GOVERNMENT OF PUERTO RICO
DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES

Puerto Rico Non-Attainment State Implementation Plan
Sulfur Dioxide (SO_2) National Ambient Air Quality Standard

Prepared by: Department of Natural and Environmental Resources
Air Quality Area

Objective: To bring into compliance with the 2010 1-Hour Sulfur Dioxide (SO_2) primary NAAQS the designated SO_2 non-attainment areas in Puerto Rico

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Acronyms

AAMN	Attainment Ambient Monitoring Networks
AQCRs:	Air Quality Control Regions
AQS:	Air Quality System
BPIP	Building Profile Input Program
CAA:	Clean Air Act
DNER:	Department of Natural and Environmental Resources
EPA:	Environmental Protection Agency
FIP:	Federal Implementation Plan
FR:	Federal Register
H4H:	Highest Fourth Highest
IRP:	Integrated Resource Plan
LNG:	Liquified Natural Gas
NAAQS:	National Ambient Air Quality Standards
NAA-SIP:	Non-Attainment Area-State Implementation Plan
NANSR:	Non-Attainment New Source Review
ppb:	parts per billion
PREB	Puerto Rico Energy Board
PREPA:	Puerto Rico Electric Power Authority
PREPPA:	Puerto Rico Environmental Public Policy Act
PREQB:	Puerto Rico Environmental Quality Board
PTE:	Potential to Emit
RCAP:	Regulation for the Control of Atmospheric Pollution
SIP:	State Implementation Plan
SO_2:	Sulfur Dioxide
SO_X	other Sulfur Dioxide
tpy:	tons per year
ULSD:	Ultra Low Sulfur Diesel
ug/m^3:	micrograms per cubic meter
USEPA:	Unites States Environmental Protection Agency

1.0 Overview

1.1 INTRODUCTION

Sulfur dioxide (SO_2) is a colorless, reactive air pollutant with a strong odor. The effects of this gas can be a threat to human health, animal health, and plant life. Short-term exposures to SO_2 can harm the human respiratory system and make breathing more difficult. Clinical Studies had demonstrated that people with asthma, particularly children, are more sensitive to the SO_2. The sulfur containing compounds in the material is oxidized in the presence of oxygen to form sulfur dioxide via the following chemical reaction:

$$S + O_2 \rightarrow SO_2$$

High concentrations of SO_2 in the air generally lead to the formation of other sulfur oxides (SO_X) which can react with other compounds in the atmosphere to form small particles, increasing particulate matter concentration and ambient pollution. SO_X can also react with water to form acids.

The general population may be exposed to sulfur dioxide mainly by breathing air that contains it. In addition, one may also be exposed to sulfur dioxide by skin contact with it. Some health effects associated with exposure to SO_2 emissions are: (1) difficult breathing, (2) changes in ability to breathe, and (3) burning nose and throat (ATSDR, 1998). Sulfur dioxide irritates the skin and mucous membranes of the eyes, nose, throat, and lungs. High concentrations of SO_2 can cause inflammation and irritation of the respiratory system, especially during heavy physical activity. The resulting symptoms associated with SO_2 exposure can include: (1) pain when taking a deep breath, (2) coughing, (3) throat irritation, and (4) breathing difficulties. High concentrations of SO_2 can affect lung function, worsen asthma attacks, and worsen existing heart disease in sensitive groups. The gases containing SO_2 can also react with other chemicals in the air and change to a small particle that can get into the lungs and cause similar health effects (NPS, 2018).

Sulfur dioxide ($S0_2$) is one of six "criteria" pollutants scientists have identified as being particularly harmful to human health and the environment. For this reason, the Clean Air Act (CAA) requires the United States Environmental Protection Agency (USEPA or EPA) to set primary air quality standards at a level judged to be requisite to protect the public health with an adequate margin of safety. The CAA also required EPA to establish secondary standards to protect public welfare from any known or anticipated effects associated with the pollutant in the ambient air, including effects on crops, vegetation, wildlife, buildings and national monuments, and visibility. Sulfur dioxide is primarily derived from fossil fuel combustion at power plants and other industrial facilities. Other sources of SO_2 include industrial processes like extracting metal from ore and the burning of high sulfur fuels by locomotives, large ships, and non-road equipment.

1.2 NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

On June 22, 2010 (75 FR 35520) the Environmental Protection Agency strengthened the primary National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO_2). Specifically, EPA replaced the annual and 24-hour primary standards with a new 1-hour SO_2 standard set at 75 parts per billion (ppb) or 196 ug/m^3 as determined in accordance with Appendix T of Title 40 of Code of Federal Regulations (40 CFR), part 50. EPA significantly strengthened the primary standard based on health studies showing that people with asthma experience negative respiratory effects following very short exposure to SO_2 while breathing at elevated rates.

On August 21, 2015, the EPA issued the Data Requirements Rule for the 2010 1-Hour SO_2 Primary NAAQS (80 FR 51052). Under this rule, each air regulatory agency was required to submit a list to the EPA by January 15, 2016, that identified all sources within its jurisdiction that have SO_2 emissions that exceeded the 2,000 tons per year (tpy) annual threshold. The rule requires air quality characterization of the area associated with each listed source and provides two options to undertake this characterization: (1) the use of monitoring or (2) modeling the impacted Air Basin using approved EPA dispersion models.

On December 21, 2015, the Department of Natural and Environmental Resources (DNER), submitted to the EPA the list of sources with SO_2 emissions above the 2,000 ton per year statutory threshold. Table # 1 below presents the sources included in the notification provided by the DNER, as well as their SO_2 emissions, as reported.

Table # 1: Source with emission on or above 2,000 ton per year of SO_2.
As reported to EPA on December 21, 2015.

		SO_2 Emission Rate (ton/year)	
Source	Municipality	Allowable	Actual
PREPA Aguirre Power Plant	Salinas	30,038.09	9,264.11
PREPA South Coast Steam Power Plant[1]	Guayanilla	11,505.53	8,336.43
PREPA San Juan Power Plant	San Juan	7,787.05	4,903.39
PREPA Palo Seco Power Plant	Toa Baja	17,344.16	3,125.37

The EPA explained in the Data Requirements Rule (80 FR 51057) that the current ambient SO_2 monitoring network, overall, is not appropriately positioned / located, or of adequate size, for purposes of demonstrating compliance with the new standard, to characterize and measure the ambient air quality around many of the larger emitting SO_2 sources in operation today in the United States, including the Island of Puerto Rico. The EPA stated that, because ambient SO_2 concentrations are not the result of complex chemical reactions (unlike ozone or $PM_{2.5}$), they can be modeled accurately using well understood air quality modeling tools, especially in areas where one or only a few sources exist. Air quality modeling and ambient monitoring are appropriate tools for characterizing ambient air quality for purposes of informing

1 While PREPA South Coast was identified in Table 1 as a source with equal or greater than 2,000 tons per year of SO_2, the modeling analysis determined this source did not contribute to non-attainment, resulting in the area near and surrounding PREPA South Coast to be designated attainment.

future decisions to implement the SO_2 NAAQS. Therefore, both options are available to the state to characterize the areas geared to demonstratecompliance with the new SO_2 1-hour NAAQS promulgated.

If the air monitoring option was selected, the EPA required that the monitors being used to satisfy this rulemaking must be operational by January 1, 2017. It recognizes that the logistical and financial burdens of installing an ambient air monitoring station can vary in difficulty and the resources required. The EPA believes that any further delay in air quality characterization around sources identified as a result of this rulemaking will delay implementation of the standard and public health protection in areas where there may be a violation of the standard. The DNER made several attempts to relocate the SO_2 air monitoring network, but lack of infrastructure or adequate site characteristics limited the capability of the agency to relocate the existing monitors and its stations. In order to comply with regulatory requirements, on June 20, 2016, DNER notified EPA that the modeling option was going to be used to characterize peak 1-hour SO_2 concentrations. The document also enclosed the Dispersion Modeling Protocol required under 40 CFR 51.1203(d).

