Region 2 Enforcement & Compliance Assurance Division
Air Compliance Branch

CAA Inspection Report

Inspection Date(s): September 1, 2021

Facility Name: PREPA Aguirre Power Station

Facility Address: State Road PR-3 Km. 152.7, Ward Montesoria, Aguirre, Salinas Puerto Rico

ICIS-Air: PR0000007212300011

Facility Contact(s): José A. Santos Jiménez, 787-521-4961, JOSE.SANTOS@prepa.com

Alexis Cruz, Plant Manager, 787-521-3842, alexis.cruz@prepa.com

EPA Inspectors: Alex Rivera, Enforcement Officer, 787-977-5845, rivera.alex@epa.gov

Bryan Lange, ERG Inspector, 919-622-2374, bryan.lange@erg.com

Permitted Regulatory Program(s) Reviewed:

1. Puerto Rico Regulations for Control of Atmospheric Pollution (RCAP)
2. National Emission Standards for Hazardous Air Pollutants (NESHAP) for Coal and Oil-Fired Electric Utility Steam Generating Units – 40 CFR Part 63 Subpart UUUUU
3. National Emission Standards for Hazardous Air Pollutants (NESHAP) for Reciprocating Internal Combustion Engines (RICE) – 40 CFR Part 63 Subpart ZZZZ
4. NSPS for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984 – 40 CFR Part 60 Subpart Kb
5. General Provisions – 40 CFR Part 60 Subpart A

Emission Source Operating Permit

PREPA Aguirre is authorized to operate a stationary source of air pollutant emissions limited to the units and conditions described in Title V Operating Permit PFE-TV-4911-63-0796-0005 issued February 24, 2008 and expired February 24, 2013. The renewal application was submitted prior to expiration of the Title V and PREPA Aguirre operates under a permit shield.

Inspection Summary

A. Opening Meeting

On September 1, 2021, EPA inspector Alex Rivera (hereafter referred to as the Inspector) and Bryan Lange (ERG, EPA Contractor) conducted an on-site inspection at PREPA Aguirre. The on-site inspection was announced to PREPA in late July such that EPA could consider PREPA's logistical concerns with the proposed inspection schedule and to allow PREPA to gather the documents need to evaluate the facility compliance. In total, seven PREPA locations were inspected in August and September 2021.

Mr. José A. Santos, the Environmental Protection & Quality Assurance Division Manager and Alexis Cruz the Plant Manager began the inspection with a short presentation about safety, the combustion, and equipment normal operations. Mr. Santos was provided with a list of documents to compile. The documents were gathered and available for review in the facility conference room.

B. Inspection Notes

The following summarizes the topics discussed during the inspection:

1. Boiler History and Operation

On the day of the inspection, the two tangentially fired oil-fired steam electric (boilers) units were not operational. Unit AG1 went out service on Sunday, August 29, 2021 and according to PREPA's representatives, the expectation was that the unit will return to operation on Friday September 3, 2021.

PREPA representatives informed that Unit AG2 has been out of service since May 2021 to conduct its environmental outage and to repair its generator and that the unit is expected to return to operation on Saturday September 4, 2021. During the outage, elements of "environmental outage" like a water-wash have been conducted. Environmental outages are scheduled every 18-months. According to Alexis Cruz, once Unit AG1 and AG2 are back in operation, each should be capable of a full load 450 MW.

The last environmental outage for unit AG1 occurred from January to March 2021, but that outage report is not yet final. Prior to that, unit AG1 had an environmental outage from January through February of 2019. Prior Unit AG2's environmental outage was conducted from August through September 2018.

Mr. Santos said that typically, these units each operate at 375 or 400 MW and have 75 to 50 MW of capacity which is used for spinning reserve to mitigate losses from other units. He elaborated

that power can be ramped up more quickly from these units as compared to a peaker unit can come online.

