

**REGULATION 9
INORGANIC GASEOUS POLLUTANTS
RULE 9
NITROGEN OXIDES FROM STATIONARY
GAS TURBINES**

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**REGULATION 9
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GAS TURBINES**

(Adopted May 5, 1993)

9-9-100 GENERAL

9-9-101 Description: The purpose of this Rule is to limit emissions of nitrogen oxides (NO_x) from stationary gas turbines.

9-9-110 Exemption, Small Gas Turbines: This Rule shall not apply to stationary gas turbines with a heat input rating less than 5 MM Btu/hr.

(Amended December 6, 2006)

9-9-111 Exemption, General: The requirements of this Rule shall not apply to:

111.1 Testing of aircraft gas turbine engines for flight certification.

111.2 Gas turbines used solely for firefighting and/or flood control.

111.3 Deleted December 6, 2006

(Amended December 6, 2006)

9-9-112 Limited Exemption, Low Usage: The requirements of this Rule shall not apply to the operation of gas turbines rated less than 50 MM Btu/hr heat input that operate less than 877 hours in any 12-month period, provided the requirements of Section 9-9-502 are satisfied.

(Amended December 6, 2006)

9-9-113 Exemption, Inspection and Maintenance Periods: The emission limits of Section 9-9-301 shall not apply during inspection and maintenance periods, with the following limitations:

113.1 Inspection and maintenance periods shall be limited to a total of 48 hours between May 1 and October 31 in a calendar year.

113.2 For a calendar year in which a boiler inspection required by California Labor Code Section 7682 is not performed, inspection and maintenance periods shall be limited to a total of 144 hours.

113.3 For a calendar year in which a boiler inspection required by California Labor Code Section 7682 is performed, inspection and maintenance periods shall be limited to 144 hours plus additional time required for the boiler inspection, provided, however, that the additional time shall not cause the calendar-year total of all inspection and maintenance periods to exceed 312 hours.

(Adopted 9/21/94; Amended 12/6/06)

9-9-114 Exemption, Start-up and Shutdown Periods: The emission limits of Sections 9-9-301 and 302 shall not apply during start-up or shutdown periods.

(Adopted 9/21/94; Amended 12/6/06)

9-9-115 Limited Exemption, Minor Inspection and Maintenance Work: The requirements of Section 9-9-301 shall not apply during periods of inspection and maintenance work on a gas turbine or associated components, not to exceed 4 hours on any day and 48 hours in any 12-month period, that are planned and scheduled at least 24 hours in advance. The operator shall keep records of these planned inspection and maintenance events and make them available to the APCO on request. This exemption shall not apply to low-usage turbines subject to Section 9-9-302. Any annual emissions limit required by permit condition shall include emissions resulting from this minor inspection and maintenance work.

(Adopted December 6, 2006)

9-9-116 Limited Exemption, Very Limited Use Turbines: The emission limits in Section 9-9-302.2 shall not apply to turbines that operate less than 1200 hours between January 1, 2007 and January 1, 2010, and do not operate more than 400 hours during any 12-month period after January 1, 2010, provided the requirements in Section 9-9-502 are met. Turbines that initially qualify for this limited exemption based on the number of hours of operation between January 1, 2007 and January 1, 2010, but operate more than 400 hours per 12-month period after January 1, 2010,

shall continue to comply with the emission limits in 9-9-302.2 subject to the compliance schedule set forth in Section 9-9-405. This limited exemption does not apply to the emission limits in Section 9-9-302.1.

(Adopted December 6, 2006)

9-9-120 Interchangeable Emission Reduction Credits: Until such time as the December 6, 2006 amendments to this rule are approved into the State Implementation Plan by the EPA, the emission limits of Sections 9-9-301.2 and 9-9-302.2 may be complied with by interchangeable emission reduction credits used pursuant to and as limited by the provisions of Regulation 2, Rule 9. An operator must still comply with the emission limits of Sections 9-9-301.1 and 9-9-302.1 without using interchangeable emission reduction credits.

(Adopted December 6, 2006)

9-9-200 DEFINITIONS

9-9-201 Commercially Available: Any control technology or equipment that is offered for a specific make and model of gas turbine by at least one vendor, is guaranteed by the vendor to achieve the emission control performance required by this Rule, has been demonstrated in practice at 3 or more sites, achieves the required emission control performance utilizing similar fuel composition for a regular or full-scale operation within the United States, and demonstrates at least 90% availability.

