

**Title 7 DNREC  
1100 Air Quality Management Section**

**1148 Control of Stationary Combustion Turbine Electric Generating Unit  
Emissions**

07/11/2007

**1.0 Purpose.**

The purpose of this regulation is to control the emissions of nitrogen oxides (NO<sub>x</sub>) from stationary combustion turbine electric generating units in the State of Delaware to reduce the impact on public health, safety, and welfare. This regulation will also reduce NO<sub>x</sub> emissions in the State of Delaware from the subject units during high electric demand days (HEDD). This will meet Delaware's obligation to support the regional HEDD NO<sub>x</sub> reduction initiative for the units subject to this regulation.

07/11/2007

**2.0 Applicability**

2.1 This regulation applies to existing, stationary combustion turbine electric generating units located in Delaware with a base-load nameplate capacity of 4 one MW or greater.

2.2 This regulation is not applicable to existing stationary combustion turbine electric generating units that are subject to ~~Regulation No. 12,~~ 7 DE Admin Code 1112 "Control of Nitrogen Oxides Emissions," and meet the NO<sub>x</sub> emissions limitations identified in Table # 3-2 of ~~paragraph 3.5 of Regulation No. 12,~~ 7 DE Admin Code 1112, and are not otherwise exempt from the NO<sub>x</sub> emissions limitations of Table # 3-2 of ~~Regulation No. 12,~~ 7 DE Admin Code 1112.

2.3 This regulation is not applicable to existing stationary combustion turbine electric generating units that have undergone New Source Review in accordance with ~~Regulation No. 1125~~ 7 DE Admin Code 1125 "Requirements for Preconstruction Review," and are covered by a permit which imposes NO<sub>x</sub> emissions limitations established to meet Best Available Control Technology ~~and/or~~ Lowest Achievable Emission Rate technology standards.

07/11/2007

**3.0 Definitions**

The following words and terms, when used in this regulation, shall have the following meanings:

**“Annual capacity factor”** means the ratio of the megawatt-hours produced in a calendar year by a stationary combustion turbine electric generating unit to the maximum possible annual electric generation determined on the base-load nameplate capacity of the stationary combustion turbine electric generating unit.

**“Base-load nameplate capacity”** means, starting from the initial installation of a combustion turbine electric generating unit, the maximum electrical generating output (in MWe) that the combustion turbine electric generating unit is capable of producing on a steady basis during continuous operation at rated ambient temperature and atmospheric pressure as specified by the manufacturer of the combustion turbine electric generating unit or, starting from the completion of a physical change in the combustion turbine electric generating unit resulting in an increase in the maximum electrical generating output (in MWe) that the combustion turbine electric generating unit is capable of producing on a steady state basis and during continuous operation, such increased maximum output as specified by the person conducting the physical change.

**“Combustion turbine”** means a combustion engine consisting of a compressor, combustor~~(s)~~ or combustors and power turbine used to provide rotary motion to an output shaft. The combustion turbine may be fueled by gaseous ~~and~~ or liquid fuels.

**“Combustion turbine electric generating unit”** means a combustion turbine used to drive an electric generator.

**“Department”** means the State of Delaware Department of Natural Resources and Environmental Control as defined in 29 **Del. C.**, Chapter 80, as amended.

**“Electric generator”** means a device that utilizes rotary motion from an input shaft to create electrical energy.

**“Existing”** means the unit has been synchronized to the grid before July 11, 2007.

**“Gaseous fuel”** means any non-solid or non-liquid fuel, including natural gas, digester gas, landfill gas, process gas, or any gas stored as a liquid at high pressure such as liquefied petroleum gas.

**“Liquid fuel”** means any non-solid or non-gaseous fuel, including kerosene, jet fuel, distillate fuel oil, bio-fuels, and methanol.

