CITY OF PHILADELPHIA
Department of Public Health
Environmental Protection Division
Air Management Services

InterOffice Memo

To:	File
From:	Max Avener, Environmental Engineer and Maryjoy Ulatowski, Chief of Source Registration.
Date:	September 11, 2023; July 8, 2024
Subject:	Statement of Basis Title V/ State Operating Permit Summary for Constellation Energy Generation, LLC – Southwark Generating Station (PLID 04905)

Facility Description:

Southwark Generating Station is an electric utility owned and operated by Constellation Generation Company, LLC (formerly called Exelon Generation Company) and located at 2501 S. Delaware Ave, Philadelphia, PA 19148. The facility's representative to contact concerning their Title V Operating Permit is Albert Hatton, (610) 213-9958, albert.hatton@constellation.com. The responsible official is Paul Weeks, Vice President of Regional Operations, (610) 909-6626.

The facility's air emission sources include four (4) 233 million British thermal unit per hour (MMBtu/hr) combustion turbines firing No. 2 fuel oil and kerosene. Insignificant sources include a No. 2 fuel oil tank, a lube oil storage tank and vents, false start tanks, and fugitive emissions from trucks.

Operating Permit Description:

The Title V Operating Permit (TVOP) application No. OP22-000013 was received by Air Management Services (AMS) on March 2, 2022, and was deemed administratively complete on March 28, 2023. OP22-000013 will replace the previous TVOP, V15-002, which was issued on September 29, 2017.

Applicability for Regulations:

Facility

The facility is a major stationary source as defined in Title I, Part D of the Clean Air Act Amendments due to the facility's potential to emit Nitrogen Oxides (NOx). The facility is therefore subject to the Title V/ State Operating Permit requirements adopted in 25 Pa Code §127, Subchapter G.

Emission Limits

Each combustion turbine is subject to the filterable particulate matter (PM) emission limit of 0.02 grains per dry standard cubic foot from 25 Pa Code §123.13(c)(1)(iii) and the Carbon Monoxide (CO) emission limit of 1% by volume of exhaust gas from AMR VIII. The combustion turbines should meet these limits as long as the turbines are maintained and operated properly according to the manufacturer specifications.

The combustion turbines are also subject to the NOx requirements of 25 Pa Code §129.202. During the ozone season, either the combustion turbines must meet the NOx emission limit of 0.30 lbs of NOx per million British thermal units or 3 pounds of NOx per megawatt-hour, or the facility must purchase NOx allowances to cover emissions above the NOx emission levels.

Work Practice Standards

The presumptive RACT requirement for the combustion turbines of 25 PA Code Section §129.112(c)(9) is the installation, maintenance, and operation of the source in accordance with the manufacturer's specifications and with good operating practices. The facility will demonstrate compliance with the presumptive RACT requirements by keeping maintenance records, records of alarm triggers, and records of corrective actions. In addition, each combustion turbine is limited to a maximum 12-month rolling capacity factor of less than 5% as per 25 PA Code §129.112(c)(9)(ii). As per 25 PA Code §129.112(c)(9)(ii), the rolling 12-month capacity factor is expressed as: last 12 months net generator in megawatt hours (MWH) divided by the maximum capacity of the unit in megawatts multiplied by 24 hours per day times the number of days in the last 12 months.

Each combustion turbine shall burn only number 2 oil or kerosene.

Testing Requirements

In the previous TVOP for Southwark Generating Station, opacity testing was required for each combustion turbine within 90 days of the permit issuance. For each turbine opacity test, the temperature differentials of the exhaust from several temperature sensors were monitored and recorded. After testing, a differential temperature operating range for each turbine was established for parametric monitoring. Since no data was available from the facility demonstrating a strong correlation between temperature differentials and compliance with opacity emissions, AMS replaced the parametric requirement with periodic opacity testing. Opacity testing is required on each of the combustion turbines using EPA Reference Method (RM) 9 in accordance with the following schedule to ensure compliance with the PA Code opacity limits.

	Total Operating Calendar Hours (t)	Opacity Testing Frequency	% Capacity Factor
	> 8 and $\leq$ 110	1x a calendar year	0.019 - 1.25%
	> 110 and $\leq$ 220	2x a calendar year	1.25 - 2.51%
	> 220 and $\leq$ 330	3x a calendar year	2.51 - 3.77%

	> 330 and ≤ 438	4x a calendar year	3.77 - 5.0%

Since the station is generally unattended, each turbine is limited to less than a 5% capacity factor, and each turbine has operated on average less than 50 hours per year since 2018, AMS believes that the proposed testing schedule is adequate. AMS does not recommend monthly testing for opacity for each turbine since each turbine operates infrequently and monthly testing will create more emissions from the burning of fuel.

The facility is required to perform a performance test for PM on one combustion turbine within one year of this permit issuance and every 5 calendar years thereafter to ensure compliance with the PM emission limit using EPA RM 5. If the turbine shows more than 50% of the PM emission limit, then the remaining three turbines must also be tested.