(Adopted December 6, 2006)

9-9-202 Dry Low-NOx Combustion Technology (DLN): A turbine combustor design that uses multiple staging, air/fuel premixing or other modifications to achieve lower levels of NOx emissions as compared to conventional combustors.

(Adopted December 6, 2006)

9-9-203 EFF: Thermal efficiency.

(Renumbered December 6, 2006)

9-9-204 Emergency Use: Operation during a natural or civil disaster or emergency situation, as requested or ordered by any federal, state or local agency to protect the public, life or property.

(Adopted December 6, 2006)

9-9-205 Essential Gas Turbine: A gas turbine that cannot be taken out of service without shutting down the process unit which it serves.

(Adopted 9/21/94; Amended, Renumbered 12/6/06)

9-9-206 Heat Input Rating: The heat input requirement (based on fuel HHV) of a gas turbine at its International Standards Organization (ISO) 3977 nameplate rated power output at standard conditions of 1 atmosphere, 15° Centigrade, and 60% atmospheric humidity.

(Adopted December 6, 2006)

9-9-207 HHV: The higher heating value of fuel.

(Renumbered 9/21/94; 12/6/06)

9-9-208 LHV: The lower heating value of fuel.

(Renumbered 9/21/94; 12/6/06)

9-9-209 Inspection and Maintenance Period: A period of time during which the heat recovery steam generator associated with an essential gas turbine is taken out of service for inspection or maintenance, and during which gas turbine emissions are vented to a bypass stack rather than through the heat recovery steam generator.

(Adopted 9/21/94; Amended, Renumbered 12/6/06)

9-9-210 Natural Gas: Any mixture of gaseous hydrocarbons containing at least 80 percent methane by volume, as determined according to Standard Method ASTM D1945.

(Adopted 9/21/94; Amended, Renumbered 12/6/06)

9-9-211 Nitrogen Oxide (NOx) Emissions: The sum of nitric oxide and nitrogen dioxide (NO₂) in the flue gas, collectively expressed as nitrogen dioxide.

(Adopted 9/21/94; Renumbered 12/6/06)

9-9-212 Non-Gaseous Fuel: Any fuel which is not a gas at 68° F and one atmosphere.

(Adopted 9/21/94; Renumbered 12/6/06)

9-9-213 Power Augmentation: An increase in the gas turbine shaft output or the decrease in turbine fuel consumption by the addition of energy recovered from exhaust heat.

(Renumbered 9/21/94; 12/6/06)

- 9-9-214 Power Output Rating:** The continuous megawatt (MW) rating or mechanical equivalent by a manufacturer for gas turbine(s) without power augmentation.
(Renumbered 9/21/94; Amended, Renumbered 12/6/06)
- 9-9-215 Refinery Fuel Gas:** A mixture of hydrogen and gaseous hydrocarbons generated by petroleum refinery processes and used by the refinery for on-site combustion in boilers, process heaters, turbines, and other combustion equipment.
(Adopted 9/21/94; Renumbered 12/6/06)
- 9-9-216 Selective Catalytic Reduction (SCR):** A post-combustion NO_x control technique in which a reducing agent (for example: ammonia) is used in a gas-phase reaction with oxides of nitrogen in the presence of a catalyst to convert the oxides of nitrogen into nitrogen and water.
(Renumbered 9/21/94; Amended, Renumbered 12/6/06)
- 9-9-217 Shutdown Period:** A period of time, not to exceed two hours, during which a gas turbine is brought from normal operating power output to inactive status.
(Adopted 9/21/94; Amended, Renumbered 12/6/06)
- 9-9-218 Start-up Period:** A period of time, not to exceed four hours (six hours for cold steam turbine starts at combined cycle facilities), during which a gas turbine is brought from inactive status to normal operating power output.
(Amended 9/21/94; Amended, Renumbered 12/6/06)
- 9-9-219 Stationary Gas Turbine:** Any gas turbine system that is attached to a foundation and is gas and/or liquid fueled with or without power augmentation. Two or more gas turbines powering one shaft shall be treated as one unit.
(Renumbered 9/21/94; Amended, Renumbered 12/6/06)
- 9-9-220 Waste Gas:** A mixture of hydrogen, gaseous hydrocarbons and other diluent gases generated by sewage treatment or landfill biomass and used by the facility for on-site combustion in gas turbines or other combustion equipment.
(Adopted December 6, 2006)
- 9-9-221 Water Injection / Steam Injection Enhancement:** A retrofit design improvement to water or steam injection location, orientation, or turbine combustor or other modifications to achieve lower levels of NO_x emissions as compared to existing water or steam injection design.
(Adopted December 6, 2006)

