Region 2 Enforcement & Compliance Assurance Division
Air Compliance Branch

CAA Inspection Plan

Inspection Date: August 31, 2021

Facility Name: PREPA Costa Sur – South Coast Steam Power Plant

Facility Address: PR-127, Km. 15.7, Guayanilla, Puerto Rico

ICIS-Air: PR0000007205900010

Facility Contact: José A. Santos Jiménez, 787-521-4961, JOSE.SANTOS@prepa.com
Miguel Beauchamp Ramos, Plant Manager
Angel Pérez Carrasquillo, Operations Manager

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 Industrial, Commercial and Institutional Boilers and Process heaters – 40 CFR Part 63 Subpart DDDDD
3. NESHAP for Coal- and Oil-Fired Electric Utility Steam Generating Units – 40 CFR Part 63 Subpart UUUUU
4. NESHAP for Reciprocating Internal Combustion Engines (RICE) – 40 CFR Part 63 Subpart ZZZZ
5. New Source Performance Standards (NSPS) for Spark Ignition Internal Combustion Engines - 40 CFR Part 60 Subpart IIII
6. 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
7. General Provisions – 40 CFR Part 60 Subpart A

Inspection Summary

A. Opening Meeting

On August 31, 2021, EPA inspector Alex Rivera (hereafter referred to as the Inspector) and Bryan Lange (ERG, EPA Contractor) conducted an on-site inspection at PREPA Costa Sur. 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.

Mr. Alex Rivera and Bryan Lange arrived at the facility at approximately 9:45 AM and met with Mr. José A. Santos, the Environmental Protection & Quality Assurance Division Manager and Mr. Angel Pérez the Plant Operations 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. Recent Boiler History and Outage

Originally, PREPA Costa Sur had six boiler units, but now only two operating units (i.e., S5 and S6). PREPA plans to permanently retire S3 and S4.

S5 and S6 each have a capacity of 410 MW and each has a steam turbine. Unit S5 has 24 burners and unit S6 has 16 burners. S5 and S6 have been capable of burning natural gas since 2010-2011.

On January 7, 2020, PREPA Costa Sur experienced an earthquake which shutdown units S5 and S6. Mr. Santos indicated that proper communications were made with EPA indicating the specific dates of the outage. Unit S5 returned to service on August 14, 2020 and S6 returned to service in January of 2021. During the outage PREPA conducted earthquake repairs (e.g., demineralization tanks and the control room were damaged) and conducted routine environmental activities (e.g., water-wash).

Costa Sur is the only plant in PREPA capable of producing power at three voltages (i.e., 38 kV, 115 kV, and 230 kV). The voltage diversity in the switchyard allows for PREPA Costa Sur to support the grid from east-to-west and north-to-south. It has direct connections to other PREPA plants Mayaguez on the east coast and Cambalache on the north coast.

On-site there are two simple cycle combustion turbines (SCGT1-1 and SCGT1-2). These units are similar to those located at PREPA Vega Baja and PREPA Palo Seco, but both are out of service.

2. Operation

Typically, PREPA Costa Sur supplies 34% of the electrical demand of Puerto Rico. These two boiler units are operated as base load and operate at approximately 75% of their name plate capacity. The unused capacity is held in spinning reserve. EcoElectrica is less than 5-miles away. It also operates its units as base load. Mr. Santos explained that the transmission line limitations prevent the EcoElectrica and PREPA Costa Sur units from both running at full load.

On the day of the inspection, August 31, 2021, only unit S5 was operational. Unit S5 was burning bunker C fuel in three burners with the balance of the 24 burners using natural gas. Mr. Pérez explained that those three oil-fired burners will go out of service later today making the unit 100% natural gas fired. Mr. Pérez said the Bunker C fuel has been burned for several days to slow natural gas fuel consumption and alleviate fuel logistical challenges that stemmed from a tropical storm.

