

STATE OF CONNECTICUT
REGULATION

OF

NAME OF AGENCY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Concerning

SUBJECT MATTER OF REGULATION
ABATEMENT OF AIR POLLUTION - CONTROL OF OXIDES OF NITROGEN

SECTION 1

Subsections (a), (b), and (c) of Section 22a-174-22 of the Regulations of Connecticut State Agencies are amended to read as follows:

22a-174-22. Control of Nitrogen Oxides Emissions

(a) ["Fuel burning equipment."]

(a)(1) No "person" shall cause or permit the "emission" of nitrogen oxides, calculated as nitrogen dioxide, from gas-fired "fuel burning equipment" in excess of 0.2 pounds per million "BTU" (0.36 gm/million gm-cal) of heat input except that for boilers with a cyclone furnace or furnaces having a "maximum rated capacity" of two-hundred-fifty (250) million "BTU" per hour or more the "emission" limit is 0.9 pounds per million BTU unless the "commissioner" by permit or other order sets an individual federally enforceable "emission" limit which:

- (A) is less than 0.9 pounds per million "BTU" of heat input; and
- (B) is reasonably achievable by the boiler as based upon stack tests approved by the "commissioner".

(a)(2) No "person" shall cause or permit the "emissions" of nitrogen oxides, calculated as nitrogen dioxide, from oil-fired "fuel burning equipment" in excess of 0.30 pounds per million "BTU" (0.54 gm/million gm-cal) of heat input except that:

- (A) For existing fast response double-furnace naval boiler the "emission" limit is 0.5 pounds per million "BTU" of heat input; and
- (B) For existing boilers with a cyclone furnace or furnaces the "emission" limit is 0.9 pounds per million "BTU" of heat input.

(a)(3) No "person" shall cause or permit "emissions" of nitrogen oxides, calculated as nitrogen dioxide, from a coal-fired boiler in excess of 0.7 pounds per million "BTU" of heat input per hour for "new sources" and 0.9 pounds per million "BTU" for existing "sources."

(a)(4) Subdivisions (a)(1) through (a)(3) inclusive shall apply to all equipment with a maximum capacity rating above 250 million "BTU" per hour. For equipment rated between 5 and 250 million "BTU"/hr., these regulations shall apply unless the "Commissioner" is satisfied that it is not technically or economically feasible for a unit of the size considered. Subdivisions (a)(1) through (a)(4) inclusive shall not apply to stationary gas turbines, stationary internal combustion engines and "mobile sources."

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(a)(5) No "person" shall cause or permit "emissions" of nitrogen oxides, calculated as nitrogen dioxide, from a stationary gas turbine in excess of 0.9 pounds per million "BTU" of heat input.] DEFINITIONS

FOR PURPOSES OF THIS SECTION, THE FOLLOWING DEFINITIONS SHALL APPLY:

- (1) "EMERGENCY GENERATOR" MEANS A RECIPROCATING ENGINE OR A TURBINE ENGINE WHICH IS USED AS A MEANS OF PROVIDING MECHANICAL OR ELECTRICAL POWER ONLY DURING PERIODS OF SCHEDULED MAINTENANCE OR DURING AN EMERGENCY SITUATION. THE TERM DOES NOT INCLUDE AN ENGINE FOR WHICH THE OWNER OR OPERATOR IS PARTY TO AN AGREEMENT TO SELL ELECTRICAL POWER FROM SUCH ENGINE TO A UTILITY, OR RECEIVES ANY REDUCTION IN THE COST OF ELECTRICAL POWER FOR AGREEING TO PRODUCE POWER DURING PERIODS OF REDUCED VOLTAGE OR REDUCED POWER AVAILABILITY.
- (2) "EMERGENCY SITUATION" MEANS ANY OF THE FOLLOWING SITUATIONS, RESULTING FROM CONDITIONS BEYOND THE CONTROL OF THE OWNER OR OPERATOR OF THE PREMISE AT WHICH THE EMERGENCY GENERATOR IS LOCATED AND OF THE OWNER OR OPERATOR OF THE UTILITY PROVIDING PRIMARY ELECTRICAL POWER:
- (A) AN INTERRUPTION IN SERVICE OF POWER FROM THE UTILITY TO THE PREMISE;
- (B) A REDUCTION IN THE VOLTAGE BELOW THE SPECIFICATIONS OF THE MANUFACTURER OF THE EQUIPMENT AT THE FACILITY; OR
- (C) A SITUATION THAT REQUIRES INTERRUPTION OF ELECTRICAL POWER TO ENABLE THE OWNER OR OPERATOR OF THE PREMISE TO PERFORM EMERGENCY REPAIRS.
- (3) "GAS" OR "GASEOUS FUEL" MEANS NATURAL GAS, PROPANE, OR ANY OTHER FUEL THAT IS IN THE GASEOUS STATE UNDER STANDARD CONDITIONS.
- (4) "GM/BK HP-HR" MEANS GRAMS PER BRAKE HORSEPOWER-HOUR.
- (5) "LB" MEANS POUND.
- (6) "MMBTU" MEANS MILLION BTU OF HEAT INPUT.
- (7) "MMBTU/HR" MEANS MILLION BTU OF HEAT INPUT PER HOUR.
- (8) "MRC" MEANS MAXIMUM RATED CAPACITY.
- (9) "MAJOR STATIONARY SOURCE OF NOX" MEANS A PREMISE WITH POTENTIAL EMISSIONS OF NOX EQUAL TO OR GREATER THAN FIFTY (50) TONS PER YEAR IN A SERIOUS NONATTAINMENT AREA FOR OZONE, OR TWENTY-FIVE (25) TONS PER YEAR IN A SEVERE NONATTAINMENT AREA FOR OZONE.
- (10) "OTHER BOILER" MEANS A BOILER THAT IS NOT A CYCLONE FURNACE, FAST-RESPONSE DOUBLE-FURNACE NAVAL BOILER, OR FLUIDIZED-BED COMBUSTOR.
- (11) "OTHER OIL" MEANS A FUEL THAT IS LIQUID AT STANDARD CONDITIONS AND IS NOT RESIDUAL OIL.
- (12) "PPMVD" MEANS PARTS PER MILLION BY VOLUME ON A DRY BASIS.

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- (13) "RECIPROCATING ENGINE" MEANS A STATIONARY INTERNAL COMBUSTION ENGINE HAVING A CRANKSHAFT TURNED BY LINEARLY RECIPROCATING PISTONS.
- (14) "SELECTIVE NONCATALYTIC REDUCTION" MEANS EMISSION CONTROL TECHNOLOGY WHICH INVOLVES THE INJECTION OF A CHEMICAL REAGENT AT HIGH FLUE GAS TEMPERATURES TO SELECTIVELY REDUCE NO_x EMISSIONS TO NITROGEN AND WATER.
- (15) "TURBINE ENGINE" MEANS A STATIONARY INTERNAL COMBUSTION ENGINE WHICH CONTINUOUSLY CONVERTS AN AIR-FUEL MIXTURE INTO ROTATIONAL MECHANICAL ENERGY THROUGH THE USE OF MOVING VANES ATTACHED TO A ROTOR.
- (16) "WASTE COMBUSTOR" MEANS AN INCINERATOR AS DEFINED IN SUBSECTION 22a-174-18(c) OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES, A RESOURCES RECOVERY FACILITY AS DEFINED IN SECTION 22a-207 OF THE CONNECTICUT GENERAL STATUTES, OR A SEWAGE SLUDGE INCINERATOR. THE TERM DOES NOT INCLUDE A FLARE OR AN INDUSTRIAL FUME INCINERATOR.

(b) [Nitric acid manufacture. No "person" shall cause or permit the "emission" of nitrogen oxides, calculated as nitrogen dioxide, from nitric acid manufacturing plants in excess of 5.5 pounds per ton (2.8 kg./metric ton) of 100 percent acid produced.]
APPLICABILITY

(b)(1) THIS SECTION SHALL APPLY TO THE OWNER OR OPERATOR OF ANY OF THE FOLLOWING SOURCES:

- (A) ANY RECIPROCATING ENGINE WHICH HAS A MAXIMUM RATED CAPACITY OF THREE (3) MILLION BTU PER HOUR OR MORE AND WHICH IS LOCATED AT A PREMISE THAT IS A MAJOR STATIONARY SOURCE OF NO_x;
- (B) ANY FUEL-BURNING EQUIPMENT, OTHER THAN A RECIPROCATING ENGINE, WHICH HAS A MAXIMUM RATED CAPACITY OF FIVE (5) MILLION BTU PER HOUR OR MORE AND WHICH IS LOCATED AT A PREMISE THAT IS A MAJOR STATIONARY SOURCE OF NO_x;
- (C) ANY EQUIPMENT WHICH BURNS FUEL FOR HEATING MATERIALS AND WHICH HAS A MAXIMUM RATED CAPACITY OF FIVE (5) MILLION BTU PER HOUR OR MORE AND WHICH IS LOCATED AT A PREMISE THAT IS A MAJOR STATIONARY SOURCE OF NO_x;
- (D) ANY WASTE COMBUSTOR WHICH HAS A DESIGN CAPACITY OF TWO THOUSAND (2000) POUNDS OR MORE OF WASTE PER HOUR AND WHICH IS LOCATED AT A PREMISE THAT IS A MAJOR STATIONARY SOURCE OF NO_x; OR
- (E) ANY FUEL-BURNING EQUIPMENT, WASTE COMBUSTOR, OR PROCESS SOURCE WHICH HAS POTENTIAL EMISSIONS OF NO_x IN EXCESS OF THE FOLLOWING:
- (i) ONE HUNDRED THIRTY-SEVEN (137) POUNDS DURING ANY DAY FROM MAY 1 THROUGH SEPTEMBER 30 OF ANY YEAR, FOR A SOURCE LOCATED IN A SEVERE NONATTAINMENT AREA FOR OZONE; OR
- (ii) TWO HUNDRED SEVENTY-FOUR (274) POUNDS DURING ANY DAY FROM MAY 1 THROUGH SEPTEMBER 30 OF ANY YEAR, FOR A SOURCE LOCATED IN A SERIOUS NONATTAINMENT AREA FOR OZONE.

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(b)(2) SUBSECTIONS (d) THROUGH (k), INCLUSIVE, OF THIS SECTION SHALL NOT APPLY TO THE OWNER OR OPERATOR OF A PREMISE IF THE ACTUAL EMISSIONS OF NOX SINCE JANUARY 1, 1990 FROM SUCH PREMISE HAVE NOT EXCEEDED TWENTY-FIVE (25) TONS IN ANY CALENDAR YEAR FOR A PREMISE IN A SEVERE NONATTAINMENT AREA FOR OZONE, OR FIFTY (50) TONS IN ANY CALENDAR YEAR FOR A PREMISE IN A SERIOUS NONATTAINMENT AREA FOR OZONE. NOTWITHSTANDING THIS PROVISION, SUBSECTIONS (d) THROUGH (k), INCLUSIVE, OF THIS SECTION SHALL APPLY IF SUCH OWNER OR OPERATOR EXCEEDS EMISSIONS OF NOX AS FOLLOWS:

(A) IN ANY CALENDAR YEAR: TWENTY-FIVE (25) TONS FOR A PREMISE LOCATED IN A SEVERE NONATTAINMENT AREA FOR OZONE, OR FIFTY (50) TONS FOR A PREMISE LOCATED IN A SERIOUS NONATTAINMENT AREA FOR OZONE; OR

(B) ON ANY DAY FROM MAY 1 THROUGH SEPTEMBER 30 OF ANY YEAR: ONE HUNDRED THIRTY-SEVEN (137) POUNDS FOR A PREMISE LOCATED IN A SEVERE NONATTAINMENT AREA FOR OZONE OR TWO HUNDRED SEVENTY-FOUR (274) POUNDS FOR A PREMISE LOCATED IN A SERIOUS NONATTAINMENT AREA FOR OZONE.

(b)(3) SUBSECTIONS (d) THROUGH (k) OF THIS SECTION SHALL NOT APPLY TO AN EMERGENCY GENERATOR. IN ADDITION, THE ACTUAL EMISSIONS FROM EMERGENCY GENERATORS OPERATING DURING AN EMERGENCY SITUATION SHALL NOT BE INCLUDED IN THE DETERMINATION OF THE APPLICABILITY OF SUBPARAGRAPH (b)(2)(B) OF THIS SECTION.

