ILLINOIS ENVIRONMENTAL REGULATORY GROUP WORK PRODUCT (6/23/06)

NATIONWIDE SURVEY OF NOX RACT IMPLEMENTATION/INDUSTRIAL BOILER FOCUS

Pursuant to the Clean Air Act ("CAA"), 42 U.S.C. §§ 7401–7571q (2006), states with areas classified as ozone nonattainment by the United States Environmental Protection Agency ("USEPA") are required to develop nonattainment plans, which provide for "the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards." 42 U.S.C. § 7502(c)(1). Additionally, the CAA regulates nitrogen oxides ("NOx") emissions and requires some state plans to implement reasonably available control technology ("RACT") for specific NOx emissions. 42 U.S.C. § 7511a(f). RACT is defined as the "lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility." Final Rule to Implement 8-Hour Ozone National Ambient Air Quality Standard – Phase 2, 70 Fed. Reg. 71612, 71652 (Nov. 29, 2005) (to be codified at 40 C.F.R. Parts 51, 52 and 80) (citing 44 Fed. Reg. 53762 (September 17, 1979)); *see also* 40 C.F.R. § 51.100(o) (2006) (defining RACT for purposes of State Implementation Plan ("SIP") requirements.)

In response to your request to conduct a nationwide survey on NOx RACT implementation, we have prepared the following summary of our findings. Due to the broad scope of the regulations, this memorandum focuses on state industrial boiler limits that have been approved by the USEPA as RACT.

I. ILLINOIS PROPOSAL

Although Illinois was granted a waiver from NOx RACT requirements under the 1-Hour Ozone National Ambient Air Quality Standard ("NAAQS"), it is now subject to the requirement to develop NOx RACT standards under the 8-Hour Ozone NAAQS. The Illinois Environmental Protection Agency ("IEPA") is in the process of developing NOx RACT rules for Illinois. IEPA is considering establishing NOx emission limits for a variety of emission units, including industrial boilers. The IEPA proposed limitations are as follows:

EXHIBIT A

Proposed Limits for NOx Sources

Category and Fuel Type	Size	Unit Type	Suggested NOx Limit
ICI Boilers	**mmBtu/hr**		**Lb/mmBtu**
Natural Gas	>100	Single Burner	0.05
	>100	Multiple Burners	0.06
Residual Fuel Oil	>100	Single Burner	0.06
	>100	Multiple Burners	0.06
Distillate Fuel Oil	>100	Single Burner	0.07
	>100	Multiple Burners	0.10
Coal-Wall	>100	PC Wall-fired	0.14
Coal-Tangential	>100	PC-Tangential	0.12
Coal-Stoker	>100	All Stokers	0.22
Coal-FBC	>100	FBC	0.08
Wood/Non-Fossil solid fuel	>100	All Stokers	0.11
Other Gaseous Fuels (*e.g.*, process Gas)	>100	Single Burner/ Multiple Burner	0.05/0.06
Other Liquid Fuels (*e.g.*, Liquid Waste)	>100	Single Burner/ Multiple Burner	0.07/0.10
N. Gas	50-100	All	Comb. Tuning
Distillate Fuel Oil	50-100	All	Comb. Tuning
Residual Fuel Oil	50-100	All	Comb. Tuning
Coal	50-100	All	Comb. Tuning
Wood/Non-Fossil solid Fuel	50-100	Stoker	Comb. Tuning
Other Gaseous Fuels	50-100	All	Comb. Tuning
Other Liquid Fuels	50-100	All	Comb. Tuning

II. OZONE TRANSPORT COMMISSION MODEL RULES

The CAA designates 11 states and the consolidated Metropolitan Statistical Area that includes the District of Columbia and parts of Virginia as the Ozone Transport Region ("OTR"). 42 USC § 7511(c). In 2001, the Ozone Transport Commission, comprised of member states from the OTR, developed a "Model Rule for Additional Nitrogen Oxides (NOx) Control Measures." This rule was part of a regional effort to attain and maintain the 1-Hour ozone standard, address emission reduction shortfalls that were identified by the USEPA in specific state plans to attain the 1-Hour ozone standard, and reduce 8-Hour ozone levels. Several states have adopted portions of this model rule as part of their efforts to implement NOx RACT. The Model Rule for Additional Nitrogen Oxides (NOx) Control Measures, March 2001, can be found at http://www.otcair.org/interest.asp?Fview=stationary with support analysis at http://www.otcair.org/document.asp?Fview=Report.

Section .03 of the model rule sets out model standards for industrial boilers, differentiating for the heat input rate and the type of fuel. The applicable boiler sections read as follows:

(b)The owner or operator of an industrial boiler with heat input rate of at least 5,000,000 Btu per hour but less than 50,000,000 Btu per hour shall:

(1) Annually, before April 1st of each year:

a. Perform an efficiency test using the test procedures specified in ASME/ANSI Boiler Test Code 4.1;
b. Adjust the combustion process of the boiler in accordance with the procedures specified in Chapter 5, Combustion Efficiency Tables, Taplin, Harry, R., Fairmont Press, 1991;
c. Measure the concentration of NOx, CO, and oxygen in the effluent/exhaust stream after the combustion process of the boiler has been adjusted using the procedures specified in Env-A xxxx.12 (h); and
d. Measure the opacity of the effluent/exhaust stream after the combustion process of the boiler has been adjusted using the procedures specified in Env-A xxxx.12 (i); and

(2) Maintain, [appropriate records and reports, as detailed in the model rule.]

* * *

(c) The NOx emissions of an industrial boiler with heat input rate of at least 50,000,000 Btu per hour but less than 100,000,000 Btu per hour shall be limited at all time to conform with one of the following two applicable NOx emission limits:

(1) For a natural gas-fired boiler:
a. 0.10 pounds of NOx per million Btu or equivalent output-based NOx emission limit, based on:
I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or
II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; or
b. The emission rate, in pounds of NOx per million Btu or equivalent output-based NOx emission rate, which is equal to a 50% NOx reduction from the uncontrolled NOx emission level based on:
I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or
II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; and

(2) For a boiler firing coal or fuel oil:

a. 0.30 pounds of NOx per million Btu or equivalent output-based NOx emission limit, based on:

I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; or

b. The emission rate, in pounds of NOx per million Btu or equivalent output-based NOx emission rate, which is equal to a 50% NOx reduction from the uncontrolled NOx emission level based on:

I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; and

(d) The NOx emissions of an industrial boiler with heat input rate of at least 100,000,000 Btu per hour but less than or equal to 250,000,000 Btu per hour shall be limited at all times to conform with one of the following two NOx emission limits:

(1) For a natural gas-fired boiler:

a. 0.10 pounds of NOx per million Btu or equivalent output-based NOx emission limit, based on:

I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; or

b. The emission rate, in pounds of NOx per million Btu or equivalent output-based NOx emission rate, which is equal to a 50% NOx reduction from the uncontrolled NOx emission level based on:

I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; and

(2) For boilers firing fuel oil or coal:

a. 0.20 pounds of NOx per million Btu or equivalent output-based NOx emission limit, based on:

I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; or

b. The emission rate, in pounds of NOx per million Btu or equivalent output-based NOx emission rate, which is equal to a 50% NOx reduction from the uncontrolled NOx emission level based on:

I. a 1-hour average of three stack test runs if stack

testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; or

(e) The NOx emissions of an industrial boiler with heat input rate greater than 250,000,000 Btu per hour which is not subject to the U.S. EPA's NOx SIP call shall be limited at all times to conform with one of the following two applicable NOx emission limits:

(1) For natural gas, fuel oil, coal and all other fuels:

a. 0.17 pounds of NOx per million Btu or equivalent output-based NOx emission limit, based on:

I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; or

b. The emission rate, in pounds of NOx per million Btu or equivalent output-based NOx emission limit, which is equal to a 50% NOx reduction from the uncontrolled NOx emission level.

I. a 1-hour average of three stack test runs if stack testing is used to demonstrate compliance; or

II. a 24-hour calendar day average if a CEM is used to demonstrate compliance; or

(f) Compliance with the NOx emission standards specified in this section shall be determined by:

(1) the emissions data from the CEM system, if a CEM system for NOx is required for the boiler under Env-A xxxx or Env-A xxxx.13; or

(2) the emissions data obtained from the NOx test methods specified in Env-A xxxx.12.

(g) Compliance with the NOx emission standards specified in this section may be achieved through the purchase of NOx allowances.

III. OTHER STATES

Approximately nineteen states and the District of Columbia have already adopted industrial boiler NOx emission limits, which the USEPA has determined to satisfy NOx RACT requirements. An overview of these state regulations is as follows.

CALIFORNIA

1. NOx RACT regulations and requirements vary according to 35 individual Air Pollution Control or Air Quality Management Districts. For links to APCD and AQMD specific

regulations, *see* the California Air Resources Board website at http://www.arb.ca.gov/drdb/drdbltxt.htm

2. Approval Date: USEPA approval dates vary according to APCD/AQMD and regulation.

3. Application: Applicability of NOx RACT requirements vary according to APCD/AQMD.

4. Limits: Same as above.

CONNECTICUT

1. For full text of NOx RACT regulations, Control of Nitrogen Oxides Emissions, Conn. Agencies Regs. § 22a-174-22 (2006), *see*: http://www.dep.state.ct.us/air2/regs/mainregs/sec22.pdf

2. Approval: Approved by USEPA as RACT at 62 Fed. Reg. 52016 (Oct. 6, 1997).

3. Applicability: Conn. Agencies Regs. § 22a-174-22 (b).

   (1) This section applies to the owner or operator of:

      (A) Any of the following sources, provided such sources are located at a major stationary source of NOx:
         (i) A reciprocating engine with a maximum rated capacity of three (3) MMBTU/hr or more;
         (ii) Fuel-burning equipment, other than a reciprocating engine, with a maximum rated capacity of five (5) MMBTU/hr or more;
         (iii) Equipment that combusts fuel for heating materials and that has a maximum rated capacity of five (5) MMBTU/hr or more;
         (iv) A waste combustor with a design capacity of two thousand (2000) pounds or more of waste per hour; or

      (B) Fuel-burning equipment, a waste combustor, or a process source that has potential emissions of NOx in excess of the following:
         (i) One hundred thirty-seven (137) pounds during any day from May 1 to September 30, inclusive, of any year, if such source is located in a severe nonattainment area for ozone; or
         (ii) Two hundred seventy-four (274) pounds during any day from May 1 to September 30, inclusive, of any year, if such source is located in a serious nonattainment area for ozone.

4. Industrial Boiler Limits:

TABLE 22-1

	Gas-fired	Residual-oil fired	Other-oil-fired	Coal-fired
Turbine engine With MRC = 100 MMBTU/hr	55 ppmvd	not applicable	75 ppmvd	not applicable
Turbine engine with MRC < 100 MMBTU/hr	0.90 lb/MMBTU	not applicable	0.90 lb/MMBTU	not applicable
Cyclone furnace	0.43 lb/MMBTU	0.43 lb/MMBTU	0.43/MMBTU	0.43 lb/MMBTU
Fast-response double furnace Naval boiler	0.20 lb/MMBTU	0.30 lb/MMBTU	0.30 lb/MMBTU	0.30 lb/MMBTU
Fluidized bed combustor	not applicable	not applicable	not applicable	0.29 Lb/MMBTU
Other boiler	0.20 Lb/MMBTU	0.25 lb/MMBTU	0.20 lb/MMBTU	0.38 lb/MMGTU
Reciprocating engine	2.5 gm/bk hp-hr	Not applicable	8 gm/bk hp-hr	not applicable

(2) For any stationary source for which there is no applicable emission limitation in Table 22-1, the owner or operator of such source shall not cause or allow emissions of NOx therefrom in excess of the following:

(A) For fuel-burning equipment fired by a fuel other than those fuels cited in Table 22-1: 0.3 pounds per MMBTU;
(B) For any waste combustor subject to the requirements of subdivision (4) of this subsection: 0.38 pounds per MMBTU;
(C) For any waste combustor not subject to the requirements of subdivision (2)(B) of this subsection which has a waterwall furnace: 0.38 pounds per MMBTU;
(D) For any other waste combustor: 0.33 pounds per MMBTU;
(E) For a glass melting furnace: 5.5 pounds of NOx per ton of glass produced;
(F) For a stationary source, other than a glass melting furnace, that combusts fuel for heating materials: 180 ppmvd, corrected to twelve percent (12%) carbon dioxide; or
(G) For any stationary source not having an emission limitation in subparagraphs (A) through (F) of this subdivision: seven hundred (700) ppmvd.

There are additional limits for multi-fuel sources at Conn. Agencies Regs. § 22a-174-22(f) and provisions for complying with the emission limitations through emissions trading at Conn. Agencies Regs. § 22a-174-22 (j).

DELAWARE

1. For full text of NOx RACT regulations, Regulation 12, Control of Nitrogen Oxides Emissions, 70-100-012 Del. Code Regs. § 1.1 *et seq.* (2006), see: http://www.dnrec.state.de.us/air/aqm_page/docs/pdf/reg_12.pdf

2. Approval: Approved by USEPA as NOx RACT at 66 Fed. Reg. 32231 (June 14, 2001).

3. Applicability: Applies to major stationary sources of NOx, defined as those with potential to emit equal or greater than 25 tons in New Castle and Kent Counties and equal to or greater than 100 tons in Sussex County.

4. Industrial Boilers Limits and Exemptions at 70-100-012 Del. Code Regs. §§ 3, 4 (2006):

3.2 Maximum allowable emission rates of nitrogen oxides from fuel burning equipment with a rated heat input capacity of 100 MMBTU/hr or greater shall be established as follows:

a) Existing fuel burning equipment shall be presumed to meet the definition of reasonably available control technology if the owner or operator demonstrates to the satisfaction of the Department that the emission levels in Table I can be met.

b) If the owner or operator does not make the demonstration described in paragraph a of this section, RACT shall be installed with the goal of achieving the presumptive emission limits as set forth in Table I. RACT for this category of equipment will consist of combustion modification technology including either:
   i) low NO burner technology with low excess air and including X Over Fire Air if technically feasible; or
   ii) flue gas recirculation with low excess air.

If actual achievable emission levels following installation of such combustion modification technology are greater than the presumptive emission limits in Table I, these actual emission levels will become RACT for those sources.

c) If the owner or operator does not comply with paragraphs a or b of this section, alternative NOx control technology and emission limitation proposals shall be required and approved by the Department in accordance with Section 5.

d) Compliance with the emission levels as determined above is based upon twenty-four hour rolling averaging period as follows:

i) For fuel burning equipment with a rated heat input of 250 MMBTU/hr of greater Continuous Emission Monitoring Systems (CEMS) approved by the Department will be used.

ii) For fuel burning equipment with a rated heat input of 150 MMBTU/hr or greater but less than 250 MMBTU/hr compliance will be based on:

A) a CEMS approved by the Department; or

B) at the sources' request, an enhanced monitoring program approved by the Department. This enhanced monitoring program will identify and correlate various operating parameters with NO emission levels through source X testing. These parameters will be used as surrogates to monitor NOx emissions. Periodic source testing will be required to verify the validity of these surrogate parameters.

iii) For fuel burning equipment with a rated heat input of 100 MMBTU/hr or greater but less that 150 MMBTU/hr compliance will be based on either ii)A or ii)B above or at the source's request by a periodic source testing program approved by the Department.

TABLE I

Pounds Per Million BTU Heat Input

		Firing Type	
Fuel Type	Face* and Tangential	Cyclone	Stokers
Gas Only	0.20	N/A	N/A
Oil or Gas or Both	0.25	0.43	N/A
Coal (Dry Bottom)	0.38	N/A	0.40

* Includes wall, opposed, and vertical firing methods.

3.3 Maximum emission rates for nitrogen oxides from fuel burning equipment with a rated heat input capacity of less than 100 MMBTU/hr shall be as follows:

a) 50 MMBTU/hr or greater: Shall not exceed those achieved by installation of either low excess air and low NOx burner technology or flue gas recirculation technology, or equivalent NOx control technology proposals approved by the Department in accordance with Section 5.

b) Less than 50 MMBTU/hr: Shall not exceed those achieved through an annual tune up performed by qualified personnel. The owner or operator shall maintain a log of the tune ups performed on each unit.

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3.6 For sources who desire to switch to a lower NOx emitting fuel, the practice of seasonal fuel switching shall be considered RACT and the requirements of Sections 3.2(a) through (c) and Section 3.3 shall not apply. Sources that would otherwise be subject to Section 3.2(a) through (c) shall monitor their emissions in accordance with Section 3.2(d)(i) through (d)(iii) for compliance with the limits established in the Permit. Seasonal fuel switching is defined as the utilization (90% availability) of a single fuel during the summer ozone season (April 1 thru October 31) that inherently produces considerably lower NOx emissions than would be otherwise emitted. Fuel switching is limited to the use of natural gas, liquid petroleum gas (LPG), or distillate oil.

