

DRAFT PERMIT

PERMITTEE

Suwannee American Cement, LLC
Post Office Box 410
Branford, Florida 32008

Authorized Representative:
Celso Martini, Plant Manager

Permit No. 1210465-012-AC
Cement Plant (SIC No. 3241)
Capacity Evaluation Program
Expires: April 30, 2005

PROJECT AND LOCATION

This permit authorizes Suwannee American Cement, LLC to conduct a production capacity evaluation program at the existing Branford Cement Plant located at US Highway 27 and County Road 49 in Suwannee County, Florida. The UTM coordinates are: Zone 17; 321.4 km E and 3315.9 km N.

STATEMENT OF BASIS:

This air construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.). The permittee is authorized to conduct tests for the production rate and fly ash injection capacities in accordance with the conditions of this permit and as described in the application. Apart from the temporary increase in feed rate, clinker production, fuel use rate, and injection of fly ash into the calciner, the permittee shall operate the facility in accordance with the previously approved permits, drawings, plans, and other documents on file with the Florida Department of Environmental Protection ("DEP" or "the Department"). This temporary permit supplements the original air construction permit and its subsequent modifications. It does not modify any other requirements from such previously issued air permits except a provision for certain emissions data exclusion (lb NOx/ton of clinker) for periods of off-capacity clinker production during the capacity evaluation program.

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DRAFT

Michael G. Cooke, Director
Division of Air Resource Management

(Date)

SECTION 1. GENERAL INFORMATION

FACILITY AND PROJECT DESCRIPTION

The existing Suwannee American Cement (SAC) facility consists of a portland cement plant, the associated quarry, and raw material and cement handling operations. The plant processes raw materials in a preheater/precalciner kiln with in-line raw mill to produce clinker. The clinker is milled and combined with gypsum to produce portland cement.

Authorized fuels for the pyroprocessing system include natural gas, coal, petroleum coke, whole tires and tire derived fuel (TDF). An authorized tire gasification system has not yet been constructed. The plant has a coal processing operation that will crush coal and petroleum coke. Petroleum coke has not yet been used.

The plant was constructed in accordance with Air Permit No. PSD-FL-259, as modified. That permit established short term production limits (24-hour average) of 178 tons per hour (TPH) of material fed to the preheater (dry basis), 105 TPH of clinker, 364 MMBtu per hour of heat input (MMBtu/hr) and 150 TPH of portland cement production. It also specifies annual production limits (based on a rolling 12-month basis) of 1,427,880 tons per year (TPY) of material fed to the preheater (dry basis), 839,500 TPY of clinker production, and 1,191,360 TPY of portland cement production. The plant is currently operating under the air construction permit while awaiting action on the application for a Title V air operation permit.

This current permit project (No. 1210465-012-AC) authorizes SAC to conduct a "capacity evaluation program" to assess the plant's production rate capacity as constructed as well as with a new fly ash injection method. The temporary program is limited to 120 operating days and is scheduled for completion by April 30, 2005. Operational and emissions information gathered during the capacity evaluation program will be used to evaluate the feasibility of a pending request for a permanent increase in the clinker production rate.

This permit authorizes SAC to evaluate the pyroprocessing system at preheater feed rates greater than 178 tons per hour and to determine the efficacy of directly injecting fly ash into the calciner in addition to the preheater. During the capacity evaluation program, the sum of dry material feed to the preheater and fly ash injected into the calciner shall be no greater than 205 TPH, the clinker production rate shall be no greater than 115.5 TPH, and the fuel use limit shall be no greater than 420 MMBtu/hr, all on a 24-hour basis.

Existing permitted emission limits remain unchanged and in effect during the capacity evaluation program except for a provision for the production-based NO_x emissions data exclusion (lb NO_x/ton of clinker) for periods of off-capacity clinker production as specified in this permit.

EMISSION UNITS

This permit addresses the following emission units.

| EU No. | Emission Unit Description |
|--------|---|
| 004 | In-line kiln/raw mill controlled by baghouse – main stack |
| 005 | Clinker cooler controlled by ESP |
| xxx | Temporary fly ash injection into the calciner |

REGULATORY CLASSIFICATION

Title III: The Suwannee American Cement Facility is classified as a "Major Source" per 40 CFR 63.2, Definitions (adopted and incorporated by reference by the Department at Paragraph 62-204.800(11)(d)) because it consists of a group of stationary sources located within a contiguous area and under common control that emit or have the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants. The facility is subject to the Major (Greenfield) Source requirements of National Emission

SECTION 1. GENERAL INFORMATION

Standards for Hazardous Air Pollutants (NESHAP) from the Portland Cement Manufacturing Industry, Code of Federal Regulations (CFR) Title 40, Part 63, Subpart LLL.

