TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Suwannee American Cement, LLC
5117 US Highway 27
Branford, Florida

Branford Cement Plant
Facility ID No. 1210465

PROJECT

Project No. 1210465-026-AC
Application for Minor Source Air Construction Permit
Bottom Ash Use and Baghouse Dust Transfer

COUNTY

Suwannee County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Office of Permitting and Compliance
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

February 1, 2013

1 GENERAL PROJECT INFORMATION

1.1 Facility Description and Location

Suwannee American Cement, LLC (SAC), operates the Branford Cement Plant. It is an existing portland cement manufacturing plant, which is categorized under Standard Industrial Classification Code No. 3241. The Branford Cement Plant is located in Suwannee County at 5117 US Highway 27 in Branford, Florida (Figure 1). The UTM coordinates of the existing facility are Zone 17, 321.4 kilometers (km) East, and 3315.9 km North. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to state and federal Ambient Air Quality Standards (AAQS). Figure 2 is an aerial photograph of the plant.

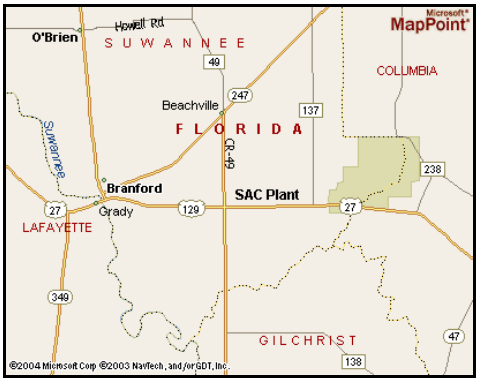


Figure 1 – Branford Cement Plant Site Figure 2 – Aerial View of Branford Cement Plant from Northwest

The plant employs the modern dry process technology. The major equipment at the plant includes an indirect-fired kiln with a separate preheater and calciner (PH/C kiln), an in-line raw mill, a clinker cooler, finish mill, silos, conveyers, and particulate control/dust collection and recycling equipment. The cement product is stored in silos and is shipped by truck. Figure 3 is a diagram of a PH/C kiln similar to the one at the plant.

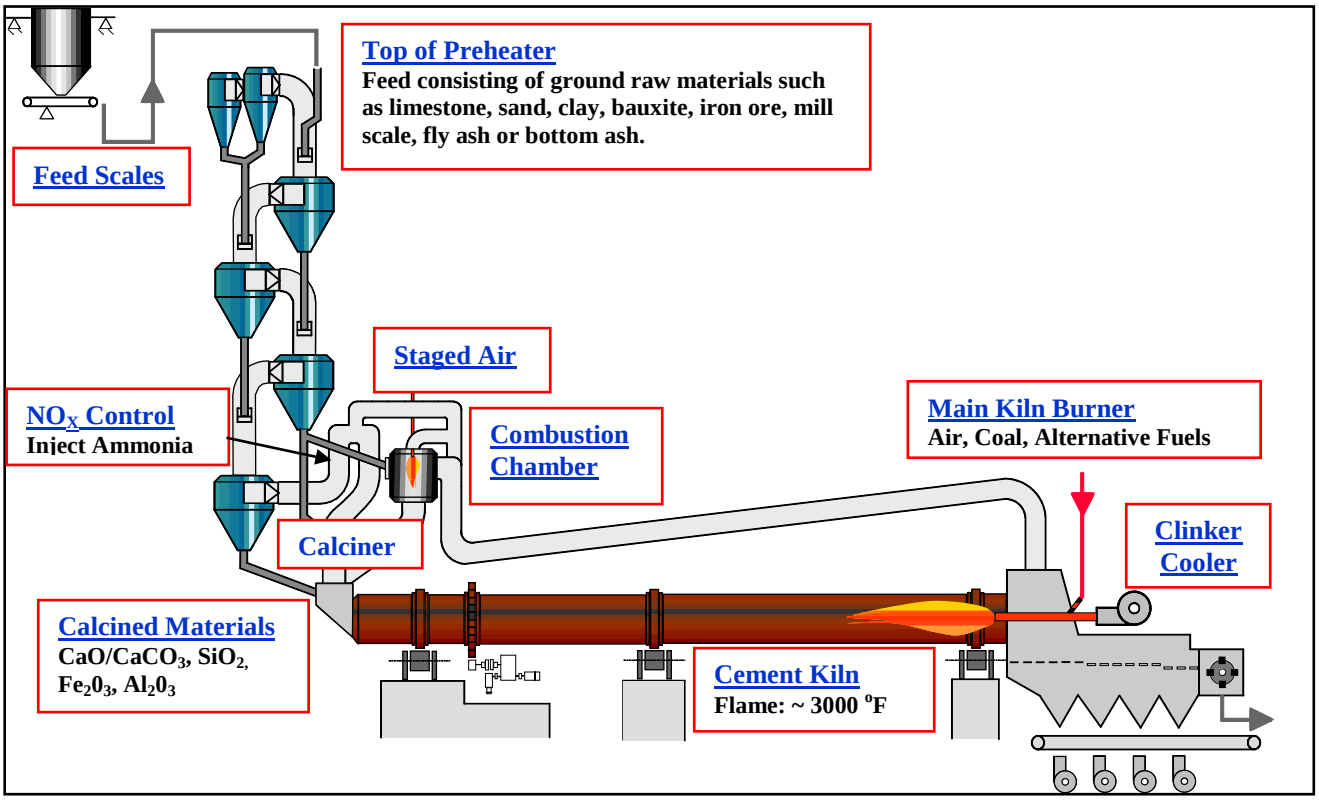


Figure 3. Diagram of Dry Process Cement Kiln with Preheater and Staged Air Calciner

The raw materials include limestone, sand, clay, bauxite, iron ore, mill scale, and fly ash that contain calcium, silica, iron and aluminum. These materials are metered to and ground within the raw mill to make finely divided raw meal. Raw meal is stored and then continuously weighed on feed scales and fed 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 ($CaCO_3 = CaO + CO_2$). The calciner operates at a temperature of approximately 2,000 degrees Fahrenheit (^oF) 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 3,000^{o}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. Figures 4 and 5 are photographs of the PH/C kiln and the present fly ash (a raw material) handling area.