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3.9 Any emission limits or other requirements necessary to define and enforce reasonably available control technology for applicable source types under this Regulation, shall be made state and federal enforceable by a permit issued in accordance with Regulation No. 2.

SECTION 4 – EXEMPTIONS

4.1 The following source types and sizes are exempt from the demonstration of reasonably available control technology requirement:

a) Any fuel burning equipment used exclusively for providing residential comfort heating and hot water.

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c) Any fuel burning equipment with a rated heat input capacity of less than 15 MMBTU/hour.

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e) Any source operating during the month of November to the end of March and operating with a capacity factor of 5% or less from April 1 to October 31.

f) Any fuel burning equipment, gas turbine, or internal combustion engine with an annual capacity factor of less than 5 percent, except that three months following any calendar year during which the capacity factor is 5 percent or greater, the source shall be subject to the applicable provision of Section 3 of this regulation, except the compliance date shall be two years after approval of the schedule by the Department.

GEORGIA

1. Rules for Air Quality Control, Ga. Comp. R. & Regs. 391-3-1-.02(2)(yy) (2006). For the full text of the regulation, *see* http://rules.sos.state.ga.us/docs/391/3/1/02.pdf

2. Approval Date: Approved by USEPA at 66 Fed. Reg. 35906 (July 7, 2001).

3. Other: Georgia regulations provide "[n]o person shall cause, let, permit, suffer or allow the emissions of nitrogen oxides from any source to exceed the levels specified in paragraph 2 below unless such source has been approved by the Director as meeting the appropriate requirement for all reasonably available control technology in controlling those emissions of nitrogen oxides." Ga. Comp. R. & Regs. 391-3-1-.02(2)(yy) (2006). Facilities apply to the Georgia Environmental Protection Division for a new or renewed permit, which is then modified, approved, or denied. Subsequently, all RACT demonstrations are submitted to EPA for approval as a revision to the SIP.

KENTUCKY

1. Jefferson County – RACT for Major VOC and NOx Emitting Sources – Regulation 6.42. For full text of the regulation, *see* http://www.apcd.org/regs/reg6/6-42v2.pdf

2. Approval Date: Jefferson County – RACT for Major VOC and NOx Emitting Sources – Regulation 6.42, approved by USEPA at 66 Fed. Reg. 53661 (Mar. 17, 1999).

3. Application: Applies to "NOx emissions from all NOx emitting facilities located at all major NOx emitting sources except for those NOx emitting facilities that have been or would be subject to NOx review pursuant to 40 CFR Section 52.21 and Regulation 2.05 *Prevention of Significant Deterioration of Air Quality after November 15, 1990,* or to review under 40 CFR Part 51 Appendix S and Regulation 2.04 *Construction or Modification of Major Sources In or Impacting Upon Non-Attainment Areas (Emission Offsets Requirements)* after November 15, 2002." *See* Regulation 6.42(1.2). Owner or operators subject to Regulation 6.42 must apply for a new or revised permit.

4. Limits: Each applicant for a new or revised permit must propose RACT emission limiting standards and RACT emission control technology and must take into account applicable CTG, ACT, or EPA guidance. *See* Reg. 6.42(4.3.1). "The District will make a case by case determination of RACT based on the applicant's proposal." *See* Reg. 6.42(4.3.2). "Each determination of RACT pursuant to this Section shall be submitted to EPA as a site-specific SIP revision." Reg. 6.42(4.4).

LOUISIANA

1. Control Emissions of Nitrogen Oxides, LAC 33.III.2201 (2006). For full text of regulation, *see* http://www.state.la.us/osr/lac/33v03/33v03.pdf

2, Approval Date: Approved by USEPA at 67 Fed. Reg. 60885 (Sept. 27, 2002). USEPA stated that LAC 33.III.2201 provisions "control emissions beyond levels that EPA has previously approved as RACT for such sources." 67 Fed. Reg. 50391, 50401 (Aug. 2, 2002).

3. Application: Applies to any affected facility in the Baton Rouge NAA and the Region of Influence during the ozone season (May 1 to September 30) of each year. *See* LAC 33.III.2201(A)(1)-(2). The following categories are exempt:

1. "boilers and process heater/furnaces with a maximum rated capacity of less than 80 million British thermal units (MMBtu) per hour;
2. stationary gas turbines with a megawatt rating based on heat input of less than 10 megawatts (MW);
3. stationary internal combustion engines as follows: a. rich-burn engines with a rating of less than 300 horsepower (Hp); b. lean-burn engines with a rating of less than 320 Hp in the Baton Rouge NonAttainment Area; and c. lean-burn engines with a rating of less than 1500 Hp in the Region of Influence;
4. low ozone season capacity factor boilers and process heater/furnaces, in accordance with Paragraph H.11 of this Section;
5. stationary gas turbines and stationary internal combustion engines, that are: a. used in research and testing; b. used for performance verification and testing; c. used solely to power other engines or turbines during start-ups; d. operated exclusively for fire fighting or training and/or flood control; e. used in response to and during the existence of any officially declared disaster or state of emergency; f. used directly and exclusively for agricultural operations necessary for the growing of crops or the raising of fowl or animals; or g. used as chemical processing gas turbines.
6. any point source, in accordance with Paragraph H.12 of this Section, that operates less than 400 hours during the ozone season;
7. flares, incinerators, kilns and ovens as defined in Subsection B of this Section;
8. any point source during start-up and shutdown as defined in LAC 33:III.111 or during a malfunction as defined in 40 CFR Section 60.2;
9. any point source used solely to start up a process;
10. any point source firing biomass fuel that supplies greater than 50 percent of the heat input on a monthly basis;
11. any point source at a sugar mill;
12. fluid catalytic cracking unit regenerators;
13. pulp liquor recovery furnaces;
14. diesel-fired stationary internal combustion engines;
15. any affected point source that is required to meet a more stringent state or federal NOx emission limitation, whether by regulation or permit. (In this case, the monitoring, reporting, and recordkeeping requirements shall be in accordance with the more stringent regulation or permit and not this Chapter. If the applicable regulation or permit does not specify monitoring, reporting, and recordkeeping requirements, the provisions of this Chapter shall apply.);
16. wood-fired boilers that are subject to 40 CFR 60, Subpart Db;

17. nitric acid production units that are subject to 40 CFR 60, Subpart G or LAC 33:III.2307;
18. any affected point source firing Number 6 Fuel Oil during a period of emergency and approved by the administrative authority;
19. boilers and industrial furnaces treating hazardous waste and regulated under LAC 33:V.Chapter 30 or 40 CFR Part 264, 265, or 266, including halogen acid furnaces and sulfuric acid regeneration furnaces; and
20. high efficiency boilers or other combustion devices regulated under the Toxic Substance Control Act PCB rules under 40 CFR Part 761.

LAC.33.III.2201(C).

4. Limits for Industrial Boilers:
   - Maximum Rated Capacity: >/= 80 MMBtu/Hour
   - NOx Emission Factor: 0.10 pound/MMBtu

5. Other: Louisiana regulations provide for both facility-wide averaging and trading plans. *See* LAC 33.111.2201.E (2006).

MAINE

1. For full text of NOx RACT regulations, Reasonably Available Control Technology for Facilities that Emit Nitrogen Oxides, 06-096-138 Me. Code R. § 1 *et seq.* (2006), *see*: http://www.maine.gov/sos/cec/rules/06/096/096c138.doc.

2. Approval: Approved by USEPA as NOx RACT at 67 Fed. Reg. 57154 (Sept. 9, 2002) with various alternative facility specific RACT determinations approved on other dates and referenced at 40 CFR § 52.1031.

3. Applicability: Applies to existing stationary sources with potential to emit NOx emissions greater than or equal to 100 tons per year. Exemptions for equipment with PTE less than 10 tons per year of NOx and for some emergency standby engines. *See* 06-096-138 Me. Code R. § 1 (2006).

4. Industrial Boiler Limits:

06-096-138 Me. Code R. § 3.Standards

A. Large Boilers. Any person owning, leasing, operating or controlling a boiler having an energy input capacity of 1500 million British Thermal Units (BTU) or greater shall comply with the following NO_X emission standard.

(1) The NO_X emission rate for large boilers licensed to fire oil shall not exceed 0.30 pounds per million British Thermal Units (BTU) on a 24-hour daily block arithmetic average basis.

(2) The NO_X emission rate for large boilers licensed to fire multiple fuels shall not exceed 0.30 pounds per million British Thermal Units (BTU) on a 24-hour daily block arithmetic average basis.

(3) Large boilers shall demonstrate compliance through the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117.

B. Mid-Size Boilers. Any person owning, leasing, operating or controlling a boiler having an energy input capacity of 50 million BTU per hour or greater and less than 1500 million British Thermal Units (BTU) or greater shall comply with the following NO_X emission standard.

(1) The NO_X emission rate for mid-size boilers licensed to fire oil shall not exceed 0.30 pounds per million BTU based on a one hour average unless the facility installs Low NO_X burners or equivalent strategies.

(2) The NO_X emission rate for mid-size boilers licensed to fire biomass shall not exceed 0.30 pounds per million BTU based on a one hour average.

(3) The NO_X emission rate for mid-size boilers licensed to fire biomass and oil shall not exceed 0.30 pounds per million BTU based on a one hour average.

(4) The NO_X emission rate for mid-size boilers licensed to fire biomass and coal shall not exceed 0.38 pounds per million BTU based on a one hour average.

(5) The NO_X emission rate for mid-size boilers licensed to fire biomass and fuels other than oil and coal shall not exceed 0.30 pounds per million BTU based on a one hour average.

(6) Mid-size boilers with a heat input of 250 million BTU per hour or greater shall demonstrate compliance through the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 by May 31, 1995.

(7) Mid-size boilers with a heat input of 200 million BTU per hour and less than 250 million BTU per hour shall demonstrate compliance through the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 by May 31, 1997.

(8) For any mid-size boiler which employs the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 compliance will be on a 24-hour daily block arithmetic average basis.

C. Kraft Recovery Boilers. Any person owning, leasing, operating or controlling a Kraft recovery boiler shall comply with the following NO_X emission standards:

(1) The NO_X emissions from any Kraft recovery boiler shall not exceed 120 parts per million by volume wet basis, corrected to 8% oxygen or 12% carbon dioxide, on a 24-hour daily block arithmetic average basis.

(2) Kraft recovery boilers shall demonstrate compliance through the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117.

D. MgO Recovery Boilers. Any person owning, leasing, operating or controlling an MgO recovery boiler shall comply with the following NO_X emission standards.

(1) The NO_X emissions from any MgO recovery boiler shall not exceed 250 parts per million by volume wet basis, corrected to 4% oxygen on a 24-hour daily block average basis except during acidification.

(2) During acidification NO_X emissions from any MgO recovery boiler shall not exceed 1200 parts per million by volume wet basis, corrected to 12% oxygen on a 24-hour daily block average basis.

(3) MgO recovery boilers shall demonstrate compliance through the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117.

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J. Seasonality Standard. Facilities subject to Sections 3(A) or 3(B) may choose the following alternative emission limits through the seasonal combustion of different fuels:

(1) Large boilers

(a) The NO_X emission rate for large boilers during the ozone season dates of May 1 through September 30 shall not exceed 0.2 pounds per million BTU on a 24-hour daily block arithmetic average basis. During the dates of October 1 through April 30, the large boiler shall not exceed 0.3 pounds per million BTU on a 24-hour daily block arithmetic average basis; or

(b) The NO_X emission rate for large boilers during the ozone season dates of May 1 through September 30 shall not exceed 0.15 pounds per million BTU on a 24-hour daily block arithmetic average basis. During the dates of October 1 through April 30, the large boiler shall not

exceed 0.35 pounds per million BTU on a 24-hour daily block arithmetic average basis.

(2) Mid-size boilers

(a) The NO_X emission rate for mid-size boilers during the ozone season dates of May 1 through September 30 shall not exceed 0.20 pounds per million BTU based on a one hour average. During the dates of October 1 through April 30, the mid-size boiler shall not exceed 0.40 pounds per million BTU based on a one hour average. For any mid-size boiler which employs the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 compliance will be on a 24-hour daily block arithmetic average basis; or

(b) The NO_X emission rate for mid-size boilers during the ozone season dates of May 1 through September 30 shall not exceed 0.15 pounds per million BTU based on a one hour average. During the dates of October 1 through April 30, the mid-size boiler shall not exceed 0.45 pounds per million BTU based on a one hour average. For any mid-size boiler which employs the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 compliance will be on a 24-hour daily block arithmetic average basis.

K. Emissions Averaging. Any person owning, leasing, operating or controlling any of the units covered in Sections 3(A)-3(E) or Section 4 at any one facility may average the applicable emission rates between units on an equivalent pounds per million BTU basis on a 24-hour daily block arithmetic basis. Continuous emission monitoring systems that satisfy the requirements of Department Regulation Chapter 117 must be employed to allow the use of this provision.

L. Small Boilers

(1) Any person owning, leasing, operating or controlling a boiler having an energy input capacity of less than 50 million BTU per hour and equal to or greater than 20 million BTU per hour shall have performed on the boiler an annual tune-up.

(2) The following tune-up record keeping requirements are required:

(a) A tune-up procedure file must be kept on-site and made available to the Department upon request,

(b) An oxygen/carbon monoxide curve or an oxygen/smoke curve must be kept on file,

(c) Once the optimum excess oxygen setting has been determined, the owner or operator of a source must periodically verify that the setting remains at that value, and

(d) If the minimum oxygen level found is substantially higher than the value provided by the combustion unit manufacturer, the owner or operator must improve the fuel and air mixing, thereby allowing operation with less air.

M. Auxiliary/Standby Boilers. Any person owning or operating an auxiliary/standby boiler shall be subject to the following:

(1) NO_X emissions shall be limited to less than 100 tons per year on a 12 month rolling average basis -beginning on August 1, 1994;

(2) The NO_X emissions for the boiler shall not exceed 20 tons per any calendar month; and

(3) The auxiliary/standby boilers shall have an annual tune-up and subject to the tune-up recordkeeping requirements specified in Section 3(L)(2).

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06-096-138 Me. Code R. § 4.Phase 1 Mid-Size Boilers Standards. Any person owning, leasing, operating or controlling a boiler having an energy input capacity of 50 million BTU per hour or greater and less than 1500 million British Thermal Units (BTU) or greater shall comply with the following NO_X emission standards except as provided in Sections (3)(I)-(3)(O):

1. The NO_X emission rate for mid-size boilers licensed to fire oil shall not exceed 0.40 pounds per million BTU based on a one hour average, unless the facility installs Low-NO_X burners or equivalent strategies.
2. The NO_X emission rate for mid-size boilers licensed to fire biomass shall not exceed 0.30 pounds per million BTU based on a one hour average.
3. The NO_X emission rate for mid-size boilers licensed to fire biomass and oil shall not exceed 0.40 pounds per million BTU based on a one hour.
4. The NO_X emission rate for mid-size boilers licensed to fire biomass and coal shall not exceed 0.45 pounds per million BTU based on a one hour average.

5. The NO_X emission rate for mid-size boilers licensed to fire biomass and fuels other than oil and coal shall not exceed 0.30 pounds per million BTU based on a one hour average.
6. Mid-size boilers with a heat input of 250 million BTU per hour or greater shall demonstrate compliance through the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 by May 31, 1996.
7. Mid-size boilers with a heat input of 200 million BTU per hour and less than 250 million BTU per hour shall demonstrate compliance through the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 by May 31, 1997.
8. For any mid-size boiler which employs the use of a continuous emissions monitoring system that satisfies the requirements of Department Regulation Chapter 117 compliance will be on a 24-hour daily block arithmetic average basis.

MARYLAND

1. For full text of NOx RACT regulations, Control of NOx Emissions for Major Stationary Sources, Md. Code Regs. 26.11.09.08 (2006), *see*: http://www.dsd.state.md.us/comar/subtitle_chapters/26_Chapters.htm#Subtitle26 or http://www.dsd.state.md.us/comar/26/26.11.09.08.htm

2. Approval: Approved by USEPA as NOx RACT at 66 Fed. Reg. 9522 (Feb. 8, 2001).

3. Applicability: Applies to major sources of NOx throughout the state with PTE 25 tons in specified counties and with PTE 100 tons in other specified counties. *See* Md. Code Regs. 26.11.09.08(a).

4. Industrial Boiler Limits:

Md. Code Regs. 26.11.09.08(B)(1)(c) --Emission Standards in Pounds of NO_x per Million Btu of heat input.

Fuel	Tangential- Fired	Wall-Fired
Gas only	0.20	0.20
Gas/Oil	0.25	0.25
Coal (dry bottom)	0.38	0.38
Coal (wet bottom)	1.00	1.00

C. Requirements for Fuel-Burning Equipment with a Rated Heat Input Capacity of 250 Million Btu Per Hour or Greater.

(1) A person who owns or operates fuel-burning equipment with a rated heat input capacity of 250 Million Btu per hour or greater shall equip each installation with combustion modifications or other technologies to meet the NO_x emission rates in §C(2) of this regulation.

