TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

CEMEX Construction Materials Florida, LLC

Brooksville South Cement Plant
Facility ID No. 0530021
10311 Cement Plant Road
Brooksville, Florida

PROJECT

Project No. 0530021-031-AC
Temporary Trial of Multiple Alternative Fuels

COUNTY

Hernando County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Bureau of Air Regulation
New Source Review Section
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

March 23, 2011

1. GENERAL PROJECT INFORMATION

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 Rules 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 on a quarterly basis in Rule 62-204.800, F.A.C.

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 the draft permit.

Facility Description and Location

CEMEX Construction Materials Florida, LLC operates an existing Portland cement manufacturing plant, which is collocated with an existing power plant. The cement plant is categorized under Standard Industrial Classification Code No. 3241. The power plant is categorized as SIC No. 4911 for electric power services. The Brooksville South Cement Plant and Central Power and Lime (CPL) Power Plant are located in Hernando County at 10311 Cement Plant Road in Brooksville, Florida. The UTM coordinates of the existing facility are Zone 17, 360.0 kilometers (km) East, and 3162.5 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).

Project Summary

The applicant proposes individual short-term trials of alternative fuel materials including: non-chlorinated agricultural plastics, tire-derived fuel including tirefluff, manufacturer reject roofing shingles, clean woody biomass, agricultural fibrous organic byproducts, pre-consumer reject paper, carpet-derived fuel and on-specification (on-spec) oil generated off-site.

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 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.

Description of the Existing Pyroprocessing System

The cement plant consists of two Portland Cement lines (Lines 1 and 2) including associated kilns (Kilns 1 and 2) and clinker coolers (Coolers 1 and 2). Kiln 2 is a F.L. Smidth design with a dry preheater/precalciner kiln, a design which improves the thermal efficiency and production capacity by adding material feed separators (cyclone vessels) arranged vertically in a preheater tower before the kiln. Hot exhaust gas passes through the

material feed separators in the preheater tower counter to the raw material flow, which provides heat transfer between the gas and solid streams. The improved heat transfer allows the kiln length to be reduced as well as dry the raw materials in the raw mill.

Coal and petroleum coke are burned in the precalciner combustion chamber at the inlet to the kiln as well as at the main burner at the discharge end of the kiln. Temperatures reach approximately 3000° F in the main burner flame, 2200° F in the kiln and 1800° F in the calciner. The following schematic represents the conditions of a modern preheater/pre-calciner kiln.

Figure 1. Kiln Temperatures and Retention Times

As shown, gas temperatures in the calciner are approximately 1800° F with a 3 second retention time. Gas temperatures at the inlet to the kiln exceed 2000° F. The high temperatures and long retention times provide excellent combustion of fuels. Figure 2 is a process flow diagram for a dry process preheater/pre-calciner cement plant.

Figure 2. Process Flow Diagram - Dry Process Preheater/Precalciner Cement Plant [1]

[1] From the Department's Project No. 1210465-004-AC; Originally from Blue Circle Home Page at http:/www.cement.bluecircle.co.uk; Teleconference between A.A. Linero (Florida DEP) and W. McLendon (Blue Circle) with permission to use modified version of Blue Circle cement process diagram; March 19, 2001.

As shown, an induced draft fan pulls hot exhaust gases from the kiln through the preheater tower, the raw mill, a baghouse and out the stack. Raw materials (limestone, sand and iron ore) are fed into the raw mill, which grinds and mixes the raw materials to form raw meal. Instead of the typical practice for an in-line vertical raw mill, the F.L. Smidth design incorporates a ball mill for the raw mill that has several benefits including assistance (by generated friction heat) in drying of the raw materials. Raw meal is transferred to the raw meal storage silo countercurrent to the hot exhaust gas, which is used to dry the raw meal. Raw meal is fed into the preheater tower, where the solid materials again flow countercurrent to the hot exhaust gas, which preheats the raw meal before being introduced to the pyroprocessing kiln. Instead of the typical practice using a ball mill for product cement grinding at the finish mill, this F.L. Smidth design incorporates a vertical mill for the finish mill that has some process benefits, but which (at times) requires use of a heater to assist in driving off moisture (from ambient air) from the finished cement prior to storage and shipping. For that heating, there is a small 45 million Btu per hour (Btu/hr) propane/diesel-fueled dryer within the cement finish mill. The kiln transforms the raw meal into cement clinker, which is cooled and eventually ground to size in the finish mill with other additives to form the final cement product. Kiln 2 and Clinker Cooler 2 exhaust gases prior to exiting via the common stack.

For the Brooksville South Cement Plant, particulate matter from the kiln and the raw mill are controlled by the baghouse and not the electrostatic precipitator shown in the above figure. Dust collected in the baghouse is diverted to the raw meal storage silo since this material is basically raw meal. This type of pyroprocessing system eliminates cement kiln dust (CKD), which used to be handled as a waste product. When the raw mill is off line, the raw meal silo contains enough raw meal to continue operating the kiln for approximately two days until the raw mill is brought back on line.

Emissions of nitrogen oxides are controlled by adjustments to the multistage combustion system timing, fuel input rates and a selective non-catalytic reduction (SNCR) system. Emissions of nitrogen oxides (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO) and total hydrocarbons (THC) are monitored with certified continuous emissions monitoring systems (CEMS). Stack opacity is monitored with a certified continuous opacity monitoring system (COMS).