Title V: Because potential emissions of at least one regulated pollutant exceed 100 tons per year, the existing facility is a Title V major source of air pollution in accordance with Chapter 62-213, F.A.C. Regulated pollutants include pollutants such as carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM/PM₁₀), sulfur dioxide (SO₂), and volatile organic compounds (VOC).

Prevention of Significant Deterioration (PSD): This facility is located in an area (Suwannee County) designated as "attainment" for all criteria pollutants. The facility is considered a "Portland Cement Plant," which is one of the 28 PSD source categories with the lower PSD applicability threshold of 100 tons per year (see Table 212.400-1, Rule 62-212.400, F.A.C.). Potential emissions of at least one regulated pollutant exceed 100 tons per year. Therefore, the facility is classified as a Major Facility with respect to Rule 62-212.400, F.A.C.

New Source Performance Standards (NSPS): The facility is subject to: 40 CFR 60 Subpart F, Standards of Performance for Portland Cement Plants; 40 CFR 60, Subpart Y, Standards of Performance for Coal Preparation Plants; and 40 CFR 60, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants.

State Rule: Some emissions units are subject to Rule 62-296.701, F.A.C., Portland Cement Plants.

RELEVANT DOCUMENTS

The documents listed below are the basis of this permit. The permit application and additional information referenced are not a part of this permit, but the information is specifically related to this permitting action and the following documents are on file with the Department.

- Air Permit No. PSD-FL-259 issued on June 1, 2000, which was the original air construction permit for the new facility.
- Air Permit No. PSD-FL-259A issued on November 8, 2002, which modified the permit as follows: added requirement for notification of the anticipated date that equipment would be commissioned; and removed the startup notification specified by 40 CFR 60.7(a)(2) because it was repealed by EPA in 1999.
- Air Permit No. PSD-FL-259B issued on January 18, 2003, which modified the permit as follows: extended expiration date to June 30, 2004; added requirements for plant managers; added construction schedule; added requirements for permit transfer; revised data retrieval requirements; and revised CEMS requirements for kiln.
- Air Permit No. PSD-FL-259C was issued on May 15, 2003, which modified the following items: clarified emissions point descriptions for several baghouses; and clarified CEMS requirements for kiln.
- Draft Permit No. 121065-008 (PSD-FL-259D) distributed September 24, 2004, which proposes to modify the permit as follows: extend expiration date to March 31, 2005; install a permanent hydrated lime injection system; base the compliance averaging time for VOC on a 30 operating-day basis instead of a 30 calendar-day basis; and clarify the correct sampling point for determining mercury in raw materials.
- Application No. 121065-012-AC received on August 26, 2004 requesting a 120 operating-day testing program to evaluate production rate and fly ash injection capacity.
- Draft Permit No. 121065-012-AC for this permitting action distributed September 24, 2004.

SECTION 2. ADMINISTRATIVE REQUIREMENTS

1. Permitting Authority: All applications for permits to construct or modify an emission unit subject to the Prevention of Significant Deterioration or Nonattainment review requirements should be submitted to the Bureau of Air Regulation, Florida Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 (phone number: 850/488-0114). All documents related to applications for permits to operate and minor modifications shall be submitted to the Air Resource Section of the Department's Northeast District Office at 7825 Baymeadows Way, Suite 200B, Jacksonville, Florida 32256-7590 (phone number: 904/807-3300).
2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Air Resource Section of the Department's Northeast District Office at 7825 Baymeadows Way, Suite 200B, Jacksonville, Florida 32256-7590 (phone number: 904/807-3300).
3. Appendices: The following Appendices are attached as part of this permit: Appendix CF (Citation Formats), Appendix GC (General Conditions), and Appendix GT (General Testing Requirements).
4. Applicable Regulations, Forms, and Application Procedures: Unless otherwise indicated in this permit, the construction and operation of the subject emissions units shall be in accordance with the capacities and specifications stated in the applicable permits and applications. The facility is subject to all applicable provisions of Chapter 403, F.S., Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296, and 62-297, F.A.C.; 40 CFR 60 (Subparts A, F, Y, and 000); and 40 CFR 63 (Subparts A and LLL). The terms used in this permit have specific meanings as defined in the applicable chapters of the F.A.C. 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. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permitting or regulations. [Rules 62-204.800, 62-210.300, and 62-210.900, F.A.C.]
5. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]
6. Modifications: No emissions unit or facility subject to this permit shall be constructed or modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]
7. Additional Permits: The scope of this temporary project is to develop information in support of a separate air construction permit for a permanent production increase. Any final action authorizing a permanent production increase requires a revision to the Title V air operation permit. [Rule 62-213.400, F.A.C.]

SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

This section of the permit addresses the following existing emissions units.

| EU No. | Emission Unit Description |
|---------------|---|
| 004 | In line kiln/raw mill controlled by baghouse – main stack |
| 005 | Clinker cooler controlled by ESP |
| xxx | Temporary fly ash injection into the calciner |

CAPACITY EVALUATION PROGRAM

- Relation to Other Permits:** The conditions of this permit are in addition to those of any other air construction or operation permits. [Rules 62-4.210, 62-4.030, and 62-210.300(1)(b), F.A.C.]
- Temporary Operating Rates:** Subject to the conditions of this permit, the permittee is temporarily authorized to conduct a capacity evaluation program to: evaluate the technical feasibility of increasing production in the existing in line kiln/raw mill/clinker cooler system as constructed; evaluate the technical feasibility of increasing production in the in line kiln/raw mill/clinker cooler system by directly injecting fly ash (a raw material) into the calciner; and to determine the emissions at the higher operating rates. Within the electrical, structural, process, and mechanical capabilities of the kiln, the permittee is authorized to temporarily operate at the following maximum process and production rates at any time during the capacity evaluation program.

| Emissions Unit Rates | Temporary Maximum Operating Rate Range |
|-----------------------------|---|
| 004 - Kiln Process | 178 to 205 tons per hour (including dry preheater feed plus direct fly ash feed to the calciner) |
| | 364 to 420 million BTU heat input per hour |
| 005 - Clinker Production | 105 to 115.5 tons per hour |
| XXX - Fly Ash Injection | Up to 27 tons per hour direct feed to the calciner (included in 205 TPH kiln process rate) |

For purposes of the capacity evaluation program only, the clinker production rate identified in the above table shall be determined by the following equation:

$$\text{Clinker Production} = [(\text{Feed}) (\text{Kiln Feed LOI Factor}) + (\text{Fly Ash Injection}) (\text{Fly Ash LOI Factor})]$$

Where:

- Kiln feed is determined by the Poldos control system.
- Fly ash is determined from the rotary feed system or equivalent.
- LOI for the kiln feed and fly ash is based on a monthly average determined from daily measurements.

At all times, the emission units shall remain subject to the conditions of all existing permits related to air pollution and control equipment during the temporary capacity evaluation program. All required CEMS and COMS shall be properly functioning when operating within the temporary maximum rate range. [Rule 62-4.070(3), F.A.C.]

- Schedule:** At least 14 days before beginning the capacity evaluation program, the permittee shall submit to the Permitting and Compliance Authorities a preliminary schedule detailing the program phases, operating scenarios, operational data collection, emissions data collection, and emissions testing protocol. The permittee shall update the schedule as necessary. [Rule 62-4.070(3), F.A.C.]

SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

4. Duration: The temporary capacity evaluation program is limited to no more than 120 operating days and shall end no later than April 30, 2005. Upon completion of the capacity evaluation program or the expiration of this permit (whichever occurs first), the permittee shall cease to operate at production and process rates in excess of the original Air Construction Permit No. 1210465-001-AC (PSD-FL-259). For this permit, "operational day" means any day that includes operation within the temporary maximum rate range specified above. [Applicable Permit, Applicant Request]
5. Operating Scenarios: The permittee shall evaluate the following operating scenarios.
 - a. *Case 1*: Operate the in-line kiln system within the temporary maximum rate range without direct fly ash injection to the calciner to evaluate the existing capacity as constructed. At least 8 hours of data shall be gathered to identify the existing capacity as constructed.
 - b. *Case 2*: Operate the in-line kiln system at a clinker production of approximately 105 tons per hour while injecting fly ash directly into the calciner at intervals of 3 tons per hour until the maximum fly ash injection capacity for the temporary fly ash injection system is determined. At least 3 hours of data shall be gathered at each fly ash injection rate.
 - c. *Case 3*: Operate the in-line kiln system within the temporary maximum rate range while injecting fly ash directly into the calciner at intervals of 3 tons per hour until the maximum fly ash injection capacity for the temporary fly ash injection system is determined. At least 3 hours of data shall be gathered at each fly ash injection rate.

The permittee may evaluate other operating scenarios within the temporary maximum rate range as necessary. All operation shall be within the electrical, structural, process, and mechanical capabilities of the kiln. If the above specified operating rates or fly ash injection rates are not possible, the permittee shall document this with the suspected reason. Whenever operating within the temporary maximum rate range or directly injecting fly ash into the calciner, the permittee shall continuously monitor and record the following information: dry feed material to the preheater (TPH); fly ash feed directly to the calciner (TPH); clinker production (TPH) by indirect calculation method as defined in Condition 2; clinker production (TPH) by direct measurement using the installed weigh scale; heat input rates (MMBtu/hour) to the kiln from each fuel in use; all required CEMS data; and all required COMS data. [Rule 62-4.070(3), F.A.C.]