9-9-300 STANDARDS

9-9-301 Emission Limits, General:

- 301.1 A person shall not operate a stationary gas turbine unless nitrogen oxides (NO_x) emission concentrations, corrected to 15 percent O₂ (dry basis), do not exceed the compliance limits listed below:
- 301.1.1 Gas turbines rated at 0.3 MW to less than 10.0 MW shall not exceed 42 ppmv, except that, for refinery fuel gas firing, the limit shall be 55 ppmv, and for non-gaseous fuel firing during natural gas curtailment or short testing periods, the limit shall be 65 ppmv.
- 301.1.2 Gas turbines rated at 10.0 MW and over, without SCR, shall not exceed 15 ppmv, except that, for non-gaseous fuel firing during natural gas curtailment or short testing periods, the limit shall be 42 ppmv.
- 301.1.3 Gas Turbines rated at 10.0 MW and over, with SCR, shall not exceed 9 ppmv, except that, for non-gaseous fuel firing during natural gas curtailment or short testing periods, the limit shall be 25 ppmv.
- 301.2 Effective January 1, 2010, a person shall not operate a stationary gas turbine unless nitrogen oxides (NO_x) emissions, corrected to 15 percent O₂ (dry basis), are less than either of the alternative compliance limits listed below for the turbine heat input rating and type of fuel burned:

Turbine Heat Input Rating	Natural Gas	Refinery Fuel Gas, Waste Gas or LPG	Non-gaseous Fuel
< 5 MM Btu/hr	Exempt	Exempt	Exempt

Turbine Heat Input Rating	Natural Gas	Refinery Fuel Gas, Waste Gas or LPG	Non-gaseous Fuel
5 - 50 MM Btu/hr	2.12 lbs/MW hr or 42 ppmv	2.53 lbs/MW hr or 50 ppmv	3.28 lbs/MW hr or 65 ppmv
> 50 – 150 MM Btu/hr - no retrofit available ^(a)	1.97 lbs/MW hr or 42 ppmv	2.34 lbs/MW hr or 50 ppmv	3.04 lbs/MW hr or 65 ppmv
> 50 – 150 MM Btu/hr - WI/SI enhancement available ^(b)	1.64 lbs/MW hr or 35 ppmv	2.34 lbs/MW hr or 50 ppmv	3.04 lbs/MW hr or 65 ppmv
> 50 – 150 MM Btu/hr - DLN technology available ^(c)	1.17 lbs/MW hr or 25 ppmv	2.34 lbs/MW hr or 50 ppmv	3.04 lbs/MW hr or 65 ppmv
> 150 – 250 MM Btu/hr	0.70 lbs/MW hr or 15 ppmv	0.70 lbs/MW hr or 15 ppmv	1.97 lbs/MW hr or 42 ppmv
> 250 – 500 MM Btu/hr	0.43 lbs/MW hr or 9 ppmv	0.43 lbs/MW hr or 9 ppmv	1.17 lbs/MW hr or 25 ppmv
> 500 MM Btu/hr	0.15 lbs/MW hr or 5 ppmv	0.26 lbs/MW hr or 9 ppmv	0.72 lbs/MW hr or 25 ppmv

- (a) The emission limits on this line apply to turbines for which no Water Injection or Steam Injection enhancement or DLN combustion technology is commercially available.
- (b) The emission limits on this line apply to turbines for which Water Injection or Steam Injection enhancement is commercially available.
- (c) The emission limits on this line apply to turbines for which DLN combustion technology is commercially available and which have not been required to install Water Injection or Steam Injection enhancements to comply with this Section 301.2.

- 301.3 If a turbine burns a mixture of fuels, the turbine's NOx emission limit shall be the highest of the limits applicable to any of the fuels in the mixture.
- 301.4 Violation of either of the alternative standards in Section 301.2 applicable to a particular turbine shall create a rebuttable presumption that the turbine is in violation of Section 301.2. The operator of the turbine may rebut the presumption of violation by demonstrating that the turbine is in compliance with the other alternative standard.

