

# ALLEGHENY COUNTY HEALTH DEPARTMENT AIR QUALITY PROGRAM

June 27, 2023

**SUBJECT:** Reasonable Available Control Technology (RACT II) Determination  
Energy Center Pittsburgh LLC - North Shore Plant  
111 South Commons  
Pittsburgh, PA 15212  
Allegheny County

**Operating Permit No. 0022**

**TO:** JoAnn Truchan, P.E.  
Program Manager, Engineering

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## I. Executive Summary

The Energy Center Pittsburgh LLC – North Shore Plant (Energy Center) is defined as a major source of NO<sub>x</sub> emissions and was subjected to a Reasonable Available Control Technology III (RACT III) review by the Allegheny County Health Department (ACHD) required for the 2015 Ozone National Ambient Air Quality Standard (NAAQS). The findings of the review established that Energy Center Pittsburgh LLC is subject to both presumptive RACT III and case-by case RACT III requirements and the requirements are summarized below.

**Table 1 Technically and Financially Feasible Control Options Summary for NO<sub>x</sub>**

Unit ID	Emissions Unit	Financially Feasible Control Option	Current NO <sub>x</sub> PTE	RACT Reduction	Revised NO <sub>x</sub> PTE	Annualized Control Cost (\$/yr)	Cost Effectiveness (\$/ton NO <sub>x</sub> removed)
There are no additional technically and financially feasible control options available for NO <sub>x</sub> reduction.							

These findings are based on the following documents:

- RACT analysis performed by Energy Center Pittsburgh, LLC (2022-12-20 RACT III.pdf) - Submitted on December 20, 2022
- RACT II permit No.0022-I003a, issued November 30, 2020 (EPA approval on November 22, 2021, 86 FR 58223)

## II. Regulatory Basis

On October 26, 2015, the US EPA revised the ozone NAAQS. To meet the new standards, ACHD requested all major sources of NO<sub>x</sub> (potential emissions of 100 tons per year or greater) and all major sources of VOC (potential emissions of 50 tons per year or greater) to reevaluate NO<sub>x</sub> and/or VOC RACT for incorporation into Allegheny

County's portion of the PA SIP. ACHD has also incorporated by reference 25 Pa. Code, §§129.111-115 under Article XXI, §2105.08 ("RACT III").

This document is the result of ACHD's determination of RACT submitted by the subject source and supplemented with additional information as needed by ACHD. The provisions of RACT III will replace those of the previous RACT I and RACT II.

As part of the RACT regulations codified in 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), ACHD has adopted the Pennsylvania Department of Environmental Protection's established 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) for a source that commenced operation on or before October 24, 2016, and which remain in force in the applicable operating permit continue to be RACT under RACT III as long as no modifications or changes were made to the source after October 24, 2016. The date of October 24, 2016 is the date specified in § 129.99(i)(1) by which written RACT proposals to address the 1997 and 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS) were due to the Department from the owner or operator of an air contamination source located at a major NO<sub>x</sub> emitting facility or a major VOC emitting facility subject to § 129.96(a) or (b) (relating to applicability).

The procedures to demonstrate that RACT II is 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).

### **III. Facility Description**

The Energy Center Pittsburgh LLC North Shore Plant is a commercial district heating and cooling plant located at 111 South Commons Avenue in the North Shore section of Pittsburgh, PA. The plant supplies steam for space heating and hospital sterilization and chilled water for summer air conditioning to commercial and institutional sites in that area. The plant is composed of five (5) boilers, which fire natural gas as their primary fuel and have the capacity to fire no. 2 fuel oil, in lieu of natural gas at times of emergency or natural gas curtailment with the exception boilers 4 & 5. The last full compliance evaluation (FCE) at Energy Center Pittsburgh LLC North Shore Plant was conducted on August 17, 2021, and the facility was found to be in compliance. The facility currently has no violations.

There were no modifications or changes made to the facility after October 24, 2016. There have been no changes to this facility since the RACT II permit No. 0022-I003 was issued on March 18, 2020.

