, and planted/cultivated land cover in the NAA. Albedo's agree within 10% for each season. Bowen ratios agree within 10 to 30% for all precipitation conditions.

Kansas City International: The surface roughness values differ by 75% in winter and spring, and 45% in summer and fall. Surface cover differences include the majority planted/cultivated cover (78%) at KC International, versus a distributed mix of water, developed, wetland, and planted/cultivated land cover in the NAA. Albedo's differ by up to 12%. Bowen ratios differ 10-20% in dry conditions, 10-40% in average conditions, and 20-40% in wet conditions.

The next closest airports (Rosecrans 76 km, Whiteman 90 km) offered no improvement to the comparison of combined surface roughness, albedo, or Bowen ratios than nearby locations. The influence of developed land cover on the 1 km diameters for both the NAA and the Kansas City Downtown airport shows these locations to be comparable for meteorological parameters. Therefore, the Kansas City Downtown airport dataset is most representative of conditions in the NAA.

For the Jackson County NAA, staff selected the Charles B. Wheeler (Kansas City) Downtown Airport as the representative surface station and the Topeka Regional Airport in Kansas as the representative upper air station. The meteorological data used for the Jackson County NAA represents the most recent certified data available for the five year period 2008-2012. The data is collected by National Weather Service (NWS) reporting stations located at the respective airports.

4.7 BUILDING DOWNWASH

Building downwash effects were calculated using the Building Profile Input Program (BPIP) with plume rise model enhancements (PRIME), version 04274. The information needed to execute BPIP PRIME includes the heights and locations of structures, which may contribute to building downwash, and the stack locations in relation to these structures. Based upon the facility configuration, the department determined if a stack is being subjected to wake effects from a surrounding structure(s). If structure wake effects are evident, flags are set to indicate which stacks are affected by building wake zones. Once it is determined that a stack is

influenced by a structure, BPIP calculates the building heights and widths to be included in the dispersion model so that building downwash effects are considered.

Building information was evaluated on a case by case basis. Downwash effects were included in the modeling analysis for the only large source contained in the nonattainment area boundary, Veolia Energy. Appendix D includes downwash values for this source in the model input files.

4.8 GOOD ENGINEERING PRACTICE STACK HEIGHT

Good engineering practice (GEP) stack height refers to the height at which emission releases from isolated stacks or vents will not cause excessive ground level concentrations in the immediate vicinity of a source due to building downwash effects, or complex terrain. Section 123 of the CAA limits the modeling stack height to GEP when performing air quality analyses in an effort to prevent facilities from installing excessively tall stacks to meet ambient air quality and increment standards.

When performing air quality analyses, the EPA has outlined three differing techniques for determining GEP stack height:

1. Stacks less than the 65 meter *de minimis* level; do not have to undergo a GEP determination,
2. GEP is calculated using mathematical formulas that consider nearby building dimensions and building/stack configurations, or
3. GEP is calculated using fluid model studies.

For sources with site specific data available, the department models all stacks at the lesser of their actual stack height or GEP stack height, as determined by the BPIP PRIME preprocessor. Building downwash influences obtained from the BPIP PRIME output were included in the model input file for the air quality dispersion model as deemed necessary on a case-by-case basis. As mentioned above, downwash effects from the Veolia Energy steam plant were included in the modeling analysis. Any stack built prior to December 31, 1970 was modeled based upon the actual stack height per 40 CFR 52.21(h). Prohibited dispersion techniques as outlined in Section 123 of the CAA were not allowed nor considered in the ambient air quality impact analysis.

4.9 BACKGROUND CONCENTRATION

According to 40 CFR Part 51, Appendix W, background concentrations must be considered when determining compliance with the NAAQS. To account for natural source impacts, sources that are not explicitly modeled and unidentified sources, 2010-2012 monitoring data was used to establish background concentrations that were incorporated into the modeled results. To account for nearby sources, staff reviewed existing inventory data in the vicinity of the violating monitor. The following paragraphs outline the procedures used to determine how background concentrations were determined.

4.9.A. Monitor Analysis

EPA guidance notes that ambient air quality data should generally be used to account for background concentrations. Staff used 1-hour design value data for the latest 3-year period (2010-2012) to develop background concentrations and to perform a thorough background analysis using monitored values. Monitored background values are based on the design value of the nearest representative air quality monitor that is the least influenced by nearby SO_2 sources.

Background concentrations include impacts attributable to natural sources, nearby sources (excluding the major sources and interactive sources), and unidentified sources. This derived background concentration includes all sources of SO_2 not already included in the model runs. Emissions from any nearby interactive point source facilities are included in the interactive source model run for each area, and as such, are not included in the background concentration.

In general, the background value was calculated similarly to design values at air quality monitors, in order to be comparable to the SO_2 NAAQS. A monitoring site near but outside the immediate area of source impact, that has SO_2 concentrations and wind direction measurements for the most recent certified three-year period, was selected for further analysis. Threshold concentrations of 5 and 10 parts per billion were chosen to limit the monitored value sample size (and associated back trajectories) in the Jackson County NAA. Statistical analysis including an Excel pivot table and chart were used to visualize the frequency of the measured concentrations from certain wind directions [Figure 4]. This is helpful in targeting a sector with the least amount of monitored days above the threshold concentration, which can most likely be attributed to the major source(s). Using the Linux-based Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model script, back trajectories were plotted to show where certain air parcels originated on days that monitored concentrations are above the threshold concentration. Impacts from sources are evident with groupings of trajectories. A sector with little to no source influence was chosen for further analysis. Considering measured concentrations from the chosen sector, the fourth highest value is chosen as representative of the area's background concentration. The plotted trajectories, pivot chart, and table excerpt used to establish the area background concentration are included below for ease of reference.

Due to the limited number of SO_2 air quality monitoring sites located within Missouri, staff reviewed the regional characteristics within five kilometers of the area to determine what monitoring station best represents the observed land use in and around the nonattainment area.

Since an urban monitor site was selected for background purposes, staff determined which meteorological corridors are not influenced by explicitly modeled sources. The meteorological corridors are defined according to ten degree wind direction sectors. Staff reviewed the 1-hour profile for each meteorological corridor in order to determine a representative background value. Statistical measures were employed in the determination of the background concentration.

4.9.B. Jackson County Nonattainment Area Specific Background Analysis

A background concentration must be included that represents the contribution from natural sources and from sources that are not explicitly modeled. The most recent air quality design value (i.e., the three-year average of the 99th percentile of the daily maximum 1-hour concentrations) of a representative monitoring site should be used as the background concentration for the area.

