

COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Southwest Regional Office

MEMO

TO Air Quality Permit File TV-65-00990

FROM Nicholas J. Waryanka, P.E./NJW
Air Quality Engineer
Air Quality Program

THROUGH Thomas J. Joseph, P.E./TJJ
Environmental Engineer Manager
Air Quality Program

Mark R. Gorog, P.E./MRG
Program Manager
Air Quality Program

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RE Review of Title V Operating Permit Application
Tenaska Pennsylvania Partners, LLC
Westmoreland Generating Station
South Huntingdon Township, Westmoreland County
APS #1117693 AUTH #1492008 PF #716802

BACKGROUND

On July 11, 2024, the Department received an initial Title V Operating Permit (TVOP) application from Tenaska Pennsylvania Partners, LLC (Tenaska) for operation of a natural gas-fired combined cycle power plant known as the Tenaska Westmoreland Generating Station (TWGS) located in South Huntingdon Township, Westmoreland County, at 446 Smithton Pike, Smithton, Pa., 15479. The SIC code for the facility is 4911, *Transmission & Utilities – Electric Services* and the corresponding NAICS code is 221112, *Fossil Fuel Electric Generation*.

Operation of the equipment at the TWGS results in the emission of various air contaminants. As a result of the potential levels of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), and greenhouse gases (GHG) emitted, the TWGS is a major stationary source as defined in Title I, Part D of the Clean Air Act Amendments. As such, the facility is subject to the Title V permitting requirements adopted at 25 Pa. Code, Chapter 127, Subchapter G.

The power plant is a single 2-on-1 combined cycle configuration consisting of two (2) Mitsubishi “J” class combined cycle combustion turbines (CCCTs). Each CCCT serves a single steam turbine generator and is equipped with heat recovery steam generators (HRSG) with supplemental 400 MMBtu/hr natural gas-fired duct burners. The two (2) HRSGs collectively

serve the one steam turbine generator. The approximate maximum plant nominal generating capacity is 930 – 1,065 MW.

Electric power production at the facility is produced by the CCCTs and the steam turbine generator. A combustion turbine operates by using ambient air as the primary working gas. Initially, air is inducted into a series of compressor stages to increase its overall potential energy. The high-pressure air exiting the compressor then passes into a low-NO_x burner unit, where it is mixed with the natural gas (the combustion turbines do not combust any other fuel). The premixed working gases are then subjected to a near constant pressure combustion process. This increases the working gas combustion temperature, further increasing potential energy. Following combustion, the working gases are expanded and cooled through a series of turbine stages that drive the turbine blade shaft. Part of the energy extracted by the spinning turbine blades is used to drive the compressor stages to allow for a continuous process, and the remaining energy is used to spin an electro-magnetic generator; thereby producing electricity.

The J-class designation to these units represents the turbine inlet temperature. According to *Mitsubishi Heavy Industries Technical Review Vol. 49 No. 1 (March 2012)*¹, MHI has developed the world's first J-class turbine which has an inlet temperature of 1,600° C. The higher inlet temperature improves thermal efficiency and reliability. According to the above referenced document, "The M501J gas turbine was designed with a turbine inlet temperature of 1,600°C by integrating the proven component technologies used in the 1,400°C F-series and the 1,500°C G and H-series turbines." Combined cycle efficiency from the G-class turbine to the J-class has increased from 58% to 61.5% or higher.

Since the exhaust gases exiting the turbine blade stages are still at temperatures significantly above ambient conditions, they represent additional available energy. The waste heat from the turbine exhaust is routed to the HRSGs. Each HRSG has an associated duct burner that can be used to raise the temperature of the turbine exhaust gas for additional steam and power generation under certain operating conditions. The duct burners operate as a natural gas diffusion flame process. Steam produced by the HRSGs is expanded through a steam turbine to drive another electro-magnetic generator, creating additional electricity. Exhaust from the steam generator is then sent to a condenser to condense the steam for eventual re-use. The condenser circulating water is cooled using a mechanical draft wet cooling tower equipped with drift eliminators.

Emissions resulting from the combustion of natural gas in the CCCTs consist of air pollutants NO_x, CO, VOC, sulfur dioxide (SO₂), particulate matter (PM), GHG, and hazardous air pollutants (HAPs). Emissions from each combustion turbine (CT) and HRSG duct burner unit are passed through a selective catalytic reduction (SCR) unit and an oxidation catalyst to reduce NO_x, CO, VOC, and HAPs before being released to the atmosphere through a common stack. There is no bypass stack for the CT exhaust; therefore, emissions are controlled at all possible times. The SCR unit employs ammonia as a reducing agent for the control of NO_x emissions.

Cooling tower emissions consist of particulate matter, particulate matter with an aerodynamic diameter of 10 microns or less (PM₁₀), and particulate matter with an aerodynamic diameter of

¹ <https://www.mhi-global.com/company/technology/review/pdf/e491/e491018.pdf>

2.5 microns or less (PM_{2.5}), originating from the dissolved solids (e.g. calcium, magnesium, etc.) that are assumed to crystalize and form airborne particles as the cooling tower water “drift” vaporizes. Particulate emissions from the cooling tower are minimized by drift eliminators. The facility also includes one (1) 245 MMBtu/hr auxiliary boiler, one (1) 575 bhp diesel-fired emergency fire pump engine, and an electric fuel gas heater. The auxiliary boiler is fired by pipeline quality natural gas only. Tenaska has voluntarily limited the usage of the auxiliary boiler to a 50% annual capacity limitation utilization.

The TVOP will include the following equipment with air contamination Source IDs:

- Sources 101 and 102 - Two (2) 3,147 MMBtu/hr Mitsubishi “J” class CCCTs serving one (1) steam turbine generator equipped with HRSGs with supplemental 400 MMBtu/hr natural gas-fired duct burners.
- Source 031 - One (1) 245 MMBtu/hr natural gas-fired auxiliary boiler.
- Source 104 - One (1) 575 bhp diesel-fired emergency fire pump engine.
- Source 105 - Cooling tower controlled by drift eliminators.

Plan Approval PA-65-00990C originally included Source 103, a 2,000 ekW diesel-fired emergency generator engine, and Source 106, a 5,000-gallon diesel storage tank for the generator engine. Tenaska decided not to install these air contamination sources and both were removed from the plan approval during the extension issued on August 14, 2019, under Authorization #1281099.

The facility also includes the following air contamination sources which were included in the original version of PA-65-00990C under the following Source IDs:

- Source 107 – One (1) 572-gallon fire pump diesel storage tank.
- Source 108 – Three (3) turbine lube oil storage tanks [one (1) 6,500-gallon tank and two (2) 7,200-gallon tanks].
- Source 109 – One (1) 30,000-gallon aqueous ammonia storage tank.
- Source 110 – Sulfur hexafluoride-insulated circuit breakers.

Due to the size of the tanks, the low vapor pressure of the products being stored, and the limited throughputs, Sources 107 and 108 have emissions which are consistently below the Annual Emission Statement reporting thresholds. Source 109 does not have an active vent and is operated at the vapor pressure of the fluid, resulting in no breathing losses. During tank filling, all emissions are recovered by the delivery truck, which eliminates working losses. In addition, PA-65-00990C does not contain any source specific conditions related to Sources 107, 108, or 109. The circuit breakers included under Source 110 are non-emitting sources by design and monitored daily via operator rounds and continuously via remote monitoring system (as required by PA-65-00990C, Condition C#011). For these reasons, Tenaska has requested that Sources 107, 108, 109, and 110 be considered as Sources of Minor Significance and removed from the TVOP source inventory.

However, Source 109 is part of the facility’s Risk Management Plan since the ammonia usage is over the threshold quantity. Therefore, Source 109 will remain a source in the TVOP.

Additionally, Tenaska has implemented a leak detection and repair (LDAR) program to ensure that SF₆ leaks from the circuit breakers are repaired as soon as possible. As a result, Source 110 will also remain a source in the TVOP. Sources 107 and 108 will be removed from the TVOP source inventory list and instead will be included in Section H, *Miscellaneous*, on the list of Sources of Minor Significance along with other sources in that category as described below.

The facility also operates a 500-gallon diesel storage tank used to fuel support equipment. A Request for Determination (RFD) was submitted on December 21, 2017, requesting exemption from plan approval requirements for installation of the tank. The RFD was approved for exemption via 25 Pa. Code §127.14(a)(8), Item #31. Similar to Sources 107 and 108 discussed above, due to the low emissions from the tank, Tenaska has requested that this source be included with the Sources of Minor Significance.

There are two (2) Natural Gas Metering Stations associated with the facility, each serving independent gas supply lines. Both metering stations were exempted from Plan Approval requirements per 25 Pa. Code 127.14(a)(8) #31, confirmed via RFDs submitted June 15, 2017, and May 31, 2018, for the TETCO Meter Station and DTI Meter Station 1, respectively. It should be noted that the Natural Gas Metering Stations are not onsite and are located several miles away. Tenaska only owns a portion of each meter station. The Department does not consider the stations to be part of this facility.

