

**The State of New Jersey
Department of Environmental Protection**

**State Implementation Plan (SIP) Revision
for the Attainment and Maintenance of the
1971 Primary and Secondary Sulfur Dioxide (SO₂)
National Ambient Air Quality Standards (NAAQS)**

**Redesignation Request and Limited Maintenance Plan
for the Warren County Sulfur Dioxide Nonattainment Area**

November 2021

PREFACE

The sulfur dioxide (SO₂) air quality in New Jersey has a history of significant impacts due to out-of-state sources. Large coal-fired Electric Generating Units located in Pennsylvania have been demonstrated to cause exceedances in Warren County, New Jersey of several SO₂ National Ambient Air Quality Standards (NAAQS), including the 1971 SO₂ primary and secondary standards and the 2010 1-hour standard. In all these cases, New Jersey put significant resources into demonstrating the significant impact from these out-of-state sources of large SO₂ emissions. This request for Redesignation to Attainment addresses the Warren County nonattainment area (New Jersey portion of the Northeast Pennsylvania-Upper Delaware Valley Interstate Air Quality Control Region), the only remaining SO₂ nonattainment area in New Jersey. In this SIP, New Jersey is demonstrating it has attained the SO₂ NAAQS to protect its citizens' health through implementation of regulations to control SO₂ emissions within its borders, as well as past actions to reduce SO₂ emissions from large, upwind sources in Pennsylvania that were causing nonattainment in New Jersey. On August 21, 2019, the United States Environmental Protection Agency (USEPA) issued a clean data determination that concluded that the Warren County nonattainment area attained the 1971 SO₂ primary and secondary NAAQS. See 84 Fed. Reg. 43,504 (August 21, 2019). This SIP provides the final chapter, including a limited maintenance plan, for the Warren County nonattainment area to be redesignated to attainment. This document acknowledges the improvement in outdoor sulfur dioxide air quality by requesting that the USEPA redesignate the New Jersey Warren County SO₂ nonattainment area to attainment in accordance with the Clean Air Act as amended in 1990.

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I. EXECUTIVE SUMMARY

This redesignation to attainment request and Limited Maintenance Plan (LMP) demonstrates that the Warren County nonattainment area (the New Jersey portion of the Northeast Pennsylvania-Upper Delaware Valley Interstate Air Quality Control Region) is attaining the 1971 sulfur dioxide (SO₂) primary and secondary NAAQS.¹ Portions of Warren County were designated nonattainment by the USEPA on February 1, 1988. Evaluation of the relevant data show that the large SO₂ emission sources located in Pennsylvania that triggered the nonattainment area designation are now emitting at a fraction of their earlier SO₂ emission rates with a corresponding reduction in ambient air quality impacts. Most importantly, the out-of-state, coal-fired units at the Martins Creek Electrical Generating Facility (hereafter referred to as Martins Creek Power Plant) and Portland Generating Station (hereafter referred to as Portland Power Plant) have been permanently shutdown.

In addition, New Jersey's SO₂ air quality in the Warren County nonattainment area has significantly improved due to New Jersey's regulations and efforts to address the two major emission sources located in Pennsylvania. Both air quality modeling and ambient air quality monitoring data from three monitors in the area demonstrate that SO₂ levels are currently well below 85 percent of the SO₂ NAAQS. Due to these low levels, New Jersey is submitting a limited maintenance plan as part of this redesignation request. A network of New Jersey and Pennsylvania SO₂ monitors are available to verify future maintenance of the SO₂ NAAQS in Warren County.

New Jersey has the legal authority through regulatory programs to both monitor air quality and to regulate, permit, enforce and control new and modified sources in Warren County to prevent future SO₂ NAAQS violations. Statewide rules, such as New Jersey's N.J.A.C. 7:27– 9 et. seq., "Sulfur in Fuels", will also ensure SO₂ concentrations are evaluated appropriately to prevent any future violations of the SO₂ NAAQS. These existing regulatory programs in New Jersey have the legal authority to keep any new or modified sources regulated through a permit in the future and are protective of all SO₂ NAAQS.

Pennsylvania also has regulatory programs that regulate, permit, enforce, and control new and modified sources. The USEPA oversees the regulatory programs in Pennsylvania and should ensure future sources of SO₂ emissions do not cause nonattainment or interfere with maintenance of the SO₂ NAAQS in New Jersey.

¹ <https://www.epa.gov/so2-pollution/table-historical-sulfur-dioxide-national-ambient-air-quality-standards-naaqs> (accessed July 23, 2020)

II. INTRODUCTION

The purpose of this document is to request that the United States Environmental Protection Agency (USEPA) redesignate the Warren County SO₂ nonattainment area to attainment for the 1971 SO₂ primary and secondary NAAQS in accordance with the Federal Clean Air Act, 42 U.S.C. 7401 et seq. USEPA has interpreted Section 175A of the CAA to indicate that an area can provide for a more limited plan for maintenance of the NAAQS if it meets certain air quality related criteria. The USEPA issued three guidance memos describing the eligibility criteria and planning requirements for limited maintenance plans.^{2,3,4} The key criteria are that the current air quality levels of ambient monitoring sites in the area are substantially below the standard. USEPA defines “substantially below the standard” as 85 percent or less of the NAAQS. In addition, air quality levels must not have been highly variable during preceding years or had recorded violations of the NAAQS.

An approvable 10-year limited maintenance plan must also contain the following elements: (1) attainment inventory, (2) maintenance demonstration, (3) attainment verification monitoring network, (4) verification of continued attainment, and (5) contingency plan.

The USEPA will evaluate New Jersey’s redesignation request and maintenance plan using the five criteria under 107(d)(3): 1) the Administrator determines that the area has attained the applicable NAAQS; (2) the Administrator has fully approved the applicable implementation plan for the area under section 110(k); (3) the Administrator determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable SIP and applicable federal air pollutant control regulations and other permanent and enforceable reductions; (4) the Administrator has fully approved a maintenance plan for the area as meeting the requirements of section 175A; and (5) the state containing such area has met all requirements applicable to the area for purposes of redesignation under section 110 and part D of the CAA. USEPA will consider and evaluate New Jersey’s redesignation request using the criteria above with consideration of the September 1992 USEPA Calcagni Redesignation memo⁵.

With respect to criteria 2) above as stated in USEPA’s Determination of Attainment for the Warren County NA area⁶, USEPA indicated that New Jersey satisfied the SIP planning requirements for nonattainment new source review (NSR) and base year inventory, and the remaining SIP planning requirements regarding reasonable further progress (RFP), attainment demonstration, etc. were suspended for as long as the area continued to meet the NAAQS.

The New Jersey Department of Environmental Protection (NJDEP) developed this redesignation to attainment request consistent with the published USEPA guidance.

² USEPA, Memorandum from Joseph Paisie (OAQPS) to Regional Air Branch Chiefs, “Limited Maintenance Plan Option for Non-Classifiable CO Nonattainment Areas,” October 6, 1995.

³ USEPA Memorandum from John Calcagni to Regional Air Branch Chiefs. “Limited Maintenance Plan Option for Non-classifiable Ozone Nonattainment Areas,” November 16, 1994.

⁴ USEPA Memorandum from Lydia Wegman to Regional Air Directors “Limited Maintenance Plan Option for Moderate PM₁₀ Nonattainment Areas,” August 9, 2001.