EMISSIONS

6. Emissions Standards: Except as described in Condition 7, this permit does not change any emission standards or establish any new emissions standards for the in line kiln system. During the temporary capacity evaluation program, the in line kiln system shall comply with the requirements of all existing, valid Department permits. [Rules 62-4.030, 62-4.070(3), and 62-210.300(1)(b), F.A.C.]
7. NO_x Data Exclusion: The following provisions apply only during the capacity evaluation program and only for 24-hour periods during which fly ash is directly injected into the calciner.
 - a. "Off-capacity clinker production" is defined as clinker production below 85 tons per hour.
 - b. If the 24-hour period includes off-capacity clinker production, up to two 1-hour production-based NO_x emission averages (lb/ton clinker) collected during such periods may be excluded from the 24-hour compliance average.
 - c. No such data exclusion is permitted for clinker production below 85 tons per hour unless fly ash is being injected directly into the calciner. Operators shall minimize such incidents of off-capacity clinker production to the extent possible. The owner or operator shall monitor and record the number of 1-hour NO_x emission rates excluded from the determination of compliance with the production-based NO_x emission limit. [Applicant Request].

SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

8. Unconfined Particulate Emissions: During the capacity evaluation program, unconfined particulate matter emissions shall be minimized by taking the reasonable precautions specified in the current air construction permit, as necessary. [Rule 62-296.320(4)(c), F.A.C.]

EMISSIONS TESTING AND MONITORING REQUIREMENTS

9. Test Notification: The permittee shall provide at least a 15-day advance notice of any scheduled stack tests to afford the Compliance Authority the opportunity to witness the tests. If unavoidable circumstances occur that would delay the stack tests, the permittee shall keep the Compliance Authority informed of the delays and the new schedule. At its discretion, the Compliance Authority may allow a shorter advance notice. [Rule 62-297.310(7)(a)9, F.A.C.]
10. Stack Tests – In Line Kiln (EU-004): Within the electrical, structural, process, and mechanical capabilities of the in-line kiln system, the permittee shall conduct the stack tests in accordance with the following provisions.
- At the operating rates specified below, the permittee shall conduct stack tests (one for each pollutant) to determine compliance with the existing emissions standards for carbon monoxide and particulate matter.
 - The permittee shall conduct dioxin/furan tests if there is a significant change in the feed that was used in the previous performance test. A Loss on Ignition (LOI) value of 30 percent or more shall be considered a significant change in the feed.
 - For mercury, the permittee shall calculate and report mercury emissions in accordance with the procedure specified in the current air construction permit.
 - Stack testing shall be performed at the in-line kiln main stack while the preheater, kiln, precalciner, cooler, and raw mill are operating simultaneously (compound operation). For each required stack test, the permittee shall operate the in-line kiln system to produce at least 110 tons per hour of clinker while injecting fly ash directly into the calciner within at least 90% of the highest sustained fly ash injection rate as determined by the results of operating scenario Case 3 in Condition 5.
 - The permittee shall conduct each required stack test using the methods approved in the current air construction permit. Each required stack test shall consist of at least three test runs.
 - For each required stack test, the permittee shall report the following continuous monitoring data: nitrogen oxides, sulfur dioxide, volatile organic compounds (total hydrocarbons), and opacity. In addition, the permittee shall report the continuous opacity monitoring data from the clinker cooler (EU-005) for each required test.
 - For each required stack test, the permittee shall report the following information: dry feed material to the preheater (TPH); fly ash feed directly to the calciner (TPH); clinker production (TPH) by indirect calculation method as defined in Condition 2; clinker production (TPH) by direct measurement using the installed weigh scale; and heat input rates (MMBtu/hour) to the kiln from each fuel in use.
 - During each day that stack tests are conducted on the in-line kiln system (EU-004), a representative sample of each fuel used shall be taken and analyzed for the following fuel properties: heating value (Btu/lb), moisture (% by weight), nitrogen (% by weight), sulfur (% by weight), chlorides (% by weight), ash (% by weight), and mercury (ppm by weight).
 - During each day that stack tests are conducted on the in-line kiln system (EU-004), a representative sample of the fly ash injected into the calciner shall be taken and analyzed for the same constituents as preheater feed. In addition, the fly ash shall be tested for ammonia, chloride, carbon, loss on ignition (LOI), and mercury.

SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

[Rules 62-4.070(3) and 62-297.310, F.A.C.]

11. Test Procedures: General stack test procedures are summarized in Appendix GT of this permit. [Rule 62-297.310, F.A.C.]
12. Monitoring: During the capacity evaluation program, the permittee shall continuously monitor and record all information specified by the existing air construction permit including operational parameters, CEMS data, and COMS data. [Rule 62-4.070(3), F.A.C.]

