

State of Kansas

2022 Annual Ongoing Data Requirements Report

**Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide
National Ambient Air Quality Standard**

August 1, 2022



Division of Environment
Bureau of Air – Monitoring and Planning

Purpose and Background

The Kansas Department of Health and Environment's Bureau of Air (BOA) has prepared this report as the state's stand-alone Annual Ongoing Data Requirements Report for the 2010 1-hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS). This report is intended to fulfill the annual reporting requirements of 40 CFR Part 51 Subpart BB, "*Data Requirements Rule for Characterizing Air Quality for the Primary SO₂ NAAQS.*" The Annual Ongoing Data Requirements Report is due to the U.S. Environmental Protection Agency (EPA) on July 1 each year to meet the reporting requirements in 40 CFR 51.1205 (b):

(b) Modeled areas. For any area where modeling of actual SO₂ emissions serve as the basis for designating such area as attainment for the 2010 SO₂ NAAQS, the air agency shall submit an annual report to the EPA Regional Administrator by July 1 of each year, either as a stand-alone document made available for public inspection, or as an appendix to its Annual Monitoring Network Plan (also due on July 1 each year under 40 CFR 58.10), that documents the annual SO₂ emissions of each applicable source in each such area and provides an assessment of the cause of any emissions increase from the previous year. The first report for each such area is due by July 1 of the calendar year after the effective date of the area's initial designation.

(1) The air agency shall include in such report a recommendation regarding whether additional modeling is needed to characterize air quality in any area to determine whether the area meets or does not meet the 2010 SO₂ NAAQS. The EPA Regional Administrator will consider the emissions report and air agency recommendation, and may require that the air agency conduct updated air quality modeling for the area and submit it to the EPA within 12 months.

In Kansas, Wyandotte County is the only *modeled area* subject to the Annual Ongoing Data Requirements Report that is due to EPA on July 1, 2022. This 2022 report is the second annual report to EPA for this *modeled area* of Wyandotte County (Table 1).

On July 9, 2020¹, EPA redesignated Wyandotte County, Kansas from unclassifiable to attainment/unclassifiable for the 2010 SO₂ NAAQS based on EPA's technical assessment of the air quality dispersion modeling submitted by BOA (January 2017 redesignation request letter) and supplemented by modeling analysis from the Missouri Department of Natural Resources (MoDNR) for Jackson County. The BOA's analysis was based on modeling of actual SO₂ emissions (based on 2012-2014 data) from sources in and around Wyandotte County. Therefore, this *modeled area* is subject to the ongoing verification requirements under 40 CFR 51.1205 (b), and BOA is submitting this Annual Ongoing Data Requirements Report to meet the reporting requirements for *modeled areas*.

2021 Annual Emissions

Per 40 CFR 51.1205 (b), the BOA is required to document the annual SO₂ emissions of each applicable source in the *modeled areas*. Table 1 lists the SO₂ emission source within the *modeled area* and details annual actual SO₂ emissions in tons from 2014 to 2021. The BOA acquired emission data from the Kansas State and Local Emissions Inventory System (SLEIS) and confirmed the emission data matched data in EPA's Air Markets Program Data (AMPD) database.²

¹ <https://www.govinfo.gov/content/pkg/FR-2020-07-09/pdf/2020-13376.pdf>

² <https://ampd.epa.gov/ampd/>

Comparison of 2021 Emissions to Previous Year

Per 40 CFR 51.1205 (b), the BOA is required to provide an assessment of the cause of any emissions increase from the previous year. Table 1 shows 2021 actual emissions increased 115 tons when compared to 2020 emissions for Nearman. Table 2 shows even though the combined facility operating time went down slightly, a small increase in 2021 annual actual emissions is attributed to an increase in gross load (219,853MWh) compared to 2020. In addition, KDHE was informed that The Kansas City Board of Public Utilities was under an Energy Emergency Alert (EEA) from the Southwest Power Pool (SPP) with respect to keeping the grid stable and from preventing power outages and manual load shedding due to the extreme cold weather events that were experienced during the period of February 8, 2021 through February 25, 2021. This order was issued from SPP's Balancing Authority (BA) as it relates to the North American Electric Reliability Corporation (NERC) Emergency Operations Plan (EOP) requirements under EOP-011. This order is issued to prevent rolling blackouts and keep grid reliability.

Recommendation Regarding Updated Modeling

Per 40 CFR 51.1205 (b)(1), the BOA is required to provide a recommendation in this annual report regarding whether additional modeling is needed to characterize air quality in any area to determine whether the area meets or does not meet the 2010 SO₂ NAAQS. Based on the information and assessment set forth below, BOA recommends that no updated dispersion modeling analysis is needed for Kansas' *modeled area*.

