BEST AVAILABLE CONTROL TECHNOLOGY (BACT) UPDATE TO AIR CONSTRUCTION PERMIT AC27-274892(A) FOR CONSTRUCTION OF A SECOND KILN

At
The Florida Crushed Stone Facility
10311 Cement Plant Road
Hernando County
Brooksville, Florida 34601

Prepared For:
Rinker
10311 Cement Plant Road
Hernando County
Brooksville, Florida 34601

Prepared By:
RTP Environmental Associates, Inc.
239 U.S. Highway 22 East
Green Brook, New Jersey 08812
(732) 968-9600

Professional Engineer Name: Paul E. Neil
Registration Number : PE0046918
RTP Environmental Associates, Inc.
7752 Fay Avenue, Suite C
LaJolla, CA 92037
Tel: 858-456-8020
Fax: 858-456-0127

Signature: Paul Neil
1-19-02

January, 2002

Rinker
MATERIALS™

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JAN 11 2002

BUREAU OF AIR REGULATION

January 10, 2002

Mr. Al Linero
Florida Department of Environmental Protection
Bureau of Air Regulation
111 South Magnolia, Suite 4
Tallahassee, FL 32301

Re: Florida Crushed Stone - kiln2 Permit AC27-274892 (A) and PSD-FL-227 (A)

Dear Mr. Linero:

As discussed previously with the Department, Rinker Materials is requesting an extension until January 30, 2005 of their permit to construct kiln2. At this time, after an extensive effort costing over $100,000, we have prepared updated BACT analyses that incorporate the latest data from the most recent 38 permits for plants operating in the United States. European experience is also discussed. Due to the short time before the expiration of the current permit, we are asking for a 6 month extension (or whatever is appropriate) to allow the Department to review and finalize the 3 year extension.

We are currently scheduled to meet with you at 1:30pm on January 15, 2002 at your offices to discuss this issue further. We appreciate your consideration and look forward to meeting with you at that time.

Should you have any questions prior to the meeting, please feel free to contact either Donald F. Elias of RTP Environmental Associates, Inc. at 732-968-9600 or Mike Vardeman at 305-229-2955.

Sincerely,

RINKER MATERIALS CORPORATION

J. Scott Benyon
Vice President

cc: M.Vardeman/ D. Elias / D. Dee / Project File: FCS4

RTP ENVIRONMENTAL ASSOCIATES INC.®

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239 U.S. Highway 22 East
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JAN 28 2002

BUREAU OF AIR REGULATION

Via Federal Express

January 25, 2002

Mr. Al Linero
Florida Department of Environmental Protection
Bureau of Air Regulation
111 South Magnolia, Suite 4
Tallahassee, FL 32301

Re: Florida Crushed Stone – Kiln #2 Permit AC27-274892 (A) and PSD-FL-227 (A)

Dear Mr. Linero:

I have enclosed a copy of the updated BACT analyses for the above referenced permit. As requested in our letter of January 10, 2002 and discussed in our meeting on January 15, 2002, it is our understanding that this submission begins an automatic extension of our current permit, and no further action is necessary on Rinker Materials part to continue the existing permit past the January 30, 2002 expiration date. If this is not the case, please notify either Mike Vardeman at 305-229-2955 or myself at the above telephone number as soon as possible.

We appreciate the Department's assistance in this matter. As you review the attached documents, should you have any questions please feel free to contact Mike Vardeman of Rinker Materials, Michael Hober or myself at RTP Environmental Associates, Inc.

Sincerely,

RTP ENVIRONMENTAL ASSOCIATES, INC.®

Donald F. Elias

Donald F. Elias
Principal

cc: G. Deangelo / M. Vardeman / D. Dee / M. Hober / S. Heath / Project File: FCS4

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Tel: 858-456-8020
Fax: 858-456-0127

Signature: Paul Neil
1-19-02

January, 2002

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1.0 INTRODUCTION

At the request of the Florida Department of Environmental Protection (FDEP), Rinker has prepared this update to the Best Available Control Technology (BACT) determinations for emissions from the Florida Crushed Stone (FCS) Unit II Kiln, currently under construction. This document contains a brief site and project description in this section. Section 2.0 presents permitted emission values for the FCS Unit II kiln. Section 3.0 presents the BACT update evaluations. Summary discussions and conclusions are presented in Section 4.0, while Section 5.0 contains a bibliography of references.

1.1 SITE AND PROJECT DESCRIPTION

The FCS facility is located on a 9,100 acre tract of property approximately 3.5 miles northwest of Brooksville, Hernando County, Florida. Currently operating on approximately 30 acres in the southwest section of this property are a nominal 600,000 ton per year (tpy) Portland Cement plant (FCS Unit I), a 125-megawatt (MW) coal-fired cogeneration power plant, and a lime plant. The lime plant has not operated for several years. Lime rock mining is also conducted on the property.

FCS originally proposed to construct a second cement kiln identical to Unit I, which incorporated a Gepol Tower Pre-heater system.[1] A permit to construct Unit II was issued on November 17, 1995.[2] This permit was later modified to allow construction of either an identical kiln to Unit I or to construct a pre-heater/pre-calciner kiln[3] and was issued on February 10, 1997.[4] A copy of this permit is included in Attachment I.

Rinker recently purchased the cement operations of FCS. The Florida Department of Environmental Protection (FDEP) has acknowledged that construction began on the Unit II kiln on July 23, 1998.

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[1] Application to Construct a Second 600,000 Ton Per Year Cement Kiln at the Florida Crushed Stone Company Facility in Brooksville, Florida, Prepared by RTP Environmental Associates, Inc., March 1995.

[2] Florida Department of Environmental Protection Air Permit AC-27-274892, Issued November 17, 1995.

[3] Proposed Modifications to Air Construction Permit AC-27-274892 to Construct a Second Cement Kiln at the Florida Crushed Stone Company Facility in Brooksville, Florida, Prepared by RTP Environmental Associates, Inc, September 6, 1996.

[4] Florida Department of Environmental Protection Air Permit AC-27-274892(A), Issued February 10, 1997.

At the request of FDEP, Rinker has prepared this BACT review update of previously approved air permit emission limits.

1.2 SUMMARY OF REPORT FINDINGS

Permits for 38 facilities were reviewed to prepare this BACT review and update. Most facilities had undergone modifications and upgrades within the last five years. Additional sources of information used to prepare this document include:

1) The BACT/RACT/LAER Clearinghouse;
2) USEPA-prepared documents and technology reviews;
3) Trade organizations and publications;
4) Recent permit actions;
5) Technical research papers and publications;
6) Correspondence with federal and state agencies; and
7) Correspondence with cement manufacturers.

Section 5.0 contains a bibliography of references.

The report findings are as follows:

1) Of the 38 facility permits reviewed, 17 permits contained proposed particulate (TSP and PM_{10}) emissions lower than those proposed in the FCS Unit II permit. It is expected that the particulate control equipment to be installed at the FCS facility will incorporate significant design margin to maintain emissions at or below 0.3 lbs/ton Clinker (CL) (one-hour average basis). Thus it is expected that the actual particulate emissions will be equivalent to the lower values identified in the other facility permits. Many of these values have yet to be demonstrated on a continuous basis. Thus, the current FCS particulate control technology and permit limit are determined to be BACT.

2) Of the 38 facility permits reviewed, four contained proposed SO_2 emissions lower than those proposed in the FCS Unit II permit. The lowest value is approximately 50% lower than the FCS Unit II emissions value. The raw materials utilized at the FCS facility are naturally low in sulfur content. FCS had proposed SO_2 absorption by the inherent scrubbing caused by the natural alkalinity of the kiln flue gases to a level of 0.23 lbs SO_2/ton CL as BACT. In order to further lower SO_2 emissions, it was determined that add-on control equipment would be necessary. An evaluation of the economic, energy,

and environmental impacts of installing an acid gas scrubber resulted in rejection of acid gas scrubbing as BACT. Therefore, BACT for SO_2 is the inherent scrubbing of the kiln flue gases, limiting SO_2 emissions to 0.23 lbs/ton CL.

3) Of the 38 facility permits reviewed, nine contain proposed CO emissions lower than those proposed in the FCS Unit II permit. Similarly, six of the 38 facility permits reviewed contain proposed VOC emissions lower than those proposed in the FCS Unit II permit. In general, the more restrictive permitted CO and VOC values were associated with correspondingly less restrictive NO_x emission values. Of the facilities with similarly low NO_x and CO/VOC emission limits, either the facility had not completed construction to demonstrate low emissions, or the facility incorporated a regenerative thermal oxidizer (RTO) to control CO/VOC emissions. Application of a RTO was evaluated for economic, energy, and environmental impacts and rejected as BACT. Good combustion practices (GCP) to limit CO to 2.0 lbs/ton CL and VOC to 0.085 lbs/ton CL is determined to be BACT.

4) Of the 38 facility permits reviewed, six contain proposed NO_x emissions lower than those proposed in the FCS Unit II permit. In four of the six permits, substantially higher CO and VOC emissions are proposed with the lower NO_x values, or no CO or VOC emissions are proposed. With the other two facilities, one incorporates a RTO to offset higher CO and VOC emissions for lower NO_x and the other facility is recently submitted an application to increase permitted NOx emissions equivalent to the FCS limit. In addition, five of the six facilities are allowed to achieve the lower NOx level as an annual average, rather than the more restrictive 24-hour average FCS has. Selective Non-Catalytic Reduction (SNCR) was evaluated and rejected as BACT based on economic, energy, and environmental impacts. Good combustion practices and multi-stage combustion to achieve a NO_x emission limit of 2.8 lbs/ton CL is determined to be BACT.

2.0 BACT APPLICABLE EMISSIONS ESTIMATES

Operation of the Unit II cement kiln will result in the emission of a number of pollutants. Only those pollutants emitted above Prevention of Significant Deterioration (PSD) threshold levels must be considered for BACT review. In the case of Unit II, five pollutants are projected to be emitted above threshold levels. These are sulfur dioxide (SO_2), total suspended particulates (TSP), particulate matter smaller than ten microns (PM_{10}), carbon monoxide (CO), and nitrogen oxides (NO_x). Thus, these must be addressed in the BACT review update. Rinker will also review VOC emissions, as requested by FDEP.

2.1 FACILITY BACT EMISSION LIMITS

Table 1 provides the permitted BACT emission levels for the PSD significant pollutants as excerpted from Appendix BD of the existing facility Unit II permit. Projected emissions are provided in both a pounds per ton clinker (lbs/ton CL) and a lbs/ton dry kiln feed (lbs/ton KF) basis.

2.2 EMISSIONS CONTROLS

Control of emissions from the operation of the Unit II kiln will be achieved by three means:

1) High temperature combustion in the cement kiln;
2) Inherent Scrubbing by the alkaline content of the flue gases; and
3) Effective operation of the fabric filter (FF) particulate collection system.

Particulate matter (TSP and PM_{10}) consisting of combustion reaction products, cement materials, and fly ash will be controlled by two reverse-air fiberglass fabric filter baghouses (main system and by-pass system). These fabric filter baghouses are designed to achieve a greater than 99% control efficiency (by weight) of particulate matter from the flue gas.

SO_2 is an acid gas formed as a part of the oxidation reactions in the combustion zone of the pre-heater/pre-calciner kiln. Sulfur contained in the fuel and in the raw materials for cement is oxidized in the high temperature regions of the combustion zone to form sulfur dioxide and other sulfur-based acid gas precursors. The excess heat contained in the combustion flue gases from the cement plant

TABLE 1

PROPOSED BACT EMISSION LEVELS
MAIN STACK

POLLUTANT	BACT EMISSION LIMIT	
	lbs/ton CL	lbs/ton dry feed
PM/PM_{10} (kiln)	0.3	0.20
SO_2	0.23	0.15
NO_x*	2.8	1.83
CO	2.0	1.307
VOC**	0.085	0.056

NOTES: *FCS has up to 18 months after start-up of commercial operation to achieve this standard.
**VOC emissions are not PSD significant to BACT. Proposed emissions on a lbs/ton CL and lbs/ton dry feed are provided for completeness.

lbs/ton CL = pounds per ton cement clinker
lbs/ton dry feed = pounds per ton dry kiln feed

Source: Appendix BD of existing facility Unit II permitted dated February 6, 1997; Permit Number AC-27-274892(A).

are utilized to condition raw material feedstocks to the kiln that are alkaline in nature. These alkaline components are also present in the combustion flue gases. This natural alkalinity absorbs ("scrubs") and removes acid gas constituents. Raw materials utilized at the FCS facility are also comparatively low in sulfur content.

NO_x formation during the combustion process is due to the high temperature oxidation of the atmospheric nitrogen (thermal NO_x) and oxidation of fuel-bound nitrogen (fuel NO_x). Thermal NO_x is formed at combustion temperatures greater than 1,800 degrees Fahrenheit (°F). The higher cement kiln operational temperatures have potential to produce significant NO_x emissions. The pre-heater/pre-calciner kiln design has shown the ability to produce lower emissions in comparison to other kiln designs, primarily through fuel and heat efficiency. This design also allows the use of staged combustion in the pre-calciner section of the pyro-processing system that has been shown to reduce overall NO_x emissions.

Control of combustion-related pollutants, such as CO and VOC, will result from the high temperature combustion of the kiln. Temperatures ranging from 2,500°F to 3,000°F are required to produce cement clinker, and in so doing, ensure the breakdown (oxidation) of VOC as well as carbon monoxide (CO) into carbon dioxide (CO_2) and water (H_2O).

Based on available information, most modern American cement kiln facilities use proper equipment design and proper combustion practices to control combustion-related pollutants and all use an electrostatic precipitator (ESP) or FF to control particulate matter emissions. These facilities met existing requirements for Best Available Control technology (BACT) at the time of their installation. Several facilities are known to incorporate acid gas controls and one of those includes a RTO for CO/VOC control. No operating U.S. facilities are known to incorporate post-combustion NO_x controls at this time on a full-scale operational basis.

In summary, control of emissions from the proposed cement kiln will be achieved by combustion control for CO, organics, and NO_x, inherent scrubbing of the flue gas and raw materials for SO_x and other acid gases; and a FF for particulate matter.

3.0 CONTROL TECHNOLOGY UPDATE REVIEW

Rinker is in the process of constructing a pre-heater/pre-calciner kiln, as described in the current permit for the Florida Crushed Stone Company (FCS) Unit II kiln [Permit Number AC-27-274892(A)]. No significant changes to permitted emission levels or operating capacity are proposed. The kiln design was prepared and supplied by Krupp-Polysius Corporation. This control technology update compares available control strategies and more recently permitted facilities' emission limits with those permitted for the Rinker Brooksville facility.

3.1 PROCESS DESCRIPTION

The FCS Unit II kiln will incorporate a dry process pre-heater/pre-calciner system. Pre-heater/pre-calciner kiln designs have been shown to be the most fuel efficient systems per unit of cement clinker produced, typically resulting in lower pollutant emissions per unit of production.

The pre-heater/pre-calciner kiln system utilizes a second burner to carry out calcination in a separate vessel situated between the pre-heater sections and the kiln. The pre-calciner utilizes pre-heated combustion air drawn from the clinker cooler and kiln exit gases and burns up to 40 percent or more of the total kiln thermal energy requirement. Coal and natural gas supplemented with tires and/or tire-derived fuel for normal operations and natural gas, fuel oil, and on-specification used oil for start-up operations are permitted for use in the kiln and pre-calciner. The raw material feed is calcined almost 95% in the calciner, and the gases continue their upward (countercurrent to the raw material flow) movement through successive cyclone pre-heater stages in the same manner as in an ordinary pre-heater system. The addition of the pre-calciner allows the use of smaller dimension kilns since the better heat transfer and heat utilization reduces the time necessary to form clinker in the rotary kiln. Also, with less energy input to the rotary kiln, the energy penalty for bypass of kiln exit gases is reduced. Both the kiln and the pre-calciner will utilize indirect-fired burners which will further improve thermal efficiency and reduce the amount of fuel combusted per ton of clinker produced. Design parameters to reduce fuel combusted per ton of clinker produced has the secondary benefit of reducing the amount of pollutants generated per ton of clinker produced.

The FCS pyro-processing system will incorporate a cylindrical drum "shaft dryer" to provide an additional heat source to dry raw materials upstream of the pre-heater/pre-calciner. This shaft dryer will be fired with permit-allowed fuel oil. The FCS system will also incorporate a bypass system, which removes volatile constituents that might condense and cause scaling, to remove up to 15% of the air from the base of the pre-calciner. The bypass exhaust will be vented through a separate baghouse and then exhausted to the main Unit II stack. Combustion gases from the rotary kiln, pre-calciner, and pre-heaters will exhaust to a new facility baghouse prior to the main Unit II stack.

3.2 RECENT BACT AND "NON-BACT" ESTABLISHED PERMIT LIMITS

Table 2 presents a list of 38 cement production facilities identified as currently undergoing, or having recently undergone permitting changes to their operations. In most cases, older facilities are being decommissioned or updated by adding calciners, and creditable emissions from the old facilities in conjunction with lower emission rates are being used to "net-out" the new construction from Prevention of Significant Deterioration (PSD) review. Thus, many sources of information were consulted to compile this list, including:

1) The RACT/BACT/LAER Clearinghouse (RBLC);
2) Trade organizations and publications;
3) Recent permit actions;
4) Technical research papers and publications;
5) Correspondence with the Florida Department of Environmental Protection and other state agencies; and
6) Correspondence with cement manufacturers.

As best as could be done, actual facility permits were obtained to verify permit emission limits. However, in several cases, formal Freedom of Information Act requests were required by state and federal agencies. This BACT update incorporates information received to date. Specific permit sections are included in Attachment II.

Table 3 provides a comparison of the range of permitted emission limits for the facilities listed in Table 2 with those currently in force for the FCS facility Unit II. The bulk of the facilities have emissions information calculable to a lbs/ton CL emissions estimate. Several facilities are only listed in a pounds per ton dry kiln feed (lbs/ton KF) format. Thus, both are listed, but lbs/ton KF are listed for those facilities for which a lbs/ton CL value could not be calculated. Upon review of the comparison, FCS permitted values are at the low end of each range. However, a number of facilities have been permitted with numerical emission levels lower than the FCS Unit II. This can be attributed to the unusually high number of cement kiln construction and modification projects proposed and undertaken in the past three years.

TABLE 2
SUMMARY OF RECENT PORTLAND CEMENT FACILITY AIR PERMITS USED IN UPDATED BACT REVIEW

Company Name & Location	Permit Date	Source Operation	PM Limit	NO_x Limit	SO_2 Limit	CO Limit	VOC Limit	Control Device	Comments
Florida Crushed Stone Unit II [Brooksville, FL]	02/10/1997	104.2 tph CL	0.306 lb/ton CL	2.80 lb/ ton CL	0.23 lb/ ton CL	2.00 lb/ ton CL	0.085 lb/ ton CL		Facility Not Applicable to BACT for VOC
		159.4 tph KF	0.200 lb/ton KF	1.83 lb/ton KF	0.15 lb/ton KF	1.307 lb/ton KF	0.056 lb/ton KF		Permit Specified Emissions Per Ton Kiln Feed
Blue Circle [Calera, AL]	10/25/2000	48 tph CL	0.30 lb/ ton CL	6.00 lb/ ton CL	10.00 lb/ ton CL	0.21 lb/ ton CL	0.027 lb/ ton CL	Bag	Title V Permit Rates for Kiln 3 and Kiln 4
Arizona Portland Cement [Rillito, AZ]	08/07/1998	2,300,000 tpy CL	0.30 lb/ ton KF [1]	4.473 lb/ ton CL	6.00 lb/ ton KF	4.408 lb/ ton CL	NLE	Bag	Significant Revision #: 1000547
Phoenix Cement Co. [Clarkdale, AZ]	08/28/2000	185,610 tpy KF First Year	0.30 lb/ ton KF	1.91 lb/ ton KF [2]	0.31 lb/ ton KF [2]	0.256 lb/ ton KF [2]	NLE	Bag	Significant Revision #: 1001001
California Portland Cement [Mojave, CA]	12/31/2000	106.3 tph KF [3]	0.30 lb/ ton KF	8.043 lb/ ton KF	5.795 lb/ ton KF	1.726 lb/ ton KF	0.173 lb/ ton KF	Bag	Permit to Operate #: 1003026M
Calavaras Cement Co. [Tehachapi, CA]	10/31/2000	59.67 tph KF [3]	0.30 lb/ ton KF	4.72 lb/ ton KF	4.95 lb/ ton KF	15.08 lb/ ton KF	0.76 lb/ ton KF	Bag	Permit to Operate #: 1147017D
National Cement Co. [Lebec, CA]	10/31/2000	3,400 tpd CL	0.30 lb/ton KF	3.4 lb/ton CL	0.380 lb/ton CL	2.711 lb/ton CL	0.071 lb/ton CL	Bag	Permit to Operate #: 1128004R
RMC Pacific-Davenport [Santa Cruz, CA]	07/06/2000	200 tph KF	0.30 lb/ ton KF	2.5 lb/ ton CL [4]	1.28 lb/ton KF	NLE	NLE		Permit to Operate #: 10171
Southdown (CEMEX) [Victorville, CA]	07/26/2000	208.3 tph CL	0.14 lb/ ton CL	2.80 lb/ ton CL	0.35 lb/ ton CL	NLE [5]	0.12 lb/ ton CL	Bag	Authority to Construct Construction Not Complete
TXI Riverside Cement [Oro Grande, CA]	08/05/1999	6,000 tpd CL	0.084 lb/ ton CL	2.8 lb/ ton CL	0.13 lb/ ton CL	1.5 lb/ ton CL	0.06 lb/ ton CL	Bag DS	Authority to Construct B007435
Holnam Inc. [Florence, CO]	08/16/2000	1,873,898 tpy CL	0.30 lb/ ton KF	3.372 lb/ ton CL	1.13 lb/ ton CL	4.64 lb/ ton CL	0.21 lb/ ton CL	WS PC	Permit #: 98FR0895 Facility has SO_2 Scrubber
Rio Grande Cement [Pueblo, CO]	09/25/2000	2,890 tpd CL	0.105 lb/ ton CL	2.32 lb/ ton CL	1.99 lb/ ton CL	2.110 lb/ ton CL	NLE	Bag PC	Permit Approval 98PB0893 Startup/Compliance in 2003
CSR – Rinker [Miami, FL]	10/31/2000 Final Title V	137 tph CL	0.321 lb/ ton CL	4.898 lb/ ton CL	2.234 lb/ ton CL	3.01 lb/ ton CL	0.100 lb/ ton CL		Permit #: 0250014-003-AV
Florida Rock Ind. [Brooksville, FL]	06/12/2000 [6]	2,300 tpd CL	0.221 lb/ ton CL	2.799 lb/ ton CL	0.170 lb/ ton CL	3.600 lb/ ton CL	0.120 lb/ ton CL	ESP	Data from June 12, 2000 Application.
Florida Rock Ind. [Newberry, FL]	01/26/2001	95.8 tph CL	0.31 lb/ ton CL	2.80 lb/ ton CL [7]	0.28 lb/ ton CL	3.60 lb/ ton CL	0.12 lb/ ton CL	ESP	
Southdown (CEMEX) [Brooksville, FL]	09/2000 Final Title V	90 tph CL	0.330 lb/ ton CL	3.344 lb/ ton CL	0.183 lb/ ton CL	2.200 lb/ ton CL	0.165 lb/ ton CL	Bag	Permit #: 0530010-002-AV

TABLE 2
SUMMARY OF RECENT PORTLAND CEMENT FACILITY AIR PERMITS
USED IN UPDATED BACT REVIEW (CONTINUED)

Company Name & Location	Permit Date	Source Operation	PM Limit	NO_x Limit	SO_2 Limit	CO Limit	VOC Limit	Control Device	Comments
Suwannee American [Branford, FL]	06/01/2000	105 tph CL	0.220 lb/ ton CL	2.9 lb/ ton CL	0.27 lb/ ton CL	3.6 lb/ ton CL	0.12 lb/ ton CL	Bag	
Tarmac American Pennsuco [Medley, FL]	05/01/2001	208 tph CL	0.255 lb/ ton CL	3.460 lb/ ton CL	1.540 lb/ ton CL	2.760 lb/ ton CL	0.190 lb/ ton CL	Bag	Permit #: 0250020-010-AC
Illinois Cement Co. [LaSalle, IL]	10/07/1998	125 tph CL	0.208 lb/ ton CL	4.500 lb/ ton CL	0.800 lb/ ton CL	10.6 lb/ ton CL	0.32 lb/ ton CL	Bag	PSD Permit #: 97030016 No Limit on CO and VOC
Lone Star Industries, Inc. [Green Castle, IN]	04/16/1999 01/08/2001	183 tph CL	0.485 lb/ton CL	5.47 lb/ton CL	4.13 lb/ton CL	3.65 lb/ton CL	NLE		Modification from Wet Kiln to Semi-Dry Kiln
Ash Grove Cement [Chanute, KS]	09/1999	194 tph CL	0.693 lb/ ton CL	3.091 lb/ ton CL	1.222 lb/ ton CL	1.661 lb/ ton CL	NLE	Bag PC	Note: VOC not a permit limit.
Monarch Cement [Humboldt, KS]	01/2000	129 tph CL	0.707 lb/ ton CL	4.200 lb/ ton CL	1.099 lb/ ton CL	3.700 lb/ ton CL	0.12 lb/ ton CL	Bag PC	Note: VOC not a permit limit.
Kosmos Cement Co. [Louisville, KY]	04/18/2001	125 tph CL	0.298 lb/ ton CL	6.6 lb/ton CL	1.32 lb/ ton CL	3.6 lb/ ton CL	NLE	Bag	Title V Permit #: 156-97-TV
Lehigh Portland Cement [Union Bridge, MD]	04/08/1999	2,100,000 tpy CL	0.591 lb/ ton CL	5.469 lb/ ton CL	1.030 lb/ ton CL	NLE	NLE		Permit #: 06-6-0256 N
Continental Cement Co. [St. Genevieve, MO]	03/31/2001	1,440,000 tpy CL	0.13 lb/ ton CL	2.3 lb/ ton CL	1.0 lb/ ton CL	1.0 lb/ ton CL	NLE	Bag DS/PC	Source: Initial PSD Applic. No VOC Limit in Application
LaFarge Corp. [8] [Sugar Creek, MO]	08/05/1997	2,818 tpd CL	0.164 lb/ ton CL	3.68 lb/ ton CL	4.066 lb/ ton CL	1.637 lb/ ton CL	NLE	Bag	Permit #: 0897-019
St. Lawrence Cement [Greenport, NY]	04/30/2001 Draft Permit	Nominal 2.6 million tpy CL	0.30 lb/ ton KF	3.6 lb/ ton CL [9]	0.743 lb/ ton CL	NLE	NLE	Bag	Permit ID: 4-1040-0001/00049
Ash Grove Cement [Durkee, OR]	02/26/2001	940,000 tpy CL	0.39 lb/ ton CL	3.709 lb/ ton CL	0.11 lb/ ton CL	2.675 lb/ ton CL	0.051 lb/ ton CL	Bag	Title V Permit #: 01-0029 8/18-20/1998 Test Showed VOC Exceedance
Puerto Rican Cement Co. [Ponce, PR]	02/25/1997	4,100 tpd CL	NLE	NLE	NLE	1.74 lb/ ton CL	0.12 lb/ ton CL	PC	Wet to Dry Kiln Modification
Holnam Inc. [Holly Hill, SC]	10/13/2000	2,462,318 tpy CL	0.94 lb/ ton CL	4.48 lb/ ton CL	3.26 lb/ ton CL	8.00 lb/ ton CL	0.27 lb/ ton CL	Bag PC	Construction Permits: 1860-0005-CO through CU
Signal Mountain Cement [Chattanooga, TN]	05/15/1999	89.5 tph CL	0.204 lb/ ton CL	4.503 lb/ ton CL	1.00 lb/ ton CL	2.77 lb/ ton CL	0.120 lb/ ton CL	Bag PC	Part 70 Permit #: 47-065-3070
Holnam, Inc. [Midlothian, TX]	06/2000	145.83 tph CL	0.21 lb/ ton CL	1.21 lb/ ton CL	2.77 lb/ ton CL	2.04 lb/ ton CL [10]	0.695 lb/ ton CL	SC	Facility Has SO_2 Scrubber Short-Term/Long-Term Limits Stack Test High on NOx & THC

TABLE 2
SUMMARY OF RECENT PORTLAND CEMENT FACILITY AIR PERMITS
USED IN UPDATED BACT REVIEW (CONTINUED)

Company Name & Location	Permit Date	Source Operation	PM Limit	NO_x Limit	SO_2 Limit	CO Limit	VOC Limit	Control Device	Comments
North Texas Cement [Whitewright, TX]	07/12/2000	129.17 tph CL	0.932 lb/ ton CL	2.802 lb/ ton CL	2.787 lb/ ton CL	5.700 lb/ ton CL	1.782 lb/ ton CL	SC	Permit #: 37177/PSD-TX-893 Hourly Value Significantly Higher
TXI Operations LP [Midlothian, TX]	Title V Not Final Yet [11]	Kiln 5 2,200,000 tpy CL	0.262 lb/ ton CL	2.477 lb/ ton CL	1.208 lb/ ton CL	0.336 lb/ ton CL	0.023 lb/ ton CL	OX	
Ash Grove Cement Co. [Nephi, UT]	01/05/2000 Final Title V	170 tph KF	0.138 lb/ ton KF	2.353 lb/ ton KF	NLE	NLE	NLE	Bag	Title V Permit #: 2300015001
Holnam, Inc. [Morgan, UT]	05/02/2001	2,310 tpd CL	0.160 lb/ ton CL	5.369 lb/ ton CL	1.257 lb/ ton CL	5.006 lb/ ton CL	NLE	Bag	Approval Order Project Code #: N0007-005
Roanoke Cement [Cloverdale, VA]	01/23/2001	183 tph CL	0.458 lb/ ton CL	4.385 lb/ ton CL	4.776 lb/ ton CL	1.994 lb/ ton CL	0.758 lb/ ton CL	ESP	
Ash Grove Cement Co. [Seattle, WA]	06/2001	92 tph CL	0.123 lb/ ton CL	4.923 lb/ ton CL	0.469 lb/ ton CL	6.275 lb/ ton CL	NLE	Bag DS	Notice of Construction #: 7381 Dry Scrubber for SO_2 Control
Mountain Cement [Laramie, WY]	06/02/1998 03/23/2000	Kiln 1 = 29 tph CL	0.469 lb/ ton CL	7.200 lb/ ton CL	3.448 lb/ ton CL	4.000 lb/ ton CL	0.252 lb/ ton CL	Bag	Title V Permit Amended 03/23/2000
Mountain Cement [Laramie, WY]	06/02/1998 03/23/2000	Kiln 2 = 62.5 tph CL	0.469 lb/ ton CL	7.200 lb/ ton CL	1.600 lb/ ton CL	4.000 lb/ ton CL	0.248 lb/ ton CL	Bag	Title V Permit Amended 03/23/2000

Legend:
CL = Clinker
KF = Kiln Feed
tpy = tons per year
tpd = tons per day
tph = tons per hour
NLE = No Emission Limit Established in Permit

Bag = Baghouse
SC = Scrubber
WS = Wet Scrubber
DS = Dry Scrubber
PC = Emissions controlled by Process Controls such as good combustion practices
ESP = Electrostatic Precipitator
OX = Combustion Controls (Thermal Oxidizer) to reduce emissions

TABLE 2
SUMMARY OF RECENT PORTLAND CEMENT FACILITY AIR PERMITS
USED IN UPDATED BACT REVIEW (CONCLUDED)

Footnotes:

[1] Arizona Portland Cement particulate emissions are 0.3 lb/ton KF for Kiln 4 and 0.3 lb/ton KF for Kilns 1, 2, and 3.

[2] Phoenix Cement Company [Clarkdale, AZ] NO_x, SO_2, and CO values are calculated using a 30-day rolling average. Phoenix Cement recently submitted an application to increase CO emissions to 2.0 lbs/ton CL (8-hour average).

[3] Process Rate for California Portland Cement [Mojave, CA] and Calavaras Cement Co. [Tehachapi, CA] derived from NESHAP PM limit of 0.30 lb/ ton KF.

[4] RMC Pacific Materials (Santa Cruz) [Davenport, CA] facility permit to operate (10171) lists NOx limits of 250 lb/24-hour avg. and 350 lb/2-hour avg. No permit limit on clinker production exists for this facility. These emission levels equate to 2.5 lb NOx/ton CL (Contact Record Between Marc Lewis of RTP and Teresa Heron of Florida Department of Environmental Protection (October 10, 1995)).

[5] The Southdown (CEMEX) [Victorville, CA] facility 'netted-out' for Carbon Monoxide (CO). No permit limit has been established for CO on a lb/ton CL basis.

[6] Florida Rock Industries [Brooksville, FL] data is from the June 12, 2000 application. Application has been withdrawn from Florida DEP Review.

[7] Florida Rock Industries [Newberry, FL] has a NOx limit is 3.8 lb/ton CL for first two years, then the NOx limit is 2.8 lb/ton CL on a 30-day rolling average.

[8] LaFarge Corporation [Sugar Creek, MO] has a NOx limit of 1,894.8 tons in any consecutive 12-month period and a CO limit of 742 tons in any consecutive 12-month period.

[9] The draft New York State Department of Environmental Conservation air permit for the St. Lawrence Cement [Greenport, NY] facility establishes a three-year time frame to allow the facility to achieve 2.8 lb NOx /ton CL with an initial limit of 3.6 lb NOx/ton CL. The emissions limits are averaged over a 12-month rolling average. This is a LAER determination and the facility will incorporate SNCR. Recent information indicates that the limits established in the draft permit are being contested and St. Lawrence Cement may be applying for an "innovative technology" determination for which actual emission limits will be established based on operational results. (Personal Communication Between Michael Hober of RTP Environmental Associates, Inc. and Mark Terry of Krupp-Polysius, January 2002.)

[10] Holnam, Inc. [Midlothian, TX] has applied to increase the NOx emission level to 2.8 lb NOx/ton CL (annual average) and the CO emissions to 13.30 lb CO/ton CL (1-hour average) and 5.57 lb/ton CL (annual average).

[11] TXI Operations LP [Midlothian, TX] values from Special Conditions to Permit 1360A, dated January 11, 2001.

TABLE 3
COMPARISON OF RANGE OF FACILITY PERMITTED EMISSION LEVELS WITH THOSE FOR THE FCS UNIT II KILN

(lbs/ton CL or lbs/ton KF)

POLLUTANT	FCS EMISSION LEVELS		OTHER FACILITIES EMISSION LEVELS	
	lbs/ton CL	**lbs/ton KF**	**lbs/ton CL**	**lbs/ton KF**
PM	0.3	0.2	0.084[1] - 0.94	0.30(9)[2]
NO_x	2.80	1.83	1.21 - 7.20	1.28 - 8.043(5)[2]
SO_2	0.23	0.15	0.089 - 10.0	0.31 - 6.00(5)[2]
CO	2.00	1.307	0.21 - 10.60	0.256 - 15.08(3)[2]
VOC	0.085	0.056	0.023 - 1.782	0.173 - 0.76(2)[2]

[1] The low value of 0.084 is a permitted value for a facility (TXI Riverside Cement, Oro Grande, CA) that has a very low probability of ever being constructed, according to a representative of the Mojave Desert Air Quality Management District. Personnel Communication Between Mr. Scott Heath of RTP Environmental Associates, Inc. And Mr. Jim Lehmann of the Mojave Desert AQMD in Victorville, CA Regarding Follow-up on PM Limit in TXI Riverside Cement (Oro Grande, CA) Permit.

[2] The number in parentheses () indicates the number of facilities for which the range encompasses (i.e., number of facilities with emissions in a lbs/ton KF format).

lbs/ton CL = pounds per ton of clinker

lbs/ton KF = pounds per ton of dry kiln feed

NOTE: The averaging times for the above emissions ranges vary by specific facility.

The emission limits established for these facilities show little uniformity, except within each permitting district. In fact, some emission limits show significant variation within states and within companies. For example, recent permit actions in northern Florida (Florida Rock Industries, Suwannee American, Florida Crushed Stone) show similar if not identical permit limits. However, permit actions in southern Florida (Rinker (Miami, Florida) and Tarmac American Pennsuco) show significantly different permit values than the northern Florida facilities, as do permit actions in other parts of the country, such as north central Texas (TXI in Midlothian; Holnam, Inc. in Midlothian; and North Texas Cement in Whitewright). This variation can be explained in part by some facilities having existing cement kilns to "net-out" of PSD and not being subject to BACT or Lowest Achievable Emission Rate (LEAR) provisions for certain pollutants. To assist in "netting-out," some facilities have established emission levels below what is considered BACT at that time. This is the case with the Rinker Miami, Tarmac American Pennsuco, TXI Midlothian and Holnam Midlothian facilities. Also, variations in cement raw materials can have a significant impact on resultant emissions. As agencies slowly ratchet down permit allowable emissions, the differences in available fuels and cement raw materials (including moisture and mineral content) must be considered in establishing realistic permit limits and compliance averaging times that provide allowance for the variability in cement kiln operation, which ultimately results in variability in emissions.

A number of recently permitted facilities have gone to great lengths to "net out" or avoid PSD review for facility upgrades, including installation of wet acid gas (SO_2) scrubbers and regenerative thermal oxidizers (RTOs) to reduce emissions of carbon monoxide (CO) and volatile organic compounds (VOCs). The cost implications for these tail gas controls are substantial. In addition, applying secondary controls for CO and VOC allows the kiln combustion to be skewed to lower emissions of nitrogen oxides (NO_x). Combustion conditions that reduce NO_x typically result in higher CO emissions. Modifying combustion in this fashion can negatively impact product (cement) quality, as well as increase combustion variability and frequency of system upset. In addition, these tail gas controls burn fossil fuels that result in additional emissions of pollutants. Given the individuality of the specific projects to date, it will be necessary, to the extent possible, to discuss each facility to judge the merits of the proposed or current emissions limitations and pollutant controls employed in comparison to the currently permitted emission limits for the FCS Unit II kiln.

3.3 BACT UPDATE FOR PARTICULATE MATTER (TSP AND PM_{10})EMISSIONS

Table 3 provides a summary of the range of permitted particulate emissions compared to those for the FCS Unit II kiln. The FCS Unit II kiln particulate emissions are low, relative to the range of emissions (0.084 - 0.94 lbs/ton CL) listed. However, up to 16 facilities have been identified with permitted particulate emissions less than the FCS facility. The lowest value listed (0.084 lbs/ton CL for the TXI Riverside facility in Oro Grande, CA) is approximately 72% lower than the current FCS Unit II permit limit. Information provided by a representative of Mojave Desert Air Quality Management District indicated that there is a very low probability that this facility construction will ever occur.[5] Therefore, this permit value will not be considered as an achievable value for purposes of this review.

Of the 15 remaining facilities identified with lower particulate emissions, the bulk of the values are approximately 50% (or smaller) less than the FCS limit. Although an air pollution control vendor has not yet been chosen, the particulate control equipment is typically constructed with a minimum 50% or more design margin to provide a level of safety for compliance assurance. It would appear that the percentage reductions for the bulk of the facilities are within the design margins of the planned particulate control device. Four facilities {Southdown (CEMEX) in Victorville, CA; Rio Grande Cement in Pueblo, CO; Continental Cement in St. Genevieve, MO; and Ash Grove Cement Company in Seattle, WA] have been identified with permitted particulate emissions lower than 50% of the FCS permitted emissions. Of these four, Three [Rio Grande Cement, Continental Cement, and Southdown (CEMEX)]) have yet to complete construction and demonstrate compliance with this value. The fourth facility, (Ash Grove Cement Company) employs an acid gas scrubber for SO_2 control in conjunction with a baghouse for particulate control. It is expected that the scrubber, along with SO_2, would assist in the removal of a significant amount of condensible particulate, allowing a lower permitted particulate emission limit. In addition, the facility is located in a PM non-attainment area and represents LAER control at the time the facility was reviewed for PSD in April, 1990. The Ash Grove limit is on an annual average value, where the FCS value is established as a one-hour average value. Short-term limits are extremely limiting relative to long-term limits.

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[5] Telephone Conversation Report from Scott P. Heath of RTP Environmental Associates, Inc. With Mr. Jim Lehmann of Mojave Desert AQMD, Victorville, California RE: Follow-up on PM Limit in TXI Riverside Cement (Oro Grande, CA) Permit.

From a "top down" BACT perspective, particulate matter can be controlled in a number of ways. It is generally accepted that the "top" particulate control options (those with highest control efficiencies) are either electrostatic precipitators (ESPs) or fabric filter (FF) baghouses, both of which are considered to provide equivalent control. Rinker has chosen to install a FF, which is the "top" control option. The planned particulate control equipment will be designed, built, and operated to reduce facility particulate emissions to levels that are equivalent to the current permit levels in order to maintain continuous (one-hour average) compliance with the proposed FCS Unit II permitted limit. Therefore, the current particulate control technology and emission limit is determined to be BACT.

3.4 BACT UPDATE FOR SULFUR DIOXIDE EMISSIONS

Table 3 provides a summary of the range of permitted SO_2 emissions reviewed in comparison to those for the FCS Unit II kiln. Only four facilities (TXI Riverside cement in Oro Grande, CA; Florida Rock Industries in Brooksville, FL; Southdown (CEMEX) in Brooksville, FL; and Ash Grove Cement Company in Durkee, OR) listed a lower SO_2 permit limit than the proposed FCS value. The TXI Riverside Cement facility proposes to incorporates an SO_2 scrubber system to achieve low SO_2 emissions. The two Florida facilities, one is the proposed Florida Rock (Brooksville) facility, and the other is the Florida Mining and Materials (Southdown/CEMEX) facility are also located in Brooksville. These two facilities would utilize similar low-sulfur bearing raw materials as the Florida Crushed Stone facility. It is expected that the proposed Florida Crushed Stone facility would have similar SO_2 emissions as these. Finally, the lowest identified SO_2 permit limit is that for the Ash Grove facility in Durkee, OR. The limit (0.11 lbs SO_2/ton CL) is approximately 50% lower than the FCS permit limit. Based on the Title V permit reviewed for Ash Grove, no additional SO_2 controls are installed at the facility other than the inherent scrubbing of the kiln flue gases. It can only be concluded that the Ash Grove raw materials are naturally very low in sulfur content, as the sulfur limitations on their permit-specified fuels - coal, oil and natural gas - have similar sulfur content as FCS fuels have. It is interesting to note that the Ash Grove permit specifies short-term SO_2 limits, but does not appear to require an SO_2 continuous emissions monitor. It is also interesting to note that the April 12, 1999 compliance test report indicated that the test was conducted with the kiln firing natural gas, and as a result, the facility easily passed their compliance test for SO_2.

Proposed BACT for the FCS Unit II kiln is the inherent scrubbing of the cement flue gases and raw feed to absorb and control SO_2 to a limit of 0.23 lbs SO_2/ton CL (24-hour rolling average). While it is expected that the kiln will achieve lower SO_2 emissions in order to maintain the permit emission limit on a rolling 24-hour basis, it is not possible at this time to surmise whether a lower emission limit is feasible, given the introduction of a new cement process at the facility (Unit I is a pre-heater kiln). Hence, additional control for SO_2 would have to be accomplished by addition of a control device, such as a dry or wet limestone scrubber. Please note that based on communication with state regulators, construction has not commenced on the TXI Riverside cement facility and it is doubtful that the facility will ever be built. Also, the Florida Rock Industries application for their Brooksville facility has been removed from FDEP review.

SO2 control is typically achieved using flue gas scrubber systems. To achieve an approximate 50% reduction, the "top" control options would be either a wet limestone scrubber or semi-dry absorber. Other SO_2 control options, such as dry sorbent injection, may not be capable of achieving a continuous 50% reduction at such a low inlet SO_2 concentration. Therefore, a wet limestone scrubber and semi-dry absorber will be analyzed for economic, energy, and environmental impacts relative to the base case of SO_2 absorption in the alkaline flue gases.

The differential SO_2 reduction from the FCS proposed level (0.23 lbs/ton CL) to the lowest listed level (0.11 lbs/ton CL) is approximately 54.8 tons of SO_2 per year, or an approximate 50% reduction. For purposes of the economic assessment, it is assumed that the semi-dry limestone absorber can be placed before the particulate control device (fabric filter baghouse). However, the wet limestone scrubber would have to be placed after the particulate control device to avoid potential damage to the fabric filter. It is also assumed that some flue gas reheat will be necessary after exiting the wet scrubber to improve exhaust gas dispersion and minimize impacts. To remove the differential amount of SO_2 emissions (54.8 tons annually), estimated costs for a dry limestone scrubber would exceed $10,000 per ton of SO_2 (ton/SO_2) removed and estimated costs for a wet limestone scrubber would exceed $30,000.00 ton/$SO_2$ removed. These values are substantially higher than those considered as economically feasible for implementation of BACT control. In addition, where actual SO_2 emissions from the proposed Unit II kiln are expected to be lower than the permitted value due to the low sulfur in the feed materials, those control costs would be even higher. Both control options also would produce environmental and energy impacts that could have secondary impacts. Both would use water, a very needed commodity in Florida, in appreciable amounts. Solid waste from the collected sorbent would be generated and require disposal. Additional energy would be needed to operate the equipment and move the flue gas through the equipment. Finally, energy for the flue gas reheat would be needed in the wet scrubber case. The energy and environmental impacts were not quantified for this discussion.

In the FDEP BACT Review for the Suwanne American Cement Company's facility in Branford, FL (which at 105 tons per hour CL is a similar sized facility with similar permit SO_2 emissions as the FCS Unit II plant), it was determined that add-on SO_2 controls were not BACT due to the excessive cost. Estimated costs for wet scrubbing were $29,700 per ton of SO_2 removed. Estimated costs for a dry circulating scrubber were $7,400 per ton of SO_2 removed plus additional particulate control that, as stated, would result in "raising this cost substantially."[6]

Based on a review of the economic, energy, and environmental impacts, acid gas removal by installation of a wet or semi-dry limestone scrubber is rejected as BACT. SO_2 removal through the inherent scrubbing of the kiln flue gases to a limit of 0.23 lbs SO_2/ton CL is determined to be BACT.

3.5 BACT UPDATE FOR NITROGEN OXIDES EMISSIONS

3.5.1 Recent NO_x Permit Determinations

Table 3 provides a summary of the range of permitted NO_x emissions reviewed in comparison to those for the FCS Unit II kiln. Six facilities were identified with permitted NO_x emissions lower than the proposed FCS Unit II limit and are shown on Table 4. However, five of the six facilities are allowed to average emissions on an annual basis. Furthermore, the Holnam Midlothian facility was unable to comply with their emission level (1.21 lbs/ton CL) and recently submitted an application to increase the level to 2.8 lbs/ton CL averaged annually.[7] Holnam, Inc. informed the regulatory agencies that the initial permit value was a "calculational error."[8] The FCS Unit II facility designer, Krupp-Polysius, claims 2.8 lbs/ton CL, averaged on a 24-hour basis, is an extremely aggressive limit with multi-stage combustion, given the inherent variability in NO_x emissions from cement production and the low permitted VOC and CO emission limits.

FDEP, in previous cement kiln BACT reviews, has stated that a NO_x emission value of 2.8 lbs NO_x/ ton CL at a Florida kiln is equivalent to 2.5 lbs NO_x/ton CL at other facilities, due to the inherent

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6 Florida Department of Environmental Protection BACT Determination for the Suwannee American facility, Branford Plant, PSD-FL-259 and 1210465-001-AC.

7 Excerpts from Environmental Quality Management, Inc.'s NO_x, CO and VOC BACT Review for the Holnam, Inc. Facility in Midlothian, Texas, September 2000.

8 Letter from Mr. Glenn Raynor of Holnam, Inc., Holly Hill, South Carolina to Ms. Diana L. Zakrzwski in response to the South Carolina Department of Health and Environmental Control's conditions to the draft air permit, September 27, 2000.

TABLE 4
IDENTIFIED FACILITIES WITH
LOWER PERMITTED NO_X EMISSION VALUES
THAN THE FCS UNIT II KILN

Company Name & Location	NO_x Limit (lbs/ ton CL)	Compliance Averaging Time	Facility Constructed and Operating (Y/N)	Notes
FCS Unit II Brooksville, FL	2.8	24-hour	NO	
Continental Cement St. Genevieve, MO	2.3	Annual	NO	Air Permit Application (submitted on 4/3/2001). Construction not started.
Holnam, Inc. Midlothian, TX	1.21*	Annual	YES	Cannot meet current NO_x Limit
RMC Pacific-Lonestar Davenport Santa Cruz, CA	**	24-hour	YES	
Rio Grande Cement Pueblo, CO	2.32	Annual	NO	Construction not started.
TXI Operations Midlothian, TX	2.477	Annual	YES	Facility Incorporates Acid Gas Scrubber and Regenerative Thermal Oxidizer
Tarmac American Pennsuco Medley, FL	3.46 or 2.88***	24-hour and annual***	NO	Limit based on clinker production. Construction not started.

lbs/ton CL = pounds per ton clinker

NOTES: *Holnam, Inc. has submitted a permit application to increase the NO_x emission limit to 2.8 lbs/ton CL on an annual averaging basis.

**The RMC Pacific (Lonestar) Davenport facility air permit does not contain a limitation in a lbsNO_x/ton clinker format. The original PSD permit <u>did not</u> contain a NO_x emission limit. The permit was recently revised to add NO_x limitations, however these are in total NO_x emissions of lbs/hr. The permit contains no capacity limitations, therefore, a lbs NO_x/ton CL value cannot be derived.

***The Tarmac permit was initially negotiated with a 3.46 lbs NO_x/ton CL limit (24-hour averaged) for operation at normal conditions (208 tons/hour CL) and 2.88 lbs NO_x/ton CL (24-hour average) for operation at high production (250 tons/hour CL). This permit was later revised to include an annual (twelve month rolling average) limit of 1953 tons NO_x/year, which when related to the annual clinker production limit of 1,642,500 tons CL yields a defacto annual limit of 2.38 lbs NO_x/ton CL. The permit does not establish 2.38 lb NO_x/ton CL as a permit limit requiring compliance verification.

characteristics of the cement raw materials in Florida.[9] The facility used for this example was the RMC Pacific-Lonestar Davenport facility located in Santa Cruz, CA. It is Rinker's contention that 2.8 lbs NO_x/ton CL (equivalent to 2.5 lbs NO_x/ton CL) on a 24-hour averaging basis is more stringent than the range of lower values 2.3 - 2.48 lbs No_x/ton CL on an annual average basis. Also, please note that the three facilities with annual average NO_x limits ranging from 2.3 - 2.38 lbs NO_x/ton CL [Continental Cement (St. Genevieve, MO), Rio Grande Cement (Pueblo, CO), and Tarmac American Pennsuco (Medley, FL)] have not completed construction and operated to prove their emission limits can be met. The TXI Midlothian facility, with permit emissions of 2.48 lbs NO_x/ton CL, also incorporates a RTO for CO and VOC control, which allows operators to skew kiln combustion to lower NOx values. It should also be noted that numerous facilities have been issued construction and operating permits with allowable NOx emissions higher than 2.8 lbs ton/CL in the last two years. Examples of these facilities are Blue Circle in Calera, AL; California Portland Cement in Mojave, CA; Calavaras Cement Company in Tehachapi, CA; Lone Star Industries in Green Castle, IN; Kosmos Cement in Louisville, KY; and Holnam, Inc. In Morgan, UT and Holly Hill, SC.

3.5.2 Other NO_x BACT Considerations

As stated previously, significant controversy has evolved recently regarding NO_x emissions from cement kilns and what should be considered BACT. Recent advancements in kiln designs that include pre-calciners and multi-stage combustion appear to be reaching the lowest NO_x emission levels possible through combustion modifications. Consistent low NO_x emissions require tight process optimization and raw materials quality control. To date, U.S. plants have not incorporated full-scale commercially demonstrational post-combustion NO_x controls, such as selective non-catalytic reduction (SNCR). However, European facilities have installed post-combustion control for NO_x and other pollutants on cement kilns, albeit typically with governmental assistance. Information from European facilities and from pilot tests in the U.S. show that post-combustion NO_x control may have potential to reduce NO_x in some situations, but performance can vary significantly when compared to typical combustion sources, such as boilers or gas turbines. SCR has yet to be demonstrated on a full-scale cement kiln in Europe or the U.S., and thus will no longer be considered a demonstrated control option for BACT. SNCR has been tested in Europe on three pre-heater/pre-calciner kilns but is operating on mostly pre-heater kilns. For this BACT review update, the feasibility of applying SNCR to the FCS Unit II kiln will be evaluated.

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[9] IBID[6]

In order to properly evaluate the potential for SNCR application to the FCS Unit II kiln, a review of existing reports and data must be done to identify the true expected ability of SNCR to achieve actual NO_x reductions in this case. Much of what is known about SNCR comes from application to combustion systems, such as boilers or turbines. In these situations, chemical reactions are relatively straightforward. Very little data exists regarding SNCR application to chemical processes which, in essence, is what a cement production process is. The combustion that occurs in a cement kiln simply provides the heat by which a mix of raw materials undergo a series of complex chemical reactions to form cement clinker. The interaction of the SNCR reactant (ammonia or urea) with the various chemical reactions occurring in the cement production process is only beginning to be realized. In addition, combustion sources such as boilers and turbines are capable of sustained steady-state operation with relatively little variation in emissions. To the contrary, cement kilns have been shown to experience wide variations in NO_x emissions levels during day-to-day operations. For this reason, the past practice of using single hourly test data to justify low facility BACT emission levels for cement kilns is no way to develop consistently achievable emission limits, but rather pass/fail deterministic standards.

Past data presented in regulatory and industry publications consisted of short-term (one-hour) compliance test results that typically showed substantial variation. Regulators have focused on the low numbers of the range and assumed that these can be achieved consistently and that higher emissions are the result of poor performance or combustion. Only with the more recent use of continuous emissions monitors (CEMs) has it been shown that NO_x emissions can vary substantially in any given hour and any given day, though cement production is continuous. This variation can go to extremes in both the high and low direction and is relatively uncontrollable by the equipment operators. Through design, NO_x emissions can be lowered when given a long enough averaging time to show reductions. However, in the short term, NO_x emissions can vary widely.

Similarly, regulatory publications have assumed that SNCR can be applied to any combustion source, based on application to combustion turbines and boilers. For boilers and turbines, fuel specifications are relatively uniform, typically resulting in uniform source emissions and relatively predictable results from application of SNCR. Also, combustion is mostly an exothermic reaction, typically producing more heat than input to the system. This is not the case with cement kilns where the available raw materials vary by location, resulting in varying raw material mixes that can cause substantial variations in kiln temperature profiles, and subsequently NOx emissions. As discussed previously, a series of both exothermic and endothermic reactions occur to form clinker from cement raw materials. This creates localized temperature peaks, and thus, NOx formation that can be magnified as heat is applied to the system. In addition, as heat is supplied to the kiln along with exothermic heat supplied by the clinkering process, any increase or decrease in heat from either source can create wide swings in temperature and NOx emissions, while operators try to maintain a stable process. Thus, identical kilns with different raw material mixes can have substantially different NO_x emissions and show different variations in these emissions. This means that limitations exist on how much NO_x reduction can be achieved by design and also limits the effectiveness of post-combustion NO_x control (i.e., SNCR). Finally, this variation in NO_x formation also shows that stringent NO_x emission limits cannot be tied to short averaging times.[10] In order to show this, a review of existing documentation follows.

3.5.3 NO_x Control Technology Guidance Documents

Little documentation exists regarding innovative control technology tested or operating on cement kilns in the United States. The cement production process, by its nature, has provided significant obstacles to the application of pollution controls. High temperature oxidizing conditions in the rotating kiln limit the ability to apply innovative NO_x control techniques. The desire to utilize fully all latent heat from the pyro-processing equipment limits the ability to apply temperature sensitive controls on the exhaust gas stream. Kiln flue gases are also high flow and contain trace contaminants that would require removal prior to a catalytic system. Finally, day-to-day variations in the flue gas streams from the non-homogenous feed mixes limit the effectiveness of traditional tail gas control options.

Most of what is generally known or considered to be generally known regarding NO_x control for cement kilns has been published in several regulatory guidance documents (United States Environmental Protection Agency [USEPA]), Portland Cement Association (PCA) documents, and a recent European guidance document (European Integrated Pollution Prevention and Control Bureau [IPPCB]). Available data and cost-estimates for the potential application of alternative NO_x controls for the cement industry have been compiled in several reports. The following provides a summary of four reports:

1) United States Environmental Protection Agency (USEPA) - *Alternative Control Techniques (ACT) Document - NO_x Emissions from Cement Manufacturing* - EPA-453/R-94-004 - March, 1994.

[10] Young, Gerald L. and Michael von Seebach. "NOx Variability, Emissions & Control from Portland Cement Kilns" Penta Engineering. Presented at the 34th International Cement Seminar in Salt Lake City, UT, December 1998.

2) Portland Cement Association (PCA) - *Report on NO_x Formation and Variability in Portland Cement Kiln Systems, Potential Control Techniques and Their Feasibility and Cost-Effectiveness* - Penta Engineering Corporation - December, 1998.

3) European Integrated Pollution Prevention and Control Bureau (IPPCB) - *Reference Document on Best Available Techniques in the Cement and Lime Manufacturing Industries* - March, 2000.

4) USEPA - *NO_x Control Technologies for the Cement Industry* - EPA Contract No. 68-D98-026 - September, 2000.

These are the most widely used reference documents regarding the feasibility of NO_x controls for cement kilns.

USEPA ACT Document

The USEPA ACT Document is the oldest of the four documents. The U.S. Congress, in the Clean Air Act Amendments of 1990, mandated that the USEPA prepare and issue technical documents which identify alternative controls for all major stationary source categories. These documents are then revised and updated as needed. Cement kilns have been identified as major sources of nitrogen oxides. Thus, the ACT Document was prepared and issued in March of 1994.

Information used in the preparation of the ACT Document came from previous EPA documents, technical publications, cement manufacturers, engineering firms, pollution control equipment vendors, and state and local regulatory agencies. Several sets of NO_x emissions data are presented in the ACT Document. Table 5 presents a summary of each data set that shows the range of reported emissions along with the average for each class of cement kiln. As can be seen, considerable spread in kiln emissions exist within specific kiln categories. USEPA provided some discussion explaining the data spread in their discussions of NO_x formation. First, USEPA states that the primary mechanism of NO_x formation is thermal NO_x generation in the high-temperature combustion conditions of the cement kiln. Given that this is inherent in all cement combustion, emissions data should show better correlation. The data, however, shows significant spread, which means that site-specific conditions can significantly influence an individual kiln's NO_x emissions. USEPA listed the following parameters that can significantly influence (increase) NO_x emissions from an individual kilns:

TABLE 5

COMPARISON OF CEMENT KILN NO_X EMISSIONS DATA PRESENTED IN THE USEPA ACT DOCUMENT

(lbs NO_X/ton CL)

Kiln Type	1982 PCA Survey[1]		AP-42 Survey[2]		ACT Survey[3]	
	Range	**Average**	**Range**	**Average**	**Range**	**Average**
Long Wet	2.0 -8.5	4.97	3 - 20	8.2	3.6 - 19.5	9.7
Long Dry	5.0 - 7.0	5.7	3 - 17	5.7	6.1 - 10.5	8.6
Pre-heater Kiln	2.0 - 4.5	2.98	2 - 9	5.5	2.5 - 11.7	5.9
Pre-heater/Pre-calciner Kiln	1.5 - 7.0	3.86	2 - 7	4.8	0.9 - 7.0	3.4

NOTE: lbs NO_x /ton CL = pounds of nitrogen oxides per ton of clinker

[1]The Portland Cement Association (PCA) collected data from cement manufacturers in 1982.

[2] The PCA collected data from cement manufacturers for use in revising USEPA AP-42 Emission Factors

[3] The USEPA collected NO_x emissions data from the major cement companies during preparation of the ACT document.

Source: USEPA ACT Document (EPA-453/R-94-004, March, 1994)

1) **Nitrogen Content of Fuels** - USEPA states in the ACT Document that where gas and fuel oils typically have low fuel-bound nitrogen content, coal may contain one to three percent nitrogen by weight, depending on the source. USEPA estimates that coal with a one percent nitrogen content (by weight) can add from 1.5 (ten percent conversion) to 9.5 (100 percent conversion) lbs NO_x emissions per ton of CL depending on the coal nitrogen conversion rate.

2) **Nitrogen Content of Feed** - USEPA states in the ACT Document that similar to coal, the raw material feed to the cement process may contain appreciable amounts of nitrogen, ranging from about 20 parts per million (ppm) up to as much as 1000 ppm by weight. USEPA gives the example that 100 ppm nitrogen in a kiln feed is equivalent to one lb NO_x/ton CL (if all converted). Thus, NO_x emissions from kiln feed may represent a significant source of NO_x from cement kilns.

3) **Process Conditions** - USEPA states in the ACT Document that three process conditions can substantially affect NO_x emissions:

   a) Temperature Stability - FCS will incorporate State-Of-The-Art process controls to maintain temperature stability. However, cement pyro-processing is dynamic and incorporates multiple feeds and additives that are difficult to continuously integrate homogeneously. Also, kiln feed and fuels are not exact. Thus, some short-term temperature instability is to be expected from cement manufacturing

   b) Burnability of Raw Mix - USEPA states in the ACT Document that different raw material compositions require different burning conditions to maintain clinker quality. Typically, cement with higher concentrations of di-calcium and tri-calcium silicates require higher clinkering temperatures and longer residence times at those temperatures. FCS raw materials do contain a higher percentage of course silica, requiring harder burning conditions that will produce higher NO_x emissions.

   c) Alkaline and Sulfur Controls - USEPA states in the ACT Document that the alkali content of finished cement needs to be below certain acceptable levels. High alkali-content material requires higher kiln temperatures and longer residence times at higher temperatures to volatilize the alkali, and thus may produce greater NO_x emissions. To control the volatilized alkali emissions, a part of the kiln exhaust gases are typically bypassed from the downstream units (precalciner and preheaters). The bypassed gases are quenched to remove alkali and exhausted. This bypass involves a fuel penalty, estimated at about 20,000 British Thermal Units (BTU)/ton CL for every one percent gas bypass. This increased heat requirement contributes to increased NO_x emissions. The FCS Unit II kiln will incorporate a gas bypass for up to 15% of the kiln exhaust gases to prevent buildup of free chloride in the kiln system.

The primary conclusions drawn from the ACT Document are summarized in Table 6, which presents USEPA's determination of achievable NO_x reductions in cement kiln emissions with several NO_x control technologies. It is important to note that the control of efficiencies indicated in Table 6 are not additive. These represent potential efficiencies for retrofit of the technology on an older, higher NO_x-emitting kiln. In general, the FCS Unit II kiln is designed with indirect firing and staged combustion and will be fired on tire-derived fuel to have an inherently low NO_x emissions. USEPA concludes that post-combustion controls, SNCR and Selective Catalytic Reduction (SCR), can achieve high control efficiencies with no qualification to their application. Within the document, USEPA could not identify one full-scale SCR application on a cement kiln, yet predicts 80-90% reduction based on an application of SCR to clean (gas) fueled industrial boilers and combustion turbines. The one pilot test identified in the document showed substantial catalyst deactivation after approximately 5,000 hours of operation. USEPA also did not identify a single full-scale installation of SNCR on a cement kiln, yet predicts 30-70% reduction based on several pilot tests and applications of SNCR on other combustion sources. It is also stated that NO_x reduction efficiency of SNCR depends upon the temperature and residence time, as well as reducing agent (ammonia or urea) concentration and NO_x concentration in the flue gas. It is not qualified (if known) which parameter is most influential in affecting the NO_x reduction efficiency. However, it is suspected that higher control efficiencies would be achieved when SNCR is applied to flue gases with higher NO_x concentrations. Thus, it is questionable as to how effective SNCR will be with a newly designed kiln with inherently low flue gas NO_x emissions resulting from indirect firing and staged combustion. USEPA does not provide sufficient data in the ACT Document to draw a conclusion.

USEPA also provides estimated capital and annual costs to apply the NO_x control options, as well as a cost-effectiveness (cost per ton of NO_x removed). This is done by identifying "model plants." The parameters of these "model plants" such as the assumed NO_x emission rate and basis for it are not clearly defined in the document. Also, it does not appear that cost data for SNCR and SCR were derived from actual application of these technologies to cement kilns. Thus, there is too much

TABLE 6

ACHIEVABLE NO_x REDUCTION WITH VARIOUS NO_x CONTROL TECHNOLOGIES AS CONCLUDED IN USEPA ACT DOCUMENT

NO_x Control Technology	Achievable NO_x Emissions Reduction (%)
Process Modifications	25
Staged Combustion in Pre-calciner	30 - 45
Conversion to Indirect Firing with a Low-NO_x Burner	20 - 30
Mid-Kiln Firing of Tires in Long Kilns	20 - 40
SNCR	30 - 70
SCR	80 - 90

Source: USEPA ACT Document (EPA-453/R-94-004, March 1994) uncertainty in the base cost values to use these numbers with confidence. Furthermore, cost and efficiency data were based on 50% control with urea reagent SNCR, 70% control with ammonia reagent SNCR, and 80% control for SCR. The data presented in the ACT document does not justify the ability to assume such high control efficiencies for technologies that have not been tested in a full-scale situation in the respective industry. For this reason, the cost and cost-efficiency data presented in the ACT Document is not deemed to have relevance to this BACT review.

One additional observation relates to the emission data presented in the ACT Document. All data presented were single one-hour test runs. While USEPA reviewed the range of tested results from all cement kilns reporting and derived an "average emission" from this, the substantial variability shown by individual kilns with multiple data points was not further discussed. For example, the California Portland Cement (Colton, CA) Unit I, a long dry-process kiln, reported NO_x emission values ranging from 3.25 lbs NO_x/ton CL to 7.1 lbs NO_x/ton CL out of eight data points presented. Similarly, the Lone Star Davenport facility in Santa Cruz, CA (now called the RMC-Pacific Lonestar facility), a dry process preheater/precalciner kiln, reported NO_x emission values ranging from 1.84 lbs NO_x/ton CL to 4.02 lbs NO_x/ton CL out of eight data points presented. It has been reported that these facilities operate with NOx emissions in the range of 2.5-2.8 lb NOx/ton CL[11] and the Colton facility recently underwent facility modifications to meet these levels. Based on the data presented in the ACT Document, these low NOx emission levels from single stack tests appear to be within the variation of historically reported values from these facilities, bringing to question their ability to consistently operate with low NOx emissions. This inherent emissions variability presents problems in trying to establish a uniform emission level for all kilns for which all kilns can comply. Similarly, with such variability, it would appear difficult to determine the success of applied control options based on short-term tests. Furthermore, this variability leads to the conclusion that NO_x emission limits must be associated with longer averaging times as short-term excursions can occur regularly.

USEPA NO_x Control Technologies for the Cement Industry

This USEPA document was prepared as an update to the ACT Document previously discussed. In addition, it is stated in the document that comments received on the ACT Document, as well as more recent emissions control technology and cost data are incorporated.

This document discusses several more recent NO_x reduction technologies, such as bio-solids injection and the CEMSTAR® process. It also provides a basic summary of more recent emissions

[11]Linero, A.A., "What's Up With Cement Plant Permitting?", Proceedings of the 94th Air and Waste Management Association Annual Conference and Exhibition in Orlando, FL, June 2001.

data said to have been received from state regulatory agencies. This new data is not presented individually for analysis, as was done in the ACT Document. This new data is even discredited for use within the document due to the use of kiln "capacities" rather than true production rates at the time emissions data were collected to calculate emissions per unit of production (lbs/ton CL). The true usefulness of this data, except to indicate that current kilns can produce lower NO_x emissions than those reported in the 1994 ACT Document, is at question.

This USEPA document provides similar if not the same conclusions that the 1994 ACT Document presented. Updated costs for SNCR and SCR were not developed. No additional SCR pilot test data or other operational data was presented other than that in the 1994 ACT Document.

This USEPA document presents little new data regarding post-combustion NO_x control applications or trials. Briefly discussed are the results of two pilot tests of NO_xOUT®, one on the Ash Grove facility in Seattle, Washington and the other at a La Farge facility in Davenport, Iowa. To date, no technical report or paper has been issued regarding the test at La Farge, Davenport. Apparently, from a personal communication, it was presented that, "This test found NO_x reductions of [only] ten to 20 percent from a baseline of approximately 350 lbs NO_x/hour, although higher levels of reduction are thought to be achievable with a higher baseline."[12] Please note that the proposed FCS Unit II kiln is expected to have a lower NO_x baseline (approximately 292 lbs NO_x/hour).

The Ash Grove data presented in this document has been quoted numerous times in numerous publications. The results of the tests, as stated in the USEPA document, "NO_x emissions were effectively reduced from 3.5 to 6.0 lbs NO_x/ton of CL to less than one pound NO_x/ton of CL," is an extreme oversimplification of the test. A review of the technical paper produced by Nalco Fuel-Tech,[13] shows some inconsistencies and problems with the tests that appear to be undiscussed relative to the result. These are:

1) The Ash Grove tests were done while firing natural gas and only 5 - 9% of total heat input to the calciner. This would result in a substantially higher NO_x baseline concentration than the low-NO_x pre-calciner kiln fired on coal and tire-derived fuel planned for the FCS Unit II kiln.

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[12] "NOx Control Technologies for the Cement Industry", Final Report, EPA Contract No. 68-D98-026, Prepared By EC/R Incorporated, September 19, 2000.

[13] *Reduction of NO_x Emissions from Cement Kiln/Calciner through the Use of the NOxOut® Process*, W. H. Sun, M. J. Bisnett, and D. W. Kirk, Nalco FuelTech and H. E. Steuch and J. Hille, Ash Grove Cement Company, Presented at the International Specialty Conference on Waste Combustion in Boilers and Industrial Furnaces, sponsored by the Air & Waste Management Association, Kansas City, MO, April 21, 1994.

2) NO_x reductions to one lb NO_x/ton CL occurred only at high reagent flow rates [Normalized Stochiometric Ratio (NSR) exceeding 2] of 80 to 100 gallons per hour. At half this rate (NSR = 1) ammonia slip was exceeding 10 ppm.

3) For determination of NO_x reductions, baseline NO_x was determined at the exit of the kiln and urea reagent was introduced into the calciner. NO_x reduction efficiency was determined as the difference between measured NO_x concentrations at the kiln exit and at the stack. In this case, it is unknown what amount of NO_x reduction was occurring in the pre-calciner. A comparison of kiln exit NO_x and stack NO_x measurements without urea reagent injection showed that approximately 50% of the data showed a reduction across the calciner. This reduction ranged from 10 to 20%.

4) Urea reagent injection and decreased pre-heater oxygen concentration was shown to increase emissions of CO and SO_2.

5) Although several data points showed NO_x emission reductions to the 100 pounds per hour (pph) level (equivalent to one lb NO_x/ton CL), the majority resided in the 200 pph level or better.

6) It is also noted that changing the calciner fuel from gas to coal decreased the NO_x reduction observed during the tests. This would infer that lower NO_x conversion occurred with lower baseline NO_x concentrations. The coal-fueled data was not separated from the natural gas only data for analysis.

Representatives of Nalco Fuel-Tech provided another technical paper on more recent pilot tests conducted on two pre-heater/pre-calciner kilns located in Taiwan.[14] SNCR cost data developed as a result of these pilot tests are presented in the USEPA document as Kiln A and B in Table 6-12, *Basis for Cost Analysis of NO_xOUT®* (1997). However, the USEPA document does not present a discussion of the results of the test program when several of these results are in direct contrast to the results from the Ash Grove tests. In a personal communication[15] with a representative of Nalco Fuel-Tech, it was relayed that Nalco Fuel-Tech has learned significantly more about NO_xOUT® application to cement kilns than was known when the Ash Grove tests were conducted. What is

[14] *Cement Kiln NO_x Reduction Experience Using the NOxOut® Process*, M. Linda Lin and Michael J. Knenlein, FuelTech, Inc., from the Proceedings of 2000 International Joint Power Generation Conference, Miami Beach, FL, July 23-26, 2000.

[15] Personal Communication Between Michael J. Hober and Mr. Michael J. Knenlein of Nalco FuelTech, Telephone Conversation. August 2001.

known now is that flue gas NO_x concentrations can vary significantly over short-term periods and that has a pronounced effect on NO_xOUT® efficiency. In general, NO_xOUT® is effective at NO_x baseline concentrations in excess of 300 ppm and percent removal increases with increasing concentration. NO_xOUT® removal efficiency is marginal for NO_x baseline concentrations between 200 - 300 ppm and virtually non-existent at concentrations less than 200 ppm. In general, Nalco Fuel-Tech prefers NO_x baseline concentrations in excess of 500 ppm to get good NO_x conversion. Another realization is that this baseline can vary substantially, so a statistical analysis of 48 hours of CEM data, and more if available, is recommended to estimate this "baseline" NO_x concentration.

The CEMSTAR® process is a kiln feed modification that can reduce NO_x emissions by the addition of a small amount of steel slag to the raw kiln feed. Developed and patented by TXI Industries, the addition of slag improves thermal efficiency by decreasing the amount of limestone calcination needed per unit amount of product.. The result is reduced formation of NO_x and CO emissions.

In general, the highest NO_x reductions are expected, and have been shown, in wet process kilns and long dry kilns. Kilns with lower initial baseline NO_x emissions, such as FCS, are expected to show minimal NO_x reductions, if any. Data presented from a single test series on a TXI pre-heater/pre-calciner kiln with baseline NO_x emissions roughly twice that of the FCS Unit II kiln showed NO_x reductions ranging from 9 to 44%. Data presented also showed that NO_x reduction varied by raw material rate and mix quality. This variation in NO_x emissions is also within the range of variation for normal operation, which means actual reductions, if any, could be substantially overstated.

Application of CEMSTAR® can have some detrimental effects on clinker quality, such as increasing the iron percentage in the raw mix and increasing the levels of alkali and magnesium oxides (MgO). Trials of the CEMSTAR® process at the Holnam Midlothian facility have not indicated a reduction in NO_x formation and have resulted in a substantial reduction in clinker quality.[16] Further testing of CEMSTAR® on new low-NO_x pre-heater/pre-calciner kilns is necessary to determine if CEMSTAR® could show actual NO_x reductions at the FCS facility.

A similar effect to Cemstar can be achieved by adding granulated blast furnace slag to ground clinker when producing end-product cement. Many cement producers do this to produce more cement from a given amount of clinker and there is no expenditure in fuel to heat the material in the kiln. Also, because the Cemstar process is patented, adding granulated blast furnace slag to end product cement avoids paying a patent royalty to a competitor.

[16] IBID[7]

According to the ACT Document update, Mitsubishi Cement Corporation's Cushenberry Cement facility in Lucerne Valley, CA utilizes bio-solids injection as SNCR for NO_x control. Bio-solids are obtained from area wastewater treatment facilities. The basic principle is to utilize the naturally occurring ammonia content of the dewatered bio-solids as the reagent. Information provided states that the bio-solids injection system underwent long-term testing in 1994 and 1995 with subsequent adoption. Utilization of bio-solids injection coincided with the introduction of tire-derived fuel at the facility. Thus, the company has not identified whether observed NO_x reductions are due to use of tire-derived fuel or bio-solids injection. Mitsubishi Cement Company estimated that use of tire-derived fuel reduced NO_x emissions by 30 - 40%, and the combination of the tire-derived fuel and bio-solids injection has produced an overall 50% reduction in NO_x emissions. The effects on CO emissions vary substantially and kiln fuel consumption has increased by only five percent.[17]

The information provided in the ACT Document update appears to have been preliminary in that more recent technical information from Mitsubishi Cement Company contradicts much of the information provided in the ACT Document update. According to information provided by Mitsubishi Cement Company[18], the bio-solids technology development has progressed through the feasibility study and two phases of demonstration testing. The Phase I testing consisted of a single test series conducted in 1995. Phase II testing is still underway. Thus, the bio-solids injection system currently is a demonstration project that is still under investigation. As best can be derived from this paper, only a single test series conducted in 1995 is being used as confirmation that bio-solids injection can achieve consistent NO_x reductions. This is hardly what can be considered as long-term testing.

Along with the lack of long-term verification data and statistical analysis, a number of other very serious problems were noted:

1) Usage of bio-solids injection required a reduction in kiln feed rate of 16%.

2) Usage of bio-solids injection resulted in a 14% increase in total fuel usage (22% in the pre-calciner and 6% in the kiln) on a MMBTU/ton CL basis.

3) Usage of bio-solids resulted in a 22% increase in kiln fan power consumption on a kilowatt (kw)/ton CL basis.

[17]IBID[12]

[18]*Biosolids Injection Technology: An Innovation in Cement Kiln NO_x Control*, H. O. Boggs, Plant Manager Mitsubishi Cement Corporation,

4) The 1995 test series showed an approximate 500% increase in CO emissions with a corresponding 45% decrease in NO_x emissions.

5) Bio-solids economics are highly dependant on the availability of sludge that would not test hazardous, and for which wastewater treatment facilities are having problems disposing, or paying a high "tipping fee" to dispose.[19]

6) Bio-solids injection system mechanical failures have been troublesome due to variability in bio-solids consistency, inability to clean process equipment, and overall difficulty in handling bio-solids.

7) No evaluation was presented on any potential effects on clinker quality.

Based on the above actual account of the bio-solids injection demonstration project at the Mitsubishi Cement Company Cushenberry facility, significant additional testing is needed before this can be considered a commercially viable system. Please note that the permitted NO_x emission limit for the Mitsubishi facility is 6.4 lbs NO_x/ton CL.

The ACT Document update included costs for SNCR for both bio-solid injection and urea injection (NO_xOUT®). Data for bio-solids injection came from a single facility in California (Mitsubishi) and showed that collected tipping fees offset the cost of the system. Currently, Rinker has no desire or intention of importing, storing, and using bio-solids. It is reported in the document that the urea injection costs were provided by a verbal communication with a representative of Nalco Fuel-Tech. A breakdown of these costs is not provided in the document. Thus, these values are not substantiated. It is also stated that additional cost estimates were obtained from two facilities (La Farge Corporation and California Portland Cement Company), but these were not presented because costs for the two potential installations were much higher than the vendor costs. Thus, it appears that the preparers of the ACT Document update considered a cost approximation from a control vendor more accurate than actual costs incurred at two facilities that pilot tested SNCR.

The vendor costs provided in the document are not itemized for application to other facilities and were not developed to a cost-effectiveness value (cost per ton NO_x removed). Thus, the SNCR costs provided in the document are of little use or relevance for comparison to other facilities.

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[19]Memo from Mr. David M. Long of Cement Industry Environmental Consortium, Riverside CA to Mr. Scott P. Heath of RTP Environmental Associates, Inc. RE: Cost and Application Details of U.S. Patents 06176187 and 05586510, July 19, 2001.

European Commission Reference Document

The European Integrated Pollution Prevention and Control Bureau (IPPCB) produced a *Reference Document on Best Available Technologies (BAT) in the Cement and Lime Manufacturing Industries* (March, 2000). This document presented the results of an exchange of information between European Union member states and industries regarding BAT for pollution control, associated monitoring, and current developments.

Table 7 provides a summary of the current European IPPC recommended BAT for new and modified cement kilns in the European Union. It is interesting to note that the report presented three opposing views regarding NO_x emissions. The first view consists of the recommended levels presented in Table 7. The second view proposed by the European cement industry recommended that the NO_x emissions be established higher, at a level of 500 - 800 mg NO_x/m^3. This view was predicated on the fact that kilns were using some form of SNCR at that time, all were achieving low efficiencies (10 - 50%) to obtain emission levels below 800 mg NO_x/m^3. Limited experience with application of SNCR at higher reduction efficiencies and the subsequent uncertainty regarding additional ammonia emissions, detached plumes, pre-heater plugging, etc. did not justify a lower recommended BAT. Examples of kilns achieving substantially higher NO_x reduction efficiencies with SNCR presented in this document appear to be old facilities with very high NO_x emissions with the greatest potential for reduction. It is questionable if such high NO_x reduction efficiencies can be achieved with newer kilns that have substantially lower baseline NO_x emissions.

The third opposing view considered that SCR should be BAT with an emission level of 100 - 200 mg NO_x/m^3. This view was proffered despite the fact that no commercial SCR was operating in Europe at the time of the document write-up and only feasibility studies and pilot plant tests had been done. It was noted that a full-scale SCR was expected to be operational by late 1999. In the report's discussion of SCR, it is presented that SCR pilot tests in Austria, Germany, Sweden, and Italy showed promising results, though an Austrian test reported considerable abrasion of the catalyst after 5,000 hours of operation. After a pilot test by Cementa AB in Slite, Sweden, the company determined that the cost of SCR was too high and not reasonable. The report also notes that the first full-scale SCR system was under construction in Germany with governmental financial support. Another full-scale SCR was planned in Austria, also with governmental financial support. Thus, no individual company has been required to install full-scale SCR or high efficiency SNCR and bear the full cost of doing so.

The report also discusses innovative controls, such as an activated carbon filtration unit at the HCB Holderbank facility in Siggenthal, Switzerland. Literature reports have established that this facility incorporates SNCR and an activated carbon filter to reduce emissions above what is currently

TABLE 7
COMPARISON OF CURRENT EMISSIONS
FROM EUROPEAN KILNS
WITH RECOMMENDED BAT LEVELS

Pollutant	**European Ranges of Emissions**			**European Recommended BAT**	
	mg/Nm^3 [1]	**kg/mton CL**	**lbs/ston CL**	**mg/Nm^3**	**lb/ston CL**
NO_x	<200 - 3000	<0.4 - 6	<0.8 - 12	200 - 500[2]	0.8-2.0
SO_2	<10 - 3500	<0.02 - 7	<0.04 - 14	200 - 400	0.8-1.6
TSP/PM_{10}	5 - 200	0.01 - 0.4	0.02 - 0.8	20 - 30	0.08-1.2
CO	500 - 2000	1 - 4	2 - 8	NLR	NLR
VOC	5 - 500	0.01 - 1	0.02 - 2	NLR	NLR

[1]Emission levels are expressed on a daily average basis at dry standard conditions corrected to 10% oxygen in the flue gas.

