Nebraska Department of Environment and Energy

Annual Report on Modeled Facilities (Data Requirements Rule, 2010 SO_2 NAAQS)

NEBRASKA

DEPT. OF ENVIRONMENT AND ENERGY

Jim Macy, Director

Month XX, 2019

Month XX, 2018

Mr. Jim Gulliford
Regional Administrator
U.S. EPA Region VII
11201 Renner Blvd.
Lenexa, KS 66219

Dear Mr. Gulliford:

Enclosed is Nebraska's *Annual Report on Modeled Facilities (Data Requirements Rule, 2010 SO_2 NAAQS)*, which satisfies ongoing requirements contained in the Data Requirements Rule, and specified in 40 CFR 51.1205 for the 2010 1-hour SO_2 National Ambient Air Quality Standards (NAAQS). This report addresses two areas of the state designated "unclassifiable/attainment" by EPA on the basis of air quality modeling. Annual emissions for applicable facilities within these areas are presented and assessed as part of this report, along with the State's recommendation regarding whether additional modeling is necessary.

The areas surrounding Gerald Gentleman Station and Gerald Whelan Energy Center were designated "unclassifiable/attainment" by EPA in July 2016 and December 2017, respectively. The assessment of recent emissions data indicates that both areas are meeting the 2010 SO_2 NAAQS. Therefore, the State is submitting its recommendation that no additional modeling is needed at this time to characterize the air quality in these areas.

If you have any questions regarding this submission, please contact Kevin Stoner, Air Division Administrator, at (402) 471-4299 or Tracy Wharton, NAAQS-SIP Coordinator, at (402) 471-6410.

Sincerely,

Jim Macy
Director, Nebraska Department of Environment and Energy

Introduction

The Data Requirements Rule (DRR) for the 2010 1-hour SO_2 Primary National Ambient Air Quality Standards (NAAQS) was issued in August 2015, and outlines ongoing requirements for states having areas designated as attainment based on air quality modeling. Of the three areas in Nebraska that are subject to this rule, there are two areas that meet the criteria for ongoing requirements.

Nebraska Department of Environment and Energy (NDEE) asserts that both areas continue to demonstrate attainment with the NAAQS, and that additional air quality modeling is not necessary as this time. Analysis of emissions data and discussion are provided below.

Areas Subject to Ongoing Requirements

The areas surrounding two Nebraska sources currently subject to the ongoing requirements described in 40 CFR Part 51.1205 were designated based on characterization using air quality modeling. These modeling analyses utilized actual emissions data and the areas have no subsequent "nonattainment" designations.

Gerald Gentleman Station (GGS) – Nebraska Public Power District (NPPD) (Lincoln County)

The modeling analysis used to characterize the area surrounding this facility was performed in September 2015 and utilized actual facility emissions from 2012-2014. This analysis indicated the SO_2 impact (99^{th} percentile 1-hour SO_2 concentration) on the area to be 144.8 µg/m^3, or 55.3 parts per billion (ppb). This impact value is below the 1-hour SO_2 NAAQS of 75 ppb, and the facility was designated "Unclassifiable/Attainment" on July 12, 2016 (81 FR 45039).

Emissions data for GGS is shown in Table 1 on the following page. Data from 2012-2014 used in the modeling analysis and emissions data for 2016-2018 are included to provide comparison. The emissions for 2018 indicate a 5% increase over the 2012-2014 modeled three-year average. Given that 2017 was a historically low generation year for GGS (the lowest in the past 20 years) the increase in SO_2 emissions in 2018 is notable in comparison, and is attributed to increases in heat input (12%) and throughput (15%), despite a less than 1% increase in operating hours, as compared to 2017.

Table 1. Gerald Gentleman Station						
Unit	**SO_2 Emissions (tons per year)**					
	2012	**2013**	**2014**	**2016**	**2017**	**2018**
1	14,832	13,047	12,539	12,853	10,351	14,334
2	11,605	15,383	11,945	9,915	10,904	13,405
Total	**26,437**	**28,430**	**24,484**	**22,768**	**21,255**	**27,739**
Average (2012-2014)	**26,450**					
Average (2016-2018)				**23,921**		

Emissions data acquired from the Clean Air Markets Division, https://ampd.epa.gov/ampd/

Excluding emissions from 2017, the average difference between 2018 emissions and emissions from previous years (2012-2016) is less than 10%. Likewise, the average emissions for this most recent three-year period (2016-2018) remain approximately 10% lower than the average emissions utilized in the modeling analysis, which was the basis for the designation issued in July 2016.

In summary, the 2018 emissions increase did not reach a level that indicates the need to re-model. Thus, NDEE asserts that the area surrounding GGS continues to be in attainment with the 1-hour SO_2 NAAQS, and that additional modeling is not necessary at this time.

