

Appendix M – 2024 Annual Report for EPA’s Data Requirements Rule to Demonstrate Attainment with the 2010 1-Hour SO₂ NAAQS

In accordance with EPA’s Data Requirements Rule (DRR) as found in 40 CFR 51 Subpart BB, the North Carolina Department of Environmental Quality, Division of Air Quality (DAQ) has prepared this annual report to demonstrate North Carolina’s ongoing attainment status with the 2010 sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS) relative to the four facilities for which attainment is based on air quality modeling. 40 CFR §51.1205 states in part:

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.

Tables 1-4 below contain EPA’s Clean Air Markets Program Data (CAMPD) SO₂ emissions over the last ten years for each facility for which North Carolina used modeling as the basis for attainment designations with regard to the 2010 SO₂ NAAQS, along with the three-year SO₂ emissions data inputs that were used in the most recent air quality models. The slight differences between the annual SO₂ emissions data from CAMPD and the modeled SO₂ emission rates can be attributed to differences in calculation methods to determine the annual SO₂ emissions. The modeling input values are a summation of the hourly SO₂ emissions data for each year.

Table 1. Duke Energy GG Allen Plant SO₂ Emissions (2013-2023)

Calendar Year	CAMPD SO ₂ Emissions (Tons/Year)	Modeled SO ₂ Emissions (Tons/Year)
2013	846.00	846.02
2014	1718.09	1718.13
2015	1127.75	1127.78
2016	676.36	
2017	353.71	
2018	245.52	
2019	147.79	
2020	91.12	
2021	20.89	
2022	32.32	
2023	15.54	

Table 2. Duke Energy Belews Creek Plant SO₂ Emissions (2013-2023)

Calendar Year	CAMPD SO ₂ Emissions (Tons/Year)	Modeled SO ₂ Emissions (Tons/Year) ¹
2013	5075.01	5075.13
2014	7032.50	7032.66
2015	6794.01	6794.16

2016	5066.42	
2017	4562.83	
2018	4119.21	
2019	3370.46	
2020	1873.39	
2021	2386.79	
2022	1980.59	
2023	1624.17	

¹Different sources may reference slightly different modeled SO₂ emission rates at Belews Creek for 2014. These minor differences are due to calculation or data source variations related to the auxiliary boilers.

Table 3. Duke Energy Marshall Plant SO₂ Emissions (2013-2023)

Calendar Year	CAMPD SO ₂ Emissions (Tons/Year)	Modeled SO ₂ Emissions (Tons/Year)
2013	4703.50	4703.61
2014	5917.44	5917.58
2015	4623.80	4623.90
2016	4918.39	
2017	4361.75	
2018	3621.34	
2019	4877.95	
2020	3085.41	
2021	2812.14	
2022	1674.45	
2023	1421.96	

Table 4. Duke Energy Mayo Plant SO₂ Emissions (2013-2023)

Calendar Year	CAMPD SO ₂ Emissions (Tons/Year)	Modeled SO ₂ Emissions (Tons/Year)
2013	4570.21	4570.21
2014	3490.71	3490.71
2015	2484.28	2484.28
2016	2736.92	
2017	1510.98	
2018	1412.84	
2019	1123.26	
2020	867.26	
2021	1293.37	
2022	933.43	
2023	1836.79	

Tables 1-4 above show that actual SO₂ emissions for calendar year 2023 are well below the 2013-2015 SO₂ emissions that were modeled to demonstrate attainment with the 2010 SO₂ NAAQS. While there is an overall downward trend in SO₂ emissions from year to year at all four facilities, the Mayo Plant did report an increase in annual SO₂ emissions from 2022 to 2023. DAQ contacted Duke Energy to determine the reason for the increase in annual SO₂ emissions for this facility in

2023. Duke Energy personnel looked into the issue and determined that the SO₂ emission increase was related to natural variability due to higher sulfur content of the coal received in 2023. The SO₂ emissions are monitored continuously for compliance with applicable standards.

Even with the increase in emissions in 2023, the annual SO₂ emissions at the Mayo Plant for 2023 are still much lower than the three-year average emission rate that was used in the initial DRR modeling for this facility to demonstrate compliance with the 2010 SO₂ NAAQS. Therefore, the 2023 annual data as reported confirms that the 2010 SO₂ NAAQS is being attained and that no additional modeling is necessary for any of the DRR facilities for which North Carolina used modeling as the basis for its attainment designations.

DAQ is looking into the possibility of requesting an exemption from future annual reporting requirements under the DRR. 40 CFR §51.1205(b)(2) states that, “[a]n air agency will no longer be subject to the requirements of this paragraph (b) for a particular area if it provides air quality modeling demonstrating that air quality values at all receptors in the analysis are no greater than 50 percent of the 1-hour SO₂ NAAQS, and such demonstration is approved by the EPA Regional Administrator.” Table 5 below shows where the applicable North Carolina facilities stand with regard to margin of modeled attainment with the 2010 SO₂ NAAQS.

Table 5. Comparisons of Three-year Averages at DRR Modeling Sites

Duke Energy Site Name	3-Year Average SO ₂ for DRR Modeling (2013-2015, tons/yr.)	Latest 3-Year Average SO ₂ Emissions (2021-2023, tons/yr.)	% of NAAQS as Originally Modeled	% Emissions Reduction Between 3-Year Cycles
GG Allen	1230.61	22.92	62%	98%
Belews Creek	6300.50	1997.18	62% ²	68%
Marshall	5081.58	1969.52	91%	61%
Mayo	3515.06	1354.53	96%	61%

²Table 8 of EPA’s Round 3 Designations Technical Support Document (TSD) shows a modeled emission rate of 50% of the NAAQS. However, the modeled SO₂ concentration recorded in Table 8 of the TSD does not include background concentrations from the original modeling report.

For the second time since DAQ started submitting the annual DRR verification report, the reported SO₂ emissions for all four facilities are at a level where it appears that remodeling may demonstrate that air quality values at all receptors in the analysis are no greater than 50 percent of the 1-hour SO₂ NAAQS. Therefore, DAQ is considering conducting additional modeling on these four facilities and may follow up with a request pursuant to 40 CFR §51.1205(b)(2) to be exempted from future annual reporting requirements under the DRR. However, North Carolina is submitting this 2024 annual DRR verification report as part of its annual monitoring network plan to ensure that we meet the July 1st submittal deadline.

A copy of this report is available for public inspection at <https://deq.nc.gov/about/divisions/air-quality/air-quality-data/annual-network-plan/annual-monitoring-network-plan-for-north-carolina-air-quality>. The report is also available for public inspection at 217 West Jones Street, Raleigh, NC 27603.