

COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Northwest Regional Office

September 9, 2021

SUBJECT: Memorandum of Review of Title V Operating Permit Renewal Application
Keystone-Conemaugh Projects, LLC / Keystone Station

Plum Creek Township, **Armstrong County**
APS No. 1002530, Authorization No. 1349542
Client 350861; Site 243270; Primary Facility 275229

TO: File: AQ/Facilities/FacOp/ TV-03-00027

FROM: Sheila Shaffer /s/ SS
Air Quality Engineering Specialist
Air Quality Program – Northwest Region

THROUGH: Matthew Williams /s/ MMW
Facilities Permitting Chief
Air Quality Program - Northwest Region
Eric A. Gustafson *EAG 9/10/2021*
Air Quality Program Manager
Northwest Regional Office

INTRODUCTION:

The Department received an application for the significant modification of the Title V Operating Permit pursuant to 25 Pa. Code §127.541 for Keystone Conemaugh Projects, LLC (Keystone) on April 14, 2021. The application addresses the Alternative Proposal RACT requirements pursuant to 25 Pa. Code §129.99 for Boiler 1 and 2 and the two auxiliary boilers. The application also addresses revisions to the Cross-State Air Pollution Rule (CSAPR).

The operating permit is for the operation of an electrical generation facility located at in Plum Creek Township, Armstrong County. On April 23, 2021, the Department determined the application to be administratively complete per 25 Pa. Code §127.503. Keystone is currently operating under TVOP-03-00027 issued on April 17, 2020 with an expiration date of March 31, 2025.

Keystone Generating Station operates two bituminous coal-fired combustion units (boilers with steam turbine-driven electric generators (Boiler 1 and Boiler 2)) that provides electricity to the Pennsylvania-Jersey-Maryland (PJM) regional electric grid. Boilers 1 and 2 are identical units and each have a nominal rating of 8,717 MMBtu/hr with gross electrical output of 910 MW for each generator at nominal maximum operating condition. No. 2 fuel oil is also used for start-up and for as-needed supplemental firing. Boiler 1 and Boiler 2 are operating as Source ID 031 and 032 respectively in the TVOP-03-00027. Boilers 1 and 2 are equipped with ABB-C-E manufactured Low NOx Burners (LNB) installed in 1995, and Selective Catalytic Reduction (SCR) system manufactured by Babcock & Wilcox and installed in 2003. Boilers 1 and 2 are

also equipped with DEP certified continuous emission monitors (CEMS) for NO_x and contain exhaust gas stream flow monitors.

The two fuel oil-fired Auxiliary Boilers A and B (Source IDs 037 and 038) at Keystone are fossil-fuel-fired steam generators with a maximum heat input capacity of 138 MMBtu per hour, each. These units were constructed during 1967.

On April 23, 2016, the Department published 25 Pa. Code Chapter 129: Standards for Sources-Additional Reasonably Available Control Technology (RACT) requirement for Major Sources of NO_x and VOCs (the RACT II Rule”) in 46 Pennsylvania Bulletin 2036. The RACT II standards apply to the existing major NO_x and/or VOC emitting facilities throughout Pennsylvania. Existing major facilities included those facilities which are major sources of NO_x and/or VOC that were existing on or before July 20, 2012, and existing minor facilities which become major sources of NO_x and/or VOC after July 20, 2012. As a major NO_x and VOC emitting facility, Keystone is subject the RACT II Rule. An application was submitted on October 24, 2016 for a minor modification to the Title V Operating Permit to incorporate 25 Pa. Code §§129.96 through 129.100 for NO_x and VOC emitting sources. The Title V Operating Permit was Modified on August 13, 2019 for the applicable NO_x and/or VOC emitting sources (Source ID 031, 032, 037, 038, 101-104, 110, 113-115).