GGS participates in the Cross-State Air Pollution Rule (CSAPR) trading program for SO_2, and actual emissions at the facility remain below the total SO_2 allocations of 28,896 tons.[1]

Gerald Whelan Energy Center – City of Hastings/Public Power Generation Agency (Adams County)

The modeling analysis used to characterize the area surrounding this facility was performed in December 2016 and utilized actual facility emissions data from 2013-2015. This analysis indicated the SO_2 impact (99^{th} percentile 1-hour SO_2 concentration) on the area to be 188.7 $\mu g/m^3$, or 72.02 parts per billion (ppb). This impact value is below the 1-hour SO_2 NAAQS of 75 ppb and the area was designated "Attainment/Unclassifiable" on January 9, 2018 (83 FR 1098).

Emissions data for Whelan Energy Station is shown in Table 2 on the following page. Data from 2013-2015 used in the modeling analysis, and emissions data for 2016-2018 are included to provide comparison. The SO_2 emissions originally reported for 2018 indicate an 18% increase over the 2013-2015 modeled three-year average.

[1] https://www.epa.gov/csapr/cross-state-air-pollution-rule-csapr-allowance-allocations-and-templates

Table 2. Gerald Whelan Energy Center						
Unit	**SO_2 Emissions (tons per year)**					
	2013	**2014**	**2015**	**2016**	**2017**	**2018**
1	1,587	1,439	2,301	1,579	1,828	1,776
2	546	692	598	440	446	1,052
Total	**2,133**	**2,131**	**2,899**	**2,019**	**2,274**	**2,828**
Average (2013-2015)	**2,388**					
Average (2016-2018)				**2,374**		

Emissions data (except for 2018-Unit 2) acquired from the Clean Air Markets Division, https://ampd.epa.gov/ampd/

The increased SO_2 emissions reported for 2018, as compared to 2017, are attributed to increases in heat input (17%) and throughput (14%), as well as the use of substitute (calculated) data for the 4th quarter of 2018, due to malfunction of the Continuous Emissions Monitoring System (CEMS) on Unit 2. The CEMS was taken offline in mid-October 2018 and sent to the manufacturer for repair, and calculated emissions data was reported per EPA protocol for the missing days. The calculated emissions were a very conservative estimate of the actual emissions, and resulted in a total approximately 400-500 tons above what is typically reported. During the 56 days that the CEMS was off-line, the SO_2 control equipment (dry scrubber) was in operation and scrubber ash totals indicate that controls were operating properly.

In an effort to determine a more accurate emissions total for 2018, a number of variables were examined for the years 2016-2018, and two analyses were conducted as described below:

1) The average ratios of SO_2 emissions to operating time, gross load, and heat input, respectively, were calculated; these values were applied to 2018 4th quarter data to calculate SO_2 emissions for that quarter (182 tons). Recalculation of the 2018 annual SO_2 emissions for the facility resulted in a value of 2,323 tons.

2) The average removal efficiency of the scrubber on Unit 2 was calculated using a comparison between SO_2 processed by Unit 1 (no controls) and Unit 2 (scrubber). This removal efficiency was applied to 4th quarter data to calculate SO_2 emissions for that quarter (202 tons). Recalculation of the 2018 annual SO_2 emissions for the facility resulted in a value of 2,343 tons.

Data and detailed calculations are provided in Attachment 1. Recalculated emissions data are contained in Table 2a on the following page, utilizing the more conservative of the two values calculated as described in item 2) above. The average efficiency of removal (87.35%) used to calculate the emissions value in item 2) was also a conservative estimate, given that data for the four quarters prior to 2018 4th quarter shows a removal efficiency of 88.9%.

As a result of these analyses, the recalculated 2018 annual emissions are 1.9% less than the 2013-2015 modeled three-year average.

Table 2a. Gerald Whelan Energy Center – recalculated emissions						
Unit	**SO_2 Emissions (tons per year)**					
	2013	**2014**	**2015**	**2016**	**2017**	**2018**
1	1,587	1,439	2,301	1,579	1,828	1,776
2	546	692	598	440	446	567
Total	**2,133**	**2,131**	**2,899**	**2,019**	**2,274**	**2,343**
Average (2013-2015)	**2,388**					
Average (2016-2018)				**2,212**		

Emissions data (except for 2018-Unit 2) acquired from the Clean Air Markets Division, https://ampd.epa.gov/ampd/

NDEE understands that if the original modeling results for an area indicate that the SO_2 impact is over 90% of the NAAQS, then the EPA guidance recommends additional modeling for any increase in emissions. However, NDEE asserts that the area surrounding Whelan Energy Center continues to be in attainment with the 1-hour SO_2 NAAQS, and that additional modeling is not necessary at this time based on the following:

1) recalculated annual emissions for 2018 are less than the average emissions utilized in the modeling analysis;

2) SO_2 control equipment was in operation and functioning properly during the time period that the CEMS was offline;

3) the monitoring device was returned to operational status on December 10, 2018 following repair by the manufacturer, and further malfunction is not anticipated; and

4) annual SO_2 emissions from other sources in the area surrounding Whelan are relatively consistent over the past three years.

Conclusion

Emissions data analyses from the areas subject to the ongoing requirements indicate that these areas demonstrate attainment with the 2010 1-hour SO_2 NAAQS. Based on these analyses, NDEE asserts that additional modeling is not necessary at this time to further characterize these areas.