

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

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**REGULATION 9
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NITROGEN OXIDES FROM STATIONARY
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 power rating heat rate less than 5 MMBtu/hr. ~~0.3 megawatts (MW).~~

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 Emergency standby gas turbines excluded under Regulation 1-110.2~~

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 MMBtu/hr. heat input ~~4.0 MW~~ which that operate less than 877 hours per year, provided the requirements of Section 9-9-502 are satisfied.

9-9-113 Exemption, Inspection and Maintenance Periods: The emission limits of Sections 9-9-301, ~~303, and 304~~ 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 September 21, 1994)

9-9-114 Exemption, Start-up and Shutdown Periods: The emission limits of Sections 9-9-301, and 302, 303, 304, and 305 shall not apply during start-up or shutdown periods.

(Adopted September 21, 1994)

9-9-120 Interchangeable Emission Reduction Credits: Until such time as the (date of adoption) amendments to this rule, or later version, are approved into the State Implementation Plan by the EPA, the provisions 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 provisions of Sections 9-9-301.1 and 9-9-302.1 without using interchangeable emission reduction credits.

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, and has been demonstrated in practice to achieve the required emission control performance utilizing similar fuel composition for a regular or full-scale operation within the United States.

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.

~~9-9-201 EFF: Thermal efficiency.~~

- 9-9-2023 Essential Gas Turbine:** A gas turbine ~~which~~ that cannot be taken out of service without shutting down the process unit which it serves.
(Adopted September 21, 1994)
- ~~9-9-203 HHV:~~ The higher heating value of fuel.
(Renumbered September 21, 1994)
- ~~9-9-204 LHV:~~ The lower heating value of fuel.
(Renumbered September 21, 1994)
- 9-9-2054 Inspection and Maintenance Period:** A period of time during which the ~~boiler~~ 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. ~~boiler to the SCR unit.~~
(Adopted September 21, 1994)
- 9-9-2065 Natural Gas:** Any mixture of gaseous hydrocarbons containing at least 80 percent methane by volume, as determined according to Standard Method ASTM D1945-64.
(Adopted September 21, 1994)
- 9-9-2076 Nitrogen Oxide (NOx) Emissions:** The sum of nitric oxide and nitrogen dioxide (NO₂) in the flue gas, collectively expressed as nitrogen dioxide.
(Adopted September 21, 1994)
- 9-9-2087 Non-Gaseous Fuel:** Any fuel which is not a gas at 68° F and one atmosphere.
(Adopted September 21, 1994)
- 9-9-2098 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 September 21, 1994)
- 9-9-2409 Rating:** The continuous megawatt (MW) rating or mechanical equivalent by a manufacturer for gas turbine(s) without power augmentation.
(Renumbered September 21, 1994)
- 9-9-2140 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 September 21, 1994)
- 9-9-2121 Selective Catalytic Reduction (SCR):** ~~Selective Catalytic Reduction~~ A post-combustion NOx 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 September 21, 1994)
- 9-9-2132 Shutdown Period:** A period of time, not to exceed ~~one~~ two hours, during which a gas turbine is brought from normal operating power output to inactive status.
(Adopted September 21, 1994)
- 9-9-2143 Start-up Period:** A period of time, not to exceed ~~three~~ four hours, during which a gas turbine is brought from inactive status to normal operating power output.
(Amended September 21, 1994)
- 9-9-2154 Stationary Gas Turbine:** Any gas turbine system which 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 September 21, 1994)
- 9-9-215 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, and other combustion equipment.
- 9-9-216 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 NOx emissions as compared to existing water or steam injection design.

9-9-300 STANDARDS

9-9-301 Emission Limits, General:

301.1 Except as provided by Sections 9-9-302, ~~9-9-303, 9-9-305, or 9-9-401,~~ effective January 1, 1997, a person shall not operate a stationary gas turbine unless nitrogen oxides (NOx) emission concentrations, corrected to 15 percent O₂ (dry basis), do not exceed the compliance limit 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, or 30 days after the end of the next scheduled major maintenance outage if no such outage is scheduled before January 1, 2010, but no later than January 1, 2012, 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 rate and type of fuel burned:

