TAB A

REGULATORY ANALYSIS REPORT – REVISED

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Prepared for:

Carolinas Cement Company LLC
Castle Hayne, North Carolina Plant

PN 050020.0051

Prepared by:

Environmental Quality Management, Inc.
Cedar Terrace Office Park, Suite 250
3325 Durham-Chapel Hill Boulevard
Durham, North Carolina 27707

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SECTION 1

PROJECT DESCRIPTION

Carolinas Cement Company LLC (CCC) is proposing to construct a modern Portland cement manufacturing facility at the site of an existing cement storage terminal operated by Roanoke Cement Company near Castle Hayne, North Carolina. The plant will include a multi-stage preheater-precalciner kiln with an in-line raw mill, coal mill, alkali bypass and clinker cooler venting through the main stack. Production is expected to be 6000 tons per day (tons/day) and 2,190,000 tons per year (tons/yr) of clinker and 2,407,000 tons/yr of cement. Fuels may include coal, petroleum coke, fuel oil, and natural gas. The raw materials for clinker production may include limestone/marl, clay, quarry spoils, bauxite, slag, fly ash/bottom ash, sand, and/or mill scale. Synthetic gypsum or natural gypsum and limestone will be milled with the clinker to produce cement. Associated processes will include mining, crushing, blending, grinding, material handling, storage for raw materials, fuels, clinker, and finished cement, and cement packing and bulk loadout. Cement will be shipped by rail and truck. The project will also include a diesel emergency generator set.

The Castle Hayne area is in attainment with all the National Ambient Air Quality Standards (NAAQS). The existing Roanoke Cement terminal is considered a minor source under North Carolina's Prevention Significant Deterioration (PSD) rules at 15A NCAC 02D.0530 for all PSD pollutants. A modification to a PSD minor source is subject to PSD if the modification itself exceeds the major source threshold for any PSD regulated pollutant. In the case of Portland cement plants, the major source threshold is 100 tons/yr, which includes all quantifiable fugitive emissions.

As shown in Table 1-1, the emissions from the project of particulate matter (PM), PM less than 10 microns in diameter (PM_{10}), $PM_{2.5}$ sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOC) will exceed the PSD major source emission rate.

TABLE 1-1. COMPARISON OF POTENTIAL ANNUAL EMISSIONS INCREASE FROM THE PROJECT TO THE PSD MAJOR SOURCE EMISSION RATES

Pollutant	Future Potential Emissions (tons/yr)	PSD Major Source Emission Rate (tons/year)	Review Required? (Yes/No)
NO_x	1,645	100	Yes
PM (TSP)	333	100	Yes
PM_{10}	239	100	Yes
$PM_{2.5}$	160	100	Yes
SO_2	438	100	Yes
CO	3,068	100	Yes
VOCs	175	100	Yes
Lead	0.09	100	No
Fluorides	1.0	100	No

Note: PM, PM_{10}, and $PM_{2.5}$ include estimated condensables.

SECTION 2

APPLICABLE REGULATIONS

2.1 New Source Performance Standards (NSPS) – 40 CFR Part 60

New or modified equipment used for processing of limestone [crushers, screens, conveyor transfer points (except to a pile), and storage bins] from the quarry up to the storage facility just prior to the raw mill is subject to NSPS Subpart OOO (Nonmetallic Mineral Processing Plants). Truck dumping to a hopper is exempt. On April 28, 2009, EPA promulgated changes to Subpart OOO which apply to affected sources commencing construction after April 22, 2008. Fugitive emissions from the crushers are limited to 12 percent opacity and 7 percent from other affected sources. The new quarry crushers will be subject to the 12 percent opacity limit).

The coal handling and crushing equipment is subject to NSPS Subpart Y (Coal Preparation Plants). On October 8, 2009, EPA promulgated changes to Subpart Y which apply to these affected facilities. The baghouses controlling affected sources are limited to 0.01 gr/dscf and the opacity from affected sources is limited to 10 percent. The coal mill will be vented through the main stack, which is subject to requirements as specified in Section 2.2.