Temporary Short-Term Trials of Multiple Alternative Fuels

On January 14, 2011, the applicant requested short-term operational trials to co-fire coal in existing Kiln No. 2 with the following materials: non-chlorinated agricultural plastics, tire-derived fuel including tirefluff, manufacturer reject roofing shingles, clean woody biomass, agricultural fibrous organic byproducts (e.g., peanut hulls, rice hulls, corn husks, citrus peels, cotton gin byproducts and animal bedding), pre-consumer reject paper, carpet derived fuel and on-specification (on-spec) oil generated off-site. The shredded and sized materials will be pneumatically introduced into the calciner portion of the kiln through a feed duct specifically designed for this purpose. The purpose of the short-term trials is to evaluate the operational feasibility of these materials as alternative fuels for supplementing coal in the kiln. A Notice of Application for these alternative fuels was published in The St. Petersburg Times on February 13, 2011.

Non-chlorinated agricultural plastics are the plastics used in agriculture and silviculture to prevent weed growth, control soil erosion and moisture exposure. The plastics are a combination of low-density polyethylene (LDPE) and/or high-density polyethylene (HDPE) non-chlorinated plastics. The materials will be provided by suppliers such as Marpan Recycling, a construction and demolition debris (C&D) processor in Tallahassee through Southern Waste Information eXchange, Inc. (SWIX). The non-chlorinated agricultural plastics will be ground by the supplier. The energy content for the polyethylene plastics is more than 50% higher than coal. The high temperatures, long residence times and scrubbing that takes place within a cement kiln calciner provides an environment conducive to the efficient combustion of agricultural plastic. Emissions are estimated to be similar to or less than coal emissions.

Michigan's Department of Environmental Quality issued a permit to St. Mary's Cement, Permit No. 242-09, for a trial burn of non-chlorinated plastic. The permit required analyses of the mercury, chlorine and Btu content. The permit also required reporting of total chromium, lead, manganese and total mercury emission rates. There has been an increased interest in using non-chlorinated agricultural plastics as an alternative fuel. SWIX has applied

for an EPA Region 4 grant to use agricultural plastic as an alternative fuel, including in the cement industry. A letter of support for the agricultural plastic as an alternative fuel was written by Raoul Clark, Administrator of DEP's Waste Reduction Section. The benefits include reduced open field burning of non-chlorinated agricultural plastics and resulting air pollution, reduced land-filling of non-chlorinated agricultural plastics, savings to farmers for landfill disposal costs, landfill space, energy savings and resource conservation, potential reduced emissions in the cement kiln compared to coal and reduced greenhouse gas emissions.

Tire-derived fuel and tirefluff (TDF) is readily available and the heating value is higher than bituminous coal. Tire-derived fuel contains processed tires which may include metal while tirefluff is the shredded materials from the crumb of tires with no metal. The metal from tire-derived fuel includes the radial steel belt, which can be beneficial in the production of cement clinker. TDF will efficiently combust within a cement kiln calciner due to the high temperatures and long residence times and is currently done in many existing cement kilns. Air Construction Permit No. 0530021-009-AC (PSD-FL-351) authorized the installation of a tire injection mechanism system for firing of whole tires and the facility currently burns whole tires.

Manufacturer reject roofing shingles will be certified to be asbestos free by the manufacturer prior to acceptance by the facility. The shingles will be ground by the supplier. The sulfur content of shingles is 0.79%, which results in approximately the same SO_2 emissions as coal (0.67% sulfur content) on a mass basis. NO_X emissions are expected to be lower than coal with CO emissions similar to coal. Other emissions are not expected to increase.

Michigan's Department of Environmental Quality issued a permit to St. Mary's Cement, Permit No. 238-09, for a trial burn of asphalt shingles. The permit required lab testing for ultimate analysis and trace elements fuel analysis as well as chlorine and heating value. CO, NO_X and SO_2 emissions data were collected by CEMS. The plant found two issues: the shingles could create dust during the handling stages and the level of lead was determined to be slightly higher than found in coal. Industry tests show that lead is captured by the pyroprocessing system with efficiencies greater than 99%, much of which is bound to the clinker product. Lead in the exhaust will also be captured in the high-efficiency baghouse.

Clean woody biomass is readily available and includes clean untreated lumber, tree stumps, millings, shavings and processed pellets made from wood or other forest residues. The Brooksville South Cement Plant will ensure these materials include no secondary residues such as plywood, particle board, medium density fiberboard, oriented strand board, laminated beams, finger-jointed trim or sheet goods. The source will come from permitted recycling facilities or contracted companies that service tree trimming operations. Depending on the material content, there may be slight increases of PM/PM_{10}, SO_2 and VOC when firing clean woody biomass versus firing an equivalent heat input rate of 3,895 tons of coal.

Agricultural fibrous organic byproducts include peanut hulls, rice hulls, corn husks, citrus peels, cotton gin byproducts and animal bedding. The Brooksville South Cement Plant is within farming areas in which these agricultural byproducts are readily available. The design and operation of cement kilns make it possible to feed many different types of fuel into the system for energy recovery at low cost to farmers. The expected emissions are similar to clean woody biomass. The applicant requests the ability to include other similar materials.

Pre-consumer reject paper will be supplied by such companies as International Paper Products Corporation or waste handlers that certify and manifest to only supply pre-consumer reject paper. These materials are typically outdated paper printings. This may include printing and writing paper, pre-consumer household and sanitary paper, wrapping and packaging paper, linerboard, Kraft liner and fluting. The chlorine content of coal and reject paper are similar. The emissions are expected to be similar to clean woody biomass.