On August 27, 2020, the U.S. Third Circuit Court of Appeals issued an opinion in *Sierra Club v. EPA*, 3d. Cir. No. 19-2562 (“Sierra Club”) vacating and remanding three aspects of the U.S. Environmental Protection Agency’s (EPA) May 19, 2019 approval of DEP’s 2016 RACT II rule to reduce ozone pollution from coal-fired power plants (84 FR 20274). Sierra Club challenged EPA’s approval of the RACT II Rule’s oxides of nitrogen (NO_x) emission limit for coal-fired power plants with selective catalytic reduction (SCR) pollution controls; the inlet operating temperature threshold for power plants to operate SCR pollution controls; and operating temperature data recordkeeping and reporting requirements. The Court found EPA’s approval of these three provisions of the RACT II Rule were not supported by the administrative record. As a result, the Court vacated EPA’s approval of these three provisions and remanded them back to the agency for further action. The vacated portion of the RACT II Rule affects Keystone facility.

As a result of the Court’s decision in *Sierra Club*, DEP is required to address RACT II requirements for existing coal-fired combustion units with SCR systems. DEP determined that the best method to do this is through requiring the owner or operator of each unit affected by the Court’s decision to case-by-case RACT determinations in accordance with the procedures in §129.92(a)(1)—(5) and (b), which includes a top-down analysis.

DEP sent the letter to Keystone Conemaugh Project LLC on November 20, 2020, to submit case-by-case RACT II determinations that satisfy 25 Pa. Code § 129.99 (relating to alternative RACT proposal and petition for alternative compliance schedule) requirements by April 1, 2021. Keystone submitted the case by case RACT determination to DEP on April 1, 2021. Subsequently on April 14, 2021, Keystone submitted a significant operating permit modification application. DEP is incorporating the final RACT determinations with associated conditions into Keystone’s Title V operating permit. RACT determinations incorporated into the Title V operating permit will be submitted to EPA as a state implementation plan revision.

The August 25, 2021, DEP's Technical Evaluation for Case-by-Case NOx RACT Review Memo for Keystone Generating Station addresses the proposed RACT and provides the DEP's conclusions regarding the technical analysis and recommendations for the requirements pertaining to Boiler 1 and 2. In the Memorandum of Review of Application for RACT II for the Keystone Station written by Hubert Flaherty on September 9, 2021 the summary of the technical review for Boiler 1 and 2 are reiterated and supplemented with additional monitoring, testing, recordkeeping, and reporting requirements. The memo also provides technical analysis for the Auxiliary Boilers and provides additional emission restrictions, testing, monitoring, and recordkeeping requirements. The alternative RACT II requirements from these memos have been incorporated in Section E. Group Restrictions G09-G011 for Source ID 031, 032, 037, and 038 as stated below.

Additionally, on March 15, 2021, new rulemaking on revised NOx ozone allocations was signed by the EPA Administrator (Michael S. Regan). This rulemaking lowers the NOx ozone allocations for power plants in 12 states, which include Pennsylvania, in response to the September 2019 ruling by the US Court of Appeals for the D.C. Circuit, *Wisconsin v. EPA*, which remanded the 2016 CSAPR Update. Although its implementation started May 1, 2021 (i.e., 1st day of the 2021 ozone season), this rulemaking took effect 60 days after publication of its notice in the Federal register (i.e., April 30, 2021). Starting 2021, Pennsylvania is under NOx Ozone Season Group 3 and has to comply with the new Subpart GGGGG (5G) (*NOx Ozone Season Group 3 Trading Program*) instead of Subpart 5E. The NOx ozone allocations have been updated from 876 tons to 660 tons for Boiler 1 (Source ID 031) and 919 tons to 604 tons for Boiler 2 (Source ID 032) as provided by EPA. The revised NOx ozone season allowances can be obtained from EPA: <https://www.epa.gov/csapr/revised-cross-state-air-pollution-rule-update>.

Because incorporation of CSAPR into the permit is based on EPA guidance, no applicability determination was performed for this rule. As indicated in the permit, allowance allocations for periods beyond 2024 (i.e., or any revisions to existing allowance allocations) will be announced by EPA in a Notice of Data Availability. Updates and revisions have been incorporated into Section E, Group G02 as stated below.

CHANGES TO PERMIT:

Section D. Source Level Requirements

Source ID 031 Boiler 1

- 25 Pa Code §129.97 has been updated to reflect applicability to presumptive RACT for VOC emissions as such; "The permittee shall install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices for the control of the VOC emissions from the combustion unit."