[2]The cement industry recommended a higher BAT level of 500 - 800 mg NO_x/Nm^3

NOTES: 1 kg/metric ton CL = 2 lbs/short ton clinker
mg/Nm^3 = milligrams per normal cubic meter
lbs/ft^3 = pounds per cubic foot
kg/mton CL = kilograms per metric ton of clinker
lbs/ton CL = pounds per ton of clinker
NLR = No Limit Recommended

Source: European Integrated Pollution Prevention and Control Bureau (IPPC) - *Reference Document on Best Available Techniques in the Cement and Lime Manufacturing Industries*, March 2000.

required (considered BAT). As best as can be derived from available literature, this is the only filter of this type installed thus far at a cement plant. This system uses a special activated coke, called POLVITEC®, which is produced from German lignite and has an extremely high surface area. Once the adsorbers are saturated it is blended and used as kiln fuel. This highly activated coke material is not available in the United States. Activated charcoal could possibly be used as a substitute, but the necessary quantity relative to the POLVITEC® would be cost prohibitive because the number of active sites available in the POLVITEC® material is approximately 10 times higher than typical activated carbon.[20] Based on information provided in this report and HCB Holderbank company literature, the facility had other reasons for installing this innovative technology. Siggenthal is permitted to burn hazardous waste, contaminated soils, and sewage sludge from the city of Zurich, which apparently heavily subsidized the installation of the innovative control equipment. In a recent letter to USEPA regarding an upgrade to an existing facility, Holnam, Inc., a subsidiary of HCB Holderbank, states that the local government funded the installation of the carbon filters.[21] It is also interesting to note that after approximately seven years of operation, no other European facility, including the other four facilities owned by HCB Holderbank in Switzerland, have installed this type of activated carbon filter.

Generally, it appears that the conclusions drawn and recommendations made in this document were derived from an extremely limited data set. Similar to the USEPA ACT Document, it is assumed that NO_x reduction with SNCR from tests on one kiln is universally applicable to all kilns. It should also be understood that the European IPPCB recommendations are merely recommendations and not requirements. Individual European Union members enforce requirements through their individual environmental agencies, with significant differences in those requirements. Furthermore, the European IPPCB recommendations establish no levels for CO and VOC, which play a role in efforts to control NO_x. The European IPPCB report does not appear to establish recommendations for monitoring, such as Continuous Emission Monitors (CEMs) for pollutants and opacity, nor does it discuss averaging times for the emission levels recommended. All play a role in a facility's ability to comply with emission requirements. Finally, problems have been encountered in the past when comparing European emissions data with U.S. emissions data due to differences in testing methodologies and techniques. This was highlighted during USEPA review of European emissions data while developing standards for Municipal Waste Combustors (MWC). As stated in the *Background Information Document for Promulgated Standards and Guidelines - Public Comments and Responses for Municipal Waste Combustors*:

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[20]*BACT: What is Achievable with Today's Technologies*, Mark S. Terry, Krupp-Polysius Corp, from the Proceedings of the 36th International Cement Seminar, Charleston, South Carolina, December 3-6, 2000.

[21]IBID[8]

> *The EPA agrees that it is difficult to compare European performance data to U.S. performance data due to the difference in test methods, QA standards, and reporting methods. As noted in the proposal preamble and by the many commenters above, there are differences between the EPA and EU guidelines with respect to regulatory flexibility, compliance, and test methods used to measure emissions. These factors must be considered when comparing the respective emission requirements. Also, as some of the commenters noted, there are differences in national policy towards combustion of MSW and funding of projects.*[22]

For this reason, USEPA refrained from using European data in developing the MWC standards.

Portland Cement Association (PCA) Report

Penta Engineering Corporation prepared a document entitled *NO_x Formation and Variability in Portland Cement Kiln Systems, Potential Control Techniques, and Their Feasibility and Cost-Effectiveness* for the Portland Cement Association, as well as the American Portland Cement Alliance and the Carolina Portland Cement Association. The purpose of this document was to conduct an independent technical, engineering, and cost review of various NO_x reduction techniques for the cement industry relative to those identified in the USEPA ACT Document.

The PCA report reiterates the limited amount of NO_x emissions data for alternate control options presented in the 1994 USEPA ACT Document. The PCA report also presents the results of additional research into pre- and post-combustion control of NO_x in cement kilns. Of primary note is the continued variability of NO_x emissions data and NO_x reductions by control techniques for a given set of conditions. The information presented in the report does not refute that overall lower NO_x emissions can be achieved through application of pre- and post-combustion controls. However, this report projects significantly lower expected control efficiencies than those reported in the 1994 ACT Document and the update to the ACT Document. The primary reason for this is that USEPA, in the ACT Document, assumed that cement kilns are similar to pure combustion sources, such as boilers. This led USEPA to conclude that NO_x controls will be as effective on cement kilns as on pure combustion sources. Though combustion is a primary part of cement manufacturing, the cement kiln is, in fact, a reactor vessel in which both endothermic and exothermic reactions occur to change the physical characteristics of the raw feed materials, to produce and form clinker. Small

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[22]*Municipal Waste Combustion: Background Information Document for Promulgated Standards and Guidelines – Public Comments and Responses*, Emission Standards Division, United States Environmental Protection Agency, Office of Air and Radiation, October, 1996 (EPA-453/R-95-0136).

changes to a cement kiln burning zone temperature can result in large variations in NO_x emissions. Given that the primary contributor to NO_x emissions from a cement kiln is thermal NO_x from the high-temperature combustion, substantial variation in this temperature will produce substantial variation in NO_x emissions.

The report presents data from a research project conducted at the Riverside Cement Company, Crestmore plant located in Rubidoux, CA in the mid-1980's. Continuous Emissions Monitoring (CEM) data for NO_x, at six-minute averages, are shown to validate the high variability of NO_x emissions. A review of a short-term period of 240 consecutive data points (24-hour period) showed NO_x emissions vary from two to 14 lbs/ton CL. Similar variation is shown over a long-term period of 270 daily averages with NO_x emissions ranging from less than two to over 14 lbs/ton CL. The majority of the daily average data ranged from three to nine lbs/ton CL. However, a significant number of daily average values were outside that range.

This study shows that short-term stack tests for NO_x, as well as short-term tests of NO_x control efficiencies, do not provide meaningful estimates of expected average emissions and control efficiency. NO_x emissions limitations, as well as emissions control, must take into account this variability by establishing higher limits and/or extending compliance averaging times. Ideally, data should be collected continuously for up to a year to encompass variations in feed, operations, fuels, products, etc. Once the data are collected, rigorous statistical analyses are necessary to derive an accurate and achievable NO_x emission limit.

The above-mentioned study was conducted on a long, dry process kiln. This analysis was further validated in a 1999 Technical Study comparing the Crestmore Plant with a pre-heater kiln owned by Lonestar Industries, Inc., located in Maryneal, Texas, and a wet process kiln owned by the Dragon Products Company, located in Thomaston, Maine.[23] As in the earlier study, this review showed that measured NO_x emission values cannot be averaged over a short period of time, such as a stack test. Also stated in this report is that statistical parameter estimates are essential for the comparison of NO_x emissions before and after application of alternative control techniques to determine their effectiveness for NO_x reduction. Otherwise, it is questionable if NO_x emissions reductions by application of a control technique are real or simply within the statistical variation of the plant

[23] *Time Variability of NO_x Emissions from Portland Cement Kilns*, L. J. Walters, Jr. And M. S. May, III, PSM International; D. E. Johnson, Department of Statistics, Kansas State University; R. S. MacMann, Penta Engineering; and W. A. Woodward, Department of Statistics, Southern Methodist University. American Chemical Society, 1999.

emissions. The need to perform these statistical analyses has also been realized by SNCR vendors, such as Nalco Fuel-Tech.[24]

For these reasons, the PCA report modified USEPA's expected control efficiencies of various NO_x control techniques and applied ranges to represent the potential variability without long-term test data. Table 8 presents these results.

As discussed previously, the Florida Crushed Stone Unit II Kiln will incorporate process controls, low-NO_x burners, and staged combustion, as well as tire-derived fuel combustion to produce inherently low NO_x emissions from the kiln without post-combustion control (SNCR). Thus, the effectiveness of post-combustion control is questionable, given the expected low-NO_x concentration in the flue gas. With this expected low-NO_x concentration, more ammonia would be required for equivalent control, which could increase the potential for ammonia slip and a visible detached plume. In addition, the location required for SNCR reagent injection in a pre-heater or pre-calciner kiln corresponds to the area of the kiln system with the highest concentration of volatile sulfur compounds. Internal re-circulation of volatile sulfur compounds can increase the gas phase concentration of sulfur an order of magnitude or more at the location required for SNCR reagent injection. Build-up of ammonium bi-sulfite could quickly plug duct work or cause other problems that could produce a kiln outage. The kiln feed raw materials utilized at the Florida Crushed stone facility naturally contain low amounts of sulfur that produce very low SO_2 emissions. However, insufficient data exists to rule out ammonium bi-sulfite formation, deposition and plugging as potential problems if SNCR is applied to the Florida Crushed Stone Unit II Kiln.

The PCA report lists additional literature data of tests of SNCR on cement kilns in both Europe and the United States than that presented in the USEPA documents. This data, once again, shows substantial variation in achieved results based on short-term limited testing. NO_x reductions varied with the type of kiln, SNCR reagent utilized (urea, ammonia water, or biosolids), process point of injection, molar ratio, baseline NO_x concentration, etc. Generally accepted results from the data were:

1) Baseline NO_x concentration can vary over an extremely wide range.

2) Ammonia slip can cause a detached plume, increase stack opacity, or exceed allowable emission limits for ammonia.

[24]IBID[14]

TABLE 8
ACHIEVABLE NO_X REDUCTION
WITH VARIOUS NO_X CONTROL TECHNOLOGIES

NO_X Control Technology	**Available NO_x Emissions Reductions (%)**
Process Modifications/Controls	0 - 30
Staged Combustion in Pre-Calciner	30 - 40
Conversion to Indirect Firing with a Low-NO_x Burner	0 - 20
Mid-Kiln Firing of Tires in Long Kilns	0 - 30
SNCR	15 - 65
SCR	N/A

Source: *Report on NO_x formation and Variability in Portland Cement Kiln Systems, Potential Control Techniques and Their Feasibility and Cost-Effectiveness*, Penta Engineering Corporation for the Portland Cement Association, 1999.

NOTES: NO_x = Nitrogen Oxides
SNCR = Selective Non-Catalytic Reduction
SCR = Selective Catalytic Reduction
N/A = Not addressed in report.

3) Ammonia utilization, and thus NO_x reduction, decreases significantly with decreasing NO concentration in exhaust gases (SNCR appears less promising at low baseline NO_x emissions rates).

4) Application of SNCR can increase emissions of carbon monoxide (CO), nitrous oxides (N_2O), and ammonia compounds in aerosol form.

5) Several tests identified higher NO_x reductions with ammonia water injection than with urea injection.

6) One test showed increased SO_2 emissions over baseline emissions when urea was utilized as a reducing agent.

The PCA report developed an estimated cost-effectiveness for application of SNCR control to various types of cement kilns. Costs were estimated for both an ammonia water injection SNCR system and a biosolids injection SNCR system. As Rinker has no intention of importing, storing, and using bio-solids in the FCS Unit II operation, only the ammonia water SNCR system will be considered. Scaling the estimated costs for the pre-calciner kiln with alkali bypass for the FCS Unit II capacity utilizing the six-tenths rule and assuming an overall 25% NO_x reduction given the low baseline NO_x emission, the cost-effectiveness value increased to approximately $7,250.00 ton/$NO_x$ removed. This is a gross approximate estimate, as the PCA report's costs are scaled from a single cost value for a smaller plant. Attachment II presents assumptions and calculations for this cost.

3.5.4 More Recent NO_x Control Information

Although several of the above guidance documents have been issued in the last two years, most of the data presented in them is substantially older. Limited additional data, especially long-term operational data, from either European or U.S. facilities regarding NO_x abatement technology has been made available. Furthermore, significant controversy has emerged relative to the potential incompatibility of SNCR with new low-NO_x designed multi-stage combustion pre-calciners.[25] Given that the bulk of European experience with SNCR is low-NO_x conversion application to pre-heater kilns with very limited application to pre-heater/pre-calciner kilns, this incompatibility issue needs to be addressed.

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[25] *Selective Non-Catalytic Reduction and the Low NOx Precalciner Kiln: Limitations on NOx Control*, Robert J. Schreiber, Jr., Allison Lauf, Dan Carney (Schreiber, Yonley and Associates), and Mark Terry (Krupp-Polysius).

In theory, multi-stage combustion systems would need to be designed to allow NO_x reduction and CO oxidation to occur simultaneously (or sequentially) in order for SNCR to be effective without increased CO and ammonia emissions. With this realization, it was questioned whether ammonia or urea would be best suited for SNCR with multi-stage combustion with the potential for increased CO emissions. While these issues are still under investigation and evaluation, a summary of more recent information follows, including an update of NO_x abatement measures in Europe, recent NO_x BACT Determinations for U.S. facilities, and preliminary results from testing of SNCR with MSC on European facilities by Krupp-Polysius.

European Experience

A technical paper, *New Development in NO_x Abatement in the Cement Industry, Part 2*,[26] prepared by H. Xeller and presented in ZRG International in 1999, provided the following summaries of the State-Of-The-Art European NO_x abatement on cement kilns, many of which contradict recommendations made in the European IPPCB report:

1) Non-process integrated, or end-of-pipe NO_x abatement measures can have substantial ecological impacts that are often overlooked in achieving short-term NO_x emission levels. Thus, it is recommended that the evaluation criteria used in Germany be changed and a sliding long-term value should be set as the NO_x limit instead of a short-term limitation.

2) Evaluation processes which, similar to the USA, limit the annual output or stimulate rolling average values over 30 days, deal better with the NO_x abatement objectives and the requirement for process-integrated measures.

3) NO_x abatement rates of up to 30% or more are often promised by suppliers of low-NO_x burners but cannot be achieved in long-term operation. A survey showed that no improvements in NO_x reduction were achieved with 50% of replacement low-NO_x burners.

4) Staged combustion is being implemented in all plants where possible. However, plant optimization for staged combustion can involve substantial effort to achieve NO_x reductions, which often can only be maintained at the expense of CO emissions.

[26] *New Developments on NOx Abatement in the Cement Industry*, H. Xeller, ZKG International, 1998.

5) Use of SNCR to achieve and establish low NO_x emission limits requires further optimization of the temperature window and residence time without increased ammonia emissions. Parallel operation of staged combustion and SNCR at the Slite Cement Works in Sweden led to operational difficulties.

6) The Lurenox® process, which involves injection of solid urea in conjunction with a catalyst (iron sulfate monohydrate) that is fed with the kiln meal, does not appear to produce verifiable NO_x reductions. Tests of the process showed no NO_x abatement achieved. Furthermore, the cost of the catalyst and urea was shown to be economically disadvantageous.

7) Low-dust SCR is not considered economically or ecologically effective and the process is not being pursued for cement kilns.

8) High-dust SCR is being pilot tested with small slip streams at several plants. Any statement on the operational feasibility of this process at full plant scale will require substantially more time.

Recent BACT Determinations

Several air permit applications with associated BACT determinations more recent than the FCS Unit II permit have been submitted to, or approved by regulatory agencies. Table 9 lists three of these facilities for which copies of their permits and permit applications were obtained - Continental Cement (St. Genevieve, MO), and Holnam, Inc. (Holly Hill, SC and Midlothian, TX). In all three, SNCR was determined to be technically infeasible. Kiln optimization and multi-stage combustion was proposed and determined to be BACT in all cases.

Based on available information, only two new facilities have proposed installation of SNCR in the United States. The Great Star facility proposed in Clark County, NV proposed use of SNCR in an application submitted in the mid-1990s. This facility was never built and the application was withdrawn.[27] Recently, St. Lawrence Cement Company has proposed to install SNCR on their proposed facility in Greenport, NY. As part of the LAER determination, the April 30, 2001 draft permit allows St. Lawrence Cement three years to achieve a NOx emission limit of 2.8 lb/ton CL (on an annual average) from an initial limit of 3.6 lb NOx/ton CL. The draft permit is currently under

[27] Personal Communication Between Scott Heath or RTP Environmental Associates, Inc. and David Wignall of the Clark County Nevada Health District, May 2001.

review and is expected to be reissued with substantial revision in the spring or summer of 2002.[28] More recent information indicates that the NOx permit limits included in the draft permit are being contested. St. Lawrence Cement may apply for "innovative technology" that would establish emission limits after demonstration of the technology.[29]

NO_x Emissions Variability

As previously presented in Section 3.5.3, recent studies have been performed in an attempt to quantify the variability of NO_x emissions from Portland cement kilns. Research conducted by L.J. Walters, Jr. and M.S. May, III, et al. and published in a technical article in 1999[30] presents data collected from five Portland Cement kilns - the Riverside Cement Company Crestmore Plant in Rubidoux, CA; the Lone Star Industries Maryneal Plant in Maryneal, TX; The Dragon Products Company plant in Thomaston, ME; the California Portland Cement Company located in Colton, CA; and the St. Lawrence Corporation plant in Hagerstown, MD. The studies presented the following recommendations and conclusions:

1) "The determination of the average emission rates and the uncertainty of the average has been improperly calculated by the cement industry and regulatory agencies"[31]

2) "The statistical analysis of NO_x emissions from cement kilns has not been rigorous. Correct calculation procedures for statistical parameter estimates, such as means and standard deviations, must be used. Such statistics are essential for the comparison of NO_x emissions before and after application of alternate control techniques to determine their effectiveness for NO_x reduction"

3) "Complexities inherent in the generation of NO_x from Portland cement kilns result in inappropriate analyses of CEM data."[32]

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[28] Personal Communication Between Scott Heath of RTP Environmental Associates, Inc. and Michael Higgins of the New York State Department of Environmental Conservation, January 2002.

[29] Personal Communication Between Michael Hober of RTP Environmental Associates, Inc. and Mark Terry of Krupp-Polysius, January 2002.

[30] IBID[23]

[31] IBID[23]

[32] IBID[23]

TABLE 9
RECENT FACILITY NO_x BACT DETERMINATIONS

Facility	Location	Proposed NO_x (lbs ton/CL)	Comments
Continental Cement[1]	St. Genevieve, MO	2.3 annual average	BACT determined SNCR to be technically infeasible. Kiln optimization with multi-stage combustion is proposed as BACT. Application submitted 5/30/2001
Holnam, Inc.[2]	Holly Hill, SC	4.48 (first year) 4.33 (second year) annual average	BACT determined SNCR to be technically infeasible. Kiln optimization with multi-stage combustion is BACT by DHEC determination dated 10/13/2001.
Holnam, Inc.[3]	Midlothian, TX	2.8 annual average	SNCR determined to be technically infeasible. Kiln optimization with multi-stage combustion is proposed BACT. Application submitted 08/2000.

[1] *Air Emission Permit Application - Prevention of Significant Deterioration and National Emissions Standards for Hazardous Air Pollutants* - Barr Engineering Company, March 31, 2001.

[2] South Carolina Bureau of Health and Environmental Control - Bureau of Air Quality - *Final Determination for Holnam - Holly Hill Plant, Orangeburg County, SC*, October 13, 2000.

[3] Excerpts from Environmental Quality Management, Inc.'s NO_x, CO and VOC BACT Review for the Holnam, Inc. Facility in Midlothian, TX, September 2000.

4) "Regulatory limits and evaluations may be misapplied because the assumption is made that NO_x measurements are independent and normally distributed. However, the degree of auto-correlation which is observed for NO_x measurements from Portland cement kilns require an alternative method of interpretation."[33]

5) NO_x values cannot be averaged over a short period of time. This is especially true when a "few" grab samples are taken during "source tests."[34]

Additional SNCR Testing

Krupp-Polysius has conducted is in the process of preliminary testing of SNCR in conjunction with multi-stage combustion on three pre-heater/pre-calciner kilns in Europe.[35] Krupp-Polysius tested various reducing agents including urea, a 25 weight-percent aqueous ammonia solution, photo-chemicals, and others such as cyanuric acid. Based on their preliminary results, the aqueous ammonia solution provided the most cost-effective NO_x reduction with the lowest secondary impacts, such as CO emissions increase, energy consumption, etc. Furthermore, injection location of the NO_x reducing agent was determined to be critical to optimize system performance. NO_x reductions of up to 50% were achieved, even at low-NO_x baseline concentrations. This has yet to be verified during long-term operations.

The ammonia water SNCR system is currently in full operation on one pre-heater/pre-calciner kiln in Europe. Krupp-Polysius is monitoring performance to resolve several issues presented in the preliminary testing, which were:

1) Increases of CO emissions varying from 15 - 27% were observed with corresponding NO_x reductions ranging from 20 - 50%. In addition, CO emissions tended to increase with increased NH_3 molar ratio;

2) Ammonia slip control continues to be problematic; and

3) It was inconclusive whether NO_x baseline concentration effects NO_x reduction.

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[33]IBID[23]

[34]IBID[23]

[35] Personal Communication Between Michael Hober of RTP Environmental Associates, Inc. And Mark Terry of Krupp-Polysius. October 2001.

In addition, the three European kilns where tests were conducted do not incorporate the latest generation of Low-NOx calciner design. It is unknown what effect the low-NO_x design parameters would have on the effectiveness of the SNCR system. Also, statistical review of the results has been far from rigorous. Substantial additional work is ahead to prove that observed NO_x reductions are real and continuously achievable.

3.5.5 NO_x BACT Summary

Based on our data review, the current FCS NO_x emission limit of 2.8 lbs NO_x/ton CL on a 24-hour average (considered by FDEP to be equivalent to 2.5 lbs NO_x/ton CL) is the most stringent short-term NO_x emission limit established for a cement kiln in the United States. The kiln designer, Krupp-Polysius, considers this to be an aggressive NO_x emission limit and questions whether it can be achieved continuously. Regardless, FCS's current permit includes the requirement to examine the option of employing SNCR, or propose an alternative technology should the NOx limit not be achieved within 18-months of full-scale commercial operation.

Given that the established NO_x emission limit is the most stringent short-term NOx emission limit established for a kiln, and the kiln incorporates advanced multi-stage combustion design, it is assumed that lower NO_x control can only be achieved through post-combustion control (SCR or SNCR). Therefore, low-NO_x combustion will be considered the "base case" for comparison to post-combustion control (SCR or SNCR). On combustion sources other than cement kilns, SCR has produced higher NO_x control effectiveness than SNCR and would be considered the "top" control alternative. However, though technically feasible, SCR has not been demonstrated as an effective NO_x control technology on cement kilns in the United States or Europe. Pilot tests have been conducted in Europe and some references state that full-scale units are under construction with substantial investment from European government authorities. No long-term operational data has been identified regarding SCR application to current kilns. Therefore, SCR is considered an unavailable technology for cement kilns at this time.

SNCR is the next most stringent control option that does have application experience to cement kilns, predominantly in Europe and Japan. The bulk of European experience is application of "photo-water," which is as much of a disposal mechanism for used photographic solutions than a true SNCR system. These systems were designed for low NO_x efficiencies. Also, most of the European kilns are higher NO_x emitting pre-heater kilns. SNCR NO_x control efficiency has been shown to decrease with decreasing baseline NO_x emissions. Some European kilns also utilize bio-solids injection.

As discussed previously, operational difficulties have been encountered with the combination of SNCR and multi-stage combustion, typically resulting in low-NO_x conversion, elevated CO emissions, and ammonia slip.[36] [37] Kiln designers such as Krupp-Polysius are currently investigating options to utilize both technologies to minimize NO_x emissions. Acquisition of long-term operational data demonstrating this is currently underway. Thus, for analysis, it is assumed that SNCR would achieve an average 25% control efficiency due to this uncertainty.

Application of SNCR also has additional ecological effects. Ammonia is a regulated air toxic pollutant and will be emitted in significant quantity through utilization of SNCR. Application of either urea or aqueous ammonia SNCR will produce a significant heat penalty on the kiln system equivalent to injecting water into the combustion flue gases. It is estimated that this heat penalty will require the additional firing of up to 1,000 tons of coal annually, with subsequent pollution emission and natural resource loss. Also, additional power requirements for pumps, fans, etc. require additional fossil fuel combustion.

The economics of SNCR are difficult to estimate, as little published data is available. Vendor estimates in technical papers typically do not include the full range of capital and operating costs involved, and no factual industry data could be obtained, as full-scale SNCR has yet to be installed on a cement kiln in the United States. The majority of recent BACT analyses have determined that SNCR is "technically infeasible" and cost data were not generated. For purposes of this review, approximate cost estimates were prepared from data presented in the PCA report[38] for an ammonia injection system and from the recently submitted air permit application for the Holnam Inc. facility in Midlothian, Texas for a urea injection system.[39] As discussed previously, using the PCA report's cost ranges and scaling them to the FCS facility size and using OAQPS costing methodology, the cost per ton of NO_x removed for SNCR implementation is approximately $7,474. Finally, using data presented in a recent BACT analysis for the Holnam, Inc. facility in Midlothian, Texas, scaling the data to the FCS facility capacity, and using OAQPS costing methodology, the cost per ton of NO_x removed is approximately $7,250. Therefore, the range of values developed are approximately $7,250 to $7,474 per ton of NO_x removed (see Attachment III). As can be seen, significant range exists regarding what the true cost would be, and these costs are all in the upper range of, if not

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[36] IBID[20]

[37] IBID[25]

[38] *Report on NO_x Formation and Variability in Portland Cement Kiln Systems Potential Control Techniques and Their Feasibility and Cost Effectiveness*, Penta Engineering Company, Published by the Portland Cement Association, 1999.

[39] IBID[7]

above, what has been considered "economically feasible" for application of a control technology in previous BACT determinations.

Based on a review of the energy, environmental, and economic impacts of SNCR application to the FCS Unit II kiln, SNCR is rejected as BACT. Low-NO_x combustion with emissions limited to 2.8 lbs NO_x/ton CL on a 24-hour average is determined to be BACT for NO_x for the FCS Unit II kiln.

3.6 BACT UPDATE FOR CARBON MONOXIDE (CO) EMISSIONS

Table 3 provides a summary of the range of permitted CO emissions reviewed in comparison to those for the FCS Unit II kiln. Nine facilities were identified with permitted CO emissions lower than the FCS permitted value of 2.0 lbs CO/ton CL on a one-hour average. These range from 0.21 - 1.994. The majority of these facilities have proportionally higher allowable NO_x emissions or no established NO_x emission limit. Efforts to reduce NO_x emissions through combustion controls such as multi-stage combustion typically result in higher CO emissions. The extremely stringent short-term NO_x limitation established for the FCS facility can not allow a correspondingly stringent short-term CO limitation. Of the nine facilities with lower permitted CO emissions four have corresponding low-NO_x emissions. Of the four facilities, two facilities (Continental Cement in St. Genevieve, MO and Phoenix Cement Company in Clarksdale, AZ) have yet to finish construction and demonstrate compliance; one facility (TXI Riverside Cement in Oro Grande, CA) will most likely never be built;[40] and another facility (TXI Operations, LP in Midlothian, TX) incorporates a RTO to reduce CO emissions. Please note that the permit for Phoenix Cement in Arizona allows a 30-day averaging time for the CO emission and, based on a personal communication with a state permit reviewer, Phoenix Cement has just recently applied to revise their permit to increase the CO emission to 2.0 lbs CO per ton CL, the same as the FCS value.[41]

Rinker believes that combustion control limiting CO emissions to 2.0 lbs CO per ton CL on a one-hour average basis in conjunction with a NO_x emission limit of 2.8 lbs NO_x per ton CL on a 24-hour average basis is one of the most stringent emission limits established for a cement kiln to date. To reduce CO further, without the potential for an increase in NO_x emission, it is assumed that post-combustion control would be necessary. To date, post-combustion CO control has not been specified as BACT control on a cement kiln in the U.S. However, a RTO has been installed and is operating at the TXI Operations, LP facility in Midlothian, TX. This RTO was installed so the facility could "net-out" of PSD review during a recent upgrade project. Furthermore, the Midlothian

[40]IBID[5]

[41]Telephone Call Report, Michael J. Hober, RTP Environmental Associates, Inc. and Ms. Barbra Sprungle, Arizona Department of Environmental Quality, November 2001.

facility is located very close to the Dallas-Fort Worth, Texas ozone non-attainment area, which could have triggered LAER review for VOC emissions. Holnam, Inc. incorporates RTOs on several wet process cement kilns in Dundee, MI to solve a visible emission problem determined to be a condensible hydrocarbon. Based on information presented in the recent application to revise the Holnam Midlothian facility permit NO_x emission level, it was reported that TXI is experiencing significant performance problems with their RTO at their Midlothian, Texas facility, which include high static pressure losses caused by fouling of the heat exchanger surfaces.[42]

The primary control mechanism for CO is oxidation and is typically achieved two ways: thermally or catalytically. Thus, the top control options to be considered are catalytic and thermal oxidation. Catalytic oxidation is accomplished by heating the flue gas stream containing CO and passing it through a catalyst bed to allow CO oxidation to occur at a lower temperature than thermal oxidation. Problems encountered with catalytic incinerators include catalyst plugging and fouling, catalyst deactivation, and there are limits to the amount of heat recovery that can be achieved. Thus, savings in fuel to heat the flue gas are offset by the lower heat efficiency than can be achieved. Catalytic oxidizers have been employed in numerous industrial applications, but not at a cement kiln.

Recuperative thermal oxidizers achieve CO oxidation through direct flame incineration. This requires substantially more fuel to heat incoming flue gas to CO oxidation temperatures. Recuperative thermal oxidizers are typically limited in the amount of heat recovery that can be achieved, and because of the large amounts of fuel combusted, typically results in significant additional pollutant generation. Regenerative thermal oxidizers (RTO) also achieve CO control through heating the flue gas to the CO oxidation temperatures. However, in RTOs the heat is contained in a series of ceramic beds that are alternately heated and reheated to maximize heat efficiency. RTOs tend to have higher capital costs than catalytic or recuperative thermal oxidizers. However, RTOs typically have significantly lower operating costs due to the greater heat efficiency of the ceramic bed design which result in substantially lower fuel usage than catalytic or recuperative thermal oxidizers. Catalytic oxidizers have been employed in numerous industrial applications, but not on a cement kiln. Based on available data, catalytic oxidizers, recuperative thermal oxidizers, and RTOs have not been specified as BACT for cement kilns. However, an RTO has been installed on a pre-heater/pre-calciner kiln voluntarily. As this technology cannot be considered technically infeasible, and RTOs typically exhibit higher control efficiencies with higher heat efficiency and lower secondary pollutant generation than catalytic and recuperative thermal oxidizers, application of a RTO will be evaluated on an energy, environmental, and economic basis. Utilizing information from a recent application to revise the permitted NO_x emissions from the Holnam Midlothian facility, estimated total capital costs for installation of a RTO to achieve 95% reduction in CO

[42]IBID[7]

emissions based on the costs incurred at the TXI Midlothian facility are $31,888.080.[43] Scaling this value to the size of the FCS Unit II kiln using the "six-tenths" rule yields an approximate total capital cost of $26,064,000. Total annual costs excluding capital recovery were estimated to be $11,209,800 for the Holnam Midlothian facility.[44] Scaling the total annual costs and including capital recovery (ten years at 10%) yields an approximate annual cost of $13,403,035. Estimated annual CO emissions from the facility are approximately 913 tons. Assuming the RTO achieves 95% efficiency in reducing CO emissions, the cost per ton of CO removed with the application of a RTO is approximately $15,450 per ton CO removed. This cost is significantly higher than that considered as a BACT technology.

Application of a RTO would have additional energy and environmental impacts in that fossil fuel would be burned to heat the flue gas, which would increase emissions of NO_x and CO as well as other pollutants. Electrical energy would be necessary to drive the system which would have secondary environmental impacts. The environmental and energy impacts of the RTO and their potential secondary impacts were not quantified for this review.

Based on the above analysis, application of a RTO to control CO is rejected as BACT due to the energy, environmental, and economic impacts. Good combustion practices to limit CO emissions to 2.0 lbs CO/ton CL is determined to be BACT for the FCS Unit II kiln.

3.7 BACT UPDATE FOR VOC EMISSIONS

Table 3 provides a summary of the range of permitted VOC emissions reviewed in comparison to those established for the FCS Unit II kiln. Six facilities were identified with permitted VOC emissions lower than the FCS Unit II permitted value of 0.085 lbs VOC/ton CL. These facilities' permitted VOC emissions range from 0.023 to 0.071 lb/ton CL. All of these facilities except for the TXI Riverside Cement Company in Oro Grande, CA and the TXI Operations, LP in Midlothian, TX have less restrictive permitted NO_x and CO emissions limits. As mentioned previously, we were informed that the TXI Riverside facility may never be built[45] and the TXI Midlothian facility voluntarily installed a RTO to reduce VOC emissions to "net-out" of PSD review and possibly avoid LAER implications from the adjacent Dallas-Fort Worth ozone non-attainment area. As discussed previously, combustion conditions to reduce NO_x typically result in increased emissions of CO and VOC. Rinker believes that with a restrictive NO_x permit (2.8 lbs NO_x/ton CL) and similarly

[43]IBID[7]

[44]IBID[7]

[45]IBID[5]

restrictive CO emission limit (2.0 lbs CO/ton CL) the most restrictive VOC emission limit may not be achievable with good combustion practices alone. Therefore, to achieve lower VOC emissions, post-combustion control of VOC would be necessary.

Control techniques for VOC are similar in nature to control techniques CO in that typically, thermal oxidation is employed. VOC can also be removed by condensation and filtration, but these are generally used for low exhaust flow rate sources, as they are costly in nature. The exception to this is the previously mentioned POLVITEC® filter utilized at the cement facility in Siggenthal, Switzerland. The Siggenthal plant is permitted to combust hazardous waste and sewage sludge and the POLVITEC® filter was financed by the City of Zurich.[46] The FCS Unit II kiln is not permitted to combust hazardous waste or municipal sewage sludge, and unfortunately, no government agency will be financing the installation of pollution control equipment. Although no accurate cost data or VOC control efficiency data is available regarding the POLVITEC® filter, it is assumed that these would be similar or higher than thermal oxidation for equivalent control. Therefore, VOC control utilizing a RTO is considered to be BACT and will be reviewed for energy, economic and environmental impacts.

The discussion of thermal oxidation provided in Section 3.6 for CO emissions also applies to VOC emissions. However, for purposes of the economic assessment, it is assumed that the RTO will control to the lowest achievable VOC emissions value identified (0.023 lbs VOC/ton CL), which would be an approximate 72% reduction . It is questionable that at such low inlet VOC emission values, the RTO could even achieve a high efficiency. Utilizing scaled capital and operating cost data for a RTO previously presented in Section 3.6 (total capital costs of $26,064,000 and total operating costs including capital recovery of $13,403,035), the estimated cost-effectiveness of application of a RTO is $478,680 ton/VOC removed. The total tons of VOC removed used in this calculation is 72% of current estimated VOC emissions or approximately 28 tons. This cost per ton of VOC removed value far exceeds what is typically considered as acceptable for application for BACT. In addition, operation of a RTO requires energy (fossil fuel combustion and electricity) consumption that results in secondary environmental impacts from generation of additional pollutants. Based on the above analysis, application of thermal oxidation is rejected as BACT. Good combustion practices limiting VOC emissions to 0.085 lbs VOC/ton CL is determined to be BACT for the FCS Unit II kiln.

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[46]IBID[8]

3.8 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPs)/ MACT

The NESHAPs for the Portland Cement Manufacturing Industry was promulgated and published in the Federal Register on June 14, 1999. The NESHAPs limits PM emissions [surrogate for Hazardous Air Pollutant (HAP) Metals], as well as opacity from new and existing Non-Hazardous Waste Burning (NHW) kilns, inline kilns/raw mills, and clinker coolers. The NESHAP also limits opacity from raw material dryers and handling processes at Portland Cement plants, which are major sources. The proposed FCS Unit II kiln would be categorized as an existing facility because construction had begun (as defined by the regulation) prior to the rule proposal.

The NESHAPs established for the Portland Cements Industry are equivalent to the New Source Performance Standards for particulate matter, which are:

1. 0.30 lbs PM per ton dry kiln feed and opacity less than or equal to 20% for the inline kiln/raw mill.

2. 0.10 lbs PM per ton dry kiln feed and opacity less than or equal to 10% for the clinker cooler.

The NESHAP also includes a limit for dioxins and furans, which varies by the temperature of the particulate control device:

1. 0.2 nanograms TEQ per dscm corrected to 7% O_2 at temperatures greater than 400 °F.

2. 0.4 nanograms TEQ per dscm corrected to 7% O_2 at temperatures less than or equal to 400 °F.

In this case (TEQ) stands for PCDD/PCDF Toxic Equivalent values and dscm is dry standard cubic meters of flue gas. The proposed FCS Unit II kiln permit contains PM emission levels lower than the established NESHAPs. In addition, the proposed emissions of PCDD/PCDF (TEQ) are also lower then the most restrictive criteria of 0.2 ng TEQ/dscm. Therefore, the proposed Unit II kiln will be in conformance with the NESHAPs/MACT.

4.0 SUMMARY AND CONCLUSIONS

At the request of the Florida Department of Environmental Protection (FDEP), Rinker has conducted a review of permitted emission limits and actually achieved emission levels from currently planned and/or operating Portland Cement production facilities in the United States and abroad. The purpose of this review is to verify that currently permitted emission limits for the Florida Crushed Stone facility meet or exceed what is considered Best Available Control Technology (BACT) as defined by the Florida Department of Environmental Protection (FDEP) and by the United States Environmental Protection Agency (USEPA). Information from the following sources was used to prepare this document:

1) The RACT/BACT/LAER Clearinghouse;
2) USEPA prepared documents and technology reviews;
3) Current facility air permits and Title V permits;
4) Trade organizations and publications;
5) Recent permit actions;
6) Technical research papers and publications;
7) Correspondence with the Florida Department of Environmental Protection (FDEP) and other state agencies; and
8) Correspondence with cement manufacturers.

Rinker is in the process of constructing a second Portland Cement production kiln at its Florida Crushed Stone (FCS) facility in Brooksville, Florida. The new facility will utilize the dry process of cement production featuring a pre-heater/pre-calciner kiln design. This method of producing cement has been shown to maximize fuel efficiency, as well as minimize emissions per unit of cement produced. Maximum production rates are expected to be 104.2 tons per hour (tons/hr) [maximum 912,500 tons per year (tpy)] of cement clinker.

At the time of permit issuance (February, 1997), proposed emission values for the second kiln met or exceeded those emission values considered BACT for cement kilns. This determination was re-affirmed in January, 1999 in a report prepared by RTP Environmental Associates, Inc. (See Attachment IV). The results of this review show that since that time, significant changes have occurred in the cement industry in the United States and abroad. A number of cement facilities have completed or are undergoing upgrades to increase cement production. In some cases, permitted emission rates have been specified that are lower than those in the current permit for the Florida Crushed Stone Unit II kiln. Some emission rates were driven by BACT review, and some were proposed voluntarily by the facilities in order to avoid Prevention of Significant Deterioration (PSD) review by "netting-out." In several of these cases, the facilities have either not been capable of demonstrating the ability to meet the emission limit or the facility is under construction and demonstration will not be capable for a period of time.

The results of this review show that lower permitted emission limits exist for particulate matter (PM), nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO) and volatile organic compounds (VOC). In the case of PM, it is expected that the proposed fabric filter baghouse will be designed to operate at a significantly lower emission level in order to achieve the required permit limit averaged on a short-term (one hour) basis. Thus, the established PM emission value of 0.3 lbs per ton CL is determined to represent BACT. The proposed NO_x emission rate of 2.8 lbs NO_x/ton of CL is determined to represent current BACT. The Department has stated that given the raw material conditions of Florida, that 2.8 lbs NO_x/ton CL is equivalent to 2.5 lbs NO_x/ton CL at other U.S. facilities.[47] Only six facilities were identified with a lower proposed NO_x emission limit. All but one were allowed an annual averaging period and all but one are yet to demonstrate the ability to achieve their limits. The sixth facility did not have an established NO_x permit limit in a pounds NO_x per ton clinker format. Rinker considers the FCS Unit II NO_x limit of 2.8 lbs/ton CL (2.5 lbs/ton CL equivalent) on a 24-hour average substantially more stringent than the lower limits established elsewhere (2.3 - 2.47 lbs NO_x/ton CL) on an annual average. Furthermore, given the low NO_x baseline concentration, post-combustion NO_x control (SNCR) was shown to be infeasible on an economic, energy and environmental basis. The raw materials for cement production at the FCS facility are naturally low in sulfur, thus add-on SO_2 controls were shown to be infeasible on an economic, energy and environmental basis. Therefore, the proposed SO_2 emission limit of 0.23 lbs/ton CL is determined to be BACT. Similarly, the low proposed emissions of CO (2.0 lbs/ton CL) and VOC (0.085 lbs/ton CL) are considered BACT levels as post-combustion controls of both pollutants were shown to be infeasible on an economic, energy and environmental basis. In addition, though lower permitted VOC and CO emission limits were identified, no facility has demonstrated the ability to meet the combination of low NO_x and low VOC/CO emissions with short-term averaging periods, without post combustion controls.

In summary, it has been determined that all proposed emission values at the time of permit issuance for the FCS Unit II kiln continue to meet or exceed those emission values considered BACT for cement kilns.

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[47]IBID[6]

5.0 BIBLIOGRAPHY

Permits and Related Documents

Arizona Portland Cement Company, Rillito, AZ. Arizona Department of Environmental Quality - Significant Revision No. 1000547 to Air Quality Control Permit No. M191365P1-99. August 7, 1998.

Ash Grove Cement Company, Chanute, KS. Kansas Department of Health and Environment - Air Emission Source Construction Permit. Source ID Number 1330001. September 1999.

Ash Grove Cement Company, Durkee, OR. Oregon Department of Environmental Quality - Oregon Title V Operating Permit. Permit No. 01-0029. February 26, 2001.

Ash Grove Cement Company, Durkee, OR. Oregon Department of Environmental Quality - Oregon Title V Operating Permit Review Report. Review Report/Permit No. 01-0029.

Ash Grove Cement Company, Nephi, UT. (Permitted Location: Leamington Cement Plant, Leamington, UT.) Utah Department of Environmental Quality, Division of Air Quality - Title V Operating Permit. Permit No. 2300015001. January 5, 2000.

Ash Grove Cement Company, Seattle, WA. Letter to Mr. Fred Austin of Puget Sound Clean Air Agency from Henrik Voldbaek, Plant Manager of Ash Grove Cement Company regarding Ash Grove Cement Company NOx Limits (to support request to increase NOx limits in Approval Order 7381). September 12, 2000.

Ash Grove Cement Company, Seattle, WA. Letter to Mr. Fred Austin and Mr. Jay Willenberg of Puget Sound Clean Air Agency from Matthew Cohen of Heller Ehrman Attorneys regarding Ash Grove Cement Application to Revise NOx Limits. November 29, 2000.

Ash Grove Cement Company, Seattle, WA. Puget Sound Clean Air Agency Notice of Construction Worksheet. NOC No. 7381. Reg. No. 11339. January 8, 2001.

Ash Grove Cement Company, Seattle, WA. Puget Sound Clean Air Agency Notice of Construction Worksheet. NOC No. 7722 (Canceled). Reg. No. 11339. February 24, 1999.

Ash Grove Cement Company, Seattle, WA. Puget Sound Clean Air Agency Notice of Construction Worksheet. NOC No. 7242. Reg. No. 11339. Received October 29, 1997.

Ash Grove Cement Company, Seattle, WA. Puget Sound Clean Air Agency Notice of Construction Worksheet. NOC No. 6644. Reg. No. 11339. October 15, 1996.

Ash Grove Cement Company, Seattle, WA. Puget Sound Clean Air Agency Notice of Construction Worksheet. NOC No. 8318. Reg. No. 11339. November 27, 2000.

Ash Grove Cement Company, Seattle, WA. Puget Sound Clean Air Agency Notice of Construction Worksheet. NOC No. 8415. Reg. No. 11339. March 14, 2001.

Ash Grove Cement Company, Seattle, WA. Puget Sound Clean Air Agency Notice of Construction Worksheet. NOC No. 6708. Reg. No. 11339. January 12, 1998.

Blue Circle Cement, Calera, AL. Alabama Department of Environmental Management - Major Source Operating Permit. Facility No. 411-0004. October 25, 2000.

Calaveras Cement Company, Tehachapi, CA. Kern County Air Pollution Control District - Permit to Operate. Permit No. 1147017D. October 31, 2000.

California Portland Cement Company, Mojave, CA. Kern County Air Pollution Control District - Permit to Operate. Permit No. 1003026M. December 31, 2000.

California Portland Cement Company, Mojave, CA. South Coast Air Quality Management District (CA) - Facility Equipment List Report for Facility Nos. 1623, 2692, 9899, 18653, 39495, 53381, 800181. Run date June 15, 2001.

California Portland Cement Company, Mojave, CA. South Coast Air Quality Management District (CA) - Annual Emissions Reports 1994 through 2000 for Facility No. 800181. Dates documents were prepared: August 25, 1994; August 28, 1995; October 2, 1996; August 25, 1997; August 26, 1998; August 25, 1999; August 25, 2000.

Carolina Cement Company, Castle Hayne, NC. North Carolina Department of Environment and Natural Resources Division of Air Quality Air Permit No. 07300R04. January 26, 2001.

Carolina Cement Company, Castle Hayne, NC. North Carolina Division of Air Quality - Air Quality Action Request (Renewal of Air Permit No. 7300R2). Issue Air Permit 7300R3. Received February 3, 1997.

Carolina Cement Company, Castle Hayne, NC. North Carolina Department of Environment, Health, and Natural Resources, Division of Air Quality - Air Permit No. 7300R3. May 9, 1997.

CEMEX California Cement LLC, Victorville, CA. Mojave Desert Air Quality Management District - Authority to Construct. No. B005362. July 26, 2000.

Continental Cement Company, Ste. Genevieve, MO. Prepared by Barr Engineering Company. Air Emission Permit Application - Prevention of Significant Deterioration and National Emission Standards for Hazardous Air Pollutants. March 31, 2001.

Florida Crushed Stone Company - Brooksville Cement, Lime and Power Plants, Brooksville, FL. Florida Department of Environmental Protection - P.E. Certification Statements. DRAFT Permit No. 0530021-002-AV. October 21, 1999.

Florida Crushed Stone Company - Portland Cement Facility No. 2, Brooksville, FL. Florida Department of Environmental Protection - Final Determination. Permit No. AC 27-274892(A), PSD-FL-227(A). February 6, 1997.

Florida Crushed Stone Company - Brooksville Cement, Lime and Power Plants, Brooksville, FL. Florida Department of Environmental Protection - Initial Title V Air Operation Permit. Final Permit No. 0530021-002-AV. October 18, 2001.

Florida Crushed Stone Company, Brooksville, FL. Florida Department of Environmental Protection - Permit for Construction of No. 2 Cement Kiln and Associated Equipment. Permit No. AC 27-274892, PSD-FL-227. Expiration Date: November 30, 1998.

Florida Crushed Stone Company, Brooksville, FL. Final Determination for Permit PSD-FL-227/AC 27-274892.

Florida Crushed Stone Company, Brooksville, FL. Florida Department of Environmental Protection - Permit for Construction (Portland Cement Manufacturing Plant No. 2 and Associated Equipment). PSD No. PSD-FL-227(A), Permit No. AC 27-274892. Expiration Date: January 30, 2002.

Florida Crushed Stone Company. United States Environmental Protection Agency Region IV - Permit to Construct Under the Rules for the Prevention of Significant Deterioration of Air Quality. March 27, 1984.

Florida Crushed Stone Company. Florida Department of Environmental Regulation - Conditions of Certification. Case No. PA 82-17. Revised February 20, 1985.

Florida Crushed Stone Company, Brooksville, FL. Florida Department of Environmental Protection - Amended Permit. Permit No. AO27-231888A. August 30, 1994.

Florida Crushed Stone Company, Brooksville, FL. Florida Department of Environmental Protection - Notice of Permit and Final Determination. File No. AC 27-274892/PSD-FL-227. November 17, 1995.

Florida Crushed Stone Company, Brooksville, FL. Before the Florida Department of Environmental Protection - Final Order Modifying Conditions of Certification. No. PA 82-17F. April 15, 1997. (Faxed by Lawrence Curtin of Holland & Knight Law Offices on April 21, 1997.)

Florida Rock Industries, Newberry, FL. Staff Report of the Local Planning Agency regarding Comprehensive Plan Amendment from Mining to Industrial on the Future Land Use Map Series of the Comprehensive Plan. File Number CPAM-99-1. June 14, 1999.

Florida Rock Industries, Newberry, FL. Memo from Lawrence Jennings, Assistant County Administrator, Growth & Development Services, to The Honorable Chairman and Members of the Board of County Commissioners regarding Packet for Hernando County Comprehensive Plan Amendments CPAM-99-1 and CPAM-99-6(DCA#00-1). May 31, 2000.

Florida Rock Industries, Newberry, FL. "Objections, Recommendations, and Comments for Hernando County Amendment 00-1."

Florida Rock Industries, Newberry, FL. "Ordinance #2000-11." An ordinance amending the Hernando County Code of Ordinances, Chapter 23 - Planning. . . .

Florida Rock Industries, Newberry, FL. Letter from Howard Rhodes, Director, Florida Department of Environmental Protection, Division of Air Resources Management, to John Baker, President of Florida Rock Industries, Inc. regarding DEP File No. 0010087-003-AC (PSD-FL-228A) Newberry Cement Plant Permit Modification.

Florida Rock Industries, Newberry, FL. Florida DEP Public Notice of Intent to Issue Title V Air Operation Permit and Public Notice of Intent to Issue Air Construction Permit Modification. Draft Title V Air Operation Permit No. 0010087-002-AV. Draft Air Construction Permit No. 0010087-003-AC.

Florida Rock Industries, Brooksville, FL. Report in Support of an Application for a PSD Construction Permit Review. June 20, 2000.

Florida Rock Industries, Brooksville, FL. Florida Department of Environmental Protection, Division of Air Resources Management - Application for Air Permit-Title V Source. Effective February 11, 1999.

Florida Rock Industries, Newberry, FL. Technical Evaluation and Preliminary Determination. DEP File No. 0010087-003-AC/PSD-FL-228A.

Florida Rock Industries, Newberry, FL. Florida Department of Environmental Protection - Initial Title V Air Operation Permit. Draft Permit No. 0010087-002-AV.

Florida Rock Industries, Newberry, FL. Response to Request for Additional Information. Permit Nos. AC01-267311 and PSD-FL-228. Cover letter dated May 16, 1995.

Florida Rock Industries, Newberry, FL. Florida Department of Environmental Protection, Division of Air Resources Management - Application for Air Permit - Long Form. Effective November 23, 1994.

Holnam, Inc. - Portland Plant, Florence, CO. Colorado Department of Public Health and Environment - Initial Approval - Modification-1 (Draft Permit). Permit No. 98FR0895. August 16, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control Engineering Calculation Sheet, BAQ Engineering Services Division. July 17, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control Memo from Donna Moye of the Bureau of Air Quality to Pat Walker et al. regarding Public Notice #00-112-PS-N. August 15, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control Public Notice of Proposed Permit Decisions and Public Hearing. Public Notice #00-112-PS-N. August 14, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Donna Moye of the Bureau of Air Quality to Greg Worley of US EPA Region IV regarding PSD Preliminary Determination (Draft Permit Nos. 1860-0005-CO through 1860-0005-CU) for Holnam, Inc. August 14, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Donna Moye of the Bureau of Air Quality to Glenn Raynor of Holnam, Inc. Regarding PSD Preliminary Determination (Draft Permit Nos. 1860-0005-CO through 1860-0005-CU) for Holnam, Inc. August 14, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Donna Moye of the Bureau of Air Quality to Hazel Miller of Times and Democrat regarding Public Notice #00-112-PS-N for Holnam, Inc. August 10, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Donna Moye of the Bureau of Air Quality to William Jackson of the USDA Forest Service regarding PSD Preliminary Determination (Draft Permit Nos. 1860-0005-CO through 1860-0005-CU) for Holnam, Inc. August 28, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control memo from Donna Moye of the Bureau of Air Quality to Lower Savanna Council of Governments et al. regarding Public Notice #00-112-PS-N for Holnam Inc. August 24, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control - Preliminary Determination for Holnam - Holly Hill Plant, Orangeburg County, South Carolina. August 14, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control NESHAP (40 CFR 63) Construction Permit. Permit Nos. 1860-0005-CO through CU. October 13, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control Memo from Donna Moye of the Bureau of Air Quality to Pat Walker et al. regarding PSD Final

Determination and Response to Comments for Public Notice #00-112-PS-D for Holnam Inc. October 11, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control - Public Notice of Final Permit Decision. Public Notice #00-112-PS-D for Permit Nos. 1860-0005-CO through 1860-0005-CU. October 13, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Carl W. Richardson of the Bureau of Air Quality to Gregg Worley of the US EPA Region IV regarding PSD Final Determination and Response to Comments (Permit Nos. 1860-0005-CO through 1860-0005-CU) for Holnam, Inc. October 11, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Carl W. Richardson of the Bureau of Air Quality to Glenn Raynor of Holnam, Inc. regarding PSD Final Determination and Response to Comments (Permit Nos. 1860-0005-CO through 1860-0005-CU) for Holnam, Inc. October 11, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Donna Moye of the Bureau of Air Quality to Hazel Miller of the Times and Democrat regarding Public Notice #00-112-PS-D for Holnam, Inc. October 10, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Carl W. Richardson of the Bureau of Air Quality to William Jackson of USDA Forest Service regarding PSD Final Determination and Response to Comments (Permit Nos. 1860-0005-CO through 1860-0005-CU) for Holnam, Inc. October 11, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control memo from Carl Richardson of the Bureau of Air Quality to Lower Savannah Council of Governments et al. regarding Final Permit Decision and Response to Comments for Holnam, Inc. October 13, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control Bureau of Air Quality - Response to Issues Raised and Comments Made during the Formal Comment Period for Public Notice #00-112-PS-N.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Patrick Walker of the Bureau of Air Quality to Ms. Virginia Townsend of the Boyer

Community regarding Holnam - Holly Hill Facility Air Quality Construction Permit Nos. 1860-0005-CO through 1860-0005-CU. October 13, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control letter from Patrick Walker of the Bureau of Air Quality to Ms. Helena Miles of the Boyer Community regarding Holnam - Holly Hill Facility Air Quality Construction Permit Nos. 1860-0005-CO through 1860-0005-CU. October 13, 2000.

Holnam, Inc., Holly Hill, SC. South Carolina Department of Health and Environmental Control Bureau of Air Quality - Final Determination for Holnam - Holly Hill Plant, Orangeburg County, South Carolina. October 13, 2000.

Holnam, Inc., Holly Hill, SC. Letter from Glenn Raynor, Environmental Manager at Holnam Holly Hill Plant, to Diana L. Zakrzwski of the Bureau of Air Quality (SC DHEC) regarding Holnam responses to EPA Comments on Holly Hill PSD Permit.
September 27, 2000.

Holnam Texas Portland Cement Plant, Midlothian, TX. Texas Natural Resource Conservation Commission - Special Conditions and Amendment Technical Review for Permit No. 8996/PSD-TX-454M2. (Faxed by Earl Jones of the TNRCC Office of Permitting/NSRP Division on March 29, 2001.)

Holnam Inc., Morgan, UT. Utah Department of Environmental Quality, Division of Air Quality - Approval Order for PSD Major Modification to Increase NOx Emissions from the Main Kiln. Approval No. DAQE-303-01. May 2, 2001.

Holnam, Inc., Morgan, UT. Utah Division of Air Quality - Modified Source Plan Review. March 27, 2001.

Holnam, Inc., Morgan, UT. Utah Department of Environmental Quality, Division of Air Quality - Intent to Approve PSD Major Modification to Increase NOx Emissions from the Main Kiln. Intent to Approve No. DAQE-225-01. March 28, 2001.

Illinois Cement Company, LaSalle, IL. Illinois Environmental Protection Agency - Revised Construction Permit - PSD Approval - NSPS Source. Application Number 97030016. October 7, 1998.

Illinois Cement Company, LaSalle, IL. Illinois Environmental Protection Agency - Project Summary for Proposed Issuance of an Air Pollution Control Construction Permit for Illinois Cement Company. Application Number 97030016. August 1997.

Kosmos Cement Company - Louisville Plant, Louisville, KY. Air Pollution Control District of Jefferson County, Kentucky - Title V Operating Permit (DRAFT). Permit No. 156-97-TV. October 22, 2000.

Kosmos Cement Company - Louisville Plant, Louisville, KY. Air Pollution Control District of Jefferson County, Kentucky - Title V Operating Permit. Permit No. 156-97-TV. April 18, 2001.

La Farge Corporation, Sugar Creek, MO. Missouri Department of Natural Resources, Division of Environmental Quality - Permit to Operate. Operating Permit Number OP2000099. September 11, 2000.

La Farge Corporation, Sugar Creek, MO. Missouri Department of Natural Resources - Permit to Construct. Permit No. 0897-019. August 5, 1997.

La Farge Corporation, Sugar Creek, MO. Missouri Department of Natural Resources Division of Environmental Quality - Permits Action Management System (Permit to Construct Amendment). Permit Review No. EX200011022. Date received November 8, 2000.

La Farge Corporation, Sugar Creek, MO. Missouri Department of Natural Resources Division of Environmental Quality letter from Randy Raymond, Permit Section Chief, to Steven Kidwell, Environmental Manager of La Farge Corporation - Sugar Creek Plant, regarding Permit Amendment - Project No. 2000-11-022. April 10, 2001.

La Farge Corporation, Sugar Creek, MO. Missouri Department of Natural Resources Division of Environmental Quality. Memo from Dawn Froning, Environmental Specialist III, Modeling Unit, to Kyra Moore, Environmental Engineer, Permit Section regarding Revised Ambient Air Quality Impact Analysis (AAQIA) for La Farge Corp., Sugar Creek, MO. January 24, 2001.

Lehigh Portland Cement Company, Union Bridge, MD. Maryland Department of the Environment, Air and Radiation Management Administration - Construction Permit. Permit No. 06-6-0256 N. April 8, 1999.

Lone Star Industries, Inc., Pleasanton, CA. Letter to Ralph F. Mitchell, Regional Environmental and Resource Manager for Lone Star Industries, Inc., from David P. Howekamp, Director of the Air Toxics Division of United States Environmental Protection Agency Region IX regarding Modification of PSD Permit for Davenport Facility (RMC-Pacific Santa Cruz Facility). July 31, 1991.

Lone Star Industries, Inc., Green Castle, IN. Letter to Mr. Craig Chrispell of Lone Star Industries from Paul Dubenetzky of the Indiana Department of Environmental Management's Office of Air Management regarding 133-12826 Amendment to CP-133-10159-00002.

Miami Cement Plant, Rinker, Miami, FL. Miami-Dade County Department of Environmental Resources Management - Notice of Final Permit. Permit No. 0250014-003-AV. October 31, 2000.

Mitsubishi Cement Corporation, Lucerne Valley, CA. Mojave Desert Air Quality Management District - Permit to Operate. Permit No. B001025. April 19, 2000.

Monarch Cement Company, Humboldt, KS. Kansas Department of Health and Environment - Air Emission Source Construction Permit. Source ID Number 0010009. January 2000.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Letter to Mr. Richard Long, Air Branch Chief of US EPA Region VIII, from Dan Olson, Administrator in Air Quality Division regarding Administrative Amendment to Operating Permit 30-098. March 22, 2000.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Letter to Mr. Richard Long, Air Branch Chief of US EPA Region VIII, from Dan Olson, Administrator in Air Quality Division, regarding Administrative Amendment to Operating Permit 30-098. February 2, 2000.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Letter to Mr. Scott Nielson, Environmental Manager for Mountain Cement Company, from Dan Olson, Administrator in Air Quality Division, regarding Operating Permit 30-098 Change Notification. October 20, 1999.

Mountain Cement Company, Laramie, WY. Letter from Scott Nielson, Environmental Manager for Mountain Cement Company, to Diana Hulme, WDEQ Air Quality Division, regarding Burning additional used oil solids. October 7, 1999.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Letter to Mr. Steve Goodrich, Environmental and Safety Manager for Mountain Cement Company, from Dan Olson, Administrator in Air Quality Division, regarding Operating Permit 30-098, Notification of change for which no permit revision is required. November 18, 1998.

Mountain Cement Company, Laramie, WY. Letter from Steve Goodrich, Environmental and Safety Manager for Mountain Cement Company, to Dan Olsen, Department of Environmental Quality, Air Quality Division, regarding 14 Day Notification of Modification Schedule for Rail Car Unloading System. November 12, 1998.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Letter to Mr. Steve Goodrich, Environmental and Safety Manager for Mountain Cement Company, from Dan Olson, Administrator in Air Quality Division, regarding Mill Scale Increase and Rail Car Unloading, AP-B99. October 23, 1998.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality Air Quality Division - Air Quality Section 30 Operating Permit. Permit No 30-098. June 2, 1998.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Testing Requirements from March 23, 2000 Permit Amendment. pp. 2 and 3.

National Cement Company of California, Inc., Lebec, CA. Kern County Air Pollution Control District - Permit to Operate. Permit No. 1128004R. October 31, 2000.

North Texas Cement Company, Whitewright, TX. Texas Natural Resource Conservation Commission - Combined Permit. Permit No. 37177/PSD-TX-893. July 12, 2000.

Phoenix Cement Company, Clarkdale, AZ. Arizona Department of Environmental Quality - Significant Revision No. 1001001 to Air Quality Control Permit No. 0381-95. August 28, 2000.

Puerto Rican Cement Company, Ponce, PR. United States Environmental Protection Agency Region 2 - Final Prevention of Significant Deterioration of Air Quality (PSD) Permit. February 25, 1997.

Rio Grande Portland Cement Corporation, Pueblo, CO. Colorado Department of Public Health and Environment, Air Pollution Control Division - Construction Permit Initial Approval. Permit No. 98PB0893. September 25, 2000.

Riverside Cement Company, Oro Grande, CA. Mojave Desert Air Quality Management District - Authority to Construct. No. B007435. August 5, 1999.

RMC Pacific-Davenport, Santa Cruz, CA. Monterey Bay Unified Air Pollution Control District - Permit to Operate. Permit No. 10171. July 6, 2000.

Roanoke Cement Company, Cloverdale, VA. Commonwealth of Virginia Department of Environmental Quality - Permit to Modify and Operate. Registration No. 20232. January 24, 2001.

St. Lawrence Cement Company, Greenport, NY. New York State Department of Environmental Conservation Permit. Permit ID No. 4-1040-00011/00049. Draft permit April 30, 2001.

Signal Mountain Cement Company, L.P., Chattanooga, TN. Chattanooga-Hamilton County Air Pollution Control Bureau - Part 70 Permit Number 47-065-3070. May 15, 1999.

Southdown California Cement LLC, Victorville, CA. Mojave Desert Air Quality Management District - Engineering Evaluation for Modification of a Major Facility. June 10, 1999.

Southdown, Inc., Brooksville, FL. Florida Department of Environmental Protection, Southwest District - Final Title V Air Operation Permit. Final Permit No. 0530010-002-AV. September 14, 2000.

Southdown, Inc., Brooksville, FL. Florida Department of Environmental Protection, Southwest District - Notice of Administratively Corrected Title V Operation Permit. Final Permit No. 0530010-002-AV, Administrative Correction Project No. 007.

Tarmac America, Inc., Medley, FL. Miami-Dade Department of Environmental Resources Management - Initial Title V Air Operating Permit (Final). Permit No. 0250020-002-AV. October 26, 2000.

Tarmac-Pennsuco Cement, Medley, FL. Miami-Dade County Department of Environmental Resources Management Permit to Construct. Permit No. 0250020-010-AC. May 1, 2001.

TXI Riverside Cement, Oro Grande, CA. Mojave Desert Air Quality Management District - Engineering Evaluation for Modification of a Major Facility. August 5, 1999.

TXI Operations, L.P., Midlothian, TX. Texas Natural Resource Conservation Commission letter from Jeffrey A. Saitas to Mr. Eric Tiemeyer regarding Permit Amendment - Permit No. 1360A. October 12, 1999.

TXI Operations, L.P., Midlothian, TX. Texas Natural Resources Conservation Commission - Permit Amendment and Consolidation. Permit No. 1360A. (Cover letter from Jeffrey Saitas of TNRCC to Rex Coffman of TXI Operations dated January 11, 2001.)

TXI Operations, L.P., Midlothian, TX. Texas Natural Resource Conservation Commission - Permit Amendment and Consolidation. Permit No. 1360A. January 11, 2001.

Emissions Data

Ash Grove Cement Company, Durkee, OR. Oregon Department of Environmental Quality - Memo from Jeff Ross to Peter Brewer regarding Source Test Review Report. Permit Number 01-0029. April 12, 1999.

Holnam Cement, L.P., Midlothian, TX. METCO Environmental - Source Emissions Survey for Holnam Cement, L.P., Line Number 1 Stack (EPN 07), TNRCC Permit 8996/PSD-TX-PR454M2. Supplied by Earl Jones of the Texas Natural Resource Conservation Commission on April 16, 2001.

Illinois Cement Company, LaSalle, IL. Applied Environmental Services - Final Report on Carbon Monoxide Emissions Testing. April 5, 1993.

Illinois Cement Company, LaSalle, IL. Halm Engineering - Final Report on Air Emissions Testing Prepared for Illinois Cement Company. April 13, 1998.

Lone Star Industries, Inc., Green Castle, IN. Stack Test Results provided by Karen Nowak of Indiana Department of Environmental Management's Office of Air Quality. (Sent via e-mail on April 27, 2001.)

Mitsubishi Cement Corporation, Lucerne Valley, CA. Parsons Engineering Science, Inc. - Report of Air Pollution Source Testing of a Cement Plant Rotary Kiln Operated by Mitsubishi Cement Corporation, Lucerne Valley, CA. May 30, 1997.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Continuous Emissions Monitoring System RATA Review for Kiln #1. April 5, 2000.

Mountain Cement Company, Laramie, WY. Wyoming Department of Environmental Quality - Continuous Emissions Monitoring System RATA Review for Kiln #2. April 7, 2000.

Mountain Cement Company, Laramie, WY. Memo from Brian Bowman, Air Quality Engineer, to Mountain Cement Company (Stack Test File) regarding Evaluation of Particulate Stack Tests on the Clinker Cooler Transfer Tower by Western Environmental Services and Testing, Inc. on July 6, 2000. October 19, 2000.

Mountain Cement Company, Laramie, WY. Memo from Brian Bowman, Air Quality Engineer, to Mountain Cement Company (Stack Test File) regarding Evaluation of Particulate Stack Test for Kiln #2 by Western Environmental Services and Testing, Inc. on September 13, 2000. November 8, 2000.

RMC Pacific Materials (Santa Cruz), Davenport, CA. Source Test Report (prepared by L.J. Borrelli). August 2, 2000 (Test date).

Roanoke Cement Inc., Cloverdale, VA. Letter from Timothy L. Overstreet of the Commonwealth of Virginia Department of Environmental Quality to Robert M. Omer of Roanoke Cement Inc. regarding receipt and review of Excess Emission Report for period of April 1, 2000 through June 30, 2000. August 16, 2000.

Roanoke Cement, Inc., Cloverdale, VA. Letter from Timothy L. Overstreet of the Commonwealth of Virginia Department of Environmental Quality to Robert M. Omer of Roanoke Cement Inc. regarding receipt and review of Excess Emission Report for period of July 1, 2000 through September 30, 2000. November 14, 2000.

Roanoke Cement, Inc., Cloverdale, VA. Letter from Timothy L. Overstreet of the Commonwealth of Virginia Department of Environmental Quality to Robert M. Omer of Roanoke Cement Inc. regarding receipt and review of Excess Emission Report for period of October 1, 2000 through December 31, 2000. February 14, 2001.

Roanoke Cement, Inc., Cloverdale, VA. Letter from Timothy L. Overstreet of the Commonwealth of Virginia Department of Environmental Quality to Robert M. Omer of Roanoke Cement Inc. regarding receipt and review of Excess Emission Report for period of January 1, 2000 through March 31, 2000. May 24, 2000.

Contact Records

Austin, Fred of Puget Sound Clean Air Agency. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding Cement Facilities in Seattle, WA from USEPA RBLC Clearinghouse (La Farge Corp. in Seattle, WA and Ash Grove Cement in Seattle, WA). June 13, 2001.

Beerli, George of Maryland Department of the Environment. Phone call to Michael Hober of RTP Environmental Associates, Inc. regarding Lehigh Portland Cement (Union Bridge, MD). June 25, 2001.

Bennett, John, Vice President for Regulatory Affairs for California Cement Company. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding information on California Cement Company. July 11, 2001.

Coffman, Rex, Environmental Manager for TXI Operations, Ltd. in Midlothian, TX. Phone call to Michael Hober of RTP Environmental Associates, Inc. regarding information for TXI Operations, Ltd. in Midlothian, TX. March 30, 2001.

Damo, Julie, Air Quality Engineer for Kern County Air Pollution Control District. E-mail to Scott Heath of RTP Environmental Associates, Inc. regarding Cement Kiln Information Request. June 6, 2001.

DeSalvio, Alan of Mojave Desert Air Quality Management District. E-mail to Scott Heath of RTP Environmental Associates, Inc. regarding California Portland Cement in Mojave, CA. May 29, 2001.

Elias, Donald of RTP Environmental Associates, Inc. Memo to Al Linero of Florida Department of Environmental Protection regarding BACT for Florida Crushed Stone Kiln No. 2. January 29, 2001.

Freedom of Information Officer 2CD of United States Environmental Protection Agency Region II. Letter, to Scott Heath of RTP Environmental Associates, Inc. regarding acknowledgment of information request. May 29, 2001.

Geier, James of Colorado Department of Public Health and Environment. E-mail to Scott Heath of RTP Environmental Associates, Inc. regarding information on Holnam, Inc. facility in Florence, CO. May 31, 2001.

Geier, James of Colorado Department of Public Health and Environment. E-mail to Scott Heath of RTP Environmental Associates, Inc. regarding information on Holnam, Inc. facility in Florence, CO. June 1, 2001.

Hamm, Jody, Coordinator of Freedom of Information Center, South Carolina DHEC. Letter to Scott Heath of RTP Environmental Associates, Inc. regarding information request for Holman, Inc. June 1, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Al Linero of Florida Department of Environmental Protection, Division of Air Quality regarding locating the Swiss Plant in the July 2000 Letter from FDEP to Florida Rock Industries. May 8, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Doug Welch of Oregon Department of Environmental Quality Air Quality Program regarding Ash Grove Cement Company in Durkee, Oregon. May 7, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to John Jenks of Utah Department of Environmental Quality Division of Air Quality regarding New Source Review Permit for Holnam, Inc. (Morgan, UT). April 19, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to John Jenks of Utah Department of Environmental Quality, Division of Air Quality regarding update to Holnam Facility in Morgan, UT. May 7, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to David Beatty of Utah Department of Environmental Quality Division of Air Quality regarding BACT Review - Ash Grove Cement (Nephi, UT). April 19, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Nisha Sizemore of Indiana Department of Environmental Management, Bureau of Air Quality regarding Lone Star Industries (Green Castle, IN). April 26, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Illinois Environmental Protection Agency FOIA Officer - Air Permits requesting information on Illinois Cement Company. May 9, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Missouri Department of Natural Resources, Division of Environmental Quality requesting information on La Farge Corporation, Sugar Creek, MO. May 9, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Monterey Bay Unified Air Pollution Control District requesting information on RMC Pacific Materials, Inc. Santa Cruz Cement Plant, Davenport, CA. May 18, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Steven Dietrich of Commonwealth of Virginia Department of Environmental Quality, West Central Regional Office regarding information on Roanoke Cement Company in Cloverdale, VA. May 24, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Commonwealth of Virginia Department of Environmental Quality, West Central Regional Office requesting information on Roanoke Cement Company, Cloverdale, VA. May 24, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to United States Environmental Protection Agency Region II Freedom of Information Act Officer requesting information on Puerto Rico Cement Company, San Juan, PR. May 24, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Dean Carol of NC DENR, Wilmington Regional Office regarding information on Carolina Cement Company of Castle Hayne, NC. May 24, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Alan DeSalvio of Mojave Desert Air Quality Management District regarding information on Southdown (now CEMEX) facility in Victorville, CA. May 24, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call with Brian Bowman of Wyoming Department of Environmental Quality, Air Quality Division regarding information on Mountain Cement Company of Laramie, WY. May 29, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Wyoming Department of Environmental Quality, Air Quality Division requesting information on Mountain Cement Company, Laramie, WY. May 29, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Kern County Air Pollution Control District requesting information on National Cement Company, Lebec, CA. May 30, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Mallika Muthiah of Miami-Dade County Department of Environmental Resources Management, Air Quality Management Division regarding information on Tarmac American Pennsuco (Medley, FL). May 29, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Clark County Health District, Air Quality Division requesting information on Great Star Cement Corp./United Rock Products Corp., Las Vegas, NV. May 30, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Kern County Air Pollution Control District requesting information on California Portland Cement Company, Mojave, CA. May 30, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Public Records Request Form for information on California Cement Company, Colton, CA. May 30, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Missouri Department of Natural Resources, Division of Environmental Quality requesting information on Continental Cement Company, Saint Genevieve County, MO. May 30, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Kern County Air Pollution Control District requesting information on Calaveras Cement Company, Tehachapi, CA. May 30, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to Kansas Department of Health and Environment, Bureau of Air and Radiation requesting information on Ash Grove Cement, Chanute, KS and Monarch Cement Company, Humboldt, KS. May 31, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Letter to South Carolina Department of Health and Environmental Conservation, Freedom of Information Office requesting information on Holman, Inc., Holly Hill, SC. May 31, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to David Gilmore of Missouri Department of Natural Resources, Air Pollution Control Program regarding Cement Facilities in Missouri. May 30, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call with Brian Bowman of Wyoming Department of Environmental Quality, Air Quality Division regarding follow-up on Mountain Cement Company of Laramie, WY. July 12, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Doug Welch of Oregon Department of Environmental Quality, Air Quality Program regarding information on Ash Grove Cement Company, Durkee, OR. July 5, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Mallika Muthiah of Miami-Dade County Department of Environmental Resources Management, Air Quality Management Division regarding follow-up on Tarmac American Pennsuco (Medley, FL). June 13, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Jim Lehmann of Mojave Desert Air Quality Management District regarding follow-up on PM Limit in TXI Riverside Cement (Oro Grande, CA) Permit. June 14, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to George Beerli of Maryland Department of the Environment, Bureau of Air and Radiation regarding information on Lehigh Portland Cement of Union Bridge, MD (Carroll County). June 4, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Errol Reksten of Chattanooga-Hamilton County Air Pollution Control Bureau regarding information on RC Cement (Signal Mountain Cement Company). May 31, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Doug Shumway of Mitsubishi Cement Corp. regarding NOx Control at Mitsubishi Cement Corp. in Lucerne Valley, CA. July 16, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Dave Long of California Cement Industry as follow-up on Sewage Sludge Injection Used at Mitsubishi Cement. July 19, 2001.

Heath, Scott of RTP Environmental Associates, Inc. E-mail to James Geier of Colorado Department of Public Health and Environment requesting information on the Holnam, Inc. facility in Florence, CO. May 31, 2001.

Heath, Scott of RTP Environmental Associates, Inc. E-mail to Alan DeSalvio of Mojave Desert Air Quality Management District regarding Information Request for Texas Industries Inc. at Oro Grande, CA. June 1, 2001.

Heath, Scott of RTP Environmental Associates, Inc. E-mail to Prabhat Bhargava of Arizona Department of Environmental Quality regarding Information Request on Portland Cement

Facilities in Arizona (California (Arizona) Portland Cement Company, Rillito, AZ and Phoenix Cement, Clarkdale, AZ). June 1, 2001.

Heath, Scott of RTP Environmental Associates, Inc. E-mail to James Lehmann of Mojave Desert Air Quality Management District requesting information on Mitsubishi Cement Corporation.

Heath, Scott of RTP Environmental Associates, Inc. Phone call to Mike Sewell of Monterey Bay Unified Air Pollution Control District regarding RMC Pacific Materials (former Lone Star) Santa Cruz facility in Davenport, CA. November 13, 2001.

Heath, Scott of RTP Environmental Associates, Inc. Telephone call to Michael T. Higgins of the New York State Department of Environmental Conservation regarding St. Lawrence Cement Company's proposed facility in Greenport, NY, January 22, 2002.

Hober, Michael of RTP Environmental Associates, Inc. Phone call to Barbra Sprungl of Arizona Department of Environmental Quality regarding construction of Kiln #4 at the Phoenix Cement Company, Clarkdale, AZ. November 27, 2001.

Hober, Michael of RTP Environmental Associates, Inc. Memo to Scott Demick requesting Title V Permit for Blue Circle Cement Company in Calera, AL. April 18, 2001.

Hober, Michael of RTP Environmental Associates, Inc. Phone call to Berhann Getahuu of Missouri Department of Natural Resources regarding La Farge Corp., Sugar Creek, MO. June 28, 2001.

Hober, Michael of RTP Environmental Associates, Inc. Phone call to Earl Jones of Texas Natural Resources Conservation Commission regarding Holnam Texas Limited Partnership, Midlothian, Texas Facility. March 30, 2001.

Hober, Michael of RTP Environmental Associates, Inc. Phone call with Pradeep Raval of Koogler & Associates regarding status of Florida Rock Industries response to request for additional information. March 26, 2001.

Hober, Michael of RTP Environmental Associates, Inc. Phone call to John Reynolds of Florida DEP regarding status of Florida Rock Industries' Brooksville, FL plant air permit. March 26, 2001.

Hober, Michael of RTP Environmental Associates, Inc. Letter to Missouri Department of Natural Resources, Division of Environmental Quality requesting information on La Farge Corporation, Sugar Creek, MO. June 28, 2001.

Hober, Michael of RTP Environmental Associates, Inc. with Mark Terry of Krupp-Polysius, Personal Communication, October 2001.

Hober, Michael of RTP Environmental Associates, Inc. and Mary Terry of Krupp-Polysius. Personal Communication, Telephone conversation regarding St. Lawrence Cement Company's proposed facility in Greenport, NY, January 2002.

Hober, Michael of RTP Environmental Associates, Inc. and Michael J. Knenlein of Nalco FuelTech. Personal Communication, Telephone Conversation. August 2001.

Jenks, John of Utah Department of Environmental Quality, Division of Air Quality. E-mail to Scott Heath of RTP Environmental Associates, Inc. regarding Engineering Review for Holnam, Inc. April 19, 2001.

Lehmann, James of Mojave Desert Air Quality Management District. E-mail to Scott Heath of RTP Environmental regarding final NSR for Southdown Cement (CEMEX, Victorville, CA). May 24, 2001.

Lehmann, James of Mojave Desert Air Quality Management District. E-mail to Scott Heath of RTP Environmental Associates, Inc. regarding Request for information on Mitsubishi Cement Corporation. July 11, 2001.

Lewis, Marc of RTP Environmental Associates, Inc. Phone call to Teresa Heron of Florida Department of Environmental Protection regarding cement plant names and details for BACT analysis. October 10, 1995.

Linero, A.A. c/o John Reynolds, Florida Department of Environmental Protection Division of Air Resources Management. Fax to Don Elias regarding review by Mr. Linero. May 9, 2001.

Linero, A.A. of Florida Department of Environmental Protection. Letter to Don Elias of RTP Environmental Associates, Inc. replying to memoranda dated January 29 and May 8, 2001 regarding approach to re-determination of BACT applicable to planned facility. May 17, 2001.

Long, David M., Executive Director of Cement Industry Environmental Consortium. Memo to Scott Heath of RTP Environmental regarding Requested Information. July 19, 2001.

Ondrusek, Bob of Indiana Department of Environmental Management, Office of Air Quality. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding Cement Plants in Indiana from Portland Cement Association Document. May 31, 2001.

Piece, Tracy of Alabama Department of Environmental Management. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding National Cement of Alabama (Ragland, AL). June 12, 2001.

Ramsay, John of Kansas Department of Health and Environment's Bureau of Air & Radiation. Phone call to Scott Heath of RTP Environmental regarding Kansas Portland Cement Sites in Portland Cement Assoc. Document (Ash Grove Cement and Monarch Cement Company). May 31, 2001.

Reyes, Virginia for Linda Mills, Public Records Coordinator for South Coast Air Quality Management District (CA). Letter to Scott Heath of RTP Environmental Associates, Inc. acknowledging request for information on California Portland Cement Company, Colton, CA. May 31, 2001.

Rojas, Jorge. Phone call to Michael Hober of RTP Environmental Associates, Inc. regarding Holnam, Inc. Midlothian, TX facility. April 5, 2001.

Seetharama, Ram of Colorado Department of Public Health and Environment, Air Pollution Control Division. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding information on Rio Grande Portland Cement of Pueblo, CO. May 21, 2001.

Steele, Jerry of Monterey Bay Unified Air Pollution Control District. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding Lonestar Davenport Cement of Santa Cruz, CA. May 18, 2001.

Tiethoff, Tanya, Records Manager for Missouri Department of Natural Resources Air Pollution Control Program. Letter to Scott Heath of RTP Environmental Associates, Inc. regarding request for information concerning La Farge Corporation. May 16, 2001.

Tiethoff, Tanya, Records Manager for Missouri Department of Natural Resources Air Pollution Control Program. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding status of request for information on La Farge Corporation. June 1, 2001.

