



2022 Annual Report

SO₂ Emissions for the San Juan Generating Station

Ongoing Requirements for the 2015 Data Requirements Rule

Prepared by the New Mexico Environment Department

Air Quality Bureau

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Introduction

Pursuant to 40 CFR § 51.1205 of the Data Requirements Rule (DRR) for the 2010 1-Hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS) (80 FR 51052, 8/21/15), air agencies are required to submit an annual report to their respective U.S. Environmental Protection Agency (EPA) Regional Administrator for areas that demonstrated attainment for the 2010 SO₂ NAAQS via modeling of actual emissions. This report documents the annual SO₂ emissions of each applicable source and provide an assessment of the cause of any emissions increase from the previous year. The first report was due by July 1 of the calendar year after the effective date of the area's initial designation (i.e., by 7/1/2018).

All areas of New Mexico have been designated Attainment/Unclassifiable through four rounds of designations by the EPA (83 FR 1184, 1/9/18). As part of the Round 3 designation process, the 2015 DRR stipulated that, for those areas surrounding sources that emit 2,000 tons per year (TPY) or more of SO₂, states must characterize air quality in proximity to the source using one of the following three methods: (1) ambient air monitoring; (2) modeling of either actual or allowable emissions; or (3) demonstration of federally enforceable emissions limitations that limit emissions of an applicable source to below the 2,000 TPY threshold.

In New Mexico, the only source exceeding the 2,000 TPY threshold was the San Juan Generating Station (SJGS) in San Juan County. This source, working with the New Mexico Environment Department (NMED), decided to characterize that area's air quality by modeling actual emissions. Modeling submitted to EPA in January 2017 demonstrated that this area met the 2010 1-hour SO₂ Primary NAAQS, using quality-assured data from the SJGS' continuous emissions monitoring system (CEMS) for the years 2013-2015.

This is the sixth annual report required by the 2015 DRR. NMED has assessed the 2016, 2017, 2018, 2019, 2020, and 2021 emissions data generated by the SJGS CEMS. Since emissions have decreased from 2015 levels and 3-year averages since 2013 also show an emissions decrease, NMED recommends that no new modeling for this source be required. In addition, because two of the four generating units were permanently shut down in December 2017, NMED anticipates this source will continue to emit less than the 2,000 TPY threshold in the future.

Emissions Data Summary – San Juan Generating Station

SO₂ emissions from SJGS are recorded by the station's CEMS. Data is quality-assured by the source and submitted annually to NMED. A summary of the main trends in SO₂ emissions are shown in Table 1, below.

Table 1: Trends in SO₂ emissions from San Juan Generating Station by year in lbs./hr.

Year	Annual 1-hour average SO₂ emissions	Annual 1-hour maximum SO₂ emissions	99th percentile of 1-hour maximum SO₂ emissions
2013	1365.05	6170.16	3332.69
2014	1112.97	5654.98	2916.55
2015	774.43	5373.22	2541.49
2016	654.13	5121.94	1745.94
2017	713.55	3515.77	1817.12
2018	283.31	3266.61	815.33
2019	322.68	2460.69	1162.26
2020	308.50	2015.12	1019.60
2021	221.41	1833.05	739.14

In 2017, the annual 1-hour average SO₂ emissions increased from 2016 due to increased unit operational efficiencies. During 2016, all four units experienced more downtime due to maintenance issues or other unexpected malfunctions. However, in 2017, all four units maintained a higher operational efficiency which resulted in less downtime and therefore, increased loads (2016 average load 372.4 MW/day; 2017 average load 383.6 MW/day) and associated emissions. In 2018, the annual 1-hour average SO₂ emissions decreased from 2017 due to the shutdown of Units 2 and 3. The average load for Unit 1 was 301.1 MW/day, and 453.7 MW/day for Unit 4.

The 2020 one-hour average SO₂ emissions show a slight decrease of 14.18 lbs./hour over the 2019 one-hour average SO₂ emissions. The 2020 one-hour maximum shows a 445.57 lbs./hour decrease from the 2019 one-hour maximum.

The 2021 one-hour average SO₂ emissions show a decrease of 87.09 lbs./hour from 2020 one-hour average SO₂ emissions. The 2021 one-hour maximum shows a 182.07 lbs./hour decrease from the 2020 one-hour maximum. Compared to the modeled 2013-2015 three year average emissions, the 2019-2021 showed a decrease of 5139.6 tpy, or approximately 85%. Also, the annual maxima for 2019-2021 as well as the 99th percentile of 1-hour maxima for 2019-2021 show significant decreases from the modeled years of 2013-2015.

In addition to annual trends shown by the CEMS data in Table 1 above, total SO₂ emissions data submitted annually to NMED and EPA show a similar trend. This downward trend is shown in Table 2, below. The 2021 total SO₂ emissions show a decrease of 418.9 tons as compared to the 2020 total SO₂ emissions. The SO₂ emissions data has been much lower since the 2017 levels due to the decommissioning and closure of Units #2 and #3.

Table 2: Total annual SO₂ emissions by year in tons¹.

Year	Total SO ₂ emissions	Change in total SO ₂ emissions from previous year
2013	6075.9	
2014	4989.4	<1086.5>
2015	3499	<1490.4>
2016	2923.1	<575.9>
2017	4535.1	1612
2018	1246.6	<3288.5>
2019	1453.3	206.7
2020	1355.2	<98.1>
2021	936.3	<418.9>

The initial attainment demonstration, modeling actual emissions, used the average of years 2013-2015. Tables 1 and 2 above show that annual emissions (except for 2017), average hourly emissions, maximum emissions and 99th percentile maxima of hourly emissions for 2019-2021 are lower than each of the modeled years. To compare trends since the modeling was performed, Table 3, below, summarizes the 3-year averages for each of these parameters.

