

(Adopted August 4, 1989)(Amended December 7, 1995)  
(Amended April 11, 1997)(Amended August 8, 1997)  
(Amended April 5, 2019)

**RULE 1134. EMISSIONS OF OXIDES OF NITROGEN FROM  
STATIONARY GAS TURBINES**

(a) Purpose

The purpose of this rule is to reduce emissions of oxides of nitrogen (NO<sub>x</sub>) from stationary gas turbines.

(b) Applicability

The provisions of this rule shall apply to all stationary gas turbines, 0.3 megawatt (MW) and larger. This rule does not apply to stationary gas turbines: subject to Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities; located at petroleum refineries, landfills, or publicly owned treatment works; or fueled by landfill gas.

(c) Definitions

- (1) ANNUAL CAPACITY FACTOR is the ratio between the measured heat input (in MMBTU) from fuel consumption to a stationary gas turbine during a calendar year and the potential heat input (in MMBTU) to the stationary gas turbine had it been operated for 8,760 hours during a calendar year at the permitted heat input rating, expressed as a percent.
- (2) COGENERATION GAS TURBINE is a gas turbine which is designed to generate electricity and useful heat energy at the same time (combined heat and power).
- (3) COMBINED CYCLE GAS TURBINE is a gas turbine, including cogeneration gas turbines, that recovers heat from the gas turbine exhaust.
- (4) COMPRESSOR GAS TURBINE is a stationary gas turbine used to transport gases or liquids in a pipeline.
- (5) DUCT BURNER is a device located in the heat recovery steam generator of a gas turbine that combusts fuel and adds heat energy to the turbine exhaust to increase the output of the heat recovery steam generator.
- (6) EMERGENCY STANDBY GAS TURBINE is a gas turbine that operates only as a power source for a facility when the primary power source has

been rendered inoperable, except it may not be used for power interruption pursuant to an interruptible power supply agreement.

- (7) EXHAUST AFTER-TREATMENT is a control method for the post-combustion reduction of NO<sub>x</sub> emissions, such as selective catalytic reduction (SCR).
- (8) EXISTING GAS TURBINE is a stationary gas turbine that is located at a non-RECLAIM NO<sub>x</sub> facility and met the following criteria prior to August 4, 1989:
  - (A) Had been issued a valid permit to construct or operate by the SCAQMD, or
  - (B) Was in operation pursuant to the provisions of SCAQMD Rule 219(b)(1).
- (9) FORMER RECLAIM NO<sub>x</sub> FACILITY is a facility, or any of its successors, that was in the Regional Clean Air Incentives Market (RECLAIM) as of January 5, 2018, as established in Regulation XX, that has received a final determination notification from the Executive Officer or the owner or operator opts-out of RECLAIM, and is no longer in the RECLAIM program.
- (10) LANDFILL is an entire disposal facility in a contiguous geographical space where solid waste is placed in or on land. A landfill may be active, inactive, or closed.
- (11) NATURAL GAS is a mixture of gaseous hydrocarbons, with at least 80 percent methane (by volume), and of pipeline quality, such as the gas sold or distributed by any utility company regulated by the California Public Utilities Commission.
- (12) NON-RECLAIM NO<sub>x</sub> FACILITY is a facility, or any of its successors, that was not in the Regional Clean Air Incentives Market as of January 5, 2018, as established in Regulation XX.
- (13) OXIDES OF NITROGEN (NO<sub>x</sub>) EMISSIONS is the sum of nitric oxides and nitrogen dioxides emitted, collectively expressed as nitrogen dioxide emissions.
- (14) OUTER CONTINENTAL SHELF is as defined in 40 CFR, Part 55 – Outer Continental Shelf Air Regulations.
- (15) PETROLEUM REFINERY is a facility identified by the North American Industry Classification System Code 324110, Petroleum Refineries.

