Eastern Kern Air Pollution Control District

Rule 425.3
PORTLAND CEMENT KILNS (OXIDES OF NITROGEN)

FINAL STAFF REPORT

March 8, 2018

Prepared by

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Senior Air Quality Specialist

Reviewed by

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I. BOARD ADOPTION

Rule 425.3, Portland Cement Kilns (Oxides of Nitrogen) was amended by the Eastern Kern Air Pollution Control District (District) Governing Board on March 8, 2018 at its regular Board meeting held at the Tehachapi Police Department Community Room, located at 220 West “C” Street, Tehachapi, California and at the Ridgecrest City Hall, located at: 100 West California Avenue, Ridgecrest, California.

Amended Rule 425.3 became effective and enforceable upon adoption. A copy of the Rule has been submitted to the California Air Resources Board (CARB) for their review and to be forwarded to the U.S. Environmental Protection Agency (EPA) for inclusion into the State Implementation Plan (SIP).

II. INTRODUCTION

This staff report presents the amendments made to Rule 425.3, Portland Cement Kilns (Oxides of Nitrogen). Rule 425.3 was originally adopted October 13, 1994, and designed to 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. The primary reason for amending Rule 425.3 is to lower the current NOx limits in order to meet current RACT requirements.

In July, August, and October of 2017, the District conducted a series of rule development meetings with representatives from the three cement plants operating within the District’s jurisdiction. National Cement Company and Lehigh Southwest Cement Company provided written comments following the meetings, while Cal Portland Cement did not.

On November 2, 2017 the District held a public rule development workshop at the Mojave Veteran's Building in Mojave, CA to present the proposed amendments to Rule 425.3. A 30-day public review and comment period followed the workshop ending December 4, 2017. The District received no comments by the close of the 30-day review period.

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.

Appendix C are the Comments made by National Cement and Lehigh Cement following a series of rule development meetings.

Appendix D is cost-effectiveness analysis of installing SNCR & SCR.

III. 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 prepared and adopted 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.

IV. APPLICABILITY

Provisions of amended Rule 425.3 are applicable to all Portland cement manufacturing facilities operating within the Eastern Kern Air Pollution Control District jurisdiction.

V. 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 NOx emission point from the kiln. There are also requirements for monitoring clinker production, see Section V of Appendix A for complete details.

VI. EXEMPTIONS

The exemptions listed in Rule 425.3 have not been changed.

VII. ADMINISTRATIVE REQUIREMENTS

Amended Rule 425.3 contains revised language in Section VI, Administrative Requirements to aid in clarity. Recordkeeping and reporting requirements have also been added. Please see Section VI, Administrative Requirements of Appendices A and B for complete details.

VIII. 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. 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.

The District performed a cost-effective analysis for the costs associated with installing and operating Selective Non-Catalytic Reduction (SNCR) and Selective Catalytic Reduction (SCR) on existing Portland cement kilns. Data was used to determine if SNCR or SCR could be considered RACT. The analysis revealed installing and operating SNCR or SCR on an existing cement kiln is not economically feasible, and therefore would not be considered RACT. A copy of the cost-effective analysis is included in Appendix D of this staff report

IX. ENVIRONMENTAL IMPACTS

Both the California Environmental Quality Act (CEQA) and CARB 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 amended Rule 425.3.

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

X. 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.

APPENDIX A

AMENDED RULE 425.3

PORTLAND CEMENT KILNS
(OXIDES OF NITROGEN)

RULE 425.3 Portland Cement Kilns (Oxides of Nitrogen) - Adopted 10/13/94, Amended 3/8/18

I. Purpose

The purpose of this Rule is to limit nitrogen oxide (NOx) 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: The product of feedstock sintered in a kiln which is then ground and mixed with additives to make cement.

C. Continuous Emissions Monitoring System (CEMS): An instrument satisfying the requirements of 40 CFR, Part 60.

D. 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.

E. 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.

F. Nitrogen Oxides (NOx) Emissions: The sum of nitric oxide (NO) and nitrogen dioxide (NO2) in the flue gas, collectively expressed as nitrogen dioxide.

G. 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.

H. 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.

I. 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.

J. 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.

K. 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 March 8, 2018, 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.

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 the 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, the new ratio must be used going forward, but a retroactive change in clinker production rates previously estimated is not required.