⁵ USEPA Memorandum from John Calcagni to Regional Directors. “Procedures for Processing requests to Redesignate Areas to Attainment,” September 4, 1992.

⁶ 84 Fed. Reg. 22768 (May 20, 2019).

III. BACKGROUND

A. The Warren Country Sulfur Dioxide Nonattainment Designation

In 1987, the Warren County Resource Recovery Facility (RRF) was undergoing an air permit evaluation. As part of the permitting process, a USEPA-approved screening model was used to evaluate air quality impacts in the surrounding area of Warren County. This screening modeling accounted for the emissions from all major sources located within a 50-km radius of the proposed Warren County RRF, including large sources located in Pennsylvania. Modeled violations of the 24-hour primary and the 3-hour secondary SO₂ standard were predicted to occur on elevated terrain in Warren County. Modeled annual violations were also predicted. The major source of emissions leading to the violations of the standards was determined to be Pennsylvania Power and Light Company's (PP&L) Martins Creek Power Plant located across the Delaware River in Lower Mount Bethel Township, Pennsylvania.⁷

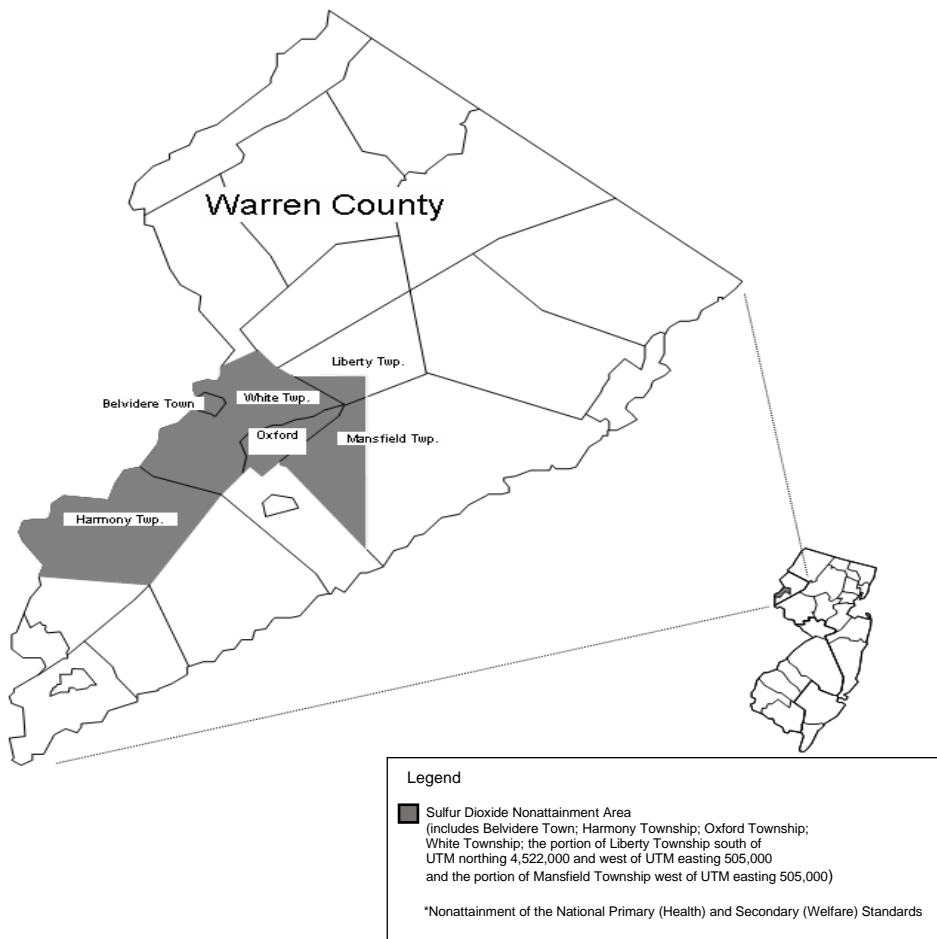
In order to allow the permitting process to continue, the NJDEP requested that the USEPA redesignate portions of Warren County from attainment to nonattainment consistent with the modeled areas with predicted violations of the short-term standards. This action was published in the Federal Register on February 1, 1988⁸. The nonattainment area is shown in Figure 1 and includes the Townships of Harmony, White, Oxford, and Belvidere; and portions of Liberty Township and Mansfield Township.

⁷ Letter from John Slade, PADEP to Alan Dresser, NJDEP dated June 19, 1992.

⁸ 52 Fed. Reg. 49408 (December 31, 1987).

Figure 1: Warren County Nonattainment Area

Sulfur Dioxide Non-Attainment Areas* in New Jersey



B. Sources Impacting the Warren County Sulfur Dioxide Nonattainment Area

The initial Warren County RRF modeling predicted emissions from the Martins Creek Power Plant as the cause of the predicted SO₂ NAAQS violations, however, other sources in the area were subsequently identified as potential contributors to the problem. Modeling studies conducted in the 1990s identified the following two sources as the principal SO₂ emitters in the area:

- Martins Creek Power Plant,
- Portland Power Plant.

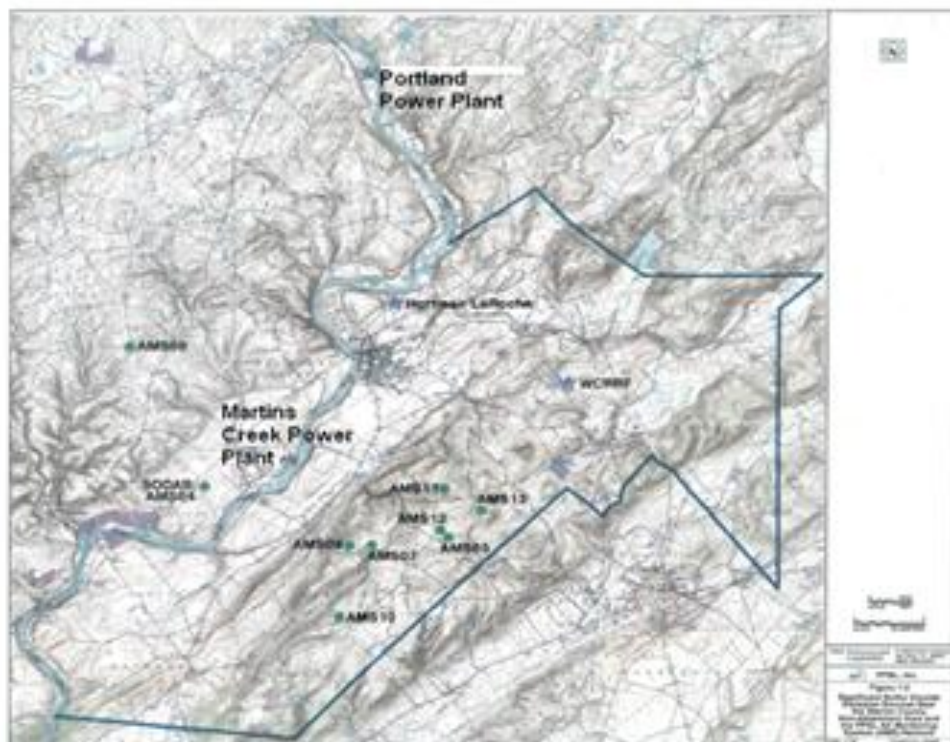
Two other smaller point sources of SO₂ located in New Jersey were also included in the modeling analyses:

- Warren County Resource Recovery Facility (Warren County RRF or Covanta), and
- Roche Vitamins Belvidere Plant (or DSM Nutritional Products).