- (16) **POWER AUGMENTATION** is the increase in the gas turbine shaft output and/or the decrease in gas turbine fuel consumption by the addition of energy recovered from exhaust heat.
- (17) **PUBLICLY OWNED TREATMENT WORKS** are wastewater treatment or reclamation plants owned and operated by a public entity, including all operations within the boundaries of the wastewater and sludge treatment plant.
- (18) **PRODUCED GAS** is made up of organic compounds that are gaseous at standard temperature and pressure and are associated with the production, gathering, separation, or processing of crude oil.
- (19) **RATING OF A GAS TURBINE** is the continuous MW (megawatt) rating or mechanical equivalent by a manufacturer for a gas turbine without power augmentation.
- (20) **RECLAIM NO<sub>x</sub> FACILITY** is a facility or its successor that was in the Regional Clean Air Incentives Market as of January 5, 2018, as established in Regulation XX and is still in RECLAIM on the relevant date.
- (21) **SEWAGE DIGESTER GAS** is any gas derived from anaerobic decomposition of organic sewage.
- (22) **SHUTDOWN** is the time period that begins when a stationary gas turbine reduces load and which ends in a period of zero fuel flow, or as otherwise defined in the SCAQMD permit to operate.
- (23) **SIMPLE CYCLE GAS TURBINE** is any stationary combustion turbine that does not recover heat from the combustion turbine exhaust gases to heat water or generate steam.
- (24) **START-UP** is the time period that begins when a stationary gas turbine combusts fuel after a period of zero fuel flow and which ends when the stationary gas turbine generates electricity for sale or for any other purpose including on-site use, or as otherwise defined in the SCAQMD permit to operate.
- (25) **STATIONARY GAS TURBINE** is any gas turbine that is gas and/or liquid fueled with or without power augmentation. This gas turbine is either attached to a foundation at a facility or is portable equipment that will reside at the same location for more than 12 consecutive months. Two or more gas turbines powering one shaft shall be treated as one gas turbine.

- (26) THERMAL STABILIZATION PERIOD is the two-hour start up time necessary for NO<sub>x</sub> control purposes in cogeneration cycle, combined cycle, or any other applicable stationary gas turbines.
- (27) TUNING is adjusting, optimizing, rebalancing, or other similar operations to a stationary gas turbine or an associated control device or otherwise as defined in the SCAQMD permit to operate. Tuning does not include normal operations to meet load fluctuations.

(d) Emissions Limitations

- (1) Until the existing gas turbine operates in compliance with subparagraph (d)(3), but no later than December 31, 2023, the owner or operator of any existing gas turbine shall not operate such unit under load conditions, excluding the thermal stabilization period or other time period specified in the Permit to Construct or the Permit to Operate issued prior to August 4, 1989, which result in the discharge of oxides of nitrogen (NO<sub>x</sub>) emissions, directly or indirectly, into the atmosphere at concentrations in excess of the following as measured pursuant to subdivision (f):

$$Compliance\ Limit = Reference\ Limit \times \frac{EFF}{25\%}$$

Where:

Compliance Limit = allowable NO<sub>x</sub> emissions (ppm by volume).

Reference Limit = the NO<sub>x</sub> emission limit (ppm by volume) is corrected to 15 percent oxygen on a dry basis, and averaged over 15 consecutive minutes. These limits for various megawatt ratings (continuous rating by the manufacturer without power augmentation) are as follows:

REFERENCE NO<sub>x</sub> LIMITS, PPM

Stationary Gas Turbine Size Megawatt (MW) Rating	Effective 12-31-95
0.3 to Less Than 2.9 MW	25
2.9 to Less Than 10.0 MW	9

2.9 to Less Than 10.0 MW No SCR	15
10.0 MW and Over	9
10.0 MW and Over No SCR	12
60 MW and Over Combined Cycle No SCR	15
60 MW and Over Combined Cycle	9
	Effective 4/11/97
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2.9 to Less Than 10.0 MW Utilizing Fuel Containing a Minimum of 60% Sewage Digester Gas by Volume on a Daily Average	25

And,

$$EFF = \frac{3413 \times 100\%}{\text{Actual Heat Rate at Higher Heat Value (HHV) of Fuel (BTU/KW-HR)}}$$

or,

$$EFF = \frac{(\text{Manufacturer's Rated Efficiency at Lower Heating Value (LHV)}) \times \frac{LHV}{HHV}}{1}$$

or

EFF = the demonstrated percent efficiency of the gas turbine only as calculated without consideration of any downstream energy recovery from the actual heat rate, (BTU/KW HR) or 1.34 BTU/HP; corrected to the HHV (higher heating value) of the fuel, as measured at peak load for that facility; or the manufacturer's continuous rated percent efficiency (manufacturer's rated efficiency) of the gas turbine after correction from LHV (lower heating value) to the HHV of the fuel, whichever efficiency is higher. The value of EFF shall not be less than 25 percent. Gas turbines with lower efficiencies will be assigned a 25 percent efficiency for this calculation.