Carpet-derived fuel (CDF) will come from the approximately 2 million tons of carpet replaced in the United States annually. Carpet has a similar heating value to coal and contains a significant fraction of calcium carbonate ($CaCO_3$) in the backing material, a beneficial component of cement production. The materials will be supplied by certified waste haulers in the form of processed CDF. This material has been tested at the Lehigh cement plant in Evansville, Pennsylvania. The results at that plant showed insignificant changes for CO, NO_X and PM, and an incongruent increase of SO_2. The sulfur content of carpet is typically 0.1% while coal is 0.67% by weight. The

chlorine content ranges from 52 to 77 ppm (milligrams/kilograms), which is well below the chlorine content of coal. Emissions from firing CDF are not expected to increase.

On-spec used fuel oil generated off-site. On-spec used fuel oil generated on-site is currently permitted for use by the facility. For this project, the applicant proposes to fire on-spec used oil generated off-site in the existing oil burners of the kiln. On-spec oil is commonly used in industrial boilers and furnaces (e.g. asphalt plants) and must meet the federal specifications in 40 CFR 279.

Summary of Expected Emissions

The table summarizes the expected heating values and amounts of alternative fuel materials requested for the short-term trials. Based on the heating values and requested amounts, the alternative fuel materials would displace 670,750 MMBtu of heat input to the kiln or approximately 26,830 tons of coal. The materials will only be introduced into the precalciner section of the kiln at temperatures of approximately 1600 to1800° F with an exhaust gas retention time of 3 seconds.

Alternative Fuel Material	Properties		
	Btu/lb	Tons	% Moisture (as received)
Agricultural Plastic	18,600	3,000	0.5
Tires, TDF	15,688	4,500	0.6
Shingles, Rejects	5,842	10,000	3.1
Clean Woody Biomass	5,200	10,000	40
Agricultural byproducts	1500	20,000	50
Paper, Pre-Consumer	6,500	5,000	16
Carpet, CDF	9,194	6,500	0.5
Off-Site On-spec Used Oil	19,036	400 (111,111 gallons)	--
Total	---	59,400	---
Equivalent Coal Displaced	12,500	26,830	---

Table A. Summary of Alternative Fuel Materials

At the expected charging rates, the applicant believes any changes in emissions from the kiln compared with coal will be negligible. CO and VOC emissions will remain low due to the high temperatures and long residence time. SO_2 and the acid gas emissions will be removed by the natural scrubbing of limestone in the kiln. NO_X emissions are not expected to increase from these alternative materials, but can be controlled by the existing SNCR system.

Mercury input to the kiln will be captured in the baghouse dust, which is cycled back into the pre-heater tower as a raw material. If the raw mill is shut down, mercury will eventually exhaust through the baghouse. The proposed alternative fuel materials contain minimal amounts of mercury. Less volatile metals will be retained in the clinker product or cooled and removed by the baghouse. As shown in the following, many of the metals are expected to remain in the clinker product.

Metal	% of Input Emitted	% of Input Retained	Metal	% of Input Emitted	% of Input Retained
Antimony	0.733	99.267	Beryllium	0.057	99.945
Thallium	0.664	99.336	Zinc	0.052	99.948
Silver	0.574	99.426	Arsenic	0.012	99.987
Cadmium	0.503	99.496	Chromium	0.011	99.988
Lead	0.269	99.722	Vanadium	0.001	99.999
Barium	0.096	99.904	Nickel	0.026	99.974

Table B. Summary of Input Metals Emitted and Retained with Cement Kilns[2]

[2] Source: Herat, Sunil, Use of Cement Kilns in Managing Solid and Hazardous Wastes: Implementation in Australia, Griffith University 1994.

In Table C, the applicant estimates emissions changes expected from firing the alternative fuel materials compared to an equivalent amount of displaced coal.

	SO_2 Inc./Dec. (tons)	NO_x Inc./Dec. (tons)	CO Inc./Dec. (tons)	VOC Inc./Dec. (tons)	PM/PM10 Inc./Dec. (tons)	PM2.5[a] Inc./Dec. (tons)	Pb Inc./Dec. (lbs)	Hg Inc./Dec. (lbs)
Fugitives	0.00	0.00	0.00	0.00	1.71	0.15	0.00	0.00
Agricultural Film	0.00	0.00	0.00	0.00	0.00	0.00	-5.78	-1.47
Agricultural Waste	0.69	-2.84	8.19	0.76	2.75	1.37	-10.82	-1.20
Carpet-Derived Fuel	0.00	0.00	0.00	0.00	0.00	0.00	9.92	2.52
Clean Woody Biomass	1.20	-4.92	14.20	1.32	4.77	2.38	-18.99	-4.05
Manufacturer Reject Roofing Shingles	0.18	-20.01	0.00	1.03	0.00	0.00	20.55	-3.25
Preconsumer Paper	0.75	-3.08	8.87	0.82	2.98	1.49	-3.43	-2.93
Tire Derived Fuel	-0.08	-3.87	22.77	-0.08	-0.24	-0.12	-0.74	-5.76
On-Spec Used Oil	11.94	-2.07	-2.24	9.64	0.80	0.40	5.20	-0.71
	↓	↓	↓	↓	↓	↓	↓	↓
Total	14.70	-36.79	51.80	13.49	12.76	5.68	-4.10	-16.85
	↓	↓	↓	↓	↓	↓	↓	↓
PSD Threshold	40	40	100	40	25/15	10	1200	permit: 122 lb/yr

a. PM2.5 from alternative fuel firing conservatively estimated at 50% of fraction of PM.

Table C. Emissions Increases for Alternative Fuel Materials

It is noted that the current PSD threshold for mercury is 200 lb, however this facility has a permitted limit of 122 lb/yr. As shown, the applicant predicts that the project will not result in significant emissions increases subject to PSD preconstruction review.

During the trial period, the applicant proposes to conduct the short-term trials using the following procedures.