**“Ozone season”** means the months of May through September.

**“Ozone season capacity factor”** means the ratio of the megawatt-hours produced during the ozone season, as defined within this regulation, by a stationary combustion turbine electric generating unit to the maximum possible ozone season

electric generation determined on the base-load nameplate capacity of the stationary combustion turbine electric generating unit.

**“Peak-load nameplate capacity”** means, starting from the initial installation of a combustion turbine electric generating unit, the maximum electrical generating output (in MWe) that the combustion turbine electric generating unit is capable of producing for limited durations at rated ambient temperature and atmospheric pressure as specified by the manufacturer of the combustion turbine electric generating unit or, starting from the completion of a physical change in the combustion turbine electric generating unit resulting in an increase in the maximum electrical generating output (in MWe) that the combustion turbine electric generating unit is capable of producing for limited durations, such increased maximum output as specified by the person conducting the physical change.

**“PPMV”** means gaseous concentration in parts per million by volume, corrected to ~~15 percent~~ 15% O<sub>2</sub> dry basis.

**“Shutdown”** means the period of time between a combustion turbine generating unit being brought from an operating condition to fuel shut off. This period of time may be begun at either opening the generator breaker or disconnecting the combustion turbine from the electric generator, and is concluded when the fuel is completely shut off to the combustion turbine.

**“Simple cycle”** means a combustion turbine electric generating unit which does not recover heat from the combustion turbine electric generating unit exhaust gases to preheat the inlet combustion air to the combustion turbine electric generating unit, to heat water, or to generate steam.

**“Start-up”** means the period during which a combustion turbine generating unit is brought from a shutdown status to rated speed and generator breaker closure.

**“Stationary”** means a unit that is not self-propelled or intended to be propelled while performing its design function.

07/11/2007

#### 4.0 NO<sub>x</sub> Emissions Limitations

4.1 Beginning May 1, 2009, no existing stationary combustion turbine electric generating unit subject to this regulation shall exceed the NO<sub>x</sub> emissions limitations shown in Table † 4-1 of this regulation during the ozone season, inclusive of any year:

Table † 4-1

Fuel Type	NO <sub>x</sub> Emissions Limit (ppmv)
Gaseous Fuel	42
Liquid Fuel	88

4.2 The owner or operator of an existing stationary combustion turbine electric generating unit shall, no later than May 1, 2009, either demonstrate to the satisfaction of the Department, through source testing approved by the Department, that the existing stationary combustion turbine generating unit meets the NO<sub>x</sub> emissions limitations of Table † 4-1 of this regulation or install NO<sub>x</sub> emission controls designed to meet the NO<sub>x</sub> emissions limitation of Table † 4-1 of this regulation in accordance with the requirements of ~~paragraph~~ 4.3 of this regulation.

4.3 The owner or operator of an existing stationary combustion turbine electric generating unit installing NO<sub>x</sub> emissions reduction controls in accordance with the requirements of ~~paragraph~~ 4.2 of this regulation shall install the NO<sub>x</sub> emissions reduction controls and implement operating procedures with the goal of achieving the NO<sub>x</sub> emissions limits of Table † 4-1 of this regulation, and shall be designed and operated to control NO<sub>x</sub> emissions across the anticipated operating load range of the combustion turbine electric generating unit, including, if technically feasible, periods of startup, shutdown, and reduced load operation.

4.3.1 The owner or operator of an existing stationary combustion turbine electric generating unit installing NO<sub>x</sub> emissions reduction controls in accordance with ~~paragraph~~ 4.3 of this regulation, shall submit to the Department for approval an emissions control plan detailing all actions, including a schedule of increments of progress, which will be taken to comply with the requirements of ~~paragraph~~ 4.1 of this regulation and the emissions control limitations of Table † 4-1 of this regulation. The plan shall contain, as a minimum, the following information:

4.3.1.1 Facility and unit identification

4.3.1.2 Combustion turbine electric generating unit manufacturer and manufacturer's model number.

4.3.1.3 Combustion turbine electric generating unit manufacturer's base and peak (when applicable) load nameplate ratings and rating conditions (atmospheric temperature and pressure, fuel type, etc.).