On the day of the inspection, unit S6 was out of service. There were circumstances on the grid that caused vibrations. Unit S6 was being checked for damage. Mr. Pérez explained that since the earthquake outage, the performance of S6 has been good, but it has been out of service for the past 2-weeks.

The facility is operating under the permit shield. The shield letter was received from Puerto Rico Department of Natural and Environmental Resources (DNER) on August 21, 2014.

3. Cold Starts

PREPA Costa Sur boilers units do not cycle on and off. Once they are on-line, PREPA keeps them on as long as possible. The boilers metal expansion that takes place requires incremental heating.

Mr. Santos said that a cold start in the boiler can take 8 to 10-hours (i.e., from the time fire is first started to synchronization). After that time, superheated steam can be provided to the turbine. A cold start in the steam turbine can take 24-hours. Collectively a unit can operate at baseload after approximately 2 days. The last cold start for S6 was February 1, 2021. There have been other outages in 2021 that were 2 or 3 days in duration and the unit was started warm. The boilers fire natural gas during cold starts.

4. Fuel

Natural gas (i.e., gasified LNG) is supplied via pipeline from EcoElectrica. There is a fuel metering station on-site. Mr. Pérez explained that there is a 1-mile pipeline on-site which provides 20-minutes of operational fuel if the supply was interrupted.

There are two reserve tanks and one service tank (which is brand new and empty) for bunker C. Mr. Santos indicate the facility complies with fuel oil constituent requirements (i.e., vanadium, asphaltene, sulfur) consistent with the last modification of the consent decree (CD).

The boiler originally burned fuel oil. After their conversion to natural gas, the required heat input rate increased for both units. Mr. Santos indicated that the boilers maintain compliance with the Mercury and Air Toxics Standards (MATS) and most of the time they burn 100% natural gas.

Inspectors viewed recent copies of bunker C and natural gas fuel analysis reports documenting compliance with respective sulfur content permit limits (i.e., boiler 1.5% by weight, turbines 0.5% by weight, diesel engines 0.0015% by weight). The daily consumption reports for units S5 and S6 were also provided, and they show sulfur for natural gas in June never exceeded 0.00009% by weight.

5. Maintenance

Mr. Pérez explained that to the extent possible, repairs and routine maintenance (e.g., instrumentation and mechanical part repairs) occur during scheduled environmental outages. Mr. Pérez said, PREPA Costa Sur prefers to use their own shop resources and staff because contractors increase response times.

Natural gas creates ash, but the quantity is less than what is generated from burning bunker C oil. Soot-blowing occur twice a day regardless of which fuel is burned and is required under the CD. The soot-blowing increases the opacity, but not to the level of a deviation (i.e., 20 percent). The next environmental outage is planned for unit S5 in February 2022 and S6 will have an environmental outage in the summer of 2022.

6. Electronic Reporting

Each facility receives a copy of their own stack test reports. Mr. Santos is responsible for adding quality assurance information to each report and filing those reports in the Electronic Reporting Tool (ERT) system. At this time, Mr. Santos is still gathering old facility reports.

7. Emission Monitors

PREPA Costa Sur has oxygen (O2) monitors at the stack to measure excess oxygen for combustion. The stacks are also equipped with opacity monitors and PM CEMs. Mr. Santos did not know when the last PM CEMs performance test occurred. During the last quarterly outage, the CEMs, the O2 probes, and opacity monitors were all audited.

Visible emissions observations are conducted every other week.

8. Spare parts

Mr. Santos explained that the PREPA Costa Sur boilers are like those located at PREPA Aguirre, and the facilities share some spare parts. PREPA has a common system for work orders, inventory, and procurement. Mr. Santos indicated that PREPA has adequate spare parts, and the counts on-site comply with the CD and quarterly reports provide documentation.