1. NO_X, SO_2, CO and THC emissions will be continuously monitored with the existing certified CEMS.
2. Opacity will be continuously monitored with the existing certified COMS.
3. Particulate matter will be monitored through stack testing.
4. Mercury emissions will be monitored based on a mass-balance calculation.
5. Each alternative fuel will be co-fired with coal in the cement kiln at low, medium and high feed rates to determine the maximum feed rate and best operational feed rate.
6. No more than 3,000 tons of non-chlorinated agricultural plastics, 4,500 tons of tire derived fuel, 10,000 tons of manufacturer reject shingles, 10,000 tons of clean woody biomass, 20,000 tons of agricultural byproducts, 5,000 tons of pre-consumer paper, 6,500 tons of carpet derived fuel and 400 tons of on-spec used oil generated off-site will be fired over a period of 60 operating days for each fuel. No more than 5,000 tons of agricultural byproducts will be stored on site at one time.

7. It is estimated that material suppliers will deliver approximately 2,970 truckloads of alternative fuels to the Brooksville South Cement Plant during this trial assuming 20 tons per truck.
8. The Brooksville South Cement Plant will sample and analyze each material for the following:
   a. *All Materials*: heating value, moisture content, density, volatiles, ash, sulfur, chlorine, fluorine and mercury.
   b. *Non-Chlorinated Agricultural Plastics*: arsenic, bromine, cadmium, chromium, lead, thallium and pesticides.
   c. *TDF*: lead and zinc.
   d. *Roofing Shingles*: lead, cadmium, chromium, manganese, nickel and zinc.
   e. *Clean Woody Biomass*: copper, chromium and arsenic.
9. The alternative fuels will be delivered in a covered truck, unloaded and stored most likely in a trailer or under cover on top of a paved or compacted clay surface. Materials will be stored in separate piles, most likely in trailers, and visibly marked. Alternative fuel materials delivered to the site shall be burned in the kiln during the 60-day trial or removed from the site within 7 days of completing the trial. A water spray system will be used to control fugitive dust as necessary; otherwise, the materials shall be kept dry to facilitate burning.
10. The permittee will submit a report to the Department summarizing and discussing the short-term trial of each alternative fuel and the actual emissions.

The results of the short-term trial may be used to support a subsequent request for permanent authorization to fire one or more of these alternative fuels or authorization for a long-term trial.

2. PSD APPLICABILITY

General PSD Applicability

For areas currently in attainment with the state and federal AAQS or areas otherwise designated as unclassifiable, the Department regulates major stationary sources of air pollution in accordance with Florida's PSD preconstruction review program as defined in Rule 62-212.400, F.A.C. Under preconstruction review, the Department first must determine if a project is subject to the PSD requirements ("PSD applicability review") and, if so, must conduct a PSD preconstruction review. A PSD applicability review is required for projects at new and existing major stationary sources. In addition, proposed projects at existing minor sources are subject to a PSD applicability review to determine whether potential emissions *from the proposed project itself* will exceed the PSD major stationary source thresholds. A facility is considered a major stationary source with respect to PSD if it emits or has the potential to emit:

- 5 tons per year or more of lead;
- 250 tons per year or more of any regulated air pollutant; or
- 100 tons per year or more of any regulated air pollutant and the facility belongs to one of the following 28 PSD-major facility categories: fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, coal cleaning plants (with thermal dryers), Kraft pulp mills, Portland cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than 250 tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, secondary metal production plants, chemical process plants, fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input, petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels, taconite ore processing plants, glass fiber processing plants and charcoal production plants.

Once it is determined that a facility is or will be a PSD major stationary source, the project emissions are compared to the "significant emission rates" defined in Rule 62-210.200, F.A.C. for the following pollutants: carbon monoxide (CO); nitrogen oxides (NO_X); sulfur dioxide (SO_2); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM_{10}); volatile organic compounds (VOC); lead (Pb); fluorides (F); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS), including H_2S; reduced sulfur compounds, including H_2S; and mercury (Hg). In addition, significant emissions rate also means any emissions rate or any net emissions increase associated with a major stationary source or major modification which would construct within 10 kilometers of a Class I area and have an impact on such area equal to or greater than 1 microgram per cubic meter ($\mu g/m^3$) 24-hour average.

If the potential emission exceeds the defined significant emissions rate of a PSD pollutant, the project is considered "significant" for the pollutant and the applicant must employ the Best Available Control Technology (BACT) to minimize the emissions and evaluate the air quality impacts. Although a facility or project may be *major* with respect to PSD for only one regulated pollutant, it may be required to install BACT controls for several "significant" regulated pollutants.

PSD Applicability for Project

As previously shown in Table C, the applicant expects that co-firing coal with alternative fuel materials will result in negligible changes in PSD pollutant emissions for the following reasons.

- CO and VOC emissions will be controlled by the high temperatures and long residence time in the calciner (1600 to 1800° F for 3 seconds), which was specifically designed with a separate calciner chamber for firing alternative fuels. CO will be monitored continuously by certified CEMS and THC will be monitored continuously with a certified CEMS as a surrogate for VOC emissions.
- NO_X emissions will be controlled with the existing SNCR system by adjusting the ammonia injection rate as necessary. NO_X emissions will be continuously monitored by certified CEMS.
- Particulate matter will be controlled with the existing baghouse. The combustion of alternative fuel materials is not expected to generate any more particulate matter than coal combustion considering the largest portion of particles removed by the baghouse are raw materials used in making cement.
- SO_2 and other acid gas emissions increases will be negligible because of the natural scrubbing with highly alkaline limestone as a raw material in the cement kiln.
- Based on previous studies for this industry, more than 99.99% of the lead will be captured and bound in the cement clinker and retained in the final cement product.