Figure 4 – Kiln and Lower Preheater/Calciner

Figure 5 – View of Fly Ash Handling Area

The plant has a capacity of 210 tons/hour of dry preheater feed materials, 120 tons/hour of clinker production, and 150 tons/hour of portland cement production. Annual (12-month rolling) production is limited to 1,648,578 tons of dry preheater feed materials; 965,425 tons of clinker production; and 1,191,360 tons of portland cement production (after addition of gypsum and limestone to clinker).

Continuous emission monitoring systems (CEMS) in the main kiln/raw mill stack measure and record emissions of carbon monoxide (CO), nitrogen oxides (NO_X), sulfur dioxide (SO_2) and total hydrocarbons (THC), which also serves as a surrogate for volatile organic compounds (VOC). A continuous opacity monitoring system (COMS) measures and records the opacity of the flue gas exhaust in the in-line raw mill/kiln stack. The baghouse inlet temperature is maintained at a level less than that of the most recent compliance stack test to prevent de-novo dioxin/furan formation. The permitted emissions units (EU's) are listed in Table 1.

1.2 Air Pollution Control Equipment

Process cyclones and a baghouse collect raw meal swept from the raw mill for return to the process. The baghouse further controls emissions of particulate matter (PM) from the PH/C kiln exhaust. Judicious selection of raw materials and combustion design are the key to control of all other pollutants. These are the specific

controls for CO, VOC/THC and organic hazardous air pollutants (HAP) such as dioxin and furan. NO_X emissions are further controlled by indirect firing, multiple burn points, air staging in the calciner and ammonia-based selective non-catalytic reduction (SNCR).

Table 1 – List of Emissions Units at the SAC Branford Cement Plant

EU NO.	Emissions Unit Description
001	1,000 TPH primary crusher and associated unenclosed belt conveyors to raw material storage – fugitive emissions
002	Raw material processing operations controlled by baghouses
003	Raw material processing – unenclosed conveyor transfer points – D conveyors
004	In line kiln/raw mill controlled by baghouse – main stack
005	Clinker cooler controlled by Electrostatic Precipitator (ESP)
006	Clinker and cement processing operations controlled by baghouses
007	Clinker and cement processing – unenclosed conveyor transfer points – M conveyors
008	Coal mill and coal transfer system controlled by baghouses
009	Unenclosed coal conveying equipment – S conveyors
010	Natural gas fired emergency generator set

Acid gases such as SO_2 and hydrochloric acid (HCl) are further controlled by limestone scrubbing by raw materials, finely divided lime in the calciner or supplementary hydrated lime injection. Mercury (Hg) is also controlled by judicious selection and sampling of Hg content in raw materials.

1.3 General Project Description

The applicant requests authorization to install and operate equipment for raw material substitution using bottom ash from coal-fueled power plants. The applicant also requests authorization to install and operate equipment to pneumatically transport some of the dust captured by the in-line raw mill/kiln baghouse via a fully enclosed system to the finish mill (also called a cement mill).

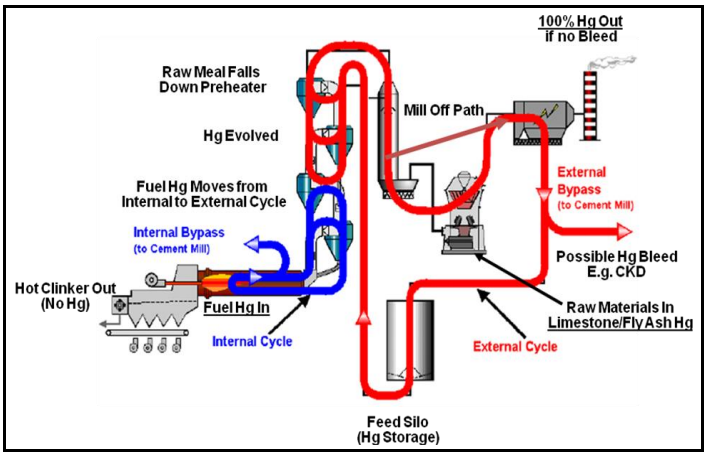
The bottom ash will be delivered to the facility and stored in the existing Fly Ash Building. The existing fly ash transfer equipment will be used to deliver stored bottom ash to the pyroprocessing system. In the event that the bottom ash is not pre-processed by the supplier, SAC may install equipment to screen the material prior to its use. The finer fraction will be used as raw material and the coarser fraction will be stored and either landfilled or returned to the supplier.

The purpose of the project is to reduce Hg emissions by using bottom ash, which contains less mercury than fly ash, and also by diverting Hg to the finished product rather than the atmosphere. The red circuit in Figure 5 represents volatile species such as Hg that enter primarily with the raw materials, including limestone, power plant fly ash, iron sources, bauxite, sand, etc., via the raw mill. The raw mix entering the raw mill is intimately contacted with exhaust gases traversing the kiln, calciner and preheater.