The location of these facilities relative to the nonattainment area is shown in Figure 2 (the AMS designations identify the locations of SO₂ monitors used in an AERMOD model validation study). Because of its proximity to the Warren County nonattainment area and its size, an additional facility that began operations in 2004, the 650 MW Lower Mount Bethel Energy Facility, has been included as a source of interest. It is located on the Martins Creek Power Plant site.

Since the nonattainment designation in 1988, the combined actual and allowable SO₂ emissions from these sources have dropped dramatically.⁹ The emissions history of these sources is discussed in Section IV.B.2.a.

Figure 2: Location of Sources Relative to the Warren County Nonattainment Area



⁹ Letter from Sharon Davis, NJDEP to Kirk Wieber, EPA Region II dated February 22, 2019. Supplemental Information for Clean Data Determination Request for the 3-Hour Sulfur Dioxide (NAAQS): Warren County Nonattainment Area.

IV. LIMITED MAINTENANCE PLAN REQUEST FOR REDESIGNATION

A. USEPA Requirements for a Limited Maintenance Plan

The State of New Jersey is requesting the USEPA Administrator redesignate New Jersey's Warren County nonattainment area to attainment of the annual 0.03 parts per million (ppm), 24-hour 0.14 ppm and 3-hour 0.5 ppm NAAQS for SO₂. Per Section 175A of the Clean Air Act, the State meets the criteria for submitting a limited maintenance plan. In support of this request, the State is providing the following required elements of a limited maintenance plan:

1. **Attainment Inventory:** New Jersey provides inventory data from 2017, as well as emissions inventory trends that coincide with monitoring data demonstrating attainment of the standards. Emissions data from USEPA's Air Market Program for sources located in Pennsylvania are also provided.
2. **Maintenance Demonstration:** Emissions reductions in New Jersey are attributable to stringent SIP-approved, state-wide rules and other federally-enforceable regulations.
3. **Monitoring Network:** New Jersey provides verification that a monitoring network is established and will be maintained to verify attainment through the maintenance period. Annual monitoring network reports are publicly available on the NJDEP website at <https://www.nj.gov/dep/airmon/>.
4. **Verification of Continued Attainment:** New Jersey documents that it has jurisdiction for New Jersey sources in the nonattainment area. This may include review of emissions and ongoing review of ambient air monitoring data.
5. **Contingency Plan:** New Jersey documents the measures that will be utilized if a violation of the National Ambient Air Quality Standard occurs during the maintenance period.

B. Primary and Secondary Sulfur Dioxide Maintenance Plan

1. Attainment Inventory

The attainment inventory identifies the level of emissions in the area that are sufficient to attain the NAAQS. The attainment inventory chosen for this redesignation request is 2017. The 2017 inventory was developed regionally for State Implementation Plan (SIP) purposes and provides information down to county-level. Although the nonattainment area was specific to certain jurisdictions within Warren County, the New Jersey inventory provided in this limited maintenance plan reflects the total emissions within Warren County, as well as facility-level for the entities located in Pennsylvania and identified to significantly contribute to nonattainment of the SO₂ NAAQS in Warren County. New Jersey qualifies for a limited maintenance plan, therefore a future projected inventory ten years from redesignation and an interim inventory are not required.

Annual emissions trends for estimated SO₂ air emissions in Warren County from 1990 to 2017 are shown below in Figure 3 and Table 1. Emissions of SO₂ in Warren County have decreased significantly by approximately 97 percent from 1990 to 2017 and about 92 percent from 2002 to

2017. Up until recently the area source emissions were higher than the other three sectors combined due to usage of distillate oil for heating. The 2010 revisions to N.J.A.C. 7:27-9 (Sulfur in Fuel), which lowered the sulfur content in heating oil in 2014 and 2016, resulted in the area source sector having the greatest overall reductions in SO₂ emissions. The decreases in the on-road and nonroad sectors were primarily due to Federal rules that reduced sulfur levels in diesel fuel beginning in 2007.

Figure 3: Warren County SO₂ Emissions Inventory Trends

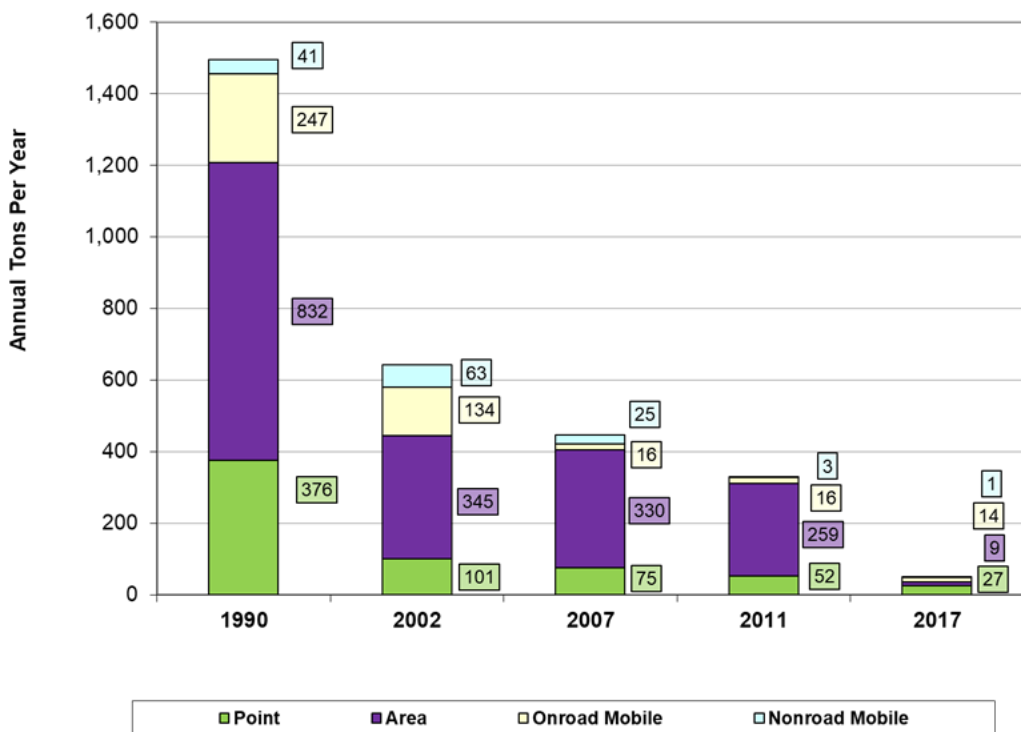


Table 1: Warren County SO₂ Emissions Inventory Trends

	Emissions (tons per year)					% of Inventory					% Change			Difference (tons)		
	1990	2002	2007	2011	2017	1990	2002	2007	2011	2017	1990-2017	2002-2017	2011-2017	1990-2017	2002-2017	2011-2017
Point	376	101	75	52	27	25%	16%	17%	16%	54%	-93%	-74%	-49%	-349	-74	-25
Area	832	345	330	259	9	56%	54%	74%	78%	18%	-99%	-97%	-97%	-823	-336	-250
Onroad Mobile	247	134	16	16	14	17%	21%	4%	5%	28%	-94%	-90%	-14%	-233	-120	-2
Nonroad Mobile	41	63	25	3	1	3%	10%	6%	1%	2%	-99%	-99%	-82%	-40	-62	-2
Total SO₂	1,496	643	446	330	49	100%	100%	100%	100%	100%	-97%	-92%	-85%	-1,447	-593	-281