Energy Center is a major source of NO<sub>x</sub> emissions. Energy Center does not emit 50 tons per of VOC and is thus not a major source of VOC emissions.

Table 2 is a list of sources subject to RACT III § 129.114(i). The RACT II determination assures compliance with RACT III requirements:

**Table 2 Facility Sources Subject to Case-by-Case RACT III per PA Code 129.114**

Source ID	Description	Rating	NO <sub>x</sub> PTE (TPY)	Case-by-Case Limit (RACT II)	Case-by-Case Limit (RACT III)	RACT II as RACT III
B001	Forced draft, water tube boiler	92 MMBtu/hr	24.4	0.145 lbs/MMBtu	No change from RACT II requirements (129.114(i)(1)(i))	Y
B002	Forced draft, water tube boiler	92 MMBtu/hr	36.7	0.145 lbs/MMBtu	No change from RACT II requirements (129.114(i)(1)(i))	Y
B003	Forced draft, water tube boiler	131 MMBtu/hr	58.3	0.145 lbs/MMBtu	No change from RACT II requirements (129.114(i)(1)(i))	Y

**Table 3 Facility Sources Subject to the Presumptive RACT III per PA Code 129.112**

Source ID	Description	Rating	NO <sub>x</sub> PTE (TPY)	Case-by-Case Limit (RACT II)	Presumptive Limit (RACT III)
P001	Three Emergency Generators	350 kW; 250 kW; and 250 kW	6.17	< 500 hr/yr	§129.112(c)(10) Operate <500 hours in a 12-month rolling period
B004	Forced draft water tube boiler with low-NO <sub>x</sub> Burners)	24 MMBtu/hr	4.0	Oxygen Trim and tune-up	§129.112(b)(1)(ii) Oxygen Trim and tune-up
B005	Nebraska Boiler	46 MMBtu/hr	1.15	Fuel burning with <5% annual capacity	§129.112(c)(9) Fuel burning with 5% annual capacity

**IV. RACT III Determination**

According to §129.114(i), a previously approved RACT II case-by-case determination that has not been modified or changed may submit a limited analysis as shown below for boilers 1-3. Six technically feasible control options were identified by the facility (two for each of Boilers 1, 2, and 3). Five options are above the threshold of \$7,500 per ton of NO<sub>x</sub> removed and one is below. Therefore, both §129.114(i)(1)(i) and §129.114(i)(1)(ii) need to be addressed.

1. **§129.114(i)(1)(i)(A) & §129.114(i)(1)(ii)(A):** A statement that explains how the permittee determined that there is no new pollutant specific air cleaning device, air pollution control technology or technique available.

**Energy Center Response:** Boilers 1, 2, and 3 are conventional package boilers, which fire natural gas as their primary fuel and have the capacity to fire No. 2 fuel oil, in lieu of natural gas at times of emergency or natural

gas curtailment. Boilers 1 and 2 have a rated capacity of 92 MMBtu/hour each and Boiler 3 has a rated capacity of 131 MMBtu/hour. The boilers are currently subject to RACT I and RACT II requirements, and since the boilers commenced operation before October 24, 2016, have not been modified, and are subject to RACT II requirements under 25 Pa Code §129.99, which satisfy §129.114, this source meets the requirements for §129.114(i).

The facility's review of the literature on NO<sub>x</sub> control, RBLC database, common industry knowledge, and consultation with the boiler vendor, Babcock & Wilcox showed that there were no new technically feasible control devices or methods for the boilers since the RACT II analysis was completed. Therefore, RACT III for boilers B001-B003 shall be continued compliance with the RACT II requirements listed above and contained in the current Title V operating permit.

2. **§129.114(i)(1)(i)(B) & §129.114(i)(1)(ii)(B):** *A list of the technically feasible air cleaning devices, air pollution control technologies or techniques previously identified and evaluated under §129.92(b)(1)–(3) included in the written RACT proposal submitted under §129.99(d) and approved by the Department or appropriate approved local air pollution control agency under §129.99(e).*

**Energy Center Response:** The RACT II analysis concluded that the only control technologies technically feasible for Boilers 1, 2 and 3 were FGR and burner modification (LNB and ULNB).

