

**Region 2 Enforcement & Compliance Assurance Division  
Air Compliance Branch**

**Inspection Report**

**Inspection Date(s):** August 6, 2021

**Facility Name:** PREPA Palo Seco Steam Power Plant

**Facility Address:** State Road PR-165 Km. 30.8, Toa Baja, San Juan, Puerto Nuevo

**ICIS-Air/RMP ID #:** 7213700006

**Federal Facility:** No

**NCI:** None

**Facility size:** Major

**Planned Activity:** FCE

**State Referral:** Yes

**NAICS code:** 221112 – Fossil Fuel Electric Power Generation

**EPA Lead Inspector:** Ralph Lonergan, Enforcement Officer, 212-637-3516

**EPA Asst. Inspector:** Bryan Lange, ERG Inspector, 919-622-2374

**Facility Contact:** José A. Santos Jiménez, 787-521-4961, [JOSE.SANTOS@prepa.com](mailto:JOSE.SANTOS@prepa.com)  
Antonio Kalil, Plant Manager  
Jose Pagan, Hydrogas Supervisor (Frame 5 combustion turbines)

**Information Sources Consulted:**

- ICIS-Air (Integrated Compliance Information System)
- ECHO (Enforcement and Compliance History Online)
- TRI (Toxic Release Inventory)
- CEDRI
- Dun & Bradstreet
- Envirofacts
- State Contact
- State Website/Database
- File Review
- Google/Bing/Aerial Photographs/Maps/Diagrams
- Facility Website
- Previous Inspection Reports
- Information Collection Request
- Other
- RMP\*Info [Review of RMP] (112r- Only)
- RMP\*Comp/MARPLOT [OCA Review] (112r- Only)
- Industry Standards [Sector Review] (112r- Only)

## Facility Information

The Palo Seco Steam Power Plant is located on State Road PR-165 Km 30.8 and adjacent to the Palo Seco Ward of the municipality of Toa Baja. The total electrical output is 707 MW.<sup>1</sup> It is connected to the grid with 115 kV transmission lines.

The facility consists of ten generating units distributed in the following two areas of the plant: steam power plant consisting of four oil-fired steam electric units (boilers) (PS1, PS2, PS3 and PS4), and one power block consisting of six simple cycle oil fired gas turbines (PSGT1-1, PSGT1-2, PSGT2-1, PSGT2-2, PSGT3-1 and PSGT3-2).

The boilers combust primarily No. 6 fuel oil (Bunker C) to generate electricity at a steam turbogenerator. The capacity of boilers PS1 and PS2 are 85 MW. Boiler PS3 and PS4 each have a capacity of 216 MW. The No. 6 fuel oil is received by barge or pipeline to the fuel oil reserve tanks and is then transferred to the No. 6 fuel oil service tanks. The combustion flue gases are exhausted to the atmosphere.

During a boiler startup, No. 2 fuel oil (distillate oil) can be used to warm up the boiler. When the boiler has reached the desired steam conditions, No. 6 fuel oil is fired to continue the operation.

The power block consists of six combustion turbines or gas turbines that combust No. 2 fuel oil. The capacity of each turbine is 21 MW. No. 2 fuel oil is received by barge into three tanks which feed the combustion process of the gas turbine units. These tanks can also be arranged to receive fuel directly from fuel delivery trucks or by pipeline.

PREPA Palo Seco has three emergency engines for three emergency electric generators. Also, the facility has one engine for a fire pump.

## Emission Source Operating Permit

The PREPA Palo Seco Steam Power Plant (hereafter referred to as Palo Seco) 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-4911-70-1196-0015 issued on March 16, 2015 and expired on March 16, 2020. The renewal application was submitted prior to expiration of the Title V and Palo Seco operates under a permit shield.

On December 17, 2019, PREPA submitted a permit to construct application for peaking combustion turbines to replace the existing units PSGT 2-2, 3-1, and 3-2 with Pratt and Whitney power systems model FT8 MOBILEPAC dual fuel combustion turbines. These units are currently under construction.

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<sup>1</sup> Autoridad de Energia Electricia. "List of Generating Units." <https://aeepr.com/es-pr/unidadesgeneratrices>



## Inspection Summary

### A. Opening Meeting

On August 6, 2021, EPA inspector Ralph Lonergan (hereafter referred to as the Inspector) and Bryan Lange (ERG, EPA Contractor) conducted an on-site inspection at San Juan. 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. In total, seven PREPA locations were inspected in August and September 2021.

In 2020, the governor signed a contract with LUMA Energy giving that company control of the PREPA electric grid, power distribution, and power transmission. That takeover took place in June 2021. PREPA remains the owner and operator of the utilities.