Notes:

1. 1990 Annual Data Source: 1990 USEPA NEI
2. 2007 Annual Data Source: MARAMA 2007 Modeling Inventory
3. 2011 Annual Data Source: "NJDEP SIP, 8-hr Ozone Reasonably Available Control Technology (RACT) Determination, 2011 Periodic Emission Inventory, 8-hr Carbon Monoxide Maintenance and Monitoring Plan, Final" dated June 11, 2015
4. 2017 Annual Data Source: 2017 USEPA NEI

New Jersey's two primary point sources of SO₂ emissions in Warren County were Roche Vitamins/DSM Nutritional Products and Warren County Resource Recovery Facility (RRF) (Covanta). Emissions from the four boilers at Roche were reduced in 1998 when the sulfur limits in their permit were lowered from 1 percent sulfur No. 6 oil to 0.05 percent sulfur No. 2 oil. As discussed further below, subsequent to this permit change two of the boilers were shutdown and removed from the permit and two were converted to natural gas.

There has been no increase in Warren County RRF's (Covanta) allowable SO₂ emission rate since 1991. Although the allowable limits have remained at 39.7 lbs/hour and 173.9 tons/year, the actual SO₂ emissions from the facility have historically been well below the allowable levels. For example, actual SO₂ emissions between 2015-2017 have averaged only 12 tons/year based on its emissions statement submitted to New Jersey. Regardless, applying allowable emissions from this facility would still show a decrease of overall SO₂ emissions in Warren County. As discussed below, as of February 2020 the two waste combustors have been disconnected and rendered inoperable with a permit modification approved February 3, 2020.

Both the permit's allowable and actual SO₂ emissions from the nearby major sources in Pennsylvania have also dropped dramatically since 1990. Between 1990 and 2018, the permit allowable SO₂ emission levels at Martins Creek Power Plant (including the Lower Mount Bethel facility) have dropped from 143,990 tons/year to 38,571 tons/year. During the same time period, the actual emissions from Martins Creek Power Plant dropped from approximately 33,293 tons/year to 115 tons/year. At the Portland Power Plant, the 1990 allowable SO₂ emissions of 64,117 tons/year and actual SO₂ emissions of 25,428 tons/year have both dropped to 0.0 in 2018. Documentation of the SO₂ emission reductions at both power plants is given in the next section.

2. Demonstration of Maintenance

a. Point Sources - Emissions

The maintenance plan must provide a demonstration that the area will continue to maintain the NAAQS for at least ten years after the redesignation and contain additional measures as may be necessary to ensure such maintenance. This maintenance plan must demonstrate that the air quality improvement is due to permanent and enforceable reductions. Considering the Warren County nonattainment area was designated nonattainment based on emissions from point sources within the area and, in particular, located out of state in Pennsylvania, the maintenance plan provides emissions information related to those point sources. New Jersey has no authority to ensure that Pennsylvania source reductions are permanent and enforceable. USEPA must ensure that upwind states meet the transport requirements of the Good Neighbor provisions of the Clean Air Act and not significantly impact New Jersey's attainment or maintenance of the SO₂ NAAQS.

Each of the five SO₂ point sources in and near the Warren County Nonattainment Area have changed significantly since 1987. A description of the enforceable emissions reductions at each facility is provided below.

Principal Sources:

1. Martins Creek Power Plant (Northampton Co., PA)

- From 1987 to September of 2007 - Units 1 and 2 (combined 300 MW) were limited to emitting no more than 4.0 lbs/MMBtu of sulfur dioxide on a daily average, equivalent to burning approximately 2.6 percent sulfur bituminous coal. Units 3 and 4 (combined 1,700 MW) were limited to burning no more than 1 percent sulfur No. 6 oil or natural gas. The 323 MMBtu/hr Auxiliary Boiler 4b and four simple-cycle combustion turbines (19 MW each) were limited to firing no more than 0.5 percent sulfur No. 2 oil.
- September 2007 – Units 1 and 2 were shutdown. Units 3 and 4 were limited to no more than 0.7 percent sulfur No. 6 oil. Auxiliary Boiler No. 4 was limited to firing natural gas. These changes were part of the October 2003 Settlement Agreement between NJDEP, Pennsylvania Department of Environmental Protection (PADEP), and Lower Mount Bethel Energy.¹⁰
- November 2014 – Auxiliary Boiler 4b officially deactivated.¹¹
- July 2016 – Pennsylvania Sulfur in Fuels regulation (25 PA Code 123.22) limits Units 3 and 4 to no more than 0.5 percent sulfur No. 6 oil.

2. Portland Power Plant (Northampton Co., PA)

- From 1987 to June 2014 - Units 1 and 2 (combined 400 MW) were limited to emitting no more than 4.0 lbs/MMBtu of sulfur dioxide on a daily average, equivalent to burning approximately 2.6 percent sulfur bituminous coal.

¹⁰ Pennsylvania Environmental Hearing Board Docket No. 2001-280-C. Settlement Agreement between the New Jersey Dept. of Enviro. Protection, Pennsylvania Dept. of Enviro. Protection, and Lower Mount Bethel Energy, October 24, 2003.

¹¹ January 26, 2021 e-mail from Sean Wenrich (PA DEP) to Kenneth Fradkin (EPA Region 2).

- November 7, 2011 - USEPA responds to New Jersey's 126 petition and finds the Portland Power Plant is emitting pollutants that significantly contribute to nonattainment of the 1-hour SO₂ NAAQS in New Jersey.
- June 2014 – In response to USEPA's approval of the New Jersey 126 Petition, Units 1 and 2 were shutdown.¹²

Other Sources:

3. Roche Vitamins/DSM Nutritional Products

- From 1987 to approximately 1998 – Four boilers were permitted to burn 1 percent sulfur No. 6 oil.
- From approximately 1998 to February 2004 – The permits for the four boilers were revised to allow for combustion of no more than 0.05 percent sulfur No. 2 oil.
- February 2004 – Facility sold to DSM Nutritional Products and the production converted to manufacturing vitamin C.
- 2011 - Boiler #1 was removed from the permit.
- 2012 - The boilers were restricted to #2 fuel oil for emergency use only.
- 2014 - All fuel oil use was removed from the permit.
- 2019 - Boiler # 3 was removed from permit.

4. Warren County RRF/Covanta

- From 1987 to February 2020 – The permit to construct was approved June 13, 1986. Units 1 and 2 (each 88.8 MMBtu/hr) are approved to combust municipal waste and have a combined SO₂ emission limit of 39.7 lb/hr.
- February 2020 to present – The two waste combustors have been disconnected and rendered inoperable with a permit modification approved February 3, 2020.

5. Lower Mount Bethel Energy (Northampton Co., PA) - adjacent to Martins Creek Power Plant)

- 2004 thru present – A 650 MW combined-cycle power generation facility that fires only natural gas started operations beginning in 2004.