(c) [Other "sources." No non-fuel burning "source" shall emit nitrogen oxides, calculated as nitrogen dioxide, in excess of 700 parts per million by volume.] EXEMPTION.

THIS SECTION SHALL NOT APPLY TO MOBILE SOURCES.

Section 22a-174-22 of the Regulations of Connecticut State Agencies is amended by the addition of new subsections (d) through (m), as follows:

(NEW)

(d) General requirements

(d)(1) Prior to May 31, 1995, the owner or operator of any source subject to this section shall not cause or allow emissions of NOx from such source in excess of the emission limitation specified in Table 22-1 of this section. The owner or operator of any source which is not subject to an emission limitation in Table

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22-1 of this section shall not cause or allow emissions of NOx from such source in excess of seven hundred (700) ppmvd.

TABLE 22-1

NOX EMISSION LIMITATIONS PRIOR TO MAY 31, 1995
(IN POUNDS PER MMBTU OF HEAT INPUT)

	GAS-FIRED	OIL-FIRED	COAL-FIRED
Turbine engine	0.9	0.9	NA
Cyclone furnace	0.9	0.9	0.9
Fast-response double-furnace Naval boiler	0.5	0.5	0.9
Other boiler, with MRC of 250 MMBTU/hr or more	0.9	0.3	0.9
Other boiler, with MRC less than 250 MMBTU/hr	0.2	0.3	0.9

(d)(2) On and after May 31, 1995, the owner or operator of any source subject to this section shall:

- (A) comply with all applicable emission limitations for such source in subsection (e) of this section;
- (B) comply with the provisions for multi-fuel sources in subsection (f) of this section;
- (C) reduce the NOx emission rate from such source by forty percent (40%), pursuant to subsection (g) of this section, in accordance with a permit issued by the Commissioner;
- (D) reconstruct the source, pursuant to subsection (h) of this section, in accordance with a permit issued by the Commissioner; or
- (E) modify the schedule of operations at the source, pursuant to subsection (i) of this section, in accordance with a permit issued by the Commissioner.

(d)(3) The owner or operator of a source subject to this section may apply in writing to the Commissioner for an extension to comply with subdivision (d)(2). The Commissioner may grant such extension for a period not to exceed one (1) year, through a permit. Such permit shall meet the Administrator's requirements for "Phase-in of Controls Beyond May 1995 (FR. Vol. 57, No. 266, Page 55623). The Commissioner shall submit such permit or order to the Administrator for approval in accordance with the provision of 42 U.S.C. 7401-7671q.

(d)(4) The owner or operator, in accordance with an order or permit issued by the Commissioner, may use emission reduction trading, pursuant to subsection (j) of this section, to achieve all or a portion of the reductions required by this section. The

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Commissioner shall submit such permit or order to the Administrator for approval in accordance with the provision of 42 U.S.C. 7401-7671q.

(d)(5) Nothing herein shall preclude the Commissioner from issuing an order to an owner or operator to comply with the requirements of this subsection.

(e) Emission limitations

(e)(1) The owner or operator of a stationary source subject to this section may, in accordance with subparagraph (d)(2)(A) of this section, comply with the requirements of this section by meeting applicable emission limitations specified in Table 22-2 of this section. Emission limitations in Table 22-2 for turbine engines that are quantified in units of ppmvd shall be corrected to fifteen percent (15%) oxygen. For any source for which there is no applicable emission limitation in Table 22-2, the owner or operator of such source shall not cause or allow emissions of NO_x therefrom in excess of the following:

(A) For fuel-burning equipment fired by a fuel other than those fuels cited in Table 22-2: 0.3 pounds per million BTU of heat input;

(B) For any waste combustor subject to the requirements of subdivision (e)(2): 0.38 pounds per million BTU of heat input.

(C) For any waste combustor not subject to the requirements of subparagraph (e)(1)(B) which has a waterwall furnace: 0.38 pounds per million BTU of heat input.

(D) For any other waste combustor: 0.33 pounds per million BTU of heat input.

(E) For a glass melting furnace: 5.5 pounds of NO_x per ton of glass produced;

(F) For a source, other than a glass melting furnace, which burns fuel for heating materials: 180 ppmvd, corrected to twelve percent (12%) carbon dioxide; or

(G) For any source not having an emission limitation in subparagraphs (e)(1)(A) through (e)(1)(F) of this section: seven hundred (700) ppmvd.

(e)(2) In addition to complying with the emission limitation in subparagraph (e)(1)(B), by May 31, 1995 the owner or operator of any waste combustor which combusts refuse derived fuel shall install and operate selective noncatalytic reduction or other NO_x emissions control technology capable of reducing the NO_x emission rate by at least thirty percent (30%) from the average emission rate in calendar year 1990 on one boiler unit at such facility. If the Commissioner determines that operations during 1990 were not representative of normal operations of the facility, the Commissioner may use another calendar period which is more representative. In addition, actual annual average NO_x emissions from other boiler units at such facility shall each not exceed 420 tons per year. The Commissioner may consider, in the same manner as for other sources, any emission reduction below 0.38 pounds per million BTU of heat input to be eligible as surplus emissions reductions for purposes of emission reduction credits pursuant to subsection (j) of this section until May 31, 1999.

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TABLE 22-2

NOX EMISSION LIMITATION ON AND AFTER MAY 31, 1995

	GAS-FIRED	RESIDUAL-OIL-FIRED	OTHER OIL-FIRED	COAL-FIRED
Turbine engine, with 100 MMBTU/hr or greater MRC	55 ppmvd	not applicable	75 ppmvd	not applicable
Turbine engine with MRC less than 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 lb/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/MMBTU
Reciprocating engine	2.5 gm/bk hp-hr	not applicable	8 gm/bk hp-hr	not applicable

(f) Multi-fuel sources

(f)(1) When the owner or operator of a source switches the use of fuel, converts to a new fuel, or is capable of burning two or more different fuels, such owner or operator shall comply with the requirements of this subsection.

(f)(2) The owner or operator of a source that is capable of firing two or more fuels shall not cause or allow emissions of NOx from such source, in excess of the following:

- (A) For fuel-burning equipment that simultaneously fires two or more different fuels: an emission limitation calculated by 1) multiplying the heat input of each fuel combusted by the emission limitation established in this section for such fuel, 2) summing those products, and 3) dividing the sum by the total heat input; or
- (B) For fuel-burning equipment that is capable of interchangeably firing two or more fuels: the emission limitation in Table 22-2 for the particular equipment and fuel used. Notwithstanding this requirement, the owner or operator of a source that operates exclusively on

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other oil or gas from May 1 through September 30 of any year and on another fuel during the remainder of the year shall not cause or allow emissions of NOx from such source in excess of 0.2 pounds per million BTU of heat input from May 1 through September 30 and 0.29 pounds per million BTU of heat input for the remainder of the year.

(f)(3) The owner or operator of a source which, on or after January 1, 1990, converts the fuel used at such source, shall not cause or allow emissions of NOx from such source in excess of the following:

- (A) 0.29 pounds per million BTU of heat input, when the source burned coal to provide more than fifty percent (50%) of its total heat input during the last full calendar year immediately prior to such conversion; or
- (B) 0.225 pounds per million BTU of heat input, if the source burned residual oil to provide more than fifty percent (50%) of its total heat input during the last full calendar year immediately prior to such conversion.

(g) Forty percent (40%) reduction

(g)(1) When the owner or operator of any source reduces the NOx emission rate from such source by forty percent (40%), as provided in subparagraph (d)(2)(C) of this section, such owner or operator shall comply with the emission limitations of this section established in a permit issued by the Commissioner. Such permit shall specify such source's NOx emission limitation to be the more restrictive of:

- (A) sixty percent (60%) of such source's emission rate at maximum capacity during calendar year 1990; or
- (B) sixty percent (60%) of such source's emission limitation in Table 22-1 of subdivision (d)(1).

Such permit shall express the NOx emission limitation in the same units of measurement as the NOx emission limitation that would otherwise apply to such source in subsection (e).

(g)(2) To determine the actual emission rate specified in subparagraph (g)(1)(A) of this subsection, such owner or operator shall conduct an emission test at such source under operating conditions representative of those conditions in existence at the source in calendar year 1990, at the maximum capacity at which the source was operated during such calendar year.

(g)(3) If the Commissioner determines that operations during calendar year 1990 were not representative of normal operations from such source, the Commissioner may use another calendar year which is more representative.

(h) Reconstruction or replacement

(h)(1) If the owner or operator of a source proves, to the satisfaction of the Commissioner, that compliance with subsections (e) or (g) of this section is not technologically or economically feasible at such source, the Commissioner may allow the owner or operator, through a permit, to comply with this section by reconstructing the existing source, or replacing the existing

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source with a new source. Such reconstruction or replacement shall be completed no later than May 31, 1999.

(h)(2) Such permit shall require that, prior to the completion of reconstruction or replacement of such source, the NOx emission rate from the existing source not exceed the more restrictive of:

- (A) the emission limitation in subdivision (d)(1); or
- (B) the emission limitation of any current permit or order issued by the Commissioner for such source.

(h)(3) Such permit shall require the owner or operator, by May 31, 1995, to deposit into an escrow account an amount equal to \$1,000 multiplied by the number of pounds per day of NOx emission reductions that would be needed by the existing source to achieve compliance with the emission limitations in subsection (e) of this section. The terms of such escrow account and escrow agent required by such permit shall be subject to the approval of the Commissioner. The Commissioner may require that such escrow account be established and properly insured against default at an institution authorized to operate in Connecticut by the State's Commissioner of Banking. In determining the acceptability of an escrow agent, the Commissioner shall consider the reliability and trustworthiness of the person acting as the escrow agent. The Commissioner shall also consider the escrow agent's ability to insure that any money deposited into such escrow account will be withdrawn upon written notification in accordance with such permit.

(h)(4) After completion of such reconstruction or replacement, the owner or operator may, upon written notification by the Commissioner, withdraw funds from the escrow account in accordance with such permit described in subdivision (h)(3). If the owner or operator fails to complete reconstruction or replacement by the date set forth in the permit, such owner or operator shall use such funds to acquire emission reduction credits upon written notice from the Commissioner.

(i) Schedule modification

(i)(1) If the owner or operator of a source proves to the satisfaction of the Commissioner that it is not technologically or economically feasible for such source to comply with the emission limitations in subsections (e) through (g) of this section, the Commissioner may by permit require NOx emission reductions through modifications of the schedule of NOx-emitting activities and implementation of other measures to reduce NOx emissions at such source. Such permit may include restrictions on operations on any day for which the Commissioner has forecast that ozone levels will be "moderate to unhealthful," "unhealthful," or "very unhealthful."

(i)(2) This subsection shall only apply to the following:

- (A) Oil-fired turbine engines or Fast-response double-furnace Naval boilers that generate power to create simulated high-altitude atmospheres for the testing of aircraft engines; or
- (B) Testing of fuel-burning equipment undergoing research and development.

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(j) Emissions reduction trading

(j)(1) When the owner or operator of a source uses emission reduction trading to comply with this section, such owner or operator shall achieve reductions in NOx emissions which, at a minimum, are equivalent to those emission reductions that would be achieved by complying with all applicable emission limitations in subsection (e) of this section. The Commissioner may allow the use of emission reduction trading through the issuance of a permit. Such permit shall require the owner or operator, by May 31, 1995, to perform emission trading or to deposit into an escrow account an amount equal to \$2000 multiplied by the number of pounds per day of NOx emission reductions needed to achieve compliance with the emission limitations in subsection (e) of this section. Such order or permit also shall require the owner or operator to withdraw and use such funds to acquire ERCs upon written notice from the Commissioner. The terms of such escrow account and escrow agent required by such permit shall be subject to the approval of the Commissioner. The Commissioner shall require that such escrow account be established and properly insured against default at an institution authorized to operate in Connecticut by the State's Commissioner of Banking. In determining the acceptability of an escrow agent, the Commissioner shall consider the reliability and trustworthiness of the person acting as the escrow agent. The Commissioner shall also consider the escrow agent's ability to insure that any money deposited into such escrow account will be withdrawn upon written notification in accordance with such permit.

(j)(2) In order to comply with subdivision (j)(1) of this subsection, such owner or operator shall conduct an emission test or submit another method acceptable to the Commissioner to estimate the NOx emission limitation shortfall. Such emission test shall be conducted under operating conditions which demonstrate the maximum emission rate of such source. Such emission test shall be certified pursuant to subsection (k) of this section.