Tenaska also operates the following activities shown in Table 1 below which it believes to be Trivial Activities due to the portable nature and non-routine operation of these sources. However, these sources are not specifically identified in the Department's *Air Quality Permit Exemptions*, Document No. 275-2101-003, effective July 1, 2021:

Table 1 – Non-Listed Sources of Trivial Activities

Source	Specifications
Portable Pump	10.6 hp diesel
Master Heaters (4)	400 MBtu/hr diesel
Master Heaters (4)	190 MBtu/hr diesel
Portable Generator	98 cc gasoline
Portable Generator	149 cc gasoline
Portable Gasoline Tanks (2)	50 gal
Portable Diesel Tanks (2)	50 gal

The 500-gallon diesel storage tank will be included in Section H, *Miscellaneous*, as a Source of Minor Significance. The sources included in Table 1, above will be listed in Section H, *Miscellaneous*, as Trivial Activities.

Finally, an RFD was submitted to the Department on December 21, 2017, for a 186-gallon gasoline storage tank; however, the tank was never installed and is therefore not included in this application.

PERMIT HISTORY

The following is a discussion of the various new plan approval, plan approval modification, and plan approval extension applications that have been submitted for the TWGS. Only those extensions which resulted in changes to a plan approval are included here.

- On February 23, 2009, the Department received Plan Approval application PA-65-00990A for the purpose of securing emission reduction credits (ERCs) ahead of operation and construction of the facility.

The application was assigned Authorization (Auth) #782782. According to information from the Department's eFACTS database, Tenaska submitted a letter on March 19, 2009, requesting to withdraw the application. The Department designated the application as "Withdrawn" in eFACTS on March 24, 2009.

- On August 10, 2012, the Department received Plan Approval application PA-65-00990B which was assigned Auth #937954. Per the TVOP application, this plan approval was submitted as the initial construction permit for multiple plan configurations and manufacturers. This plan approval was also subsequently withdrawn by Tenaska and was closed out as "Withdrawn" in eFACTS on November 8, 2013.
- On November 6, 2013, the Department received Plan Approval application PA-65-00990C which was assigned as Auth #1001276. The application was for the authorization of construction and temporary operation of the TWGS facility. The plan approval was issued on April 1, 2015, and had an expiration date of April 1, 2018.
- On October 2, 2015, the Department received Plan Approval application PA-65-00990D which was assigned Auth #1091483. This application was for the authorized transfer and use of a portion of the VOC ERCs required by PA-65-00990C, Section C, Condition #020. The plan approval was issued on November 24, 2015, with an expiration date of April 1, 2018.

In accordance with 25 Pa. Code §127.208(2), Tenaska submitted PA-65-00990D to authorize the transfer and use of a total of 18.30 tons of VOC ERCs from R.R. Donnelley & Sons Co. in Lancaster, Lancaster County, and a total of 22.27 tons of VOC ERCs from Bemis Company, Inc. in Hazle Township, Luzerne County, for a total of 40.57 VOC ERCs obtained under Auth #1091483.

- On October 21, 2015, the Department received an application to modify PA-65-00990C which was assigned Auth #1095574. The application was submitted in order to reduce the startup and shutdown (SUSD) emissions from the combined cycle combustion turbines resulting in reduced facility-wide potential to emit and required ERCs. However, upon consultation with Central Office staff, it was determined that this change could not be made through a minor plan approval modification and that submission of a new plan approval would be required. Auth #1095574 was designated as replaced on December 10, 2015.
- On December 10, 2015, the Department received Plan Approval application PA-65-0990E which was assigned as Auth #1100651. This application was for the reduction of SUSD emissions

from the combined cycle combustion turbines resulting in reduced facility-wide potential to emit and required ERCs, and replaced the minor plan approval modification application to PA-65-00990C received on October 21, 2015. The plan approval was issued on February 12, 2016, and had an expiration date of April 1, 2018.

The revised emissions during SUSD from the combustion turbines were based upon updated emission information from the manufacturer and assumptions made regarding operational dispatch, resulting in a reduction in the maximum number of expected SUSD events per year. There were no emission increases from the revised calculations or any changes to the design parameters. As such, no reassessment of the control technology or of the ambient impacts of the source was required.

As a result of this modification, facility-wide PTE decreased by 62.57 tons per year (tpy) of NO_x; 1,652.15 tpy of CO; 1,028.59 tpy of VOC, and 101,858 tpy of CO₂e. The reduction in PTE resulted in a reduction of 72 tons of NO_x ERCs and 1,183 tons of VOC ERCs required to be secured by the facility in accordance with 25 Pa. Code §§ 127.205(4) and 127.210.

- On August 4, 2016, the Department received an application to modify PA-65-00990D which was assigned Auth #1147723. This plan approval was for the authorization of transfer and use of NO_x and VOC ERCs required by Section C, Condition #002, of PA-65-00990E. The plan approval was revised and reissued on August 8, 2017, and had an expiration date of April 1, 2018.

As discussed above, Tenaska secured the use and transfer of 40.57 VOC ERCs through the authorization of PA-65-00990D (Auth #1091483) on November 24, 2015. Tenaska still needed to obtain 357 tons of NO_x ERCs and 215.43 tons of VOC ERCs. Under this modification of PA-65-00990D, Tenaska secured the transfer and use of ERCs from the following facilities:

Table 2: Additional ERCs Used by Tenaska

Generating Facility	Location	Type	Quantity (tpy)	Expiration Date	Registry Transfer Date
Quad Graphics, Inc.	Erie Co., NY	VOC	106.10	12/21/2021	8/24/2015
Sunoco Products Co.	Beaver Co., PA	VOC	19.45	4/30/2021	12/11/2015
FXI, Inc.	Delaware Co., PA	VOC	48.00	12/31/2018	1/22/2016
Printpack Inc. ^a	Suffolk Co., NY	VOC	19.77	8/31/2020	4/7/2016
Interstate Brand Corp. ^a	Queens, Co., NY	VOC	22.78	1/20/2021	4/7/2016
Talen Martins Creek	Northampton Co., PA	NO _x	357.00	9/17/2017	7/6/2016

^a These ERCs were generated at Printpack, Inc. and Interstate Brand Corp., however the ERC holder/transferor is Koch Supply and Trade, LP.

The Department authorized the transfer and use of these ERCs at the TWGS and the ERC Registry transaction certificates for each were included with the application. As a result of this plan approval modification, Tenaska satisfied the offset requirements of 25 Pa. Code Chapter 127 Subchapter E.

- On January 28, 2019, the Department received an application to extend PA-65-00990C which was assigned as Auth #1259763. The plan approval was modified to reflect the commencement of operation on March 20, 2018, and to combine PA-65-00990C, PA-65-00990D, and PA-65-00990E. The plan approval was revised and reissued on February 2, 2019, and the period of temporary operation was extended with an expiration date of August 28, 2019.
- On July 22, 2019, the Department received an application to extend PA-65-00990C which was assigned Auth #1281099 and an application to modify PA-65-00990C which was assigned Auth #1283622. The plan approval was modified to correct the source inventory list by removing the proposed emergency generator engine (Source 103) and associated diesel storage tank. The plan approval was revised and reissued on August 14, 2019, and the period of temporary operation was extended with an expiration date of February 28, 2020.
- On July 13, 2020, the Department received an application for minor modification of PA-65-00990C which was assigned Auth #1322823. The purpose of this application was to request an extension of the allowable duration of startups from one hour to one and one-half hours. Condition #008 of Section E, Plan Approval PA-65-00990C, limited the duration of startups to one hour. This application was designated as “Replaced” on September 23, 2021.
- On August 5, 2021, the Department received an application for minor modification of PA-65-00990C which was assigned Auth #1370370. This application was submitted to replace the July 13, 2020, plan approval minor modification application (Auth #1322823). The purpose of this application was to request a change to the duct burners annual operating limitation metric from hours-based to the equivalent fuel volume-basis, in addition to the original request to increase the allowable startup duration from one hour to one and one-half hours. This application was designated as “Replaced” on August 5, 2021.
- On April 13, 2022, the Department received an application for minor modification of PA-65-00990C. This application was submitted to replace the August 5, 2021, plan approval minor modification application (Auth #1370370). The purpose of this application was to request a change to the applicable short term emission limits for combustion tuning procedures from the “normal” steady-state limits to those for SUSD events, in addition to requesting a change to the duct burners annual operating limitation metric from hours-based to the equivalent fuel volume-basis, and the original request to increase the allowable startup duration from one hour to one and one-half hours. However, as opposed to reviewing this application as a minor modification of PA-65-00990C, the Department reviewed the application as a new plan approval submitted to modify PA-65-00990C. The new plan approval was designated as PA-65-00990F and assigned Auth #1433549.

The review of PA-65-00990F was performed by staff from the Department’s Southcentral Regional Office. PA-65-00990F also included revision to conditions in PA-65-00990C related to stack test submission time frames and methods, and the addition of the applicable requirements of *NSPS 40 CFR Part 60 Subpart TTTT – Standards of Performance for Greenhouse Gas Emissions for Electric Utility Generating Units*. The plan approval was issued on November 28, 2023, and had an expiration date of February 28, 2024. It should be noted that

the application “Received Date” entered in the eFACTS database for Auth #1433549 is July 28, 2020.