Source ID 032 Boiler 2

- 25 Pa Code §129.97 has been updated to reflect applicability to presumptive RACT for VOC emissions as such; "The permittee shall install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices for the control of the VOC emissions from the combustion unit."

Section E. Group Restrictions

G01 Main Boilers #1 and #2

- 25 Pa Code §127.441 Testing Requirement (Condition #010) item #13 has been updated by removing the requirement to submit paper copies as the Department has transitioned to only electronic submittal for source testing. Therefore, the addresses for Central Office and the Northwest Region pertaining to paper copy submittal has also been removed.

G02 Main Boilers #1 and #2 CSAPR

- 40 CFR §97.404 (Subpart AAAAA) Condition #002 added “Data allowances are available at EPA's Air Markets Program Data (<https://ampd.epa.gov/ampd/>)”.
- 40 CFR §97.604 (Subpart CCCCC) Condition #006 added “Data allowances are available at EPA's Air Markets Program Data (<https://ampd.epa.gov/ampd/>)”.
- 40 CFR §97.804 (Subpart EEEEE) Condition #010 removed 2021-2024 allowances as well as subsection (b) and (c). Incorporated by reference §§97.806, 97.830, and 97.834 and a footnote is added to document the effective date that Subpart GGGGG replaced Subpart EEEEE as noted above.
- 40 CFR §§ 97.806, 97.830, and 97.834 (Subpart EEEEE) have been removed and replaced with Subpart GGGGG.
- 40 CFR §§97.1004, 97.1006, 97.1030, and 97.1034 (Subpart GGGGG) has been incorporated.

G04 Auxiliary Boilers (Source ID 037 and 038)

- 25 Pa. Code §127.441 Conditions #003 and #005 (annual capacity factor of 10% and operating log) have been removed from this Group as the conditions are duplicated in G011 Alternative RACT II for Auxiliary Boilers. Additionally, each condition references RACT I and II requirements.

G06 RACT II (Previously Source ID 031, 032, 037 and 038)

- Condition # 001, 003, and #008 pertaining to 25 Pa. Code §129.98 and §129.100 have been deleted as the presumptive RACT determination no longer applies.
- Condition #002 per 25 Pa. Code §129.100 pertaining to source testing of the Auxiliary Boilers (Source ID 037 and 038) has been relocated to Group G011 Alternative RACT II for Auxiliary Boilers.
- Condition # 004, 005, and 007 per 25 Pa. Code §129.100 pertaining to SCR temperature and ammonia slip have been revised and relocated to Group G09 Alternative RACT II for Boiler 1 and 2.
- Condition #006 pertaining to 25 Pa. Code §129.100 has been relocated to Group G09 Alternative RACT II for Boiler 1 and 2 and G011 Alternative RACT II for Auxiliary Boilers.
- Group G06 is kept as “Reserved”.

G09 Alternative RACT II for Boiler 1 and 2 (Source ID 031 and 032) has been added.

The following conditions have been incorporated under 25 Pa. Code §129.99 and *will be included in the Pennsylvania SIP*:

Emissions of NO_x expressed as NO₂ for Boiler 1 and 2 (Source ID 031 and 032) are individually limited to a maximum of 0.080 lb NO_x /MMBtu on a daily average basis. This limit excludes, emissions during start-up, shut-down, and malfunction; operation pursuant to emergency generation required by PJM, including any necessary testing for such emergency operations; and during periods in which compliance with this emission limit would require operation of any equipment in a manner inconsistent with technological limitations, good engineering and maintenance practices, and/or good air pollution control practices for minimizing emissions.