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. Any owner or operator of a kiln subject to this Rule shall convert observed NOx 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 x 10-6 (ppmv)(dscfm)

   Parts Per Million by Volume: (ppmv)

   Dry Standard Cubic Feet per Minute: (dscfm)

4. For the purposes of this Rule, NOx shall be calculated as NO_2 on a dry basis.

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.

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APPENDIX B:

AMENDED RULE 425.3

PORTLAND CEMENT KILNS
(OXIDES OF NITROGEN)

STRIKEOUT UNDERLINE

RULE 425.3 Portland Cement Kilns (Oxides of Nitrogen) - Adopted 10/13/94, Amended 3/8/18

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~~ The product of feedstock sintered in a ~~cement~~ kiln ~~from~~ which ~~finished~~is then ground and mixed with additives to make cement ~~is manufactured by milling~~.

~~B~~C. Continuous ~~NOx emissions~~ Emissions ~~monitoring~~ Monitoring ~~system~~ System (CEMS): ~~an~~ An instrument satisfying the requirements of 40 CFR, Part 60.

D. 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.

E. 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.

F. Nitrogen Oxides (NOx) Emissions: The sum of nitric oxide (NO) and nitrogen dioxide (NO2) in the flue gas, collectively expressed as nitrogen dioxide.

G. 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.

~~C~~H. 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.~~

I. 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.

J. 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.

~~E~~K. 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 March 8, 2018, 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 the 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, the new ratio must be used going forward, but a retroactive change in clinker production rates previously estimated is not required.

~~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. ~~Recordkeeping~~

~~Continuous NOx 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.~~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:

~~B. 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.

~~2. 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:~~

3. Any owner or operator of a kiln subject to this Rule shall convert observed NOx 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 x 10-6 (ppmv)(dscfm)

   Parts Per Million by Volume: (ppmv)

   Dry Standard Cubic Feet per Minute: (dscfm)

4. For the purposes of this Rule, NOx shall be calculated as NO_2 on a dry basis.

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.

~~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.~~

APPENDIX C:

AMENDED RULE 425.3

PORTLAND CEMENT KILNS
(OXIDES OF NITROGEN)

RULE DEVELOPMENT COMMENTS

Appendix C – Comments

On November 2, 2017 the District held a public rule development workshop at the Mojave Veteran's Building in Mojave, CA to present the proposed amendments to Rule 425.3. A 30-day public review and comment period followed the workshop ending December 4, 2017. The District did not receive any comments by the close of the 30-day review period. However, National Cement Company and Lehigh Southwest Cement Company provided written comments in response to the rule development meetings held in July, August, and October of 2017, (prior to the 11/2/2017 workshop).

National Cement Company and Lehigh Southwest Cement Company written comments are provided on the following pages.

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NATIONAL CEMENT
National Cement Company, Inc.

15821 Ventura Blvd.
Suite 475
Encino, California 91436-4778
Telephone: 818-728-5200
Fax: 818-788-0615

July 31, 2017

Mr. Glen Stephens, APCO
Eastern Kern Air Pollution Control District
2700 M Street, Suite 302
Bakersfield, CA 93301

Re: NOx RACT Update

Dear Mr. Stephens:

We appreciate your taking the time to meet with us last week to discuss the ongoing review of the EKAPCD NOx RACT rule for Portland Cement kilns. As we discussed, our current NOx limit is 3.4 pounds per ton of clinker, averaged over 30 days. It stems from a BACT review in 2000-2001. We currently have average emissions below 3 pounds per ton but we are occasionally very close to the 3.4 limit on a 30 day average, due to the inherent variations in NOx emissions due to kiln inputs, ambient conditions and operating rates. We will not be able to meet a tighter limit without some change to our NOx controls.

We have looked into reducing our emissions further with a change in burner design. We noted that the current burners have low-NOx features. Our parent company has kilns in Europe that have installed the latest in low NOx burner technology and not found any significant improvements in NOx emissions over what we have.

We know that some kilns have Selective Non-Catalytic Reduction (SNCR). We asked our consultant, John Holmes of AEMS, LLC to look into the cost of SNCR. At our meeting with you, John presented a cost analysis based on work EPA did in support of a review of the NSPS for Portland Cement kilns. John's analysis indicated that the installation of SNCR could cost over $3,000,000 and the operating cost would be over $500,000 per year. These represent a significant financial burden.

You indicated that EPA had asked that the District consider lowering the limit to 2.8 pounds per ton which they indicated is the RACT limit in Texas. We said that we thought that was surprisingly stringent and indicated that we would look into how Texas arrived at that number.