Terry, Mark of Polysius. E-mail to Michael Hober of RTP Environmental Associates, Inc. regarding NOx Emissions from Cement Kilns. October 5, 2001.

Terry, Mark of Krupp-Polysius Corp. Faxed document to Michael Hober of RTP Environmental Associates, Inc. regarding cost analysis for Suwanee American. October 16, 2001.

Vardeman, Michael of Rinker Cement Mill Administration Office. Fax to Don Elias of RTP Environmental Associates, Inc. regarding Application Requirements to Extend FCS Kiln 2 Permit to 2005. December 4, 2000.

Welch, Laura, File Room of Missouri Department of Natural Resources, Air Pollution Control Program. Faxed letter to Scott Heath of RTP Environmental Associates, Inc. regarding Records Request. June 1, 2001.

Wignall, David of Clark County Health District. Phone call to Scott Heath of RTP Environmental Associates, Inc. regarding information on Great Star Cement of Las Vegas, NV. May 30, 2001.

Other Correspondence

Boyer Community. Letter to Thomas N. Thornton, Plant Manager of the Holnam - Holly Hill Plant regarding Health and Environmental Concerns of the Boyer Community with the Proposed Holnam Holly Hill, SC Plant Expansion. Received by Bureau of Air Quality October 16, 2000.

Boyer Community. Letter to Patrick T. Walker, Assistant Bureau Chief of the Bureau of Air Quality as follow up to conversations between Mr. Walker and Boyer Community resident Mrs. Helena Miles. October 9, 2000.

Cullen, Steven of Koogler & Associates. Letter and Attachments ("Protocol for the Use of the Plume Visibility Model Pluvue II for Coherent Plume Analyses at Chassahowitzka Class I Area" and "Evaluation of Nitrogen Deposition at Chassahowitzka Class I Area") to Al Linero of Florida DEP, Division of Air Resources regarding Florida Rock Industries, Inc. Proposed Brooksville Cement Plant. June 2, 2000.

Durham, Dawn M., Environmental Planner for Board of County Commissioners - Hernando County. Letter and Attachments to Al Linero of Florida DEP, Division of Air Resource Management regarding Comments Relating to the Proposed FRI Portland Cement Plant in Hernando County, FL (BCC Minutes Excerpt - Florida Rock Comprehensive Plan Amendment). August 10, 2000.

Linero, A.A, Administrator, New Source Review Section, Florida DEP. Letter to John Bunyak, Chief of Policy, Planning & Permit Review Branch, NPS-Air Quality Division regarding PSD Permit Application for Florida Rock Industries, Inc., Brooksville, FL. PSD-FL-293. June 14, 2000.

Linero, A.A, Administrator, New Source Review Section, Florida DEP. Letter to Gregg Worley, Section Chief of Air, Radiation Technology Branch, Preconstruction/HAP Section, US EPA Region IV regarding PSD Permit Application for Florida Rock Industries, Inc., Brooksville, FL. PSD-FL-293. June 14, 2000.

Linero, A. A. Letter to Mr. John D. Baker, President of Florida Rock Industries Inc. regarding Request for Additional Information regarding DEP File No. 0530050-005-AC (PSD-FL-293). July 11, 2000.

Thornton, Thomas N. Letter to the Residents of the Boyer Community (South Carolina) c/o Ms. Virginia Townsend regarding Holnam's offer to contribute funds toward a public health study. October 17, 2000.

Guidance Documents

Battye, Rebecca, and Stephanie Walsh and Judy Lee-Greco of EC/R Incorporated. NOx Control Technologies for the Cement Industry - Final Report. EPA Contract No. 68-D98-026. September 19, 2000.

"Best Available Control Technology (BACT) Determination" for Florida Crushed Stone Company, Hernando County, FL. Amended 6 April 1982. Approved November 10, 1983.

"Best Available Control Technology (BACT) Determination" for Florida Crushed Stone, Hernando County, FL. PSD-FL-227/AC 27-274892. Revised November 9, 1995.

Biggs, H.O. "Biosolids Injection Technology: An Innovation in Cement Kiln NOx Control."

BRG Environmental. "NOx Control Technology Review Summary Table for Portland Cement Kilns." Draft June 13, 2000.

"DEP Steps Up Monitoring of Newberry Plant." Florida Department of Environmental Protection Web Site - External Affairs Communications: http://www.dep.state.fl.us/comm/releases/2001/00-061.htm. For immediate release

February 13, 2001.

"The Facts on the DEP permit to Suwannee American Cement." Florida Department of Environmental Protection Web Site: http://www.dep.state.fl.us/officsec/news/cement.htm. Last updated June 16, 2000.

Golder Associates. "Best Available Control Technology." Document sent to Don Elias by Patty Adams of Florida DEP on October 16, 2001. 4-2 to 4-15.

HCB "Holderbank" Cement and Concrete. Environmental protection in construction materials production: objectives, measures, achievements. April 2000 (2nd ed.).

European Integrated Pollution Prevention and Control Bureau. "Reference Document on Best Available Techniques in the Cement and Lime Manufacturing Industries." European Commission. Seville, Spain: March 2000.

Lin, M. Linda. and Michael J. Knenlein. "Cement Kiln NOx Reduction Experience Using the NOxOUT Process." Proceedings of 2000 International Joint Power Generation Conference. ASME, 2000.

Linero, A. A. "What's Up With Cement Plant Permitting? - What's BACT?" Presented at Air and Waste Management Association's 94th Annual Conference and Exhibition, Orlando, FL. June 24-28, 2001.

Linero, A. A. "What's Up With Cement Plant Permitting?" Abstract No. 884, Session No. EI-5a. Proceedings of the Air & Waste Management Association 94th Annual Conference and Exhibition, Orlando, FL. June 24-28, 2001.

"NOx Generation" Excerpt from Air Permit Application to Revise NOx Emission limits for the Holnam, Inc. Facility in Midlothian, TX. Document faxed by Ron Hawks of Environmental Quality Management, Inc. to Michael Hober of RTP Environmental Associates, Inc. Fax date September 17, 2001.

United States Environmental Protection Agency (USEPA) New Source Review (NSR)/RACT, BACT, LAER Clearinghouse (RBLC) Query Results (Matching Records for Process Code 90.006). Search conducted on March 27, 2001. http://209.42.208.109/rblc/cfm/result01.cfm.

USEPA NSR/RBLC Query Results (Matching Records for Process Code 90.028). Search conducted on March 27, 2001. http://209.42.208.109/rblc/cfm/result01.cfm.

USEPA NSR/RBLC Query Results (Matching Records for Process Code 90.028). Search conducted on March 19, 2001. http://209.42.208.109/rblc/cfm/result01.cfm.

Penta Engineering Company, St. Louis, MO, for Portland Cement Association. Report on NOx Formation and Variability in Portland Cement Kiln Systems Potential Control Techniques and Their Feasibility and Cost Effectiveness. December 1998. (Copyright 1999 by Portland Cement Association.)

Portland Cement Association (Economic Research Department). "U.S. & Canadian New Cement Plants and Plant Modernizations." November 29, 2000.

Portland Cement Association (Economic Research Department). "U.S. & Canadian New Cement Plants and Plant Modernizations." September 1, 2000.

Portland Cement Association (Economic Research Department). Executive Summary. Skokie, Illinois: 2000.

Schreiber, Robert J., Jr. et al. "Selective Non-Catalytic Reduction and the Low NOx Precalciner Kiln: Limitations on NOx Control."

"Technical Consideration in Formation of CO and VOC from Cement Kilns." Excerpt from Air Permit Application to Revise NOx Emission limits for the Holnam, Inc. Facility in Midlothian, TX. Document faxed by Ron Hawks of Environmental Quality Management, Inc. to Michael Hober of RTP Environmental Associates, Inc. Fax Date September 17, 2001.

"Technical Consideration in Formation of NOx From Precalciner Cement Kilns." Excerpt from Air Permit Application to Revise NOx Emission limits for the Holnam, Inc. Facility in Midlothian, TX. Document faxed by Ron Hawks of Environmental Quality Management, Inc. To Michael Hober of RTP Environmental Associates, Inc. Fax date September 17, 2001.

Sun, W.H., et al. "Reduction of NOx Emissions from Cement Kiln/Calciner through the Use of the NOxOUT Process." (Nalco Fuel Tech) Presented at the International Specialty Conference on Waste Combustion in Boilers and Industrial Furnaces, sponsored by Air & Waste Management Association, Kansas City, MO, April 21, 1994.

Terry, Mark S. "BACT: What is Achievable with Today's Technologies." Proceedings of the 36th International Cement Seminar December 3 - December 6, 2000. Greenwood Village, CO: Intertec Exhibitions. 131-157.

Texas Natural Resource Conservation Commission. "Subchapter B: Combustion at Existing Major Sources - Division 4: Cement Kilns." Chapter 117 - Control of Air Pollution from Nitrogen Compounds. Effective May 11, 2000. 98 - 103.

United States Environmental Protection Agency. Municipal Waste Combustion: Background Information for Promulgated Standards and Guidelines - Summary of Public Comments and Responses Appendices A to C. Office of Air Quality Planning and Standards. Research Triangle Park, NC: December 1990.

Utah Department of Environmental Quality - Division of Air Quality. "Title V Operating Permits Issued." March 30, 2001. http://www.deq.state.ut.us/equair/permits/pi_opp.htm. (Accessed on April 19, 2001.)

Walters, L. J., Jr. et al. "Time-Variability of NOx Emissions from Portland Cement Kilns." Environmental Science & Technology 33 (1999): 700-704.

Young, Gerald L., and Michael von Seebach. "NOx Variability Emission and Control from Portland Cement Kilns." Penta Engineering. Presented at the 34th International Cement Seminar in Salt Lake City, UT, December 1998.

Xeller, H. "Neue Entwicklungen bei der NOx - Minderung in der Zementindustrie, Teil 2." ZKG International: April 1998. 208-218.

ATTACHMENT I

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AIR PERMIT NUMBER AC-27-274892(A)

DIVISION OF AIR RESOURCES MANAGEMENT
BUREAU OF AIR REGULATION
NEW SOURCE REVIEW SECTION
PHONE 904/488-1344 FAX 904/922-6979
Mail Station # 5505

AIR CONSTRUCTION PERMIT
Portland Cement Plant No. 2
(This permit replaces permit AC27-274892 and PSD-FL-227)

FLORIDA CRUSHED STONE COMPANY

Facility ID No. 0530021
Brooksville, Florida
Hernando County

Permit No. AC 27-274892(A)
PSD-FL-227(A)
PA 82-17

February 6, 1997

FLORIDA CRUSHED STONE COMPANY.
PORTLAND CEMENT PLANT NO. 2
Brooksville, Florida
PSD-FL-227(A) and AC 27-274892(A)
Facility ID No.: 0530021

Table of Contents

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

PERMITTEE:

Florida Crushed Stone Company
Brooksville Plant
10311 Cement Plant
Brooksville, Florida 34601

Authorized Representative:
Joseph Piermatteo
Senior Vice President

FID No.	0530021
PSD No.	PSD-FL-227(A)
Permit No.	AC 27-274892 (A)
PPS No.	82-17
Expires:	January 30, 2002

LOCATED AT:

Florida Crushed Stone, Company, Brooksville Facility
Project: Portland Cement Manufacturing Plant No. 2 and Associated Equipment
Standard Industrial Classification Code (SIC): 3241
Hernando County, Florida

UTM: Zone 17; 360.0 km E ; 3162.5 km N
Directions: *Approximately 3.5 miles Northwest of Brooksville, Hernando County*

STATEMENT OF BASIS:

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

Attached appendices and Tables made a part of this permit:

Table 1-1	Allowable Opacity Limits
Table 1-2	Air Pollutants Standards and Terms
Table 2-1	Compliance Requirements
Appendix BD	BACT Determination
Appendix GC	Construction Permit General Conditions

EFFECTIVE DATE:

Howard L. Rhodes, Director
Division of Air Resources
Management

SECTION I. FACILITY INFORMATION

FACILITY DESCRIPTION:

This existing facility consists of one (1) portland cement plant (preheater design) and associated equipment (Cement Plant No.1), a lime manufacturing plant and a 150 MW Power Plant. This permit is for the construction of a second portland cement plant (preheater/precalciner design) and associated equipment. The new plant will be identified as Cement Plant No. 2.

EMISSION UNITS

This permit addresses the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
031	Raw Materials Processed	Material Handling (Fugitive) Handling and Storage (Fugitive)
025	Raw Mill System	Filter Dust Bin Transport, Raw Meal Transport, Raw Meal Storage, Homogenizing Silos
026	Kiln System	Kiln Feed System Kiln & Cooler Main Stack
027	Clinker Cooler	Kiln & Cooler Main Stack
028	Finish Mill	Gypsum Storage Bin, Clinker Transport, Belt Conveyor, Finish Mill Discharge Vent, Finish Mill Sepal Separator, Clinker Storage Silo and Clinker Bin
029	Cement Handling	Cement Storage Silo A, Cement Storage Silo B, Cement Silo Discharge Hopper A, Cement Silo Discharge Hopper B
030	Coal Handling	Coal Handling and Storage (fugitives) Coal Dust Bin, Coal Mill

REGULATORY CLASSIFICATION

This industry is listed in Table 62-212.400-1 of Chapter 62-212, F.A.C., "Major Facility Categories." Therefore, stack and fugitive emissions of over 100 tons per year of carbon monoxide, volatile organic compounds, sulfur dioxide, nitrogen oxides, or particulate matter characterize the installation as a major facility subject to the requirements of **Rule 62-204.800, F.A.C.**, which incorporates 40 CFR Subpart F, the New Source Performance Standards (NSPS) for Portland Cement Plants. This facility is a Title V source.

SECTION I. FACILITY INFORMATION

PERMIT SCHEDULE:

- 1/21/97 Receipt of the RTP Envronmental Associates most recent letter with comments
- 12/02/96 Proof of Publication received by the Department
- 11/22/96 Notice of Intent published in the Hernando Today/ Hernando Sunday
- 11/12/96 Issued Notice of Intent to issue Permit
- 10/17/96 Application deemed complete

RELEVANT DOCUMENTS:

The documents listed below are the basis of the permit. The documents listed below are specifically related to this permitting action. These documents are on file with the Department.

Year 1995

1. Application received March 13, 1995.
2. Department's letters dated April 21, memo dated June 16, letter dated August 3, August 10, and October 11, 1995.
3. RTP Environmental Associates letters dated March 21, May 10, May 19, July 11, July 17, August 11, August 22, September 5, September 7, September 12, September 14, and October 24, 1995.
4. EPA's letters dated June 15, and November 2, 1995.
5. Hernando County Planning Department's letter dated April 28, June 5, and August 11, 1995.
6. Technical Evaluation and Preliminary Determination, BACT determination and proposed permit dated October 3, 1995.
7. Construction Permit AC27-274892 and PSD-FL-227 issued on November 17, 1995.

Year 1996

1. Application received September 11, 1996.
2. Department's letter dated October 3, 1996.
3. EPA's letter dated November 1, 1996.
4. RTP Environmental Associates letter dated October 17, December 13, 1996 and January 16, 1997.
5. United States Department of the Interior letter dated October 11, 1996.

Permit AC27-274892 and PSD-FL-227 Issued on 11/17/95
(Expiration Date: January 30, 2002)

FCS is allowed to construct either kiln (gepol tower or precalciner kiln). FCS shall surrender one of the permits to the Department's Bureau of Air Regulation after the decision to construct the selected kiln has been made or before the construction of the selected kiln will take place.

SECTION II. EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

1.0 ADMINISTRATIVE

1.1 Regulating Agencies: All documents related to applications for permits to operate, reports, tests, minor modifications and notifications shall be submitted to the Department of Environmental Protection (DEP) Southwest District Air Resources Program Permitting Section located at 3804 Coconut Palm Drive, Tampa, Florida 33619-8218, and phone number (813)744-6100. All applications for permits to construct or modify an emission unit(s) subject to the Prevention of Significant Deterioration requirements should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP) located at 2600 Blairstone Road, Tallahassee, Florida 32399-2400 and phone number (904)488-1344.

1.2 General Conditions: The owner and operator is subject to and shall be aware of and operate under, the attached General Permit Conditions G.1 through G.15 listed in *Appendix GC* of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. **[Rule 62-4.160, F.A.C.]**

1.3 Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.

Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. **[Rule 62-210.900, F.A.C.]**

1.5 Expiration: This air construction permit shall expire on January 30, 2002. **[Rule 62-210.300(1), F.A.C.]**. The permittee may, for good cause, request that this construction permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit. However, the permittee shall promptly notify the Southwest District office of any delays in completion of the project which would affect the startup day by more than 90 days. **[Rule 62-4.090, F.A.C]**

1.6 Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213 F.A.C., must be submitted to the DEP's Southwest District office. **[Chapter 62-213, F.A.C.]**

1.7 Applicable Regulations: Unless otherwise indicated, the construction and operation of Cement Plant No. 2 and associated equipment shall be in accordance with the capacities and specifications stated in the application. This facility is subject to all applicable provisions of Chapter 403, F.S and Florida Administrative Code Chapters 62-4; 62-103; 62-204, 62-210, 62-212, 62-213, 62-296, 62-297; and the Code of Federal Regulations Section 40, Part 60, Subpart A, Appendix A and Appendix B (1995 version). Specifically, this facility is subject to the New Source Performance Standards (NSPS) for Portland Cement Plants identified by the Code of Federal Regulations Section 40, Part 60, Subpart F, and incorporated by reference in Florida Administrative Code Rule 62-204.800. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. **[Rule 62-210.300, F.A.C.]**

SECTION II. EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

2.0 EMISSION LIMITING STANDARDS

2.1 General Visible Emissions Standard: **[Rule 62-296-320(4)(b)]** Unless otherwise specified by rule or permit, no person shall cause, let, permit, suffer or allow to be discharged into the atmosphere any air pollutants from new, or existing emissions units, the opacity of which is equal to:

- Visible emissions of all minor sources controlled by baghouses shall not exceed 5% opacity (BACT determination).
- Visible emissions from PM fugitive sources shall not exceed 10% opacity (BACT determination).

2.2 Unconfined Emissions of Particulate Matter **[Rule 62-296.320(4)(c), F.A.C.]**

(a) The owner or operators shall not cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any source whatsoever, including, but not limited to, vehicular movement, transportation of materials, construction, alteration, demolition or wrecking, or industrially related activities such as loading, unloading, storing or handling, without taking reasonable precautions to prevent such emission.

(b) The following reasonable precautions shall be implemented at the facility:

- All permanent haul roads and traffic areas at the plant site (with the exception of the coal storage area) shall be paved.
- A sweeper truck shall be maintained and operated at the plant to limit dust buildup on paved surfaces in and around the plant site, as well as internal areas of the plant.
- A water tanker truck shall be maintained and operated at the plant to water paved surfaces, raw material transfer points and other plant areas during dry meteorological periods as necessary to prevent fugitive emissions. Unpaved haul roads in and around the plant site shall be watered at regular intervals (or, alternately, treated with chemical dust suppressants at regular intervals).
- A vacuum truck shall be maintained and operated at the plant to "immediately collect" any spilled cement kiln dust.
- Dry materials (moisture content less than 10%) shall be stored below grade, in silos, or in covered structures.
- Limestone and gypsum shall be stored in the existing covered A-frame storage structure.
- Fly ash shall be charged directly into the storage silo via tank truck.
- Coal stored at or above natural grade shall be shaped, compacted, turned and/or watered as necessary to minimize wind erosion.
- A water sprinkler system shall be maintained and operated at the coal storage area to wet high traffic areas during hopper charging operations The hopper and coal conveyor network shall be covered. Traffic in the coal storage area is limited to hopper charging operations.
- All cement products shall be transferred to transport vehicles with sealed pneumatic conveying systems which are either closed systems or exhausted through bag filters.

SECTION II. EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

- All plant equipment operators shall be trained in basic environmental compliance, and shall perform visual inspections of materials before handling. If the visual inspections indicate a lack of excess surface moisture, the materials shall be wetted. Such wetting will continue until the materials can be handled without generating unconfined particulate matter emissions.

(c) FCS shall comply with applicable provisions of Rule 62-296.320(4)(c), F.A.C.

NOTE: Facilities that cause frequent, valid complaints may be required by the Southwest District office in Tampa to take these or other reasonable precautions. In determining what constitutes reasonable precautions for a particular source, the Department shall consider the cost of the control technique or work practice, the environmental impacts of the technique or practice, and the degree of reduction of emissions expected from a particular technique or practice.

2.3 General Pollutant Emission Limiting Standards: **[Rule 62-296.320, F.A.C.]**

(a) The owner or operator shall not store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems.

(b) No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

NOTE: An objectionable odor is defined as any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance. [F.A.C. 62-210.200(198)]

3.0 OPERATION AND MAINTENANCE

3.1 Changes/Modifications: The owner or operator shall submit to the Department of Environmental Protection, Bureau of Air Regulation and/or the Southwest District office in Tampa, for review any changes in, or modifications to: the method of operation; process or pollution control equipment; increase in hours of operation; equipment capacities; or any change which would result in an increase in potential/actual emissions. Depending on the size and scope of the modification, it may be necessary to submit an application for, and obtain, an air construction permit prior to making the desired change. FDEP will provide a clear point of entry for Hernando County and any other substantially-affected parties to challenge any of FDEP's proposed determinations in this regard. *Routine maintenance of equipment will not constitute a modification of this permit.* **[Rule 62-4.030, 62-210.300 and 62-4.070(3), F.A.C.]**

3.2 Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the Southwest District office in Tampa as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit and the regulations. **[Rule 62-4.130, F.A.C.]**

3.3 Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. **[Rules 62-210.650, F.A.C.]**

3.4 Excess Emissions Requirements **[Rule 62-210.700, F.A.C.]**

(a) Excess emissions resulting from start-up, shutdown or malfunction of these emissions units shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed two hours in any 24 hour period unless specifically authorized by the Southwest District office for a longer duration. **[Rule 62-210.700(1), F.A.C.]**

(b) Excess emissions that are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during start-up, shutdown, or malfunction shall be prohibited. **[Rule 62-210.700(4), F.A.C.]**

(c) In case of excess emissions resulting from malfunctions, the owner or operator shall notify the Air Pollution Control Section of the Southwest District office within one (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the problem; and the corrective actions being taken to prevent recurrence. **[Rule 62-210.700(6), F.A.C.]**

4.0 MONITORING OF OPERATIONS

4.1 Determination of Process Variables

(a) The permitee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value. **[Rule 62-297.310(5), F.A.C]**

5.0 TEST REQUIREMENTS

5.1 Test Performance Within 60 days after achieving the maximum production rate at which this facility will be operated, but not later than 180 days after initial startup and annually thereafter, the owner or operator

SECTION II. EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

5.1 Test Performance Within 60 days after achieving the maximum production rate at which this facility will be operated, but not later than 180 days after initial startup and annually thereafter, the owner or operator of this facility shall conduct performance test(s) pursuant to 40 CFR 60.8, Subpart A, General Provisions, 40 CFR 60, Appendix A and 40 CFR 51, Appendix M. No other test method shall be used unless approval from the Department has been received in writing. Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emission unit(s) operating at permitted capacity pursuant to Rule 62-297.310(2). F.A.C. **[Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C.]**

5.2 Test Procedures and Test Reports shall meet all applicable requirements of the Florida Administrative Code Chapter 62-297. **[Rule 62-297.310, F.A.C.]**

5.3 Test Notification: The owner or operator shall notify the Southwest District office in Tampa in writing at least *30 days* (initial) and *15 days* (annual) prior to conducting compliance tests. The notification shall include the date of test, time and place of each test, and the test contact person who will be responsible for coordinating and conducting such test for the owner or operator. **[Rule 62-297.310, F.A.C.; 40 CFR 60.7 and 40 CFR 60.8]**

5.4 Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in Rule 62-204, 62-210, 62 -212, 62-296 and 62-297, F.A.C. or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Southwest District office in Tampa. **[Rule 62-297.310(7)(b), F.A.C.]**

5.5 Stack Testing Facilities: The owner or operator shall install stack testing facilities in accordance with **Rule 62-297.310(6), F.A.C..**

5.6 Exceptions and Approval of Alternate Procedures and Requirements: An Alternate Sampling Procedure (ASP) may be requested from the Bureau of Air Monitoring and Mobile Sources in Tallahassee in accordance with the procedures specified in **Rule 62-297.620, F.A.C.**

6.0 REPORTS AND RECORDS

6.1 Duration: All reports and records required by this permit shall be kept for at least (5) years from the date the information was recorded. **[Rule 62-4.160(14)(b),F.A.C.]**

6.2 Emission Compliance Stack Test Reports:

SECTION II. EMISSION UNIT(S) COMMON SPECIFIC CONDITIONS

(a) A test report indicating the results of the required compliance tests shall be filed with the Southwest District office in Tampa as soon as practical, but no later than 45 days after the last sampling run is completed. **[Rule 62-297.310(8), F.A.C.]**

(b) The report shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in **Rule 62-297.310(8), F.A.C.**

6.3 Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the Air Section of the Southwest District office within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. **[Rules 62-4.130 and 62-210.700(6), F.A.C.]**

6.4 Annual Operating Report for Air Pollutant Emitting Facility: Before March 1st of each year, the owner or operator shall submit to the Department this required report [DEP Form No. 62-210.900(5)], which summarizes operations for the previous calendar year. **[Rule 62-210.370(3), F.A.C.]**

7.0 OTHER REQUIREMENTS

7.1 Waste Disposal: The owner or operator shall treat, store, and dispose of all liquid, solid, and hazardous wastes in accordance with all applicable Federal, State, and Local regulations. This air pollution permit does not preclude the permittee from securing any other types of required permits, licenses, or certifications.

SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

SUBSECTION A. COMMON CONDITIONS: 40 CFR 60 SUBPART A, GENERAL PROVISIONS

EMISSION UNITS

This permit addresses the following emission units.

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
031	Raw Materials Processed	Material Handling (Fugitive) Handling and Storage (Fugitive)
025	Raw Mill System	Filter Dust Bin Transport, Raw Meal Transport, Raw Meal Storage, Homogenizing Silos
026	Kiln System	Kiln Feed System Kiln & Cooler Main Stack
027	Clinker Cooler	Kiln & Cooler Main Stack
028	Finish Mill	Gypsum Storage Bin, Clinker Transport, Belt Conveyor, Finish Mill Discharge Vent, Finish Mill Sepal Separator, Clinker Storage Silo and Clinker Bin
029	Cement Handling	Cement Storage Silo A, Cement Storage Silo B, Cement Silo Discharge Hopper A, Cement Silo Discharge Hopper B
030	Coal Handling	Coal Handling and Storage (Fugitives) Coal Dust Bin, Coal Mill.

These emission units shall comply with all applicable requirements of 40 CFR 60, General Provisions, Subpart A.

A1. [40 CFR 60.7, Notification and record keeping]
A2. [40 CFR 60.8, Performance tests]
A3. [40 CFR 60.11, Compliance with standards and maintenance requirements]
A4. [40 CFR 60.12, Circumvention]
A5. [40 CFR 60.13, Monitoring requirements]
A6. [40 CFR 60.19, General notification and reporting requirements]

SUBSECTION B. SPECIFIC CONDITIONS:

The following Specific Conditions apply to the following emission units:

EMISSION UNIT NO.	SYSTEM	EMISSION UNIT DESCRIPTION
026	Kiln System	Kiln No. 2, preheater, precalciner, clinker cooler, dryer, raw mill. Kiln & Cooler Main Stack : Baghouse 2E-40
027	Clinker Cooler	Kiln & Cooler Main Stack : Baghouse 2E-40

These emission units shall comply with all applicable provisions of the 40 CFR 60 New Source Performance Standards for Portland Cement Plants, Subpart F **[Rule 62-204.800, F.A.C].**

EMISSION LIMITATIONS

B1. The maximum allowable emission rates for the No. 2 kiln, clinker cooler, raw mill, shaft dryer heater and preheater/precalciner shall not exceed the limits listed in Table 1-2. Air Pollutant Standards and Terms (attached). **[Rule 62-210.200(198) and 62-212.400, F.A.C.]**

B2. In order to minimize excess emissions during startup/shutdown/malfunction this emission units shall adhere to best operational practices. **[Rule 62-210.700, F.A.C. and 40 CFR 60.7]**

OPERATIONAL LIMITATIONS

B3. These emission units are allowed to operate continuously (8760 hours/year) **[Rule 62-210.200(223), F.A.C.]** Definitions-Potential to emit (PTE).

B4. *PROCESS OPERATING RATES*

The No. 2 kiln clinker production rate shall not exceed 104.2 tons per hour (TPH), 2500 tons per day (TPD) and 912,500 tons per year (TPY) based upon 8,760 hours of operation per year. The permitted maximum preheater feed is 173.2 TPH, which is equivalent to a maximum kiln feed rate of 159.4 TPH. **[Rule 62-210.200(223), F.A.C.]**

B5. *FUEL COMBUSTION*

(1) Fuels fired in No. 2 kiln and precalciner shall not exceed a total heat input rate of 325 MMBtu/hr and shall consist only of:

a. Coal and whole tires, tire derived fuel (shredded tires), and natural gas for normal operation.

b. Natural gas, all grades (meeting 1.5% sulfur limit) of virgin fuel oil, and/or blends (meeting 1.5% sulfur limit) of virgin fuel oil and on-spec used oils for startup.

c. Fuels fired in the shaft dryer heater shall not exceed a total input of 30 MMBtu/hr and shall consist only of all grades of virgin fuel oil (meeting 1.5% sulfur limit) for startup and normal operation.

COAL

(2) The coal usage rate shall not exceed 13.8 TPH or 120,888 TPY based on continuous operation.

TIRES

(3) Whole tires and tire derived fuel may be fed continuously at the kiln inlet at the base of the precalciner at a rate not to exceed 48.75 MMBtu/hr (15% of total kiln and precalciner fuel input) or 1.44 TPH and 11,952 tons per year based on 8300 hours per year.

(4) Before initiating tire firing, the gases exiting the kiln shall reach a minimum temperature of 1400 degrees F for one hour and the oxygen level in the kiln, as measured at the cement plant induced draft fan, shall reach at least 3 percent (1-hour average). Upon reaching steady state conditions, and within 6 hours, gases exiting the kiln shall be maintained at an outlet temperature of at least 1750 degrees F.

FUEL OIL

(5) The sulfur content of the fuel oil blend shall not exceed 1.5% by weight. The constituents and properties of the on-spec used oil shall comply with the following allowable concentration levels, as stipulated and defined in 40 CFR 266.40 (July 1, 1992 version), which is adopted by reference in **Rule 62-730.181, Florida Administrative Code (F.A.C.)**:

Constituent/Property	Allowable Concentration
Cadmium	2 ppm maximum
Arsenic	5 ppm maximum
Chromium	10 ppm maximum
Lead	100 ppm maximum
Total Halogens	1000 ppm maximum
Flash Point	140 ° F minimum
Polychlorinated	Less than 2 ppm
Byphenyls (PCBs)	

(6) On-spec used oil to be blended and burned at this facility shall not be a hazardous waste as defined by Rule 62-730.030, F.A.C., or 40 CFR Part 261 (July 1, 1992 version). It shall not include fuels or blended fuels consisting in whole or in part of hazardous waste or which include mixture of any solid waste generated from the treatment, storage, or disposal of hazardous waste. The on-spec used oil shall be burned in compliance with Section 403.769(3), Florida Statutes.

(7) The on-spec used oil to be blended with the unused fuel oil in the cement kiln fuel storage tank shall be obtained only from the used oil storage tanks located at the FCS Gregg Mine and CPL Plant. The used oil sample from Specific Condition No. B5(5) and B22 shall be analyzed for the following constituent/property, associated unit, and using the test methods indicated:

Constituent/Property	Unit	Test Method
Cadmium	ppm	EPA SW-846(6010)
Arsenic	ppm	EPA SW-846(6010)
Chromium	ppm	EPA SW-846(6010)
Lead	ppm	EPA SW-846(6010)
Total Halogens	ppm	EPA SW-846(9252)
Sulfur	percent	ASTM D129 or ASTM D1552
Flash Point	degree F	EPA SW-846(1010)
Heat of Combustion	Btu/gal	ASTM D240
Density	lbs/gal	
Polychlorinated Byphenyls		
(PCB's)	ppm	

NOTE: Other test methods may be used only after receiving written prior approval from the Department.

(8) The maximum on-specification used oil concentration in the final storage tank blend of on-specification used oil and purchased virgin oil shall not exceed 15 percent by volume.

B6. Any other operating parameters (including control equipment operating parameters) established during compliance testing and/or inspection that will confirm the proper operation of each emission unit shall be included in the operating permit **[Rule 62-297.310, F.A.C. and 62-4.070(3), F.A.C.]**

SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

MONITORING OF OPERATIONS

B7. The owner or operator shall record the daily production and the preheater-kiln system feed rate. **[Rule 62-204.800, F.A.C., 40 CFR 60.63(a)]**

B8. The owner or operator shall install, calibrate, maintain, and operate in accordance with 40 CFR 60.13 a *continuous opacity monitoring system* to measure the opacity of emissions from the cement kiln and clinker cooler control device stack. **[Rule 62-204.800, F.A.C., 40 CFR 60.63(b)]**

B9. Continuous process monitors shall be installed for CO or O_2 to insure proper combustion practices and for use in determining plant operating parameters to optimize emissions of CO, NO_x, and SO_2. **[Rule 62-212.400(5), and 62-4.070(3) F.A.C.]**

B10. Continuous monitoring equipment shall also be installed, calibrated, maintained, operated, and used to determine compliance for NO_x and SO_2. Continuous emission monitors shall be installed and certified, before the initial performance test, and operated in compliance with 40 CFR 60, Appendix F, Quality Assurance Procedures (1994 version) or other Department approved QA plan; 40 CFR 60, Appendix B, Performance Specification 1, 2, and 3 (1994 version). **[Rule 62-204.800, F.A.C.]**

Compliance By Continuous Emission Monitoring System (CEMS)

B.11 Compliance with the emission limits for NO_x and SO_2 in Table 1-2 shall be demonstrated by the continuous emission monitoring system (CEMS). The CEMS shall calculate and record emission rates in units of pounds of NOx and SO_2 per hour. Clinker production rates shall be recorded daily. The permittee may establish a relationship between material feed rates and production rates of clinker if material feed rates are measured more accurately than clinker production rates and the relationship is accurate within 10%.

Every day, the 24-hour average NOx and SO2 emission rate for the previous day shall be calculated. Emissions shall be calculated in units of pounds per hour and pounds per ton of clinker. Daily averages are to be calculated as the arithmetic mean of each monitored operating hour. A monitored operating hour is each hour in which fuel is fired in the unit and at least two emission measurements are recorded at least 15 minutes apart. Data taken during periods of startup, or when fuel is not fired to the unit, or when the CEMS is not calibrated shall be excluded from the daily average.

For compliance with the emission limits in Table 1-2, the daily average shall not include data from periods of startup when no clinker is being produced. However, emissions during startup periods shall not exceed the pound per hour limits in Table 1-2. Data recorded during periods of shutdown, malfunction, load change, and continuous operating periods shall be included in the daily average.

To the extent the monitoring system is available to record emissions data, the CEMS shall be operated and shall record data at all operating hours when fuel is fired in the unit, including periods of startup, shutdown, load change, continuous operation and malfunction.
Monitor downtimes and excess emissions based on daily averages, which include startup emissions, shall be reported on a quarterly basis using the SUMMARY REPORT in 40 CFR 60.7. A detailed report of the cause, duration, magnitude, and corrective action taken or preventative measures adopted for each excess emission occurrence, and a listing of monitor downtime occurrences shall accompany the SUMMARY REPORT when the total duration of excess emissions is 1% or greater or if the monitoring system downtime is 5% or greater of the total monitored operating hours.

Mass emission rates (lb/hr, and lb/ton clinker) shall be calculated based on source specific and fuel specific F factors calculated using 40 CFR 60 Appendix A, Method 19. These F factors shall be recalculated when fuel properties vary significantly from those used in the previously calculated F factors but not less than once per year.

B12. The monitoring devices shall meet the applicable requirements of Chapter 62-204, F.A.C., 40 CFR 60, Appendix F, and 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7(a)(5) Notification Requirements. Data on monitoring equipment specifications, manufacturer, type calibration and maintenance requirements, and the proposed location of each monitor shall be provided to the Department's Southwest District office for review at least 90 days prior to installation of a new CEMS. **[Rule 62-204.800, F.A.C.]**

TEST METHODS AND PROCEDURES

B13. Compliance with the allowable emission limiting standards listed in Table 1-2 shall be determined by using the following reference methods as described in 40 CFR 60, Appendix A (1994 version) and 40 CFR 61 Appendix B (1994 version) adopted by reference in Chapter 62-204, F.A.C.

Method 5 Determination of Particulate Matter Emissions from Stationary Sources (I) and (A).
Method 8 Determination of Sulfuric Acid Mist from Stationary Sources (I).
Method 9 Visual Determination of the Opacity of Emissions from Stationary Sources (I) and (A).
Method 10 Determination of Carbon Monoxide Emissions from Stationary Sources (I) and (A).
Method 25 Determination of Volatile Organic Compound Emissions from Stationary Sources (I).
Method 29 Determination of Metals Emissions from Stationary Sources (I).

Emission testing shall be performed at the No. 2 kiln/cooler main stack (baghouse 2E-40) during a period when the No. 2 kiln precalciner, cooler, shaft dryer/heater, raw mill and preheater are operating simultaneously and under normal operating conditions. The measured emission rates shall be the combined rates from the kiln and clinker cooler determined at the stack. EPA reference methods for sampling pollutants shall consist of the average of 3 consecutive test runs, each of one hour duration.
These emission units (026 and 027) shall comply with all applicable requirements of Rule 62-297.310, F.A.C. General Test Requirements and 40 CFR 60.8. Performance Tests. Table 2-1, Compliance Requirements (attached) also lists the EPA methods.

Testing of emissions shall be conducted with the emission unit operating at permitted capacity (85% coal and 15% tires). Permitted capacity is defined as 90-100% of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then the unit may be tested at less than 90% of the maximum operating rate allowed by the permit; in this case, subsequent source operation shall be limited to 110% of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no more than fifteen consecutive days for the purpose of additional compliance testing to regain the permitted capacity in the permit. **[Rules 62-204.800, 62-297.310, 62-297.400, 62-297.401, F.A.C., and 40 CFR 60 Appendix A and 40 CFR 60.8, Subpart A].**

B14. The visible emissions test shall be conducted by a certified observer and be a minimum of 180 minutes in duration. The test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur [**40 CFR 60.11 and Rule 62-297.310 (7), F.A.C.**].

B15. Compliance with the particulate matter standard contained in Table 1-2 (attached) shall be determined using EPA Method 5. The emission rate (E) of particulate matter shall be computed for each run using the following equation:

$$E = (c_s \times Q_{sd})/(P \times K)$$

where:

E = emission rate of particulate matter, kg/metric ton (lb/ton) of kiln feed
c_s = concentration of particulate matter, g/dscm (g/dscf)
Q_{sd} = volumetric flow rate of effluent gas, dscm/hr (dscf/hr)
P = total kiln feed (dry basis) rate, metric ton/hr (ton/hr)
K = conversion factor, 1000 g/kg (453.6 g/lb)

B16. The sampling time and sample volume for each run shall be at least 60 minutes and 0.85 dscm (30.0 dscf) for the kiln and at least 60 minutes and 1.15 dscm (40.6 dscf) for the clinker cooler. **[Rules 62-204.800 and 62-297.401, F.A.C. 40 CFR 60.64(b)(1) - (3)].**

B17. Suitable methods shall be used to determine the kiln feed rate (P), except fuels, for each run. Material balance over the production system shall be used to confirm the feed rate **[40 CFR 60.64(3)].**

B18. Operating procedures shall include good combustion practices and proper training of all operators and supervisors. The good combustion practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. **[Rule 62-4.070(3), F.A.C.].**

RECORDKEEPING AND REPORTING REQUIREMENTS

B19. The owner or operator shall submit reports of excess emissions based upon data from the continuous opacity monitoring system. Periods of excess emissions that shall be reported are defined as all 6 minute periods during which the average opacity exceeds that allowed in the BACT determination. The content of these reports must comply with the requirements in 40 CFR 60.7(d). Such reports shall be submitted quarterly pursuant to 40 CFR 60.7 (c). **[Rule 62-204.800, F.A.C.; 40 CFR 60.63(d), 60.65(a) and 40 CFR 60.7].**

B20. In order to document compliance with Specific Condition No. B5(3) TIRES:

a. A log shall be established and maintained for the hours of operation using tires as supplemental fuels. The log shall include the daily tire usage (hours) as supplemental fuel at the facility, a monthly running total of the tire usage (hours), and a cumulative 12 month running total (hours), to ensure that the annual limit is not exceeded. The log shall be maintained on file for at least five (5) years and shall be made available to the Department upon request.

b. A log that includes the date of all tire deliveries to the facility, and the total quantity (nearest 0.1 tons) of tires received.

c. A tire usage-control system shall be installed to assure that the tire usage as supplemental fuel at the facility does not exceed the maximum of 15% of the total Btu heat input to the No. 2 kiln and precalciner or 1.44 tons per hour. The control system shall include a verification method and a log that insures and documents that the tires usage and heat input limits are not exceeded.

d. A log for the utilization rate (tons per hour) of tires. The utilization rate of tires as supplemental fuel shall be determined by a continuous weighing method and shall be recorded.

e. The logs shall be maintained on file for at least five (5) years and shall be made available to the Department upon request.

FCS shall record, as a minimum, the daily dry feed rate into the No. 2 kiln (TPH), and the clinker production rate. The above records shall be retained for a period of five (5) years and made available to the Department upon request.

B21. In order to document compliance with Specific Condition No. B5(2) COAL:

A coal usage control system shall be established to assure that the coal usage does not exceed a maximum of 13.8 TPH.

B22. In order to document compliance with Specific Conditions No. B5(5) through B5(8) FUEL OILS, the following used oil control system shall be used, as a minimum:

a. Record the transfer of used oil and virgin oil to the blend tanks (dates and gallons).

b. Record the final blend quantities of on-spec used oil and virgin oil (gallons)

c. Calculate and record the final percentage of on-spec used oil in the tank blend of on-spec used oil and virgin oil, and verify that the percentage does not exceed 15.0 percent, by volume.

These records shall be maintained on file for at least five (5) years and shall be made available to the Department upon request. **[Rule 62-4.070(3), F.A.C. and FCS letter on Used Oil Sampling].**

B23. Recordkeeping requirement when burning on-spec used oil shall be in accordance with 40 CFR 266.43 (b) and (6) (July 1, 1992 version). The results of each sample analysis shall be submitted to the Department's Southwest District office and the Hernando County Planning offices within 30-days after a sample is taken. The dates and quantities of on-spec purchased fuel oil transferred to the facility storage tank shall be reported quarterly (i.e., Jan-Mar, April-June, July-Sept, and Oct-Dec). The report is due in the month following the ending quarter. All records shall be kept for a minimum of five (5) years period for public and regulatory agency inspection.

B24. All measurements, records, and other data required to be maintained by the permittee shall be reported to the Southwest District office on a quarterly basis with the start of commercial operation in accordance with 40 CFR 60.7. All measurements, records and other data required to be maintained by the permittee shall be retained for at least 5 years following the date on which such measurements, records, or data are recorded. The data shall be available to Department staff as requested. **[40 CFR 60.7]**

B25. The owner or operator shall submit reports of the malfunction information required to be recorded by 40 CFR 60.7(b). These reports shall include the frequency, duration, and cause of any incident resulting in de-energization of any device controlling kiln emissions or in the venting of emissions directly to the atmosphere. **[Rule 62-204.800, F.A.C., 40 CFR 60.65 (c)]**

Daily Operation and Maintenance (O&M) Log:

B26. This facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to the various specific conditions of this permit. Operators shall keep a daily O&M log to include, at a minimum, the following information:

The data collected from in-stack monitoring instruments.

The records on daily feed rates and clinker production rate.

The amount and type of fuel burned.

SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

Total quantity (by weight) of tire used as supplemental fuel.

The results of all source tests.

Calibration logs for all instruments.

Maintenance/repair logs for any work performed on equipment or instruments, that is subject to this permit;

Total coal, natural gas, and oil usage.

All measurements, records, and other data required to be maintained by FCS shall be retained for at least five (5) years following the data on which such measurements, records, or data are recorded. These data shall be made available to the Department upon request. The Department's Southwest District office shall be notified in writing at least 15 days prior to the testing (auditing) of any instrument required to be operated by these specific conditions of certification in order to allow witnessing by authorized personnel. [Rule 62-4.070(3), F.A.C.]

SUBSECTION C. SPECIFIC CONDITIONS

The following Specific Conditions apply to the following emission units:

EMISSIONS UNIT NO.	SYSTEM	EMISSIONS UNITS DESCRIPTION
031	Raw Materials Processed	Material Handling (Fugitive) Handling and Storage (Fugitive)
025	Raw Mill System	Filter Dust Bin Transport, Raw Meal Transport, Raw Meal Storage, Homogenizing Silos
028	Finish Mill	Gypsum Storage Bin, Clinker Transport, Belt Conveyor, Finish Mill Discharge Vent, Finish Mill Sepal Separator, Clinker Storage Silo and Clinker Bin
029	Cement Handling	Cement Storage Silo A, Cement Storage Silo B, Cement Silo Discharge Hopper A, Cement Silo Discharge Hopper B
030	Coal Handling	Coal Handling and Storage (Fugitives) Coal Dust Bin, Coal Mill.

EMISSION LIMITATIONS

C1. The permittee shall not cause or allow to be discharged into the atmosphere visible emissions which exceed the limits given in Table 1-1 Allowable Opacity Limits. **[Rule 62-210.200(198) and 62.212.400, F.A.C.]**

C2. In order to minimize excess emissions during startup/shutdown/malfunction these emission units shall adhere to best operational practices. **[Rule 62-210.700, F.A.C. and 40 CFR 60.7]**

OPERATIONAL LIMITATIONS

C3. Cement Plant No.2 and associated equipment is allowed to operate continuously (8760 hours/year) **[Rule 62-210.200(223), F.A.C. Definitions-Potential to emit (PTE)].**

C4. *Process operating rates*:

The maximum material handling rates are as specified in Table 1-1. Allowable Opacity Limits.

TEST METHODS AND COMPLIANCE PROCEDURES

C5. The maximum permitted allowable particulate emission rate (lbs/hr and gr/dscf) from these emissions units are as stated in Table 1-1 Allowable Opacity Limits. Because of the expense and complexity of conducting a stack test on minor sources of particulate matter, and because these sources are equipped with a baghouse, the Department pursuant to the authority granted under Rule 62-297.620(4), F.A.C., with a baghouse, the Department pursuant to the authority granted under Rule 62-297.620(4), F.A.C., hereby establishes a visible emission limitation not to exceed an opacity of 5% in lieu of a particulate stack test. **[Rule 62-297.620(4), F.A.C.]**

In accordance with Rule 62-297.620(4), minor particulate sources equipped with baghouses with visible emissions that are greater than or equal to 5 percent opacity may result in the permittee being required to perform a stack test in accordance with approved methods to verify compliance with the 0.01 gr/dscf emission limits contained in Table 1-1.

C6. Compliance with the allowable emission limiting standards listed in Table 1-1 shall be determined by using the following reference methods as described in 40 CFR 60, Appendix A (1995 version) adopted by reference in Chapter 62-204, F.A.C.

Method 9 Visual Determination of the Opacity of Emissions from Stationary Sources (I) and (A).

Testing of emissions shall be accomplished within 90 to 100% of the permitted capacity **[Rule 62-297.310(2), F.A.C]**. Failure to submit the input rates and actual operating conditions may invalidate the test **[Rule 62-297.310 (2), F.A.C.]**.

These emission units shall comply with all applicable requirements of Rule 62-297.310 General Test Requirements and 40 CFR 60.8, Subpart A, Performance Tests.

C7. The visible emissions test, EPA Method 9, shall be conducted by a certified observer and be a minimum of 180 minutes in duration. The test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur. **[Rule 62-297.310, F.A.C.]**

C8. Should the Department have reason to believe the particulate matter standards set forth in Table 1-1 are not being met, the Department may require that compliance with the particulate emission standards be demonstrated by testing (applicable emission unit) in accordance with Rule 62-297.620 (4) F.A.C. **[Rule 62-297.620(4) and 62-297.310, F.A.C.]**

C9. Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. **[Rule 62-4.070(3), F.A.C.]**.

C10. Particulate emissions from coal handling facilities related to the No. 2 kiln shall be minimized by following the procedures listed below: **[Rule 62-296.320(4)(c), F.A.C.]**

a. All conveyers and transfer points shall be enclosed to preclude particulate emissions (except those directly associated with coal stacking/reclaiming).

b. Coal storage piles shall be shaped, compacted and oriented to minimize wind erosion.

c. Water sprays or chemical wetting agents and stabilizers shall be applied to storage piles, handling equipment, etc during dry periods and as necessary to maintain an opacity of less than 10 percent, except when adding, moving or removing coal from the coal pile, during which the opacity shall be no more than 20%.

C11. The part of the fly ash handling system related to the No. 2 kiln (including transfer equipment, flyash bin, and pneumatic system exhaust) shall be totally enclosed and vented through fabric filters.

RECORDKEEPING AND REPORTING REQUIREMENTS

Daily Operation and Maintenance (O&M) Log:

C12. This facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to the various specific conditions of this permit. Operators shall keep a daily O&M log to include, at a minimum, the following information:

The results of all source tests.

Calibration logs for all instruments.

Maintenance/repair logs for any work performed on equipment or instrument which is subject to this permit.

All measurements, records, and other data required to be maintained by FCS shall be retained for at least five (5) years following the data on which such measurements, records, or data are recorded. These data shall be made available to the Department upon request. The Department's Southwest District office shall be notified in writing at least 15 days prior to the testing (auditing) of any instrument required to be operated by these specific conditions of certification in order to allow witnessing by authorized personnel. **[Rule 62-4.070(3), F.A.C.]**

SECTION IV. PERMITTING HISTORY

CEMENT PLANT

06-13-83	PA 82-17	Original PPS Certification
07-25-83	PA 82-17	Modification, limestone injection
11-10-83	AC27-61016	Original air construction permit
03-27-84	PSD-FL-091	EPA PSD permit
06-29-86	PA 82-17	Modification, limestone calciner
08-26-86	AC27-118674 PSD-FL-091	Modification, reduced emission limits
04-30-90	AC27-118674 PSD-FL-091A	Intent to Issue, testing shredded tires
06-06-90	AC27-118674 PSD-FL-091A	Amendment, testing shredded tires
09-24-90	AC27-118674 PSD-FL-091	Amendment, testing JEA sediment
05-24-91	AO27-183508	Original air operation permit
08-30-91	AC27-118674 PSD-FL-091B	Intent to Issue, use of shredded tires
10-09-91	AC27-118674 PSD-FL-091	Amendment, testing shredded tires for NO_x measurements
10-25-91	AC27-118674 PSD-FL-091	Amendment, testing whole tires
07-20-92	AC27-118674 PSD-FL-091C	Amendment, additional testing with whole tires
11-18-92	AC27-118674 PSD-FL-091A	Modification, use of shredded tires
11-24-92	AC27-118674	Intent to Issue, use of whole tires

SECTION IV. PERMITTING HISTORY

	PSD-FL-091	
12-21-92	AC27-118674	Modification, use of whole tires
12-17-93	AC27-222095 PSD-FL-091D	Modification, use of used oil
03-11-94	AO27-231888	Modification, use of used oil, and tires (whole and shredded)
08-10-94	AC27-222095 PSD-FL-091E	Modification, use of used oil w/ PCB limit condition
08-30-94	AO27-231888A	Modification, used oil test method
POWER PLANT		
06-13-83	PA 82-17	Original PPS Certification
07-25-83	PA 82-17	Modification, limestone injection
08-03-83	PA 82-17	Modification
03-27-84	PSD-FL-090	EPA PSD permit
02-20-85	PA 82-17	Modification
06-29-86	PA 82-17	Modification, limestone calciner
06-02-94	PA 82-17	Revision to transfer authorization from SWFWMD to DEP for dike construction
10-06-94	PSD-FL-090A	Amendment, testing at 133 MW
05-23-95	PSD-FL-090D	Intent to Issue, for operation of power at 1850 MMBtu/hr input

G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

(a) Have access to and copy and records that must be kept under the conditions of the permit;
(b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
(c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

(a) A description of and cause of non-compliance; and
(b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extend it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.

G.13 This permit also constitutes:

(a) Determination of Best Available Control Technology *(X)*
(b) Determination of Prevention of Significant Deterioration *(X)*; and
(c) Compliance with New Source Performance Standards *(X)*.

G.14 The permittee shall comply with the following:

(a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

(b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

(c) Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The person responsible for performing the sampling or measurements;
3. The dates analyses were performed;
4. The person responsible for performing the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

FLORIDA CRUSHED STONE COMPANY
PORTLAND CEMENT PLANT NO. 2 AND ASSOCIATED EQUIPMENT
Brooksville, Florida
Hernando County

The applicant, Florida Crushed Stone Company (FCS), plans to construct a 104.2 ton per hour (maximum TPH as clinker) dry process portland cement kiln with a *preheater/precalciner design* at its existing cement plant approximately 3.5 miles northwest of Brooksville, Hernando County, Florida. The project includes a single kiln and clinker cooler along with raw mill, finish mill, cement and clinker handling equipment, coal handling equipment, silos, and air pollution control equipment. The facility will produce 912,500 tons per year (maximum TPY as clinker) and approximately 1,004,000 TPY of portland cement.

The Department issued a construction permit and a BACT determination for Cement Plant No. 2 utilizing the preheater (PH) design (1995). This revised BACT analysis will consider the proposed preheater/precalciner (PH/PC) design that may be utilized by FCS in lieu of the permitted PH kiln. An extensive analysis supporting the BACT determination requested by FCS was submitted with the original application and is included by reference along with the original BACT Determination made by the Department and the additional information submitted with the present application.

A detailed process description is included in the Technical Evaluation and Preliminary Determination.

Following is the BACT determination proposed by the applicant:

<u>BACT DETERMINATION REQUESTED BY THE APPLICANT:</u>

POLLUTANT	EMISSION LIMIT
Particulate Matter (kiln)	0.2 lb/ton of dry kiln feed
Particulate Matter (cooler)	0.1 lb/ton of dry kiln feed
Particulate Matter (material handling, conveying, storage	0.01 gr/dscf, baghouses
Sulfur Dioxide (kiln)	0.23 lb/ton clinker
Nitrogen Oxides (kiln)	2.8 lb/ton clinker
Carbon Monoxide (kiln)	2.0 lb/ton clinker

A single, large, fabric filter system (baghouse) will be used to capture particulate matter from the kiln and the cooler. Baghouses will also be used to limit particulate emissions from other process emission points. Table 1-1 is a list of the emission units to be controlled by baghouses.

Portland cement installations are among the major facilities listed in Table 212.400-1, F.A.C., "Major Facilities Categories." A BACT determination is required for each pollutant exceeding the significant emission rates in Table 212.400-2, "Regulated Air Pollutants Significant Emissions Rates," which in this case are particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), and nitrogen oxides (NOx).

This facility is also subject to the following requirements given in Rule 62-208.800, F.A.C., "Federal Regulations adopted by Reference:"

- 40 CFR 60, Subpart F - Standards of Performance for Portland Cement Plants.
- 40 CFR 51, Subpart P - Protection of Visibility.

Date of Receipt of a BACT Application:

September 11, 1996

Review Group Members:

[Te]resa Heron and A. A. Linero of the New Source Review Section.

BACT DETERMINATION PROCEDURE

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determination of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in [thi]s approach is to determine, for the emission unit in question, the most stringent control available for a similar [or] identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from this facility can be grouped into categories based upon the control equipment and techniques that are available to control emissions from these emission units. Using this approach, the emissions can be classified as follows:

- Particulate matter from kilns and coolers (PM/PM_{10}, and VE). Controlled generally by add-on particulate collection equipment such as baghouses or electrostatic precipitators.
- Products of combustion and incomplete combustion (e.g., SO_2, NO_x, CO, VOC). Control is largely achieved by good combustion practices, reactions with clinker and raw materials and removal in add-on control equipment.
- Emissions from materials handling, conveyance, and storage (primarily PM). Controlled generally by fabric filters and reasonable precautions.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "non-regulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., PM, SO_2, H_2SO_4, fluorides, etc.), if a reduction in "non-regulated "air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

BACT DETERMINATION ANALYSIS:

PARTICULATE MATTER (PM/PM_{10})

Particulate Matter is generated by the various physical and chemical processes at a cement manufacturing plant. Sources of particulate matter at cement plants include (1) quarrying and crushing, (2) raw material storage, (3) grinding and blending, 4) clinker production, 5) finish grinding, and 6) packaging and loading. Additional sources of PM are raw material storage piles, conveyers, storage silos, and unloading facilities. The largest emission source of PM within cement plants is the pyroprocessing system that includes the kiln and clinker cooler exhaust stacks (in this case, common kiln/cooler stack). Emissions from kilns are affected by several factors, including differences in convective patterns, material movement patterns, burner locations and insertion lengths, heat transfer mechanisms, and the type of clinker cooler that supplies secondary air to the kiln for combustion. Typically, dust from the pollution control equipment servicing the kiln and cooler is collected and recycled into the kiln and thus incorporated into the clinker. According to FCS, virtually all of the cement kiln dust (CKD) generated from Cement Plant 1 is captured in the baghouse and returned to the pyroprocessing system as raw material. A small amount is removed every few weeks and sold to avoid build-up of thallium in the product. It is expected that most of the CKD from Cement Plant 2 will be recycled, while any excess will be stored in a silo for sale.

Common control devices for stack gases include settling chambers, inertial separators, impingement separators, wet scrubbers, fabric filters, and electrostatic precipitators. Fabric filters (baghouses) and electrostatic precipitators (ESPs) are generally considered equivalent for particulate control. Both types of devices can achieve removal efficiencies of over 99%. ESPs and baghouses are used extensively as control devices at cement plants. ESPs are generally specified for kiln and clinker cooler exhaust gases because of their ability to operate effectively at varying temperatures. Baghouses are also used at facilities for particulate control from kilns and coolers. Both types of control equipment provide for the recovery/recycling of collected dust back into the process stream. Baghouses are also used to control particulate emissions from most other material processing operations at cement plants.

Common controls to limit particulate emissions from fugitive sources (such as roadways, stockpiles, and material processing and conveying equipment) include wet suppression, sweeping, application of surfactants, paving of roads and covering of stockpiles to reduce wind erosion. Wet suppression of fugitive particulate emissions is considered as BACT for most material handling operations and unpaved roads. Dust from stockpiles can be minimized by relatively high material moisture content with additional water spraying as necessary.

Small quantities of beryllium (Be), mercury (Hg) and lead (Pb) are generated by the combustion of coal and fuel oil blends. Be and Pb will be generated as particulate emissions from the combustion of fuels, and will be removed by incorporation into the product clinker or controlled by the kiln/cooler baghouse. Hg can exist in both particulate and gaseous form and can only be partially removed by the process and control equipment The applicant projects such low emissions of these metals that they will not be subject to BACT.

A review of the BACT Clearinghouse indicates that baghouses and ESPs are widely used to control particulate matter from process emission units at cement plants. They are commonly accepted as BACT.

The applicant has proposed kiln particulate emissions of 0.2 pounds per ton of dry kiln feed (lb/ton kiln feed) and cooler particulate emissions equal to the New Source Performance Standards (NSPS) limit of 0.1 lb/ton kiln feed as BACT for this source. This compares with the proposed values in the original application for the PH kiln of 0.3 and 0.1 lb/ton kiln feed for the two units, respectively.

PRODUCTS OF COMBUSTION AND INCOMPLETE COMBUSTION

Nitrogen Oxides

Emissions of NO_x from dry process cement plants with a preheater/precalciner include the kiln, the calcining loop, and any fuel-fired support operation. NO_x is generated during fuel combustion by oxidation of chemically bound nitrogen in the fuel (fuel NO_x) and by thermal fixation of nitrogen in the combustion air (thermal NO_x). As flame temperature increases, the amount of thermally generated NO_x increases. Fuel type affects the quantity and type of NO_x generated. Generally, natural gas is low in nitrogen. However it causes higher flame temperatures and generates more thermal NO_x than oil or coal, which have higher fuel nitrogen content, but exhibit lower flame temperatures.

NO_x emissions represent a significant portion of the total emissions generated by this project, and shall be minimized using BACT.

The emissions of NO_x can potentially be reduced at Portland cement plants by two methods:

1. Minimizing the quantity of NO_x generated during combustion (combustion modifications).

2. Reducing the quantity of NO_x in the flue gas stream (flue gas controls).

A review of EPA BACT/LAER Clearinghouse (BACT Clearinghouse) information indicates that NO_x emissions at most facilities are minimized by process control and good combustion practices.

The applicant stated that NO_x emissions at this facility will be controlled through "proper combustion practices" such as burner design with primary combustion air control. Burning a portion of the fuel in the precalciner, introduction of tires in the material feed end of the kiln, and indirect firing will spread out the thermal load and will help minimize NO_x emissions.

In its original submittal, the applicant ruled out Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR) as technically unfeasible or cost prohibitive. The applicant gave subsequent consideration to other possible control methods following a request by the Department for additional details justifying the selected method. The applicant rejected Low NO_x Burners, low Nitrogen Fuel, Flue Gas Recirculation, Fuel Reburning, and Contemporaneous Reductions from the on-site power plant and cement kiln as options which are allegedly ineffective, undemonstrated, or beyond the control of the applicant.

The applicant has proposed for this kiln with a preheater/precalciner design a NO_x emission rate of 292 lb/hr and 2.8 lb/ton clinker. This value is substantially less than the one FCS proposed in its original application (4.3 lb/ton clinker) and, on a unit basis, is equal to the BACT Determination made by the Department in 1995. It is compared below with previous determinations documented by the BACT Clearinghouse.

Previous BACT Determinations

BASIS	Least Stringent	Most Stringent	Proposed
	Year 1978	Year 1981	Year 1996
lb/ton clinker	11.13	0.85	2.8

It is important to note that the facility which was given the 0.85 lb/ton clinker NO_x limit has not been able to meet it since construction. A dry process plant with a preheater/precalciner received a NO_x limit of 1.11 lb/ton clinker but was never built. Another dry process plant with a preheater/precalciner received a BACT determination of 2.09 lb NO_x/ton clinker. However, it appears that since that time a less stringent standard was applied. One dry process preheater/precalciner kiln in California received a NO_x BACT determination of 2.5 lb/ton clinker. The Department made a BACT Determination of 2.8 lb/ton clinker in 1995 for the proposed Florida Rock Industries Cement Plant in Newberry, Florida. The main reason it was higher than the one for the California plant was that Florida limestone is wetter and requires more heat input to dry. A claim by the kiln manufacturer that differences in volatility between Eastern and Western coal should be reflected in an even higher emission limit for the Florida kiln was rejected by the Department.

A review of the NO_x emission rate summary indicates that the applicant's proposal is representative of the most stringent BACT determinations made to date for plants utilizing dry processes. The dry process with a preheater/precalciner is considered to be the most energy-efficient process. Therefore it is expected that the lower fuel use will result in relatively low NO_x. Additionally, the lower flame temperature realized when burning coal, spreading the thermal load over various burn points, indirect firing, as well as documented reductions from tire burning, are further reasons to a expect low emission rate from the proposed preheater/precalciner kiln.

The Department also reviewed a paper presented at the Air and Waste Management Association (AWMA) International Specialty Conference on Waste Combustion in Boilers and Industrial Furnaces. The paper, "Reduction of NO_x Emissions from Cement Kiln/Calciner through the Use of the NOxOUT Process," which was written by representatives of Nalco and Ash Grove Cement, suggests that SNCR is a viable control method. A level as low as 1.0 lb/ton of clinker was reached based on demonstration tests conducted at the Ash Grove cement plant in Seattle, Washington. However the process has not been demonstrated on a long term basis and FCS' kiln designer, Polysius, has not been willing to guarantee its performance or the quality of cement produced when using this control process.

Recently a proposed cement plant (Great Star Cement, Clark County, Nevada) was permitted with the urea-based SNCR/NOxOUT process as BACT. The process relies on the reaction between ammonia and NO_x to yield molecular nitrogen. The delivery system consists of urea injectors in one of the preheater sections. The objective was to achieve 50% reduction of NO_x emissions. At that level there should be no ammonia slip while meeting a BACT limit of 3.1 lb/ton clinker.

A survey of stack test data from various kilns around the country, operating for more than three years, suggests that the proposed emission limit for NO_x is low but achievable

The USEPA Technology Transfer Network (TTN) BACT/LAER/RACT Clearinghouse database was reviewed for more recent data. Review of this data does not change the Department's original review.

Sulfur Dioxide

Sulfur dioxide (SO_2) may be generated both from sulfur compounds such as sulfates in the raw materials and from sulfur in the fuel. The sulfur content of both raw materials and fuels varies from plant to plant and with geographic location. Sulfur dioxide at this facility will be generated by the combustion of coal and tires in the kiln and generation of sulfur gases from the raw materials.

The exhaust gas from a cement kiln can contain varying amounts of SO_2. Under low oxygen conditions, sulfates in the raw materials can be converted to SO_2. At high temperature and excess air conditions, some of the sulfur introduced into the cement kiln with the raw materials, and most of the sulfur contained in the fuel, are converted to SO_2. Most of the SO_2 subsequently reacts with oxygen and alkali compounds (such as Na_2O and K_2O vaporized at sintering temperatures) to form alkali sulfates, which are found in cement clinker and in kiln dust. The amount of SO_2 released in the kiln flue gases will vary with the amount of excess alkali available for absorption. Additional SO_2 may be removed through contact with the incoming raw materials and, to some extent, in the particulate control equipment.

SO_2 control processes can be classified into five categories: fuel/material sulfur content limitations, absorption by a solution, adsorption on a solid bed, direct conversion to sulfur, or direct conversion to sulfuric acid.

FCS proposes to limit SO_2 emissions by taking advantage of the alkaline environment in the kiln, preheater, and raw mill to effect substantial removal of SO_2. Ultimately the sulfur is incorporated into the clinker lattice structure, thus minimizing the amount emitted to the atmosphere. Some additional SO_2 removal through contact with particulate matter may also take place in the kiln/cooler baghouse.

A review of the BACT determinations for cement plants as contained in the BACT Clearinghouse indicates SO_2 reduction levels from 70 to 96% (percent) from facilities utilizing the dry processes. The Department did not find instances of BACT involving measures beyond those proposed by FCS.. Some plants use baghouses as proposed by FCS instead of Electrostatic Precipitators (ESPs) for particulate control. It is possible that the filter cake on the bags enhances SO_2 removal compared with an ESP. However, the difference is marginal compared with the primary removal mechanism involving oxidation of SO_2 to SO_3, alkali reactions, and subsequent removal of sulfates as particulate matter and with the clinker.

The SO_2 limit proposed by the applicant, 0.23 lb/ton clinker, is substantially less than the 0.55 lb/ton value proposed in the original application submitted by FCS in 1995 and is equal to the BACT emission limit (on a unit basis) set by the Department in its review of the previous preheater (PH) kiln proposal. A survey of stack test data from different facilities around the country operating for at least three years demonstrates that the proposed limit is low but achievable.

Carbon Monoxide and Volatile Organic Compounds

Carbon monoxide (CO) is a pollutant formed by the incomplete combustion (oxidation) of carbon containing compounds in the cement kiln fuel and during the transformation of cement raw materials to cement clinker. When insufficient oxygen is provided, more CO and less CO_2 are formed than under excess air conditions. Substantial quantities of CO and CO_2 are also generated through calcining of limestone and other calcareous material. This calcining process thermally decomposes $CaCO_3$ to CaO and CO_2. The calcining of limestone in the cement manufacturing process liberates large amounts of CO_2, which is available for dissociation into CO.

Emissions of CO can potentially be reduced at portland cement plants by two main methods: utilization of proper combustion practices to maximize the oxidation of CO to CO_2 and reducing the quantity of CO in the flue gas stream (flue gas control).

VOC is also a pollutant formed by the incomplete combustion of fuel or hydrocarbons contained in the raw materials. The temperatures of the gases in the kiln will reach between 3700 to 3800 degrees Fahrenheit. At these high temperatures, virtually all VOCs will be consumed or destroyed regardless of their source (limestone, mill scale, coal, fuel oil, etc.). Clinker production requires certain temperatures, residence time, and turbulence within the kiln. These factors are sufficient to ensure the destruction of almost all VOCs at cement plants.

Emissions of VOC can be controlled by add-on control devices by the mechanisms of adsorption, absorption, or incineration (afterburning). Incineration processes include flame incineration, thermal incineration, and catalytic incineration. No add-on controls for CO or VOC have been demonstrated for cement plants.

The high temperatures and control of excess air and fuel, typically results in simultaneous optimization for control of products of incomplete combustion and NO_x. The applicant proposes proper combustion practices as BACT to control emissions of CO from this plant. The applicant estimates low emissions of VOC such that the new kiln will not be subject to BACT for this pollutant.

A review of the BACT Clearinghouse reveals that for CO and VOC, BACT from cement plants for these pollutants is proper combustion practices.

BACT DETERMINATION BY DEP:

Particulate Matter Determination

BACT for visible emissions was determined to be more stringent than the NSPS for Portland Cement Plants, 40 CFR 60, Subpart F. With respect to the kiln, BACT for PM was also determined to be more stringent than the NSPS for Portland Cement Plants, 40 CFR 60, Subpart F. This value of 0.2 lb/ton kiln feed is equal to the Department's previous BACT determination for the PH kiln and equal to the proposed determinations made for the Florida Rock Industries kiln in Newberry and the Southdown Cement Plants in Brooksville.

Based on actual data the kiln and cooler PM limits are considered to be low and achievable.

For each small baghouse in the material handling process the exhaust gases must not exhibit greater than 5 percent opacity. The Department has determined that 5 percent opacity is BACT, and is attainable with a baghouse.

Nitrogen Oxides Determination

The Department has determined that the NO_x level proposed by the applicant is similar to the lowest emission limits from plants already in operation throughout the country and reflects recent BACT determinations for Florida portland cement plants.

FCS previously ruled out SNCR as unfeasible for the previous PH design because the "optimum temperature range to drive the SNCR reactions between 1600-2000 degrees F is encountered in a typical kiln system only in the kiln itself." FCS contended that injection of ammonia/urea in the kiln will cause increases in NO_x. In the new PH/PC arrangement, the temperature range for SNCR will occur outside of the kiln and its use is at least plausible.

The Department believes that the proposed NO_x limit of 2.8 lb/ton clinker (at 104.2 TPH clinker production) is BACT for this plant. Therefore, BACT for NO_x emissions from the cement kiln is determined to be equal to 2.8 lb/tons of clinker. The Department believes that this limit can be achieved by the technology proposed by FCS. If it is not met within the time allotted in the proposed construction permit, then FCS must examine the option of employing SNCR or propose an alternative technology to accomplish the same end.

Sulfur Dioxide Determination

The Department has also determined that the SO_2 BACT limit proposed by the applicant is also one of the lowest in the country and is equal to recent BACT Determinations by the Department for this pollutant. It is the conclusion of the Department that the key factors in SO_2 removal are maintaining proper ratios of sulfur and alkali in the kiln environment and intimate contact between raw materials and exhaust gases. This is considered by the Department to be the mechanism by which the proposed limit of 0.23 lb/ton clinker will be achieved.

The Department believes that FCS will meet the SO_2 limits as proposed. This is substantiated by the letter of October 28, 1983 from Sholtes and Koogler, Environmental Consultants, regarding the existing PH kiln at FCS. Per page 13, "Polysius (cement plant designer) states that if only sulfur dioxide from the cement plant were considered, sulfur dioxide emissions as low as 20 pounds per hour could be expected from the cement plant." This is further proved by actual emissions tests from the original kiln which average about 10 lb of SO_2 per hour or approximately 0.1 lb/ton clinker.

The Department has also concluded that sulfuric acid mist emissions are not expected to be significant because free sulfite (SO_3) will preferentially react with clinker and kiln dust in the alkali environment of the kiln. Also, little water is available to complete the reaction to acid mist. No BACT determination was required for sulfuric acid mist (H_2SO_4).

An emission limit of 0.23 lb SO_2/ton clinker will insure that ambient SO_2 concentration increases will be less than the applicable National Park Service Significant Impact Level. Although it appears that FCS can achieve even lower values, it would be prudent to allow sufficient flexibility such that emissions of all combustion products can be minimized simultaneously. To provide further assurance that this limit will be met, the Department proposes a limit on the sulfur content of the coal of 1.25 percent.

CO Determination

BACT for CO was determined to be 2.0 lb/ton clinker. This value is equivalent to that proposed by FCS and the Department's previous BACT determination for Cement Plant 2. It is lower than the value given in AP-42 and will provide sufficient flexibility to minimize NO_x and SO_2 emissions. The Department requests that FCS continue to be judicious in its procurement of raw materials such as coal ash with low levels of unburned carbon to minimize CO generation in the PH.

Other Pollutants

No BACT determination was required for VOC as it will not be emitted in significant amounts.

No BACT determination was required for Pb. The limit requested by FCS insures BACT will not be triggered. Removal will be accomplished by the particulate control system and incorporation into the clinker matrix.

No BACT was required for Be. The adopted value will result in emissions less than the PSD significant threshold value. The particulate control system will remove Be which will also be largely incorporated into the clinker matrix.

No BACT was required for Hg. The estimate provided by FCS will result in emissions less than the applicable BACT threshold. This is consistent with information available to the Department on mercury levels in raw materials and coal as well as tests conducted at kilns in Florida.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

The BACT emissions established by the Department are summarized as follows:

SOURCE	POLLUTANT EMISSION LIMIT
KILN	
Kiln (PM/PM_{10})	0.2 lb/ton kiln feed (dry basis) and 0.3 lb/ton clinker - 1 hour average
Kiln (VE)	Visible emissions not to exceed 10 percent opacity
Kiln (SO_2)	0.23 lb/ton clinker 24 hr rolling average
Kiln (NOx)	2.8 lb/ton clinker - 24 hr rolling average
Kiln (CO)	2.0 lb/ton clinker - 1 hr average
Kiln (SO_3)	0.014 lb/ton clinker (non-BACT)
Kiln (VOC)	0.085 lb/ton clinker (non-BACT)
Kiln (Be)	8.5×10^{-7} lb/ton clinker (non-BACT)
Kiln (Hg)	2.4×10^{-5} lb/ton clinker (non-BACT)
Kiln (Pb)	5.2×10^{-4} lb/ton clinker (non-BACT)
Fuels	Coal (1.25 % S), blend of fuel oil and on-spec used oil (1.5 % S), tires (up to 15% of heat input), and natural gas are the only fuels allowed
COOLER	
Cooler (PM/PM_{10})	0.1 lb/ton kiln feed (dry basis) and 0.15 lb/ton clinker
Cooler (VE)	Visible emissions not to exceed 10% opacity

ASSOCIATED EQUIPMENT

Minor points with baghouses	Visible emissions not to exceed 5% opacity

FUGITIVES SOURCES

Fugitive sources	Visible emissions not to exceed 10% opacity

COMPLIANCE

Compliance with the particulate emission limitations shall be demonstrated using EPA Reference Method 5 as contained in Appendix A, 40 CFR 60, and set forth in Subsection 60.64 of the NSPS for Portland Cement Plants, 40 CFR 60.

Compliance with opacity standards (minor sources controlled by baghouses) shall be determined by conducting observations in accordance with 40 CFR 60, Appendix A, Method 9.

Continuous Opacity Monitors (kiln and cooler) shall meet the requirements of the 40 CFR 60, Appendix B and 40 CFR 60, Subpart F, NSPS for Portland Cement Plants. Compliance with the opacity standard for the kiln and cooler shall be demonstrated by EPA Reference Method 9 as contained in Appendix A, 40 CFR 60.

Compliance with the opacity standards for fugitive sources shall be determined by EPA reference Method 9 as contained in Appendix A, 40 CFR 60.

Compliance with the SO_2 and NO_x emission limitations shall be demonstrated using CEMs. The CEMs shall meet all the applicable requirements of 40 CFR 60, Appendix B and Appendix F.

Compliance with the CO limitations shall be demonstrated by 3 one-hour tests using EPA Method 10.

Pursuant to F.A.C. 62-4.070(3), 62-212.400(6) and 62-296.520, the kiln/cooler exhaust system shall be equipped with continuous monitors to record NO_x and SO_2 for the purposes of compliance; opacity at the stack to indicate proper maintenance and operation; and CO and/or O_2 to optimize combustion conditions for pollution control.

Compliance with the VOC limitations shall be demonstrated (on a one time basis) by three one hour stack tests using Method 25 or 25A to confirm emission rate is less than the PSD significant emission rate.

Compliance with the Pb, Hg, and Be limitations shall be demonstrated (on a one time basis) by three one-hour stack tests using EPA Method 29 to confirm emission rate is less than the PSD significant emission rate.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACT/LAER/RACT CLEARINGHOUSE DATABASE COMPARISON

The following table is to be used for reference and comparison with portland cement facilities listed in the BACT/LAER/RACT Clearinghouse database:

POLLUTANT	lb/ton clinker	lb/ton $kiln_{ph}$ feed	lb/ton kiln feed	lb/MM BTU
PM/PM_{10} (kiln)	0.3	0.18	0.2	0.09
SO_2 (kiln)	0.23	0.14	0.15	0.07
NO_x (kiln)	2.80	1.68	1.83	0.89
CO (kiln)	2.0	1.20	1.31	0.64
VOC (kiln)	0.085	0.05	0.06	0.03
H_2SO_4 (kiln)	0.014	8.37 E-03	0.009	4.46 E-03
Be (kiln)	8.5 E-07	5.10 E-07	5.55 E-07	2.72 E-07
Hg (kiln)	2.4 E-05	1.44 E-05	1.57 E-05	7.69 E-06
Pb (kiln)	5.2 E-04	3.13 E-04	3.40 E-04	1.67 E-04
PM/PM_{10} (Cooler)	0.15	0.09	0.1	0.04

Based on the following FCS process rates:
Preheater feed rate ($kiln_{ph}$ feed) : 173.2 TPH
Kiln feed rate : 159.4 TPH
Clinker production : 104.2 TPH
Heat Input : 325 MMBTU/hr

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING

Teresa Heron, Review Engineer,
A. A. Linero, P.E., Administrator
New Source Review Section
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

2/7/97
Date:

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

2/9/97
Date:

Table 1-1
Allowable Opacity Limits (Minor Particulate Sources)
Florida Crushed Stone

Description	Control	Emission Unit Equipment	Grain Loading (gr/dscf)	OPACITY	lb/hr
Emission Unit: Raw Material Processed Process Rate = 245 TPH					
Material Processing (Fugitive)				10	
Handling and Storage (Fugitive)				10	
Emission Unit: Raw Mill System Process Rate = 173.2 TPH Preheater Feed					
Filter Dust Bin Transport	Baghouse	2E-67	0.01	5	0.302
Raw Meal Transport	Baghouse	2F-02	0.01	5	0.208
Raw Mill Storage and Homogenizing Silos	Baghouse	2G-01	0.01	5	1.178
Emission Unit: Kiln Operations Process Rate = 159.4 TPH Kiln Dry Feed					
Kiln Feed System	Baghouse	2H-05, 2E-66	0.01	5	0.499
Emission Unit: Finish Mill Process Rate = 104.2 TPH Clinker					
Gypsum Storage Bin	Baghouse	2L-14	0.01	5	0.320
Clinker Transport	Baghouse	2L-03	0.01	5	0.253
Belt Conveyor	Baghouse	2M-04	0.01	5	0.485
Finish Mill Discharge Vent	Baghouse	2N-02	0.01	5	2.640
Finish Mill Sepol Separator	Baghouse	2N-08	0.01	5	8.270
Clinker Storage Silo	Baghouse	2L-05	0.01	5	0.253
Clinker Bin	Baghouse	2M-15	0.01	5	0.624
Emission Unit: Cement Handling Process Rate: ~ 115 TPH Portland Cement					
Cement Storage Silo A	Baghouse	2Q-18	0.01	5	0.499
Cement Storage Silo B	Baghouse	2Q-18	0.01	5	0.499
Cement Silo Discharge Hopper A	Baghouse	2Q-28	0.01	5	0.208
Cement Silo Discharge Hopper B	Baghouse	2Q-38	0.01	5	0.208
Emission Unit: Coal Handling Process Rate = 13.8 TPH					
Coal Mill	Baghouse	2S-15	0.01	5	1.745
Coal Dust Bin	Baghouse	2S-20	0.01	5	0.145
Coal Handling and Storage (Fugitive)				5/20	
TOTAL					18.336

Table 2. Compliance Requirements.