(Amended 9/21/94; 12/6/06)

9-9-302 Emission Limits, Low Usage:

- 302.1 Until January 1, 2010, or other date provided under a compliance schedule pursuant to Section 9-9-402.2, a person may operate a stationary gas turbine for up to 877 hours in any 12-month period (not counting hours of emergency use) without complying with the emission limits Section 9-9-301 as long as nitrogen oxides (NOx) emission concentrations, corrected to 15 percent O₂ (dry basis), do not exceed 42 ppmv when firing with natural gas and 65 ppmv when firing with non-gaseous fuel, and the requirements of Section 9-9-502 are satisfied.
- 302.2 Effective January 1, 2010, a person may operate a stationary gas turbine rated at 50 MMBtu/hr or greater for up to 877 hours in any 12-month period (not counting hours of emergency use) without complying with the emission limits set forth in Section 9-9-301 as long as nitrogen oxides (NOx) emissions, corrected to 15 percent O₂ (dry basis), are less than either of the of the alternative limits listed below for the turbine's heat input rating and the type of fuel burned, and the requirements of Section 9-9-502 are satisfied:

Turbine Heat Input Rating	Natural Gas	Refinery Fuel Gas, Waste Gas or LPG	Non-gaseous Fuel
< 50 MMBtu/hr	Exempt	Exempt	Exempt
50 – 150 MMBtu/hr (3 – 10 MW)	1.97 lbs/MW hr or 42 ppmv	N/A	3.04 lbs/MW hr or 65 ppmv

Turbine Heat Input Rating	Natural Gas	Refinery Fuel Gas, Waste Gas or LPG	Non-gaseous Fuel
> 150 – 250 MMBtu/hr (10 – 19 MW)	1.97 lbs/MW hr or 42 ppmv	N/A	3.04 lbs/MW hr or 65 ppmv
> 250 – 500 MMBtu/hr (19 – 40 MW)	1.17 lbs/MW hr or 25 ppmv	N/A	1.97 lbs/MW hr or 42 ppmv
> 500 MMBtu/hr (40+ MW)	0.72 lbs/MW hr or 25 ppmv	N/A	1.21 lbs/MW hr or 42 ppmv

302.3 If a turbine burns a mixture of fuels, the turbine's NOx emission limit shall be the highest of the limits applicable to any of the fuels in the mixture.

302.4 Violation of either of the alternative standards in Section 302.2 applicable to a particular turbine shall create a rebuttable presumption that the turbine is in violation of Section 302.2. The operator of the turbine may rebut the presumption of violation by demonstrating that the turbine is in compliance with the other alternative standard.

(Amended 9/21/94; 12/6/06)

9-9-303 Deleted December 6, 2006

9-9-304 Deleted December 6, 2006

9-9-305 Deleted December 6, 2006

9-9-400 ADMINISTRATIVE REQUIREMENTS

9-9-401 Certification, Efficiency: If a person who operates a gas turbine subject to the limits of subsections 9-9-301.1.2 or 301.1.3 can demonstrate a thermal efficiency (EFF) greater than 25 percent in accordance with subsections 401.2.1 or 401.2.2, the emissions limit may be adjusted in accordance with Section 9-9-401.1.

$$401.1 \text{ Adjusted Emission Limit} = \frac{\text{Emission Limit} \times \text{EFF}}{25}$$

401.2 EFF (percent efficiency) is the higher of 2.1 or 2.2. An EFF that is less than 25% shall be assigned a value of 25%.

$$2.1 \text{ EFF} = \frac{3412 \times 100\%}{\text{Actual Heat Rate at HHV of Fuel} \times \frac{\text{BTU}}{\text{KW} - \text{HR}}}$$

which is the demonstrated percent efficiency of the gas turbine only as calculated without consideration of any downstream energy recovery (not used for power augmentation) from the actual heat rate, (BTU/KW-HR) or 1.34 (BTU/HP-HR); corrected to the HHV (higher heating value) of the fuel and standard conditions, as measured at peak load for that facility.

or

$$2.2 \text{ EFF} = \text{Manufacturer's Rated Efficiency} * \times \frac{\text{LHV}}{\text{HHV}}$$

*With Air Pollution Equipment at LHV

which is the manufacturer's continuous rated percent efficiency of the gas turbine with air pollution equipment after correction from LHV to HHV of the fuel.

(Amended 9/21/94; 12/6/06)

9-9-402 Compliance Schedule:

402.1 A person who must modify existing sources or install new control equipment to meet the requirements of Section 9-9-301.2 or 302.2 shall submit an application for any Authority to Construct for the modification or installation of new control equipment by July 1, 2008, or by the date required pursuant to Section 9-9-404.3.