- On December 30, 2023, the Department received an application to modify PA-65-00990C which was assigned Auth #1468907. The purpose of this application was to modify certain conditions in PA-65-00990C, to incorporate the appropriate RACT III requirements, and to incorporate the requirements of Plan Approval PA-65-00990F. The plan approval was revised and reissued on June 7, 2024, and the period of temporary operation was extended with an expiration date of November 28, 2024.
- On March 13, 2025, the Department received an application for extension of PA-65-00990C which was assigned Auth #1519512. The plan approval extension was issued on May 7, 2025, and expires on November 28, 2025. This is the current Auth under which TWGS is operating.

REGULATORY ANALYSIS

Federal Requirements

New Source Performance Standards

Title 25 Chapter 122 of the Pa. Code adopts the New Source Performance Standards (NSPS) promulgated by the EPA under Section 111 of the Clean Air Act in 40 CFR Part 60. These standards regulate the construction of new or modification of existing stationary sources and have been adopted by the Department to implement a delegation of Federal authority under section 111(c) of the Clean Air Act (42 U.S.C.A. §7411). The applicability of an NSPS Subpart depends on the source type (or source category) and its date of *construction, reconstruction, or modification*, as these terms are defined in 40 CFR Part 60 Subpart A—*General Provisions* or as defined in the associated subpart.

40 CFR Part 60 Subpart Da – Electric Utility Steam Generating Units does not apply to this facility. Per 40 CFR §60.40Da(e)(1), “Affected facilities (*i.e.* heat recovery steam generators used with duct burners) associated with a stationary combustion turbine that are capable of combusting more than 73 MW (250 MMBtu/hr) heat input of fossil fuel are subject to this subpart except in cases when the affected facility (*i.e.* heat recovery steam generator) meets the applicability requirements of and is subject to subpart KKKK of this part.” The HRSGs used with steam generators associated with the stationary combustion turbines meet the requirements and are subject to Subpart KKKK.

40 CFR Part 60 Subpart Db – Industrial-Commercial-Institutional Steam Generating Units applies to the auxiliary boiler and does not apply to the HRSGs with duct burners associated with the combustion turbines.

Auxiliary Boiler – Per 40 CFR § 60.40b(a), “The affected facility to which this subpart applies is each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels

combusted in the steam generating unit of greater than 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)).” The 245 MMBtu/hr natural gas-fired Auxiliary Boiler meets the applicability criteria and is therefore subject to this subpart. The Auxiliary Boiler is subject to a NO_x limit of 0.20 lb/MMBtu as specified in 40 CFR §60.44b(a). Compliance with the NO_x limit is demonstrated via a predictive monitoring system (PEMS) that utilizes a burner management system to continuously monitor pertinent operating conditions that could affect NO_x emissions and automatically make adjustments, if necessary. The SO₂ and PM limits of Subpart Db do not apply since the Auxiliary Boiler utilizes natural gas exclusively.

CCCTs – Per 40 CFR § 60.40b(i), the HRSGs with duct burners associated with the combustion turbines are subject to subpart KKKK and therefore not subject to subpart Db.

40 CFR Part 60 Subpart Dc – Small Industrial-Commercial-Institutional Steam Generating Units does not apply to the units at this facility. Per 40 CFR § 60.40c(a), this subpart applies to units less than 100 MMBtu/hr but greater than 10 MMBtu/hr. All proposed steam generating units at this facility are greater than 100 MMBtu/hr; therefore, this subpart does not apply.

40 CFR Part 60 Subpart Kb – Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, does not apply to the storage vessels at this facility. Per 40 CFR 60.110(a), the affected facility to which this subpart applies is each storage vessel with a capacity greater than 75 m³ that is used to store volatile organic liquid. The storage tanks that store volatile organic liquids are less than 75 m³.

40 CFR Part 60 Subpart IIII – Stationary Compression Ignition (CI) Internal Combustion Engines (ICE) applies to the diesel-fired fire pump engine. Per 40 CFR 60.4200(a)(2), the provisions of this subpart are applicable to “Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:

- (i) Manufactured after April 1, 2006, and are not fire pump engines, or
- (ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.”

The fire pump engine commenced construction after July 11, 2005, and is a certified National Fire Protection Association fire pump engine manufactured after July 1, 2006; therefore, the fire pump engine is subject to Subpart IIII. Per §60.4205(c), owners and operators of fire pump engines with a displacement less than 30 liters per cylinder must comply with the emission standards in Table 4 of Subpart IIII. For units (300≤HP<600), the applicable emission standards are 7.8 g/bhp-hr NMHC+NO_x, 2.6 g/bhp-hr CO, and 0.40 g/bhp-hr PM for model years 2008 and earlier, and 3.0 g/bhp-hr NMHC+NO_x and 0.15 g/bhp-hr PM for model years 2009+ (model years 2009-2011 with a rated speed greater than 2,650 rpm may comply with the emission limitations for 2008 model year engines). PA-65-00990C includes limits equal to or more stringent than the 2009+ limits of this subpart for this engine.

Per 40 CFR §60.4211(c), Tenaska is complying with the requirements of Subpart IIII by purchasing an engine which is certified to meet the applicable emission standards. Per 40 CFR §60.4207(b), Tenaska uses diesel fuel with a sulfur content of no more than 15 ppm and with a minimum cetane index of 40 or maximum aromatic content of 35 volume percent (from 40 CFR 80.510(b)). Furthermore, the engine is equipped with a non-resettable hour meter; routine maintenance checks and readiness testing are limited to 100 hours per year, and usage for emergency purposes is not restricted as required by Subpart IIII. However, PA-65-00990C limits total operation to 500 hours per year. Emergency engines may also be used for up to 50 hours per year of non-emergency use. These 50 hours of non-emergency use count towards the 100 hours for maintenance and readiness testing.

40 CFR Part 60 Subpart JJJJ – Stationary Spark Ignition (SI) Internal Combustion Engines (ICE) does not apply to any sources at this facility. Tenaska has not installed any SI ICE at the TWGS.

40 CFR Part 60 Subpart GG – Stationary Gas Turbines does not apply to the turbines at this facility. The units are subject to NSPS Subpart KKKK and are therefore exempt from Subpart GG per 40 CFR §60.4305(b).

40 CFR Part 60 Subpart KKKK – Stationary Combustion Turbines applies to the turbines at this facility. Per 40 CFR §60.4305, this subpart applies to stationary combustion turbines with a heat input at peak load equal to or greater than 10 MMBtu/hr based upon the higher heating value (HHV) of the fuel, and which commenced construction after February 18, 2005. The turbines commenced construction after the above date and have a HHV heat input of approximately 3,147 MMBtu/hr. This subpart also applies to emissions from the associated HRSGs and duct burners. Applicable requirements from this subpart include emission limitations; testing, reporting, and recordkeeping requirements; and work practice standards. Since the CCTs are subject to subpart KKKK, they are exempt from the requirements of Subparts GG, Da, Db, and Dc.

For units greater than 850 MMBtu/hr, applicable NO_x emissions, including associated HRSG and duct burners, are limited to 15 ppm @ 15% O₂ or 54 nanograms per joule (ng/J) of useful output (0.43 lb/MWh). Tenaska has proposed a more stringent NO_x limit of 2.0 ppm @ 15% O₂ and this more stringent limit is already included in PA-65-00990C.

Per 40 CFR §60.4330(a)(2), for SO₂ emissions, each combustion turbine must comply with one of the following: 1) limit emissions to less than 110 ng/J gross output, or 2) burn fuel which contains total potential sulfur equal or less than 26 ng/J (0.060 lb SO₂ /MMBtu) heat input. Tenaska is complying with the SO₂ emission limitations by combusting pipeline quality natural gas with sulfur content less than 0.25 gr/100 scf. The emission limits of 2.7 lb/hr with duct burners and 2.4 lb/hr without duct burners is equivalent to a limit of 0.00086 lb/MMBtu for this size unit. Compliance with the plan approval SO₂ limit ensures compliance with the limit in this Subpart. In addition to keeping records of the current, valid purchase contract, tariff sheet, or transportation contract obtained from the natural gas supplier, Tenaska is required to sample and analyze the sulfur content on an annual basis in accordance with 25 Pa. Code §127.12b. The Department may change the sampling frequency based upon the analysis and stack test results.

Per to 40 CFR §60.4333(a), Tenaska is required to operate and maintain the stationary combustion turbine, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.

To demonstrate compliance with the NO_x emission limits, Tenaska has installed Continuous Emissions Monitors (CEMS) for NO_x satisfying the requirements specified in 40 CFR §60.4340(b)(1). Tenaska is required to comply with the CEMS requirements specified in 40 CFR §60.4345 and the excess emissions requirements specified in 40 CFR §60.4350.

40 CFR Part 60 Subpart TTTT – Greenhouse Gas Emissions for Electric Utility Generating Units applies to this facility. CCCT Units #1 and #2 (Sources 101 and 102) were installed after January 8, 2014, with base load heat input greater than 250 MMBtu/hr each and serve a generator capable of selling greater than 25 MW to the grid. As such, the CCCTs are subject to Subpart TTTT and must meet a limit of 1,000 lbs CO₂/MWh (gross) on a 12-month average basis. Because the combustion turbines are permitted to burn natural gas exclusively, they are only subject to the fuel use monitoring requirements in §60.5520(d)(1).