Total project emissions are not expected to exceed the PSD significant emissions rates; therefore, the project is not subject to PSD preconstruction review. The project is for short-term (60-days) trials of alternative fuels on a temporary basis. Once the trial ends, the alternative materials can no longer be fired. The purpose of each trial is to gather information in support of a permanent request. At that time, the Department will require a comparison of projected actual emissions to baseline actual emissions to determine PSD applicability with the selected alternative fuel materials.

3. DEPARTMENT REVIEW

Operating Capacity and Production

The Brooksville South Cement Plant's construction permit for Kiln 2 was issued July 6, 2005 and has a maximum permitted Portland cement production capacity of 1,022,000 tons of clinker per year. Florida's cement production peaked in 2007, but dropped in 2008 and then dropped again in 2009 with the downturn in the economy. Currently, the Brooksville South Cement Plant operates Kiln 2, but not Kiln 1 due to the decreased demand.

The alternative materials will be supplied by pneumatic injection into the pyroprocessing system by a temporary feeding system at the base of the precalciner tower. Alternative materials are blown pneumatically into the pre-

calciner through an injection porthole.

Unfortunately, the economic downturn coincided with the construction of new plants, which lead to excess production capacity. According to the Portland Cement Association, cement production in Florida was more than 12 million tons in 2006 and has dropped each year to a low of just over 4 million tons in 2009. In addition to preventing the construction of several of the new kilns, this situation has caused the shutdown of recently constructed and existing kilns.

New NESHAP for Portland Cement Plants

On February 21, 2011, EPA updated the NESHAP standards in Subpart LLL of 40 CFR 63, which represent the MACT for Portland cement production. The federal NESHAP provisions regulate the following HAP emissions: mercury, dioxins/furans, hydrochloric acid (HCl), PM (as a surrogate for metals such as cadmium and lead) and THC (as a surrogate for organic HAP). For an existing cement plant, the mercury standard is 55 pounds per million tons of clinker produced. For a new cement plant, the mercury standard is 21 pounds per million tons of clinker produced. The final NESHAP standards will apply in 2012. For the existing Brooksville South Cement Plant ("existing plant" in terms of NESHAP LLL), this regulation will reduce the allowable mercury emissions from the current permit limit of 122 pounds per year to 56.21 pounds of mercury per year based on the annual permitted capacity of 1,022,000 tons of clinker per year.

Consent Order OGC No. 10-1407 for Brooksville South Cement Plant was issued on October 10, 2010 requiring testing and monitoring of mercury emissions for Kiln 2 with the raw mill down. Dust shuttling, diverting some of the cooled baghouse dust directly to the final cement product to reduce mercury emissions, proved to be an effective method of reducing mercury emissions. The facility is currently in compliance with the mercury standards and the facility is also in compliance with the provisions of the consent order.

New NSPS for Commercial and Industrial Solid Waste Incineration (CISWI) Units

EPA updated the NSPS Subpart CCCC provisions for new CISWI units and Emission Guidelines for existing CISWI units (Subpart DDDD). The new CISWI rules changed the definition of solid waste within these rules to conform with the definition of solid waste under the Resource Conservation and Recovery Act (RCRA), "… any distinct operating unit of any commercial or industrial facility that combusts any solid waste as that term is defined in 40 CFR Part 241 [RCRA]..." Each subcategory will have different emission limits.

In a parallel regulatory action, EPA amended the definition of solid waste provided under 40 CFR Part 241 to add an exclusion for "non-hazardous secondary wastes" that would otherwise qualify as solid waste under 40 CFR Part 241.

Identification of Non-Hazardous Materials That Are Solid Waste

According to 40 CFR 241(b), the following non-hazardous secondary materials are not solid wastes when combusted:

> (1) Non-hazardous secondary materials used as a fuel in a combustion unit that remain within the control of the generator and that meet the legitimacy criteria specified in paragraph (d)(1) of the section.
>
> (2) The following non-hazardous secondary materials that have not been discarded and meet the legitimacy criteria specified in paragraph (d)(1) of the section when used in a combustion unit (by the generator or outside the control of the generator):
>
> > (i) Scrap tires used in a combustion unit that are removed from vehicles and managed under the oversight of established tire collection programs.
> >
> > (ii) Resinated wood used in a combustion unit.
>
> (3) Non-hazardous secondary materials used as an ingredient in a combustion unit that meet the legitimacy criteria specified in paragraph (d)(2) of this section.

(4) Fuel or ingredient products that are used in a combustion unit, and are produced from the processing of discarded non-hazardous secondary materials and that meet the legitimacy criteria specified in paragraph (d)(1) of the section, with respect to fuels, and paragraph (d)(2) of the section, with respect to ingredients. The legitimacy criteria apply after the non-hazardous secondary material is processed to produce a fuel or ingredient product. Until the discarded nonhazardous secondary material is processed to produce a non-waste fuel or ingredient, the discarded non-hazardous secondary material is considered a solid waste and would be subject to all appropriate federal, state, and local requirements.

Processing means any operations that transform discarded non-hazardous secondary material into a non-waste fuel or non-waste ingredient product. Processing includes, but is not limited to, operations necessary to: remove or destroy contaminants; significantly improve the fuel characteristics of the material, e.g., sizing or drying the material in combination with other operations; chemically improve the as-fired energy content; or improve the ingredient characteristics. Minimal operations that result only in modifying the size of the material by shredding do not constitute processing for purposes of this definition. The proposed materials will be processed by at least sizing and screening to remove incombustibles.