FACILITY NUMBER: 0530021

DRAFT Permit No.: AC27-274892(A)
and PSD-FL-227(A)

Permittee:
Florida Crushed Stone, Company
Portland Cement Plant No. 2 and Associated Equipment

E.U. ID#	Description	Pollutant Name or parameter	Fuel(s) [1]	EPA/Reference Method/CMS *	Testing Time Frequency	Min. Compliance Test Duration	CMS * Compliance
026	Kiln No. 2	PM/PM_{10}	Oil/Coal /Gas/WTDF	5	initial/annual	3 one-hr run	
026	Kiln No. 2	VE	Oil/Coal/Gas/WTDF	9/COMS	initial/annual/COMS	3 one-hr run	No [4]
026	Kiln No. 2	SO_2	Oil/Coal/Gas/WTDF	CEMS	daily average	continuous	Yes [6]
026	Kiln No. 2	NOx	Oil/Coal/Gas/WTDF	CEMS	daily average	continuous	Yes [3]
026	Kiln No. 2	CO	Oil/Coal/Gas/WTDF	10 [5]	initial/annual	3 one-hr run	
026	Kiln No. 2	VOC	Oil/Coal/Gas/WTDF	25 or 25A [2]	initial	3 one-hr run	
026	Kiln No. 2	H_2SO_4 mist	Oil/Coal/Gas/WTDF	8	initial	3 one-hr run	
026	Kiln No. 2	Hg, Pb	Oil/Coal/Gas/WTDF	29	initial	3 one-hr run	
026	Kiln No. 2	Be	Oil/Coal/Gas/WTDF	29	initial	3 one-hr run	
031	Fugitive sources	VE		9	Protocol [7]		
025/028/029/030	Minor Sources	VE		9	initial/annual	3 one-hr run	
027	Cooler No. 2	PM/PM_{10}	Oil/Coal/Gas/WTDF	5	initial/annual	3 one-hr run	
027	Cooler No. 2	VE	Oil/Coal/Gas/WTDF	9/COMS	initial/annual/COMS	3 one-hr run	No [4]

Notes:

[1] Testing of emissions shall be conducted while burning coal, 85% coal and 15% tires (permitted capacity). The kiln is allowed to burn virgin fuel oil and a blend of virgin fuel oil and on-spec used oil for startup. See specific conditions No. 3.

[2] VOC emission shall be tested initially to comply with the condition of this permit. Thereafter, compliance will be assumed provided the CO allowable emission rate is reached.

[3] NO_x - The continuous emission monitor (CEM) data shall be used for Kiln No. 2 compliance requirement. The CEM calibration and maintenance shall meet the applicable requirements of 40 CFR 60, Appendix B and Appendix F.

[4] Pursuant to 40 CFR 60, Subpart F, the kiln/cooler exhaust system shall be equipped with continuous opacity monitor system (COMS) to record the opacity at the stack to indicate proper maintenance and operation. Monitoring of the opacity of emissions shall be demonstrated by COMS pursuant to 40 CFR 60.63. Notification and recordkeeping shall be in accordance with 40 CFR 60.7 and 40 CFR 60.65.

[5] Continuous process monitors for CO and/or O_2 to optimize combustion conditions for pollution control shall be part of the process.

[6] SO_2 - The continuous emission monitor (CEM) data shall be used for Kiln No. 2 compliance requirement. The CEM calibration and maintenance shall meet the applicable requirements of 40 CFR 60, Appendix B and Appendix F.

[7] Protocol as approved by the Southwest District Ofiice.

* CMS [=] compliance demonstrated by a continuous monitoring system: CEMS or COMS.

Table 1-2. Air Pollutant Standards and Terms.

FACILITY ID NUMBER: 0530021

Permittee:
Florida Crushed Stone, Company

DRAFT Permit No.: AC27-274892(A) and PSD-FL-227(A)
Portland Cement Plant No. 2 and Associated Equipment

Emission Unit 026 - Kiln No. 2
Emission Unit 027 - Cooler No. 2

				Allowable Emissions			
E.U. ID#	Description	Pollutant ID	Fuel(s) [2]	BACT limits	lb/hr	TPY	Basis
026	Kiln No. 2	PM/PM_{10}	coal/gas/WTDF/oil	0.20 lb/ton kiln feed*	31.9	140.0	BACT
026	Kiln No. 2	SO_2	coal/gas/WTDF/oil	0.23 lb/ton clinker	24.0	105.0	BACT
026	Kiln No. 2	NO_x	coal/gas/WTDF/oil	2.8 lb/ton clinker	291.7	1280.0	BACT [3]
026	Kiln No. 2	CO	coal/gas/WTDF/oil	2.0 lb/ton clinker	208.3	913.0	BACT
026	Kiln No. 2	VOC	coal/gas/WTDF/oil	0.085 lb/ton clinker	8.85	38.8	FCS/DEP
026	Kiln No. 2	H_2SO_4	coal/gas/WTDF/oil	0.014 lb/ton clinker	1.46	6.39	FCS DATA
026	Kiln No. 2	Beryllium	coal/gas/WTDF/oil	8.5 E-07 lb/ton clinker	8.85 E-05	3.88 E-04	FCS/DEP
026	Kiln No. 2	Mercury	coal/gas/WTDF/oil	2.4 E-05 lb/ton clinker	2.50 E-03	1.10 E-02	FCS DATA
026	Kiln No. 2	Lead	coal/gas/WTDF/oil	5.2 E-04 lb/ton clinker	5.42 E-02	2.37 E-01	FCS DATA
026	Kiln No. 2	VE	coal/gas/WTDF/oil	10% opacity			BACT
027	Cooler No. 2	PM/PM_{10}	coal/gas/WTDF/oil	0.1 lb/ton kiln feed*	15.94	70.0	BACT-NSPS
027	Cooler No. 2	VE	coal/gas/WTDF/oil	10% opacity			BACT

ALLOWABLE OPERATING RATES

		KILN No. 2	Cooler No.2
Hours of operation per year		8760	8760
Kiln preheater feed rate	TPH	173.2	
Kiln feed rate *	TPH	159.4	

Suitable methods shall be used to determine the kiln feed rate, except fuels, for each run. Material balance over the *production system shall be used to confirm the feed rate.*

Kiln Heat Input	MMBtu/hr	325	
Clinker Production (1)	TPH	104.2	
Cooler throughput rate	TPH	104.2	

NOTES

(1) At a maximum design clinker production rate of 104.2 TPH and preheater feed rate of 173.2 TPH, utilizing a conversion factor of 0.602: (173.2 x 0.602 = 104.2).
(2) Fuel oil burning as specified in Specific Condition No. 8 is allowable for startup only. WDTF and whole tires (15% heat input) are allowed to be burned at this kiln.
(3) FCS shall have up to 18 months after startup of commercial operation to achieve the NO_x standard (2.8 lb/ton clinker).

ATTACHMENT II

SPECIFIC PERMIT SECTIONS USED IN BACT UPDATE PREPARATION

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

MAJOR SOURCE OPERATING PERMIT

RECEIVED
MAY 8 2001

Permitee: **Blue Circle Cement**

Facility Name: **Blue Circle Cement**

Facility No.: 411-0004

Location: Calera

*In accordance with and subject to the provisions of the Alabama Air Pollution Control Act of 1971, as amended, **Code of Alabama 1975**, §§22-28-1 to 22-28-23 (the "AAPCA") and the Alabama Environmental Management Act, as amended, **Code of Alabama 1975**, §§22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to construct, install and use the equipment, device or other article described above.*

*Pursuant to the **Clean Air Act of 1990**, all conditions of this permit are federally enforceable by EPA, the Alabama Department of Environmental Management, and citizens in general. Those provisions which are not required under the **Clean Air Act of 1990** are considered to be state permit provisions and are not federally enforceable by EPA and citizens in general. Those provisions are contained in separate sections of this permit.*

Issuance Date: *October 25, 2000*
Expiration Date: *October 24, 2005*

Ronald W. Gore

Alabama Department of Environmental Management

Area 300 – Cement Kilns and Clinker Coolers

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

[ ][ ][ ] - [ ][ ][ ][ ] - [ ][ ][ ][ ]

Do not write in this space

1. Name of firm or organization Blue Circle Cement, Roberta, AL

2. Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.

Operating scenario number 1

Area 300 - Cement Kilns and Clinker Coolers

This area of the Cement Plant contains the two cement kilns (#3 and #4) and their corresponding clinker coolers, the kiln feed system, kiln fuel handling, clinker handling and Cement Kiln Dust (CKD) handling. Material processed in the raw mill is transferred to the blending silos for final kiln feed preparation. The kiln feed is converted to clinker in the two dry process kilns, each equipped with 150,000 acfm baghouses for particulate control. CKD from the baghouses is collected in the CKD Tank. A majority of the loadout from the CKD Tank is recycled back into the process at the blending silos. Clinker produced in the kilns is cooled in the clinker coolers and transferred to the clinker silo or clinker store.

3. Type of unit or process (e.g., calcining kiln, cupola furnace): Dry Process Cement Kilns, Clinker Coolers, Conveyors, Silos

Make: Various Model: Various

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: Kiln Feed to each kiln: 85 TPH, Clinker Produced: 48 TPH

Manufactured date N/A

Proposed installation date N/A

Original installation date (if existing) 1956

Reconstruction or

Modification date (if applicable) N/A

4. Normal operating schedule:

Hours per day 24 Days per week 7 Weeks per year 365

Peak production season (if any):

5. Materials (feed input) used in unit or process (include solid fuel materials used, if any):

Material	Process weight average (lbs/hr)	Maximum (lb/hr)	Quantity tons/year
Kiln Feed (to both kilns)	341,760	341,760	1,496,909
Solid Fuel	36,000	36,000	157,680

6. Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on form ADEM-104): N/A MMBtu/hr

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal	13,000	Btu/lb	N/A	N/A	N/A	N/A
Fuel Oil	140,000	Btu/gal	N/A	N/A	2	N/A
Natural Gas	1050 (1)	Btu/ft^3	N/A	N/A	N/A	N/A
L.P. Gas		Btu/ft^3				
Wood		Btu/lb				
Other (specify)						

(1) Natural Gas used to fire kilns at startup or when problems exist with the coal mill.

7. Products of process or unit:

Products	Quantity/year	Units of Production
Clinker	840,960	tons
CKD	127,000	tons

8. For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):

N/A

9. Is there any emission control equipment on this emission source?
[X] Yes [ ] No (Where a control device exists, form ADEM-110 must be completed and attached).

10. Air contaminant emissions by emission point: (each point of emission should be listed separately and numbered so that it can be located on the attached flow sheet). Fugitive emissions must be included.

Emission point	Pollutant	Potential emissions rate (lbs/hr)	Potential emissions rate (tons/yr)	Basis for Calculation	Regulatory emission limit (lbs/hr)	Regulatory emission limit (units of standard)	Stack: Height above grade (ft-in)	Stack: Base Elevation (ft)	Stack: Diameter (ft-in)	Exhaust volume (ACFM)	Exit temp. (°F)
EU300	PM	2.1	9.1	See Appendix B	40.1	lbs/hr	79	427	2.2 x 1.3	12,185	250
EU301	PM	1.9	8.4	See Appendix B	39.4	lbs/hr	74	427	2.2 x 1.3	7,500	150
EU302	PM	14.4	63.1	See Appendix B	25.5 => dry feed clinker 14.4	0.30 lb/ton dry feed	100	427	6.30	150,000	350
EU302	SO_2	480.0	2,102.4	See Appendix B	NA	NA	100	427	6.30	150,000	350
EU302	NO_x	288.0	1,261.4	See Appendix B	NA	NA	100	427	6.30	150,000	350
EU302	CO	10.1	44.2	See Appendix B	NA	NA	100	427	6.30	150,000	350
EU302	VOC	1.3	5.9	See Appendix B	NA	NA	100	427	6.30	150,000	350
EU302	Lead	0.004	0.02	See Appendix B	NA	NA	100	427	6.30	150,000	350
EU303	PM	~~25.5~~ 14.4	63.1	See Appendix B	25.5 => dry feed 14.4 clinker	0.30 lb/ton dry feed	100	427	6.30	150,000	350
EU303	SO_2	480.0	2,102.4	See Appendix B	NA	NA	100	427	6.30	150,000	350

SIGNIFICANT REVISION NO. 1000547
TO AIR QUALITY CONTROL PERMIT NO. M191365P1-99
for Arizona Portland Cement Company

SIGNIFICANT PERMIT REVISION DESCRIPTION

The permittee operates a cement plant and quarry in Rillito, Arizona. This significant permit revision will allow the permittee to modernize and increase the efficiency of the cement plant. The changes that are the basis for the permit revision are collectively referred to as RIMOD III. The principal changes associated with RIMOD III are incorporated into two construction Phases (Phase I and II). These changes are summarized in the following table:

Principal Changes for RIMOD III		
Cement Manufacturing Process	Phase I	Phase II
Import of Raw Materials	Installation of equipment to handle raw feed additives at the plant	Installation of a stacker belt for additional additive handling
Raw Mix Preparation	Installation of a new roller mill system	No additional changes; but throughput will increase
	Installation of new equipment to feed the homogenizing silo and Kilns 1-3 proportioning silos from the new mill	Possible installation of an additional homogenizing silo and associated transfer equipment
Pyroprocessing	Mechanical and process control changes to Kilns 1-3 Modification of the Kiln 4 preheater calciner configuration	Installation of a second preheater tower for Kiln 4 and associated kiln feed handling equipment Replacement of current calciner with new high efficiency calciner Addition of a new baghouse for Kiln 4 and utilization of the existing Kiln 4 baghouse for one or more of Kilns 1-3
Clinker Grinding and Handling	Conversion of the D2 raw mill to a finish mill Addition of clinker handling equipment	Implementation of second phase upgrade to the CM7 finish mill
Fuel Storage and Preparation	No changes	Addition of a coal mill for the new preheater

Currently, the quarry and cement plant are operating under Air Quality Control Permit (Permit Number M191365P1-99, as revised by the Hearing Board). This document constitutes the revisions to ADEQ Permit Number M191365P1-99 for RIMOD III, pursuant to A.A.C. R18-2-320.

As stated above, the RIMOD III changes will be implemented in two phases of construction. Each phase of

II. EMISSION AND OPACITY LIMITS

As noted Arizona Portland Cement Company operates four kilns. The commencement of construction of Kiln No.s 1, 2 and 3 occurred prior to August 17, 1971: therefore, New Source Performance Standards (NSPS) do not apply. NSPS does apply to the following facilities (associated control device in parenthesis): Kiln No. 4 (H5-GB/Phase I and K50/Phase II); Kiln No. 4 clinker cooler (H2-GB); conveyor transfer points: D-10 to bin D-12 (D-11), C2-BC8 to C2-BC9 (C2-DC4), C-05 to C-06 (C-08), K-12 to L-01 (L-04), L-01 to L-02 (H2-DC1); raw material storage bins: D-12, D-17, D-18, D-19, and D-21 (D-11 and D-20); roller mill (raw mill) system (H5-GB/Phase I and K-50/Phase II), D3 finish mill system (D3-1-DC1, D3-1-DC2 and D3-1-DC3), the second phase CM7 finish mill system (CM7-DC1 through CM7-DC5) and other NSPS affected facilities.

A. On and after the date on which the initial performance test required to be conducted by Section V, below, is completed, Arizona Portland Cement Company shall not discharge or cause the discharge into the atmosphere from the following emission points the following pollutants in excess of the specified limits:

PARTICULATE MATTER:

1. Kiln No. 4 and associated affected process equipment: [40 CFR 60, Subpart F]

   a. Kiln No. 4

      (1) discharge in excess of 0.3 pounds per ton of feed (dry basis);

      (2) exhibit greater than 20 percent opacity. [This is a Material Permit Condition]

   b. Clinker Cooler

      (1) discharge in excess of 0.1 pounds per ton of feed (dry basis);

      (2) exhibit greater 10 percent opacity. [This is a Material Permit Condition]

   c. Dust Collector C-08 controlling emissions from Belt Conveyor C-05

      (1) discharge in excess of 0.05 gm/dscm;

      (2) exhibit greater than 7 percent opacity. [This is a Material Permit Condition]

   d. Conveyor transfer points (associated control device in parenthesis): D-10 to bin D-12 (D-11), C2-BC8 to C2-BC9 (C2-DC4), C-05 to C-06 (C-08), K-12 to L-01 (L-04), L-01 to L-02 (H2-DC1); raw material storage bins: D-12, D-17, D-18, D-19, and D-21 (D-11 and D-20); roller mill (raw mill) system (H5-GB/Phase I and K-50/Phase II), D3 finish mill system (D3-1-DC1, D3-1-DC2 and D3-1-DC3), and the second phase CM7 finish mill system (CM7-DC1 through CM7-DC5).

      (1) exhibit greater than 10 percent opacity. [This is a Material Permit Condition]

2. Kiln No.s 1, 2 and 3 and the remainder of facilities : [40 CFR 52.126, A.A.C. 701, 702, and 705]

   a. For the single stack serving Kiln No.s 1, 2 and 3:

      (1) discharge in excess of 0.3 pounds per ton of feed (dry basis);

      (2) exhibit greater than 20 percent opacity.

   b. Each identifiable process source, other than the single stack serving Kiln No.s 1, 2 and 3, having a process source weight rate of 30 tons per hour or less shall not emit

Permittee shall develop and submit a dust control plan to the Department for approval for achieving an 80% control efficiency on the quarry roads and an 85% control efficiency from all other regularly used unpaved roads during Phase II (the Phase II dust control plan).

Each of these plans shall provide for watering or the type of dust suppressant used if other than water, the amount and frequency of application and the recordkeeping necessary to demonstrate the required control efficiency and to verify compliance with the emission standards of A.A.C. R18-2-605 through 607 and 610.

Prior to start-up of the roller mill of RIMOD III, Permittee shall execute the Phase I dust control plan.

Prior to start-up of the first Phase II change of RIMOD III, Permittee shall execute the Phase II dust control plan.

Prior to start-up of the roller mill of RIMOD III, the quarry road, between Twin Peaks Road and the quarry entrance, shall be paved and maintained in a paved condition.

Prior to start-up of the first Phase II change of RIMOD III, the quarry road, between Twin Peaks Road and Avra Valley Road, shall be paved and maintained in a paved condition.

Prior to start-up of the first Phase II change, all paved roads at the quarry and the paved portions of the quarry road shall be controlled by weekly sweeping or equivalent, as necessary to assure compliance with the approved dust control plan.

The plant road segments paved in 1995 and 1996 shall be maintained in a paved condition.

SULFUR DIOXIDE [A.A.C. R18-2-705.D]

Sulfur dioxide emissions from each of the four kilns shall not exceed six pounds per ton of kiln feed.

CARBON MONOXIDE [A.A.C. R18-2-306.01]

Voluntary Enforceable Condition: Total emissions of carbon monoxide from the four kilns shall not exceed 5,069 tons per year (twelve month total calculated at the end of each month). [This is a Material Permit Condition]

NITROGEN OXIDES [A.A.C. R18-2-306.01]

Voluntary Enforceable Condition: Total emissions of nitrogen oxides from the four kilns shall not exceed 5,144 tons per year (twelve month total calculated at the end of each month). [This is a Material Permit Condition]

B. Excess emission shall be defined as: [A.A.C. R18-2-310]

1. any 6 minute average opacity, as measured by Method 9 of the Arizona Testing Manual, EPA Reference Method 9, 40 CFR 60, Appendix A, which exceeds a specified opacity limit.

2. any emission rate based on an average of three one-hour manual source tests which exceeds the emission limits for SO_2 and Particulate Matter cited in Section II.A, above. Acceptable test methods are listed in Attachment "B", Section V.B, below.

3. any consecutive 12 month period during which the total emissions of CO or NO_x exceeds the 12 month limits stated above.

III. PROCESS RATE LIMITS [A.A.C. R18-2-306.01]

A. Voluntary Enforceable Condition: Upon completion of Phase II of RIMOD III, the quarry production will be limited to a combined total of 8,000,000 tons per year (twelve month total calculated at the end of each month) of waste rock and kiln grade stone. [This is a Material Permit Condition]

B. Voluntary Enforceable Condition: Upon completion of Phase II of RIMOD III, the total clinker production will be limited to 2.3 millions tons per year (twelve month total calculated at the end of each month). [This is a Material Permit Condition]

C. Voluntary Enforceable Condition: Upon completion of Phase II of RIMOD III, the blasting at the quarry shall not exceed 268 blasts per year (twelve month total calculated at the end of each month). [This is a Material Permit Condition]

IV. STACK SAMPLING FACILITIES [A.A.C. R18-2-312.E]

For performance test purposes, sampling ports, platforms, and access shall be provided by Arizona Portland Cement Company on the following in accordance with Arizona Testing Manual for Air Pollutant Emissions:

A. Dust Collectors **H5-5-GB, H5-GB and K-50.**

B. Dust Collectors **H2-1-DC, H2-2-DC** and **H2-3-DC** serving the clinker coolers on kiln Nos. 1, 2 and 3, respectively, and Dust Collectors **H2-GB** serving the clinker cooler on kiln No. 4.

C. Dust Collectors **CM7-DC3**, **D3-1-DC1** and **D3-1-DC2** serving the finish mill systems.

V. PERFORMANCE TESTS [A.A.C. R-18-2-311, A.A.C. R18-2-312]

A. Standard Performance Tests

Arizona Portland Cement Company shall conduct or cause to be conducted performance tests (as required by R18-2-312) on the sources listed in Attachment "E" according to the schedule also defined in Attachment "E".

All performance tests shall be conducted while firing a fuel or fuel combination, defined herein as a fuel or combination of fuels listed in Section VII, with the written approval of AQD prior to the test. These performance tests shall be conducted while at the maximum operating capacity of the unit being tested. Upon prior receipt of written approval from the Department, Arizona Portland Cement Company may conduct performance tests at less than the maximum operating capacity of the units being tested. The maximum permitted process rate shall then become the process rate during the test plus 20 percent, not to exceed the original permitted value.

A pre-test meeting shall be arranged with the Department at least 14 calendar days prior to such tests to allow time for the development of a performance test plan and to arrange for an observer to be present at the test. Arizona Portland Cement Company shall prepare and submit a written copy of the proposed test plan to the Department seven (7) calendar days prior to pre-test meeting. A written copy of Final Test Plan must be submitted to the Department prior to performance test. Such prior approval will minimize the possibility of Department's rejection of test results for procedural deficiencies. In lieu of the test methods listed in Section B, equivalent methods may be used with prior approval from the Department. Within thirty (30) days following a performance test, Arizona Portland Cement Company shall furnish the Department a written report of such tests.

B. Should APCC want to use a fuel combination that is not within the permitted Fuel Mixture Matrix given in Section VII below, APCC shall be required to apply for a "significant permit revision" (A.A.C. R18-2-320).

SIGNIFICANT REVISION NO. 1001001
TO AIR QUALITY CONTROL PERMIT NO. 0381-95
For
PHOENIX CEMENT COMPANY

SIGNIFICANT PERMIT REVISION DESCRIPTION

Phoenix Cement Company (PCC) operates a cement plant and quarry in Clarkdale, Arizona. This significant permit revision will allow PCC to modernize and increase the efficiency of the cement plant. Under the revised permit PCC may:

1. Convert the existing swing mill to an in-line raw mill with a new elevator, separator and dust collector;

2. Replace Kilns 1, 2 and 3 with a new Kiln 4. Kiln 4 is a five-stage, indirect-fired coal and coke, preheater/precalciner unit with associated kiln feed handling system;

3. Replace the current clinker coolers with a new clinker cooler for Kiln 4; add new baghouses for Kiln 4 and the new clinker cooler; and install a stack for Kiln 4 and a stack for the clinker cooler;

4. Install a new elevator, separator, stack and two dust collectors for the new roller mill system; and

5. Install a new indirect-fired coal mill system and stack to replace the current three direct-fired coal mills.

This revision voids and supersedes all previouslv issued permits including Operating Permit No. 0381-95 and all associated amendments and revisions. The existing svstem shall be operated in compliance with the provisions of Operating Permit No. 0381-95 and all its associated amendments and revisions:

ATTACHMENT "A": GENERAL PROVISIONS

I. RELATIONSHIP OF PERMIT TO APPLICABLE STATE IMPLEMENTATION PLAN

[A.R.S. §49-404.C and -426]

This permit is issued pursuant to the provisions of Arizona Revised Statutes (A.R.S.) and constitutes an Installation Permit for the purpose of the applicable State Implementation Plan (SIP).

II. COMPLIANCE WITH PERMIT CONDITIONS

[A.A.C. R18-2-306.A.8, A.R.S. 49-463, A.R.S. 49-464]

A. The Permittee shall comply with all the conditions contained in Attachments "A" and "B"of this permit including all applicable requirements of Arizona air quality statutes and the air quality rules. Any permit noncompliance constitutes a violation of the Arizona Revised Statutes and is grounds for enforcement action; for permit termination, revocation and reissuance, or revision; or for denial of a permit renewal application. In addition, noncompliance with any federally enforceable requirement constitutes a violation of the Clean Air Act (Act).

B. Need to halt or reduce activity not a defense. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

III. PERMIT REVISION, REOPENING, REVOCATION AND REISSUANCE, OR TERMINATION FOR CAUSE

[A.A.C. R18-2-306.A.8.c, -321]

MS501 (DC501); Metal Trap: MT 340; Pelletizers: PT501and PT502; Pin Gates: G350 and G351; Pneumatic Piping: FKP501; Pneumatic Pumps: PN-601 (DC604), PN-602 (DC604A), PN402, PN350 (DC350), PN302, PN340 (DC343), PN501 (DC501), PN301, PN341 (DC304), and PN303; Preheater: DC431(DC212); In-line Raw Mill Silo: S601 and S602 (DC601); Reclaim Gates: RG301-RG307 and RG308-RG311; Roller Mill: RM305; Rotary Feeders: RF205, RF206, and RF350-RF352; Screw Conveyors: SC301, SC303, SC304, SC313, SC314, SC430, SC431, SC432, SC461, SC462, SC463, SC464, SC465, SC466, SC467 (DC446), SC305, SC306, SC309, SC320, SC342, SC340; Separator: SE308 (DC350); Stacks: S350, S402 and S403; Tipping Valves: TV213 and TV214; Vibrating Feeder: VF404; Weigh Belts: W305, W304, BS340, W305, BS341, WB520 (DC505), WB530 (DC501); Weigh Feeder: W301, W302 (DC305), W350, and W351 (DC351); and Weigh Scale: WS601, WS602, WS340, WS341.

On and after the date on which the initial performance test required to be conducted by Section VII of this Attachment is completed, PCC shall not discharge or cause the discharge into the atmosphere from the following emission points the following pollutants in excess of the specified limits specified in Sections B through F.

B. PARTICULATE MATTER AND OPACITY STANDARDS:

1. The Kiln No. 4/ In-line Raw Mill and associated affected process equipment shall not: [40 CFR 63, Subpart LLL]
   a. Discharge in excess of 0.3 pounds per ton of feed (dry basis);
   b. Exhibit greater than 20 percent opacity. [This is a Material Permit Condition]
   c. Discharge dioxins and furans in excess of 0.20 ng per dscm (TEQ) corrected to seven percent oxygen or 0.40 ng per dscm (TEQ) corrected to seven percent oxygen when the performance test run average temperature at the inlet to the particulate matter control device is 204°C (400°F) or less.
2. The Clinker Cooler shall not: [40 CFR 63, Subpart LLL]
   a. Discharge in excess of 0.1 pounds per ton of feed (dry basis) to the Kiln;
   b. Exhibit greater than 10 percent opacity. [This is a Material Permit Condition]
3. Under 40 CFR 63, subpart LLL, the Finish Mill System, Raw Material, Clinker or Finish Product Storage Bins, Conveyor Transfer Points, Bagging and Bulk Loading and Unloading Systems including Bins, Bucket Elevators, Belt Conveyors, Chain Conveyors, Crushers, Cyclones, Diverter Gates, Explosion Vents, Finish Silos, Grinding Mills, Hoppers, Raw Silos, Rotary Feeders, Separators, and Weigh Feeders shall not:

   Exhibit greater than 10 percent opacity. [This is a Material Permit Condition]
4. Affected facilities at PCC that are not subject to Section IIB.3 include: Alleviator: AM 407 (DC409); Bag Filter: DC350; Cement Coolers: C302, C303, C305, and C306; Cement/Mortar Samplers: SAM303 and SAM340; Compressors: RC350 and RC351; Control Gate: G-401; Cyclone Separators: CY301-CY302 (DC 301), CY304-CY305 (DC302), and CY303 (DC303); Diverter Gates: DG216 (DC213) and DG313; Domes: DO200 (DC213) and DO201 (DC214); Homogenizing Silo: S605 (DC602); Hot Gas Generator: FR350; Material Separators: SE300 (DC301) and SE302 (DC302); Metal Separators: MS502 (DC505) and MS501 (DC501); Metal Trap: MT 340; Pin Gates: G350 and G351; Pneumatic Piping: FKP501; Pneumatic Pumps: PN-601 (DC604, PN-602 (DC604A), PN402, PN350 (DC350), PN302, PN340 (DC343), PN501 (DC501), PN301, PN341 (DC304), and PN303; In-line Raw Mill Silo: S601 and S602 (DC601); Reclaim Gates: RG301-RG307 and RG308-RG311; Rotary Feeders: RF205, FR206, and RF350-RF352; Tipping Valves: TV213 and TV214; Vibrating

533.BF1	0.74	0.63
533.BF2	0.60	0.51
543.BF1	7.63	6.48
DC308	0.13	0.13
DC100	0.17	0.05
DC309	0.41	0.13
DC501	1.71	0.45
DC505	1.73	0.45
DC503	0.51	0.13
DC504	1.03	0.27
DC507	0.09	0.02
DC506	1.20	0.31
DC508	0.86	0.22
DC540	0.81	0.21

b. Prior to start-up of the modern system, PCC shall enclose the clinker storage area within two domes.

c. Road Wetting/Stabilizing Procedures:

Unpaved plant and quarry roads shall be watered once per hour during periods with vehicular traffic except when roads are damp due to normal precipitation.

d. No visible emissions shall be produced from unpaved plant and quarry roads.

C. SULFUR DIOXIDE STANDARD [A.A.C. R18-2-306.01]

Total sulfur dioxide emissions from Kiln No. 4 and the coal mill exhaust shall not exceed 0.31 pounds per ton of feed (dry basis) on a 30-day rolling average calculated hourly based on certified Continuous Emissions Monitoring System (CEMS) hourly averages and feed rate measurements.

D. CARBON MONOXIDE STANDARD [A.A.C. R18-2-306.01]

Total carbon monoxide emissions from Kiln No. 4 and the coal mill shall not exceed 0.256 pounds per ton of feed (dry basis) on a 30-day rolling average calculated hourly based on certified CEMS hourly averages and feed rate measurements. [This is a Material Permit Condition]

E. NITROGEN OXIDES STANDARD [A.A.C. R18-2-306.01]

Total nitrogen oxides emissions from Kiln No. 4 and the coal mill shall not exceed 1.91 pounds per ton of feed (dry basis) on a 30-day rolling average calculated hourly based on certified CEMS hourly averages and feed rate measurements. [This is a Material Permit Condition]

F. EXCESS EMISSIONS [A.A.C. R18-2-310]

Excess emissions shall be defined as:

1. Any 6 minute average opacity, as measured by EPA Reference Method 9, 40 CFR 60, Appendix A or Continuous Opacity Monitoring System (COMS), which exceeds a specified opacity limit.

2. Any emission rate based on an average of three one-hour manual source tests or PM CEMS, which exceeds the emission limits for Particulate Matter cited in Section II.B, above. Acceptable test methods are listed in Section VII.F, below.

3. Any hourly emission rate averaged over any 30-day period during which the total emissions of carbon monoxide, nitrogen oxides or sulfur dioxide.

III. PROCESS RATE LIMITS [A.A.C. R18-2-306.01]

A. Upon completion of the modern system, the quarry production will be limited to a combined total of 2.4 million tons per year (twelve month total calculated at the end of each month) of kiln grade stone. [This is a Material Permit Condition]

B. Explosives used in blasting operations shall be limited to 10 tons per day and 1,028 tons per year of ammonium nitrate and fuel oil (ANFO). Compliance with the annual limit shall be determined on the basis of a 12-month rolling total calculated daily.
[This is a Material Permit Condition]

C. Upon completion of the modern system, for the first twelve months, raw feed to the Kiln shall not exceed more than 185,610 tons per day determined on the basis of a 30-day rolling total calculated daily. After the end of the first year, raw feed to the Kiln shall be limited to 2.258 million tons per year calculated daily. [This is a Material Permit Condition]

D. PCC shall not operate the modern system (Kiln No. 4, Clinker Cooler No. 4, and associated process and control equipment) and the existing system (consisting of Kiln Nos. 1, 2, and 3; Clinker Cooler Nos. 1, 2, and 3; and associated process and control equipment) concurrently.

IV. FUEL TYPES AND AMOUNTS [A.A.C. R18-2-304.A.6 and 306.01]

A. PCC shall be permitted to burn the following fuels in the Kiln No. 4:

Fuel Type	Maximum Fuel Proportion
Coal	100 %
Coke	60 %
Fuel Oil	100 %
Natural Gas	100 %

Maximum Fuel Proportion is defined as the maximum percent of the actual heat input provided by a fuel component in a fuel mixture.

B. Without prior approval by the Department, PCC is not authorized to use any other fuels, including, but not limited to, on-specification or off-specification used oil fuel, hazardous waste, or hazardous waste fuel.

V. MONITORING, RECORDKEEPING & REPORTING REQUIREMENTS
[40 CFR 60.63, A.A.C. R18-2-306, -306.01, and -309]

A. PCC shall keep the following records readily available for inspection at the cement plant:

1. The total quantity of raw material processed per hour in Kiln No. 4.

2. The total quantity of clinker produced per day.

3. The type and amount of each fuel component utilized per day in Kiln No. 4.

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

2700 "M" STREET, SUITE 302
BAKERSFIELD, CA 93301-2370
BAKERSFIELD: (661) 862-5250
MOJAVE: (661) 824-4631

PERMIT NUMBER: **1003026M**

PERMIT TO OPERATE IS HEREBY GRANTED TO: **CALIFORNIA PORTLAND CEMENT COMPANY**

FOR EQUIPMENT LOCATED AT: **8 MI. WEST OF MOJAVE ON OAK CREEK ROAD**

EQUIPMENT OR PROCESS DESCRIPTION: **PYROPROCESSING SYSTEM**

OPERATIONAL CONDITIONS LISTED BELOW.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR LOCATION, OR ANY ALTERATION. EQUIPMENT MODIFICATION REQUIRES AN APPLICATION FOR AUTHORITY TO CONSTRUCT.

TESTING: Permittee may be required to provide adequate sampling and testing facilities.

THOMAS PAXSON, P.E.
AIR POLLUTION CONTROL OFFICER

By: ____________

REVOCABLE: This permit does not authorize emission of air contaminants in excess of those allowed by Rules and Regulations of K.C.A.P.C.D.

For Period: 12-31-00 TO 12-31-01

CONDITIONS OF APPROVAL:

Pursuant to Rule 209, "conditional approval" is hereby granted. Please be aware all conditions of approval imposed by any applicable Authority to Construct remain in effect for life of project, unless modified by application.

EQUIPMENT DESCRIPTION: Pyroprocessing System, including following equipment:

A. Oxygen injection system including: Vacuum Swing Absorption (VSA) plant, cryogenic storage tanks, vaporizers, pressure temperature control manifold with associated piping valves, regulators, trim heater and injection nozzles;
B. Scrap tire shipping trailer parking/storage area;
C. Scrap tire receiving conveyor;
D. Scrap tire elevator;
E. Scrap tire weigh bridge and conveyor;
F. Scrap tire sliding air lock gate valve followed by two air lock flap gates;
G. Two first stage preheating cyclones (H4-CC1A and CC1B) exhausting to heat exchanger (H4-6-HE1);
H. Second stage preheater cyclone (H4-6-CC2);
I. Third stage preheater cyclone (H4-6-CC3);
J. Fourth stage preheater cyclone (H4-6-CC4);
K. Air-cooled heat exchanger (H4-6-HE1) with two cooling fans;
L. Preheater section exhaust fan and roller mill sweep fan (H4-6-KF1) with 2,500 hp motor;
M. Preheater/precalciner combination burner assembly with coal and/or petroleum coke pipe, natural gas nozzle, and fuel oil nozzle;
N. Preheater bypass/beneficiation quench air chamber and blower (H6-6-BL1);

Within 30 days of District-approved use of an increased percentage of tires as fuel and production of useable clinker, full source testing of kiln exhaust stack, H5-6-DC1, shall be conducted for both criteria and toxic air pollutants. Testing shall be conducted by independent laboratory certified by CARB to conduct each test. Additionally, testing shall be conducted pursuant to requirements of Rule 108.1 and most updated CARB/OEHHA version of AB2588 Air Toxic Guidelines. Detailed source test protocol shall be submitted at least 15 days prior to testing and complete source test results shall be submitted to District within 60 days of completion of source testing.

Annual testing for compliance with volatile organic compound, particulate, and oxides of nitrogen emission limits shall be demonstrated by District-witnessed sample collection by certified testing laboratory pursuant to Rule 108.1. Should inspection reveal conditions, including operational conditions, indicating potential non-compliance with emission limitations, or analysis assumptions, or which may result in significant adverse health effect, testing for toxics shall be required. (Rules 108.1 and 210.1)

EMISSION LIMITS:

Maximum emission rate of each air contaminant from this emission unit shall not exceed following limits:

All Fabric Collector Exhaust Particulate Matter Concentrations: 0.015 grains/scf

Particulate Matter (PM_{10}):		
Beneficiation Collector H6-6-DC1:	5.79	lb/hr
Loadout Collector H6-6-DC2:	0.51	lb/hr
Surge Bin Collector H6-6-DC3:	0.15	lb/hr
Coal Mill Collector H7-6-DC1:	3.86	lb/hr
Kiln #6 Collector H5-6-DC1:	31.89	lb/hr
Fabric Collector D2-6-DC1:	0.99	lb/hr
Fabric Collector D2-6-DC2:	0.31	lb/hr
Fabric Collector D2-6-DC3:	0.71	lb/hr
Fabric Collector H4-6-DC1:	3.41	lb/hr
Fabric Collector H4-6-DC2:	0.90	lb/hr
Fabric Collector F3-6-DC1:	0.58	lb/hr
1003026B PM_{10} Emission Totals:	49.10	lb/hr
	1,178.40	lb/day
	215.06	ton/yr
Sulfur Oxides (as SO_2):	616.00	lb/hr
	14,784.00	lb/day
	2,698.08	ton/yr
Oxides of Nitrogen (as NO_2):	855.00	lb/hr
	20,520.00	lb/day
	3,744.90	ton/yr
Volatile Organic Compounds (VOC):	18.35	lb/hr (of NMHC)
	440.40	lb/day (of NMHC)
	80.37	ton/yr (of NMHC)

<u>Carbon Monoxide</u>:	183.50	lb/hr
	4,404.00	lb/day
	803.73	ton/yr

(Emission limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

2700 "M" STREET, SUITE 302
BAKERSFIELD, CA 93301-2370
BAKERSFIELD: (661) 862-5250
MOJAVE: (661) 824-4631

PERMIT NUMBER: **1147017D**

PERMIT TO OPERATE IS HEREBY GRANTED TO: **CALAVERAS CEMENT COMPANY**

FOR EQUIPMENT LOCATED AT: **13573 TEHACHAPI BLVD., MONOLITH**

EQUIPMENT OR PROCESS DESCRIPTION: **PREHEATER/PRECALCINER PORTLAND CEMENT KILN**

OPERATIONAL CONDITIONS LISTED BELOW.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR LOCATION, OR ANY ALTERATION. EQUIPMENT MODIFICATION REQUIRES AN APPLICATION FOR AUTHORITY TO CONSTRUCT.

TESTING: Permittee may be required to provide adequate sampling and testing facilities.

THOMAS PAXSON, P.E.
AIR POLLUTION CONTROL OFFICER

By: ____________________

REVOCABLE: This permit does not authorize emission of air contaminants in excess of those allowed by Rules and Regulations of K.C.A.P.C.D.

For Period: 10-31-00 TO 10-31-01

CONDITIONS OF APPROVAL:

Pursuant to Rule 209, "conditional approval" is hereby granted. Please be aware all conditions of approval imposed by any applicable Authority to Construct remain in effect for life of project, unless modified by application.

EQUIPMENT DESCRIPTION: Preheater/Precalciner Portland Cement Kiln, including following equipment:

A. Pyroprocessing equipment vented to ICA/Rees size 20-7200 senior 12, 20 compartment Dust Collector S3-160 and 1500 hp Exhaust Fan S3-187 shared with PTO 1147014A, including:
   1. One 2 hp Louver Damper S3-186 controls flow of process gas while gas circuit is in operation;
   2. Ten 0.5 hp Tipping Valves S3-162 through S3-171 compartments 1 through 10 tipping valves for material flow to Screw Conveyor S3-183;
   3. Ten 0.5 hp Tipping Valves S3-172 through S3-181 compartments 11 through 20 tipping valves for dust flow to Screw Conveyor S3-185;
   4. One 110 hp 14 in. Screw Conveyor S3-183 from compartments 1 through 10 to Screw Conveyor S3-183 and discharges to Screw Conveyor S4-130;
   5. One 10 hp 14 in. Screw Conveyor S3-184 from plenum chamber to Screw Conveyor S4-130;
   6. One 10 hp 14 in. Screw Conveyor S3-185 from compartments 11 through 20 to Screw Conveyor S4-130;
   7. One 125 hp Reverse Air Fan S3-151 provides reverse air flow during baghouse operation; and
   8. Pneumatic Dampers S3-188 and S3-189 controls air flow during Dust Collector S3-160 operation.

B. Preheater/Precalciner equipment, including:
   1. Two 5 hp Rotary Feeders G1-153 and G1-155 receives feed from Airslide F1-230 and discharges to Preheater G2-100;

Particulate Matter (PM_{10}):	17.90	lbm/hr	(Kiln Baghouse S3-160)
	429.60	lbm/day	
	0.01	gr/acfm	
Sulfur Compounds:	295.25	lbm/hr	(as SO_2) (24 hr avg.) (includes coal mill exhaust)
	7086.00	lbm/day	
	29.54	lbm/hr	(as SO_4) (24 hr avg.) (includes coal mill exhaust)
	708.96	lbm/day	
Oxides of Nitrogen:	281.33	lbm/hr	(as NO_2) (24 hr avg.) (includes coal mill exhaust)
	6752.00	lbm/day	
	1232.24	ton/yr	
Volatile Organic Compounds (VOC):	45.08	lbm/hr	(24 hr avg) (includes coal mill exhaust)
	1082.00	lbm/day	
	197.47	ton/yr	
Carbon Monoxide:	3033.00	lbm/hr	(3 hr avg) (includes coal mill exhaust) (Rule 210.4)
	2135.00	lbm/hr	(8 hr avg) (includes coal mill exhaust) (Rule 210.4)
	1282.00	lbm/hr	(24 hr avg) (includes coal mill exhaust)
	900.00	lbm/hr	(365 day rolling avg) (Rule 210.4)
	30768.00	lbm/day	(maximum day)
	21600.00	lbm/day	(annual avg day) (Rule 210.4)

(Emission limits established pursuant to Rule 210.1, unless otherwise noted.)

Compliance with maximum daily emission limits shall be verified by source operator (with appropriate operational data and recordkeeping to document maximum daily emission rate) each day source is operated and such documentation of compliance shall be retained and made readily available to District for period of three years. (Rules 209 and 210.1)

SPECIAL CONDITIONS:

aa. Kiln fabric collector stack shall be equipped with continuously recording oxides of nitrogen, oxides of sulfur, carbon monoxide, oxygen, opacity, and temperature monitors. (Rules 210.1 and 422)

bb. Reports of excess emissions shall be submitted semiannually for all opacity exceedances of six minutes or longer. Report shall comply with requirements of Code of Federal Regulations Section 40 Part 60.7c. (Rule 422)

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

2700 "M" STREET, SUITE 302
BAKERSFIELD, CA 93301-2370
BAKERSFIELD: (661) 862-5250
MOJAVE: (661) 824-4631

PERMIT NUMBER: **1128004R**

PERMIT TO OPERATE IS HEREBY GRANTED TO: **NATIONAL CEMENT COMPANY OF CALIFORNIA, INC.**

FOR EQUIPMENT LOCATED AT: **SEC. 35, T9N, R18W**
5 MILES EAST OF I-5 ON HWY. 138, LEBEC

EQUIPMENT OR PROCESS DESCRIPTION: **PREHEATER/PRECALCINER CEMENT KILN SYSTEM**

OPERATIONAL CONDITIONS LISTED BELOW.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR LOCATION, OR ANY ALTERATION. EQUIPMENT MODIFICATION REQUIRES AN APPLICATION FOR AUTHORITY TO CONSTRUCT.

TESTING: Permittee may be required to provide adequate sampling and testing facilities.

REVOCABLE: This permit does not authorize emission of air contaminants in excess of those allowed by Rules and Regulations of K.C.A.P.C.D.

THOMAS PAXSON, P.E.
AIR POLLUTION CONTROL OFFICER

By: ______________________

For Period: 10-31-00 TO 10-31-01

CONDITIONS OF APPROVAL:

Pursuant to Rule 209, "conditional approval" is hereby granted. Please be aware all conditions of approval imposed by any applicable Authority to Construct remain in effect for life of project, unless modified by application.

EQUIPMENT DESCRIPTION: Preheater/Precalciner Cement Kiln System, including following equipment:

A. Blending silo (south, 42-SL-01) ventilated to item D;
B. Blending silo (center, 42-SL-02) ventilated to item D;
C. Blending silo (north, 42-SL-03) ventilated to item D;
D. Fabric collector (42-DC-02) with fines conveyor (42-SC-07);
E. Air conveyor (42-AC-13) from silo (42-SL-01);
F. Air conveyor (42-AC-14) from silo (42-SL-02);
G. Air conveyor (42-AC-15) from silo (42-SL-02);
H. Air conveyor (42-AC-16) from silo (42-SL-03);
I. Elevator (north, 42-BE-02);
J. Elevator (south, 42-BE-03);
K. Constant head feeder (42-CH-01);
L. Mix box (42-MB-01);
M. Two air conveyors (42-AC-18 and 42-AC-19);
N. Air conveyor (51-AC-02) served by 7,100 acfm pulse jet fabric collector (51-DC-09);

O. Fuel oil storage tank (51-TK-01, permit exempt);
P. 150 MMBtu/hour coke/natural gas-fueled, precalciner preceded by multi-stage preheater (51-PH-01);
Q. Rotary kiln (51-KN-01) with one multi-channel Fuller Duoflex low NO_x burner with provisions to introduce #2 fuel oil, natural gas, or petroleum coke, with a nominal rating of 10 ton/hr of coke for production of approximately 3,400 ton/day clinker;
R. Evaporative cooling tower (51-CT-01) with hopper and 24 in. screw conveyor;
S. Rotary valve (51-RV-29);
T. Tempering air damper (51-DA-34);
U. Bucket elevator (51-BE-03) with 280 ft. lift served by 8,200 acfm pulse jet fabric collector (51-DC-08);
V. 70 ton capacity kiln feed recirculation bin (51-BN-02) receiving bypass material from bucket elevator (51-BE-03);
W. Kiln fabric collector (51-BH-02), including pulse jet air cleaning mechanism, rated at 300,000 acfm @ 450° F;
X. Kiln fabric collector exhaust fan (51-FA-11) rated at 300,000 acfm @ 17 in. w.c., and 450°F. Kiln and preheater ID fan (51-FA-15) rated at 300,000 acfm @ 28 in. w.c. and 450° F, exhausting to circular cross section exhaust stack;
Y. Kiln exhaust ductwork, 7 ft. 6 in. ID, from evaporative cooling tower (51-CT-01), to kiln fabric collector (51-BH-02); and
Z. Fabric collector (51-BH-02) exhaust ductwork, 8 ft. 6 in. ID, from exhaust fan to exhaust stack.

OPERATIONAL CONDITIONS:

1. If opacity of stack emissions equals or exceeds 5% or Ringelmann No. 1/4 during normal operation, District-witnessed particulate emissions sampling shall be performed to demonstrate compliance with particulate emission limits. (Rules 108.1 and 209)
2. All fines collected in dust collectors shall be returned to process. (Rule 210.1)
3. Exhaust stack gas NO_x emissions shall not exceed 3.40 lb/ton of clinker (as NO_2) when averaged over any 30 consecutive day period. (Rules 425.3 and 210.1 BACT)
4. Water spray(s) shall be provided at all raw material transfer and crushing points upstream of kiln with potential to emit dust. Each water spray installation shall deliver sufficient water to eliminate visible emissions. (Rule 210.1)
5. All raw material conveyors upstream of kiln shall be covered/enclosed and shall not exhibit visible emissions. (Rules 209 and 210.1)
6. Compliance with all operational conditions shall be verified by appropriate recordkeeping, including records of clinker production and other operational data needed to demonstrate compliance. Such records shall be kept on site in readily available format. (Rule 107)
7. No emission resulting from use of this equipment shall cause injury, detriment, nuisance, annoyance to or endanger comfort, repose, health, or safety of any considerable number of persons or public. (Rule 419 and CH&SC, Sec 41700)
8. The opacity, carbon monoxide, nitrogen oxides, and sulfur oxides Continuous Emissions Monitoring System (CEMS) on the kiln exhaust stack shall be maintained and operated at all times. (Rules 108, 422, and 425.3)

COMPLIANCE TESTING REQUIREMENTS:

Compliance with kiln collector (51-BH-01) emission sampling limits shall be demonstrated by District-witnessed sample collection by independent, CARB-certified testing laboratory per U.S. EPA-approved test methods upon startup and annually 60 days prior to permit anniversary date, and official test results and field data submitted within 60 days after collection. Samples shall be collected during maximum fuel consumption. (Rule 108.1)

COMPLIANCE DEMONSTRATION REQUIREMENTS:

On a quarterly basis, permittee shall report NO_x emissions per ton of clinker (30 day rolling average), daily NO_x emissions, and annual average NO_x emissions (365 day rolling average). (Rules 210.1 and 107)

EMISSION LIMITS:

Maximum emission rate of each air contaminant from Kiln Fabric Collector (51-BH-01) shall not exceed following limits (hourly limits may be averaged over 24 hour period):

Particulate Matter:		
From Kiln Fabric Collector (51-BH-02):	0.3	lbm/ton of feed to kiln (Rule 422)
	40.00	lbm/hr
	960.00	lbm/day
	175.20	ton/yr
From Kiln Feed Fabric Collector (51-DC-08):	0.01	grains/acf
	0.70	lbm/hr
	16.87	lbm/day
	3.08	ton/yr
From Kiln Feed Fabric Collector (51-DC-09):	0.01	grains/acf
	0.61	lbm/hr
	14.61	lbm/day
	2.67	ton/yr
Sulfur Oxides:		
From Kiln Fabric Collector (51-BH-01):	53.83	lbm/hr (as SO_2)
	1291.92	lbm/day (as SO_2)
	5.83	lbm/hr (as SO_4)
	139.92	lbm/day (as SO_4)
Oxides of Nitrogen (as NO_2):		
From Kiln Fabric Collector (51-BH-02):	3.4	lbm/ton of clinker (Rule 210.1 BACT)
	481.67	lbm/hr (Rule 210.1 BACT)
	11,560.00	lbm/day (30 day rolling average)
	1,992.90	ton/yr (365 day rolling average)
Volatile Organic Compounds (VOC):		
From Kiln Fabric Collector (51-BH-02):	10.00	lbm/hr
	240.00	lbm/day
	43.80	ton/yr
Carbon Monoxide:		
From Kiln Fabric Collector (51-BH-01):	384.00	lbm/hr
	9216.00	lbm/day
	1681.92	ton/yr

(Emission limits are established pursuant to Rule 210.1, unless otherwise noted.)

Toxics Emissions:

Limits are values resulting in incremental cancer health risk increase to the public beyond that documented in the Health Risk Assessment prepared by Ebasco Environmental and Dames and Moore, revised 1990, of less than one in a million and increased total hazard index of less than one.

MONTEREY BAY UNIFIED AIR POLLUTION CONTROL DISTRICT

PERMIT TO OPERATE

10171

OPERATION UNDER THIS PERMIT MUST BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS INCLUDED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED. THE EQUIPMENT MUST BE PROPERLY MAINTAINED AND KEPT IN GOOD CONDITION AT ALL TIMES. THIS PERMIT TO OPERATE MUST BE POSTED OR ACCESSIBLE.

LEGAL OWNER OR OPERATOR: RMC PACIFIC MATERIALS, INC.

EQUIPMENT LOCATED AT: 700 Highway One
Davenport, California

EQUIPMENT DESCRIPTION AND CONDITIONS: THIS PERMIT TO OPERATE IS ISSUED AND IS VALID FOR THIS EQUIPMENT ONLY WHILE IT IS IN THE CONFIGURATION SET FORTH IN THE FOLLOWING:

CEMENT CLINKERING PROCESS:

Raw Mill:

- C-E Raymond #14892 VR7 Roller Mill #05-108, 148" Diameter Rotating Table And Three 92" Diameter Grinding Rolls With 01750 Hp Electric Motor With Speed Reducer. Preheater And By-Pass Gases Combined And Vented Through Mill For Drying And Sweep Air. Mill Equipped With Double Cone Type Classifier And Discharged To Main ESP.
- C-E Raymond #14 Booster Air Heater #05-118, 25 MM BTU/Hr Heat Input And Fired On #2 Fuel Oil Or Natural Gas With 40 Hp Combustion Air Fan.

Suspension Preheater With Precalciner:

- Two 15' 6" Diameter First Stage Cyclones In Parallel.
- Three 22' 7" Diameter Cyclones In Series, i.e. Second, Third And Fourth Stage Cyclones.
- Precalciner: 41' High, 18' Diameter Cylindrical Section. Dry Coal Introduced By Pneumatic Feed Pump, 216 MM BTU/Hr Typical Heat Input Rate (250 MM BTU/Hr Maximum). Gases Discharged From Rotary Kiln Vented Through Precalciner Providing Partial Combustion Air And Kiln Feed/Coal Mixing. Additional Combustion Air From Cooler Drop Out Box.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR ADDRESS, OR ANY ALTERATION.

AIR POLLUTION CONTROL OFFICER

DATE JUL - 6 2000

PCD 3

- 900 Hp Bypass Precipitator I.D. Fan Discharging To Combine With Preheater Gases Downstream Of Preheater Fan And Before Raw Mill.

Main Electrostatic Precipitator (ESP)

Combined Preheater And Bypass Gases Passed Through Raw Mill Or Bypassing Raw Mill To Main ESP.

- Environmental Elements Corporation Electrostatic Precipitator, Single Chamber With 58 Gas Passages On 10" Centers And 5 Fields East 9' In Length And 36' Field Height. Collected Material To Fur Trough Hoppers And To Homo Silo Storage.

- 3100 Hp Precipitator I.D. Fan With Discharge To 200 Foot Exhaust Stack.

- In-stack Continuous Monitoring Instruments

  Lear Siegler Model RM-41, Transmissometer

  Lear Siegler Model SM-810, SOx And NOx

  Teledyne Hastings Model AFI-6KL Pitot Tube Flow Meter, Or Equivalent

THE EQUIPMENT FOR WHICH THIS PERMIT TO OPERATE IS ISSUED MAY BE OPERATED ONLY WHEN IN COMPLIANCE WITH THE FOLLOWING CONDITIONS:

Conditions:

1. The gases vented to the atmosphere from the main stack shall not contain:

   a) particulate matter in excess of 0.30 pounds per ton of feed to the kiln, as measured using 40 CFR Part 60 Appendix A Reference Method 5;

   b) particulate matter in excess of 40 pounds per hour, as measured using methods approved by the Air Pollution Control District;

c) visible emissions which exhibit 20 percent opacity or greater, or Ringelmann 1 or greater, pursuant to District Rule 400;

d) oxides of nitrogen in excess of 250 pounds per hour on a running 24 hour average;

e) oxides of nitrogen in excess of 350 pounds per hour on a running 2 hour average.

f) sulfur dioxide in excess of 250 pounds per hour on a running 24 hour average; or,

g) sulfur dioxide in excess of 300 pounds per hour on a running 2 hour average; or,

2. RMC Pacific Materials, Inc. shall operate the alkaline slurry injection system(ASIS) at all times the raw mill is not operating except during kiln start-up. During all start-ups the ASIS shall be operated as soon as the kiln feed rate reaches 100 tons per hour, and at all times when the sulfur dioxide mass emission rate equals or exceeds 102.3 pounds per hour from the main stack, to the extent possible to maintain sulfur dioxide emissions below 102.3 pounds per hour. The slurry produced shall consist of at least 12 percent solids and shall consist of slaked lime or equivalent material which has been approved by the District. RMC Pacific Materials, Inc. shall monitor and record the flow rate in gallons per minute, of slurry and water used in the ASIS on a continuous basis, and shall determine the percent solids in the slurry on a daily basis and shall make data available to the District upon request.

3. RMC Pacific Materials, Inc. shall limit their shale usage to the lower sulfur content "tan" shale at all times the sulfur dioxide emissions from the main stack exceed 91.9 pounds per hour. Tan shale shall be defined as that identified by RMC Pacific Materials, Inc. to have an average SO_3 content of 0.37 percent with a standard deviation of 0.67 percent.

4. RMC Pacific Materials, Inc. shall operate continuous in-stack monitoring instrumentation which measures the volumetric flow, opacity, and concentrations of SO_2 and NOx in the main stack and shall maintain a system which calculates the mass emission rate of SO_2 and NOx using this data. The in-stack instrumentation shall be operated in accordance with the performance specifications and test procedures contained in 40 CFR Part 60 Appendix B.

SOURCE TEST REPORT

RMC Pacific Materials

Main Stack

Davenport, California

00-15

August 2, 2000

Report Prepared By: L.J. Borrelli, Source Test Coordinator

Report Authorized For Release By: F.W. Thoits, Engineering Mgr.

II. TEST RESULTS

Table III

Source Test Results

APCD: MBUAPCD	Rule No. PTO 8161A	Allowable Emissions	Run 1	Sampled Emissions Run 2	Run 3	Average
Test No.: 00-15						
Test Date: 8-2-00						
Duration Of Test (Minutes)			40	40	40	
Roller Mill Feed Rate TPH				214		
Kiln Feed Rate TPH				196		
Gas Flow Rate SCFM Dry				151000		
Stack Gas Temp. Degrees F				225		
CO2 % by Volume				17.0		
O2 % by Volume			10.5	10.5	10.5	10.5
CO PPM			1320	1600	1600	1507
CO lb/hr			882	1069	1069	1007
H2O % by Volume				12.0		
Particulate Cons. GR/SDCF				Not Sampled		
Particulate Weight lb/hr				N/A		
NOx PPM			188	163	178	176
NOx (Calculated as NO2) lb/hr		350	206	179	195	193
SO2 PPM				Not Sampled		
SO2 lb/hr		250		N/A		

Reviewed By: L. Borrelli

Approved By: F. Thoits

Engineering Evaluation

for
Modification of a Major Facility

Pursuant to
Regulation XIII
New Source Review

Southdown California Cement LLC
1688 North "E" Street
Victorville, California 92394-2999

____
Charles L. Fryxell
Air Pollution Control Officer

Mojave Desert Air Quality Management District
15428 Civic Drive
Suite 200
Victorville, California 92392-2383

June 10, 1999

At the Quarry plant the major construction will be a new kiln to be designated Q3. It will be placed south of the existing kiln Q2. Kiln Q3 will replace existing Kiln Q1. Q3 will be a single-string, 5 stage pre-heater type with a pre-calciner, rotary kiln and clinker cooler. Ancillary equipment will include new dust collectors (baghouses), which will serve covered conveyors, the kiln/cooler exhaust, coal unloading/stacker reclaimer equipment, storage areas and electrical, water, instrumentation and monitoring systems to regulate the flow of materials and collect emissions data. Additionally, a new roll press in the raw grinding loop will be added along with the control equipment necessary (dust collectors) for compliance with District rules.

3. Description of Project

A new pre-heater, pre-calciner kiln, Q3 will be erected south of the existing Q2 at the Quarry plant. This new Q3 will be of approximately 625 millions Btu/h input and produce a nominal 5000 ton/day of clinker. Associated with Q3 will be the necessary feed and fuel mechanisms including but not limited to conveyors, hoppers, motors which drive them, controls for the emissions (baghouses), instrumentation, monitoring equipment, piping, water service, electrical and support facilities for the operating, maintenance and administrative personnel. Upon a successful start-up of Kiln Q3, existing Kiln Q1 will be shut down.

A new coal handling/storage system will be installed to serve both kilns, the existing Q2 and the proposed Q3. The new system will consist of a coal rail car unloading process that dumps the coal from individual cars of approximately 100-ton capacity to hoppers below the cars. About 85 cars will be unloaded every week. The under-car unloading process will employ water sprays to attenuate any coal dust generated during the unloading process. The coal will be transported by the conveyors and a variable height stacker onto a pile. This pile may be as high as 55 ft and as long as 435 ft and as wide as 130 ft. Because the coal stacker height is adjustable, virtually no drop height can be reasonably anticipated, which will greatly reduce any fugitive potential emissions of coal dust.

The River plant will be modified by the addition of grinding, storing, shipping equipment and the control equipment necessary (baghouses) for compliance with District rules. The removal from service, which includes the surrender of Permits to Operate for kilns 8 and 9, are an integral part of this project.

4. Specific Project Details

The emissions for the existing permitted equipment, fugitive emissions and those emissions from transportation and material handling were calculated. Some of the estimates were based on compliance testing, including existing CEMS data. Others were based on emissions factors found in the most recent editions of AP-42 and the Districts own Mineral Guidance Document. Among these others are the PM_{10} generated from hauling materials via truck on paved and un-paved roads, wind erosion of material storage piles, blasting and other activities associated with the manufacture of cement.

A. Oxides of nitrogen, NO_x, BACT

Nitrogen oxides, NO_x are pre-cursors to both ozone, and PM_{10}, both of which are non-attainment pollutants at the Victorville SCC facility.

NO_x is formed in the combustion of fuels in two distinct ways. The first is the direct oxidation of nitrogen primarily in the fuel, but may be present in the raw materials used in the formation of clinker. The second is the high temperature oxidation of nitrogen from the air. The former takes place from the combustion of nitrogen in all materials in the clinker formation process to some extent and is dependent on the concentration of the nitrogen present and only marginally dependent on temperature. The latter takes place with increasing yields of NO_x at much higher temperatures. The calcining of limestone and related materials in a cement kiln requires temperatures ranging from 2000° to approximately 4000°F. These temperatures are conducive to oxides of nitrogen formation by high temperature oxidation of elemental nitrogen in the air.

The District has reviewed the most recent NO_x BACT determinations. The review included those BACT determinations from both USEPA and Cal-EPA (CARB). The lowest BACT, which the District found, was 2.8 lb NO_x per ton of clinker on a 24-hour basis. The facility for which this limit was determined is the Portland Cement Kiln at Florida Crushed Stone in Brooksville, Florida. The permit, number AC 27-274892 was issued by the State of Florida Department of Environmental Protection in November of 1995. The kiln thus permitted is of the pre-calciner type. (Please see reference 2.) The permit also stipulates NO_x emission limits of 1018 t/yr and 1.83 lb/t of dry feed. Florida Crushed Stone had pointed out that the manufacturer of their proposed kiln could not or would not guarantee less than 4.0 lb NO_x per ton of clinker. However the state agency countered that their determination was made based on tests conducted at a Southdown facility in Brooksville, Florida.

SCC in their application has proposed 2.8 lb NO_x per ton of clinker, which is based on the guarantee of the manufacturer of the proposed kiln, Q3. It is mentioned that the tests at the Southdown facility in Brooksville demonstrated as low as 2.8 lb NO_x per ton of clinker. SCC proposed to meet this limit by the use of indirect-firing with a Low NO_x burner in the kiln and a low NO_x calciner. This level of NO_x is both demonstrable and reasonable to achieve without the use of SCR or other control methods. SCR is largely unproved as of this determination. Some methods of control are expensive to install, operate and maintain. These methods of control may also incur the added expenses of increased insurance premiums as well as more in depth HRAs. No new kilns have been built in this country with SCR, urea injection or similar NOx reduction methods. State of the art combustion controls as those proposed by SCC have achieved sufficiently low NOx emissions rates and have been accepted as BACT by regulatory agencies.

Therefore the District has determined that 2.8 lb NO_x per ton of clinker is BACT.

Mojave Desert AQMD

14306 Park Avenue, Victorville, CA 92392-2310 (760) 245-1661

AUTHORITY TO CONSTRUCT

B005362

If construction is not completed by the expiration date of this permit, it may be renewed for one additional year upon payment of applicable fees. Any additional extension will require the written approval of the Air Pollution Control Officer. This Authority to Construct may serve as a temporary Permit to Operate provided the APCO is given prior notice of intent to operate and the Permit to Operate is not specifically denied.

EXPIRES LAST DAY OF: JUNE 2001

OWNER OR OPERATOR (0001)
CEMEX California Cement LLC
16888 North E Street
Victorville, CA 92392

EQUIPMENT LOCATION: (00005)
CEMEX - Black Mountain Quarry Plant
25220 Black Mountain Quarry Road
Victorville, CA 92392

DESCRIPTION:

KILN (Q3) AND CLINKER COOLER SYSTEM consisting of:

Capacity	Equipment Description
	Kiln Feed System
	Belt Conveyors
	Elevator
	Calibration System
	Dust Return System
	Pre-Calciner
	Pre-Heater
	Kiln (Q3), which is rated at 625 milliions Btu/h input
	Induced Draft Fan
	Clinker Cooler (Vent-less)
	Clinker Cooler Cyclone Separator
	Cllinker Cooler Heat Exchanger
	Pan Conveyor
	Screw Conveyors
	Feeders
	Coal Mill
	Primary Air Fan

Fee Schedule: 8(f) Rating: 648.0 SIC: 3241 SCC: 99999999 Location/UTM(Km): 491E/3831N

This permit does not authorize the emission of air contaminants in excess of those allowed by law, including Division 26 of the Health and Safety Code of the State of California and the Rules and Regulations of the District. This permit cannot be construed as permission to violate existing laws, ordinances, statutes or regulations of this or other governmental agencies. This permit must be renewed by the expiration date above. If billing for renewal fee required by Rule 301(c) is not received by expiration date above, please contact the District.

CEMEX California Cement LLC
16888 North E Street
Victorville, CA 92392

BY: Copy

For: Charles L. Fryxell
Air Pollution Control Officer

DATE: 7/26/2000

CONDITIONS continued:

	Drag Conveyors
	Clinkder Breakers
	Clilnker Cooler Fans
9000.0	Discharge Gate Drives
9000.0	

CONDITIONS:

1. The owner/operator, o/o, shall install, operate and maintain the equipment described on this permit in compliance with all data and specifications submitted with the application under which this permit is issued unless specifically exempted in other conditions hereon.

2. This equipment shall not be operated unless it is vented to the properly functioning baghouse NBH 9 under valid Distrit permit number C007368.

3. The sulfur content of coal used in firing the kiln shall not exceed 2.4 lb/ million Btu. The District rule, 431, which limits sulfur concentrations of all fuels used, is applicable.

4. The emissions from Q3 shall not exceed the following, in lb/ton clinker:

NOx	2.8
SOx	0.35
VOC	0.12
TSP-Kiln Stack	0.14
Opacity:	20%

5. The requirements for oxides of nitrogen in 4. above shall not apply during start-up and during the first 36 hours of operation following start-up nor during the 36 hours immediately preceding shut-down During those calendar days, from midnight to midnight, when these start-ups and shut-downs occur, the total oxides of nitrogen from Q2 and Q3 shall not exceed those described in 6. below.

6. The emissions from Q3 and Q2, in lb/day on a 30-day rolling average basis shall not exceed the following:

NOx	42,207
SOx	4,220
CO	27,522
VOC	2,139
PM	1,435 (This is from the main stacks of both kilns)
PM	699 (This from Q2 main clinker cooler stack only, in that Q3 has no vent.

For the testing requirements, please see the baghouse NBH 9 serving kiln Q3.

7. Compliance with the emissions described in 4. above shall be determined by using CEMS data and calculating an arithmetic average of the previous 30 days (day is defined as any 24-hour period beginning at midnight).

8. The daily emissions for each operating day for kiln Q3 shall be recorded and/or calculated in a manner approved by the District. The data shall be submitted to the District within 30 days of the end of each calendar quarter.

Mojave Desert AQMD

15428 Civic Drive, Suite 200, Victorville, CA 92392-2383 (760) 245-1661

AUTHORITY TO CONSTRUCT

B007435

If construction is not completed by the expiration date of this permit, it may be renewed for one additional year upon payment of applicable fees. Any additional extension will require the written approval of the Air Pollution Control Officer. This Authority to Construct may serve as a temporary Permit to Operate provided the APCO is given prior notice of intent to operate and the Permit to Operate is not specifically denied.

EXPIRES LAST DAY OF: MAY 2000

OWNER OR OPERATOR (0012)
Riverside Cement Company
19409 National Trails Hwy
Oro Grande, CA 92368

EQUIPMENT LOCATION: (00003)
Riverside Cement
19409 National Trails Hwy
Oro Grande, CA 92368

DESCRIPTION:

KILN AND PREHEATER consisting of:

Capacity	Equipment Description
	Pre-heater Section, 441PH1
	Exhaust Fans, 2 @ 2000 hp each, 441FN1 and 2
	Water Spray Pumps and Compressosr, 441WS1, 3 pumps @ 5 hp each, 3 Compressors @ 60 hp each
	3 Compressors @ 200 hp each and 3 Fans @ 10 hp each, 461CP1 through 3
	Compressor Air Dryer Fan, 461DY1, 15 hp
	Shell Cooling Fans, 104 @ 3 hp each and 4 @ 1.5 hp each
	Kiln, 461KL1, @ 1250 hp
	Kiln Auxilliary Motor, 60 hp
	Kiln Lube Pumps & Sprays, 2 @ 0.5 hp each and one at 1.5 hp
	Shut Off Damper and Fan, 461SD1, total hp 22.5
	The kiln is rated at approximately 726 millions Btu/h and the total hp is 6,211.
	The fee is calculated as: 726 + (6211 x 2550/1000000) and = 741.8

CONDITIONS:

1. The owner/operator, o/o, shall install, operate and maintain the equipment described above in strict accord with the recommendations of the manufacturer/supplier.

Fee Schedule: 8(f) Rating: 741.8 SIC: 3241 SCC: 99999999 Location/UTM(Km): 469E/3828N

This permit does not authorize the emission of air contaminants in excess of those allowed by law, including Division 26 of the Health and Safety Code of the State of California and the Rules and Regulations of the District. This permit cannot be construed as permission to violate existing laws, ordinances, statutes or regulations of this or other governmental agencies. This permit must be renewed by the expiration date above. If billing for renewal fee required by Rule 301(c) is not received by expiration date above, please contact the District.

Riverside Cement Company
PO Box 158
Oro Grande, CA 92368

BY: [signature]
For: Charles L. Fryxell
Air Pollution Control Officer

DATE: 8/5/99

2. This equipment shall not be operated unless vented to both the sulfur oxides scrubber (431SS1) and the baghouse (431BF1), which follows the scrubber. These pollution control devices shall be under valid District permits C007438 and C007411, respectively when the kiln is operating.

3. Specific emissions rates on the operation of the kiln, include but are not limited to the following:

   Operation of the kiln utilizing any fuel or combination of fuels, i.e., natural gas and/or coal shall be limited to the extent as follows:

Pollutant	lb/ton of clinker
NOx	2.8
SOx	0.13
CO	1.5
VOC	0.06
TSP - Clinker Cooler,	0.099
PM10 -Clinker Cooler,	0.084

   Compliance with these emissions limits shall be determined by using CEMS and clinker production data and calculating an arithmetic average of the previous 30 days (day is defined as any 24-hour period beginning at midnight).

   The daily emissions for each operating day for the kiln shall be recorded and/or calculated in a manner approved by the District. The data shall be submitted to the District within 30 days of the end of each calendar quarter. The daily emissions of the following pollutants CO, NOx, SOx and VOC as well as gaseous O2 for kiln shall be monitored using a Continuous Emissions System (CEMS). The stack gas flow rate shall be monitored using a Continuous Emission Rate Monitoring System (CERMS). The stack gas opacity shall be monitored using a Continuous Opacity Monitoring System (COMS).

4. The emissions from the kiln shall not exceed the following, which are based on 6000 tons of clinker per day of maximum production:

Pollutant	lb/hour
NOx	700.
SOx	32.5
CO	375.
VOC	15.0
TSP-Clinker Cooler	24.8
PM10 -Clinker Cooler	21.0

5. The following are the acceptability testing requirements for the CEMS, CERMS and COMS:

   A. For COMS (Opacity) - Performance Specification 1 of 40 CFR 60 Appendix B.
   B. For SO2 and NOx CEMS - Performance Specification 2 of 40 CFR 60 Appendix B.
   C. For O2 CEMS - Performance Specification 3 of 40 CFR 60 Appendix B.
   D. For CO CEMS - Performance Specification 4 of 40 CFR 60 Appendix B.
   E. For CERMS (stack gas flow rate) - Performance Specification 6 of 40 CFR 60 Appendix B.
   F. For VOC CEMS - Acceptability testing shall be performed per a District approved procedure that is to be submitted by the o/o.

Engineering Evaluation

For

Modification of a Major Facility

Pursuant to

Regulation XIII- New Source Review

TXI Riverside Cement
1490 Rubidoux Boulevard
Riverside, California 92509

____

Charles L. Fryxell
Air Pollution Control Officer

Mojave Desert Air Quality Management District
15428 Civic Drive
Suite 200
Victorville, California 92392-2999

August 5, 1999

kilns, once the new kiln is operational. The quarry will continue to operate as it does. It will use a
new mobile crusher, and the crushed limestone will be transported to the cement manufacturing area by way of a conveyor belt. This transport will eliminate the use of 25-100 ton haul trucks from the quarry to the current crusher over a 6-mile round trip quarry haul road. The haul trucks will continue to be used in the quarry to move the uncrushed limestone to the new mobile crusher located in the quarry.

The major construction will be a new kiln, new clinker storage, new coal storage, new raw materials storage, a sulfur oxides scrubber, many new baghouses and covered conveyors. Ancillary equipment will include, piping, electrical, monitoring, data acquisition, sampling areas and access thereto, coal handling and cooler exhaust.

A new pre-heater, pre-calciner kiln will be erected north and to the east of the existing cement manufacturing area. This new kiln will be of approximately 720 millions Btu/h input and produce a nominal 6000 t/d of clinker. Associated with the kiln will be the necessary feed and fuel mechanisms including but not limited to conveyors, hoppers, motors which drive them, controls for emissions (baghouses and sulfur oxides scrubber), instrumentation, monitoring equipment, piping, water service, electrical and support facilities for the operating, maintenance and administrative personnel.

4. Specific Project Details

The emissions for the existing permitted equipment, fugitive emissions and those emissions from transportation and material handling were calculated. Many of these estimates were based on extractive compliance testing and some included CEMS data. Other conservative estimates were based on emissions factors found in the most recent editions of AP-42. Among these, are the PM_{10} generated from hauling materials via truck on paved and un-paved roads, wind erosion of material storage piles, blasting and other normal activities consistent with the manufacture of cement.

The following tables, which are lettered A-G, show the Historic Actual Emissions in ton/year for each of the 7 existing kilns at the RCC plant. The emissions are for the 2 separate years 1996-1997 and 1997-1998. Each year begins July 1 and concludes on June 30 the following year.

Table A Historic Actual Emissions, in ton/year, for Kiln No. 1
for Operating Years July 1, 1996 to June 30, 1998

Parameter	1996-1997	1997-1998
Clinker Produced	178,051	174,968
NO_x	854.6	839.9
CO	110.4	108.5
SO_2	0.12	0.12
VOC	10.2	10.0
TSP	5.07	4.98

The District has reviewed the most recent NO_x BACT determinations. The review included those BACT determinations from both USEPA and Cal-EPA (CARB). The lowest BACT, which the District found, was 2.8 lb NO_x per ton of clinker on a 24-hour basis. The facility for which this limit was determined is the Portland Cement Kiln at Florida Crushed Stone in Brooksville, Florida. The permit, number AC 27-274892 was issued by the State of Florida Department of Environmental Protection in November of 1995. The kiln thus permitted is of the pre-calciner type. (Please see reference 2.) The permit also stipulates NO_x emission limits of 1018 t/yr and 1.83 lb/t of dry feed. Florida Crushed Stone had pointed out that the manufacturer of their proposed kiln could not or would not guarantee less than 4.0 lb NO_x per ton of clinker. However the state agency countered that their determination was made based on tests conducted at a Southdown facility in Brooksville, Florida.

RCC, in their application, has proposed 2.8 lb NO_x per ton of clinker, which is based on the guarantee of the manufacturer for the kiln. It is mentioned that the tests at the Southdown facility in Brooksville (see above) demonstrated as low as 2.8 lb NO_x per ton of clinker. RCC proposed to meet this limit by the use of indirect-firing with a Low NO_x burner in the kiln and a low NO_x calciner. This level of NO_x is both demonstrable and reasonable to achieve without the use of SCR or other control methods. SCR is largely unproved as of this determination. Some methods of control are expensive to install, operate and maintain. These methods of control may also incur the added expenses of increased insurance premiums as well as more in depth HRAs. No new kilns have been built in this country with SCR, urea injection or similar NOx reduction methods. State of the art combustion controls as those proposed by RCC have achieved sufficiently low NOx emissions rates and have been accepted as BACT by regulatory agencies.

Therefore the District has determined that 2.8 lb NO_x per ton of clinker is BACT for this project.

B. Particulate Matter-10 micron, PM_{10}, BACT

PM_{10} is the respirable fraction aerosol that has been found to cause and exacerbate existing breathing problems/illnesses. It is formed as a result of many processes. The following are some of the more common ways for its formation:

1. combustion of fossil fuels
2. from grinding, screening, moving and other mechanical methods associated with solid materials handling
3. fugitive emissions from vehicles traveling on paved and/or unpaved roadways
4. the physical and/or chemical combinations of two or more gas-liquid-solid matrices of all three above.

PM_{10} is formed from oxides of nitrogen, oxides of sulfur and VOCs emitted from combustion sources. These materials react with water and/or other materials in the atmosphere. The reaction products may be nitrates and/or nitrites; sulfites and/or sulfates; and organic adducts of other minerals, all of which may be PM_{10}. PM_{10} is also formed by the direct reaction of VOCs with the SO_x and/or NO_x. There are more than these avenues of formation of PM_{10}.

PM_{10} from mechanical formation may be captured by cyclones, scrubbers, electro-static precipitators (ESP) and fabric filters (baghouses, predominantly). In many industries the method of collection depends on the final disposition of the collected materials. Many users of cyclones in conjunction with baghouses can readily use the collected material in that it is their final product.

Baghouses have become a standard of many industries, which deal with dry solid collections and are found throughout the rock crushing and/or handling facilities worldwide. Indeed, baghouses are BACT for many applications in the Portland Cement Manufacturing Industry as well as others industries.

RCC has calculated that aggregated PM_{10} from the new kiln, kiln cooler, coal mill and roller mill will be 150 tons per year based on 2 million tons of clinker per year. This is 0.150 lb PM_{10} / ton of clinker. RCC has proposed the addition of baghouses to many of the new systems and upgrading older permit units, which will reduce PM_{10} emissions greatly in excess of that required to achieve District rules and those of USEPA New Source Performance Standards (40 CFR 60, Subpart F). RCC has proposed a baghouse on the kiln emissions that will capture down to and including 0.0125 grains/dSCFM of gas emitted. This is sufficiently stringent to comply with NSPS (40 CFR 60, Subpart F), as well as District Regulation IV, Prohibitions, specifically, Rules 401, 402 and 403.

Because NO_x will be reduced in the design, construction and operation of the new kiln, formation of PM_{10} and O_3 will also be reduced. No empirical numbers can be placed on this reduction in that it is an extremely complex matter and beyond the scope of this evaluation.

The District has determined that 0.15 lb/t clinker is BACT for this project's new kiln emissions.

Other sources of PM_{10} from grinding of raw materials, coal handling, clinker milling and storing operations will be controlled by baghouses down to a minimum of 0.013 gr/dSCF of PM (0.01 gr/dSCF of PM_{10}) as proposed by RCC.

Baghouses have become a standard for many industries, which deal with dry solid collections, and are found throughout the rock crushing and handling facilities worldwide. Indeed, baghouses are BACT for many applications in the Portland Cement Manufacturing Industry as well as others. Particulate matter emissions searches produced some varied limits in the cement manufacturing industry. These limits ranged from 0.11 to 0.35 lb per ton of clinker. Grain loadings for those specified ranged from 0.01 to 0.015 grains per dry standard cubic foot of exhaust. These plants only produce a maximum of 2800 t clinker per day, which is well below the 6000 t/day for the proposed RCC project and therefore not truly comparable.

The District has determined that 0.013-0.017 gr/dSCF of PM (0.02 gr/dSCF of PM_{10}) is BACT for the proposed project's permittable sources for PM_{10} not directly associated with the kiln emissions.

C. Volatile Organic Compounds, VOC, BACT

VOCs are those organic compounds, which may be emitted as the result of incomplete combustion of fossil fuels. RCC has proposed combustion design and operation as BACT. RCC's analysis demonstrates a kiln emission rate of about 65 ton/yr VOC, which is about 720 lb/day based on RCC's anticipated 330 day/year operations projection. A recent (1997) determination of BACT was made by Region II of USEPA. The determination of 0.12 lb/ton of clinker was made for the Puerto Rican Cement Company Plant (in Ponce, Puerto Rico, see reference 4). When RCC is fully operational 6000 ton/day of clinker will be the nominal clinker production. This is about 394 lb/d (0.065 lb VOC/ton of clinker) and well under the USEPA determination of 0.12 lb/ton clinker.

When the proposed MACT standard of 50 ppm, v/v, is compared to the flow rate through the proposed baghouse controlling emissions of 15.4 million dSCF/h and 550 lb VOC/d, it is shown that emissions of VOC will be approximately 13.0 ppm, v/v. RCC will be in compliance.

The District determines that 0.12 lb VOC/t clinker is BACT for this project.

D. Sulfur oxides, SO_x BACT

Sulfur oxides are pre-cursors to PM_{10}, which is a non-attainment pollutant. Sulfur dioxide, and to a lesser extent, sulfur trioxide are formed by the combustion of sulfur in the fuel and other materials containing sulfur, which are present in the feed stock. Projected emissions from the new kiln are about 800 ton/yr. RCC has proposed a sulfur oxides scrubber, which is expected to reduce the emissions to 162 ton/year. Also, it is well known in the cement industry, and indeed, the State of Florida (reference 2) states "...sulfur oxides, because of their strongly acidic properties, are scrubbed out to a significant proportion in the alkaline solids of the cement while in the kiln". The citation has been paraphrased for brevity.