On September 9, 2010, EPA promulgated major changes to the NSPS for Portland cement (PC) plants (Subpart F) which apply to this project. Previously, the PC NSPS regulated only PM. The final NSPS changes reduce the PM emission limits for the new kiln and clinker cooler to 0.0145 lb/ton clinker based on the formula at 40 CFR 63.1343(b)(2). In addition, the new kiln is subject to new limits for NO_x and SO_2 emissions of 1.5 and 0.4 lb/ton clinker, respectively. The new NSPS limits for the kiln and clinker cooler are all 30-day rolling averages as measured by continuous emission monitoring systems (CEMS). All other stack and fugitive process sources, except those subject to the NSPS under Subparts Y and OOO are subject to an opacity limit of 10 percent.

There will be no new storage tanks that would be subject to NSPS Subpart Kb.

On July 11, 2006, EPA promulgated final NSPS for stationary compression ignition (diesel) engines constructed or ordered after July 11, 2005 (40 CFR Part 60, Subpart IIII). The rules limit emissions of NO_x, PM, SO_2, CO, and HC to the same levels required by EPA's nonroad diesel engine regulations. The rules take effect in three increasingly stringent stages:

1. Transition period for engines built after July 11, 2005 and before model year 2007. Generally, owners or operators will purchase a certified nonroad engine for stationary use.

2. Beginning in model year 2007, owners must purchase certified engines meeting more stringent emission limits.

3. Beginning with 2011 model year engines, add-on controls will be required to achieve the emission limits for non-emergency engines.

The requirements vary depending on the size and designated use (e.g., emergency versus non-emergency engines, fire pump engines, etc.). The main burden for meeting the emission limits will fall on the manufacturers, but owners/operators have monitoring, recordkeeping, and reporting requirements, including use of specified low sulfur fuel. The following table summarizes the Subpart IIII emission limits for the emergency generator.

NEW EMERGENCY DIESEL GENERATOR EMISSION REQUIREMENTS

Pollutant	Units	Emission Standards NSPS Subpart IIII (New Requirements)*
NO_x	g/kW-hr	-
NMHC	g/kW-hr	-
NMHC + NO_x	g/kW-hr	6.4
CO	g/kW-hr	3.5
PM	g/kW-hr	0.20
S(6/1/10)	ppm	15

Applicable Requirements

1. 40 CFR 60.4200 et al: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.
2. 40 CFR 89.112 Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards.
3. 40 CFR 80.510 Standards and marker requirements for NRLM diesel fuel.

*Standards for 2007 model year and later emergency diesel engines with displacement < 30 liters/cylinder and > 560 kW rated power.

Note that for this application, the emergency generator will be vented through the main kiln stack. The kiln emission limits will be maintained when the emergency generator and kiln are both operating (i.e., during engine testing events). During emergency events the kiln fuel feed will be cut off when the generator is operating.

2.2 National Emission Standards for Hazardous Air Pollutants (NESHAP) – 40 CFR Part 63

On September 9, 2010, the EPA promulgated major revisions to the NESHAP for Portland cement plants (Subpart LLL). For new cement kilns, the final revisions substantially tightened the emission limits for mercury and PM. The total hydrocarbons (THC) limit was increased slightly. New limits for hydrogen chloride (HCl) were set for both new and existing kilns at major HAP sources. HCl is not limited at area sources. CEMS are required for PM, mercury and THC. See Section 3.1 for pollutant-specific limits for the kiln system. For the proposed CCC facility, there is no separate raw material dryer subject to the total hydrocarbon standard. CCC must be in compliance with applicable limits upon startup of the new equipment. CCC stipulates that it will be an area source as defined under 40 CFR Part 63 (i.e., potential emissions will not exceed 10 tons/yr for any single HAP or 25 tons/yr for total HAPs) and has proposed permit limits (see Sections 3.1.10 and 3.1.11 below) to ensure that CCC will remain an area source of HAPs.