The JFK air quality monitor on the Kansas side of the Kansas City metropolitan area was chosen as the representative monitor for the Jackson County nonattainment area. It was the least impacted by SO_2 sources in the Kansas City metropolitan area compared to nearby monitors, and therefore is more representative of background concentrations. However, the JFK monitor no longer records hourly wind directional data, so another monitoring site was required to supplement the analysis. The JFK monitor recorded hourly wind direction and wind speed measurements from 1/1/2001 to 12/31/2007. Hourly wind data recorded at Richards-Gebaur South (RGS), an ozone monitor south of the Kansas City area in Cass County, Missouri, was chosen to supplement the background analysis. Missouri maintains that RGS data is representative of meteorological patterns throughout the Kansas City area. Specific monitor site information is included in Table 2.

Table 2 - Background Monitor Information

Monitor Information		
Monitor Name	JFK	Richards-Gebaur South
AQS Site ID	20-209-0021	29-037-0003
County	Wyandotte	Cass
Latitude	+39.1175	+38.75976
Longitude	-94.635556	-94.57997
Area Represented	Kansas City, MO-KS	Kansas City, MO-KS

Monitoring data from the JFK site was obtained for the most recent certified three-year period, 2010-2012. Monitored values above 10 ppb, 15 ppb, and 20 ppb were selected to run back trajectories using the HYSPLIT model. Twenty-four (24) hour back trajectories were plotted for the selected high monitored days to evaluate where air parcels originated/passed through on the days of interest. The trajectories had a starting height of ten (10) meters to be consistent with monitor height. A sector with little to no influence from either Missouri or Kansas SO_2 sources was chosen to represent background concentrations. The sector with the least source influence was chosen as 180-200 degrees. Due North is assumed as zero degrees concerning wind direction. The plotted trajectories are included in Figures 5 and 6. Figure 5 depicts the trajectories and NAA boundary with relation to the background and violating monitors. Figure 6 depicts the trajectories with relation to SO_2 emission sources in the area. Frequency of higher monitored values is plotted by wind direction in Figure 4 below. This aids in identifying sectors with less direct source influence. Once a representative sector was a chosen, the highest monitoring values from that sector were evaluated. The four highest values are included below in Table 3. The fourth high monitored value chosen in the representative sector was 13 ppb. Therefore, an SO_2 concentration of 13 ppb or 34.09 $\mu g/m^3$ was used as the modeled background concentration for all Jackson County SO_2 nonattainment area SIP purposes.

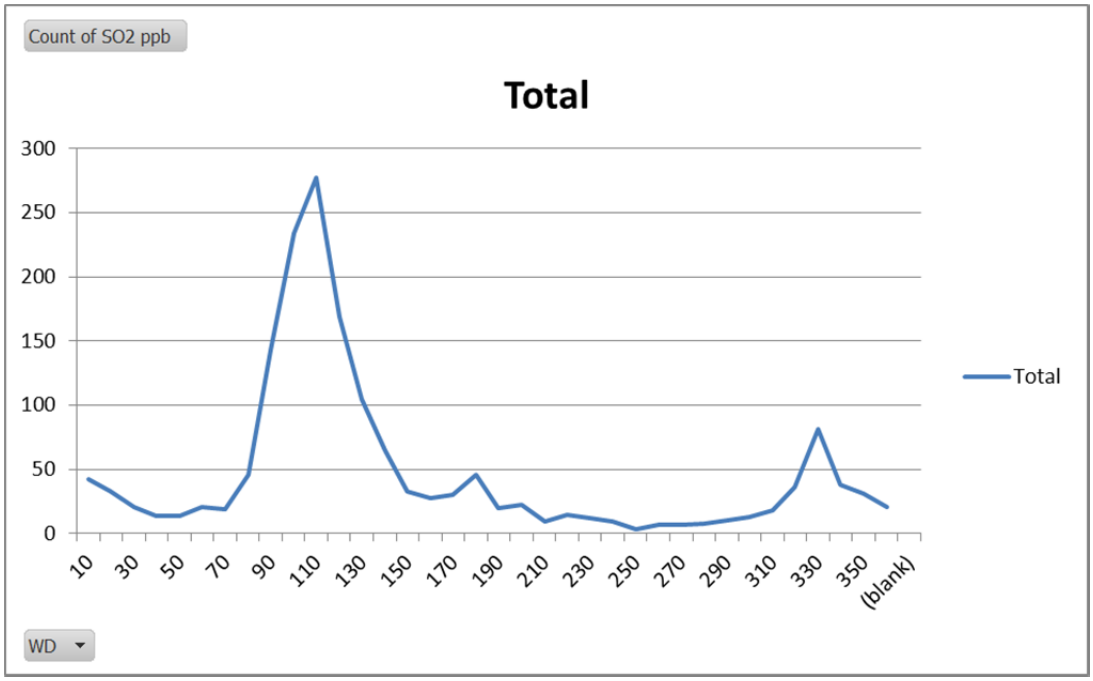

Figure 4 - Chart showing number of hits per 10 degrees in Wind Direction, to depict areas of source influence

Note: The dominant source in the Jackson County NAA, Veolia Energy, is located in the wind sector, 110-115 degrees, from where most of the monitored highs originate, as depicted in the pivot chart [Figure 4] above and the following HYSPLIT plots [Figures 5 and 6].