(j)(3) Any creation or use of ERCs for the purpose of this subsection shall be consistent with the provisions of the U.S. Environmental Protection Agency's "Economic Incentive Program Rules; Proposed Rules," published February 23, 1993 (Federal Register, Volume 58, Number 34), and the U.S. Environmental Protection Agency's "Emissions Trading Policy Statement," published December 4, 1986 (Federal Register, Volume 51, Number 233).

(k) Emissions testing and monitoring

(k)(1) The owner or operator of any source subject to an emission limitation under this section shall conduct an emission test to demonstrate compliance with this section no later than May 31, 1995. Any such owner or operator which does not install or operate a continuous emissions monitor at such source shall also conduct emission tests at least once every five years. Compliance with the emission limitations of this section shall be determined based on the average of three (3) one-hour tests, each performed over a consecutive 60-minute period and performed in accordance with Section 22a-174-5. Any analysis of nitrogen content conducted as part of such emission testing shall be in accordance with Method D-3228 of the American Society for the Testing of Materials.

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(k)(2) The owner or operator shall demonstrate compliance with emission limitations of this section using sampling and analytical procedures approved under 40 CFR Part 60, Appendix A, or under procedures in subsection 22a-174-5(d). Sampling shall be conducted when the source is at normal operating temperature and is operating at or above ninety percent (90%) of maximum rated capacity for a fuel-burning source or at or above ninety percent (90%) of design capacity for a waste combustor. Notwithstanding such requirement, any source which has operated in excess of one hundred percent (100%) of its maximum rated capacity at any time since January 1, 1990 shall be tested when the source is operating at or above ninety percent (90%) of its highest operating rate since January 1, 1990.

(k)(3) On and after May 31, 1995, the owner or operator of any source that emitted more than one hundred (100) tons of NOx from a single stack during any calendar year beginning January 1, 1990, shall install, calibrate, maintain, operate, and certify a continuous emissions monitor for NOx for each such stack. The owner or operator shall notify the Commissioner in writing at least thirty (30) days prior to conducting any performance or quality assurance testing of any such monitor. Any such testing shall be conducted in accordance with a testing protocol approved by the Commissioner. Any continuous emission monitor for NOx shall be installed, calibrated and operated in accordance with the performance and quality assurance specifications contained in 40 CFR 60, Subpart A, Appendix B and Appendix F.

(k)(4) Unless otherwise specified by the Commissioner in a permit or order, the averaging times for the emission limitations in this section for a source that has, or is required to have, a continuous emissions monitor for NOx shall be twenty-four (24) hours, measured from midnight at the beginning of any day to midnight of the end of that day and shall include all periods of operation, including startup, shutdown, and malfunction.

(k)(5) The owner or operator of a source subject to this subsection may apply in writing to the Commissioner for an extension to comply with this subsection. The Commissioner may grant such extension for a period not to exceed one (1) year through a permit or order.

(l) Reporting and record keeping

(l)(1) The owner or operator of any source subject to this section shall keep the following records:

- (A) Daily records of the operating hours of such source;
- (B) Daily records of fuel use and NOx emissions from such source (in pounds per day);
- (C) Monthly and annual records of NOx emissions from such source (in tons);
- (D) Records of all tune-ups, repairs, replacement of parts and other maintenance of such source;
- (E) Copies of all documents submitted to the Commissioner pursuant to this section;
- (F) For any source required to install, calibrate, and operate a continuous emissions monitor for NOx under subdivision (k)(3), all charts, electronically stored

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data, and printed records produced by such continuous emissions monitor;

- (G) Procedures for calculating NOx emission rates in (B) and (C), above;
- (H) Records of the dates, times, and places of all emission testing required by this section, the persons performing the measurements, the testing methods used, the operating conditions at the time of testing, and the results of such testing;
- (I) For any source required to install, calibrate, and operate a continuous emissions monitor for NOx under subdivision (k)(3), records of all performance evaluations, calibration checks and adjustments on such monitor; a record of maintenance procedures; and all data necessary to complete the quarterly reports required under subdivision (l)(4) of this section; and
- (J) Any other records or reports required by an order or permit issued by the Commissioner pursuant to this section.

(1)(2) Within thirty (30) days of the completion of emission tests conducted under the requirements of subdivision (k)(1) of this section, the owner or operator of such source shall submit a written report of the results of such testing to the Commissioner.

(1)(3) Within sixty (60) days of the completion of certification tests conducted under the requirements of subdivision (k)(3) of this section, the owner or operator of such source shall submit a written report of the results of such testing to the Commissioner.

(1)(4) The owner or operator of any source required to be equipped with a continuous emissions monitor for NOx under subdivision (k)(3) of this section shall submit to the Commissioner written quarterly reports of excess emissions and CEM malfunctions. Such reports shall be submitted to the Commissioner on or before January 30, April 30, July 30, and October 30 and shall include data for the three calendar month period ending the month before the due date of the report. For each period of excess emissions, such report shall include the date and time of commencement and completion of such period, the magnitude and suspected cause of the excess emissions and all actions taken to correct the excess emissions. For each malfunction of the CEM system, such report shall include the date and time of when the malfunction commenced and ended, and all actions taken to correct the malfunction.

(1)(5) The owner or operator of any source subject to this section shall retain all records and reports produced pursuant to the requirements of this section for five (5) years. Such records and reports shall be available for inspection at reasonable hours by the Commissioner or the Administrator. Such records and reports shall be retained at the source, unless the Commissioner approves in writing the use of another location in the State.

(1)(6) On or before April 15 of each year, the owner or operator of any source subject to this section shall submit a report on NOx emissions from such source, on a form provided by the Commissioner.

STATE OF CONNECTICUT
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DEPARTMENT OF ENVIRONMENTAL PROTECTION

(1)(7) The Commissioner may use data recorded by continuous emissions monitors for NOx and any other records and reports to determine compliance with applicable requirements of this section.

(m) Compliance plans

(m)(1) The owner or operator of any source that is subject to this section shall submit a compliance plan to the Commissioner by September 1, 1994, on forms provided by the Commissioner. Such compliance plan shall document how the source will comply with all applicable requirements of this section. The owner or operator of any source which becomes subject to this section after May 1, 1994, shall submit a compliance plan within four (4) months of the date on which the source becomes subject to this section.

(m)(2) Any compliance plan submitted pursuant to this subsection shall include a certification signed by a responsible corporate officer or a duly authorized representative of such officer, as those terms are defined in subdivision 22a-430-3(b)(2) of the Regulations of Connecticut State Agencies, and by the individual delegated by such officer with the responsibility of actually preparing the compliance plan. Such certification shall read as follows:

"I have personally examined and am familiar with the information submitted in this compliance plan and all attachments. Based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, I certify that the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in this compliance plan or its attachments may be punishable as a criminal offense."

(m)(3) If a compliance plan does not contain all measures necessary to comply with all requirements of this section, the Commissioner may notify the owner or operator of such source of the deficiency. Such owner or operator shall resubmit a revised compliance plan within thirty (30) days of receipt of such notice.

Statement of Purpose. To reduce the emission of nitrogen oxides, as required by the Clean Air Act.

Be it known that the foregoing:

Regulations Emergency Regulations

Are:

Adopted Amended as hereinabove stated Repealed

By the aforesaid agency pursuant to:

Section 22a-174 of the General Statutes.

Section _____ of the General Statutes, as amended by Public Act No. _____ of the _____ Public Acts.

Public Act No. _____ of the Public Acts.

After publication in the Connecticut Law Journal on June 22 19 93, of the notice of the proposal to:

Adopt Amend Repeal such regulations

(If applicable): And the holding of an advertised public hearing on 22nd day of July 19 93

WHEREFORE, the foregoing regulations are hereby:

Adopted Amended as hereinabove stated Repealed

Effective:

When filed with the Secretary of the State.

(OR)

The _____ day of _____ 19 _____.

In Witness Whereof:	DATE <u>4/27/94</u>	SIGNED (Head of Board, Agency or Commission) <u>Robert S. Moore</u>	OFFICIAL TITLE, DULY AUTHORIZED <u>Deputy Commissioner</u>
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Approved by the Attorney General as to legal sufficiency in accordance with Sec. 4-169, as amended, C.G.S.:	SIGNED <u>Will B. L...</u>	OFFICIAL TITLE, DULY AUTHORIZED <u>Assoc. Atty. General</u>
---	-------------------------------	--

5/2/94

- Approved
- Disapproved
- Disapproved in part, (Indicate Section Numbers disapproved only)
- Rejected without prejudice.

By the Legislative Regulation Review Committee in accordance with Sec. 4-170, as amended, of the General Statutes.	DATE	SIGNED (Clerk of the Legislative Regulation Review Committee)
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Two certified copies received and filed, and one such copy forwarded to the Commission on Official Legal Publications in accordance with Section 4-172, as amended, of the General Statutes.

DATE	SIGNED (Secretary of the State.)	BY
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INSTRUCTIONS

- One copy of all regulations for adoption, amendment or repeal, except emergency regulations, must be presented to the Attorney General for his determination of legal sufficiency. Section 4-169 of the General Statutes.
- Seventeen copies of all regulations for adoption, amendment or repeal, except emergency regulations, must be presented to the standing Legislative Regulation Review Committee for its approval. Section 4-170 of the General Statutes.
- Each regulation must be in the form intended for publication and must include the appropriate regulation section number and section heading. Section 4-172 of the General Statutes.
- Indicate by "(NEW)" in heading if new regulation. Amended regulations must contain new language in capital letters and deleted language in brackets. Section 4-170 of the General Statutes.

Exhibit E

AGENCY FISCAL ESTIMATE OF PROPOSED REGULATION

AGENCY SUBMITTING REGULATION Environmental Protection Date 2/7/94
 SUBJECT MATTER OF REGULATION Abatement of Air Pollution - Control of Nitrogen Oxides Emissions
 REGULATION SECTION NO. 22a-174-22 STATUTORY AUTHORITY 22a-174
 OTHER AGENCIES AFFECTED None
 EFFECTIVE DATE USED IN COST ESTIMATE 7/1/94
 ESTIMATE PREPARED BY Phil Florkoski TELEPHONE 566-2506

SUMMARY OF STATE COST AND REVENUE IMPACT OF PROPOSED REGULATION

Agency <u>Environmental Protection</u>	Fund Affected <u>General</u>		
	1st Year 1995	2nd Year 1996	Full Operation 1997
Number of Positions	0	0	0
Personal Services	0	0	0
Other Expenses	0	300,000	300,000
Equipment	0	0	0
Grants	0	0	0
Total State Cost (Savings)			
Estimated Revenue Gain (Loss)			
Total Net State Cost (Savings)	0	300,000	300,000

EXPLANATION OF STATE IMPACT OF REGULATION:

It is estimated that there are 13 sources which have the potential to be affected by this regulation. This cost estimate is based on 5 of those sources having to make modifications. Remainder may receive permit restrictions to keep them below the applicability level.

EXPLANATION OF MUNICIPAL IMPACT OF REGULATION:

It is estimated that there are 8 sources which have the potential to be affected by this regulation. Two of those sources may have to make modifications. Remainder may receive permit restrictions to keep them below the applicability level.

Exhibit A
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Notice of Intent to Amend Regulations and to Revise
the State Implementation Plan for Air Quality

The Commissioner of Environmental Protection hereby gives notice of a public hearing as part of a rulemaking proceeding. The purpose of this proceeding is to amend the Regulations of Connecticut State Agencies concerning abatement of air pollution. This amendment will be submitted to the U.S. Environmental Protection Agency (EPA) for their review and approval as a revision to the State Implementation Plan for air quality (SIP). The public hearing will cover a proposed revision to section 22a-174-22 of the Regulations of Connecticut State Agencies concerning control of nitrogen oxides (NOx) emissions.

The proposed revision will require the use of Reasonably Available Control Technology to reduce oxides of nitrogen (NOx RACT). NOx emissions are an important ingredient in the formation of ozone. Connecticut significantly exceeds the National Ambient Air Quality Standard for ozone. Photochemical indicates that ozone may be cost-effectively controlled by reductions in NOx emissions.