402.2 Any turbine subject to Sections 9-9-301.2 or 9-9-302.2 shall comply with the applicable emission limits set forth in those sections by January 1, 2010, or by the date required pursuant to Section 9-9-404.3, unless the turbine has not had a scheduled major maintenance outage by January 1, 2010, in which case the turbine shall comply with the applicable emission limits 30 days after the end of the next scheduled major maintenance outage, but in no event later than January 1, 2012.

(Amended December 6, 2006)

9-9-403 Deleted December 6, 2006

9-9-404 Compliance Schedule for Future Commercial Availability of Retrofit Technology: If water injection or steam injection enhancement retrofits or Dry Low NOx combustion technology become commercially available for a specific make and model of turbine after December 31, 2006, subjecting operators of that make and model of turbine to lower NOx emissions limits pursuant to Section 9-9-301.2, affected operators shall comply with Section 9-9-301.2 according to the following schedule.

404.1 Upon determining that water injection or steam injection enhancement retrofits or Dry Low NOx combustion technology are commercially available for a specific make and model of turbine, the APCO shall notify all operators of that make and model, in writing, of the commercial availability of the technology.

404.2 If any affected operator disagrees that the technology is commercially available for its turbine, as that term is defined in Section 9-9-201, the operator may object to the APCO in writing within 90 days of such notification. Within 30 days after receiving an objection, the APCO may amend the determination of commercial availability for the turbine for which the objection is made. If no objection is made for a particular turbine, or an objection is made and the APCO does not change the determination of commercial availability, the technology shall be deemed commercially available for that turbine. The APCO shall conduct a cost-effectiveness analysis prior to making a final determination of commercial availability.

404.3 Any affected operator that must install new equipment or modify its operation in a manner that requires a permit amendment in order to comply with the applicable NOx emissions limit in Section 9-9-301.2 shall (i) submit an application for Authority to Construct to install the new equipment or modify its operation within 18 months of the date of the initial notification from the APCO of the commercial availability, and (ii) comply with the more stringent emission standards associated with the commercially available technology within 36 months of the date of the initial notification, or 30 days after the end of the next scheduled major maintenance outage if no such outage is scheduled within 36 months of the date of the initial notification, but in no event more than 60 months after the date of initial notification.

404.4 If an affected operator can comply the applicable NOx emissions limit in Section 9-9-301.2 without having to install new equipment or modify its operation in a manner that requires a permit amendment, the operator shall (i) so inform the APCO in writing within 90 days of the date of the initial notification from the APCO of the commercial availability, and (ii) comply with the more stringent emission standards associated with the commercially available technology within 30 days thereafter.

(Adopted December 6, 2006)

9-9-405 Notification and Compliance Schedule, Very Limited Use Turbines: If a gas turbine exceeds 400 hours of operation in any 12-month period and is not compliant with the emission limits in Section 9-9-302.2, the operator must notify the APCO of that fact and must provide its best estimates for future operation of the turbine. Based on a review of these estimates, if the APCO determines that the turbine will likely continue to be operated at a rate exceeding 400 hours per 12-month period in the future, the APCO will provide written notice of that determination to the operator. If the APCO determines that the turbine will be operated at a rate exceeding 400 hours in the future, the turbine shall comply with the emission limits in Section 9-9-

302.2. If the operator will have to modify existing sources or install new control equipment to meet the emission limits in Section 9-9-302.2, the operator shall submit an application for Authority to Construct the modification or installation of new control equipment within 18 months of such notification, and shall comply with the emission limits in Section 9-9-302.2 within 36 months of such notification, or 30 days after the end of the next scheduled major maintenance outage if no such outage is scheduled within 36 months of the date of the initial notification, but in no event more than 60 months after the date of initial notification. The limited exemption in Section 9-9-115 shall cease to apply if the turbine violates this compliance schedule.

(Adopted December 6, 2006)

9-9-406 Other Useful Heat Recovery: Any operator who wishes to get credit for other useful heat recovery for their gas turbines shall propose a calculation method to determine Po, as used in Section 9-9-605. This calculation method shall be subject to approval by the APCO.