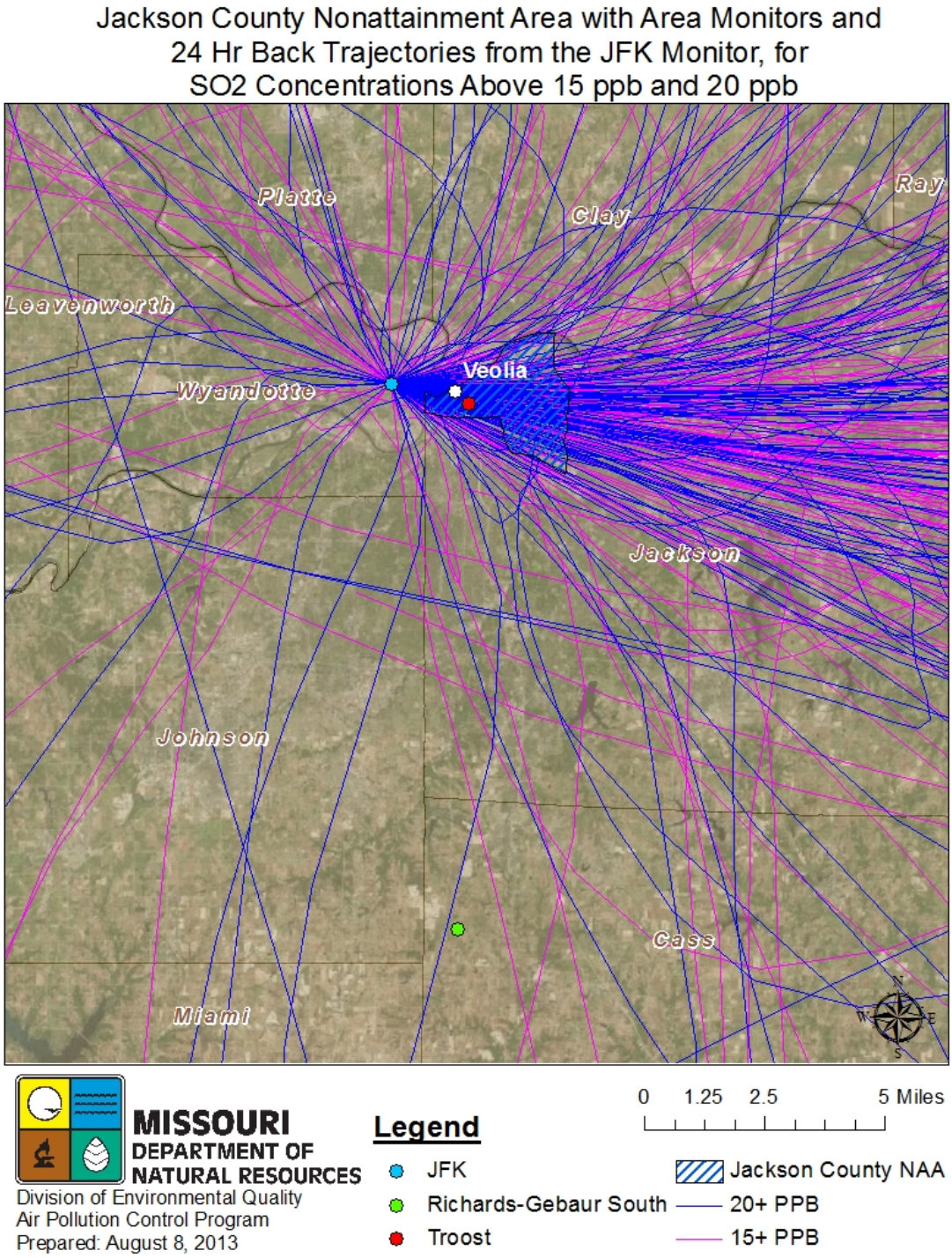

Figure 5 - Plotted Back Trajectories with Jackson County NAA & Monitors used for Background Analysis

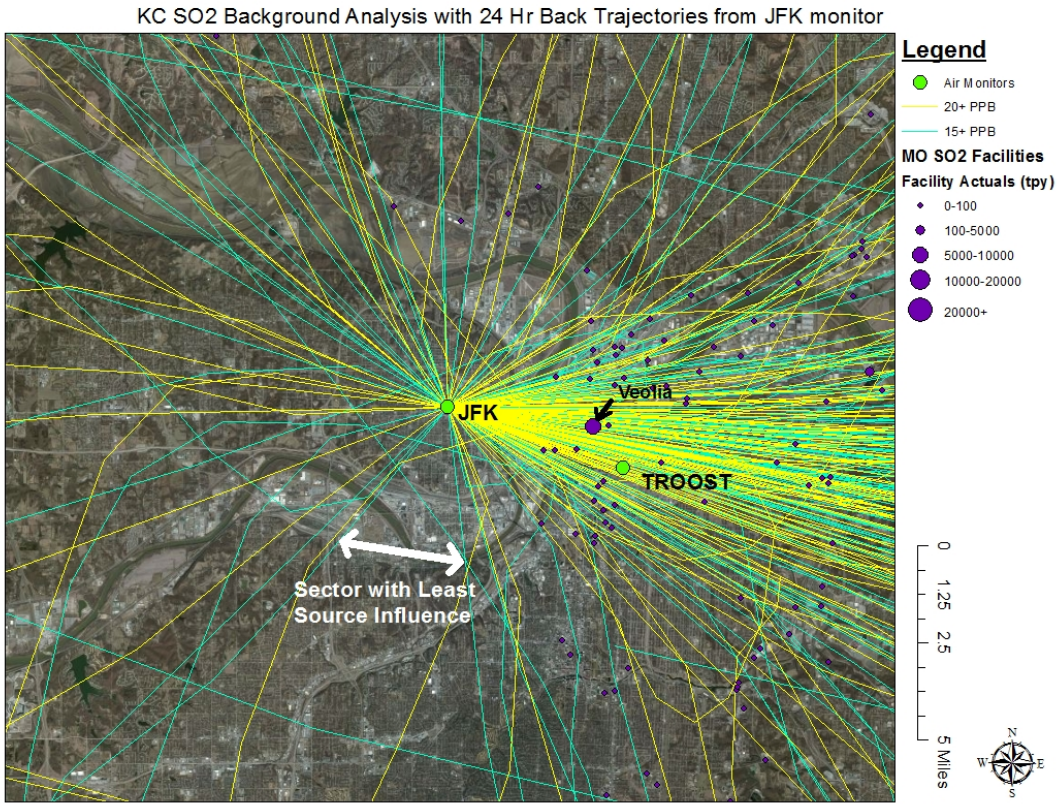

Figure 6 - Plotted Back Trajectories depict areas of source influence and the chosen background sector

Table 3 - Wind and Monitor Data for Chosen Sector (180-200 Degrees) Used to Derive the Fourth High Value to be the Representative Background Concentration for the Area

Date	Start Time	Richards Gebaur-South WD (Degree)	**JFK (Wyandotte) SO_2 Conc. (ppb)**
20100210	17	193	19
20100712	17	184	18
20110104	13	195	13.5
20100818	17	197	13

5. MODELING DEMONSTRATION

Several iterations of modeling scenarios were performed in order characterize the air quality in the NAA and to determine practicable control strategies that demonstrate compliance. All model inputs and associated output files are included in Appendices D & E, respectively.