All interested persons are invited to express their views and arguments on the proposed revision and regulations. Comments should be submitted to the Bureau of Air Management, Room 144, State Office Building, 165 Capitol Avenue, Hartford, Connecticut 06106. All comments must be received by August 6, 1993.

In addition to accepting written comments, the DEP will also hold the public hearing described below. Persons appearing at the hearing are requested to submit a written copy of their statement. However, oral comments will also be made part of the record and are welcome.

July 22, 1993, 9:30 a.m.
Room 1D, Legislative Office Building
Capitol Avenue, Hartford, CT

Copies of the amendment described above will be available for public inspection during normal business hours at the Bureau of Air Management at the above address. Additional copies will also be available for review at the Government Information Service Desk (Balcony Level) of the Connecticut State Library, 231 Capitol Avenue, Hartford, CT. New London Public Library, Torrington Public Library, Bridgeport Public Library (Main Branch) and Governor's Bridgeport Office, 10 Middle Street, Bridgeport. For further information contact John Gove of the Bureau of Air Management at 566-2690.

The authority to adopt this plan and regulations is granted by sections 22a-6 and 22a-174 of the Connecticut General Statutes (CGS). This notice is required by 4-168 and 22a-6 CGS and Title 40 Code of Federal Regulations Part 51.102.

ROBERT E. MOORE
Deputy Commissioner

Amendments to Section 22a-174-22
Control of Nitrogen Oxides Emissions

Summary

The rule is divided into thirteen subsections ((a) through (m)), as follows:

Subsection (a) defines terms used in the section.

Subsection (b) identifies sources to which the regulation applies. This rule only applies to large facilities, i.e. major stationary sources. NOx-emitting equipment at these facilities are subject to emission limits and other recordkeeping requirements of the rule. The regulation primarily affects fuel-burning sources, but it also covers incinerators and industries that use fuel for process heating or who otherwise emit NOx. Subsection (b) also partially exempts emergency generators and contains a provision for "synthetic minors," i.e., sources that voluntarily limit emissions to below major-source levels.

Subsection (c) exempts mobile sources.

Subsection (d) specifies general requirements including emission limits that apply prior to May 31, 1995 (see Table 1) and the options that are available for compliance after 1995. The primary options are 1) meeting the presumptive NOx RACT emission limits or 2) reducing NOx emissions by 40% from baseline levels. There are special provisions for fuel switching, reconstruction and schedule modifications. Finally emission reduction trading is allowed as an economic incentive for those sources where it would be infeasible to comply with the emission limits.

Subsection (e) specifies emission limits on or after May 31, 1995.

Subsection (f) specifies emission limits for for multi-fuel sources. It covers co-fired sources and sources that switch to cleaner-burning fuels interchangeably, seasonally, or permanently.

Subsection (g) provides an option for sources to reduce NOx emissions by 40% from emission rates in 1990. It specifies how to calculate the new emission limitation and requires such limitation to be incorporated into a permit or order.

Subsection (h) specifies requirements for reconstruction, in which a company can get a compliance extension until 1999 if it reconstructs or replaces the source with a new unit meeting emission limits that apply to new sources.

Subsection (i) allows schedule modification, to restrict emission of NOx on days with high-ozone potential, if nothing else is feasible. This option is only available at research and development facilities.

Subsection (j) specifies requirements for the use of emission reduction trading to comply with the emission limits.

Subsection (k) requires emission testing of sources subject to emission limits and continuous emission monitoring at any stack with actual emissions in excess of 100 tons per year..

Subsection (l) specifies recordkeeping and reporting requirements.

Subsection (m) requires sources that are subject to this regulation to prepare and submit compliance plans, due on September 1, 1994.



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



HEARING REPORT

Amendments to Section 22a-174-22 - Control of Nitrogen Oxides Emissions

April 29, 1994

The Clean Air Act, as amended in 1990, mandates states to impose requirements for Reasonably Available Control Technology (RACT) for major stationary sources of nitrogen oxides (NOx). In accordance with that requirement, the Connecticut Department of Environmental Protection (DEP) proposes to revise Section 22a-174-22 of the Regulations of Connecticut State Agencies and to its State Implementation Plan (SIP) for Air Quality, as it pertains to control of NOx emissions.

On June 22, 1993 the DEP announced a public hearing to receive comments concerning its proposed regulation and SIP revision. The hearing was held at 9:30 AM, Thursday, July 22, 1993, in Room 1D of the Legislative Office Building, Hartford, Connecticut. DEP maintained the hearing record open until August 6, 1993 for receipt of written comments. Comments received on or before that date were considered in the preparation of these regulations and SIP.

PRINCIPAL REASONS IN SUPPORT OF THIS PROGRAM

Nitrogen oxides (NOx) are an important ingredient, along with volatile organic compounds (VOC) and sunlight, in the formation of ozone. Ozone levels in Connecticut, while trending downward in response to emission control strategies over the past fifteen years, continue to frequently exceed the National Ambient Air Quality Standard. In the summer of 1993, Connecticut experienced 14 days on which the NAAQS for ozone was exceeded, at one or more monitoring sites. Concentrations have exceeded the NAAQS by as much as 40%. Ozone causes shortness of breath, irritation to the eyes and the respiratory system, and aggravation of respiratory distress in preexisting conditions, such as emphysema and asthma. It also deteriorates materials, primarily rubber, harms plants, and reduces crop yields.

Strategies to reduce ozone in the past relied on the reduction of volatile organic compounds, but more recent studies indicate that ozone can also be effectively reduced by controlling NOx.

In addition, nitrogen oxides are pollutants in their own right. They increase susceptibility to respiratory infection and are important contributors to acid rain.

There is also a legal obligation to undertake this program. Three sections (Sections 110, 172(c)(1), and 182(f)) of the Clean Air Act as amended in 1990 contain requirements for NOx reductions. In addition, U.S. EPA's "Nitrogen Oxides Supplement to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990" (November 12, 1992) includes guidance on the requirements for NOx

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control. States are required to promulgate regulations consistent with this guidance.

CONTENTS OF THIS REPORT

As required by Section 4-168 of the Connecticut General Statutes (CGS), this report includes the final wording of the proposed regulation and the proposed wording of the draft regulation, as presented at the public hearing. The report also describes the principal reasons in support of the final regulations, discusses the principal comments and objections raised in opposition to the draft regulations, and offers the Department's reasons for accepting or rejecting the suggested changes. Copies of the public comments are available for review at the DEP offices.

Amendments to Section 22a-174-22
Control of Nitrogen Oxides Emissions

Summary

The rule is divided into thirteen subsections ((a) through (m)), as follows:

Subsection (a) defines terms used in the section.

Subsection (b) identifies sources to which the regulation applies. This rule only applies to large facilities, i.e. major stationary sources. NOx-emitting equipment at these facilities are subject to emission limits and other recordkeeping requirements of the rule. The regulation primarily affects fuel-burning sources, but it also covers incinerators and industries that use fuel for process heating or who otherwise emit NOx. Subsection (b) also partially exempts emergency generators and contains a provision for "synthetic minors," i.e., sources that voluntarily limit emissions to below major-source levels.

Subsection (c) exempts mobile sources.

Subsection (d) specifies general requirements including emission limits that apply prior to May 31, 1995 (see Table 1) and the options that are available for compliance after 1995. The primary options are 1) meeting the presumptive NOx RACT emission limits or 2) reducing NOx emissions by 40% from baseline levels. There are special provisions for fuel switching, reconstruction and schedule modifications. Finally emission reduction trading is allowed as an economic incentive for those sources where it would be infeasible to comply with the emission limits.

Subsection (e) specifies emission limits that will apply after May 31, 1995 (See Tables 2 and 3).

Subsection (f) specifies emission limits for for multi-fuel sources. It covers co-fired sources and sources that switch to cleaner-burning fuels interchangeably, seasonally, or permanently.

Subsection (g) provides an option for sources to reduce NOx emissions by 40% from emission rates in 1990. It specifies how to calculate the new emission limitation and requires such limitation to be incorporated into a permit or order.

Subsection (h) specifies requirements for reconstruction, in which a company can get a compliance extension until 1999 if it reconstructs or replaces the source with a new unit meeting emission limits that apply to new sources.

Subsection (i) allows schedule modification, to restrict emission of NOx on days with high-ozone potential, if nothing else is feasible. This option is only available at research and development facilities.

Subsection (j) specifies requirements for the use of emission reduction trading to comply with the emission limits.

Subsection (k) requires emission testing of sources subject to emission limits and continuous emission monitoring at any stack with actual emissions in excess of 100 tons per year..

Subsection (l) specifies recordkeeping and reporting requirements.

Subsection (m) requires sources that are subject to this regulation to prepare and submit compliance plans, due on September 1, 1994.

TABLE 1. EMISSION LIMITS (LB/MMBTU) FOR FUEL-BURNING EQUIPMENT BEFORE 5/31/95

	GAS-FIRED	OIL-FIRED	COAL-FIRED
Turbine engine	0.9	0.9	--
Cyclone furnace	0.9	0.9	0.9
Naval boilers	0.5	0.5	0.9
Other boiler > 250 MMBTU	0.9	0.3	0.9
Other boiler < 250 MMBTU	0.2	0.3	0.9

TABLE 2. EMISSION LIMITATIONS AFTER 5/31/95 FOR FOSSIL-FUEL SOURCES

	GAS	RESIDUAL OIL	OTHER OIL	COAL
Turbine engine >	55 ppmv	--	75 ppmv	--

100 MMBTU/hr MRC

Turbine engine < 100 MMBTU/hr MRC	0.90 lb/MMBTU	--	0.90 lb/MMBTU	--
Cyclone furnace	0.43 lb/MMBTU	0.43 lb/MMBTU	--	--
Naval boiler	0.20 lb/MMBTU	0.30 lb/MMBTU	0.30 lb/MMBTU	0.30 lb/MMBTU
Fluidized-bed combustor	--	--	--	0.29 lb/MMBTU
Other boiler	0.20 lb/MMBTU	0.25 lb/MMBTU	0.20 lb/MMBTU	0.38 lb/MMBTU
IC engine	2.5 gm/bk hp-hr	--	8 gm/bk hp-hr	--

TABLE 3. EMISSION LIMITATIONS AFTER 5/31/95 FOR OTHER SOURCES

Fuel-burning equipment not in Table 2:	0.3 lb/MMBTU
Waste combustor, refractory lined:	0.33 lb/MMBTU
Waste combustor, waterwall, refuse-derived fuel	0.33 lb/MMBTU
Waste combustor, waterwall, mass burn	0.38 lb/MMBTU
Glass melting furnace: of glass	5.5 lb/ton
Other materials heating source	180 ppmvd @ 12% CO ₂
Other process source	700 ppmvd.

Abbreviations for Tables 1-3: gm/bk hp-hr -- grams per brake horsepower hour; IC engine -- internal combustion engine; lbs/MMBTU -- pounds per million BTU; MRC -- maximum rated capacity; ppmvd -- parts per million by volume, dry basis; > -- greater than; < -- less than

COMMENTS AND RESPONSES

1. Definitions (subsection (a))

This subsection defines the terms that are used throughout the section.

Summary of Comments

- a. EPA suggested that we include definitions for the following:
natural gas; distillate oil; residual oil; coal; fast-response,

double-furnace naval boiler; fluidized bed boiler; maximum rated capacity; higher heating value; cyclone furnace; stationary reciprocating internal combustion engine; glass melting furnace; stationary combustion turbine; rich-burn and lean-burn turbines; and simple-cycle, regenerative cycle, and combined-cycle combustion turbines.

- b. EPA suggested that we reference 40 CFR Part 81 in defining serious and severe nonattainment areas.
- c. One commenter requested that internal combustion (I.C.) engines driving emergency pumps for wastewater pretreatment be included in the definition of "emergency generator."
- d. One commenter said that the definition of "emergency generator" improperly excluded emergency generators that are owned by utilities. The term should be defined in terms of its frequency and conditions of use, and not by its ownership.
- e. Another commenter said that the definition of "emergency generator" should allow for generators which are operated for maintenance.
- f. EPA commented that DEP should consider collateral environmental impacts from increases in other pollutants that result from the installation of NOx RACT controls.