- (2) The operator of any existing gas turbine subject to this rule shall also be subject to Regulation XIII if carbon monoxide (CO) emissions increase as a result of the application of NO<sub>x</sub> controls.
- (3) Notwithstanding the exemptions contained in Rule 2001 – Applicability, Table I Rules Not Applicable to RECLAIM Facilities for Requirements Pertaining to NO<sub>x</sub> Emissions, on and after January 1, 2024, or when required by a permit to operate, whichever occurs first, the owner or operator of any stationary gas turbine, excluding compressor gas turbines, shall not operate such unit under load conditions, excluding start-up, shutdown, and tuning periods, which result in the discharge of NO<sub>x</sub> and ammonia emissions, directly or indirectly, into the atmosphere at concentrations in excess of the following emissions limits listed in Table I.

**Table I: Emissions Limits for Stationary Gas Turbines**

(Corrected to 15% oxygen on a dry basis)

Fuel Type	NO <sub>x</sub> (ppmv)	Ammonia (ppmv)
Liquid Fuel – Turbines Located on Outer Continental Shelf	30	5
Natural Gas – Combined Cycle Turbine	2	5
Natural Gas – Simple Cycle Turbine	2.5	5
Produced Gas	9	5
Produced Gas – Turbines Located on Outer Continental Shelf	15	5
Other	12.5	5

- (4) Notwithstanding the exemptions contained in Rule 2001 – Applicability, Table I – Rules Not Applicable to RECLAIM Facilities for Requirements Pertaining to NO<sub>x</sub> Emissions, 24 months after a permit to construct is issued by the Executive Officer, or 36 months after a permit to construct is issued by the Executive Officer if the application was submitted by July 1, 2021, the owner or operator of a compressor gas turbine, shall not operate such unit under load conditions, excluding start-up, shutdown, and tuning periods, which result in the discharge of NO<sub>x</sub> and ammonia emissions, directly or indirectly, into the atmosphere at concentrations in excess of the following emissions limits listed in Table II.

**Table II: Emissions Limits for Compressor Gas Turbines**

(Corrected to 15% oxygen on a dry basis)

Fuel Type	NO <sub>x</sub> (ppmv)	Ammonia (ppmv)
Natural Gas – Compressor Gas Turbine	3.5	10

## (5) Start-Up, Shutdown, and Tuning

The owner or operator of a stationary gas turbine shall meet start-up, shutdown, and tuning requirements in the SCAQMD permit to operate. On and after January 1, 2024, the SCAQMD permit to operate shall include limitations for duration, mass emissions, and number of start-ups, shutdowns, and tunings.

## (6) Averaging Time

(A) Stationary gas turbines installed prior to April 5, 2019 shall comply with the averaging time requirements specified on the SCAQMD permit to operate as of April 5, 2019, not to exceed 3 hours.

(B) Stationary gas turbines installed after April 5, 2019 shall average the NO<sub>x</sub>, and ammonia emissions limits in Table I over a 60-minute rolling average.

(C) Stationary compressor gas turbines installed after April 5, 2019 shall average the NO<sub>x</sub> and ammonia emissions limits in Table II over a three-hour rolling average.

## (7) Prohibition of Liquid Fuel

An owner or operator of a stationary gas turbine shall not burn liquid fuel in a stationary gas turbine except for those located in the Outer Continental Shelf.

## (8) On or before July 1, 2022, the owner or operator of a stationary gas turbine shall submit an application for a permit to construct or change of permit conditions to reconcile the permit to operate with Rule 1134.

(9) The owner or operator of a compressor gas turbine may submit a request to the Executive Officer for approval of an extension of up to 12 months to meet the NO<sub>x</sub> limits specified in paragraph (d)(4) and up to an additional 36 months to meet the ammonia emissions limits specified in paragraph (d)(4); (such request shall be considered a plan for purposes of Rules 216 – Appeals and Rule 221 – Plans).

