

Eastern Kern Air Pollution Control District

Rule 425.3 PORTLAND CEMENT KILNS (OXIDES OF NITROGEN)

**STAFF REPORT
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I. INTRODUCTION

The Eastern Kern Air Pollution Control District (District) is proposing amendments to Rule 425.3, Portland Cement Kilns (Oxides of Nitrogen), originally adopted October 13, 1994. The rule set emissions standards for nitrogen oxides (NOx) produced by cement kilns to levels consistent with Reasonably Available Control Technology (RACT), in order to satisfy the 1990 Federal Clean Air Act. Proposed amendments to Rule 425.3 will lower the current NOx limits to meet current RACT requirements.

Appendix A is the clean version of proposed Rule 425.3, Portland Cement Kilns (Oxides of Nitrogen).

Appendix B shows all changes made to proposed Rule 425.3, Portland Cement Kilns (Oxides of Nitrogen) in ~~strikeout~~ underline form.

II. BACKGROUND

NOx is an ozone precursor pollutant, that when emitted can form tropospheric ozone in the presence of light winds, high temperatures, and sunlight. When inhaled, ozone can irritate and inflame the lining of the lungs, much like sunburn damage on skin. Potential health impacts include aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis. Ozone can also hurt the economy by affecting crop yield and the durability of certain materials.

In 2008, the U.S. Environmental Protection Agency (EPA) adopted a more stringent 8-hour Ozone National Ambient Air Quality Standard (NAAQS) of 0.075 parts per million (ppm). Although the District attained the previous (1997) 8-hour Ozone NAAQS, and Indian Wells Valley met the new (2008) Ozone NAAQS, a portion of the District failed to meet the new standard by the applicable attainment date. As a result, the District prepare and adopt an attainment plan pursuant to the 2008 Ozone NAAQS. Additionally, sections of the Federal Clean Air Act (FCAA) require ozone nonattainment areas to implement Reasonably Available Control Technology (RACT) for all sources of air pollution for which the EPA has published a Control Techniques Guidelines (CTG) document. RACT is also required for facilities located in the nonattainment area that emit 50 tons per year (tpy) of the ozone precursors NOx or Volatile Organic Compounds (VOC).

On May 11, 2017, the District adopted a Reasonably Available Control Technology (RACT) State Implementation Plan (SIP) for the 2008 Ozone NAAQS. The RACT SIP demonstrated most current District rules fulfil RACT requirements. However, Rule 425.3 was identified as one of three rules with deficiencies that needed to be corrected in order to attain the 2008 Ozone NAAQS by 2020.

III. APPLICABILITY

Upon adoption, provisions of amended Rule 425.3 will be applicable to all Portland cement manufacturing facilities operating within the Eastern Kern Air Pollution Control District jurisdiction.

IV. REQUIREMENTS

Effective upon adoption of amended Rule 425.3, no person shall operate a Portland cement manufacturing facility unless the 30-operating day rolling average of NOx emissions from the kiln do not exceed:

1. 2.8 lb/ton of clinker produced; or
2. 3.4 lb/ton of clinker produced if low-NOx burner or low-NOx precalciner was installed and made operational by January 1, 2007.

Additionally, all Portland cement manufacturing facilities shall provide, properly install, maintain, calibrate, and operate a continuous emission monitoring system (CEMS) for each emission point from the kiln. There are also requirements for monitoring clinker production, see Section V of Appendix A for complete details.

V. EXEMPTIONS

The exemptions listed in proposed amended Rule 425.3 have not been changed.

VI. ADMINISTRATIVE REQUIREMENTS

Proposed amended Rule 425.3 contains an extensive revision of the Administrative Requirements. Please see Section VI, Administrative Requirements of Appendix A for complete details and Section VI, Administrative Requirements of Appendix B for strikeout underline changes.

VII. ECONOMIC IMPACTS

Pursuant to California Health & Safety Code (CH&SC) §40920.6(a), the District is required to analyze the cost effectiveness of new rules or rule amendments that implement Best Available Retrofit Control Technology (BARCT) or all feasible measures. Proposed amended Rule 425.3 employs federal RACT requirements, not BARCT or all feasible measures, and is therefore not subject to the cost effectiveness analysis mandate.