As required by 40 CFR 63.1347(a), CCC must submit to the Department of Environment and Natural Resources (DENR) a written operation and maintenance (O&M) plan for the kiln system as part of the application for a part 70 (Title V) permit. Among other things, the plan provides procedures for proper O&M of the emission units and their control devices and procedures used in inspecting and monitoring the emission units and control equipment.

The new emergency diesel generator set is exempt from Part 63, Subpart ZZZZ [Stationary Reciprocating Internal Combustion Engines (RICE)], except for the initial notification requirements, pursuant to § 63.6590(b)(1).

2.3 Compliance Assurance Monitoring (CAM)

The CAM rules at 40 CFR Part 64 apply to air pollution emission units that meet all the following criteria:

1. The unit is located at a plant that is subject to the Title V operating permit program.

2. The unit is subject to an emission limitation or standard under a State Implementation Plan (SIP) or EPA rule such as an NSPS.

3. The unit uses a control device to achieve compliance with the emission limitation or standard. A control device does not include passive control measures such as low-sulfur fuels, low-NO_x burners, or good operating practices.

4. The unit has potential emissions before the control device of the regulated pollutant(s) that are 100 percent or more of the major source thresholds, as defined under the Title V program.

There are several exemptions to CAM applicability, including the following types of emission standards or limitations:

a) Standards proposed by EPA after November 15, 1990 [e.g., the NESHAP Subpart LLL and revised NSPS Subparts F, Y, and OOO emission limits].

b) Standards subject to a continuous compliance determination method (CCDM).

Per 40 CFR 64.1, CCDM means a method, specified by the applicable standard or an applicable permit condition, which:

1. Is used to determine compliance with an emission limitation or standard on a continuous basis, consistent with the averaging period established for the emission limitation or standard.

2. Provides data either in units of the standard or correlated directly with the compliance limit.

For those emission limits requested in Section 3 below that are not covered by the exemptions listed above, CCC will make an applicability determination and submit a proposed CAM plan as part of its application for a Title V permit at a later date as specified by DENR.

2.4 New Source Review (NSR)

As noted above, the project will trigger the PSD rules under 15A NCAC 020.0530, which requires the following:

1. A Best Available Control Technology (BACT) analysis for each pollutant that exceeds the PSD major source thresholds (PM, PM_{10}, $PM_{2.5}$, SO_2, CO, NO_x, and VOC).

2. An analysis of impacts on Federal Class I areas, including Class I PSD increments and air quality related values.

3. A demonstration of compliance with the Ambient Air Quality Standards (AAQS) (Section .0400) and Class II PSD increments, as applicable.

4. An additional impacts analysis (potential impacts on soils, vegetation, visibility, and secondary growth).

In addition, the project will trigger the toxic air pollutant (TAP) procedures for new facilities under 15A NCAC 2Q.0700. These procedures require that a new facility which exceeds certain emission rates specified at 2Q.0711 must demonstrate compliance with the acceptable ambient levels (AAL's) set forth at 15A NCAC 02D.1104. Emission factors for most TAP's are highly uncertain and site-specific, depending on the raw material mix, kiln, design, and operating conditions. Nonetheless, emission estimates have been made using available emission factors and AAL compliance demonstrations have made for the applicable TAPs.

These analyses are contained in separate reports attached to the application.