National Emission Standards for Hazardous Air Pollutants (NESHAPS)

NESHAPs are applicable to both major and area sources of hazardous air pollutants (HAPs). Part 63 NESHAPs apply to sources in specifically regulated industrial source categories (CAA Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type. Based on potential to emit, TWGS is a minor source of total HAPs.

40 CFR Part 63 Subpart Q – Industrial Process Cooling Towers does not apply to the cooling tower. Per 40 CFR 63.400(a), “The provisions of this subpart apply to all new and existing industrial process cooling towers that are operated with chromium-based water treatment chemicals and are either major sources or are integral parts of facilities that are major sources as defined in §63.401.” The cooling tower does not utilize chromium-based water treatment chemicals and is located at an area source of HAPs (<10 tons of a single HAP and <25 tons of total HAPs); therefore, this subpart does not apply.

40 CFR Part 63 Subpart YYYY – Stationary Combustion Turbines does not apply to the CCCTs. Per 40 CFR §63.6085, this subpart applies to owners or operators of a stationary combustion turbine located at a major source of HAP emissions. TWGS is an area source of HAPs; therefore, this subpart does not apply.

40 CFR Part 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines (RICE) from 40 CFR Part 63 applies to the emergency fire pump engine at this facility. Per 40 CFR § 63.6585, this subpart applies to owners or operators of a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand. This facility is an area source of HAP emissions and does not include stationary RICE test cells/stands. Therefore, the emergency fire pump engine is subject to Subpart ZZZZ.

Per 40 CFR § 63.6590(2)(iii), the engine is classified as a “new” stationary RICE since construction commenced after June 12, 2006. Per 40 CFR § 63.6590(c)(1), “new” stationary RICE have no further requirements under 40 CFR 63 Subpart ZZZZ, and meet the requirements of this subpart by meeting the requirements of 40 CFR Part 60 Subpart IIII.

40 CFR Part 63 Subpart DDDDD – Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters does not apply. TWGS is an area source of HAPs; therefore, this subpart is not applicable.

40 CFR Part 63 Subpart JJJJJ – Industrial, Commercial, and Institutional Boilers Area Sources does not apply to the HRSGs with duct burners or the auxiliary boiler. These units combust natural gas only and per §63.11195(e), gas-fired boilers are not subject to this Subpart.

40 CFR Part 63 Subpart UUUUU – Coal- and Oil-Fired Electric Utility Steam Generating Units (Mercury and Air Toxics Standards (MATS) Rule) does not apply to this facility. On December 21, 2011, EPA announced standards to limit mercury, acid gases and other toxic pollution from power plants. The final rule became effective on April 16, 2012. The MATS rule reduces emissions of heavy metals, including mercury (Hg), arsenic (As), chromium (Cr), and nickel (Ni); and acid gases, including hydrochloric acid (HCl) and hydrofluoric acid (HF). TWGS burns natural gas only. Therefore, the facility is not subject to the MATS rule pursuant to 40 CFR §63.9983(b).

Additional Federal Requirements

40 CFR Part 64 – Compliance Assurance Monitoring (CAM) Regulations – CAM applies to pollutant-specific emissions units at major sources that are required to obtain a Part 70 or Part 71 permit (i.e. Title V permit) if the following criteria are met:

- (1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof), other than an emission limitation or standard that is exempt under paragraph (b)(1) of this section;
- (2) The unit uses a control device to achieve compliance with any such emission limitation or standard; and
- (3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. For purposes of this paragraph, “potential pre-control device emissions” shall have the same meaning as “potential to emit,” as defined in §64.1, except that emission reductions achieved by the applicable control device shall not be taken into account.

CAM does not apply to the NO_x emissions from the power blocks (i.e. CCTs with HRSGs and duct burners), per 40 CFR Section 64.2(b)(1)(i), because the NO_x emissions are subject to

emission limitations and standards pursuant to Section 111 of the federal Clean Air Act (NSPS Subpart KKKK). CAM does not apply to CO, as per 40 CFR Section 64.2(b)(1)(vi), since CO is monitored by CEMS. Pre-control VOC emissions exceed the major source threshold. As a result, the power blocks are subject to CAM for VOC emissions and submission of a CAM plan is required for the oxidation catalysts pursuant to 40 CFR Sections 64.1 through 64.10 with the Part 70 TVOP application. The emergency fire pump engine is not subject to CAM because all three criteria specified in 40 CFR Section 64.2(a)(1-3) are not met. Specifically, 40 CFR Section 64.2(a)(2), because this engine is not equipped with a control device.

Regarding VOC emissions from the power blocks, the control efficiency achieved by the oxidation catalyst is a function of temperature. A level of control efficiency can be expected by maintaining catalyst temperature within the manufacturer's specified range. Tenaska will use catalyst integrity and activity, via routine inspection and sampling, to provide an indication of how much of the catalyst useful life remains. Compliance stack testing in accordance with EPA methods will also be conducted once per permit term to further demonstrate compliance with VOC limits.

The selected indicator range for catalyst temperature was provided by the catalyst manufacturer to ensure design control efficiencies are met as well as ensure the catalyst is not damaged by high temperatures. Aside from startup, shutdown and tuning events, the catalyst temperature is maintained within the specified range. If the average catalyst outlet temperature is outside of the manufacturer specified range during normal operations, the cause will be investigated, and appropriate action taken.

The elements of the VOC CAM plan are presented below in Table 3:

Table 3: VOC CAM Plan for Power Blocks Oxidation Catalysts

	Indicator No. 1	Indicator No. 2	Indicator No. 3
Indicator:	Oxidation Catalyst Average Outlet Temperature	Catalyst Management Program	VOC Emissions
Measurement Approach:	Outlet temperature is measured by four thermocouples.	Routine inspection and sampling.	VOC concentration is measured via stack test.
Indicator Range:	500-700°F (does not apply during SUSD or tuning events).	N/A	2.4 ppmvd @ 15% O ₂ (with duct burners) 1.4 ppmvd @ 15% O ₂ (without duct burners) 9.4 lb/hr 2 ppmvd @ 15% O ₂ , Presumptive RACT III
Performance Criteria			
Data Representativeness:	The avg. oxidation catalyst outlet temp. is measured via four thermocouples installed in each HRSG, immediately downstream of the catalyst. The thermocouples are scaled 0-875°F and the standard tolerance is +/- 1°C or 0.75% (whichever is greater).	Routine inspection and sampling to verify catalyst integrity and activity.	Compliance stack tests are completed in accordance with EPA approved methods and the PA DEP Source Testing Manual.
Verification of Operational Status:	The thermocouples are installed in accordance with manufacturer specifications and calibration checks are completed after failure or repair. Signal monitoring will be completed by the DCS to detect quality failure and reduce the occurrence of invalid data.	N/A	N/A
Quality Assurance and Control Practices:	Signal monitoring will be completed by the DCS to detect quality failure and reduce the occurrence of invalid data. Calibration checks are completed after failure or repair.	N/A	QA/QC is completed in accordance with the selected EPA-approved method.
Monitoring Frequency:	Outlet temperature is measured continuously.	Inspections and sampling completed on a routine basis in accordance with OEM recommendations.	Stack tests are completed once per permit term.
Data Collection Procedures:	Data is collected and recorded continuously by the DCS.	N/A	Data is collected via stack test vendor as prescribed in PA DEP approved protocol.
Averaging Period:	3-hour rolling average.	N/A	3-hour average of three 1-hour test runs.

40 CFR Part 68 – Chemical Accident Prevention Provisions applies to the storage of anhydrous ammonia at this facility. In accordance with 40 CFR § 68.130, Table 1, the storage of more than 10,000 pounds of anhydrous ammonia triggers the Chemical Accident Prevention Provisions found at 40 CFR Part 68. The anhydrous ammonia storage tank at TWGS has a maximum capacity of 30,000 gallons which equates to approximately 154,500 lbs; therefore, this Part applies.

40 CFR Parts 72-78 – Acid Rain Program (ARP) Regulations – Per 40 CFR Section 72.6(a)(3)(i), the facility is subject to the Title IV Acid Rain Program since it includes new *utility units*, as defined in 40 CFR 72.2, and the units serve a generator that produces electricity for sale. Accordingly, Tenaska is required to submit a complete Acid Rain permit application at least 24 months prior to commencing operation per 40 CFR 72.30(b)(2)(ii). A copy of the Acid Rain permit application is included with the TVOP application.

40 CFR Part 96 – Clean Air Interstate Rule (CAIR) and 40 CFR Part 97 – Cross-State Air Pollution Rule (CSAPR) On March 10, 2005, EPA issued the Clean Air Interstate Rule (CAIR). This rule provides states with a solution to the problem of power plant pollution that drifts from one state to another. On July 6, 2011, EPA finalized the Cross-State Air Pollution Rule (CSAPR) to replace CAIR and required 28 states to reduce SO₂ and NO_x emissions from electric generating units (EGUs) that contribute to smog and soot formation in downwind states for the intended purpose of assisting those downwind areas with attaining compliance with the NAAQS. CSAPR implementation began on January 1, 2015. CCCT Units #1 and #2 (Sources 101 and 102) are subject to CSAPR and compliance is met via EPA's Clean Air Markets Division (CAMD) allowance-based trading program.