Mr. José A. Santos, the Environmental Protection & Quality Assurance Division Manager and Antonio Kalil, the Plant Manager began the inspection with a short presentation about the combustion equipment and normal operations. Mr. Santos was provided a list of documents to compile. The documents had been collected and were available in the conference room.

### B. Inspection Notes

The following summarizes the topics discussed during the inspection:

## 1. Bunker C Fired Boilers

Palo Seco has four bunker C fired steam cycle boilers. Units PS1 and PS2 have one stack. Units PS3 and PS4 have two stacks each.

Unit PS1 was installed in 1960 and is currently out of service. It failed in August 2020. Unit PS2 was installed in 1961 and failed in 2016. There are no plans to operate units PS1 or PS2 in the future.

Unit PS3 and PS4 are tangential fired and were installed in 1970. PS3 is in service but experienced a water-wall failure and is currently in a day 3 outage. On August 6, 2021, unit PS4 was in service.

Typically, PS3 (170 MW) and PS4 (140 MW) run at 70 percent of their capacity. They can increase power if there is demand, their maximum capacities are 195 MW and 160 MW respectively. Dispatch choices consider unit availability, transmission line capacity, locational needs, and fuel costs. The price per MW for Units PS3 and PS4 is lower than the San Juan units.

Unit PS3 and PS4 cannot reach their 216 MW nameplate capacities because of amperage limitations on the fan.

## 2. Low Sulfur Fired Frame 5 Combustion Turbines

Palo Seco also has a total of three Frame 5 - 20 MW simple cycle operational turbines (PSGT1-1, PSGT1-2, PSGT2-1). These units are permitted to use low sulfur (no more than 0.5% by weight) distillate oil and each turbine has their own stack.

They operate as peaking units and typically support the peak load period from 7pm to 11pm. This time is when renewables are unavailable (i.e., at night the sun does not shine, and the wind is not blowing).

Hydrogas is the operator of the frame 5 combustion turbines. This operation arrangement is consistent with the Vega Baja PREPA location.

Originally, in 1974, six turbines were installed. Three are not operational (i.e., PSGT 2-2, 3-1, and 3-2), but remain on-site. Mr. Santos explained that PREPA intends to get emission credit when they are retired. The fate of unit 3-1 is uncertain and it will only be retired if emission credits are issued.

During the inspection none of the Frame 5 combustion turbines were operating and PSGT1-2 was not available because of an electrical problem. EPA visited the three idle Frame 5 combustion turbines and confirmed they were not operational.

## 3. Dual Fuel MOBILEPAC Combustion Turbines

Three 27 MW model Pratt & Whitney FT8 MOBILEPAC dual fuel combustion turbines were installed in 2019. The units are not yet operational because the water injection system is incomplete. At the time of the inspection, Mr. Santos stated that he expected to complete construction of the water tank and supply lines and get EPA approval to operate these turbines by September 2021.

At an on-site plant, water is demineralized for the boilers. The MOBILEPAC units will use water from that same system. Like the Frame 5 turbines, the MOBILEPAC turbines will burn low sulfur distillate oil. PREPA is looking for a natural gas provider for these units. Mr. Santos expect that natural gas will be provided in portable ISO containers (15,000 gallon capacity).

PREPA is considering adding a combined cycle at either the San Juan or Palo Seco plant in the next 5-years. San Juan has an advantage given that the New Fortress Energy liquefied natural gas (LNG) terminal is adjacent to that plant.

EPA visited the MOBILEPAC and confirmed they were not operational, and the water injection system was not hooked up. The inspectors noted that the duct configuration could create a cyclonic flow. Mr. Santos explained that particulate performance test will be conducted, and EPA Reference Method 1 will ultimately determine the appropriate sampling ports and traverse points.

#### 4. Pollution control and monitoring.

Boiler units PS3 and PS4 have CEMS. The Frame 5 turbines do not have controls or COMS. Visible emission observations are taken on the turbines and boilers.

Like at San Juan, a consent decree required that optimization occurred on these units to reduce opacity deviations and optimize excess O<sub>2</sub> and the steam to fuel differential at the burners. The control room display for PS4 showed zero opacity and zero particulate emissions indicating good pollution control.

#### 5. Routine maintenance

The Palo Seco boilers use soot blowing. Soot blowing is the use of high-pressure super-heated steam, to remove accumulated particulate inside the boiler and comply with requirements in the consent decree (CD). Soot blowing occurs once per 8-hour shift. The duration is longer than soot blowing at San Juan because the units are larger. PREPA follows manufacture soot blow pressure recommendations. Mr. Santos indicated that soot blowing will raise the opacity, but not to the level of a deviation.