The permitted, allowable SO₂ emissions for these sources over the years is given in Table 2 in pounds per hour (lb/hr), as well as tons per year (TPY). The table shows that allowable SO₂ emissions from the sources of interest have dropped 81 percent, from approximately 48,280 lb/hr (211,467 TPY) in 1987 to 8,852 lb/hr (38,750 TPY) in 2018.

The allowable emissions are the maximum rate of emissions allowed from the facility. In reality, the actual emission rates tend to be much lower to ensure compliance with the permit. Table 3 shows the actual SO₂ emissions from these same sources of interest have dropped 99.8 percent, from approximately 58,700 TPY in 1990 to the 2015-2017 average of 130 TPY. New Jersey's permitted limits and conditions for SO₂ emissions based on N.J.A.C. 7:27-22 ("Operating Permits"), N.J.A.C. 7:27-9 ("Sulfur in Fuels"), and N.J.A.C. 7:27-7 ("Sulfur") are federally enforceable.

¹² Consent Decree Case 5:07-cv-05298-JKG. Filed in the U.S. District Court for the Eastern District of PA on May 15, 2013.

Note that in Table 3 actual emissions from the Auxiliary Boiler 4b and combustion turbines at Martins Creek Power Plant were not listed. These sources have historically had low utilization rates and are now either shutdown (Auxiliary Boiler 4b) or exclusively natural gas (combustion turbines). The assumption of their low SO₂ actual emissions is supported by the following: their actual SO₂ emissions data were not collected in 1992 - 1993 for input into a model validation study supported by USEPA, NJDEP, PADEP ¹³; and SO₂ emissions from the combustion turbines were deemed too insignificant to include in the 2003 Settlement Agreement between NJDEP, PADEP, and Lower Mount Bethel Energy. All other Martins Creek oil and coal fired sources at that time were included in the Settlement Agreement.

The significant emission reductions at the two Pennsylvania facilities shown in Table 2 and 3 are permanent and enforceable. The two coal-fired units (total of 300 MW) at Martins Creek Power Plant were permanently shut down in September of 2007. The boiler building and emissions stack have subsequently been demolished.¹⁴ Their retirement was part of a legally binding agreement reached on October 10, 2003 between Lower Mount Bethel Energy LLC, PADEP, and NJDEP. The settlement agreement stipulations were incorporated into the Lower Mount Bethel Energy, LLC Plan Approval 48-328-004 and the PPL Martins Creek Title V Operating Permit 48-00011.¹⁵

New Jersey's legal action against Portland Power Plant and its petition to the USEPA under Section 126 of the Clean Air Act resulted in a final rule on November 7, 2011.¹⁶ The final rule established interim and final limits to reduce the SO₂ emissions from this facility so that there would be compliance with the 1-hour NAAQS. A May 15, 2013 Consent decree (Case 5:07-cv-05298-JKG) led to the permanent shutdown of the two coal-fired units (total of 400 MW) at Portland Power Plant in June of 2014.¹⁷

¹³ <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models>

¹⁴ <https://www.youtube.com/watch?v=-415fyj67fc>

¹⁵ 34 Pennsylvania Bulletin 1271 - 1273 (February 28, 2004). Air Quality Plan Approval and Operating Permit Applications – New Sources and Modifications.

¹⁶ 76 Fed. Reg. 69052 (November 7, 2011) Final Response to Petition from New Jersey Regarding SO₂ Emissions from the Portland Generating Station

¹⁷ Consent Decree Case 5:07-cv-05298-JKG. Filed in the U.S. District Court for the Eastern District of PA on May 15, 2013.

Table 2: Allowable Sulfur Dioxide Emissions ^f

Facility		1987	2000	2010	2018
Martins Creek Power Plant	Units 1 and 2	14,520 lb/hr ^a (63,600 TPY)	14,520 lb/hr ^a (63,600 TPY)	Shutdown ^b	
	Units 3 and 4	17,600 lb/hr ^a (77,109 TPY)	17,600 lb/hr ^a (77,109 TPY)	12,320 lb/hr ^b (53,961 TPY)	8,800 lb/hr ^c (38,544 TPY)
	Auxiliary Boiler 4b	168.2 lb/hr ^d (737 TPY)	168.2 lbs/hr ^d (147 TPY) ^e	0.35 lb/h ^b (0.3 TPY)	Shutdown ^f
	4 Combustion Turbines (each)	145.2 lb/hr ^d (636 TPY)	36.3 lbs/hr ^d (159 TPY) ^e	5.9 lbs/hr (2.6 TPY)	5.9 lbs/hr ^f 2.6 (TPY)
Portland Station Units 1 and 2		14,652 lb/hr ^d (64,177 TPY)	14,652 lb/hr ^d (64,177 TPY)	14,652 lb/hr ^d (64,177 TPY)	Shutdown ^g
Roche Vitamins/ DSM Nutritional		719 lb/hr ^a (3,149 TPY)	37.6 lb/hr ^d (165 TPY)	1.5 lb/hr ^h (6.3 TPY)	1.5 lb/hr ^{fh} (6.3 TPY)
Warren Co. RRF/Covanta		39.7 lb/hr ^d (173.9 TPY)	39.7 lb/hr ^d (173.9 TPY)	39.7 lb/hr ^d (173.9 TPY)	39.7 lb/hr ⁱ (173.9 TPY)
Lower Mount Bethel Energy		not yet built		5.4 lb/hr ^j (23.6 TPY)	5.4 lb/hr ^k (23.6 TPY)
Total		48,280 lb/hr (211,467 TPY)	47,163 lb/hr (205,507 TPY)	27,023 lb/hr (118,342 TPY)	8,852 lb/hr (38,750 TPY)

- a. From *Protocol for the Sulfur Dioxide Air Quality Compliance Modeling Evaluation of the Warren County New Jersey Nonattainment Area* (March 15, 1996), prepared by TRC Environmental for Pennsylvania Power and Light Company
- b. From the October 24, 2003 Settlement Agreement between NJDEP, PADEP, and Lower Mount Bethel Energy
- c. 25 PA Code Chapter 123.22 (Standards for Contaminants /Sulfur Compound Emission/Combustion units), maximum allowable emission rate based on 0.5 % sulfur oil and each unit's heat input rate of 7,721 MMBtu/hr.
- d. From *Sulfur Dioxide Air Quality Compliance Modeling for Areas Surrounding Martins Creek Steam Electric Station Using Aermoc* (June 1999), prepared by TRC Environmental for Pennsylvania Power and Light Company.
- e. PADEP NOx RACT Operating Permit issued December 19, 1994 for Martin's Creek. Annual capacity limits for Combustion Turbines and Aux. Boiler 4b.
- f. June 1, 2016 Title V Operating Permit for the MC Project Company LLC/Martins Creek
- g. Consent Decree Case 5:07-cv-05298-JKG. Filed in the U.S. District Court for the Eastern District of PA on May 15, 2013.
- h. DSM Nutritional Products 2018 New Jersey Operating Permit Renewal (Facility # 85010)
- i. Covanta 2018 New Jersey Operating Permit Renewal (Facility # 85455)
- j. PADEP Plan Approval No. 48-328-004 issued October 29, 2001 for Lower Mount Bethel Energy
- k. June 1, 2016 Title V Operating Permit for the Lower Mount Bethel Energy SES/Bangor Plant