VIII. ENVIRONMENTAL IMPACTS

Both the California Environmental Quality Act (CEQA) and ARB policy require an evaluation of the potential adverse environmental impacts of proposed projects. The intent of amended Rule 425.3 is to protect public health by reducing the public's exposure to potentially harmful NOx emissions. An additional consideration is the impact that the proposed rule may have on the environment. District has determined that no significant adverse environmental impacts should occur as a result of adopting amendments to Rule 425.3.

Pursuant to the Section 15061, Subsections (2) & (3) of the CEQA Guidelines, staff will prepared and file a Notice of Exemption for this project upon adoption.

IX. SOCIOECONOMIC IMPACTS

CHSC Section 40728.5 exempts districts with a population of less than 500,000 persons from the requirement to assess the socioeconomic impacts of proposed rules. Eastern Kern County population is below 500,000 persons.

X. RULE APPROVAL PROCESS DONE

District will be accepting written comments and concerns from persons interested in amended Rule 425.3 for a period of 30 days following the workshop November 2, 2017. District anticipates amended Rule 425.3 will be considered for adoption by the Board at the January 2018 Board Hearing.

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APPENDIX A

DRAFT RULE 425.3

PORTLAND CEMENT KILNS (OXIDES OF NITROGEN)

RULE 425.3 Portland Cement Kilns (Oxides of Nitrogen) - Adopted 10/13/94, Amended XX/XX/XX

I. Purpose

The purpose of this Rule is to limit nitrogen oxide (NO_x) emissions from Portland cement kilns.

II. Applicability

Provisions of this Rule shall apply to all Portland cement manufacturing facilities operating in the Eastern Kern Air Pollution Control District (District).

III. Definitions

- A. 30-Operating Day Rolling Average: Total of all hourly emissions data (in pounds) fuel was combusted in a cement kiln, in the preceding 30 operating days, divided by the total number of tons of clinker produced in that kiln during the same 30-day period.
- B. Clinker: Product of a cement kiln from which finished cement is manufactured by milling.
- C. Continuous Emissions Monitoring System (CEMS): An instrument satisfying the requirements of 40 CFR, Part 60.
- D. Clinker: The product of feedstock sintered in a kiln which is then ground and mixed with additives to make cement.
- E. Low-NO_x Burner: Type of cement kiln burner that results in decreasing NO_x emissions and has an indirect-firing system and a series of channels or orifices that:
1. Allow for the adjustment of the volume, velocity, pressure, and direction of the air carrying the fuel (known as primary air) and the combustion air (known as secondary air) into the kiln; and
 2. Impart high momentum and turbulence to the fuel stream to facilitate mixing of the fuel and secondary air.
- F. Kiln: Any device including associated preheater and precalciner devices that produce clinker by heating limestone and other raw materials for subsequent production of Portland cement.
- G. Nitrogen Oxides (NO_x) Emissions: The sum of nitric oxide (NO) and nitrogen dioxide (NO₂) in the flue gas, collectively expressed as nitrogen dioxide.
- H. Operating Day: A calendar day during which Portland cement is manufactured by the kiln. An operating day includes all valid data obtained in any daily 24-hour period

during which the kiln operates and excludes any measurements made during the daily 24-hour period when the kiln was not operating or was in startup or shutdown.

- I. 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.
- J. Portland Cement Manufacturing Facility: Any facility that produces Portland cement or associated products, as defined in the Standard Industrial Classification Manual as Industry Number 3241, Portland Cement Manufacturing.
- K. Shutdown: The period of time between when kiln raw material feed and fuel to the kiln begin to be decreased to reduce the kiln operating temperature until both feed and fuel are no longer fed into the kiln and it has ceased operation. A shutdown period shall not last more than 36 hours.
- L. Startup: Period of time after non-production of clinker during which a cement kiln is heated to operating temperature from a lower temperature and feed rate is increased to normal production levels. A startup period shall not last longer than 48 hours.

IV. Exemptions

The requirements of Section V of this Rule shall not apply to:

- A. Startup and shutdown as defined in this rule; and
- B. Breakdown conditions qualifying under District Rule 111.