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EASTERN KERN AIR
POLLUTION CONTROL DIST.

Our review of the Texas regulation, which I have attached, did show that the limit for units such as ours is 2.8 pounds per ton on a 30 day average. However, importantly the rule also says: "Each preheater or precalciner kiln for which either a low-NOx burner or a low-NO x precalciner is installed and operated during kiln operation is not required to meet the NOx emission specifications of subsection (a) of this section."

The subsection (a) specification is the 2.8 limit. As you can see, it is Texas' expectation that kilns will install low-NOx burners and need only do that if they are not then able to meet the 2.8 figure. We have low-NOx burners and could comply with the Texas RACT rule given this important qualification of the 2.8 limit.

In summary, our current NOx limit is 3.4 which comes from a BACT determination and it is substantially tighter than the current RACT limit of 6.4. Furthermore, we are not able to meet a limit less than 3.4 without installing SNCR which is costly both to install and to operate.

We see several options for revising the rule which will work for us. They include:

- Tightening the limit from 6.4 to 3.4.
- Tightening the limit to something less than 3.4 but keeping the provision in the current EKAPCD rule that allows sources with BACT limits set after 1990, such as ours, to meet the BACT limit instead.
- Tightening the limit to 2.8 to match Texas but also include the Texas provision that allows one to have a low NOx burner in lieu of meeting that limit.

Again, thank you for seeking and considering our input on this matter.

Sincerely,

Olivia Fisher

Olivia Fisher
Environmental Manager

LEHIGH
HEIDELBERGCEMENT Group

Lehigh Southwest Cement Company
13573 E. Tehachapi Blvd.
Tehachapi, CA 93561
Phone (661) 822-4445
Fax (661) 822-1278

August 21, 2017

Mr. Glen Stephens
East Kern Air Pollution Control District
2700 "M" Street, Suite 302
Bakersfield, CA 93301-2370

Re: EKAPCD NOx RACT Response

Dear Mr. Stephens:

Lehigh Southwest Cement (plant) hereby submits this follow-up letter in response to our meeting with the Eastern Kern Air Pollution Control District (EKAPCD) on August 10, 2017 at 10:30 am. We appreciate you and your team taking the time to come discuss the NOx RACT rule and welcoming our input.

During the meeting, your team indicated the Environmental Protection Agency (EPA) had asked the District to lower the NOx RACT limit from 6.4 to 2.8 pounds per ton (of clinker) by referring EKAPCD to the Texas RACT rule. Currently, our NOx limits are 281.33 pounds per hour; 6,752 pounds per day; and 1,232.24 tons per year. Please note that we do not have a "pounds per ton" limit. Our review of historic data shows that a NOx limit of 3 pounds per ton or above based on a rolling 30-day average will be suitable for the plant operation. However, if EKAPCD would require a more stringent limit of 2.8 pound per ton, this would present a huge financial burden to the plant.

In addition, it is important to note that our current kiln main burner is a "low-NOx burner", with this setup there cannot be any further improvement in the NOx emission control. Therefore, having a limit below 3 pounds per ton will require us to install Selective Non-Catalytic Reduction (SNCR). According to an EPA report, "NOx Control Technologies for the Cement Industry", the installation and annualized operating cost of SNCR could cost well over $3,000,000 and $500,000 respectively. This represents a significant financial responsibility for the plant.

Another option would be to add a provision similar to the one in the Texas RACT rule §117.3110(d) which states: "Each preheater or precalciner kiln for which either a low-NO_X burner or a low-NO_X precalciner is installed and operated during kiln operation is not required to meet the NO_X emission specifications of subsection (a) of this section". Hence, we would be willing to propose reducing the limit from 6.4 to 2.8 pounds per ton, as long as EKAPCD would include a provision that exempts low-NOx kiln burner kilns (like our plant) from the stringent 2.8 pounds per ton limit. As your team proposed in the

meeting, we will welcome the idea of setting 3.4 pounds per short ton of clinker (30-day rolling average) limit as part of the provision for low-NOx Burner kilns.

Once again, we appreciate your willingness to coordinate with us in finding a workable solution for both groups.