In March of 2017, the DNER submitted to EPA a 1-hour SO_2 modeling assessment and boundary recommendations for the designation of Puerto Rico area. DNER provided updated modeling between October and November 2017, in response to EPA comments on the March 2017 submission, which allowed EPA to finalize the SO_2 designation for Puerto Rico.

1.3 GEOGRAPHICAL DESPCRIPTION

On January 9, 2018, EPA notified in the Federal Register (83 FR 1098) the designation of two (2) areas, comprised of several wards in different municipalities of Puerto Rico, as non-attainment for the new SO_2 NAAQS. This designation was based on EPA mathematical dispersion modeling, as provided by the regulation. According to the dispersion model's results, the Puerto Rico Electric Power Authority (PREPA) Plants located in the designated non-attainment areas were the only contributors of the NAAQS exceedances.

DNER's modeling assessment indicates the main SO_2 emitters in the non-attainment areas are: PREPA San Juan Power Plant and PREPA Palo Seco Power Plant in the San Juan Area, and PREPA Aguirre PowerPlant in Guayama-Salinas Area. Table # 2 presents the designated non-attainment areas for sulfur dioxideas defined in the Federal Register. Note that the areas are defined by municipalities and wards.

Table #2: Designated non-attainment areas as defined in the Federal Register

San Juan Area	Guayama - Salinas Area

• Cataño Municipality (All)
• Toa Baja Municipality (Partial)
  o Palo Seco Ward
  o Sabana Seca Ward
• San Juan Municipality (Partial)
• Guaynabo Municipality (Partial)
• Bayamón Municipality (Partial)
	• Salinas Municipality (Partial)
	  o Aguirre Ward
	  o Lapa Ward

Figure 1: The striped area includes the non-attainment municipalities and wards. The map also presents the site location for PREPA San Juan and PREPA Palo Seco Power Plants

Figure 2: The striped area includes the non- attainment municipality and wards. The map also presents the site location for PREPA Aguirre Power Plant

2.0 CLEAN AIR ACT REQUIREMENTS

As required by the CAA, states, including the Government of Puerto Rico must develop a Non-Attainment Area State Implementation Plan (NAA-SIP) that meets the requirements of Section 172(c) of the CAA. According to this Section the required components of the NAA-SIP are: (1) Attainment Demonstration, (2) Contingency Measures, (3) Emission Inventory, (4) Reasonable Further Progress, (5) Non-attainment New Sources Review, (6) Reasonably Available Control Measure and (7) Reasonable Available Control Technology. As stated in Section 191(a) of the CAA the state should submit an NAA-SIP with a demonstration to reach attainment within 5 years of the designation.

Emissions inventory and source emission rate data serve as the foundation for modeling and other requiredanalyses. Sulfur dioxide emissions come from anthropogenic sources such as fossil fuel combustion and biogenic sources such as volcanic activity. Anthropogenic emissions of SO_2 in Puerto Rico are mainly due tocombustion of fossil fuels by external combustion boilers (~90 %), internal combustion engines (~1.6%) and transportation-related sources (~8.4%) based on 2014 EPA National Emission Inventory (USEPA, 2014). DNER prepared the Baseline National Emission Inventory 2014 for SO_2 Non Attainment Areas for San Juan and Guayama-Salinas Areas, and the emission data is shown in Figures #3 and #4.

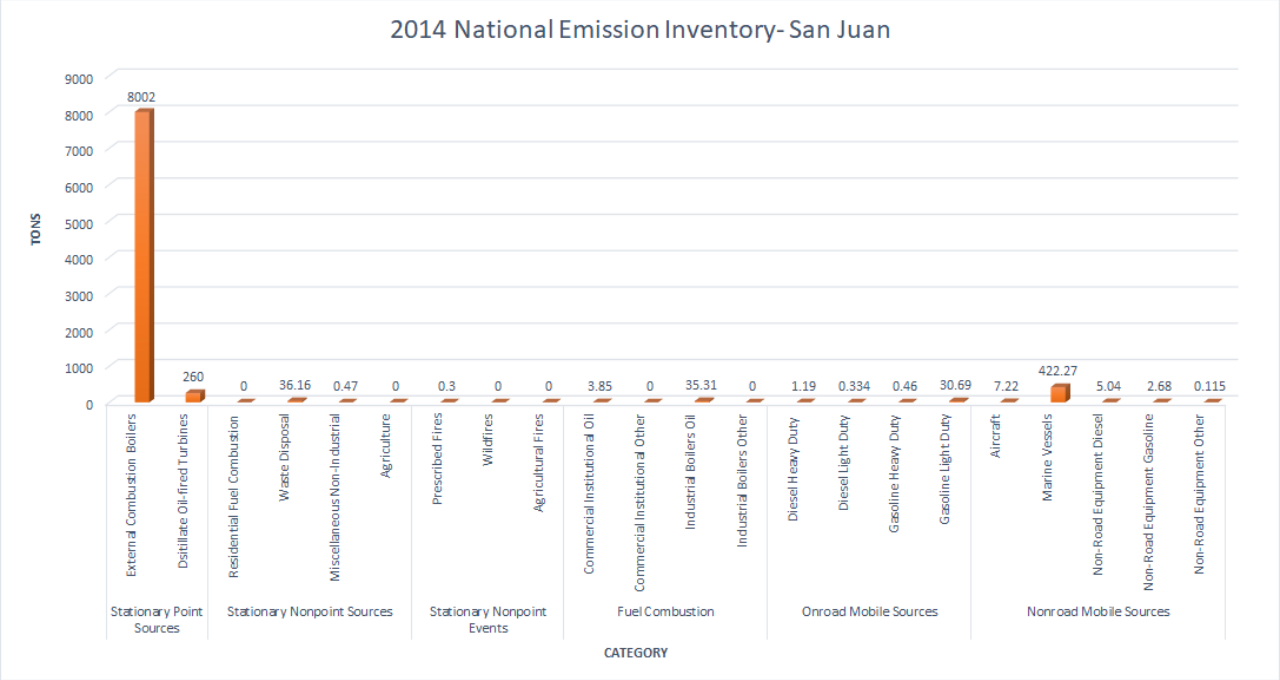
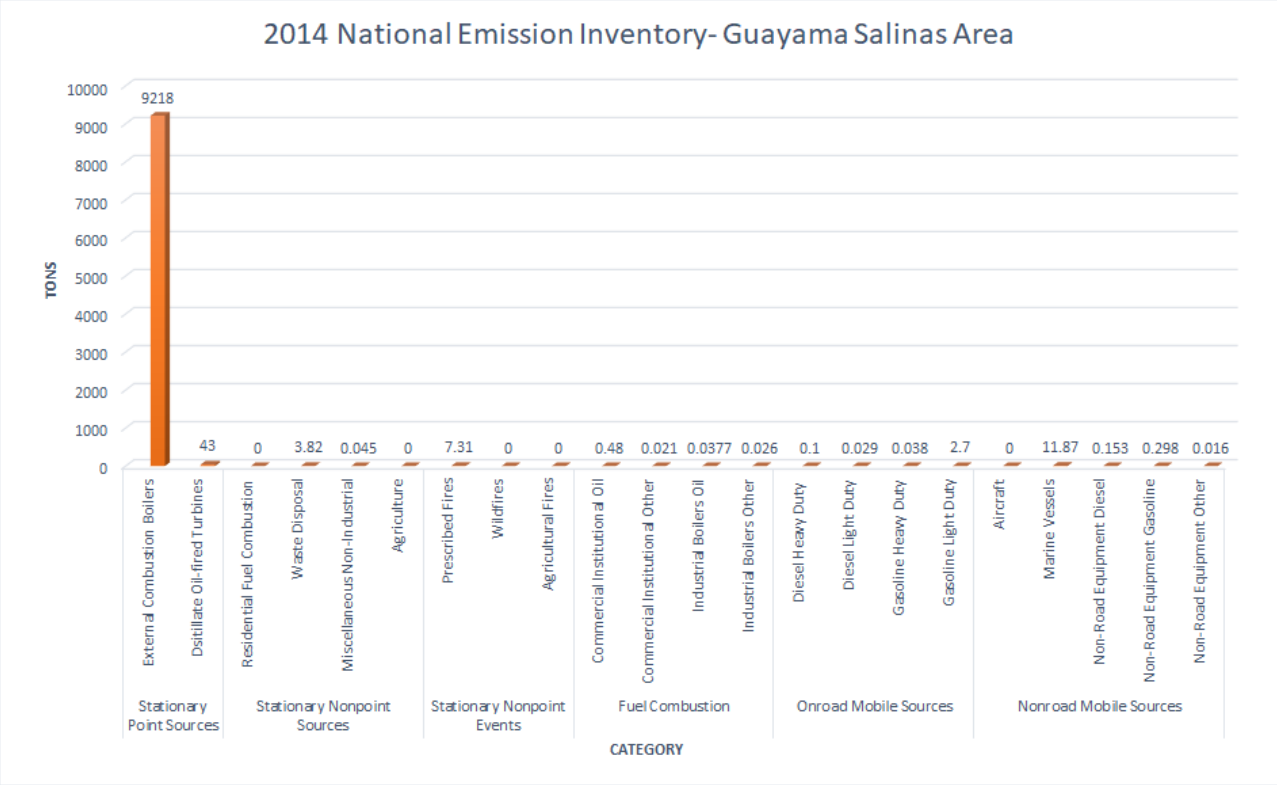