4.3.1.4 Primary and secondary (where applicable) fuel type~~(s)~~ or types.

4.3.1.5 Hours of operation and electrical output for the previous five years.

4.3.1.6 Documentation of the combustion turbine electric generating unit's NO<sub>x</sub> emissions rate, without NO<sub>x</sub> emissions controls installed in compliance with this regulation. The documents may include:

4.3.1.6.1 Results of any previous NO<sub>x</sub> emissions testing conducted in the five calendar years prior to July 11, 2007; or

4.3.1.6.2 A plan to conduct NO<sub>x</sub> emissions testing, as part of the initial compliance testing conducted in accordance with ~~paragraph~~ 4.3.3 of this regulation, with the NO<sub>x</sub> emissions controls (installed in compliance with this regulation) turned off.

4.3.1.7 Reserved.

4.3.1.8 Technical description of proposed emissions control technology and equipment designed to minimize NO<sub>x</sub> emissions across the entire operating range of the existing stationary combustion turbine electric generating unit (including, if technically feasible, periods of start-up, shutdown, and reduced load operation), predicted NO<sub>x</sub> emissions levels following controls installation, and supporting documentation.

4.3.1.9 Compliance schedule including compliance emissions testing conducted representative of anticipated normal load range, including base load and peak load (if applicable), and anticipated monitoring plan submittal.

4.3.1.10 Any other information requested by the Department.

4.3.2 The owner or operator of an existing stationary combustion turbine electric generating unit submitting an emissions control plan in accordance with ~~paragraph~~ 4.3.1 of this regulation shall submit the plan to the Department for approval no later than April 11, 2008.

4.3.3 Following completion of the approved NO<sub>x</sub> emissions control installation described in ~~paragraphs~~ 4.3.1 and 4.3.2 of this regulation, emissions testing approved by the Department shall be conducted to determine compliance with the NO<sub>x</sub> emissions requirements of ~~paragraph~~ 4.1 and the Table † 4-1 of this regulation. Testing results shall be submitted to the Department no later than 60 days following the completion of the testing.

4.3.4 If actual achievable NO<sub>x</sub> emissions levels following completion of the approved emissions reduction plan are greater than those of Table † 4-1 of this regulation, the owner or operator of the stationary combustion turbine electric generating unit may petition the Department for alternative NO<sub>x</sub> emissions limitations no greater than the actual achievable NO<sub>x</sub> emissions levels determined in the post-emissions control installation testing.

4.4 The NO<sub>x</sub> emissions limitations of ~~paragraph~~ 4.1 and Table † 4-1 of this regulation, or alternate NO<sub>x</sub> emissions limitations approved by the Department in accordance with ~~paragraph~~ 4.3.4 of this regulation, are applicable to existing

stationary combustion turbine electric generating units subject to this regulation whenever combusting fuel during the ozone season, inclusive of any year:

4.4.1 except during periods of start-up or shutdown, if the control of NO<sub>x</sub> emissions during these periods is shown not to be technically feasible in the emissions control plan submitted in accordance with ~~paragraph~~ 4.3.1 of this regulation; or

4.4.2 including periods of start-up and shutdown, if the control of NO<sub>x</sub> emissions during these periods is shown to be technically feasible in the emissions control plan submitted in accordance with ~~paragraph~~ 4.3.1 of this regulation.

4.5 Compliance with the NO<sub>x</sub> emissions limitations of ~~paragraph~~ 4.1 and Table ~~4-1~~ of this regulation, or alternate NO<sub>x</sub> emissions limitations approved by the Department in accordance with ~~paragraph~~ 4.3.4 of this regulation, are based on one hour averaging periods.

