MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT

RULE 1161 -- PORTLAND CEMENT KILNS
(Adopted: 06/28/95) (Amended: 10/22/01)

(A) General

(1) Purpose:

(a) The purpose of this Rule is to limit emissions of oxides of nitrogen (NO_x) resulting from the operation of existing Portland cement kilns.

(2) Applicability:

(a) The provisions of this Rule shall apply to all existing Portland cement kilns operated within the Federal Ozone Non-Attainment Area of the Mojave Desert Air Quality Management District.

(3) Applicability of Other District Rules:

(a) Compliance with this Rule does not exempt a person from complying with any other applicable State, federal or local law, statute, code, ordinance, rule or regulation.

(B) Definitions

For the purposes of this Rule, the following definitions shall apply:

(1) "Aggregate Emissions Limit" - A facility-wide sum of NO_x emission limits (expressed in lb/ton of clinker) from all of a facility's Portland cement kilns.

(2) "Baseline Emission Rate" - Emissions under normal operating conditions, prior to control, determined by an emissions compliance test conducted in accordance with the requirements specified in Section (H).

(3) "Clinker" - The product of a cement kiln from which finished cement is manufactured by milling and grinding.

(4) "Combustion Control(s)" - A process, equipment or device used to achieve changes in the combustion process that results in a reduction of oxides of nitrogen emissions; emphasis is on reducing the formation of NO_x.

(5) "Continuous Emissions Monitoring System (CEMS)" - The total equipment necessary for the continuous determination and recordkeeping of process gas NO_x concentrations and NO_x emission rates. Such equipment shall comply with the requirements set forth in Section (F)(1).

(6) "Emissions" - The quantitative rate of releases of air contaminants to the atmosphere from an emission point, as measured by the Continuous Emission Monitoring System, source tests, or as calculated by the methods specified in an applicable rule, regulation or Permit to Operate.

(7) "Facility" - Any permit unit or grouping of permit units or other air emission activities which are located on one or more contiguous properties within the District, in actual physical contact, or separated solely by a public roadway or other public right of way, and which are owned or operated by the same person (or by persons under common control).

(8) "Federal Ozone Non-Attainment Area" - That portion of San Bernardino County that lies within the lines which begin at:

(a) the San Bernardino/Riverside County boundary, running north along the range line common to Range 3 East and Range 2 East;

(b) then west along the township line common to Township 2 North and Township 3 North;

(c) then north along the San Bernardino/Los Angeles County boundary and the San Bernardino/Kern County Boundary;

(d) then east along latitude 35 degrees, 10 minutes north;

(e) then south along longitude 115 degrees, 45 minutes west and westward along the San Bernardino/Riverside County Boundary (see Map 1).

(9) "Heat Input" - The chemical heat released due to fuel combustion in a permit unit, using the higher heating value of the fuel. Does not include the sensible heat of incoming combustion air.

(10) "Higher Heating Value" - The total heat liberated per mass of fuel burned (Btu per pound), when fuel and dry air at standard conditions undergo complete combustion and all resultant products are brought to standard conditions.

(11) "Maximum Rated Capacity" - The maximum design heat input of a unit at the highest heating value of the fuel used.

(12) "Normal Production Level" – The average Clinker production rate in tons per hour for the preceding calendar quarter. Calendar days when the kiln did not operate for the full twenty-four hours shall be excluded from this determination.

(13) "Oxides of Nitrogen (NO_x)" - The sum of the molecular forms of nitrogen oxide and nitrogen dioxide. When measured or calculated, the total of the two molecular forms is collectively expressed as nitrogen dioxide (NO_2).

(14) "Parts per Million (by Volume)" (ppmv) - The number of gas molecules of a given species, or group, in one million total gas molecules.

(15) "Permit Unit" - Any Portland cement kiln required to have a Permit to Operate pursuant to District Rule 203.

(16) "Portland Cement" - A hydraulic cement produced by pulverizing clinker consisting essentially of hydraulic calcium silicates, usually containing one or more of the forms of calcium sulfate as an interground addition.

(17) "Portland Cement Kiln" (Kiln) - A system, including any solid, gaseous or liquid fuel combustion equipment, used to calcine and fuse raw materials, including limestone and clay, to produce Portland cement clinker. For the purposes of this Rule, three types of Portland cement kilns are described:

(a) "Preheater-Precalciner Kiln" - A high-production, large diameter, short kiln where much of the feed to the kiln system is preheated in cyclone chambers prior to the final fusion which constitutes the formation of clinker.