The facility is required to test the combustion turbines for NO_x using EPA RM 7E or 20 to demonstrate compliance with the NOx requirements and to determine if the facility is required to purchase NOx allowances to comply with 25 Pa Code 129.202. The facility must complete an initial performance test for NO_x on each combustion turbine by the end of 2030 according to the following schedule:

Combustion Turbine	Testing Deadline
CU05	December 31, 2024
CU07	December 31, 2026
CU06	December 31, 2028
CU08	December 31, 2030

Thereafter, the facility must perform a performance test for NO_x on one combustion turbine every 5 calendar years, alternating turbines so that each combustion turbine is tested every 20 years or sooner. The previous Title V/State Operating Permit did not require NOx testing. AMS added the NOx testing requirement as part of this Title V/State Operating Permit renewal because the combustion turbines are now subject to the NOx requirements of 25 Pa Code §129.202. In an earlier draft of this operating permit, AMS required one combustion turbine to be tested for NO_x every 5 calendar years with the first test required within one year of permit issuance. The requirement that all turbines undergo an initial test by the end of 2030 was added in response to public comments requesting additional NO_x testing.

The facility last tested combustion turbine 6 for PM and combustion turbines 5, 6, 7, and 8 for opacity while burning No. 2 fuel oil on 4/4/2018. The test results are shown below in Tables 1 and 2. As discussed earlier, the temperature differential parametric requirement has been removed and replaced by periodic opacity testing.

Table 1: PM Test Results for Combustion Turbine 6 Burning No. 2 Oil on 4/4/18

Run No.	Test Time	Operating Load (Megawatts)	PM Concentration (lbs/hr)	Total PM Concentration (gr/dscf)	Filterable PM Concentration (gr/dscf)	TVOP Emission Limit (gr/dscf)	Test Result
1	0929-1126	14.69	41.84	0.0076	0.0041	0.02	PASS
2	1155-1342	15.03	32.06	0.0058	0.0025		PASS
3	1418-1633	15.68	144.88	0.0263	0.0156		PASS
Average		15.13	72.93	0.0133	0.0074		PASS

Table 1: Opacity Test Results for Combustion Turbines 5, 6, 7, & 8 Burning No. 2 Oil on 4/4/18

Turbine	Highest 3-Minute Aggregate Reading	TVOP 3-Minute Aggregate Reading Limit	Highest Individual Reading	TVOP Individual Reading Limit	Test Result
5	5%	20%	5%	60%	PASS
6	10%		10%		PASS
7	10%		10%		PASS
8	5%		5%		PASS

Monitoring and Recordkeeping Requirements

The facility is required to monitor and record the following:

- the proper operation and maintenance of the combustion turbines;
- daily hours of operation and fuel usage;
- sulfur content in fuel;
- rolling 12-month capacity factor calculated monthly;
- forced normal shutdowns or trips initiated by the computerized control system,
- corrective actions;
- actual NOx emissions during ozone season per combustion turbine; and
- periodic opacity test results for each combustion turbine.

Reporting Requirements

The facility is required to submit the following records to AMS:

- reports of any violation of an emission limitation by phone or fax within 24 hours, followed by written notification within 31 days;
- semiannual performance reports using the City of Philadelphia Monitoring Report Form;
- annual compliance certification;
- and calculations used to determine the quantity of NOx allowances required to be surrendered and the serial number of each NOx allowance surrendered.

Non-Applicable Requirements and Insignificant Activities:
The facility is a major source of GHGs but does not have any GHG applicable requirements at this time.

The facility is not subject to the Compliance Assurance Monitoring (CAM) requirements of 40 CFR Part 64 as there are no control devices on the combustion turbines.

The combustion turbines are not subject to 40 CFR 60 Subpart KKKK as the combustion turbines were constructed prior to February 18, 2005.

The combustion turbines are not subject to 40 CFR 63 Subpart YYYY as the combustion turbines are not located at a major source of HAP emissions.

Tank No. 3 (FML01) is not subject to AMR V Section II.A as the stationary storage tank stores organic material with a vapor pressure of less than 1.5 pounds per square inch absolute (psia).

Tank No. 3 (FML01) is not subject to 25 Pa Code 129.56 as the stationary storage tank stores organic material with a vapor pressure of less than 1.5 psia.

Tank No. 3 (FML01) is not subject to 40 CFR 63 Subpart Kb as the stationary storage tank was constructed prior to July 23, 1984 and stores No. 2 fuel oil with a maximum true vapor pressure of less than 3.5 kPa.

The facility is no longer subject to 40 CFR 72-78 as per 40 CFR 72.6(a)(2), the unit listed in Table 2 of 40 CFR 73.10 (Boiler 1) has been removed from the facility.

The facility is no longer subject to 40 CFR 97 as Boiler 1 has been removed from the facility and each combustion turbine's rated capacity is less than 25 MWe.

The facility is not subject to 25 Pa Code 145 as per 25 Pa Code 145.4(a)(1)(i)-(iii), Boiler 1 has been removed from the facility and each combustion turbine's rated capacity is less than 25 MWe.

Compliance History:
AMS last inspected the facility on 11/28/2018. There are no consent agreements or significant compliance issues.