Response

- a. DEP has incorporated the suggested definitions of reciprocating engine and turbine engine. Two of the suggested terms, maximum rated capacity and residual oil, are already defined in Section 22a-174-1 of the regulations. The term "distillate oil" has been dropped from the regulation, and "other oil" (i.e., other than residual) is used instead. Some of the terms (rich-burn turbines, lean-burn turbines, and simple-cycle, regenerative-cycle, and combined-cycle combustion turbines) do not appear in the regulations. DEP feels that the remaining terms are sufficiently clear.
- b. The suggested change was not made. DEP feels that a definition that lists the specific towns is more useful. It specifies unambiguously which towns are in which areas. If the serious area is "bumped" to severe, EPA will request DEP to revise the SIP.
- c. In response to the suggestion, the definition was changed to include equipment that is used to provide mechanical power as well as electricity, during power outages.
- d. DEP agrees with the comment. The definition has been changed in accordance with the suggestion.
- e. DEP agrees and the definition has been changed to allow maintenance of emergency generators.

- f. The definition of "NOx" no longer excludes nitrous oxide (N₂O). Under the proposed definition in the June 22 version, a facility could have installed controls such as SNCR which would have reduced both NO and NO₂ while producing N₂O. DEP would prefer to see technologies that reduce total NOx, rather than merely convert it from one form to another. Also, N₂O is involved in stratospheric ozone depletion, and we did not wish to encourage technologies that would increase N₂O emissions.

The following changes were made for clarity:

Certain abbreviations (gm/bk hp-hr, lb, MMBTU, MMBTU/hr, MRC, and PPMVD) are defined. In the proposed rule, emission limitations were specified in narrative form. In the final version, they are in tables (Tables 22-1 and 22-2). Since there is only so much room for text in a table, abbreviations had to be used.

The definition of "gas" was expanded to include any fuel that is gaseous at standard conditions.

2. Applicability (subsection (b))

This subsection identified the source categories that are subject to the regulation.

Summary of Comments

- a. EPA and one other commenter questioned the May 1 through September 30 period as the ozone season. EPA would prefer to have the ozone season to be the period in which ozone monitoring is required in Connecticut -- April 1 to October 31. Connecticut has had ozone exceedances in April, although not in October.
- b. One commenter cited confusion over the relationship of subsection (b)(3) of the June 22 draft (dealing with preexisting exemptions to the old NOx rule) to other sections of the regulation.
- c. One commenter objected to the daily applicability thresholds of 137 and 274 pounds per day.
- d. One commenter complained that mobile sources are exempt, since they are the largest contributor to NOx.
- e. One commenter requested that test facilities for stationary source air pollution control be exempt.
- f. EPA recommended that in subparagraph (b)(1)(C) (on applicability threshold for waste combustors) "design capacity of 2000 pounds or more" should be "maximum design capacity of 2000 pounds or more per hour."

- g. EPA is requesting a justification for exempting small sources (I.C. engines of 3 MM BTU/hr or less, waste combustors of 2000 #/hr or less, and other sources below 5 MM BTU/hr) and infrequently used sources (emergency generators).
- h. EPA suggests that emergency power generators be forced to retard their ignition timing by 4°.
- i. Two commenters suggested that the draft regulation did not specify which requirements a synthetic minor would be exempt from and which requirements it would remain subject to.
- j. One commenter suggested that a synthetic minor source that violates its agreement to emit below its allowable threshold should be required to comply with the emission limitation (or an alternative strategy) within 120 days.
- k. Two commenters suggested that the exemption for synthetic minors should be automatic and should not require an application.
- l. One commenter said that exemptions can properly be created only by a permit, not through an order.
- m. One commenter questioned whether Title V permits would recognize NOx compliance plans as federally enforceable.

Response

- a. DEP believes that the probability of an ozone episode before May 1 or after September 30 is sufficiently low to justify confining the seasonal NOx requirements to that time frame. The last exceedance in an October was a marginal exceedance (0.129 ppmv) in 1983. The last exceedance in an April was also in 1983 (on April 28). The April 28 exceedances were in Danbury (0.181 ppm), East Hartford (0.126 ppm), Middletown (0.137 ppm), Stafford (0.151 ppm), and Stratford (0.143 ppm). All five exceedances were on a single day during a three-hour period. The maximum temperature was 88°F at Bradley Airport.

Since 1983, there have been two episodes of unusually hot weather in April -- April 7, 1991, on which the temperature reached 90°F, and April 27-28, 1990, during which the temperatures reached 92°F and 94°F, respectively. We had no exceedance during either of those episodes. In the 1990 episode, the high ozone reading ranged from 0.051 ppm (at Middletown) to 0.111 ppm (at Danbury); in the 1991 episode, the high ozone reading ranged from 0.075 ppm (at Torrington) to 0.101 ppm (at Madison).

The absence of exceedances is not just luck. It is consistent with the general trend of ozone concentrations in the state: violation-days per year have declined from more than 40 in 1983 to fewer than 10 in 1992, based on the best (least squares) fit of ozone readings taken during the period. Three-year running

averages of annual maximum readings declined from 0.268 ppm in 1983 to 0.178 ppm in 1992.

The decline in exceedances is consistent with the real decline in the emissions of hydrocarbons and oxides of nitrogen during the 1983-1991 period (according to DEP's emission inventory), a decline that has continued since 1991 and that will continue.

An important reason why DEP would like to exclude April from the NOx seasonal requirements (which only apply to a limited number of sources anyway) relates to winter time space heating demands. Climatologically speaking, April weather in Connecticut is often more characteristic of winter than summer. Including April in the seasonal requirements would be problematic for sources that wish to become synthetic minors but that operate in excess of 137 or 274 lb/day on cold days. If there is a cold day in April, the source would have to choose between violating its allowable 137/274 lb/day emission cap and violating housing or occupational health rules limiting temperature.

- b. DEP agrees with the commenter that the language extending exemptions under the old rule was confusing and that language has been removed.
- c. The purpose of daily thresholds is to insure that large sources that operate infrequently like so-called "peak shaving" electrical generating units are "caught in the net." Peak shaving units are supplemental power generating units that come on line on days of high electrical demand, typically hot summer days. These are the worst of all possible days to be emitting NOx. Collectively, peak shaving units are responsible for a substantial portion of the NOx emissions on the worst-ozone days, but because they are operated infrequently, their total annual emissions may be less than the 25/50 TPY major-source thresholds. Many of the units can be reasonably controlled, but without a daily applicability threshold, they would not be subject to any requirements.
- d. NOx emissions from mobile sources are being reduced considerably under the Clean Air Act Amendments of 1990 but primarily through Federal measures. DEP is currently developing programs to reduce NOx emissions from mobile sources. The enhancements to the annual emissions testing program is expected to reduce the fleetwide average NOx emissions by 9%. Also, the Ozone Transport Commission may recommend adopting more stringent NOx standards on new cars on new cars throughout the Northeast.
- e. The rule is structured in a way that allows options for complying with the emissions limits rather than outright exemptions. The commenter may select to comply with this rule as a synthetic minor, with emissions trading or with schedule modifications. In fact the schedule modification option is designed as a low cost option for testing of NOx emitting equipment at research and development facilities.

- f. The phrase was changed to "design capacity of 2000 pounds or more per hour." The term "design capacity" implies a maximum rate.
- g. There were three considerations that went into determining the size cutoffs: compliance costs, air quality benefit, and administrative enforcement burden.

Compliance costs per ton of NOx reduced increase considerably for smaller sources. Few sources that are exempted by the size cutoffs established in the regulation could comply by means that are economically feasible.

According to DEP's emission inventory, the air quality benefit from the control of such small stationary sources would be miniscule compared to the benefit expected from the sources that are not exempted.

Verifying compliance for a large number of small sources would require additional staff, or would force us to spread existing staff so thin that their effectiveness in controlling larger sources would be compromised.

Also, reason suggests that Congress could not have intended that EPA should require controls on the smallest NOx emitters at every major stationary source.

Finally, DEP has included in its regulations requirements that go beyond the minimum that EPA requires -- notably in its emission limits for coal burning facilities, waste combustors, and sources that have high daily emission rates but yet are not located at a major stationary source.

- h. The cited reference (EPA's August 1992 I.C. Engine Control Techniques Document) indicates increases in CO and HC emissions from retarded ignition timing. Also, other commenters cited increased soot emissions. Of course the owner or operator of any engine can use timing retard to comply with the emission limits, if appropriate.
- i. Subsection (b)(2) of the regulation now explicitly exempts "synthetic minors" from subsections (d)-(k) but not from subsections (l) and (m). Subsection (l), requires recordkeeping and reporting to document continued status as a synthetic minor; while subsection (m) requires submittal of a compliance plan to DEP which should indicate that a source intends to take this option.
- j. Small sources that want to stay synthetic minors must not exceed the 25/50 tpy or the 137/274 lb/day emission levels. If the owner or operator of the source plans to exceed these levels then the source must immediately be in compliance with the previously exempt requirements. Those other requirements are the applicable emission limitation and stack testing.

- k. DEP has made the requested change. DEP has decided to allow compliance for "synthetic minors" by rule rather than through an order or permit. All the requirements that will apply to any synthetic minor source are now in the regulation itself, so no order or permit is needed to make it enforceable.
- l. DEP has decided to allow compliance for "synthetic minors" by rule rather than through an order or permit. The requirements that would have been included in an order or permit, for monitoring recordkeeping and reporting, are now specified in the rule. This will greatly relieve the administrative burden on DEP and the regulated community.
- m. The Title V operating permits regulations being developed by DEP will likely require most stationary sources subject to the NOx regulation to obtain a Title V operating permit. At that time "synthetic minor" restrictions on operating rates, fuel use or hours of operation will be made federally enforceable.

3. Exemptions for mobile sources (subsection (c))

For organizational clarity, the exemption for mobile sources was moved to subsection (c). This was to emphasize that mobile sources are the only sources that are categorically excluded from the rule. Provisions for synthetic minors and emergency generators, previously in subsection (c), are now in (b), because, they are excluded from only certain requirements.

4. Emission limits (subsection (e))

This subsection establishes emission limitations.

Summary of Comments

- a. Two commenters were concerned that a lack of parity in emission limitations would have the perverse effect of encouraging the replacement of relatively low-emitting equipment with higher-emitting equipment. Sources could replace clean-burning gas turbines with dirtier I.C. engines, because the emission limitation for I.C. engines is easier to meet.
- b. Some commenters said that the availability of emission reduction credits, emissions averaging, and interpremise trades justifies more stringent emission limits, because ERCs would be available to any source that might have difficulty in achieving physical reductions.
- c. One commenter faulted DEP for failure to include in its SIP any technical support for its selection of emission limits.
- d. One commenter suggested allowing an exemption from emission limits during start-up, shutdown, and malfunction.

- e. Two commenters recommended fuel-neutral emission limits to encourage conversion to natural gas.
- f. EPA objected to the fact that there are no emission limits for small (< 100 MM BTU) boilers that burn fuel other than residual oil.
- g. Three commenters suggested that the emission limitation for cyclone furnaces (0.43 pounds per million BTU of heat input) is overly permissive. 0.3 #/MM BTU was suggested as an alternative.
- h. Three commenters suggested that the emission limitation for fluidized-bed coal-fired combustors (0.29 pounds per million BTU of heat input) is overly permissive.
- i. Three commenters suggested that the emission limitation for oil-fired turbines is overly stringent. Two suggested a limit of 125 ppmv.
- j. Two commenters noted that after May 31, 1995, there will no longer be any emission limitation for turbines smaller than 100 million BTU maximum hourly capacity.
- k. One commenter suggested that the applicability threshold for turbines is too high. Other NESCAUM states have applicability thresholds from 10 to 30 MM BTU/hr.
- l. One commenter recommended that a distinction be made between simple- and combined-cycle turbines.
- m. One commenter cited NOx emission limits for turbines in California as low as 9 ppm.
- n. Several commenters objected to the proposed 180 part per million emission limitation for waste combustors. The following points were made in respect to the proposed limit:

The technical basis for the selection of the limit was not explained.

No other NESCAUM state has an emission limit for waste combustors.

The limit is achievable only through selective non-catalytic reduction (SNCR). All other source categories may attain their limits through combustion modifications alone.

SNCR causes increases in other pollutants (carbon monoxide, mercury, ammonia, and ammonium chloride).

SNCR involves risks to the public by transport of reagents and increases in the ammonia in landfill leachate.

SNCR would require a "down time" of as much as three weeks.

Costs of SNCR are \$2500 to \$7000 per ton.

Costs of lost electrical revenues and tipping fees were not included in vendors' estimates of the costs of SNCR.

