TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Argos Cement, LLC
4000 Northwest County Road 235
Newberry, Florida 32669

Argos Newberry Cement Plant
Facility ID No. 0010087

PROJECT

Project No. 0010087-053-AC
PSD-FL 228F and PSD-FL-350D
Application for Minor Source Air Construction Permit
Kiln Lines 1 and 2 ESP Conversion Project

COUNTY

Alachua 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

December 9, 2014

1. GENERAL PROJECT INFORMATION

1.1. Air Pollution 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 regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control – General Provisions); 62-210 (Stationary Sources – General Requirements); 62-212 (Stationary Sources – Preconstruction Review); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources – Emissions Monitoring). Specifically, air construction permits are required pursuant to Chapters 62-4, 62-210 and 62-212, F.A.C.

In addition, the U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations in Rule 62-204.800, F.A.C.

1.2. Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

1.3. Facility Description and Location

Argos Cement, LLC, Newberry Cement Plant, is a Portland cement plant and associated quarry, and raw material and cement handling operations. The plant combines raw materials and utilizes preheater/precalciner kilns with in-line raw mill to produce clinker. The clinker is milled and combined with gypsum to produce Portland cement. The facility consists of the following major activities: raw material handling and storage; raw mill systems; kiln systems clinker handling; finish grinding operations; cement handling, loading, and bagging operations; and coal handling and grinding operations. **Figure 1** shows the location of the Argos Cement Plant while **Figure 2** shows an aerial view of the facility.

Each In-Line Kiln System (EU 003 and EU 010) includes a 157 foot kiln, a 4-stage preheater tower, a multi-stage combustion calciner, a tire feed system, two coal burners and ancillary equipment. To control emissions of particulate matter (PM), the kiln systems are equipped with an electrostatic precipitator (ESP).

Figure 1. Location of Argos Newberry Cement Plant.

Figure 2. Argos Newberry Cement Plant.

Argos Newberry Cement Plant is an existing Portland cement plant, which is categorized under Standard Industrial Classification Code No. 3241. The existing Argos Newberry Cement Plant is located in Alachua County at 4000 Northwest County Road 235 in Newberry, Florida. The UTM coordinates of the existing facility are Zone 17, 346.4 kilometers (km) East, and 3,285.7 km North. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to Ambient Air Quality Standards (AAQS).

1.4. Facility Regulatory Categories

- The facility is a major source of hazardous air pollutants (HAP).
- The facility does not operate units subject to the acid rain provisions of the Clean Air Act.
- The facility is a Title V major source of air pollution in accordance with Chapter 62-213, F.A.C.
- The facility is a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.
- The facility does operate units subject to the NSPS Subparts A (General Provisions) and F (Portland Cement Plants) of 40 CFR 60.
- The facility does operate units subject to the NESHAP Subparts A (General Provisions) and LLL (Portland Cement Manufacturing Industry) of 40 CFR 63.

1.5. Project Description

The applicant is requesting to remove the existing ESP's on the In-Line Kiln Systems Lines 1 and 2 and to replace them with fabric filter baghouses to control emissions of PM, PM with a mean diameter of 10 microns or less (PM_{10}) and PM with a mean diameter of 2.5 microns or less ($PM_{2.5}$). The existing ESP's on the kiln systems were installed in approximately 1999 (Line 1) and 2008 (Line 2). The applicant is proposing to install a fabric filter, pulse-jet baghouse design on each kiln with a design efficiency of 99% or greater control of emissions of $PM/PM_{10}/PM_{2.5}$ henceforth called PM in this document. The new baghouses are needed to further reduce emissions of PM on the In-Line Kiln Systems.

This project will modify the following emissions units.

EU No.	Emission Unit Description
003	In-Line Kiln System/Raw Mill - Line 1
010	In-Line Kiln System/Raw Mill - Line 2

1.6. Processing Schedule

12/01/2014 Received the application for a minor source air pollution construction permit, application complete.

12/09/2014 Draft permit package issued.

2. PSD APPLICABILITY

2.1. 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 that are currently in attainment with the state and federal AAQS or areas designated as "unclassifiable" for certain regulated pollutants. Commonly addressed PSD pollutants for Portland cement plants such as the Argos Newberry Cement Plant include: carbon monoxide (CO), nitrogen oxide (NO_X), PM, sulfur dioxide (SO_2), volatile organic compounds (VOC), sulfuric acid mist (SAM), mercury (Hg), and hydrogen chloride (HCl).