In determining the appropriate recommendation regarding the need for any updated dispersion modeling analysis, the appropriate assessment should compare emission characteristics in the most recent year with the emission characteristics that were modeled for the sources of interest to inform their attainment designations. Factors for consideration in such a comparison may include total annual emissions, the level of the modeled design value from the initial modeling analysis, other relevant facility-specific information, and where appropriate, hourly emission profiles or daily maximum 1-hour emission rates.

The BOA's assessment to determine the appropriate recommendation regarding the need for updated modeling first evaluates the annual emission totals that were modeled for the source of interest against the actual annual emissions from the most recent year for the same source. In the modeling performed to inform the redesignation, the modeled emissions from the one Kansas source that is subject to the DRR ongoing reporting requirements demonstrated compliance with the 2010 SO₂ NAAQS. Therefore, if emissions in the most recent year are lower than emissions as modeled, it is reasonable to assume any updated modeling analysis utilizing the lower emission levels from the more recent year would similarly demonstrate NAAQS compliance.

Table 1 shows the 2021 annual emissions for the modeled source are significantly less than the average annual emissions from 2012–2014 as applicable.³ Thus, any additional modeling for this source would likely result in lower maximum-modeled design values than those listed in Table 1. This supports a recommendation for no updated modeling at this source.

The following discussion includes facility-specific details considered in developing the BOA's recommendations regarding the need for no additional modeling for the Nearman facility (Unit 1) that is showing a small SO₂ increase when comparing 2021 and 2020 emissions.

Nearman

³ Table 1, Column 4 of this document

Although annual SO₂ emissions increased slightly from 2020 to 2021, the 1,326 tons of 2021 actual emissions are far below the annual emission levels in each of the individual years of 2012, 2013, and 2014, which were used in the modeling to inform the attainment designation for the area. Annual actual emissions data at the Nearman facility from 2014 to 2021 shows that even though 2017 (lowest emissions) and 2018 (second lowest) are both lower compared to 2021, the emissions for 2021 are still significantly lower than 2012–2016 values, including the modeled years. Therefore, an updated refined dispersion modeling analysis would likely result in even lower predicted SO₂ concentrations in the area surrounding this facility when compared to the maximum modeled concentration listed in Table 1.

In order to further determine the appropriate recommendation for whether additional modeling is needed to determine ongoing compliance with the 2010 SO₂ NAAQS for the area surrounding this facility, the BOA performed a more in-depth hourly emissions profile analysis for the facility.

Compliance with the 2010 SO₂ NAAQS is based on a comparison of the 1-hour design value to the level of the standard (75 ppb). In the modeling used to inform the designation, the 1-hour design value was determined by taking a three-year average of the annual 99th percentile daily maximum 1-hour concentrations. This is the same way a design value would be calculated for a SO₂ monitor. This calculation is performed for each receptor included in the modeling domain, which gives each receptor a different 1-hour design value. The receptor with the highest 1-hour design value is considered the maximum modeled concentration and corresponds to the value listed in Table 1.

Therefore, in evaluating the need for additional modeling at this facility, the BOA obtained the hourly emissions data for Nearman Unit 1 from 2012–2014, which was used in the modeling, along with the hourly emissions data for this unit in 2021. Next, the BOA determined the daily maximum 1-hour SO₂ emission rates for the facility for each day in these three years. For the modeled years (2012–2014) these maximum daily values were sorted from highest to lowest and then averaged across the three years to determine the average highest, second highest, third highest, etc. daily maximum emission rates for the facility during the modeled years. The BOA compared 2021 data to the average levels from the modeled years (2012–2014). Absent consideration of meteorology, which would be included in a new refined dispersion modeling analysis, this is nearly as refined of a comparison as possible for determining how emission changes at a facility might affect the 1-hour modeled design value.

Table 3 provides the top 40 daily maximum 1-hour facility-wide emission rates from 2021 along with the average of these top 40 values from 2012–2014. As shown in the table the 1st, 2nd, and 3rd highest daily maximum 1-hour emission rates in 2021 were significantly lower than the average from the modeled years. Specifically, the 1st, 2nd, and 3rd highest values from 2021 were 51.1 percent, 53.2 percent, and 53.1 percent lower than the corresponding average values from 2012–2014. However, 1-hour SO₂ design values are based on the 99th percentile of daily maximum 1-hour SO₂ concentrations, which corresponds to the fourth highest daily maximum each year. As seen in Table 3, the 4th highest value from 2021 is 52.6 percent less than the 4th highest value from the 2012–2014 average. In addition, the 5th highest through 40th highest values from 2021 are all significantly less than their corresponding values from 2012–2014 values. This means that although annual emissions increased slightly in 2021, when compared to the average emissions that were modeled, a new modeling analysis would likely result in a maximum modeled 1-hour design value that is lower than the value included in Table 1 for this facility. Therefore, this hourly emission rate comparison supports a recommendation for no additional modeling.