The disparity in stringency is discriminatory. Utility boilers can comply for only \$260 to \$1500 a ton. This places municipal waste combustors (MWCs) at a competitive disadvantage. Utility boilers can control cheaply and market ERCs at a profit. The least-cost option for MWCs would be to purchase these ERCs, effectively generating a flow of money from the MWCs to the utilities. Under a "level playing field" of emission limits that are all perfectly matched in stringency, all source categories would have an equal opportunity to become buyers or sellers.

Costs to utilities are distributed among ratepayers, 58% of whom (on a megawatt-hour basis) are out of state. Thus the costs for the power plants are borne primarily by people living out of state. Costs to MWCs, however, it is implied, are levied mostly on towns within the state

- o. EPA asked why there is a 12% CO₂ correction factor, rather than a 7% oxygen correction factor for the waste combustor emission limit.
- p. One commenter requested that the emission limit for fast response double-furnace naval boilers be changed from 0.30 to 0.35 #/MM BTU. Points made in support of this were as follows:
 - The equipment operates at variable temperatures and flow rates, eliminating SCR as a control option.
 - The equipment has a high heat release rate.
 - Natural gas conversion is prohibitively expensive, and the emission limit would be 0.2 #/MMBTU after conversion.
 - Only a single premise is affected by the limit, and the difference in emissions between 0.3 and 0.35 #/MM BTU is only 12 tons per year.
- q. One commenter said that inlet air heaters for jet test cells cannot be controlled to 0.2 #/MM BTU.
- r. One commenter recommended that a distinction be made between rich- and lean-burn I.C. engines in setting emission limits.
- s. One commenter suggested that the applicability threshold for I.C. engines is too high. 3 MM BTU/hr is approximately equal to a 1200 HP engine. Other NESCAUM states have applicability thresholds from 225 to 500 HP.

- t. One commenter cited NOx emission limits for I.C. engines in California. They range from 0.5 to 1.78 gm/hp-hr.
- u. One commenter said that the emission limit for gas-powered I.C. engines is 3.2 times as stringent as the limit for oil-powered I.C. engines, and that such a disparity would place gas engines at a competitive disadvantage.
- v. EPA suggested that "on or after" in subdivisions (d)(2), (e)(2), and (f)(2) and subsections (g), (h), and (j) (as so identified in the June 22 draft) be changed to "on and after."
- w. EPA suggested alternative wording to subparagraphs (i)(1)(A) and (i)(1)(B) regarding multiple fuels.
- x. EPA commented that all units located at major sources are generally subject to the NOx RACT requirements.

Response

- a. The replacement of "dirtier" for "cleaner" would not be allowed if the difference in emissions were 5 TPY or more of any pollutant; it would be a "modification" and would be subject to new source review, BACT/LAER, and offset requirements.
- b. Emission limits were not established as reasonably achievable on a "stand-alone" basis, as the commenter alleges. The limits are considered reasonable for the particular affected class of sources, not for every individual source. The ERC provision is a mechanism that allows those individual "problem sources" to meet the program requirements without undue economic burden.

To be workable, ERCs must be available for sources that need them. This means that there must be other sources that can easily achieve their limits and economically overcontrol. If emission limits are made too stringent, some sources would not be able to comply with the regulation, either through ERCs or through actual physical reductions.

Another problem with emission limits that are too stringent is that it would present barriers to establishing a system for interstate emission trading.

- c. The proposed limits were based on studies performed by EPA, NESCAUM and private industry as well as guidance from EPA and NESCAUM, the limits proposed by other states, and information in the technical literature. Most of this information is available at DEP's offices and is available upon request.
- d. For sources for which compliance is determined by source testing, there does not need to be such as exemption, because tests are conducted under specified conditions that do not include start-up, shutdown, and malfunction periods. For sources whose compliance

is determined by continuous emissions monitoring, there does not need to be such as exemption either, because the averaging period of the emission limit is 24 hours, long enough to absorb the impact of momentary spikes. If there is a malfunction that lasts a significant portion of a 24-hour period, that might indeed cause a violation, but DEP feels that such a prolonged incident should be subject to enforcement action.

- e. Fuel-neutral emission limits would encourage conversion to natural gas, and also would allow stricter standards, since most boilers could easily meet a 0.2 #/MMBTU standard. The problem with such standards is that for many sources conversion to natural gas is not feasible, and a strict emission limit could not be met using the original fuel.
- f. Emission limits are now included for these sources. They are 0.2 #/MMBTU for gas and distillate oil boilers smaller than 100 MM BTU. These limits are considered easily attainable by most affected sources. EPA emission factors are about 0.14 for distillate oil boilers and 0.12 #/MM BTU for gas boilers in this size range. For small (<100 MMBTU) turbines, there is now a limit of 0.9 #/MMBTU. Through this change, the emission limit that was in effect prior to these amendments continues on after 1995.
- g. While 0.3 lb/MMBTU is achievable, 0.43 lb/MMBTU is felt to be reasonable based on the NESCAUM study of utility boilers and the fact that DEP has required emission controls on these units in the past, while other nearby states have not. Sources in the State having cyclone burners estimate that they can comply through modifications that would involve derating and combustion modifications.
- h. The emission limit for fluidized-bed coal combustors is 0.29 pounds per million BTU (#/MM BTU) of gross heat input. This limit is based on the current permit limit for the one, recently permitted, facility of its type in the State. This limit is considerably more restrictive than the other emission limits for coal-fired combustors.
- i. The limits for combustion turbines (75 ppm for oil-fired, 55 ppm for gas-fired turbines) can be achieved by dry low-NOx combustors. Costs of this technology for gas-fired units, reported in EPA's Alternative Control Techniques Document -- NOx Emissions from Stationary Gas Turbines, January 1993, range from \$57 to \$4230 per ton of NOx removed. The average is well below the \$2000 considered reasonable.

For oil-fired turbines, the emission limit is based on the September 1992 NESCAUM recommendations. The draft recommendation (September 11, 1992) stated that a 65 ppmv limit could be met "through the application of water or steam injection and dry low-NOx combustion technology."

DEP recognizes that some oil-fired turbines may be currently emitting at rates far exceeding the standard (175 to 220 ppmv, according to one commenter). For such units, the requirements of the regulation could be satisfied by a reduction of 40% from baseline emission levels, in which case the emission limitation of 75 ppmv would not apply.

- j. Under the final rule, the emission limitation for turbines under 100 million BTUs is 0.9 #/MMBTU. This change, and the change in response to comment k below merely continue the standards that were in the old rule.
- k. The threshold of applicability is now 5 MMBTU/hr. This is the same as under the old rule.
- l. Combined-cycle turbines are not inherently different in their emission characteristics, except that generally they are newer than the simple-cycle turbines. Having a single emission limit also simplifies the regulation. Because the emission limit is the higher of the two limits recommended by NESCAUM, it will not cause a burden for sources. EPA does not have a presumptive RACT level for these turbines.
- m. Attaining emission limits that range from 9 to 42 ppm costs \$3200 to \$15,000 per ton of NOx reduced, according to a study done for the Bay Area (California) District. There is doubt that the selective catalytic reduction that is required for the 9 ppm limit is feasible at any price as a retrofit technology for some units.
- n. DEP has decided to make two changes in emission limits for waste combustors. First, the emission limits will be expressed as pounds of NOx per million BTU of heat input. This change was made to make the limitations comparable to emission limits for most other source categories.

The second change was to make a distinction between different kinds of waste combustors. Refractory-lined units will have a limit of 0.33 #/MMBTU (approximately equivalent to 180 ppm at 12% CO₂); waterwall units (including the Mid-Connecticut resources recovery facility) will have a limit of 0.38 (approximately equivalent to 210 ppm at 12% CO₂); and in addition, one of the three boilers at the Mid-Connecticut resources recovery will be required to install SNCR or another technology with a NOx control efficiency of at least 30%. This distinction was made in response to the recognition that waste combustors vary in their propensity to create NOx. Waterwall units have greater heat losses through their walls and thus need more intense combustion to meet the 1-second-at-1800° requirement needed for dioxin control. This makes most waterwall units inherently higher in NOx emissions. Refractory-lined units, such as the Wallingford RRF, need less intense heat and can meet a more restrictive 0.33 #/MMBTU limit. The Mid-Connecticut facility, a waterwall unit, has relatively low NOx emissions because its design features include the firing of refuse derived fuel along with coal.

DEP is aware that some units may still require technology such as SNCR. However, DEP considers the emission limit to be reasonable, for the following reasons:

1. Air pollution control equipment vendors quote costs of SNCR at about \$1000 per ton of NOx removed. This is significantly less than the cost claimed by source operators.

SNCR is not the only control option. Natural gas reburn has been tried on a pilot scale and has reduced NOx from 190-260 ppm down to 110-125 ppm at moderate cost.

2. If control technology is installed that reduces NOx to below the emission limit, the source can harvest emission reduction credits and sell them to offset its costs. At least four facilities (Wallingford, Lisbon, Hartford, and Preston) now meet, or come very close to meeting, their limits. Low-cost reductions are possible from these facilities, and virtually all of this reduction would be eligible for sale (as ERCs) to the facilities for whom the limit would be costly to meet.
3. A completely "level playing field," in which all source categories will have identical cost exposure, would be desirable, but is achievable only in a decision-making environment of perfect information. The frequent changes in control technology cost, the uncertainties concerning what to include in such cost estimates, and the variability in cost from source to source make it impossible to set limits that are equally fair to all sources.
4. Utility power plants have already achieved substantial reductions in their NOx emissions, particularly from their cyclone boilers. In other states, cyclone boilers typically emit 0.9 #/MM BTU. Connecticut's units achieved a standard twice as stringent prior to the drafting of the NOx RACT regulations. Waste combustors were not required to meet NOx limits beyond those being achieved elsewhere.
5. MWC's can also use emission trading amongst themselves or with other sources in Connecticut to comply with this rule, without investing in costly control equipment. For example, if emission reductions can be achieved at an industrial plant for \$500/ton vs. \$1000/ton at a given MWC, an emission trade could be negotiated.
6. The limits are very close to those of coal-fired fuel-burning equipment, even for older, primitively controlled units.
7. The limits are very close to the recommended NESCAUM numbers for coal and other solid fuel.

8. Subdivision 22a-174-22(e)(2) has been added to allow for emission reduction credits to be generated by those sources which achieve emission levels below 0.38#/MMBTU.
- o. Since the emission limits are now in units of #/MMBTU, the comment is now moot.
 - p. These units currently emit about 0.37 #/MM BTU. The one affected source is switching to better quality, low-sulfur fuel for SO₂ control. This fuel is lower in nitrogen. The fuel switch, combined with low-NOx burners, should lower emissions to 0.3 #/MM BTU.
 - q. It is planned that equipment in this category will be granted a permit to employ schedule modification under subsection (h). However, first a demonstration must be made that neither the emission limit nor the alternatives under subsections (f) and (g) are feasible for the units.
 - r. DEP made a single standard to simplify the regulation. The more permissive of the two limits was used, so there should not be a burden for affected sources.
 - s. The equivalency of 3 MM BTU and 1200 HP is based on an assumption of 100% conversion of heat into mechanical energy. Actually only about 25% of the heat input is transformed into energy output. Taking these transfer losses into account, the 3 MM BTU I.C. engine is approximately the equivalent of a 300 HP engine. Such an engine would have the potential to emit about 25 TPY at 8 gm/hr.
 - t. EPA's available control technologies document on I.C. engines does not display data showing that the cited limits are even achievable, let alone at reasonable cost.
 - u. According to I.C. engine manufacturers, the limit for oil-fired engines is actually harder to meet than the gas-fired engine limit, even though it is 3.2 times as permissive. DEP believes that both limits represent RACT. Having an emission limit for oil units more stringent than 8 gm/bhp-hr would require techniques that are "beyond RACT." Having an emission limit for gas units less stringent than 2.5 gm/bhp-hr would not meet the EPA criteria for RACT.
 - v. DEP agrees with the comment and the suggested change was made.
 - w. DEP agrees with the comment and the wording was changed in response to the suggestion, now in subsection (f).
 - x. The existing emission limit (700 ppm) for process sources not otherwise covered by the regulations as combustion sources was retained. In the June 22 draft such sources were inadvertently removed from the rule. Also, see (g), above, under "2. Applicability."