- (A) The owner or operator that elects to submit a request for a time extension shall submit the request at least 30 days before the compliance deadline specified in paragraph (d)(4).
- (B) The owner or operator that submits a request for a time extension request shall provide the following information to the Executive Officer:
  - (i) Identification of the units for which a time extension is needed;
  - (ii) The reason(s) a time extension is needed;
  - (iii) Progress of replacing or retrofitting the compressor gas turbines;
  - (iv) The length of time requested;
  - (v) A demonstration that actual facility NO<sub>x</sub> emissions will decrease by at least an average of 25% in the two years prior to the extension request in comparison to 2017 facility emissions.
  - (vi) Installation of an ammonia continuous emission monitoring system certified under an approved SCAQMD protocol if an extension is requested beyond 12 months to comply with the ammonia emission limits in paragraph (d)(4).
  - (vii) A demonstration that use of a turbine is less than 1,000 hours annually if an extension is requested beyond 24 months to comply with the ammonia emission limits in paragraph (d)(4).
- (C) The Executive Officer will approve or disapprove the request for a time extension. Approval or disapproval will be based on the following criteria:
  - (i) The owner or operator prepared the request for a time extension in compliance with subparagraphs (d)(9)(A) and (d)(9)(B); and
  - (ii) The owner or operator provided sufficient details identifying the reason(s) a time extension is needed that demonstrates to the Executive Officer that there are extenuating circumstances that necessitate additional time to complete implementation. Such a demonstration may include, but is not limited to, providing detailed schedules, engineering

designs, construction plans, land acquisition contracts, permit applications, test results, and purchase orders.

- (D) The owner or operator may appeal the rejection of the extension to the Hearing Board under Rule 216 – Appeals. If the Hearing Board denies the appeal, the emissions limits must be complied with by the compliance deadline specified in paragraph (d)(4) or 30 days after the Hearing Board denial, whichever is later.

(e) Monitoring and Source Testing

The owner or operator of any stationary gas turbine subject to the provisions of this rule shall perform the following actions:

- (1) For gas turbines 2.9 MW and larger (continuous rating by the manufacturer without power augmentation) located at a non-RECLAIM NO<sub>x</sub> facility, install, operate, and maintain in calibration a continuous in-stack NO<sub>x</sub> and oxygen monitoring system which meets the requirements of SCAQMD Rule 218 – Continuous Emission Monitoring to demonstrate compliance with the emission limits of this rule. This system shall include equipment that measures and records the following:
- (A) Flow rate of liquids or gases and the ratio of water or steam to fuel added to the combustion chamber or to the exhaust for the reduction of NO<sub>x</sub> emissions, as applicable;
  - (B) Elapsed time of operation; and
  - (C) Turbine output in MW.
- (2) Source Testing
- (A) The owner or operator of any existing gas turbine located at a non-RECLAIM NO<sub>x</sub> facility operating without a continuous emission monitoring system, shall provide source test information regarding the gas turbine's exhaust gas NO<sub>x</sub> concentration, and the demonstrated percent efficiency (EFF), or the manufacturer's rated EFF, if the Executive Officer determines that it is representative of the unit's EFF, and the carbon monoxide concentration as specified pursuant to paragraph (f)(1). NO<sub>x</sub> and carbon monoxide concentrations shall be in ppm by volume, corrected to 15 percent oxygen on a dry basis.
  - (B) The owner or operator of each stationary gas turbine with a catalytic control device shall conduct source testing pursuant to clause