Figure #3: SO_2 Non-Attainment Area- San Juan



Figure#4: SO_2 Non-Attainment Area-Guayama-Salinas

As required under Section 172(c)(3) of the CAA, the air regulatory agency should develop a comprehensive, accurate and current inventory of actual emission from all relevant sources of SO_2. Inventory should be consistent with data requirements codified in 40 CFR, part 51, Subpart A. For more information about the 2014 baseline emission data, refer to the Puerto Rico 1-Hour SO_2 Non-Attainment Area State Implementation Plan: Baseline Emission Inventory 2014 included in Appendix 10.1.

DNER prepared the projected emission inventory 2019-2029, for the 1- hour SO_2 non-attainment SIP, in the areas of San Juan and Guayama-Salinas. The significant SO_2 emitters in each area are: PREPA San Juan and Palo Seco in San Juan, and PREPA Aguirre, in Guayama-Salinas. All of them are comprised primarily of external combustion boilers, combined cycle and internal combustion generation units. See Stationary Point Sources on Figures 3 & 4 for PREPA's facilities SO_2 emissions.

The projected emission inventory includes the SO_2 allowable emissions, from 2019-2029. This inventory shows the required reductions in SO_2 potential emissions, and the emission unit retirements recommended by PREB, that PREPA facilities should reach to comply with the 1-hour SO_2 NAAQS. The 1-hour SO_2 SIP attainment strategy, using PREPA's emission unit retirements recommended by PREB/IPR schedule, will occur after the required attainment date of April 9,2023. See Table #3 for a summary of the total projected emission reductions for the PREPA facilities.

Table #3: PREPA Projected SO_2 Allowable Emissions 2019-2029

PREPA Facility	Emission Point	AERMOD Model ID	SO_2 Current Permit Allowable Emission (TPY) 2019-2022	SO_2 Boilers Bunker 6 and Gas Turbines/Combined Cycle ULSDF) Interim Plan (TPY) February 1, 2023[4]		ULSD Fuel and Emission Units Retirements Final SO_2 Allowable Emission (TPY) 2022-2029	Final Operating Status and Fuel Type 2022-2029	ULSD Fuel Switching or Retirement Date[1, 2]
Palo Seco	Boiler 1	PS1	1966.01	1966.01	Bunker 6	0	Retired	6/30/2023
Palo Seco	[3]Boiler 2	PS2	1966.01	0	-	0	Retired	6/30/2023
Palo Seco	Boiler 3	PS3_1, PS3_2	4517.93	4517.93	Bunker 6	0	Retired	12/31/2024
Palo Seco	Boiler 4	PS4_1, PS4_2	4517.93	4517.93	Bunker 6	0	Retired	12/31/2025
Palo Seco	Power Block 1-1, 1-2	PSGT1_1, PSGT1_2	1333.78	4.0	ULSD	4.0	Operating/ ULSD	2/1/2023
Palo Seco	Power Block 2-1	PSGT2_1	666.89	2.0	ULSD	2.0	Operating/ ULSD	2/1/2023
Palo Seco	[3]Power Block 2-2	PSGT2_2	666.89	0	-	0	Retired	6/30/2023
Palo Seco	[3]Power Block 3-1	PSGT3_1	666.89	0	-	0	Retired	6/30/2023
Palo Seco	[3]Power Block 3-2	PSGT3_2	666.89	0	-	0	Retired	6/30/2023
Palo Seco	FT8 MobilePack 1	MP1	62.66	1.8	ULSD	1.8	Operating/ ULSD	2/1/2023
Palo Seco	FT8 MobilePack 2	MP2	62.66	1.8	ULSD	1.8	Operating/ ULSD	2/1/2023
Palo Seco	FT8 MobilePack 3	MP3	62.66	1.8	ULSD	1.8	Operating/ ULSD	2/1/2023
San Juan	[5]HRSG 5& 6	SJ56	741.96	22.5	ULSD	42.9	Operating ULSD/LNG	Dual fuel since 2019/ULSD no later than 2/1/2023
San Juan	Boiler 7	SJ7_1, SJ7_2	2368.35	2368.35	Bunker 6	0	Retired	6/30/2023
San Juan	Boiler 8	SJ8_1, SJ8_2	2368.35	2368.35	Bunker 6	0	Retired	6/30/2023
San Juan	Boiler 9	SJ9_1, SJ9_2	2368.35	2368.35	Bunker 6	0	Retired	12/31/2024
San Juan	Boiler 10	SJ10_1, SJ10_2	2368.35	2368.35	Bunker 6	0	Retired	6/30/2023
Aguirre	AG1	AG1_1, AG1_2	9581.5	9581.5	Bunker 6	0	Retired	12/31/2025
Aguirre	AG2	AG2_1, AG2_2	9581.5	9581.5	Bunker 6	0	Retired	12/31/2026
Aguirre	Gas Turbine CC1-1HRSG	CC1-1HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2028
Aguirre	Gas Turbine CC1-2HRSG	CC1-2HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2028
Aguirre	Gas Turbine CC1-3HRSG	CC1-3HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2028
Aguirre	Gas Turbine CC1-4HRSG	CC1-4HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2028
Aguirre	Gas Turbine CC2-1HRSG	CC2-1HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2029

Aguirre	Gas Turbine CC2-2HRSG	CC2-2HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2029
Aguirre	Gas Turbine CC2-3HRSG	CC2-3HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2029
Aguirre	Gas Turbine CC2-4HRSG	CC2-4HRSG	1343.73	4.0	ULSD	0	Retired	12/31/2029
Aguirre	Gas Turbine AGGT2-1, 2-2	AGGT2-1, AGGT2-2	1333.78	4.0	ULSD	4.0	Operating/ ULSD	2/1/2023

[1]Information about emission unit retirements provided by the Puerto Rico Energy Board (PREB) via letter to PRDNER on October 18, 2022 and updated on November 15, 2022.

[2]According to Rule 425 of the RCAP, the emission units from PREPA San Juan, Palo Seco and Aguirre shall be retired as early as the dates listed in Table 3 above unless an alternative date is authorized by the PREB. This alternative date shall be no later than December 31, 2025 for PREPA San Juan and Palo Seco, and for PREPA Aguirre, shall be no later than December 31, 2029.

[3]The PS2, PB2-2 and PB3-2 units were permanently shut-down and out of use on November 9, 2022 to generate netting credits for MobilePac units according to EPA's determination regarding the PSD/SO_2 NNSR Non-Applicability per 40 CFR Part 52.21, Appendix S and DNER's emission source construction permit PFE-70-0120-0010-II-C. The unit PB3-1 is considered to be a retired unit in the IRP, according to the PREB retirement schedule submitted to PRDNER.