Raw mix adsorbs additional Hg from the exhaust gases, some of which is also of fuel origin from the internal cycle (blue circuit). The raw mill operates much like a scrubber and the concentration of Hg builds up in the red circuit. More Hg enters the system than exits the stack. When the raw mill is turned off and the process continues using raw meal from the feed silo, most of the Hg trapped in the red circuit is released via the stack until the raw mill is restarted. Hg does not leave the system via the clinker because it is vaporized long before reaching the kiln exit. Unless a solid stream (other than the clinker) is removed, it is clear that all Hg entering the system will ultimately be emitted to the atmosphere through the cement kiln stack.

The pneumatic transport equipment that will be used in the proposed project will extract dust from the in-line mill/kiln baghouse, store it in an unused injection fly ash silo, and meter the dust from the silo into a location at the material discharge end of the cement mill as an inorganic process addition (IPA). This will serve the

purpose of an external bypass or Hg bleed as shown in Figure 6.



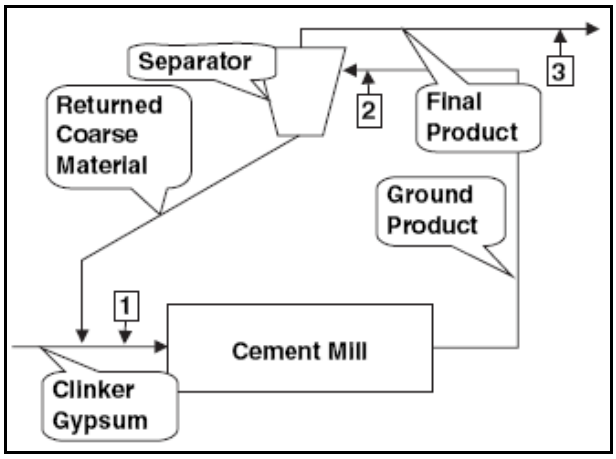


Figure 6 – Circulations within Process and Hg Bypass **Figure 7 – Possible Baghouse Dust Addition Points**

IPAs are typically materials such as fly ash of several kinds, slag, or cement kiln dust (CKD). These IPAs can be interground with clinker, gypsum and limestone in the cement mill as shown at Point 1 in Figure 7. Alternatively, IPAs can be added to the ground product as shown at Point 2 (before the separator) or after the separator and into the final product as shown at Point 3. SAC will likely introduce the extracted kiln baghouse at Point 2. The Hg in the dust will ultimately be encased in concrete.

Because of the high temperature in the power plant furnaces (sources of the ash), almost all Hg is released and contained in the furnace exhaust. Much of it condenses on fly ash particles as they cool; very little is contained in the bottom ash. The applicant submitted the following table indicating Hg content of bottom ash and fly ash from seven coal-fueled power plants (not necessarily in Florida). The values are expressed as micrograms per kilograms (µg/kg), which equate to parts per billion by weight (ppb).

Table 2 – Mercury Content in Ash Samples from Coal-fueled Power Plants (µg/kg)

Source	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7
Bottom Ash	3	16	7	3	3	1	12
Fly Ash	295	245	160	10	134	24	435

As a general rule, typical bottom ash has greater loss on ignition (LOI) than typical fly ash. Much depends on the origin and type of coal used by the power plant that generates the ash. Furnace operation at the power plant also affects the LOI, such as degree of pulverization, residence time, use of low NO_X burners, overfire air, etc. High LOI bottom ash (or fly ash) can result in additional evolution and emission of CO, VOC, THC or carbon dioxide (CO_2) along with any Hg as the raw meal is progressively heated on the downward path in the preheater.

Because of the typically greater LOI of bottom ash, SAC is requesting a temporary volatile organic compounds (VOC) emissions standard of 50 parts per million by volume, dry at 7% oxygen (ppmvd @7% O_2) as a surrogate for total hydrocarbons (THC) for a period of 180 operating days. This will provide sufficient time for SAC to determine the final raw material mix (including bottom ash) that will optimize product quality and insure compliance with the permanent VOC standard of 0.12 lb/ton of clinker, which was established in the original BACT determination.

The proposed, temporary VOC emission standard of 50 ppmvd @7% as THC is equal to the presently applicable emission standard for THC contained in Title 40 Code of Federal Regulations Part 63 (40 CFR 63), Subpart LLL - National Emission Standards for Hazardous Air Pollutants (NESHAP) From the Portland Cement Manufacturing Industry. The THC emission standard has been revised by EPA to 24 ppmvd @7% O_2 with an effective compliance date of September 9, 2015 and would override the temporary VOC emission standard if the initial 180 operating day period of bottom ash use is completed prior to the compliance date.

2 AIR POLLUTION REGULATIONS

2.1 Department Regulations

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish air quality regulations as part of the Florida Administrative Code (F.A.C.), which includes the applicable chapters contained in Table 3.

Table 3 - Applicable Rules from the F.A.C.

Chapter	Description
62-4	Permits
62-17	Electrical Power Plant Siting
62-204	Air Pollution Control – General Provisions
62-210	Stationary Sources of Air Pollution – General Requirements
62-212	Stationary Sources – Preconstruction Review
62-213	Operation Permits for Major Sources (Title V) of Air Pollution
62-296	Stationary Sources – Emission Standards
62-297	Stationary Sources – Emissions Monitoring

2.2 Federal Rules

The U.S. Environmental Protection Agency (EPA) establishes air quality regulations in 40 CFR 60 that identify Standards of Performance for New Stationary Sources (NSPS) for a variety of industrial activities. 40 CFR 61 specifies NESHAP for certain pollutants. 40 CFR 63 specifies NESHAP provisions based on the Maximum Achievable Control Technology (MACT) for given industrial source categories.