<u>Turbine Heat Rate</u>	<u>Natural Gas</u>	<u>Refinery Fuel Gas, Waste Gas or LPG</u>	<u>Non-gaseous Fuel</u>
< 5 MMBtu/hr	<u>Exempt</u>	<u>Exempt</u>	<u>Exempt</u>
5 - 50 MMBtu/hr	<u>2.12 lbs/MW/hr or 42 ppmv</u>	<u>2.53 lbs/MW/hr or 50 ppmv</u>	<u>3.28 lbs/MW/hr or 65 ppmv</u>
> 50 – 140 MMBtu/hr - no retrofit available*	<u>1.97 lbs/MW/hr or 42 ppmv</u>	<u>2.34 lbs/MW/hr or 50 ppmv</u>	<u>3.04 lbs/MW/hr or 65 ppmv</u>
> 50 – 140 MMBtu/hr - WI/SI enhancement available **	<u>1.64 lbs/MW/hr or 35 ppmv</u>	<u>2.34 lbs/MW/hr or 50 ppmv</u>	<u>3.04 lbs/MW/hr or 65 ppmv</u>
> 50 – 140 MMBtu/hr - DLN technology available ***	<u>1.17 lbs/MW/hr or 25 ppmv</u>	<u>2.34 lbs/MW/hr or 50 ppmv</u>	<u>3.04 lbs/MW/hr or 65 ppmv</u>
> 140 – 250 MMBtu/hr	<u>0.70 lbs/MW/hr or 15 ppmv</u>	<u>0.70 lbs/MW/hr or 15 ppmv</u>	<u>1.97 lbs/MW/hr or 42 ppmv</u>
> 250 – 500 MMBtu/hr	<u>0.43 lbs/MW/hr or 9 ppmv</u>	<u>0.43 lbs/MW/hr or 9 ppmv</u>	<u>1.17 lbs/MW/hr or 25 ppmv</u>
> 500 MMBtu/hr	<u>0.15 lbs/MW/hr or 5 ppmv</u>	<u>0.26 lbs/MW/hr or 9 ppmv</u>	<u>0.72 lbs/MW/hr or 25 ppmv</u>

*The standards on this line apply to gas turbines for which no Water Injection / Steam Injection enhancement, or DLN combustion technology is commercially available.

**The standards on this line apply to gas turbines for which Water Injection / Steam Injection enhancement is commercially available.

***The standards on this line apply to gas turbines for which DLN combustion technology is commercially available.

Note: Output based emission limits based on 25% thermal efficiency for gas turbines with heat rate of 50 MMBtu/hr. or less; 27% thermal efficiency for gas turbines with heat rate of more than 50 to 500 MMBtu/hr.; and 44% thermal efficiency for gas turbines with heat rate of greater than 500 MMBtu/hr.

(Amended September 21, 1994)

9-9-302 Emission Limits, Low Usage:

- 302.1 Effective January 1, 1997, a person shall not operate a stationary gas turbine rated at 4.0 MW or greater and operating less than 877 hours per year unless nitrogen oxides (NO_x) 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 provided the requirements of Section 9-9-502 are satisfied.

(Amended September 21, 1994)

- 302.2 Effective January 1, 2010, or 30 days after the end of the next scheduled major maintenance outage if no such outage is scheduled before January 1, 2010, but no later than January 1, 2012, a person shall not operate a stationary gas turbine rated at 50 MMBtu/hr. or greater and operating more than 400 hours but less than 877 hours per year unless nitrogen oxides (NO_x) emissions, corrected to 15 percent O₂

(dry basis), are less than either of the of the alternative limits listed below for the turbines heat rate and the type of fuel burned, and provided the requirements of Section 9-9-502 are satisfied:

<u>Turbine Heat Rate</u>	<u>Natural Gas</u>	<u>Refinery Fuel Gas, Waste Gas or LPG</u>	<u>Non-gaseous Fuel</u>
<u>< 50 MMBtu/hr</u>	<u>Exempt</u>	<u>Exempt</u>	<u>Exempt</u>
<u>50 – 140 MMBtu/hr (3 – 10 MW)</u>	<u>1.97 lbs/MWhr or 42 ppmv</u>	<u>N/A</u>	<u>3.04 lbs/MWhr or 65 ppmv</u>
<u>> 140 – 250 MMBtu/hr (10 – 19 MW)</u>	<u>1.97 lbs/MWhr or 42 ppmv</u>	<u>N/A</u>	<u>3.04 lbs/MWhr or 65 ppmv</u>
<u>> 250 – 500 MMBtu/hr (19 – 40 MW)</u>	<u>1.17 lbs/MWhr or 25 ppmv</u>	<u>N/A</u>	<u>1.97 lbs/MWhr or 42 ppmv</u>
<u>> 500 MMBtu/hr (40+ MW)</u>	<u>0.72 lbs/MWhr or 25 ppmv</u>	<u>N/A</u>	<u>1.21 lbs/MWhr or 42 ppmv</u>