RECORDS AND REPORTS

13. Stack Test Reports: The permittee shall prepare and submit reports for all required stack tests in accordance with the requirements in Rule 62-297.310(8), F.A.C. The permittee shall submit a written report that summarizes the results within 45 days of completing each required stack test. All stack test data collected during the temporary testing program shall be submitted for review. For each test run, the report shall also indicate the following information: dry material feed to the preheater (TPH); fly ash injection directly to the calciner (TPH); clinker production (TPH); heat input rates (MMBtu/hour) from each fuel in use; CEMS and COMS data; and ambient conditions.
14. Fuel and Fly Ash Analyses: Within 45 days of taking a fuel or fly ash sample required by this permit, the permittee shall submit a report detailing the results of the analyses. [Rule 62-4.070(3), F.A.C.]
15. CEMS Data: The permittee shall provide the Department with data disks containing all CEMS data and production data for the duration of the capacity test. The permittee shall provide a description to decipher and review the data. The data should indicate when the raw mill is on (compound operation) and when it is off. [Rule 62-4.070(3), F.A.C.]
16. Final Report on the Capacity Evaluation Program: Within 90 days of completing the capacity evaluation program and no later than July 30, 2005, the permittee shall submit a technical report detailing the capacity evaluation program and its findings. The report shall be comprehensive and include, but not be limited to, the following:
 - For each day the plant operated within the temporary maximum rate range or directly injected fly ash into the calciner, an hour-by-hour summary of the following information: dry material feed to the preheater (TPH); fly ash injection directly to the calciner (TPH); clinker production (TPH); portland cement production (TPH); heat input rates (MMBtu/hour) from each fuel in use; CEMS data; and COMS data.
 - For each emissions stack test conducted, a summary of the information required in Condition 13.
 - An assessment of the precision and accuracy of the methods used to determine feed material rates and indirectly calculate clinker production.
 - An assessment of the precision and accuracy of direct measurement of clinker production using the installed scales.
 - A discussion of any operational problems encountered at the higher authorized rates.
 - Details of any mechanical, electrical, structural, and process limitations that were identified during the course of the capacity evaluation program.

[Rule 62-4.070(3), F.A.C.]

17. Engineering Report on Kiln: Any future or pending applications for a permanent production increase shall include an engineering report describing the full capability of the kiln to sustain the requested production rates while meeting proposed emission rates. The report shall be sealed by professional engineers or other experts as appropriate in structural, mechanical, electrical, process, and

SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

environmental disciplines. A single report from the kiln manufacturer would suffice to fulfill this requirement. [Rule 62-4.070(3), F.A.C.]

19. Emissions Limited and Subject to Revision for SO₂ and NO_x: Based on results of compliance tests and continuous monitoring data, the Department may revise the emission limits for sulfur dioxide and nitrogen oxides downward to make these limits more stringent provided that overall control attained for all air pollutants including SO₂, NO_x, VOC and CO is optimized. Such revision shall be based on data that represents a full range of operating conditions and a representative period of time. Such revision, if required by the Department, shall be in the form of a federally enforceable permit and shall be publicly noticed by the permittee. [Rules 62-4.070(3) and 62-212.400(7)(a), F.A.C., Permit 1210465-001 (PSD-FL-259)]

DRAFT PERMIT

TECHNICAL EVALUATION
AND
PRELIMINARY DETERMINATION

SUWANNEE AMERICAN CEMENT, LLC
BRANFORD, SUWANNEE COUNTY

Portland Cement Manufacturing Facility
Production Capacity and Fly Ash Injection Testing

DEP File Nos. 1210465-012-AC

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

September 24, 2004

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

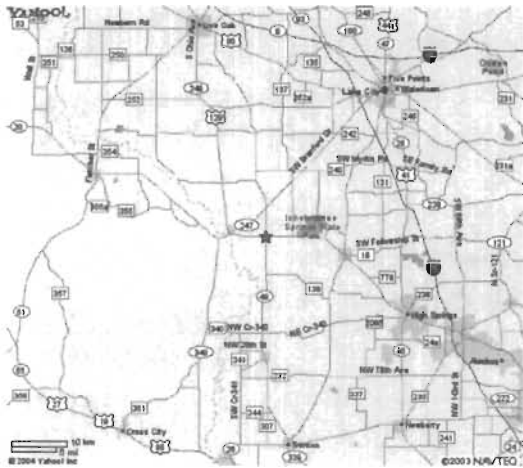
I. APPLICANT NAME AND ADDRESS

Suwannee American Cement LLC
Post Office Box 410
Branford, Florida 32008
Authorized Representative: Mr. Celso Martini, Plant Manager

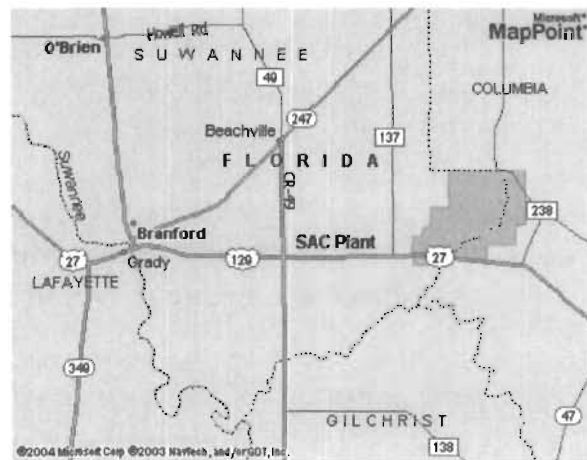
II. FACILITY INFORMATION

A. FACILITY LOCATION

Suwannee American Cement, LLC (SAC), owns and operates the cement plant located at U.S. Highway 27 and County Road 49 in Branford, Suwannee County. The UTM coordinates of the facility are Zone 17; 321.4 km East and 3315.9 km North.