The plant is connected to the grid with 230 and 115 kV transmission lines. Mr. Santos said that most of the load is in the North of the island and most of the generation capacity is in the South of the island (i.e., PREPA Aguirre, AES Power Plant, PREPA Costa Sur). PREPA must rely on the transmission lines to transit the power. While Mr. Santos noted that the lines are monitored carefully to avoid failure and blackouts, he added that better transmission lines would help us to avoid selective blackouts and provide better opportunities for maintenance. Mr. Cruz informed that the complex can generate a total of 1,536 MWs and specified that the complex power block can generate 44 MWs, the combined cycle 592 MWs, and the steam power plant 900 MWs. The boiler was manufactured by Combustion Engineering. Through acquisitions and mergers, GE Power now services the boilers. GE has all the design specifications and can manufacture or repair parts. PREPA has ordered a replacement turbine for unit AG1. Mr. Santos noted that although GE does not maintain a parts inventory for these old boilers, GE has manufacturing capacities at several location and with a lead time of approximately 8-months a turbine can be manufactured. This replacement order is necessary given the age and use of the equipment and if not regularly replaced it can cause other damage (e.g., condenser failure).

2. Boiler Performance

A collection of parameters is monitored in the control room including temperature and pressure of steam for at various stages, soot-blowing, fuel viscosity in storage tanks, load, fan amperage, excess oxygen for combustion, opacity, pump pressures, water conductivity (which would indicate condenser leak), and temperature differentials in the air heater and burner. Soot-blowing occurs once per shift on the boilers or twice a day. The process takes about 7 minutes at each location.

The most recent PM testing occurred in June of 2021 for unit AG1 (the measured emission rate was 0.026 lb/MMBtu). Currently, PREPA has only draft numbers which show compliance. Mr. Santos noted that there is a billing issue that is delaying the delivery of the final report. When unit AG2 is operational PM testing will be performed.

3. Hydro-gas turbine - Power block

The two oil-fired gas turbines (AGGT2-1 and AGGT2-2) burn liquid fuel. Each operate as peakers and generate 21 MW of power. These turbines are supervised by hydro-gas, a division of PREPA that operates the smaller units like these turbines and those located at Vega Baja.

4. Combined Cycle Turbines

The combined cycle power plant consists of eight oil-fired gas turbines (CC1-1, CC1-2, CC1-3, CC1-4, CC2-1, CC2-2, CC2-3, and CC2-4) with two steam electric generators. Five gas turbines (each with a capacity of 50 MW) and one steam turbine are currently available. Each steam turbine can accommodate 100 MW. All turbines are equipped with a HRSG.

The operators walk around the combined cycle units and collect hourly parametric observations including cooling systems temperature and oil consumption. The operators also touch the equipment to note vibrations and observe the quantity of oil in system reservoirs.

5. Engines

Alexis Cruz shared a collection of documents showing that each of the five engines operate as emergency generators and are used less than 500-hours annually.

Engine ID	Capacity	Evidence that Annual Operation Is Less than 500-hours
GE-AUS-AG1	600 hp	2021 Q1 period (Jan. through March) operated for a total of 0 hours. Logbook: 275 lifetime hours
GE-CCAM-AG2	102 hp	2021 Q1 period (Jan. through March) operated for a total of 14.91 hours.
B1-AG-3	190 hp	2021 Q1 period (Jan. through March) operated for a total of 0.10 hours.
B1-AG-4	190 hp	2021 Q1 period (Jan. through March) operated for a total of 0.20 hours.
GE-SISTINF-AG-6	86 hp	2020 Q3 period (July through Sept) operated for a total of 111.95 hours.

PREPA is in the early stages of considering the addition of two reciprocating internal combustion engines (RICE) to provide black starts to the combined cycle turbines. The inspectors reviewed the log counter for the GE-AUS-AG1 for consistency.

6. Fuel

Fuel is received in the terminal. When both oil-fired boilers are operational, barges unload fuel every 2 or 3 days. Each day bunker C fuel is transported to service tank location on each of the oil boilers.