40 CFR Part 98 – Mandatory Greenhouse Gas Reporting The Mandatory Greenhouse Gas Reporting Rule requires qualifying facilities, including EGUs, to report greenhouse gas emissions annually. Per 40 CFR §98.2(a)(1), EGUs must report emissions from stationary fuel combustion and all applicable source categories. Annually, emissions from the combustion turbines are reported under Subpart D and emissions from other stationary non-emergency combustion equipment (i.e., auxiliary boiler) are reported under Subpart C.

Title 25 PA Code Requirements

25 Pa. Code §§ 123.1, 123.2, and 123.31 – Prohibition of certain fugitive emissions, fugitive particulate matter, and malodor emission limitations apply to this facility and are included operating permit conditions.

25 Pa. Code §§ 123.11 and 123.13 – Particulate Matter Emissions apply to this facility and are included as operating permit conditions. The following table summarizes the applicable limit for each source.

Table 4: PM Emissions Standards Summary

Source	Citation	PM Emission Limit (lb/MMBtu heat input)	Permitted Emission Rate (lb/MMBtu heat input)
Combustion Turbines	25 Pa. Code §123.13(c)(1)(iii) ^a	0.02	0.0039
Duct Burners	25 Pa. Code §123.11(a)(2) ^b	0.13	
• Emergency Generator • Fire Pump Engine	25 Pa. Code §123.13(c)(1)(i) ^c	0.04	0.02
Auxiliary Boiler	25 Pa. Code §123.11(a)(2) ^d	0.165	0.0075

^a Processes with effluent gas greater than 300,000 dry standard cubic feet per minute.

^b Determined by $A=3.6E^{-0.56}$ where E equals the heat input of the combustion unit (400 MMBtu/hr).

^c Processes with effluent gas less than 150,000 dry standard cubic feet per minute.

^d Determined by $A=3.6E^{-0.56}$ where E equals the heat input of the combustion unit (245 MMBtu/hr).

PA-65-00990C includes a PM emission limitation of 0.0039 lb/MMBtu/hr from the combined firing of the combustion turbine and duct burner. Compliance with the combined PM emission rate ensures compliance with the individual limitations of §§ 123.11 and 123.13.

25 Pa. Code § 123.21 – Sulfur Compound Emissions applies to the combustion turbines and fire pump engine. Per §123.21(b), SO₂ in the effluent gas is limited to less than 500 ppmv. Based on the emission rates in PA-65-00990C and the sources' exhaust flow rates, the turbines and fire pump engine comply with this emission limit.

25 Pa. Code § 123.22(a)(1) applies to the duct burners and auxiliary burners. SO₂ from a combustion unit shall not exceed 4 lb/MMBtu of heat input over any 1-hour period. The SO₂ limits in PA-65-00990C ensures compliance with the requirements of § 123.22(a)(1).

25 Pa. Code § 123.22(a)(2) requires commercial fuel oil No. 2 and lighter to contain a maximum sulfur content of 0.5% (5,000 ppm) through June 30, 2016, and a maximum sulfur content of 500 ppm beginning July 1, 2016. Compliance with the NSPS IIII requirement to use diesel fuel with less than 15 ppm sulfur will ensure compliance with the requirements of § 123.22(a)(2).

25 Pa. Code § 123.31 – Odor Emissions Limitations applies to this facility and will be included as TVOP condition. Per §123.31(b), a person may not permit the emission into the outdoor atmosphere of any malodorous air contaminants from any source, in such a manner that the malodors are detectable outside the property of the person on whose land the source is being operated. Tenaska is complying with the requirements of §123.31 by combusting pipeline quality natural gas and ultra-low sulfur diesel fuel only.

25 Pa. Code §123.41 – Visible Emissions Limitations applies to this facility and will be included as a TVOP condition. Per §123.41, visible emissions are limited to:

- (1) Equal to or greater than 20% for a period or periods aggregating more than 3 minutes in any 1 hour.
- (2) Equal to or greater than 60% at any time.

In accordance with 25 Pa. Code §127.12b in PA-65-00990C, and pursuant to the requirements of Prevention of Significant Deterioration provisions in 40 CFR § 52.21 and of 25 Pa. Code § 127.83, as well as the best available technology provisions in 25 Pa. Code § 127.1 and other recent plan approvals for similar sources, visible emissions from each power block are limited to the following:

- (1) Equal to or greater than 10% for a period or periods aggregating more than 3 minutes in any 1 hour.
- (2) Equal to or greater than 10% for a period or periods aggregating more than 6 minutes during startup and shutdown.

To ensure continued compliance with the above visible, fugitive, and malodorous emission requirements, the Department is requiring the permittee in accordance with 25 Pa. Code §127.12b, to conduct facility-wide inspections for the presence of any visible stack emissions, fugitive emissions, and any potentially objectionable odors at the property line at a minimum of once each operating day, during daylight hours, and while the sources are operating. If any visible stack emissions, fugitive emissions, and/or potentially objectionable odors are apparent, the permittee shall take corrective action. Records of each inspection shall be maintained in a log and at the minimum include the date, time, name and title of the observer, along with any corrective action taken as a result.

For the purposes of the TVOP, the following definitions related to startups and shutdowns apply:

- (a) *Startup* is defined as the period beginning when fuel begins flowing to the combustion turbine and ending when the combustion process, air pollution control equipment, and associated control systems have attained normal operating conditions.
- (b) *Shutdown* is defined as the period beginning when the combustion turbine exits dry low NO_x (DLN) mode and ending when fuel flow ceases.
- (c) *Cold Startup* is defined as a startup in which the power block (which includes both the combustion turbines and the steam turbine) did not operate during the previous 72 hours.
- (d) *Warm Startup* is defined as a startup in which the power block last operated between 8 and 72 hours prior to startup.
- (e) *Hot Startup* is defined as a startup in which the power block operated during the previous 8 hours.

In order to minimize emissions during startup and shutdown, each startup event is limited to one and one-half hours in duration, each shutdown event will be limited to one half hour in duration, and the total startup and shutdown duration for each combined cycle combustion turbine is limited to 390 hours in any consecutive 12-month period. In order to accurately calculate annual emissions, records of the time, date, and duration of each startup and shutdown is required.

25 Pa. Code §123.51 – Nitrogen Compound Emissions Monitoring Requirements applies to combustion units with a rated heat input of 250 MMBtu/hr or greater and with an annual average capacity factor of greater than 30%. The duct burners are subject to this section. Per §123.51(b), each unit is required to have a CEMS installed to monitor emissions of NO_x. Tenaska has installed and is currently operating each CEMS in accordance with Chapter 139, Subchapter C.

NO_x Allowance Requirements under Chapter 123 do not apply. Per 25 Pa. Code §123.121, NO_x allocations for the NO_x allowance control periods starting May 1, 2003, will be distributed in accordance with Chapter 145 (relating to interstate pollution transport reduction).

25 Pa. Code § 127.1 – requires that “the emissions from a new source will be the minimum attainable through the use of the best available technology” (BAT).

25 Pa. Code § 127.12b(c) – PA-65-00990C has incorporated the monitoring, record keeping and reporting provisions required by Chapter 139 (relating to sampling and testing). The plan approval required testing within 60 days after achieving the maximum production rate, but not later than 180 days after initial startup for NO_x, CO, VOC (with and without duct burners), formaldehyde, PM (filterable and condensable), PM₁₀ (filterable and condensable), PM_{2.5} (filterable and condensable), sulfuric acid mist, SO₂, and ammonia slip. Subsequent testing for VOC, formaldehyde and PM (filterable and condensable) is required no less often than every two (2) years after initial testing. The testing frequency may be revised based upon the satisfactory demonstration of compliance with the emission limitations by the owner/operator. Subsequent testing is not required for NO_x, CO, and ammonia slip since they will be required to be monitored with the CEMS. Since Tenaska has assumed all particulate matter emissions from the combustion turbines is PM_{2.5}, the Department is not requiring separate testing for PM, PM₁₀, and PM_{2.5} for subsequent tests. Sulfuric acid mist and SO₂ emissions is being calculated based upon the measured sulfur content of the natural gas, therefore subsequent testing is not required for those pollutants.

25 Pa. Code §129.56 for storage tanks greater than 40,000 gallons capacity containing VOCs do not apply to the storage tanks at this facility since they are each less than 40,000 gallons.

25 Pa. Code §129.57 for storage tanks less than or equal to 40,000 gallons capacity containing VOCs does not apply to the storage tanks at this facility. The provisions of this section apply to above ground stationary storage tanks with a capacity equal to or greater than 2,000 gallons which contain VOCs with vapor pressure greater than 1.5 psia. The three (3) 1,000 gallon lube oil and one (1) 1,000 gallon diesel storage tanks are not subject since they are less than 2,000 gallons and do not contain VOCs with vapor pressure greater than 1.5 psia. The one (1) 5,000 gallon diesel and 30,000 gallon ammonia storage tanks are not subject since they do not contain VOCs with vapor pressure greater than 1.5 psia.