V. Requirements

- A. Emissions Limits: Effective *Need Date*, No person shall operate a Portland cement manufacturing facility unless 30-operating day rolling average of NO_x emissions from the kiln do not exceed:
 - 1. 2.8 lb/ton of clinker produced; or
 - 2. 3.4 lb/ton of clinker produced if low-NO_x burner or low-NO_x precalciner was installed and made operational by January 1, 2007.
- B. Emissions Monitoring: Any person who operates a Portland cement manufacturing facility shall provide, properly install, maintain, calibrate, and operate a continuous emission monitoring system (CEMS), as defined in Section III.C., for each emission point from the kiln.
- C. Production Monitoring: Any person who operates a Portland cement manufacturing facility shall determine hourly clinker production by one of the following two methods:

1. Install, calibrate, maintain, and operate a permanent weigh scale system to measure and record weight rates in tons-mass per hour of the amount of clinker produced. The system of measuring hourly clinker production must be maintained within ± 5 percent accuracy; or
2. Install, calibrate, maintain, and operate a permanent weigh scale system to measure and record weight rates in tons-mass per hour of the amount of feed to the kiln. The system of measuring feed must be maintained within ± 5 percent accuracy. Calculate your hourly clinker production rate using a kiln specific feed to clinker ratio based on reconciled clinker production determined for accounting purposes and recorded feed rates. This ratio must be updated monthly. Note that if this ratio changes at clinker reconciliation, you must use the new ratio going forward, but you do not have to retroactively change clinker production rates previously estimated.

VI. Administrative Requirements

A. Annual Demonstration of Compliance: Any person who operates a Portland cement manufacturing facility shall demonstrate compliance with this Rule by conducting annual testing, not more than 13 months after the most recently conducted testing, pursuant to the following test methods:

1. NO_x stack testing for purposes of this Rule shall be conducted using EPA Test Method 7E.
2. Stack gas flow rate testing for purposes of this Rule shall be conducted using EPA Test Method 2.
3. The following formula shall be used to convert uncorrected observed NO_x concentration in ppm to tons per day at standard conditions of 68°F and a gas pressure of 29.92 inches of mercury:

$$\frac{\text{Tons NO}_x}{\text{day}} = (\text{ppmv NO}_x) \left(\frac{46 \text{ grams}}{\text{mole}} \right) (1.56 \times 10^{-7}) (\text{dscfm}) (0.0120)$$

B. Recordkeeping: Any person subject to the requirements of this rule shall maintain records of the following:

1. Results of any testing conducted to determine compliance with this Rule as specified in Section VI.A;
2. Daily clinker production rates and kiln feed rates. During each quarter of operation, you must determine, record, and maintain the ongoing accuracy of the system of measuring hourly clinker production (or feed mass flow);
3. Calculated NO_x emission rates from the kiln in lbs/ton of clinker produced for each day of operation of the kiln;
4. Date, time, and duration of any startup, shutdown or malfunction in the operation of any unit, emissions control equipment or emission monitoring equipment; and

5. Results of performance testing, evaluations, calibrations, checks, adjustments, and maintenance of CEMS required by this rule.

Such records shall be retained for a minimum of 60 months from date of entry and be made available to District staff upon request.

- C. Reporting: Any person subject to this Rule shall meet the following reporting requirements:
 1. Report to the APCO: date, time, duration, magnitude, nature and cause (if known), and corrective action taken of any exceedance;
 2. Supply APCO copy of all test protocols at least 30-days prior to testing and copy of test results within 60 days following testing.

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APPENDIX B:
PROPOSED RULE 425.3
PORTLAND CEMENT KILNS

RULE 425.3 Portland Cement Kilns (Oxides of Nitrogen) - Adopted 10/13/94, Amended
XX/XX/XX

I. Purpose

The purpose of this Rule is to limit nitrogen oxides of nitrogen (NOx) emissions from existing Portland cement kilns, to levels consistent with Reasonably Available Control Technology to satisfy 1990 Federal Clean Air Act Amendments, Section 182 (f).