Note: Output based emission limits based on 25% thermal efficiency for gas turbines with heat rate of 50 MMBtu/hr. or less; 27% thermal efficiency for gas turbines with heat rate of more than 50 to 500 MMBtu/hr.; and 44% thermal efficiency for gas turbines with heat rate of greater than 500 MMBtu/hr.

~~9-9-303 Emission Limits, Alternative Schedule: A person operating a stationary gas turbine rated at 10 MW to less than 30MW, without SCR, which is otherwise subject to Section 9-9-301.2, may comply with both of the following emission limitations instead of complying with Section 9-9-301.2:~~

~~303.1 Effective January 1, 1996, a person shall not operate such a stationary gas turbine unless nitrogen oxides (NOx) emission concentrations, corrected to 15 percent O₂ (dry basis), do not exceed 25 ppmv, except that, for non-gaseous fuel firing during natural gas curtailment or short testing periods, the limit shall be 42 ppmv.~~

~~303.2 Effective January 1, 2000, a person shall not operate such a stationary gas turbine unless nitrogen oxides (NOx) emission concentrations, corrected to 15 percent O₂ (dry basis), do 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.~~

(Adopted September 21, 1994)

~~9-9-304 Emission Limits, Interim RACT: Effective May 31, 1995, a person shall not operate a stationary gas turbine rated at 30 MW or greater and operating 877 hours per year or more unless nitrogen oxides (NOx) emission concentrations, corrected to 15 percent O₂ (dry basis), do not exceed 42 ppmv when firing with natural gas or 65 ppmv when firing with non-gaseous fuels.~~

(Adopted September 21, 1994)

~~9-9-305 Emission Limits, Existing Low-NOx Turbines: Effective January 1, 1997, a person shall not operate a stationary gas turbine which 1) received a permit to operate prior to May 5, 1993, 2) was required to comply with Best Available Control Technology provisions limiting NOx emissions to 25 ppm or below, and 3) used a technology other than SCR to comply with that limit unless nitrogen oxides (NOx) emissions, corrected to 15 percent O₂ (dry basis), do not exceed 18 ppmv, except that, for non-gaseous fuel firing during natural gas curtailment or short testing periods, the limit shall be 42 ppmv.~~

(Adopted September 21, 1994)

9-9-400 ADMINISTRATIVE REQUIREMENTS

~~9-9-401 Certification, Efficiency: If a person who operates a gas turbine subject to the limits of subsections 9-9-301.2, 301.3, 9-9-303, or 9-9-305 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 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%.~~

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

— 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-

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

— *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 September 21, 1994)

9-9-402 Compliance Schedule: A person who must modify existing sources or install new control equipment to meet the requirements of Section 9-9-301 or 302 shall comply with the following increments of progress:-

402.1 ~~By July 1, 1995~~ 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 the modification or installation of new control equipment by July 1, 2008:

402.2 ~~By January 1, 1996: Submit a status report to the APCO stating the progress of the modification or installation.~~

402.3 If water injection or steam injection enhancement retrofits or Dry Low NOx combustion technology becomes commercially available for a specific make and model of turbine after December 31, 2006, and the operator becomes aware that the technology is available, the operator shall inform the District of this information in writing. The District shall acknowledge this information in writing, and shall notify the operator and all other operators of the specific make and model of gas turbine in writing, of the commercial availability. Similarly, if the District becomes aware of commercial availability of any of these NOx emission control technologies, the District shall notify all operators of the specific make and model of gas turbine in writing, of commercial availability. 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, but is not required to, 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 operator shall submit an application for Authority to Construct to install the commercially available technology within 18 months of the date of the initial notification, and shall 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 not 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.