Recent BACT determinations have shown emissions rates for sulfur oxides to be from 0.28 to 5.0 lb SO_2 per t clinker. These sources were the Florida Crushed Rock Industries (see reference 2) and the Roanoke Cement Company (see reference 8).

The District finds that the RCC proposal to limit sulfur oxides to 0.16 lb SO_x/ t clinker by the addition of a scrubber represents BACT for this project.

E. Visible Emissions, VE BACT

Visible emissions arise from mainly two categories. One is from the kiln stack, which for the new kiln will be emitted through a baghouse. Other instances wherein these emissions arise are from material handling, coal handling and clinker handling operations. RCC has proposed baghouses for the main kiln, as well as many pickup points for the remainder of the previously mentioned sources.

Although the District found many VE BACT determinations for opacity from the kiln main stack to be 10%, the District believes that an opacity limit of 20% to be BACT for this kiln and the clinker cooler exhausts. The limit is consistent with that in 40 CFR 60, subpart F, Standards of Performance for Portland Cement Plants. Further, the PM emissions from the main stack will comply with the BACT limit of 0.14 lb/t clinker. Based on anticipated experience gained during the first year of operation, the opacity may be lowered by the District to less than 20%.

DRAFT PERMIT

PERMIT NO: **98FR0895**

INITIAL APPROVAL
MODIFICATION - 1

DATE ISSUED:

ISSUED TO: **HOLNAM, INC. - PORTLAND PLANT**

THE SOURCE TO WHICH THIS PERMIT APPLIES IS DESCRIBED AND LOCATED AS FOLLOWS:

Portland cement manufacturing facility, including raw materials quarries, known as **Holnam Portland Plant**, located at 3500 State Highway 120, near Florence, Fremont County, Colorado.

THE SPECIFIC EQUIPMENT OR ACTIVITY SUBJECT TO THIS PERMIT INCLUDES THE FOLLOWING:

This is a facility-wide permit covering all equipment / activities at this facility. Details of equipment / activities are given in Attachment A.

This facility is a major stationary source located in an area designated as attainment / unclassifiable for all criteria pollutants.

Issuance of this permit was for a major modification of a major stationary source. This Modification-1 is a minor modification.

THIS PERMIT IS GRANTED SUBJECT TO ALL RULES AND REGULATIONS OF THE COLORADO AIR QUALITY CONTROL COMMISSION AND THE COLORADO AIR POLLUTION PREVENTION AND CONTROL ACT C.R.S. (25-7-101 et seq), TO THOSE GENERAL TERMS AND CONDITIONS INCLUDED IN THIS DOCUMENT AND THE FOLLOWING SPECIFIC TERMS AND CONDITIONS:

1. All previous versions of this permit are canceled upon issuance of this permit.

2. Construction for modification of this facility must commence within 18 months of initial approval permit issuance date or within 18 months of date on which such construction or activity was scheduled to commence as stated in the application. If commencement does not occur within the stated time the permit will expire on **January 29, 2001.**
(See General Condition No. 6., Item 1 on the reverse side of the first page of this permit.) (Reference: Regulation No. 3, Part B, IV. G. 4.)

3. Operation of the wet scrubber by-pass (AIRS ID: 111) shall be restricted to periods of unforeseen (breakdown) of the scrubber, and shall be reported under upset provisions.

4. Prior to the start up of the equipment / activities permitted under this permit, all existing activities / operations not covered by this permit shall be terminated. The permittee shall send a notification to the Division of the termination of the activities. Upon starting of operations under this permit, **all** previous permits / exemptions for individual equipment / activities, or group of equipment / activities, stand **canceled**. These include, but not limited to Permits/Exemptions No.: 10FR107-1, 10FR107-2, 10FR484, 93FR1062, and 95FR399.

5. Within one hundred and eighty days (180) after commencement of operation, compliance with the conditions contained in this permit shall be demonstrated to the Division. It is the permittee's responsibility to self certify compliance with the conditions. Failure to demonstrate compliance within 180 days may result in revocation of the permit. (Information on how to certify compliance was mailed with the permit or can be obtained from the Division at 303-692-3209.)

6. If more than one provision applies, the most stringent provision shall be applicable.

7. Visible emissions shall not exceed twenty percent (20%) opacity during normal operation of the source. During periods of startup, process modification, or adjustment of control equipment visible emissions shall not exceed 30% opacity for more than six minutes in any sixty consecutive minutes. Opacity shall be measured by EPA Method 9. (Reference: Regulation 1, Section II. A. 1. & 4.)

8. This source is subject to the odor requirements of Regulation No. 2. (State only enforceable)

9. The manufacturer, model number and serial number of the subject equipment shall be provided to the Division prior to Final Approval. (Reference: Reg. 3, Part B. IV. E.)

10. AIRS ID numbers (for example, "AIRS ID: 006") shall be marked on the subject equipment for ease of identification. (Reference: Reg. 3, Part B, IV. E.) (State only enforceable)

11. The following operations at this facility are subject to the requirements of Regulation No. 6 - Standards of Performance for New Stationary Sources including, but not limited to, the following:

    Part A - Federal Register Regulations Adopted By Reference:

    Subpart F - Standards of Performance for Portland Cement Plants: These standards apply to kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finished product storage, conveyor transfer points, bagging and bulk loading and unloading systems.

    Kiln: Gases discharged into the atmosphere from the kiln shall not contain particulate matter in excess of 0.30 pound ton of feed (dry basis) to the kiln. Emissions through all bypasses must be included while

13. The emission sources shall be equipped with control devices / systems capable of reducing uncontrolled emissions of various pollutants as specified in Attachment A. Operating parameters of the control equipment shall be identified prior to final approval of this permit. The identified operating parameters will replace the control efficiency requirement on the final permit. (Reference: Reg.3, Part B, IV. E.)

14. The particulate emission control measures listed on Attachment B (as approved by the Division) shall be applied to the particulate emission producing sources as required by Regulation No. 1, Section III. D. 1. b.

15. The equipment / activities at this facility are subject to the provisions of Prevention of Significant Deterioration (PSD). Application of Best Available Control Technology (BACT) is required. Emissions from various equipment / activities shall be controlled, and the permittee shall comply with the following BACT determinations:

Preheater / Precalciner and Kiln System referenced under AIRS ID: 111

Carbon Monoxide:

Controls: Good Combustion Practices for minimizing emissions of Carbon Monoxide. Emissions not to exceed 4.64 pounds per ton of clinker produced.

Volatile Organic Compounds:

Controls: Good Combustion Practices for minimizing emissions of volatile organic compounds. Emissions not to exceed 0.21 pound per ton of clinker produced.

Coal Mill Vent referenced under AIRS ID: 107

Carbon Monoxide: A bypass stream of hot gases from the kiln / precalciner is sent through the coal mill for drying of coal. "Good Combustion Practices" are used in the kiln and precalciner.

Volatile Organic Compounds: "Good Combustion Practices" are used in the kiln and precalciner.

16. "Good Combustion Practices" constitute monitoring and control of several operating parameters. These parameters include, but not limited to, fuel flow rate, primary and secondary air flows, carbon monoxide concentration in the flue gas, level of excess air, and recirculating air flow. All relevant parameters and their optimal operating ranges for various combustion devices shall be identified, and included in the required operation and maintenance plan. Continuous emission monitoring systems shall be programmed to send out warnings if the operating parameters are on the verge of going out of the established operating ranges, and alarms shall be sounded if the operating parameters go out of established operating range.

17. This facility shall be limited to throughput as listed below and all other

activities, operational rates and numbers of equipment as stated in the application. Throughput of individual equipment / activities shall be limited to the process rate limits specified in Attachment A. Monthly records of the actual throughput shall be maintained by the applicant and made available to the Division for inspection upon request. (Reference: Regulation 3, Part B,III.A.4)

Cement clinker produced at this facility shall not exceed 1,873,898 tons per year and 178,127 tons per month.

Overburden / waste rock disposed at the quarries shall not exceed 4,895,749 tons per year, and 458,980 tons per month.

Total raw materials (including limestone, translime, and sand/sandstone) extracted from the quarries shall not exceed 3,086,264 tons per year and 289,340 tons per month.

Total quantity of coal processed and fired shall not exceed 277,614 tons per year and 26,030 tons per month.

Tire derived fuel fired into the cement kiln shall not exceed 55,000 tons per year and 5,156 tons per month.

Spent lubricant (non-hazardous) fired into the cement kiln shall not exceed 100 tons per year.

Natural gas fired into the kiln shall not exceed 700,000,000 SCF per year and 65,625,000 SCF per month.

Total feed into the cement kiln (dry basis) shall not exceed 3,021,478 tons per year and 283,264 tons per month.

During the first twelve (12) months of operation, compliance with both the monthly and yearly production limitations shall be required. After the first twelve (12) months of operation, compliance with only the yearly limitation shall be required. Compliance with the yearly production limits shall be determined on a rolling twelve (12) month total.

18. Prevention of Significant Deterioration (PSD) requirements shall apply to this source at any such time that this source becomes major solely by virtue of a relaxation in any permit condition. Any relaxation that increases the potential to emit above the applicable PSD threshold will require a full PSD review of the source as though construction had not yet commenced on the source. The source shall not exceed the PSD threshold until a PSD permit is granted. (Reference: Reg.3, Part B, IV. D. 3. b.(iv)). This condition applies to all pollutants for which major modification and application of Best Available Control Technology (BACT) have not been addressed in this permit. They include, but not limited to, Particulate Matter, Particulate Matter less than 10 micrometers in diameter [PM-10], Sulfur Dioxide, and Oxides of Nitrogen.

19. This facility is subject to Title 40 CFR Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart LLL - National Emission Standards for the Portland Cement Manufacturing Industry. Compliance with these standards shall be achieved immediately upon startup of operation.

20. Emissions of air pollutants shall not exceed the following limitations (as calculated in the Division's preliminary analysis): Compliance with the annual limits shall be determined on a rolling (12) month total. By the end of each month a new twelve month total is calculated base on the previous twelve months' data. The permit holder shall calculate monthly emissions and keep a compliance record on site for Division review. (Reference: Regulation 3, Part B, III.A.4)

Particulate Matter:	299.14 tons per year
Particulate Matter < 10 µm [PM-10]: (includes condensables)	298.80 tons per year
	28.02 tons per month
Nitrogen Oxides:	3,203.60 tons per year
	300.34 tons per month
Carbon Monoxide:	4,418.20 tons per year
	414.21 tons per month
Sulfur Dioxide:	1,073.90 tons per year
	100.68 tons per month
Volatile Organic Compounds:	196.80 tons per year
	18.45 tons per month
Lead:	148.3 pounds per year
	13.91 pounds per month
Particulate Matter - Fugitive:	268.70 tons per year
	25.20 tons per month
Particulate Matter < 10 µm [PM-10]-Fugitive:	141.28 tons per year
	13.25 tons per month

Note: These limits include emissions of combustion gases from explosives used in blasting, but do not include emissions of combustion gases from internal combustion engines mounted on mining related equipment and trucks hauling out the cement product from the facility. However, all these emissions have been considered in modeling for the purpose of demonstrating compliance with various ambient quality standards and allowable increments.

During the first twelve (12) months of operation, compliance with both the monthly and yearly emission limitations is required. After the first twelve (12) months of operation, compliance with only the yearly limitation is required. Compliance with the yearly limits shall be determined on a rolling twelve (12) month total.

Compliance with the fugitive particulate matter emission limits shall be demonstrated by not exceeding the process rate limits, and by applying, at a minimum, the emission control measures specified in Attachment B.

PERMIT NO: **98PB0893**

INITIAL APPROVAL

DATE ISSUED: SEPTEMBER 25, 2000

ISSUED TO: **RIO GRANDE PORTLAND CEMENT CORPORATION**

THE SOURCE TO WHICH THIS PERMIT APPLIES IS DESCRIBED AND LOCATED AS FOLLOWS:

Portland cement manufacturing facility (including raw materials quarry), known as **Rio Grande Cement Plant**, located approximately six (6) miles south south-east of Pueblo, in Pueblo County, Colorado.

THE SPECIFIC EQUIPMENT OR ACTIVITY SUBJECT TO THIS PERMIT INCLUDES THE FOLLOWING:

This is a facility-wide permit covering all equipment / activities at this facility. Details of these equipment / activities are given in Attachment A.

THIS PERMIT IS GRANTED SUBJECT TO ALL RULES AND REGULATIONS OF THE COLORADO AIR QUALITY CONTROL COMMISSION AND THE COLORADO AIR POLLUTION PREVENTION AND CONTROL ACT C.R.S. (25-7-101 et seq), TO THOSE GENERAL TERMS AND CONDITIONS INCLUDED IN THIS DOCUMENT AND THE FOLLOWING SPECIFIC TERMS AND CONDITIONS:

1. Construction of this source must commence within 18 months of initial approval permit issuance date or within 18 months of date on which such construction or activity was scheduled to commence as stated in the application. If commencement does not occur within the stated time the permit will expire on____
(See General Condition No. 6., Item 1.) (Reference: Regulation 3,Part B, IV.G.4.)

2. If multiple provisions apply, compliance with less stringent provisions shall not excuse compliance with more stringent provisions.

3. Post-construction monitoring of ambient concentrations and source impacts for Particulate Matter less than 10 micrometers in aerodynamic diameter [PM_{10}] shall be conducted for a period of one year. Such monitoring shall be started within thirty (30) days of the startup of operations. A monitoring protocol (including the proposed locations of monitoring stations) shall be submitted to, and approval obtained from, the Division. Results of such monitoring shall be reported to the Division on a quarterly basis within thirty (30) days of the end of the quarter. Such data shall be valid as long as the activity rates do not exceed the activity rates under which such monitoring was conducted. Prior to increasing the activities, the permittee shall approach the Division to determine if additional monitoring is required.

4. This source is subject to the odor requirements of Regulation No. 2. (State only enforceable)

Limiting the vehicle speeds on quarry haul roads, service roads, unpaved roads, and disturbed areas to a maximum of 18 miles per hour. Posting of speed limit signs.

Reclamation works and sequential extraction of material to keep the total disturbed areas at any one time to a minimum.

Plant entryway, truck service roads, and other traffic areas shall be concreted or graveled. Watering shall be implemented for additional controls, as necessary.

Minimization of disturbed areas, revegetation, and mulching.

When wind speed exceeds 30 miles per hour, as measured on the property for a period lasting longer than fifteen (15) minutes, all additional appropriate abatement and preventive measures, for control of fugitive emissions, shall be applied. These shall include the use of additional water sprays. Suspension of all quarry activities shall occur when wind speed reaches or exceeds 30 miles per hour, as measured on the property for a period lasting longer than sixty (60) minutes. Resumption of activities shall only occur when wind speeds reduce to less than 30 miles per hour for a continuous period lasting longer than fifteen (15) minutes.

Materials Processing and Handling, including storage of clinker, intermediate products, and finished products:

Particulate Matter:

Dust collectors, which will limit the concentration of particulate matter in the outlet to a maximum of 0.005 grain per dry standard cubic foot, shall be used on all processing / conveyor / handling systems.

Preheater / Precalciner and Kiln System referenced under AIRS ID: 039

Carbon Monoxide:

Controls: Good Combustion Practices (multi-stage firing) for minimizing emissions of Carbon Monoxide. Emissions not to exceed a 12-month rolling average of 2.11 pounds per ton of clinker produced.

"Good Combustion Practices" (applicable to Carbon Monoxide) constitute monitoring and control of several operating parameters. These parameters may include, fuel flow rate, primary and secondary air flows, carbon monoxide concentration in the flue gas, level of excess air, and recirculating air flow. All relevant parameters and their optimal operating ranges as per the manufacturer's recommendations, to ensure minimization of emissions, for various combustion devices shall be identified, and included in the Compliance Assurance Monitoring (CAM) plan required by 40 CFR Part 64. Continuous emission monitoring systems shall be programmed to send out warnings if the operating parameters are on the verge of going out of the established operating ranges, and alarms shall be triggered if the operating parameters go out of established operating range. This provision shall be implemented, within twelve (12) months of commencement of operations, through the Division approved CAM plan.

Oxides of Nitrogen:

Controls: Low NOx combustion system (multi-stage firing) for minimizing emissions of Oxides of Nitrogen. Emissions not to exceed a 12-month rolling average of 2.32 pounds per ton of clinker produced.

Particulate Matter:

Emissions of particulate matter shall be controlled by high temperature filter medium dust collector. The concentration of filterable particulate matter in the dust collector outlet shall not exceed 0.01 grain per dry standard cubic foot. Emissions of condensable particulate matter shall be minimized by appropriate quarry management practices. Emissions of all condensable particulate matter shall not exceed 0.105 pound per ton of clinker produced.

Sulfur Dioxide:

Emissions of sulfur dioxide shall be minimized by: using low sulfur coals containing a 12-month rolling average of less than 0.65 % sulfur on as-received basis, and control by 5-stage counter-current dry scrubber with an overall control efficiency of at least 85 % based on pyritic sulfur in the raw materials (excluding coal). Emissions not to exceed a 12-month rolling average of 1.99 pounds per ton of clinker produced.

Clinker Cooler:

Particulate Matter:

Emissions of particulate matter shall be controlled by high temperature filter medium dust collector. The concentration of particulate matter in the dust collector outlet shall not exceed 0.01 grain per dry standard cubic foot.

14. The emission sources shall be equipped with control devices / systems capable of reducing uncontrolled emissions of various pollutants as specified in Attachment A. These control devices / systems shall be operated as per the recommendations of the manufacturers. These parameters shall be contained in Operation and Maintenance plan, and updated as necessary.

15. The source shall be limited to throughput as listed below. and all other activities, operational rates and numbers of equipment as stated in the permit. Throughput of individual equipment / activities shall be limited to the process rate limits specified in Attachment A. Monthly records of the actual throughput shall be maintained by the applicant and made available to the Division for inspection upon request. (Reference: Regulation No. 3, Part B, III. A. 4)

Cement clinker produced at this facility shall not exceed 950,000 tons per year, 86,000 tons per month, and 2,890 tons per day.

Total of topsoil and overburden / waste rock handled at the quarries shall not exceed 405,000 tons per year, 52,000 tons per month, and 2,400 tons per day.

Total surface area disturbed and subject to wind erosion in the quarry shall not exceed 15.50 acres. Areas revegetated, or surface areas stabilized with geotextile netting or other similar measures, are not considered subject to wind erosion.

Total raw materials extracted from the quarries shall not exceed 1,470,000 tons per year, 163,000 tons per month, and 7,500 tons per day.

Total quantity of coal processed, and fired shall not exceed 122,250 tons per year, 11,000 tons per month, and 370 tons per day.

Facility-wide consumption of pipeline quality natural gas shall not exceed 352,770,000 SCF per year.

Combination of activities shall be limited to the emission limits specified. This shall be demonstrated by adequate recordkeeping of the activities and corresponding emissions.

Additionally the following operational restrictions apply:

Quarrying activities (defined by loading of quarry raw materials to trucks, truck transport, and unloading of raw materials at primary crusher hopper, and primary crushing) shall be limited to a total of ten (10) hours per day, between the hours of 6:00 AM and 9:00 PM.

Overburden activities (defined by overburden removal, overburden replacement, and scraper activity) shall be limited to a total of eight (8) hours per day, between the hours of 7:00 AM and 7:00 PM.

Records shall be kept of the actual hours of quarrying and overburden activities each day.

During the first twelve (12) months of operation, compliance with the daily, monthly and yearly limitations shall be required. After the first twelve (12) months of operation, compliance with the daily and yearly limitations is required. Compliance with the yearly limits shall be determined on a rolling twelve (12) month total.

16. Emissions of air pollutants shall not exceed the following limitations (as calculated in the Division's preliminary analysis):

Particulate Matter - Filterable	155.40 tons per year
	13.25 tons per month
Particulate Matter < 10 µm [PM-10]- Filterable:	147.97 tons per year
	12.62 tons per month
	831.00 pounds per day
Particulate Matter (all PM-10) - Condensable	49.70 tons per year
	4.60 tons per month
	297.00 pounds per day
Particulate Matter - Fugitive:	42.64 tons per year
	3.50 tons per month
Particulate Matter < 10 µm [PM-10] - Fugitive:	17.77 tons per year
	1.48 tons per month
PM-10-Fugitive (non-wind erosion)	159.00 pounds per day
PM-10-Fugitive (wind erosion)	177.00 pounds per day
Oxides of Nitrogen:	1,104.30 tons per year
	100.40 tons per month
Sulfur Dioxide:	944.00 tons per year
	85.80 tons per month
Volatile Organic Compounds:	24.20 tons per year
	2.20 tons per month
Carbon Monoxide:	1,010.40 tons per year
	91.90 tons per month
Lead	75.00 pounds per year

Note 1: These limits include emissions of combustion gases from explosives used in blasting, but do not include emissions of combustion gases from internal combustion engines mounted on mining related equipment and trucks hauling out the cement product from the facility.

Note 2: Condensable particulate matter shall be measured by EPA Reference Test Methods 202, 8, and 26A. The calculated sulfate and nitrate emissions from Method 202 shall be limited by the maximum sulfate and nitrate levels measured by Methods 8 and 26A.

During the first twelve (12) months of operation, compliance with the daily, monthly and yearly emission limitations is required. After the first twelve (12) months of operation, compliance with the daily and yearly limits is required. Compliance with the yearly limits shall be determined on a rolling twelve (12) month total. By the end of each month, a new twelve month total shall be calculated based on previous twelve (12) calendar months' data. The permit holder shall calculate monthly emissions and keep a compliance record on site for Division review. (Reference: Regulation No. 3, Part B. III. A. 4)

Compliance with the fugitive particulate matter emission limits shall be demonstrated by not exceeding the throughput limits, and by applying, the emission control measures specified under BACT condition.

CERTIFIED MAIL No. 7000 0600 0027 7981 6083
RETURNED RECEIPT REQUESTED

NOTICE OF FINAL PERMIT

October 31, 2000

In the Matter of an
Application for Permit by:

Ms. Sharon DeHays
Vice President of Cement Operations
Rinker Materials Corporation
1200 NW 137 Avenue
Miami, Florida 33182

FINAL Permit No.: 0250014-003-AV
Rinker Materials Corporation

Dear Ms. DeHays:

Enclosed is FINAL Permit Number 0250014-003-AV for the operation of the Miami Cement Plant facility located at 1200 NW 137 Avenue, Miami-Dade County, issued pursuant to Chapter 403, Florida Statutes (F.S.).

Please be advised of the following:

1. A copy of your submittal to EPA of the Notification of the initial startup date of the modified emissions units in your facility must be submitted to this office within 10 days of receipt of this letter. Previous correspondence from the facility's representative indicates that the modernization plant project started sometime in April 2000.
2. All NSPS tests shall be conducted within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility.
3. All initial compliance tests and certifications required by construction permit 0250014-002-AC and Consent Order OGC CASE No. 96-1751 shall be conducted by applicable dates in the documents.
4. All other initial tests specified in this Title V permit shall be performed by November 30, 2000.
5. Results of all performance tests that are conducted in your facility shall be submitted to this office no later than 45 days after the last sampling runs of the tests are completed.

Section I. Facility Information.

Subsection A. Facility Description.

The currently permitted Rinker facility consists of the following: a quarry, limestone crushing system, material receiving facilities both by rail and truck, open short-term material storage piles, a storage building for intermediate raw material and clinker storage, a stone dryer, raw mill system, kiln feed slurry system, six finish mills, two packhouses, thirty two cement silos, a rail and truck bulk loadout facility, and a liquid fuel tank farm. Recently, the facility replaced the existing two wet process cement kilns and clinker coolers with a single dry-process kiln with pre-heater, precalciner and clinker cooler, capable of producing approximately 1,200,000 tons per year of clinker.

For purposes of this Title V permit, the previous AO permits based on the Wet Process Kilns are no longer valid and this type of operation is prohibited.
[Rule 62-212.400, F.A.C.]

Based on the Title V permit applications received June 19, 1996, this facility is a major source of hazardous air pollutants (HAPs).

Subsection B. Summary of Emissions Unit ID Number(s) and Brief Description(s).

E.U. ID No.	Brief Description
-001	Finish Mill No. 1
-002	Finish Mill No. 2
-003	Finish Mill No. 3
-004	(32) Bulk Cement Storage Silos
-005	Mortar Packhouse
-006	Cement Packhouse
-012	Finish Mill No. 4
-013	Finish Mill No. 5
-014	Stone Dryer & Soil Thermal Treatment Facility
-015	Cement Truck Loading
-016	Raw Materials Handling (Fugitive)
-017	Raw Material Handling (Baghouses)
-018	In-Line Kiln/Raw Mill & Clinker Cooler
-019	Finish Mill No. 6
-020	Coal Mill System
-021	Sweetwater Concrete Block and Concrete Batch Plants
-022	Crushers
-023	Affected Screening Operations/Belt Conveyors
-024	Diesel Engine Drive Unit
-025	Facility Wide Fugitive Emissions

Note: Emission Units 007-011 have been replaced by Emission Units 018-020.

Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.

Section III. Emissions Unit(s) and Conditions.

Subsection A. This section addresses the following emissions unit: 018

E.U. ID No.	Brief Description
-018	In-Line Kiln/Raw Mill & Clinker Cooler

{Permitting note: This emissions unit activity is regulated under 40 CFR 60, Standards of Performance for New Stationary Sources for Portland Cement Plants, Subpart F}

General

A.0. The following Specific Conditions are in effect until midnight of June 9, 2002.

Essential Potential to Emit (PTE) Parameters

A.1. Maximum permitted capacities are:

Emissions Unit 018	Maximum Capacity
Kiln Preheater Feed Rate ($kiln_{ph}$) (TPH) on a 24-hour basis	220
Kiln Heat Input (MMBtu/hr) on a 24-hour basis	437
Clinker Production Rate (TPH) on a 24-hour basis	137
Cooler Throughput Rate (TPH) on a 24-hour basis	137

[0250014-002-AC dated September 11, 1997]

A.2. Maximum allowable hours of operation are:

Emissions Unit 018	Maximum hours of Operation	Permit
Kiln System	8,760	0250014-002-AC dated September 11, 1997

Rules 62-4.160(2) and 62-210.200(PTE), F.A.C.

Emission Limitations and Standards

B.6. In-line Kiln /Raw Mill /Clinker Cooler Allowable Emissions [1]:

Pollutant ID	Fuel(s) [2]	Allowable Emissions [3] Permit limits	lb/hr	Equivalent Emissions [4] TPY	Basis
PM	coal/gas/WTDF/oil	0.20 lb/ton $kiln_{ph}$ feed *	44	193	RMC[5] - Data
PM10	coal/gas/WTDF/oil	0.17 lb/ton $kiln_{ph}$ feed *	37.40	164	RMC - Data
SO_2	coal/gas/WTDF/oil	0.7 lb/MMBTU	306	1340	RMC - Data
NO_x	coal/gas/WTDF/oil	1.53 lb/MMBTU	671	2940	RMC - Data
CO	coal/gas/WTDF/oil	3.01 lb/ton clinker	412	1807	RMC - Data
VOC	coal/gas/WTDF/oil	0.1 lb/ton clinker	13.7	60	RMC - Data
SAM	coal/gas/WTDF/oil	0.014 lb/ton clinker	1.92	8.4	AP - 42 [6]
Beryllium	coal/gas/WTDF/oil	6.6×10^{-7} lb/ton clinker	9.04 E-05	0.000396	AP - 42
Mercury	coal/gas/WTDF/oil	2.4×10^{-5} lb/ton clinker	3.30 E-03	0.014	AP - 42
Lead	coal/gas/WTDF/oil	7.5×10^{-5} lb/ton clinker	0.01	0.045	AP - 42
Dioxins/Furans	coal/gas/WTDF/oil	0.20 ng/dscm or 0.40 ng/dscm (see specific condition B.8)			40 CFR 63, Subpart LLL

* Kiln preheater feed rate (Kiln)ph

NOTES

[1] At a maximum design clinker production rate of 137 TPH and preheater feed rate of 220 TPH, utilizing a conversion factor of 0.60: (220 x 0.60 = 137).
[2] Fuel combustion as specified in Specific Condition No. B.5, and the protocols established by DERM. See also Specific Condition B.21.
[3] Compliance Units. This facility shall demonstrate compliance based on these standards.
[4] "Equivalent Emissions" are based on annual emissions at 8760 hrs/yr. The "Equivalent Emissions" are also listed for informational purpose and for PSD and recordkeeping tracking purposes.
[5] RMC-Rinker Materials Corporation Data
[6] AP-42 - Emission Factors

[0250014-002-AC dated September 11, 1997]

B.7. Maximum Visible Emissions .

Emissions Unit 018	**Maximum Visible Emissions Limits**
In line Kiln / Raw Mill/ Clinker Cooler	10%

[0250014-002-AC dated September 11, 1997]

B.8. Dioxins/Furans. No owner or operator of an existing in-line kiln/raw mill shall cause to be discharged into the atmosphere from these affected emissions units, any gases which contain

LAW OFFICES

OERTEL, HOFFMAN, FERNANDEZ & COLE, P.A.

TIMOTHY P. ATKINSON
JEFFREY BROWN
M. CHRISTOPHER BRYANT
C. ANTHONY CLEVELAND
TERRY COLE
SEGUNDO J. FERNANDEZ
SCOTT W. FOLTZ
KENNETH F. HOFFMAN
KENNETH G. OERTEL
PATRICIA A. RENOVITCH

301 SOUTH BRONOUGH STREET
SUITE 500
TALLAHASSEE, FLORIDA 32301

(850) 521-0700
FAX (850) 521-0720

MAILING ADDRESS:
POST OFFICE BOX 1110
TALLAHASSEE, FLORIDA 32302-1110

http://www.ohfc.com

RECEIVED
JUN 13 2000
BUREAU OF AIR REGULATION

June 12, 2000

Mr. A. A. Linero, P.E.
Administrator
New Source Review Section
Department of Environmental Protection
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Via Hand Delivery

0530050-005-AC
PSD-FI-293

Re: Florida Rock Industries, Inc.
Application Fee

Dear Mr. Linero:

The undersigned represents Florida Rock Industries, Inc. in State regulatory matters, including permit applications filed with the State of Florida Department of Environmental Protection. On June 5, 2000, the Florida Rock Industries, Inc. filed an application for a Construction Permit and the associated PSD Report, for its proposed Brooksville, Florida facility. We discussed this in your absence with Ms. Theresa Herron of your office. Enclosed please find a check to cover the application processing fee of $7,500.00.

Additionally, it has come to our attention that the Owner/Authorized Representative signatures page had not been executed. I am enclosing four of these pages with the original signature of John D. Baker, President of Florida Rock Industries, Inc.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Segundo J. Fernandez

Enclosure
cc: F. Cohrs
J. Koogler
2320-2-Application.wpd

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1.	Maximum Heat Input Rate:		**364** mmBtu/hr
2.	Maximum Incineration Rate:	lb/hr	tons/day
3.	Maximum Process or Throughput Rate: **2300 tons/day clinker**		
4.	Maximum Production Rate:		
5.	Requested Maximum Operating Schedule:	hours/day weeks/year	days/week **8760** hours/year
6.	Operating Capacity/Schedule Comment (limit to 200 characters):		

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **21.19** lb/hour 78.7 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year	
6. Emission Factor: **0.13 lb/ton dry feed** Reference: **BACT**	7. Emissions Method Code: **0**
8. Calculation of Emissions (limit to 600 characters): **0.13 lb/ton x 163 tons/hr = 21.19 lb/hour** **0.13 lb/ton x 1,211,000 tons/yr = 78.7 TPY**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **PM back-calculated from PM10 BACT. AP-42 shows that PM10 is 85% of PM.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE - BACT**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.13 lb/ton of dry preheater feed**	4. Equivalent Allowable Emissions: **21.19** lb/hour **78.7** tons/year
5. Method of Compliance (limit to 60 characters): **Method 5**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **The allowable emission rate represents BACT, and is more stringent than NSPS/NESHAP.**	

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM10**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **17.93** lb/hour **66.6** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year	
6. Emission Factor: **0.11 lb/ton dry feed** Reference: **BACT (Lafarge 1997)**	7. Emissions Method Code: **0**
8. Calculation of Emissions (limit to 600 characters): **0.11 lb/ton x 163 tons/hr = 17.93 lb/hour** **0.11 lb/ton x 1,211,000 tons/yr = 66.6 TPY**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE – BACT**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.11 lb/ton of dry preheater feed**	4. Equivalent Allowable Emissions: **17.93** lb/hour **66.6** tons/year
5. Method of Compliance (limit to 60 characters): **Method 5**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **The allowable emission rate represents BACT.**	

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **16.29** lb/hour **60.6** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year	
6. Emission Factor: **0.17 lb/ton clinker** Reference: **Process Knowledge**	7. Emissions Method Code: **0**
8. Calculation of Emissions (limit to 600 characters): **0.17 lb/ton x 95.83 tons/hr = 16.29 lb/hour** **0.17 lb/ton x 712,500 tons/year = 60.6 TPY**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **AMBIENT**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.17 lb/ton clinker**	4. Equivalent Allowable Emissions: **16.29** lb/hour **60.6** tons/year
5. Method of Compliance (limit to 60 characters): CEM	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **The allowable emission rate is more stringent than BACT, and results in less than significant ambient concentrations at Chassahowitzka NWR.**	

Potential/Fugitive Emissions

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **268.32** lb/hour **997.5** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year	
6. Emission Factor: **2.8 lb/ton clinker** Reference: **BACT**	7. Emissions Method Code: **0**
8. Calculation of Emissions (limit to 600 characters): **2.8 lb/ton x 95.83 tons/hr = 268.32 lb/hour** **2.8 lb/ton x 712,500 tons/yr = 997.5 TPY**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE - BACT**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **2.8 lb/ton clinker, 30-day average**	4. Equivalent Allowable Emissions: **268.32** lb/hour **997.5** tons/year
5. Method of Compliance (limit to 60 characters): **CEM**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **The allowable emission rate represents BACT.**	

Potential/Fugitive Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **344.99** lb/hour **1282.5** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year	
6. Emission Factor: **3.6 lb/ton clinker** Reference: **BACT**	7. Emissions Method Code: **0**
8. Calculation of Emissions (limit to 600 characters): **3.6 lb/ton x 95.83 tons/hr = 344.99 lb/hour** **3.6 lb/ton x 712,500 tons/yr = 1282.5 TPY**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE - BACT**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **3.6 lb/ton clinker**	4. Equivalent Allowable Emissions: **344.99** lb/hour **1282.5** tons/year
5. Method of Compliance (limit to 60 characters): **Method 10**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **The allowable emission rate represents BACT.**	

Potential/Fugitive Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **11.50** lb/hour **42.8** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year	
6. Emission Factor: **0.12 lb/ton clinker** Reference: **BACT**	7. Emissions Method Code: **0**
8. Calculation of Emissions (limit to 600 characters): **0.12 lb/ton x 95.83 tons/hr = 11.50 lb/hour** **0.12 lb/hr x 712,500 tons/yr = 42.8 TPY**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE - BACT**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.12 lb/ton clinker**	4. Equivalent Allowable Emissions: **11.50** lb/hour **42.8** tons/year
5. Method of Compliance (limit to 60 characters): **Method 25A**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **The allowable emission rate represents BACT. VOC is assumed as equivalent to THC for compliance with the NESHAP. The proposed rate is more stringent than the NESHAP (50 ppmvd as propane at 7% O_2 = 49.5 lb/hr).**	

STATEMENT OF BASIS

Florida Rock Industries, Inc.
Newberry Cement Plant
Facility ID No.: 0010087
Alachua County

Initial Title V Air Operation Permit
DRAFT Permit No.: 0010087-002-AV

This Title V air operation permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-213. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents, attached hereto or on file with the permitting authority, in accordance with the terms and conditions of this permit.

The currently permitted Florida Rock Industries, Inc. facility consists of the following: raw material handling and storage, a raw mill system, kiln system, clinker handling, finish grinding operations, cement handling, loading, and bagging operations, and coal handling and grinding operations.

Based on the initial Title V permit application received October 1, 1999, this facility is a major source of hazardous air pollutant Sulfur Dioxide, Carbon Monoxide, Particulate Matter, PM_{10}, and NO_x.

Summary of Emissions Unit ID Number(s) and Brief Description(s).

E.U. ID No.	Brief Description
-001	Raw Materials Handling and Storage
-002	Raw Mill System
-003	Kiln System
-004	Clinker Handling
-005	Finish Grinding Operations
-006	Cement Handling, Loading, and Bagging Operations
-007	Coal Handling and Grinding Operations

Emission Unit ID Nos. 001: Emission points EP01 (Raw material unloading). EP02 (Raw material handling and storage) and EP03 (Crusher): Identifies the raw material handling and storage operations. Controlled by the application of water sprays.

Emission Unit ID Nos. 002: identifies the raw mill system, consisting of: (EP01) Recycle Dust and Raw Meal to Homogenization Silo, (EP02) Recycle dust airlift, (EP03) Recycle dust and raw material to homogenization silo No. 2, and (EP04) Raw meal and recycle dust to preheater all controlled by fabric filters.

Florida Rock Industries, Inc.
Thomas S. Baker Cement Plant - Newberry
Facility ID No.: 0010087
Alachua County

Initial Title V Air Operation Permit
DRAFT Permit No.: 0010087-002-AV

Permitting Authority:
State of Florida
Department of Environmental Protection
Northeast District Air Program
7825 Baymeadows Way, Suite B-200
Jacksonville, Florida 32256-7590
Telephone: 904/448-4310
FAX: 904/448-4363

Compliance Authority:
State of Florida
Department of Environmental Protection
Northeast District - Branch Office
101 NW 75th Street, Suite 3
Gainesville, Florida 32607-1609
Telephone: 352/333-2850
FAX: 352/333-2856

Section III. Emission Unit(s) and Conditions

Subsection C.: This section addresses the following emissions unit

E.U. ID No.	Brief Description
-003	Kiln System

Emissions Unit 003 identifies the Kiln system. A high efficiency electrostatic precipitator controls particulate emissions.
{Permitting note(s): This emissions unit is regulated under NSPS- 40 CFR 60 Subpart F, Standards of Performance for Portland Cement Plants adopted and incorporated by reference in Chapter 62-204, F.A.C., and PSD regulations.}

The following conditions apply to the emissions unit(s) listed above:

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

__General__

C.0. Tables I and II of AC01-267311/PSD-FL-228 and revised Table II of 0010087-003-AC/PSD-FL-228A are incorporated by reference.
[AC01-267311/PSD-FL-228; and, 0010087-003-AC/PSD-FL-228A]

__Essential Potential to Emit (PTE) Parameters__

C.1. __Capacity (Preheater).__ The preheater dry feed rate shall not exceed 149.9 tons per hour and 1,114,350 tons per year.
[Rules 62-4.160(2) and 62-210.200(PTE), F.A.C.; AC01-267311/PSD-FL-228]

C.2. __Capacity.__ The maximum production rate for the kiln clinker shall not exceed 95.8 tons per hour and 2300 tons per day and 712,500 tons per year. The clinker production rate shall be determined as a function of the preheater dry feed rate.
[Rules 62-4.160(2) and 62-210.200(PTE), F.A.C.; AC01-267311/PSD-FL-228]

C.3. __Methods of Operation - (i.e. Fuels).__ Fuels fired in the pyroprocessing system (kiln and calciner) shall not exceed a total maximum heat input of 364 MMBtu/hr and shall consist of only coal, whole tires, propane and "unused No. 2" fuel oil which may also be fired in the Raw Mill Air Heater. Propane usage is limited to startup and in lieu of tires in the first stage of the MSC. The burning of RCRA hazardous waste or used oil is prohibited. The fuel usage shall meet the following:

Coal	• The sulfur content shall not exceed 1.25% by weight. The maximum usage rate shall not exceed 14.0 tons per hour. The sulfur content shall be determined by ASTM Method D-2234, D-3173, D-3176, D-3177 or D-4239.

Whole Tires	• The maximum feed rate shall not exceed 109.2 MMBtu/hour (30% of the total kiln fuel input) or 4.2 tons per hour (approximately 400 tires per hour) and 36,792 tons per year. • The tires shall be fed into the kiln system at the transition section between the base of the precalciner and the point where gases exit the kiln. The tire feeder mechanism shall have a double airlock, vertical and horizontal guillotine gates, and a ram. • Prior to initiating tire firing, the gases exiting the kiln ahead of the calciner burner shall be maintained at a minimum of 1,400 degrees F for at least one hour.
No. 2 Fuel Oil (unused)	• Shall be fired and the sulfur content shall not exceed 0.05% by weight. The maximum usage rate shall not exceed 125,000 gallons per year for kiln startup.
Propane	• Limited to startup and in lieu of tires in the first stage of the MSC.

[Rule 62-213.410, F.A.C., AC01-267311/PSD-FL-228; 0010087-003-AC/PSD-FL-228A]

C.4. Hours of Operation. This emissions unit is allowed to operate continuously, i.e., 8,760 hours/year, as long as the 712,500 TPY clinker limit is not exceeded.
[Rules 62-4.160(2) and 62-210.200(PTE), F.A.C.]

Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

C.5. Mercury (Hg). Total input of mercury compounds (as Hg) in all materials and fuel kiln system shall not exceed 200 pounds per year.
[AC01-267311/PSD-FL-228].

C.6. Visible Emissions (Kiln). Visible emissions from the kiln shall not exceed 10 percent opacity.
[AC01-267311/PSD-FL-228 and BACT]
{Permitting Note: The averaging time for Condition C.6. is based on the run time of the specified test method.}

C.7. Particulate Matter. Particulate Matter emissions shall not exceed 0.20 pounds per ton of dry feed to the kiln and 0.31 pounds per ton of clinker, and 30.00 lb/hr and 110.50 ton/yr.
[AC01-267311/PSD-FL-228, BACT; 40 CFR 60.62(a)(1), 40 CFR 63.1343(c)(1)]
{Permitting Note: The averaging time for Condition C.7. is based on the run time of the specified test method.}

C.8. Particulate Matter (PM_{10}). PM_{10} emissions shall not exceed 0.17 pounds per ton of dry feed to the kiln and 0.26 pounds per ton of clinker, and 25.50 lb/hr and 93.93 ton/yr.
[AC01-267311/PSD-FL-228, BACT]
{Permitting Note: The averaging time for Condition C.8. is based on the run time of the specified test method.}

C.9. Sulfur Dioxide. Sulfur dioxide emissions shall not exceed 0.18 lb/ton of dry feed to the kiln and 0.28 pounds per ton of clinker (24-hr rolling average), and 28.82 lb/hr and 108.55 ton/yr. The permittee shall submit 90 days of certified SO_2 data by July 31, 2001. The Department may revise

the sulfur dioxide emissions limit to less than 0.28 lb/ton clinker based on the compliance test and continuous emission monitoring data within 120 days following receipt of this data. Any such changes will be publicly noticed.
[AC01-267311/PSD-FL-228, BACT]

C.10. **NO_x.** NO_x emissions shall not exceed 3.8 pounds per ton of clinker (30-day rolling average) during the first two years after startup. After this two-year period, NO_x emissions shall not exceed 2.8 pounds per ton of clinker (30-day rolling average). The permittee shall install any additional control equipment during the two-year time period to insure compliance with the 2.8 pounds per ton of clinker limit by the end of the period. The startup date was 12/31/99.
[AC01-267311/PSD-FL-228, BACT]

C.11. **Carbon Monoxide.** Carbon Monoxide emissions shall not exceed 2.30 lb/ton of dry feed and 3.60 pounds per ton of clinker (1-hr average), and 346.38 lb/hr and 1288.60 ton/yr.
[AC01-267311/PSD-FL-228, BACT]

C.12. **VOC.** VOC emissions shall not exceed 0.08 lb/ton of dry feed and 0.12 pounds per ton of clinker (1-hr average), and 11.55 lb/hr and 42.90 ton/year.
[AC01-267311/PSD-FL-228 and BACT]

C.13. **Beryllium.** Limit to be determined by future stack tests. The startup test date will be 03/31/01.
[0010087-003-AC/PSD-FL-228A]

C.14. **Sulfuric Acid Mist (SAM).** SAM emissions shall not exceed 0.0016 lb/ton dry feed and 0.0025 lb/ton clinker, and 0.25 lb/hr and 1 ton/year.
[AC01-267311/PSD-FL-228 and BACT; and, Revised Attached Table II of 0010087-003-AC/PSD-FL-228A]

Operations

C.15. **Tires**. The Permittee shall not place waste tires on the ground. Waste tires shall be received in closed vans and unloaded directly into the tire feeding hopper. In an effort to control mosquitoes at the site, waste tires shall be sprayed with an insecticide prior to receipt at the facility.
[AC01-267311/PSD-FL-228]

C.16. **Cement Kiln Dust (CKD).** The permittee shall "immediately collect" any spilled CKD to prevent fugitive emissions.
[AC01-267311/PSD-FL-228]

C.17. **Cement Kiln Dust (CKD).** CKD collected in the kiln electrostatic precipitator (ESP) will be returned to the process. Any CKD not returned to the process shall be handled in accordance with Subtitle C rules under development by EPA. In the interim, the Permittee shall operate under the contingent management practice plan for the storage, sale, or disposal of any CKD not reused.
[AC01-267311/PSD-FL-228]

Test Methods and Procedures

{Permitting note: Table 2-1, Summary of Compliance Requirements, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

Southdown, Inc.
Brooksville Plant
Facility ID No.: 0530010
Hernando County

Initial Title V Air Operation Permit
FINAL Permit No.: 0530010-002-AV

Permitting Authority:
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, FL 33619
Telephone: 813/744-6100
Fax: 813/744-6458

[electronic file name: 0530010f.doc - 9/14/00]

Subsection B. This section addresses the following emissions unit(s).

E.U. ID No.	**Brief Description**
-003	Cement Kiln No. 1 (Baghouse E-55)
-004	Cement Plant Clinker Cooler No. 1 (Baghouse F-18)

The No. 1 Cement Kiln, a rotary kiln, is used to produce Portland cement clinker. The kiln preheater feed rate is 165 tons/hour (one-hour maximum) and 150 tons/hr (30 calendar-day rolling average). The kiln uses coal as the primary fuel at a maximum heat input rate of 300 MMBtu/hr. Flolite re-refined oil blend is also used as a start-up and supplemental fuel. No. 6 fuel oil is used as a backup fuel. Continuous utilization/firing of whole tires as supplemental fuel to coal is also allowed. The maximum utilization/firing rate is 20.0% of the total Btu heat input, or 2.14 tons per hour. Particulate emissions from the No. 1 Kiln are controlled by the Fuller Draco Custom Baghouse (Baghouse ID E-55, with 20 compartments exhausting to one common stack).

The No. 1 Clinker Cooler is used to cool cement clinker from the No. 1 Kiln. Particulate emissions from the No. 1 Clinker Cooler are controlled by the Western Precipitation Baghouse (Baghouse ID F-18). The maximum clinker production is 90 tons/hour.

{Permitting note(s): This emissions unit is regulated under NSPS – 40 CFR 60, Subpart F, Standards of Performance for Portland Cement Plants, adopted and incorporated by reference in Rule 62-204.800(7)(b)9., F.A.C.; Rule 62-296.407, F.A.C., Portland Cement Plants; Rule 62-296.320, F.A.C., General Pollutant Emission Limiting Standards.}

The following specific conditions apply to the emissions unit(s) listed above:

Essential Potential to Emit (PTE) Parameters

B.1. Capacity.

a. The maximum process preheater feed rate for the No. 1 Kiln shall not exceed 165 tons per hour (one-hour maximum) and 150 tons per hour (rolling 30-calendar day average).
b. The No. 1 cement kiln's maximum utilization/firing rate of whole tire-derived fuel (WTDF) shall not exceed 20 percent of the total Btu heat input, or 2.14 tons per hour (daily average basis).
c. The No. 1 cement kiln fuel heat input rate shall not exceed 300 MMBtu/hr, (daily average basis) which is approximately:
   1. 24,000 pounds per hour of coal with a heating value of 12,500 Btu/lb,
   2. 2,116 gallons/hour of No. 2 fuel oil with a heating value of 141, 300 Btu/gal,
   3. 2,060 gallons/hour of No. 4 fuel oil with a heating value of 145,600 Btu/gal,
   4. 2,016 gallons/hour of No. 5 fuel oil with a heating value of 148,800 Btu/gal,
   5. 1,982 gallons/hour of No. 6 fuel oil with a heating value of 151,300 Btu/gal,
   6. 292,683 cubic feet/hour of natural gas with a heating value of 1,025 Btu per cubic foot,
   7. 2.14 tons per hour of whole tire-derived fuel (WTDF).

will not result in exceedances of air quality or ambient guidelines developed to protect human health and welfare.

B.4. Used Oil and Grease: Used oil and grease burned at this facility (Kiln Nos. 1 and 2) shall not be a hazardous waste as defined by 40 CFR Part 261.3 or Rule 62-730.030, F.A.C. It shall not include fuels or blended fuels consisting in whole or in part of hazardous waste or which include mixture of any solid waste generated from the treatment, storage, or disposal of hazardous waste. These fuels shall be burned in compliance with Section 403.769(3), Florida Statutes.
[Air Construction Permit 0530010-003-AC/PSD-FL-233]
{Permitting note: This condition is identical to Condition J.4.}

B.5. Reserved

B.6. Reserved

Emission Limitations and Standards

B.7. The emissions from this emission unit shall not exceed the allowable emission rates listed in the table below:

E.U. ID No.	Description	Pollutant	Allowable Emissions (2)		
			lb/ton dry kiln feed	lb/hr @ 150 TPH	lb/hr @ 165 TPH
003	Kiln No. 1	PM/PM_{10}	0.18	27.0	29.7
003	Kiln No. 1	SO_2 (1)	0.10	15.0	16.5
003	Kiln No. 1	NO_x	1.83	275	301
003	Kiln No. 1	CO	1.20	180.0	198.0
003	Kiln No. 1	VOC (4)	0.09	13.6	14.9
003	Kiln No. 1	20% VE (3)			
004	Cooler No. 1	10% VE (3)			
004	Cooler No. 1	PM/PM_{10}	0.09	13.6	14.9

(1) Emissions of SO_2 will not exceed 15 lbs/hr (at production of 150 TPH) and 16.5 lbs/hr (at production of 165 TPH). Annual testing is required in lieu of fuel sulfur restrictions. [Air Construction Permit AC27-258571]
(2) Compliance units. This facility shall demonstrate compliance based on these emission standards.
(3) Visible emission from PM fugitive sources shall not exceed 10% opacity.
(4) Per Air Construction Permit 0530010-003-AC/PSD-FL-233, VOC compliance testing was only required at the initial testing. However, if the allowable emissions indicated above are exceeded for CO then the Department shall require VOC compliance testing to determine that the permittee is in compliance with the allowable VOC emission rate.

[Rule 62-210.200 and 62-212.400, F.A.C.; Air Construction Permit 0530010-003-AC/PSD-FL-233]
{Permitting Note: The averaging time for Condition B.7. is based on the run time of the specified test method.}

Test Methods and Procedures

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit by:

Fred W. Koester, President
Suwannee American Cement Company, Inc.
PO Box 410
Branford, Florida 32008

DEP File No. 1210465-001-AC, PSD-FL-259
Branford Plant, Portland Cement Plant
Suwannee County

Enclosed is Final Permit Number 1210465-001-AC. This permit authorizes Suwannee American Cement Company, Inc. to construct a portland cement plant located at US Highway 27 and County Road 49, Suwannee County. This permit is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order has the right to seek judicial review of it under section 120.68 of the Florida Statutes, by filing a notice of appeal under rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Lisa Polak Edgar
Deputy Secretary

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Notice of Final Permit (including the Final permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on _____________ to the person(s) listed:

Mr. Fred W. Koester *
Mr. Larry Sellers
Mr. Frank Darabi, P.E.
Mr. Steve Cullen, P.E.
Mr. Ernest E. Frye, Director, NE District
Mr. Gregg Worley, EPA
Mr. John Bunyak, NPS
Mr. Jim Stevenson, DEP
Mr. Tom Workman, DEP
Mr. Mark Latch, DEP

Ms. December McSherry
Mr. Svenn Lindskold
Mr. Tom Greenhalgh
Mr. Dave Bruderly
Mr. Chris Bird, Alachua Co. DER
Mr. John Mousa, Alachua Co. DER
Ms. Penny Wheat, Chair, Alachua Co. Board of Co. Commissioners

Mr. J. Calvin Gaddy
Ms. Patrice Boyes, Esq.
Ms. Kathy Cantwell
Mr. Ralph Ashodian
Ms. Virginia Seacrist
Dr. Bob and Lynn Milner
Ms. Linda Pollini
Helen Beaty
Bessie Robinson
Mr. Craig Pittman, St. Petersburg Times

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

_____________________ _____________
(Clerk) (Date)

PERMITTEE

Suwannee American Cement Company, Inc.
Branford Plant
PO Box 410
Branford, Florida 32008

Permit No.	1210465-001-AC, PSD-FL-259
Project	Portland Cement Plant
SIC No.	3241
Expires:	May 30, 2003

Authorized Representative:

Fred W. Koester, President

PROJECT AND LOCATION

This permit authorizes Suwannee American Cement Company, Inc. to construct a dry process, preheater/precalciner type portland cement plant to be located at US Highway 27 at County Road 49, Suwannee County. The UTM coordinates are: Zone 17; 321.4 km E and 3315.9 km N.

STATEMENT OF BASIS

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. The above named permittee is authorized to construct the emissions units in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

APPENDICES

The attached appendices are a part of this permit:

Appendix A	BACT Determination
Appendix B	NSPS General Provisions
Figure 1	Summary Report--Gaseous and Opacity Excess Emission & Monitoring System Performance
Appendix C	NESHAP General Provisions
Appendix GC	General Permit Conditions

Lisa Polak Edgar
Deputy Secretary

b. Whole tires and tire derived fuel may be fed into the tire gasification system at a rate not to exceed a maximum heat input of 40% of the total pyroprocessing heat input, not to exceed 145.6 mmBtu/hr at any time. The remaining 60% of the total pyroprocessing heat input shall be derived from firing natural gas, coal or petroleum coke. The tire feeder mechanism for the tire gasification system shall have an airlock. The tire gasification system shall convey solid byproducts into the pyroprocessing system via a ram system.

c. Tires and tire derived fuel shall be fired in either manner a. or b. above, but not both at any given time.

[Rules 62-4.070(3) and 62-210.200, F.A.C., Definitions -- potential to emit (PTE), F.A.C.]

3. Fuels and Materials Not Allowed: The owner or operator shall not introduce hazardous wastes, petroleum contaminated soil or materials, used oil, oil fuels, solid fuels other than those allowed by this permit, or solid wastes other than tires and tire derived fuel into any part of the process or emission control equipment. [Rule 62-4.070(3), F.A.C.]

4. Process Rate Limitations: The kiln shall not process more than 178 tons of dry preheater feed per hour and shall not produce more than 105 tons of clinker per hour. The facility shall not produce more than 150 tons of cement per hour. Process and production rates shall be further limited to 1,427,880 tons of dry preheater feed in any consecutive 12-month period, 839,500 tons of clinker in any consecutive 12-month period, and 1,191,360 tons of portland cement in any consecutive 12-month period. [Rule 62-210.200, F.A.C., Definitions -- potential to emit (PTE)]

5. Air Heater: The permittee may install an air heater associated with the raw mill, fired only with natural gas, with a maximum rated heat input capacity of 32 mmBtu/hr. [Rule 62-4.070(3), F.A.C.]

[Note: Emissions from the air heater are included in the emission limitations of emissions unit 004, specified in specific condition 15 of this subsection. Estimated maximum potential emissions from the air heater alone are: NOx, 3.12 lb/hr, CO 2.62 lb/hr, SO_2, 0.02 lb/hr, and VOC 0.08 lb/hr.]

6. Final Construction Schedule: The permittee shall provide to the Department a final construction schedule after selection of the contractor and before commencement of construction. [Rule 62-212.400(5)(h)2., F.A.C.]

7. Cement Kiln Dust: Cement kiln dust shall be recirculated in the process and shall not be directly discharged from process or emission control equipment. Cement kiln dust removed from process equipment during maintenance and repair shall be confined and controlled at all times and shall be managed in accordance with the applicable provisions of 40 CFR 261. [Rule 62-4.070(3), F.A.C.]

[Note: 40 CFR 261 has been omitted for brevity. See the Code of Federal Regulations for the text of this section.]

8. Tires and TDF Management: Tires and tire derived fuel shall be stored, handled and managed in accordance with the provisions of Rule 62-711, F.A.C. [Rule 62-4.070(3), F.A.C.]

[Note: Rule 62-711, F.A.C., has been omitted for brevity. See the Florida Administrative Code for the text of this rule.]

9. Continuous Monitor Data Retrieval System: The owner or operator, at its sole expense, shall provide to the Department, at the Department's chosen site, one personal computer equipped with a modem and software, and corresponding hardware at the owner's facility, to enable the Department at any

POLLUTANT	EMISSION LIMIT		AVERAGING TIME	BASIS
PM	0.13 lb/ton of dry preheater feed	23.1 lb/hour	3 hours [3]	BACT
PM_{10}	0.11 lb/ton of dry preheater feed	19.6 lb/hour	3 hours [3]	BACT
SO_2	0.27 lb/ton of clinker	28.4 lb/hour	3 hours [4]	BACT
NOx	2.9 lb/ton of clinker [1]	304.5 lb/hour [1]	24 hours [4]	BACT
CO	3.6 lb/ton of clinker	378.0 lb/hour	3 hours [5]	BACT
VOC	0.12 lb/ton of clinker [2]	12.6 lb/hour [2]	30 days [6]	BACT
VE	10% opacity		6 minutes [7]	BACT

[1] NOx emissions shall not exceed 3.8 lb/ton of clinker and 399.0 lb/hour during the first 12 months after initial startup. After 12 months after initial plant startup, emissions of NOx shall not exceed the limits shown in the table. Emissions of NOx up to 600 lb/hr for up to one hour in duration shall be allowed for each startup of the pyroprocessing system which occurs when there is no material in the kiln.

[2] VOC emissions shall be expressed as propane.

[3] The averaging times for PM and PM_{10} correspond to the required length of sampling for the initial and subsequent emission tests.

[4] The averaging time for NOx shall be a rolling average that shall be recomputed every hour from the individual hourly averages for the current hour and the preceding 23 hours. The averaging time for SO_2 shall be a rolling average that shall be recomputed every hour from the individual hourly averages for the current hour and the preceding two hours. Each hourly average shall be computed from a minimum of one measurement every minute.

[5] The averaging time for CO corresponds to the required length of sampling for the initial and subsequent emission tests.

[6] The averaging time for VOC shall be a 30-day block average that shall be computed from a minimum of one measurement every minute.

[7] The averaging time for visible emissions shall be a 6-minute block average that shall be computed from a minimum of one measurement every 15 seconds. The 6 minute block averages shall start at the beginning of each hour.

[Note: These emission limits, along with annual production limits, effectively limit annual emissions to: PM, 92.8; PM_{10}, 78.4; SO_2, 113.4; NOx, 1217.5; CO, 1511.1; and VOC, 50.4 tons per year. First year NOx emissions are effectively limited to 1595.4 tons per year. NOx emissions are estimated assuming that two startups as specified occur per year, each resulting in maximum allowable excess emissions. Mercury introduced into the pyroprocessing system is limited pursuant to specific condition 13 of this subsection of this permit; annual emissions of mercury are effectively limited by this condition to 97 pounds per year.]

[Rules 62-4.070(3) and 62-212.400, F.A.C., and BACT]

May 1, 2001

CERTIFIED MAIL: 7000 0600 0027 7981 5918
RETURN RECEIPT REQUESTED

PERMITTEE:

Tarmac America, Inc.
455 Fairway Drive
Deerfield Beach, Fl 33441

Permit No. 0250020-010-AC
Issue Date: May 1, 2001
Expiration Date: October 31, 2003

Authorized Representative:
Hardy Johnson
President, Florida Division

PROJECT AND LOCATION:

Project:
The project encompasses the construction of a dry process modernization plant to include a new preheater/calciner/kiln, cooler, coal mill and raw mill. This new process will replace the existing wet kiln and cooler systems. A new finish mill (No. 6) will be constructed to operate with units 3 & 4. Finish Mill units 1 & 2 will be shut down.

The project will result in an increase in production at the facility while maintaining air pollution emissions at or below the levels allowed in the construction Permit Number 0250020-008-AC, dated October 21, 1999. The facility will accomplish this increase in production while maintaining emissions through adjusting facility operating hours and increasing production efficiency.

Facility Description: Portland Cement Plant (SIC # 3241)
Facility Name: Tarmac-Pennsuco Cement
Location: 11000 NW 121 Way, Medley, Florida 33178
Lat./Long.: 25° 52' 30" N / 80° 22' 30" W
UTM: Zone 17; 562.8 Km. E; 2861.7 Km. N

This is Permit Number 0250020-010-AC to construct an air pollution source issued by the **Miami-Dade County Department of Environmental Resources Management (DERM) pursuant to Chapter 24, Code of Miami-Dade County and Chapter 403.087, Florida Statutes (F.S.).**

The Florida Department of Environmental Protection (FDEP) has permitting jurisdiction under Section 403.087, Florida Statutes (F.S.). However, in accordance with Section 403.182, F.S., the FDEP recognizes the DERM as the approved local air pollution control program of Miami-Dade County. Through a Specific Operating Agreement, the FDEP delegated to the DERM the authority to issue or deny permits for this type of air pollution source located in Miami-Dade County.

EMISSIONS UNIT NO. 005 - RAW MILL/PYROPROCESSING SYSTEM

Operational Requirements

B.18 Hours of Operation: This emissions unit may not operate in excess of 7,884 hours per year except for 341.BF01 which may operate 8760 hours per year.
[Requested by permittee in application received November 14, 2000]

B.19 Raw Mill/Pyroprocessing Unit Production Limits: The maximum production of clinker shall not exceed 250 TPH on a 24-hour block average and 1,642,500 TPY.
[Rule 62-210.200 (228)(PTE), F.A.C.; and Application received November 14, 2000]

B.20 Operating Limits for In-line kiln/raw mills:

(a) The owner or operator of a in-line kiln/raw mill subject to a D/F emissions limitation under 40 CFR 63.1343 must operate the in-line kiln/raw mill such that the temperature of the gas at the inlet to the kiln Particulate Matter control device (PMCD) does not exceed the applicable temperature limit specified in the following paragraph.

(b) The temperature limit for affected sources meeting the limits above is determined in accordance with the following: the run average temperature must be calculated for each run, and the average of the run average temperature must be determined and included in the performance test report and will determine the applicable temperature limit.

(c) The owner or operator of an affected source subject to a D/F emission limitation under §63.1343 that employs carbon injection as an emission control technique must operate the carbon injection system in accordance with paragraphs (c)(1) and (c)(2) of this section.

(1) The three-hour rolling average activated carbon injection rate shall be equal to or greater than the activated carbon injection rate determined in accordance with §63.1349(b)(3)(vi).

(2) The owner or operator shall either:

(i) Maintain the minimum activated carbon injection carrier gas flow rate, as a three-hour rolling average, based on the manufacturer's specifications. These specifications must be documented in the test plan developed in accordance with §63.7(c) of this part, or

(ii) Maintain the minimum activated carbon injection carrier gas pressure drop, as a three-hour rolling average, based on the manufacturer's specifications. These specifications must be documented in the test plan developed in accordance with §63.7(c).

(d) Except as provided in paragraph (e) of this section, the owner or operator of an affected source subject to a D/F emission limitation under §63.1343 that employs carbon injection as an emission control technique must specify and use the brand and type of activated carbon used during the performance test until a subsequent performance test is conducted, unless the site-specific performance test plan contains documentation of key parameters that affect adsorption and the owner or operator establishes limits based on those parameters, and the limits on these parameters are maintained.

(e) The owner or operator of an affected source subject to a D/F emission limitation under §63.1343 that employs carbon injection as an emission control technique may substitute, at any time, a different brand or type of activated carbon provided that the replacement has equivalent or improved properties compared to the activated carbon specified in the site-specific performance test plan and used in the performance test. The owner or operator must maintain documentation that the substitute activated carbon will provide the same or better level of control as the original activated carbon.

[40 CFR 63.1344]

B.23 SO_2, NO_x, CO, VOC, and SAM Emission Limits: The emissions from the Raw Mill/Pyroprocessing system shall not exceed the limits shown in the following table:

Pollutant	Allowable Emissions		Emissions Limits in lbs./ton of clinker		Monitors
	12-month rolling average in TPY	Lbs./hr 24-hr average	24 hr avg. @208 TPH of clinker production (5)	24-hr average @250 TPH of clinker production	
SO_2	806	320	1.54	1.28	CEM
NO_x	1953	720	3.46	2.88	CEM
CO	1457	576	2.76	2.30	Process
VOC	155	40	0.19	0.16	CEM
SAM	8.68	2.24	0.009	0.009	-

Notes:

- The 12-month rolling average in TPY would be the average of the daily values for the current month and the preceding 11 months. The averages shall be based on the operating days or hours, and shall exclude days or hours in which the plant is not operating.
- The averaging time for CO corresponds to the required length of sampling for the initial and subsequent emission tests.

[Rules 62-4.070(3) and 62-212.400, F.A.C.]

B.24 PM/PM-10 and Dioxins/Furans Emissions:

Pollutant	Allowable Emissions		Emissions		
	TPY	lbs./hr	Limit	Unit	Averaging Time
PM	175	53.1	0.125	lbs./ton of dry kiln feed	3 hours
PM_{10}	147	42.0	0.105	lbs./ton of dry kiln feed	3 hours
Dioxins/ Furans			0.40	ng TEQ/dscm	3 hours

Notes:

- The averaging times for PM and PM10 correspond to the required length of sampling for the initial and subsequent emissions tests.

[Rules 62-4.070(3) and 62-212.400, F.A.C.]

B.25 Sulfur Dioxide Emissions: Emissions of SO_2 shall not exceed 1.2 lb/MMBtu heat input when solid fuel is fired, or 0.8 lb/MMBtu heat input when liquid fuel is fired, based on a 24 hour average.
[Miami-Dade County Code, Section 24-17(2)(a)]

Mary A. Gade, Director
217/782-2113

P. O. Box 19506, Springfield, IL 62794-9506

REVISED
CONSTRUCTION PERMIT -- PSD APPROVAL -- NSPS SOURCE

PERMITTEE

Illinois Cement Company
Attn: Frank Koeppel
Liberty Street, Box 442
LaSalle, Illinois 61301-0442

Application No.: 97030016 I.D. No.: 099030AAZ
Applicant's Designation: PSDPLANTEXPAN Date Received: September 09, 1998
Subject: Plant Expansion - Cement Production
Date Issued: October 7, 1998
Location: 1601 Rockwell Road, LaSalle

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a raw feed grinding roller mill; calcining vessel; preheater tower, pulverized solid fuel system; expanded baghouse and new stack for the existing kiln; new finish grinding mill with baghouse; and material transfer systems, all with baghouse control, to increase cement production, as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special conditions:

This permit also constitutes approval pursuant to the federal rules for Prevention of Significant Deterioration of Air Quality Regulations (PSD) to construct the above referenced equipment in that the Illinois Environmental Protection Agency (Illinois EPA) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., the Federal regulations promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency (USEPA) and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the findings and conditions which follow:

Findings

1. Illinois Cement Company has requested a permit to increase cement production with construction of an additional raw feed grinding mill; calcining vessels, preheater tower; pulverized solid fuel firing system, expanded baghouse, and new stack for the existing NSPS regulated kiln; additional finish grinding mill with baghouse; and material transfer systems with baghouses. Illinois Cement currently operates with a daily capability to produce 1,800 tons of cement clinker and is proposing to increase capacity to 3,000 tons of cement clinker per day.

2. The plant is located in the City of LaSalle in LaSalle County. The area is currently designated attainment for all air quality standards.

3. The plant is a major source under the federal PSD rules. The proposed project will increase potential annual emissions of 59.3 tons of particulate matter (PM), 292.4 tons of sulfur dioxide (SO_2),

1,246.7 tons of nitrogen oxides (NO_x), 3,018.0 tons of carbon monoxide (CO) and 91.1 tons of volatile organic compounds (VOC), as described in Table 1. The project is therefore subject to PSD review as a major modification for the above contaminants.

4. The new and modified equipment must be operated so that emissions are in compliance with (i) all applicable Pollution Control Board emission standards, (ii) federal New Source Performance Standards, (iii) Best Available Control Technology (BACT) pursuant to the PSD rules and Section 55(h) of the Environmental Protection Act, as set in conditions of this permit. The application submitted by Illinois Cement Company, as reviewed by the Illinois EPA shows that the project will comply with these requirements. This BACT determination meets or exceeds all applicable state and federal regulations.

5. The air quality analysis submitted by Illinois Cement Company and reviewed by the Illinois EPA shows that this project will not cause a violation of the national ambient air quality standards.

6. The Illinois EPA has determined that the application for the proposed project complies with all applicable Pollution Control Board Regulations, the federal New Source Performance Standards 40 CFR 60, Subparts A and F, and the federal Prevention of Significant Deterioration of Air Quality Regulations (PSD), 40 CFR 52.21.

7. A copy of the application, and the Illinois EPA's project summary and a draft of this permit were placed in a location in the City of LaSalle, LaSalle Clerk's Office at 745 - 2nd Avenue in LaSalle and the public were given notice and opportunity to examine this material and to submit oral and written comments on the proposed issuance of a permit for this facility.

The Illinois EPA is issuing approval subject to the following conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization of Illinois EPA.

Conditions

1. Standard conditions for issuance of construction permits, attached hereto and incorporated herein by reference, shall apply to this project, unless superseded by the following conditions.

2a. i. Emissions from the modified cement kiln shall not exceed 0.208 lbs of PM, 4.5 lbs of NO_x and 0.8 lb of SO_2 per ton of clinker produced by the kiln. The NO_x limit shall only apply in the maximum range at which the kiln is operated following installation of the calcining vessel. (See also Condition 6b(i). Compliance with these limits shall be determined by testing in accordance with Condition 10, monitoring in accordance with Condition 11 and recordkeeping in accordance with Conditions 12, 13, 14, and 15.

ii. When a significant amount of the tire derived fuel is being used as supplemental fuel for the cement kiln (with calcining vessel), emissions of NO_x shall not exceed 3.6 lb/ton clinker. For this

Small Finish Mills (#1, #2, #3)
Old Cement Storage Silos

6a. Emissions and operation of equipment shall not exceed the following limits. These limits shall take effect upon initial commencement of operations of new equipment:

Item of Equipment	Particulate Matter Emissions (Lb/Hour)	(Ton/Yr)
Blending Silos (311, 312-01, 312-02)	1.157	5.07
Finish Collector (F-8)	0.771	3.4
Clinker Cooler (429)	20.833	91.24
Existing No. 5 Finish Mill (722)	4.95	21.68
Existing Mini Mills No. 2 and 3 (611)	1.908	8.35
Existing Mini Mill No. 1 (630)	0.944	4.13
New Finish Mill (F-9) Separator collector	4.88	21.4
Finish Silo (807 Modified)	0.514	2.3
Raw Mill Collector - F-4 (C413, 422)	0.193	0.84
F-K Pump Collector (F-2)	0.514	2.30

b. i. Emissions and operation of the kiln cement and raw mills (existing Loesche and New Mill) shall not exceed the following limits with compliance determined at the exhaust of the baghouse (422). These limits shall take effect upon initial commencement of operation of kiln with associated modified equipment:

Pollutant	(Lb/Hour)	(Ton/Yr)
PM*	26.0	113.9
CO	1,325.0	5,803.5
NO_x	562.5	2,463.7
SO_2	100.0	438.0
VOM	40.0	175.2

*This limit does not include condensible particulate compounds such as calcium sulphate which exist as gases in the exhaust to the atmosphere from the kiln. These condensibles are assumed to be twice the filterable particulate matter, i.e., 52 pounds/hour, for purposes of the air quality analysis required by the PSD rules.

ii. The Permittee shall not alter any parameters of the kiln stack or operating or design characteristics of the kiln exhaust, as identified in its application so as to reduce dispersion without the prior written authorization. Upon achievement of routine operation by the modified kiln :

A. The kiln shall exhaust through a stack with at least 190 ft. height above grade.

B. The exhaust velocity shall be at least 63.6 ft/second as would be determined by USEPA Method 1, except during startup and shutdown of the kiln.

CONSTRUCTION PERMIT
OFFICE OF AIR MANAGEMENT

Lone Star Industries, Inc.
3301 South County Road 150 West
Greencastle, Indiana 46135

(herein known as the Permittee) is hereby authorized to construct the facilities listed in Section A (Source Summary) of this permit.

This permit is issued in accordance with the provisions of 326 IAC 2-1, 326 IAC 2-2, 40 CFR 52.780 and 40 CFR 124, with conditions listed on the attached pages.

Construction Permit No.: CP-133-10159-00002	
Issued by: Paul Dubenetzky, Branch Chief Office of Air Management	Issuance Date:

SECTION D.2 FACILITY OPERATION CONDITIONS

(f) Kiln Operation (360 tons raw feed per hour capacity and 183 tons clinker per hour capacity)

(1) One new hammermill dryer equipped with one existing electrostatic precipitator (ESP 3-1) to control particulate emissions that exhausts to Stack 3-1.

(2) One new coal-fired calciner tower with a maximum rated capacity of 451 million British thermal units (MMBtu) per hour. Particulate emissions from the calciner tower are controlled by one existing electrostatic precipitator (ESP 3-1) that exhausts to Stack 3-1.

(3) One modified semi-dry process cement kiln with a rated capacity of 376 MMBtu per hour. Particulate emissions from the kiln are controlled by one existing electrostatic precipitator (ESP 3-1) that exhausts to Stack 3-1. The kiln is fired by coal and the following supplemental fuels:

(A) hazardous and nonhazardous waste fuel at a maximum rate allowed by the approved Boiler and Industrial Furnace Permit required by 40 CFR 270; and

(B) distillate fuel for burner startup activities.

(4) Seven existing screw conveyors, two rotary feeders, and two bucket elevators covered by a building enclosure (BE 3-2) to control particulate emissions.

(5) One existing ESP return dust bin and one new waste dust bin equipped with one fabric filter system (FF 3-3) to control particulate emissions.

(6) One existing raw material dust truck loading station covered by a building enclosure (BE 3-4) to control particulate emissions.

(7) One new alkali bypass system equipped with one gas suspension absorber (GSA). Particulate matter emissions are controlled by one fabric filter system (FF 3-5) that exhausts to Stack 3-1. The GSA is equipped with a water mist spray system and lime injection system to control sulfur dioxide emissions.

(8) Seven new alkali bypass system dust screw conveyors and one new bucket elevator covered by a building enclosure (BE 3-6) to control particulate emissions.

(9) One new alkali bypass system dust bin equipped with one fabric filter system (FF 3-7) to control particulate emissions. The material from the dust bin is loaded into trucks via a new truck loading system. Particulate emissions from loading are controlled by a building enclosure.

(10) One new alkali bypass system dust truck loading station covered by a building enclosure (BE 3-8) to control particulate emissions.

Emission Limitations and Standards:

D.2.1 Particulate Matter Emission Limitation

(a) Pursuant to the 326 IAC 12 and 40 CFR 60 Subpart F (New Source Performance Standards for Portland Cement Plants), the following facilities of the kiln operation shall not exceed the following limitations:

Operation	Emission Point	Emission Limitations
Hammer Mill Dryer, Calciner Tower, Semi-Dry Kiln, + Alkali Bypass System	Stack 3-1	0.30 lb PM/ton feed (dry basis); 20 percent opacity
Alkali Bypass Dust Transfer Equipment	BE 3-6	10 percent opacity
	BE 3-8	10 percent opacity
Alkali Bypass System Dust Bins	FF 3-7	10 percent opacity

Opacity from the kiln operation exhausting to Stack 3-1 shall be measured using a continuous opacity monitoring system and recorded in accordance with the applicable procedures under 40 CFR 60, Appendix B, Performance Specification 1 and 326 IAC 3-5. Opacity from the kiln system transfer equipment and bins not exhausting to Stack 3-1 shall be measured in accordance with 40 CFR 60, Appendix A, Method 9. These limitations satisfy the requirements of 326 IAC 2-2-3(a)(3) (PSD), 326 IAC 5-1-2 (Opacity Limitations), and 326 IAC 6-3 (Particulate Limitations for Process Operations).

(b) Pursuant to 326 IAC 2-2-3(a)(3) (PSD), the following facilities shall comply with the following particulate limitations:

Operation	Emission Point	Filterable PM Limits		Filterable PM_{10} Limits	
		gr/dscf	lbs/hr	gr/dscf	lbs/hr
Hammer Mill, Calciner Tower, and Semi-Dry Process Kiln + Alkali Bypass System	ESP 3-1	0.016	91.3	0.014	88.7

These limitations satisfy the requirements of 326 IAC 2-2-3(a)(3) (PSD) and 326 IAC 6-3 (Particulate Limitations for Process Operations).

Operation	Emission Point	Filterable PM Limits		Filterable PM_{10} Limits	
		gr/dscf	lbs/hr	gr/dscf	lbs/hr
ESP Dust Bins	FF 3-3	0.02	1.40	0.02	1.40
Alkali Bypass Dust Bins	FF 3-7	0.01	0.64	0.01	0.64

These limitations satisfy the requirements of 326 IAC 2-2-3(a)(3) (PSD) and 326 IAC 6-3 (Particulate Limitations for Process Operations).

D.2.2 Sulfur Dioxide Emissions Limitation

To avoid the requirements of 326 IAC 2-2-3(a)(3), the sulfur dioxide (SO_2) emissions from Stack 3-1 of the semi-dry process kiln and calciner tower shall not exceed 3317 tons per year rolled on a monthly basis. At maximum operating capacity, this limitation is equivalent to 4.13 pounds per ton of clinker produced rolled on a monthly basis. This emissions limitation is equivalent to 1.01 pounds of SO_2 per MMBtu which satisfies the requirements of 326 IAC 7-1.1-2 (Sulfur Dioxide Emission Limitations).

D.2.3 Nitrogen Oxide Emission Limitation

To avoid the requirements of 326 IAC 2-2-3(a)(3), the nitrogen oxide (NO_X) emissions from Stack 3-1 of the semi-dry process kiln shall be controlled by the low-NO_X calciner and good combustion practices and shall not exceed 4428 tons per year rolled on a monthly basis. At maximum operating capacity, this limitation is equivalent to 5.47 pounds per ton of clinker produced rolled on a monthly basis.

D.2.4 Carbon Monoxide Emission Limitation

To avoid the requirements of 326 IAC 2-2-3(a)(3), the carbon monoxide (CO) emissions from Stack 3-1 of the semi-dry process kiln shall be controlled by good combustion practices and shall not exceed 2930 tons per year rolled on a monthly basis. At maximum operating capacity, this limitation is equivalent to 3.65 pounds per ton of clinker produced rolled on a monthly basis.

D.2.5 Hazardous Air Pollutant Emission Limitations

(a) To avoid the requirements of 326 IAC IAC 2-1-3.4 (New Source Toxic Rule), the hazardous air pollutant (HAP) emissions from Stack 3-1 of the kiln system shall not exceed 10 tons per year for a single HAP and 25 tons per year for a combination of HAPs.

(b) The benzene associated with the hazardous waste fuel shall comply with the requirements of 40 CFR 61 Subpart FF (National Emission Standards for Benzene Waste Operations). Pursuant to 40 CFR 61.348(d)(2), the treatment process (combustion of the hazardous waste in the kiln system) shall be in compliance with the requirements of 40 CFR 61 Subpart FF provided that the owner or operator documents that the treatment process has been issued a final permit under 40 CFR 270 and complies with the requirements of 40 CFR 266 Subpart D.

(c) The hazardous waste fuel combustion shall be limited by the requirements of 40 CFR 266 (Boiler and Industrial Furnace Regulations).

D.2.6 Operation Standards

Pursuant to 326 IAC 2-2-3(a)(3), the Permittee shall comply with the following throughput limitations:

(a) The raw material feed input rate to the kiln system shall not exceed 3,149,427 tons per year rolled on a monthly basis;

(b) The coal input rate to the kiln burner system shall not exceed 157,680 tons per year rolled on a monthly basis;

(c) The coal input rate to the calciner burner system shall not exceed 201,480 tons per year rolled on a monthly basis;

(d) The total coal input rate to the kiln and calciner burner systems shall not exceed 313,552 tons per year rolled on a monthly; and

AIR EMISSION SOURCE CONSTRUCTION PERMIT

Source ID Number:	1330001
Effective Date:	
Source Name:	Ash Grove Cement Company
SIC Codes:	3241, 4953
Site Location:	1801 North Santa Fe Chanute, Kansas 66720
Site Owner Name:	Ash Grove Cement Company
Site Owner's Mailing Address:	8900 Indian Creek Parkway, Suite 600 Overland Park, Kansas 66210
Site Operator for Approved Activity:	Ash Grove Cement Company
Site Operator's Mailing Address:	1801 North Santa Fe Chanute, Kansas 66720
Contact Person for Site Owner:	Walter Greer Vice President, Environmental Affairs Telephone number (913) 451-8900
Contact Person for Site Operator:	Jim Shea Plant Manager Telephone number (316) 431-4500

This permit is issued pursuant to K.S.A. 65-3008, as amended; and consists of the conditions contained herein, the permit application dated April 14, 1999, and all revisions.