Table 3: Actual Sulfur Dioxide Emissions

Facility		1990 (TPY)	May 1992 - May 1993 (TPY)	2000 (TPY)	2010 (TPY)	Average of 2015 - 2017 (TPY)
Martins Creek	Units 1 and 2	25,637 ^a	20,270 ^b	18,775 ^a	Shutdown	
	Units 3 and 4	7,656 ^a	6,317 ^b	6,925 ^a	508 ^a	106 ^a
	Auxiliary Boiler 4b and 4 Combustion Turbines	NA	NA	0 ^a	Shutdown	
Portland Station Units 1 and 2		25,428 ^a	24,675 ^b	20,295 ^a	22,072 ^a	Shutdown
Roche Vitamins/ DSM Nutritional		no data	837 ^b	16.1 ^c	0.2 ^c	1.8 ^c
Warren Co. RRF/Covanta		no data	1 ^b	4.8 ^c	11 ^c	12 ^c
Lower Mount Bethel Energy		not built			6.3 ^a	9 ^a
Total		58,721	52,100	46,016	22,597	129

a. Data from the USEPA Air Markets website.

b. Data from "Air Quality Model Performance, Evaluation and Comparison Study for Martins Creek Steam Electric Station (September 1994) prepared by TRC Environmental for Pennsylvania Power and Light Company.

c. Data from facilities submitted to New Jersey Emissions Statements program for 2015, 2016 and 2017 emissions.

d. NA = Not Applicable

b. Point Sources - Modeling

A detailed modeling analysis of major SO₂ sources in the vicinity of the Warren County nonattainment area was conducted in 1999.¹⁸ The USEPA-approved air dispersion model, AERMOD (version 98314), was applied to model the following four major SO₂ sources in the area: Martins Creek Power Plant, Portland Power Plant, Warren County RRF (Covanta), and Roche Vitamins/DSM Nutritional Products (formerly Hoffmann LaRoche). Three years of meteorological data collected near the Martins Creek Power Plant was used in the model runs and receptors were placed throughout the Warren County nonattainment area.

Table 4-4 in the 1999 Martin's Creek compliance modeling report listed the maximum predicted impacts for comparison to the NAAQS when these four sources are modeled with their 1999 allowable emission rates. Background concentrations were also added. Table 4 in this

¹⁸ Sulfur Dioxide Air Quality Compliance Modelling for Areas Surrounding Martins Creek Steam Electric Station Using AERMOD, June 1999, prepared by TRC Environmental Corp., prepared for PP&L.

document below is identical to Table 4-4 in the 1999 Martin's Creek modeling report. Table 4 lists the predicted high-second high (HSH) 3-hour, 24-hour and maximum annual concentrations, the location and elevation of the receptor where the concentrations occur, and when the concentration was predicted. The 3-hour, 24-hour, and annual SO₂ impacts listed in Table 4 are all greater than 85 percent of each averaging time's NAAQS (3-hour = 1300 ug/m³, 24-hour = 365 ug/m³, Annual = 80 ug/m³).

Table 4: Summary of Modeling Results (from 1999 Martin's Creek Report, 1999 allowable emission rates)

Description	Annual		H2H 3-Hour		H2H 24-Hour	
	Concentration (µg/m ³)	Receptor Location and Time Period	Concentration (µg/m ³)	Receptor Location and Time Period	Concentration (µg/m ³)	Receptor Location and Time Period
ALL Sources	71.0		1298.3		334.5	
UTM East (m)		491380		492750		494160
UTM North (m)		4516400		4513550		4513330
Elevation (m)		70.71		365.46		382.32
Time Period *		7/91 - 6/92		1992, 89, 21		1992, 80, 24
Martins Creek						
Units 1, 2	6.1		865.0		204.7	
Unit 3	1.1		220.0		53.1	
Unit 4	0.7		201.0		53.1	
CTs	1.5		0.0		1.1	
Auxiliary 4	45.0		1.8		N/A	
Portland P. P.	3.7		0.0		8.2	
Warren Co. RRF	0.04		0.0		0.0	
Roche Vitamins/DSM Nutronal	0.2		0.0		0.0	
Background	12.7		10.5		14.3	
* - Year, Julian day, hour ending.						

Table 5 lists the 2018 predicted impacts based on the emissions ratios with more recent background data added from the Columbia, NJ monitor. To predict the air concentrations in 2018, the ratio of the 2018 and 2000 allowable emissions in Table 2 are multiplied by the 1999 modeling predicted impacts in Table 4 (note: there was no change in allowable emissions of the sources in Table 2 between 1999 and 2000). Table 5 confirms SO₂ air quality has improved, and all averaging times are now far less than 85 percent of the NAAQS. The improved air quality in the area, principally due to the emission reductions shown in Tables 2 and 3 above, support the use of a limited maintenance plan redesignation request.

Table 5: Updated Air Quality Modeling Results for Martin's Creek and Surrounding Sources (2018 allowable emission rates)

Description	Annual		H2H 3-Hour		H2H 24-Hour	
	Conc. (µg/m³)	Receptor Location and Time Period	Conc. (µg/m³)	Receptor Location and Time Period	Conc. (µg/m³)	Receptor Location and Time Period
ALL Sources	3.7		226		58.3	
UTM East (m)		491380		492750		494160
UTM North (m)		4516400		4513550		4513330
Elevation (m)		70.71		365.46		382.32
Time Period *		7/91 - 6/92		1992, 89, 21		1992, 80, 24
Martins Creek						
Units 1, 2	0		0.0			
Unit 3	0.55		110.0			
Unit 4	0.35		100.5			
CTs	1.5		0.0			
Auxiliary 4	0.0		0.0			
Portland P. P.	0		0.0			
Warren Co. RRF	0.04		0.0			
Roche Vitamins/DSM Nutritional	0		0.0			
Background **	1.3		15.3			
* - Year, Julian day, hour ending.						

** Columbia NJ monitor; 2015 - 2017 data; highest annual/highest, second-high 3 hr and 24 hr

c. Statewide SIP Approved Control Measures

New Jersey's requirements at N.J.A.C. 7:27-9 (Sulfur in Fuels)¹⁹ will also help maintain the area's current low levels of SO₂ emissions and ambient concentrations. N.J.A.C. 7:27-9

¹⁹ EPA approval at 77 FR 19 (January 3 , 2012)

requires all No. 2 and lighter fuel oil sold after July 1, 2016 contain no more than 15 ppm (0.0015 percent) sulfur content. In addition, No. 4 fuel oil sold in Warren County cannot be more than 0.25 percent sulfur and No. 6 oil cannot be more than 0.5 percent sulfur. These enforceable sulfur limits were adopted in 2010 and are much more stringent than the rules in place in 1990. N.J.A.C. 7:27-9 et seq. will ensure SO₂ emissions from fuel-oil firing point and area sources in Warren County are protective of the 1971 SO₂ NAAQS.