2.5 North Carolina's Emission Limiting Rules

Several provisions of North Carolina's air rules are applicable to the proposed CCC plant, although they are less stringent than the NSPS, NESHAP, or BACT requirements. Applicable provisions in 15A NCAC 2D include:

Section 0510 – Particulates from Sand, Gravel, or Crushed Stone Operations
Section 0513 – Particulates from Portland Cement Plants
Section 0515 – Particulates from Miscellaneous Industrial Processes
Section 0516 – Sulfur Dioxide from Combustion Sources
Section 0540 – Particulates from Fugitive Dust Emission Sources

Section 0510 requires a) measures to limit PM emissions so as to attain the TSP and PM_{10} NAAQS beyond the property line, b) fugitive emissions must meet Section 0540, and c) crushers must be controlled by wet suppression, and conveyors, screens and transfer points must be controlled so as to meet opacity standards in Sections 0521 or 0524 (NSPS). The NAAQS modeling demonstration under the PSD rules meets the requirements under Item a; compliance

with Section 0540 is discussed below; materials processed by the crusher will generally be saturated with moisture; and the sources under Item c) must meet the opacity standards under NSPS Subpart OOO.

Section 0513 requires that PM from the kiln be controlled by at least 99.7 percent and that the emission rate not exceed 0.327 lb/barrel of cement. The proposed BACT for the kiln system and clinker cooler is baghouse controls with control efficiency exceeding 99.9 percent and an emission limit of 0.0145 lb/ton of clinker (equivalent to 0.002 lb/barrel of cement). Section 0513 also requires that PM from other stacks or vents not exceed the process weight limits in Section 0515. The proposed BACT for other sources is baghouse controls meeting a limit of 0.01 gr/scf, which results in much lower emissions than the limits in Section 0515.

Section 0516 requires that SO_2 from fuel combustion sources not exceed 2.3 lb/million Btu heat input. The proposed BACT is a wet scrubber and an emission limit of 0.4 lb/ton of clinker, 30 day rolling average. This limit is equivalent to 0.15 lb/million Btu.

Section 0540 requires that fugitive dust emissions not cause or contribute to substantive complaints, excessive fugitive dust emissions at the property boundary, or NAAQS violations. BACT will be applied for fugitive dust sources and NAAQS compliance, including fugitive dust sources, is demonstrated as part of this permit application. CCC will also develop a Fugitive Dust Control Plan to be submitted to DENR for approval within 60 days of normal plant operations.

SECTION 3

REQUESTED PERMIT LIMITS

The permit limits, including the regulatory basis and the associated testing and monitoring requirements, being requested by CCC are discussed below. Where there are multiple regulatory bases (e.g., BACT, NESHAPs, PSD increment compliance), the most restrictive limits that will ensure compliance with other applicable requirements are recommended. CCC requests elimination of multiple redundant forms of emission limits and throughput limits. The kiln emission limits below are applicable for all combinations of fuel to be burned. The emission limits proposed below for PM will ensure the application of BACT for PM_{10} and $PM_{2.5}$; thus, CCC requests that separate PM_{10} and $PM_{2.5}$ emission limits not be established.

Pursuant to current EPA guidance at 79 FR 20652 (April 25, 2007), CCC requests that the PM emission limits include filterable PM but not condensables. The current estimate of condensable PM emissions is highly uncertain based on an AP-42 emission factor for inorganic condensables and an estimated reduction due to wet scrubbing. Based on experience with cement kilns, condensable emissions are site-specific and variable. In addition, EPA has indicated that additional time is needed to implement a program to assess and improve available test methods for condensable PM.

3.1 Kiln/Raw Mill/Coal Mill/Alkali Bypass/Clinker Cooler Emission Limits

3.1.1 PM

Normal operation: 0.0145 lb/ton [per formula at 40 CFR 63.1343(b)(2)] 30-day rolling average, as determined by PM CEMS (revised NSPS and NESHAP).

Startup and shutdown: 0.0008 gr/dscf, 7-day rolling average.

3.1.2 Opacity

Not limited – see 40 CFR 60.62(a)(2).

3.1.3 CO

2.80 lb/ton of clinker, 30-day rolling average, as measured using a CERM meeting Performance Specification (PS) 4B (BACT).

3.1.4 VOC (non-methane)

0.16 lb/ton of clinker, 30-day rolling average, as measured by CERM (BACT).