Scrap tires, for this project, TDF, are identified as not solid waste when legitimately used as a fuel that are removed from vehicles, managed under the oversight of established tire collection programs and used in combustion units. Clean woody biomass, agricultural fibrous organic byproducts and on-specification (on-spec) oil generated off-site are defined as "traditional" fuels. Traditional fuels are not wastes when used in combustion units. The other alternative fuels are generated off-site and require a legitimacy determination as outlined in 40 CFR 241 paragraph (d)(1), which is shown in the following table. For this project, each alternative fuel is seen as a valuable commodity to be used in a combustion unit.

Table D. Legitimacy Determination

Fuel or Ingredient	Legitimacy Criteria			
	Reasonable time frame of storage?	**Managed to prevent release into environment?**	**Meaningful Heating Value? (Btu/lb)**	**Comparable emissions?**
Traditional Fuels				
Clean Woody Biomass	N/A	N/A	3,500-5,000	N/A
Coal	N/A	N/A	12,500	N/A
Secondary Non-Hazardous Materials (Alternative Fuel Materials)				
Agricultural Plastic	Yes	Yes [1]	18,600, Yes	Yes [2]
Shingles, Rejects	Yes	Yes [1]	5,842, Yes	Yes [2]
Paper, Pre-Consumer	Yes	Yes [1]	6,500, Yes	Yes [2]
Carpet, CDF	Yes	Yes [1]	9,194, Yes	Yes [2]

Notes:

[1] Stored under cover on paved area or compacted clay surface.

[2] Emissions are comparable to coal and the purpose of the short-term trial burn is to determine emissions.

Applicant's Project Objective

In response to the economic downturn and newly proposed regulations, the Brooksville South Cement Plant is seeking to develop alternative fuel materials that will displace coal and fly ash to lower operating costs and eventually reduce mercury emissions.

Summary of Other Miscellaneous Alternative Fuel Materials

Agricultural Plastic: The energy content for the polyethylene plastics is higher than coal. The high temperatures,

long residence times and scrubbing that takes place within a cement kiln calciner provides an environment conducive to the efficient combustion of agricultural plastic. The material should handle well in the pneumatic feed to the calciner. Emissions are estimated to be similar to or less than emission from coal. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance.

Tire derived fuel and tirefluff (TDF): TDF has a heating value higher than bituminous coal. Many cement plants in the United States are authorized to fire TDF or wholes tires. Kiln 2 is currently authorized to fire whole tires with the tire injector system. Table D provides a comparison of the ultimate analysis of TDF with that of coal. [3]

EPA Report No. 600/R-97-115 entitled "Air Emissions From Scrap Tire Combustion" states the following with regard to combusting tires: "Based on the results of the Rotary Kiln Incinerator System (RKIS) test program, it can be concluded that, with the exception of zinc emissions, potential emissions from TDF are not expected to be very much different than from other conventional fossil fuels, as long as combustion occurs in a well-designed, well-operated and well-maintained combustion device. However, as with most solid fuel combustors, an appropriate particulate control device would likely be needed in order to obtain an operating permit in most jurisdictions in the United States. Test data, from 22 industrial facilities that have used TDF are presented: 3 kilns (2 cement and 1 lime) and 19 boilers (utility, pulp and paper, and general industrial applications). All sources had some type of particulate control. In general, the results indicate that properly designed existing solid fuel combustors can supplement their normal fuels, which typically consist of coal, wood, coke and various combinations thereof, with 10 to 20% TDF and still satisfy environmental compliance emissions limits."

ULTIMATE ANALYSIS (% AS RECEIVED)

CHARACTERISTIC	COAL	TIRES W/WIRE	TDF W/O WIRE
CARBON	67.69	67.00	72.25
HYDROGEN	4.59	5.81	6.74
NITROGEN	1.13	0.25	0.36
SULFUR	2.30	1.33	1.23
ASH	11.05	23.19	8.74
CHLORINE	0.01	0.03	0.09
MOISTURE	7.76	0.75	1.02
OXYGEN (DIFF)	5.47	1.64	9.67
TOTAL	100.00	100.00	100.00

Source: Babcock and Wilcox

Table D. Ultimate Analysis of TDF vs. Coal.

According to a study by the Portland Cement Association (PCA)[4]:

> "In 2008, PCA member companies completed a study on the impact of TDF firing on cement kiln air emissions. The study's data set included emission tests from 31 of the cement plants presently firing TDF. Dioxin-furan emission test results indicated that kilns firing TDF had emissions approximately one-third of those kilns firing conventional fuels – this difference was statistically significant. Emissions of particulate matter (PM) from TDF-firing kilns were 35% less than the levels reported for kilns firing conventional fuels (not statistically significant due to the low PM emissions reported for essentially all cement plants). Nitrogen oxides, most metals, and sulfur dioxide emissions from TDF-firing kilns also exhibited lower levels than those from conventional fuel kilns. The emission values for carbon monoxide and total hydrocarbons were slightly higher in TDF versus non-TDF firing kilns.
>
> However, none of the differences in the emission data sets between TDF versus non-TDF firing kilns for sulfur dioxide, nitrogen oxides, total hydrocarbons, carbon monoxide, and metals were statistically significant. Separate studies conducted by governmental agencies and engineering consulting firms have also indicated that TDF firing either reduces or does not significantly affect emissions of various contaminants from cement kilns [PCA 2008]."

TDF will efficiently combust within a cement kiln calciner due to the high temperatures and long residence times. The TDF will include the radial steel belt, which can be beneficial in the production of cement clinker. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance.

[3] "Tired Derived Fuel: Environmental Characteristics and Performance", Terry Gray, President, T.A.G. Resource Recovery, Southeast Regional Scrap Tire Conference, Nashville, Tennessee, November 6, 1997.

[4] "Tire-Derived Fuel", Fact Sheet by the Portland Cement Association, May 2008.