(2) The maximum NO_x emission rates as pounds of NO_x per Million Btu per hour are:

(a) 0.45 for tangentially coal fired units located at an electric generating facility (excluding high heat release units);

(b) 0.50 for wall coal fired units located at an electric generating facility (excluding high heat release units);

(c) 0.30 for oil fired or gas/oil fired units located at an electric generating facility;

(d) 0.70 for coal fired cyclone fuel burning equipment located at an electric generating facility from May 1 through September 30 of each year and 1.5 during the period October 1 through April 30 of each year;

(e) 0.70 for a tangentially coal fired high heat release unit located at an electric generating facility;

(f) 0.80 for a wall coal fired high heat release unit located at an electric generating facility;

(g) 0.6 for coal fired cell burners at an electric generating facility; and

(h) 0.70 for fuel burning equipment stacks at a non-electric generating facility during the period May 1 through September 30 of each year and 0.99 during the period October 1 through April 30 of each year.

(3) A person who owns or operates fuel burning equipment with a rated heat input capacity of 250 Million Btu per hour or greater shall install, operate, calibrate, and maintain a certified NO_x CEM or an alternative NO_x monitoring method approved by the Department and the EPA on each installation.

D. Requirements for Fuel-Burning Equipment with a Rated Heat Input Capacity of Less than 250 Million Btu Per Hour and Greater than 100 Million Btu Per Hour.

(1) Equipment Specifications and Standards.

(a) A person who owns or operates coal fired fuel-burning equipment with a rated heat input capacity of less than 250 Million Btu per hour and greater than 100 Million Btu per hour shall install and operate in accordance with the

manufacturer's specifications, combustion modifications, or other technologies to meet an emission rate of 0.65 pounds of NO_x per Million Btu per hour.

(b) All other fuel burning equipment with a rated heat input capacity of less than 250 Million Btu per hour and greater than 100 Million Btu per hour shall meet the NO_x emission rates set forth in §B(1)(c) of this regulation.

(2) Exceptions. The requirements in §D(1) of this regulation do not apply to a space heater as defined in Regulation .01B of this chapter or to fuel-burning equipment subject to §G of this regulation.

E. Requirements for Fuel-Burning Equipment with a Rated Heat Input Capacity of 100 Million Btu Per Hour or Less. A person who owns or operates fuel-burning equipment with a rated heat input capacity of 100 Million Btu per hour or less shall:

(1) Submit to the Department an identification of each affected installation, the rated heat input capacity of each installation, and the type of fuel burned in each;
(2) Perform a combustion analysis for each installation at least once each year and optimize combustion based on the analysis;
(3) Maintain the results of the combustion analysis at the site for at least 2 years and make this data available to the Department and the EPA upon request;
(4) Once every 3 years, require each operator of the installation to attend operator training programs on combustion optimization that are sponsored by the Department, the EPA, or equipment vendors; and
(5) Prepare and maintain a record of training program attendance for each operator at the site, and make these records available to the Department upon request.

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G. Requirements for Fuel-Burning Equipment with a Capacity Factor of 15 Percent or Less, and Combustion Turbines with a Capacity Factor Greater than 15 Percent.

(1) A person who owns or operates fuel-burning equipment with a capacity factor (as defined in 40 CFR Part 72.2) of 15 percent or less shall:

(a) Provide certification of the capacity factor of the equipment to the Department in writing;
(b) For fuel-burning equipment that operates more than 500 hours during a calendar year, perform a combustion analysis and optimize combustion at least once annually;
(c) Maintain the results of the combustion analysis at the site for at least 2 years and make these results available to the Department and the EPA upon request;
(d) Require each operator of an installation, except combustion turbines, to attend operator training programs at least once every 3 years, on combustion optimization that are sponsored by the Department, the EPA, or equipment vendors; and
(e) Maintain a record of training program attendance for each operator at the site, and make these records available to the Department upon request.

MASSACHUSETTS

1. For full text of NOx RACT regulations, Reasonably Available Control Technology (RACT) for Sources of Oxides of Nitrogen (NOx), 310 Mass. Code Regs. 7.19 (2006), see: http://www.mass.gov/dep/air/laws/7b.htm#19

2. Approval: Approved by USEPA as NOx RACT at 674 Fed. Reg. 48099 (Sept. 2, 1999) with various alternative facility specific RACT determinations approved on other dates and referenced at 40 CFR § 52.1167.

3. Applicability: Applies statewide to facilities with PTE greater than or equal to 50 tons of NOx per year. Some exemptions listed for low capacity or low emission units. 310 Mass. Code Regs. 7.19(1).

4. Industrial Boiler Limits, 310 Mass. Code Regs. 7.19, selected provisions:

(4) **Large Boilers.**

(a) Applicability and NOx RACT. After May 31, 1995, any person owning, leasing, operating or controlling a boiler having an energy input capacity of 100 million Btu per hour or greater, at a facility subject to 310 CMR 7.19, shall comply with the following NOx emission standard, except as provided in 310 CMR 7.19(2)(b), 7.19(2)(e), 7.19(2)(f), 7.19(4)(b) and 7.19(4)(c).

1. For dry bottom boilers burning coal:

a. for tangential fired boilers, 0.38 pounds per million Btu,

b. for face fired boilers, 0.45 pounds per million Btu.

2. For stoker-fired boilers burning other solid fuels, 0.33 pounds per million Btu.

3. For boilers with an energy input capacity greater than or equal to 250 million Btu per hour burning either oil or oil and gas (This includes burning the oil and gas simultaneously or at different times. Boilers approved to burn another fuel, such as coal, are subject to this limit only while burning only oil and/or gas and not the other fuel.):

a. i. for tangential oil fired boilers, 0.25 pounds per million Btu;

ii. for tangential gas fired boilers, 0.20 pounds per million Btu.

b. for face fired boilers, 0.28 pounds per million Btu.

4. For boilers with an energy input capacity greater than or equal to 100 million Btu per hour and less than 250 million Btu per hour burning either oil or oil and gas:

a. for boilers with a heat release rate less than or equal to 70,000 Btu/hours-ft<3>, 0.30 pounds per million Btu, and

b. for boilers with a heat release greater than 70,000 Btu/hour-ft<3>, 0.40.

5. For boilers burning only gas, 0.20 pounds per million Btu.

6. The averaging time for determining compliance with 310 CMR 7.19(4)(a) shall be one hour. Except that, for boilers using a continuous emissions monitoring system that satisfies the requirements of 310 CMR 7.19(13)(b) to determine compliance, compliance will be based on a calendar day average.

(b) **Repowering**. Any person subject to 310 CMR 7.19(4)(a), may choose to repower by December 31, 2003 and comply with 310 CMR 7.19(4)(b) rather than 310 CMR 7.19(4)(a). Such person shall enter into an enforceable agreement with the Department prior to June 1, 1994 agreeing to comply with the requirements of 310 CMR 7.19(4)(b).

1. A boiler to be repowered by December 31, 2003 shall not, after May 31, 1995 and before May 1, 1999, cause, suffer, allow or permit emissions from the facility in excess of an emission rate achievable through the implementation of RACT as required in an emission control plan approved under 310 CMR 7.19(3).

2. The repowered boiler shall be approved under 310 CMR 7.02(1), 310 CMR 7.00: Appendix A or 40 CFR 52.21, unless specifically exempted by those regulations.

3. The existing or repowered boiler shall not be operated after April 30, 1999 unless it complies with the most restrictive of the following NOx emissions standards (this limit represents RACT):

a. For dry bottom, tangential and face fired boilers burning solid fuel, 0.2 pounds per million Btu, based on a one hour average;
b. For boilers burning oil or gas, 0.1 pounds per million Btu, based on a one hour average;
c. The averaging time for determining compliance with 310 CMR 7.19(4)(b) shall be one hour. Except that, for boilers utilizing a CEMS that satisfies the requirements of 310 CMR 7.19(13)(b) to determine compliance, compliance shall be based on a calendar day average.
d. A Best Available Control Technology determination made as part of an approval issued pursuant to 310 CMR 7.02(1) or 40 CFR 52.21 or Lowest Achievable Emission Rate determination made pursuant to 310 CMR 7.00: Appendix A, as applicable.
e. An applicable New Source Performance Standards (40 CFR 60).

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(5) **Medium-size Boilers.**

(a) **Applicability and NOx RACT.** After May 31, 1995, any person owning, leasing, operating or controlling a boiler with an energy input capacity of 50 million Btu per hour or greater and less than 100 million Btu per hour at a facility subject to 310 CMR 7.19, shall comply with the following NOx emission standard, except as provided for in 310 CMR 7.19(2)(b), 7.19(2)(e) and 7.19(2)(f).

1. For tangential or face-fired or stoker-fired boilers, burning solid fuel, 0.43 pounds per million Btu, based on a one-hour average.

2. For tangential or face fired boilers, based on a one-hour average.

a. burning gas only, 0.1 pounds per million Btu.
b. burning distillate oil or oil and gas (This includes burning the oil and gas simultaneously or at different times. Boilers approved to burn another fuel such as coal are subject to this limit while only burning oil and/or gas and not coal.) 0.12 pounds per million Btu.
c. burning residual oil,

i. 0.3 pounds per million Btu burning residual oil or residual oil and gas (This includes burning the oil and gas simultaneously or at different times. Boilers approved to burn another fuel such as coal are subject to this limit while burning only oil and/or gas and not coal.), or

ii. recirculate at least 15% of the flue gas and maintain flue gas oxygen concentration at 3% at the boiler exit. The O2 level

should not be decreased beyond the point that the CO concentration increases beyond 130 ppmvd, corrected to 3% O2.

3. For boilers using a continuous emissions monitoring system that satisfies the requirements of 310 CMR 7.19(13)(b) to determine compliance, compliance will be based on a calendar day average.

(b) **Cofiring Fuels.** Except as provided for under 310 CMR 7.19(2)(f), if more than one fuel is fired simultaneously or during the same hour (or day if an averaging time of 24 hours is used), the allowable NOx emissions standard shall be calculated according to the procedure contained in 310 CMR 7.19(15).

* * *

(d) **Carbon Monoxide (CO) Limitation.** Any facility subject to 310 CMR 7.19(5), shall not exceed a CO exhaust concentration of 200 ppmvd, corrected to 3% oxygen. This shall be based on a one hour averaging time. If a continuous emissions monitoring system is used for determining compliance, the averaging time shall be a calendar day. Not withstanding this CO emission standard, the Department may approve a higher CO emission standard for a medium-size boiler as part of the emission control plan if the facility demonstrates that combustion conditions will not significantly deteriorate with the higher CO emission standard.

(6) **Small Boilers**

(a) **Applicability and NOx RACT**. After March 15, 1995, any person owning, leasing, operating or controlling a boiler, with an energy input capacity of less than 50 million Btu per hour and equal to or greater than 20 million Btu per hour or with an energy input capacity less than 20 million Btu per hour with potential emissions greater than 50 TPY of NOx, at a facility subject to 310 CMR 7.19, shall tune the boiler annually according to the following procedure (tuneup procedure based on Combustion Efficiency Optimization Manual for Operators of Oil and Gas Fired Boilers (EPA 340/1-83-023)):

1. Operate the boiler at a firing rate most typical of normal operation. If the boiler experiences significant load variations during normal operation, operate it at its average firing rate.
2. At this firing rate record stack gas temperature, oxygen concentration, and CO concentration (for gaseous fuels) or smoke-spot number (For liquid fuels, the smoke spot number can be determined with ASTM Test Method D-2156 (Bacharach or equivalent)) and observe flame conditions after boiler operation stabilizes at the firing rate selected. If the excess oxygen in the stack gas is at the lower end of the range of typical minimum values (typical minimum oxygen levels for boilers at high firing rates are: for natural gas 0.5-3.0%; for liquid fuels 2.0-4.0%. The for natural gas 0.5-3.0%; for liquid fuels 2.0-4.0%. The O[2] level should be reduced below this range with caution). If the CO emissions are low

and there is no smoke, the boiler is probably operating at near optimum efficiency at this particular firing rate. However, complete the remaining portion of this procedure at 310 CMR 7.19(6)(a)3. through 10. to determine whether still lower oxygen levels are practical.

3. Increase combustion air flow to the boiler until stack gas oxygen levels increase by 1 to 2% over the level measured in 310 CMR 7.19(6)(a)2.. As in 310 CMR 7.19(6)(a)2., record the stack gas temperature, CO concentration (for gaseous fuels) and smoke-spot number (for liquid fuels), and observe flame conditions for these higher oxygen levels after boiler operation stabilizes.

4. Decrease combustion air flow until the stack gas oxygen concentration is at the level measured in 310 CMR 7.19(6)(a)2. From this level gradually reduce the combustion air flow, in small increments. After each increment, record the stack gas temperature, oxygen concentration, CO concentration (for gaseous fuels) and smoke-spot number (for liquid fuels). Also observe the flame and record any changes in its condition.

5. Continue to reduce combustion air flow stepwise, until one of these limits is reached:

   a. Unacceptable flame conditions - such as flame impingement on furnace walls or burner parts, excessive flame carryover, or flame instability.
   b. Stack gas CO concentrations greater than 400 ppm for gaseous fuels.
   c. Smoking at the stack for liquid fuels.
   d. Equipment-related limitation - such as low windbox/furnace pressure differential, built in air-flow limits, etc.

6. Develop an O[2]/CO curve (for gaseous fuels) or O[2]/smoke curve (for liquid fuels) similar to those shown in figures 310 CMR 7.19(6)-1 and 2 using the excess oxygen and CO or smoke-spot number data obtained at each combustion air flow setting.

7. From the curves prepared in 310 CMR 7.19(6)(a)6., find the stack gas oxygen levels where the CO emission or smoke spot number equals the following values:

Fuel	Measurement	Value
Gaseous	CO emissions	400 ppm
#1 & #2 oils	smoke-spot number	number 1
#4 oil	smoke-spot number	number 2
#5 oil	smoke-spot number	number 3
#6 oil	smoke-spot number	number 4

The above conditions are referred to as CO or smoke threshold, or as the minimum excess oxygen level. Compare this minimum value of excess oxygen to the expected value provided by the combustion unit manufacturer. If the minimum level found is substantially higher than the value provided by the combustion unit manufacturer, the owner or operator should improve fuel and air mixing, thereby allowing operation with less air.

8. Add 0.5 to 2.0% to the minimum excess oxygen level found in 310 CMR 7.19(6)(a)7. and reset burner controls to operate automatically at this higher stack gas oxygen level. This margin above the minimum oxygen level accounts for fuel variations, variations in atmospheric conditions, load changes, and non-repeatability or play in automatic controls.

9. If the load of the combustion unit varies significantly during normal operation, repeat 310 CMR 7.19(6)(a)1. through 8. for firing rates that represent the upper and lower limits of the range of the load. Because control adjustment at one firing rate may effect conditions at other firing rates, it may not be possible to establish the optimum excess oxygen level at all firing rates. If this is the case, choose the burner control settings that give best performance over the range of firing rates. If one firing rate predominates, settings should optimize conditions at that rate.

10. Verify that the new settings can accommodate the sudden changes that may occur in daily operation without adverse effects. Do this by increasing and decreasing load rapidly while observing the flame and stack. If any of the conditions in 310 CMR 7.19(6)(a)5. result, reset the combustion controls to provide a slightly higher level of excess oxygen at the affected firing rates. Next, verify these new settings in a similar fashion. Then make sure that the final control settings are recorded at steadystate operating conditions for future reference.

11. Another method may be substituted if it is approved, in writing, by the Department and EPA as equivalent.

MISSOURI

1. For full text of NOx RACT regulations, Air Quality Standards and Air Pollution Control Rules Specific to the St. Louis Metropolitan Area, Mo. Code Regs. Ann. tit. 10, § 10-5.510 (2006), http://www.sos.mo.gov/adrules/csr/current/10csr/10c10-5.pdf

2. Approval: Approved by USEPA as NOx RACT at 65 Fed. Reg. 31484 (May 18, 2000).

3. Applicability: Applies to "Installations" in the city of St. Louis and the 4 surrounding counties with potential to emit 100 tons or more per year of NOx.

4. Industrial Boiler Limits:

The rule does not apply to any boiler having a maximum heat input of less than fifty (50) million British thermal units (mmBtu) per hour. The following provisions are applicable to industrial boilers:

Mo. Code Regs. Ann. tit. 10, § 10-5.510(3) General Provisions.

(A) No owner or operator of a boiler with a maximum rated heat input capacity of one hundred (100) mmBtu per hour or greater shall allow the unit to emit NOx in excess of the emission rates specified in Table 1 as measured pursuant to section (5) of this rule.