Federal regulations adopted by reference are given in Rule 62-204.800, F.A.C. State regulations approved by EPA are given in 40 CFR 52, Subpart K – Florida; also known as the State Implementation Plan (SIP) for Florida.

2.3 Key Facility Regulatory Categories

- The facility is a major source of HAP subject to the applicable provisions in 40 CFR 63, including 40 CFR 63, Subpart LLL. Link to NESHAP, Subpart LLL
- The facility is an existing Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is an existing major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

2.4 Applicable Permits

The SAC Branford Cement Plant was constructed pursuant to permit No. 1210465-001-AC (PSD-FL-259) issued in 2000. Link to Original Air Construction Permit

Key modifications were made pursuant to permit No. 1210465-011-AC (PSD-FL-259F). These included an approximate 15 percent (%) production increase, use of fly ash as a raw material, installation of the SNCR NO_X control system and lower emission standards in terms of lb/ton of clinker. Link to Production Increase Permit

In early 2012, the Department issued permit No. 1210465-023-AC that authorizes installation of equipment and extensive kiln modifications to use a wide variety of alternative fuels. Link to Alternative Fuels Permit

The plant operates pursuant to the Title V air operation permit No. 1210465-019-AV issued in 2010 with an expiration date of July 7, 2015. Link to Title V Permit The permit will be revised before that date to include additional air construction permit requirements and regulations finalized since issuance of the Title V permit.

3 PSD APPLICABILITY

3.1 General PSD Applicability

The Department regulates major stationary sources in accordance with Florida's PSD program pursuant to Rule 62-212.400, F.A.C. PSD preconstruction review is required in areas, such as Suwannee County, that are currently in attainment with the state and federal ambient air quality standards (AAQS) or areas designated as "unclassifiable" for these regulated pollutants. Commonly addressed PSD pollutants in the cement industry include: CO, NO_X, PM, PM smaller than 10 micrometers (PM_{10}), PM smaller than 2.5 micrometers ($PM_{2.5}$), SO_2, VOC, sulfuric acid mist (SAM), lead (Pb), fluorides (F), and Hg.

Additional PSD pollutants that are more common to certain other industries include: hydrogen sulfide (H_2S); total reduced sulfur (TRS) including H_2S; reduced sulfur compounds (RSC) including H_2S; municipal waste combustor (MWC) organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans (dioxin and furan); MWC metals measured as PM; MWC acid gases measured as SO_2 and HCl; and, municipal solid waste (MSW) landfill emissions measured as non-methane organic compounds (NMOC).

As defined in Rule 62-210.200(Definitions), F.A.C., a stationary source is a "major stationary source" (major PSD source) if it emits or has the potential to emit (PTE):

- 250 tons per year (tons/year) or more of any PSD pollutant; <u>or</u>
- 100 tons/year or more of any PSD pollutant <u>and</u> the facility belongs to one of the 28 listed PSD major facility categories.

The list given in the citation includes the category of "portland cement plants". The given category applies to the facility before and after the proposed project. The SAC Branford Cement Plant is a major stationary source based on actual emissions of and potential to emit 100 tons/year or more of several individual PSD pollutants.

For major stationary sources such as the Branford Cement Plant, PSD applicability for modification projects is based on thresholds known as the significant emission rates (SER) as defined in Rule 62-210.200(Definitions), F.A.C. Any "net emissions increase" as defined in Rule 62-210.200(Definitions), F.A.C. of a PSD pollutant from the project that equals or exceeds the respective SER is considered "significant". SER also means any emissions rate or any net emissions increase of a PSD pollutant associated with a major stationary source or major modification which would construct within 10 km of a Class I area and have an impact on such area equal to or greater than 1 gram per cubic meter, 24-hour average.

Although a facility may be "major" (i.e. emits or has the potential to emit 100 or 250 TPY as applicable) for only one PSD pollutant, a project must include BACT controls for any PSD pollutant that exceeds the corresponding significant emission rates (SER) given in 4.

According to 40 CFR 52.21, six greenhouse gases (GHG), are also be subject to regulation at new stationary sources that will emit or have the potential to emit 100,000 tons/year (SER equal to 75,000 tons/year) expressed as the carbon dioxide equivalent emissions (CO_2e). This requirement has not been incorporated into Department rules but is a separate requirement of the EPA.

3.2 Methodology for Calculations of Baseline Actual Emissions and Projected Actual Emissions

To determine whether the project causes net emissions increases equal to or greater than the respective SER (triggering PSD) requires a comparison of recent "baseline actual emissions" with future "projected actual emissions". According to Rule 62-210.200(Definitions), F.A.C., for an existing unit other than an electric steam generating unit (existing simple cycle units are not yet electrical steam generating units):

Table 4 – List of Significant Emission Rates by PSD-Pollutant. [1, 3]

Pollutant	SER (TPY)	Pollutant	SER (TPY)
CO	100	NO_X	40
$PM/PM_{10}/PM_{2.5}$	25/15/10	Ozone (VOC) [2]	40
$PM_{2.5}$ (NO_X)	40	$PM_{2.5}$ (SO_2)	40
Ozone (NO_X) [2]	40	SAM	7
SO_2	40	Pb	0.6
Hg	0.1	GHG (CO_2e)	75,000 [3]

1. Excluding fluoride and those pollutants defined for Pulp and Paper, MWC, MSW landfills.
2. Ozone (O_3) is regulated by its precursors (VOC and NO_X). PSD for $PM_{2.5}$ can be triggered by its precursors (NO_X and SO_2).
3. Federal SER of 75,000 TPY for GHG (as CO_2e) for PSD sources and has not been incorporated into Department rules.