(b) "Long Dry Kiln" - A kiln 14' or larger in diameter, 400' or greater in length, which employs no preheating of the dry feed.

(c) "Short Dry Kiln" - A kiln less than 14' in diameter, less than 400' in length, which employs no preheating of the dry feed.

(18) "Reasonably Available Control Technology" (RACT) - The lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available, considering technological and economic feasibility. RACT for this source category may consist of a process change and/or equipment modification.

(19) "Start-up" - Period of time after non-production of clinker during which a cement kiln is heated to operating temperature from a lower temperature and before Clinker production reaches at least sixty-five percent (65%) of normal production level.

(20) "Shut-down" - Period of time when Clinker production is below sixty-five percent (65%) of normal production level and cement kiln is allowed to cool from operating temperature to a lower temperature in preparation for a period of non-production of clinker.

(21) "Waste Heat" - Excess heat generated as a result of a combustion process within a kiln.

(C) Requirements

(1) NO_x Reduction Technologies

(a) Each owner or operator of a kiln subject to this Rule shall operate such equipment with NO_x RACT. RACT shall be specific to the type of kiln being operated, and can include - but is not limited to - any one, or a combination of, the following:

(i) Combustion Controls

(ii) Low NO_x burners

(iii) Staged combustion

(iv) NO_x-reducing fuels or substances (includes tire-derived fuels).

(2) NO_x RACT Emission Limits – All periods except Start-up and Shut-down

(a) Any owner or operator of a kiln subject to this Rule shall not exceed the following NO_x emission limits, calculated pursuant to Section (E)(1)(b), during periods of operation other than Start-up and Shut-down:

(i) For Preheater-Precalciner Kilns: 6.4 lb/ton of clinker produced when averaged over any 30 consecutive day period;

(ii) For Long Dry Kilns: 6.4 lb/ton of clinker produced when averaged over any 30 consecutive day period;

(iii) For Short Dry Kilns: 7.2 lb/ton of clinker produced when averaged over any 30 consecutive day period.

(b) For kiln systems which recover waste heat and convert it into electricity, the NO_x emission limit shall be adjusted using the following equation:

Waste Heat Recovery NO_x Emission Limit = Lb NO_x/clinker ton per Section (C)(2)(a) x Recovery Factor.

$$\text{Recovery Factor} = 1 + \frac{\text{Waste Heat Recovered (Btu/hr)}}{\text{Kiln Heat Input}^{*}\text{ (Btu/hr)}}$$

*Kiln Heat Input shall be based on the higher heating value of the fuel fired.

(3) NO_x RACT Emission Limits –Start-up and Shut-down Periods

(a) Any owner or operator of a kiln subject to this Rule shall not exceed the following limits during Start-up and Shut-down periods:

(i) For Preheater-Precalciner Kilns manufactured by Allis Chalmers whose construction was completed in 1982: 17,616 lb NO_x/day

(ii) For Preheater-Precalciner Kilns manufactured by Humboldt-Wedag whose construction was completed in 1984: 28,160 lb NO_x/day

(iii) For Long Dry Kilns manufactured by F.L. Smidth whose construction was completed in 1965: 30,664 lb NO_x/day

(iv) For all other kiln types: maximum heat input of 4,500 MMBtu/day/kiln

(4) Additional Start-up and Shut-down Requirements

(a) The frequency and duration of operation in Start-up or Shut-down mode will be minimized to the maximum extent practicable, and in no case shall the duration of the Start-up or Shut-down period exceed 36 hours;

(b) All possible steps will be taken to minimize the impact of emissions during Start-up and Shut-down on ambient air quality;

(c) The facility must be operated in a manner consistent with good practice for minimizing emissions, and the source must have used best efforts regarding planning, design and operating procedures to meet the applicable emission limitation; and

(d) The owner or operator's actions during Start-up and Shut-down periods must be documented by properly signed, contemporaneous operating logs, or other relevant evidence.

(D) Alternative Compliance Strategy

(1) As an alternative to complying with the limits specified in Section (C)(2) on a permit unit basis, the owner or operator of a kiln subject to this Rule may be allowed to aggregate NO_x emissions from all cement kilns at a single facility, subject to the following conditions:

(a) The owner or operator must request, in writing, to aggregate emissions pursuant to the compliance schedule set forth in Section (I).

(b) Aggregating of emissions must be approved in writing by the District.

