



NORTHEAST STATES FOR COORDINATED AIR USE MANAGEMENT (NESCAUM)

MEMBERS:

CONNECTICUT BUREAU OF AIR MANAGEMENT
MAINE BUREAU OF AIR QUALITY CONTROL
MASSACHUSETTS DIVISION OF AIR QUALITY CONTROL
NEW HAMPSHIRE AIR RESOURCES DIVISION

NEW JERSEY OFFICE OF ENERGY
NEW YORK DIVISION OF AIR RESOURCES
RHODE ISLAND DIVISION OF AIR AND HAZARDOUS MATERIALS
VERMONT AIR POLLUTION CONTROL DIVISION

NESCAUM Stationary Source Committee Recommendation On NO_x RACT for Utility Boilers

August 12, 1992

The NESCAUM Stationary Source Review Committee is one of nine technical Committees established by the NESCAUM Board of Directors. The purpose of the committee is to provide an opportunity for engineers who review permits for new and existing sources to discuss common technical issues and provide some measure of consistency in the review of permits in the region. This recommendation has been developed in response to Sections 182(f) and 182(b)(2) of the Clean Air Act Amendments of 1990 (CAAA), which require states to impose Reasonably Available Control Technology (RACT) for sources that have the potential to emit nitrogen oxides (NO_x) in excess of specified threshold amounts and are located in ozone nonattainment areas or in the ozone transport region. RACT is defined as follows:

"the lowest emission limit that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility"

The CAAA requires states to develop and submit NO_x RACT regulations to the US EPA by November 15, 1992. All regulated sources must be in compliance with the NO_x RACT regulations by May 31, 1995.

In the Northeast, approximately 40 percent of the annual NO_x emissions are from stationary sources and 60 percent are from mobile sources. NO_x emissions react photochemically with volatile organic compounds (VOC) to form ground-level ozone. NO_x emissions also react to form gaseous and particulate acids and other toxic air pollutants. Large portions of the NESCAUM region are currently in nonattainment for ozone, and up to 35 million people are exposed to unhealthy ozone levels each summer in the Northeast. The US EPA's Regional Oxidant Modeling for Northeast Transport (ROMNET) Report (June 1991), which is regarded as the most sophisticated analysis of the regional ozone problem, indicates that a NO_x emission reduction of more than 55% in conjunction with substantial VOC emission reductions will be necessary to achieve the ozone health standard. In 1987, NO_x emissions from all sources in the NESCAUM region totalled approximately 1.6 million tons. Utility boiler NO_x emissions, which totalled almost 335,000 tons, accounted for 20 percent of the inventory and represent the largest stationary source category of NO_x emissions in the NESCAUM region. In some states in

the NESCAUM region, utility boiler NO_x emissions represent more than 20 percent of the inventory.

Based on this information and the requirements of 1990 CAAA, the Committee has proceeded to develop this NO_x RACT recommendation for utility boilers. The NO_x RACT limits presented herein attempt to account for variations in fuel type, boiler design, boiler age, and capacity factor. The Committee used the report entitled "Evaluation and Costing of NO_x Controls for Existing Utility Boilers in the NESCAUM Region," prepared by Acurex Environmental Systems for NESCAUM and EPA, as the basis for considering the cost of NO_x controls.

Phase I

As discussed with the Directors at their January 6-8, 1992 meeting, the control for NO_x emissions from utility boilers should be implemented in two phases, with Phase I NO_x emission limits ideally to be based on the use of low-NO_x burners, burners out of service, enhanced overfire air systems, and combustion modifications. The NESCAUM Stationary Source Review Committee believes that the NO_x RACT limits specified in the table below represent the most stringent RACT limits that generally can be achieved without the use of add-on control equipment, such as Selective Catalytic Reduction (SCR) or Selective Non-Catalytic Reduction (SNCR). The Acurex report indicates that the vast majority of utility boilers in the Northeast can comply with the Phase I limits listed below at a cost of less than \$1000 per ton of NO_x removed and that a few utility boilers may incur a cost of up to \$2000 per ton of NO_x removed. Even if actual costs are double the range given, the Committee believes that such costs would be considered economically cost effective as RACT, when compared to the higher cost of VOC control. The Committee recommends that the limits listed below be based on a one (1) hour averaging period for oil and/or gas-fired boilers and on a 24-hour averaging period for coal-fired boilers.