- [Startup, Shutdown and daily average is defined within the permit condition but omitted from this description.]
- Emissions of NO_x expressed as NO₂ from Boiler 1 and 2 (Source ID 031 and 032) are individually limited to a maximum of 0.30 lb NO_x /MMBtu on a daily average basis under all operating conditions.
- Emissions of NO_x expressed as NO₂ from Boiler 1 and 2 (Source ID 031 and 032) are individually limited to a maximum 800 lbs NO_x/hr on a 30-operating day rolling average basis under all operating conditions.
- The owner or operator shall calibrate, operate, and maintain all elements of the SCR system and units in accordance with the manufacturer's specifications, in a manner consistent with good engineering and air pollution control practices when the SCR system is in use.
- The owner or operator shall maintain NO_x controls as effective as reasonably possible during startups and shutdowns.
- The owner or operator shall take steps to bring NO_x controls back into full service as quickly as practicable whenever the control equipment experiences a malfunction
- The owner or operator shall document and report to the DEP, information regarding the cause of the malfunction and the steps for bringing the controls back.
- The owner or operator shall develop, maintain and implement an operation and maintenance plan (O&M Plan) for Boiler 1 and 2 (Source ID 031 and 032) and the SCR within 30-days of issuance of this Permit. The O&M Plan shall include, but not be limited to the following:
 - Inspection, repairs, and preventive maintenance procedures to be followed to ensure proper operation of the Boiler 1 and 2 (Source ID 031 and 032) and SCR system and continuing compliance with the applicable emission limits specified in this Permit.
 - A description of preventive maintenance schedules, spare parts inventories, procedures and protocols for unscheduled outages, and provisions for equipment replacement and measures to be taken to protect SCR system in the event of failure or shutdown.
 - Inspections of duct work and boiler casing and repairs of leaks to maintain flue gas temperature.
 - Details of the practices and procedures to be followed during periods of startup, shutdown and upset conditions in order to prevent emissions in excess of the standards specified in this permit.
- The owner or operator shall develop, maintain and implement an operation and maintenance plan (O&M Plan) for Boiler 1 and 2 (Source ID 031 and 032) and LNB within 30-days of issuance of this Permit. The O&M Plan shall include, but not be limited to the following:

- Inspection, repairs, and preventive maintenance procedures to be followed to ensure proper operation of the Boiler 1 and 2 (Source ID 031 and 032) and LNB and continuing compliance with the emission standards specified in this Permit.
- A description of preventive maintenance schedules, spare parts inventories, procedures and protocols for unscheduled outages, and provisions for equipment replacement and measures to be taken to protect air pollution control equipment in the event of any control equipment failure or shutdown.
- Details of the practices and procedures to be followed during periods of startup, shutdown and upset conditions in order to prevent emissions in excess of the standards specified in this permit.
- Inspections, repair and testing of Over Fire Air (OFA) components.
- Details of the practices and procedures to be followed to ensure that the boiler is tuned to optimize NOx reduction over combustion efficiency, including but not limited to the properly adjusted burner angle.
- During the first 60 days of each calendar year, the facility shall perform a catalyst activity test.
- Within 60 days of receiving the results of catalyst activity test, the facility shall consult with the SCR catalyst vendor to monitor SCR performance in accordance with the catalyst management plans (CMPs) developed for the SCR systems. Corrective action, if required, shall be completed by April 30th.

The following conditions have been incorporated under 25 Pa. Code §127.441 and ***are not included in the SIP***:

- The owner or operator shall operate and maintain LNB in accordance with the manufacturer's specifications and in a manner consistent with good engineering and air pollution control practices.
- All operators of Boiler 1 and 2 (Source ID 031 and 032), SCR, and LNB shall be trained in the operation and maintenance of the unit(s) they are assigned to operate by qualified personnel.
- The facility shall tune the boiler to minimize NOx emissions within 6 months of the effective date of this permit and annually thereafter.
- The facility shall maintain the following records of the tune-up:
 - The date of the tuning procedure.
 - The name of the service company and the technician performing the procedure.
 - The final operating rate or load.
 - The final NOx and CO emission rates.
 - The final excess oxygen rate.
- Within 3 months of the effective date of this permit, the facility shall set the SCR at a target NOx emission rate of 0.060 lb NOx /MMBtu.
- After operating the SCR with an outlet NOx emission rate set-point of 0.060 lb/MMBtu for twelve consecutive months, the facility shall submit an engineering study within 180 days that analyzes the overall environmental performance of the system at that set-point.
- All records shall be retained by the permittee for five (5) years and made available to the Department upon request.