3.1.5 SO_2

0.4 lb/ton of clinker, 30-day rolling average as measured using a CERM meeting PS 2 (revised NSPS and BACT).

3.1.6 NO_x

1.5 lb/ton of clinker, 30-day rolling average, as measured using a CERM meeting PS 2 (revised NSPS and BACT).

3.1.7 Dioxins/Furans (all conditions)

0.2 ng/dscm (TEQ) corrected to 7 percent oxygen as measured by Method 23 initially and every 30 months (NESHAP). If the average temperature during the test does not exceed 204°C (400°F), the limit is 0.4 ng/dscm.

3.1.8 Mercury

Normal operation: 21 lb/ton clinker, 30-day rolling average, as measured by CEM meeting PS 12A or 12B.

Start up and shutdown: 4 µg/dscm, 7-day rolling average (revised NESHAP).

3.1.9 THC

Normal operation: THC: 24 ppmvd, 30-day rolling average, as measured by CEM meeting PS8 or 9 ppmvd for total organic HAPs.

Start up and shutdown: Same as above except 7-day rolling average, measured by CEM (NESHAP).

3.1.10 HCl

9.5 tons/yr as determined by initial Method 320 or Method 321 compliance test.

3.1.11 Other HAPs

Less than 10 tons/yr for any single HAP and less than 25 tons/yr for total HAPs (including HCl).

An initial compliance test for HCl and organic HAPs using Method 320 or 321 on the main kiln stack (E44) will be conducted in accordance with §63.1352. The results of the test will be used to determine compliance with the HCl and HAP emission limits. The results will also be

used in an applicability determination to demonstrate that the plant is an area source as defined in §63.2.

3.1.12 TAP's

CCC has demonstrated compliance with the AALs for various TAPs and understands that State-only emission limits may be set for selected TAPs that exceed the toxic pollutant emission rates (TPERS) based on the maximum modeled emission and appropriate averaging periods.

3.2 Finish Mills and Miscellaneous Baghouses

3.2.1 PM

0.01 gr/scf (BACT) determined by implementation of 10 percent opacity limit (see below).

3.2.2 Opacity

Ten percent as determined by initial Method 9 test and CAM plan to be developed as part of the Title V permit.

3.3 Fugitive Emissions

Quarry crushers – 12 percent opacity. Conveyor transfer points subject to NSPS Subpart OOO – 7 percent. All other process fugitive sources – 10 percent opacity (BACT and Subpart OOO).

3.4 Diesel Emergency Generator Set

NSPS Subpart IIII limits as described in Section 2.2 above.

3.5 Throughput Limits

Throughput limits are needed to limit the potential to emit (PTE) for sources that are subject to lb/ton emission limits and for sources that are not effectively limited by the emission limits outlined above (e.g., fugitive process sources). Throughput limits are not needed for other miscellaneous sources. For example, the handling of cement is controlled by baghouses permitted at 0.01 gr/scf and 8760 h/yr. This defines the PTE for these sources and thus a cement throughput limit would not be necessary or appropriate. CCC requests a throughput limit of

2,190,000 tons/yr clinker, rolling 12-month sum. The clinker throughput limit effectively limits the throughput of all raw materials required for production, as well as the quantity of the cement that can be produced.

3.6 Fuel Limitations

Emissions of NO_x, SO_2, and CO will be monitored by CERM, and there is little relationship between the sulfur and nitrogen content of kiln/calciner fuels and resulting emissions (see BACT report). The clinker production limit effectively limits the total quantity of fuel required. Because of these reasons, CCC requests that no limits be set on the amount or quality of the fuels to be burned.

3.7 Operating Hour Assumptions

All sources are assumed to operate 24 hours per day, 365 days per year except for the following:

Emergency generator – 500 h/yr

Under EPA guidance, States can assume that the potential to emit (PTE) for emergency generators can be based on 500 h/yr. Thus, CCC requests that no operating hour limits be included in the permit.