



REGION 3

PHILADELPHIA, PA 19103

Report Title: Clean Air Act Inspection of PSEG Keys Energy Center
Inspection Date(s): 12/06/2023
Regulatory Program(s): Title V, NESHAPS, NSPS

Company Name: PSEG Keys Energy Center, LLC
Facility Name: PSEG Keys Energy Center
Facility Location: 10322 N Keys Rd
Brandywine, MD 20613-8200
Latitude: 38.701989 **Longitude:** -76.821513
County/Parish: Prince George's County

AFS/ICIS-Air Number: MD00000002403302737
Permit Number: 24-033-2737
NAICS Code: 221112 **SIC:** 4911
DSBID #: ECAD-125

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Date

Table of Contents

I. Introduction	4
A. Summary of the Facility.....	4
B. Inspection Opening Conference.....	5
II. Site Activity/Process Description	5
III. Observations	6
IV. Records Review	7
V. Closing Conference	8
VI. List of Attachments	10

I. Introduction

The United States Environmental Protection Agency (EPA) conducted a Clean Air Act (CAA) inspection at PSEG Keys Energy Center (Keys Energy Center or Facility) to verify compliance with applicable State and Federal regulations. The Maryland Department of The Environment (MDE) was notified of the inspection on November 29, 2023, via email. On November 30, 2023, EPA notified the Facility of the planned inspection via phone and email. EPA emailed a list of records for review to Richard Modes, EHS Manager, prior to the inspection (see Attachment 1). These records are listed in the Records Review section of the report.

The inspection included an evaluation of the Facility's processes and its compliance with the CAA. All information included in this report is the result of statements by the Facility representatives, materials shown to the inspectors by the Facility representatives, and/or documents provided by the Facility representatives to the inspectors at the time of, or subsequent to, the inspection. In addition, information gathered prior to the inspection from a review of EPA and State records may be included in Section A. Summary of the Facility.

A. Summary of the Facility

The Facility is located at 10322 North Keys Road, Brandywine, MD 20613. PSEG Keys Energy Center is an electric generating facility that operates a 755 megawatt (MW) natural gas fired combustion turbine to produce electricity. The Facility commenced operations in June 2018 on a 170-acre property, however, the footprint of the power plant is 30 acres, the rest of the property will be used for future anticipated expansion. There are currently 24 employees at the site and the Facility operates 24 hours per day, seven days per week. Planned maintenance occurs in the Fall and Spring every year and typically lasts for five to twelve days, although major maintenance, if required, on a combustion unit can last up to thirty days.

The Facility received a Title V permit (#24-033-2737) from Maryland Department of the Environment (MDE) issued on October 18, 2023, the permit expires on November 30, 2027. Keys Energy Center is a major source for nitrogen oxides (NOx). The Facility is subject, or is potentially subject, to the following federal regulations:

- 40 CFR 60 Subpart Dc-Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
- 40 CFR 60 Subpart IIII- Standards of Performance for Stationary Ignition Internal Combustion Engines
- 40 CFR 60 Subpart KKKK- Standards of Performance for Stationary Combustion Turbines
- 40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

B. Inspection Opening Conference

At 9:00 am on December 6, 2023, EPA inspectors arrived at the Facility for a CAA Inspection and conducted a brief opening conference. Keys Energy Center was represented by Cameron Keith, Corporate Environmental Associate, Nathan Hedrick, Maintenance Manager, Jeffrey Perry, Plant Manager and Steve Knach, Plant Engineer. EPA inspectors, Stafford Stewart, and Paul Arnold presented their credentials and explained the purpose of the visit was to conduct a CAA inspection to determine compliance with their permit and any applicable regulations. Additionally, EPA informed the facility representatives of their right to claim any confidential business information (CBI). At that time, Keys Energy Center did not claim any photos or documentation as CBI.

EPA inspectors were asked to review the Facility's safety procedures which included a discussion on the required personal protective equipment needed. The Facility's plant engineer, Steve Knach stated that there are no public announcement (PA) systems in use on site, radios are used if there are any emergencies, and members of the inspection team are required to call 301-782-2515. Only authorized personnel are allowed in certain areas, inspectors are disallowed entry in these areas due to electrical hazards. Steve Knach also stated that the most hazardous chemical on site is aqueous ammonia (concentration of 19 %), there are 25,000 gallons of this chemical stored on site. All aqueous ammonia is trucked in and stored in an aboveground storage tank; this chemical is used in the emissions control process for nitrogen oxides (NO_x).