Table 1
Maximum Allowable NOx Emission Rates
for Boilers
(Pounds of NOx per mmBtu)

Fuel/Boiler Type	**Firing Configurations**			
	Tangential	**Wall**	**Cyclone**	**Stoker**
Gaseous Fuels Only	0.2	0.2	0.5	-
Distillate Oil	0.3	0.3	-	-
Residual Oil	0.3	0.3	-	-
Coal - Wet Bottom	-	-	0.86	-
Coal - Dry Bottom	0.45	0.5	-	0.5

(B) An owner or operator of a boiler or incinerator with a maximum rated heat input capacity equal to or greater than fifty (50) mmBtu per hour but less than one hundred (100) mmBtu per hour shall complete an annual adjustment or tune up on the combustion process. This adjustment or tune up shall include at a minimum the following items:

1. Inspection, adjustment, cleaning or replacement of fuel burning equipment, including the burners and moving parts necessary for proper operation as specified by the manufacturer;

2. Inspection of the flame pattern or characteristics and adjustments necessary to minimize total emissions of NOx and, to the extent practicable, minimize emissions of carbon monoxide; and

3. Inspection of the air to fuel ratio control system and adjustments necessary to ensure proper calibration and operation as specified by the manufacturer.

NEW HAMPSHIRE

1. For full text of NOx RACT regulations, Nitrogen Oxides (NOx), N.H. Code Admin. R. Ann. Env-A 1211.01 *et seq.* (2006), see: http://www.des.state.nh.us/Rules/pdf/env-a1200.pdf

2. Approval: Approved by USEPA as NOx RACT at 62 Fed. Reg. 17092 (April 9, 1997).

3. Applicability: Applicability for specified source types is based on combined maximum heat input. For industrial boilers, the rules are applicable if the combined maximum heat input rate exceeds 50,000,000 Btu per hour at any time after December 31, 1989. Other types of emission units listed are subject to the rule if located at a facility which has potential NOx emissions greater than 50 tons per year since Jan 1, 1990. Some exemptions.

4. Industrial Boiler Limits:

N.H. Code Admin. R. Ann. Env-A 1211.05 Emission Standards for Industrial Boilers.

(a) All industrial boilers that meet the applicability criteria of Env-A 1211.01(d) shall be subject to the provisions of this section.

(b) Owners or operators of industrial boilers with heat input rates of at least 5,000,000 Btu per hour but less than 50,000,000 Btu per hour shall:

(1) Before April 1st of each year:

a. Perform an efficiency test using the test procedures specified in chapter 3, Combustion Efficiency Tables, Taplin, Harry, R., Fairmont Press, 1991; and
b. Adjust the combustion process of the boiler in accordance with the procedures specified in chapter 5, Combustion Efficiency Tables, Taplin, Harry R., Fairmont Press, 1991; and

(2) Maintain, in a permanently bound log book the following information:

a. The date(s) on which:
   1. The efficiency test was conducted; and
   2. The combustion process was last adjusted;

b. The name(s), title and affiliation of the person(s) who:
   1. Conducted the efficiency test; and
   2. Made the adjustments;

c. The NOx emission concentration, in ppmvd, corrected to 15% oxygen, after the adjustments are made;
d. The CO emission concentration, in ppmvd, corrected to 15% oxygen, after the adjustments are made;
e. The opacity readings; and
f. Any other information required by Env-A 903, Env-A 905, and Env-A 909.

(c) Industrial boilers in existence on or after May 31, 1995 with heat input rates of at least 50,000,000 Btu per hour but less than 100,000,000 Btu per hour shall comply with the NOx RACT emission limits, or install the NOx RACT control technology, specified below:

(1) For dry-bottom boilers firing coal, capable of firing coal, oil or any combination thereof:

a. For tangential-fired boilers, 0.38 lb. per million Btu, based on a 24-hour calendar day average;
b. For face-fired boilers, 0.50 lb. per million Btu, based on a 24-hour calendar day average; and
c. For stoker-fired boilers, 0.30 lb. per million Btu, based on a 24-hour calendar day average;

(2) For tangential or face-fired boilers firing exclusively oil:

a. For boilers firing No. 2 fuel oil, 0.12 lb. per million Btu, based on an hourly average; and
b. For boilers firing No. 4, 5, or 6 fuel oil:

1. 0.30 lb. per million Btu, based on a 24-hour calendar day average;
2. Install, operate, and maintain low NOx burners (LNB); or
3. Install, operate and maintain air pollution control equipment or an air pollution control process having equivalent or greater NOx removal efficiency as LNB as approved by the division and EPA pursuant to Env-A 1211.18;

(3) For tangential or face-fired boilers firing a combination of oil and gas:

a. When firing exclusively gas:

1. 0.10 lb. per million Btu, based on an hourly average;

2. Install, operate, and maintain LNB; or

3. Install, operate, and maintain air pollution control equipment or an air pollution control process having equivalent or greater NOx removal efficiency as LNB as approved by the division and EPA pursuant to Env-A 1211.18;

b. When firing exclusively oil:

1. When firing No. 2 fuel oil, 0.12 lb. per million Btu, based on an hourly average; and

2. When firing No. 4, 5, or 6 fuel oil:

(i) 0.30 lb. per million Btu, based on a 24-hour calendar day average;

(ii) Install, operate, and maintain LNB; or

(iii) Install, operate, and maintain air pollution control equipment or an air pollution control process having equivalent or greater NOx removal efficiency as LNB as approved by the division and EPA pursuant to Env-A 1211.18;

c. When firing a combination of oil and gas:

1. When firing gas and No. 2 fuel oil, 0.12 lb. per million Btu, based on an hourly average; and

2. When firing gas and No. 4, 5, or 6 fuel oil:

(i) 0.30 lb. per million Btu, based on a 24-hour calendar day average;

(ii) Install, operate, and maintain LNB; or

(iii) Install, operate, and maintain air pollution control equipment or an air pollution control process having equivalent or greater NOx removal efficiency as LNB as approved by the division and EPA pursuant to Env-A 1211.18;

(4) For boilers firing exclusively gas:

a. 0.10 lb. per million Btu, based on an hourly average;

b. Install, operate, and maintain LNB; or

c. Install, operate, and maintain air pollution control equipment or an air pollution control process having equivalent or greater NOx removal efficiency as LNB as approved by the division and EPA pursuant to Env-A 1211.18; and

(5) For boilers firing wood fuel, or a combination of wood fuel and oil:

a. For boilers equipped with a traveling, shaker, or vibrating grate, 0.33 lb. per million Btu, based on a 24-hour calendar day average; and
b. For boilers equipped with a stationary grate, 0.25 lb. per million Btu based on a 24-hour calendar day average.

(d) Industrial boilers in existence on or after May 31, 1995 with heat input rates of 100,000,000 Btu per hour or more shall comply with the NOx RACT emission limits, or install the NOx RACT control technology, specified below:

(1) For wet-bottom boilers firing coal, or any combination of fuels utilizing coal:

a. For tangential or face-fired boilers, 1.0 lb. per million Btu, based on a 24-hour calendar day average; and
b. For cyclone-fired boilers, 0.92 lb. per million Btu, based on a 24-hour calendar day average;

(2) For dry-bottom boilers firing coal, capable of firing coal, oil, or any combination thereof:

a. For tangential-fired boilers, 0.38 lb. per million Btu, based on a 24-hour calendar day average;
b. For face-fired boilers, 0.50 lb. per million Btu, based on a 24-hour calendar day average; and
c. For stoker-fired boilers, 0.30 lb. per million Btu, based on a 24-hour calendar day average;

(3) For boilers firing oil, capable of firing oil, gas, or any combination thereof:

a. For tangential or face-fired boilers when firing exclusively oil

1. 0.30 lb. per million Btu, based on a 24-hour calendar day average;
2. Install, operate, and maintain LNB; or
3. Install, operate, and maintain air pollution control equipment or an air pollution control process having equivalent or greater NOx removal efficiency as LNB as approved by the division and EPA pursuant to Env-A 1211.18;

b. For face-fired boilers when firing gas, or any combination of oil and gas, 0.25 lb. per million Btu based on a 24-hour calendar day average; and

c. For tangential-fired boilers when firing gas, or any combination of oil and gas, 0.25 lb. per million Btu based on a 24-hour calendar day average;

(4) For boilers firing exclusively gas:

a. For tangential or face-fired boilers, 0.10 lb. per million Btu, based on an hourly average;

b. Install, operate and maintain LNB; or

c. Install, operate and maintain air pollution control equipment or an air pollution control process having equivalent or greater NOx removal efficiency as LNB as approved by the division and EPA pursuant to Env-A 1211.18; and

(5) For boilers firing wood fuel, capable of firing a combination of wood fuel and oil:

a. For boilers equipped with a traveling, shaker, or vibrating grate, 0.33 lb. per million Btu, based on a 24-hour calendar day average; and

b. For boilers equipped with a stationary grate, 0.25 lb. per million Btu, based on a 24-hour calendar day average.

(e) Compliance with the NOx RACT emission standards specified in this section shall be determined by the testing methods specified in Env-A 800 and, if applicable, by a CEM system for NOx required by Env-A 600 or Env-A 1211.21.

NEW JERSEY

1. For full text of NOx RACT regulations, Control and Prohibition of Air Pollution from Oxides of Nitrogen, N.J. Admin. Code § 7:27-19.01 *et seq.* (2006), see: http://www.state.nj.us/dep/aqm/Sub19.pdf. (Rule amended in 2005 with changes based on OTC model rule.)

2. Approval: Approved by USEPA as RACT at 64 Fed. Reg. 14834 (Mar. 29, 1999) with various source specific RACT determinations approved on other dates and referenced at 40 CFR § 52.1570.

3. Applicability: Applies statewide to owners and operators of stationary sources of NOx emissions, including boilers serving electric generating units, industrial/commercial/institutional boilers, combustion turbines, reciprocating engines, asphalt plant rotary dryers, glass manufacturing furnaces and any other equipment or

source operation not specified that has the PTE more than 10 tons of NOx per year. *See* N.J. Admin. Code § 7:27-19.2.

4. Industrial Boiler Limits:

7:27-19.2

(b) The following types of equipment and source operations are subject to the provisions of this subchapter:

1. Any boiler serving an electric generating unit, located at a major NOx facility;
2. Until March 7, 2007, any industrial/commercial/institutional boiler or other indirect heat exchanger that has a maximum gross heat input rate of at least 20 million BTUs per hour, located at a major NOx facility. On and after March 7, 2007, the applicability of this subchapter to an industrial/commercial/institutional boiler or other indirect heat exchanger shall be determined by (c)1 below;

(c) On and after March 7, 2007, in addition to the types of equipment and source operations listed at (b) above, the following types of equipment or source operations shall be subject to the provisions of this subchapter:

1. Any industrial/commercial/institutional boiler or other indirect heat exchanger that has a maximum gross heat input rate of at least five million BTU per hour, whether or not it is located at a major NOx facility;

7:27-19.7 Industrial/commercial/institutional boilers and other indirect heat exchangers

(a) Beginning in calendar year 1995, and until March 7, 2007, the owner or operator of an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 20 million but less than 50 million BTUs per hour shall:

1. Annually adjust the boiler's combustion process in accordance with N.J.A.C. 7:27-19.16, each calendar year; or
2. Cause the boiler or other indirect heat exchanger to emit NO_x at a rate no greater than the applicable maximum allowable NO_x emission rate specified in Table 5 below, and establish compliance with this requirement by continuous emissions monitoring pursuant to N.J.A.C. 7:27-19.15(a)1.

(b) Beginning on May 31, 1995, and until March 7, 2007, the owner or operator of an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 50 million but less than 100 million BTUs per hour shall cause the boiler or other indirect heat exchanger to emit NO_x at a rate no greater than the applicable maximum allowable NO_x emission rate specified in Table 5 below, and comply with the requirements of (e) below.

TABLE 5

Maximum Allowable NO_x Emission Rates for
Industrial/Commercial/Institutional Boilers and other Indirect Heat Exchangers
Subject to N.J.A.C. 7:27-19.7(b)
(pounds per million BTU)

Firing Method

Fuel/Boiler Type	Tangential	Face	Cyclone
Coal -- Wet Bottom	1.0	1.0	0.55
Coal -- Dry Bottom	0.38	0.43	0.55
#2 Fuel Oil	0.12	0.12	0.12
Other Liquid Fuels	0.3	0.3	0.3
Refinery fuel gas	0.20	0.20	N/A
Natural Gas	0.1	0.1	0.1

(c) Beginning on May 31, 1995, and until March 7, 2007, the owner or operator of an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 100 million BTUs per hour shall cause the boiler or other indirect heat exchanger to emit NO_x at a rate no greater than the applicable maximum allowable NO_x emission rate specified in Table 6 below, and comply with the applicable requirements of (d) or (e) below.

TABLE 6

Maximum Allowable NO_x Emission Rates for
Industrial/Commercial/Institutional Boilers and other Indirect Heat Exchangers
Subject to N.J.A.C. 7:26-19.7(c)
(pounds per million BTU)

Firing Method

Fuel/Boiler Type	Tangential	Face	Cyclone
Coal -- Wet Bottom	1.0	1.0	0.60
Coal -- Dry Bottom	0.38	0.45	0.55
Oil and/or Gas	0.20	0.28	0.43
Refinery fuel gas	0.20	0.20	N/A
Gas Only	0.20	0.20	0.43

(d) In addition to complying with (c) above, the owner or operator of any industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 250 million BTUs per hour shall install a continuous emissions monitoring system in accordance with N.J.A.C. 7:27-19.18.

(e) Until March 7, 2007, in addition to complying with (b) or (c) above, as applicable, the owner or operator of an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 50 million BTUs per hour but less than 250 million BTUs per hour shall either:

1. Annually adjust the boiler's combustion process in accordance with N.J.A.C. 7:27-19.16, each calendar year; or
2. Establish compliance with the applicable maximum allowable emission rate by continuous emissions monitoring pursuant to N.J.A.C. 7:27-19.15(a)1.

(f) Until March 7, 2007, in lieu of complying with a NO_x emission limit under (b) or (c) above, the owner or operator of an industrial/commercial/institutional boiler or other indirect heat exchanger may comply with N.J.A.C. 7:27-19.3(f).

(g) On and after March 7, 2007, the owner or operator of an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least five million BTU per hour, whether or not it is located at a major NO_x facility, shall adjust the combustion process annually in accordance with the procedure set forth at N.J.A.C. 7:27-19.16 and the following schedule:

1. For an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least five million BTU per hour, but less than 10 million BTU per hour, in the same quarter of each calendar year, beginning in 2010;
2. For an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 10 million BTU per hour, but less than 20 million BTU per hour, in the same quarter of each calendar year beginning in 2008; or
3. For an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 20 million BTU per hour or greater, in the same quarter of each calendar year beginning in 2007.

(h) On and after March 7, 2007, an industrial/commercial/institutional boiler or other indirect heat exchanger with a maximum gross heat input rate of at least 50 million BTU per hour, located at a major NO_x facility, shall cause the boiler or other indirect heat exchanger to emit NO_x at a rate no greater than the applicable maximum allowable NO_x emission rate specified in Table 7 below, unless the owner or operator is complying with N.J.A.C. 7:27-19.3(f).

TABLE 7

Maximum Allowable NO_x Emission Rates for

Industrial/Commercial/Institutional Boilers or other Indirect Heat Exchangers
(pounds per million BTU)

Heat Input Rate (million BTU per hr)	Fuel/Boiler Type	Firing Method		
		Tangential	Face	Cyclone
at least 50 but < 100	Natural gas	0.10	0.10	0.10
	#2 Fuel oil	0.12	0.12	0.12
	Refinery fuel gas and other gaseous fuels	0.20	0.20	N/A
	Other liquid fuels	0.30	0.30	0.30
	Coal – Wet Bottom	1.0	1.0	0.55
	Coal – Dry Bottom	0.38	0.43	0.55
at least 100 or greater	Natural gas only	0.10	0.10	0.10

	Refinery fuel gas and other gaseous fuels	0.20	0.20	N/A
	Fuel oil and/or natural gas	0.20	0.28	0.43
	Coal – Wet Bottom	1.0	1.0	0.60
	Coal – Dry Bottom	0.38	0.45	0.55

NEW YORK

1. For full text of regulations, Reasonably Available Control Technology (RACT for Oxides of Nitrogen (NOx), N.Y. Comp. Codes R. & Regs. tit. 6 § 227-2.1 *et seq.* (2006), see: http://www.dec.state.ny.us/website/regs/subpart227_2.html

2. Approval: Approved by USEPA as NOx RACT at 66 Fed. Reg. 28063 (May 22, 2001).

3. Applicability: Applies statewide to owners and operators of specific types of major stationary sources of NOx, including boilers, combustion turbines, stationary internal combustion engines and other combustion sources.