(c) Aggregating of emissions shall be allowed only between kiln types with the same emission limits, as set forth in Section (C)(2)(a).

(d) The aggregated emissions limit for NO_x shall be less than or equal to ninety percent (90%) of the sum of the total NO_x emissions from all kilns at a facility, as allowed pursuant to Section (C)(2).

(e) The aggregate emissions per ton of clinker shall be calculated as the aggregate emissions divided by the facility clinker production sum for the same period. When this option is approved, the aggregated NO_x emissions per clinker ton will be used to comply with the NO_x RACT Emission Limit.

(f) Regardless of method of compliance employed (permit unit limit or aggregate emission limit), and prior to implementation, the applicable emission limits and method of compliance shall be incorporated into the District Permit to Operate (PTO) for each kiln.

(E) Compliance Determination

(1) Any owner or operator of a kiln subject to this Rule shall make the following determinations, as set forth herein:

(a) Compliance determinations shall not be established from data obtained during the periods specified in Section (G).

(b) Emission Calculation Method

(i) Emissions shall be calculated by dividing the sum of all hourly lb of NO_x for the current operating day and the preceding 29 operating days by the tons of clinker produced over the same period of time. Such calculations shall exclude any emissions and clinker produced during those time periods specified in Section (G) and during Start-up and Shut-down.

(c) Any owner or operator of a kiln subject to this Rule shall convert observed NO_x concentrations to a mass emission rate using the following formula (for purposes of this calculation, standard conditions are @ 68°F and 29.92 inches Hg):

$$lb/hr = 7.1497 \times 10^{6} (ppmv)(dscfm)$$

(d) For the purposes of this Rule, oxides of nitrogen shall be calculated as NO_2 on a dry basis.

(F) Monitoring and Recordkeeping

(1) Continuous Emissions Monitoring

(a) Any owner or operator of a kiln subject to this Rule shall not operate such equipment unless it is equipped with one of the following:

(i) A CEMS monitoring system which meets the requirements of 40 CFR Part 60, Subpart A, and Appendix B, and complies with the quality assurance procedures specified in 40 CFR Part 60, Appendix F. The

CEMS shall be used to demonstrate compliance with the applicable emission limit, specified pursuant to Section (C)(2), or the aggregate emission limit, as set forth in Section (D), by measuring NO_x emissions; or

(ii) If an owner or operator can demonstrate, by preponderance of the evidence, that installation of a CEMS conforming to the requirements of Section (F)(1)(a)(i) above is technologically and economically unfeasible, the owner or operator may provide an alternate calculational and recordkeeping procedure based upon actual emission testing and correlations with operating parameters (such as kiln loading, fuel-type, percent excess oxygen, etc.). The installation, implementation and use of such an alternate calculational and recordkeeping procedure must be approved by the District, CARB and USEPA, in writing, prior to implementation.

(b) The CEMS or approved alternate recordkeeping procedure shall be operated and maintained in strict accordance with the manufacturer's/supplier's specifications and in continual compliance with the provisions of this Rule.

(2) Recordkeeping Requirements

(a) Any owner or operator of a kiln subject to this Rule shall produce and maintain CEMS records, or alternate records pursuant to Section (F)(1)(a)(ii) above, for each affected kiln on a daily basis. Such records shall include, but are not limited to:

(i) The emissions, in pounds, of NO_x from each cement kiln if complying with the limit specified in (C)(2) on a permit unit basis; or

(ii) The aggregate emissions, in pounds, of NO_x from all cement kilns at a facility, if complying with the limit specified in (C)(2) on an aggregate basis, as approved by the District.

(iii) The date, time and duration of any start-up, shutdown or malfunction in the operation of any of the kiln systems or the emissions monitoring equipment;

(iv) The results of performance testing, evaluation, calibration checks, adjustments and maintenance of the CEMS or approved alternate

recordkeeping procedure employed, pursuant to the requirements of Section (F)(1)(a)(ii).

(b) Any owner or operator of a kiln subject to this Rule shall produce and maintain daily records of NO_x emission concentrations and NO_x mass emission rate, as required by Section (E)(1)(c).

(c) Any owner or operator of a kiln subject to this Rule shall produce and maintain daily clinker production records.

(d) Any owner or operator of a kiln subject to this Rule shall produce and maintain daily records of the type and quantity of fuel used.

(e) All records required to be produced or maintained shall be retained on site for a minimum of two years and be made available to the APCO or his designee upon request.