07/11/2007

## **5.0 Monitoring and Reporting**

5.1 For existing stationary combustion turbine electric generating units with an ozone season capacity factor of 10% or less for each of the five calendar years preceding July 11, 2007, compliance emissions testing acceptable to the Department shall be conducted by the owner or operator in the calendar years representing successive ~~5~~ five-year intervals from the calendar year in which the initial compliance test was conducted in accordance with ~~paragraph~~ 4.3.3 of this regulation.

5.2 For existing combustion turbine electric generating units with an ozone season capacity factor greater than 10% for any of the five calendar years preceding July 11, 2007:

5.2.1 Compliance emissions testing acceptable to the Department shall be conducted by the owner or operator every two years following the calendar year in which the initial compliance test was conducted in accordance with ~~paragraph~~ 4.3.3 of this regulation.

5.2.2 If an existing combustion turbine electric generating unit's ozone season capacity factor drops below 10% for ~~5~~ five consecutive years, the owner or operator may petition the Department to reduce the compliance testing frequency to ~~5~~ five years.

5.3 For existing combustion turbine electric generating units in compliance with ~~paragraph~~ 5.1 of this regulation but which have an ozone season capacity factor of greater than 10% for any year subsequent to July 11, 2007, compliance emissions

testing acceptable to the Department shall be conducted by the owner or operator every two years, starting in the calendar year after the year that the 10% ozone season capacity factor was exceeded.

5.4 The owner or operator of an existing combustion turbine electric generating unit shall submit to the Department, for approval, a monitoring plan containing monitoring information correlating control system parameters or other operating characteristic indications with NO<sub>x</sub> emissions output.

5.4.1 The correlations may be developed using actual emissions test data and parameters and characteristics recommended by the combustion turbine electric generating unit manufacturer, emission control equipment supplier, or other operating experience. The correlations shall address the entire anticipated operating load range of the combustion turbine electric generating unit.

5.4.2 This information may be used by the Department to monitor compliance with this regulation.

5.4.3 Representative data shall be continuously collected and recorded while the combustion turbine electric generating unit combusts any fuel during the ozone season.

5.4.4 The approved monitoring information shall be annually submitted to the Department no later than February 1 of the year following the calendar year for which the data is collected, and shall also include detailed explanations for any periods during the ozone season where the monitored operating parameters were outside acceptable margins and include descriptions of corrective actions taken.

5.5 The provisions of ~~paragraphs~~ 5.1, 5.2, 5.3 and 5.4 of this regulation are not applicable to existing stationary combustion turbine electric generating units which are otherwise required to install, test, operate, and maintain NO<sub>x</sub> continuous emissions monitoring system in accordance with the Department or EPA requirements for continuous emissions monitoring systems meeting all applicable requirements of 40 CFR Part 60 or 40 CFR Part 75 (July 1, 2006 edition).

5.6 The owner or operator of an existing stationary combustion turbine electric generating unit shall maintain an operating log during the ozone season that includes, on a daily basis, actual start-up and shutdown times, total hours of operation, gross electrical megawatt-hours generated, fuel consumption, type of fuel~~(s)~~ or fuels, identification of any periods operating outside the monitoring parameters identified in ~~paragraph~~ 5.4 of this regulation (where applicable), identification of any periods of non-compliance with the requirements of this regulation, cumulative-to-date hours of operation and gross electrical megawatt-hours generated, and any other information requested by the Department. This data

shall be submitted annually to the Department no later than February 1 of the year following the calendar year for which the data is collected.

07/11/2007

## **6.0 Recordkeeping**

The owner or operator of a stationary combustion turbine electric generating unit subject to this regulation shall maintain, for a period of at least five years, copies of all measurements, tests, reports, operating logs, and other information required by this regulation. This information shall be provided to the Department upon request at any time.

07/11/2007

## **7.0 Penalties**

The Department may enforce all of the provisions of this regulation under 7 Del. C., Chapter 60.