Description of Activity Subject to Air Pollution Control Regulations

The Ash Grove Cement Company (Ash Grove) owns and operates a portland cement manufacturing plant in Chanute, Kansas with a nominal production capacity of 500,000 tons per year. Raw materials are mined from local quarries or purchased from outside sources and transported to the plant by truck. Operations at the plant currently include raw material quarrying, raw feed or slurry preparation, coal handling and preparation, cement clinker production in two wet-process rotary kilns, clinker cooling, clinker grinding, and cement storage and shipping. Coal, natural gas, used oil and waste-derived fuels are burned to supply thermal energy to the cement manufacturing process.

Ash Grove intends to replace the two existing wet-process cement kilns with a single dry process preheater/precalciner-type kiln system. Included in the proposed installation will be the new kiln system with an in-line raw mill, a preheater/precalciner tower consisting of five stages of cyclone-type preheater vessels stacked on top of a precalciner vessel, and a new clinker cooler. Fuels of the same type currently in use (as noted above) shall be burned in the kiln and the preheater/precalciner vessel. The new dry process preheater/precalciner kiln system will allow the potential cement clinker production to be increased to 1,697,000 tons per year. A new coal mill and coal handling equipment are also to be installed. The existing tank farm for liquid waste-derived fuels and the container storage building for solid waste derived fuels will remain in service. Emissions from the in-line raw mill, the preheater tower, the alkali bypass, and the coal mill shall be ducted to the main stack where they will be discharged to the atmosphere approximately 400 feet above grade. The clinker cooler shall have a separate stack to vent excess cooling air.

Ash Grove also intends to expand the cement grinding capacity of the plant by converting the existing raw mill into a finish mill. A new finish mill is also to be constructed. The two existing finish mills will continue in service. Each finish mill system is to consist of a ball mill, a high-efficiency separator, dust collectors, material bins and feeders, and material handling equipment. Finish mills No. 1 (existing) and No. 3 (converted raw mill) shall share a high-efficiency separator.

New conveyors (screw, belt, pneumatic, metal pan and drag chain), bucket elevators, storage bins and silos are also to be installed. New fabric filters shall be installed to control particulate matter (PM) emissions from the main stack, the clinker cooler stack, the finish mill vents and numerous material transfer points as described in the *Air Emission Unit Technical Specifications* section of this permit.

Significant Applicable Air Pollution Control Regulations

The following air quality regulations were determined to be applicable to this source:
K.A.R. 28-19-17, *Prevention of Significant Deterioration (PSD) of Air Quality* adopting by reference 40 CFR 52.21.

K.A.R. 28-19-20, *Particulate Matter Emission Limitations*

K.A.R. 28-19-650, *Opacity Requirements*

K.A.R. 28-19-720, *New Source Performance Standards*, adopting by reference 40 CFR Part 60, Subpart F, *Standards of Performance for Portland Cement Plants* , and Subpart Y, *Standards of Performance for Coal Preparation Plants, Subpart OOO, Standards of performance for Nonmetallic Mineral Processing plants*.

K.A.R. 28-19-750, *Hazardous Air Pollutants; Maximum Achievable Control Technology (MACT)*, adopting by reference 40 CFR Part 63, Subpart EEE*National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors*, and Subpart LLL, *National Emission Standards for the Portland Cement Manufacturing Industry*. Effective dates, applicability and compliance requirements for these standards shall be as specified in each MACT standard upon promulgation by the United States Environmental Protection Agency (EPA).

Air Emission Unit Technical Specifications

Ash Grove shall install, operate, and maintain the following new and modified process and material handling equipment at the Chanute, Kansas plant:

a. One preheater/precalciner kiln system with an annual average design feed rate of 331 tons/hr of dry raw material mix and a maximum design heat input of 826.2 million Btu per hour. The kiln shall be fired with a combination of coal, natural gas, used oil and waste-derived fuel. Good combustion practices (GCP), as described herein and in the permit application shall be used as best available control technology (BACT) to minimize emissions of carbon monoxide (CO). Fabric filters shall be installed, operated and maintained to control particulate matter emissions from this unit.
b. One vertical, in-line raw mill with an annual average design capacity of 375 tons of raw material per hour. A fabric filter shall be installed, operated and maintained to control particulate matter emissions from this unit.
c. One clinker cooler with an annual average design capacity of 194 tons per hour. A fabric filter shall be installed, operated and maintained to control particulate matter emissions from this unit.
d. One vertical roller mill for crushing coal with an annual average design processing rate of 28 tons per hour, and associated coal handling equipment. A fabric filter shall be installed, operated and maintained to control particulate matter emissions from this unit.

e. Two modified finish mill systems (i.e., Finish Mills No. 1 and No. 3) with a combined annual average design processing rate of 100 tons per hour. Fabric filters shall be installed, operated and maintained to control particulate matter emissions from these units.

Air Emissions Estimates from the Proposed Activity

Table 1

Pollutant	Annual Air Pollutant Emission Rates (Tons per Year)		Estimated Operating Emissions[a] (Tons per Year)
	Pre-Permit Actual Emissions	Post-Permit Potential-To-Emit[b]	
PM_{10}	623	588	588
SO_2	998[c]	1037	1037
NO_x	2584[c]	2623	2623
VOC	14.94[c]	52.92[d]	52.92
CO	333[c]	1409[e]	1409
Lead	8.316[f]	0.85[g]	0.85
Beryllium	0.00074	0.00054[g]	0.00054
Mercury	0.0896	0.4528[g]	0.4528
Fluorides	0.215[h]	0.764[h]	0.764
Sulfuric Acid Mist	20.58[h]	11.88[h]	11.88
Hydrogen Sulfide	None	None	None
Total HAPs	59.1	130.03[d, g]	130.03
HCl	30.89	78.46[d]	78.46
Chlorine	19.61	49.82[d]	49.82
Inorganic HAPs [i]	8.53	1.57	1.57
Organic HAPs	0.07	0.17[d]	0.17

a Estimated operating emissions are the emissions of a pollutant from a stationary source based on the expected hours and conditions of operation

b Potential-to-emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, processed, shall be treated as part of its design if the limitation or the effect it would have on emission is federally enforceable. For emergency engines, the maximum hours of operation can be assumed to be 500 hours per year according to the U.S. EPA [Ref. EPA memorandum entitled "Calculating Potential-to-Emit for Emergency Generators", September 6, 1995]. a Estimated operating emissions are based on the expected operating hours and conditions.

c Emission estimates based on CEMS data.

d Emission computed by scaling up former emission rates by the ratio of new to old production capacity.

e Emissions based on vendor information and BACT analysis in permit application

f Emissions based on stack test.

g Emissions based on anticipated MACT emission limit.

h Emissions based on AP-42 emission factors.

i Does not include HCl and chlorine emissions.

AIR EMISSION SOURCE CONSTRUCTION PERMIT

Source ID Number:	0010009
Effective Date:	
Source Name:	Monarch Cement Company
NAICS Code:	32731, Hydraulic Cement
SIC Code:	3241, Portland Cement
Source Location:	Route 2, Box 15 Humboldt, Kansas 66747
Contact Person:	Roy Harris Quality Control Supervisor Telephone number (316) 473-2222

This permit is issued pursuant to K.S.A. 65-3008, as amended; and consists of the conditions contained herein, the permit application dated April 30, 1999, and all revisions. In the event that any condition(s), requirement(s), or limitation(s) contained herein is not in exact agreement with the permit application, or any of its revisions, the condition(s), requirement(s), and/or limitation(s) contained herein shall control.

Description of Activity Subject to Air Pollution Control Regulations

The Monarch Cement Company (Monarch) owns and operates a portland cement manufacturing plant located in Humboldt, Kansas with a nominal production capacity of 675,000 tons per year. Operations at the plant include raw material quarrying, transportation of raw materials by trucks to the plant, raw feed/material preparation, coal handling and preparation, cement clinker production in three kilns, finish cement processing and product storage and shipping. Coal, petroleum coke, natural gas and tire-derived fuel are burned to supply thermal energy to the cement manufacturing process. The facility currently operates two preheater kilns (Kiln #4 and Kiln #5), both with in-line raw mills, and one long dry process cement kiln.

Monarch intends to modify kilns #4 and #5, converting them to preheater/precalciner operation by installing precalciner furnaces at the base of the existing preheater towers. The proposed modifications also are to include upgrades to the clinker coolers (new grates, fans etc.), installation of high efficiency bags in the baghouse air pollution control equipment and installation of a new finish mill. The new finish mill will have a grinding capacity of 876,000 tons of clinker per year and is to consist of a ball mill, a high efficiency separator, dust collectors and suppression systems, draft fans, material bins and feeders, and product handling equipment. Fuels of the same type currently used (as noted above) are to be burned in the kilns and in the new preheater/precalciner furnaces. Conversion to the preheater/precalciner system will allow the potential combined cement clinker production capacity of kilns 4 and 5 to be increased to 1,131,500 tons per year.

Significant Applicable Air Pollution Control Regulations

The following air quality regulations were determined to be applicable to this source:

K.A.R. 28-19-17, *Prevention of Significant Deterioration (PSD) of Air Quality*, adopting by reference 40 CFR 52.21.

K.A.R. 28-19-20, *Particulate Matter Emission Limitations*

K.A.R. 28-19-650, *Opacity Requirements*

K.A.R. 28-19-510 through 28-19-518, *Class I Operating Permits*

K.A.R. 28-19-720, *New Source Performance Standards*, adopting by reference 40 CFR Part 60, Subpart F, *Standards of Performance for Portland Cement Plants and Subpart OOO, Standards of Performance for Non-Metallic Mineral Processing Plants.*

K.A.R. 28-19-750, *Hazardous Air Pollutants; Maximum Achievable Control Technology*, adopting by reference 40 CFR Part 63, Subpart LLL, *National Emission Standards for the Portland Cement Manufacturing Industry.*

Air Emission Unit Technical Specifications

Monarch shall install, operate, and maintain the following new and modified process and material handling equipment according to the manufacturer's recommendations at the Humboldt, Kansas plant.

a. Two new precalciners, one each on kilns 4 and 5. Each precalciner shall have a maximum design heat input of 120 million Btu per hour. The maximum design capacity of kilns 4 and 5 each shall be 107.6 tons per hour of dry feed and 64.6 tons per hour clinker. Existing fabric filters shall be upgraded as described in the permit application to control particulate matter emissions from the kilns and associated ancillary equipment.

Pollutant	Annual Air Pollutant Emission Rates (Tons per Year)		Estimated Operating Emissions[a] (Tons per Year)
	Pre-Permit Actual Emissions	Post-Permit Potential-To-Emit[b]	
PM_{10}	389.4	399.8	399.8
SO_2	153.6	622.3[c]	468.7
NO_x	1340.1	2,376.2[c]	2,376.2
VOC	50.3	67.9[c]	67.9
CO	273.6	2,093.3[c]	2,093.3
Lead[c]	0.0209	0.0424	0.0424
Beryllium[c]	0.00018	0.00037	0.00037
Mercury[c]	0.0067	0.0136	0.0069
Fluorides[c]	0.25	0.51	0.51
Sulfuric Acid Mist[c]	3.91	7.92	7.92
Hydrogen Sulfide[d]	0.032	0.065	0.065
Total HAPs[c]	45.55	92.3	92.3
HCl[c]	39.1	79.2	79.2
Inorganic HAPs[c,e]	0.95	1.93	1.93
Organic HAPs[c]	5.51	11.16	11.16

a Estimated operating emissions are based on the maximum hourly design rates.

b Potential-to-emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, processed, shall be treated as part of its design if the limitation or the effect it would have on emission is federally enforceable. For emergency engines, the maximum hours of operation can be assumed to be 500 hours per year according to the U.S. EPA [Ref. EPA memorandum entitled "Calculating Potential-to-Emit for Emergency Generators", September 6, 1995]. a Estimated operating emissions are based on the expected operating hours and conditions.

c Emissions computed using U.S. EPA emission factors.

d No emission factor available. Emissions based on maximum odor threshold.

e Does not include HCl.

BACT Air Emission Limitations

Pollutant	Emission Limit	Averaging Period
Sulfur Oxides (SO_2)	421 pounds per hour	24- hour block average
	622.3 tons	12-month rolling Average
Oxides of Nitrogen (NOx)	200 tons	30-day rolling average
	2,376.2 tons	12-month Rolling average
Carbon Monoxide (CO)	5,000 pounds per hour	8-hour block average
	2,093.3 tons	12-month rolling average

Summary of Opacity Requirements

The new preheater/precalciner kilns and raw mills, the modified clinker cooler, and the new finish mill will subject to the particulate matter and opacity standards in 40 CFR 60 Subpart F, *Standards of Performance for Portland Cement Plants*.

Table 3

Affected Facility	PM Emission Limit	Opacity Limit (percent)
In-line Raw Mill/Kiln #4	0.30 lb/ton of dry kiln feed material excluding fuel	20
In-line Raw Mill/Kiln #5	0.30 lb/ton of dry kiln feed material excluding fuel	20
Clinker Coolers	0.10 lb/ton of dry kiln feed material excluding fuel	10
Finish Mill System	N.A.	10
Conveyor Transfer Points	N.A.	10

Permit Conditions

1. Each air pollution control device shall be installed, operated and maintained according to the manufacturer's specifications or recommendations.
2. Each air pollution control device shall be operating at all times that the emissions source that it is designated to control is operating.

AIR POLLUTION CONTROL DISTRICT OF JEFFERSON COUNTY, KENTUCKY

TITLE V OPERATING PERMIT

Permit No.: 156-97-TV	Plant ID: 0060
Effective Date: ## XXXXXX 2000	Expiration Date: ## XXXXXX 2000
UTM Northing: 4210.10	UTM Easting: 595.80
SIC: 3241	NAICS: 32731 AFS: 00060

Permission is hereby given by the Air Pollution Control District of Jefferson County to operate equipment located at:

Kosmos Cement Company - Louisville Plant
15301 Dixie Highway
Louisville, Kentucky 40272

in accordance with the permit application on file with the District and under the conditions in the permit. This permit and the authorization to operate the emission units listed shall expire on midnight on the expiration date shown above. If a renewal permit is not issued prior to the expiration date, the owner or operator may continue to operate in accordance with the terms and conditions of this permit beyond the expiration date, provided that a complete renewal application is submitted to the District no earlier than eighteen (18) months and no later than one-hundred eighty (180) days prior to the expiration date.

Applicant for Permit: Kosmos Cement Company

Responsible Official: Stuart Tomlinson

Title of Responsible Official: Plant Manager

Date Application Received: 21 April 1997

Date Application Administratively Complete: 11 June 1997

Date Public Notice Given: 22 October 2000

____________________________ Reviewing Engineer (89)

____________________________ Air Pollution Control Officer

Additional Conditions

1. **Standards** (Regulation 2.16, section 4.1.1)

a. **Opacity**

i. The owner or operator shall not allow or cause the opacity from baghouse C-28 to exceed 20%. (40 CFR 60.62 (a)(2))

ii. The owner or operator shall not allow or cause the opacity from baghouse C-29 to equal or exceed 10%.(40 CFR 60.62 (c))

b. **PM**

i. The owner or operator not cause to be discharged into the atmosphere from Stack S-11, any gases which contain particulate matter in excess of 0.15 kg per metric ton of feed (dry basis) to the kiln (0.30 lb. per ton). (40 CFR 60.62(a)(1))

ii. The owner or operator shall not exceed 162.9 tons per year of emissions to the atmosphere. (Regulation 2.05)

c. **SO_2**

The owner or operator shall not exceed 165 pound per hour and 665 tons per year of emissions to the atmosphere. (Regulation 2.05)

d. **CO**

The owner or operator shall not exceed 450 pound per hour and 1690 tons per year of emissions to the atmosphere. (Regulation 2.05)

e. **NO_X**

i. The owner or operator shall not exceed 6.6 pounds of emissions to the atmosphere per ton of clinker produced or 825 pounds per hour. (Regulation 6.42)

ii. See attached NO_X RACT Plan (Regulation 6.42)

KEEP PERMIT AT SITE **Best Available Copy** CONTROL NO. 030

State of Maryland

TR 3962

DEPARTMENT OF THE ENVIRONMENT

AIR AND RADIATION MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY
BALTIMORE, MARYLAND 21224

Parris N. Glendening
Governor

Jane Nishida
Secretary

[X] Construction Permit [ ] Operating Permit

PERMIT NO. 06-5-0256 N

Date Issued April 8, 1999

PERMIT FEE $20,200.00 (Paid)

Expiration Date In accordance with COMAR 26.11.02.04B

LEGAL OWNER & ADDRESS	SITE
Lehigh Portland Cement Company 7660 Imperial Way Allentown PA 21791	Lehigh Portland Cement Company 117 Main Street Union Bridge MD 21791 Carroll County Premises #C012

SOURCE DESCRIPTION

Installation of one (1) preheater kiln with secondary firing to modernize and expand the existing Portland cement plant.

This source is subject to the conditions described on the attached pages.

Program Manager

Director, Air and Radiation Management Administration

AMA-1 (Rev. 10-1-89)
MDE 130

(NOT TRANSFERABLE)

LEHIGH PORTLAND CEMENT COMPANY
PERMIT TO CONSTRUCT CONDITIONS
PERMIT NUMBER 06-6-0256 N

(6). The emissions from the entire premises, including the existing Portland cement plant and the Pyroprocessing Portland cement plant, shall not exceed the following limits for any 12-month period, rolling monthly:

(a) 925 tons of PM;
(b) 716 tons of PM_{10};
(c) 620.3 tons of PM_{10} stack emissions;
(d) 1,082 tons of SO_2;
(e) 0.6 tons of lead; and
(f) 3.0 tons of fluoride.

(7) The NOx emissions from the entire premises, including the existing Portland cement plant and the Pyroprocessing Portland cement plant, shall not exceed the following limits for the periods so specified:

(a) 5,743 tons for any 12-month period, rolling monthly, until a date one year after the NOx CEMS are certified by the Company in accordance with Part C of this permit; and

(b) 4,871 tons for any 12-month period, rolling monthly, thereafter.

(8) The Company is subject to the provisions of COMAR 26.11.15.02D which requires the emissions from a new or reconstructed source will be controlled to a level no less stringent than the maximum achievable control technology emission limitation for new sources determined by the Department on a case by case basis following procedures of 40 CFR Part 63 Subpart B. The Department has determined that the proposed NESHAP for Portland Cement Manufacturing Facilities (Federal Register, Vol. 63, No. 56 (March 24, 1998), pp. 14182- 14248) for new major sources shall apply, except for the emission limitation for total hydrocarbons (THC). In addition, the Company is subject to the provisions of 40 CFR Part 63 Subpart A (General Provisions) unless the proposed NESHAP for Portland Cement Manufacturing Facilities specifically overrides a particular requirement. These requirements are federally enforceable.

Specific requirements of the case-by-case MACT are detailed in Part E through Part M.

Part C - Construction

(1) The Company shall install covered conveyors as stated in the application to reduce fugitive particulate matter emissions during transport of the following materials:

CONTACT RECORD

RTP Environmental Associates, Inc.
239 US Highway 22 East
Green Brook, NJ 08812
732.968.9600

Date: June 25, 2001
Time:
Proj. File: FCS4

Description: Lehigh Portland Cement Company of Union Bridge, Maryland

Made/Received By: Michael J. Hober
Point of Contact: George Beerli
Company: Maryland Department of the Environment Bureau of Air and Radiation, 2500 Broening Highway Baltimore, Maryland 21224

Distribution: D. Elias, S. Heath, File: FCS4

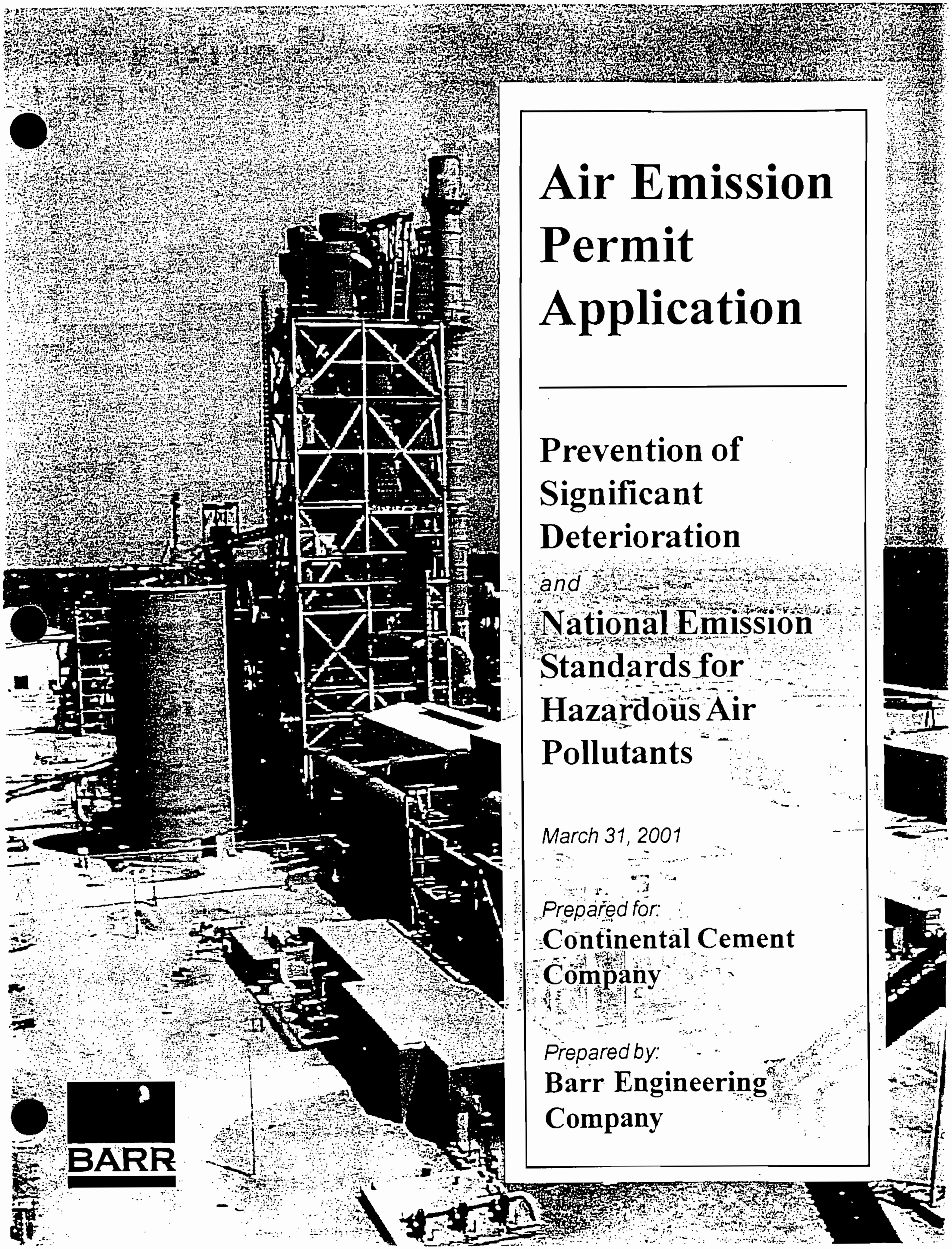
Telephone Number: 410-631-3230
Fax Number: 410-631-3391
E-Mail:

Initiated Correspondence: ☐ Received Correspondence: ☑

Phone Call: ☑ Fax: ☐ Email: ☐

Site Visit: ☐ Office Visit: ☐ Other:

Summary: Mr. George Beerli called regarding Lehigh Portland Cement. He said the design clinker rate is 2.1 million tons per year, but they expect to produce from 1.5-1.6 million tons clinker. There's no permit production limit and no short-term limits. Only annual emission caps exist.



Air Emission Permit Application

Prevention of Significant Deterioration

and

National Emission Standards for Hazardous Air Pollutants

March 31, 2001

Prepared for:

Continental Cement Company

Prepared by:

Barr Engineering Company

BARR

Prevention of Significant Deterioration
And
National Emission Standards for Hazardous Air Pollutants
Permit Application
Continental Cement Company
Ste. Genevieve, Missouri

Table of Contents

Table 3-1 Executive Summary of BACT Annual Emission Limits and Control Technologies

Source	Particulate Matter PM_{10}	Nitrogen Oxides NOx	Sulfur Dioxides SO_2	Carbon Monoxide CO	Volatile Organic Compounds VOC
Material Handling - Point Sources	Fabric Filter 0.01 gr/dscf 10 % Opacity	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Material Handling Fugitive Sources Roads	Paving with Water Flushing Sweepers 10 % Opacity	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Material Handling Fugitive Sources Storage Piles/Material Transfers	Enclosure/Fabric Filter 10 % Opacity	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Pyroprocessing System	Fabric Filter 0.01 gr/dscf 23.84 lb/hr 0.08 lb/ton feed 0.13 lb/ton clinker Kiln - 20% Opacity Clinker Cooler - 10% Opacity Raw Mill - 10% Opacity	Kiln System incorporating: • Multi-Staged Combustion • Low NOx Burners • Top-Air Duct 2.3 lb/ton clinker 412.09 lb/hr 1656.58 ton/yr	Inherent Dry Scrubbing 1.0 lb/ton clinker 179.1 lb/hr 720.25 ton/yr	Good Combustion Practices 1.0 lb/ton clinker 179.1 lb/hr 720.25 ton/yr	Emissions less than 100 tons/year and therefore did not undergo PSD review

1.0 Project Description

1.1 Overview

Continental Cement Company, LLC is a Missouri owned small business that is currently operating a cement production plant in Hannibal, MO with distribution terminals in St. Louis and Bettendorf, Iowa. Continental Cement competes with large international cement companies and is currently importing cement clinker from Southeast Asia to serve their customers' needs. Additional cement production capacity is needed to allow Continental Cement to remain competitive in the Midwest market. Continental Cement is proposing to construct and operate a new Portland cement production plant in east central Ste. Genevieve County just north of the City of Ste. Genevieve.

Continental Cement Company promotes sustainable development. The location for this project was chosen with sustainability as a goal. First of all, the area has abundant supply of high quality limestone, a key ingredient in cement. Not only is the limestone at the proposed site of high quality from the perspective of cement production, but it is also low in sulfur and volatile organics which means it will also have lower emissions than many other sources of limestone. Due to the limestone quality and the plant design, emissions from the facility on a per ton of clinker produced basis will be one of the lowest emitting cement production facilities in the country. Secondly, the site is located on the Mississippi River giving direct access to environmentally friendly and energy efficient transportation of cement. Thirdly, the process will beneficially utilize industrial byproducts as raw materials by strategically locating the cement plant next to an existing quarry and lime production plant. Limestone which cannot be used in the lime production plant will be diverted to Continental Cement for value added processing into cement. Lime fines which are generated by the nearby lime production facility and are currently stocked piled as waste material will be used in the cement production process as a beneficial material. Lastly, the plant is proposed to be constructed in an abandoned quarry. This will lead to improved land use by turning an unreclaimed vacant industrial site and turning it into a productive operation providing quality jobs for the area.

The Ste. Genevieve plant will occupy approximately 73 acres and employ 80 people most of which will likely come from the local labor pool. The plant is designed for an annual clinker production of 1,440,000 tons. Cement clinker is ground and mixed with small additions of gypsum to provide the final cement product. The facilities proposed to produce the product include raw material storage,

Conti[illegible]ent Company
St[illegible]vieve Plant
Emissions Inventory

Non-PM10 Criteria Pollutant Emissions

Emission Point No.	Emission Point Description	Emission Point Activities	Vent ID	Notes	Pollutant	Emission Factor Reference	Uncontrolled Emission Factor (lb/units)	Controlled Emission Factor (lb/units)	Maximum Hourly Rate	Limited Annual Rate	Units	Limited Uncontrolled Emissions (tpy)	Control Method	Control Efficiency (%)	Limited Controlled Emissions (tpy)
17	Kiln	preheater transfer to kiln	422-SK1/710-SK1	[1]	SOx	KHD (2/15/01)	----	1.0000	179.17	1,440,500	tons clinker produced	----	Inherent Scrubbing	0	720.25
					NOx	KHD (2/15/01)	----	2.3000	179.17	1,440,500	tons clinker produced	----	----	0	1656.58
					VOC	KHD (2/15/01)	----	0.0500	179.17	1,440,500	tons clinker produced	----	----	0	36.01
					CO	KHD (2/15/01)	----	1.0000	179.17	1,440,500	tons clinker produced	----	----	0	720.25

[1] A portion of these emissions will be vented through the coal mill.

Contine[illegible]ment Company
Ste. Genevieve Plant
Emissions Inventory

Throughputs and Control Efficiencies

Throughputs	Hourly	Annual	Annual Thruputs provided by KHD 02/16/01 unless otherwise indicated.
Clinker Production (tons)	179.17	1,440,500	Provided by KHD (02/15/01)
Cement Shipping (tons)	—	1,515,844	Assume all cement shipped by barge or truck. Clinker + Gypsum
Gypsum (tons)	—	75,344	KHD's FEL # ratioed up to clinker limit
Coal (tons)	—	75,496	pyroclon & low NOx burner max feed rates ratioed up to clinker limit
Coke (tons)	—	42,612	main burner max feed rate ratioed up to clinker limit
Sweetener (lime fines pile) (tons)	—	120,789	KHD's FEL # ratioed up to clinker limit
Mill Scale (tons)	—	51,425	KHD's FEL # ratioed up to clinker limit
Silica (tons)	—	56,209	KHD's FEL # ratioed up to clinker limit
Premix (tons)	—	2,355,986	KHD's FEL # ratioed up to clinker limit
Limestone (tons)	—	1,449,807	# provided by Greg Haug 02/14/01 ratioed up to premix associated w/clinker limit
Onsite Clay (tons)	—	261,914	# provided by Greg Haug 02/14/01 ratioed up to premix associated w/clinker limit
Owensville Clay (tons)	—	106,341	# provided by Greg Haug 02/14/01 ratioed up to premix associated w/clinker limit
Lime Fines to Preblend (tons)	—	537,925	total lime fines received = 500,000 tons (on 3650 tpd & 7920 hr/yr basis) per Greg Haug 02/14/01. 101,000 tons (on 3650 tpd & 7920 hr/yr basis) go to fines pile rest to premix. Ratioed up to premix associated w/clinker limit.
Total Lime Fines Received (tons)	—	656,714	sweetener + lime fines to preblend
Raw Mix (tons)	—	2,584,409	sweetener + mill scale + lime fines + premix
Cooling Tower Water (1000 gal)	4.73	38,056	# provided by KHD (02/08/01) ratioed up to clinker limit

Storage Pile Acreage

	Tons In Pile	Acres [1]	Hourly Acres [2]
premix #1	18500	0.69	8.57E-05
premix #2	18500	0.69	8.57E-05
raw coal	3000	0.22	2.71E-05
raw coke	3000	0.31	3.85E-05
gypsum	2000	0.11	1.43E-05

[1] Provided by KHD (02/16/01)
[2] Based on Acres/8040 (hours of op needed to reach limit assuming 4300 tpd clinker production.)

Vehicle Miles Traveled

		Length of Haul Road	Ave Wt of Material/Load	Hourly Amount Hauled [1]	Hourly VMT	Annual Amt Hauled	VMT	Ave Wt of Material/Load reference
Road 1	Mill Scale Delivery Truck	0.24	20	400	9.47	51,425	1,217	per Greg Haug 02/06/01
Road 1A	Silica Delivery Truck	0.24	20	425	10.06	56,209	1,331	per Greg Haug 02/06/01
Road 2	Coal Delivery Truck	0.21	20	50	1.04	75,496	1,573	per Greg Haug 02/06/01
Road 2	Coke Delivery Truck	0.21	20	50	1.04	42,612	888	per Greg Haug 02/06/01
Road 3	Gypsum Delivery Truck	0.09	20	2000	18.94	75,344	713	per Greg Haug 02/06/01
Road 4	Cement Shipping Truck	0.08	20	500	3.79	1,515,844	11,484	per Greg Haug 02/06/01

[1] Hourly rates based on following.
Mill Scale - Takes 10 loads to fill mill scale raw material storage bin. At 0.48 total miles per load that's 4.8 miles to fill bin. Assume truck speed = 20 mph which means it takes 0.24 hours to fill bin. Calculate hourly rate as 400 tons in bin divided by 0.24 hours to fill bin. Since le
Coal & Coke - Based on conveyor rate under delivery hopper.
Gypsum - Takes 50 loads to fill pile. At 0.18 total miles per load that's 9 miles to fill pile. Assume truck speed = 20 mph which means it takes 0.45 hours to fill pile. Calculate hourly rate as 2000 tons in pile divided by 0.45 hours to fill pile. Since time to fill pile is less than 1 hour
Cement - Based on truck load rate.

Control Efficiencies

Control Method [1]	Capture Efficiency	APCP Accepted Midpoint [2]	CE [3]	Overall CE	Capture Efficiency reference	CE reference
Hooded Fabric Filter 018	90	89.48	99.00	89.1	AEC engineering estimate	Lafarge Application (11/96)
Direct Fabric Filter 018	100	89.48	99.00	99	AEC engineering estimate	Lafarge Application (11/96)
Cyclone 007	100	78.05	78.05	78.05	AEC engineering estimate	Max Allowed by MDNR w/out Documentation
Enclosure 054	100	37.50	50.00	50	AEC engineering estimate	Lafarge Application (11/96)
Raw Material Bldg (Enclosure 054)	100	37.50	98.20	98.20	LLS engineering estimate	Calc. Percent of opening and door is open 8 out of 24 hours per day CE calculated as 1150 (length of building) - 150 (width of building)/1150 (length of building)
Sweeper/Water	100	—	90.00	90	AEC engineering estimate	AWMA Air Pollution Engineering Manual, 1992

[1] The number following the control device name is that listed in the RY1999 EIQ Instructions.
[2] The RY1998 EIQ Instructions list an acceptable control efficiency range for different control methods.
Typically, if a value greater than the midpoint is reported, supporting documentation must be provided.
[3] Control efficiency utilized in the emissions inventory.

COPY

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

August 20, 1997

Mr. Rick Toedtman
Project Manager
Lafarge Corporation, Cement Group/Sugar Creek Plant
4201 North River Boulevard
Sugar Creek, MO 64050

FILE COPY

RE: Air Permit Application - Project/Installation No. 2240-0030-013

Dear Mr. Toedtman:

Enclosed with this letter is your permit to construct. Please note the special conditions on the accompanying pages. Operation in accordance with these conditions and your permit application is necessary for continued compliance. The document entitled "Review of Application for Authority to Construct" is part of the permit as well and should be kept with the permit in your files.

The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions or need additional information regarding this permit, please contact me at (573) 751-4817, or you may write to me at the Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Refaat H. Mefrakis, P.E.
Construction Permits Unit Chief

RHM:dck

Enclosures

c: Kansas City Regional Office
Source File
Permit No.: 0897-019

RECYCLED PAPER

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the facility described below, in accordance with the laws, rules, and conditions as set forth herein.

Permit Number: 0897-019 Facility I.D. Number: 2240-0030-013

Owner: Lafarge Corporation

Owner's Address: PO Box 887, Southfield, MI 48037

Facility Name: Lafarge Corporation

Facility Address: 4201 North River Blvd., Sugar Creek, MO 64050

COPY

~~Legal Description:~~ Jackson County, S1~~3, T50N, R32W~~
Location Information:

Application for Authority to Construct was made for:

A new Portland cement manufacturing plant and an aggregates operation. This review was conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required.*

☐ Special Conditions are not applicable to this permit.

☒ Special Conditions do apply to this permit and are listed as attachments starting on page 2.

8-5-1997
EFFECTIVE DATE

Deputy Director
DIRECTOR
DIVISION OF ENVIRONMENTAL QUALITY

MO 780-1204 (4-95)

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

8. BACT for PM_{10} emissions from the screen, tertiary crusher, and conveyor transfer points identified as EP 59 is an emission rate not to exceed 0.18 pounds per hour, 24-hour average.

9. Within 60 days of reaching full production, but in no case later than 180 days after initial startup, a performance test shall be conducted to verify PM_{10} emissions from the screen, tertiary crusher, and conveyor transfer points identified as EP 59. The stack test shall determine the emission rate in pounds per hour. A completed Proposed Test Plan Form (enclosed) will serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting emissions testing.

10. The results of the performance test required in Condition 9 shall be reported to the Air Pollution Control Program, Enforcement Section, PO Box 176, Jefferson City, MO 65102, within 30 days of completion of the test.

11. BACT for PM_{10} emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is an emission rate not to exceed 19.22 pounds per hour, 24-hour average.

12. Within 60 days of reaching full production, but in no case later than 180 days after initial startup, a performance test shall be conducted to verify PM_{10} emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78. The stack test shall determine the emission rate in pounds per hour. A completed Proposed Test Plan Form (enclosed) will serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting emissions testing.

13. The results of the performance test required in Condition 12 shall be reported to the Air Pollution Control Program, Enforcement Section, PO Box 176, Jefferson City, MO 65102, within 30 days of completion of the test.

14. BACT for PM_{10} emissions from the clinker cooler system identified as EP 79 is an emission rate not to exceed 11.74 pounds per hour, 24-hour average.

15. Within 60 days of reaching full production, but in no case later than 180 days after initial startup, a performance test shall be conducted to verify PM_{10} emissions from the clinker cooler system identified as EP 79. The stack test shall determine the emission rate in pounds per hour. A completed Proposed Test Plan Form (enclosed) will serve the purpose of notification and must be

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

approved by the Air Pollution Control Program prior to conducting emissions testing.

16. The results of the performance test required in Condition 15 shall be reported to the Air Pollution Control Program, Enforcement Section, PO Box 176, Jefferson City, MO 65102, within 30 days of completion of the test.

17. BACT for PM_{10} emissions from the finish mill, finish mill screen/weigh hopper, and cement air separation identified as EP 87 is an emission rate not to exceed 3.46 pounds per hour, 24-hour average.

18. Within 60 days of reaching full production, but in no case later than 180 days after initial startup, a performance test shall be conducted to verify PM_{10} emissions from the finish mill, finish mill screen/weigh hopper, and cement air separation identified as EP 87. The stack test shall determine the emission rate in pounds per hour. A completed Proposed Test Plan Form (enclosed) will serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting emissions testing.

19. The results of the performance test required in Condition 18 shall be reported to the Air Pollution Control Program, Enforcement Section, PO Box 176, Jefferson City, MO 65102, within 30 days of completion of the test.

20. BACT for emissions of oxides of sulfur from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is an emission rate not to exceed 477.3 pounds per hour, 3-hour average.

21. Within 60 days of reaching full production, but in no case later than 180 days after initial startup, a performance test shall be conducted to verify emissions of oxides of sulfur from the raw mill and preheater/precalciner rotary kiln system identified as EP 78. The stack test shall determine the emission rate in pounds per hour. A completed Proposed Test Plan Form (enclosed) will serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting emissions testing.

22. The results of the performance test required in Condition 21 shall be reported to the Air Pollution Control Program, Enforcement Section, PO Box 176, Jefferson City, MO 65102, within 30 days of completion of the test.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

23. BACT for emissions of oxides of nitrogen from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is an emission rate not to exceed 1,894.8 tons in any consecutive 12-month period.

24. BACT for carbon monoxide emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is an emission rate not to exceed 842 tons in any consecutive 12-month period.

25. Continuous Emission Monitors (CEMs) shall be installed, operated, and calibrated to monitor carbon monoxide and oxides of nitrogen emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78. Monthly records shall be kept providing the 12-month rolling totals of carbon monoxide and oxides of nitrogen emissions to verify compliance with the emission limitations of Condition Number 23 and Condition Number 24.

26. CEM certification protocols shall be submitted to the Air Pollution Control Program, Enforcement Section, PO Box 176, Jefferson City, MO 65102, at least 30 days prior to the certification date.

27. BACT for organic hazardous air pollutant (HAP) emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is the use of good combustion practices.

28. BACT for heavy metal HAP emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is the use of a fabric filter baghouse.

29. BACT for hydrogen chloride emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is the inherent alkali environment of the preheater/precalciner rotary kiln.

30. BACT for sulfuric acid mist emissions from the raw mill and preheater/precalciner rotary kiln system identified as EP 78 is the inherent dry scrubbing of the preheater/precalciner rotary kiln system.

31. All existing quarrying operations present prior to the activities outlined in this permit shall only be conducted within the underground limestone mine. If an equipment malfunction occurs which requires the short-term reinstatement of above ground surface quarrying activities, the Permittee shall report, following the procedures of 10 CSR 10-6.050, *Start-Up, Shutdown, and Malfunction*

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (8) REVIEW

Project/Facility No: 2240-0030-013
Permit No: 0897-019

Lafarge Corporation
4201 North River Blvd.
Sugar Creek, MO 64050

Complete: February 3, 1997
Reviewed: July 21, 1997

Parent Company:
Lafarge Corporation
PO Box 887
Southfield, MI 48037

Jackson County, S13, T50N, R32W

REVIEW SUMMARY

- Lafarge Corporation has applied for authority to construct a new Portland cement manufacturing plant and an aggregates operation.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) regulations apply to this facility.

- Subpart "F," Subpart "Y," and Subpart "OOO" of the New Source Performance Standards (NSPS) apply to this facility.
- Hazardous air pollutant (HAP) emissions are expected from this facility.
- This review conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required.*
- Approval of this permit is recommended with conditions.

PROJECT DESCRIPTION

Lafarge Corporation has applied for authority to construct a new Portland cement manufacturing plant and an aggregates operation in Jackson County. Each operation will obtain its primary raw material (limestone) from an adjacent underground mine. The limestone will be crushed in the mine and screened for size at the plants.

The mine will be able to provide up to 18,000 tons of limestone daily. The material will exit the mine at the surface and will be conveyed to a screening/crushing building where additional screening will occur. Tertiary crushing of up to 25% of the limestone will also occur at this location. The limestone will then be transferred to either the cement plant stacker conveyor belt or the aggregates plant stacker conveyor belt.

The preheater/precalciner kiln system will be the heart of the Portland cement making process. Raw material from the raw mix silo will be fed into the five-stage preheater. In the preheater, the material will be dried to nearly zero moisture content and heated several hundred degrees using waste heat from the kiln and precalciner. Once the material exits the preheater it immediately enters the precalciner. The precalciner will be designed to begin the clinkerization process by calcining the material. Supplemental heating will be provided at this stage of the process. The supplemental heat will be produced by burners fired by solid fuel from a solid fuel day bin.

When the precalcined material leaves the precalciner, it will enter the rotary kiln. The kiln will complete the clinkerization process by heating the material to several thousand degrees. The kiln will be fired primarily with solid fuel provided from one of the solid fuel day bins.

The preheater/precalciner kiln system is the most energy efficient cement manufacturing process available. Waste heat from the kiln and precalciner will be used in the preheaters and raw mill. The use of this waste heat will eliminate the need to supplementally fire the preheaters or the raw mill. The preheater/precalciner kiln system will be designed to produce 2,818 tons of clinker per day. Raw material and solid fuel feed rates to the main cement plant area will be based on this production capacity. The storage capacities of the raw mix silos and solid fuel day bins have no impact on the maximum throughput rates.

The clinker will exit the kiln and pass through a clinker cooler. The cooler will utilize ambient air as a heat transfer medium. From the cooler, the clinker will be transferred to one of three clinker storage silos.

Portland cement sales are cyclical. Therefore, sometimes it will be necessary to produce and store clinker during periods of low cement sales, and reclaim clinker for use during periods of high cement sales. The cement plant design will include a truck loadout station to load clinker for transport to underground storage areas. Clinker must be kept underground or in an enclosure to minimize the degradation that weather can cause. Because the Sugar Creek facility already has a series of underground mines, these areas will be utilized for clinker storage. A maximum of 25% of the clinker produced will be transported to underground storage.

Portland cement is a blend of cement clinker and gypsum. Clinker and gypsum will be transferred from their respective storage silos to a finishing mill. The mill grinds, screens, and weighs the material continuously during the milling process. Finished cement will be air separated and pneumatically transferred to storage silos. Cement will be loaded out to trucks for transport off site.

New York State Department of Environmental Conservation
Facility DEC ID: 4104000011

PERMIT
Under the Environmental Conservation Law (ECL)

IDENTIFICATION INFORMATION

Permit Type: Air State Facility
Permit ID: 4-1040-00011/00049
Effective Date: Expiration Date:

Permit Issued To: ST LAWRENCE CEMENT CO LLC
1945 GRAHAM BLVD
MONT-ROYAL, PQ H3R-1H1

Contact: PHILLIP LOCHBRUNNER
4303 ROUTE 9
HUDSON, NY 12534
(518) 828-8478

Facility: SLC GREENPORT CEMENT PLANT
ROUTE 9
GREENPORT, NY

Description:

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, the General Conditions specified and any Special Conditions included as part of this permit.

Permit Administrator: MICHAEL T. HIGGINS
1150 NORTH WESCOTT RD
SCHENECTADY, NY 12306-2014

Authorized Signature: ______________________ Date: ___ / ___ / _____

Monitoring Type: CONTINUOUS EMISSION MONITORING (CEM)
Monitoring Description:

THIS FACILITY SHALL INSTALL A CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) WHICH MEASURES SULFUR DIOXIDE EMISSIONS FROM THE KILN. THE CEMS SHALL BE INSTALLED AND OPERATED IN SUCH A MANNER IN ORDER TO MEET THE REQUIREMENTS OF 40 CFR PART 60, APPENDIX B, PERFORMANCE SPECIFICATION 2.

THE 12 MONTH ROLLING TOTAL OF SO2 EMISSIONS FROM THE KILN SHALL BE DETERMINED EACH MONTH AND REPORTED ANNUALLY. ANY EXCEEDANCE SHALL BE REPORTED MONTHLY WITHIN 30 DAYS AFTER THE END OF ANY MONTH THAT A VIOLATION IS NOTED FROM THE 12 MONTH ROLLING SUM.

THIS COMPLIANCE CERTIFICATION REQUIREMENT SATISFIES THE EMISSION LIMITS OF 225-2

Upper Limit of Monitoring: 850 tons per year
Reference Test Method: 40CFR Part 60
Monitoring Frequency: CONTINUOUS
Averaging Method: ANNUAL MAXIMUM ROLLED MONTHLY
Reporting Requirements: ANNUALLY (CALENDAR YEAR)
Reports due by January 30th for previous calendar year

Condition 58: **Compliance Certification**
Effective for entire length of Permit

Applicable Federal Requirement: 6NYCRR 225-1.5(b)

Item 58.1:
The Compliance Certification activity will be performed for:

Emission Unit: 0-CPROD Emission Point: 1KILN

Regulated Contaminant:
CAS No: 007446-09-5
Name: SULFUR DIOXIDE

Item 58.2:
Compliance Certification shall include the following monitoring:

Monitoring Type: RECORD KEEPING/MAINTENANCE PROCEDURES

Monitoring Description:
This facility shall demonstrate that the control systems for Sulfur Dioxide emissions from emission point 1Kiln will result in sulfur emissions which are less than what would be emitted using the sulfur in fuel limitations of this Part. Equivalency shall be calculated on the basis of pounds of sulfur dioxide per million Btu heat input.

Monitoring Frequency: CONTINUOUS
Reporting Requirements: SEMI-ANNUALLY (CALENDAR YEAR)
Reports due 30 days after every 6 calendar months (January - June, July - December)

Condition 59: Compliance Certification
Effective for entire length of Permit

Applicable Federal Requirement: 40CFR 63.1343(b)(1), Subpart LLL

Item 59.1:
The Compliance Certification activity will be performed for:

Emission Unit: 0-CPROD Emission Point: 1KILN

Regulated Contaminant:
CAS No: 0NY075-00-0
Name: PARTICULATES

Item 59.2:
Compliance Certification shall include the following monitoring:

Monitoring Type: INTERMITTENT EMISSION TESTING
Monitoring Description:
NO OWNER OR OPERATOR OF AN EXISTING, RECONSTRUCTED OR NEW BROWNFIELD KILN AT A FACILITY THAT IS A MAJOR SOURCE SUBJECT TO THE PROVISIONS OF SUBPART LLL SHALL CAUSE TO BE DISCHARGED INTO THE ATMOSPHERE ANY GASES WHICH CONTAIN PARTICULATE MATTER IN EXCESS OF 0.30 LB PER TON OF FEED(DRY BASIS) (0.15 KG PER MG) TO THE KILN. EMISSIONS TESTING IS REQUIRED INITIALLY AND EVERY 5 YEARS THEREAFTER, USING METHOD 5 OF 40 CFR PART 60, APPENDIX A.

Upper Limit of Monitoring: 0.30 pounds per ton
Reference Test Method: METHOD 5
Monitoring Frequency: AS REQUIRED - SEE MONITORING DESCRIPTION
Averaging Method: AVERAGING METHOD AS PER REFERENCE TEST METHOD INDICATED

OPERATION MONTH 1 BEGINS WITH FIRST CLINKER FROM THE KILN.

DURING THE INITIAL OPERATION MONTHS 1 THROUGH 24, THE NOX EMISSIONS SHALL NOT EXCEED 4121 TONS PER YEAR BASED ON A 12 MONTH ROLLING TOTAL.

EMISSION LIMITS FOR NOX:

TIME FRAME(INITIAL OPERATING MONTHS):
1 TO 24
NOX LIMIT(LB OF NOX/TON OF CLINKER)
3.6
AVERAGING TIME
12 MONTH
ROLLING

EMISSION LIMITS FOR NOX:

TIME FRAME(INITIAL OPERATING MONTHS):
25
NOX LIMIT(LB OF NOX/TON OF CLINKER)
3.5
AVERAGING TIME
12 MONTH ROLLING

TIME FRAME(INITIAL OPERATING MONTHS):
26
NOX LIMIT(LB OF NOX/TON OF CLINKER)
3.5
AVERAGING TIME
12 MONTH
ROLLING

TIME FRAME(INITIAL OPERATING MONTHS):
27
NOX LIMIT(LB OF NOX/TON OF CLINKER)
3.4
AVERAGING TIME

Compliance Certification shall include the following monitoring:

Capping: Yes
Monitoring Type: CONTINUOUS EMISSION MONITORING (CEM)
Monitoring Description:
FEDERAL ENFORCEABLE CONDITION: LIMIT ON NOX EMISSIONS - POUNDS PER HOUR

OPERATION MONTH 1 BEGINS WITH FIRST CLINKER FROM THE KILN.

POUNDS PER HOUR LIMIT: (BASED ON A 30-DAY AVERAGE CALCULATED EACH 24 HOURS)

EMISSION LIMITS FOR NOX:
TIME FRAME(INITIAL OPERATING MONTHS):
1 TO 24
NOX LIMIT(LB/HR)
1454
AVERAGING TIME

30-DAY ROLLING AVERAGE CALCULATED EACH 24 HOURS.

TIME FRAME(INITIAL OPERATING MONTH):

25
NOX LIMIT(LB/HR)
PRORATED LIMIT BETWEEN 1454 AND 1131
AVERAGING TIME
30-DAY ROLLING AVERAGE CALCULATED EACH 24 HOURS.

TIME FRAME(INITIAL OPERATING MONTH):

26 TO 36
NOX LIMIT(LB/HR)
1131

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT

Eastern Region
2146 NE 4th, #104
Bend, OR 97701
Telephone (541) 388-6146

Issued in accordance with the provision of
ORS 468A.040 and based on the land use compatibility findings included in the permit record.

ISSUED TO:

Ash Grove Cement Company
P.O. Box 287
Durkee, OR 97905-0287

PLANT SITE LOCATION:

33060 Shirttail Creek Road
Durkee, OR 97905-0287

INFORMATION RELIED UPON:

Application Number:	018031
Received:	12/30/98

LAND USE COMPATIBILITY STATEMENT:

Issued by:	Baker County
Dated:	06/26/96

ISSUED BY THE DEPARTEMENT OF ENVIRONMENTAL QUALITY

Peter J. Brewer
Peter Brewer, Eastern Region Air Quality Manager

February 26, 2001
Date

Nature of Business:	SIC
Portland Cement manufacturing	3241
Limestone Quarry	1422

RESPONSIBLE OFFICIAL

Title: Plant Manager

FACILITY CONTACT PERSON

Name:	Donald Guyer
Title:	Safety and Environmental Manager
Phone:	(541) 877-2411 x314

PLANT SITE EMISSION LIMITS

76. The plant site emissions shall not exceed the following:

Emission Unit	Pollutant	lbs/hr	tons/yr	kg/hr	Mg/yr
Non-Fugitive: Unit OA	PM	10	45	4.7	41
	PM_{10}	8.7	38	4.0	35
	SO_2	12	42	5.3	38
	NO_x	769	1743	349	1581
	CO	489	1257	222	1140
	VOC	9.4	24	4.3	21
	Pb	0.0066	0.024	0.0030	0.022
Non-Fugitive: Units RM, HO, CC, CH, KG, CM, CP	PM	32	139	14	127
	PM_{10}	27	117	12	106
Fugitives: Units FU2, FU3, CRUSH, FU-BIN, FU4-A, FU4-B, AI	PM	95	52	43	47
	PM_{10}	37	20	17	19
Unassigned	PM	--	67	--	61
	PM_{10}	--	--	--	--

The PSEL is based on the actual predicted emissions for the current operating conditions at the facility, and does not include credits, and may or may not equal the total allowable PSEL as defined in OAR 340-222-0040. If there is a difference, it is shown and discussed in the attached review report. The unassigned PSEL is available for internal use by the permittee for increases in emissions upon receipt of written approval by the Department.

77. Testing Requirement: The permittee shall conduct emission factor verification tests in accordance with the Department's Source Sampling Manual using the following test methods and minimum test frequencies:

Monitoring Point	Pollutant	Test Method	Frequency
Main kiln stack	PM	EPA/DEQ Method 5	1 time per permit term
	SO_2	EPA Method 6 or 6c	1 time per permit term
	VOC	EPA Method 25a	1 time per permit term
	HCl	EPA Method 26, 320, or 321	1 time per permit term
	Benzene	EPA Method 18 or 320	1 time per permit term
541.BF1	PM	DEQ Method 8	1 time per permit term
542.BF3	PM	DEQ Method 8	1 time per permit term

77.a. The testing required in Conditions 18, 21, or 32 may be used to satisfy this requirement in full or in part.

77.b. The HCl test on the main kiln stack must be performed within 6 months of permit issuance.

77.c. The permittee must notify the Department at least 15 days prior to conducting any emission factor verification tests by submitting a test plan in accordance with the Department's Source Sampling Manual.

77.d. The permittee must submit a summary of all emission factor verification tests to the Department within 45 days of any test. The summary must include the following information:

- 77.d.i. Emission unit and monitoring point identification;
- 77.d.ii. Emission results in pounds per hour;
- 77.d.iii. Process parameters during the test (e.g. material throughput, types and amounts of fuels, heat input, cement production);
- 77.d.iv. Control device operating parameters.

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT REVIEW REPORT

Ash Grove Cement Company
9720 SW Macadam Ave, Suite 300
Portland, OR 97219-2312

33060 Shirttail Creek Road
Durkee, OR 97905-0287

PSEL	SOURCE			AMB	COMPL	SPEC	REPORT				EXCESS					SIZE	
CRED	TEST	COMS	CEMS	MON	SCHED	COND	A	S	Q	M	R	N	NSPS	NSR	PSD		TV
	X	X	X				X	X			X		X		X		X

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4.b. Unit HO: Kiln Feed Handling & Storage

Meal from the roller mill is blended and stored in two silos. The blended material is fed to the calciner and kiln through two preheat towers.

ID	Description	Control Device
411.BF1	Air slide for the raw mix into blend silos	Baghouse
421.BF3	Kiln feed system for preheat tower #1[1] (alleviator)	Baghouse
421.BF2	Kiln feed system for preheat tower #2 (alleviator)	Baghouse
421.BF1	Kiln feed system (ground level)	Baghouse

1. Equipment has been controlled since baseline and is part of Emissions Unit HO'.

4.c. Unit OA: Pyroprocessing

The pyroprocessing line is designed to produce approximately 940,000 tons of clinker per year. Kiln feed from the roller mill flows through the first three stages of two parallel preheat towers into a calciner. Fuel burned in the calciner achieves approximately 90% of the total material calcination. The calciner is designed with a 3.2 second retention time to ensure proper combustion of coal or natural gas. From the calciner, the feed passes through the final stage of the preheat towers before entering the kiln.

In the kiln, the feed is further calcined and reacted into clinker. The kiln is permitted to burn coal, natural gas, fuel oil, used oil, whole tires, and non-hazardous wastes. Whole tires are introduced at the kiln entrance and flow concurrently with the feed. The remaining fuels are combusted at the kiln exit so that the flow of combustion gases is counter to the direction of the feed flow. Hot clinker at 2500°F - 2640°F exits the kiln into a reciprocating grate cooler (Unit CC).

The combustion air required in the kiln and calciner is preheated as it passes through the reciprocating grate cooler. The exhaust gases from the in-line calciner and separate calciner/preheater are mixed before passing through the two preheat towers. The exhaust gas is then conditioned, dedusted in a baghouse 431.BF1 and vented directly to the main stack about 10% of the operating time. The remainder of the kiln operating time the exhaust gases are used to dry the raw materials and raw coal in the roller mill and coal mill respectively. During normal operation about 90% of the gases pass through the roller mill to the baghouse 431.BF1. The remaining gases pass through the coal mill to baghouse 476.BF3. Both baghouses vent to the main stack.

ID	Description	Control Device
431.BF1	Kiln/Roller mill system	Baghouse
476.BF3	Coal mill system	Baghouse

4.d. Unit CC: Reciprocating Grate Clinker Cooler

A reciprocating grate cooler serves to cool the clinker while heating the combustion air used in the kiln and calciner. The clinker is further cooled in an H-clinker cooler (Unit CM) before transfer to the clinker storage silos.

ID	Description	Control Device
471.BF1	Reciprocating grate clinker cooler vent	Baghouse

Table 2. Emissions Unit OA emission limits and standards:

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
40 CFR 60.62(a)(2)	15	Visible emissions	20% opacity	6 minute average	NA	16
40 CFR 60.62(a)(1)	17.a	PM	0.30 lb/ton of dry kiln feed	avg. of 3 test runs	18	19
1977 PSD permit	17.b	PM	0.033 gr/dscf	6-hour average	18	19
1977 PSD permit	17.c	PM	436 lbs/day	daily average	18	19
1977 PSD permit	20.a	SO_2	10 ppm by volume	3-hour average	21	22
1977 PSD permit	20.b	SO_2	150 lbs/day	daily average	21	22
1997 PSD permit	24	CO	490 lbs/hr	8 hour rolling average	NA	25
40 CFR 63.1343(d)	26	Dioxins and Furans	0.20 ng/dscm TEQ, corrected to 7% O_2 if T (baghouse) > 204°C or 0.40 ng/dscm TEQ, corrected to 7% O_2 if T (baghouse) ≤ 204°C	avg. of 3 test runs	27	28
340-222-0040	31.a	Non-hazardous waste fuel supplement	20% by heat input and weight; 30% after performance test	1 hour average	32	33
340-222-0040	31.b	Non-hazardous waste raw material supplement	5% by weight; 10% after performance test	1 hour average	32	33

VISIBLE EMISSIONS

15. Applicable Requirement: The permittee must not cause or allow the emissions of any air contaminant into the atmosphere for any six (6) minute average period which is equal to or greater than 20% opacity, excluding uncombined water, from emission unit OA. [40 CFR 60.62(a)(2)]

16. Monitoring and Recordkeeping Requirement: The permittee must monitor visible emissions from the emission unit OA by calibrating, maintaining, and recording the output of a continuous opacity monitoring system (COMS) on the kiln stack in accordance with the Department's Continuous Monitoring Manual. Averaging times and data reporting requirements shall be consistent with the Continuous Monitoring Manual.

PARTICULATE EMISSIONS

17. Applicable Requirement: The permittee must not cause or allow the emissions of particulate matter from emission unit OA in excess of the following levels:

    17.a. 0.30 lbs/ton of dry kiln feed; [40 CFR 60.62(a)(1)]
    17.b. 0.033 gr/dscf; [1977 PSD permit - PSD-X-77-03]
    17.c. 436 lbs/day. [1977 PSD permit - PSD-X-77-03]

18. Testing Requirement: The permittee must determine compliance with the particulate matter standards by conducting an EPA Method 5 source test on the kiln stack once each calendar year in accordance with the Department's Source Sampling Manual. Successive annual source tests shall be at least 6 months apart.

19. Monitoring Requirements: The permittee must prepare a written operations and maintenance plan for the kiln, raw mill, and related air pollution control devices . The plan shall be submitted to the Department for review and approval. [40 CFR 63.1350(a)] Failure to comply with any provision of the operation and maintenance plan, as approved by the Department, shall be a violation of this permit. [40 CFR 63.1350(b)]

UNITED S TES ENVIRONMENTAL PROTECTION A NCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

FEB 25 1997

Certified Mail - Return Receipt Requested

Mr. Servando Mejia
Director
Environmental Department
Puerto Rican Cement Company, Inc.
P.O. Box 364487
San Juan, PR 00936-4487

Re: Final Prevention of Significant Deterioration of Air Quality (PSD) Permit and Revised PSD Non-applicability Determination for the Kiln 6 Expansion from 3,100 TPD of Clinker to 4,100 TPD

Dear Mr. Mejia:

On May 23, 1995, the Region II Office of the U.S. Environmental Protection Agency (EPA) received a PSD application from the Puerto Rican Cement Company, Inc. (PRCC) for the expansion of clinker production of Kiln 6 from 3,100 tons per day (tpd) and 971,030 tons per year (tpy) to 4,100 tpd and 1,238,100 tpy. PRCC further augmented the application on June 27, July 6, October 3, November 10 and December 1, 1995. In addition, PRCC provided more information on January 17, February 28, March 26, April 2, and April 24, 1996. The facility is currently located in the town of Ponce, Puerto Rico.

On July 10, 1996, EPA issued a preliminary determination, subject to public review, to approve the PSD application. As part of the review process pursuant to 40 CFR §124, a public notice allowing for a 30-day public review period was published on July 19, 1996, in the two newspapers, El Nuevo Dia and the San Juan Star. EPA received public comments from PRCC only.

EPA concludes that this final permit now meets all applicable requirements of the PSD regulations codified at 40 CFR §52.21 and the Clean Air Act (the Act). Accordingly, I hereby approve PRCC's PSD permit for the Kiln No. 6 Wet to Dry Conversion and Capacity Expansion Project. This letter and its attachments represent EPA's final permit decision. A project description and summary of the control technologies to be used are provided in Attachment I. The permit conditions are found in Attachment II. Attachment III contains a summary of the netting analyses (which determined that SO_2, NO_x, PM/PM_{10} and Pb are still not subject to PSD), a summary of the air quality impacts for CO, and a summary of the stack parameters for Kiln 6 and the nearby Lime Kiln. Attachment IV contains EPA's Responsiveness Summary on the comments received on the draft PSD permit.

Attachment I (cont'd)

Puerto Rican Cement Company, Inc.
Kiln No. 6 Wet to Dry Conversion and Capacity Expansion
Project Description

CFG fan and the P1 fan will be equipped with an outlet manifold and a series of manual control dampers which subdivide the air longitudinally along the cooler. The airflow is also subdivided across the width of the cooler by the location of the fans. In this way, airflow is independently controlled to every grate plates. The CFG system will reduce the amount of air to 0.6755 kg air per kg of clinker (excluding pressurization air). Together with the proposed modifications to the kiln feed system and the kiln I.D. fan, a future clinker production approaching 4,100 TPD is expected.

As described, the proposed project is a modification to an existing facility and identification of the specific items to be modified fall into two categories: 1) modifications that will certainly be made, and 2) modifications that may be made. For the second category of items, PRCC will know whether these need to be made until after the first category of items have been made and 6 to 9 months of actual operation have occurred. This operating experience is necessary to evaluate the need to make the second category of modifications. Table 1. below presents those items that will certainly be modified or added. Table 2. below presents the types of items which may be modified or added after evaluating the Kiln 6 clinker production capability after making the Table 1. modifications.

The first four modifications on Table 1. will be made initially. The Pre-heater Gas Conditioning Tower modification will be made after the initial phase because of the lead time required to engineer, procure, and install the cooling vessel. The Table 2. modifications will begin within 18 months of completing the Table 1. modifications. All modifications will be completed within 24 months of first startup after the initial Table 1. modifications.

Table 1. Kiln 6 Modifications that will be Made

	Description and Comments
Clinker Cooler Fans	Replace the Folax Cooler first stage section with CFG system and reconfigure the P1 fan. In addition cooler fans 4-7 will be replaced with fans with higher pressure rating.
Kiln Feed System	The kiln feed system will be modified by upgrading the "air-lift" system to feed around 315 TPH.
Kiln I.D. Fan	The kiln I.D. fan will be replaced with a larger fan.
Raw Feed Roller Mill	The roller mill drive motor will be replaced with a new motor rated at 2500 HP and insulation will be added to the roller mill body. The roller mill feeder capacity will be increased to 400 tph.
Pre-heater Gas Conditioning Tower	A new gas cooling tower will replace the existing tower to handle the increase in kiln flue gas flow rate. This tower is important to the successful operation of the electrostatic precipitators.

Attachment II (cont'd)

Puerto Rican Cement Company, Inc.
Kiln No. 6 Wet to Dry Conversion and Capacity Expansion
PSD Permit Conditions

V. Transfer of Ownership

In the event of any changes in control or ownership of facilities to be constructed or modified, this PSD Permit shall be binding on all subsequent owners and operators. The applicant shall notify the succeeding owner and operator of the existence of this PSD Permit and its conditions by letter, a copy of which shall be forwarded to the Regional Administrator.

VI. Maximum Clinker Production

PRCC shall limit the maximum annual clinker production from Kiln 6 to 1,238,100 tons of clinker per 365-day rolling average period. PRCC shall also limit the maximum daily clinker production from Kiln 6 to 4,100 tons of clinker per 24-hour block average period. PRCC may request an increase in the clinker production limits provided PRCC can demonstrate that the emission factor for NO_x is lower than 5.17 lbs of NO_x/ton of clinker. In addition, when using a revised emission factor, the netting calculation for NO_x shall not exceed the PSD de minimis value for NO_x (see Attachment III).

VII. Best Available Control Technology (BACT) and Emission Limitations for Kiln 6

1. **Carbon Monoxide (CO)**

   a. PRCC shall employ combustion controls to reduce CO emissions by increasing the oxidation of CO to CO_2 by: 1) improving contact with oxygen, which can be accomplished by improved mixing and/or increased excess air; and 2) increasing the time/temperature relationship.

   b. Emissions of CO shall not exceed, during any 8-hour average basis, 1.74 lbs/ton of clinker, 381 ppm_{dv} corrected to 7% oxygen, and 296.6 lbs/hour, whichever is more stringent.

2. **Volatile Organic Compounds (VOCs)**

   a. PRCC shall employ combustion controls to reduce VOC emissions by increasing the oxidation of VOC to CO_2 by: 1) improving contact with oxygen, which can be accomplished by improved mixing and/or increased excess air; and 2) increasing the time/temperature relationship.

   b. Emissions of VOCs shall not exceed, during any twenty-four-hour average basis, 0.12 lb/ton of clinker and 20.5 lbs/hour, whichever is more stringent.

Attachment II (cont'd)

Puerto Rican Cement Company, Inc.
Kiln No. 6 Wet to Dry Conversion and Capacity Expansion
PSD Permit Conditions

VIII. Continuous Emission Monitoring (CEM) Requirements

1. Prior to the date of startup and thereafter, PRCC shall install, calibrate, maintain, and operate the following continuous monitoring systems:

   a. A continuous monitoring system to measure stack gas volumetric flow rates. The system shall meet EPA monitoring performance specifications (40 CFR Part 52, Appendix E).

   b. Continuous emission monitoring (CEM) systems to measure CO and oxygen. These systems, at a minimum, shall meet EPA monitoring performance specifications of 40 CFR Part 60, Appendix B, Performance Specifications 3 and 4, and 40 CFR Part 60, Appendix F.

2. Not less than 60 days prior to the date of startup of the modified Kiln 6, PRCC shall submit to the EPA a Quality Assurance Project Plan for the certification of the CEM systems. CEM performance testing may not begin until the Quality Assurance Project Plan has been approved by EPA.

3. PRCC shall notify EPA 15 days in advance of the date upon which demonstration of the CEM system performance will commence (40 CFR Part 60.13(c)). The CEM system performance date shall be no later than the date of the initial performance testing required under Permit Condition IX.1. of this permit.

4. PRCC shall submit a written report to EPA of the results of all monitor performance specification tests conducted on the monitoring system(s) within 45 days of the completion of the tests. The continuous emission monitors must meet all the requirements of the applicable performance specification test in order for the monitors to be certified.

5. PRCC shall submit a written report of all excess emissions to EPA for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each quarter and shall include the information specified below:

   a. The magnitude of excess emissions computed in accordance with 40 CFR Part 60.13(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions.

   b. Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions for Kiln 6. The nature and cause of any malfunction (if known) and the corrective action taken or preventive measures adopted shall also be reported.

Attachment II (cont'd)

Puerto Rican Cement Company, Inc.
Kiln No. 6 Wet to Dry Conversion and Capacity Expansion
PSD Permit Conditions

4. To ensure that the emission factors used in the netting analyses have not changed significantly after the Kiln 6 modification, PRCC shall also conduct stack tests for NO_x, SO_2, PM and PM_{10}. PRCC shall use the following test methods, or a test method which would be applicable at the time of the test and detailed in a test protocol approved by EPA:

   a. Performance tests for the emissions of NO_x shall be conducted using 40 CFR Part 60, Appendix A, Method 7E.

   b. Performance tests for the emissions of SO_2 shall be conducted using 40 CFR Part 60, Appendix A, Method 6C.

   c. Performance tests for the emissions of PM shall be conducted using 40 CFR Part 60, Appendix A, Method 5.

   d. Performance tests for the emissions of PM_{10} shall be conducted using 40 CFR Part 51, Appendix M, Method 201 (exhaust gas recycle) or Method 201A (constant flow rate), and Method 202.

5. Test results indicating that emissions are below the limits of detection shall be deemed to be in compliance.

6. Additional performance tests may be required at the discretion of the EPA or EQB for any or all of the above pollutants.

7. For performance test purposes, sampling ports, platforms and access shall be provided by PRCC on the combustion exhaust system in accordance with 40 CFR Part 60.8(e).

8. Results of emission testing must be submitted to EPA within 60 days after completion of performance tests.

9. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test.

10. EPA may require PRCC to install, maintain and operate a NO_x CEMS if the performance stack test results show that the NO_x actual emission rate exceeded the value proposed in the permit application or the actual NO_x values show significant variability during the tests so as to question PRCC's ability to achieved the proposed annual NO_x emission rate.

X. Malfunction

Any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner which results in an increase in emissions above any allowable emission limit stated in Condition VII of this Attachment II and actions taken on any unit must be reported by telephone within 24 hours to:

Attachment III (cont'd)

Puerto Rican Cement Company, Inc.
Kiln No. 6 Wet to Dry Conversion and Capacity Expansion
PSD Netting Analyses, Air Quality Impacts, and Stack Parameters Summary

I) Emission Factors for Wet Process Kiln:

a. SO_2: 8.2 lb SO_2/ton of clinker -- (AP-42)
b. NO_x: 7.4 lb NO_x/ton of clinker -- (AP-42)
c. PM/PM_{10}: 0.77 lb PM/ ton of clinker -- (AP-42)
d. VOC: 0.028 lb VOC/ton of clinker -- (AP-42)
e. CO: 0.12 lb CO/ton of clinker -- (AP-42)
f. Pb: 7.1×10^{-4} lb Pb/ton of clinker -- (AP-42)

II) Emission Factors for Preheater/Precalciner Kiln:

a. SO_2: 1.0 lb SO_2/ton of clinker (AP-42) (1/95 test: 0.033 lb/ton)
b. NO_x: 5.17 lb NO_x/ton of clinker (1/95 test: 5.17 lb/ton)
c. PM/PM_{10}: 0.048 lb PM/ton of clinker (AP-42) (1/95 test: 0.015 lb/ton)
d. VOC: 0.12 lb VOC/ton of clinker (AP-42) (1/95 test: 0.108 lb/ton)
e. CO: 1.74 lb CO/ton of clinker (1/95 test: 0.108 lb/ton)
f. Pb: 7.1×10^{-4} lb Pb/ton of clinker (AP-42)

6. CO emission factor of 1.74 lb/ton of clinker is based on an 8-hour averaging period. The 1/95 test data value of 0.108 lb/ton of clinker for CO is based on a 24-hour averaging period.

Air Quality Impacts Due to Kiln 6 Modifications

Carbon Monoxide*

Averaging Period	Kiln 6 Impact	Sign.Impact Lev.	Total Impact (includes Background)	NAAQS
1-Hour	2,894	2000	3,228	40,000
8-Hour	461	500	N/A[1]	10,000

* Measured in $\mu g/m^3$
[1] Not Applicable (below significance level)

Location (UTM)

Source	Easting (m)	Northing (m)	Height (m)
Kiln 6	749932	1994105	25
Lime Kiln	749902	1994298	25

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ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

PROJECT/PROPOSAL NAME:	Holnam Holly Hill Facility Construction Permits 1860-0005-CO through CU	ENGINEER: Diana Zakrzwski	
		DATE: 7/17/00	

Date Application Received: 12/23/99

FACILITY DESCRIPTION

The facility is a Portland cement manufacturing facility. The existing facility consists of two wet process rotary kilns which produce approximately 1.1 million tons per year of clinker. The facility is proposing removing the two existing kilns and replacing them with one large dry process rotary kiln. The change in operation will also allow an increase in production to approximately 2.5 million tons per year of clinker. With this change much of the existing facility will be decommissioned and new equipment installed. Several other processes will be modified. More detail of the changes is included in the preliminary determination in Appendix A. A detailed description of the proposed process is also included in the preliminary determination.

PROJECT DESCRIPTION

Holnam has submitted an application for a proposed major modification to Holnam's existing Holly Hill Portland Cement Plant located in Holly Hill (Orangeburg County), South Carolina. The existing two wet cement kilns (which produced approximately 1.1 million tons per year of clinker), as well as much of the associated equipment, are proposed to be decommissioned and replaced upon completion of the construction of a new preheater/precalciner kiln and associated equipment. The new kiln will have the capability to produce approximately 2.5 million tons of clinker annually. The new kiln system will fire a combination of many different types of fuel including, but not limited to coal, natural gas, tire derived fuel, non-hazardous fuels, carbon material and hazardous waste derived fuel. The new equipment will be subject to many different state and federal regulations and will require a PSD permit.

SOURCE DESCRIPTION

CO Permission is hereby granted to construct a raw material handling and processing area. This area includes a 5.9 million ton per year raw mill (S98 & S99), a blending raw meal silo (S100 and S101), a dribble bin (S143) and raw mill feed bins for clay, marl, wet fly ash and iron. The gas stream from the kiln system will be used as a direct heating source for the roller mill. The emission limitations for the vertical roller mill gas exhaust is included in the emission limitations for the kiln (with an in line raw mill) in 1860-0005-CS. New product recovery units will also be added to the fly ash receiving to the bin (S127) and to the raw mill (S123). Emission points from product recovery units and control devices (baghouses)are present on the above as labeled as "S" units. The raw material handling and processing area is subject to 40 CFR 63 Subpart A (General Provisions) and LLL (Portland Cement Manufacturing Industry).

CP Permission is hereby granted to construct a cement loadout area. This area will include two (2) cement silos, the cement dome product conveying system, surge bin (S122), and two (2) railcar loading stations (S144 and S145) and the new cement silo truck loadout (S176). Emission points from product recovery units (baghouses)are present on the above as labeled as "S" units. The cement loadout area is subject to 40 CFR 63 Subpart A (General Provisions) and LLL (Portland Cement Manufacturing Industry).

CQ Permission is hereby granted to construct a fuel grinding (primarily coal mill) system. This area will include a coal storage silo (S134), a 400,000 ton per year vertical coal roller mill with a baghouse as a control device (BH95, S95), two pulverized coal bins (S132/S133), a carbon dust bin (S130) and associated fuel conveying system. A small part of the kiln exhaust gases are used for drying in the vertical roller mill in order to utilize this point as a "thermal dryer". Product recovery units and control devices (baghouses) are present on the above as labeled as "S" units. The coal mill system is subject to 40 CFR 63 Subpart A (General Provisions), Subpart EEE (Hazardous Waste Combustors) and LLL (Portland Cement Manufacturing Industry) and 40 CFR 60 Subpart A (General Provisions) and Subpart Y (Coal Preparation Plants).

CR Permission is hereby granted to construct two (2) finish mill systems to produce 1.5 million tons per year of product each (finish mills #5 and 6) and modify the product handling system supporting existing Finish Mill #4. This area will include gypsum and additive feed bins (S114 through S117, S126), a dry Marl bin (S118), a grinding aid tank (S140), two (2) ball mills (S96 and S97), and product storage (S92, S175) along with cement coolers, dedusting operations (S120, S121, S135, S136, S174) and associated product conveying systems (S108, S137, S138). Emission points from product recovery units and control devices

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ENGINEERING CALCULATION SHEET
BAQ Engineering Services Division

PROJECT/PROPOSAL NAME:	Holnam Holly Hill Facility Construction Permits 1860-0005-CO through CU	ENGINEER: Diana Zakrzwski	
		DATE: 7/17/00	

(baghouses) are present on the above as labeled as "S" units. The finish mill system is subject to 40 CFR 63 Subpart A (General Provisions) and LLL (Portland Cement Manufacturing Industry).

CS Permission is hereby granted to construct a clinker manufacturing and handling system. The system is a preheater/precalciner dry process kiln system with an in-line raw mill. This system includes a raw mill silo (S102) and kiln feed elevator (S103) that feeds a 2-string, 4-stage preheater with an in-line precalciner feeding the 2.5M TPY kiln, a clinker cooler and handling system (S106, S107, S119, and S124). Combustion gases from the system (i.e, raw mill, preheater, precalciner, hot gas generator, clinker cooler) will be exhausted out of the main kiln stack (S94). Some of the kiln gases will be used by the coal mill system to preheat the coal. Particulate matter will be controlled by a baghouse (BH94A) before being discharged to the atmosphere out of main kiln stack. To control volatile elements in the kiln system a bypass will be installed. The bypass will divert approximately 15% of the kiln gases away from the preheater and precalciner. These diverted gases contain cement kiln dust (CKD) which will be cleaned in a separate baghouse (BH94B) and then exhausted back to the main kiln stack (S94). The CKD collected by BH94B will be conveyed to a storage tank. CKD emissions associated with this transfer will be controlled by a baghouse (BH104, S104). CKD emissions associated with the transfer to trucks for transport will be controlled by a baghouse (BH105, S105). Emission points from product recovery units and control devices are labeled as "S" units. The clinker manufacturing and handling system is subject to 40 CFR Part 63, Subpart A (General Provisions), Subpart LLL (Portland Cement Manufacturing Industry), and Subpart EEE (Hazardous Waste Combustors). The kiln system is subject to 40 CFR 61, Subpart A (General Provisions) and Subpart FF (National Emission Standard for Benzene Waste Operations).

CT Permission is hereby granted to construct a hazardous waste derived fuel (HWDF) storage burn tank (250,000 gallons, T-111, (S-128)). Emissions are either vented to the kiln system (primary control) or a carbon canister system (secondary). Emissions from the existing HWDF storage tank and blend tanks will also be vented to the kiln system (primary control) or an existing carbon canister system (secondary). The HWDF tank and closed vent system, including control devices are subject to 40 CFR 61, Subpart A (General Provisions), Subpart V (National Emission Standard for Equipment Leaks (Fugitive Emission Sources)) and Subpart FF (National Emission Standard for Benzene Waste Operations) and 40 CFR 63 Subpart A (General Provisions) and Subpart DD (National Emission Standards for Hazardous Air Pollutants from Off-Site Waste and Recovery Operations). The HWDF tank and closed vent system, including control devices are subject to 40 CFR 60 Subpart A (General Provisions) and Subpart Kb (Standards of Performance for VOL Storage Vessels). This tank is subject to SC Regulation 61-62.5, Standard No. 5.1 (LAER) and Standard No. 7 (PSD).

CU Permission is hereby granted to construct new mining equipment associated with the quarrying of both clay and marl. This clay quarrying equipment includes a clay crusher and pre-blending pit consisting of several transfer points and associated conveying equipment. The excavation, pre-crushing, and conveying of marl will be done by a 4,500,000 ton per year continuous mining system. The material from this system will be conveyed to a mobile belt conveyor and then to a covered storage area consisting of several transfer points and associated conveying equipment. The mining system is subject to 40 CFR 60 Part 60, Subpart A (General Provisions) and Subpart OOO (Standards of Performance for Non-Metallic Mineral Processing).

ACTUAL AND POTENTIAL EMISSIONS

ID Number	Pollutant	Actual Emission Rate lb/hr	Actual Emission Rate TPY	Emission Increase from Project (TPY)	Method of Estimating Emissions
Total Project	TSP	311	1156	-526	Engineering Calcs
	PM-10	225	836	-155	Engineering Calcs
	SO2	1077	4011	-161	Engineering Calcs
	NO_x	1482	5516	1749	Engineering Calcs

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	CO	2645	9849	8835	Engineering Calcs
	VOCs	88	327	203	Engineering Calcs
	Pb	0.08	0.3011	-0.0601	Engineering Calcs
	Be	0.0001	0.00049	0.00015	Engineering Calcs
	Hg	0.06	0.2099	0.098	Engineering Calcs
	Fluorides	0.30	1.11	0.65	AP-42

Emissions are based on a production capacity of 2,462,318 tons of clinker per calendar year (This limit is included in the permit.)