The modeled compliant scenario employs a 100 m spacing receptor grid that encompasses the entire nonattainment area. The representative meteorological data selected for the area is surface data from the Kansas City Downtown Airport (KMKC) and upper air data from Topeka, KS (KTOP) for the most recent 5 year period, 2008-2012. The receptor grid was broken into six sub-grids [Figure 7] to minimize model runtime. The total number of receptors utilized is 5,787.

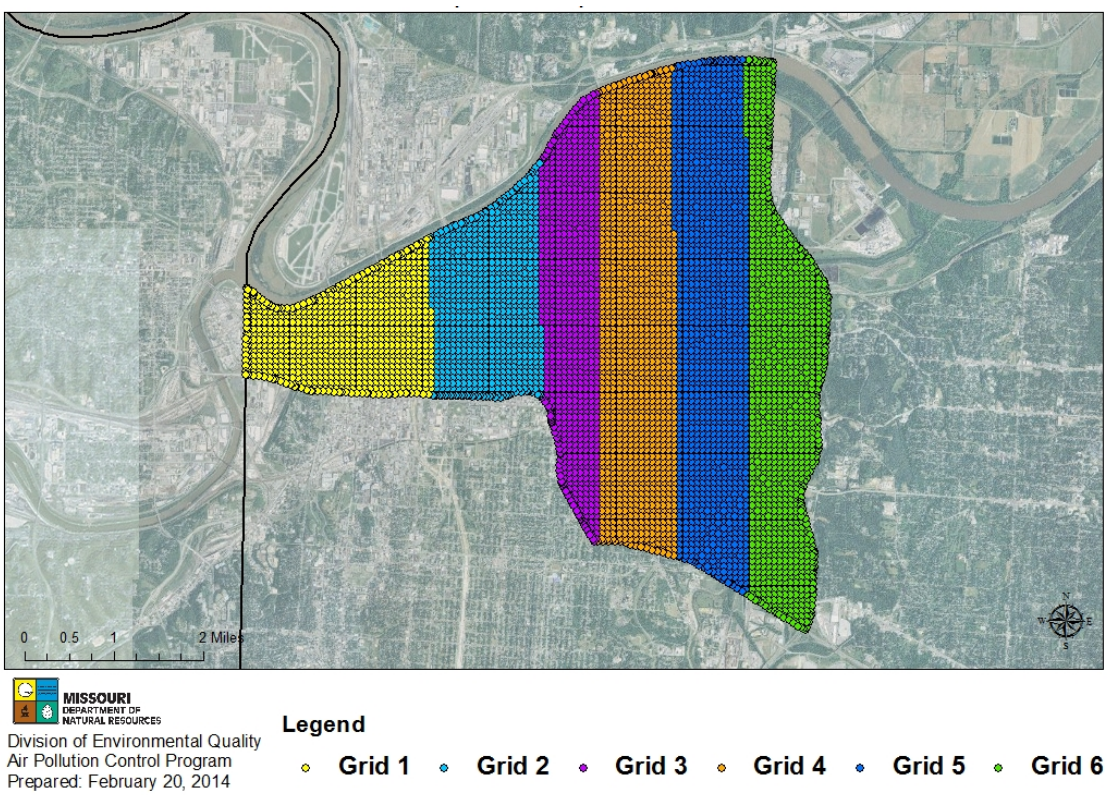

Figure 7 – Jackson County NAA Modeling Sub-grids

The Jackson County SO_2 nonattainment area includes a number of small to medium size SO_2 emitting sources within its geographical boundaries. The largest modeled source contained within the NAA boundary is the Veolia Energy steam plant. Veolia emitted 6,702 tons of SO_2 in 2012, which accounts for 99.95% of all SO_2 emissions reported within the NAA boundary. Veolia is a steam generating plant that combusts coal, oil, and gas, with the capability to cogenerate electricity. Veolia provides centrally produced steam and chilled water to approximately 60 customers in the central business district. Veolia's production capacity includes: 1.3 million pounds of steam per hour, 10,650 tons of chilled water capacity, and 5 megawatts of cogeneration capacity. The distribution network extends 6.5 miles for steam and 2 miles for chilled water pipes.

Of the interactive sources located in Missouri but outside the boundaries of the Jackson County SO_2 Nonattainment Area, four are coal-fired EGUs: Kansas City Power & Light (KCPL)

Hawthorn station, KCPL Sibley station, Independence Power & Light (IPL) Blue Valley station, and IPL Missouri City station. Of these, two are subject to upcoming federal regulations that are not directly included, or needed, as part of this NAA plan. As a result of these federal regulations, both plants will be dramatically reducing their SO_2 emissions over the next couple years. In lieu of requiring compliance with the applicable federal rule as part of this NAA plan, the three units at IPL Blue Valley are required by the proposed new SO_2 rule to use natural gas. The IPL Missouri City station will be permanently shut down. Since the permanent closure of this power plant is scheduled in early 2016, the SO_2 impacts associated with the IPL Missouri City station are not included in the compliant model analysis. The other two coal-fired EGUs are not subject to federal regulations but rather require new emission limitations for this NAA plan in the proposed new SO_2 rule [Appendix I]. All of these reductions will be realized no later than January 1, 2017 as required for initial round SO_2 NAAs per the 1-hour standard. Modeled emission rates for the Missouri SO_2 sources that impact the nonattainment area are included in Table 5.

There are also two large coal-fired power plants located near the state line in Kansas, also located outside the NAA boundary, that are included in the model analysis – as well as two smaller Kansas sources. One power plant is completely switching to natural gas combustion only and the other is installing a wet scrubber. The other two interactive sources located in Kansas include glass and automotive manufacturing companies, whose combined limited emissions are less than 2,500 tpy. These Kansas sources are outside Missouri's jurisdictional boundaries but are included in Missouri's 2010 1-Hour SO_2 NAAQS compliant modeling using information provided by KDHE.

The modeled emission rates and parameters for sources located in Kansas originated with KDHE as well as the EPA's Emission Inventory System. As sources located outside Missouri are not within Missouri's jurisdiction to control, all control strategy discussions including modeled emission rates [Table 4] for those sources have been negotiated with KDHE and/or EPA. The Air Program has been involved in communication with KDHE and EPA regarding these issues.