[4]Information about ULSD fuel switching provided by PREPA.

[5]This unit was converted to dual fuel Diesel/LNG since late 2019, PREPA's Public Hearing comment. In the Interim Plan, the unit will change from regular diesel to ULSD. For the attainment modeling scenario, the 100% LNG PTE rate was considered because the SO_2 emissions are higher than using ULSD, more conservative scenario.

PREB provided DNER a schedule of retirements for the PREPA emission units, based on the integration of the renewable energy to the system. PREB mentioned that once the renewable energy projects start, the older emission units in PREPA fleet will be retired or replaced by this new generation. According to PREB's retirement schedule, the SO_2 emission reductions projection, due to the PREPA emission unit retirements will be completed around year 2029. Based on the PREB schedule, DNER understand that the December 31, 2025 and December 31, 2029 will be the attainment dates for the 1- hour SO_2 SIP for San Juan Area and Guayama-Salinas Area, respectively.

To satisfy the projected emission inventory requirement, the DNER prepared a document titled: Puerto Rico 1-Hour SO_2 Non-Attainment Area State Implementation Plan: 2019-2029 Projected Emission Inventory- PREB, that is included in Appendix 10.2.

4.0 ATTAINMENT DEMONSTRATION

The two (2) non-attainment areas in Puerto Rico for the 1-hour SO_2 NAAQS are San Juan and Guayama-Salinas. The San Juan non-attainment area, includes the following municipalities and wards; within Cataño, (Palmas and Barrio Pueblo Wards), in Toa Baja (Palo Seco and Sabana Seca Wards), within Guaynabo (Pueblo Viejo Ward), in Bayamón (Juan Sánchez Ward) and in San Juan (San Juan Antiguo,Santurce, Hato Rey Norte and Gobernador Piñero Wards). The rest of the wards in each municipality were classified as attainment/unclassified.

The largest SO_2 sources in San Juan area are, PREPA San Juan in San Juan municipality and PREPA Palo Seco in Toa Baja. Both sites are located within urban areas. In Guayama -Salinas area, the major SO_2 emissions comes from PREPA Aguirre, and this facility is located in Salinas municipality. The Guayama- Salinas area is classified as rural. See modeling protocol for additional information of the area characterization. See Figures 3 and 4 for SO_2 emission data.

The other SO_2 sources in San Juan area are: Bacardí, Edelcar and other minor sources, and Applied Energy System (AES) and other minor sources in Guayama-Salinas area. Previously modeling analysis showed that the SO_2 emissions contributions for these industries were insignificant. However, these minor sources emissions contributions will be addressed with the 1- hour SO_2 background concentration.

The attainment demonstration will be conducted with dispersion modeling using the emission projections based on PREPA emission units retirements, due to the integration of new renewable sources, according to PREB schedule. In addition to dispersion modeling, ambient air monitoring network (AAMN) in the designated non-attainment areas will be used to measure current air quality and to compare the results of the SO_2 ground level concentration values predicted through the dispersion modeling analysis. This NAA-SIP developed by the DNER was prepared to establish the Government of Puerto Rico's strategy to reach compliance of the 2010 Sulfur Dioxide (SO_2) primary NAAQS.

In particular, the NAA-SIP that has been developed will use the modeling tools available through the EPA-approved modeling program and will be complemented with an ambient air monitoring network geared to compare actual ground-level concentrations of SO_2 within the two (2) designated Non-Attainment Areas. The locations where these new monitoring stations will be located six (6) units per Non-Attainment Area are to be the same as the points of high SO_2 concentration calculated through the modeling exercise. DNER's goal is to compare the Model concentration predictions with the data secured from these new monitoring stations. All data to be secured will be fully validated through the EPA's Quality Assurance / Quality Control guidelines implemented at the DNER.

Modeling Methodology

The dispersion model used for the analysis is the AERMOD modeling system. This model is the USEPA recommendation in the Guideline on Air Quality Models [2] (GAQM), for the modeling of the 1-hour SO_2 NAAQS. The AERMOD model version used by DNER, is the latest available or the 21112. The AERMOD default modeling options are used in the analysis.

DNER attainment modeling scenario in each non-attainment area is based on the potential emissions or PTE rate and the PREB proposed emission unit retirements of the PREPA fleet,through the integration of

[2] 40CFR Part 51. Guideline on Air Quality Models. Environmental Protection Agency. January 2017.

renewable projects to the power grid. The modeling scenarios have the certified SO_2 emissions that PREPA provided DNER. PREPA calculated the emission rates in all the emission units that will stay operating in their facilities. See Modeling Protocol on Appendix 10.3 for SO_2 emissions data and modeling strategy.

The model for San Juan area, includes the allowable emissions of PREPA San Juan and PREPA Palo Seco, in the same modeling run, due to the proximity of each plant. The model for Guayama-Salinas area, only considers the allowable emissions for PREPA Aguirre. The contribution to the 1- hour SO_2 emissions from nearby sources in both non-attainment areas, is represented by the 1- hour SO_2 background concentration.

The AERMOD parameters used in the analysis were the default options, including building downwash for all PREPA plants. The emission units stack parameters data including the updated coordinates, was submitted and revised by PREPA. PREPA submitted DNER the height, width, and length of the buildings in each facility, along with maps identifying the structures. PREPA also submitted the BPIP Prime output model data to be used in the 1- hour SO_2 attainment model in San Juan and Guayama-Salinas areas. DNER used this BPIP data for PREPA San Juan, Palo Seco and Aguirre.

DNER use a coarse and refined receptor grid for the modeling analysis. The coarse grid is used to determine the maximum 1-hour SO_2 concentrations and the extension of the area of significant impact, or the area where the model predicts violations of the 1-hour SO_2 NAAQS. The refined grid is denser and covers the area where the previous model predicts the 1-hour SO_2 maximum concentration. See modeling protocol for additional information about the receptor grids.

The onsite meteorological data for the 1-hour SO_2 SIP model, was provided by PREPA and reprocessed by DNER. PREPA submitted DNER, meteorological data from PREPA San Juan, PREPA Palo Seco and PREPA Aguirre stations. The data from PREPA San Juan is from 2013 and in the case of PREPA Aguirre, thedata is from years 2014-2016.

The SO_2 background concentration is a Tier 1 approach or based on a monitored design value. The design value is from the SO_2 monitor at Guayama, AQS-72-057-009. The concentration is 47 ug/m^3 or 18 ppb, and this value will be added to the AERMOD model result, or the Highest Fourth Highest (H4H).

Model Results

The AERMOD model results for the San Juan and Guayama-Salinas non-attainment areas demonstrated attainment with the 1- hour SO_2 NAAQS. According to the model results, the H4H concentration was below the NAAQS. The Table 4 and 5 shows the model results in each non-attainment areas.