EMISSION LIMITATIONS

Permit	Pollutant	Limit	Test Method
CO	Opacity (All other sources in raw mill permit)	10%	Method 9
CO	Opacity (Raw mill gas stream which is also kiln exhaust - included in 1860-0005-CS)	20%	Method 9
CP	Opacity	10%	Method 9
CQ	Opacity PM (Coal Mill Stack only)	10% 0.031 gr/dscf	Method 9 Method 5
CR	Opacity PM	10% 56.84 lb/hr each finish mill	Method 9 Bureau Approved
CS	Dioxin/Furan HWMACT / PC MACT	0.20 ng TEQ/dscm Corrected to 7%O_2 or 0.40 ng TEQ/dscm Corrected to 7%O_2 and inlet temperature of baghouse not to exceed 400 deg F	Method 0023A and SW-846
	Mercury HWMACT	56 μg/dscm Corrected to 7%O_2	Method 29
	Pb and Cd HWMACT	180 μg/dscm (sum of both)	Method 29
	As, Be and Cr HWMACT	54 μg/dscm (sum of all)	Method 29
	Hydrocarbons HWMACT	10 ppmv - hourly rolling avg dry basis as propane Corrected to 7%O_2	CEM

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	Hcl and Cl_2 HWMACT	86 ppmv (sum of both) expressed as Hcl equivalents, dry basis Corrected to 7%O_2	Method 26A, 320 or 321
	PM HWMACT / PC MACT	0.15 kg/Mg dry feed (Combined both coal mill system stack and main stack)	Method 5 or 5I
	Opacity HWMACT / PC MACT/ Std 4	20%	COM or Method 9
	Ni Std 3	0.006 lb/million Btu total heat input	Bureau Approved
	Cd Std 3	1.0e-4 lb/million Btu total heat input	Bureau Approved
	Cr Std 3	5.0e-4 lb/million Btu total heat input	Bureau Approved
	As Std 3	2.5e-4 lb/million Btu total heat input	Bureau Approved
	Pb Std 3	5.0e-3 lb/million Btu total heat input	Bureau Approved
	HCl Std 3	0.45 lb/million Btu total heat input	Bureau Approved
	NO_x PSD	4.48 lb/ton clinker (first year) 4.33 lb/ton clinker (after first year) 30 day rolling average - sum of both the main kiln stack and the coal mill stack	CEM
	CO PSD	8.00 lb/ton clinker (first year) 6.8 lb/ton clinker (after first year) 30 day rolling average - sum of both the main kiln stack and the coal mill stack	CEM
	VOC PSD/LAER	0.27 lb/ton clinker 3 hr block average - sum of both the main kiln stack and the coal mill stack tested simultaneously or ratioed appropriately	Bureau approved
	DRE HWMACT / Std 3	99.99% destruction efficiency of POHC	Bureau approved
	SO_2 PSD	3.26 lb/ton clinker 30 day rolling average - sum of both the main kiln stack and the coal mill stack	CEM
CT	Opacity VOC	20% 1.07 tons/yr	Method 9 Bureau Approved
CU	Opacity	10%	Method 9

South Carolina

Department of Health and Environmental Control

Bureau of Air Quality

Final Determination

for

Holnam- Holly Hill Plant
Orangeburg County, South Carolina

October 13, 2000

Stack Height) and SC Regulation 61-62.70 (Title V Regulations).

Table 1 - Potential Emissions from New Project

Pollutant	Emission Factor	pounds per hour (lb/hr)	Tons per year (TPY)
TSP	Engineering Calcs	311	1156
PM-10	Engineering Calcs	225	836
SO2	Engineering Calcs	1077	4011
NO_x	Engineering Calcs	1482	5516
CO	Engineering Calcs	2645	9849
VOCs	Engineering Calcs	88	327
Pb	Engineering Calcs	0.08	0.3011
Be	Engineering Calcs	0.0001	0.00049
Hg	Engineering Calcs	0.06	0.2099
Fluorides	AP-42	0.30	1.11

Emissions are based on a production capacity of 2,462,318 tons of clinker per calendar year (This limit is included in the permit.)

Table 2 - Emission Increase from New Project

Pollutant	Tons per year (TPY)
TSP	-526
PM-10	-155
SO2	-161
NO_x	1749
CO	8835
VOCs	203
Pb	-0.0601
Be	0.00015
Hg	0.098
Fluorides	0.65

Emissions are based on a potential production capacity of 2,462,318 tons of clinker per calendar year (This limit is included in the permit.)

permit condition for NO_x emissions similar to the permit condition for CO emissions that would allow SCDHEC to review and revise the NO_x limitation depending on future conditions. If added, it should also contain the stipulation that in no event shall revised NO_x emission limitations exceed the limitations listed in the permit.

Bureau - The Bureau has required that Holnam test the raw material properties listed above on a semiannual basis. A requirement has also been added to the permit similar to the CO condition which reads as follows:

This PSD permit's emission limitation for NO_x is based on the site specific raw material properties, fuel usage and design of the system. The Bureau shall review the raw material testing, Continuous Emission Monitor data, and any other pertinent information periodically (beginning after the first two years of commercial operation). Upon review, the NO_x emission limitation and/or the NO_x averaging time may be adjusted downward if deemed appropriate by the Bureau. In no event shall revised NO_x emission limitations allow greater emissions than the limitations listed in II.A. The intent of this condition is not to remove operational and process flexibility from Holnam, but to show a realistic permit limit relative to actual operation.

3. EPA - We consider the 30-day averaging period specified in the draft permit to be excessive, and a 24-hour averaging period should be specified instead.

Bureau - The raw materials that this facility uses are highly variable in regards to nitrogen and moisture content. The NOx emission limit is not based on the absolutely worst case conditions for either of these two variables. Due to the fact that the facility has great concern over the variability of the NOx emissions from this process due to the raw materials and the newly designed kiln, the Bureau has issued the permits with the 30-day averaging period with a condition requiring that the issue of averaging time be reevaluated periodically as information from the new kiln is reviewed. The condition is listed above in item 2.

EPA - SCDHEC should require Holnam to explain the technology that will allow achieving the low NOx emission rate at the Texas facility (Midlothian - 1.2 lb/ton clinker) and further discuss why such technology is not applicable to the Holly Hill facility.

Bureau - Holnam has stated that the construction permit application submitted to the Texas Natural Resource Conservation Commission (TNRCC) is inaccurate due to an error in the calculations. Holnam is initiating appropriate measures with TNRCC to correct the error.

EPA - SCDHEC should require Holnam to provide information on SNCR as it relates to HCB Siggenthal facility in Sweden. More information is also requested in general on the infeasibility of SNCR.

Bureau - SNCR is not considered BACT because of the high probability for external opacity and a detached plume. All of the current installations of SNCR on cement kilns are in other countries which do not have opacity limitations on the kiln systems. Only two of these incorporate multistage combustion with SNCR.

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OFFICE OF ENVIRONMENTAL QUALITY CONTROL
BUREAU OF AIR QUALITY
NESHAP (40CFR63) CONSTRUCTION PERMIT

Holnam, Inc.
PO Box 698
Holly Hill, SC 29059

Permission is hereby granted to construct a clinker manufacturing and handling system. The system is a preheater/precalciner dry process kiln system with an in-line raw mill. This system includes a raw mill silo (S102) and kiln feed elevator (S103) that feeds a 2-string, 4-stage preheater with an in-line precalciner feeding the 2.5M TPY kiln, a clinker cooler and handling system (S106, S107, S119, and S124). Combustion gases from the system (i.e, raw mill, preheater, precalciner, hot gas generator, clinker cooler) will be exhausted out of the main kiln stack (S94). Some of the kiln gases will be used by the coal mill system to preheat the coal. Particulate matter will be controlled by a baghouse (BH94A) before being discharged to the atmosphere out of main kiln stack. To control volatile elements in the kiln system a bypass will be installed. The bypass will divert approximately 15% of the kiln gases away from the preheater and precalciner. These diverted gases contain cement kiln dust (CKD) which will be cleaned in a separate baghouse (BH94B) and then exhausted back to the main kiln stack (S94). The CKD collected by BH94B will be conveyed to a storage tank. CKD emissions associated with this transfer will be controlled by a baghouse (BH104, S104). CKD emissions associated with the transfer to trucks for transport will be controlled by a baghouse (BH105, S105). Emission points from product recovery units and control devices are labeled as "S" units. The clinker manufacturing and handling system is subject to 40 CFR Part 63, Subpart A (General Provisions), Subpart LLL (Portland Cement Manufacturing Industry), and Subpart EEE (Hazardous Waste Combustors). The kiln system is subject to 40 CFR 61, Subpart A (General Provisions) and Subpart FF (National Emission Standard for Benzene Waste Operations). This project is also subject to SC Regulation 61-62.5 Standard No. 7, Prevention of Significant Deterioration (PSD).

NOTWITHSTANDING ANY OF THE CONDITIONS LISTED BELOW, NO APPLICABLE LAW, REGULATION, OR STANDARD MAY BE VIOLATED.

CONDITIONS

1. All official correspondence, plans, permit application forms, and written statements are an integral part of this permit.

2. THE DIRECTOR OF THE ENGINEERING SERVICES DIVISION MUST BE NOTIFIED IN WRITING OF THE DATE CONSTRUCTION BEGAN POSTMARKED NO LATER THAN 30 DAYS AFTER SUCH DATE, AND THE ACTUAL DATE OF STARTUP POSTMARKED WITHIN 15 DAYS AFTER SUCH DATE OF EACH PERMITTED FACILITY.

3. This construction permit shall expire 18 months from date issued. This permit may be extended one year upon approval by the Bureau following the written request from the permittee. This request must be made prior to the permit expiration.

4. An expired construction permit may be reactivated within one year of the expiration only upon approval by the Bureau following the written request of the permittee. This request shall address all laws, regulations, and standards applicable at the time of request for reactivation.

This is pursuant to the provisions of Section 48-1-110, 1976 *Codes of South Carolina*, as amended, and the *South Carolina Air Quality Control Regulation 62.1*, Section II and the *Code of Federal Regulations*, Title 40, Part 63, Subpart A.

PERMIT NUMBER: 1860-0005-CS
PLANT LOCATION: Hwy 453 - Holly Hill
DATE OF ISSUE: October 13, 2000

C. ADDITIONAL CONDITIONS

ID. NO.

CS67 Continuous Emission Monitors for SO_2, CO and NO_x are required in order to verify compliance with the above emission limitations for the kiln system. CEMs shall be installed on both the coal mill stack and on the main kiln stack. Quarterly reports detailing any excursions (if applicable) or downtime shall be submitted to the Manager of the Technical Management Section, Bureau of Air Quality postmarked no later than 30 calendar days after the end of the reporting period. These reports shall include the 30 day rolling average (24 1-hour measurements in tonnage of SO_2, CO and NO_x summed together and added to the previous 29 day sum). The lb/ton clinker value shall be calculated using the daily production records for clinker. These records shall be maintained as required in CS69. Quarterly Continuous Emission Monitor reports shall be submitted to the Manager of the Technical Management Section, Bureau of Air Quality postmarked no later than 30 calendar days after the end of the reporting period. Monitor operations shall be subject to South Carolina's "Continuous Monitoring System Evaluation Plan"(9/96), as amended. The report shall include the following minimum information:
a. All measurements for periods during which the above emission limitations have been exceeded, together with their nature and cause.
b. For periods of monitoring system malfunction:
i. The date and time identifying each period during which the monitoring system was inoperative, except for zero and span checks.
ii. The nature of monitoring system repairs or adjustments.
iii. Proof of the monitoring system performance may be required by the Department whenever repairs or adjustments have been made.

CS68 A source test for VOC emissions from the kiln system will be required. The tests shall be performed within 60 days after achieving maximum production but not later than 180 days after initial start-up. The Bureau must be notified at least two weeks prior to any source test so that a Bureau representative may be present. This testing shall then hereafter be done with the comprehensive and confirmatory testing required by the HWCMACT/PCMACT Standard. The testing shall be done at least every two and a half years. Source test methodology must be approved by the Bureau and comply with SC Regulation 62.1, Section IV, Source testing.

CS69 This source is limited to a maximum production rate of 2,462,318 short tons per year of clinker. Holnam must record the actual monthly production rates and maintain these records on-site for a period of at least five (5) years from the date generated. The facility shall also maintain daily clinker production records for the calculation of the NO_x, CO and SO_2 emissions. These records shall be made available to Department personnel upon request. Annual reports including all recorded parameters and calculated values including the annual clinker production rate shall be submitted to the Manager of the Technical Management Section, Bureau of Air Quality postmarked no later

Part 70 Permit Number
47-065-3070

This Permit Shall Remain in Full Force and Effect

From May 15, 1999 Through May 14, 2004

Issued to:

SIGNAL MOUNTAIN CEMENT COMPANY, L.P.
1201 SUCK CREEK ROAD
CHATTANOOGA, TENNESSEE 37405

Designated Representative:
Robert East

TELEPHONE: (423) 624-3500
extension 106

Responsible official:

Agreed to By:
J. Joseph Zimmerman
Vice-President of Manufacturing

An Application For Renewal Must Be Submitted to the Director of
the Chattanooga-Hamilton County Air Pollution Control Bureau
No Later Than November 14, 2003

CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
3511 Rossville Blvd
Chattanooga, Tennessee 37407
(423) 867-4321

Robert H. Colby
Director

Prepared by: Douglas L. Erwin

ALTERNATE OPERATING SCENARIO EMISSIONS UNIT SPECIAL CONDITIONS

Emission Unit 10 Precalciner/Kiln (dry kiln)

1.0 The maximum allowable emission of carbon monoxide (CO) from Stack #1 (EP2010) is 2.77 pounds per ton of clinker or 248 lb/hr (if determined by stack testing, averaged over three 1-hour test runs), not to exceed 1,085 tons/yr. This limitation is Best Available Control Technology (BACT) based on the emissions netting determinations and the BACT analysis submitted by the source in accordance with Section 4-41, Rule 18 (Prevention of Significant Air Quality Deterioration, or PSD) of the Ordinance and in accordance with the PSD Final Determination. Compliance with this limitation shall be accomplished by adherence to kiln and precalciner oxygen level requirements.
§4-41, Rule 18 (PSD)

2.0 Emissions of particulate matter from exhaust Stack #1 serving the Raw Mill, Precalciner, and Kiln shall not exceed 18.3 lb/hr (if determined by stack testing, averaged over three 1-hour test runs); and shall not exceed the New Source Performance Standard (NSPS) emission limit of 0.30 pounds per ton of dry kiln feed, which is specified in Title 40 *Code of Federal Regulations (CFR)* Part 60, Subpart F (July 1, 1996). Compliance with these limitations shall be achieved by venting the exhaust through baghouses 12 and 15; by operating these baghouses at all times that material is being processed; and by maintenance of the baghouses in accordance with the source's Baghouse Operating and Maintenance Plan. This limitation and these requirements are BACT as determined by the Director, the Chattanooga-Hamilton County Air Pollution Control Bureau (the Bureau) in accordance with Section 4-41, Rule 27.1 of the Ordinance.
§4-41, Rule 15.1, Rule 18, Rule 27.1

3.0 The maximum allowable emission of nitrogen oxides (NO_x) from Stack #1 is 1500 ppm when averaged over any three consecutive hour period and, based on the Director's Final Determination under PSD Rule 18, 403 lb/hr. This limitation shall be accomplished by adherence to kiln oxygen level requirements.
§4-41, Rule 2.6, Rule 18

4.0 The maximum allowable emission of sulfur dioxide (SO_2) from Stack #1 is 500 ppm and, based on the Director's Final Determination under PSD Rule 18, 89.5 lb/hr. This limitation shall be accomplished by adherence to kiln and precalciner oxygen level requirements.
§4-41, Rule 13.1, Rule 18

5.0 The oxygen level in the preheater section of the kiln shall be determined by oxygen analyzer and continuously recorded in order to maintain optimum kiln/precalciner performance and to minimize gaseous pollutants. The preheater oxygen range that results in optimum kiln system performance will be determined at the time of the required stack testing and shall be submitted to the Bureau at or before the time that the stack test results are submitted.
§4-41, Rule 2.6, Rule 13.1, Rule 18

6.0 The sulfur content of the composite fuel of coal and/or petroleum coke shall not exceed

5% by weight. Daily sampling, while the plant is operating, and analysis to determine the elemental sulfur content of the fuel shall be conducted and documented. This data shall be retained and be made available to Bureau personnel during normal business hours.
§4-41, Rule 13.1, Rule 18

7.0 The sulfur content (as elemental sulfur) of the raw limestone shall not exceed 1% by weight. Daily sampling, while the plant is operating, and analysis to determine the sulfur content of the limestone shall be conducted and documented. This data shall be retained and made available to Bureau personnel during normal business hours.
§4-41, Rule 13.1, Rule 18

8.0 The owner or operator of Signal Mountain Cement Company L.P. shall be required to obtain written approval from the Bureau Director prior to changing the type of raw materials and/or fuels to be used in the cement kiln or precalciner, other than those which are considered to be traditionally used in the manufacture of cement clinker. Traditionally used raw materials means calcium carbonate, aluminum, silica, iron, and water; and fuel constituents consisting of petroleum coke, coal, tires, and #2 fuel oil.
§4-41, Rule 13.1, Rule 18

9.0 The maximum allowable emission of volatile organic compounds (VOCs) from Stack #1 is 10.7 lb/hr. Compliance with this limitation shall be accomplished by adherence to kiln and precalciner oxygen level requirements.
§4-41, Rule 18, Rule 25.3

AMENDMENT
TECHNICAL REVIEW

Permit No:	8996	Company:	**Holnam Texas, L.P.**
Project Type:	**CAMD**	Facility Name:	**PORTLAND CEMENT PLANT**
Record No:	**54651**	City:	**Midlothian**
Account No:	**ED-0099-J**	County:	**Ellis**

AUTHORIZATION CHECKLIST (any "Yes" requires signature by Executive Director):

Will a new policy/precedent be established?	**No**
Was at least one public hearing request received?	**No**
If yes, was/were all the request(s) withdrawn?	**No**
Is a state or local official opposed to the permit?	**No**
Is waste or tire derived fuel involved?	**No**
Are waste management facilities involved?	**No**

PROJECT OVERVIEW

Holnam Texas, L.P. owns and operates a state-of-the art Portland cement plant in Midlothian, Texas. The existing plant consists of a quarry, a raw material storage and processing area, a 3,500 ton/day clinker preheater/precalciner kiln system, two finish mills, and facilities for loading out cement by either rail or truck, and related support systems. The company proposes to install a second cement production line, parallel to the existing, which will use the quarry's existing capacity. The new production will consist of additional raw material storage capacity, a new preheater/precalciner kiln system, a new finish mill, and additional cement loadout capability. The existing line will be modified to conform with the new line. The company proposes that both lines will have low NOX burners, CO reduction, high efficiency baghouses, and a separate scrubber behind the main baghouse of each kiln for control of sulfur compounds. A comparison of existing versus proposed plant emissions is as follows:

Pollutant	Existing Plt ton/yr	Proposed Plt ton/yr
PM	972.1	439.8
NOX	3230	1540
CO	6806	2602
Total Hydrocarbons (THC)	1025.8	888
Total Reduced Sulfur (TRS)	65.3	36.6
SO2	6230.8	3538
H_2SO_4	Not previously Represented	6.9

SPECIAL CONDITIONS

Permit No. 8996/PSD-TX-454M2

EMISSION STANDARDS, FUEL SPECIFICATIONS, AND OTHER LIMITATIONS

1. A copy of this permit shall be kept at the plant site and made available at the request of personnel from the Texas Natural Resource Conservation Commission (TNRCC) or any air pollution control agency with jurisdiction.

2. This permit covers only those sources of emissions listed in the enclosed table entitled "Emission Sources - Maximum Allowable Emission Rates," as those sources are limited to the emission limits and other conditions specified in that attached table. If one emission rate limitation is more stringent than another emission rate limitation, then the more stringent limitation shall govern and be the standard by which compliance will be demonstrated. The annual rates are based on a rolling 12-month period. This permit authorizes the construction of a new second cement production line, including a new kiln, plus the modification of the existing cement production line, and the permit holder must begin construction within 18 months from the issuance of this permit unless a time extension is requested and granted. The changes authorized by this amendment must be completed within a reasonable time. Compliance with the terms of this permit is expected no later than the date of compliance testing under Special Condition No. 15. (2/98)

3. Fuels fired in the kiln and precalciner shall be limited as follows:

   A. Pipeline-quality, sweet natural gas;

   B. Coal containing no more than 1.5 percent sulfur by weight;

   C. Tire-chip fuel (TCF) shall be fired in the precalciner only; and

   D. Wood chips, oil filter fluff, and on-site generated used oil, greases, used sorbents, and rags

   No hazardous waste, as defined by the Federal Resource Conservation and Recovery Act and the rules implementing that Act, may be fired in the kiln or precalciner.

4. Tire-chip fuel shall not exceed 45 percent on an hourly average basis of the total fuel fed into the kiln system (kiln and precalciner) on a higher heating value (HHV) basis. The natural gas heating value shall be provided by the gas supplier, and the HHVs and sulfur content of the coal and TCF shall be determined monthly prior to firing the fuel.

5. Except as otherwise specified in the enclosed maximum allowable emission rates table (MAERT), emission rates for all other individual chemical species with an Effects Screening Level (ESL) from each kiln scrubber stack are limited as follows: (2/98)

BEST AVAILABLE COPY

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

Permit No. 8996/PSD-TX-454M2

This table lists the maximum allowable emission rates and all sources of air contaminants on the applicant's property covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

AIR CONTAMINANTS DATA

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates * lb/hr	TPY
01	Primary Crusher (Mobile)	PM	0.15	0.7
	Baghouse Stack	PM_{10}	0.15	0.7
02	Secondary Crusher	PM	0.15	0.7
	Baghouse Stack	PM_{10}	0.15	0.7
03	Raw Material Transfer Point	PM	0.07	0.3
	Baghouse Stack	PM_{10}	0.07	0.3
04	Conveyor Belt Transfer	PM	0.12	0.5
	Baghouse Stack	PM_{10}	0.12	0.5
05	Raw Material Storage Bins	PM	0.19	0.8
	Baghouse Stack	PM_{10}	0.19	0.8
06	Raw Material Storage Shale	PM	0.19	0.8
	Baghouse Stack	PM_{10}	0.19	0.8
07	Rotary Kiln Scrubber Stack	NO_x	545.0	770.0
		CO	1100.0	1301.0
		THC	117.0	444.0
	(1-hour Average)	SO_2	2600.0	
	(3-hour Average)	SO_2	2300.0	
	(24-hour Average)	SO_2	1900.0	
	(Annual Limit)	SO_2		1769.0
		TRS	14.9	18.3
	(5)	PM (filterable)	16.7	33.6
		PM_{10} (filterable)	16.7	33.6
	(6)	PM (condensible)	353.0	102.6
		PM_{10} (condensible)	353.0	102.6
		PM (total)	367.4	131.6
		PM_{10} (total)	367.4	131.6
		H_2SO_4	197.0	3.45

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

July 12, 2000

Mr. Ronnie T. Beall
President
North Texas Cement Company
P.O. Box 520
Midlothian, Texas 76065-0520

Re: Permit No. 37177/PSD-TX-893
Portland Cement Manufacturing Facility
Whitewright, Grayson County
Account ID No. GI-0248-T

Dear Mr. Beall:

A combined permit for your new facility is enclosed. This will acknowledge that your application for the above-referenced permit is technically complete as of September 11, 1998. We appreciate your cooperation in sending us the information necessary to evaluate your proposal.

The permit contains several general and special conditions that define the level of operation and allowable emissions. In addition, the construction and operation of the facilities must be as represented in the application.

Thank you for your cooperation and interest in air pollution control. If you have any questions, please call Mr. Skip Clark at (512) 239-1274 or write the assigned engineer at Texas Natural Resource Conservation Commission, Office of Permitting, Remediation, and Registration, Air Permits Division (MC-162), P.O. Box 13087, Austin, Texas 78711-3087.

Sincerely,

Jeffrey A. Saitas, P.E.
Executive Director

JS/LC/ds

Enclosures

cc: Ms. Jole Luehrs, Chief, New Source Review Section (6PD-R), U.S. Environmental Protection Agency, Region 6, Dallas
Mr. Tony L. Walker, Air Program Manager, Arlington

SPECIAL CONDITIONS

Permit No. 37177/PSD-TX-893

EMISSION STANDARDS, FUEL SPECIFICATIONS, AND OTHER LIMITATIONS

1. A copy of this permit shall be kept at the plant site and made available at the request of personnel from the Texas Natural Resource Conservation Commission (TNRCC) or any air pollution control agency with jurisdiction.

2. This permit covers only those sources of emissions listed in the enclosed table entitled "Emission Sources - Maximum Allowable Emission Rates," and those sources are limited to the emission limits and other conditions specified in that attached table. If one emission rate limitation is more stringent than another emission rate limitation, then the more stringent limitation shall govern and be the standard by which compliance will be demonstrated. This permit authorizes the construction of a new Portland Cement Manufacturing Facility, and the permit holder must begin construction within 18 months from the issuance of this permit unless a time extension is requested and granted. The construction authorized by this permit must be completed within a reasonable time. Compliance with the terms of this permit is expected no later than the date of compliance testing under Special Condition No. 24.

3. Fuels fired in the kiln and precalciner shall be limited to the following:

   A. A blend of coal and petroleum coke;

   B. Pipeline-quality, sweet natural gas.

   No hazardous waste, as defined by the Federal Resource Conservation and Recovery Act and the rules implementing that Act, or tire-derived fuel may be fired in the kiln or precalciner. Use of any other fuel will require prior approval of the Executive Director of the TNRCC, and retesting may be required.

4. These facilities shall comply with all applicable requirements of the Environmental Protection Agency (EPA) Regulations on Standards of Performance for New Stationary Sources promulgated in Title 40 Code of Federal Regulations Part 60 (40 CFR 60) Subpart A and the following:

   A. Subpart F - Portland Cement Plants;

   B. Subpart Y - Coal Preparation Plants;

   C. Subpart OOO - Nonmetallic Mineral Processing Plants.

C. Excess emissions of CO are each one-hour average period of operation during which the hourly average emissions of CO, as measured and recorded by the CERMS, exceed the emission limitations of Special Condition No. 2.

D. Excess periods of opacity are each six-minute period of operation during which the average opacity, as measured and recorded by the COMS, exceed the emission limitations of Special Condition Nos. 6, 7, and 8.

30. The holder of this permit shall physically identify and mark in a conspicuous location all equipment that has the potential of emitting air contaminants as follows:

A. The facility identification numbers as submitted to the Emissions Inventory Section of the TNRCC.

B. The EPNs as listed on the maximum allowable emission rates table.

RECORDKEEPING REQUIREMENTS

31. Emission rates are based on a maximum allowable clinker production rate of 1,131,500 tons/year on a rolling 12-month basis as determined at the end of each calendar month.

32. Records of the operating hours for the mining operation and overburden handling operations shall be kept on a daily basis. These records shall be maintained for a period of two years.

Dated July 12, 2000

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

AIR CONTAMINANTS DATA

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates * lb/hr	TPY
F10	Main Kiln/Scrubber Stack	PM (5)	28.00	123.00
		PM_{10} (5)	28.00	123.00
		PM (6)	435.00	527.00
		PM_{10} (6)	435.00	527.00
		NO_x	1085.00	1585.00
		SO_2	2840.00	1577.00
		CO	2209.00	3225.00
		VOC	686.00	1008.00
		H_2SO_4	190.00	187.00
F11	Blending Silo Dedusting Baghouse Stack	PM	0.22	0.95
		PM_{10}	0.22	0.95
F12	Feed Bin Baghouse Stack	PM	0.20	0.86
		PM_{10}	0.20	0.86
F13	Preheater Feed	PM	0.20	0.89
		PM_{10}	0.20	0.89
F14	Blending Silo Main Baghouse Stack	PM	0.06	0.28
		PM_{10}	0.06	0.28
F15	Clinker Conveyor No. 1 Baghouse Stack	PM	0.51	2.22
		PM_{10}	0.51	2.22
F16	Clinker Conveyor No. 2 Baghouse Stack	PM	2.15	9.42
		PM_{10}	2.15	9.42
F17	Clinker Conveyor and Bin Baghouse Stack	PM	0.67	2.91
		PM_{10}	0.67	2.91
F18	Bypass Dust Bin	PM	0.22	0.96
		PM_{10}	0.22	0.96

Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

January 11, 2001

Mr. Rex Coffman
Senior Environmental Engineer
TXI Operations, L.P.
1341 West Mockingbird Lane
Dallas, Texas 75247

Re: Permit Amendment and Consolidation
Permit No. 1360A
Portland Cement Manufacturing Facility
Midlothian, Ellis County
Account ID No. ED-0066-B

Dear Mr. Coffman:

This is in response to your permit application, Form PI-1, concerning the proposed amendment to Permit No. 1360A. We understand that you propose to increase the throughput of finished cement through an existing cement storage and distribution system and to represent improved abatement in certain fabric filter baghouses. Also, this will acknowledge that your application for the above-referenced permit is technically complete as of October 25, 2000.

Permit No. 4758, Masonry Rail Loading Baghouse [Emission Point No. (EPN) E4-21], will be voided and consolidated into Permit No. 1360A as a result of this amendment. Additionally, this amendment will void and consolidate into Permit No. 1360A several previously registered standard exemption and/or permit by rule authorizations as listed below:

Registration No.	EPN(s)
44064	E3-50
43268	E1-31A
42768	E4-24, 26, 27, and 28
24035	E3-9, E4-24
24934	E3-14
23504	E3-2, E3-3, and E3-5

III. CEMENT KILN EMISSION STANDARDS AND FUEL SPECIFICATIONS

A. Kilns Nos. 1 through 4 (EPNs E2-2, E2-4, E2-6, and E2-8)

1. The maximum sulfur content of fuels fired in the Kilns (EPNs E2-2, E2-4, E2-6, and E2-8) shall not exceed the following:

   a. Pipeline-quality natural gas-0.25 grain hydrogen sulfide (H_2S) and 5.0 grains total sulfur per 100 dry standard cubic feet.

   b. Fuel oil-1.5 percent by weight.

   c. Coal or coke-3.5 percent by weight.

   d. Waste-derived fuel-1.0 percent by weight.

2. Emissions from the cement kiln exhaust stacks shall not exceed 30 percent opacity (except at times when the only fuel burned in a kiln is fuel oil in which case the opacity limit is 20 percent opacity averaged over a six-minute period) as determined by EPA Reference Method 9 or by the continuous opacity monitoring systems (COMS) required pursuant to Special Condition No. V(A)1.

3. The clinker production rate of each of Kilns Nos. 1 through 4 shall not exceed 375,000 tons of clinker per year.

4. The average oxygen (O_2) content measured at the kiln exit of Kilns Nos. 1 through 4 shall be maintained at/or above 0.75 percent by volume on a five-minute average. Monitoring of the kiln exit average O_2 content will be in accordance with Special Condition No. V(A)1.

B. Kiln No. 5 (EPN E2-22)

1. Fuels fired in the main burner and precalciner of Kiln No. 5 (EPN E2-22) shall be limited as follows:

   a. Pipeline-quality, sweet natural gas containing no more than 5.0 grains of sulfur per 100 dry standard cubic feet.

   b. Coal containing no more than 1.5 percent sulfur by weight.

   No hazardous waste, as defined by the RCRA and the rules implementing that Act, may be fired in the dry process kiln or precalciner.

2. Opacity of emissions from the Kiln No. 5 (EPN E2-22) must not exceed 10 percent as determined by EPA Reference Method 9 or by COMS, averaged over a six-minute period, except for those periods described in 30 TAC §111.111 or as otherwise allowed by law.

3. The clinker production rate of Kiln No. 5 (E2-22) shall not exceed 2,200,000 tons of clinker per year.

IV. INITIAL DETERMINATION OF COMPLIANCE

A. Kilns Nos. 1 through 4 (EPNs E2-2, E2-4, E2-6, E2-8)-Compliance testing required by this permit was conducted for Kilns Nos. 1 through 4 in May 1988, July 1990, and April 1991.

B. Kiln No. 5 (E2-22)

1. Sampling ports and platform(s) shall be incorporated into the design of the kiln stack according to the specifications set forth in the enclosed entitled "Chapter 2, Stack Sampling Facilities." Alternate sampling facility designs may be submitted for approval by the TNRCC Regional Director or the TNRCC Manager of the Enforcement Division, Engineering Services Team.

2. The holder of this permit shall, within 180 days of start-up of Kiln No. 5, perform stack sampling and other testing, as required, to establish the actual pattern and quantities of oxides of nitrogen (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), total reduced sulfur (TRS) including H_2S, sulfuric acid mist (H_2SO_4), total hydrocarbons (THC), front and back-half PM and particulate matter equal to or less than 10 microns in diameter within 10 percent of the maximum proposed production rate with the raw mill operating. Additionally, sampling within 10 percent of the maximum production rate shall be performed for SO_2, TRS including H_2S and H_2SO_4 with the raw mill down. Sampling must be conducted in accordance with appropriate procedures of the TNRCC Sampling Procedures Manual and in accordance with EPA Reference Methods. The holder of this permit is responsible for providing sampling and testing facilities and conducting the sampling and testing operations at its expense.

   a. The TNRCC Arlington Regional Office shall be contacted as soon as testing is scheduled, but not less than 45 days prior to sampling to schedule a pretest meeting. The notice shall include:

      (1) Date for pretest meeting.
      (2) Date sampling will occur.
      (3) Name of firm conducting sampling.

EMISSION SOURCES - MAXIMUM ALLOWABLE EMISSION RATES

AIR CONTAMINANTS DATA

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates * lb/hr	TPY
E2-22	Kiln No. 5 Main Stack	PM/PM_{10} (front-half)	29.24	128.10
		PM/PM_{10} (back-half)	40.00	160.00
		NO_X	681.25	2725.00
		SO_2	332.25	1329.00
		THC	6.40	25.60
		CO	92.44	369.74
		H_2SO_4	6.64	29.08
		TRS (including H_2S)	0.03	0.13
E2-101	No. 1 Cooler Baghouse	PM	2.35	10.29
		PM_{10}	1.79	7.84
E2-103	No. 2 Cooler Baghouse	PM	8.78	38.46
		PM_{10}	6.67	29.23
E2-105	No. 3 Cooler Baghouse	PM	8.78	38.46
		PM_{10}	6.67	29.23
E2-107	No. 4 Cooler Baghouse	PM	2.35	10.29
		PM_{10}	1.79	7.84
E3-1	No. 4 Clinker Elevator Baghouse (10)	PM	0.21	0.94
		PM_{10}	0.21	0.94
E3-2	No. 3 Tunnel Baghouse (10)	PM	0.21	0.94
		PM_{10}	0.21	0.94
E3-3	No. 2 Tunnel Baghouse	PM	0.43	1.88
		PM_{10}	0.43	1.88
E3-5	No. 1 Tunnel Baghouse	PM	0.43	1.88
		PM_{10}	0.43	1.88

State of Utah

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY

Michael O. Leavitt
Governor

Dianne R. Nielson, Ph.D.
Executive Director

Ursula Kramer
Director

150 North 1950 West
P.O. Box 144820
Salt Lake City, Utah 84114-4820
(801) 536-4000 Voice
(801) 536-4099 Fax
(801) 536-4414 T.D.D.
Web: www.deq.state.ut.us

Title V Operating Permit

PERMIT NUMBER: 2300015001
DATE OF PERMIT: January 5, 2000
Date of Last Revision: January 5, 2000

This Operating Permit is issued to, and applies to the following:

Name of Permittee:

Ash Grove Cement Company
PO Box 51
Nephi, UT 84648

Permitted Location:

Leamington Cement Plant
Hwy 132
Leamington, UT 84638

UTM coordinates: 4,379,850 meters Northing, 397,300 meters Easting
SIC code: 3241

ABSTRACT

Ash Grove Cement Company operates the Leamington cement manufacturing plant in Juab County, Utah. This plant has been in operation since 1981. At the Leamington cement plant, cement is produced when inorganic raw materials, primarily limestone (quarried on site), are correctly proportioned, ground and mixed, and then fed into a rotating kiln. The kiln alters the materials and recombines them into small stones called cement clinker. The clinker is cooled and ground with gypsum into a fine powdered cement. The final product is stored on site for later shipping. The major sources of air emissions are from the combustion of fuels for the kiln operation, from the kiln, and from the clinker cooling process. The Leamington cement plant is a major source for emissions of PM_{10}, NO_x, and CO, and is subject to NSPS Subparts A, F, Y, & OOO, and NESHAP Subparts A & LLL.

UTAH AIR QUALITY BOARD

By:

Ursula Kramer, Executive Secretary

Prepared By:

David Beatty

(e) Production Rate During Testing. The production rate during all compliance testing shall be no less than 90% of the maximum production achieved in the previous three (3) years.

II.B.6.b.2 **Recordkeeping:** Results of all stack testing shall be recorded and maintained in accordance with the associated test method and Provision S.1 in Section I of this permit.

II.B.6.b.3 **Reporting:** The results of stack testing shall be submitted to the Executive Secretary within 60 days of completion of the testing. Reports shall clearly identify results as compared to permit limits and indicate compliance status. There are no additional reporting requirements for this provision except those specified in Section I of this permit.

II.B.7 **Conditions on Coal Silo (R15):**

II.B.7.a Visible emissions shall be no greater than 20 percent opacity. [Authority granted under 40 CFR 60.252(c) (Subpart Y); condition originated in DAQE-958-96]

II.B.7.a.1 **Monitoring:** A visual observation of each affected emission unit shall be performed on a weekly basis by an individual trained on the observation procedures of 40 CFR 60, Appendix A, Method 9. The individual is not required to be a certified visible emissions observer (VEO). If any visible emissions are observed, an opacity determination of that emission unit shall be performed by a certified VEO in accordance with 40 CFR 60, Appendix A, Method 9 within 24 hours of the initial observation. For each affected emission unit, if no visible emissions are observed for eight consecutive weeks the observation frequency shall be reduced to a monthly basis. If visible emissions are observed during any monthly observation the frequency shall revert back to a weekly basis.

II.B.7.a.2 **Recordkeeping:** Records of visual observations performed and data required by 40 CFR 60, Appendix A, Method 9 for each determination shall be maintained in accordance with Provision I.S.1 of this permit.

II.B.7.a.3 **Reporting:** There are no reporting requirements for this provision except those specified in Section I of this permit.

II.B.8 **Conditions on Kiln & Pre-Calciner and Raw Mill (D38):**

II.B.8.a Emissions of TSP shall be no greater than 23.45 lbs/hr (dry basis) at 170 tons per hour kiln feed rate. [Authority granted under R307-401-6(1) [BACT] & 40 CFR 60 (Subpart F) & 40 CFR 63 (Subpart LLL); condition originated in DAQE-958-96]

II.B.8.a.1 **Monitoring:** Stack testing shall be performed as specified below:

(a) Testing and Frequency. Emissions shall be tested every three years, based on the date of the most recent stack test. Tests may also be required at the direction of the Executive Secretary.

within 60 days of completion of the testing. Reports shall clearly identify results as compared to permit limits and indicate compliance status. There are no additional reporting requirements for this provision except those specified in Section I of this permit.

II.B.8.b Emissions of PM_{10} shall be no greater than 21.11 lbs/hr at 170 tons per hour kiln feed rate. [Authority granted under R307-401-6(1) [BACT]; condition originated in DAQE-958-96]

II.B.8.b.1 **Monitoring**: Stack testing shall be performed as specified below:

(a) Frequency. Emissions shall be tested every three years, based on the date of the most recent stack test. Tests may also be required at the direction of the Executive Secretary.

(b) Notification. At least 30 days before the test, the source shall notify the Executive Secretary of the date, time, and place of testing and provide a copy of the test protocol. The source shall attend a pretest conference if determined necessary by the Executive Secretary.

(c) Methods.

(1) Sample Location - the emission point shall conform to the requirements of 40 CFR 60, Appendix A, Method 1, and Occupational Safety and Health Administration (OSHA) approved access shall be provided to the test location.

(2) For stacks in which no liquid drops are present, the following methods shall be used: 40 CFR 51, Appendix M, Methods 201 or 201a. Method 202 may be used to measure condensible particulate matter.

(3) For stacks in which liquid drops are present, methods to eliminate the liquid drops should be explored. If no reasonable method to eliminate the drops exists, then the following methods shall be used: 40 CFR 60, Appendix A, Method 5, 5a, 5d, or 5e as appropriate. The back half condensibles shall also be tested using a method specified by the Executive Secretary. All particulate captured shall be considered PM_{10}.

(4) The back half condensibles shall not be used for compliance demonstration but shall be used for inventory purposes.

(d) Calculations. To determine mass emission rates (lb/hr, etc.) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate and any necessary conversion factors determined by the Executive Secretary to give the results in the specified units of the emission limitation. In addition, if the production rate during testing is less than 170 tons kiln feed per hour the hourly emission rates shall be scaled linearly using the following formula:

$E = Etest\ (170/P)$

E = equivalent emission rate scaled linearly to a production rate of 170 tons kiln feed per hour

Etest = the measured emission rate at test conditions

P = the production rate at which the source test was conducted (not less than 90% of the highest production rate achieved within the previous three years)

(e) Production Rate During Testing. The production rate during all compliance testing shall be no less than 90% of the maximum production achieved in the previous three (3) years.

II.B.8.b.2 **Recordkeeping:** Results of all stack testing shall be recorded and maintained in accordance with the associated test method and Provision S.1 in Section I of this permit.

II.B.8.b.3 **Reporting:** The results of stack testing shall be submitted to the Executive Secretary within 60 days of completion of the testing. Reports shall clearly identify results as compared to permit limits and indicate compliance status. There are no additional reporting requirements for this provision except those specified in Section I of this permit.

II.B.8.c Visible emissions shall be no greater than 20 percent opacity. [Authority granted under 40 CFR 60 (Subpart F) & 40 CFR 63 (Subpart LLL); condition originated in DAQE-958-96]

II.B.8.c.1 **Monitoring:** The permittee shall calibrate, maintain and operate a continuous monitoring system for measuring the opacity of emissions discharged to the atmosphere in accordance with R307-170 and 40 CFR 63.8 (Subpart A), and shall record the output of the system. The output shall be reviewed at least monthly for compliance with the opacity limit; compliance is to be based on the percent opacity averaged over six consecutive minutes.

II.B.8.c.2 **Recordkeeping:** Results of opacity observations shall be recorded and maintained as required in R307-170 and as described in Provision I.S.1 of this permit.

II.B.8.c.3 **Reporting:** Reports shall be submitted as outlined in R307-170 and Provision I.S.1 of this permit.

II.B.8.d Emissions of NO_x shall be no greater than 400 lbs/hour. [Authority granted under R307-401-6(1) [BACT]; condition originated in DAQE-958-96]

II.B.8.d.1 **Monitoring:** Stack testing shall be performed as specified below:

(a) Frequency. Emissions shall be tested annually based on the date of the most recent stack test. The source may also be tested at any time if directed by the Executive Secretary.

(b) Notification. At least 30 days before the test, the source shall notify the Executive Secretary of the date, time, and place of testing and provide a

4: Comment on an item originating in DAQE-958-96, AO Condition 9.A.4. regarding Kiln & Pre-Calciner and Raw Mill (Unit D38):

CO emissions limit not established.: Approval Order DAQE-958-96, Condition 9.A.4. States: Emissions from this source have been estimated at 501 lb/hr however the final CO emission limit will be established after the initial compliance tests. This limit has not been established to date, however, the permittee has submitted a Notice of Intent dated June 4, 1999 that suggests a limit be set at 3500 lb/hr for this unit. As per the NSR permitting engineer the CO limit will be established with the finalization of the new approval order and will then be incorporated into this permit after that time. [Comment last updated on 6/23/1999]

5: Comment on an item originating in DAQE-958-96 & 40 CFR 63 (Subpart LLL) regarding Kiln & Pre-Calciner and Raw Mill (Unit D38):

BACT more stringent than MACT: 40 CFR 63 (Subpart LLL) shows a TSP limitation of 0.30 lbs./ton of feed (dry basis) to the kiln. AO DAQE 958-96 shows a BACT limitation of 23.45 lbs/hr at 170 tons per hour kiln feed rate or 0.138 lbs/ton of feed to the kiln. The BACT limitation is more stringent and is used as the limitation in this permit. [Comment last updated on 7/19/1999]

6: Comment on an item originating in DAQE-958-96, AO Condition 15 regarding permitted source (Source-wide):

AO monitoring technique subsumed by Method 203C: 58 FR 61640 Method 203C subsumes the haul road opacity monitoring technique described in DAQE-958-96, Condition 15, which has therefore not been included in this permit. [Comment last updated on 12/14/1999]

7: Comment on an item originating in DAQE-958-96, AO Condition 6 regarding Kiln & Pre-Calciner and Raw Mill (Unit D38):

Part of DAQE-958-96, Condition 6 not carried forward to this permit: A)-DAQE-958-96, Condition 6 is partially subsumed by AO Condition 7 for used oil and Utah state rule R307-203-1 for coal. Quarterly reporting requirements from AO Condition 6 have been added to II.B.7.h.3. for coal and used oil. The AO does not indicate any concentration limits to meet or specify any methods to utilize when analyzing TDF, therefore no applicable requirements pertaining to TDF quarterly reporting from AO Condition 6 have been included in this permit. [Comment last updated on 12/20/1999]

8: Comment on an item originating in DAQE-958-96, AO Condition 7 regarding Kiln & Pre-Calciner and Raw Mill (Unit D38):

Used oil sulfur limit subsumed: AO-DAQE-958-96, Condition 7 shows a sulfur limit of 0.5 percent by weight for used oil. Utah state rule R307-203-1 shows a sulfur limit of 0.85 lbs/MMBtu for used oil. The 0.5 percent by weight limit is more stringent than the 0.85 lbs/MMBtu limit and therefore this permit only includes the 0.5 percent by weight limit (condition II.B.7.h.) [Comment last updated on 12/14/1999]

STATE OF UTAH

Department of Environmental Quality

Division of Air Quality

APPROVAL ORDER FOR PSD MAJOR MODIFICATION TO INCREASE NO_X EMISSIONS FROM THE MAIN KILN

Prepared By: John D. Jenks, Engineer
(801) 536-4459

APPROVAL NUMBER

DAQE-303-01

Date: May 2, 2001

Source Contact
Kevin Ovard
(801) 829-2122

Holnam Incorporated

Richard W. Sprott
Executive Secretary
Utah Air Quality Board

following methods shall be used: 40 CFR 60, Appendix A, Method 5, 5a, 5d, or 5e as appropriate. The back half condensibles shall also be tested using the method specified by the Executive Secretary. The portion of the front half of the catch considered PM_{10} shall be based on information in Appendix B of the fifth addition of the EPA document, AP-42, or other data acceptable to the Executive Secretary.

The back half condensibles shall not be used for compliance demonstration but shall be used for inventory purposes.

G. Sulfur Dioxide (SO_2)

40 CFR 60, Appendix A, Method 6, 6A, 6B or 6C

H. Nitrogen Oxides (NO_x)

40 CFR 60, Appendix A, Method 7, 7A, 7B, 7C, 7D or 7E

I. Carbon Monoxide (CO)

40 CFR 60, Appendix A, Method 10

J. Calculations

To determine mass emission rates (lb/hr, etc.) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate and any necessary conversion factors determined by the Executive Secretary, to give the results in the specified units of the emission limitation.

K. Existing Source Operation

For an existing source/emission point, the production rate during all compliance testing shall be no less than 90% of the maximum production achieved in the previous three (3) years.

8. Visible emissions from the following emission points shall not exceed the following values:

A. All kiln exhaust gases - 20% opacity
B. All other point sources - 10% opacity

Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9.

9. The following production limits shall not be exceeded:

A. 691,250 tons of clinker produced per rolling 12-month period

B. 2310 tons of clinker produced per day
C. 7900 hours per rolling 12-month period for operation of the main kiln

To determine compliance with a rolling 12-month total the owner/operator shall calculate a new 12-month total by the twentieth day of each month using data from the previous 12 months. Records of production shall be kept for all periods when the plant is in operation. Production shall be determined by maintenance of a supervisor log. The records of production shall be kept on a daily basis.

10. The emergency generator hours of operation for maintenance purposes shall not exceed 60 hours per 12-month period. Compliance with the annual limitation shall be determined on a rolling 12-month total. Based on the twentieth day of each month a new 12-month total shall be calculated using the previous 12 months of engine hours and shall be kept for all periods when the plant is in operation. Engine hours of operation shall be determined by examination of maintenance records, which shall be kept on site.

<u>Roads and Fugitive Dust</u>

11. The facility shall abide by all applicable requirements of UAC R307- 205 for Fugitive Emission and Fugitive Dust sources.. The provisions of R307-205 shall not apply to any sources for which limitations for fugitive dust or fugitive emissions are assigned pursuant to R307-401 or R307-305 nor shall they apply to agricultural or horticultural activities.

12. All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. The application of water or chemical treatment shall be used. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition unless it is below freezing. The opacity shall not exceed 20% during all times the areas are in use. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:

A. Date
B. Number of treatments made, dilution ratio, and quantity
C. Precipitation received, if any, and approximate amount
D. Time of day treatments were made
E. Records of temperature if the temperature is below freezing.

13. B. The haul road limitations shall be:
B. Twenty-five (25) miles per hour for all haulers
C. Fifteen (15) miles per hour for all loaders

These limitations shall not be exceeded. The vehicle speed on the haul road shall be posted, at a minimum, on site at the beginning of the haul road so that it is clearly visible from the haul road.

records be kept as part of the compliance with this AO is listed following the individual record. Examples of records to be kept at this source shall include the following as applicable:

Production rate	Condition number 9
Hours of operation	Condition number 9
Test results	Condition number 7
Fugitive emission control	Condition number 12
CEMS[1] records	Condition number 22
Maintenance records	Condition number 23
Emission inventory	Condition number 24
Upset, breakdown episodes	Condition number 25

The list above may not be a complete list of all records that are required to be kept by Holnam Inc.. For a complete list of required records check all AO conditions, and all applicable Federal regulations such as NSPS standards that apply to this source.

Any changes which may affect the terms or conditions of this Approval Order shall be reviewed in accordance with R307-401, UAC.

The Executive Secretary shall be notified in writing if the company is sold or changes its name.

This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including UAC R307.

A copy of the rules, regulations and/or attachments addressed in this AO may be obtained by contacting the Division of Air Quality. The Utah Administrative Code R307 rules used by DAQ, the Notice of Intent (NOI) guide, and other air quality documents and forms may also be obtained on the Internet at the following web site: http://www.eq.state.ut.us/eqair/aq_home.htm

Annual emissions for this source (the entire plant) are currently calculated at the following values:

	Pollutant	Tons/yr
1.	PM_{10}	54.8
2.	SO_2	433.7
3.	NO_x	1856.0
4.	CO	1728.1
5.	VOC	32.8

[1] CEMS = Continuous Emission Monitor System

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

West Central Regional Office
3019 Peters Creek Road, Roanoke, Virginia 24019
Telephone (540) 562-6700, Fax (540) 562-6725
http://www.deq.state.va.us

Dennis H. Treacy
Director

[redacted]

Larry K. Owens
Acting Regional Director

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES PERMIT

NEW SOURCE PERFORMANCE STANDARDS PERMIT

STATIONARY SOURCE PERMIT TO MODIFY AND OPERATE

This permit "expansion" supersedes all previously modified or amended conditions and pages to date to your permit dated October 23, 1997, as modified December 9, 1997, January 15, 1999 and June 22, 1999 (Pages amended January 20, 2000 and July 13, 2000) which superseded all previous permits, including permit dated July 26, 1994 as revised October 4, 1995 to modernize the overall plant,which superseded permits dated November 10, 1993, May 22, 1987 and December 18, 1973.

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution,

Roanoke Cement Company
Post Office Box 27
Cloverdale, Virginia 24077
Registration No. 20232; County-Plant No. 0460-0003

is authorized to modify and operate

a portland cement manufacturing plant

located at

State Route 779, 5555 Catawba Road
Botetourt County, Virginia

in accordance with the Conditions of this permit.

Approved on **January 24, 2001.** Larry K. Owens

for Dennis Treacy
Director

Permit consists of 25 pages.
Permit Conditions 1 to 78. Source Testing Report Format.

Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. This permit modification incorporates and supersedes the above permit actions.
(9 VAC 5-170-160)

2. The current principal changes to the plant are: to replace the existing packing operation (packhouse, designated as Unit # PH), and add 3 silos (and associated air pollution control equipment) to Finish Mill #11. The new packhouse is being permitted for a higher throughput capacity, but lower PM/PM10 emissions since six existing baghouses will be replaced with three smaller baghouses. Since maximum emissions at permitted throughput levels have decreased, the hours of operation limit previously imposed on the packing operation (by Condition #27 of prior permits) has been removed. The additional silos to Finish Mill #11 contribute a small amount of additional PM/PM10 emissions. The packing operation no longer has an operating hour limit, as in condition #27 of prior permits. Other changes, which are considered exempt from permitting but included for administrative purposes, is that several small 5,500 acfm Micropul baghouses located on the Cement (Finish) Group 1, 2 and 3 silos will be replaced with similar 5,000 acfm Sly baghouses.

   a. Equipment modified or added by this permit action consists of:

      (1) The existing Cement Bagging/Packing System will be replaced by a new system. Throughput will increase from 94 tons/hr and 312,500 tons/yr to 113 tons/hr and 350,000 tons/yr. Six existing baghouses will be replaced by three smaller baghouses, and emission limits will decrease.

      (2) Three additional silos will be added to the Finish Mill #11 silo system.

      (3) The cement bagging/packing operation will no longer have limits hours of operation.

   Historical Changes prior to this permit have been: to increase throughput, add various equipment and a new process, and increase emissions of certain pollutants, especially SO_2 and particulate. The rated capacity for cement clinker production has increased 37% from 950,000 to 1,300,000 tons/yr (No. 5 kiln system/ main stack and its clinker cooler). The daily rated capacity for cement clinker production has increased from 4,000 tons/day to 4,400 tons/day. Throughputs of certain related processes may have had proportionally greater increases. The rated capacity for the No. 11 Finish Mill (FM11) decreased slightly, for a total of 800,000 tons/year throughput.

   b. Equipment modified or added prior to the date of this permit consists of:

      (1) The plant's cement clinker production limit increased 37% from 950,000 to 1,300,000 tons/yr for the No. 5 Kiln System (main stack) and its Clinker Cooler (cooler stack). The No. 5 kiln system (main stack) includes the original hot rotary end, recent six stage preheater/precalciner tower, both original raw mills (normally heated by the kiln's exhaust

from the preheater) and the kiln's recently replaced alkali bypass system. The No.5 kiln's hourly rated capacity has increased from 131 to 166.7 tons/hr (4000 tons/day) clinker, and subsequently the No. 5 Kiln's hourly rated capacity increased from 166.7 tons/hr (4,000 tons/day) to 183.33 tons/hr (4,400 tons/day). The No. 5 Kiln's feed capacity has increased from 219 to 278 tons/hr, and subsequently the No. 5 Kiln's feed capacity increased from 278 tons/hr to 318.56 tons/hr, including dry and recycle material. The No. 5 Kiln's fuel burning capacity has increased from 393 to 500 x 10^6 Btu/hr, and subsequently the No. 5 Kiln's fuel burning capacity has increased from 500 to 550 x 10^6 Btu/hr. This firing capacity is 22.92 tons/hr pulverized coal (162,500 tons/yr combination coal/coke expected maximum). Up to 50% of the coal Btu may be replaced with petroleum coke as before the 1994 modification began (73,996 tons/yr coke output as kiln fuel expected maximum). The modified/ modernized kiln system is able to achieve these higher than predicted rates, and will be able to maintain these increased rates for more than a very few hours at a time after various related systems listed below are expanded to support the increased throughput.

Most of prior permits' emissions increases of particulates and essentially all the SO_2 increase has come from the kiln system via its main stack. The main stack's visible emission limit increased from 10% to 20% opacity, partly due to the increased particulate emission from the increased throughput, partly due to the 10% permit limit having proven unrealistic for this system at the 1994 production rate of 131 tons/hr clinker, and to be consistent with other preheater/ precalciner kilns across the U.S.. The height of the main stack shall be increased from 198 ft to 350 ft to maintain attainment of the SO_2 NAAQS (National Ambient Air Quality Standard) at the increased short term SO_2 emission rate.

A process lime injection system and a moisturizing gas conditioning system shall be operational and used as needed for the kiln system/ main stack, especially when one or both raw mills are off-line, to help achieve approximately equivalent SO_2 and particulate/ opacity control as achieved when both raw mills are on-line during normal operation (all ESP controlled) as needed to meet the SO_2 and opacity emission limits.

The kiln system's annual emissions limits did not increase for NOx, CO, VOC, and sulfuric acid mist, although short term limits have increased for NOx and CO. The clinker cooler's emission limit (particulates) increased on an hourly basis but did not increase on an annual basis. The 10% opacity limit for the clinker cooler remained the same. The kiln system preheater/precalciner may be altered as necessary to maintain compliance with the emission limits. For record keeping purposes, Roanoke Cement must notify West Central Regional Office of such alterations in writing within ten (10) business days after such alterations are made.

(2) The Clinker Grinding System capacity (finish mills) increased from 1,200,000 to 2,488,000 tons/yr cement (from 202 to 342 tons/hr) by adding a new large finish mill system, refr. FM11, and reactivating 2 old small finish mills FM5 & FM6 to add to the current large FM10 and small FM9 finish mills (all emissions fabric filtered). Except for

22. The annual throughput of the Kiln Feed System from the raw mills to the No. 5 kiln, including recycle dust, shall not exceed 2,258,932 tons, calculated as the sum of each consecutive 12 month period.
(9 VAC 5-170-160)

23. The annual throughput of the No. 5 Kiln System and its Clinker Cooler shall not exceed 1,300,000 tons of clinker produced, calculated as the sum of each consecutive 12 month period.
(9 VAC 5-170-160)

24. The annual throughput of the Waste Dust Storage and Handling System is estimated to typically be 40,000 tons of waste dust but may vary widely, calculated as the sum of each consecutive 12 month period.
(9 VAC 5-170-160)

25. The annual throughput of the Clinker Gallery as storage during malfunctions involving the Clinker Handling and Storage System shall not exceed 20,000 tons of clinker, calculated as the sum of each consecutive 12 month period.
(9 VAC 5-170-160)

26. The annual throughput of the Clinker Grinding System shall not exceed 2,488,000 tons of cement produced including additives, calculated as the sum of each consecutive 12 month period.
(9 VAC 5-170-160)

27. The existing packhouse / cement bagging operation will be replaced with a new system. Reactivation of the old packing equipment may require a permit.
(9 VAC 5-170-160)

28. Operations at the Gypsum Unloading Bin and the Gypsum Storage Bin shall not exceed 16 hours per day and 5839 hours per year, calculated as the sum of each consecutive 12 month period.
(9 VAC 5-170-160)

29. The annual throughput of the Slag Dryer shall not exceed 120,000 tons, calculated as the sum of each consecutive 12 month period.
(9 VAC 5-170-160)

30. The sulfur content of the coal to be burned in the No. 5 kiln shall not exceed 1.5 percent by weight per shipment and 1.0 percent by weight annual average, calculated monthly as the average of each consecutive 12 month period. The permittee shall maintain records (supplier fuel analysis) of all coal shipments purchased. These records shall be available for inspection by the DEQ. Such records shall be current for the most recent five years.

48. Process instruments to continuously measure and record oxygen and temperature shall be installed near the outlet of the kiln's precalciner. Although not required to meet any specific air pollution control regulatory requirements, these are considered to be normal plant process instruments which assist the plant in determining the preferred operating parameters for process control of NOx and VOC. Stack continuous emission monitors are already required for NOx and VOC, as stated in Condition 44.
(9 VAC 5-170-160)

49. Emissions from the operation of the Raw Material Processing System from primary crushing through feed to the raw mills, including reference Q, new limestone crushing plant in the new limestone quarry, shall not exceed the limits specified below:

Total Suspended Particulate	0.005 gr/acf	5.85 lbs/hr	25.01 tons/yr
PM-10	0.005 gr/acf	5.56 lbs/hr	23.75 tons/yr

(9 VAC 5-50-260 and 9 VAC 5-50-180)

50. Emissions from the operation of the Kiln Feed System, including reactivation of thirteen old silos (refr. RS), shall not exceed the limits specified below:

Total Suspended Particulate	0.005 gr/acf	1.44 lbs/hr	6.3 tons/yr
PM-10	0.005 gr/acf	1.37 lbs/hr	5.98 tons/yr

(9 VAC 5-50-260 and 9 VAC 5-50-180)

51. Emissions from the operation of the No. 5 Kiln System including the kiln hot end/preheater/precalciner, raw mill pulverizers and alkali bypass (main stack) shall not exceed the limits specified below:

Total Suspended Particulate	0.30 lbs/ton kiln feed	83.9 lbs/hr	297.5 tons/yr
PM-10	0.255 lbs/ton kiln feed	71.31 lbs/hr	252.8 tons/yr
Sulfur Dioxide		950. lbs/hr	3,104.4 tons/yr
Nitrogen Oxides (as NO_2)		982. lbs/hr	2,850 tons/yr

Carbon Monoxide	600. lbs/hr	1,296 tons/yr
Volatile Organic Compounds	126.35 lbs/hr	493 tons/yr
Lead	0.13 lbs/hr	0.46 tons/yr
Fluorides	0.17 lbs/hr	0.6 tons/yr
Sulfuric Acid Mist	10.0 lbs/hr	35.5 tons/yr
Hydrogen Chloride	4.89 lbs/hr	N.A. tons/yr

The sulfur dioxide pound per hour emission limit is averaged over 3 hours and the nitrogen oxide pound per hour emission limit is averaged over 24 hours. Annual emission limits are based on 1,300,000 tons per year clinker produced. The corresponding kiln feed is based on a combined total of 2,258,932 tons per year raw materials plus recycle dust.
(9 VAC 5-50-260, 9 VAC 5-50-180, 9 VAC 5-80-1700, and 9 VAC 5-50-400)

52. Emissions from the operation of the Clinker Cooler shall not exceed the limits specified below:

Total Suspended Particulate	0.0473 lbs/ton kiln feed annual avg.	13.23 lbs/hr	46.9 tons/yr
PM-10	0.0402 lbs/ton kiln feed annual avg.	11.24 lbs/hr	39.9 tons/yr

Annual emission limits are based on 1,300,000 tons per year of clinker produced. The corresponding kiln feed is based on a combined total of 2,258,932 tons per year raw materials plus recycle dust.
(9 VAC 5-50-260, 9 VAC 5-50-180, 9 VAC 5-80-1700, and 9 VAC 5-50-400)

53. Emissions from the operation of the Coal/Coke Grinding and Handling System shall not exceed the limits specified below:

Total Suspended Particulate	0.005 gr/acf	1.80 lbs/hr	7.9 tons/yr
PM-10	0.005 gr/acf	1.71 lbs/hr	7.5 tons/yr

(9 VAC 5-50-260 and 9 VAC 5-50-180)

Puget Sound Clean Air Agency
Notice of Construction Worksheet

NOC Number: 7381	Reg. No. 11339	Source Name: Ash Grove Cement Company
Date Received 3/2/98 Mod recd 4/20/00	Due Date: 4/2/98 5/20/00	Source Location 3801 E Marginal Wy S Seattle, WA 98134
Engineer: F Austin	Inspector: E Gilpin	Compliance Issues: Yes o No o

(Request modify Order No. 7381 recd 4/20/00)

A. Project Description

This Order of Approval No. 7381 modifies the Cement Kiln NOx emission standard and incorporates previously approved existing equipment consisting of one dry process 92-ton/hour (2200 ton/day, 750,000 ton/year) coal-fired Cement Plant with a 177,000 cfm Baghouse, including the following equipment: (a) Systems 216, 311, 312, 314, 41A, 315, 316, 317, 411, 416, 41B, 41C, and 419, with 24 Baghouses of various sizes (1990); and (b) two 60-ton/hour Finish Mill High Efficiency Separators with two 77,000 cfm Baghouses (515.BF2, 5255.BF2) (1995);

B. Fees

Invoiced for $500 modification fee. Fee was paid 3/23/98. 4/20/2000 - -Invoiced for $1000 ($500 modification fee and $500 public notice fee. $1000 fee paid 6/12/00. $759.16 publication fees still due.

C. SEPA Review

No Checklist with application. May 8, 2000 letter requested Checklist. Checklist received 3/30/01. Puget Sound Clean Air Agency is the lead agency.

D. Emission Estimate

1. ACTUAL EMISSIONS
2. POTENTIAL TO EMIT

There will be no change in the annual mass emissions with this proposal.

NOx PERMIT HISTORY

Original NO_x Limits Approved 6/19/90

NO_x Limits	Order # 3382	
1 hr Average	668 ppm @ 10% O2	590 lb/hr
24 hr average	478 ppm @ 10% O2	422 lb/hr
1 hr startup	Not Applicable	Not Applicable
Annual Mass Emission Limit	1846 tons/yr	

1st Modified NO_x Limits Approved 12/29/94

NO_x Limits	Order # 5730
1 hr Average	700 ppm @ 10% O2
24 hr average	501 ppm @ 10% O2
1 hr startup	1000 ppmc @ 10% O2
Annual Mass Emission Limit	1846 tons/yr

Order of Approval # 7381 Approved 6/29/98 did not modify NO_x limits.

NO_x Limits	

1 hr Average	700 ppmc @ 10% O2
24 hr average	501 ppmc @ 10% O2
1 hr startup	1000 ppmc @ 10% O2
Annual Mass Emission Limit	1846 tons/yr

Proposed Limits in letter requested 4/18/00

NO_x Limits NOC# 7381	4/18 Requested Limits
1 hr Average	1000 ppmc @ 10% O2
24 hr average	600 ppmc @ 10% O2
1 hr startup	1000 ppmc @ 10% O2
Annual Mass Emission Limit	1846 tons/yr

Proposed Limits requested in letter of 9/12/00

NO_x Limits NOC# 7381	9/12 Current Requested Limits
1 hr average	Request to drop this limit.
24 hr average	650 ppmc @ 10% O2
1 hr startup	Request to drop this limit.
Annual Mass Emission Limit	1846 tons/yr

The 9/12/00 proposal requests to drop the standard for 1-hr average limit.

{See Attached table at end}

A) PRODUCTION restrictions

None

3. Facility wide Emissions

A) REPORTING SOURCE YES
B) SYNTHETIC MINOR NO
C) OPERATING PERMIT YES

E. Applicable Regulations

1. PUGET SOUND CLEAN AIR AGENCY

Regulation I, II, & III

2. State

WAC 173-401

3. Federal

40 CFR 60, Subpart F & .40 CFR 63, Subpart LLL

F. Technology Review BACT, RACT, LAER

1. **GENERIC BACT** This application requests that the NOx emission standards as set originally were too restrictive as BACT limits & the limits in D2 above should apply.
2. **Similar to:**
3. **Case-By-Case BACT:**

G. AMBIENT Impact Analysis

1. **GENERIC**
2. **SCREEN RESULTS**
3. **SCREEN RESULTS**

H. Public Notice Requirement

Recommend 30-day comment period.

I. Operating Permit or PSD

Title V source

J. Recommended Approval Conditions

3. This source is subject to Subpart A and F of 40 CFR Part 60.

4. PM-10 emissions from each baghouse, except the main stack baghouse, shall not exceed 0.005 grains/dscf over a 24-hour period. Ash Grove may demonstrate compliance with this condition by any of the following:

(a) Performing a Puget Sound Clean Air Agency-approved source test according to EPA Method 5 or EPA Method 201A;

(b) Demonstrating no visible emissions for 15 consecutive seconds;

(c) Demonstrating no visible emissions for three consecutive minutes; or

(d) Repairing within 24 hours, any baghouse that has visible emissions for more than three consecutive minutes.

Compliance shall be determined for visible emissions using EPA Method 22. The Puget Sound Clean Air Agency may require a source test for any baghouse that has sustained visible emissions, unless such emissions are unavoidable under WAC 173-400-107.

5. Except during startup and shutdown of the kiln, scheduled maintenance and for emissions considered unavoidable under WAC 173-400-107, emissions from the main baghouse shall not exceed the most stringent of PSD limits or the following limits:

(a) Carbon monoxide (CO) emissions shall not exceed 1049 ppm (parts per million) corrected to 10% oxygen (O_2) for an 8-hour average, and CO shall not exceed 2353 tons per year;

(b) Nitrogen oxides (NO_x) emissions shall not exceed 650 ppm corrected to 10% O_2 as a 24-hour rolling average, and NO_x emissions shall not exceed 1846 tons as a 12-month running total; and if the NOx emissions exceed 1400 tons as a 12-month running total, Ash Grove shall notify the Puget Sound Clean Air Agency (Attn. Permit Certification) describing actions that will be implemented to assure compliance with the annual NOx limit.

(c) Sulfur dioxide (SO_2) emissions shall not exceed 180 ppm corrected to 10% O_2 for a one-hr average, and 176 tpy;

(d) Particulate matter (PM) emissions shall not exceed 10.6 pounds per hour, and 46 tpy.

THE STATE OF WYOMING

JIM GERINGER
GOVERNOR

Department of Environmental Quality

Herschler Building • 122 West 25th Street • Cheyenne, Wyoming 82002

ADMINISTRATION	ABANDONED MINES	AIR QUALITY	INDUSTRIAL SITING	LAND QUALITY	SOLID & HAZARDOUS WASTE	WATER QUALITY
(307) 777-7758	(307) 777-6145	(307) 777-7391	(307) 777-7368	(307) 777-7756	(307) 777-7752	(307) 777-7781
FAX 777-7682	FAX 777-6462	FAX 777-5616	FAX 777-6937	FAX 777-5864	FAX 777-5973	FAX 777-5973

March 23, 2000

Bruce Ballinger
President
Mountain Cement Company
5 Sand Creek Rd.
Laramie, Wyoming 82070

CERTIFIED MAIL

Re: Administrative Amendment to Operating Permit 30-098

Dear Mr. Ballinger:

In accordance with conditions 13 and 14 of Air Quality Permit CT-1137 issued to Mountain Cement Company on March 6, 1995, and conditions of F13(vi) and (vii) of Air Quality Operating Permit 30-098 issued on June 2, 1998, Mountain Cement Company submitted required monitoring data to the Division on August 12, 1998. From the submitted information the Division determined that hourly SO_2 emissions should be limited to 100 pounds per hour on a 30-day rolling average. The operating permit has been amended to reflect the change.

While amending the permit, the Division also updated the information regarding the Clinker Transfer Tower Dust Collector. The Division received information from Mountain Cement on February 15, 2000 regarding the upgrade of this dust collector. In the interest of conserving paper, we are transmitting herewith a copy only of the affected pages for insertion into Mountain Cement Company's copy of the referenced permit.

If you should have any questions regarding this transmittal, please feel free to contact this office.

Sincerely,

Dan Olson
Administrator
Air Quality Division

Enclosures

xc: Michael Stoll
Lynn Olson w/o enclosure
Diana Hulme w/enclosure
File 30-098
Permit Books (3rd and 4th)

FACILITY-SPECIFIC PERMIT CONDITIONS

Facility-Wide Permit Conditions

(F1) HYDROCARBONS [WAQSR Sec 9]

Hydrocarbon emissions shall be limited by all persons handling, transporting, or storing volatile organic compounds to prevent unnecessary emissions as specified in WAQSR Section 9.

(F2) FUGITIVE EMISSIONS [WAQSR Sec 21 Permits MD-73 & CT-562]

(a) All conveyors and transfer points exposed to the open air shall be covered and maintained to emit negligible fugitive emissions.

(b) All working areas subject to the movement of trucks, loaders and other heavy equipment shall be treated with chemical dust suppressants and/or water to prevent excessive fugitive dust emissions.

(c) The permittee shall maintain surfaced haul roads to the extent the surface treatment remains viable as a fugitive emissions control measure.

(d) Cement kiln dust shall be recycled back into the kiln or raw material feed system or otherwise disposed of in a manner that will not create fugitive dust emissions.

(F3) VISIBLE EMISSIONS [WAQSR Sec 14 & Sec 22, Subpart F]

(a) Visible emissions from the #1 and #2 kiln stacks (Sources #1 & #2) shall not exhibit greater than 20 percent opacity.

(b) Unless a lower limit is specified elsewhere in this permit, visible emissions of any contaminant discharged into the atmosphere from any other single source of emission, shall not exhibit greater than 20 percent opacity except for one period or periods aggregating not more than six minutes in any one hour of not more than 40 percent opacity.

(F4) RAW MATERIAL & CLINKER STORAGE [WAQSR Sec 21 Permit MD-73]

(a) No raw materials or clinker shall be stored in the open.

(b) The Division will allow temporary outside storage of materials due to materials handling equipment breakdown. The permittee shall notify the Division of each such event within 24 hours of occurrence to be followed in writing requesting permission to do so and stating the types of materials involved, amounts to be stockpiled, life of stockpile, and proposed method of controls.

(c) Adequate control measures such as water or suitable chemical dust suppressants shall be used during periods of temporary outside storage of materials to prevent fugitive dust emissions from occurring due to wind erosion or equipment activity.

Source-Specific Permit Conditions

(F5) KILN STACK EMISSIONS [WAQSR Sec 22, Subpart F & Sec 21 Permits CT-1137 & MD-245]

(a) Emissions from the #1 and #2 kiln stacks (Sources #1 & #2) shall be limited as follows:

(Amended March 23, 2000)

POLLUTANT	#1 Kiln			#2 Kiln		
	lb/ton of feed (dry basis)	lb/hr	TPY	lb/ton of feed (dry basis)	lb/hr	TPY
Particulate	0.30	13.59	59.5	0.30	29.30	128.3
Sulfur Dioxide	N/A	406.00 [1] *100.00* [2]	*438.0*	N/A	537.50 [1] 100.00 [2]	438.0
Nitrogen Oxides	N/A	208.80 [2]	914.5	N/A	450.00 [2]	1971.0

1 - Based on a rolling 3-hour average2 - Based on a 30-day rolling hourly average

POLLUTANT	#1 Kiln			#2 Kiln		
	lb/ton of feed (dry basis)	lb/hr	TPY	lb/ton of feed (dry basis)	lb/hr	TPY
Carbon Monoxide	N/A	116.0	508.0	N/A	250.00	1095.0
VOCs	N/A	7.30	32.0	N/A	15.47	67.8

(b) Emissions of SO_2 or NO_X from the #1 and #2 kiln stacks (Sources #1 & #2) as measured by the continuous emission monitoring systems in excess of the above stated limits, other than emissions caused by equipment malfunctions or abnormal operating conditions as qualified by condition G21 of this permit, shall constitute prima facie evidence that emissions from the facility exceed limits specified in this permit.

(F6) KILN FUEL & FEED
[WAQSR Sec 21 Permit CT-1137 & Feb 2, 1996 & Nov 19, 1996 WAQSR Sec 21 (k) Permit Waivers]

(a) Fuel for kiln #1 and kiln #2 shall be limited to coal or natural gas.

(b) Raw materials used for the production of clinker shall be limited to limestone, shale, silica, iron ore or mill scale, and spent alumina catalyst (SAC).

(i) The maximum usage of SAC shall not exceed 5 percent by weight of the total raw meal and the annual usage shall be limited to 50,000 tons.

(ii) SAC exhibiting Toxicity Characteristic Leachate Procedure (TCLP) metal concentrations in excess of regulatory limits can not be used as a raw material without prior approval from the DEQ Solid and Hazardous Waste and Air Quality Divisions.

(c) Any non-mineral raw material substitutions which the permittee wishes to use shall be evaluated on a case-by-case basis and approved by the Administrator.

(d) The permittee may burn used oil solids generated internally from the permittee's plant in the #2 kiln only. Used oil solids are considered to be the remnant material or more solid fraction remaining after spills and clean-ups.

(i) No liquid used oils shall be burned in the #2 kiln.

(ii) The permittee shall remove any gloves, rags, plastic sheeting, wood, and other foreign material from the used oil solids when it is repackaged; this material shall not be burned in the #2 kiln.

(iii) The permittee shall burn only non-hazardous used oil solids as defined by EPA regulations found in the Federal Register and the Resource Conservation and Recovery Act.

(iv) Each collection site of used oil solids shall be given an identification number. The identification number shall be clearly labeled on each canister of used oil solids to be burned in the #2 kiln.

(v) A maximum of one 2.5 gallon can of used oil solids may be introduced into the #2 kiln every 2.5 minutes. A maximum of 900 gallons of used oil solids may be burned each month.

(vi) The permittee shall continue to operate the #2 kiln within the permitted allowable emissions rates listed in condition F5 of this permit.

(F7) BAGHOUSE EMISSIONS [WAQSR Sec 14, Sec 22, Subpart F & Sec 21 Permit CT-1137]
Emissions of particulate matter from each material handling dust collector shall be limited as follows:

Source ID# *(ID #'s used in permit application)*	Description	Particulate Emission Limit (lb/hr)	Opacity Limit (percent)
12 *(03CLK1)* (common stack with 04CLK2)	Clinker Cooler #1 (K1 880A & 880B)*	4.53 *and* 0.10 lb/ton of feed to the kiln (dry basis)	Less than 10

AIR QUALITY SECTION 30
OPERATING PERMIT

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
122 West 25th Street
Cheyenne, Wyoming 82002

PERMIT NO. 30-098

Issue Date: **June 2, 1998**
Expiration Date: **June 2, 2003**
Effective Date: **June 2, 1998**
Replaces Permit No.: **N/A**

In accordance with the provisions of W.S. §35-11-203 through W.S. §35-11-212 and Section 30 of the Wyoming Air Quality Standards and Regulations,

Mountain Cement Company
5 Sand Creek Road, Laramie, Wyoming
Albany County, Wyoming

is authorized to operate a stationary source of air contaminants consisting of emission units described in this permit. The units described are subject to the terms and conditions specified in this permit. All terms and conditions of the permit are enforceable by the State of Wyoming. All terms and conditions of the permit, except those designated as not federally enforceable, are enforceable by EPA and citizens under the Act. A copy of this permit shall be kept on-site at the above named facility.

Dan Olson, Administrator
Air Quality Division

6/3/98
Date

Dennis Hemmer, Director
Department of Environmental Quality

6-5-98
Date

SOURCE EMISSION POINTS

This table may not include any or all insignificant activities at this facility.

SOURCE ID# (*ID #'s used in permit application*)	SOURCE DESCRIPTION		SIZE	SEC. 21 PERMITS
1 (*01KILN*)	Kiln #1 Baghouse		160 MMBtu/hr	CT-1137 Feb. 2, 1996 waiver MD-245
2 (*02KILN*)	Kiln #2 Precipitator (K-401)		262.5 MMBtu/hr	CT-1137 Feb. 2, 1996 waiver MD-245 Nov. 19, 1996 waiver
12 (*03CLK1*)	Clinker Cooler #1 (K1 880A and 880B)	Combined Stack	29 TPH	CT-1137
12 (*04CLK2*)	Clinker Cooler #2 (K-515 and K-541)		62.5 TPH	CT-1137
6 (*05FINA*)	Finish Mill "A" System (F-531)		36 TPH	CT-1137
3 (*06FINBD*)	Finish Mill "B" Discharge (F-636)		70 TPH	CT-1137
5 (*07FINBF*)	Finish Mill "B" Feed (F-641)		70 TPH	CT-1137
4 (*08FINBV*)	Finish Mill "B" Vent (F-631)		70 TPH	CT-1137
7 (*09BSIL1A*)	1A Blending Silo (K-207-1)		170 TPH	CT-1137
8 (*10BSIL1B*)	1B Blending Silo (K-207-2)		170 TPH	CT-1137
9 (*11WGKL2*)	Kiln Feed Scale/2A Blend Silo (K-224) (enclosed)		180 TPH	None
10	Kiln Dust Return Collector (K-438) (enclosed)		50 TPH	None
11 (*12ALKL2*)	Kiln #2 Alleviator (K-222)		350 TPH	CT-1137
19 (*13CEBNV*)	Bulk Cement Bin Vent (B-816A) (Silo #7 vent)		200 TPH	CT-1137
17 (*14CELO1*)	Bulk Cement Loadout #1 (B-823)		200 TPH	CT-1137
18 (*15CELO2*)	Bulk Cement Loadout #2 (B-824)		200 TPH	CT-1137
20 (*16CEBE*)	Bulk Cement Bucket Elevator (B-816)		200 TPH	CT-1137
13 (*23CKDSS*)	Kiln #1 Cement Kiln Dust Storage Silo (K-410)		30 TPH	CT-1137 Oct. 22, 1996 waiver
22	Coal Belt Dust Collector (K-551) (enclosed)		75 TPH	None

ATTACHMENT III

COST REMOVAL ESTIMATES FOR SELECTIVE NON-CATALYTIC REDUCTION

Florida Crushed Stone (Brooksville, FL)
Estimated Capital Cost for Selective Non-Catalytic
Reduction Utilizing Vendor Cost Data

Cost Component	Cost	Basis of Cost Component
Direct Capital Costs		
SNCR Associated Equipment	$972,350	Vendor Estimate *
Flue Gas Ductwork	$192,670	Vatavuk, OAQPS Control Cost Manual, 1995
Instrumentation	$100,000	Additional Instrumentation for System Integration
Taxes	$77,788	8% of SNCR Associated Equipment
Freight	$97,235	10% of SNCR Associated Equipment
Total Direct Capital Costs (TDCC)	$1,440,043	
Direct Installation Costs		
Foundation and Supports	$115,203	8% of TDCC; OAQPS Control Cost Manual
Handling and Erection	$201,606	14% of TDCC; OAQPS Control Cost Manual
Electrical	$144,004	10% of TDCC; OAQPS Control Cost Manual
Piping	$216,006	15% of TDCC; OAQPS Control Cost Manual
Insulation for Ductwork		Included in Ductwork Total Capital Investment
Painting	$14,500	1% of TDCC; OAQPS Control Cost Manual
Site Preparation	$25,000	Engineering Estimate
Buildings	$50,000	Engineering Estimate
Total Direct Installation Cost (TDIC)	$766,319	
Total Capital Cost (TCC)	$2,206,362	Sum of TDCC and TDIC
Indirect Costs		
Engineering	$220,636	10% of TCC; OAQPS Control Cost Manual
Construction and Field Expenses	$220,636	10% of TCC; OAQPS Control Cost Manual
Contractor Fees	$220,636	10% of TCC; OAQPS Control Cost Manual
Start-up	$44,127	2% of TCC; OAQPS Control Cost Manual
Performance Tests	$66,191	3% of TCC; OAQPS Control Cost Manual
Contingencies	$441,272	20% of TCC; OAQPS Control Cost Manual
Total Indirect Capital Costs (TInDC)	$1,213,498	
Total Direct, Indirect and Capital Costs (TDICC)	$3,419,860	Sum of TCC and TInCC

* Vendor estimate referenced in Environmental Quality Management, Inc.'s application to revise NOx emission limits for the Holnam, Inc. facility in Midlothian, TX was scaled using "six-tenths" rule.