Tank IDs	Contents	Capacity
1	Bunker C; in service	6,792 barrels
2	Bunker C	damaged and open*
3	Bunker C; in service	6,792 barrels
6	No. 2 oil; in service	6,792 barrels

* Inspectors observed the damaged tank. No fuel was present, and it has not been removed.

Conditions in the consent decree (CD) require the bunker C fuel to comply with vanadium content limit. Vanadium can influence the NOx emission rate. In addition to the fuel supplier's analysis, PREPA has a licensed chemist in San Juan to verify that the CD limits are maintained.

7. Other

Mr. Santos noted that there are 216 employees and about 214 vacancies at PREPA Aguirre.

Mr. Santos explained that there is a citizen group that occasionally expresses the environmental concerns of a community located on the east side of the plant. Alex Rivera of Region 2 was aware of recent complaints and videos of high opacity events that were covered by the media and social media. Mr. Santos indicated the recorded high opacity event was an exceedance and proper notifications were made. Mr. Santos also noted that the high opacity conditions are not representative of normal operations.

Mr. Santos confirmed that on June 2021 PREPA conducted a performance test at Unit AG1, but the report has not been made available by the testing company because PREPA has not completed the procurement process to pay for the testing service. According to Mr. Santos, PREPA currently owes the testing company around $500,000. Mr. Santos added that a draft report is available, and that the unit passed the test.

8. Plant Walkthrough

The bullets below describe the equipment that was visited on the walkthrough:

- Oil-fired boiler AG1 water tubes were being tested for leaks. Water was observed pouring from the bottom of the boiler. Alexis Cruz expected the unit would operate on Saturday (9/4/2021). Staff was seen inside the boiler identifying and patching leaks.
- From the catwalk of boiler AG1, approximately 4 stories up, the inspectors observed the 13 soot blowers on boiler AG2. There are 13 more on the opposite side.
- The Durag opacity monitor was inspected with the case open. Visible on the right side of the monitor is the site to orient the opacity signal at the Durag receiver. The real time opacity display was also visible.
- Boiler control room. Screen 1: Real time display of unit AG1 and AG2 opacity (1.39 percent), oxygen (2.49 percent) and fuel viscosity (299 SSU). Screen 2: Unit AG2 overview showing the 4 turbines connected in series (high pressure, intermediate pressure, and two low pressure turbines) and temperature and pressure of steam for at various stages.
- Boiler room log sheet showing that unit AG1 was not operational on the day of the inspection.

Closing Meeting

After the conclusion of the inspection, Mr. Rivera expressed gratitude for all the assistance provided during the inspection and all the cooperation to provide the information needed to complete the inspection. Below is a comprehensive summary of documents that were reviewed during the inspection:

1. Visible Emissions Evaluation Report. July 28, 2021 at 7:56 am. Visible emissions of 5 percent observed on stack 1-1 on boiler AG1 by Alexis Cruz.
2. Method 9 Evaluator Certificate for Alexis Cruz. Date of certification October 2020.
3. Ultra-low sulfur diesel fuel analysis. Sampled on March 29, 2020. Percent sulfur is 0.0015. Location: Puma Energy Caribe Bayamon Terminal.
4. Opacity deviation report for July 2021 showing five deviations ranging from 29.84 to 48.25 percent. Three of the five deviations were attributed to poor combustion and a boiler tube break, and the boiler air flow was adjusted. The other deviations were attributed economizer breaks, and the boiler oxygen was adjusted.
5. Unit AG1, third elevation soot blowing activities log sheet, August 29, 2021.

Inspection Report Sign Off

Lead Inspector's Name: Alex Rivera

Rivera, Alex

Digitally signed by Rivera, Alex
Date: 2021.10.19 08:47:44 -04'00'

Assisting Inspector's Name: Bryan Lange

Bryan Lange

Digitally signed by Bryan Lange
DN: cn=Bryan Lange, o=ERG, ou, email=bryan.lange@erg.com, c=US
Date: 2021.10.19 09:01:04 -04'00'

Supervisor's Name: Harish Patel

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Date: 2021.10.19 16:45:15 -04'00'