4. Industrial Boiler Limits:

   New York has two types of limits--presumptive or case-by-case. Case-by-case RACT considers the technological and economic circumstances of the individual source and is established by permit and submitted separately to USEPA as a SIP revision. A source may use this when presumptive RACT limits are not attainable at the source. The source must demonstrate that presumptive RACT is not economically or technically feasible. N.Y. Comp. Codes R. & Regs. tit. 6, §§ 227-2.4, 227-2-5(c). Presumptive RACT limits for industrial boilers are at N.Y. Comp. Codes R. & Regs. tit. 6, § 227-2.4 as follows:

   (a) *Very large boilers*. The owner or operator of a very large boiler must comply with either the presumptive RACT emission limits of paragraph (1) of this subdivision or a case-by-case RACT determination made pursuant to paragraph (2) of this subdivision, as applicable.

(1) Emission limits.

(Pounds NO_x per million Btu) Boiler Configuration				
Fuel Type	***Tangential***	***Wall***	***Cyclone***	***Stokers***
Gas Only	0.20	0.20	na	na
Gas/Oil	0.25	0.25	0.43	na
Coal Wet Bottom	1.00	1.00	0.60	na
Coal Dry Bottom	0.42	0.45	na	0.30[1]

[1]This emission limit is 0.33 pounds per million Btu when at least 25 percent other solid fuels (*e.g.,* tire-derived fuel, waste wood), on a Btu basis, are utilized.

Compliance with these emission limits must be determined on a 24-hour heat input-weighted average basis in accordance with the provisions of section 227-2.6 (a)(1) of this Subpart. From October 1st to April 30th, a 30-day rolling heat input-weighted average may be used to demonstrate compliance.

(2) For very large boilers having configurations other than those listed above or which are fired primarily with fuels not listed above, the owner or operator must submit, as part of the compliance plan required under section 227-2.3(a) and (b) of this Subpart, a proposal for RACT to be implemented that includes descriptions of:

(i) the available NO_x control technologies, the projected effectiveness of the technologies considered, and the costs for installation and operation for each of the technologies; and

(ii) the technology and the appropriate emission limit selected as RACT considering the costs for installation and operation of the technology.

(b) *Large boilers*. The owner or operator of a large boiler must comply with either the presumptive RACT emission limits of paragraph (1) of this subdivision or a case-by-case RACT determination made pursuant to paragraph (2) of this subdivision, as applicable.

(1) Emission limits.

(Pounds per million Btu)

Fuel Type	*Emission Limit*
Gas Only	0.20
Gas/Oil	0.30
Pulverized Coal	0.50
Coal (Overfeed Stoker)	0.30[2]

[2]This emission limit is 0.33 pounds per million Btu when at least 25 percent other solid fuels (*e.g.*, tire-derived fuel, waste wood), on a Btu basis, are utilized.

Compliance with these emission limits must be determined with a one hour average in accordance with the provisions of section 227-2.6(a)(3)of this Subpart unless the owner or operator chooses to utilize a CEMS under the provisions of section 227-2.6(a)(2) of this Subpart. If a CEMS is utilized, the requirements of section 227-2.6(b) of this Subpart apply, including the use of a 24-hour averaging period.

(2) For large boilers fired primarily with fuels not listed above, the owner or operator must submit, as part of the compliance plan required under section 227-2.3(a) and (b) of this Subpart, a proposal for RACT to be implemented that includes descriptions of:

(i) the available NO_x control technologies, the projected effectiveness of the technologies considered, and the costs for installation and operation for each of the technologies; and

(ii) the technology and the appropriate emission limit selected as RACT considering the costs for installation and operation of the technology.

(c) *Mid-size boilers*. The owner or operator of a mid-size boiler must comply with the presumptive RACT technology provisions of subparagraph (1)(i) or (ii) of this subdivision, the presumptive RACT emission limits of paragraph (2) of this subdivision, or a case-by-case RACT determination pursuant to subparagraph (1)(iii) or (iv) of this subdivision, as applicable.

(1) (i) Boilers fired with natural gas, distillate oil or a combination of these fuels must utilize approved low NO_x burners.

(ii) Boilers fired primarily with residual oil must utilize approved low NO_x burners and flue gas recirculation utilizing at least 10 percent recirculation.

(iii) For boilers fired primarily with fuels not listed in subparagraphs (i) and (ii) of this paragraph, the owner or operator must submit, as part of the compliance plan required under section 227-2.3(a) and (b) of this Subpart, a proposal for RACT to be implemented that includes descriptions of:

(*a*) the available NO_x control technologies, the projected effectiveness of the technologies considered, and the costs for installation and operation for each of the technologies; and

(*b*) the technology and the appropriate emission limit selected as RACT considering the costs for installation and operation of the technology.

(iv) For those boilers where physical constraints make it impossible or impractical to implement the requirements of subparagraph (i), (ii), or (iii) of this paragraph or paragraph (2) of this subdivision, the owner or operator must submit, as part of the compliance plan required under section 227-2.3(a) and (b) of this Subpart, a proposal for RACT to be implemented that includes a clear and convincing technical demonstration of such constraints and descriptions of:

(*a*) the available NO_x control technologies, the projected effectiveness of the technologies considered, and the costs for installation and operation for each of the technologies; and

(*b*) the technology and the appropriate emission limit selected as RACT considering the costs for installation and operation of the technology.

(2) Emission limits.

(Pounds NO_x per million Btu)

Fuel Type	***Emission Limit***
Gas Only	0.10
Distillate Oil	0.12
Residual Oil	0.30

Compliance with these emission limits must be determined with a one hour average in accordance with the provisions of section 227-

2.6(a)(4) of this Subpart unless the owner or operator chooses to utilize a CEMS under the provisions of section 227-2.6(a)(2) of this Subpart. If a CEMS is utilized, the requirements of section 227-2.6(b) of this Subpart apply, including the use of a 24-hour averaging period.

(d) *Small boilers.* The owner or operator of a small boiler must annually perform a tune-up and maintain, in a permanently bound log book, or other format approved in writing by the department, the following information:

(1) the date of the last tune-up;

(2) the name, title and affiliation of the person who made the adjustments; and

(3) any other information which the department may require as a condition of approval of its permit.

PENNSYLVANIA

1. For full text of NOx RACT regulations, Stationary Sources of NOx And VOCs, 25 Pa. Code § 129.91 – 129.95 (2006), *see*: http://www.pacode.com/secure/data/025/chapter129/chap129toc.html

2. Approval: Approved by USEPA as NOx RACT at 66 Fed. Reg. 52534 (Oct. 16, 2001) and 66 Fed. Reg. 54699 (Oct. 30, 2001) with various case-by-case RACT determinations approved on other dates and referenced at 40 CFR § 52.2020.

3. Applicability: Applies to owners and operators of major NOx emitting facilities throughout the state.

4. Industrial Boiler Limits:

A. Generic RACT regulations do not specifically define RACT for a source or source category, but instead impose procedures for imposing case-by-case RACT determinations. Subject facilities are required to submit a RACT proposal to the Pennsylvania Department of Environmental Protection (PDEP) who then imposes RACT on each subject source in an enforceable document, usually a Plan Approval (PA) or Operating Permit (OP). The PDEP then submits these PAs and OPs to USEPA for approval as source-specific SEP revisions. 25 Pa. Code § 219.91 - 129.95 (2006).

B. Presumptive RACT emission limitations listed for specified units as an alternative to the process of establishing RACT on a case-by-case basis. Limits here are tied to inspection, adjustments or tune-ups, or operations in accordance with manufacturer

specifications. Applicable industrial boiler text of the regulation at 25 Pa. Code § 129.93 is as follows:

§ 129.93. Presumptive RACT emission limitations.

(a) The owner and operator of a major NO_x emitting facility listed in this section and subject to § 129.91 (relating to control of major sources of NO_x and VOCs) may elect to comply with the emission limitations of this section as an alternative to developing and implementing a RACT emission limitation on a case-by-case basis.

(b) The owner and operator shall develop and implement the following presumptive RACT emission limitations:

(1) For a coal-fired combustion unit with a rated heat input equal to or greater than 100 million Btu/hour, presumptive RACT shall be the installation and operation of low NO_x burners with separate overfire air.

(2) For a combustion unit with a rated heat input equal to or greater than 20 million Btu/hour and less than 50 million Btu/hour presumptive RACT shall be the performance of an annual adjustment or tuneup on the combustion process. This adjustment shall include, at a minimum, the following:

(i) Inspection, adjustment, cleaning or replacement of fuel-burning equipment, including the burners and moving parts necessary for proper operation as specified by the manufacturer.

(ii) Inspection of the flame pattern or characteristics and adjustments necessary to minimize total emissions of NO_x, and to the extent practicable minimize emissions of CO.

(iii) Inspection of the air-to-fuel ratio control system and adjustments necessary to ensure proper calibration and operation as specified by the manufacturer.

(3) For combustion units subject to paragraph (2), the owner and operator of the adjusted equipment shall record each adjustment conducted under the procedures in paragraph (2) in a permanently bound log book or other method approved by the Department. This log shall contain, at a minimum, the following information:

(i) The date of the tuning procedure.
(ii) The name of the service company and technicians.
(iii) The final operating rate or load.
(iv) The final CO and NO_x emission rates.
(v) The final excess oxygen rate.
(vi) Other information required by the applicable operating permit.

(4) For oil, gas and combination oil/gas units subject to paragraph (2), the owner and operator shall maintain records including a certification from the fuel supplier of the type of fuel

and for each shipment of distillate oils number 1 or 2, a certification that the fuel complies with ASTM D396-78 "Standard Specifications for Fuel Oils." For residual oils, minimum recordkeeping includes a certification from the fuel supplier of the nitrogen content of the fuel, and identification of the sampling method and sampling protocol.

(5) For oil and gas and combination oil/gas fired units subject to paragraph (2), the owner and operator shall make the annual adjustment in accordance with the EPA document "Combustion Efficiency Optimization Manual for Operators of Oil and Gas-fired Boilers," September 1983 (EPA-340/1-83-023) or equivalent procedures approved in writing by the Department.

(c) For the following source types, presumptive RACT emission limitations are the installation, maintenance and operation of the source in accordance with manufacturers specifications:

(1) Boilers and other combustion sources with individual rated gross heat inputs less than 20 million Btu/hour of operation.

* * *

(5) Any fuel-burning equipment, gas turbine or internal combustion engine with an annual capacity factor of less than 5%, or an emergency standby engine operating less than 500 hours in a consecutive 12-month period.

(6) Sources which have been approved as meeting LAER for NO_x emissions since November 15, 1990, with Federally enforceable emission limitations.

(7) Sources which have been approved as meeting BACT for NO_x emissions since November 15, 1990, with Federally enforceable emission limitations. These sources shall, however, meet any more stringent category-wide RACT emission limitation promulgated by EPA or the Department.

RHODE ISLAND

1. For full text of NOx RACT regulations, Control of Nitrogen Oxides Emissions, 12-031-027 R.I. Code R. § 27.1 *et seq.* (2006), *see*: http://www.dem.ri.gov/pubs/regs/regs/air/air27_96.pdf

2. Approval: General NOx RACT approved at 62 Fed. Reg. 46202 (Sept. 2, 1997) with various alternative facility specific RACT determinations approved on other dates.

3. Applicability: Applies statewide to all stationary sources which have PTE 50 tons of NOx per year from all pollutant-emitting equipment or activities. Some exemptions are allowed. 12-031-027 R.I. Code R. § 27.2.

4. Industrial Boiler Limits:

The regulations provide two options. The Alternative RACT option provides procedures for facilities that seek a relaxed standard from prescribed RACT limits. These alternative RACT determinations must be approved by USEPA as a SIP revision and must be reviewed every three years until the prescribed RACT limits are achieved. 12-031-027 R.I. Code R. § 27.4.8. Prescribed RACT specifies limits for sources, including the following limits for industrial boilers:

Regulation 27.4.2 Industrial - Commercial - Institutional Boilers

(a) On and after 31 May 1995, no person shall cause or allow the emission of NOx from any Industrial - Commercial – Institutional boiler, fired with natural gas or distillate oil, with a heat input capacity of 50 million BTUs per hour or greater, in excess of the following emission limitations:

1. 0.10 lbs per million BTU of heat input 10 when operated on natural gas
2. 0.12 lbs per million BTU of heat input when operated on distillate oil or liquified petroleum gas (LP)

(b) On and after 31 May 1995, no person shall cause or allow the emission of NOx from any Industrial - Commercial – Institutional boiler, fired with residual oil, with a heat input capacity of 50 million BTUs per hour or greater, unless the boiler is equipped with low - NOx burners and flue gas recirculation (with a minimum of 10% flue gas recirculation) or equivalent control.

(c) On and after 31 May 1995, no person shall cause or permit the emission of NOx from any Industrial - Commercial – Institutional boiler, with a heat input capacity of 1 million BTU per hour or greater, but less than 50 million BTUs per hour, unless the boiler is tuned at least once per year in accordance with the procedure described in Appendix A.

Regulation 27.4.5

The RACT requirements in Subsections 27.4.1 - 27.4.4 do not apply to equipment and pollutant - emitting activities that have been determined to be BACT or LAER in any permit issued by the Division pursuant to Air Pollution Control Regulation No. 9 since 15 November 1992.

TENNESSEE

1. Nitrogen Oxides, Tenn. Comp. R. & Regs. 1200-3-27, et seq. (2006). For full text of the regulation, *see* http://www.state.tn.us/sos/rules/1200/1200-03/1200-03-27.pdf

2. Approval Date: Nitrogen Oxides, Tenn. Comp. R. & Regs. 1200-3-27 (2006). Approved by USEPA at 61 Fed. Reg. 39326 (July 29, 1996). Only portions of the sections were approved and added to the SIP.

3. Application/Limits for Industrial Boilers:

(1) "(b) Specifically, the owner of operator of a tangentially-fired coal burning boiler having heat input capacity in excess of 600 million BTU per hour in Davidson, Rutherford, Sumner, Williamson, or Wilson County shall not allow emissions of nitrogen oxides from that boiler in excess of 0.45 pound per million BTU (30-day rolling average) (RACT)." *See* Tenn. Comp. R. & Regs. 1200-3-27.03(1)(b).

(3) "(a) The owner or operator of a boiler subject to the requirements of Subparagraph (1)(b) of this rule shall:
1. Submit a final control plan, acceptable to the Technical Secretary, for the installation of nitrogen oxides emission control systems and/or modifications of fuel burning equipment to the Technical Secretary by April 26, 1994;
2. Complete construction or installation of equipment by May 31, 1995; and
3. Demonstrate full compliance with nitrogen oxides reasonably available control technology by July 31, 1995, using approved test methods and procedures." *See* Tenn. Comp. R. & Regs. 1200-3-27.03(3)(a).

TEXAS

1. For full text of the regulations, *see*:

- EGUs in Ozone Containment Areas – Applicability, 30 Tex. Admin. Code § 117.101 (2006).
http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=117&rl=101
- EGUs in Ozone NonAttainment Areas – Emission Specifications for RACT, 30 Tex. Admin. Code §117.105 (2006).
http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=117&rl=105
- Industrial Commercial and Institutional Combustion Sources in Ozone NonAttainment Areas – Applicability, 30 Tex. Admin. Code § 117.201 (2006).
http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=117&rl=201
- Industrial Commercial and Institutional Combustion Sources in Ozone NonAttainment Areas – Emission Specifications for RACT, 30 Tex. Admin. Code § 117.205 (2006).
http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=117&rl=205

2. Approval Date: All provisions referenced above were approved by USEPA at 66 Fed. Reg. 57244 (Nov. 14, 2001).

3. Application and Limits for Industrial Boilers

- Industrial Commercial and Institutional Combustion Sources in Ozone NonAttainment Areas – Applicability, 30 Tex. Admin. Code § 117.201 (2006)

- Applies to the following units located at any major stationary source of NOx located within the Beaumont/Port Arthur, Dallas/Fort Worth, or Houston/Galveston ozone nonattainment areas: . . . industrial, commercial, or institutional boilers and process heaters; and boilers and industrial furnaces which were regulated as existing facilities by the United States Environmental Protection Agency at 40 Code of Federal Regulations Part 266, Subpart H (as was in effect on June 9, 1993) . . . *See* 30 Tex. Admin. Code §§ 117.201(1), (5) (2006).