Table #4: 1-Hour Modeling Results for the SO_2 SIP- San Juan Area

Industry	East (m)	North (m)	Background (µg/m^3)	Modeling Result H4H (µg/m^3)	Final Result (µg/m^3)	NAAQS (µg/m^3)
PREPA San Juan & Palo Seco	801053.5	2039722	47	0.518	47.518	196
Facility Contribution to the San Juan Area H4H (µg/m^3)						
PREPA San Juan Facility Contribution	801053.5	2039722	0.00053			
PREPA Palo Seco Facility Contribution	801053.5	2039722	0.518			

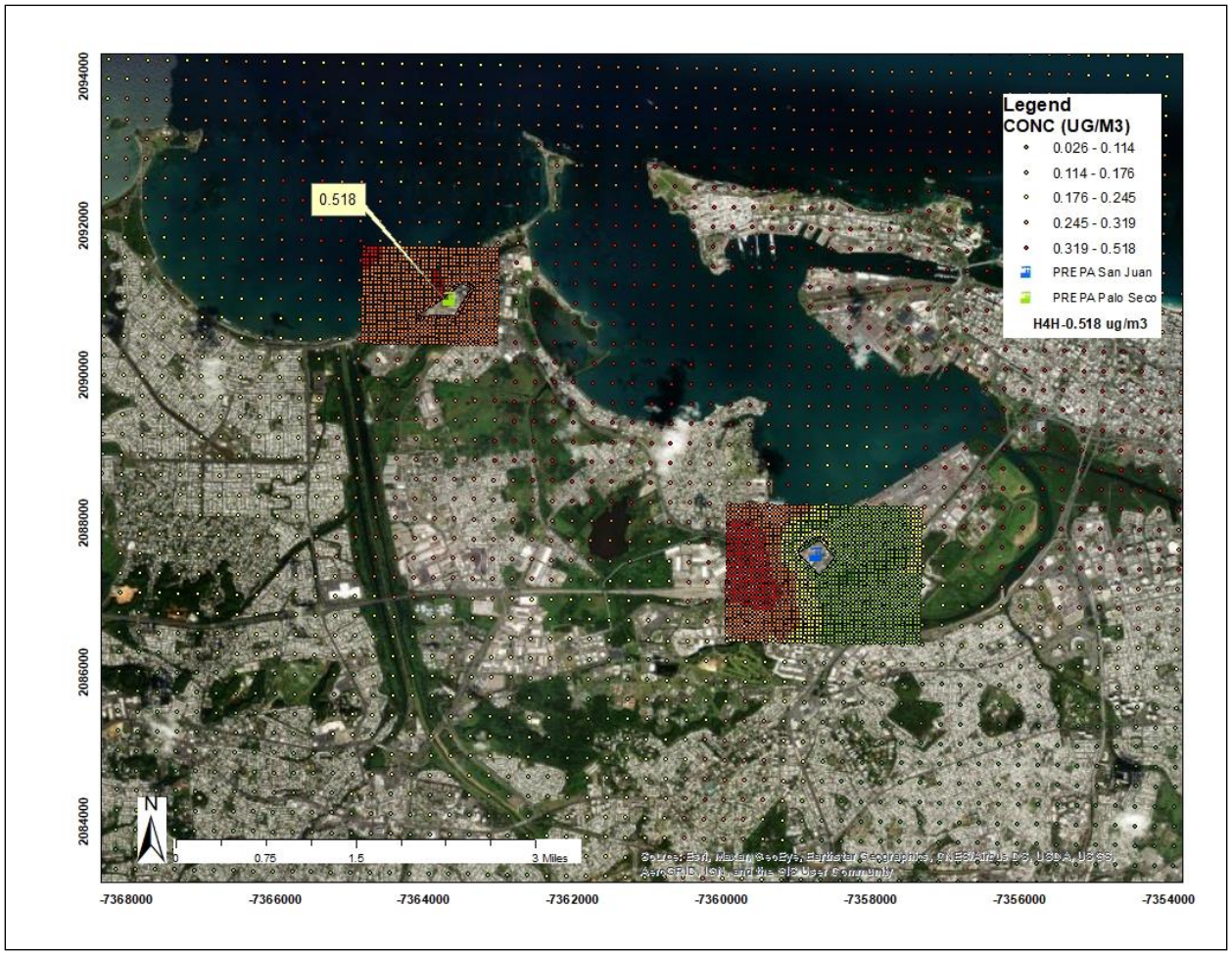
Table #5: 1-Hour Modeling Results for the SO_2 SIP- Guayama-Salinas Area

Industry	East (m)	North (m)	Background (µg/m^3)	Modeling Result H4H (µg/m^3)	Final Result (µg/m^3)	NAAQS (µg/m^3)
PREPA Aguirre	793080	1987265	47	0.1912	47.191	196

The H4H in San Juan area was 47.518 µg/m^3 and was registered to the northwest of PREPA Palo Seco facility fence line. PREPA Palo Seco had the major contribution to this concentration. Refer to Figure 5.

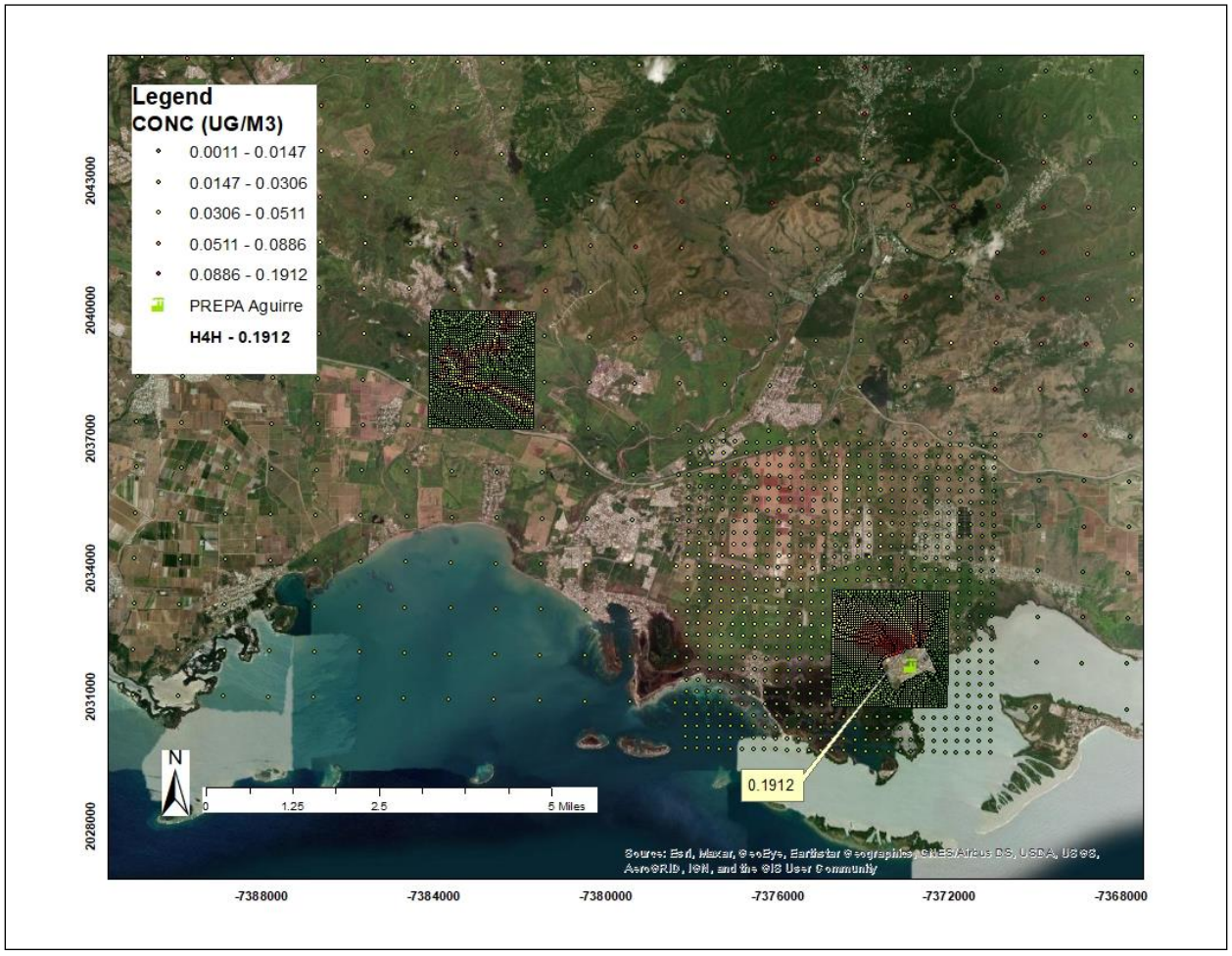
In the Guayama-Salinas area the H4H was 47.191 µg/m^3 and was registered to the north at the fence line area of PREPA Aguirre. Refer to Figure 6. The complete report for the 1-hour SO_2 SIP modeling results is included in Appendix 10.4.