- In accordance with §129.99(g), the emission limit and requirements specified in the plan approval or operating permit issued by the Department or appropriate approved local air pollution control agency under subsection (f) supersede the emission limit and requirements in the existing plan approval or operating permit issued to the owner or operator of the source prior to April 23, 2016, on the date specified in the plan approval or operating permit issued by the Department or appropriate approved local air pollution control agency under subsection (f), except to the extent the existing plan approval or operating permit contains more stringent requirements.

The following conditions have been incorporated under 25 Pa. Code §127.511 and ***are not included in the SIP:***

- The permittee shall monitor the following for Boiler 1 and 2 (Source ID 031 and 032):
 - The SCR inlet temperature, continuously, in order to determine compliance with the O&M Plan.
 - The permittee shall monitor and record the times at which the SCR inlet temperature transitions across the 600°F threshold.
 - The ammonia injection rate to the SCR, continuously, in order to determine compliance with the O&M Plan.
- The permittee shall keep records of the following for Boiler 1 and 2 (Source ID 031 and 032) to demonstrate compliance with 25 Pa. Code §§ 129.99 in the following manner:
 - The SCR inlet temperature continuously with at least one reading every 15 minutes.
 - When the SCR inlet temperature transitions across the 600°F threshold.
 - The ammonia injection rate to the SCR hourly with at least one reading every hour.
 - The records must include sufficient data, including SCR inlet temperature for each boiler; times at which the SCR inlet temperature transitions across the 600°F threshold for each boiler; ammonia injection rate for each boiler, and calculations to demonstrate that the requirements of §§ 129.97 are met.
 - Data or information required to determine compliance shall be recorded and maintained in a time frame consistent with the averaging period of the requirement.
- The permittee shall submit quarterly reports to the Department for Boiler 1 and 2 (Source ID 031 and 032) of the following:
 - The SCR inlet temperature on an hourly average basis.
 - The ammonia injection rate to the SCR on an hourly average basis.
 - The quarterly reports shall be submitted according to the following schedule:
 - The quarterly report for the period of January 1 - March 31 is due no later than April 30.
 - The quarterly report for the period of April 1 - June 30 is due no later than July 30.
 - The quarterly report for the period of July 1 - September 30 is due no later than October 30.
 - The quarterly report for the period of October 1 - December 31 is due no later than January 30.

The following conditions have been incorporated under 25 Pa. Code §129.100 and ***are not included in the SIP:***

- In accordance with §129.100(d), the owner and operator of an air contamination source subject to this section and §§129.96-129.99 shall keep records to demonstrate compliance with §§129.96-129.99 in the following manner:
- The records must include sufficient data and calculations to demonstrate that the requirements of 25 Pa. Code 129.96 – 129.99 are met.
- Data or information required to determine compliance shall be recorded and maintained in a time frame consistent with the averaging period of the requirement.
- In accordance with §129.100(i), records shall be retained by the owner or operator for 5 years and made available to the Department or appropriate approved local air pollution control agency upon receipt of a written request from the Department or appropriate approved local air pollution control agency.

G10 NO_x CEMs Requirements (Source ID 031 and 032)

- 25 Pa. Code §127.441 Monitoring, Reporting, Recordkeeping, and Additional Requirements pertaining to the installation and operation of CEMS for the NO_x pollutant have been incorporated per the Department’s Continuous Source Monitoring Manual.

Pollutant	Measurement	Averaging Period	Standard	Basis
NO _x	lb/MMBtu	Calendar Day	0.080 lb/MMBtu	Continuously excluding emissions during start-up, shut-down, and malfunction; operation pursuant to emergency generation required by PJM, including any necessary testing for such emergency operations; and during periods in which compliance with this emission limit would require operation of any equipment in a manner inconsistent with technological limitations, good engineering and maintenance practices, and/or good air pollution control practices for minimizing emissions.
NO _x	lb/MMBtu	Calendar Day	0.30 lb/MMBtu	Continuously under all operating conditions
NO _x	lb/hr	30-operating day rolling average	800 lb/hr	Continuously under all operating conditions

G11 Alternative RACT II for Auxiliary Boilers (Source ID 037 and 038)

The following conditions have been incorporated under 25 Pa. Code §129.99 and *will be included in the Pennsylvania SIP*.