Additional PSD pollutants that are more common to certain other industries include: lead (Pb), hydrogen sulfide (H_2S), total reduce 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/furan), MWC metals measured as PM; and MWC acid gases measured as SO_2, and municipal solid waste (MSW) landfill emissions 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 (TPY) or more of any PSD pollutant; or
- 100 TPY or more of any PSD pollutant and 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 Argos Newberry Cement Plant is a major stationary source based on actual emissions of and potential to emit 100 TPY or more of several individual PSD pollutants.

For major stationary sources such as the Argos Newberry 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 microgram 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 Best Available Control Technology (BACT) controls for any PSD pollutant that exceeds the corresponding SER given in **Table 1** below.

TABLE 1 – LIST OF SER BY PSD-POLLUTANT. [1]

Pollutant	SER (tons/year)	Pollutant	SER (tons/year)
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	GHGs	> 75,000 (CO_2e) and > 0 (mass) [3]

1. Excluding fluoride and pollutants specific to the Pulp and Paper industry, MWCs, 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. Pursuant to 40 CFR 52.21(b)(23)(ii), pollutants with no SER listed at 40 CFR 52.21(b)(23)(i) have a SER of zero (0) tons/year.
4. SER also means any emissions rate or any net emissions increase 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 $\mu g/m^3$, 24-hour average.

2.2. PSD Applicability for Project

The project is located in Alachua County, which is in an area that is currently in attainment with (or designated as unclassifiable) the state and federal AAQS. According to the application, the pollutants of concern (PM emissions) will be reduced for this project. Based on the available information, this project is not subject to any additional PSD preconstruction review.

3. DEPARTMENT REVIEW

The applicant proposes to replace the existing ESP's on the In-Line Kiln Systems Lines 1 and 2 with fabric filter, pulse-jet baghouses to control emissions of PM.

3.1. Process Description

Refer to **Figure 3**. Portland cement is a fine powder, usually gray in color, and consist 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. The transformation from raw materials to cement is done through chemical reactions and physical processes. The processes used in the production of Portland cement consists of: raw materials acquisition and handling, kiln feed preparation for pyroprocessing, and finished cement grinding.

Raw materials, predominantly limestone, but also including sand, clay, iron ore, and coal ash, will be crushed and then blended and milled in the raw mill. The resulting material will be conveyed to the pyroprocessing system in the top stage of the preheater. The material exits the preheater/precalciner and enter the kiln at the elevated end (feed end). The rotation of the kiln causes the solid materials to be slowly transported downward from the front end (discharge end). Fuel will be supplied to the precalciner combustion chamber, optionally at the feed end of the kiln, and at the lower or discharge end of the kiln. The hot, gaseous combustion products will move countercurrent to the material flow, thereby transferring heat to solids in the kiln and preheater/precalciner, and to the raw mill.

The clinker will enter the clinker cooler where it will be cooled by ambient air. This cooling or quenching serves to "freeze" the clinker, halting the formation chemistry. Hot air from the clinker cooler will be recovered and returned to the pyroprocessing system as combustion air and will also be supplied to the coal mill for drying the coal.

Figure 3. Portland Cement Process Description.

Emissions of PM from the raw mill and in-line kilns at the Argos Newberry cement plant are controlled by an ESP. The ESP's are kept under slight negative pressure with an induced draft fan discharging into each in-line

kiln stack. The applicant proposes to replace the existing ESP's on the In-Line Kiln Systems with fabric filter, pulse-jet baghouses.

3.1.1. Fabric Filter, Pulse-Jet Baghouse Design

The fabric filter baghouse is designed to reduce emission of PM and HAPs that are in particulate form, such as most metals. Typically, design efficiencies for pulse-jet cleaned type baghouses will range between 99 and 99.9%. Fabric filters with pulse-jet cleaning are effective for many different type of applications including cement plants. A schematic of a pulse-jet baghouse is given in **Figure 4** below.

Figure 4. Fabric Filter, Pulse-Jet Baghouse.

Based on a nominal design flow rate of 2,200,000 actual cubic feet per minute (acfm) when the raw mill is running and 195,000 acfm when the raw mill is down, the proposed baghouses will be designed to meet the following specifications (or equivalent to):

- Inlet of the collector will be designed to prevent the direct impingement of dust and large particles upon the collector bags.
- Air-to-cloth ratio of less than 1.0 cubic meter per meter squared-minutes.
- Can velocity (100% of gas volume between the bags) will be less than 1.0 meter per second (m/s).
- Transversal velocity (gas in hopper) will be less than 5 m/s.
- Membrane or equivalent filter bags will be used in the baghouses.
- Clean gas dust load is less than 2.63 milligrams per dry standard cubic meter at 7% oxygen.