3. **§129.114(i)(1)(i)(C) & §129.114(i)(1)(ii)(C):** *A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology or technique listed in paragraph 2 above and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology or technique as submitted previously under §129.99(d) or as calculated consistent with the “EPA Air Pollution Control Cost Manual” (6th Edition), EPA/452/B-02-001, January 2002, as amended.*

**Energy Center Response:** As stated above, the RACT II analysis concluded that the only technologies technically feasible for Boilers 1, 2 and 3 were FGR and burner modification (LNB and ULNB). Energy Center performed an economic analysis for these control options. The analysis is included in Attachment B, Appendix A, Table 3 of the RACT III submittal and Table 4 below. The cost effectiveness for all technically feasible control options for Boilers 1, 2 and 3 were calculated to be greater than \$7,500 per ton NO<sub>x</sub> removed; therefore, these control options are cost prohibitive.

4. **§129.114(i)(1)(i)(D) & §129.114(i)(1)(ii)(D):** *A statement that an evaluation of each economic feasibility analysis summarized in paragraph 3 above demonstrates that the cost effectiveness remains equal to or greater than \$7,500 per ton of NO<sub>x</sub> emissions reduced.*

**Energy Center Response:** Energy Center performed an evaluation of cost effectiveness of each technically feasible control option consistent with the “OAQPS Control Cost Manual” (Sixth Edition), EPA 450/3-90-006 and material and labor costs provided by boiler vendors. The OAQPS Control Cost Manual has not been updated since the RACT II analysis was completed. In addition, based on discussions with vendors and inflation, the costs of materials and labor are expected to have increased since the RACT II analysis. Based on the expected increase in material and labor costs, the cost effectiveness of the control technologies evaluated remains greater than \$7,500 per ton of NO<sub>x</sub> emissions reduced.

5. **§129.114(i)(1)(ii)(E):** *A new economic feasibility analysis for each technically feasible air cleaning device, air pollution control technology or technique listed in paragraph 2 above in accordance with §129.92(b)(4).*

**ACHD Response:** The use of FGR + FD fan + Ultra Low-NO<sub>x</sub> Burners on Boiler 3 was determined to cost \$7,247 per ton of NO<sub>x</sub> removed under the RACT II analysis. The department performed another economic analysis for the use of FGR + FD fan + Ultra Low-NO<sub>x</sub> Burners on Boiler 3 and determined that the updated cost would be \$399,106 per year and \$7,704 per ton of NO<sub>x</sub> removed, thus continuing to make this control option economically infeasible.

The Technically Feasible Control Options for NO<sub>x</sub> are detailed in Table 4.

**Table 4 RACT II Technically Feasible NO<sub>x</sub> Control Cost Comparisons**

Control Option	Process	NO <sub>x</sub> Emissions Before the Control (TPY)	NO <sub>x</sub> Emissions After the Control (TPY)		Cost *
FGR + FD fan +Low-NO <sub>x</sub> Burner (LNB)	B001	24.4	7.3	Cost	\$189,724
				\$/ton	\$11,095
FGR + FD fan + Ultra Low- NO <sub>x</sub> Burner (ULNB)	B001	24.4	2.4	Cost	\$232,000
				\$/ton	\$10,546
FGR + FD fan +Low- NO <sub>x</sub> Burner (LNB)	B002	36.7	9.4	Cost	\$270,242
				\$/ton	\$9,899
FGR + FD fan + Ultra Low- NO <sub>x</sub> Burner (ULNB)	B002	36.7	3.1	Cost	\$311,910
				\$/ton	\$9,283
FGR + FD fan +Low- NO <sub>x</sub> Burner (LNB)	B003	58.3	19.6	Cost	\$333,013
				\$/ton	\$8,605
FGR + FD fan + Ultra Low- NO <sub>x</sub> Burner (ULNB)	B003	58.3	6.5	Cost	\$375,394
				\$/ton	\$7,247

\* RACT II Technical Support Document; energy center northshore – ract rv3 (Mar. 18, 2020)

**V. RACT II as RACT III**

The conditions listed in the table in Section V of this document below supersede the relevant conditions of Plan Approval Order and Agreement #220 (RACT I), issued March 4, 1996, and RACT II. The RACT III conditions are at least as stringent as those from RACT II. Other RACT I conditions listed in Table 6 below not affected by RACT III remain in effect.