Phase I NO_x RACT (pounds NO_x/million BTU)

<u>Fuel Type</u>	<u>Tangential</u>	<u>Wall</u>	<u>Cyclone</u>	<u>Stokers</u>
Gas Only No Oil	0.20	0.20	N/A	N/A
Gas/Oil	0.25	0.25	0.43	N/A
Coal Wet Bottom	1.00	1.00	0.55	N/A
Coal Dry Bottom	0.38	0.43	N/A	0.30*

* For stoker boilers that use 25% or more of solid fuels other than coal (e.g., wood waste, scrap tires), the recommended emission limit is 0.33 lb/mmBTU.

For units with high uncontrolled emission rates, which make a clear technical demonstration that Phase I emission limits are not feasible even with utility-wide averaging, states may set higher Phase I unit-specific emission limitations. Such limits would be based on the capabilities of combustion modifications, including but not limited to low-NO_x burners, overfire air, flue gas recirculation, natural gas reburn, and fuel switches.

The Committee generally prefers that RACT requirements be implemented on a unit-by-unit basis, without allowing averaging of emissions between units. However, in light of the facts that the effectiveness of NO_x control measures will vary from unit to unit and that some utilities may want to proceed with a longer term compliance strategy using advanced add-on control on some boilers during the Phase I period, the Committee recognizes that an alternative approach, which includes emissions averaging, is preferred by the utilities.

The Committee recommends that emissions averaging comply with EPA's emissions trading policy and be permitted within a utility within a given state. Demonstrating compliance with the NO_x RACT weighted average allowable emission rate would be based on the weighted average of the actual emissions from the units that are operating on a given day. Should an electric utility opt to use averaging in order to comply with RACT, then all fossil fuel fired units, including but not limited to utility boilers, combustion turbines, and internal combustion engines owned or operated by the electric generating utility located in a given state will be subject to RACT. NESCAUM intends to issue separate but comparable RACT recommendations for combustion turbines, industrial boilers, reciprocating engines, and incinerators.

Phase II

Based on the ROMNET Report and the National Academy of Sciences Report entitled "Rethinking the Ozone Problem in Urban and Regional Air Pollution," utility boiler NO_x emissions may have to be reduced to the levels set forth in the Phase II limits listed below in order to ensure future regionwide attainment of the ozone health standard. Implementation of Phase II controls should be completed by May 15, 1999 throughout the NESCAUM region in order to provide serious nonattainment areas with timely ozone reduction benefits to allow those areas to achieve attainment by the deadline specified in the 1990 CAAA and avoid being automatically bumped up into a severe nonattainment classification.

The interim Phase II NO_x limits are based on the use of add-on control technologies such as Selective Catalytic Reduction (SCR) or Selective Non-Catalytic Reduction (SNCR). The recommended Phase II limits are as follows:

Oil/Gas	0.1 pounds NO _x /million BTU (1-hour average)
Coal	0.2 pounds NO _x /million BTU (24 hour average)

For coal burning wet bottom units with high uncontrolled NO_x emission rates, states may set higher Phase II unit specific emission limitations based on the capabilities of SCR to reduce NO_x emission rates to these low levels.

The limitations on the use of emissions averaging under Phase I also apply to Phase II unless otherwise amended at a future date by the NESCAUM Directors. If 1994 ozone

attainment demonstrations, based on Urban Airshed Modeling, indicate that NO_x emissions reductions other than those that would be achieved under Phase II are necessary, then states may consider alternative NO_x emission limits on utility boilers, as well as additional controls on other stationary and mobile sources of NO_x emissions.

Prior to 1995, the NESCAUM Directors will evaluate the feasibility of integrating energy efficiency incentives (i.e. pounds of NO_x emitted per megawatt hour of electric output) into the Phase II NO_x control program for utility boilers.

If, prior to December 31, 1994, a utility signs a legally enforceable commitment to permanently shut down, dismantle, and replace any currently operating utility boiler and commits to complete this repowering project prior to May 15, 1999, said utility boiler is exempt from installing device-specific RACT. However, such repowering must reduce the NO_x emission rate from this utility boiler to at least the levels specified in Phase II. Prior to May 15, 1999, instead of the NO_x RACT emission limit found in the Phase I NO_x RACT table, the current NO_x emission rate for said utility boiler will be included in the weighted average calculation used to determine the utility wide NO_x RACT limit.

This strategy was approved by the NESCAUM Board of Directors on March 25, 1992, and amended on August 12, 1992.