Table 4 - Modeled Emission Rates for the Two Large Kansas Facilities Included in the Modeling Analysis

Unit	Actual 2010 SO_2 Emissions (tons)	2010 Operating Hours	Actual Avg Emission Rate (lb/hr)	Actual Avg Emission Rate(g/s)	Current Allowable Emission Rate (lb/hr)	Current Allowable Emission Rate (g/s)	Limited Rates (lb/hr)
Nearman 1	6126.365	7831.56	1564.532481	197.12675	2919.72	367.8783	2,920
Quindaro 1	1698.41	7644.77	444.3325306	55.984665	3577.8	450.7949	**780**
Quindaro 2	2201.557	7795.3	564.8421485	71.168542	5514.6	694.8275	**990**
Limited Rates based on Nearman at PTE and Quindaro Units at 75% Above Actuals							

The enforceable mechanism for this plan is the proposed new state rulemaking, 10 CSR 10-6.261, which includes new emission limitations and other requirements for sources located in

Missouri. Through the modeling analysis described, this scenario demonstrates the entire nonattainment area will attain by the attainment date for the 2010 SO_2 NAAQS. This model scenario includes controlled emission rates for the facilities outlined in Table 5.

Table 5 - Modeled Emission Rates for Controlled NAA Sources in Proposed State SO_2 Rule^

Unit	Critical (Modeled) Value (g/s)	Critical (Modeled) Value (lb/hr)	Limit in Rule (lb/hr)	Averaging Time
Veolia Unit 1	0.0629	0.5	0.5	1-Hour
Veolia Unit 2	44.326	351.8	351.8	1-Hour
Veolia Unit 3	0.0629	0.5	0.5	1-Hour
KCPL Hawthorn 5	192.76	1529.88	785	30 day rolling**
KCPL Sibley 1	254.35	2018.69	1468.17	30 day rolling**
KCPL Sibley 2	250.66	1989.44	1447.01	30 day rolling**
KCPL Sibley 3	1759.42	13964.01	10632	30 day rolling**
IPL Blue Valley – All Units	Natural Gas Fuel Switch			Identified in Rule
IPL Missouri City – All Units	Shutdown			Federally Required

**See Table 7 for variability analysis used to establish longer averaging time limits.
^ All other sources are modeled at allowable SO_2 emission rates

All modeling input files are contained in Appendix D and all associated output plotfiles are contained in Appendix E. The highest modeled impacts in the entire nonattainment area yielded by this scenario for the six sub-grids are summarized in Table 6 in both $\mu g/m^3$ and ppb. Figure 8 depicts the modeled concentrations plotted with the NAA boundary showing all receptors as in compliance with the NAAQS.

Table 6 - Highest Modeled Impacts in each Sub-grid of NAA Modeling Analysis

Sub-grid	Highest Modeled Impact	
#	*$\mu g/m^3$*	*ppb*
1	190.55	72.65
2	190.26	72.54
3	183.87	70.10
4	184.66	70.40
5	182.46	69.56
6	192.78	73.50

The modeled compliant scenario includes all explicitly modeled sources within Missouri at permanent and enforceable emission rates. The department modeled certain sources (see Appendix F → 1. "notes/comments" column of model input tables, and 2. the separate ULSD

calculation table [pages F-11 through F-14]) currently using diesel or distillate fuel oils as using fuels with a maximum sulfur content equivalent to ULSD. ULSD calculations provided by KDHE for Kansas BPU facilities are also in the model inventory [pages F-5 through F-10].

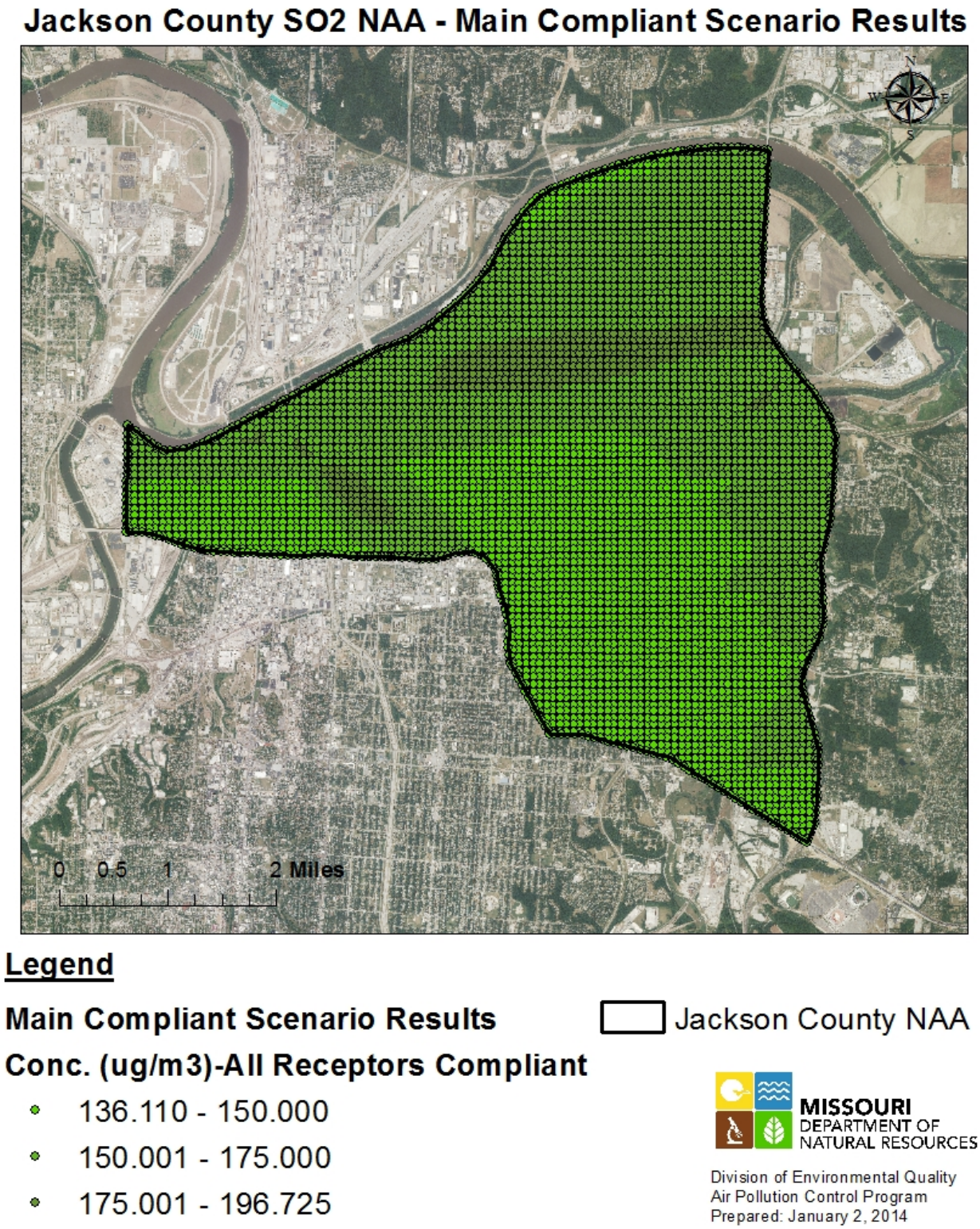

Figure 8 – Jackson County NAA Modeled Receptor Concentrations – All Receptors Modeling Compliance

