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2020 Annual Report

SO_2 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 Section 51.1205 of the Data Requirements Rule (DRR) for the 2010 1-Hour Sulfur Dioxide (SO_2) 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 SO_2 NAAQS via modeling of actual emissions. This report shall document the annual SO_2 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 three 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 SO_2, 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 SO_2 Primary NAAQS, using quality-assured data from the SJGS' continuous emissions monitoring system (CEMS) for the years 2013-2015.

This is the third annual report required by the 2015 DRR. NMED has assessed the 2016, 2017, 2018 and 2019 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 have been 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

SO_2 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 SO_2 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 SO_2 emissions[1]	Annual 1-hour maximum SO_2 emissions	99th percentile of 1-hour maximum SO_2 emissions[2]
2013	1365.05	6170.16[3]	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

In 2017, the annual 1-hour average SO_2 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 SO_2 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 2019 one-hour average SO_2 emissions show a slight increase of 39.07 lbs./hour over the 2018 one-hour average SO_2 emissions. However, the 2019 one-hour maximum shows an 806 lbs./hour decrease from the 2018 one-hour maximum. The past three years (2017-2019) show decreased emissions when compared to the modeled years of 2013-2015. Also, the annual maxima for 2017-2019 as well as the 99th percentile of 1-hour maxima for 2017-2019 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 SO_2 emissions data submitted annually to NMED and EPA show a similar trend. This downward trend is shown in Table 2, below. The 2019 total SO_2 emissions show a marginal increase of 206.7 tons as compared to the 2018 total SO_2 emissions. However, the 2016, 2018 and 2019 total SO_2 emissions data is below the 2017 levels.

[1] The annual average values from 2013 through 2018 are corrected from the 2019 report. Incorrect formulas originally used returned incorrect annual averages. This correction excludes all N/A hourly values from the calculated annual averages and returns correct values for 2013-2018.
[2] The 99th percentile 1-hour maximum values from 2013 through 2018 are corrected from the 2019 report. Incorrect formulas originally used returned incorrect 99th percentile values. This correction selects the 87th or 88th largest value from each year's data set and returns the correct 99th percentile data value for 2013-2018.
[3] This value has been corrected from the 2018 report, due to a typo (i.e., 5170.16[sic]).

Table 2: Total annual SO_2 emissions by year in tons[4].

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[5]	1612
2018	1246.6	<3288.5>
2019	1453.3	206.7

The initial attainment demonstration, modeling actual emissions, used the average of the 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 2016-2019 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.)[6]	Average Maximum 1-hr SO_2 (lbs./hr.)	Average 99th percentile maximum 1-hr SO_2 (lbs./hr.)[7]	Average total SO_2 (tons/year)[8]
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

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

[4] The 2018 report used eia.gov data for 2013-2016, and NMED data for 2017. Beginning with the 2019 report, *NMED-AQB Facility Actual Emissions* were used for all years. This data is publicly available through NMED's *Emissions Analysis Tool* https://eatool.air.net.env.nm.gov/aqbeatool/.

[5] The 2018 report mistakenly used the value for 2016 emissions (2923) in the place of 2017 emissions (i.e. 4535.1).

[6] As indicated in Table 1, this report corrects the Annual 1-hour average SO_2 emission (lbs./hr.) values. The corresponding 3-year Average 1-hr SO_2 (lbs./hr.) for 2013-2015, 2014-2016, 2015-2017, 2016-2018, and 2017-2019 in Table 3 changed accordingly.

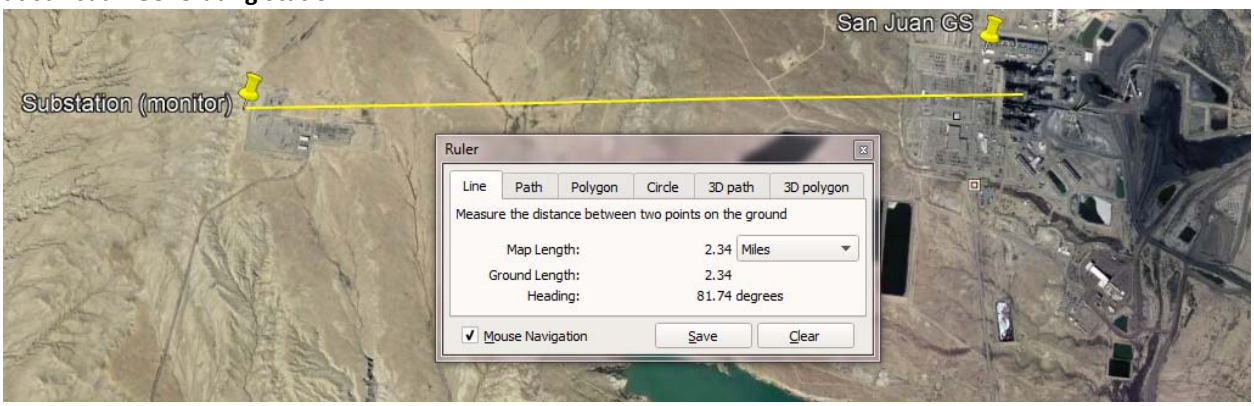
[7] As indicated in Table 1, this report corrects the 99th percentile of 1-hour maximum SO_2 emission (lbs./hr.) values. The corresponding 3-year Average 99th percentile maximum 1-hr SO_2 (lbs./hr.) for 2013-2015, 2014-2016, 2015-2017, 2016-2018, and 2017-2019 in Table 3 changed accordingly

[8] Because NMED data are being used for this report as shown in Table 2, the 3-year averages for total SO_2 (tons/year) have been changed accordingly in Table 3.

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.

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 SO_2 concentrations in the ambient air are regularly well below the SO_2 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 SO_2 monitor data summary, 2013–2019.[9]

Year	Mean SO_2 concentration (ppb)	Maximum SO_2 concentration (ppb)	99th 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

The maximum 99th percentile concentration of 25 ppb occurred in 2013.

[9] The 2018 report used data from the NMED Air Emissions Map and Data at http://nmaqinow.net/ , but this data had not been certified. Therefore data in this report has been retrieved from *Interactive Map of Air Quality Monitors* https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors.

Discussion and Recommendation

The above summary tables show that for all parameters, SO_2 emissions from the San Juan Generating Station have decreased since the 2013-2015 modeling, which showed the area in attainment of the 2010 1-hour SO_2 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. Additionally, the 99th percentile of 1-hour maximum also experienced a marginal increase from the 2018 value. However, all other emissions trends have steadily decreased since the modeled years, which shows the area in attainment of the 2010 1-hour SO_2 primary NAAQS.

Monitoring data near SJGS also show that ambient air quality meets the 2010 1-hour SO_2 primary standard of 75 ppb for all years, 2013-2019.

Since overall emissions are decreasing and are expected to be significantly lower in future years, and since monitoring data near SJGS show acceptable SO_2 concentrations for 2013-2019, 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 or 2017-2019.