The following change was made for clarity:

Most emission limitations were placed in a tabular format.

5. Alternative Emission Reduction Strategies in subsections (f) through (j))

These subsections provide for alternative to meeting the emission limits in subsection (e)

Summary of Comments

- a. One commenter suggested that sources be required to select the most effective option, rather than be allowed to pursue any option that just barely meets the requirements of the regulation.
- b. Some commenters recommended that a demonstration of "clear and convincing evidence" be required for sources that seek options under subsections (g) and (h) (formerly (l) and (m)); other commenters objected that there were no criteria for determining feasibility.
- c. One commenter recommended that energy conservation be creditable as an emission reduction strategy.
- d. One commenter suggested that (k) and (l), now (f), be more flexible, allowing combinations of fuel switching and other techniques.
- e. One commenter recommended that innovative alternative strategies should be allowed. A source that can achieve the required reduction through a strategy not on the list should be free to use such a strategy.
- f. EPA contended that a 40% reduction under subdivision (f) may not be equivalent to RACT, if the source was never subject to a NOx emission limit under the old rule.
- g. EPA had several questions regarding how the baseline for the 40% reduction is determined.
- h. One commenter questioned the meaning of "continuously limit" and asked how compliance would be determined.
- i. Several commenters were concerned that there is no existing emissions trading and banking rule and expressed desire for an interim trading or offset procedure to use until the ERC regulation is passed.
- j. One commenter objected to the reference to the Economic Incentive Plan Program rule, because it is proposed.

- k. One commenter objected to the provision that allows sources not to do anything as long as no ERCs are available at any price. He also questioned how the criterion for that could be \$2000 per pound per day.
- l. One commenter asks whether a utility that buys power from out of state will be eligible for receiving ERCs under the referenced trading rules.
- m. One commenter was concerned about the slow pace of development of trading and banking rules. These were supposed to be in place when the NOx rule was being considered. One commenter suggested that compliance plans should not be due until after nine months after the trading and banking rule, to allow sources to negotiate trades as part of their compliance plans.
- n. One commenter suggested that if no ERCs are available at any price, a source should be allowed to commit to ERC purchase, even if compliance with the (d) through (j) emission limits (now the subsection (e) emission limits) is economically feasible.
- o. EPA recommended that ERC trading provisions be written into the text of the regulation, rather than incorporated by reference.
- p. EPA is requiring that if a source opts for use of ERCs for compliance, and if ERCs are overpriced or unavailable, there must be a showing that compliance with emission limits and alternative strategies is not feasible.
- q. EPA questioned the \$2000 per pound per day price cap in subparagraph (k)(3)(B) (now subdivision (j)(1)).
- r. One commenter suggested that the EPA rules referenced in the emission trading subsection include the July 30, 1993, guidance, "Fuel Switching to meet RACT Requirements for NOx."
- s. EPA recommended that for seasonal fuel switching, emission limits be established for the ozone and non-ozone seasons by use of an equation:

$$O = 1.71E - 0.71N,$$

where:

O is the emission limitation during the ozone season (assuming 7 months in duration),

E is the emission limitation during the non-ozone season (assuming 5 months in duration), and

N is the historical uncontrolled emission rate.

- t. One commenter said that subdivisions (k)(4) and (l)(2) conflict, and that (l)(2) might be more restricting. (In the June 22 version, (k)(4) dealt with seasonal fuel switching, with equivalency to year-round compliance with emission limits; (l)(2) dealt with seasonal fuel switching, without such equivalency.)
- u. One commenter recommended an emission limit of 0.3 #/MM BTU for gas- and distillate oil-fired units in the ozone season.
- v. Some commenters felt that the reconstruction option provides an overly generous concession to sources.
- w. EPA is requiring that sources that reconstruct must make an enforceable commitment to repower or shut down by May 31, 1999 and to incorporate alternative strategies, if they are feasible.
- x. One commenter said that schedule modifications may not be reasonable from a business perspective.
- y. EPA is requiring that a source opting to use a strategy under subsection (k) of the June 22 draft make a demonstration that the reductions are equivalent to the reductions that would be achieved under emission limits.

Response

- a. DEP encourages sources to pursue the most cost-effective air pollution reduction strategies. Forcing a company to spend twice as much for an alternative that is only 10% more effective is not likely to be cost-effective, and it would not be likely to contribute significantly to air quality. Also, it would burden sources with a requirement to justify their selection in terms of cost, and it would increase the burden on DEP staff to do a review of economic justification.
- b. The suggested term "clear and convincing evidence" was considered too arbitrary a test.
- c. It would be difficult to know how to credit emission reductions that occur as a result of conservation. In some cases conservation results in true emission reductions, but in other cases it causes emissions to be created at some other source. Conservation is encouraged and is often a cost-effective means of meeting power needs and reducing pollution, but the difficulties in identifying and tracking the ramifications of a conservation program make it impractical at this time.
- d. There is nothing in the final draft that would preclude a source from meeting the requirements through a combination of strategies.
- e. The regulation will allow DEP to consider any techniques, including innovative techniques, subject to constraints in subsection (d).

- f. Subdivision (f) has been changed in response to the comment. For sources that are operating under a pre-1993 exemption, the baseline emissions will be the emissions that would have been required in the baseline year had the unit not been granted the exemption.
- g. The baseline concept has been clarified by incorporation of a baseline year as calendar year 1990. It is 1990 unless the emission rate in 1990 was not representative of that of a normal year. A flexible baseline concept, allowing years other than 1990, is necessary to accommodate sources that were "mothballed" throughout 1990, and sources that were not yet in existence in that year.

Baseline emission rates are to be established using emission tests conducted under conditions identical to those used for compliance testing. The test requirement is intended to prohibit a source from altering its excess air to increase its baseline rate, then altering the excess air again to "achieve" a 40% reduction without really doing anything. Language to this effect will be incorporated into permits issued under subsection (g).

- h. The word "continuously" has been eliminated. Under subsection (f), a source would receive an emission limit based on its baseline emission rate. This would be specified case-by-case in a permit or order. The source would have to comply with that source-specific limit, just as if it were a subsection (e) limit.
- i. The references in subsection (k) to the 1986 Emission Trading Policy Statement and the EIP (Economic Incentive Program) proposed rule of February 1993 allow us to issue permits for sources that wish to average their emissions among different pieces of equipment, or to trade with other premises. DEP has contracted with ICF Resources and Environmental Risk Limited to develop protocols for quantifying the emission reductions available from twelve specific strategies. These protocols will be completed for distribution this summer. That will assist companies in negotiating emissions trades. In addition, the compliance plan form requests sources to disclose how many ERCs they propose to make available to other sources. This will allow DEP to develop a clearinghouse, if not a bank, to facilitate trades.
- j. Reference is made to both the proposed EIP rule and EPA's Emission Trading Policy Statement because, while the ETPS is inflexible, the proposed EIP provides considerable latitude for economic incentive programs. Compliance with any emission trade will require a permit or order which ultimately will need EPA approval.
- k. To require a source to spend more than \$2000 per ton of NOx reduced is not consistent with the concept of RACT. The commenter's concern about the \$2000 per pound per day was well taken. Language regarding the escrow account was strengthened.

- l. The ETPS does allow for the use of emission reduction credits that are created by a source not located in the state, provided that the emission reductions have a benefit on air quality levels in the state where they are used. Whether a utility buys power from out of state is not an issue; any NOx emitting source in Connecticut will need to comply with the emission limitations of this regulation either through control technology or trading of emission reductions.
- m. The cited EPA rules would allow for trades to be conducted in the absence of DEP's own ERC regulation.
- n. Such a change would relieve any source of an obligation to comply with the emission limits and would undermine the effectiveness of the rule. Under the suggested change, if there were no ERCs available, nobody would have to do anything.
- o. DEP intends to make each state-approved trade a SIP revision, at least until the state's own trading rule is passed. This is an option approvable to EPA, although not its preferred option.
- p. Subdivision (j) has been revised to assure that the high cost, or lack of availability, of ERCs does not release a source from the compliance requirement, if compliance options are available for \$2000 a ton.
- q. The intent of the \$2000/lb/day cap is twofold. First, it is meant to be approximately equivalent to \$2000/ton of NOx reduced, a level felt to be reasonable. Secondly, it limits the financial liability for any source subject to this rule to a reasonable level. The calculation methodology has been clarified.
- r. EPA's memo's were reviewed and revisions were made to the fuel switching section, subsection (f), to clarify the intent.
- s. DEP has decided on a similar equation for sources that convert seasonally to cleaner fuel. Any source may opt for fuel switching, and the emission limits would be 0.2 #/MMBTU in the ozone season (May - September) and 0.29 #/MMBTU in the remaining months. This is equivalent to year-round compliance with a limit of 0.25#/MMBTU assuming a full 7 months at 0.29 #/MMBTU. The 0.2 #/MMBTU May-September limit creates an incentive to convert, since it is so easily met that sources can sell ERCs to offset some of their conversion costs.

DEP believes that the seasonal limit-setting process, specified in subparagraph (f)(2)(B) of the final rule, is in conformity with requirements of the July 1993, EPA "Fuel Switching Memo."
- t. In the June 22 draft, seasonal fuel switching in subsection (l) did not require annual equivalency in NOx reduction. This was less restrictive than subsection (k), which did require such equivalency. In the final version, only the latter is allowed, because of the July 1993 fuel switching policy. For permanent fuel

conversion (after January 1, 1990) to a cleaner fuel, the emission limit would be the average for the unit under the old and the new fuel. Also, see s, above.

- u. 0.2 #/MM BTU is the emission limit that applies to all sources that burn gas and distillate oil. Although the 0.2 #/MM BTU emission limit may not be met by every individual source that opts for seasonal fuel switching, the limit is generally attainable for the affected sources as a class. 0.3 #/MMBTU would be too permissive, and would require few if any sources to control emissions. It is also not approvable by EPA.
- v. The reconstruction option now requires interim emission control techniques to assure immediate reductions. Sources that can feasibly meet emission limits (or an alternative) must do so; sources that cannot will still have to do interim measures. Either way, substantial reductions could occur through these requirements. Moreover, even without such interim techniques, reconstruction affords long-term benefits for air quality. The NOx emissions from new sources are much lower than the NOx emissions from existing sources, even from those existing sources that meet the subsection (e) emission limits. Plus new source review requires emission reductions to offset any emission increases. DEP felt that the delay in compliance is a bearable price to pay for the much greater reductions that would be achieved over the long term.

DEP intends to provide an incentive for reconstruction by allowing sources to amortize their capital compliance costs over the 1995-1999 period, rather than over the expected life of the control equipment, which could be 20 years or more. Where a shortened amortization period would raise the compliance cost above \$2000 a ton it would relieve these sources from the obligation to comply with subsection (e) limits, or alternatives, in the 1995-1999 period.

- w. The suggested change has been made. Reconstruction (and replacement) must be done under permits or orders, which are enforceable commitments. Notwithstanding the response to comment v above, DEP realizes that measures that EPA considers to be RACT must be required even for sources that agree to reconstruct.
- x. The option to comply with this rule through schedule modification was intended to be available to only a very limited number of sources, primarily research and development facilities, that operate a limited number of hours during the summer.
- y. Sources that comply with the new subsections (f) and (g) will achieve reductions equivalent to those of most sources that choose to meet the subsection (e) emission limits. Sources that comply with the new subsections (h) and (i) will achieve reductions in excess of emission limit equivalency.

For clarity, DEP changed "reconstruction" to "reconstruction and replacement." Reconstruction is available only for sources for which an NSPS (new source performance standard) applies. Replacement would make the strategy available for sources such as turbines and IC engines, for which there are no NSPS.

6. Maintenance requirements (now deleted)

In the June 22 draft regulation, there was a subsection (n) that required annual tune-ups for sources of less than 100 million BTU maximum hourly capacity.

Summary of Comments

There were three comments concerning this subsection:

- a. One commenter suggested that sources that are shut down for extended periods should not be required to have an annual tune-up.
- b. One commenter advised that December 15, 1993, might be too soon for the required date of the first tune-up.
- c. EPA said that requiring tune-ups to be done in accordance with manufacturers' recommendations is unenforceable. Step-by-step instructions should be specified in the regs.
- d. EPA required that DEP demonstrate that a tune-up requirement qualifies as "RACT" in terms of its effectiveness.