25 Pa. Code §§ 129.111 – 129.115 (RACT III)

On October 24, 2023, the Department received a Notification of RACT III Applicability from Tenaska for the TWGS as required by 25 PA Code §129.115(a). A revised RACT III Initial Notification was submitted at the request of the Department on December 30, 2023. The facility is a major source of NO_x and VOC. The facility was in operation¹ prior to August 3, 2018, and therefore subject to RACT III, 25 Pa Code §§129.111 through 129.115.

¹ The Combined Cycle Combustion Turbines (Sources 101 and 102) commenced operation in September 2018, but the facility had commenced operation prior to August 3, 2018, and it has been determined the turbines are subject to RACT III.

On November 12, 2022, PADEP published 25 Pa. Code §§129.111-129.115, “Additional RACT Requirements for Major Sources of NO_x and VOCs for the 2015 Ozone NAAQS” (RACT III). The requirements or emissions limitations under RACT III supersede the requirements or emissions limitations of a RACT permit previously issued in accordance with 25 Pa. Code §§129.91-129.95 and §§129.96-129.100, except in cases where an existing RACT permit specifies more stringent requirements and/or emissions limitations. Compliance with applicable RACT III Rule requirements or emissions limitations must be demonstrated not later than January 1, 2023. Note the facility does not have a previous RACT permit.

The following sources at TWGS were determined to be exempt from RACT III because emissions are less than 1.0 tpy each for both NO_x and VOC per 25 Pa. Code §129.111(c):

- 104 Emergency Fire Pump Engine
- 107 Fire Pump Engine ULSD Tank
- 108 Turbine Lube Oil Tank

The following sources at TWGS are complying with RACT III NO_x requirements by meeting the presumptive RACT standards of 25 Pa. Code §129.112:

- | | | |
|-----|------------------------|------------------------|
| 031 | Auxiliary Boiler | §129.112(g)(1)(i) |
| 101 | Combined Cycle Unit #1 | §129.112(g)(2)(iii)(A) |
| 102 | Combined Cycle Unit #2 | §129.112(g)(2)(iii)(A) |

The following sources at TWGS are complying with RACT III VOC requirements by meeting the presumptive RACT standards of 25 Pa. Code §129.112:

- | | | |
|-----|------------------------|------------------------|
| 031 | Auxiliary Boiler | §129.112(d) |
| 101 | Combined Cycle Unit #1 | §129.112(g)(2)(iii)(B) |
| 102 | Combined Cycle Unit #2 | §129.112(g)(2)(iii)(B) |

The presumptive VOC RACT standard in §129.112(g)(2)(iii)(B) is listed as “2 ppmvd VOC (as propane) @ 15% oxygen when firing natural gas or a noncommercial gaseous fuel.” The presumptive RACT standard will be enforced as 2.0 ppmvd VOC (as propane) @ 15% oxygen.

25 Pa. Code §§ 129.201 through 129.203 establish additional NO_x requirements for boilers, stationary combustion turbines, and stationary internal combustion engines located in Bucks, Chester, Delaware, Montgomery, or Philadelphia counties. This facility is located in Westmoreland County, therefore these sections do not apply.

25 Pa. Code Chapter 135 establishes requirements for record keeping and reporting of annual emissions and will be applicable to the proposed facility. Annual source reports are required to be submitted by March 1 of each year for the preceding calendar year.

25 Pa. Code Chapter 139 establishes requirements for sampling and testing and will be applicable to the proposed sources at this facility. In addition to testing, the CEMS required for

the combustion turbines by 25 Pa. Code §123.51(b) are subject to the requirements of 25 Pa. Code § 139.5(f).

25 Pa. Code Chapter 145 – Interstate Pollution Transport Reduction – Chapter 145 establishes general provisions and the applicability, allowance, excess emissions, monitoring, and opt-in provisions for the NO_x, SO₂, and CO₂ trading programs. The CO₂ trading program is accomplished via the Regional Greenhouse Gas Initiative (RGGI); however, the RGGI regulation is currently under litigation, preventing Pennsylvania’s participation in the program.

New Source Review (NSR)

40 CFR Part 52 – Prevention of Significant Deterioration (PSD) Review

Per 40 CFR §52.21(a)(2)(i) and §52.21(a)(2)(ii), any project at a new major stationary source (as defined in paragraph (b)(1) of this section) or the major modification of any existing major stationary source in an area designated as attainment or unclassifiable under the federal Clean Air Act must comply with the applicable requirements of 40 CFR Part §52.21, *Prevention of Significant Deterioration of Air Quality (PSD)*. A major stationary source is defined as either:

- (a) A source in one of the 28 source categories identified in 40 CFR 52.21 that has a potential to emit 100 tons or more per year of any regulated NSR pollutant;
- (b) Any other stationary source that has the potential to emit 250 tons or more per year of a regulated NSR pollutant; or
- (c) Any physical change which would constitute a major stationary source by itself.

Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input are listed as one of the 28 source categories; therefore, the threshold is 100 tpy of any regulated NSR pollutant for the proposed facility. Sources on the list are also required to include fugitive emissions in determining whether the source is a major stationary source.

The proposed potential emissions at the TWGS in the PA-65-00990C application were in excess of 100 tpy for one or more regulated NSR pollutants and therefore met the §52.21 definition of a new major source with respect to the PSD program. A project at a major facility for any one regulated NSR pollutant is required to be evaluated for all NSR pollutants to determine if PSD requirements are to be applied. The evaluation of PSD applicability during the review of PA-65-00990C determined that a best available control technology (BACT) analysis was required for all PSD pollutants. The results of the BACT analysis for each PSD pollutant will be discussed below in the “Emissions and Controls” section. For a more detailed explanation of these results, please refer to the original review memo for PA-65-00990C dated December 16, 2014.

Non-Attainment New Source (NANSR) Review

On May 19th, 2007, the Department adopted revised New Source Review regulations in 25 Pa. Code Chapter 127 Subchapter E. Per 25 Pa. Code §127.201(a), “A person may not cause or permit the construction or modification of an air contamination facility in a nonattainment area

or having an impact on a nonattainment area unless the Department... has determined that the requirements of this subchapter have been met.”

25 Pa. Code §127.201(c) specifies that “The NSR requirements of this subchapter also apply to a facility located in an attainment area for ozone and within an ozone transport region that emits or has the potential to emit at least 50 tpy of VOC or 100 tpy of NO_x. A facility within either an unclassifiable/attainment area for ozone or within a marginal or incomplete data nonattainment area for ozone or within a basic nonattainment area and located within an ozone transport region will be considered a major facility and shall be subject to the requirements applicable to a major facility located in a moderate nonattainment area.”

25 Pa. Code §127.201(g)(1) specifies that “Beginning January 1, 2011, or an earlier date established by the Administrator of the EPA, condensable PM shall be accounted for in applicability determinations and for PM_{2.5} and PM₁₀ emission limitations established in a plan approval or operating permit issued under this chapter.” Per 25 Pa. Code §127.202(a), “The special permit requirements in this subchapter apply to an owner or operator of a facility to which a plan approval will be issued by the Department after May 19, 2007, except for PM_{2.5}, which will apply after September 3, 2011.”

Per 40 CFR § 81.339, South Huntingdon Township, Westmoreland County is classified as an area of nonattainment for the 8-hour ozone, annual PM_{2.5}, and 24-hour PM_{2.5} National Ambient Air Quality Standards (NAAQS). The entire Commonwealth of Pennsylvania is considered a “moderate” ozone nonattainment area for NO_x and VOC because Pennsylvania is a jurisdiction in the Ozone Transport Region established by operation of law under Section 184 of the Clean Air Act. Recognized precursor pollutants for PM_{2.5} are SO₂, NO_x, VOC, and ammonia (NH₃); and for ozone are NO_x and VOC.

During review of PA-65-00990C for purposes of NNSR, the TWGS would be considered major if the PTE exceeded 100 tons of NO_x, 50 tons of VOCs, 100 tons of SO₂, or 100 tons of PM_{2.5} per year. The NNSR applicability determination resulted in the potential emissions of NO_x and VOC exceeding the respective NNSR major source thresholds. However, the proposed PTE for SO₂ and PM_{2.5} (including condensable) was less than 100 tpy; therefore, NNSR was not triggered for these pollutants. As a result, Plan Approval PA-65-00990C was conditioned to include Federally enforceable emission standards limiting SO₂ and PM_{2.5} (including condensable) below the major source thresholds. NNSR requirements for NO_x and VOC included installation of control technology demonstrating the Lowest Achievable Emission Rate (LAER) and the purchase of Emission Reduction Credits (ERCs) to offset emissions of NO_x and VOC. The results of the LAER analysis for NO_x and VOC will be discussed below in the “Emissions and Controls” section. For a more detailed explanation of these results, please refer to the original review memo for PA-65-00990C dated December 16, 2014, the review memo for PA-65-00990D dated October 5, 2015, and the review memo for the modification of PA-65-00990D dated June 23, 2017.