5.1 DISCUSSION ON LIMITS/VARIABILITY ANALYSIS

Once the final compliant scenario was identified, the critical modeled values, or emission rates that allow for modeled compliance were identified. The limits identified in the proposed new state SO_2 rulemaking, 10 CSR 10-6.261, were based on this critical modeled value. As laid out in the EPA's SO_2 NAA guidance[2], longer averaging times (up to 30 days) may be applied to new emission limitations. Staff followed the methods outlined in the guidance to establish longer averaging time limits for the two KCPL facilities. Staff used recent (2010-2012) hourly recorded emissions [CEMS] to determine variability on the desired averaging time basis and applied the resulting ratio to the modeled compliant value to arrive at the final longer averaging time emission limits that are contained in the proposed new rule. Table 7 contains the modeled values, averages, applied ratios, and resulting longer averaging time limits. This analysis uses data available publicly through EPA's Clean Air Markets Division Database (CAMD)[3].

Table 7 – Variability Analysis Data

KCPL Hawthorn and Sibley's Longer Averaging Time Variability Analysis								
Assuming All Hours Scaled to Full, 2010-2012 CEMS								
Unit	**Critical (Modeled) Value (g/s)**	**Critical (Modeled) Value (lb/hr)**	**Percentile**	**Hourly Average (lb/hr)**	**30-day Average (lb/hr)**	**Ratio**	**30-day (720 Hour) Equiv. Limit (lb/hr)**	**Averaging Time**
Hawthorn 5 (EP6)	192.76	1,529.88	96	1,049.85	536.83	0.5113	782.3*	30 day rolling
Sibley 1 (5A)	254.35	2,018.69	99	1,075.61	782.28	0.73	1,468.17	30 day rolling
Sibley 2 (5B)	250.66	1,989.44	99	1,070.74	778.80	0.73	1,447.01	30 day rolling
Sibley 3 (5C)	1,759.42	13,964.01	99	7,044.07	5,363.30	0.76	10,632.02	30 day rolling
*Hawthorn 5's limit in rule is rounded to an even 785 lb/hr on 30 day rolling basis per facility request. The percentile used in Hawthorn 5's variability analysis is less than 99; therefore, supporting justification provided by the facility is included in Appendix J. The justification details extenuating startup and maintenance conditions associated with installation of new scrubber technology that had not yet been fully optimized.								

[2] EPA Guidance for 1-hour SO_2 Nonattainment Area SIP Submissions, released April 23, 2014. http://www.epa.gov/oaqps001/sulfurdioxide/pdfs/20140423guidance.pdf

[3] EPA's Clean Air Markets Division Air Markets Program Data, http://ampd.epa.gov/ampd/

6. CONTROL STRATEGY

The NAA SIP should provide for attainment of the standard based on SO_2 emission reductions from control measures that are permanent and enforceable [section 110(a)(2)(A) of the CAAA]. Air agencies should consider all RACM/RACT. Section 172(c)(I) of the CAAA provides that "Such plan shall provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards" that can be implemented in light of the attainment needs for the affected area. In addition to the modeled control strategy of this NAA plan, the EPA has promulgated other regulatory requirements that it expects will yield substantial reductions in SO_2 emissions that will also contribute to timely attainment of the 2010 SO_2 NAAQS. The federal requirements included in the modeling scenarios of this NAA plan are described in section 4.

Pursuant to section 172(c) of the CAAA, control measures must be permanent and federally enforceable to be used in a SIP to demonstrate attainment. Federal enforceability is demonstrated via a federally approved SIP which may include a SIP-approved rule, construction permit and/or legally binding agreement such as a consent judgment or AOC.

Control measures required to model compliance for the two larger Kansas EGU sources were negotiated with affected facilities by KDHE and EPA.

6.1. PROPOSED STATE SO_2 RULE

The new control measures needed for this proposed SIP revision to demonstrate attainment for the 2010 SO_2 NAAQS in the Jackson County nonattainment area are made enforceable by the proposed new state SO_2 rule, 10 CSR 10-6.261 *Control of Sulfur Dioxide Emissions*.

As previously mentioned, required control measures include: (1) strengthened stack emission limitations for the Veolia Energy steam plant, KCPL Hawthorn station and Sibley station, and a fuel switch to Natural Gas at the IPL Blue Valley station [Section 6.1] with a compliance date of January 1, 2017 as outlined in the proposed new state SO_2 rule [Appendix I]; (2) the permanent closure of the IPL Missouri City station; and (3) the required delivery of ULSD at all facilities currently using diesel fuel (and No.1 or No. 2 distillate fuel oils) that are located within the nonattainment area and throughout Jackson County with a compliance date of January 1, 2017 per the proposed new state SO_2 rule (10 CSR 10-6.261 *Control of Sulfur Dioxide Emissions*) with a projected rule effective date in late 2015.

Once the proposed rule 10 CSR 10-6.261 is final and effective, Missouri intends to submit this NAA plan to the EPA for review and approval as an amendment to the Missouri SIP.

7. REASONABLY AVAILABLE CONTROL MEASURES & REASONABLE FURTHER PROGRESS

7.1. REASONABLY AVAILABLE CONTROL MEASURES (RACM)

Section 172(c)(1) requires SIP provisions to provide for implementation of Reasonably Available Control Measures (RACM) as expeditiously as possible (including such emissions reductions from existing sources obtained through implementation of Reasonably Available Control Technology (RACT) requirements) and provide for attainment of NAAQS.

Missouri performed a RACM analysis in compliance with the RACM Guidance. Missouri analyzed RACM/RACT for all sources in the boundaries of the nonattainment area that emit at least 99% of the nonattainment area's SO_2 emissions. Missouri has determined that no additional RACM/RACT requirements are needed beyond those established in the proposed new state SO_2 rule.