Manufacturer Reject Roofing Shingles: Reject shingles will be certified to be asbestos free by the manufacturer prior to acceptance by the facility. The shingles will be ground by the supplier and the grit materials removed leaving the flaked asphalt adhesive. The sulfur content is 0.79%, which results in potentially higher SO_2 emissions than coal on a mass basis. NO_X emissions are expected to be lower than coal and CO emissions similar to coal. Other emissions are not expected to increase. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance.

Clean Woody Biomass: This material is readily available and includes clean untreated lumber, tree stumps, millings, shavings and processed pellets made from wood or other forest residues. This material excludes copper-chromium-arsenic (CCA)-treated wood, creosote-treated wood, construction and demolition (C&D) debris, plywood, particle board, medium density fiberboard, oriented strand board, laminated beams, finger-jointed trim or sheet goods. The source will come from permitted recycling facilities or contracted companies that service tree trimming operations. Depending on the material content, there may be slight increases of particulates and VOC when firing clean woody biomass versus firing an equivalent heat input rate of coal. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance.

Agricultural Fibrous Organic Byproducts: This material includes peanut hulls, rice hulls, corn husks, citrus peels, cotton gin byproducts and animal bedding. The Brooksville South Cement Plant is within farming areas in which these agricultural byproducts are readily available. The applicant requests the ability to include other similar materials. The design and operation of this cement kiln makes it possible to feed many different types of fuel into the system for energy recovery, while reducing the material disposal costs to farmers. The expected emissions are similar to clean woody biomass. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance.

Pre-Consumer Reject Paper: This material will be supplied by such companies as International Paper Products Corporation or waste handlers that certify and manifest to only supply pre-consumer reject paper. These materials are typically outdated paper printings. This may include printing and writing paper, pre-consumer household and sanitary paper, wrapping and packaging paper, linerboard, Kraft liner and fluting. The chlorine content of coal and reject paper are similar. The emissions are expected to be similar to clean woody biomass. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance.

Carpet-Derived Fuel (CDF): This material will come from the approximately 2 million tons of carpet replaced annually. Carpet has a similar heating value to coal and contains a significant fraction of $CaCO_3$ in the backing material, a beneficial component of cement production. The materials will be supplied by certified waste haulers in the form of processed CDF. This material has been tested at the Lehigh cement plant in Evansville, Pennsylvania. The results at that plant showed insignificant changes for CO, NO_X and PM, and an incongruent increase of SO_2. The sulfur content of carpet is typically 0.1% while coal is 0.67% by weight. The chlorine content ranges from 52 to 77 ppm, which is well below the chlorine content of coal. Emissions from firing CDF are not expected to increase. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance.

On-Spec Used Oil Generated Off-Site: On-spec used oil generated on-site is currently permitted for use by the facility. The applicant proposes to also fire on-spec used oil generated off-site in the existing oil burners of the kiln. The current emissions monitoring systems for CO, NO_X, SO_2, THC and opacity will be sufficient to evaluate performance with the on-spec used oil generated off-site.

Particulate Matter

Clean woody biomass and agricultural fibrous organic byproducts will likely provide the highest dust loading from combustion. The draft permit requires a PM stack test to determine emissions while co-firing coal with either clean woody biomass or one of the agricultural byproducts.

Metals

The raw materials used to produce cement often contain trace quantities of virtually every natural element, including heavy metals such as lead, cadmium, chromium and arsenic. Many of these same constituents are also

contained in fossil fuels, such as coal, oil and petroleum coke (Chadbourne, 1997). With few exceptions, materials introduced into cement kilns will be oxidized and stabilized, requiring no further treatment (Chadbourne, 1997). As previously discussed, mercury is a volatile metal and will eventually be emitted from the exhaust. Metals such as antimony, thallium, silver, cadmium, lead, barium, beryllium, zinc, arsenic, chromium, vanadium and nickel will be retained in the clinker.[5] The draft permit requires extensive sampling and analysis of each material before being delivered. TDF will have the highest metals content and the draft permit requires stack testing to validate that metals are retained in the clinker or collected by the baghouse. If a trial of TDF is not conducted, then permittee shall conduct the stack test for metals on one of the other alternative fuels in this order: roofing shingles, clean woody biomass or carpet-derived fuel.

Chlorinated Compounds

HCl Emissions

Some materials contain chlorine, which has the potential to generate HCl emissions. However, the finely ground limestone raw materials fed into the kiln are highly alkaline and act as a large acid gas scrubber. HCl emissions will be regulated in the future by the new provisions in NESHAP Subpart LLL. The kiln will be tested while firing TDF at permitted capacity, which can be high in chlorine. If a trial of TDF is not conducted, then permittee shall conduct the HCl stack test on one of the other alternative fuels in this order: roofing shingles, clean woody biomass or carpet-derived fuel.

Dioxins/Furans Emissions

The presence of chlorine may also produce polychlorinated dibenzo-dioxins and -furans (PCDD/PCDF) from the kiln. "PCDD/PCDF", also known as dioxins/furans, represents more than 140 different cogeners of chlorinated compounds that form as by-products of combustion (Fiedler et al. 1990).[6] At high temperatures and sufficient residence times, dioxins/furans can be destroyed. Pre-heater/pre-calciner kilns like that at the Brooksville South Cement Plant have high temperatures and sufficient retention times to destroy these organic compounds. The preheater/calciner design rapidly cools the exhaust gases, which prevents dioxin/furans from reforming.