SOURCES, CONTROL DEVICES, AND EMISSIONS

As discussed above, the facility-wide potential emissions are greater than the PSD and NNSR NO_x emission threshold of 100 tpy; therefore, the sources at this facility were subject to the PSD BACT provisions in 40 CFR § 52.21 and NNSR LAER provisions in 25 Pa. Code § 127.201 through 127.217 as detailed in the review memo for PA-65-00990C. The following is a summary of control technologies imposed on the sources at TWGS as a result of the LAER/BACT/BAT determinations.

Power Blocks, Sources 101 and 102

The BACT determination for control of NO_x was good combustion practices and installation of Selective Catalytic Reduction (SCR). The emission limitation is 2.0 ppmvd NO_x corrected to 15% O₂ based on a 3-hour averaging period. Tenaska is required to continuously monitor and record the NO_x emission rate, the SCR pressure differential, inlet and outlet temperatures, and ammonia injection rate to ensure proper operation. Maintenance is required per the manufacturer's recommendations. Tenaska is also required to visually inspect the catalyst during planned outages and clean/replace as needed.

The Department has determined the appropriate control technology for both CO and VOC is the use of good combustion practices and operation of an oxidation catalyst. The imposed CO emission rate is 2.0 ppmvd @ 15% O₂ on a 3-hour averaging period. The original VOC emission limits imposed in PA-65-00990C, Section E, Condition #001(c), require emissions from each combined cycle unit not to exceed 2.4 ppmvd @ 15% O₂ with duct burners and 1.4 ppmvd @ 15% O₂ without duct burners on a 3-hour averaging period. However, the applicable presumptive RACT III requirement for Sources 101 and 102 in 25 Pa. Code §129.112(g)(2)(iii)(B) states the following:

“The owner and operator of a combined cycle or combined heat and power combustion turbine with a rated output equal to or greater than 180 MW shall comply with the following presumptive RACT emission limitations as applicable:

(B) 2 ppmvd VOC (as propane) @ 15% oxygen when firing natural gas or a noncommercial gaseous fuel.”

To satisfy presumptive RACT III requirements, the emissions rate of 2.0 ppmvd VOC (as propane) @ 15% O₂ has been included in the TVOP as discussed earlier in this memo.

Tenaska is required to continuously monitor and record the pressure differential across the oxidation catalyst as well as the catalyst inlet and outlet temperatures to ensure proper operation. Maintenance is required per the manufacturer's recommendations. Tenaska must visually inspect the catalyst during planned outages and clean/replace as needed.

For PM/PM₁₀, the Department determined that LAER/BACT/BAT for Sources 101 and 102 is the utilization of good combustion practices, the use of low ash/low sulfur natural gas, and a total PM emission rate of 0.0039 lb/MMBtu/hr over a 3-hour averaging period.

Due to the elimination of all add-on control options, the appropriate BAT control for SO₂ and BACT control for H₂SO₄ was determined to be combustion of pipeline quality natural gas with low sulfur content. This also meets the SO₂ standards under NSPS Subpart KKKK. Note that Tenaska is not subject to BACT for SO₂. A BACT emission rate for normal operation of 5.7 E-04 lb H₂SO₄/MMBtu HHV on a 3-hour average basis has been established in PA-65-00990C.

For Greenhouse Gases (GHG), the Department has determined that BACT/BAT is combustion of natural gas, high turbine efficiency, and good combustion practices. Tenaska proposed a combustion turbine BACT limitation of 876 lbs CO₂/MWh at full load based on a 3-hour averaging period and the Department accepted that this meets BACT/BAT requirements.

Ammonia is used as a reagent in the SCR for NO_x control. Ammonia slip is the ammonia that doesn't react in the SCR and exhausts into the atmosphere. For optimum SCR efficiency, NO_x and ammonia slip concentrations are measured continuously and adjusted by automated control systems. Therefore, BAT for ammonia has been determined to be good combustion practices and continuous monitoring. To ensure good combustion and appropriate ammonia injection, an ammonia slip emission limit of 5.0 ppmvd at 15% O₂ was established as BAT.

Based on the above analysis, the following table lists a summary of the LAER/BACT/BAT/RACT III analysis for Sources 101 and 102:

Table 5: Sources 101 and 102 LAER/BACT/BAT/RACT III Summary

Pollutant	Technology	Emission Limit
NO _x	SCR+DLN	2.0 ppmvd @ 15% O ₂ , 3-hour average
CO	Oxidation Catalyst and Good Combustion Practices	2.0 ppmvd @ 15% O ₂ , 3-hour average
PM	Good Combustion Practices	0.0039 lb/MMBtu, 3-hour average
PM ₁₀	Good Combustion Practices	0.0039 lb/MMBtu, 3-hour average
PM _{2.5}	Good Combustion Practices	0.0039 lb/MMBtu, 3-hour average
VOC	Oxidation Catalyst and Good Combustion Practices	2.0 ppmvd @ 15% O ₂ , 3-hour average w/duct burner
		1.4 ppmvd @ 15% O ₂ , 3-hour average w/o duct burner
H ₂ SO ₄	Low Sulfur Fuel	5.7E-04 lb/MMBtu HHV, 3-hour average
GHG	Good Combustion Practices	876 lbs CO ₂ /MWh, 3-hour average
NH ₃	Good Engineering Practices	5.0 ppmvd @ 15% O ₂ , 3-hour average

Auxiliary Boiler – Source 031

Table 6 lists a summary of the LAER/BACT/BAT analysis for Source 031:

Table 6: Source 031 LAER/BACT/BAT Summary

Pollutant	Control Standard	Technology	Emission Limit
NO _x	LAER	Ultra-low NO _x Burners	0.011 lb/MMBtu
CO	BACT	Good Combustion and Operating Practices	0.037 lb/MMBtu
PM/PM ₁₀	BACT	Natural Gas and Good Combustion Practices	0.0075 lb/MMBtu, 3-hour average
PM _{2.5}	LAER	Natural Gas and Good Combustion Practices	0.0075 lb/MMBtu, 3-hour average
VOC	LAER	Natural Gas and Good Combustion Practices	0.0054 lb/MMBtu, 3-hour average
SO ₂	BAT	Combustion of Pipeline Quality Natural Gas	--
H ₂ SO ₄	BAT	Combustion of Pipeline Quality Natural Gas	9.2E-06 lb/MMBtu

In addition to the above emission limits, visible emissions will be limited to the following based upon BAT and other recent plan approvals:

- (1) Equal to or greater than 10% for a period or periods aggregating more than 3 minutes in any 1 hour.
- (2) Equal to or greater than 30% at any time.

Furthermore, Tenaska requested to limit the operation of the auxiliary boiler by 50%. Rather than limiting the hours of operation, Tenaska suggested an annual capacity limitation. Based upon the rated capacity of the boiler of 245 MMBtu/hr, natural gas Btu content of 1,020 Btu/scf, and an operation time of 4,380 hours per year; the resulting annual fuel usage for the boiler shall not exceed 1,052 MMscf/yr.

575 bhp diesel-fired emergency fire pump engine – Source 104

Table 7 lists a summary of the LAER/BACT/BAT analysis for Source 104:

Table 7: Source 104 LAER/BACT/BAT Summary

Pollutant	Control Standard	Technology	Emission Limit
NO _x	LAER/BACT	Good Combustion Practices	3.0 g/bhp-hr ^a
CO	BACT/BAT	Good Combustion Practices	0.67 g/bhp-hr
VOC	LAER	Good Combustion Practices	0.086 g/bhp-hr

^a Limit is for NO_x + NMHC.

Cooling Tower – Source 105

Table 8 lists a summary of the BACT/BAT analysis for Source 105:

Table 8: Source 105 LAER/BACT/BAT Summary

Pollutant	Control Standard	Technology	Emission Limit
PM	BACT/BAT	Advanced drift eliminators based upon a 0.0005% drift rate and a max TDS concentration of 2,000 ppm. Continually monitor & minimize circulating water TDS.	1.5 lb/hr
PM ₁₀	BACT/BAT		0.75 lb/hr
PM _{2.5}	BACT/BAT		0.002 lb/hr

Circuit Breakers – Source 110

Tenaska is using state-of-the-art circuit breaker technology with a totally enclosed pressure system to minimize leaks of sulfur hexafluoride (SF₆), a greenhouse gas which is commonly used in circuit breakers as a high voltage insulator and circuit-interrupting medium. In addition, Tenaska has implemented a leak detection and repair (LDAR) program to ensure that SF₆ leaks from the circuit breakers are repaired as soon as possible.

Power Blocks Potential to Emit (PTE)

Emissions were calculated by the applicant for the natural gas-fired CCCTs based upon the turbine manufacturer's emissions data and recommendations, SCR control efficiency, oxidation catalyst control efficiencies, AP-42 Chapters 1.4 and 3.1 emission factors, and 40 CFR Part 98 Subpart C emission factors.

Emissions were calculated at 8,760 hours at full load and considering the maximum allowable startup/shutdown time of 390 hours to determine the worst case scenario for each pollutant. Potential emissions account for the maximum hours of operation of the duct burners of 5,200 hours per year. NO_x emissions during normal operation are controlled by selective catalytic reduction. VOC and CO emissions are controlled by oxidation catalysts. The oxidation catalysts also control HCHO emissions however the manufacturer did not guarantee a control efficiency. HCHO emissions were based upon stack test data from a similar unit with a safety factor.