Only one major source that impacts nonattainment is located in the boundaries of the nonattainment area – Veolia Energy. The modeling demonstration discussion [Section 5] details that this plan's control strategy necessitates a 95% reduction in allowable emissions for Veolia Energy. This 95% reduction, which is expressed as unit specific emission rates/limits [Table 5 and Appendix I], also constitutes RACM/RACT for Veolia Energy.

In addition to Veolia Energy which is located in the NAA, only four additional major sources that impact nonattainment are located in the modeled area and also in Missouri [Table 5]. All SO_2 units at one of these four, IPL Missouri City, will cease to burn coal after January 30, 2016 and will be permanently ceasing operations in lieu of installing controls to comply with the requirements of the federal requirements per the Commercial and Industrial Boilers MACT. Therefore, no further RACM analysis is required for IPL Missouri City.

For the three remaining major Missouri sources impacting the NAA, the modeled emission rates [Table 5] are linked to the modeled critical value and represent the combined emission reductions necessary to achieve NAAQS compliance throughout the NAA. Since the modeled emission rates for both KCPL facilities (Hawthorn and Sibley) and IPL Blue Valley are made permanent and enforceable by the proposed new state SO_2 rule {explicitly by either a unit specific emission rate or a unit specific Natural Gas requirement}, the modeled emission rates for these three remaining major Missouri sources address all RACM/RACT requirements.

Missouri analyzed RACM/RACT for all sources within the Jackson County SO_2 NAA (and nearby contributing sources) that emit at least 99% of the NAA's total SO_2 emissions. Further, all remaining modeled Missouri sources were found to not contribute to the nonattainment status of the area and do not necessitate control and/or further RACM analysis.

Missouri maintains that the modeling analysis contained within this NAA plan both provides for attainment of the 2010 1-hour SO_2 NAAQS and constitutes the required RACM analysis. To this end, Missouri has determined that existing controls and practices described above, combined with the requirements and SO_2 limits in Table I of the proposed new rule 10 CSR 10-6.261, constitute RACM.

As previously stated, the department has also promulgated state regulations controlling SO_2 emissions to the atmosphere, some of which pertain to specific installations. Affected SO_2 sources are currently limited by 10 CSR 10-6.260, which is scheduled to be replaced by proposed new state SO_2 rule, 10 CSR 10-6.261 with a projected rule effective date in late 2015. Affected sources are currently meeting the 10 CSR 10-6.260 requirements. Compliance with new emission limits and additional requirements per proposed new rule 10 CSR 10-6.261 is required by January 1, 2017.

7.2. REASONABLE FURTHER PROGRESS (RFP)

Section 172(c)(2) of the CAAA requires areas designated as nonattainment for criteria pollutants to include a demonstration of RFP in nonattainment area plans. Further, Section 171(1) of the CAAA defines RFP as "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part (part D) or may reasonably be required by the EPA for the purpose of ensuring attainment of the applicable NAAQS by the applicable attainment date." EPA has explained that this definition is most appropriate for pollutants that are emitted by numerous and diverse sources, where the relationship between any individual source and the overall air quality is not explicitly quantified, and where the emission reductions necessary to attain the NAAQS are inventory-wide. EPA has exerted that the definition of RFP is generally less pertinent to pollutants like SO_2 that usually have a limited number of sources affecting areas of air quality which are relatively well defined, and emissions control measures for such sources result in swift and dramatic improvement in air quality. That is, for SO_2, there is usually a single "step" between pre-control nonattainment and post-control attainment. Therefore, for SO_2, with its discernible relationship between emissions and air quality, and significant and immediate air quality improvements, EPA explained in the General Preamble that RFP is best construed as "adherence to an ambitious compliance schedule" (74 FR 13547, April 16, 1992) and is appropriate for the implementation of the 2010 SO_2 NAAQS.

As stated in the April 23, 2014 SO_2 SIP submittal guidance, RFP is satisfied by the strict adherence to an ambitious compliance schedule which is expected to periodically yield significant emissions reductions. The emission limitations and fuel requirements included in 10 CSR 10-6.261 have been modeled to demonstrate attainment of the 2010 SO_2 NAAQS at the existing violating monitor and throughout the Jackson County nonattainment area. Compliance with these new regulatory requirements by January 1, 2017 demonstrates significant progress toward attainment of the SO_2 NAAQS and leads to demonstration of attainment with the 2010 SO_2 NAAQS by the 2018 deadline.

8. OTHER NAA PLAN REQUIREMENTS

8.1. CONTINGENCY MEASURES

Section 172(c)(9) of the CAAA defines contingency measures as such measures in a SIP that are to be implemented in the event that an area fails to make RFP, or fails to attain the NAAQS by the applicable attainment date. Contingency measures are to become effective without further action by the state or the EPA, where the area has failed to (1) achieve RFP or, (2) attain the NAAQS by the statutory attainment date for the affected area. These control measures are to consist of other available control measures that are not included in the control strategy for the NAA SIP for the affected area.

To address contingency measures, the EPA has explained that SO_2 presents special considerations. First, for some of the other criteria pollutants, the analytical tools for quantifying the relationship between reductions in precursor emissions and resulting air quality improvements remains subject to significant uncertainties, in contrast with procedures for directly-emitted pollutants such as SO_2. Second, emission estimates and attainment analyses for other criteria pollutants can be strongly influenced by overly optimistic assumptions about control efficiency and rates of compliance for many small sources. In contrast, the control efficiencies for SO_2 control measures are well understood and are far less prone to uncertainty. Since SO_2 control measures are by definition based on what is directly and quantifiably necessary to attain the 2010 SO_2 NAAQS, it would be unlikely for an area to implement the necessary emission controls yet fail to attain the NAAQS. In addition, Missouri has an active enforcement program to address violations. Missouri will continue to operate a comprehensive program to identify sources of violations of the SO_2 NAAQS and to undertake an aggressive follow-up for compliance and enforcement, including expedited procedures for establishing enforceable consent agreements pending the adoption of revised SIPs. This is consistent with the approach for the implementation of contingency measures to address the 2010 SO_2 NAAQS as described in EPA's April 23, 2014 Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions.