II. Applicability

The ~~p~~Provisions of this Rule shall apply to all Portland cement manufacturing facilities kilns ~~operated~~operating in the ~~KCAPCD~~Eastern Kern Air Pollution Control District (District). ~~It is hereby acknowledged kilns constructed and placed in operation after January 1, 1990 meet new source Best Available Control Technology requirements of Rule 210.1, and exceed requirements of Section V, and; therefore, are not subject to Section VII.~~

III. Definitions

- A. 30-Operating Day Rolling Average: Total of all hourly emissions data (in pounds) fuel was combusted in a cement kiln, in the preceding 30 operating days, divided by the total number of tons of clinker produced in that kiln during the same 30-day period.
- B. Clinker: ~~the product~~Product of a cement kiln from which finished cement is manufactured by milling.
- ~~BC.~~ Continuous NOx emissions~~Emissions monitoring~~Monitoring system~~System~~ (CEMS): ~~an~~An instrument satisfying the requirements of 40 CFR, Part 60.
- D. Clinker: The product of feedstock sintered in a kiln which is then ground and mixed with additives to make cement.
- E. Low-NOx Burner: Type of cement kiln burner that results in decreasing NOx emissions and has an indirect-firing system and a series of channels or orifices that:
1. Allow for the adjustment of the volume, velocity, pressure, and direction of the air carrying the fuel (known as primary air) and the combustion air (known as secondary air) into the kiln; and
 2. Impart high momentum and turbulence to the fuel stream to facilitate mixing of the fuel and secondary air.
- F. Kiln: Any device including associated preheater and precalciner devices that produce clinker by heating limestone and other raw materials for subsequent production of Portland cement.
- G. Nitrogen Oxides (NOx) Emissions: The sum of nitric oxide (NO) and nitrogen dioxide (NO2) in the flue gas, collectively expressed as nitrogen dioxide.

- H. Operating Day: A calendar day during which Portland cement is manufactured by the kiln. An operating day includes all valid data obtained in any daily 24-hour period during which the kiln operates and excludes any measurements made during the daily 24-hour period when the kiln was not operating or was in startup or shutdown.
- ~~CI. Portland Cement: – cementitious, crystalline compound composed of metallic oxides. 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.~~
- ~~D. Portland Cement Kiln – a system, including any solid fuel preparation equipment, used to calcine and fuse a mixture of limestone, clay, recycled dust and other raw materials to produce Portland cement.~~
- J. Portland Cement Manufacturing Facility: Any facility that produces Portland cement or associated products, as defined in the Standard Industrial Classification Manual as Industry Number 3241, Portland Cement Manufacturing.
- K. Shutdown: The period of time between when kiln raw material feed and fuel to the kiln begin to be decreased to reduce the kiln operating temperature until both feed and fuel are no longer fed into the kiln and it has ceased operation. A shutdown period shall not last more than 36 hours.
- ~~EL. Start-up: – period~~ Period of time after non-production of clinker during which a cement kiln is heated to operating temperature from a lower temperature and feed rate is increased to normal production levels. A startup period shall not last longer than 48 hours.
- ~~F. Shut down – period of time cement kiln is allowed to cool from operating temperature to a lower temperature in preparation for a period of non-production of clinker.~~

IV. Exemptions

The requirements of Section V of this Rule shall not apply to:

- A. Startup and shutdown as defined in ~~Subsections III.E and F~~ this rule; and
- B. Breakdown conditions qualifying under District Rule 111.

V. Requirements

- A. Emissions Limits: Effective Need Date, No person shall operate a Portland cement manufacturing facility unless 30-operating day rolling average of NOx emissions from the kiln do not exceed:
 - 1. 2.8 lb/ton of clinker produced; or

2. 3.4 lb/ton of clinker produced if low-NOx burner or low-NOx precalciner was installed and made operational by January 1, 2007.

~~kiln unless such kiln is equipped with a continuous NOx emissions monitoring system as defined in Subsection III.B. If a kiln's dust collector exhaust system will not accommodate a CEM conforming to 40 CFR, Part 60 criteria, an equivalent calculational and record keeping procedure based upon actual emission testing and correlations with operating parameters (kiln loading, fuel type, percent excess oxygen, etc.) may be substituted.~~

B. Emissions Monitoring: Any person who operates a Portland cement manufacturing facility shall provide, properly install, maintain, calibrate, and operate a continuous emission monitoring system (CEMS), as defined in Section III.C., for each emission point from the kiln.

C. Production Monitoring: Any person who operates a Portland cement manufacturing facility shall determine hourly clinker production by one of the following two methods:

1. Install, calibrate, maintain, and operate a permanent weigh scale system to measure and record weight rates in tons-mass per hour of the amount of clinker produced. The system of measuring hourly clinker production must be maintained within ± 5 percent accuracy; or

2. Install, calibrate, maintain, and operate a permanent weigh scale system to measure and record weight rates in tons-mass per hour of the amount of feed to the kiln. The system of measuring feed must be maintained within ± 5 percent accuracy. Calculate your hourly clinker production rate using a kiln specific feed to clinker ratio based on reconciled clinker production determined for accounting purposes and recorded feed rates. This ratio must be updated monthly. Note that if this ratio changes at clinker reconciliation, you must use the new ratio going forward, but you do not have to retroactively change clinker production rates previously estimated.