Figure #5: San Juan Area H4H Modeling Results



The Figure 5 presents the Highest Fourth Highest (H4H) AERMOD modeling concentration in San Juan Area, using the potential SO_2 emissions for PREPA San Juan and Palo Seco. The concentration does not include the background of 47 µg/m^3.

Figure 6: Guayama-Salinas Area H4H Modeling Results



The Figure 6 presents the Highest Fourth Highest (H4H) modeling concentration for PREPA Aguirre, using the potential SO_2 emissions, in Guayama area. The concentration does not include the background of 47 µg/m^3.

5.0. NON-ATTAINMENT NEW SOURCE REVIEW 172 (c)(5)

Permits for new and modified major stationary sources.

The location or construction of any new major stationary source, or major modification, or significant source shall obtain a location approval from the DNER, prior to its construction in accordance with Rule 201 of Regulation for the Control of Atmospheric Pollution (RCAP). The DNER shall notify the public of the location approval application. An application for location approval shall include information about alternative sites, proposed facility size, production, processes, and environmental control techniques that demonstrate that the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification.

The non-attainment NSR program would ensure that the construction and modification of major stationary sources of the non-attainment pollutant will not interfere with reasonable further progress toward the attainment of the NAAQS. More specifically, the applicable statutory requirements include but are not limited to:

- The installation of Lowest Achievable Emissions Rate (LAER) control technology;
- The acquisition of emissions reductions to offset new emissions of non-attainment pollutant(s);
- Certification that all major sources owned and operated in the state by the same owner are in compliance with all applicable requirements under the CAA;
- A demonstration via an analysis of alternative sites, sizes, production process, and environmental control techniques shows that the benefits of a proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification; and
- An opportunity for a public hearing and written comment on the proposed permit.

Non-attainments provisions are included in Rule 210 for existing major stationary sources that undergo a major modification for that non-attainment pollutant and for new major stationary source construction that equals or exceeds the major source threshold for that non-attainment pollutant.

The SO_2 limits and requirements for existing sources located in the non-attainment SO_2 areas of San Juan and Guayama-Salinas are included in Rule 425. This rule requires control measures to reach attainment or improve air quality using different alternatives, such as, switching fuel to ultra low sulfur diesel, LNG and emission unit retirements.

6.0 REASONABLE FURTHER PROGRESS 172 (c)(2) CAA

This NAA-SIP has been developed based on the integration of renewable energy sources, a fuel-switching program under which the PREPA power generation fleet located within the designated Non-Attainment Areas will be switching diesel fuel to Ultra Low Sulfur Diesel (ULSD) and retiring emission units according to PREB schedule, to provide attainment at the San Juan and Guayama-Salinas Non-Attainment Areas.

On August 24, 2020, the Energy Bureau issued the IRP Final Order, with respect to the Integrated Resource Plan ("IRP") of the PREPA.[3] The Approved IRP includes a Modified Preferred Resource Plan (Action Plan) considering specific power generation capacity additions[4] and retirements.[5] In the Approved IRP, the Energy Bureau established a schedule for minimum quantities of renewable resources and battery energy storage resources and directed PREPA to submit a renewable resource and battery energy storage procurement plan. The Approved IRP included a program for six (6) tranches of procurement for renewable energy and battery storage resources from third parties,[6] in support of, among other things, meeting Act 17-2019[7] targets for renewable energy installations.[8]

The schedule of minimum quantities of renewables and battery storage additions is expected to be as follows:

Table #6: PREB Procurement Tranches Dates

Procurement Tranche	RFP Target Release Date	Solar PV or equivalent other energy, MW	4-hr. Battery Storage equivalent, MW
2-3	September 2022	1000	500
4-5	March 2023	1000	500
6	September 2023	750	125

Based on the foregoing estimates, the integration of renewables and storage resources mandated by the Approved IRP is expected to be as follows:

[3] Final Resolution and Order on the Puerto Rico Electric Power Authority's Integrated Resource Plan, *In re. Review of the Puerto Rico Electric Power Authority Integrated Resource Plan,* Case No. CEPR-AP-2018-0001, August 24, 2020 ("Approved IRP").
[4] Id., ¶¶847-867, pp. 263-269.
[5] Id., ¶¶869-873, pp. 270-271.
[6] Id., ¶ 860, pp. 266-268.
[7] Known as *Puerto Rico Energy Public Policy Act* ("Act 17-2019").
[8] Approved IRP, p. 266.

Table #7: PREB Integration of Renewables and Storage Resources Expected Commercial Operational Date

Updated Expected Integration of Renewables Contract	Project Capacity	Generation Type	Expected Commercial Operational Date
Tranche #1-PPOA-1	25 MW AC	PV Solar	June 2024
Tranche #1-PPOA-2	20 MW AC	PV Solar	June 2024
Tranche #1-PPOA-3	100 MW AC	PV Solar	June 2024
Tranche #1-PPOA-4	29.975 MW AC	PV Solar	June 2024
Tranche #1-PPOA-5	20.70 MW AC	PV Solar	June 2024
Tranche #1-PPOA-6	33 MW AC	PV Solar	June 2024
Tranche #1-PPOA-7	25 MW AC	PV Solar	June 2024
Tranche #1-PPOA-8	35 MW AC	PV Solar	June 2024
Tranche #1-PPOA-9	25 MW AC	PV Solar	June 2024
Tranche #1-PPOA-10	80 MW AC	PV Solar	June 2024
Tranche #1-PPOA-11	120 MW AC	PV Solar	June 2024
Tranche #1-PPOA-12	100 MW AC	PV Solar	June 2024
Tranche #1-PPOA-13	60 MW AC	PV Solar	June 2024
Tranche #1-PPOA-14	38.7 MW AC	PV Solar	June 2024
Trance #1-PPOA-15	60 MW AC	PV Solar	June 2024
Tranche #1-PPOA-16	25 MW AC	PV Solar	June 2024
Tranche #1-PPOA-17	32.1 MW AC	PV Solar	June 2024
Tranche #1-PPOA-18	20 MW AC	PV Solar	June 2024
Tranche #1-ESSA-19	100 MW (400 MWh or equivalent)	Energy Storage	June 2024
Tranche #1-ESSA-20	100 MW (400 MWh or equivalent)	Energy Storage	June 2024
Tranche #1-ESSA-21	20 MW (80 MWh or equivalent)	Energy Storage	June 2024
Tranche #1-ESSA-22	20 MW	Energy Storage	June 2024
Tranche #1-ESSA-23	100 MW	Energy Storage	June 2024
Tranche #1-ESSA-22	25 MW	Energy Storage	June 2024
Tranche #1-ESSA-22	50 MW	Energy Storage	June 2024
Tranche #1-ESSA-22	50 MW	Energy Storage	June 2024
Tranche #1-ESSA-22	25 MW	Energy Storage	June 2024
Tranche #1-GSA-23	17 MW	Grid Service	June 2024
Amended-PPOA-Ciro One Salinas, LLC	90 MW	PV Solar	December 2023
Amended PPOA Xzerta Tec Solar I, LLC	60 MW	PV Solar	December 2023
Amended PPOA Punta Lima Wind, LLC	26 MW	Wind	August 2024
Tranche #2 and #3	1000 MW (Aggregate)	Renewable	June 2025
Tranche #2 and #3	500 MW (Aggregate)	Storage	June 2025
Tranche #4 and #5	1,000 MW (Aggregate)	Renewable	December 2025
Tranche #4 and #5	500 MW (Aggregate)	Storage	December 2025
Tranche #6	750 MW (Aggregate)	Renewable	June 2026
Tranche #6	125 MW (Aggregate)	Storage	June 2026
TOTAL	5,282.45 MW		

As part of the SIP, DNER proposes an Interim Plan, to strengthen the existing SIP to improve air quality. The Interim Plan proposes fuel switching from diesel to ultra-low sulfur diesel (ULSD) incertain units, starting February 1, 2023, as described below:

Table #8: Interim Plan (PREPA Fuel Switching to ULSD)

