

**CITY OF PHILADELPHIA**  
**Department of Public Health**  
**Public Health Services**  
**Air Management Services**

**MEMO**

**TO** Kassahun Sellassie, Program Director

**FROM** Hana Elum *HE*

**THRU** Maryjoy Ulatowski, Chief of Source Registration *MU*

**DATE** 11/1/2023

**RE** Constellation Energy Generation, LLC's  
Richmond Generating Station (Constellation – Richmond)  
Title V Operating Permit No. OP17-000008  
Philadelphia, Philadelphia County

## Procedural History

As part of the RACT regulations codified at 25 Pa. Code §§ 129.111—129.115 (relating to additional RACT requirements for major sources of NO<sub>x</sub> and VOCs for the 2015 ozone NAAQS) (RACT III), PA DEP has established a method under § 129.114(i) (relating to alternative RACT proposal and petition for alternative compliance schedule) for an applicant to demonstrate that the alternative RACT compliance requirements incorporated under § 129.99 (relating to alternative RACT proposal and petition for alternative compliance schedule) (RACT II) that are currently in force in the applicable operating permit continue to be RACT under RACT III.

The procedures to demonstrate that RACT II equals RACT III are specified in § 129.114(i)(1)(i), 129.114(i)(1)(ii) and 129.114(i)(2), that is, subsection (i), paragraphs (1) and (2). An applicant may submit an analysis, certified by the responsible official, that the RACT II permit requirements remain RACT for RACT III by following the procedures established under subsection (i), paragraphs (1) and (2). Paragraph (1) establishes cost-effectiveness thresholds of \$7,500 per ton of NO<sub>x</sub> emissions reduced and \$12,000 per ton of VOC emissions reduced as “screening level values” to determine the amount of analysis and due diligence that the applicant shall perform if there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis. Paragraph (1) has two subparagraphs.

Subparagraph (i) under paragraph (1) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air

pollution control technology or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by the Department (or appropriate approved local air pollution control agency) under § 129.99(e) had a cost effectiveness equal to or greater than \$7,500 per ton of NO<sub>x</sub> emissions reduced or \$12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under RACT II.
- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains equal to or greater than \$7,500 per ton of NO<sub>x</sub> emissions reduced or \$12,000 per ton of VOC emissions reduced.

Subparagraph (ii) under paragraph (1) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air pollution control technology or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by the Department (or appropriate approved local air pollution control agency) under § 129.99(e) had a cost effectiveness less than \$7,500 per ton of NO<sub>x</sub> emissions reduced or \$12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under RACT II.
- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains less than \$7,500 per ton of NO<sub>x</sub> emissions reduced or \$12,000 per ton of VOC emissions reduced.
- A new economic feasibility analysis for each technically feasible air cleaning device, air pollution control technology or technique.

Paragraph (2) establishes the procedures that the applicant that evaluates and determines that there is a new or upgraded pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis shall follow.

- Perform a technical feasibility analysis and an economic feasibility analysis in accordance with § 129.92(b) (relating to RACT proposal requirements).

- Submit that analysis to the Department (or appropriate approved local air pollution control agency) for review and approval.

The applicant shall also provide additional information requested by the Department (or appropriate approved local air pollution control agency) that may be necessary for the evaluation of the analysis submitted under § 129.114(i).

## Facility Information

Constellation – Richmond, formerly Exelon Richmond, is an electric generating facility at 3901 N. Delaware Ave., Philadelphia, PA, 19137. It is owned by Constellation Energy Generation, LLC and was previously owned by the Exelon Generation Company.

The sources in the facility include two (2) combustion turbines, Combustion Turbines 91 and 92, which were commissioned in 1974. They are General Electric Frame 7B combustion turbine-generator units, nominally rated at 66 megawatts (MW) or 838 MMBTU/hr each, fueled by No. 2 oil and/or kerosene. Constellation-Richmond is operated in accordance with Title V Operating Permit No. OP17-000008 issued by the City of Philadelphia, Air Management Services (AMS) on May 30, 2019. Each combustion turbine is restricted to an operational limit of 15% of maximum capacity in a rolling 12-month period and has a NO<sub>x</sub> emission limit of 0.68 lbs/MMBtu. Each combustion turbine’s NO<sub>x</sub> PTE of 374.38 tpy factors in these restrictions. In actuality, the two combustion turbines typically operate no more than 10 hours in a month or 20 hours annually, with actual emissions a fraction of their potential to emit.

The two combustion turbines are being evaluated under §129.114(i)(1)(i).

Constellation-Richmond submitted their RACT II analysis on October 24, 2016, and since then, the facility didn’t install new sources or change their existing sources.

The facility submitted the RACT II equals RACT III proposal on December 28, 2022.