The BOA recommends no additional modeling is needed to further characterize area emissions or to verify ongoing compliance with the 2010 1-hour SO₂ NAAQS for the area surrounding the Nearman facility.

Public Inspection and Review

As required in 40 CFR 51.1205, BOA is making this stand-alone report available for public inspection and review on our public website. The report is also available for review at the Kansas Department of Health and Environment, Bureau of Air, 1000 SW Jackson St, Ste 310, Topeka KS, (785) 296-0910.

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Table 1. Annual Actual SO₂ Emissions and Maximum Modeled Design Values

County Name	DRR Facility Name (Source ID)	Modeling Information			Year of SO ₂ actual emissions from SLEIS (tons)*							
		Maximum-modeled Design Value (ppb)	Years of Met and Emissions Data	Average Annual Emissions Modeled (tons)^	2014	2015	2016	2017	2018	2019	2020	2021
Wyandotte	Nearman (2090008)	49.24	2012-2014	4,957.2	5332	4762	2439	903	1023	1203	1211	1326

^ - 2012 – 4,611.8 tons
 2013 – 4,927.9 tons
 2014 – 5,332 tons

*- State (KS) and Local Emissions Inventory System



Table 2. Operating Hours and Gross Load for 2019 and 2020 at Kansas City BPU - Nearman Unit 1*

Unit	Year	Operating time (hrs)	Gross load (MWh)	Unit SO2 (tons)
Nearman 1	2020	6,851	1,200,509	1,210.5
Nearman 1	2021	6,830	1,420,362	1,326.1

* Data source: EPA Air Markets Program Data (<https://ampd.epa.gov/ampd/>)

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Table 3. Kansas City BPU - Nearman Unit 1 Daily Maximum 1-hour SO₂ Emissions*

Rank	Daily maximum 1-hour SO ₂ emissions (lbs/hr)		Percent change (2021 vs. 2012-2014 avg.)
	2012-2014 avg.	2021	
1st highest	3122.2	1527.6	-51.1%
2nd highest	3051.7	1429.4	-53.2%
3rd highest	2911.5	1364.3	-53.1%
4th highest	2858.1	1353.5	-52.6%
5th highest	2849.4	1297.3	-54.5%
6th highest	2787.5	1279.1	-54.1%
7th highest	2775.3	1269.8	-54.2%
8th highest	2763.1	1259.6	-54.4%
9th highest	2747.1	1259.3	-54.2%
10th highest	2739.3	1254.6	-54.2%
11th highest	2713.4	1241.6	-54.2%
12th highest	2699.1	1237.8	-54.1%
13th highest	2671.9	1233.3	-53.8%
14th highest	2648.2	1198.5	-54.7%
15th highest	2608.4	1191.1	-54.3%
16th highest	2586.7	1186.5	-54.1%
17th highest	2581.0	1154.4	-55.3%
18th highest	2573.0	1153.4	-55.2%
19th highest	2569.6	1135.8	-55.8%
20th highest	2551.7	1133.1	-55.6%
21st highest	2533.6	1130.2	-55.4%
22nd highest	2486.9	1110.8	-55.3%
23rd highest	2377.1	1109.8	-53.3%
24th highest	2260.2	1102.7	-51.2%
25th highest	2254.6	1098.5	-51.3%
26th highest	2235.1	1086.5	-51.4%
27th highest	2216.8	1080.9	-51.2%
28th highest	2164.1	1077.9	-50.2%
29th highest	2157.3	1066.8	-50.5%
30th highest	2147.9	1065.0	-50.4%
31st highest	2142.0	1064.9	-50.3%
32nd highest	2120.6	1049.9	-50.5%
33rd highest	2109.7	1036.4	-50.9%
34th highest	2104.9	1030.8	-51.0%
35th highest	2096.9	1026.3	-51.1%
36th highest	2087.0	1018.0	-51.2%
37th highest	2082.9	1016.5	-51.2%
38th highest	2074.5	1004.7	-51.6%
39th highest	2057.4	1003.9	-51.2%
40th highest	2049.8	998.9	-51.3%

* Data source: EPA Air Markets Program Data (<https://ampd.epa.gov/ampd/>)