Facility	Units	Compliance Start Date	Projected Fuel Conversion
PREPA San Juan	SJ5/SJ6	2/1/2023	ULSD
PREPA Palo Seco	PSGT 1-1	2/1/2023	ULSD
PREPA Palo Seco	PSGT 1-2	2/1/2023	ULSD
PREPA Palo Seco	PSGT 2-1	2/1/2023	ULSD
PREPA Palo Seco	Mobile Pac 1	2/1/2023	ULSD
PREPA Palo Seco	Mobile Pac 2	2/1/2023	ULSD
PREPA Palo Seco	Mobile Pac 3	2/1/2023	ULSD
PREPA Aguirre	AGGT2-1	2/1/2023	ULSD
PREPA Aguirre	AGGT2-2	2/1/2023	ULSD
PREPA Aguirre	CC1-1HRSG	2/1/2023	ULSD
PREPA Aguirre	CC1-2HRSG	2/1/2023	ULSD
PREPA Aguirre	CC1-3HRSG	2/1/2023	ULSD
PREPA Aguirre	CC 1-4HRSG	2/1/2023	ULSD
PREPA Aguirre	CC 2-1HRSG	2/1/2023	ULSD
PREPA Aguirre	CC2-2HRSG	2/1/2023	ULSD
PREPA Aguirre	CC2-3HRSG	2/1/2023	ULSD
PREPA Aguirre	CC2-4HRSG	2/1/2023	ULSD

[3] Final Resolution and Order on the Puerto Rico Electric Power Authority's Integrated Resource Plan, *In re. Review of the Puerto Rico Electric Power Authority Integrated Resource Plan,* Case No. CEPR-AP-2018-0001, August 24, 2020 ("Approved IRP").
[4] Id., ¶¶847-867, pp. 263-269.
[5] Id., ¶¶869-873, pp. 270-271.
[6] *Id.*, ¶ 860, pp. 266-268.
[7] Known as *Puerto Rico Energy Public Policy Act* ("Act 17-2019").
[8] Approved IRP, p. 266.

Also, the Final Plan considers the retirement of certain units as described below:

Table #9: Final Plan (PREPA Emission Unit Retirements)

Facility	Units	Retirements Date [9]
PREPA San Juan	SJ7	6/30/2023
PREPA San Juan	SJ8	6/30/2023
PREPA San Juan	SJ9	12/31/2024
PREPA San Juan	SJ10	6/30/2023
PREPA Palo Seco	PS1	6/30/2023
PREPA Palo Seco	PS2	6/30/2023
PREPA Palo Seco	PS3	12/31/2024
PREPA Palo Seco	PS4	12/31/2025
PREPA Palo Seco	PSGT 2-2	6/30/2023
PREPA Palo Seco	PSGT 3-1	6/30/2023
PREPA Palo Seco	PSGT 3-2	6/30/2023
PREPA Aguirre	AG1	12/31/2025
PREPA Aguirre	AG2	12/31/2026
PREPA Aguirre	CC1-1HRSG	12/31/2028
PREPA Aguirre	CC1-2HRSG	12/31/2028
PREPA Aguirre	CC1-3HRSG	12/31/2028
PREPA Aguirre	CC 1-4HRSG	12/31/2028
PREPA Aguirre	CC 2-1HRSG	12/31/2029
PREPA Aguirre	CC2-2HRSG	12/31/2029
PREPA Aguirre	CC2-3HRSG	12/31/2029
PREPA Aguirre	CC2-4HRSG	12/31/2029

This is contingent on the effective integration of new renewable energy projects forecasted by the Energy Bureau. This action is required to maintain the power grid stability for Puerto Rico and in compliance with the best management practices.

[9] Dates provided by the Puerto Rico Energy Bureau via letter on October 18, 2022 and updated on November 15, 2022. According to the letter, these dates are estimated "based on capacity balance and planned." If PREB issues any order or IRP amendment requiring retirement of these units prior to the dates provided herein, PREPA must comply with such order or IRP amendment.

7.0 REASONABLY AVAILABLE CONTROL MEASURE/ REASONABLY AVAILABLE CONTROL TECHNOLOGY

DNER evaluated different alternatives presented by different parties such as PREB and PREPA regarding the available control measures to comply with the 1-hour SO_2 NAAQS. The control measures evaluated were: PREPA emission units fuel switching to ULSD, conversion to LNG and emission unit retirements due to the integration of renewable energy sources.

One of the control measures evaluated was the fuel switching of PREPA's gas turbines from current diesel fuel (0.5%) to ULSD (0.0015%). This control measure lowers the SO_2 emissions but is not enough to comply with the 1-hour SO_2 NAAQS, because it only applies to PREPA gas turbines. For this reason, is considered as an interim plan to reach attainment.

The PREPA's significant contributors to the SO_2 modeled impacts are the boilers that burns Bunker C. These units are baseload and can run continuously, producing electricity at a nearly constant rate throughout most of the day which make its unfeasible to run in ULSD due to the high cost of the fuel.

DNER modeled the scenarios for conversion PREPA emission units to LNG in each non-attainment areas. Although this control measure reach attainment with the 1-hour SO_2 NAAQS, the conversion to LNG was not considered to be reasonable because it wasn't aligned with the PREB.

The other control measure evaluated in both non-attainment areas, was the retirements of emission unit combined with the integration of renewable energy sources. DNER modeled the retirement scenarios in the San Juan and Guayama-Salinas areas and demonstrated attainment with the 1-hour SO_2 NAAQS. This control strategy conforms with the PREB.

After considering all the aforementioned, the control measures to be implemented are emission units fuel switching to ULSD and emission unit retirements. The ULSD switching dates were provided by PREPA. The emission unit retirements dates were provided by the PREB. See Tables 8 and 9 at Section 6.0, Reasonable Further Progress Program.

The new emission limits for PREPA facilities after the fuel switching to ULSD are the following:

Table #10 PREPA Palo Seco Gas Turbines Emission Limits

Power Block/ Boiler Units	Stack	PTE. 100% load in ULSD 0.0015%/wt (Lb/hr SO_2)
PB1	PSGT 1-1	0.5
	PSGT 1-2	0.5
PB2	PSGT 2-1	0.5
PS MP1	PSMP1-1	0.4
PS MP2	PSMP2-1	0.4
PS MP3	PSMP3-1	0.4

Table #11: PREPA San Juan Gas Turbines Emission Limits (ULSD/LNG)

PREPA San Juan	Stack	PTE. 100% load Natural Gas* (Lb/hr SO_2)	Sulfur Content in LNG
SJ 5+6	SJ5&6	9.8	1 gr/100 dscf

* The units SJ5&6 have been operating as dual-fuel units since late 2019 and shall be switched to ULSD in no later than 2/1/2023. PRDNER use the most conservative rate or LNG 100% load.

Table #12 PREPA Aguirre Gas Turbines Emission Limits

Power Block/ Boiler Units	Stack	PTE. 100% load in ULSD 0.0015%/wt (Lb/hr SO_2)
AGGT2	AGGT2-1	0.46
	AGGT2-2	0.46

*According to IRP, only gas turbines AGGT2-1, 2-2 will stay operating in PREPA Aguirre.

DNER established measurements methods and procedures for determining compliance which include the specific monitoring, recordkeeping and reporting requirements in Rule 425. The following outlines these requirements:

(a) PREPA shall ensure that each of the affected units from PREPA San Juan, PREPA Palo Seco, and PREPA Aguirre facilities shall have a fuel monitor for each of the type of fuel burned. PREPA shall monitor and record the amount of each fuel type burned at each of the units on an hourly basis.

(b) Fuel sampling and analysis is to be performed in accordance with USEPA Method 19, ASTM D2622, D4294, D5453, D7039, or other appropriate EPA or ASTM method.

(c) Each sample shall be submitted in a timely manner to a qualified laboratory and an analysis obtained for the constituents/properties. PREPA shall maintain records of each laboratory analysis performed for a period of at least five (5) years.