(3) Emission Reporting

(a) Daily NO_x emission data for the calendar quarter compiled pursuant to Section (F)(2)(a)(i) or (ii) shall be submitted to the District. All quarterly reports must be received within 30 days after the end of each quarter.

(G) Exemptions

(1) The requirements of Sections (C)and (D) shall not apply to periods during which any gaseous/liquid fuel is used (except Start-up and Shut-down), and the applicable emission limit is consequently exceeded. This exemption shall be subject to the following conditions:

(a) The total allowable exceedance period shall be limited to an aggregate total of 14 calendar days per calendar year; and

(b) Operating pursuant to this exemption shall not relieve the owner or operator from the requirements of District Regulations II, XII or XIII; and

(c) This exemption shall only apply to periods when there is an interruption in the supply of solid fuel which is beyond the control of the facility; and

(d) The frequency and duration of operation under this exemption will be minimized to the maximum extent practicable; and

(e) All possible steps will be taken to minimize the impact of emissions on ambient air quality during gasesous or liquid fuel use;

(f) The facility must be operated in a manner consistent with good practice for minimizing emissions, and the source must have used best efforts regarding planning, design and operating procedures to meet the applicable emission limitation; and

(g) The owner or operator's actions under this exemption must be documented by properly signed, contemporaneous operating logs, or other relevant evidence.

(H) Test Methods

(1) The following tests shall be used in conducting compliance testing, Relative Accuracy Test Audits (RATA) and other testing required for compliance with this Rule:

(a) Compliance testing shall be subject to the protocols prescribed in the District's Compliance Procedural Manual.

(b) Certification Testing shall be subject to the protocols prescribed in the District's Compliance Procedural Manual and 40 CFR 60, Appendix B.

(c) Quality Assurance Testing shall be subject to the protocols prescribed in the District's Compliance Manual and 40 CFR Part 60, Appendix F.

(d) Oxides of nitrogen stack testing for purposes of this Rule shall be conducted pursuant to EPA Method 7E, "Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)" or CARB Method 100, "Procedures for Continuous Gaseous Emission Stack Sampling (Stack Gas NO_x)."

(e) Stack gas flow rate testing shall be conducted pursuant to EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)."

(f) Oxygen concentration stack testing shall be conducted pursuant to EPA Method 3A, "Determination of 0_2 and CO_2 Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)" or CARB Method 100.

(I) Compliance Schedule

(1) Any owner or operator of a permit unit subject to this Rule shall comply with all applicable requirements immediately upon adoption, except:

(a) Those owners or operators following the alternative compliance strategy pursuant to subsection (D)(1) shall comply with an aggregated emissions limit for NO_x less than or equal to ninety percent (90%) of the sum of the total allowable NO_x emissions from all kilns at the facility by April 22, 2002. Prior to that date, such owners or operators shall at a minimum comply with an aggregated emission limit for NO_x less than or equal to the sum of the total allowable NO_x emissions from all kilns at the facility.

(J) Violations

(1) The occurrence of any of the following shall constitute a violation of this Rule:

(a) Exceedance of the applicable emission limit specified pursuant to Section (C)(2), unless the facility has an approved aggregate emissions limit, as set forth in Section (D);

(b) Exceedance of the applicable emission limit specified pursuant to subsection (C)(3);

(c) For facilities which have been approved to aggregate emissions, exceedance of the sum of the total NO_x emissions from all kilns at a facility, as set forth in Section (D)(1)(d), shall constitute a violation of this Rule for every permitted unit operating during the exceedance period in the averaging group;

(i) A violation of the aggregate limit shall also be considered a violation of the 30-day average for the facility. Such exceedances shall be determined by using the emission calculation method set forth in Section (E)(1)(b)(i), and considered on a daily basis.

(d) Failure to comply with any limits contained in this Rule, as determined by any one of the test methods in Section (H), or by any other previously-approved test method, as set forth in a valid PTO pursuant to Regulation II or Regulation XII;

(e) Exceedance of the 14 day exemption period for gaseous/liquid fuel use, as set forth in Section (G)(1)(d);

(f) Lack of data collection and/or reporting, pursuant to the requirements of Section (F)(2) and (F)(3);

(g) Failure to comply with any provision of this Rule shall constitute a violation of the Rule.

[SIP: Submitted mm/dd/yr as amended 10/22/01; Limited Approval/Disapproval 5/11/00 65 FR 30355, 40 CFR 52.220(c)(274)(i)(A)(1)]