"Baseline Actual Emissions" means the rate of emissions, in tons/year of a PSD pollutant, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 10-year period immediately preceding the date a complete permit application is received by the Department.

"Projected Actual Emissions" means the maximum annual rate, in tons/year, at which an existing emissions unit is projected to emit a PSD pollutant in ***any one*** *of the 5 years following the date the unit resumes regular operation after the project, or in* ***any one*** *of the 10 years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit that PSD pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source. One year is one 12-month period. In determining the projected actual emissions, the Department:*

(a) Shall consider all relevant information, including historical operational data, the company's own representations, the company's expected business activity and the company's highest projections of business activity, the company's filings with the State or Federal regulatory authorities, and compliance plans or orders, including consent orders; and

(b) Shall include fugitive emissions to the extent quantifiable and emissions associated with startups and shutdowns; and

(c) Shall exclude that portion of the unit's emissions following the project that an existing unit could have accommodated during the consecutive 24-month period used to establish the baseline actual emissions and that are also unrelated to the particular project including any increased utilization due to product demand growth; or

(d) In lieu of using the method set out in paragraphs (a) through (c) above, may be directed by the owner or operator to use the emissions unit's potential to emit, in tons per year.

3.3 Historical Operational Data and Highest Projections of Business Activity

Table 5 includes the historical clinker and finished cement production data for the period 2003-2012 submitted by SAC to the Department. Soon after the facility began operation in 2003, it reached its original permitted production limit of 839,500 tons/year of clinker. The limit was increased to 965,425 tons/year by a permit modification in 2005.

Thereafter, the plant was able to achieve 91% capacity utilization in an environment of very high demand in Florida, which was so great that much of the demand was satisfied by importation from overseas operations. Demand greatly slackened in 2008 and stabilized at about half of the plant capacity.

Table 5 – Baseline and Projected Production and Emissions from SAC Branford Cement Plant (tons/year)

Year	Clinker	Cement	CO	NO_X	PM/PM_{10}	SO_2	VOC	Hg
2003	195,576	198,654	151	306	5.5	10.6	13.6	0.022
2004	757,157	816,629	570	866	18.8	3.3	27.5	0.025
2005	790,968	866,084	898	866	25.3	13.9	16.9	0.041
2006	844,314	858,461	659	849	48.3	14.2	25.0	0.0390
2007	845,390	911,112	862	834	21.3	7.8	13.6	0.0377
2008	673,808	752,311	663	674	28.9	7.6	17.5	0.0250
2009	385,277	399,303	378	355	16.2	5.5	14.6	0.0189
2010	441,701	423,372	462	469	15.1	2.4	21.0	0.0254
2011	345,089	361,074	498	358	13.3	3.2	17.7	0.0179
2012	399,699	432,301	2012 emissions data not yet available, but will not be relevant for baseline.					
Baseline Actual Emissions [1]	~809,460	~863,070	779	842	36.8	14.1	22.2	0.040
2013	450,654	487,416	Production and emissions progressively increase and achieve reach maximum in 2017. Except for Hg and VOC, the values for 2017 also represent the unadjusted Future Actual Emissions (FAE).				58 [5]	0.022 [6]
2014	562,260	608,125					58 [5]	0.028 [6]
2015	715,540	773,910					24.8 [3]	0.020 [6]
2016	843,155	911,934					29.3 [3]	0.023 [6]
2017 - Unadjusted FAE [2]	925,275	1,000,750	1,067 [3]	922 [4]	41.6	16.0	58 [3]	0.028 [6]
Present PTE [7]	965,425	1,191,360	1,610	1,159	~144/120 [8]	97	58	0.0485 [6]
Unadjusted Increases [9]	~115,8150	~137,680	+290	+80	+4.8	+1.9	+35.8	-0.012
Net emission Increases [10]			78	0	0	0	+35.8	-0.022
SER			100	40	25/15	40	40	0.10
Triggers PSD?			No	No	No	No	No	No

1. Baseline actual emissions (BAE) are the simple average of emissions from two highest years.
2. Unadjusted Future Actual Emissions (FAE) based on future demand. Some pollutants are linearly affected, others are non-linear.
3. CO and VOC emissions are increased by increased production, less residence time, and greater LOI in bottom ash.
4. NO_X emissions are controllable to practically any reasonable level with SNCR system. Assume linear increase.
5. VOC emissions will also temporarily increase specifically due to the project for 180 operating days until applicant determines optimal raw mix that meets product quality requirements and emission standards. A temporary cap of 58 tons/year will be imposed to avoid triggering PSD. The present total hydrocarbons (THC) emission standard of 50 ppmvd @7% O_2 pursuant to NESHAP, Subpart LLL will serve as a backstop. A new THC standard of 24 ppmvd @7% O_2 with a compliance date of September 9, 2015 will apply pursuant to revised NESHAP, Subpart LLL.
6. Hg emissions may initially increase with demand utilization and are ultimately limited in 2015 by a new emission standard of 55 lb/million tons of clinker pursuant to NESHAP, Subpart LLL. Future Hg PTE equals 53 lb/year (0.0265 tons/year).
7. Present Potential-to-Emit (PTE) is based on existing permits and BACT determinations. All FAE are less than respective PTE.
8. Present PTE of PM/PM_{10} will be reduced to approximately 67.6 tons/year by a new emission standard of 0.07 lb/ton of clinker separately applicable to the kiln and the clinker cooler pursuant to NESHAP, Subpart LLL.
9. Unadjusted increases reflect simple difference between unadjusted FAE and BAE.
10. Net Emissions Increases after excluding portion of emissions following the project that could have been accommodated during the period used to establish the BAE and are unrelated to the project including increased utilization due to product demand growth. The excludable portion represents increase of 115,815 tons/year of clinker, 137,680 tons/year of cement.

