CITY OF PHILADELPHIA
DEPARTMENT OF PUBLIC HEALTH
AIR MANAGEMENT SERVICES

RACT II PLAN APPROVAL
AMS Permit No. IP16-000250

Effective Date: March 4, 2020

Expiration Date: None

Replaces Permit No.: RACT Plan Approval dated January 9, 2015

In accordance with provisions of the Air Pollution Control Act, the Act of January 8, 1960, P.L. 2119, as amended, and after due consideration of a Reasonably Available Control Technology (RACT) proposal received under the Pennsylvania Code, Title 25, Chapter 129.96 thru 129.100, of the rules and regulations of the Pennsylvania Department of Environmental Protection (PADEP), Air Management Services (AMS) approved the RACT II proposal of the facility below for the source(s) listed in section 1.A. Emission Sources of the attached RACT II Plan Approval

Facility:	Grays Ferry Cogeneration Partnership – Schuylkill Station
Permittee:	Grays Ferry Cogeneration Partnership
Location:	2600 Christian Street, Philadelphia, PA 19146
Mailing Address:	2600 Christian Street, Philadelphia, PA 19146
SIC Code(s):	4961
Plant ID:	4944
Facility Contact:	Jessica Hartley
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Responsible Official:	Michael Kopistansky
Title:	Vice President of Operations

3/4/20

Edward Wiener, Chief of Source Registration — Date

The RACT II Plan Approval is subject to the following conditions:

1. **Purpose/Sources:**

The purpose of this Plan Approval is to establish Nitrogen Oxides (NOx) Reasonably Available Control Technology (RACT II) for Grays Ferry Cogeneration Partnership – Schuylkill Station (GFCP). This includes the following emission sources and control equipment:

A. Emission Sources

(1) Boiler 25: Auxiliary boiler with a capacity of 1119 MMBTU/hr. The boiler is front wall fired and burns natural gas and No. 2 oil.

(2) Combustion Turbine (CT) with and without Heat Recovery Steam Generating Unit (HRSG): The CT is a combined cycle turbine with a capacity of 1515 MMBTU/hr (135 MW). The CT can operate both with and without HRSG. The CT burns natural gas and No. 2 oil.

(3) Boiler 26 operates under Vicinity Schuylkill (PA 04942) - it is listed in the RACT II Permit because it is part of the Vicinity Facility Wide NOx Averaging Emission Plan (VFWNOxAEP).

B. Control Equipment

(1) Boiler 25 is equipped with low NOx (LNB) burners and flue gas recirculation (FGR).

(2) CT has a SCR system and dry low NOx (DLN) combustion for gas firing, and water injection (WI) for oil firing.

2. Approval and Authorization:

A. Boiler 25 and the CT (with and without HRSG) shall be installed, operated, and maintained in accordance with the manufacturer's specifications and with good engineering practices.

3. Stack Emission Limitations:

A. NOx emissions from the CT shall not exceed any of the following:

(1) 255 pounds per (lb/hr) without HRSG. [PA 04944 RACT Plan Approval dated 1/9/2015]

(2) 298.9 lb/hr for the CT with HRSG. [PA 04944 RACT Plan Approval dated 1/9/2015]

(3) 0.0344 pounds per million British Thermal Units (lb/MMBTU) when firing natural gas. [AMS Plan Approval 97019 dated 3/8/2001]

(4) 0.1683 lb/MMBTU when firing No. 2 oil. [AMS Plan Approval 97019 dated 3/8/2001]

B. NOx Emissions from Boiler 25 shall not exceed any of the following:

(1) 0.10 lb/MMBTU when firing natural gas [PA 04944 RACT Plan Approval dated 1/9/2015]

(2) 0.15 lbMMBTU when firing No. 2 oil. [PA 04944 RACT Plan Approval dated 1/9/2015]

(3) 0.10 lb/MMBTU when firing natural gas on a 30 operating day rolling average per Vicinity Facility Wide NOx Emission Averaging Plan (VFWNOxEAP).

(4) 0.12 lbs/MMBTU when firing No. 2 oil on a 30 operating day rolling average per VFWNOxEAP.