Florida Crushed Stone (Brooksville, FL)
Estimated Capital Cost for Selective Non-Catalytic
Reduction Utilizing Vendor Cost Data

Cost Component	Cost	Basis of Cost Component
Direct Annual Costs		
Operating Personnel	$150,000	5000 hours/year @ $30/hour
Supervisory	$22,500	15% of Operating Costs
Ammonia Solution	$999,396	Assumed Molar Ratio of 1
Power	$22,770	
Maintenance Labor and Materials	$72,002	5% of TDCC
Contingency	$253,400	20% of Direct Annual Costs
Total Direct Annual Costs (TDAC)	$1,520,068	Vendor Estimate
Indirect Annual Costs		
Overhead	$146,701	60% of Total Labor and Maint. Material Costs
Property Taxes	$14,400	1% of TDCC
Administration	$28,801	2% of TDCC
Insurance	$14,400	1% of TDCC
Heat Rate Penalty	$40,000	Assumed 1000 tons coal at $40/ton
Forced System Shutdown	**	
Annualized Total Direct Capital	$556,411	16.27% Cost Recovery Factor of 10% over 10 years multiplied by TDICC
Total Indirect Annual Costs (TIAC)	$800,713	
Total Annual Costs (TAC)	$2,320,781	Sum of TDAC and TIAC
Cost Effectiveness	$7,252.44	Cost per ton of NOx removed

Note: 320 tons NOx removed per year for 25% removal annual average.

** Estimate based on five forced shutdowns per year due to SNCR system and ancillary systems disruption or failure. Estimated costs in lost product are approximately $250,000 per day for a total of $1,250,000 annually. This would change the cost effectiveness value to $11,159 per ton of NOx removed.

Florida Crushed Stone (Brooksville, FL)
Estimated Capital Cost for Selective Non-Catalytic
Reduction Utilizing PCA Document Cost Data

Cost Component	Cost	Basis of Cost Component
Direct Capital Costs		
SNCR Associated Equipment	$1,688,000	Scaled Vendor Estimate *
Flue Gas Ductwork	$192,670	Vatavuk, OAQPS Control Cost Manual, 1995
Instrumentation	$100,000	Additional Instrumentation for System Integration
Taxes	$135,040	8% of SNCR Associated Equipment
Freight	$168,800	10% of SNCR Associated Equipment
Total Direct Capital Costs (TDCC)	$2,284,510	
Direct Installation Costs		
Foundation and Supports	$182,761	8% of TDCC; OAQPS Control Cost Manual
Handling and Erection	$319,831	14% of TDCC; OAQPS Control Cost Manual
Electrical	$228,451	10% of TDCC; OAQPS Control Cost Manual
Piping	$342,677	15% of TDCC; OAQPS Control Cost Manual
Insulation for Ductwork	$0	Included in Ductwork Total Capital Investment
Painting	$22,900	1% of TDCC; OAQPS Control Cost Manual
Site Preparation	$25,000	Engineering Estimate
Buildings	$50,000	Engineering Estimate
Total Direct Installation Cost (TDIC)	$1,171,620	
Total Capital Cost (TCC)	$3,456,130	Sum of TDCC and TDIC
Indirect Costs		
Engineering	$345,613	10% of TCC; OAQPS Control Cost Manual
Construction and Field Expenses	$345,613	10% of TCC; OAQPS Control Cost Manual
Contractor Fees	$345,613	10% of TCC; OAQPS Control Cost Manual
Start-up	$69,123	2% of TCC; OAQPS Control Cost Manual
Performance Tests	$103,684	3% of TCC; OAQPS Control Cost Manual
Contingencies	$691,226	20% of TCC; OAQPS Control Cost Manual
Total Indirect Capital Costs (TInDC)	$1,900,872	
Total Direct, Indirect and Capital Costs (TDICC)	$5,357,002	Sum of TCC and TInCC

* Vendor Estimate referenced in PCA document was scaled using "six tenths" rule.

Florida Crushed Stone (Brooksville, FL)
Estimated Capital Cost for Selective Non-Catalytic
Reduction Utilizing PCA Document Cost Data

Cost Component	Cost	Basis of Cost Component
Total Direct Annual Costs (TDAC)	$1,262,531	Vendor Estimate*
Indirect Annual Costs		
Overhead	$126,253	10% of TDAC
Property Taxes	$22,845	1% of TDCC
Administration	$45,690	2% of TDCC
Insurance	$22,845	1% of TDCC
Heat Rate Penalty	$40,000	Assumed 1,000 tons coal at $40/ton
Forced System Shutdown	**	
Annualized Total Direct Capital	$871,584	16.27% Cost Recovery Factor of 10% over 10 years multiplied by TDICC
Total Indirect Annual Costs (TIAC)	$1,129,218	
Total Annual Costs (TAC)	$2,391,749	Sum of TDAC and TIAC
Cost Effectiveness	$7,474.21	Cost per ton of NOx removed

Note: 320 tons NOx removed per year for 25% removal annual average

* Vendor Estimate referenced in PCA document was scaled using "six tenths" rule.

** Estimate based on five forced shutdowns per year due to SNCR system and ancillary systems disruption or failure. Estimated costs in lost product are approximately $250,000 per day for a total of $1,250,000 annually. This would change the cost effectiveness value to $11,380 per ton of NOx removed.

ATTACHMENT IV

"VERIFICATION OF CURRENT BACT LIMITS FOR CEMENT KILNS", PREPARED BY RTP ENVIRONMENTAL ASSOCIATES, INC. JANUARY 1999

VERIFICATION OF CURRENT BACT LIMITS FOR CEMENT KILNS

RTP Environmental Associates, Inc. (RTP) assisted Florida Crushed Stone (FCS) in obtaining an approved Air Construction Permit from the Florida Department of Environmental Protection (FDEP) to construct a second cement kiln at the Brooksville facility in November, 1995 and again in February, 1997. The permits issued by the FDEP and the associated air permit applications submitted by the applicant provided extensive analyses supporting the determinations of Best Available Control Technology (BACT) for the proposed FCS Unit II cement kiln. The BACT pollutant emission levels determined by the FDEP are presented in the final air permit dated February 6, 1997. Thus, the information previously presented is relatively recent and is included by reference. A copy of the BACT determination is attached.

Based on a staff recommendation by the Hernando County Planning Department, RTP has conducted a review of the recently issued air permits for cement kilns in Florida and the rest of the United States to verify that the FCS kiln and associated control equipment will be designed and built to current BACT standards relative to more recently permitted facilities. RTP reviewed the BACT/Lowest Achievable Emission Rate (LAER) Clearinghouse and other United States Environmental Protection Agency's (USEPA's) databases for recent data. In addition, RTP reviewed the most recent permits for similar cement kiln facilities issued by the FDEP. Review of the data did not indicate that any significant changes in the proposed emission values or proposed control technologies for the FCS facility were warranted.

The pollutants subject to BACT standards according to the Prevention of Significant Deterioration (PSD) regulations are sulfur dioxide (SO_2), total suspended particulates (TSP), particulate matter less than 10 microns (PM_{10}), carbon monoxide (CO), and nitrogen oxides (NO_x).

RECENT BACT DETERMINATIONS

Table 1 provides the permitted BACT emission levels for the PSD significant pollutants as excerpted from Appendix BD of the existing FCS permit. Table 2 presents recent BACT determinations for facilities that have been constructed and/or are operational in comparison with the FCS BACT determinations. Several facilities appear to have been updated in the USEPA Technology Transfer Network (TTN) BACT/LAER database. These are the Roanoke Cement Company of Virginia, Mountain Cement Company in Wyoming, Illinois Cement Company in Illinois, and LaFarge Corporation in Missouri. In addition, RTP reviewed recently issued permits to Florida Rock Industries and Suwanee American Cement Company, Inc. in Florida. As can be seen, some more recent permits contain emission levels for CO and particulates that are lower than those established in the FCS permit.

BACT UPDATE FOR NOx EMISSIONS

Based on the BACT values listed in Table 2, it appears that FCS has the most restrictive BACT NO_x emission level. FCS considers the proposed NO_x BACT emission limit of 2.8 pounds per ton (lbs/ton) clinker to be an extremely aggressive NO_x standard that very few plants have demonstrated the ability to meet. Furthermore, existing data of facilities emitting NO_x at these levels has been shown to be of questionable quality. FCS has proposed to construct a kiln technology that typically exhibits lower NO_x emissions (Precalciner kiln) , but there is still risk associated with this type of kiln and the feed materials used at FCS. Thus, the FCS permit allows at least eighteen (18) months after initiating commercial operation to optimize facility operations in order to meet the specified NO_x permit limit.

BACT FOR CO EMISSIONS

As noted on Table 2, the Puerto Rican Cement Company and LaFarge Corporation both have lower permitted CO emissions (1.74 and 1.64 lbs CO per ton clinker produced, respectively) than the proposed FCS facility at 2.0 lbs per ton clinker produced. However, both of these facilities have permitted NO_x emissions that are significantly higher 5.17 and 3.68 lbs NO_x per ton clinker produced, respectively) than the FCS facility at 2.8 lbs per ton clinker produced. The FDEP has required some of the lowest NO_x emission levels in the country in recent permits issued to FCS, Florida Rock Industries, Florida Mining and Materials, and Suwanee American Cement Co., Inc. In so doing, the FDEP has recognized the inverse relationship of NO_x and CO formation in the combustion zone of a cement kiln. Combustion conditions that reduce NO_x formation favors CO formation, and combustion conditions that reduce CO formation favor NO_x formation. This is discussed on page B-11 of the attached BACT section of the Suwanee American Cement Co., Inc.'s air permit (No. 1210465-001-AC).

Therefore, we consider the proposed CO emission level of 2.0 lbs per ton clinker produced, relative to the proposed NO_x emission level of 2.8 lbs per ton clinker produced to be equivalent or more restrictive than the CO limits established for the Puerto Rican Cement Company and the LaFarge Corporation facilities relative to their permitted NO_x limits. Furthermore, it appears that the FCS values are more restrictive than the two cement kiln permits most recently issued by the FDEP, Florida Rock Industries and Suwanee American Cement Company.

BACT UPDATE FOR SO_2 EMISSIONS

As noted in Table 2, it appears that the FCS permit contains the most restrictive emissions limit for SO_2 of the facilities reviewed. The proposed limit is 0.23 lbs SO_2 per ton clinker produced. Since more recent facilities have been permitted at higher levels, it would appear that the FCS permit limit for SO_2 is more restrictive than what is considered current BACT.

BACT UPDATE FOR PM/PM_{10}

Table 3 provides a comparison of permitted particulate emissions for the several facilities listed in Table 2 with those for the proposed FCS Unit II kiln. The PM emissions are divided between the precalciner/kiln and the clinker cooler. In many facilities, these have separate control devices and stack exhausts. In the case of FCS, the facility will utilize a single control device and exhaust point.

As shown in Table 3, permitted total PM emission values ranged from 0.27 to 0.57 lbs per ton clinker for the precalciner/kiln and from 0.29 to 0.45 lbs per ton clinker for the clinker cooler. Thus, the lowest emission values for each show an approximate 35-40% reduction from the permitted FCS values. This percentage reduction is within the capabilities of the particulate control device planned for the facility exhaust. Although the air pollution control vendor has not yet been chosen, the particulate control equipment is typically constructed with a minimum 50% design margin to provide a level of safety for compliance assurance. Therefore, the particulate control equipment will be designed and built to reduce facility particulate emissions to levels below current permitted BACT levels in order to maintain continuous compliance with the proposed FCS permitted emission limits.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPs)/MACT

The NEHSAPs for the Portland Cement Manufacturing Industry was promulgated and published in the Federal register on June 14, 1999. The NESHAPs limits PM [surrogate for Hazardous Air Pollutant (HAP) metals] emissions, as well as opacity from new and existing Non-Hazardous Waste Burning (NHW) kilns, inline kilns/raw mills, and clinker coolers and limits opacity from raw material dryers and handling processes at Portland Cement plants which are major sources. The proposed FCS Unit II kiln would be categorized as an existing facility because construction had begun (as defined by the regulation) prior to the rule proposal.

The NESHAPs established for the Portland Cement Industry are equivalent to the New Source Performance Standards for particulate matter, which are:

a) 0.30 lbs PM per ton dry kiln feed and opacity ≤ 20 % for the inline kiln/raw mill.

b) 0.10 lbs PM per ton dry kiln feed and opacity ≤ 10% for the clinker cooler.

The NESHAP also includes a limit for dioxins and furans, which varies by the temperature of the particulate control device:

a) 0.2 ng TEQ/dscm corrected to 7% O_2 at temperatures >400°F

b) 0.4 ng TEQ/dscm corrected to 7% O_2 at temperatures ≤400°F

In this case (TEQ) stands for PCDD/PCDF Toxic Equivalent values and (dscm) is dry standard cubic meters of flue gas. The proposed FCS Unit II kiln permit contains PM emission levels lower than the established NESHAPs. In addition, the proposed emissions of PCDD/PCDF (TEQ) are also lower than the most restrictive criteria of 0.2 ng TEQ/dscm. Therefore, the proposed Unit II kiln will be in conformance with the newly promulgated NESHAPs/MACT.

BACT SUMMARY

RTP Environmental Associates, Inc. has reviewed recently issued air permits for Portland Cement producing facilities as indicated on USEPA databases and as acquired from FDEP personnel. Based on this review, the air pollution control technologies specified in the air construction permit for the proposed FCS Unit II kiln will be designed and built to achieve emissions reductions equivalent to or lower than what is considered current BACT for all PSD applicable pollutants.

REFERENCES

Florida Department of Environmental Protection (FDEP), 1995. Permit for No. 2 Cement Kiln and Associated Equipment, AC27-274892 & PSD-FL-227. November 17, 1995.

RTP Environmental Associates, Inc. (RTP), 1995a. Application to Construct a Second 600,000 Ton Per Year Cement Kiln at the Florida Crushed Stone Facility in Brooksville, Florida. March, 1995.

United States Environmental Protection Agency (USEPA), 1999. December 6, 1999 search of RACT/BACT/LAER Clearinghouse (main and transient databases) on the Office of Air Quality Planning and Standards (OAQPS) Technology Transfer Network (TTN) Bulletin Board System.

USEPA, 1995. Compilation of Air Pollutant Emission Factors, Fifth Edition. January, 1995.

USEPA, 1994. Emission Factor Documentation for AP-42 Section 11.6, Portland Cement Manufacturing, Final Report. May, 1994.

USEPA, 1994. Alternative Control Techniques Document - NO_x Emissions from Cement Manufacturing, EPA-453/R-94-004, March, 1994.

RTP Environmental Associates, Inc. (RTP), 1996. Proposed Modifications to Air Construction Permit AC27-274892 to Construct a Second Cement Kiln at the Florida Crushed Stone Facility..., September, 1996.

FDEP, 1997. Air Construction Permit: Portland Cement Plant No. 2 for Florida Crushed Stone Company, Permit No. AC27-274892(A) and PSD-FL-227(A), February 10, 1997.

FDEP, 1999. Best Available Control Technology (BACT) Determination for Suwanee American Cement Company, Inc., Branford Plant, Permit No. 1210465-001-AC and PSD-FL-259, 1999.

USEPA, 1999. National Emission Standards for Hazardous Air Pollutants for Source Categories: Portland Cement Manufacturing Industry: Final Rule, June 14, 1999 Federal Register.

FDEP, 1996. Best Available Control Technology (BACT) Determination Portland Cement Manufacturing Facility, Florida Rock Industries, Permit No. AC01-267311 and PSD-FL-228, December, 1996.

TABLE 1

PROPOSED BACT EMISSION LEVELS
MAIN STACK

POLLUTANT	BACT EMISSION LIMIT	
	lbs/ton clinker	lbs/ton dry feed
PM/PM_{10} (kiln)	0.306	0.200
SO_2	0.230	0.150
NO_x*	2.800	1.830
CO	2.000	1.307

Note: * FCS has up to 18 months after start-up of commercial operation to achieve this standard.

TABLE 2

COMPARISON OF PROPOSED BACT EMISSION LEVELS FOR THE FCS MAIN STACK WITH BACT DETERMINATIONS FOR PORTLAND AND NON-PORTLAND CEMENT KILNS CONSTRUCTED AND OPERATED SINCE NOVEMBER 1, 1996

FACILITY	LAST UPDATE	POLLUTANT	EMISSION LIMIT (LB/TON CLINKER)	BASIS
Proposed FCS Limit		CO	2	
SUWANNEE AMERICAN CEMENT COMPANY, INC.			3.6	BACT
FLORIDA ROCK INDUSTRIES			3.6	BACT
FACILITY[1]	05/12/99		4.00	BACT-PSD
PUERTO RICAN CEMENT COMPANY, INC.	05/06/98		1.74	BACT-PSD
LAFARGE CORPORATION	03/24/98		1.64	BACT-PSD
ASH GROVE CEMENT COMPANY	02/18/98		4.34	BACT-PSD
ROANOKE CEMENT COMPANY	05/07/97		2.53	BACT-OTHER
Proposed FCS Limit		NO_X	**2.8**	
SUWANNEE AMERICAN CEMENT COMPANY, INC.			2.9	BACT
FLORIDA ROCK INDUSTRIES			2.8	BACT
MOUNTAIN CEMENT COMPANY-LARAMIE FACILITY	05/12/99		7.20	BACT-PSD
ILLINOIS CEMENT COMPANY	04/15/99		4.5	BACT-PSD
LAFARGE CORPORATION	03/24/98		3.68	BACT-PSD
ROANOKE CEMENT COMPANY	05/07/97		6	BACT-OTHER
PUERTO RICAN CEMENT COMPANY, INC.[2]			5.17	(2)
Proposed FCS Limit (Total PM Combined Kiln and Cooler)		PM/PM_{10}	**0.45/0.45**	
SUWANNEE AMERICAN CEMENT COMPANY, INC.			0.34/0.29	BACT
FLORIDA ROCK INDUSTRIES			0.47/0.39	BACT
MOUNTAIN CEMENT COMPANY-LARAMIE FACILITY	05/12/99		0.57	BACT-PSD
ILLINOIS CEMENT COMPANY[3]	04/15/99		0.208	BACT-PSD
LAFARGE CORPORATION	03/24/98		0.270	BACT-PSD
ROANOKE CEMENT COMPANY	05/07/97		0.50/0.43	NSPS
Proposed FCS Limit		SO_2	**0.23**	
SUWANNEE AMERICAN CEMENT COMPANY, INC.			0.27	BACT
FLORIDA ROCK INDUSTRIES			0.28	BACT
MOUNTAIN CEMENT COMPANY-LARAMIE FACILITY	05/12/99		8.96	BACT-PSD
ILLINOIS CEMENT COMPANY	04/15/99		0.8	BACT-PSD
LAFARGE CORPORATION	03/24/98		2.64	BACT-PSD
ROANOKE CEMENT COMPANY	05/07/97		4.99	BACT-OTHER

Notes:

(1) Facility does not employ a precalciner.

(2) Emission value from original permit. According to Frank Jon of U.S. EPA Region II, the source of the reported value, the 5.17 lb/ton clinker produced number is the permitted emission limit but is not considered BACT.

(3) Cooler is a separate emissions unit from the kiln. Unfortunately, the BACT/RACT/LAER database entry and the designated contact only had data on the PM permitted emission limits for the kiln.

TABLE 3

FACILITY PERMITTED PM/PM_{10} EMISSION LIMITS (LBS/TON CLINKER)

POLLUTANT	FCS	SUWANEE	FLORIDA ROCK	MOUNTAIN CEMENT	ILLINOIS CEMENT	LAFARGE	ROANOKE
PM (Precalciner/Kiln)	0.3	0.22	0.31	0.47	0.208	0.170	0.404
PM_{10} (Precalciner/Kiln)	0.3	0.19	0.26	ND	ND	ND	0.345
PM (Cooler)	0.15	0.12	0.16	0.15*	ND	0.1	0.1
PM_{10} (Cooler)	0.15	0.10	0.13	ND	ND	ND	0.084
PM (Total)	0.45	0.34	0.47	0.57	ND	0.27	0.504
PM_{10} (Total)	0.45	0.29	0.39	ND	ND	ND	0.429

*Value is listed as 0.10 lbs PM per ton dry kiln feed multiplied by the FCS ratio of tons dry kiln feed to tons clinker produced (159.4/104.2).

ND = No Data Available

ATTACHMENT 1

FDEP BACT DETERMINATION
FOR
FLORIDA CRUSHED STONE COMPANY
UNIT II KILN

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

FLORIDA CRUSHED STONE COMPANY
PORTLAND CEMENT PLANT NO. 2 AND ASSOCIATED EQUIPMENT
Brooksville, Florida
Hernando County

The applicant, Florida Crushed Stone Company (FCS), plans to construct a 104.2 ton per hour (maximum TPH as clinker) dry process portland cement kiln with a *preheater/precalciner design* at its existing cement plant approximately 3.5 miles northwest of Brooksville, Hernando County, Florida. The project includes a single kiln and clinker cooler along with raw mill, finish mill, cement and clinker handling equipment, coal handling equipment, silos, and air pollution control equipment. The facility will produce 912,500 tons per year (maximum TPY as clinker) and approximately 1,004,000 TPY of portland cement.

The Department issued a construction permit and a BACT determination for Cement Plant No. 2 utilizing the preheater (PH) design (1995). This revised BACT analysis will consider the proposed preheater/precalciner (PH/PC) design that may be utilized by FCS in lieu of the permitted PH kiln. An extensive analysis supporting the BACT determination requested by FCS was submitted with the original application and is included by reference along with the original BACT Determination made by the Department and the additional information submitted with the present application.

A detailed process description is included in the Technical Evaluation and Preliminary Determination.

Following is the BACT determination proposed by the applicant:

BACT DETERMINATION REQUESTED BY THE APPLICANT:

POLLUTANT	EMISSION LIMIT
Particulate Matter (kiln)	0.2 lb/ton of dry kiln feed
Particulate Matter (cooler)	0.1 lb/ton of dry kiln feed
Particulate Matter (material handling, conveying, storage	0.01 gr/dscf, baghouses
Sulfur Dioxide (kiln)	0.23 lb/ton clinker
Nitrogen Oxides (kiln)	2.8 lb/ton clinker
Carbon Monoxide (kiln)	2.0 lb/ton clinker

A single, large, fabric filter system (baghouse) will be used to capture particulate matter from the kiln and the cooler. Baghouses will also be used to limit particulate emissions from other process emission points. Table 1-1 is a list of the emission units to be controlled by baghouses.

Portland cement installations are among the major facilities listed in Table 212.400-1, F.A.C., "Major Facilities Categories." A BACT determination is required for each pollutant exceeding the significant emission rates in Table 212.400-2, "Regulated Air Pollutants Significant Emissions Rates," which in this case are particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), and nitrogen oxides (NOx).

This facility is also subject to the following requirements given in Rule 62-208.800, F.A.C., "Federal Regulations adopted by Reference:"

- 40 CFR 60, Subpart F - Standards of Performance for Portland Cement Plants.
- 40 CFR 51, Subpart P - Protection of Visibility.

Date of Receipt of a BACT Application:

September 11, 1996

Review Group Members:

Teresa Heron and A. A. Linero of the New Source Review Section.

BACT DETERMINATION PROCEDURE

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determination of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from this facility can be grouped into categories based upon the control equipment and techniques that are available to control emissions from these emission units. Using this approach, the emissions can be classified as follows:

- Particulate matter from kilns and coolers (PM/PM_{10}, and VE). Controlled generally by add-on particulate collection equipment such as baghouses or electrostatic precipitators.

- Products of combustion and incomplete combustion (e.g., SO_2, NO_x, CO, VOC). Control is largely achieved by good combustion practices, reactions with clinker and raw materials and removal in add-on control equipment.

- Emissions from materials handling, conveyance, and storage (primarily PM). Controlled generally by fabric filters and reasonable precautions.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "non-regulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., PM, SO_2, H_2SO_4, fluorides, etc.), if a reduction in "non-regulated "air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

BACT DETERMINATION ANALYSIS:

PARTICULATE MATTER (PM/PM_{10})

Particulate Matter is generated by the various physical and chemical processes at a cement manufacturing plant. Sources of particulate matter at cement plants include (1) quarrying and crushing, (2) raw material storage, (3) grinding and blending, 4) clinker production, 5) finish grinding, and 6) packaging and loading. Additional sources of PM are raw material storage piles, conveyers, storage silos, and unloading facilities. The largest emission source of PM within cement plants is the pyroprocessing system that includes the kiln and clinker cooler exhaust stacks (in this case, common kiln/cooler stack). Emissions from kilns are affected by several factors, including differences in convective patterns, material movement patterns, burner locations and insertion lengths, heat transfer mechanisms, and the type of clinker cooler that supplies secondary air to the kiln for combustion. Typically, dust from the pollution control equipment servicing the kiln and cooler is collected and recycled into the kiln and thus incorporated into the clinker. According to FCS, virtually all of the cement kiln dust (CKD) generated from Cement Plant 1 is captured in the baghouse and returned to the pyroprocessing system as raw material. A small amount is removed every few weeks and sold to avoid build-up of thallium in the product. It is expected that most of the CKD from Cement Plant 2 will be recycled, while any excess will be stored in a silo for sale.

Common control devices for stack gases include settling chambers, inertial separators, impingement separators, wet scrubbers, fabric filters, and electrostatic precipitators. Fabric filters (baghouses) and electrostatic precipitators (ESPs) are generally considered equivalent for particulate control. Both types of devices can achieve removal efficiencies of over 99%. ESPs and baghouses are used extensively as control devices at cement plants. ESPs are generally specified for kiln and clinker cooler exhaust gases because of their ability to operate effectively at varying temperatures. Baghouses are also used at facilities for particulate control from kilns and coolers. Both types of control equipment provide for the recovery/recycling of collected dust back into the process stream. Baghouses are also used to control particulate emissions from most other material processing operations at cement plants.

Common controls to limit particulate emissions from fugitive sources (such as roadways, stockpiles, and material processing and conveying equipment) include wet suppression, sweeping, application of surfactants, paving of roads and covering of stockpiles to reduce wind erosion. Wet suppression of fugitive particulate emissions is considered as BACT for most material handling operations and unpaved roads. Dust from stockpiles can be minimized by relatively high material moisture content with additional water spraying as necessary.

Small quantities of beryllium (Be), mercury (Hg) and lead (Pb) are generated by the combustion of coal and fuel oil blends. Be and Pb will be generated as particulate emissions from the combustion of fuels, and will be removed by incorporation into the product clinker or controlled by the kiln/cooler baghouse. Hg can exist in both particulate and gaseous form and can only be partially removed by the process and control equipment The applicant projects such low emissions of these metals that they will not be subject to BACT.

A review of the BACT Clearinghouse indicates that baghouses and ESPs are widely used to control particulate matter from process emission units at cement plants. They are commonly accepted as BACT.

The applicant has proposed kiln particulate emissions of 0.2 pounds per ton of dry kiln feed (lb/ton kiln feed) and cooler particulate emissions equal to the New Source Performance Standards (NSPS) limit of 0.1 lb/ton kiln feed as BACT for this source. This compares with the proposed values in the original application for the PH kiln of 0.3 and 0.1 lb/ton kiln feed for the two units, respectively.

PRODUCTS OF COMBUSTION AND INCOMPLETE COMBUSTION

Nitrogen Oxides

Emissions of NO_x from dry process cement plants with a preheater/precalciner include the kiln, the calcining loop, and any fuel-fired support operation. NO_x is generated during fuel combustion by oxidation of chemically bound nitrogen in the fuel (fuel NO_x) and by thermal fixation of nitrogen in the combustion air (thermal NO_x). As flame temperature increases, the amount of thermally generated NO_x increases. Fuel type affects the quantity and type of NO_x generated. Generally, natural gas is low in nitrogen. However it causes higher flame temperatures and generates more thermal NO_x than oil or coal, which have higher fuel nitrogen content, but exhibit lower flame temperatures.

NO_x emissions represent a significant portion of the total emissions generated by this project, and shall be minimized using BACT.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

emissions of NO_x can potentially be reduced at Portland cement plants by two methods:

1. Minimizing the quantity of NO_x generated during combustion (combustion modifications).

2. Reducing the quantity of NO_x in the flue gas stream (flue gas controls).

A review of EPA BACT/LAER Clearinghouse (BACT Clearinghouse) information indicates that NO_x emissions at most facilities are minimized by process control and good combustion practices.

The applicant stated that NO_x emissions at this facility will be controlled through "proper combustion practices" such as burner design with primary combustion air control. Burning a portion of the fuel in the precalciner, introduction of tires in the material feed end of the kiln, and indirect firing will spread out the thermal load and will help minimize NO_x emissions.

In its original submittal, the applicant ruled out Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR) as technically unfeasible or cost prohibitive. The applicant gave subsequent consideration to other possible control methods following a request by the Department for additional details justifying the selected method. The applicant rejected Low NO_x Burners, low Nitrogen Fuel, Flue Gas Recirculation, Fuel Reburning, and Contemporaneous Reductions from the on-site power plant and cement kiln as options which are allegedly ineffective, undemonstrated, or beyond the control of the applicant.

The applicant has proposed for this kiln with a preheater/precalciner design a NO_x emission rate of 292 lb/hr and 2.8 lb/ton clinker. This value is substantially less than the one FCS proposed in its original application (4.3 lb/ton clinker) and, on a unit basis, is equal to the BACT Determination made by the Department in 1995. It is compared below with previous determinations documented by the BACT Clearinghouse.

<u>Previous BACT Determinations</u>

BASIS	Least Stringent	Most Stringent	Proposed
	Year 1978	Year 1981	Year 1996
lb/ton clinker	11.13	0.85	2.8

It is important to note that the facility which was given the 0.85 lb/ton clinker NO_x limit has not been able to meet it since construction. A dry process plant with a preheater/precalciner received a NO_x limit of 1.11 lb/ton clinker but was never built. Another dry process plant with a preheater/precalciner received a BACT determination of 2.09 lb NO_x/ton clinker. However, it appears that since that time a less stringent standard was applied. One dry process preheater/precalciner kiln in California received a NO_x BACT determination of 2.5 lb/ton clinker. The Department made a BACT Determination of 2.8 lb/ton clinker in 1995 for the proposed Florida Rock Industries Cement Plant in Newberry, Florida. The main reason it was higher than the one for the California plant was that Florida limestone is wetter and requires more heat input to dry. A claim by the kiln manufacturer that differences in volatility between Eastern and Western coal should be reflected in an even higher emission limit for the Florida kiln was rejected by the Department.

A review of the NO_x emission rate summary indicates that the applicant's proposal is representative of the most stringent BACT determinations made to date for plants utilizing dry processes. The dry process with a heater/precalciner is considered to be the most energy-efficient process. Therefore it is expected that the lower fuel use will result in relatively low NO_x. Additionally, the lower flame temperature realized when burning coal, spreading the thermal load over various burn points, indirect firing, as well as documented reductions from tire burning, are further reasons to a expect low emission rate from the proposed preheater/precalciner kiln.

The Department also reviewed a paper presented at the Air and Waste Management Association (AWMA) International Specialty Conference on Waste Combustion in Boilers and Industrial Furnaces. The paper, "Reduction of NO_x Emissions from Cement Kiln/Calciner through the Use of the NOxOUT Process," which was written by representatives of Nalco and Ash Grove Cement, suggests that SNCR is a viable control method. A level as low as 1.0 lb/ton of clinker was reached based on demonstration tests conducted at the Ash Grove cement plant in Seattle, Washington. However the process has not been demonstrated on a long term basis and FCS' kiln designer, Polysius, has not been willing to guarantee its performance or the quality of cement produced when using this control process.

Recently a proposed cement plant (Great Star Cement, Clark County, Nevada) was permitted with the urea-based SNCR/NOxOUT process as BACT. The process relies on the reaction between ammonia and NO_x to yield molecular nitrogen. The delivery system consists of urea injectors in one of the preheater sections. The objective was to achieve 50% reduction of NO_x emissions. At that level there should be no ammonia slip while meeting a BACT limit of 3.1 lb/ton clinker.

A survey of stack test data from various kilns around the country, operating for more than three years, suggests that the proposed emission limit for NO_x is low but achievable

The USEPA Technology Transfer Network (TTN) BACT/LAER/RACT Clearinghouse database was reviewed for more recent data. Review of this data does not change the Department's original review.

Sulfur Dioxide

Sulfur dioxide (SO_2) may be generated both from sulfur compounds such as sulfates in the raw materials and from sulfur in the fuel. The sulfur content of both raw materials and fuels varies from plant to plant and with geographic location. Sulfur dioxide at this facility will be generated by the combustion of coal and tires in the kiln and generation of sulfur gases from the raw materials.

The exhaust gas from a cement kiln can contain varying amounts of SO_2. Under low oxygen conditions, sulfates in the raw materials can be converted to SO_2. At high temperature and excess air conditions, some of the sulfur introduced into the cement kiln with the raw materials, and most of the sulfur contained in the fuel, are converted to SO_2. Most of the SO_2 subsequently reacts with oxygen and alkali compounds (such as Na_2O and K_2O vaporized at sintering temperatures) to form alkali sulfates, which are found in cement clinker and in kiln dust. The amount of SO_2 released in the kiln flue gases will vary with the amount of excess alkali available for absorption. Additional SO_2 may be removed through contact with the incoming raw materials and, to some extent, in the particulate control equipment.

SO_2 control processes can be classified into five categories: fuel/material sulfur content limitations, absorption by a solution, adsorption on a solid bed, direct conversion to sulfur, or direct conversion to sulfuric acid.

[illegible] proposes to limit SO_2 emissions by taking advantage of the alkaline environment in the kiln, preheater, and raw mill to effect substantial removal of SO_2. Ultimately the sulfur is incorporated into the clinker lattice structure, thus minimizing the amount emitted to the atmosphere. Some additional SO_2 removal through contact with particulate matter may also take place in the kiln/cooler baghouse.

A review of the BACT determinations for cement plants as contained in the BACT Clearinghouse indicates SO_2 reduction levels from 70 to 96% (percent) from facilities utilizing the dry processes. The Department did not find instances of BACT involving measures beyond those proposed by FCS. Some plants use baghouses as proposed by FCS instead of Electrostatic Precipitators (ESPs) for particulate control. It is possible that the filter cake on the bags enhances SO_2 removal compared with an ESP. However, the difference is marginal compared with the primary removal mechanism involving oxidation of SO_2 to SO_3, alkali reactions, and subsequent removal of sulfates as particulate matter and with the clinker.

The SO_2 limit proposed by the applicant, 0.23 lb/ton clinker, is substantially less than the 0.55 lb/ton value proposed in the original application submitted by FCS in 1995 and is equal to the BACT emission limit (on a unit basis) set by the Department in its review of the previous preheater (PH) kiln proposal. A survey of stack test data from different facilities around the country operating for at least three years demonstrates that the proposed limit is low but achievable.

Carbon Monoxide and Volatile Organic Compounds

Carbon monoxide (CO) is a pollutant formed by the incomplete combustion (oxidation) of carbon containing compounds in the cement kiln fuel and during the transformation of cement raw materials to cement clinker. When insufficient oxygen is provided, more CO and less CO_2 are formed than under excess air conditions. Substantial quantities of CO and CO_2 are also generated through calcining of limestone and other calcareous material. This calcining process thermally decomposes $CaCO_3$ to CaO and CO_2. The calcining of limestone in the cement manufacturing process liberates large amounts of CO_2, which is available for dissociation into CO.

Emissions of CO can potentially be reduced at portland cement plants by two main methods: utilization of proper combustion practices to maximize the oxidation of CO to CO_2 and reducing the quantity of CO in the flue gas stream (flue gas control).

VOC is also a pollutant formed by the incomplete combustion of fuel or hydrocarbons contained in the raw materials. The temperatures of the gases in the kiln will reach between 3700 to 3800 degrees Fahrenheit. At these high temperatures, virtually all VOCs will be consumed or destroyed regardless of their source (limestone, mill scale, coal, fuel oil, etc.). Clinker production requires certain temperatures, residence time, and turbulence within the kiln. These factors are sufficient to ensure the destruction of almost all VOCs at cement plants.

Emissions of VOC can be controlled by add-on control devices by the mechanisms of adsorption, absorption, or incineration (afterburning). Incineration processes include flame incineration, thermal incineration, and catalytic incineration. No add-on controls for CO or VOC have been demonstrated for cement plants.

The high temperatures and control of excess air and fuel, typically results in simultaneous optimization for control of products of incomplete combustion and NO_x. The applicant proposes proper combustion practices as BACT to control emissions of CO from this plant. The applicant estimates low emissions of VOC such that the new kiln will not be subject to BACT for this pollutant.

A review of the BACT Clearinghouse reveals that for CO and VOC, BACT from cement plants for these pollutants is proper combustion practices.

BACT DETERMINATION BY DEP:

Particulate Matter Determination

BACT for visible emissions was determined to be more stringent than the NSPS for Portland Cement Plants, 40 CFR 60, Subpart F. With respect to the kiln, BACT for PM was also determined to be more stringent than the NSPS for Portland Cement Plants, 40 CFR 60, Subpart F. This value of 0.2 lb/ton kiln feed is equal to the Department's previous BACT determination for the PH kiln and equal to the proposed determinations made for the Florida Rock Industries kiln in Newberry and the Southdown Cement Plants in Brooksville.

Based on actual data the kiln and cooler PM limits are considered to be low and achievable.

For each small baghouse in the material handling process the exhaust gases must not exhibit greater than 5 percent opacity. The Department has determined that 5 percent opacity is BACT, and is attainable with a baghouse.

Nitrogen Oxides Determination

The Department has determined that the NO_x level proposed by the applicant is similar to the lowest emission levels from plants already in operation throughout the country and reflects recent BACT determinations for Florida portland cement plants.

FCS previously ruled out SNCR as unfeasible for the previous PH design because the "optimum temperature range to drive the SNCR reactions between 1600-2000 degrees F is encountered in a typical kiln system only in the kiln itself." FCS contended that injection of ammonia/urea in the kiln will cause increases in NO_x. In the new PH/PC arrangement, the temperature range for SNCR will occur outside of the kiln and its use is at least plausible.

The Department believes that the proposed NO_x limit of 2.8 lb/ton clinker (at 104.2 TPH clinker production) is BACT for this plant. Therefore, BACT for NO_x emissions from the cement kiln is determined to be equal to 2.8 lb/tons of clinker. The Department believes that this limit can be achieved by the technology proposed by FCS. If it is not met within the time allotted in the proposed construction permit, then FCS must examine the option of employing SNCR or propose an alternative technology to accomplish the same end.

Sulfur Dioxide Determination

The Department has also determined that the SO_2 BACT limit proposed by the applicant is also one of the lowest in the country and is equal to recent BACT Determinations by the Department for this pollutant. It is the conclusion of the Department that the key factors in SO_2 removal are maintaining proper ratios of sulfur and alkali in the kiln environment and intimate contact between raw materials and exhaust gases. This is considered by the Department to be the mechanism by which the proposed limit of 0.23 lb/ton clinker will be achieved.

Department believes that FCS will meet the SO_2 limits as proposed. This is substantiated by the letter of October 28, 1983 from Sholtes and Koogler, Environmental Consultants, regarding the existing PH kiln at FCS. Per page 13, "Polysius (cement plant designer) states that if only sulfur dioxide from the cement plant were considered, sulfur dioxide emissions as low as 20 pounds per hour could be expected from the cement plant." This is further proved by actual emissions tests from the original kiln which average about 10 lb of SO_2 per hour or approximately 0.1 lb/ton clinker.

The Department has also concluded that sulfuric acid mist emissions are not expected to be significant because free sulfite (SO_3) will preferentially react with clinker and kiln dust in the alkali environment of the kiln. Also, little water is available to complete the reaction to acid mist. No BACT determination was required for sulfuric acid mist (H_2SO_4).

An emission limit of 0.23 lb SO_2/ton clinker will insure that ambient SO_2 concentration increases will be less than the applicable National Park Service Significant Impact Level. Although it appears that FCS can achieve even lower values, it would be prudent to allow sufficient flexibility such that emissions of all combustion products can be minimized simultaneously. To provide further assurance that this limit will be met, the Department proposes a limit on the sulfur content of the coal of 1.25 percent.

CO Determination

BACT for CO was determined to be 2.0 lb/ton clinker. This value is equivalent to that proposed by FCS and the Department's previous BACT determination for Cement Plant 2. It is lower than the value given in AP-42 and will provide sufficient flexibility to minimize NO_x and SO_2 emissions. The Department requests that FCS continue to be judicious in its procurement of raw materials such as coal ash with low levels of unburned carbon to minimize CO generation in the PH.

Other Pollutants

No BACT determination was required for VOC as it will not be emitted in significant amounts.

No BACT determination was required for Pb. The limit requested by FCS insures BACT will not be triggered. Removal will be accomplished by the particulate control system and incorporation into the clinker matrix.

No BACT was required for Be. The adopted value will result in emissions less than the PSD significant threshold value. The particulate control system will remove Be which will also be largely incorporated into the clinker matrix.

No BACT was required for Hg. The estimate provided by FCS will result in emissions less than the applicable BACT threshold. This is consistent with information available to the Department on mercury levels in raw materials and coal as well as tests conducted at kilns in Florida.

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

The BACT emissions established by the Department are summarized as follows:

SOURCE	POLLUTANT EMISSION LIMIT
KILN	
Kiln (PM/PM_{10})	0.2 lb/ton kiln feed (dry basis) and 0.3 lb/ton clinker - 1 hour average
Kiln (VE)	Visible emissions not to exceed 10 percent opacity
Kiln (SO_2)	0.23 lb/ton clinker 24 hr rolling average
Kiln (NO_x)	2.8 lb/ton clinker - 24 hr rolling average
Kiln (CO)	2.0 lb/ton clinker - 1 hr average
Kiln (SO_3)	0.014 lb/ton clinker (non-BACT)
Kiln (VOC)	0.085 lb/ton clinker (non-BACT)
Kiln (Be)	8.5×10^{-7} lb/ton clinker (non-BACT)
Kiln (Hg)	2.4×10^{-5} lb/ton clinker (non-BACT)
Kiln (Pb)	5.2×10^{-4} lb/ton clinker (non-BACT)
Fuels	Coal (1.25 % S), blend of fuel oil and on-spec used oil (1.5 % S), tires (up to 15% of heat input), and natural gas are the only fuels allowed
COOLER	
Cooler (PM/PM_{10})	0.1 lb/ton kiln feed (dry basis) and 0.15 lb/ton clinker
Cooler (VE)	Visible emissions not to exceed 10% opacity

ASSOCIATED EQUIPMENT

Minor points with baghouses	Visible emissions not to exceed 5% opacity

FUGITIVES SOURCES

Fugitive sources	Visible emissions not to exceed 10% opacity

COMPLIANCE

Compliance with the particulate emission limitations shall be demonstrated using EPA Reference Method 5 as contained in Appendix A, 40 CFR 60, and set forth in Subsection 60.64 of the NSPS for Portland Cement Plants, 40 CFR 60.

Compliance with opacity standards (minor sources controlled by baghouses) shall be determined by conducting observations in accordance with 40 CFR 60, Appendix A, Method 9.

Continuous Opacity Monitors (kiln and cooler) shall meet the requirements of the 40 CFR 60, Appendix B and 40 CFR 60, Subpart F, NSPS for Portland Cement Plants. Compliance with the opacity standard for the kiln and cooler shall be demonstrated by EPA Reference Method 9 as contained in Appendix A, 40 CFR 60.

Compliance with the opacity standards for fugitive sources shall be determined by EPA reference Method 9 as contained in Appendix A, 40 CFR 60.

Compliance with the SO_2 and NO_x emission limitations shall be demonstrated using CEMs. The CEMs shall meet all the applicable requirements of 40 CFR 60, Appendix B and Appendix F.

Compliance with the CO limitations shall be demonstrated by 3 one-hour tests using EPA Method 10.

Pursuant to F.A.C. 62-4.070(3), 62-212.400(6) and 62-296.520, the kiln/cooler exhaust system shall be equipped with continuous monitors to record NO_x and SO_2 for the purposes of compliance; opacity at the stack to indicate proper maintenance and operation; and CO and/or O_2 to optimize combustion conditions for pollution control.

Compliance with the VOC limitations shall be demonstrated (on a one time basis) by three one hour stack tests using Method 25 or 25A to confirm emission rate is less than the PSD significant emission rate.

Compliance with the Pb, Hg, and Be limitations shall be demonstrated (on a one time basis) by three one-hour stack tests using EPA Method 29 to confirm emission rate is less than the PSD significant emission rate.

BACT/LAER/RACT CLEARINGHOUSE DATABASE COMPARISON

The following table is to be used for reference and comparison with portland cement facilities listed in the BACT/LAER/RACT Clearinghouse database:

POLLUTANT	lb/ton clinker	lb/ton $kiln_{ph}$ feed	lb/ton kiln feed	lb/MM BTU
PM/PM_{10} (kiln)	0.3	0.18	0.2	0.09
SO_2 (kiln)	0.23	0.14	0.15	0.07
NO_x (kiln)	2.80	1.68	1.83	0.89
CO (kiln)	2.0	1.20	1.31	0.64
VOC (kiln)	0.085	0.05	0.06	0.03
H_2SO_4 (kiln)	0.014	8.37 E-03	0.009	4.46 E-03
Be (kiln)	8.5 E-07	5.10 E-07	5.55 E-07	2.72 E-07
Hg (kiln)	2.4 E-05	1.44 E-05	1.57 E-05	7.69 E-06
Pb (kiln)	5.2 E-04	3.13 E-04	3.40 E-04	1.67 E-04
PM/PM_{10} (Cooler)	0.15	0.09	0.1	0.04

Based on the following FCS process rates:
Preheater feed rate ($kiln_{ph}$ feed) : 173.2 TPH
Kiln feed rate : 159.4 TPH
Clinker production : 104.2 TPH
Heat Input : 325 MMBTU/hr

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING

Teresa Heron, Review Engineer,
A. A. Linero, P.E., Administrator
New Source Review Section
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

2/7/97
Date:

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

2/9/97
Date:

ATTACHMENT 2

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATION FOR THE SUWANEE AMERICAN CEMENT COMPANY, INC. BRANFORD PLANT PERMIT NO. 1210465-001-AC AND PSD-FL-259

Suwannee American Cement Company, Inc.
Branford Plant
PSD-FL-259 and 1210465-001-AC
Suwannee County

1. BACKGROUND

The Suwannee American Cement Company, Inc. plans to construct a dry process, preheater/precalciner type portland cement plant to be located at US Highway 27 at County Road 49, Suwannee County.

This facility will consist of a portland cement plant and associated quarry, and raw material and cement handling operations. The plant will combine raw materials and utilize a preheater/precalciner kiln with in-line raw mill to produce clinker. The clinker will be milled and combined with gypsum to produce portland cement. The plant will have a capacity of 178 tons per hour of material fed to the preheater (dry basis), 105 tons per hour of clinker production, and 150 tons per hour of portland cement production. Annual production will be limited (on a rolling 12-month basis) to 1,427,880 tons per year of material fed to the preheater (dry basis), 839,500 tons per year of clinker production, and 1,191,360 tons per year of portland cement production. Fuels allowed to be used in the pyroprocessing system are natural gas, coal, petroleum coke, whole tires and tire derived fuel (TDF). The plant may include a tire gasification system that will utilize heat from the pyroprocessing system to decompose tires to gas, coke and wire which will be utilized in the kiln and pyroprocessing system in an enclosed process. The plant will also include a coal processing operation that will crush coal and petroleum coke and will have an annual processing capacity of 127,896 tons of coal and petroleum coke. Fuel usage will be 14.6 tons per hour of coal, based on a heat content of 12,500 Btu per pound, or 13.0 tons per hour of petroleum coke, based on a heat content of 14,000 Btu per pound. At 40% of maximum heat input, usage of tires will be 5.2 tons per hour, based on a heat content of 14,000 Btu per pound.

Emissions units addressed by this permitting action are:

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
001	1000 TPH primary crusher and associated unenclosed belt conveyors to raw material storage – fugitive emissions
002	Raw material processing – baghouses for transfer points
003	Raw material processing – unenclosed conveyor transfer points
004	In line kiln/raw mill – main stack controlled by baghouse
005	Clinker cooler controlled by ESP
006	Clinker and cement processing – baghouses for transfer points
007	Clinker and cement processing – unenclosed conveyor transfer points
008	Coal mill and coal transfer system baghouses
009	Unenclosed coal conveying equipment
010	Natural gas fired emergency generator set [1]

[1] Emissions unit 010 is exempt from permitting (exempt emissions unit) pursuant to Rule 62-210.300(3)(a)20, F.A.C., provided that total fuel consumption by the generator is limited to 4.4 million cubic feet per year of natural gas. Estimated maximum potential emissions from the generator set are: NOx, 8.5 lb/hr, CO 4.1 lb/hr, and VOC 0.5 lb/hr.

This facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), or volatile organic compounds (VOC) will exceed 100 tons per year (TPY).

This facility is within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions will be greater than 100 TPY for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD).

The proposed project is subject to the provisions of Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD), because it will be a new major facility. This review consisted of a determination of Best Available Control Technology (BACT) and an analysis of the air quality impact of the increased emissions.

The proposed project is subject to preconstruction review requirements under the provisions of Chapter 403, Florida Statutes, and Chapters 62-4, 62-204, 62-210, 62-212, 62-214, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.).

This facility is located in an area designated, in accordance with Rule 62-204.340, F.A.C., as attainment for the criteria pollutants ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide, and designated as unclassifiable for PM_{10}.

The applicant stated that this facility is a major source of hazardous air pollutants (HAPs), because the plant may be a major source of hydrochloric acid. As provided by the federal requirements, the applicant may perform stack testing to confirm whether the facility is or is not a major source of hydrochloric acid.

The emissions units included in this project are subject to regulation under the New Source Performance Standards, 40 CFR 60 Subpart A, General Provisions, Subpart F, Standards of Performance for Portland Cement Plants, Subpart Y Standards of Performance for Coal Preparation Plants, and Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants (all revised as of July 1, 1997). Some of these emissions units are also subject to 40 CFR 63 Subpart LLL, National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry (40 CFR 63.1340 – 63.1359), revised as of May 14, 1999 and 40 CFR 63 Subpart A, revised as of February 12, 1999. These emissions units are also subject to the requirements of the state rules as indicated in this permit, particularly Rule 62-212.400, F.A.C., Prevention of Significant Deterioration, effective February 5, 1998. Some emissions units are subject to Rule 62-296.701, F.A.C., Portland Cement Plants, effective March 2, 1999. Additionally the permit references the test methods of 40 CFR 60, Appendix A, Test Methods; 40 CFR 63, Appendix A, Test Methods; 40 CFR 51, Appendix M, Recommended Test Methods for State Implementation Plans; 40 CFR 61, Appendix B, Test Methods. clar.

Particulate matter emissions from the in-line kiln/raw mill will be controlled by a baghouse and from the clinker cooler will be controlled by an electrostatic precipitator. Particulate matter emissions from other sources will be controlled by baghouses. Sulfur dioxide emissions are limited by the process. NOx emissions will be controlled by multistage combustion. Carbon monoxide and VOC emissions will be limited by process control.

The total annual air pollutant potential emissions in tons per year from the facility (not including the emergency generator set – emissions unit 010 – will be:

POLLUTANT	PSD SIGNIFICANCE LEVELS [1]	MAXIMUM EMISSIONS	SUBJECT TO PSD REVIEW?
PM	25	226.0	Yes
PM_{10}	15	193.3	Yes
SO_2	40	113.4	Yes
NOx	40	1217.5 [2]	Yes
CO	100	1511.1	Yes
VOC	40	50.4	Yes

[1] Florida Administrative Code 212.400-2.

2 Emissions of NOx for the first year of operation will be 1595.4 tons per year. NOx emissions shown in the table are emissions after the first year of operation. Excess emissions resulting from two startup procedures per year are included in these estimates.

Maximum emissions of mercury will be 184 pounds per year. Control of mercury emissions will result from limiting the mass of mercury introduced into the pyroprocessing system from the preheater feed and fuels. Maximum emissions of dioxin will be 0.002 pounds per year. Dioxin emissions will be controlled by limiting the temperature of the inlet of the baghouse for the in-line kiln/raw mill pursuant to federal NESHAP regulation. Mercury and dioxin are not subject to PSD review.

Emissions of PM and PM_{10} from the unenclosed conveying equipment are expected to be insignificant because of inherent moisture and moisture applied to comply with the reasonable precautions for control of unconfined particulate matter emissions.

2. Date of Receipt of a BACT Application

November 30, 1998
Additional information received February 25, 1999; March 19, 1999; April 21, 1999; May 4, 1999 May 27, 1999 and May 28, 1999.
Additional information and comments on the preliminary draft permit and related documents were received from Koogler & Associates dated November 8, 1999.
Revised permit application and modeling information were received from Koogler & Associates by electronic mail on November 11, 1999.

3. BACT Determination Requested by the Applicant

The applicant proposed BACT for the PSD pollutants to be control equipment for particulate matter, process control for SO_2, multistage combustion with a separate line combustion chamber for NOx, and combustion control for CO and VOC.

4. Reviewer

Joseph Kahn, P.E., prepared BACT determination

5 Detailed Process Description

The project is a dry process preheater/precalciner type portland cement plant. Portland cement is a fine powder, usually gray in color, that consists of a mixture of dicalcium silicate, tricalcium silicate, tricalcium aluminate, and tetracalcium aluminoferrate, and small amounts of magnesium oxide, sodium, potassium and sulfur, to which one or more forms of calcium sulfate have been added. About 95% of the cement production in the U.S. is portland cement. Masonry cement represents the balance of the domestic cement production.

The proposed preheater/precalciner process is a dry manufacturing process in which thermal efficiency and production capacity have been improved by adding process vessels arranged vertically before the kiln, wherein the hot gases pass counter to the material flow, effecting heat transfer through the intimate contact between the two streams. The improved heat transfer allows the kiln length to be reduced. This arrangement also allows the hot gases from the preheater tower to be used to dry raw materials in the raw mill. In the preheater/precalciner process, fuel combustion is divided between the kiln and a preheater vessel below the preheater tower. This arrangement provides for greater thermal efficiency than the preheater process. A relatively new innovation is the use of a separate line combustion chamber for the preheater burner, so called because it is installed to the side (separate) of the material flow through the precalciner region. This device aids in the control of NOx emissions. The applicant proposed to use the dry preheater/precalciner process, with a separate line combustion chamber for the calciner burner, in an in-line arrangement with the raw mill.

The process for this plant is discussed in more detail below.

Limestone will be mined primarily below the water table. The overburden, consisting of sand and clay, will be removed from the limestone surface and stockpiled in the vicinity of the crusher. The crusher will be portable, and will be relocated periodically in accordance with the mining plan. The overburden and the limestone will be fed into the crusher with front end loaders in the ratios dictated by the target chemical composition of the desired raw mix. The quarry mix will be delivered to a covered storage hall by a conveyor belt system. The quarry mix will have a moisture content of 10-20%. The storage hall will have space devoted to storage of the other raw materials: iron ore and coal ash, sand, and limestone. The other raw materials will be transported to the facility by truck.

Fugitive emissions from raw material handling and conveying will be minimized by inherent moisture and by the application of water for suppression of unconfined emissions of particulate matter. Unpaved roads will be sprayed by a water truck as required to prevent unconfined particulate matter emissions. Material stockpiles at the plant will be covered to limit particulate matter generated by wind erosion.

The quarry mix and other raw materials will be conveyed to the raw mill feed bin with a capacity of 90 short tons. Raw materials will be fed from the raw mill feed bin to the raw mill. The raw mill will grind and mix the raw materials, and dry the raw materials with the hot gases from the pyroprocessing system. Emissions from the raw mill (and in-line kiln) will be controlled by a baghouse. The baghouse is kept under slight negative pressure with an induced draft fan discharging into a stack. The baghouse catch (kiln dust) and the raw mill product will be conveyed to the homogenization silo of 8,000 tons capacity. (Because the baghouse catch is re-introduced to the process, this cement plant will not generate cement kiln dust (CKD) as a waste product.) Other enclosed emission sources will be controlled by baghouses (fabric filters).

The kiln feed from the homogenization silo will be conveyed to the preheater by means of an airlift. The feed will enter the top stage of the preheater or, during wet material conditions, drop into the next lower stage of the preheater to increase the gas temperature to the raw mill. Gases from the pyroprocessing system will flow counter to the material direction to the raw mill and the baghouse.

Coal and petroleum coke will be burned in the precalciner separate line combustion chamber near the inlet to the kiln as well as at the main burner at the discharge end of the kiln. Natural gas will be used as a startup and supplemental fuel and to fire a small supplementary air heater for the raw mill. The plant will also burn tires and tire derived fuel either directly at the transition from the preheater to the kiln feed end, or via a tire gasification system, as described previously. Combustion air for the precalciner will be provided through a tertiary air duct from the clinker cooler. Multi-stage combustion will control NOx emissions.

The pyroprocessing system will transform the raw meal from the homogenization silo into clinker. The pyroprocessing system will produce 105 tons per hour of clinker, from 178 tons of dry preheater feed per hour. This amount of clinker will produce 150 tons of cement per hour. The plant will be limited by permit to an annual production rate of 839,500 tons of clinker and 1,191,360 tons of portland cement.

After discharge from the kiln, the clinker will be cooled with ambient air in a reciprocating grate cooler equipped with an electrostatic precipitator (ESP) and ID fan for particulate control. A portion of the clinker cooler gases will be ducted to the coal mill to dry the coal. These gases will then exhaust through the coal mill fabric filter into another stack. A portion of the clinker cooler gases will be ducted to the precalciner, the precalciner combustion chamber and the tire gasification system, if installed.

The clinker will be conveyed to one of two clinker silos with a capacity of 25,000 short tons each. The clinker will be withdrawn from the silos by vibrating feeders, and discharged onto the finish mill feed belt. Enclosed clinker handling operations and storage silos will be controlled with baghouses.

Gypsum and limestone will be received by truck and stored under cover in stockpiles. Each material will be transferred by a front end loader to feed hoppers, and conveyed to the finish mill. The finish mill can produce up to 150 tons per hour of cement.

All enclosed sources associated with the finish milling operation will be controlled with baghouses. Fugitive emissions from gypsum and limestone handling and conveying associated with the finish milling operation will be minimized by inherent moisture and by the application of water for suppression of unconfined emissions of particulate matter.

Finished cement will be stored in five concrete silos. Cement will be withdrawn from the silos and loaded into tanker trailers for bulk shipment or into bags which will be cleaned and placed on pallets for shipment. All product will be transported by truck.

All enclosed sources associated with the cement handling operation will be controlled with baghouses.

Coal and petroleum coke will be received by truck. These will drop into a hopper and be conveyed to a bucket elevator at a rate of 200 TPH. The bucket elevator will discharge either into a covered storage facility or onto a belt and then to a bin. Coal and petroleum coke in covered storage will be reclaimed by a front end loader through unloading system. Coal and petroleum coke will be metered from the bin to a vertical mill, for milling and drying with hot gases from the clinker cooler. The milled fuels will be stored in a pulverized fuel storage bin for pneumatic conveyance to the main burner and precalciner burner.

All enclosed sources associated with the coal and petroleum coke handling and milling operation will be controlled with baghouses. Fugitive emissions from coal and petroleum coke handling and conveying will be minimized by inherent moisture and by the application of water for suppression of unconfined emissions of particulate matter.

6. BACT DETERMINATION PROCEDURE

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques for control of each such pollutant. In addition, Rule 62-212.400(6)(a), F.A.C., states that in making the BACT determination, the Department shall give consideration to:

1. Any Environmental Protection Agency determination of BACT pursuant to Section 169 of the Clean Air Act, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).
2. All scientific, engineering, and technical material and other information available to the Department.
3. The emission limiting standards or BACT determination of any other state.
4. The social and economic impact of the application of such technology.

The EPA currently directs that BACT should be determined using the "top-down" approach. In this approach, available control technologies are ranked in order of control effectiveness for the emissions unit under review. The most stringent alternative is evaluated first. That alternative is selected as BACT unless the alternative is found to not be achievable based on technical considerations or energy, environmental or economic impacts. If this alternative is eliminated for these reasons, the next most stringent alternative is considered. This top-down approach is continued until BACT is determined. In general EPA has identified five key steps in the top-down BACT process: Identify alternative control technologies; eliminate technically infeasible options; rank remaining control technologies by control effectiveness; evaluate most effective controls; select BACT.

BACT evaluation should be performed for each emissions source and pollutant under consideration. All of the combustion emissions from the plant are associated with the in-line kiln/raw mill. BACT for particulate matter can be treated separately for the in-line kiln/raw mill, clinker cooler, the enclosed material handling processes and the unenclosed conveyors.

The Department will consider the control or reduction of "non-regulated" air pollutants when determining the BACT limit for regulated pollutants, and will weigh control of non-regulated air pollutants favorably when considering control technologies for regulated pollutants. The Department will also favorably consider control technologies that utilize pollution prevention strategies. These approaches are consistent with EPA's consideration of environmental impacts.

The EPA has determined that a BACT determination shall not result in a selection of a control technology which would not meet any applicable emission limitation under 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants). This project is subject to such standards as described above.

In addition to the information submitted by the applicant and that information mentioned above, the Department may rely upon other available information in making its BACT determination. For this project, the Department relied upon information from the EPA Publication: Alternative Control Techniques Document – NOx Emissions from Cement Manufacturing, March 1994. The Department also relied upon recent BACT determinations it made for similar facilities and information in EPA's BACT/LAER Clearinghouse, and BACT guidelines for the California Air Resources Board, South Coast Air Quality Management District, and Bay Area Air Quality Management District.

7. BACT POLLUTANT ANALYSIS AND DEPARTMENT'S DETERMINATION

For this project the PSD pollutants of concern are PM, PM_{10}, SO_2, NOx, CO and VOC. The applicant proposed control strategies for these pollutants for the emission sources at this facility. The applicant's proposal and the Department's BACT for each pollutant and source is discussed below.

Nitrogen Oxides (NOx)

Emissions of NOx from cement plants result from fuel combustion in the pyroprocessing system. Oxides of nitrogen (NOx) are generated during fuel combustion by oxidation of chemically bound nitrogen in the fuel (fuel NOx) and by oxidation of elemental nitrogen in the combustion air (thermal NOx). The thermal NOx reaction occurs in regions of high temperature associated with the combustion of fuel. As flame temperature increases, the amount of thermal NOx increases. Fuel type affects the quantity and type of NOx generated. Pipeline natural gas is low in nitrogen. However it causes higher flame temperatures and generates more thermal NOx than coal, which has higher fuel nitrogen content, but exhibits lower flame temperatures.

The emissions of NOx can potentially be reduced at cement plants by two methods: Minimizing the quantity of NOx generated during combustion through combustion process controls and modifications; or reducing the quantity of NOx in the flue gas stream through flue gas controls.

A review of the EPA's BACT/LAER Clearinghouse indicates that NOx emissions at all operating facilities are minimized by combustion process control.

The applicant proposed that NOx emissions at this facility will be controlled through multistage combustion with a separate line combustion chamber (MSC-CC). The applicant considered other possible control methods, and rejected Selective Catalytic Reduction and Low NOx burners as not feasible for this project. The applicant performed a control cost analysis for Selective Non-catalytic

Reduction (SNCR) and MSC-CC. MSC-CC is the more cost effective control technology at $360 per ton of NOx controlled, versus $1251 for SNCR. The applicant did not reject SNCR based on cost alone, but further because MSC-CC will result in a higher level of control guaranteed by the plant manufacturer, because the plant will be more energy efficient using the MSC process, and because of concerns about handling the non-catalytic reactant. Possible reactants considered by the applicant were ammonia water and anhydrous ammonia, both of which present concerns over transport, handling and storage at the proposed location. Ammonia slip is another concern, and is a consideration of the Department. MSC-CC is also a pollution prevention technique. The Department also considered another SNCR reagent, cyanuric acid, that is listed as a control technology in the Bay Area BACT guideline. This reactant will decompose to isocyanic acid at 320°C, well below the required temperature for reaction. Cyanide compounds are classified as hazardous air pollutants pursuant to Department rule, and the Department rejects this reagent on this basis. Also, SNCR systems using this reagent are not likely to be less expensive than SNCR systems using ammonia.

MSC works by staging the introduction of fuel, combustion air, and raw meal in a manner to reduce NOx formation and reduce NOx to nitrogen. NOx formed in the kiln's sintering zone is chemically reduced by maintaining a reducing atmosphere at the kiln feed end by firing fuel in this region. The reducing atmosphere is maintained in the calciner region by controlling combustion air such that the calcining fuel is first burned under reducing conditions to reduce NOx, then under oxidizing conditions to complete the combustion reaction. Controlling the introduction of raw meal allows for control over temperature in the calciner. Through these mechanisms, both fuel NOx and thermal NOx are controlled. The combustion chamber allows for improved control over introduction of tertiary air in the calciner region, helping to promote the proper reducing environment for NOx control.

One public commentor suggested combusting the fuels in the pyroprocessing system with pure oxygen, presumably to reduce the formation of thermal NOx. The pure oxygen would be supplied from a liquid air fractionation plant which would be located at or near the facility. The Department considered this suggestion but rejected it for the following reasons. The facility will have large combustion air requirements and would require large volumes of pure oxygen to offset the air required, at a significant cost; this technology has not been demonstrated to be feasible for the production of cement or for similar pyroprocessing processes; oxygen actively supports combustion to the extent that it is explosive on contact with heat or oxidizable materials, thus presenting a safety hazard; and use of pure oxygen will do nothing to prevent the formation of fuel NOx. This suggestion can best be characterized as speculative, and extensive redesign and pilot study of the entire pyroprocessing system would be required to accomplish pure oxygen firing, if it is possible at all; such a change would completely alter the mass and heat transfer characteristics of the plant. MSC-CC is an effective control technology that will reduce both thermal NOx and fuel NOx.

Except for emissions during startup of the kiln, the applicant has proposed a NOx emission rate of 3.0 pounds per ton of clinker produced. The applicant advised that excess emissions of NOx during a startup of the pyroprocessing system when there is no material in the kiln may be as high as 600 pounds per hour for up to an hour.

We note that no plant has been constructed in the U.S. with SNCR as a control technology. The Department's research of EPA's BACT/LAER Clearinghouse found one plant achieving a permitted limit less than 2.8 pounds per ton of clinker: A Lone Star facility in California that uses a preheater/precalciner design, and meets a limit of 2.5 lb/ton clinker. In its previous BACT determinations for Florida Rock Industries and Florida Crushed Stone, the Department determined that this value is equal to 2.8 lb/ton clinker when corrected for the additional heat requirement necessary to process the higher moisture limestone mined in Florida. The proposed plant will utilize rock with a higher moisture content than the Florida Rock Industries plant, so the applicant proposed a higher NOx limit than the BACT limit of 2.8 lb/ton clinker imposed for Florida Rock Industries. The three factors most affecting NOx emissions at portland cement plants are fuel volatility, burnability of the material mix and moisture content. The Department considered these factors in previous BACT determinations for cement plants, and in making its determination for this plant, and concluded that moisture content is the factor that warrants most consideration in setting BACT for NOx for cement plants.

The dry process with preheater/precalciner proposed by the applicant is the most energy-efficient process for the production of portland cement. Therefore, one would expect the increased efficiency and consequent lower fuel consumption to result in the lowest possible emissions compared to wet process or other dry process operations, all else being equal. Additionally, the lower flame temperature realized when burning coal compared with burning natural gas, as well as documented NOx reductions from tire burning (tires have a higher heat content and lower nitrogen content than coal), are further reasons to expect the lowest possible emission rate among kilns employing the preheater/precalciner design. MSC-CC is a pollution prevention technique that is integrated into the energy efficient design of the preheater/precalciner process.

The Department agrees with the applicant that MSC-CC is the most cost effective control technology and is BACT for NOx for this project. However, considering the additional benefits that will be derived from the separate line combustion chamber, the Department has determined that the emission limit for this control technology at this facility shall be 2.9 pounds of NOx per ton of clinker produced, and 304.5 pounds per hour. The Department has determined that the appropriate averaging time for this emission limit at this facility shall be a rolling 24 hour period.

The applicant requested a higher limit for NOx for two years after startup, to allow time for adjustment of the plant controls to assure that compliance with the BACT limit will be attained. The Department commented to the applicant that although the temporary exemption language of Department rules provides for exemption from certain PSD requirements for emissions lasting up to two years, such time period for NOx seems excessive given the plant manufacturer's experience with the startup of similar facilities, and the experience it will gain with the startup of the similar Florida Rock plant (which is scheduled to begin operation prior to completion of this facility). The applicant subsequently revised its request to a period of one year after startup, and the Department agrees that such a period is reasonable. During first year after startup, the kiln shall not exceed a NOx limit of 3.8 lb/ton clinker, and 399.0 pounds per hour; the limit of 2.9 lb/ton clinker (304.5 lb/hr) shall be imposed thereafter. Emissions of NOx up to 600 lb/hr for up to one hour in duration shall be allowed for startup of the pyroprocessing system when there is no material in the kiln. (Assuming that two of these startups occur per year, excess NOx emissions will be 591 pounds per year greater than allowable.)

Sulfur Dioxide (SO_2)

Sulfur dioxide is generated from volatilization and subsequent oxidation of sulfur compounds in the raw materials within the preheater and precalciner regions, and by oxidation of sulfur compounds in the fuel during combustion. Sulfur dioxide at this facility will be generated through these mechanisms. The sulfur content of both raw materials and fuels varies based on the raw materials and fuels available at a given location, and consequently sulfur dioxide emissions vary with these factors. As is typical of conditions in Florida, the limestone, which is the principal raw material, will be low in sulfur compounds. Sulfur compounds present in the other raw materials such as the iron sources, which represent a small proportion of the total raw materials, will most significantly contribute to sulfur dioxide emissions.

Most of the sulfur dioxide formed subsequently reacts with alkaline compounds present in the pyroprocessing environment to form alkali sulfates, which become incorporated in the cement clinker. The amount of sulfur dioxide released in the flue gases will vary with the amount of excess alkali available for absorption. The pyroprocessing system is very alkaline, and will be quite effective at removing sulfur dioxide formed from fuel sulfur. A significant proportion of sulfur dioxide from sulfur in raw materials will be removed through intimate contact with the incoming alkaline raw materials which flow counter to the gas flow. Further contact is achieved in the raw mill where the flue gases are used to dry incoming material feed.

Control for sulfur dioxide applicable to the project are use of low sulfur raw materials; process control to assure a sufficiently alkaline environment is present for reaction with sulfur dioxide formed during pyroprocessing, and to assure intimate contact between flue gases and incoming materials; and flue gas controls – principally scrubbers.

The applicant proposes to limit sulfur dioxide emissions through process control. This will be accomplished by taking advantage of the alkaline environment in the kiln, preheater/precalciner, and raw mill to effect substantial removal of sulfur dioxide. Ultimately, the sulfur is incorporated into the clinker, thus minimizing the amount emitted to the atmosphere. The applicant proposed a sulfur dioxide limit of 0.28 pounds per ton of clinker produced.

Several cement plants in the U.S. use scrubbers for control of sulfur dioxide, ammonia and visible plumes that occur at some plants. Many more plants use process control for sulfur dioxide control. The Department investigated the applicability of a dry circulating scrubber for sulfur dioxide control for this project, and requested comments from the applicant. The applicant provided information regarding control cost for wet scrubbing, and discussed problems with installing the dry circulating bed system at this facility. The applicant demonstrated that wet scrubbing is not cost effective, having estimated a control cost for wet scrubbing of $29,700 per ton. Despite the problems pointed out by the applicant, the Department estimated the control cost for the dry circulating scrubber, assuming, to simplify the cost estimate, the originally proposed ESP for the in-line kiln/raw mill could be used for reagent recovery. (The applicant has changed the design to use a baghouse for particulate control for the in-line kiln/raw mill.) Based on a capital cost estimate of $8 million and 20 year depreciation period and estimated 90% efficiency, provided by Ken Olen, Ph.D., the control cost was estimated to be $7,400 per ton. It is possible that an additional ESP would be required to effect proper operation of the dry circulating scrubber at this facility, raising this cost estimate substantially. The applicant's engineer commented by letter dated November 8, 1999 that he believes that such additional equipment is necessary. The Department agrees with the applicant that flue gas controls are not cost effective for this project, and are not required as BACT.

The Department believes that process control is the appropriate technology for control of sulfur dioxide emissions for this project and is BACT. The Department considered imposing limitations on the sulfur content of the fuels and the raw materials used, but determined that such limits are not required. Fuel sulfur is largely irrelevant because of the substantial exposure and contact between sulfur dioxide formed from fuel sulfur and the alkaline materials. Sulfur limits on the raw materials are not needed because the primary raw material, limestone, will be naturally low in sulfur. The other raw materials will be obtained by the applicant, which will acquire materials with regard to the alkali available in the process for control of sulfur dioxide formed from volatilization and oxidation of sulfur compounds in these materials. The Department will require a continuous emission monitor system for sulfur dioxide, which will offer a continuous demonstration of compliance with the emission limit, as well as process control data for the plant operators. The use of a CEM system ensures that process control will be effective, and eliminates the need for a limit on sulfur in raw materials.

The Department has determined that BACT for sulfur dioxide is process control. The BACT sulfur dioxide emission limit for this plant shall be 0.27 pounds/ton of clinker produced, and 28.4 pounds per hour, based on a rolling 3-hour averaging time. Process control will allow for sulfur dioxide emissions to be minimized by maintaining a sufficient alkaline environment in the pyroprocessing system and by intimate contact between raw materials and exhaust gases. The sulfur dioxide that would result from fuel sulfur, as well as that resulting from volatilization and oxidation of sulfur from raw materials, will be controlled in this manner.

Particulate Matter (PM and PM_{10})

Particulate matter results from the various physical and chemical processes at a cement manufacturing plant such as: quarrying and crushing, material transfer and storage, grinding and blending, clinker production, finish grinding, and packaging and loading. As is typical of cement plants, the largest emission source of particulate matter at this facility will be the pyroprocessing system that includes the in-line kiln/raw mill and clinker cooler. At this facility, all cement kiln dust (CKD) captured in the in-line kiln/raw mill baghouse will be returned to the pyroprocessing system as raw material. Emissions from enclosed fuel and material handling and storage operations represent another significant source of emissions at this facility. Unenclosed sources represent the smallest sources of emissions, given the use of proper controls. The limestone will primarily be mined below the water table and have an average moisture of 10-20%. The quarrying activities and associated crushing and transport will involve moist or wet raw materials with negligible unconfined emissions.

Common control devices for controlling emissions of particulate matter at cement plants are fabric filters (baghouses) and electrostatic precipitators (ESPs). Baghouses and ESPs are generally considered equivalent for particulate control. Both types of devices can achieve removal efficiencies of over 99%. ESPs and baghouses are used extensively as control devices at cement plants. ESPs are generally specified for kiln and clinker cooler exhaust gases because of their ability to operate effectively at varying temperatures, although baghouses are also used at some facilities for this purpose. Both types of control equipment provide for the recovery and recycling of CKD back into the process stream. ESPs offer the advantage of having no fabric filters that will wear and break and require routine replacement, while baghouses offer the advantage of providing for "passive" control in the event of an electrical power failure. A review of the BACT/LAER Clearinghouse shows that baghouses and ESPs are widely used to control particulate matter from process emission units at cement plants. Both offer an essentially equivalent level of control and are commonly accepted as BACT. Baghouses are also generally used to control particulate emissions from most other material processing operations at cement plants.

Common controls to limit particulate emissions from fugitive sources (such as roadways, stockpiles, and material processing and conveying equipment) include application of water for dust suppression, removal of dust, application of water and other dust suppressants, paving of roads and covering of stockpiles to reduce wind erosion. These methods of controlling fugitive particulate matter emissions are generally considered to be BACT for most material handling operations and unpaved roads.

The applicant proposed respective PM and PM_{10} emission limits of 0.20 and 0.17 pounds per ton of dry preheater feed for the in-line kiln/raw mill, and 0.10 and 0.085 pounds per ton of dry preheater feed for the clinker cooler. After comment from the Department that lower limits are found in the BACT/LAER Clearinghouse, the applicant revised the PM_{10} limits to 0.11 and 0.06 pounds per ton of dry preheater feed (equivalent to 19.6 and 10.7 lb/hr at maximum process rate) for the in-line kiln/raw mill and clinker cooler, respectively. The applicant originally proposed to achieve these limits using an ESP for the in-line kiln/raw mill and an ESP for the clinker cooler, with other enclosed sources controlled by baghouses. The applicant later revised its design to use a baghouse for the in-line kiln/raw mill.

The Department agrees with the applicant's proposal, but has instituted additional limits for PM of 0.13 and 0.07 pounds per ton of dry preheater feed (and 23.1 and 12.5 lb/hr) for the in-line kiln/raw mill and clinker cooler, respectively. BACT is the use of a baghouse to control particulate matter emissions from the in-line kiln/raw mill and an ESP to control particulate matter emissions from the clinker cooler to the PM and PM_{10} limits noted above. Visible emissions from these sources shall not exceed 10 percent opacity. BACT for other enclosed emission sources will be control of particulate matter emissions using baghouses to meet respective PM and PM_{10} emission limits of 0.01 and 0.0085 grains per dry standard cubic foot. Visible emissions from these sources shall not exceed 5 percent opacity.

BACT for unenclosed sources is generally control of particulate matter emissions by inherent or applied moisture. Unpaved roads will be sprayed with water or dust suppressants to prevent unconfined particulate matter emissions. Material and fuel storage piles will be stored under roof or in enclosed vessels. Storage piles shall be shaped, compacted and oriented to minimize wind erosion. Storage piles shall be wetted with devices located near such piles when visual inspection determines wetting is needed. Water spray bars shall be located at each unenclosed conveyor and used for wetting of materials and fuel if inherent or previously-applied moisture is insufficient to prevent unconfined PM emissions. Paving of the manufacturing area and access roadways is required. Bulk transport trucks leaving the plant must travel through a tire wash prior to traveling on access roadways.

The Department believes that these controls and emission limits constitute BACT for particulate matter.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

Carbon monoxide is a pollutant formed by the incomplete combustion of carbon in the fuels fired during pyroprocessing. When insufficient oxygen is provided or poor combustion conditions occur, more CO and less CO_2 is formed than under ideal conditions. VOC is also a pollutant formed by the incomplete combustion of fuel.

Emissions of CO and VOC are controlled by utilization of proper combustion practices to maximize the oxidation of carbon to CO_2 instead of CO, and by flue gas controls. No add-on controls for CO or VOC have been demonstrated for cement plants. The high temperatures and control of excess air, process temperatures and fuel typically results in simultaneous optimization for control of CO, VOC and NOx. CO and NOx generally show an inverse relationship in cement plants as in many combustion processes, so reduction of NOx results in higher CO emissions. The applicant proposed combustion control as BACT for CO and VOC from this plant, and proposed emission limits of 3.6 and 0.12 pounds per ton of clinker produced for CO and VOC, respectively.

The Department agrees with the applicant. BACT for CO and VOC shall be combustion control. The emission limit for CO shall be 3.6 pounds per ton of clinker produced, and 378.0 pounds per hour, based on a 3 hour average. The averaging time is that of the annual test. A CEM will not be required for CO. However, the facility will install process monitors for CO to provide for the use of CO as a short-term measure of the efficacy of combustion control. The emission limit for VOC shall be 0.12 pounds per ton of clinker produced, and 12.6 pounds per hour, based on a 30 day averaging time. This averaging time is consistent with the NESHAP requirements.

Based on the information provided by the applicant and the informed judgement of the Department, BACT for PM, PM_{10}, SO_2, NOx, CO and VOC for the emission sources at this facility is determined to be the control technologies and emission limits discussed above.

8. COMPLIANCE

The compliance methods are briefly summarized here. Except for PM, PM_{10} and CO, compliance with the emission and process limitations for the in-line kiln/raw mill shall be demonstrated on a regular basis through a variety of continuous monitoring systems, and by record keeping for some production parameters. Compliance with the visible emissions limitation for the clinker cooler shall be regularly demonstrated using COM system clinker cooler stack. Annual emission tests will be required for all emission-limited pollutants, including visible emissions, from the in-line kiln/raw mill and the clinker cooler. Tests conducted for the annual RATA can satisfy the annual test requirements for the in-line kiln/raw mill. Initial compliance testing to demonstrate compliance with the emission limits for the three largest process sources controlled by baghouses will be required; thereafter, no subsequent tests will be required if these sources meet a visible emissions limit of 5% opacity. Initial and annual tests for the other process sources controlled by baghouses is not required if these sources meet a visible emissions limit of 5% opacity. The opacity limit for the clinker cooler is 10%. Compliance with the mercury throughput limitation will be demonstrated via sampling and analysis of the materials and fuels. Compliance with the dioxin emissions limit of the NESHAP shall be demonstrated via testing, and continuous monitoring of the temperature at the inlet of the baghouse for the in-line kiln/raw mill, in accordance with that rule.

The Department will require that the data from continuous monitors for emissions be available to the Department via a data retrieval system to one of the Department's offices. This data will also be posted to an Internet site by the permittee, if technically feasible.