~~B. Each owner/operator of a Portland cement kiln shall provide NOx Reasonably Available Control Technology (RACT) for this type of kiln. RACT can include, but is not limited to any one or a combination of the following: combustion controls, low-NOx burner(s), staged combustion, and/or use of NOx reducing fuels.~~

~~C. Any owner/operator of a Portland cement kiln subject to this Rule shall limit NOx emissions to no more than:~~

~~1. 11.6 lbs/ton of clinker produced when averaged over any 24 consecutive hour period, and~~

~~2. 6.4 lbs/ton of clinker produced when averaged over any 30 consecutive day period.~~

~~D. Should State and/or Federal law be amended, or the District's ozone non attainment status be changed to not require RACT for Portland cement kilns, implementation of this Rule shall cease.~~

VI. Administrative Requirements

A. Annual Demonstration of Compliance: Any person who operates a Portland cement manufacturing facility shall demonstrate compliance with this Rule by conducting annual testing, not more than 13 months after the most recently conducted testing, pursuant to the following test methods:

1. NOx stack testing for purposes of this Rule shall be conducted using EPA Test Method 7E.
2. Stack gas flow rate testing for purposes of this Rule shall be conducted using EPA Test Method 2.
3. The following formula shall be used to convert uncorrected observed NOx concentration in ppm to tons per day at standard conditions of 68°F and a gas pressure of 29.92 inches of mercury:

$$\frac{\text{Tons NOx}}{\text{day}} = (\text{ppmv NOx}) \left(\frac{46 \text{ grams}}{\text{mole}} \right) (1.56 \times 10^{-7}) (\text{dscfm}) (0.0120)$$

B. Recordkeeping: Any person subject to the requirements of this rule shall maintain records of the following:

1. Results of any testing conducted to determine compliance with this Rule as specified in Section VI.A;
2. Daily clinker production rates and kiln feed rates. During each quarter of operation, you must determine, record, and maintain the ongoing accuracy of the system of measuring hourly clinker production (or feed mass flow);
3. Calculated NOx emission rates from the kiln in lbs/ton of clinker produced for each day of operation of the kiln;
4. Date, time, and duration of any startup, shutdown or malfunction in the operation of any unit, emissions control equipment or emission monitoring equipment; and
5. Results of performance testing, evaluations, calibrations, checks, adjustments, and maintenance of CEMS required by this rule.

Such records shall be retained for a minimum of 60 months from date of entry and be made available to District staff upon request.

C. Reporting: Any person subject to this Rule shall meet the following reporting requirements:

1. Report to the APCO: date, time, duration, magnitude, nature and cause (if known), and corrective action taken of any exceedance;
2. Supply APCO copy of all test protocols at least 30-days prior to testing and copy of test results within 60 days following testing.

A. ~~Recordkeeping~~

~~Continuous NO_x emissions monitoring system (or Subsection V.A. equivalent) records and clinker production records for each cement kiln shall be maintained at the facility for a period of at least two years and made readily available to District personnel.~~

B. ~~Test Methods~~

1. ~~Oxides of nitrogen stack testing for purposes of this Rule shall be conducted using EPA Test Method 7E.~~

~~Stack gas flow rate testing for purposes of this Rule shall be conducted using EPA Test Method 2.~~

2. ~~The following formula shall be used to convert uncorrected observed NO_x concentration in ppm to tons per day at standard conditions of 68°F and a gas pressure of 29.92 inches of mercury:~~

VII. Compliance Schedule

~~The owner/operator of any kiln subject to this Rule shall:~~

A. ~~Submit a compliance plan no later than May 31, 1995, including a description of how each kiln has already been made to comply with Section V, or a description of all actions to be taken to affect compliance;~~

B. ~~If installation of emissions control equipment or devices, or kiln modification is necessary to meet the requirements of Section V, file a complete application for Authority to Construct (ATC) no later than May 31, 1995; and~~

~~Demonstrate full compliance with applicable sections of Section V by May 31, 1997.~~