Regional Map Showing Branford Area



Suwannee American Cement Plant Location

B. FACILITY CLASSIFICATION CODE (SIC)

Major Group No. 32, Clay, Glass, and Concrete Products
Industry Group No. 324 Cement, Hydraulic
Industry No. 3241 Cement, Hydraulic

C. FACILITY CATEGORY

SAC's Cement Plant emits more than 100 tons per year (TPY) of several regulated air pollutants and is, therefore, classified as a "Major Source of Air Pollution" or "Title V Source," per the definitions in Rule 62-212.200, Florida Administrative Code (F.A.C.).

This industry is listed in Table 212.400-1, "Major Facilities Categories", Section 62-212.400, F.A.C. Therefore, stack and fugitive emissions of over 100 TPY of carbon monoxide (CO), volatile organic compounds (VOC), sulfur dioxide (SO₂), nitrogen oxides (NO_x), or particulate matter (PM/PM₁₀) characterize the existing installation as a Major Facility per the definitions in Rule 62-210.200, F.A.C. and subject it to applicability review for the requirements of Prevention of Significant Deterioration (PSD) per Rule 62-212.400, F.A.C. Accordingly, the original SAC project was subject to New Source Review (NSR) including the PSD provisions and requirement to conduct a determination of Best Available Control Technology (BACT).

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

Per Table 212.400-2, "Regulated Air Pollutants – Significant Emission Rates", any further modifications at the facility resulting in emissions increases greater than 40 TPY of NO_x or SO_2 , 7 TPY of sulfuric acid mist (SAM), 25/15 TPY of PM/PM_{10} , 3 TPY of fluorides, 1200 pounds per year (lb/yr) of lead or 200 lb/yr of mercury require review per the PSD rules and a determination for Best Available Control Technology (BACT) per Rule 62-212.400, F.A.C.

The facility is also subject to a number of industry-specific regulations and permit specific conditions. Among these is designation as a major source of hazardous air pollutants (HAPs) and applicability of the major source provisions of 40 CFR 63, Subpart LLL – National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry.

III. ORIGINAL PROJECT

The Florida Department of Environmental Protection ("Department") issued a permit to SAC in June 2000 to construct the existing facility. The plant employs the modern dry process technology including a preheater and calciner (PH/C kiln) along with indirect firing.

The major equipment at the plant includes the PH/C kiln, a clinker cooler, raw mill, finish mill, silos, conveyers, and particulate control/dust collection and recycling equipment. The cement product is stored in silos and is shipped by truck.

The following diagram is of a PH/C kiln that approximates the one installed at SAC.