- Industrial Commercial and Institutional Combustion Sources in Ozone NonAttainment Areas – Emission Specifications for RACT, 30 Tex. Admin. Code § 117.205 (2006).
  - Previous Permit Limits/New Permit limits
  - "b) For each boiler and process heater with a maximum rated capacity greater than or equal to 100.0 MMBtu/hr of heat input, the applicable emission limit is as follows:
    (1) gas-fired boilers, as follows:
    (A) low heat release boilers with no preheated air or preheated air less than 200 degrees Fahrenheit, 0.10 lb NO_x /MMBtu of heat input;
    (B) low heat release boilers with preheated air greater than or equal to 200 degrees Fahrenheit and less than 400 degrees Fahrenheit, 0.15 lb NO_x /MMBtu of heat input;
    (C) low heat release boilers with preheated air greater than or equal to 400 degrees Fahrenheit, 0.20 lb NO_x /MMBtu of heat input;
    (D) high heat release boilers with no preheated air or preheated air less than 250 degrees Fahrenheit, 0.20 lb NO_x /MMBtu of heat input;
    (E) high heat release boilers with preheated air greater than or equal to 250 degrees Fahrenheit and less than 500 degrees Fahrenheit, 0.24 lb NO_x /MMBtu of heat input; or
    (F) high heat release boilers with preheated air greater than or equal to 500 degrees Fahrenheit, 0.28 lb NO_x /MMBtu of heat input. . .
    (3) liquid fuel-fired boilers and process heaters, 0.30 lb NO_x /MMBtu of heat input;
    (4) wood fuel-fired boilers and process heaters, 0.30 lb NO_x /MMBtu of heat input;
    (5) any unit operated with a combination of gaseous, liquid, or wood fuel, a variable emission limit calculated as the heat input weighted sum of the applicable emission limits of this subsection;
    (6) for any gas-fired boiler or process heater firing gaseous fuel which contains more than 50% hydrogen by volume, over an eight-hour period, in which the fuel gas composition is sampled and

analyzed every three hours, a multiplier of up to 1.25 times the appropriate emission limit in this subsection may be used for that eight-hour period. The total hydrogen volume in all gaseous fuel streams will be divided by the total gaseous fuel flow volume to determine the volume percent of hydrogen in the fuel supply. The multiplier may not be used to increase limits set by permit. The following equation shall be used by an owner or operator using a gas-fired boiler or process heater which is subject to this paragraph and one of the rolling 30-day averaging period emission limitations contained in paragraph (1) or (2) of this subsection to calculate an emission limitation for each rolling 30-day period: [*See* http://info.sos.state.tx.us/fids/30_0117_0205-1.html]. . . .

h) Units exempted from the emissions specifications of this section include the following:

(1) any industrial, commercial, or institutional boiler or process heater with a maximum rated capacity less than 100 MMBtu/hr;

(2) any low annual capacity factor boiler, process heater, stationary gas turbine, or stationary internal combustion engine as defined in §117.10 of this title (relating to Definitions); boilers and industrial furnaces which were regulated as existing facilities by the EPA at 40 Code of Federal Regulations Part 266, Subpart H, as was in effect on June 9, 1993 . . ." 30 Tex. Admin. Code § 117.205 (2006).

VERMONT

1. For full text of NOX RACT regulations, Control of Nitrogen Oxides Emissions, 12-031-001 Vt. Code R. § 5-251 (2006) *see*: http://www.anr.state.vt.us/air/docs/apcregs.pdf.

2. Approval: Approved by USEPA as NOx RACT at 62 Fed. Reg. 17084 (April 9, 1997). SIP approval for a source-specific NOx RACT determination was based on a Vermont consent order dated January 4, 1995, allowing a facility-specific RACT determination.

3. Applicability: Applies to stationary sources with 100 tons per year or more of NOx emissions. (Only one source in the state is subject to NOx RACT.)

4. Industrial Boiler Limits:

Limits for any fuel burning equipment with a heat input capacity of 250 million BTUs per hour or more are specified at 12-031-001 Vt. Code R. § 5-251 as follows:

(1) No person shall discharge, or cause, allow or permit emissions of oxides of nitrogen, expressed as NOx, from any fuel burning equipment with a heat input capacity of 250 million BTU's per hour or more in excess of:

(a) 0.36 grams per million calories heat input (0.20 pounds per million BTU) derived from gaseous fossil fuel.
(b) 0.54 grams per million calories heat input (0.30 pounds per million BTU) derived from liquid fossil fuel.
(c) 1.26 grams per million calories heat input (0.70 pounds per million BTU) derived from solid fossil fuel (except lignite or a fossil fuel containing 25 percent by weight, or more of coal refuse).

* * *

(3) Reasonably available control technology for large stationary sources.

* * *

(d) Exemptions. Any NOx emission unit required to meet the most stringent emission rate (MSER) in a construction permit containing specific emission limits is exempt from the requirements of Section 5-251(3).

VIRGINIA

1. For full text of NOx RACT regulations, Reasonably available control technology guidelines for stationary sources of nitrogen oxides, 9 Va. Admin. Code § 5-40-311 (2006) see: http://www.deq.virginia.gov/air/pdf/airregs/404.pdf

2. Approval: Generic limits approved by USEPA as NOx RACT in 64 Fed. Reg. 22792 (April 28, 1999). Various source specific RACT determinations were approved on other dates and are referenced at 40 C.F.R § 52.2420(d).

3. Applicability: RACT applies to all facilities that are within a stationary source within Northern Virginia or Western Virginia Emission Control Areas and that are within a stationary source that has a theoretical potential to emit 25 TPY or greater in the Northern Virginia Emissions Control Area or 100 tons per year or greater in the Western Virginia Emissions Control Area. Theoretical potential to emit shall be based on emissions at design capacity or maximum production and maximum operating hours (8,760 hours/year) before add-on controls, unless the facility is subject to state and federally enforceable permit conditions which limit production rates or hours of operation. Emissions from all facilities, including facilities exempt from any other emission standard for nitrogen oxides in this chapter, shall be added together to determine theoretical potential to emit. *See* 9 Va. Admin. Code § 5-40-310(C).

4. Industrial Boiler Limits at 9 Va. Admin. Code § 5-40-311(C):

C. Definition of reasonably available control technology.

1. For the source types listed below, reasonably available control technology is defined as the emission limits specified below based upon the application of combustion modification; however, owners may elect to use any alternative control technology, provided such alternative is capable of achieving the prescribed emission limits.

a. Steam generating units and process heaters. The maximum allowable emission rate for nitrogen oxides from steam generating units and process heaters is as follows:

TABLE 4-4C

Maximum Allowable Emission Rates for Nitrogen Oxides Emissions from Steam Generating Units and Process Heaters (pounds per million Btu heat input)

Fuel Type	Firing Method		
	Face and Tangential	Cyclone	Stokers
Coal – wet bottom	1.0	.55	N/A
Coal – dry bottom	.38	N/A	0.4
Oil or Gas or both	.25	.43	N/A
Gas only	.20	N/A	N/A

* Includes wall, opposed and vertieal firing methods

The regulation **excludes** from NOx RACT requirements specific source types and sizes at 9 VAC 5-4311(C)(3) including any steam generating unit, process heater or gas turbine with annual capacity factor of less than 5.0% with some limitations. *See* 9 Va. Admin. Code § 5-40-311(C)(3)(a).

WASHINGTON, D.C.

1. NOx RACT regulations, Reasonably Available Control Technology for Major Stationary Sources of the Oxides of Nitrogen, D.C. Mun. Regs. Tit. 20, § 20-805.1 *et seq.* (2006).

2. Approval: Approved as NOx RACT by USEPA at 65 Fed. Reg. 81369 (Dec. 26, 2000).

3. Applicability: The requirements apply to any person specified pursuant to the following provisions of D.C. Mun. Regs. Tit. 20 § 20-805.1:

(a) Any person owning, leasing, operating or controlling any major stationary source, having the potential to emit twenty-five (25) tons per year or more of oxides of nitrogen, including the following major stationary sources:

(1) Fossil-fuel-fired steam-generating units having an energy input capacity of twenty million (20,000,000) BTU per hour or more;

(2) Stationary combustion turbines having an energy input capacity of one hundred million (100,000,000) BTU per hour or more;
(3) Asphalt concrete plants having the potential to emit twenty-five (25) tons per year or more of NOx; and
(4) Any major stationary source or part of a major stationary source, other than those specified in this subsection, having the potential to emit twenty-five (25) tons per year or more of NOx;

(b) Any person owning, leasing, operating or controlling a major stationary source ever subject to § 805 shall continue to comply with all requirements of § 805, even if emissions from the subject major stationary source no longer exceed the twenty-five (25) ton per year applicability requirement of § 805; and

(c) The requirements of § 805 shall not apply to the following:

(1) Any person subject to § 805 who is able to demonstrate to the Mayor that, since January 1, 1990, the major stationary source has not emitted, before the application of air pollution control equipment, twenty-five (25) tons per year or more of NOx in any year: provided that the person obtains a permit from the Mayor limiting the potential to emit to less than twenty-five (25) tons per year and provided the permit is transmitted to and approved by EPA as a revision to the District's State Implementation Plan; and
(2) Emergency standby engines operated less than five hundred (500) hours during any consecutive twelve (12) month period.

4. Industrial Boiler Limits:

D.C. Mun. Regs. Tit. 20, § 20-805.5: Any person owning, leasing, operating or controlling any fossil-fuel-fired steam-generating unit subject to § 805 shall comply with the requirements of this subsection:
(a) Any person owning, leasing, operating or controlling any fossil-fuel-fired steam-generating unit with an energy input capacity of twenty million (20,000,000) BTU per hour or greater shall, prior to May 1st of each year starting in 1995, adjust the combustion process in accordance with the procedure for doing so set forth at § 805.8; and
(b) After May 31, 1995, no person owning, leasing, operating or controlling any fossil-fuel-fired steam-generating unit with an energy input capacity of fifty million (50,000,000) BTU per hour or greater and less than one hundred million (100,000,000) BTU per hour shall emit NOx at a rate greater than the applicable maximum allowable NOx emission rate cited in this paragraph. For tangential or face-fired fossil-fuel-fired steam-generating units powered exclusively by oil: thirty hundredths pound (0.30 lb) per million BTU, based on a calendar day average;
(c) After May 31, 1995, no person owning, leasing, operating or controlling a fossil-fuel-fired steam-generating unit with an energy input capacity of one hundred million (100,000,000) BTU per hour or greater shall emit NOx at an emission rate greater than the following maximum allowable NOx emission rate:
(1) For dry bottom coal fired fossil-fuel-fired steam-generating units:

(A) Forty-three hundredths pound (0.43 lb) per million BTU, based on a calendar day average, for tangential or face-fired fossil-fuel-fired steam-generating units; and

(B) Forty-three hundredths pound (0.43 lb) per million BTU, based on a calendar day average, for stoker-fired fossil-fuel-fired steam-generating units;

(2) For tangential or face-fired fossil-fuel-fired steam-generating units:

(A) Twenty-five hundredths pound (0.25 lb) per million BTU, based on a calendar day average, for fossil-fuel-fired steam-generating units powered by fuel oil or a combination of fuel oil and natural gas; and

(B) Twenty hundredths pound (0.20 lb) per million BTU, based on a calendar day average, for fossil-fuel-fired steam-generating units powered exclusively by natural gas;

(d) Any person who owns, leases, operates or controls a fossil-fuel-fired steam-generating unit subject to § 805.6(b) or (c) shall submit an emissions control plan, and have the plan approved by the Mayor under § 805.3. The plan shall be submitted by July 1, 1994;

ILLINOIS ENVIRONMENTAL REGULATORY GROUP WORK PRODUCT (6/23/06)

Summary Table Comparing Illinois Proposed NOx RACT Limits to Other States NOx RACT Limits

(To the extent the Categories are Comparable)

(Note, most states do not distinguish between single and multiple burners)

Category and Fuel Type	Size	Unit Type	IL Suggested NOx Limit	OTC[1]	CA[2]	Conn.	Del.	GA[3]	KY[4]
IERG Memo Page #				**3-5**	**6**	**6-8**	**8-11**	**11**	**11**
ICI Boilers	**mmBtu/hr**		**Lb/mmBtu**						
Natural Gas	>100	Single Burner	0.05	0.10.		0.20	0.20		
	>100	Multiple Burners	0.06	0.10		0.20	0.20		
Residual Fuel Oil	>100	Single Burner	0.06	0.20		0.25	0.25		
	>100	Multiple Burners	0.06	0.20		0.25	0.25		
Distillate Fuel Oil	>100	Single Burner	0.07	0.20		0.20	0.25		
	>100	Multiple Burners	0.10	0.20		0.20	0.25		
Coal-Wall	>100	PC Wall-fired	0.14	0.20		0.38	0.38		
Coal-Tangential	>100	PC-Tangential	0.12	0.20		0.38	0.38		
Coal-Stoker	>100	All Stokers	0.22	0.20		0.38	0.40		
Coal-FBC	>100	FBC	0.08	0.20		0.29			
Wood/Non-Fossil solid fuel	>100	All Stokers	0.11			0.30			
Other Gaseous Fuels (*e.g.*, process Gas)	>100	Single Burner/ Multiple Burner	0.05/0.06			0.30			
Other Liquid Fuels (*e.g.*, liquid waste)	>100	Single Burner/ Multiple Burner	0.07/0.10			0.30			
N. Gas	50-100	All	Comb. Tuning	0.10		0.20	T.based[5]		
Distillate Fuel Oil	50-100	All	Comb. Tuning	0.30		0.20	T.based		
Residual Fuel Oil	50-100	All	Comb. Tuning	0.30		0.25	T.based		
Coal	50-100	All	Comb. Tuning	0.30		0.38	T.based		
Wood/Non-Fossil solid Fuel	50-100	Stoker	Comb. Tuning			0.30	T.based		
Other Gaseous Fuels	50-100	All	Comb. Tuning				T.based		
Other Liquid Fuels	50-100	All	Comb. Tuning				T.based		

[1]The Ozone Transport Commission ("OTC") Model Rule proposes a separate limit for boilers sized greater than 250 mmBTU/hr of .17 lb/mmBTU for all fuels.
[2] California has extremely complex NOx RACT procedures.
[3] Georgia RACT determined on facility by facility basis through permitting.
[4] Kentucky RACT determined on case-by-case basis.
[5] Technology based

Category and Fuel Type	Size	Unit Type	IL Suggested NOx Limit	LA[6]	Maine[7]	MD[8]	MA[9]	MO	NH[10]	NJ
IERG Memo Page #				**12-13**	**13-18**	**18-21**	**21-25**	**26-28**	**28-32**	**32-36**
ICI Boilers	**mmBtu/hr**		**Lb/mmBtu**							
Natural Gas	>100	Single Burner	0.05	0.10		0.20	0.20	0.2	0.10	0.20
	>100	Multiple Burners	0.06	0.10		0.20	0.20	0.2		
Residual Fuel Oil	>100	Single Burner	0.06	0.10				0.3	0.30	
	>100	Multiple Burners	0.06	0.10				0.3	0.30	
Distillate Fuel Oil	>100	Single Burner	0.07	0.10				0.3	0.30	
	>100	Multiple Burners	0.10	0.10				0.3	0.30	
Coal-Wall	>100	PC Wall-fired	0.14	0.10		0.38		0.5		
Coal-Tangential	>100	PC-Tangential	0.12	0.10		0.38	0.38	0.45	0.38	0.38
Coal-Stoker	>100	All Stokers	0.22	0.10				0.5	0.30	
Coal-FBC	>100	FBC	0.08	0.10						
Wood/Non-Fossil solid fuel	>100	All Stokers	0.11				0.33		0.25-0.33	
Other Gaseous Fuels (*e.g.*, process Gas)	>100	Single Burner/ Multiple Burner	0.05/0.06							
Other Liquid Fuels (*e.g.*, liquid waste)	>100	Single Burner/ Multiple Burner	0.07/0.10							
N. Gas	50-100	All	Comb. Tuning				0.1	Tuning	0.1	0.10
Distillate Fuel Oil	50-100	All	Comb. Tuning				0.12	Tuning		
Residual Fuel Oil	50-100	All	Comb. Tuning				0.3	Tuning		
Coal	50-100	All	Comb. Tuning					Tuning	Varies	.33-.55
Wood/Non-Fossil solid Fuel	50-100	Stoker	Comb. Tuning				0.43	Tuning		
Other Gaseous Fuels	50-100	All	Comb. Tuning					Tuning		
Other Liquid Fuels	50-100	All	Comb. Tuning					Tuning		0.3

[6] LA limits apply to industrial boilers >/= 80mmBTU/hr.
[7] The categories, sizes and limits of Maine do not translate easily into the format of this table. *See* text of rule on pages 13 – 18 of memo for limits.
[8] Md has separate specific limits for boilers sized 250 mmBTU/hr or greater, depending on the fuel type on p. 19 of memo.
[9] MA has separate specific limits for boilers sized 250 mmBTU/hr or greater, depending on the fuel type on p. 22 of memo.
[10] NH has a complicated scheme of limits based on type of boiler, type of fuel and whether the fuels are combined.