9. Emergency Engines

PREPA Costa Sur has three emergency engines. One is a fire pump, and the other two are for general emergencies. Two new engines are in the permitting process, each will provide 1.2 MW of electrical power for raw water, lighting, and cooling water. Mr. Santos indicated that the application for the new engines was submitted in 2020, but he was not able to produce a copy of the issued permit. Mr. Santos planned to review his permit records and report his findings to EPA. He indicated that permit revisions, like these, are typically issued within one calendar year. The inspectors visited three engines to observe the lifetime hours of operations. One of the new engines, had been operated for 2 hours and 30 minutes.

10. Plant Walkthrough

The plant walkthrough was conducted at around 11:45 PM. The following is a summary of the observations and notes gathered during the walkthrough:

- Vaporized LNG is received from EcoElectrica at an on-site natural gas metering station. The pressure drops from 600 to 9 psi.

- The 1,676 hp emergency engine had 451 hours of lifetime operations.
- The 511 hp fire pump engine had 173 hours of lifetime operations.
- Because of circumstances on the grid that caused vibrations on S6, the staff were checking the steam turbine for broken blades.
- EPA visually looked for evidence of leaks from each storage tank on-site and secondary containment areas. No leaks were observed. Inspectors observed that one tank was permanently closed and empty, but not yet removed.

Closing Meeting

After the conclusion of the inspection, at around 1:45 PM, 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. No. 6 fuel oil analysis. Sampled on August 12, 2021. Percent sulfur is 0.49. Tank No: TK 951.
2. In the control room, the Unit S5 overview screen showed 335.1 MW power output, the three oil fired burners and various boiler temperatures. Mr. Santos also shared the soot blowing screen which showed the soot blowing was not operational during the inspection.
3. In the control room, Units S5 and S6 exhaust and fuel screen showed: opacity, oxygen, particulate emissions (i.e., Mg/Acm and lb/MMBtu), stack temp, natural gas consumption rate and oil fuel consumption rates.
4. Evidence that each emergency engine operates annually less than 500-hrs per year. In a report showing the first 3-months of 2021, the total hours of operation were as follows: 804 hp = zero hours, 511 hp = 75 hours, and 1,676 hp = 2.5 hours.
5. June 2021 heat input summary for units S5 and S6 showing daily natural gas and oil consumption totals.
6. Operator log sheet for units S5 and S6 for the day prior to the inspection (i.e., April 30, 2021), showing hourly parameters including opacity, oxygen, MW load, and airflow.
7. Environmental outage report for unit S5 dated January 30, 2021. Sections included turbines and mechanical repairs.
8. Visible emissions observation form. August 23, 2021, at 9:15 am during soot blowing. Average visible emissions of 2.08 percent were observed on unit S5 by Zulma E. Rodríguez González.
9. Method 9 Evaluator Certificate for Zulma E. Rodríguez González. Date of certification August 5, 2021.
10. Daily natural gas consumption report for units S5 and S6 showing hours of operation, standard cubic feet of natural gas consumed, and sulfur content.
11. LNG fuel analysis. Date loaded: May 23, 2021. Origin: Atlantic LNG Co., Port of Point Fortin, LNG Berth 2, Trinidad. Percent sulfur is 0.6396 mg/Nm3.

12. Particulate deviation report for unit S5 from April through June 2021 showing five deviations ranging from 0.032 to 0.033 lb/MMBtu (the limit is 0.030 lb/MMBtu). The identified code was “4 – other know causes”.
13. Opacity monitor calibration drift tests for units S5 and S6 on June 30, 2021.

Inspection Report Sign Off:

Lead Inspector’s Name: Alex Rivera

Rivera, Alex
Digitally signed by Rivera, Alex
Date: 2021.10.25 17:28:31 -04'00'

Assisting Inspector’s Name: Bryan Lange

Byan Lange
Digitally signed by Byan Lange
Date: 2021.10.25 17:33:28 -04'00'

Supervisor’s Name: Harish Patel

GAETANO LAVIGNA
Digitally signed by GAETANO LAVIGNA
Date: 2021.10.27 12:17:51 -04'00'