Inspectors reviewed boiler environmental outage reports required under the CD. Outages occur every 18 months and PREPA follows maintenance checklists to inspect equipment (e.g., fans, burner, air damper). Each plant has their own forms, but the equipment is similar at each PREPA plant. Boiler unit PS4 came off its environmental outage in February of 2021 and unit PS3 completed its outage in July 2021.

Mr. Santos discussed that there is always something that needs to be fixed (e.g., replace pump bearings, cables to be replaced) on the boilers because they were commissioned in the 1960s and salt from the ocean increases the rate of corrosion. He noted that each environmental outage cycle could be extended, and maintenance was performed when it is necessary. Mr. Santos explained that the boiler performance indicates when an outage is needed.

#### 6. Emergency engines

Palo Seco has three electric generators and a fire-pump. They are run only for testing purposes. PREPA provided paper evidence that each of their nine-emergency generator operates annually less than 500-hrs. The inspectors verified the low totals on the life-time hour counters for "Generator #1" and "Generator #2."

#### 7. Fuel and Spare Parts

Although the facility is adject to the ocean it does not have its own pier for receiving fuel. It receives fuel approximately twice a month from one of two suppliers, each of which have supply lines to the facility.

Mr. Kalil said the facility currently has three reserve tanks and three service tanks in use. One reserve tank and one service tank are out of service. Service tanks can be filled from more than one reserve tank, and they are continuously refilled.

The fuel tanks are not heated. EPA visually looked for evidence of leaks from each storage tanks and secondary containment areas. No leaks were observed.

The spare parts inventory process is operationally like San Juan. Part inventories can be seen by other PREPA facilities and transferred in a day if necessary. Across PREPA maintenance, procurement, and

work orders are all tracked in the same system. EPA was not able to visit the spare parts warehouse because they had a positive COVID test and PREPA was sanitizing the area.

## Closing Meeting

After the conclusion of the inspection, Mr. Lonergan 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. Evidence that emergency engine GE-GIS-PS-1 (385 hp) operates annually less than 500-hrs per year. In 2021, the total hours of operation were 105.6.
2. Evidence that emergency engine GE-PS-1 (670 hp) operates annually less than 500-hrs per year. In 2021 the total hours of operation were 228.
3. Evidence that emergency engine GE-PS-2 (670 hp) operates annually less than 500-hrs per year. In 2021 the total hours of operation were 228.
4. Evidence that emergency engine BE-PS-2 emergencias (208 hp) operates annually less than 500-hrs per year. In 2021 the total hours of operation were 62.4.
5. Ultra-low sulfur diesel fuel analysis. Date received: February 9, 2020. Sulfur: 4.4 mg/kg.
6. Daily operational data sheet for July 31, 2021, for Units PS3 and PS4 showing a collection of parameters including hourly load, opacity, feedwater temp.
7. Daily optimal operating range deviation report. Two deviations occurred July 31, 2021 on unit PS3.
8. Opacity monitors calibration drift test for Units PS3 and PS4 for July 31, 2021.
9. Soot blowing activities log sheet for Units PS3 and PS4 for July 31, 2021.
10. Fuel oil burner cleaning activities log sheet Unit PS4, elevation 3 for July 31, 2021; Unit PS3, elevation 2 for July 31, 2021.
11. Visible emissions observations for Unit PS1. Observations of brick stack on August 4, 2021 and July 11, 2021 by Angel E. Colon Recera and Omer Figueroa Nazario - Unit out of service on both days.
12. Visible emissions readings for combustion turbine PS 1-2 and PS 1-1. 4-month summary of compliance. This unit runs when electricity demand is high and visible emissions measurements are not taken when the unit is off.
13. Visible emissions observation for combustion turbine PS 1-1. Observations of exhaust on July 1, 2019, at 9:45 am. The observer's name was not legible.
14. Control room displays for PS 2-1 and PS 1-1 showing the combustion turbines were off-line and the fuel consumption rate was zero. One screen shows exhaust temperature at 18 points on the combustion turbine.
15. Control room display for boiler units PS3 and PS4 showing opacity, oxygen, stack temp, and particulate. Both units are offline.
16. CEMs room opacity for each stack of unit PS4. Instant readings were 1.19 and 3.23 percent.


The inspector concluded the inspection closing meeting on August 6, 2021 at around 1 PM.

## Inspection Report Sign-off

Lead Inspector's Name: Ralph Lonergan

 Digitally signed by Lonergan, Ralph  
Date: 2021.10.04 09:15:51 -04'00'

Assisting Inspector's Name: Bryan Lange

 Digitally signed by Bryan Lange  
Date: 2021.10.01 15:09:59  
-04'00'

Supervisor's Name: Harish Patel