Category and Fuel Type	Size	Unit Type	IL Suggested NOx Limit	NY[11]	PA[12]	RI	TN
IERG Memo Page #				**37-41**	**41-43**	**43-45**	**45**
ICI Boilers	**mmBtu/hr**		**Lb/mmBtu**				
Natural Gas	>100	Single Burner	0.05	0.20		0.10	
	>100	Multiple Burners	0.06	0.20		0.10	
Residual Fuel Oil	>100	Single Burner	0.06			*[13]	
	>100	Multiple Burners	0.06			*	
Distillate Fuel Oil	>100	Single Burner	0.07			0.12	
	>100	Multiple Burners	0.10			0.12	
Coal-Wall	>100	PC Wall-fired	0.14		**[14]		
Coal-Tangential	>100	PC-Tangential	0.12		**		0.45 if > 600 mmBTU
Coal-Stoker	>100	All Stokers	0.22	0.30	**		
Coal-FBC	>100	FBC	0.08		**		
Wood/Non-Fossil solid fuel	>100	All Stokers	0.11				
Other Gaseous Fuels (*e.g.*, process Gas)	>100	Single Burner/ Multiple Burner	0.05/0.06				
Other Liquid Fuels (*e.g.*, liquid waste)	>100	Single Burner/ Multiple Burner	0.07/0.10				
N. Gas	50-100	All	Comb. Tuning	0.10		0.10	
Distillate Fuel Oil	50-100	All	Comb. Tuning	0.12		0.12	
Residual Fuel Oil	50-100	All	Comb. Tuning	0.30		*See Fn 13	
Coal	50-100	All	Comb. Tuning				
Wood/Non-Fossil solid Fuel	50-100	Stoker	Comb. Tuning				
Other Gaseous Fuels	50-100	All	Comb. Tuning				
Other Liquid Fuels	50-100	All	Comb. Tuning				

[11] NY has separate specific limits for very large boilers sized 250 mmBTU/hr or greater, depending on the fuel type. *See* p. 38 of memo.
[12] PA mainly establishes RACT on a case-by-case basis, but has presumptive RACT for a few situations.
[13] *In RI, boilers fired with residual oil must be equipped with low-NOx burners and flue gas recirculation or equivalent control.
[14]** In PA, for coal-fired combustion units of this size, presumptive RACT is the installation and operation of low NOx burners with separate overfire air.

Category and Fuel Type	Size	Unit Type	IL Suggested NOx Limit	TX	VT*[15]	VA	Wash., D.C.
IERG Memo Page #				**45-47**	**47-48**	**48-49**	**49-51**
ICI Boilers	**mmBtu/hr**		**Lb/mmBtu**				
Natural Gas	>100	Single Burner	0.05	Varies from 0.10-0.28	0.20*	0.20	0.20
	>100	Multiple Burners	0.06		0.20*	0.20	0.20
Residual Fuel Oil	>100	Single Burner	0.06			0.25	0.25
	>100	Multiple Burners	0.06			0.25	0.25
Distillate Fuel Oil	>100	Single Burner	0.07				
	>100	Multiple Burners	0.10				
Coal-Wall	>100	PC Wall-fired	0.14				
Coal-Tangential	>100	PC-Tangential	0.12			0.38	0.43
Coal-Stoker	>100	All Stokers	0.22			0.4	0.43
Coal-FBC	>100	FBC	0.08				
Wood/Non-Fossil solid fuel	>100	All Stokers	0.11	0.30			
Other Gaseous Fuels (*e.g.*, process Gas)	>100	Single Burner/ Multiple Burner	0.05/0.06				
Other Liquid Fuels (*e.g.*, liquid waste)	>100	Single Burner/ Multiple Burner	0.07/0.10				
N. Gas	50-100	All	Comb. Tuning				
Distillate Fuel Oil	50-100	All	Comb. Tuning				0.30
Residual Fuel Oil	50-100	All	Comb. Tuning				0.30
Coal	50-100	All	Comb. Tuning				
Wood/Non-Fossil solid Fuel	50-100	Stoker	Comb. Tuning				
Other Gaseous Fuels	50-100	All	Comb. Tuning				
Other Liquid Fuels	50-100	All	Comb. Tuning				

[15] *VT limits are only for any fuel burning equipment with heat input capacity of 250 mmBTU/hr or greater. *See* p. 48 of memo

ILLINOIS ENVIRONMENTAL REGULATORY GROUP WORK PRODUCT (6/23/06)

Nitrogen Oxides ("NOx") RACT Implementation by States
Under Federal 8-Hour Ozone NAAQS[1] – Phase 2
Illinois Environmental Regulatory Group Survey of June 2006

Reasonably Available Control Technology ("RACT") is generally defined as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.[2]

For the Nonattainment ("NA") Classification of "Moderate", as all or part of 12 Illinois counties are classified, the RACT SIP is due September 2006, the Rate of Progress SIP is due June 2007 and the Attainment Demonstration is due June 2010.

Ozone Transport Region ("OTR")—The Clean Air Act ("CAA") designates 11 states and the consolidated Metropolitan Statistical Area that includes the District of Columbia and parts of Virginia as the OTR. 42 USC § 7511(c). The entire OTR has been designated as Moderate NA under the 8-Hour rule.

REGION V STATES

STATE	CLASSIFICATIONS	RULES CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
Illinois	**Moderate** – all or part of 12 counties	*Rules under development.*	NONE--USEPA had granted waiver of NOx RACT in IL 1-Hour NA counties
Indiana	Central IN—**Basic**	Monitors are registering attainment in	NONE --USEPA had granted waiver of

[1] NAAQS – National Ambient Air Quality Standard

[2] Final Rule to Implement 8-Hour Ozone National Ambient Air Quality Standard – Phase 2, 70 Fed. Reg. 71612, 71652 (Nov. 29, 2005) (to be codified at 40 C.F.R. Parts 51, 52 and 80) (citing 44 FR 53762 (September 17, 1979)); *see also* 40 C.F.R. § 51.100(o) (2006) (defining RACT for purposes of State Implementation Plan ("SIP") requirements.)

STATE	CLASSIFICATIONS	RULES CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
	NW IN--**Moderate**	Lake and Porter counties so IN is seeking reclassification to attainment from USEPA at this time. The State is not planning any 8-hour NOx RACT rules and is considering extending the existing VOC degreaser rule which applies in NW counties to Central IN counties.	NOx RACT in 1-Hour NA counties
Michigan	16 of 25 counties being redesignated as attainment. One County in Western MI is **Basic** Nonattainment	NONE. Because nonattainment is due to ozone transport from Chicago and Wisconsin, MI will rely on whatever LADCO does to demonstrate attainment as "expeditiously as possible."	NONE—West side of state was under NOx RACT waiver. Eastern counties around Detroit achieved attainment before NOx RACT rules were due.
Michigan – SE	8 Counties in South East MI – **Marginal** Nonattainment	NONE. MI understood that USEPA only requires RACT under Subpart 2 for Moderate and Above Classifications, so RACT not required.	NONE
Minnesota	*No NA areas in the state*		
Ohio	NE Ohio – 8 counties **Moderate;**	Proposing a rule very soon to impose NOx RACT on all non-EGU boilers in the 8 moderate NAA counties. Emission limits by categories; very inclusive, except for asphalt plants and EGUs. Compliance with rule expected to be required by Jan 1, 2009. Based proposal on OTC model	NONE – USEPA had granted waiver of NOx RACT for 1-Hour NA areas.

STATE	CLASSIFICATIONS	RULES CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
		rule and New York rule. (Shared proposal with LADCO)	
Wisconsin	3 Counties – **Basic** 10 Counties **Moderate**	Rules under development. Probably will require RACT in moderate NA counties only, unless WI requests an attainment date extension beyond 2009. Then it will include Basic NA counties in RACT. RACT will be unit-by-unit for specific source categories with annual and ozone season emission limits. Trading provision will allow averaging of units in same source category on a facility basis.	NONE—WI rules on NOx did not represent NOx RACT because USEPA had granted waiver of NOx RACT in WI 1-hour NA counties.

OTHER STATES SUBJECT TO NOx RACT REQUIREMENTS

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
Alabama	Birmingham – **Basic**	Alabama has no plans to develop NOx RACT regulations to meet the 8-hour ozone standard, unless areas of the state fall into nonattainment. As a contingency measure in the state's maintenance plan, the state has provided that rules to meet the 8-hour standard could be developed and implemented within 18 months of a determination that such regulations are necessary.	
Arizona	Phoenix – **Basic**	Arizona will begin conducting modeling in the upcoming weeks. The state's monitors for the Phoenix area are showing attainment for the last three seasons, and the state does not know whether it will need NOx controls.	
Arkansas	Crittenden County - **Marginal**	Since only one county, which is adjacent to the Memphis metropolitan area, is in nonattainment for the 8-hour ozone standard, the State is waiting for Tennessee to determine	

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
		what it will do to meet the standard. In addition, there are very few sources in the county which would be subject to NOx RACT requirements; therefore, Arkansas will likely move forward by considering source requirements on a case by case basis.	
California	Amador and Calaveras Cos. - **Basic** Kern Co (Eastern Kern) - **Basic** Los Angeles South Coast Air Basin - **Severe 17** Los Angeles-San Bernardino Cos. (W Mojave) - **Moderate** Nevada Co. (Western Part) - **Basic** Riverside Co, (Coachella Valley) - **Serious**	The 15 APCDs in non-attainment are submitting RACT SIPs to the state agency in July. NOx RACT requirements in each district vary according to the needs of the district. NOx RACT requirements in CA are more stringent than the federal standards, and in order to control NOx, the state is focusing on mobile sources since the majority of ozone pollution is from mobile sources.	NOx RACT requirements vary according to APCD.

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
	Sacramento Metro - **Serious** San Diego - **Basic** San Francisco Bay Area – **Marginal** San Joaquin Valley - **Serious** Sutter Co (Sutter Buttes) – Basic		
Colorado	Denver – **EAC**	No part of the state was in NAA for NOx. NOx RACT requirements for sources will be identified on a case-by-case basis (40 tons per year or more will trigger RACT permitting requirements). The State may amend its regulations to add control requirements for oil and gas sources.	
Connecticut	**Moderate** as part of OTR	State is considering ways to achieve more NOx reductions, but intends to keep1-Hour rules intact at this time.	Conn. Agencies Regs. §22a-174-22 (2006) http://www.dep.state.ct.us/air2/regs/mainregs/sec22.pdf. Specified limits with compliance options of reductions,

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
			modifications, fuel switching. Trading allowed when a facility can't meet the specified compliance options, but this may be phased out in conjunction with CAIR allowances.
Delaware	**Moderate** as part of OTR, but state chose to retain the 1-hour severe classification under state rules for New Castle and Kent counties.	State is proposing to USEPA that its 1-hour NOx RACT rules meet RACT under the 8-hour standard. No changes planned.	70-100-012 Del. Code Regs. § 1.1 *et seq.* (2006) http://www.dnrec.state.de.us/air/aqm_page/docs/pdf/reg_12.pdf. Regulation 12 sets out generally applicable NOx RACT standards for specific equipment with an option to seek approval on a case-by-case basis for alternate and equivalent RACT determinations. (Case-by-case seldom used.)
Georgia	Atlanta – **Marginal**	One additional county is subject to the 8-hour standard. The state will use a facility-by-facility approach to determine NOx RACT requirements for sources. If the Atlanta area becomes designated as moderate, the state will begin rulemaking process to meet the attainment date that USEPA establishes.	Ga. Comp. R. & Regs. 391-3-1-.02(2)(yy) (2006). http://rules.sos.state.ga.us/docs/391/3/1/02.pdf
Kentucky	Cincinnati-Hamilton – **Basic**	The state is focusing on redesignation requests. In the future, it will evaluate NOx RACT requirements if	EPA approved 11 source specific regulations (permits) called NOx RACT Plans in 2001.

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
	Huntington-Ashland – **Basic** Louisville – **Basic** NAAs will likely be redesignated.	necessary; however, the entire state met the one-hour standard before the implementation of the 8-hour standard, and the state is confident that with its data it can get the NAAs redesignated. Since the state was in attainment or could not be classified under the one hour standard, Kentucky applied NOX requirements on a case by case basis.	Jefferson County – RACT for Major VOC and NOx Emitting Sources – Regulation 6.42 (2006). http://www.apcd.org/regs/reg6/6-42v2.pdf
Louisiana	Baton Rouge – **Marginal**		Control of Emissions of Nitrogen Oxides – LAC 33:III:2201 (2006). http://www.state.la.us/osr/lac/33v03/33v03.pdf *See also* 67 Fed. Reg. 50391, 50401(stating above referenced provisions "control[] emissions beyond levels that EPA has previously approved as RACT for such sources.").
Maine	**Moderate** as part of OTR	No changes planned. State is in attainment for ozone.	NOx RACT rules at 06-096-138 Me. Code R. § 1 *et seq.* (2006). http://www.maine.gov/sos/cec/rules/06/096/096c138.doc
Maryland	**Moderate** as part of	State is planning workgroup to	NOx RACT Rules at Md. Code Regs.

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
	OTR.	determine what changes are needed under 8-Hour rule. Plans to keep 1-hour rules in place, making any needed changes or additions.	26.11.09.08 (2006). http://www.dsd.state.md.us/comar/26/26.11.09.08.htm
Massachusettes	**Moderate** as part of OTR	State is analyzing whether its 1-Hour NOx RACT rules will satisfy the 8-Hour requirements or whether new NOx RACT rules will be needed. Probably will file a Committal SIP in September that it intends to propose new RACT rules. Is looking at Model OTC rule to determine which new emission categories to include in new NOx RACT rules.	NOx RACT Rules at 310 Mass. Code Regs. 7.19 (2006) http://www.mass.gov/dep/air/laws/7b.htm#19
Missouri	5 Counties around St. Louis -- **Moderate**	NONE. 1-Hour Ozone Classification is same as 8-Hour, so NOx RACT rules already on books will stay in effect and apply to the same region. 10 CSR 10-5.510 (fix cite) (See attachment of the rule or specifics.)	NOx RACT Rules for St. Louis Metropolitan Area, Mo. Code Regs. Ann. tit. 10, § 10-5.510 (2006), http://www.sos.mo.gov/adrules/csr/current/10csr/10c10-5.pdf *MO will soon be proposing a rule with a new concept for the state—regulating facilities locating upwind of NAAs, but outside of the NAA.*
Nevada	Las Vegas – **Basic**	Under one-hour standard, Las Vegas was in attainment.	
New Hampshire	**Moderate** as part of OTR	No rule changes anticipated in direct response to 8-Hour standard. Will keep 1-Hour rules. May update them	NOx RACT Rules at N.H. Code Admin. R. Ann. Env-A 1211.01 *et seq.* (2006), see: http://www.des.state.nh.us/Rules/pdf/env-

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
		to address new boiler designs such as the fluidized bed boilers and the new internal combustion engines.	a1200.pdf
New Jersey	**Moderate** as part of OTR	Considering ways to gain additional NOx reductions. Planning to continue using NOx RACT rules developed under 1-Hour.	NOx RACT Rules at N.J. Admin. Code § 7:27-19.01 *et seq.* (2006). http://www.state.nj.us/dep/aqm/Sub19.pdf Rules were amended in 2005 to include additional boilers and turbines.
New York	**Moderate** as part of OTR.	Part of OTC Additional Control Measures Workgroup to design model rule for additional NOx reductions. Will begin rulemaking in state based on what OTC develops as model rule, adapting it to the existing NY regulatory scheme.	NOx RACT rules at N.Y. Comp. Codes R. & Regs. tit. 6 § 227-2.1 *et seq.* (2006). http://www.dec.state.ny.us/website/regs/subpart227_2.html. State also has case-by-case RACT targeted to specific processes, such as cement kiln, iron and steel and general industrial processes at N.Y. Comp. Codes R. & Regs. tit. 6 §§ 212, 214, 216. Rules were amended in 2004 to extend NOx controls to some major source stationary combustion installations.
North Carolina	Charlotte-Gastonia-Rock Hill, NC/SC - **Moderate** Fayetteville area- EAC – **Basic** Greensboro-Winston-Salem-High Point –	The state is still considering what steps it may take regarding NOx RACT. The state will likely hold a hearing later this year to discuss its next steps. The proposed amendments, if any, would only apply to the NAA rather than the whole state.	