Recovery in utilization at the Branford Cement Plant and other Florida cement plants was further suppressed by the startup of new kilns in Newberry, Sumterville and Brooksville during the period 2008-2010. During 2012 there was a noticeable bump upwards in utilization of more than 12% relative to 2011.

Because cement kilns operate most efficiently near their design capacities, the Branford Cement Plant is operated for a period of time relatively close to full short term capacity followed by a shutdown of roughly equal time.

Figure 8 is a historical summary and future projection of U.S. portland cement consumption and annual rates of increase based on the Portland Cement Association's (PCA) "Cement Outlook" presented at its Spring 2012 meeting. Link to Spring 2012 Cement Outlook The nation-wide falloff in consumption actually began in 2007.

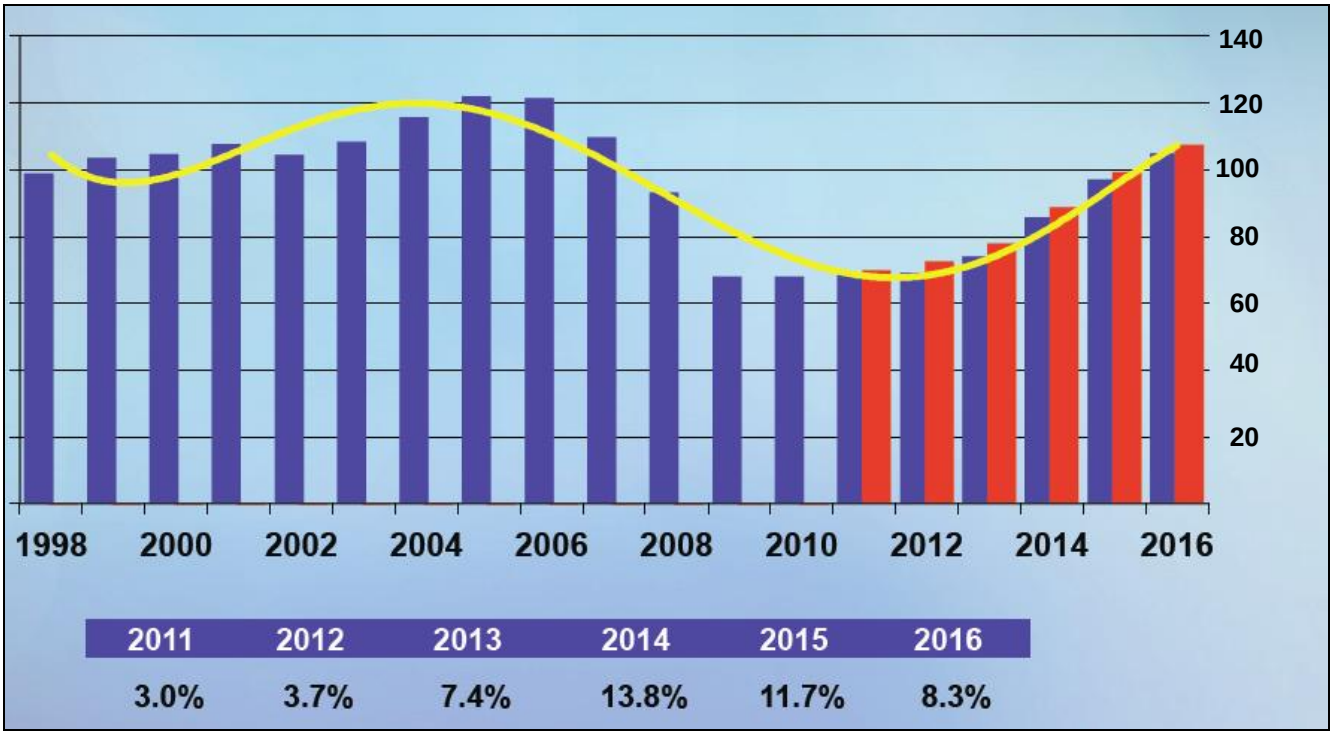


Figure 8 – Historical and Projected U.S. Portland Cement Consumption Millions of Metric Tonnes/Year

According to a PCA News Release dated April 30, 2012:

> *"Cement usage is greatest at the early stages of construction with foundation work. The retreat of building starts during the recession had a huge impact on consumption and intensity," said Ed Sullivan, PCA chief economist. "A construction start rebound in 2012 coupled with concrete's competitive price compared to other building materials translates to increases."* Link to PCA News Release

According SAC, the PCA Outlook for Florida indicates greater rates of increased consumption (actually recovery) compared with the rest of the U.S. during the period 2012 to 2017. The values for Florida from the Spring 2012 Cement Outlook are 12.7, 24.8, 27.3, 17.8 and 9.7% for the years 2013, 2014, 2015, 2016 and 2017, respectively.

Using the projected consumption growth figures developed by the PCA and assuming that SAC will maintain its present market share, the company provided the clinker and cement projections contained in Table 5 for the period 2013-2017. By 2016, production will have recovered to the levels achieved in 2006-2007 and close to the practical production limits given reasonable downtime. In 2017, production from the plant will be effectively "sold out". With best operation and effort, the plant may actually be capable of producing the projected value of 925,275 tons/year compared with the permitted limit of 965,425 tons/year.