C. NOx emissions from Boiler 26 shall not exceed any of the following:

(1) 0.36 lbs/MMBTU on a 30-day rolling average when firing No. 6 fuel oil; [PA 04942 RACT

Plan Approval dated 2/9/2016]

(2) 0.41 lbs/MMBTU on an hourly basis when firing No. 6 fuel oil; [PA 04942 RACT Plan Approval dated 2/9/2016]

(3) 312.01 lbs/hr on an hourly basis when firing No. 6 fuel oil ; [PA 04942 RACT Plan Approval dated 2/9/2016]

(4) 0.10 lbs/MMBTU when firing natural gas on a 30 operating day rolling average per Vicinity Facility Wide NOx Emission Averaging Plan (VFWNOxEAP); and

(5) 0.20 lbs/MMBTU/hr when firing No. 6 oil on a 30 operating day rolling average per VFWNOxEAP.

4. Vicinity Facility Wide NO_X Emission Averaging Plan (VFWNOxEAP)

A. Averaging Units:

TABLE 1: NO_X Emission Averaging Units

Facility PLID	Unit	Description	Capacity	Allowable NO_X Emission Limitation [$E_{iallowable}$]	Reference
GFCP, 04944	*CU02	Combustion Turbine with HRSG	135 MW	42 ppmdv @15% O_2 when firing natural gas. Represented as 0.0344 lb/MMBTU 96 ppmdv @15% O_2 when firing No.2 fuel oil. Represented as 0.1683 lb/MMBTU	25 Pa Code §129.97(g)(2)(i)(A) AMS Plan Approval dated 3/8/2001 25 Pa Code §129.97(g)(2)(i)(B) and §129.98(e) AMS Plan Approval dated 3/8/2001
GFCP, 04944	CU25	Boiler 25	1119 MMBTU /hr	0.10 lb/MMBTU when firing natural gas. 0.12 lb/MMBTU when firing No. 2 fuel oil.	25 Pa Code §129.97(g)(1)(i) 25 Pa Code §129.97(g)(1)(ii)
Schuyl kill, 04942	CU05	Boiler 26	761 MMBTU /hr	0.10 lb/MMBTU when firing natural gas. 0.20 lb/MMBTU when firing No. 6 Oil.	25 Pa Code §129.97(g)(1)(i) 25 Pa Code §129.97(g)(1)(iii)

* 25 PaCode §129.97 emission limits for Grays Ferry CU02 in units of ppmvd are equivalent to 0.155 lb/MMBTU (natural gas) and 0.3732 lb/MMBTU (No. 2 fuel oil). Unit CU02 is subject to more stringent emission limits in the existing Title V Permit No. V13-0003 (Originally from AMS Plan Approval No. 97019 & AMS Plan Approval letter, dated 3/8/2001), 0.0344 lb/MMBTU for natural gas and 0.1683 lb/MMBTU for No. 2 oil.

B. Averaging Plan:

(1) Vicinity Facility Wide NO_X Emission Averaging Plan (VFWNOxEAP):

(i) Vicinity shall comply with the RACT requirements of 25 Pa Code §129.98(e) for the Facility Wide Averaging Plan.

The owner or operator shall calculate the alternative facility-wide or system-wide NO_X RACT emissions limitation using a 30-day rolling average for the air contamination sources included in Section 1.A by using the following equation to sum the emissions for all of the sources included in the NO_X emissions averaging plan:

$$\sum_{i=1}^{n} Ei_{actual} \leq \sum_{i=1}^{n} Ei_{allowable}$$

Where:

Ei_{actual} = The actual NO_X mass emissions, including emissions during start-ups, shutdowns and malfunctions, for air contamination source i on a 30-day rolling basis.

Calculate the daily actual NO_X emissions from each unit in the averaging plan for each day at least one of the units operates by summing the hourly NO_X emissions using a certified CEM. The daily actual NO_X mass emissions must include emissions that occur during the entire operating day, including emissions from start-ups, shutdowns, and malfunctions. Each day that at least one of the units operates shall be defined as a system-wide operating day. The mass NO_X emissions from each source within the NO_X emission averaging plan shall be calculated for each hour of operation and expressed in pounds, which will be used in calculations to determine compliance with the total 30-day allowable pounds on a 30-day rolling average.

The 30-day rolling actual NO_X emissions for each unit in the averaging plan is calculated by summing the actual NO_X mass emissions for the current system-wide operating day and the previous 29 system-wide operating days.