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
	EAC – **Moderate** Hickory-Newton-Conover Area – EAC - **Basic** Raleigh-Durham-Chapel Hill – **Basic** Rocky Mount – **Basic** Haywood and Swain Counties - **Basic** Both moderate NAAs will likely be redesignated as marginal or basic.		
Pennsylvania	**Moderate** as part of OTR	Currently evaluating 1-Hour rules to see if an update is needed under 8-Hour standard.	NOx RACT rules at 25 Pa. Code § 129.91 – 129.95 (2006). http://www.pacode.com/secure/data/025/chapter129/chap129toc.html Rule give options to use presumptive RACT limitations or facility specific procedures to establish NOx RACT.
Rhode Island	**Moderate** as part of OTR	No plans to change NOx RACT rules. Will continue to operate under current	NOx RACT rules at 12-031-027 R.I. Code R. § 27.1 *et seq.* (2006)

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
		rules adopted under the 1-Hour standard.	http://www.dem.ri.gov/pubs/regs/regs/air/air27_96.pdf
South Carolina	Charlotte-Gastonia-Rock Hill – **Moderate** Columbia – **EAC** Greenville-Spartanburg-Anderson – **EAC**	The state has only 6 sources that may be subject to NOx RACT requirements, which would be determined on a case-by-case basis. The NOx RACT requirements would become part of a permit and consequently part of the state's federally enforceable SIP. Each of the 6 facilities is currently performing a RACT analysis. The state has no plans to draft any NOx RACT rules.	
Tennessee	Memphis – **Marginal** Knoxville – **Basic** Nashville – **EAC** Chattanooga – **Basic** Johnson City-Kingsport-Bristol – **EAC**	The state is conducting modeling in the Knoxville and Memphis areas to determine if NOx RACT will be needed.	Nitrogen Oxides Tenn. Comp. R. & Regs. 1200-3-27 (2006). http://www.state.tn.us/sos/rules/1200/1200-03/1200-03-27.pdf
Texas	Houston/Galveston-Brazoria – **Moderate** Dallas/Fort Worth –	The State is re-writing Part 117 of its regulations to include 8-Hour NOx RACT requirements for all NAAs. There is nothing yet proposed;	30 Texas Admin. Code § 117.105 (2006). (RACT for utilities) http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
	Moderate Beaumont/Port Arthur – **Marginal** San Antonio – **EAC**	everything is still in its conceptual stages. New NOx sources will have to be identified for the Dallas NAA since under 8-hour rule, there is an additional 5 counties in the NAA. Otherwise, NOx RACT requirements will remain about the same since Texas will be proposing stricter emissions specifications for attainment demonstration, which will likely take care of the NOx requirements.	&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=117&rl=105 30 Texas Admin. Code § 117.205 (2006). (RACT for other Sources) http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=117&rl=205
Vermont	**Moderate** as part of OTR, but actually in attainment.	Currently reviewing 1-Hour rules to see if any changes are needed under 8-Hour rule. (Only one source in state is subject to NOx RACT.)	General NOx RACT rule at 12-031-001 Vt. Code R. § 5-251 (2006). http://www.anr.state.vt.us/air/docs/apcregs.pdf Also have a Vermont consent order dated January 4, 1995, allowing a facility-specific RACT determination
Virginia	NE region of the state is **Moderate** as part of OTR. Other parts of state are lesser classifications.	Currently reviewing 1-Hour rules to see if any additional changes are needed. If so, will begin rulemaking in Fall (a 2 year process)	Generic NOx RACT rule at 9 Va. Admin. Code § 5-40-311 (2006). http://www.deq.virginia.gov/air/pdf/airregs/404.pdf Case-by-case limits enforced through permitting. No trading allowed.
Washington D.C.	**Moderate** as part of OTR.		NOx RACT rules at D.C. Mun. Regs. Tit. 20 § 20-805.1 *et seq.* (2006).

STATE	CLASSIFICATIONS	RULES-CONSIDERED, PROPOSED, or ADOPTED PURSUANT TO 8-HOUR RULE	EXISTING NOx RACT RULES (See attached memo for detailed summaries of existing state rules)
West Virginia	Wheeling – **Basic** Huntington-Ashland – **Basic** Charleston – **Basic** Steubenville-Weirton – **Basic** Parkersburg-Marietta – **Basic** Berkeley & Jefferson – **EAC**	The state has no plans to develop NOx RACT for the 8-hour standard. The state is focused on redesignation.	

ILLINOIS ENVIRONMENTAL REGULATORY GROUP WORK PRODUCT (10/8/08)

UPDATE TO NATIONWIDE SURVEY OF NOX RACT
IMPLEMENTATION/INDUSTRIAL BOILER FOCUS

I. INTRODUCTION

Since the June 2006 NOx RACT Survey Report was prepared, the Illinois Environmental Protection Agency ("IEPA") has proposed new NOx emissions limitations for industrial boilers. *See* Proposed Amendments, *In the Matter of: Amendments to 35 Ill. Adm. Code 217, Nitrogen Oxides Emissions, and 35 Ill. Adm. Code 211*, R08-19 (Ill.Pol.Control.Bd. May 9, 2008). Accordingly, this report updates the June 2006 Report by reviewing newly proposed or adopted state NOx emissions standards and USEPA NOx RACT certifications.[1]

II. NOx RACT FOR 8-HOUR OZONE

Pursuant to the Clean Air Act ("CAA"), 42 U.S.C. §§ 7401-7571, States with areas classified as ozone nonattainment by the USEPA are required to develop nonattainment plans, which provide for "the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of RACT) and shall provide for attainment of the national primary ambient air quality standards." 42 U.S.C. § 7502(c)(1). Additionally, the CAA regulates NOx emissions and requires some state plans to implement RACT for specific NOx emissions. 42 U.S.C. § 7511a(f). RACT is defined as the "lowest emission limitation that a particular source is capable of meeting by the application of control

[1] Attachment 1 to this Report is an update to the Summary Table Comparing Illinois Proposed NOx RACT limits to other states' NOx RACT limits. Unlike the 2006 table that listed the limits for all the states surveyed, Attachment 1 only lists the limits for those six states that have made revisions to their limits or whose limits have been recertified as NOx RACT.

technology that is reasonably available considering technological and economic feasibility." Final Rule to Implement 8-hour Ozone National Ambient Air Quality Standard – Phase 2, 70 Fed. Reg. 71612, 71652 (Nov. 29, 2005) (to be codified at 40 C.F.R. Parts 51, 52 and 80) (citing 44 Fed. Reg. 53762 (Sept. 17, 1979)); *see also* 40 C.F.R. § 51.100(o) (defining RACT for purposes of State Implementation Plan ("SIP") requirements).

States with nonattainment areas classified as moderate or above for the 8-hour Ozone National Ambient Air Quality Standard ("NAAQS"), including Illinois, were required to submit a SIP demonstrating that specific sources were subject to RACT requirements by September 15, 2006. *See* 70 Fed. Reg. 71612, 71652 (Nov. 29, 2005). However, on March 24, 2008, USEPA found that Illinois, along with certain other states, failed to make an appropriate RACT submittal. *See* 73 Fed. Reg. 15416 (Mar. 24, 2008). Accordingly, IEPA proposed NOx emissions standards to meet these requirements. *See* Statement of Reasons, *In the Matter of: Amendments to 35 Ill. Adm. Code 217, Nitrogen Oxides Emissions, and 35 Ill. Adm. Code 211*, R08-19 (Ill.Pol.Control.Bd. May 9, 2008).

III. UPDATES TO THE JUNE 2006 REPORT

Since the June 2006 Report, USEPA has recertified NOx RACT emissions standards in the State of Delaware and has proposed to recertify NOx RACT emissions standards in one Pennsylvania County. Additionally, Ohio and Wisconsin have adopted standards for NOx RACT since the June 2006 Report, but these standards have not been certified as NOx RACT. Finally, Virginia and Texas have recodified existing NOx RACT standards but those standards have not been recertified by USEPA as RACT.

A. Delaware

USEPA approved a Delaware SIP addressing RACT for NOx emission under the 8-hour Ozone NAAQS on July 23, 2008. The SIP revision was submitted by Delaware to USEPA on October 5, 2006. Upon approval of the SIP, USEPA determined that:

> Delaware's SIP revision satisfies the 8-hour RACT requirements through (1) certification that previously adopted RACT controls in Delaware's SIP that were approved by [US]EPA under the 1-hour ozone NAAQS are based on the currently available technically and economically feasible controls, and continues to represent RACT for the 8-hour implementation purposes; (2) the adoption of new or more stringent regulations that represent RACT control levels; and (3) a negative declaration that certain CTG or non-CTG major sources of VOC and NOx sources do not exist in Delaware.

73 Fed. Reg. 42681 (July 23, 2008).

In its SIP submittal, Delaware certifies that NOx RACT controls in Delaware Regulation No. 12, 70-100-012 Del. Code Regs., represent RACT for purposes of the 8-hour ozone NAAQS. *Delaware RACT SIP under the 8-hour Ozone NAAQS*, 19-28, Delaware Department of Natural Resources and Environmental Control, September 2006 ("Delaware RACT SIP"). Delaware has not amended Regulation No. 12 since the previous NOx RACT survey was conducted for IERG. Furthermore, the Delaware SIP explains that, while not part of the RACT submittal, Delaware has developed and is in the process of developing the following beyond-RACT provisions to aid in the attainment of the 8-hour NAAQS:

- Regulation 1142, Section 1 – Control of NO_X Emissions from Industrial Boilers. This regulation imposes beyond RACT controls on certain boilers with heat input greater than 100 mmBTU/hr. (Regulation 1142 is previously numbered as Regulation 42. The new number is used to follow the new Delaware state document numbering system established by the Delaware Register of Regulations).

- EGU Multi-Pollutant Regulation. This regulation is under development, and is anticipated to impose beyond RACT NO_X controls on large coal and residual oil fired EGUs.

- Large Refinery Boiler Regulation. This regulation is under development, and is anticipated to impose beyond RACT NO_X controls on large boilers and heat exchangers at petroleum refineries.

- Large Non-Refinery Boiler Regulation. This regulation is under development, and is anticipated to impose beyond RACT NO_X controls on large boilers and heat exchangers not located at petroleum refineries.

- Regulation No. 1144 - Stationary Generators. This regulation was completed in 2005, and imposes beyond RACT NO_X controls on stationary generators used at times other than times of emergency.

- Peaking Turbine Regulation. This regulation is under development, and is anticipated to impose beyond RACT NO_X controls on peaking units, in order to address the high peak ozone day emissions from these units.
- Diesel Retrofits. This rule is under consideration and is anticipated to provide further NO_X reductions for the attainment of the 8-hour ozone standard.

Delaware RACT SIP at 30-31.

Since Delaware's SIP submittal and the June 2006 Report, Delaware has promulgated new NOx standards for large refinery boilers as described in bulleted point three above. *See* 70-100-1142.2 Del. Code Regs. These regulations limit certain industrial boilers or process heaters with a maximum heat input capacity equal to or greater than 200 mmBTU/hour to 0.04 lb/mmBTU NOx. However, the NOx RACT standards in Regulation No. 12 remain the same.

B. Ohio

Ohio adopted new NOx RACT standards for industrial boilers on December 12, 2007. *See* Ohio Admin. Code 3745:110-03. However, USEPA is still reviewing these regulations for RACT certification.

C. Pennsylvania

USEPA has proposed to approve a SIP revision for Philadelphia County. *See* 73 Fed. Reg. 50270 (Aug. 26, 2008). The Pennsylvania Department of Environmental Protection submitted a SIP revision for Philadelphia County on September 25, 2006, certifying that RACT 1-hour ozone controls satisfy 8-hour ozone RACT requirements. 73 Fed. Reg. 50270, 50271 (Aug. 26, 2008). The City of Philadelphia Department of Public Health Air Management Services ("AMS") prepared the SIP revision and certified that it meets the RACT requirements for the 50 ton per year ("tpy") non-CTG major VOC sources and for 100 tpy NOx sources, and that all CTG-covered source categories are addressed at the emission thresholds set in the CTG. *City of Philadelphia Department of Public Health Air Management Services (AMS) Reasonable Available Control Technology (RACT) State Implementation Plan (SIP) Revision under the 8-hour Ozone National Ambient Air Quality Standard (NAAQS)*, City of Philadelphia AMS, 4-6 (Aug. 3, 2006) (hereinafter "City of Philadelphia SIP Revision"). USEPA stated the following in the proposed rule approving the SIP revision:

> Pennsylvania's SIP revision satisfies the 8-hour RACT requirements through (1) certification that previously adopted RACT controls in Pennsylvania's SIP that were approved by EPA under the 1-hour ozone NAAQS are based on the currently available technically and economically feasible controls and continues to represent RACT for the 8-hour implementation purposes; (2) the adoption of federally enforceable permits that represent RACT control levels; and (3) a negative declaration that certain CTG or non-CTG major sources of VOC and NOx sources do not exist in Philadelphia County.

73 Fed. Reg. 50270, 50272 (Aug. 26, 2008).

NOx RACT standards for industrial boilers in Pennsylvania have not changed since the June 2006 Report. Additionally, note that the SIP revision only applies to Philadelphia County. However, the entire Commonwealth of Pennsylvania is considered a moderate ozone

nonattainment area for the new federal 8-hour standard and, therefore, must still submit a demonstration that the current rules meet 8-hour ozone RACT requirements. *City of Philadelphia SIP Revision* at 3.

D. Virginia

Virginia has amended its regulations to incorporate an 8-hour ozone standard for NOx RACT. *See* 9 VAC 5-40-7420. The standard applies to sources in Northern Virginia with a threshold greater than or equal to 100 tpy and prohibits any affected facility from emitting NOx in excess of RACT. 9 VAC 5-40-7420(A)-(B). RACT requirements have been reworded and renumbered, but the underlying RACT standards remain the same as the previous 1-hour ozone RACT standard. *See* 9 VAC 5-40-7430.

USEPA has proposed to approve a Virginia SIP revision for Stafford County that addresses the requirements of RACT under the 8-hour ozone NAAQS. *See* 73 Fed. Reg. 45925 (Aug. 7, 2008). However, Stafford County only has one facility that is a major stationary source for either VOC or NOx, and NOx emissions from that facility are negligible. *Technical Support Document for the Stafford County Virginia Reasonable Available Control Technology Under the 8-hour Ozone National Ambient Air Quality Standard*, 8, Gregory Becoat, USEPA Air Quality Planning Branch, July 24, 2008 (hereafter "Stafford County TSD"). Since actual VOC emissions from the source are significantly below the facility's federally enforceable limit, further controls would not be feasible and the existing source-specific new RACT determination is appropriate, and therefore, the existing RACT controls can be recertified. Stafford County TSD at 8.

In a separate matter, Virginia submitted a revision for the Northern Virginia Area in order to recertify RACT as part of the 8-hour ozone NAAQS. *See* Stafford County TSD. However, that SIP revision has not been approved by USEPA.

E. Wisconsin

Wisconsin adopted new NOx RACT regulations for industrial boilers in July 2007. *See* Wis. Admin. Code N.R. § 428.20-428.26. However, USEPA has not certified these new regulations as NOx RACT, but the state expects conditional certification pending a small change in language.

F. Texas

NOx RACT provisions have been renumbered with no substantive changes. *See* 32 Tex. Reg. 3206 (June 8, 2007). However, USEPA has not recertified NOx RACT under the 8-hour ozone NAAQS.

IV. CONCLUSION

To conclude, since USEPA recently recertified NOx RACT standards in Delaware, and Wisconsin and Ohio recently developed new NOx RACT standards that are awaiting USEPA approval, these three states provide the best insight into what standards USEPA might certify and what other states have recently developed as NOx RACT.

ILLINOIS ENVIRONMENTAL REGULATORY GROUP WORK PRODUCT (9/08)
Update to Summary Table Comparing Illinois Proposed NOx RACT Limits to Other States NOx RACT Limits
(To the extent the Categories are Comparable)
(Note, most states do not distinguish between single and multiple burners)

Category and Fuel Type	Size	IL Proposed NOx Limit	Del.[1]	OH[2]	PA[3]	TX[4]	VA[4]	WI[5]
ICI Boilers	**mmBtu/hr**	**Lb/mmBtu**						
Solid Fuel	>250	0.18						
Natural Gas	>100	0.08	0.20	0.10		Varies 0.10-0.28	0.20	0.08
Residual Fuel Oil	>100		0.25	0.23			0.25	0.15
Distillate Fuel Oil	>100	0.10	0.25	0.12				0.10
Coal-Wall	>100		0.38		*[6]			0.15 or 0.17
Coal-Tangential	>100		0.38		*		0.38	
Coal-Stoker	>100		0.40		*		0.40	0.25
Pulverized Coal	>100							
Solid Fuel – FBC	>100	0.10			*			0.10
Other Gaseous Fuels	>100	0.08						0.08
Other Liquid Fuels	>100	0.15						
Solid Fuel	100≤Size≤250	0.25						
Natural Gas	≤100	Comb. Tuning	T. based	0.10				
Distillate Fuel Oil	≤100	Comb. Tuning	T. based	0.12			0.30	
Residual Fuel Oil	≤100		T. based	0.23			0.30	
Other Gaseous Fuels	≤100	Comb. Tuning	T. based					
Other Liquid Fuels	≤100	Comb. Tuning						
Solid Fuel	≤100	Comb. Tuning						

[1] Delaware also imposes a limit of 0.04 lb/mm Btu on certain boilers larger than 200 mm Btu/hr at petroleum refineries.
[2] Ohio developed limits for boilers greater than 250 mmBTU/hr depending on fuel type. USEPA has not certified Ohio's standards as NOx RACT.
[3] NOx RACT has only been recertified in Philadelphia County.
[4] Texas and Virginia have recodified their NOx RACT provisions but have not substantively changed the requirements. USEPA has not recertified these rules as RACT.
[5] Wisconsin also developed standards for industrial boilers greater than or equal to 1,000mmBTU/hr and industrial boilers greater than or equal to 500mmBTU/hr. USEPA has not certified Wisconsin's NOx standards as RACT
[6]* In Pennsylvania, for coal-fired combustion units of this size, presumptive RACT is the installation and operation of low NOx burners with separate overfire air.