Similarly, 25 PA Code Chapter 123.22 (Standards for Contaminants /Sulfur Compound Emission/Combustion units) will also help maintain low SO₂ levels in Warren County. After July 1, 2016, the sulfur content of No. 2 oil or lighter combusted must be 0.05 percent or less. The sulfur content of No. 5, 6, or heavier oil must be 0.5 percent sulfur or less. All sources that combust oil in Pennsylvania will have to meet the sulfur in fuel limits of Chapter 123.22. The regulation has already reduced the SO₂ impact of Martins Creek Power Plant Units 3 and 4 on Warren County. The No. 6 fuel oil now fired by these units must have a sulfur content of 0.5 percent or less instead of the 0.7 percent sulfur limit that applied before the rule became effective on July 1, 2016. 25 PA Code Chapter 123 is a USEPA approved regulation²⁰ included in the Pennsylvania SIP.

3. Monitoring Network

a. SO₂ NAAQS Verification Monitors

The use of several nearby monitors will be used to verify compliance with the SO₂ NAAQS in the maintenance period and is consistent with the approach used and approved by USEPA in the Clean Data Determination. Criteria pollutant monitoring in New Jersey is regulated by the USEPA, which prescribes the design and siting of the monitoring networks, the acceptable monitoring methods, and the minimum quality assurance activities. Only data which meet USEPA requirements can be used to determine compliance with the NAAQS. Currently, there are no significant SO₂ sources in the Warren County nonattainment area.

In New Jersey, SO₂ is measured using USEPA-approved real-time monitoring methods, and data for these pollutants are continuously transmitted to a central data acquisition system. Once an hour, NJDEP posts this air quality data to its website (www.njairnow.net) and to the USEPA's Air Now website (www.airnow.gov). Data is subsequently reviewed and certified and is available from USEPA's Air Quality Database. These procedures will allow for the continual review of accurate SO₂ measurements to verify compliance with the NAAQS in the Warren County nonattainment area.

NJDEP currently operates 9 ambient SO₂ air monitors throughout the State. The SO₂ monitoring network is shown in Figure 4. The Chester and Columbia monitors, along with the Freemansburg SO₂ air quality monitor in Pennsylvania, were selected to define the former Warren County nonattainment area's future air quality. Please note that the Clean Data Determination request²¹ originally used SO₂ data from Pennsylvania's Easton monitor. Subsequent to the NJDEP submittal, the Easton monitor was shutdown and replaced by a

²⁰ 79 FR 39330 (July 10, 2014)

²¹ Letter from Francis Steitz, NJDEP to John Filippelli, EPA Region II dated August 17, 2018. Clean Data Determination Request for the 3-Hour Sulfur Dioxide (NAAQS): Warren Co. Nonattainment Area.

monitor in Freemansburg. The Freemansburg monitor began collecting SO₂ data on February 21, 2018. Details about these monitors are given in Table 6.

Figure 4: New Jersey Sulfur Dioxide Monitoring Network

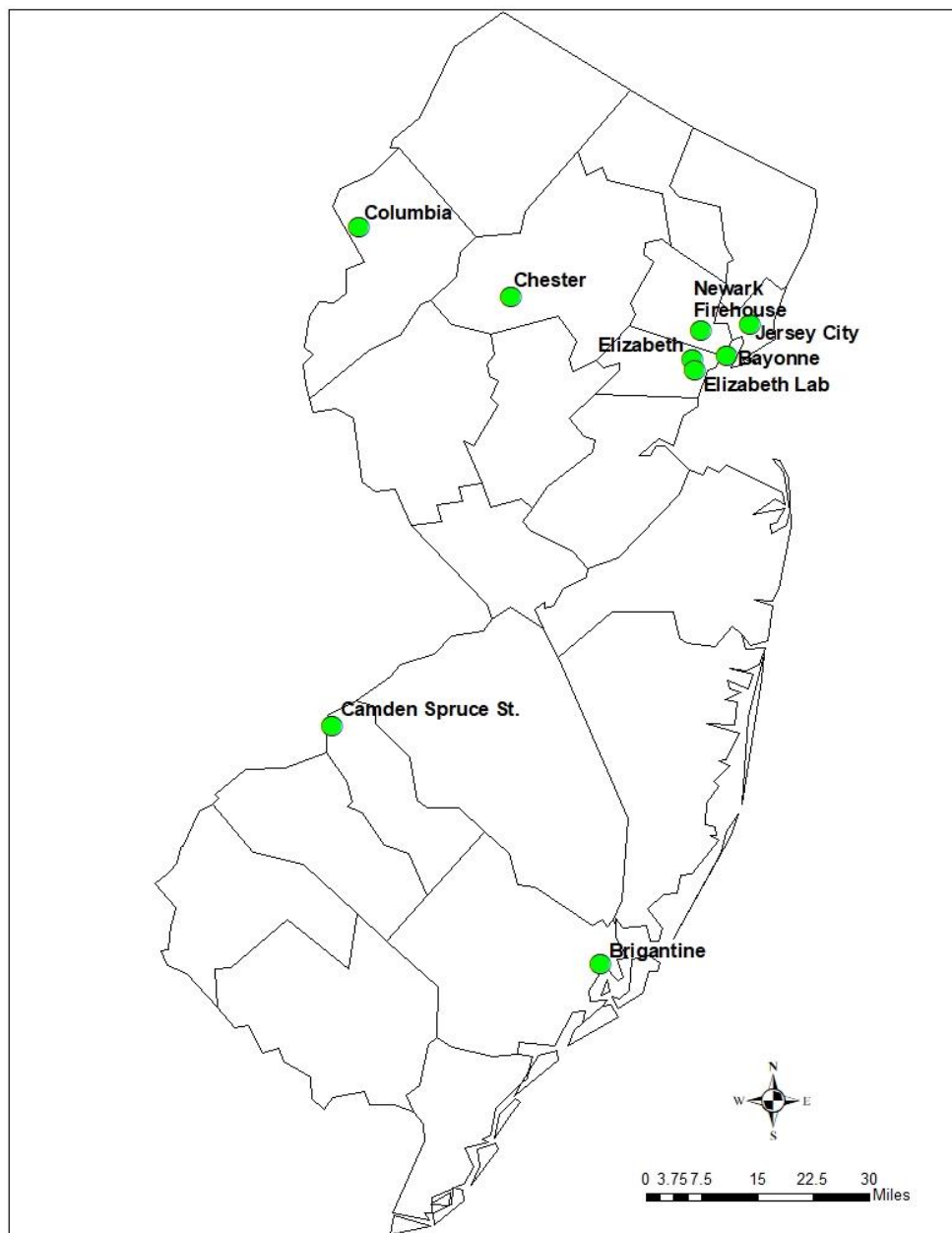


Table 6: Monitoring Stations

STATE	NAME	AQS CODE	COUNTY	CBSA	ADDRESS
NJ	Chester	340273001	Morris	New York-Newark-Jersey City, NY-NJ-PA	Building #1 Dept. of Public Works Off Route 513
NJ	Columbia	340410007	Warren	Allentown-Bethlehem-Easton, PA-NJ	Columbia Wildlife Management Area, Delaware Road
PA	Freemansburg	420950025	Northampton	Allentown-Bethlehem-Easton, PA-NJ	Washington & Cambria Streets, Freemansburg

b. Recent Data from the Verification Monitors

The 1971 SO₂ NAAQS design values for the secondary (3-hour average) and primary (24-hour and annual average) are summarized in Table 7.

A summary of the SO₂ design values for each of the sites are presented in Tables 8 – 10. The design values from Chester, Columbia, and Freemansburg were obtained by generating Raw Data and Design Value Reports from USEPA's Air Quality System (AQS) web application accessed from the website, <https://www.epa.gov/aqs>.