8.2. NEW SOURCE REVIEW (NSR)

Part D of title I of the CAAA prescribes the procedures and conditions under which a new major stationary source or major modification may obtain a preconstruction permit in an area designated nonattainment for any criteria pollutant. The nonattainment NSR permitting requirements in section 172(c)(5) and 173 of the CAAA are among "the requirements of this part". Missouri already has a nonattainment NSR permitting program (10 CSR 10-6.060(7)). The program is applicable to any nonattainment area as designated under section 107 of the CAAA (10 CSR 10-6.020(2)(N)(10)). Therefore, this existing program applies to the construction and modification of major stationary sources of SO_2 that would locate in the Jackson County SO_2 nonattainment area and any other/new 2010 1-hour SO_2NAAQS nonattainment area.

Missouri's nonattainment NSR program ensures that the construction and modification of major stationary sources of SO_2 will not interfere with reasonable further progress toward the attainment of the 2010 SO_2 NAAQS. This is accomplished through applicable regulatory requirements that include, but are not limited to:

- The installation of Lowest Achievable Emissions Rate (LAER) control technology [10 CSR 10-6.060(7)(B)(8)];

- The acquisition of emissions reductions to offset new emissions of nonattainment pollutant(s) [10 CSR 10-6.060(7)(B)(3)];

- Documentation that all major sources owned and operated in the state by the same owner are in compliance with all applicable CAAA requirements [10 CSR 10-6.060(7)(B)(6)];

- A demonstration via an analysis of alternative sites, sizes, production processes, and environmental control techniques shows that the benefits of a proposed source significantly

outweigh the environmental and social costs imposed as a result of its location, construction, or modification [10 CSR 10-6.060(7)(B)(9) and 10 CSR 10-6.020(2)(A)(42)]; and

- An opportunity for a public hearing and written comment on the proposed permit [10 CSR 10-6.060(7)(F)].

The nonattainment NSR requirements apply on a pollutant-specific basis with respect to each nonattainment pollutant for which a source has the potential to emit in amounts greater than the applicable major source threshold for the pollutant, i.e., in major amounts [40 CFR §51.165(a)(l)(iv)]. For new sources, in areas that are designated nonattainment for the 2010 SO_2 NAAQS, 100 tons per year (tpy) or more of SO_2 represents a major amount. Similarly, SO_2 nonattainment NSR requirements also apply to any existing major stationary source of SO_2 that proposes a major modification, i.e., a physical change or change in the method of operation that results in a significant net emissions increase (40 tpy or more) of SO_2 [40 CFR §51.165(a)(l)(x)(A)].

8.3. CONFORMITY

General conformity is required by CAAA section 176(c). This section of the CAAA requires that actions by federal agencies do not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS or interim reductions and milestones. General conformity applies to any federal action (e.g., funding, licensing, permitting or approving), other than certain highway and transportation projects, if the action takes place in a nonattainment or maintenance area for any of the six criteria pollutants [ozone, PM, $N0_2$, carbon monoxide, lead or SO_2]. Projects that are Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) projects as defined in 40 CFR §93.101, are generally not subject to general conformity requirements and are instead subject to transportation conformity. However, per 40 CFR §93.101, general conformity requirements do apply to a federal highway and transit project that does not involve title 23 or title 49 funding but requires FHWA or FTA approval, such as is required for a connection to an Interstate highway or for a deviation from applicable design standards.

The EPA's General Conformity Rule (40 CFR §93.150 to 93.165) establishes the criteria and procedures for determining if a federal action conforms to the SIP. With respect to the 2010 SO_2 NAAQS, federal agencies are expected to continue to estimate emissions for conformity analyses in the same manner as they estimated emissions for conformity analyses under the previous NAAQS for SO_2. The EPA's General Conformity Rule includes the basic requirement that a federal agency's general conformity analysis be based on the latest and most accurate emission estimation techniques available 40 CFR §93.159(b). When updated and improved emissions estimation techniques become available, the EPA expects the federal agency to use these techniques.

Transportation conformity is required under CAAA section 176(c) to ensure that federally supported highway and transit project activities are consistent with ("conform to") the purpose of the SIP. Transportation conformity applies to areas that are designated nonattainment, and those areas redesignated to attainment after 1990 ("maintenance areas" with plans developed under CAAA section 175A) for transportation-related criteria pollutants. Due to the relatively small, and decreasing, amounts of sulfur in gasoline and on-road diesel fuel, the EPA' s transportation conformity rules provide that they do not apply to SO_2 unless either the EPA Regional

Administrator or the director of the state air agency has found that transportation-related emissions of SO_2 as a precursor are a significant contributor to a PM2.5 nonattainment problem, or if the SIP has established an approved or adequate budget for such emissions as part of the RFP, attainment or maintenance strategy [40 CFR §93.102(b)(l), (2)(v)]. Missouri has not identified SO_2 as a significant contributor to a PM2.5 NAA problem and Missouri has not established an approved or adequate budget for SO_2. Therefore, transportation conformity rules continue to not apply to SO_2 for Missouri.

9. PUBLIC PARTICIPATION

In accordance with section 110(a)(2) of the CAAA, the department is required to hold a public hearing prior to adoption of this SIP revision and the subsequent submittal to the EPA. The department will notify the public and other interested parties of an upcoming public hearing and comment period thirty (30) days prior to holding such hearing for this SIP revision as follows:

- Notice of availability of the nonattainment area plan for Jackson County was posted on the Department of Natural Resources' Air Pollution Control Program website on May 22, 2015: http://www.dnr.mo.gov/env/apcp/stateplanrevisions.htm
- The public hearing to receive comments on this nonattainment area plan was held on June 25, 2015, beginning at 9:00 am at the Governor's Office Building, Conference Room 450, 200 Madison Street, Jefferson City, MO 65101.
- Notification for the public hearing and solicitation for public comment for the nonattainment area plan for Jackson County was posted May 22, 2015, on the department website at http://dnr.mo.gov/env/apcp/public-notices.htm Per standard procedure, notices are posted online at least 30 days prior to public hearing. The public comment period closed on July 2, 2015, seven (7) days after the public hearing.

Appendix H includes a copy of the notice of availability and a copy of the notification of public hearing and solicitation for public comment. The remaining public participation documents, including but not limited to the transcript from the public hearing and the response to comments, will be included in the SIP submittal package sent to EPA.

10. CONCLUSION

The department hereby asserts that the State has met its CAAA section 191(a) obligation to submit a plan for the Jackson County SO_2 Nonattainment Area SIP under the 2010 SO_2 NAAQS via this SIP submittal. Furthermore, this document demonstrates attainment of the 2010 SO_2 NAAQS though air dispersion modeling of an effective control strategy as well as complying with requirements of section 172(c) in regard to this standard for the Jackson County SO_2 Nonattainment Area.