402.4 If a gas turbine greater than 140 MMBtu/hr heat rate exceeds 400 hours operation in a calendar year and is not compliant with 9-9-301.2 or 302.2, the operator must notify the APCO of that fact and must provide its best estimates for future operation of the turbine. If the APCO determines based on a review of these estimates that the turbine will trigger more stringent emissions standards, the APCO will provide written notice of that determination to the operator. If the operator will have to modify existing sources or install new control equipment to meet the more stringent standards, it 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 more stringent standards within 36 months of such notification, or 30 days after the end of the next scheduled major maintenance outage if not 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.

~~9-9-403 **Alternative Compliance Schedule:** A person who must modify existing sources or install new control equipment to meet the requirements of Section 9-9-303 shall comply with the following increments of progress:~~

~~403.1 By January 1, 1995: Submit an application for any Authority to Construct to achieve compliance with Section 9-9-303.1.~~

~~403.2 By July 1, 1995: Submit a status report to the APCO stating the progress of the modification or installation to achieve compliance with Section 9-9-303.1.~~

~~403.3 By January 1, 1996: Be in compliance with the requirements of Section 9-9-303.1 and all other applicable requirements of this Rule.~~

~~403.4 By January 1, 1998: Submit an application for any Authority to Construct to achieve compliance with Section 9-9-303.2.~~

~~403.5 By January 1, 1999: Submit a status report to the APCO stating the progress of the modification or installation to achieve compliance with Section 9-9-303.2.~~

~~403.6 By January 1, 2000: Be in compliance with the requirements of Section 9-9-303.2 and all other applicable requirements of this Rule.~~

(Adopted September 21, 1994)

~~9-9-404 **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 9-9-605. This calculation method is subject to approval by the APCO.~~

9-9-500 MONITORING AND RECORDS

~~9-9-501 **Monitoring and Recordkeeping Requirements:** A person who operates any stationary gas turbine heat rate rated equal to or greater than 140 MMBtu/hr. ~~40.0 MW~~ and operated an average of more than 4000 hours per year over the last any three calendar years period before April 21, 1993, 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 comply with the output based NO_x limits must also monitor and record fuel rates to 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 September 21, 1994)

~~9-9-502 **Records, Low Usage:** A person subject to the requirements of Section 9-9-302 or seeking exemption per Section 9-9-112 of this Rule shall maintain a daily gas turbine operating record that includes, the actual start-up and stop time, total hours of operation, type and quantity of fuel used (liquid/gas). This information shall be available to District staff upon request for at least two years from the date of entry.~~

~~9-9-503 **Records, Startup and Shutdown Periods:** If the facility does not have a Continuous Emissions Monitor, the operator must document startup and shutdown periods. For startup periods, the operator shall record operating data indicating the time the startup was initiated and the time the process has achieved the normal operating temperatures, pressures, and control parameters required to comply with NO_x limits. For shutdown periods, the operator shall record operating data indicating the time the gas turbine shutdown was initiated and the time it was complete. These records shall be retained and made available to District staff upon request for at least two years from the date of entry.~~

9-9-5034 Initial Demonstration of Compliance: A person who must modify existing sources or install new control equipment shall conduct a District approved source test, by the following dates and submit the results to the District within two months after the following dates:

~~503.1 March 31, 1996, for the purpose of demonstrating compliance with Section 9-9-303.1.~~

~~503.2 March 31, 1997, for the purpose of demonstrating compliance with Section 9-9-301, 302, or 305.~~

~~503.3 March 31, 2000, for the purpose of demonstrating compliance with Section 9-9-303.2. (Amended September 21, 1994)~~

504.1 A person who must modify existing sources or install new control equipment shall conduct a District approved source test and submit the results to the District within two months of initial operation of the new or modified equipment.

504.2 A person who must install a Continuous Emissions Monitor pursuant to this Rule shall conduct a Field Accuracy Test of the Continuous Emissions Monitor using the procedure in Appendix D in the Manual Of Procedures, Volume V and submit the results to the District within two months.

9-9-505 Annual Demonstration of Compliance: The operator of any turbine subject to this Rule that 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.

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 Emissions of oxides of nitrogen as specified in Sections 9-9-301, and 302, 303, 304, and 305 shall be measured as prescribed in the District Manual of Procedures, Volume IV, ST-13A or B.

(Amended September 21, 1994)

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).

~~**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.~~

9-9-605 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/MW_{hr} shall be calculated in accordance with the following equations:

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

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

Ps = useful thermal energy of steam production

Po = other useful heat recovery.

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

Q = measured steam flowrate in lb/hr.

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