- (e)(2)(C)(iii) or utilize an ammonia continuous emission monitoring system certified under an approved SCAQMD protocol to demonstrate compliance with the ammonia emission limit.
- (C) Source Test Frequency
- (i) The owner or operator of each stationary gas turbine operating without a continuous emission monitoring system and emitting 25 tons or more of NO<sub>x</sub> per calendar year shall perform source tests to demonstrate compliance with the NO<sub>x</sub> emission limits at least once every calendar year.
  - (ii) The owner or operator of each stationary gas turbine operating without a continuous emission monitoring system and emitting less than 25 tons shall perform source tests to demonstrate compliance with the NO<sub>x</sub> emission limits at least once every three calendar years.
  - (iii) The owner or operator of each stationary gas turbine with a catalytic control device not utilizing an ammonia continuous emission monitoring system shall conduct source tests quarterly to demonstrate compliance during the first twelve months of operation of the catalytic control device and every calendar year thereafter when four consecutive source tests demonstrate compliance with the ammonia emission limit. If a source test is failed, four consecutive quarterly source tests shall demonstrate compliance with the ammonia emissions limits prior to resuming source tests annually.
- (3) The owner or operator of each stationary gas turbine subject to Rule 1134 located at a RECLAIM NO<sub>x</sub> facility shall comply with SCAQMD Rule 2012 – Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NO<sub>x</sub>) Emissions to demonstrate compliance with the NO<sub>x</sub> emissions limits of this rule.
- (4) The owner or operator of each stationary gas turbine subject to Rule 1134 located at a former RECLAIM NO<sub>x</sub> facility shall conduct monitoring and recordkeeping pursuant to SCAQMD Rule 2012 – Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NO<sub>x</sub>) Emissions, excluding the following:
- (A) Rule 2012 paragraphs (c)(3) through (c)(8), reporting and Super Compliant facilities;

- (B) Rule 2012 subparagraphs (d)(2)(B) through (d)(2)(E), reporting and emission factors;
- (C) Rule 2012 subdivision (e), NO<sub>x</sub> Process Units;
- (D) Rule 2012 paragraphs (g)(5) through (g)(8), reporting;
- (E) Rule 2012 paragraphs (h)(1), (h)(2), and (h)(4) through (h)(6), reporting and mass emissions;
- (F) Rule 2012 subdivisions, (i), (k), and (l), Recordkeeping, Exemptions, and Appeals; and
- (G) Reported Data and Transmitting/Reporting Frequency requirements from Rule 2012 Appendix A – “Protocol for Monitoring, Reporting and Recordkeeping for Oxides of Nitrogen (NO<sub>x</sub>) Emissions.”

(f) Test Methods

The following may be used by the Executive Officer to verify the concentrations of NO<sub>x</sub>, ammonia, carbon monoxide (CO), and oxygen subject to the provisions of this rule. Emissions determined to exceed any limits established by this rule through either of the following shall constitute a violation of this rule.

- (1) SCAQMD Test Methods 3.1, 5.3, 7.1, 10.1, 100.1, and 207.1, and EPA Test Methods 10 and 17, or any method deemed to be equivalent by the Executive Officer and approved by CARB and EPA.
- (2) Data obtained from a continuous emissions monitoring system, which is installed and properly operated according to paragraph (e)(1) of this rule and as approved by the Executive Officer.
- (3) Emissions determined to exceed any limits established by this rule through the use of any of the above-referenced test methods shall constitute a violation of the rule.

(g) Recordkeeping

The owner or operator of a stationary gas turbine shall comply with the following provisions effective July 5, 2019:

- (1) All records shall be maintained at the facility for a period of two years and made available to SCAQMD staff upon request.
- (2) Maintain a gas turbine operating log that includes, on a daily basis, the actual start-up and shut-down times; total hours of operation; type and quantity of fuel used (liquid/gas); cumulative hours of operation to date for the calendar year.

- (3) Install, operate, and maintain a data acquisition system (DAS) to demonstrate compliance with the provisions subdivisions (d) and (h) of this rule.
- (4) The results of source tests shall be submitted to the SCAQMD in a form and manner as specified by the Executive Officer within 60 days after source testing is completed.
- (5) Any person using an emission control system as a means of complying with this rule shall maintain daily records of system operation and maintenance which will demonstrate continuous operation and compliance of the emission control device during periods of emission producing activities.

(h) Exemptions

The owner or operator seeking to qualify for any one of the following exemptions has the burden of proving their stationary gas turbine meets the applicable specified criteria.