Emissions from the power blocks in Table 9 below include two 3,147 MMBtu/hr combined cycle combustion turbines with 400 MMBtu/hr duct burners and one steam turbine generator.

Table 9: Power Blocks PTE (tpy)

Pollutant	Normal Operation^a (8,760 hours)	Normal Operation^a (8,370 hours)	Startup/Shutdown (390 hours)	Worst Case PTE^b
NO _x	224.0	214.5	82.3	296.8
CO	135.0	129.3	508.0	637.3
VOC	69.9	67.6	151.7	219.3
HCHO ^c	8.6	--	--	8.6
Total HAPs	21.1	20.3	--	21.1
PM	84.9	82.3	--	84.9
PM ₁₀	84.9	82.3	--	84.9
PM _{2.5}	84.9	82.3	--	84.9
H ₂ SO ₄	15.2	14.5	--	15.2
SO ₂ ^d	22.5	21.5	--	22.5
NH ₃	193.8	185.7	--	193.8
GHGs (as CO ₂ e)	3,643,638	--	--	3,661,953 ^e

^a Potential emissions account for a maximum of 5,200 hours with duct burners.

^b Worst case PTE for NO_x, CO, and VOC results from scenario with maximum number of startups/shutdowns.

^c Highest single HAP.

^d SO₂ emissions based upon a natural gas sulfur content of 0.25 gr/scf.

^e Facility maximum CO₂e emissions calculated from maximum CO₂, CH₄ and N₂O emissions.

Power block startup durations vary based upon the temperature of components downstream of the combustion turbines, most notably the heat recovery system and steam turbine. This equipment needs to be warmed slowly to avoid thermal stress, and is typically achieved by ramping the combustion turbine slowly with several hold points at less than normal minimum load. Emissions are also affected since the control devices must reach a minimum temperature and/or exhaust flow rate before they are effective. Actual NO_x and CO emissions will be determined using CEMS.

It has been determined the effective way to limit startup/shutdown emissions is to limit the duration of startup/shutdown and to require the operation of the control devices at all possible times. Therefore, each startup event is limited to one and one-half hours and each shutdown event is limited to one half hour, and the total duration of all startups and shutdowns is limited to 390 hours on a 12-month rolling basis.

Facility-wide PTE

Other air contamination sources at this facility include a 245 MMBtu/hr natural gas-fired auxiliary boiler, a 575 bhp diesel-fired fire pump engine, emissions from the cooling tower, and diesel storage and lube oil tanks. Note that tank emissions are not explicitly shown in Table 10 below as total potential VOC emissions from the tanks are less than one-tenth of a ton. Table 10 below lists the facility-wide PTE.

Table 10: TWGS Facility-Wide PTE (tpy)

Pollutant	Power Blocks	Auxiliary Boiler ^a	Fire Pump	Cooling Tower	Facility-Wide
NO _x	296.8	5.8	0.5	--	303.1
CO	637.2	20.0	0.1	--	657.3
VOC	219.3	2.9	0.0	--	222.2
HCHO ^b	8.6	--	--	--	8.6
Total HAPs	21.1	1.0	--	--	22.1
PM	84.9	4.0	0.0	6.6	95.5
PM ₁₀	84.9	4.0	0.0	3.3	92.2
PM _{2.5}	84.9	4.0	0.0	0.0	88.9
H ₂ SO ₄	15.2	--	--	--	15.2
SO ₂	22.5	0.3	--	--	22.8
NH ₃	193.8	--	--	--	193.8
GHGs (as CO ₂ e)	3,661,953	62,778	95.0	--	3,724,826

^a Auxiliary boiler PTE on a tons per year basis is based upon maximum operation of 4,380 hours/year.

^b Highest single HAP.

Facility-wide Actual Emissions

The following tables summarize actual emissions of criteria pollutants, HAPs, and other non-Clean Air Act Section 112b pollutants emitted from the TWGS as reported by Tenaska for the 2020 through 2024 calendar years.

Table 11 – TWGS Facility-Wide 2020-2024 Actual Emissions, Criteria Pollutants

Criteria Pollutant	Actual Emissions in Tons Per Year				
	2020	2021	2022	2023	2024
Carbon Monoxide	14.05	2.98	3.45	5.50	4.57
Nitrogen Oxides	101.70	118.85	117.17	110.35	117.33
Particulate Matter < 10 Microns	29.71	49.32	51.56	45.36	47.47
Particulate Matter < 2.5 Microns	28.46	48.20	50.33	44.12	46.21
Sulfur Oxides	13.21	14.83	14.51	13.80	14.70
Volatile Organic Compounds	17.82	16.22	15.83	11.69	8.96

Table 12– TWGS Facility-Wide 2020-2024 Actual Emissions, Hazardous Air Pollutants¹

Other/ Non 112b Pollutants	Actual Emissions in Tons Per Year				
	2020	2021	2022	2023	2024
Formaldehyde	1.90	1.10	0.70	0.60	0.60
Hexane	1.57	0.17	1.91	0.09	0.07
Acetaldehyde	0.84	0.36	0.90	0.02	0.02
Acrolein	0.13	0.06	0.14	0.00	0.00
Benzene	0.25	0.11	0.27	0.01	0.01
Ethyl Benzene	0.67	0.28	0.72	0.01	0.01
Napthalene	0.03	0.02	0.03	--	--
Polycyclic Aromatic Hydrocarbons	0.05	0.05	0.05	0.04	0.06
Propylene Oxide	0.61	0.26	0.65	0.01	0.01
Toluene	2.68	1.13	2.87	0.05	0.06
Xylenes (Isomers and Mixture)	1.32	0.56	1.41	0.03	0.03
Total HAPs	10.07	4.08	9.68	0.86	0.87

¹ Only individual HAPs with emissions of 0.01 tpy or more are included in this table.

Table 13 – TWGS Facility-Wide 2020-2024 Actual Emissions, Non 112b Pollutants

Other/ Non 112b Pollutants	Actual Emissions in Tons Per Year				
	2020	2021	2022	2023	2024
Carbon Dioxide	2,616,123	2,939,615	2,812,437	2,660,931	2,835,053
Methane	48.41	52.50	52.14	49.26	52.34
Nitrous Oxide (N ₂ O)	4.84	5.25	5.22	4.92	5.24
Ammonia	10.10	12.50	11.40	15.40	17.50
Sulfuric Acid	3.90	4.20	4.20	3.90	4.20
Particulate Matter, Condensable	8.64	19.41	21.22	19.91	21.41

COMPLIANCE & ENFORCEMENT

- On June 12, 2019, the Department sent Tenaska a Notice of Violation (NOV) for failing to report a January 13, 2019, malfunction of the ammonia delivery system. In addition, a review of emission records revealed that the facility exceeded the facility-wide 12-month rolling CO emission limit. Records also indicated that Source 102 exceeded the 12-month rolling CO emission limit as well as the hourly NO_x emission limit for at least twelve individual hours between October 29-30, 2018.
- On October 3, 2019, the Department sent Tenaska an NOV for underreporting 2018 VOC emissions for Sources 101 and 102.
- On September 16, 2022, the Department executed a Consent Assessment of Civil Penalty (CACP) with Tenaska for the above violations and for a malfunction report submitted on October 4, 2019, which indicated that Source 102 exceeded the one-hour startup duration limit identified in PA-65-00990C. The Department assessed a civil penalty for these

violations of \$14,997.00 which Tenaska agreed to and made payment on September 7, 2022. The case was closed in eFACTS on October 6, 2022.

- On August 29, 2023, the Department sent Tenaska an NOV for failure to submit the 15-day pre-test notification to the Department prior to stack testing conducted at the facility on October 5-6, 2022. The Department did not pursue any additional enforcement action for this violation and the case was closed in eFACTS on October 17, 2023.
- Additionally, Tenaska violated 25 Pa. Code § 127.25 by failing to operate Units 1 and 2 in compliance with the carbon monoxide emissions limits of Plan Approval PA-65-00990C during 2nd quarter 2022, 4th quarter 2022, 2nd quarter 2023, 3rd quarter 2024, and 1st quarter 2025 based on CEMs data submitted to the Department. The Department is currently working with Tenaska to resolve these past violations.

CONCLUSIONS AND RECOMMENDATIONS

I have completed my review of Tenaska's initial TVOP application for the TWGS. Tenaska has met the regulatory requirements associated with this application submittal. Notification of issuance of a proposed initial TVOP for the facility will be made to the US EPA, the *PA Bulletin*, any neighboring states within 50 miles of the facility, and a newspaper of general circulation in accordance with 25 Pa. Code §127.521. The applicant, the Operations Chief, the Air Quality District Supervisor, and the Air Quality Specialist for the facility will also be provided a copy of the proposed TVOP for comment. The attached proposed TVOP reflects terms and conditions as described in Tenaska's TVOP application. It is my recommendation to issue an initial TVOP for this facility with a five (5) year permit term.