II. Site Activity/Process Description

PSEG Keys Energy Center operates a two-on-one cycle 755 megawatt (MW) natural gas fired combustion turbine system to generate electricity. The two-on-one cycle system consists of two 2330 MMBtu/hr combustion turbine generators (CT1 and CT2) that work in conjunction with two heat recovery steam generators (HRSG1 and HRSG2) and a steam turbine generator. Nathan Hedrick stated that the HRSG can be viewed as a huge heat exchanger that recovers heat from the exhaust gases of a gas turbine. Air is compressed in the turbines and injected natural gas mixes with the compressed hot air and combusts to produce energy which is ultimately used to produce electricity. The process is not unlike that of a turbine engine on jet airplanes. The hot gas that is created moves through the turbine blades, resulting in a rotation action, the rotation action of the drive shaft of the generator produces electricity. The steam turbine generator on site is used to maximize the production of electricity, the hot exhaust generated from the gas turbine is used to produce steam in a boiler, this spins the steam turbine blade to produce electricity.

Continuous emission monitors (CEMS) are used to track and record NO_x, CO and O₂ emissions, exhaust gases are analyzed and depending on the levels recorded, automatic system controls are activated to control emissions in order to comply with permissible emission limits. Additional equipment includes an auxiliary boiler which is powered by natural gas and is used to heat the catalyst during cold startup, this boiler is used infrequently. The facility also maintains a 260-brake horsepower (bhp) diesel fired

emergency fire pump and a 1500 kwh emergency generator. There are two aboveground diesel storage tanks which store fuel for the equipment used on site, Facility representatives could not recall the exact dimensions of these tanks at the time of the inspection.

The opening conference concluded at 9:40 am.

III. Observations

EPA inspectors were led on a walkthrough of the Facility at 9:46 am by Cameron Keith, Nathan Hedrick, and Jeffrey Perry of Keys Energy Center EPA inspectors noted photos would be taken during the Facility walkthrough (Attachment 2).

The tour began with a visit to the control room where the continuous emissions monitoring system (CEMS) was observed. The monitors for combustion turbine Unit 11 (Unit 11) displayed a reading of 1.51 parts per million (ppm) at 15% oxygen for NO_x and 0.00 ppm for carbon monoxide (CO) at 15% oxygen (O₂), and for combustion turbine unit 12 (Unit 12), the readings for NO_x at 15% oxygen and CO at 15% oxygen (O₂) on the monitors were 1.48 ppm and 0.00 ppm, respectively. The monitor displaying electrical generation showed that 680 MW of electricity was being produced during the time of the facility tour. The flowrate of ammonia being monitored was observed to be 143 lbs/hr at Unit 11 and 151.6 lbs/hr at Unit 12.

After exiting the control room, the inspection team proceeded to inspect the natural gas fired auxiliary boiler, the boiler, which was not operating during the time of the inspection, was installed in January 2018 and displayed a rating on the affixed label of 71,200 lbs/hr steam, there are no air pollution controls (APCs) associated with this boiler. The Facility tour continued with an inspection of the combustion turbine, CT 11. Nathan Hedrick explained that the combustion turbine generators produce electricity in conjunction with two heat recovery steam generators. It was also explained that some of the hot exhaust from the turbine is harnessed to spin another turbine generator, producing more electricity. Exhaust from the combustion turbines also exit to the two heat recovery steam generators (HRSG1 & HRSG2), the HRSGs were the next equipment inspected, this is where steam is pressurized to generate additional electric power in the steam turbine. The seven duct burners used in conjunction with CT11 were observed. Nathan Hedrick stated that the duct burners can burn additional fuel to heat the combustion turbine's exhaust gases allowing the HRSG to increase or maintain steam production depending on operating conditions. The ammonia tank associated with the electricity production process was observed, the aqueous ammonia from this tank is used in the nitrogen oxides (NO_x) emission control process. Liquid ammonia (NH₃ (aq)) is sprayed onto a selective catalytic reduction (SCR) catalyst which promotes the conversion of NO_x to nitrogen and water vapor.

The area where the natural gas pipelines and associated components are located was inspected next. This was followed by an inspection of the diesel fired water pump engine, inspectors were able to observe the label "low sulfur fuel" that was affixed to the water pump diesel tank. The facility tour continued with an inspection of the air-cooled condenser, the 1500-kilowatt (KW) diesel fired emergency generator and the steam turbine generator. Nathan Hedrick stated that the air-cooled

condenser only uses ambient air flow to remove heat from the steam turbine generator exhaust, the condensation process results in the production of water which is re-used in the process. The steam turbine is a mixed pressure type, where the pressure ranges from a low of 60 pounds per square inch (psi) to high pressure at 2500 psi, this allows for the optimal selection of pressure and temperature conditions for the HSRGs exhaust gas used to drive the turbine. EPA inspectors were able to record the run time meter on the emergency diesel generator, the reading on the meter was 62 hours 49 minutes.

The walkthrough concluded at 10:56 am.