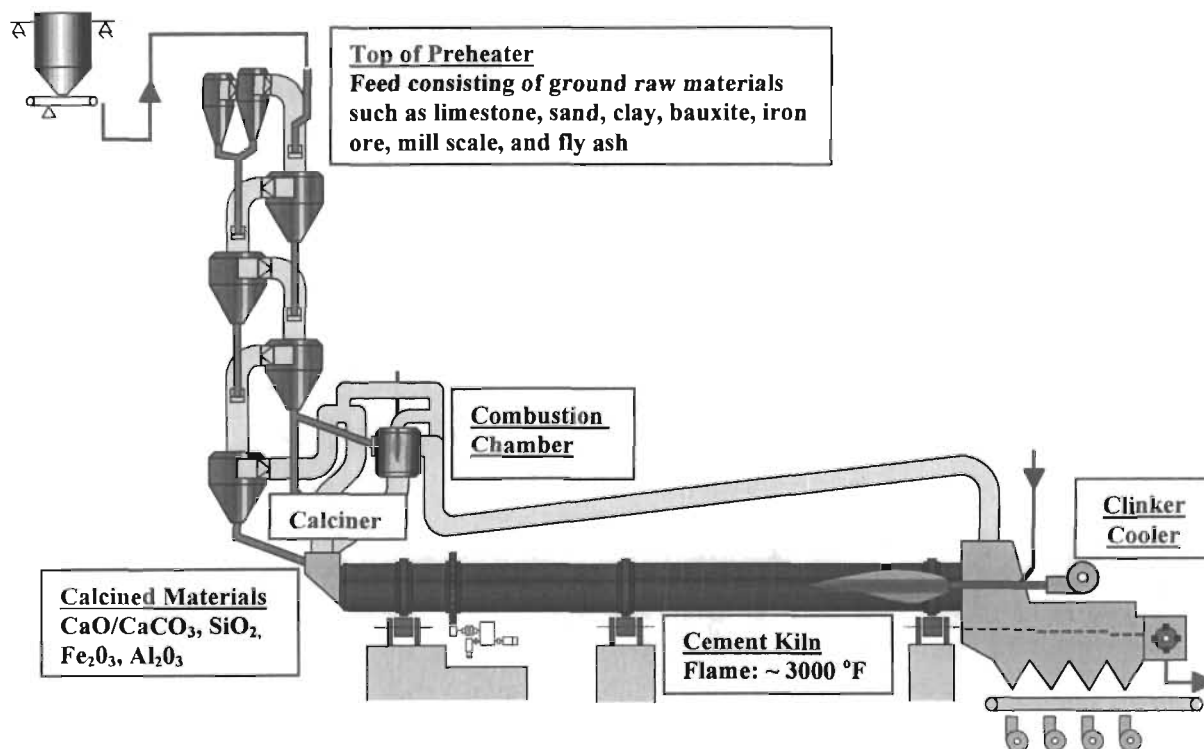


Diagram of Dry Process Cement Kiln with Preheater and Calciner Kiln

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

Raw meal is finely divided dried material that includes sources of calcium, silica, iron and aluminum. These sources can include limestone, sand, clay, bauxite, iron ore, mill scale, and fly ash. It is continuously weighed on feed scales and introduced at the top of the preheater tower as shown in the diagram. As it falls through the preheater it is contacted and progressively heated by exhaust gases from the calciner and kiln.

The calciner has a burner in a separate combustion chamber that provides the necessary heat to drive off carbon dioxide from the limestone converting it to free lime ($\text{CaCO}_3 = \text{CaO} + \text{CO}_2$). The calciner operates at a temperature of approximately 2000 degrees F and burns coal.

The calcined materials enter the kiln where they are further heated and transformed into nodules of clinker. These exit the kiln near the main kiln coal burner that operates at approximately 3000 °F. The clinker falls into the cooler where it is cooled by ambient air.

The heated air from the clinker cooler is used as secondary air to support combustion at the kiln burner and is also conveyed along a tertiary air duct to support combustion in and near the calciner combustion chamber.

Cooled exhaust gases leaving the preheater go through the raw mill (not shown) where the remaining heat is used to dry incoming coarse raw materials. As the raw materials are ground they are lifted by the exhaust gas flow and conveyed to the main baghouse (not shown) that also serves the purpose of a particulate control device. The finely divided dry material in the baghouse is conveyed to storage silos and then weighed and introduced into the process at the top of the preheater as discussed above.

The facility has been constructed and began operation in February 2003. Several photographs of the plant are shown below. SAC has conducted compliance tests and applied for a Title V Operation Permit. At this time, it is operating at or near its full capacity.



Cement Plant Under Construction (Photo DEP)



Completed Cement Plant (Photo SAC Website)

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION



Kiln Inlet, Main Stack, Lower Preheater, Calciner, and Tertiary Air Ducts (Photo A. Linero)

IV. ADDITIONAL PROJECTS

SAC has requested an air construction permit to:

- Add capability to introduce fly ash directly to the calciner in addition to the top of the preheater; and
- Increase clinker production.

The Department advised SAC that it will be necessary to conduct tests to demonstrate the efficacy of fly ash introduction to the calciner and higher production while meeting the Department's emission limitations. SAC applied on August 26 to conduct production testing during 120 operating days over a six month period.

FLY ASH INJECTION

Fly ash is the finely divided residue from the combustion of ground or powdered coal and is usually obtained from electric power plants. Typical fly ash contains silica, aluminum, and iron compounds and even some calcium. High quality fly ash (for example low in ammonia and carbon) can be substituted for cement in certain types of concrete. Fly ash can also be used as a raw material in lieu of other potential sources such as clay, sand, bauxite, iron ore, etc.

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

Fly ash is currently mixed with the other raw materials prior to being dried and ground to form the feed. The fly ash constitutes approximately 8-10 percent of the material mix and helps to provide the chemical composition of kiln feed required to produce clinker.

SAC presently introduces fly ash with the rest of the feed at the top of the preheater tower where the temperature is in the range of 750-800°F. From that point, the feed travels downward through the preheater tower, increasing in temperature until it reaches the calciner where the temperature is approximately 1500 °F. During the progression of the feed down through the preheater, carbonaceous material in the fly ash can volatilize and cause the release of organic compounds (THC/VOC) and carbon monoxide (CO) to the atmosphere.

SAC proposes to inject fly ash directly into the calciner where the carbonaceous material can be completely combusted along with the fuel fired to the calciner. SAC believes that more complete combustion of the carbonaceous material will occur. Therefore less THC, VOC, and CO will be produced, and the emission of these gases to the atmosphere will be minimized.