3.1.2. Project Emissions

According to the application and the facility's Title V air operation permit, the maximum design hourly production rates and the PM/PM_{10} emission factors used for the kiln systems are established BACT limits. Based on these emission standards, the potential emission for PM/PM_{10} equipped with an ESP are the same. Therefore, the proposed project does not show an increase or decrease in PM emissions. **Table 2** summarizes the annual emissions from these emission units.

TABLE 2. - ANNUAL EMISSIONS SUMMARY FOR THE IN-LINE KILN SYSTEMS/RAW MILL - LINES 1 AND 2.

Emission Unit	Pollutant	Emission Factor lb/ton	Equivalent to	
			lb/hour	TPY
In-Line Kiln System/ Raw Mill Line 1[b] (EU 003)	PM	0.23 (clinker produced) & 0.14 (dry preheater feed)	25.9	94
	PM_{10}	0.20 (clinker produced) & 0.12 (dry preheater feed)	22.1	80
In-Line Kiln System/ Raw Mill Line 2[c] (EU 010)	PM	0.136 (clinker produced) & 0.23 (dry preheater feed)	28.8	126.1
	PM_{10}	0.20 (clinker produced) & 0.118 (dry preheater feed)	25.0	109.5

a. Pound per ton (lb/ton).
b. Based on the design hourly preheater dry feed rate of 183.4 tons/hour (24-hour average) and 191.4 tons/hour (peak hourly rate resulting in an estimated preheater dry feed rate of 187.71 tons/hour for In-Line Kiln System/Raw Mill – Line 1.
c. Based on the design hourly preheater dry feed rate of 125 tons/hour (24-hour average) for In-Line Kiln System/Raw Mill – Line 2.

The Department recognizes that the primary control for the kiln systems will be the new fabric filter baghouses. According to EPA Air Pollution Control Technology Fact Sheets for dry ESP (wire-plate type) and fabric filter, pulse-jet cleaned type, baghouses, typically for new equipment, have design efficiencies between 99 and 99.9% for both control devices. However, older existing equipment have a range of actual operating efficiencies of 90 to 99.9% for ESP's and 95 to 99.9% for the baghouses. Based on the control efficiencies of the new fabric filter baghouses vs. the existing ESP's, the Department concurs that new baghouses will further reduce the emissions of PM initially as well as in the future.

3.1.3. State Provisions

The existing kiln systems are subject to Rule 62-212.400, F.A.C. PSD BACT limits identified in **Error! Reference source not found.** above. In addition to these emission limits, each kiln stack are subject to a 10% opacity BACT standard. Visible emissions are continuously monitored by a continuous opacity monitoring system (COMS). The In-Line Kiln/Raw Mill – Lines 1 and 2 have met the applicable requirements of these rules. The draft permit will not change these emission standards, but will revise conditions by removing the ESP's and add the fabric filter baghouses.

3.1.4. NESHAP Provisions

The existing kiln systems are subject to the following NESHAP provisions: Subparts A (General Provisions) and LLL (Portland Cement Manufacturing Industry) of 40 CFR 63. The existing kiln systems have met the applicable requirements of these subparts. The draft permit will not change any currently applicable requirements with regard to these regulations.

3.1.5. NSPS Provisions

The existing kiln systems are subject to Subparts A (General Provisions) and F (Portland Cement Plants) of 40 CFR 60. The existing kiln systems have met the applicable requirements of these subparts. The draft permit will not change any currently applicable requirements with regard to these regulations.

3.2. Departments Conclusion

The design for the baghouse specifies the exhaust gas will be vented through the existing stack. Each In-Line Kilns Systems/Raw Mill – Lines 1 and 2 are subject to annual PM emissions test to demonstrate compliance with the established PM emission limits and each stack is equipped with a COMS to continuously monitor opacity. Based on information provided in the application, the Department believes the applicant has provided reasonable assurance that emissions PM will be reduced and the project will not trigger PSD review.

The Department's draft permit will:

- Authorizes the replacement of the existing ESP with a new fabric filter, pulse-jet type baghouse.
- Require the submittal of the final design specifications upon final equipment selection.
- Revises previous permit conditions that established the BACT limits for opacity standard of 10% by removing the ESP's and adding the fabric filter baghouses

4. 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. Tammy McWade 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 Blairstone Road, Tallahassee, Florida 32399-2400 at 850/717-9086 or by email tammy.mcwade@dep.state.fl.us.