Response

a-d. In response to EPA's concerns, DEP has decided to delete the maintenance requirement. In the June 22 draft version, the maintenance requirement was to apply to sources other than residual oil-burning sources between 5 and 100 MMBTU/hr maximum rated capacity. We could not justify tune-ups as RACT, since there was no good evidence that tune-ups on these sources actually result in NOx reductions. In the final version, there are emission limits for these sources instead.

7. Compliance Plans (subsection (m))

Subsection (m), previously subsection (o), requires that sources that are subject to the regulation must prepare and submit compliance plans, due September 1, 1994.

Summary of Comments

- a. Several commenters expressed concern over subdivision (o)(7), which allowed the commissioner to consider the effect a compliance plan for a source would have on emissions from other sources. Commenters thought it would be burdensome to administer, both for

- sources and for DEP staff. Two commenters suggested that emissions only from sources within the state should be considered. One commenter thought that (o)(7) was not strong enough to assure that market decisions are not skewed toward higher emission options.
- b. Two commenters recommended that compliance cost estimates be a required item to report in the compliance plan.
 - c. EPA recommended that the total NOx emissions from the premise, including the emissions from equipment not subject to the rule be required data for the report. The total NOx emissions determines whether a premise is subject to the rule.
 - d. EPA recommended that the subsection specify test methods, monitoring devices, recordkeeping, and reporting requirements.
 - e. EPA recommended that compliance plans using alternative strategies require a demonstration that they are equivalent to compliance with subsection (e) emission limits.
 - f. Several commenters wondered what use DEP would make of the compliance plan and whether DEP intended to approve or disapprove them, and what would happen if the plan were disapproved.
 - g. One commenter suggested that for sources that become subject to the rule after the effective date, the 90-day time limit for the preparation of compliance plans be changed to six months to give them as much time as other sources to complete their plans.
 - h. One commenter suggested that a compliance plan should be automatically approved if it is not disapproved by DEP within 90 days of submittal.
 - i. One commenter suggested that DEP develop model plans or a blanket rule for small sources.
 - j. EPA recommends that all sources be required to come into compliance by May 15, 1995.
 - k. One commenter pointed out that, because of a logical flaw in the wording of subdivision (o)(1) of the June 22 draft, compliance plans would be required of most sources over 5 million BTU.
 - l. One commenter suggested that the word "milestone" be used instead of "deadline" to describe the latest time by which an incremental compliance step is to be completed.
 - m. EPA is requiring that permits and orders issued to commit a source to a compliance plan be federally enforceable.

Response

- a. Subdivision (o)(7) was included in the June 22 draft in response to a concern that sources could replace existing on-site equipment, such as a combustion turbine, with electrically driven equipment. That replacement would reduce emissions from the premise, but might cause an increase in NOx from the facility that generates the power to run the motor. The net effect of the replacement might be actually to increase NOx.

DEP has decided to delete this subdivision. We do not feel that off-site emissions would increase substantially by the replacement of fuel-burning equipment with electrical equipment. Nor would it be possible to enforce such conditions as a practical matter.

Another reason for proposing (o)(7) in the June 22 draft was concern over a possible increase in carbon monoxide, hydrocarbons, or particulates from a boiler that is retuned to minimize NOx by reducing excess air. CO increases dramatically when excess air goes below 20%. Such increases would be detected in periodic stack tests, and any increases that result in 5 or more tons of additional pollution would be considered a modification and would be subject to new source review.

- b. DEP feels that cost data do not serve a useful purpose in determining approvability of a compliance plan, except for sources that need to demonstrate that control technology and ERC's are not available at \$2000 a ton.
- c. DEP agrees with the comment and the suggested change was made.
- d. DEP decided to eliminate most of the specific information to be supplied in the plan. Instead, DEP intends to develop and distribute compliance plan forms. Subsection (j) requires that any affected source must supply the information stated in the form. EPA's suggested additions have been incorporated into the compliance plan form.
- e. Not all alternative strategies in fact give equivalent reductions, although they do make equal demands (in terms of dollars per ton of required reduction) on affected sources.
- f. The primary functions of the compliance plan are twofold: to initiate a timely planning process by affected sources; and to let DEP know what measures sources intend to take. We want an opportunity to advise a source if its program appears deficient, or not in compliance with the requirements of the rule. It also lets us know if the program requires additional resources to implement, so we can plan accordingly. It also provides us with useful information, including ERC credit availability, should we decide to develop a clearinghouse for ERCs. The final rule provides that if the compliance plan is not satisfactory, DEP may specify a program of compliance and write it into a permit or order.

- g. It was changed to four months, approximately equal to the 5.5 months that sources have that are immediately subject to the rule on the effective date.
- h. DEP will make every effort to review compliance plans in a timely fashion. However, compliance plans are planning tools for sources subject to the regulation. DEP will enforce the regulation not the compliance plan.
- i. A compliance plan form has been developed.
- j. Certain sources would not become subject to the rule until after May 15, 1995. For example, a hypothetical turbine has a maximum rated capacity of 6 million BTU/hr and is located in the severe nonattainment area. The premise has potential to emit 24 TPY of NOx. Because the turbine is not located at a major stationary source, it is not now subject to the NOx rule. However, later on, the factory expands and adds a boiler and brings the total emissions from the premise up to 31 TPY. Now, the turbine is located at a major stationary source of NOx and must comply with emission limits.
- k. The commenter was correct, but the point is now moot, because all boilers over 5 MM BTU/hr MRC are subject to emission limits now anyway.
- l. DEP agrees with the comment and the suggested change was made.
- m. The suggested change was made. Subdivision (d)(4) will require the commissioner to submit an order or permit for approval by the EPA administrator. However, a provision in the final draft allows the commissioner alone to issue a permit or order. That means that during the period in which the permit or order is under review by EPA, it will still be state-enforceable. This provision will tide us over until an EPA-approved rules are in place for ERCs, enhanced monitoring, and operating permits.

Orders and permits, with a provision for federal enforceability, will be required for sources reducing by 40%, for sources using ERCs, and for sources granted extensions. Orders and permits, with only state enforceability, will be issued for sources under the reconstruction and schedule modification options.

The following changes were made for clarity:

The date October 12, 1993, was changed to May 1, 1994. October 12 had been anticipated as the effective date of the regulation.

The required date for compliance plan submittal was changed from May 15 to September 1, 1994. This change was made in response to a delay in promulgation of the final rule.

8. Monitoring, recordkeeping, and reporting (subdivision (k)(3) and subsection (l))

Previously, subsection (p) required records of fuel use, reports of violations, continuous emission monitoring (CEM), continuous process monitoring (CPM), and retention of records.

Summary of Comments

- a. Several commenters objected to the size cutoff for the CEM requirement. The equipment is costly (up to \$800,000 per stack); it does not reduce emissions; and it gives information that can be just as effectively obtained by surrogates, e.g., fuel firing rates and combustion parameters.

For sources having an emission limit of 0.25 #/MM BTU, maximum rated capacity would have to be 91 million BTU per hour to make it subject to the CEM requirement. For sources with emission limits of 0.2 #/MM BTU, the cutoff size would be 114 MM BTU/hr. For I.C. engines at 8 gm/hp-hr the size would be 1300 horsepower.

- b. EPA asked why CEM is required of only stacks that have potential emissions greater than 100 TPY.
- c. EPA recommended detailed requirements for CEM systems.
- d. EPA suggested that the regulation explicitly state that CEM data will be used for enforcement purposes.
- e. One commenter said that process (parameter) monitoring need not be continuous.
- f. EPA suggested that daily records be required, and that fuel type, heat content, heat value, and actual and allowable emission rates be required.
- g. One commenter suggested that the requirement for fuel-nitrogen testing was redundant for sources that have CEM.
- h. EPA recommended detailed procedures and specifications for determining fuel nitrogen content of residual fuel.
- i. EPA recommended that records be kept five years.

Response

- a. The CEM requirement now applies only to sources whose actual NOx emissions exceeded 100 TPY after 1989. Most of the sources required to have CEM in this regulation would have to have it anyway, under Title IV requirements of the Clean Air Act.
- b. The pending enhanced monitoring rule will cover additional NOx sources with a CEM requirement and, in addition, specify parameter monitoring to measure surrogates effectively.

- c. DEP has incorporated some of the suggested provisions. In addition, DEP is now developing regulations for CEM and also for continuous parameter monitoring. They are expected to be in effect by the required compliance date of May 31, 1995.
- d. DEP agrees with the comment and the suggested addition was made (subdivision (1)(7)).
- e. The final rule makes no reference to continuous process monitoring. However recordkeeping is required daily in the rule, and the expectation is that a forthcoming enhanced monitoring rule will more adequately cover this issue.
- f. DEP agrees with the comment and the suggested change was made.
- g. The requirement for fuel nitrogen testing was dropped entirely from the rule, although it may be required case-by-case in orders issued for 40% reductions and ERC trades.
- h. Fuel testing must now be done by ASTM standard D-3228. Sampling and recordkeeping procedures are not specified, because the testing is no longer required.
- i. DEP agrees with the comment and the requested change was made.

9. Testing and test methods (subdivisions (k)(1) and (k)(2))

Subsection (q) previously required a compliance test by May 31, 1995, and tests every five years thereafter.

Summary of Comments

- a. EPA is requiring that compliance tests be done on or before the required date of compliance.
- b. Two commenters said that the testing requirement is burdensome for small sources.
- c. One commenter recommended that sources that have annual tune-ups should have only a one-time test.
- d. EPA said that we must establish a schedule to require periodic source testing for sources not having CEM.
- e. One commenter requested an exemption from the testing requirements for peak shaving units.
- f. One commenter recommended stack tests at more than one load, i.e., more than one firing rate.

- g. EPA recommended that this subsection include specifications for units and averaging times for determining compliance for I.C. engines and glass melting furnaces.
- h. One commenter suggested that all emissions limits should have a one-hour averaging time.
- i. EPA brought out that some sources have their own particular test method (Turbines use Method 20, for example).
- j. EPA said that the duration of an emission test should be specified.

Response

- a. Under the final rule, source testing will be required by the required compliance date. If the source can prove that it is not possible to have compliance testing done by then, it can apply for up to a one year extension.
- b. There are now exemptions from the testing requirement for synthetic minors and emergency generators.

As another means of reducing the burden of the emission testing requirement, DEP may allow an abbreviated test that has an accuracy of $\pm 2\%$. That accuracy would be considered equivalent to the Method 7 test and as such might be allowable under regulations currently in place (22a-174-5(d)).
- c. The subsection in the June 22 proposed rule that required tune-ups has been deleted.
- d. The suggested change was made. DEP is now requiring an initial stack test, and follow-up tests every five years, to coincide with most operating permit renewals. This frequency, coupled with continuous parameter monitoring (to be required under a future rule), should be sufficient to demonstrate continued compliance. DEP already has the authority, under Section 22a-174-5, to require additional or more frequent testing, should it be necessary.
- e. Although peak shaving units are small in terms of their annual emissions, they are significant contributors to NOx on high-ozone days. Therefore, DEP feels that they should not be exempt from the testing requirement.
- f. The commenter's suggestion would increase the cost of the test and would not give useful information, since the maximum NOx production could be expected at 90% of maximum firing rate. For sources that have historically operated in excess of their rated capacity, testing should be done at 90% of those rates, and the regulation has been changed accordingly.
- g. Averaging times have been specified for CEM-equipped sources and appear in subdivision (k)(4).

- h. DEP has decided to retain the 24-hour averaging time for sources equipped with CEM. The 24-hour average does allow high instantaneous spikes that would violate a 1-hour limit, but, as the commenter concedes, most fuel burning sources emit at a relatively constant rate. Moreover, the emissions over the entire day are more critical to air quality than the emissions in any one hour. The 1-hour averaging time for sources not equipped with CEM is a concession to practical limitations in stack testing.
- i. The regulation was changed to accommodate sources for which Method 7 does not apply. Subdivision (k)(2) of the final rule references 40 CFR 60 Appendix A, and in Section 22a-174-5, rather than specifically Method 7 from Appendix A.
- j. The change was made (subdivision (k)(4)). Appendix A specifies three 1-hour samples.

FINAL RECOMMENDATION

Base upon the considerations in this Hearing Report, I recommend that the final amended regulations be adopted by the Commissioner of Environmental Protection and submitted for approval by the Attorney General and the Legislative Regulations Review Committee.

4/29/94
Date

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