If you need any additional information or have any questions, please feel free to contact me via email: Gideon.sarpong@lehighhanson.com; or 661-822-4445 ext 202)

Sincerely,

Gideon Sarpong
Environmental Manager
(661) 822-4445 Extension 202
Gideon.Sarpong@LehighHanson.com

Enclosures
Texas NOx RACT Rule for Cement Kilns

cc: Rick Sterner, HTC.
Craig Mifflin, Lehigh Hanson
Jean Claude Royer, Lehigh Hanson

APPENDIX D

AMENDED RULE 425.3

PORTLAND CEMENT KILNS
(OXIDES OF NITROGEN)

SNCR & SCR COST-EFFECTIVENESS ANALYSIS

Appendix D – Cost-Effectiveness

The District assessed the cost of installation and use of Selective Non-Catalytic Reduction (SNCR) and Selective Catalytic Reduction (SCR) on existing Portland cement kilns. These NOx control technologies were evaluated against an example kiln meeting the current limit of 6.4 pounds of NOx per ton of clinker produced (see D-2). SNCR was estimated to reduce a 1980s era kiln to an emissions limit of approximately 1.71 pounds per ton (from 3.41), however, the cost was extremely high. Installing SNCR or SCR on an existing cement kiln is not economically feasible; therefore, not considered RACT. RACT is defined as the lowest emissions limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility (44 FR 53762, September 17, 1979).

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SNCR and SCR Cost-Effectiveness Analysis	*Kiln Nox Control Examples*				NOT Cost-Effective	
	SNCR	SCR	SNCR	SCR	SNCR	SCR
	Holcim Example	**Holcim Example**	**TXI Example**	**TXI Example**	**6.4 Kiln**	**6.4 Kiln**
Project Term (years)	15	15	15	15	15	15
Control Capital Cost (2006 $)	*$ 2,300,000*	*$ 7,500,000*	*$ 2,300,000*	*$ 8,400,000*	*$ 4,316,716*	*$ 14,076,246*
Control O&M (2006 $)	*$ 1,100,000*	*$ 2,400,000*	*$ 1,000,000*	*$ 2,200,000*	*$ 2,064,516*	*$ 4,504,399*
Costs						
Equivalent Project Capital Cost (2017 $)	$ 3,183,738	$ 10,381,754	$ 3,183,738	$ 11,627,565	$ 5,975,344	$ 19,484,817
Equivalent Project O&M (2017 $)	$ 1,522,657	$ 3,322,161	$ 1,384,234	$ 3,045,315	$ 2,857,773	$ 6,235,141
Capital Recovery Factor (15@10%)	0.1315	0.1315	0.1315	0.1315	0.1315	0.1315
Discounted Cash Flow Factor (15@4%)	11.118	11.118	11.118	11.118	11.118	11.118
DCF O&M Costs (2017 $)	$ 16,928,903	$ 36,935,789	$ 15,389,912	$ 33,857,807	$ 31,772,722	$ 69,322,302
NOx Emissions						
Control Efficiency	50%	85%	35%	80%	50%	85%
Uncontrolled Rate (lb/ton of clinker)	3.41	3.41	1.36	1.36	6.40	6.40
Controlled Rate (lb/ton of clinker)	1.71	0.51	0.88	0.27	3.20	0.96
Uncontrolled Emissions (tpy)	2222	2222	1710	1710	2222	2222
Controlled Emissions (tpy)	1111.0	333.3	1111.5	342.0	1333.2	1333.2
Reduction (percent)	50.0%	85.0%	35.0%	80.0%	40.0%	40.0%
Reduction (tons/yr)	1111.0	1888.7	598.5	1368.0	888.8	888.8
Cost Effectiveness						
Average (DCF Method)						
NOx Cost Effectiveness ($/ton)	$ 1,207	$ 1,670	$ 2,069	$ 2,217	$ 2,831	$ 6,661
Average (CRF Method)						
NOx Cost Effectiveness ($/ton)	$ 1,747	$ 2,482	$ 3,012	$ 3,344	$ 4,099	$ 9,897
Average (Combined CRF and DCF)						
NOx Cost Effectiveness ($/ton)	$ 1,393	$ 2,026	$ 2,414	$ 2,767	$ 3,267	$ 8,082

Notes:
Holcim & TXI control examples taken from "Assessment of Nox Emissions Reduction Strategies for Cement Kilns - Ellis County" ERG, July 14, 2006
SNCR, SCR Upgrade costs estimated for 6.4 kiln using ratio of Nox rate (6.4 to 3.41)
Annual inflation rate of 3% used to adjust to current year (2017 dollars)
Real interest rate of 4% at 15 years used for Discounted Cash Flow Factor (SCAQMD method)
Capital cost annualized by multiplying by CRF based on 15 years at 10%