- Emissions of NO_x, expressed as NO₂, for the Auxiliary Boilers A and B (Source ID 037 and 038) are individually limited to a maximum of 0.22 lb NO_x/MMBtu on a daily average basis.

- Emissions of NO_x, expressed as NO₂, for the Auxiliary Boilers A and B (Source ID 037 and 038) are individually limited to a maximum of 13.3 tpy based on a 12-month rolling total
- Auxiliary Boilers A and B (Source ID 037 and 038) shall each not exceed a 10% annual heat input capacity factor. [Pursuant to 25 Pa. Code Sections 129.91-192.95 (RACT I Operating Permit No. 03-000-027) and 25 Pa. Code Sections 129.96-129.100]
- Maintain an operating log for the Auxiliary Boilers A and B (Source ID 037 and 038) to verify that the annual capacity limit is not exceeded. The permittee shall maintain an operating log, including records of hours of operation, fuel consumption, fuel type, and typical fuel analyses to verify compliance with the annual capacity factor limitation of 10%. [Pursuant to 25 Pa. Code Sections 129.91-192.95 (RACT I Operating Permit No. 03-000-027) and 25 Pa. Code Sections 129.96-129.100]
- A minimum of one (1) stack test in accordance with in 25 Pa. Code, Chapter 139, Subchapter A (relating to sampling and testing methods and procedures) and the Department Source Testing Manual shall be performed on Auxiliary Boiler A and B (Source ID 037 and 038) during each five (5) calendar year period to verify the emission rates for NO_x. This test should be conducted between 6 to 18 months prior to the operating permit expiration date. [Also authorized by 25 Pa. Code Section 129.100(a)(4)]

The following conditions have been incorporated under 25 Pa. Code §127.441 and ***are not included in the SIP:***

- All records shall be retained by the permittee for five (5) years and made available to the Department upon request.
- In accordance with §129.99(g), the emission limit and requirements specified in the plan approval or operating permit issued by the Department or appropriate approved local air pollution control agency under subsection (f) supersede the emission limit and requirements in the existing plan approval or operating permit issued to the owner or operator of the source prior to April 23, 2016, on the date specified in the plan approval or operating permit issued by the Department or appropriate approved local air pollution control agency under subsection (f), except to the extent the existing plan approval or operating permit contains more stringent requirements.

The following conditions have been incorporated under 25 Pa. Code §129.100 and ***are not included in the SIP:***

- In accordance with §129.100(d), the owner and operator of an air contamination source subject to this section and §§129.96-129.99 shall keep records to demonstrate compliance with §§129.96-129.99 in the following manner:
- The records must include sufficient data and calculations to demonstrate that the requirements of 25 Pa. Code §§ 129.96 – 129.99 are met.
- Data or information required to determine compliance shall be recorded and maintained in a time frame consistent with the averaging period of the requirement.
- In accordance with §129.100(i), records shall be retained by the owner or operator for 5 years and made available to the Department or appropriate approved local air pollution control agency upon receipt of a written request from the Department or appropriate approved local air pollution control agency.

RECOMMENDATION:

In accordance with 25 Pa. Code §§127.424, 127.425, 127.428, 127.521 and 127.522, notice of intent to modify the TVOP is required to be published in the Pennsylvania Bulletin for a 30-day public comment period, published in the local newspaper, and sent to EPA for a 45-day comment period. On September 10, 2021, the proposed permit was sent to EPA and Keystone for review. On September 11, 2021, the notice of intent to issue will be published in the PA Bulletin. On September 9th, 10th, and 11th, 2021, notice of intent to issue will be published in the Indiana Gazette. Within the published notices is the notice of a public hearing. If requested by October 6, 2021, a public hearing will be held at 1p.m. on October 13, 2021 at the DEP Northwest Regional Office. To request a hearing or to register to speak at a hearing, one must do so by October 6, 2021. If no one request a hearing, the hearing will be cancelled.

It is my recommendation that the modification to the Title V Operating Permit for Keystone-Conemaugh Projects, LLC located in Plum Creek Township, Armstrong County, SOOP 03-00027, be issued.