(Adopted December 6, 2006)

9-9-500 MONITORING AND RECORDS

9-9-501 Monitoring and Recordkeeping Requirements: A person who operates any stationary gas turbine with a heat input rating equal to or greater than 150 MMBtu/hr for more than 4000 hours in any 36-month period shall install, operate and maintain in calibration a continuous emissions monitor (CEM), or alternative monitoring system, capable of determining exhaust gas NO_x concentrations. A CEM must meet the requirements of the District Manual of Procedures, Volume V. Any operator choosing to demonstrate compliance with Section 9-9-301.2 or 9-9-302.2 using the output-based NO_x limits expressed in lbs/MWhr must also monitor and record fuel consumption by the gas turbine and any supplemental duct burners, electrical and mechanical output from both combustion and steam turbines, any steam production flow rates and steam enthalpy. Any alternative monitoring system must be approved by the APCO. Such approval will only be granted upon a determination, pursuant to the criteria of 40 CFR Part 75, Subpart E, that the alternative monitoring system provides information with the same precision, reliability, accessibility, and timeliness as that provided by a CEM for the source.

(Amended 9/21/94; 12/6/06)

9-9-502 Records, Low Usage: A person claiming to be exempt from Section 9-9-301 based on the number of hours of turbine operation, or seeking exemption per Sections 9-9-112 or 9-9-116 of this Rule, shall maintain a daily gas turbine operating record that includes the actual start-up and stop time, total hours of operation, and type (liquid or gas) and quantity of fuel used. This information shall be available to District staff upon request for at least two years from the date of entry.

(Amended December 6, 2006)

9-9-503 Initial Demonstration of Compliance: A person who must modify existing sources or install new control equipment shall conduct a District approved source test to demonstrate compliance with 9-9-301.2 or 302.2, and submit the results to the District within two months of initial operation of the new or modified equipment.

(Amended 9/21/94; 12/6/06)

9-9-504 Annual Demonstration of Compliance: The operator of any turbine subject to this Rule that operates more than 400 hours in any 12-month period and is not equipped with a Continuous Emissions Monitor shall conduct a District-approved source test of the turbine at least once per calendar year, and at intervals not to exceed 15 months between tests, and shall submit the test results to the District within two months of the test date. The operator of any turbine that operates 400 hours or less in any 12-month period shall conduct a District-approved source test of the turbine every two calendar years, at a rate not to exceed 25 months.

(Adopted December 6, 2006)

9-9-600 MANUAL OF PROCEDURES

9-9-601 Determination of Emissions: Source tests for determining compliance with the NOx emissions standards of this rule as specified in Sections 9-9-301 and 302 shall be conducted as prescribed in the District Manual of Procedures, Volume IV, ST-13A.

(Amended 9/21/94; 12/6/06)

9-9-602 Determination of Stack Gas Oxygen: Oxygen content of the exhaust gas shall be determined by using District Manual of Procedures, Volume IV, ST-14.

9-9-603 Continuous Emission Monitoring: Continuous Emissions Monitoring (CEM) procedures shall be determined using District Manual of Procedures, Volume V. For purposes of determining compliance with the NOx emissions standards of this rule, NOx emissions shall be calculated as the three hour average NOx emissions corrected to 15 percent O₂ (dry basis). Results of source tests conducted as prescribed in the District Manual of Procedures shall be deemed to be representative of three-hour average NOx emissions.

(Amended December 6, 2006)

9-9-604 Determination of HHV and LHV: The HHV and LHV shall be determined using 1) ASTM D240-87 or ASTM D2382-88 ASTM D4809 for liquid hydrocarbon fuel; or 2) ASTM 1826-88 or ASTM 1945-81 in conjunction with ASTM D3588-89 for gaseous fuels.

(Amended December 6, 2006)

9-9-605 Compliance With Output Based NOx Emissions Standards: For purposes of complying with the emissions standards in Section 9-9-301.2 and 9-9-302.2, emission rates expressed in lbs/MWhr shall be calculated in accordance with the following equations:

$$E = \frac{1.194 \times 10^{-7} * (NOx)_c * Q_{std}}{(Pe)_t + (Pe)_c + P_s + P_o}$$

E = hourly NOx emission rate, in lb/MWh

(NOx)_c = Average NOx concentration, in ppmv adjusted to 15% O₂

Q_{std} – stack gas volumetric flow rate, in dry scf/hr

(Pe)_t = electrical or mechanical energy output of the combustion turbine in MW

(Pe)_c = Electrical or mechanical energy output of the steam turbine (if any) in MW

P_s = useful thermal energy of steam production

P_o = other useful heat recovery.

$$P_s = \frac{Q * H}{3.413 \times 10^6 \text{ Btu} / \text{MWh}}$$

Q = measured steam flowrate in lb/hr.

H = enthalpy of the steam at measured temperature and pressure in Btu/lb.

(Adopted December 6, 2006)