The facility is major for NO<sub>x</sub>. The facility is not considered a major VOC RACT facility because their potential for VOC is less than 50 tons per year.

The last Compliance Monitoring Report inspection was performed on January 12, 2022. There were no violations identified as a result of the January 12, 2022, inspection.

## RACT III Analysis for NO<sub>x</sub> and VOC applicability

Since RACT II, Constellation-Richmond didn’t install new sources or change their existing sources.

Source ID	Source Name	New source or change to existing source?	NO <sub>x</sub> (tpy)	VOC (tpy)
CU37	Combustion Turbine #92 Make: General Electric Model: Frame 7B	No change to existing source	374.38	0.23

CU38	Combustion Turbine #91 Make: General Electric Model: Frame 7B	No change to existing source	374.38	0.23
<b>TOTAL FACILITY PTE</b>			748.76	0.45

### Summary of RACT requirements for each source

The facility’s RACT II Determination under the 2008 8-Hour Ozone NAAQS has the Plan Approval number IP16–000246 issued on 4/20/2020 and was approved under Federal Register 52.2064(f)(2) issued to Exelon Generation Company – Richmond Generating Station. The following conditions were as follows:

- Source ID: CU37, Combustion Turbine #92, Make: General Electric, Model: Frame 7B:  
Each combustion turbine is restricted to operation limit of 15% of maximum capacity in a rolling 12-month period and has a NO<sub>x</sub> emission limit of 0.68 lbs/MMBtu.
- Source ID: CU38, Combustion Turbine #91, Make: General Electric, Model: Frame 7B:  
Each combustion turbine is restricted to operation limit of 15% of maximum capacity in a rolling 12-month period and has a NO<sub>x</sub> emission limit of 0.68 lbs/MMBtu.

RACT II continues to be RACT for RACT III and therefore these requirements are not changing.

### RACT II as RACT III

- Air cleaning devices, air pollution control technologies, and techniques previously evaluated in RACT II analysis include water/ stream injection, fuel switching, selective catalytic reduction (SCR), and dry low NO<sub>x</sub> combustors. The facility’s analysis concluded that the only technologies technically feasible for the combustion turbines are water/ stream injection and SCR.
- For the limited RACT III analysis, Constellation-Richmond determined that no new control technologies have been developed since the RACT II analysis was completed and approved by AMS. The list of sources that were consulted to demonstrate that no new NO<sub>x</sub> control technologies exist for the combustion turbines include the following: a review of the RACT/BACT/LAER Clearinghouse (RBLC) database, common industry knowledge, and consultation with the combustion turbine manufacturer, General Electric.
- As part of the RACT III analysis, Constellation-Richmond performed an updated evaluation of cost effectiveness for water injection and SCR. Constellation-Richmond worked with representatives from the combustion turbine manufacturer, General Electric, to update the cost analysis. In addition to confirming that there are no new control technologies available in the RBLC database, General Electric did not identify any available new control technologies in their updated cost information.

Source ID	Source Name	Control	RACT II Cost NO <sub>x</sub> (\$/Ton)	Updated Cost NO <sub>x</sub> (\$/Ton)
CU37	Combustion Turbine #92	Water/ Stream Injection	\$5,301	\$8,435
CU37	Combustion Turbine #92	Selective Catalytic Reduction (SCR)	\$4,759	\$11,894
CU38	Combustion Turbine #91	Water/ Stream Injection	\$5,301	\$8,435
CU38	Combustion Turbine #91	Selective Catalytic Reduction (SCR)	\$4,759	\$11,894

The Department has reviewed source information, control technologies or measures evaluated by Constellation – Richmond, and the cost analysis performed by General Electric. The Department also performed an independent analysis which included, the Department’s continuous review of permit applications since the applicability date of RACT II, internet searches, BACT/RACT/LAER Clearinghouse search, knowledge gained from the Department permitting staff participating in technical presentations by several vendors and manufacturers of pollution control technology, and a review of EPA and MARAMA’s documents. Based on our review of these documents, along with training and the expertise of the reviewing staff, the Department concludes that there are no new or updated air pollution control technologies available for the sources found at Constellation – Richmond and determines that RACT II requirements for sources CU37 and CU38 at Constellation – Richmond listed in the table assure compliance with requirement for RACT III for the § 129.111 - § 129.115.

## Comparison between RACT II and RACT III requirements

- Because RACT II requirements are being certified as continuing to be RACT, RACT III requirements are identical to RACT II and therefore are as stringent as RACT II.

## Public discussion

- After submittal of the initial application, AMS requested more information from the facility. The information request included what actions the facility took to determine if there were new control techniques for the combustion turbines. The facility responded and the actions taken by the facility are summarized under the RACT II as RACT III paragraph above.
- No discussions occurred with the public after the facility submitted the RACT II is RACT III proposal application.