Table 7: National Ambient Air Quality Standards for Sulfur Dioxide (1971)

NAAQS	Average Time	Level	Form
Secondary	3-hour	0.500 ppm (1,300 ug/m ³)	not to be exceeded more than once/year
Primary	24-hour	0.140 ppm (365 ug/m ³)	not to be exceeded more than once/year
Primary	annual	0.030 ppm (80 ug/m ³)	not to be exceeded in a year

Source: 40 CFR Part 50.4 and 40 CFR Part 50.5

Table 8: 3-Hour Average SO₂ Design Value (2nd Highest 3-Hour Average, ppm)

SITE	2015	2016	2017	2018	2019
Chester	0.005	0.004	0.002	0.003	0.003
Columbia	0.004	0.006	0.003	0.005	0.004
Freemansburg	-	-	-	0.004	0.004

Table 9: 24-Hour Average SO₂ Design Values (2nd Highest 24-Hour, ppm)

SITE	2015	2016	2017	2018	2019
Chester	0.003	0.002	0.001	0.002	0.001
Columbia	0.002	0.002	0.002	0.004	0.002
Freemansburg	--	--	--	0.001	0.002

Table 10: Annual Average SO₂ Design Values (Annual Average, ppm)

SITE	2015	2016	2017	2018	2019
Chester	0.000	0.000	0.000	0.000	0.000
Columbia	0.000	0.000	0.000	0.001	0.000
Freemansburg	--	--	--	0.000	0.000

None of the monitors' design values shown in the tables indicate a violation of the 1971 primary or secondary SO₂ NAAQS. The design values in Tables 8 – 10 show SO₂ design values in the region of the Warren County nonattainment area have consistently been significantly below 85 percent of the NAAQS. Therefore, the air quality criteria for submittal of a limited maintenance plan are met. The same conclusion was made with the monitoring data presented in the NJDEP Clean Data Determination request made for the Warren County nonattainment area.²²

4. Verification of Continued Attainment

Verification of the continued maintenance of the SO₂ NAAQS attainment will be accomplished through the ongoing review of SO₂ emissions and monitoring data collected in the area and New Jersey's air permitting and enforcement programs.

The ongoing review of data collected by the monitors described in the previous section will be used to verify continued maintenance of the SO₂ NAAQS attainment in the Warren County nonattainment area. Data from these monitors demonstrates that there has been a significant improvement in SO₂ levels since the area's designation as nonattainment in February 1988. The SO₂ concentrations measured by monitors in the area will be reviewed on a continual basis to verify they remain below the NAAQS in the future.

New Jersey's air permitting and enforcement programs discussed in the next section will track and limit SO₂ emissions from major and minor sources in the area. These actions will help ensure SO₂ emissions will remain low and verify the continued attainment of the SO₂ NAAQS in Warren County. The SO₂ modeling analysis discussed in Section IV.B.2.b provides additional validation that air quality in Warren County has significantly improved in recent years and is well below the NAAQS. The authority of the New Jersey air permitting, and enforcement programs will ensure the large sources of SO₂ emissions in the past (Roche Vitamins/DSM Nutritional Products) will not cause a problem in the future. Pennsylvania and USEPA must ensure that the large sources of SO₂ emissions located in Pennsylvania meet the Good Neighbor conditions of the Clean Air Act and do not interfere with New Jersey's ability to attain and maintain the SO₂ NAAQS.

²² Letter from Francis Steitz, NJDEP to John Filippelli, EPA Region II dated August 17, 2018. Clean Data Determination Request for the 3-Hour Sulfur Dioxide (NAAQS): Warren Co. Nonattainment Area.

5. Contingency Plan

The purpose of the contingency provisions is to assure that any violations of the National Ambient Air Quality Standards that occur after the redesignation of an area to attainment will be corrected promptly.²³

NJDEP's air permitting, and enforcement programs will have jurisdiction over new and modified SO₂ sources located in and near the Warren County nonattainment area thereby ensuring no new NAAQS violations occur. Similarly, new and modified SO₂ sources in Pennsylvania located near the Warren County nonattainment area will and should be permitted by the PADEP through its authority in 25PA Code Chapter 127.

The Prevention of Significant Deterioration (PSD) program applies when a major source, located in an area designated as attainment or unclassifiable for any criteria pollutant, is constructed or undergoes a major modification. Therefore, PSD will apply in Warren County, not nonattainment new source review (NNSR).

New Jersey accepted delegation of the administration of the PSD program from the USEPA on February 22, 1983 (subsequently revised on July 15, 2011) and the provisions of 40 CFR 52.21(b) through (w), related to Prevention of Significant Deterioration. New Jersey's delegated PSD program will evaluate the impact of any new or modified SO₂ sources on the former nonattainment area to assure there are no new violations of the SO₂ NAAQS. These sources will have to meet the Federal PSD permitting requirements such as Best Available Control Technology (BACT) and an air impact analysis to verify there would be no new NAAQS violations.

Other new and modified SO₂ sources located in the area will be regulated by New Jersey's enforcement and permitting programs that operate under rules designated in N.J.A.C. 7:27 and N.J.A.C. 7:27A. Specifically, N.J.A.C. 7:27-8 (Permits and Certificates for Minor Facilities [and Major Facilities without an Operating Permit]) and N.J.A.C. 7:27-22 (Operating Permits) require newly constructed, reconstructed, or modified equipment and control apparatus to incorporate State of the Art (SOTA) in air pollution controls. SOTA control requirements have been developed for the kind and amount of air contaminant emitted by an applicant's equipment or control apparatus.

In addition, N.J.A.C. 7:27-18 (Control and Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rule)) is specifically designed to prevent the occurrence of a new NAAQS violation by a new, reconstructed, or modified air pollutant sources not subject to PSD. Any source predicted to have a SO₂ NAAQS violation must either reduce emissions or obtain sufficient emission offsets to eliminate the NAAQS violation.

N.J.A.C. 7:27-8, 7:27-9, and 7:27-18 are USEPA approved regulations that are included in the New Jersey SIP. Though not part of the SIP, the N.J.A.C. 7:27-22 operating permit program has full approval by the USEPA.

²³ Clean Air Act 42 U.S.C. §7505a(d).

New Jersey does not have jurisdiction to control SO₂ emissions from new or modified sources located in Pennsylvania that may cause an exceedance of the NAAQS in New Jersey. Through Section 110 of the Clean Air Act, States must ensure in their SIPs ("Good Neighbor SIPs") that they do not significantly contribute to a violation of the NAAQS or interfere with the maintenance of NAAQS in a downwind state.

New Jersey notes that Pennsylvania's PSD program in 25 PA Code Chapter 127.81 through 83 will regulate proposed new major sources and major modifications in Pennsylvania. Pennsylvania's authority in 25 PA Code Chapter 127 (Construction, Modification, Reactivation and Operation of Sources) will control minor sources in the area. Both programs require an air impact analysis be conducted, which should also ensure that the emissions from sources do not cause or interfere with attainment or maintenance of the SO₂ NAAQS in Warren County. 25 PA Code Chapter 123 (Standards for Contaminants) and Chapter 127 are USEPA approved regulations that are included in the Pennsylvania SIP.