The company is in the process of making approved physical modifications to the calciner, kiln burner and other plant components to accommodate an assortment of recently permitted alternative fuels. These changes, together with a planned (permitted) extension of the duct work between the calciner and bottom cyclone, will allow the plant to achieve the permitted clinker capacity more comfortably.

The Department accepts reliance by SAC of the optimistic projection of the PCA when estimating "the company's highest projections of business activity" as described in paragraph (a) of the definition given above of "projected actual emissions".

3.4 Baseline Actual Emissions

Table 5 also contains the "baseline actual emissions" (BAE) in tons/year of each PSD pollutant, during a consecutive 2-year period (instead of any 24-months) selected by the company for the 9-year period that the facility has actually operated, immediately preceding the submittal of the application. The selected two-year period for each pollutant is shaded and the simple average is reported in the shaded row labeled "baseline". All of the data contributing to the BAE are derived from the "high demand" period of 2004-2007.

3.5 Unadjusted Projected Actual Emissions and Emission Increases

Unadjusted projected actual emissions are also listed in Table 5 along with explanatory notes. Basically, most emissions are expected to increase in proportion to the expected increase in production. The Department added an additional 10% increase of CO and VOC emissions to account for the lower residence time of exhaust gases in the calciner, which could reduce the degree of burnout possible. As mentioned above, the project to increase residence time through an extended burnout loop from the calciner to the bottom cyclone was authorized, but construction is not certain.

The present NESHAP, Subpart LLL THC standard is 50 ppmvd @7% O_2 and will be replaced by a THC emission standard equal to 24 ppmvd @7% O_2.with a compliance date of September 9, 2015. This will suppress VOC emissions even if the VOC emission standard is temporarily relaxed while the company optimizes the raw material mix.

Hg emissions will initially increase due to increased utilization and will subsequently decrease because of the project and because of the revised NESHAP, Subpart LLL mercury limit that has a compliance date of September 9, 2015. NESHAP, Subpart LLL will further limit the potential-to-emit (PTE) of Hg from its present value of 97 pounds pear year (lb/year) to 53 lb/year <u>and</u> 55 lb/million tons of clinker. Thus, if production is low, Hg emission will be further suppressed.

PM/PM_{10} will increase as production increases. In 2015 NESHAP, Subpart LLL will require installation of a continuous parametric monitoring system (CPMS) for particulate matter, along with a 3-hour averaging time requirement. This will cut the PTE of PM/PM_{10} in half and will tend to suppress PM/PM_{10} emissions. For reference, past stack testing suggests that clinker cooler and kiln emissions already comply with the future PM/PM_{10} limit.

According to Table 5, the <u>unadjusted</u> emission increases are greater than the respective significant emission rates (SER's) for CO and NO_X.

3.6 Net Emission Increases and PSD Applicability

The net emission increases were calculated for each pollutant after excluding the portion of emissions following the project that could have been accommodated during the period used to establish the BAE and are unrelated to the project, including increased utilization due to product demand growth. Basically, there will be little or no actual increases except for CO and VOC, which will not exceed the PSD thresholds. Ultimately, the plant will comply with the existing PSD and BACT requirements and the updated requirements of NESHAP, Subpart LLL without triggering PSD again.

4 CONVERSION OF VOC BACT EMISSION STANDARD TO A THC EMISSIONS STANDARD

The original VOC emission standard of 0.12 lb/ton of clinker was established as a BACT limit during the initial evaluation and permitting of the Branford Cement Plant in 2000. SAC uses the THC instrument required by NESHAP, Subpart LLL to also demonstrate compliance with the VOC limit. SAC is allowed to subtract methane and ethane, which are THC, but not defined as VOC when determining compliance with the VOC emission standard.

For convenience in measurement and reporting, the Department proposes to specify a THC emission standard in terms of concentration as required by NESHAP, Subpart LLL. The Department reviewed THC data summarized in Table 6 submitted by SAC.

Table 6 – Branford Cement Plant Hourly CEMS Data for November 14, 2012.