Table 3: Trends in 3-year averages.

Years	Average 1-hr SO ₂ (lbs./hr.)	Average Maximum 1-hr SO ₂ (lbs./hr.)	Average 99 th percentile maximum 1-hr SO ₂ (lbs./hr.)	Average total SO ₂ (tons/year)
2013-2015	1084.15	5732.79	2930.24	4854.77
2014-2016	847.18	5383.38	2311.33	3803.83
2015-2017	714.04	4670.31	2034.85	3652.4
2016-2018	550.33	3968.11	1459.46	2901.6
2017-2019	439.85	3081.02	1264.90	2411.67
2018-2020	304.83	2580.81	999.06	1351.7
2019-2021	284.20	2102.95	974.67	1248.27

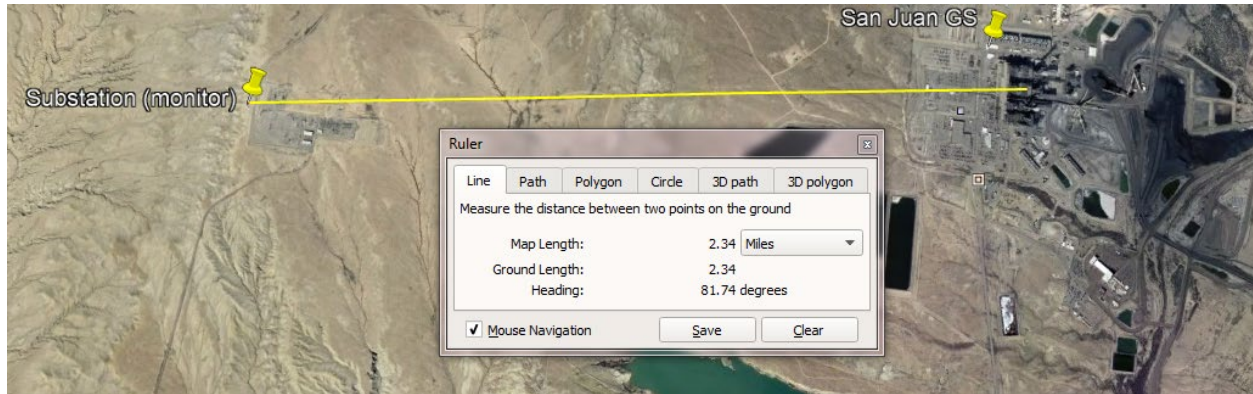
Note: 2014-2016, 2015-2017, 2016-2018, 2017-2019, 2018-2020, and 2019-2021 averages are significantly below the modeled years' (2013-2015) average.

Monitoring Data Summary – San Juan Substation, NMED Monitor 1H

NMED operates an ambient air monitoring station (1H San Juan Substation, AQS ID 35-045-1005) located at 36.79667 degrees latitude and -108.47250 degrees longitude, approximately 2.34 miles nearly due west of SJGS. This monitor is the nearest ambient air monitor to SJGS. See Figure 1, below.

¹ This data is publicly available through NMED's *Emissions Analysis Tool* <https://eatool.air.net.env.nm.gov/aqbeatool/>.

Figure 1: Google Earth image calculating the distance between the San Juan Substation monitor and the stacks at San Juan Generating Station.



This monitor is not located near enough to SJGS to be used for regulatory purposes related to the DRR. However, a review of the monitoring data indicates that SO₂ concentrations in the ambient air are regularly well below the SO₂ standard of 75 ppb. The form of the standard, the 99th percentile 1-hr maximum concentration (ppb), is shown in column 3 of Table 4, below.

Table 4: San Juan Substation SO₂ monitor data summary, 2013–2021.

Year	Mean SO ₂ concentration (ppb)	Maximum SO ₂ concentration (ppb)	99 th percentile concentration (ppb)	Number of hours exceeding 75 ppb
2013	2.60	32	25	0
2014	0.837	18	14	0
2015	0.058	1	1	0
2016	1.18	16	8	0
2017	3.24	30	16	0
2018	1.41	15	9	0
2019	0.84	14	9	0
2020	2.3	15	4*	0
2021	0.41	9	2	0

**This is a recalculated number after the identification of an error in the 2020 annual report*

A maximum 99th percentile concentration of 25 ppb occurred in 2013. Every year since 2013 have shown significantly lower concentrations.

Discussion and Recommendation

The above summary tables show that for all parameters, SO₂ emissions from the San Juan Generating Station have decreased since the 2013-2015 modeling, which indicates the area is in attainment of the 2010 1-hour SO₂ primary standard. Even though 2017 and 2019 data showed slight increases in the average hourly emissions and the total annual emissions from the 2016 and 2018 data, respectively, these increases were less than the 2,000 TPY threshold. In 2021, the average hourly emissions and the total annual emissions again fell as compared to the 2017

average hourly and total emissions. Additionally, the 2021 99th percentile of 1-hour maximum also experienced a decrease from the 2020 value. All other emissions trends have steadily decreased since the modeled years, which also shows the area is in attainment of the 2010 1-hour SO₂ primary NAAQS.

Likewise, monitoring data near SJGS show that ambient air quality meets the 2010 1-hour SO₂ primary standard of 75 ppb for all years, 2013-2021.

Since overall emissions are decreasing and are expected to be significantly lower in future years, and since monitoring data near SJGS show acceptable SO₂ concentrations for 2013-2020, NMED recommends that further modeling is not warranted to assess any expected changes in recent air quality, and that EPA not require re-modeling for 2014-2016, 2015-2017, 2016-2018, 2017-2019, 2018-2020, or 2019-2021.