(d) PREPA shall calculate and record SO_2 emissions for each unit on a monthly basis. In calculating the SO_2 emissions, PREPA shall assume that 100% of the sulfur in fuel is converted to SO_2.

(e) PREPA shall maintain a monthly record of the following information for each unit:

i. Fuel used, including hourly usage and total fuel used for the month
ii. Sulfur content of the fuel, fuel density, fuel heating value, and the basis for the sulfur content used (fuel analysis showing date sample collected, type of fuel, sulfur content, and fuel heating value).
iii. SO_2 emission rates (lb/hr)

(f) All data, calculations and reports from any performance test or fuel sample developed for the purpose of demonstrating compliance with this rule shall be retained for a minimum of five years and shall be available for inspection by DNER's representative.

(g) Any owner or operator of any sulfur dioxide emission source subject to this rule, shall document any compliance test or applicable emission tracking procedure, shall document compliance with any applicable emission rate limits and shall retain all data, calculations and reports from any performance test, fuel sample, or operating rate monitor utilized for the purpose of demonstrating compliance with the applicable emission limits, emission tracking requirements, or emission rate limits for a period of not less than five years and shall make such records available for inspection by and submittal to the DNER upon request.

(h) Any owner or operator of any sulfur dioxide source subject to this rule, shall demonstrate compliance with the combined hourly emission limits by performing emission tests in accordance with Rule 425 V (A) and V(B).

8.0 CONTINGENCY MEASURE

DNER will continue to operate a comprehensive program to identify sources of violations of the SO_2 NAAQS and undertake a compliance inspection and enforcement actions.

Identify sources of violation of the SO2 NAAQS: DNER may declare an air pollution alert, warning or emergency, and will determine that such condition requires immediate action for the protection of the health of human beings. The DNER will order persons causing or contributing to the atmospheric pollution to reduce their emissions to eliminate such condition, or to immediately discontinue the emission of pollutants. In addition, the DNER also maintains air quality information in a form readily available to the public on the DNER Website (www.drna.pr.gov).

Compliance and enforcement: Article 9(a)(7) of Puerto Rico Environmental Public Policy Act (PREPPA) 416 of September 22, 2004, provides the Secretary of the DNER the authority to order persons causing or contributing to a condition which harms the environment and natural resources, or which poses an imminent danger for the public health and safety, to immediately diminish or discontinue their actions. Also, Article 9(a)(8) of PREPPA provides the authority to issue orders to do or forbear or to cease and desist so as to take the preventive or control measures that, in its judgment, are necessary to achieve the purposes of this Act and the regulations promulgated thereunder.

Upon notification by DNER that a nearby air monitor for the area has registered four validated ambient SO_2 concentrations in excess of the standard, or that a monitored SO_2 violation based on the design value occurred during calendar years 2022 and beyond, PREPA will, without any further action by DNER or EPA, undertake a full system audit of all emissions units subject to control under this plan. PREPA will submit a written system audit report to DNER within 90 days of the notification. The system audit report must detail the operating parameters of all emissions units for four 10-day periods up to and including the date upon which the reference monitor registered each exceedance, together with recommended provisional SO_2 emission control strategies for each affected unit and evidence that these control strategies have been deployed, as appropriate. Upon receipt of the system audit report, DNER will immediately begin a 60-day evaluation period to diagnose the cause of the monitored exceedance. This evaluation will be followed by a 60-day consultation period with PREPA to develop and implement operational changes necessary to prevent future monitored violations of the standard. These changes may include fuel switching to reduce or eliminate the use of sulfur containing fuels, physical or operational reduction of production capacity, or other changes DNER determines as appropriate. If any new emission limits are necessary, they would be submitted to EPA as a SIP revision.

Establishment of an Attainment Ambient Monitoring Networks (AAMN): The 2010 SO_2 NAAQS attainment strategy in this SIP considers the development of a AAMN in the Guayama-Salinas and the SanJuan non-attainment areas. The data gathered from the existing monitoring network allows the DNER to propose the development of a AAMN to be installed at the designated non-attainment areas in Puerto Rico, geared to compare NAAQS compliance. It is recommended to install twelve (12) monitoring stations under the AAMN, placing six (6) in each of the two non-attainment areas. The analysis developed to select the monitoring

station locations will be based upon the areas predicted to have the maximum concentrations through the use of EPA-approved AERMOD[10] Modeling Program. The SO_2 monitoring used for comparison to the NAAQS is subject to 40 CFR Part 58 requirements.

Enforceable emission limitations and control measures

The DNER RCAP has rules to implement and enforce the NAAQS and other air quality standards. These rules include formal systematic procedures for construction and operation permits that will meet the federal requirements. As part of this SIP, the RCAP will be amended to include more specific rules (Rule 210 and 425) for non-attainment areas.

(1) If emission sources do not achieve compliance with the emission limits established in Rule 425 (II), (III) and (IV) by the dates provided in these subparagraphs, it will be subject to a compliance inspection and enforcement action. This includes expedited procedures for establishing enforceable consent agreements pending the adoption of revised SIPs. Any source that is found in violation of any compliance plan approved by the DNER or any requirement within such plan will be subject to sanctions specified in Rule 115.

(2) In the event adoption of any additional control measure is necessary, it will be subject to DNER's administrative and legal process, including fines.

(3) If a new measure/control is already promulgated and scheduled to be implemented at the federal level, and that measure/control is determined to be sufficient to address a violation of the SO_2 NAAQS, additional local measures may be unnecessary.

(4) The DNER may require, any owner or operator responsible for any source of sulfur dioxide emissions which may be contributing to air pollution, to install, operate, and maintain monitoring devices; to maintain records; and file periodic reports to the DNER.

a. The DNER may require the owner or operator to submit an "Ambient Air Quality Monitoring Plan". Such plan shall include an air quality and meteorological measurement network consistent with the objective of obtaining an accurate assessment of the sulfur dioxide air quality and meteorology within the zone impacted by sulfur dioxide emissions from the source. The plan shall comply with the USEPA guidelines. The DNER may issue additional orders pursuant to this paragraph to require that a previously submitted plan be clarified, updated, corrected, supplemented, or otherwise amended.

[10] AERMOD is a "steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain." Air Quality Dispersion Modeling - Preferred and Recommended Models | US EPA

9.0 CONCLUSION

On January 9, 2018, the EPA's decision to designate areas of Puerto Rico as non-attainment areas for the 2010 SO_2 NAAQS was published in the Federal Register (83 FR. 1098). The non-attainment designations that took effect on April 9, 2018, correspond to the Air Quality Control Regions (AQCRs) covering: 1. Areas within the Municipalities of San Juan, Guaynabo, Toa Baja, and Bayamón, together with the entire Cataño Municipality on the north of the main island (San Juan Area); 2. Sectors of the Guayama and Salinas Municipalities on the south of the main island. For areas designated as non-attainment, states must develop a State Implementation Plan that meets the requirements of Section 172(c) Clean Air Act (CAA). Paragraphs 172(c) and 172(a)(2) establish the requirements for the implementation of reasonably available control measures to achieve compliance as soon as practicable but no later than five years after the non-attainment designation. In response to the promulgation of the 2010 1-Hour SO_2 Primary National Ambient Air Quality Standard, this SIP is submitted, according to the requirements established in Sections 172(b) and (c) of the (CAA). With this plan, the DNER will meet all requirements to demonstrate attainment with the 2010 1-hour SO_2 NAAQS ambient air monitoring in the designated non-attainment San Juan and Guayama-Salinas areas. This plan demonstrates the implementation of the control measures at existing source limit SO_2 emissions below the 2010 NAAQS for sulfur dioxide.

10.0 APPENDIX

- 10.1: Baseline Emission Inventory 2014
- 10.2: 2019-2029 Projected Emission Inventory- PREB
- 10.3: 1-Hour SO_2 Non-attainment Area State Implementation Plan - PREB Modeling Protocol
- 10.4: 1-Hour SO_2 Non-attainment Area State Implementation Plan - PREB Modeling Results