The 30-day rolling system-wide actual NO_X mass emissions shall be calculated for each consecutive system-wide operating day in the data acquisition handling system associated with the NO_X CEMs at the facility.

$Ei_{allowable}$ = The allowable NO_X mass emissions computed using the allowable emission rate limitations for air contamination source i on a 30-day rolling basis specified in §129.97. If an air contamination source included in an averaging plan is subject to a numerical emission rate limit that is more stringent than the applicable allowable emission rate limitation in §129.97, then the numerical emission rate limit shall be used for the calculation of the allowable NO_X mass emissions.

$Ei_{allowable} = \sum_{j=1}^{720}(Allowable\ NO_X\ Emissions)_j$, where:

$(Allowable\ NO_X\ Emissions)_j$ is the hourly "Allowable NO_X Emissions" for the source i during the j^{th} hour in a 30-day period determined using Table 3.

720 is the number of hours in a 30-day period.

The first hourly value (j = 1) is for the hour 12 midnight to 1:00 am on the first day.

n = The number of air contamination sources included in the NO_X emissions averaging plan.

If multiple fuels are combusted during any hour, the applicable RACT II NO_X emission limit will be determined on the total heat input fuel weighed basis according to the

calculation specified in §127.97(g)(4)(i). A fuel representing less than 1% of the unit's annual fuel consumption on a heat input basis is excluded when determining the applicable fuel emission limits.

The Permittee shall utilize 40 CFR Part 75 data substitution procedures, or an alternate data substitution method specified by PADEP, for invalid data for hourly NO_X (lbs) and hourly heat input (MMBTU).

(ii) System-wide emissions averaging must be among sources under common control of the same owner or operator within the same ozone nonattainment area in this Commonwealth.

(iii) Each unit averaged listed in TABLE 1 shall be equipped with a Continuous Emission Monitoring Data Acquisition System (CEM/DAS) certified by AMS. The following parameters will be monitored on an hourly basis:

TABLE 2: CEM/DAS Parameters

Parameter	Units	Period
Heat Input for Each Fuel Type	MMBTU	Hourly
NO_X Emission Rate **(DETERMINED USING CEMS)** for Each Fuel Type	lbs/MMBTU	Hourly

(iv) The following parameters shall be monitored during each unit operating hour and will include start-ups, shutdowns, and malfunctions:

TABLE 3: Additional CEM/DAS Parameters

Parameter	Units	Period
Total Heat Input, All Fuels or Heat Inputs for each different fuel if more than one fuel is burned during the hour	MMBTU	Hourly
ACTUAL NO_X Emission Rate = NO_X emission rate (lbs/MMBTU) x Total Heat Input, All Fuels (MMBTU)	lbs	Hourly
Applicable NO_X Emission Limit (Determined as Specified in Table 1 and Condition D.2.(a)(1)(i) above and weighted using 25 Pa Code §129.97(g)(4) if more than one fuel is burned during the hour)	lbs/MMBTU	Hourly
Allowable NO_X Emissions = RACT II NO_X Emissions limit x Total Heat Input, All Fuels	lbs	Hourly

(v) The following parameters shall be totalized for all three averaged units as specified in 25 PA Code §129.98(e):

TABLE 4: Totalized Average Parameters for Averaging Units

Parameter	Units	Period
Total Actual NO_X Emissions	lbs	Operating Day
Total Allowable NO_X Emission	lbs	Operating Day
Total Actual NO_X Emissions	lbs	30 Operating Days (Rolling)
Total Allowable NO_X Emissions	lbs	30 Operating Days (Rolling)

The 30-day total actual NO_X emission limit shall finally be compared to the 30-day total allowable NO_X emissions, for each successive operating day, in order to determine the RACT II compliance status.

5. RACT II Implementation Schedule:

A. Upon issuance of this approval, Vicinity shall begin immediate implementation of the measures necessary to comply with the approved RACT II Proposal.

B. Upon issuance of this approval, Boiler 25 shall meet the NO_X RACT II emission limits of 25 Pa Code §129.97 by averaging NO_X emissions on a system-wide basis using a 30 day rolling average per the VFWNO$_X$EAP (Condition 4). The NO_X averaging plan shall meet the requirements of 25 Pa Code §§129.98(e) -129.100.