By injecting fly ash directly into the calciner instead of introducing it into the raw mill and ultimately at the top of the preheater, it is possible to increase the amount of limestone and other raw materials entering the process. This makes it possible to increase clinker production given that other equipment (such as burners, fans, the kiln, cooler, etc.,) is inherently overdesigned or can be upgraded.

PRODUCTION CAPACITY TESTING

Diversion of fly ash to the calciner creates the possibility of increased clinker production given sufficient capacity of burners, fans, the cooler, etc. The existing permit limits the introduction of feed at the preheater to 178 tons per hour (TPH), clinker production to 105 TPH, and 364 million Btu heat input per hour (mmBtu/hr). Ultimately SAC requests to increase the feed rate to 205 TPH (including fly ash feed to the calciner), increase clinker production to 115.5 TPH of clinker and fuel use to 420 mmBtu/hr.

The tests will determine the extent to which existing vessels, pumps, fans, burners, etc. are overdesigned or can be uprated as well as any additional projects needed to accomplish the requested permanent increase. Injection of fly ash into the calciner will make it possible to increase total feed without challenging the materials handling capability of the preheater feed system and the preheater cyclones. The details of the testing and requirements are given in the accompanying draft permit. The highlights are given below.

The testing will be conducted during 120 operating days over a period of six months. Except for one exception during low load discussed below, the kiln shall continue to comply with all existing emission standards in terms of pounds per hour (lb/hr) and pounds per ton of clinker (lb/ton). The values recorded by the continuous emission monitoring systems (CEMS) will continue to be transmitted in real time to the Department's district office in Jacksonville. These values include sulfur dioxide (SO₂), nitrogen oxides (NO_x), total hydrocarbons (THC) and visible emission (opacity).

Mercury emissions will continue to be estimated by analyzing raw materials and fuel. Historically, clinker cooler and kiln particulate emissions have been much lower than allowed by the permit. The Department believes that particulate emissions will continue to be very low.

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

Past tests indicate that dioxin and furan emissions are also much less than allowed by the present permit and the National Emission Standards for Hazardous Air Pollutants at 40 CFR Part 63, Subpart LLL for portland cement plants. The permittee shall conduct dioxin/furan tests if there is a significant change in the feed that was used in the previous performance test. A Loss on Ignition (LOI) value for the fly ash of 30 percent or more shall be considered a significant change in the feed. However injection of the higher LOI fly ash directly into the calciner would counteract the tendency to form dioxin and furan formation potential.

Testing requirements are detailed in the draft permit distributed with this evaluation.

SAC has requested relief during testing from NO_x emission limits expressed in terms of lb/ton of clinker (but not lb/hr). They believe some measure of relief is needed during the learning associated with optimizing injection points and flows within the complex atmosphere of the calciner.

Typically, process rate is maximized not only for the sake of production, but also because the cyclones in the preheater require certain minimum rates to effectively separate raw materials from one cyclone to the next. Hours characterized by low production usually mean that the process is down for part of the time rather than actual low load operation. During portions of those hours the denominator in the lb/ton term is low and a high lb/ton value can occur.

The Department will allow exclusion of two hours per day during which fly ash injection to the calciner is practiced and low production occurs.

SAC shall submit test results and a technical report summarizing the following: a description of the production capacity tests; pollutant emissions when operating at higher rates; ambient conditions during each test; feed rates; and heat input rates. The final report shall also detail any operational problems as well as mechanical, electrical, structural, and process limitations identified during the course of the test.

For purposes of the capacity evaluation program only, the clinker production rate shall be determined by the following equation:

$$\text{Clinker Production} = [(\text{Feed}) (\text{Kiln Feed LOI Factor}) + (\text{Fly Ash Injection}) (\text{Fly Ash LOI Factor})]$$

Where:

- Kiln feed is determined by the Poldos control system.
- Fly ash is determined from the rotary feed system or equivalent.
- LOI for the kiln feed and fly ash is based on a monthly average determined from daily measurements.

The technical report shall include an engineering assessment describing the full capability of the process to sustain the requested production rates while meeting the permitted emission rates. The report shall be sealed by professional engineers or other experts as appropriate in structural, mechanical, electrical, process, and environmental disciplines. It shall include a description of any additional projects required to attain or maintain the requested production rates. A single report from the kiln manufacturer or acknowledged pyroprocessing expert would suffice to fulfill this requirement.

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

VI. CONCLUSION

The Department will authorize 120 operating days of production and fly ash injection testing over a six month period ending April 30, 2005.

Some mass emission increases will occur as a result of the testing because of increased fuel and material use and clinker production. These will be within the emission limits authorized by the original air construction permit and the Department has determined that a PSD/BACT review is not required for the testing program.

The original permitted BACT limits still apply during the test period except for the exclusion mentioned above. Ultimately the Department may revise the NO_x and SO₂ limits downward for normal operation (i.e. non-test conditions) per Subsection B, Specific Condition 12 of the original permit.