**Table 5 RACT II as RACT III Summary**

Unit ID	New source or change to existing source?	Pollutant	(RACT II) PTE (tpy)	RACT III PTE (tpy)	RACT II NO <sub>x</sub>	RACT III NO <sub>x</sub>	RACT III Same as RACT II?
B001	No	NO <sub>x</sub>	24.4	24.4	cbc	cbc	Y
B002	No	NO <sub>x</sub>	36.7	36.7	cbc	cbc	Y
B003	No	NO <sub>x</sub>	58.3	58.3	cbc	cbc	Y

Unit ID	New source or change to existing source?	Pollutant	(RACT II) PTE (tpy)	RACT III PTE (tpy)	RACT II NO <sub>x</sub>	RACT III NO <sub>x</sub>	RACT III Same as RACT II?
B004	No	NO <sub>x</sub>	4.0	4.0	P	P	NA
B005	No	NO <sub>x</sub>	1.15	1.15	P	P	NA
P001 (3 emergency generators)	No	NO <sub>x</sub>	6.17	6.17	P	P	NA
<b>TOTAL</b>		<b>NO<sub>x</sub></b>	<b>130.72</b>	<b>130.72</b>			

**VI. RACT III Summary and Revised RACT III Permit Conditions**

The Department has analyzed the facility’s proposal for considering RACT II requirements as RACT III and also performed an independent analysis. Based on the information provided by the facility and independently verified by the Department, ACHD has determined that the RACT II requirements satisfy the RACT III requirements. The RACT III requirements are identical to the RACT II requirements and are as stringent as RACT II.

**Table 6 RACT I, RACT II, and RACT III Summary**

Unit ID	Permit Condition No.	RACT I Requirement	RACT II Requirement	RACT III Requirement
Boilers-B001 – B002	V.A.1.b – V.A.1.g	Order #220, 1.1, 1.3	§129.99	§129.114(i)
Boilers-B001 – B002	V.A.2.a- V.A.2.b	Order #220, 1.4	§129.99	§129.114(i) & §129.115(b)(6)
Boilers-B001 – B002	V.A.3	Order #220, 1.5	§129.99	§129.114(i)
Boilers-B001 – B002	V.A.4.a – V.A.4.c	Order #220, 1.5	§129.99	§129.115(f)
Boilers-B001 – B002	V.A.5.a	Order #220	§129.99	§129.115
Boilers-B001 – B002	V.A.6		§129.99	§129.114(c)
Boiler-B003	V.B.1.b – V.B.1.g	Order #220, 1.1, 1.3	§129.99	§129.114(i)
	V.B.2.a- V.B.2.b	Order #220, 1.4	§129.99	§129.114(i) & §129.115(b)(6)
	V.B.3	Order #220, 1.5	§129.99	§129.114(i)
	V.B.4.a – V.B.4.c	Order #220, 1.5	§129.99	§129.115(f)
	V.B.5.a	Order #220	§129.99	§129.115
	V.B.6		§129.99	§129.114(c)

1. Section V.A: Removed and Added. Removed RACT I & II citations. RACT III citations was added and to supersede RACT II.

2. Section V.B: Removed and Added. Removed RACT I & II citations. RACT III citations was added and to supersede RACT II
3. Section V.C: Added boiler No 4 as a RACT source, incorporated the requirements from the Title V Operating Permit, and added RACT III citations.
4. Section V.D: Added boiler No 5 as a RACT source, incorporated the requirements from the Title V Operating Permit, and added RACT III citations.
5. Section V.E: Added generators 1, 2 & 3 as RACT sources, incorporated the requirements from the Title V Operating permit and added RACT III citations.
6. Section VII: Revised the emissions summary to include boilers 4, 5 and generators 1-3 limits.