6. Testing and Monitoring Requirements:

A. Continuous NO_X and oxygen (O_2) monitors and recorders shall be operated on the exhaust stacks of Boiler 25 and the CT/HRSG. The continuous emission monitors must conform to USEPA performance specifications in 40 CFR Part 60, Appendix B and Pa. DEP Continuous Source Monitoring Manual Rev. No. 7.

B. For the CT, the Permittee shalldemonstrate compliance with the emission limits of Conditions 3.A.(1) thru (4) using CEM data and VFWNO$_X$EAP. The CT shall be monitored in accordance with the requirements of 25 Pa Code Chapter 139, Subchapter C.

C. For Boiler 25, the Permittee shall demonstrate compliance with the emission limits in Conditions 3.B.(1) thru (4) using CEM data and VFWNO$_X$EAP. Boiler 25 shall be monitored in accordance with the requirements of 25 Pa Code Chapter 139, Subchapter C.

D. For Boiler 26, the Permittee shall demonstrate compliance with the emission limits of Conditions 3.C.(1) thru (5) using CEM data and VFWNO$_X$EAP. Boiler 26 shall be monitored in accordance with the requirements of 25 Pa Code Chapter 139, Subchapter C.

7. Recordkeeping and Reporting Requirements:

A. For the CT, Boiler 25, and Boiler 26, compliance shall be recorded based on NO_X CEM data and VFWNO$_X$EAP calculations. The facility shall record compliance based on daily hours of operation, fuel type, fuel usage, CEM data, and NO_X averaging calculations.

For the VFWNO$_X$EAP, the Permittee shall comply with the requirements of 25 Pa Code

§129.100 for each source included in the VFWNO_XEAP.

Except as provided in 25 Pa Code §129.100(c), the owner and operator of an air contamination source subject to a NO_X requirement or RACT emission limitation or VOC requirement or RACT emission limitation, or both, listed in §129.97 (relating to presumptive RACT requirements, RACT emission limitations and petition for alternative compliance schedule) shall demonstrate compliance with the applicable RACT requirement or RACT emission limitation by performing the following monitoring or testing procedures:

(1) For an air contamination source with a CEMS, monitoring and testing in accordance with the requirements of Chapter 139, Subchapter C (relating to requirements for source monitoring for stationary sources) using a 30-day rolling average, except municipal waste combustors.

(i) A 30-day rolling average emission rate for an air contamination source that is a combustion unit shall be expressed in pounds per million Btu and calculated in accordance with the following procedure:

(A) Sum the total pounds of pollutant emitted from the combustion unit for the current operating day and the previous 29 operating days.

(B) Sum the total heat input to the combustion unit in million Btu for the current operating day and the previous 29 operating days.

(C) Divide the total number of pounds of pollutant emitted by the combustion unit for the 30 operating days by the total heat input to the combustion unit for the 30 operating days.

(ii) A 30-day rolling average emission rate for each applicable RACT emission limitation shall be calculated for an affected air contamination source for each consecutive operating day.

(iii) Each 30-day rolling average emission rate for an affected air contamination source must include the emissions that occur during the entire operating day, including emissions from start-ups, shutdowns and malfunctions.

(2) For each source in the system-wide NO_X emission averaging plan that combust any fuels in the amount less than 1% of its annual fuel combustion on a heat input basis, the permittee shall keep records pursuant to 25 Pa Code §129.100(d)

B. GFCP shall maintain a file containing all the records and other data that are required to be collected to demonstrate compliance with NO_X RACT requirements of 25 Pa Code §§129.96-129.100. These records shall include fuel consumption, and NO_X emissions.

C. The records shall provide sufficient data and calculations to clearly demonstrate that the requirements of 25 Pa Code §129.96-129.100 are met.

D. Data or information required to determine compliance shall be recorded and maintained in a time frame consistent with the averaging period of the requirement.

E. Records shall be retained for at least five (5) years and shall be made available to AMS on request.

8. Revisions:

A. Revisions to any emission limitations incorporated in this RACT II Approval will require resubmission as revision to the PA State Implementation Plan. The applicant shall bear the cost of public hearing and notification required for EPA approval as stipulated in 25 PA Code §129.91(h).