IV. Records Review

The records review commenced immediately after the plant walkthrough at 10:56 am, lunch was taken at 11:45 am and the records review resumed at 1:10pm. EPA inspectors posed questions to the Facility representatives and reviewed some of the documents requested in the 11/30/23 email to Richard Modes (see Attachment 1). Some of the questions asked by EPA inspectors included whether there were any deviations in the CEM reports for the past calendar year. Key Energy Center representatives stated that there were none. A request was also made to review Title V semi-annual reports for the last three years, the Facility representatives explained that the Title V permit was only recently approved (October 2023) and therefore no reports have been generated yet. It took until 2023 for the Title V permit to be issued and in the interim the state issued a Permit to Operate (PTO). EPA inspectors inquired about the failed stack test reflected in ECHO for 2019 for PM 10 for units 11 and 12. The Facility representatives stated that this was due to hardware failure, however the affected system was shut down cleaned, repaired, and upgraded and all subsequent stack tests conducted in 2019 on the associated stack passed. The Facility's PTO requires annual stack tests to be conducted for PM, NOx, CO, and volatile organic compounds (VOCs) to determine emissions in pounds per hour.

Records were provided at the time of the inspection by Jeffrey Perry, some records were also emailed on 12/4/23 and 12/7/23 by Richard Modes and Jeffrey Perry, respectively. Below are the records requested and what was provided:

- Process flow diagram and plot plan. *The plot plan was provided and used as a tool to guide the inspection team during the facility walkthrough.*
- A list of all air emissions sources and corresponding dates of installation. *This was provided and will be reviewed subsequent to the inspection.*
- A list of all air pollution control (APC) devices and the pollutant(s) controlled by each. *The air pollution control devices for NOx and Co were inspected and associated documents reviewed.*
- A list of all combustion sources, including but not limited to boilers, engines, furnaces, and heaters. *Records were provided for review and will be reviewed after the inspection. Provide a list of all applicable NESHAP or NSPS regulations for your air emission source(s). This list was provided during the inspection and are identified the Summary of Facility Section above in this report.*
- For all engines associated with combustion sources identified in item 4 above, as appropriate provide the following information:

- The make, serial number, model number or other model designation, model year and date of installation
- The hours of operations for each month for the past 5 years
- The rated capacity and type(s) of fuel used
- Indicate and describe if each engine has manufacturer installed or add-on emission controls

The information requested above was provided and will be reviewed.

- The monthly and annual throughput of natural gas for the combustion equipment for the past 5 years. *This information was provided via electronic mail and will be reviewed.*
- Records of scheduled and unscheduled maintenance of APC equipment for the past 5 years. *This information was provided via electronic mail and will be reviewed.*
- Results of visual emission evaluations, including but not limited to stack test results, CEM reports etc., for the past 5 years. *This information was provided via electronic mail and will be reviewed. However, a review of the stack test results for the October 11 to October 13, 2021 test conducted at the stack associated with CT11 was done. The tests analyzed the stack flue gases for NO_x, CO, Total hydrocarbons and volatile organic compounds(THC/VOC), sulfur dioxides, particulate matter and carbon dioxide, no exceedances were recorded. Records for the emissions tests conducted at the stack associated with CT12 were also reviewed, no exceedances were identified in the record.*
- Emissions certification reports for the past 5 years. *This information was provided via electronic mail and will be reviewed.*
- Any reports of occurrences of excess emissions, malfunctions, shutdown, or failure associated with APC equipment for the past 5 years. *This information was provided via electronic mail and will be reviewed.*
- The Facility's combustion analysis reports will be provided for review.
- Stack tests reports will be sent for review.
- The Facility will send for review a copy of the initial notifications as required by 40 CFR § 63.6645 - *What notifications must I submit and when?*
- A request was made for a copy of the Title V permit which was issued on October 18, 2023.
- Method 22 visual emission records was requested and will be submitted for review.

V. Closing Conference

After the records review, EPA inspectors, Cameron Keith, Nathan Hedrick, Jeffrey Perry, and Steve Knach, Plant Engineer had a brief closing conference to ask additional questions and discuss observations. The EPA inspectors noted that the investigation is on-going, and any areas of concern identified in the final report do not necessarily reflect a violation or deviation, rather, they are areas that will require further investigation. EPA also noted that they would issue an inspection report within

DSBID #: ECAD-125

in 60 days, with a copy to the State. Simultaneously, EPA will perform a detailed review of records and may have additional questions. The inspection concluded at 2:00 pm.

There were no *potential* areas of concerns discussed during the inspection.

DSBID #: ECAD-125

VI. List of Attachments

- Attachment 1: Email correspondence to Richard Modes of records requested to review during inspection
- Attachment 2: Photo Log: DSCN 1054 – DSCN 1067