Suwannee American Cement - CEMS Data												
Start Time	Clinker Production tons/hr	Kiln Feed tons/hr	NOx Mass Rate lb/hr	NOx Prod Rate lb/ton	NOx Measured ppm wet	SO2 Mass Rate lb/hr	SO2 Prod Rate lb/ton	SO2 Measured ppm wet	THC Mass Rate lb/hr	THC Prod Rate lb/ton	THC Measured ppm wet	THC Corrected ppmv
11/14/12 0:00	102.6	170.2	108.4	1.06	81.1	4.86	0.047	2.61	5.78	0.056	4.51	6.46
11/14/12 1:00	102.6	170.2	167.8	1.66	127.7	5.40	0.054	2.95	5.18	0.051	4.11	5.89
11/14/12 2:00	103.2	171.2	177.5	1.72	132.2	5.89	0.057	3.15	5.47	0.053	4.25	6.04
11/14/12 3:00	104.9	174.0	172.0	1.64	128.2	6.13	0.058	3.28	5.97	0.057	4.64	6.57
11/14/12 4:00	104.9	174.0	150.1	1.43	115.1	4.96	0.047	2.71	6.62	0.063	5.31	7.35
11/14/12 5:00	102.8	170.5	97.6	0.97	77.8	4.76	0.047	2.73	7.11	0.070	5.92	8.09
11/14/12 6:00	102.6	170.1	87.7	0.86	68.3	5.79	0.056	3.24	7.04	0.069	5.72	7.82
11/14/12 7:00	102.6	170.1	108.5	1.06	84.2	5.53	0.054	3.08	7.10	0.069	5.75	7.81
11/14/12 8:00	102.6	170.1	107.4	1.08	85.5	5.14	0.052	2.94	6.92	0.070	5.69	7.61
11/14/12 9:00	101.3	168.0	115.6	1.14	89.1	5.43	0.054	3.00	6.44	0.071	5.75	7.76
11/14/12 10:00	96.5	160.1	217.9	2.26	167.3	5.88	0.061	3.24	7.09	0.073	5.68	7.79
11/14/12 11:00	98.1	162.7	222.6	2.39	179.9	5.92	0.063	3.43	6.83	0.073	5.75	7.90
11/14/12 12:00	99.5	165.0	231.1	2.32	177.7	5.50	0.055	3.04	7.35	0.074	5.89	7.96
11/14/12 13:00	100.0	165.8	221.9	2.22	170.6	5.20	0.052	2.87	7.29	0.073	5.85	7.99
11/14/12 14:00	101.7	168.6	214.6	2.11	166.4	5.18	0.051	2.89	7.78	0.076	6.30	8.44
11/14/12 15:00	103.9	172.3	196.2	1.89	159.0	5.23	0.050	3.03	7.96	0.077	6.73	8.70
11/14/12 16:00	105.0	174.2	184.2	1.75	157.6	4.91	0.047	3.01	10.41	0.099	9.30	11.16
11/14/12 17:00	105.2	174.4	185.7	1.77	158.5	4.95	0.047	3.03	7.98	0.076	7.10	8.75
11/14/12 18:00	102.5	170.0	152.2	1.48	129.9	4.81	0.047	2.95	7.78	0.076	6.94	8.60
11/14/12 19:00	102.5	170.1	150.2	1.52	132.4	4.90	0.049	3.10	7.30	0.074	6.71	8.36
11/14/12 20:00	102.5	170.0	111.1	1.10	95.4	5.18	0.051	3.20	7.27	0.072	6.53	8.21
11/14/12 21:00	102.6	170.2	118.6	1.16	101.0	5.23	0.051	3.20	7.81	0.076	6.94	8.59
11/14/12 22:00	102.5	170.1	146.5	1.50	132.2	5.50	0.057	3.57	7.51	0.077	7.11	8.70
11/14/12 23:00	102.6	170.1	116.3	1.13	107.4	4.62	0.045	3.06	7.44	0.073	7.17	8.49
Average	102.3	169.7	156.7	1.55	126.0	5.29	0.052	3.06	7.14	0.071	6.07	7.96
Maximum	105.2	174.4	231.1	2.39	179.9	6.13	0.063	3.57	10.41	0.099	9.30	11.16
Minimum	96.5	160.1	87.7	0.86	68.3	4.62	0.045	2.61	5.18	0.051	4.11	5.89

By extrapolation of the data, 0.12 lb THC/ton of clinker equates to approximately 14 ppmvd @7% O_2. For kilns in North Florida, methane and ethane typically comprise approximately 30% of measured THC. Therefore, the value of 0.12 lb VOC/ton (excluding methane and ethane) equates to approximately 20 ppmvd of THC (including methane and ethane) @7% O_2.

The Department will revise the original BACT determination of 0.12 lb/ton clinker to the equivalent emission standard of 20 ppmvd THC @7% O_2 on a 30 operating day basis using the existing THC-CEMS. It will apply after completion of 180 operating days of bottom ash use, but no later than September 9, 2015. This value is more stringent than the NESHAP, Subpart LLL emission standard of 24 ppmvd THC @7% O_2 that also is subject to a compliance date of September 9, 2012.

5 DRAFT PERMIT FOR MINOR STATIONARY SOURCE MODIFICATION

Based on the foregoing evaluation, the Department prepared the attached draft air construction permit to authorize the use of bottom ash as a raw material at the SAC Branford Cement Plant.

Key provisions include:

- Maintenance of applicable permitting conditions from previous applicable air construction permits with an exception for VOC;
- Continued applicability of requirements from NESHAP, Subpart LLL;
- Authorization to construct and operate the equipment to store, process and introduce bottom ash into the pyroprocessing system and to transport a portion of the dust captured in the in-line kiln/raw mill baghouse to the exhaust side of the finish mill;
- Inclusion of bottom ash when determining process rates;

- Alternative VOC emissions limits during a period of 180 operating days.
  a. 50 ppmvd @7% O_2, (THC reported as propane), beginning on the date of initial use of bottom ash following issuance of this permit; and
  b. 58 tons per 12-calendar month period, rolled monthly, (THC reported as propane), within the 180 operating days, beginning with the first use of bottom ash after issuance of this permit. Methane and ethane emissions may be measured and subtracted to calculate this value.
- A final limit 20 ppmvd @7% O_2, (THC reported as propane) to replace the VOC BACT emission limit of 0.12 lb/ton of clinker, beginning 181 operating days after the date of initial use of bottom ash following issuance of this permit but no later than September 9, 2015.
- Authorization to deduct Hg in the dust transferred (from the In-Line Kiln/Raw Mill to the Finish Mill) when demonstrating compliance with the Hg throughput limitation of 97 pounds per consecutive 12-month period by material balance;
- Continued use of installed CEMS/COMS, periodic stack tests and operations monitoring equipment as required by existing permit to demonstrate compliance with applicable standards; and
- Future Monitoring, Reporting and Recordkeeping of Projected Actual Emissions of CO and VOC to demonstrate that PSD is not triggered in the future.

6 PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. No air quality modeling analysis is required because the project does not result in a significant increase in emissions. Al Linero is the project engineer responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting the project engineer at the Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Electronic mail: alvaro.linero@dep.state.fl.us .
Phone: 850-717-9076.