- (1) All provisions of this rule shall not apply to the following:
  - (A) Laboratory gas turbines used in research and testing; and
  - (B) Gas turbines operated exclusively for firefighting and/or flood control.
- (2) Emergency Standby Gas Turbines
  - (A) The owner or operator of an emergency standby gas turbine shall not be subject to subdivisions (d) and (e), and paragraphs (g)(3), (g)(4), and (g)(5) for that turbine, provided that the owner or operator of the emergency standby gas turbine shall:
    - (i) Install and maintain in proper operation a non-resettable engine hour meter; and
    - (ii) Demonstrates less than 200 hours of operation per calendar year.
  - (B) If the hour-per-year limit is exceeded, the exemption shall be automatically and permanently withdrawn. The owner or operator of any stationary gas turbine exempt under subparagraph (h)(2)(A) shall:
    - (i) Notify the Executive Officer within seven days of the date the hour-per-year limit is exceeded; and
    - (ii) Within 30 days after the date the hour-per-year limit is exceeded, submit a permit application for modification to

equipment to meet the applicable compliance limit within 24 months of the date the hour-per-year limit is exceeded. Included with this permit application, the owner or operator shall submit an emission control plan including a schedule of increments of progress for the installation of the required control equipment. This plan and schedule shall be subject to the review and approval of the Executive Officer.

(3) Combined Cycle Gas Turbines

The owner or operator of a combined cycle gas turbine installed prior to April 5, 2019 shall not be subject to paragraph (d)(3) for that combined cycle gas turbine, provided that:

- (A) The SCAQMD permit to operate as of April 5, 2019 includes a condition limiting the NO<sub>x</sub> concentration to 2.5 ppmv NO<sub>x</sub> at 15% oxygen on a dry basis; and
- (B) The NO<sub>x</sub> and ammonia limits, averaging times, and start-up, shutdown, and tuning requirements specified on the SCAQMD permit to operate as of April 5, 2019 are retained.

(4) Low-Use

- (A) The owner or operator of a stationary gas turbine installed prior to April 5, 2019 shall not be subject to subdivision (d) for that stationary gas turbine, provided that:
  - (i) The stationary gas turbine maintains an annual capacity factor of less than twenty-five percent each calendar year;
  - (ii) The stationary gas turbine maintains an annual capacity factor of less than ten percent averaged over three consecutive calendar years on a rolling basis;
  - (iii) The stationary gas turbine retains the NO<sub>x</sub> and ammonia limits, averaging times, and start-up, shutdown, and tuning requirements specified on the SCAQMD permit to operate as of April 5, 2019;
  - (iv) The NO<sub>x</sub> limit shall not exceed 12 ppmv at 15% oxygen on a dry basis and the ammonia limit shall not exceed 10 ppmv at 15% oxygen on a dry basis; and
  - (v) The low-use exemption is a condition of the SCAQMD permit.

- (B) The owner or operator of a stationary gas turbine that elects the low-use exemption pursuant to subparagraph (h)(4)(A) shall submit permit applications for each stationary gas turbine requesting the change of SCAQMD permit conditions to incorporate the low-use exemption by July 1, 2022.
- (C) The owner or operator shall determine eligibility of the low-use exemption for each stationary gas turbine annually and report to the Executive Officer no later than March 1 following each reporting year.
- (D) If a stationary gas turbine with a low-use exemption pursuant to subparagraph (h)(4)(A) exceeds the annual or three-year average annual capacity factor limit, such an exceedance shall be a violation of this rule and the owner or operator of that stationary gas turbine is subject to issuance of a notice of violation each year there is an exceedance for each annual and/or three-year exceedance. The owner or operator of that stationary gas turbine shall:
  - (i) Submit complete SCAQMD permit applications to repower, retrofit, or retire that stationary gas turbine within six months from the date of the reported exceedance of subparagraph (h)(4)(A);
  - (ii) Submit a CEMS Plan within six months from the date of complete SCAQMD permit application submittal pursuant to clause (h)(4)(D)(i); and
  - (iii) Not operate that stationary gas turbine in a manner that exceeds the emissions limits listed in Table I after two years from the date of the reported exceedance of subparagraph (h)(4)(A).
- (5) The ammonia limits in Table 1 and ammonia source testing requirements of clause (e)(2)(C)(iii) shall not apply to turbines that do not use selective catalytic reduction or other processes that add ammonia into the exhaust gas.