The dioxins/furans emissions standard for this existing cement kiln is 0.40 ng/dscm @ 7% oxygen when the temperature at the inlet to the baghouse is 204° C or less. In the development of the MACT regulations for hazardous waste combustors (Federal Register, 64 FR 52876, September 30, 1999), EPA stated that, "… based on our engineering judgment … dioxin/furan is formed post-combustion." Although dioxins/furans can be destroyed at high temperatures, they can reform if temperatures remain high in the exhaust. NESHAP Subpart LLL regulates the inlet temperature to the particulate control device based on successful compliance tests and requires continuous temperature monitoring. The kiln will be tested to demonstrate compliance while firing TDF at permitted capacity to verify the destruction and control of dioxins/furans emissions. If a trial of TDF is not conducted, then permittee shall conduct the dioxins/furans stack test on one of the other alternative fuels in this order: roofing shingles, clean woody biomass or carpet-derived fuel.

<u>Other Draft Permit Requirements</u>

- *Existing Permits*: The temporary air construction permit supplements all existing valid permits. The permittee shall continue to comply with all applicable conditions from valid air construction and operation permits.
- *Authorization*: The permittee is authorized to conduct a short-term operational trial for each of the following alternative fuel materials: non-chlorinated agricultural plastics (3,000 tons), tire-derived fuel (4,500 tons),

[5] "Use of Cement Kilns in Managing Solid and Hazardous Wastes: Implementation in Australia Heart", Sunil, Griffith University, 1994.

[6] "Cement Kiln Co-Processing (High Temperature Treatment)", Pesticides Treatment Technology Fact Sheet, John Vijgen, International HCH and Pesticides Association and Dr. Ir. Ron McDowall, Auckland New Zealand for Secretariat of the Basel Convention.

reject roofing shingles (10,000 tons), clean woody biomass (10,000 tons), agricultural fibrous organic byproducts (20,000 tons), pre-consumer reject paper (5,000 tons), carpet-derived fuel (6,500 tons) and on-spec used oil generated off-site (111,111 gallons or 400 tons). Each trial is limited to no more than 60 operating days while co-firing coal with only one of the alternative fuel materials. Only one alternative fuel material at a time shall be co-fired with coal. *{Note: The Department approves of the proposed 60-day trial period, the draft permit specifies a trial period of 60 operational days. This was to allow for projected limited operation of the kiln due to the economy and potential initial problems with fuel handling.}*

- *Expiration and Revocation*: Authorization to each alternative fuel material expires with this permit or when permitted amount of material has been fired. The Bureau of Air Regulation may revoke the authorization to fire an alternative fuel material if:
  - The permittee accepts material that does not meet the acceptance criteria based on analytical results provided by the material suppliers;
  - The analytical results of samples taken by the plant vary widely with those provided by the material suppliers;
  - The firing of an alternative fuel material causes frequent upsets to kiln operation resulting in non-steady state operation; or
  - The pyroprocessing kiln is unable to comply with the emissions standards in the Title V air operation permit.
- *Temporary Equipment*: The permittee is authorized to temporarily install and operate the following equipment for the trial: a Schenk feeder system or equivalent to measure and dose alternative fuel materials through the existing fly ash injection feed lines; a hopper; a conveyor; ductwork; and other miscellaneous equipment to unload, store and handle the alternative fuel materials. The Schenck feeder system or equivalent shall be integrated with the operation and monitoring system currently in use in the operator control room and tied into the existing Data Retrieval System. There shall be a visible display of the alternative material feed rate at the Schenck feeder system or equivalent as well as in the operator control room. The alternative material feed rate shall be recorded along with the other fuel and material feed rates.
- *Accepting Shipments of Alternative Fuels*: The permittee shall receive alternative fuel materials only in covered trucks (approximately 20 tons per truckload). A delivery may consist of more than one truckload. The alternative fuel materials shall be unloaded to a paved area or compacted clay surface and stored under cover. No more than 5,000 tons (of the allowable 20,000 tons) of agricultural organic fibrous byproducts shall be stored on site at any given time. To prevent fugitive dust caused by any alternative fuel materials from leaving the property, the plant shall apply water as necessary; otherwise, the material shall be kept dry to facilitate burning. The permittee shall obtain copies from the material supplier of manufacturer certifications, analytical results and the amount (tons) for each delivery. See Appendix E (Criteria for Material Suppliers) of this permit for material processing procedures. For acceptance of on-specification used oil, a certified fuel analysis indicating that the oil meets the on-specification requirements in 40 CFR 279 shall accompany each delivery.
- *Sampling/Analyses*: At least once every four hours while firing an alternative fuel material, the permittee shall take a grab sample of as-fired material (approximately one gallon) before being dumped into the feed bin of the Schenck feeder system or equivalent. At the end of each day, the grab samples shall be thoroughly mixed and a composite sample made (approximately 2 lb). Each representative composite sample shall be analyzed for the following: heating value, moisture, density, volatiles, ash, sulfur, chlorine, fluorine and metals (including arsenic, cadmium, chromium, copper, lead and mercury). The composite samples for non-chlorinated agricultural plastics shall also be analyzed for pesticides, bromine and thallium. The composite samples for TDF shall also be analyzed for zinc. The composite samples for manufacturer reject roof shingles shall also be analyzed for manganese, nickel and zinc.

- *Operation*: Alternative fuel materials shall only be fired when the kiln has achieved stable operation, temperatures and production. Alternative fuel materials shall not be fired during startup, shutdown, malfunction, other non-steady state operation or when the raw mill is down.
- *Upsets*: When an upset condition causes the plant to stop firing an alternative fuel that results in non-steady state operation, the permittee shall record each incident and identify the cause of the upset as well as the corrective action taken.
- *Operations and Emissions*: During the trial period, the permittee shall continue to monitor: NO_X, SO_2, CO and THC emissions with the existing certified CEMS; opacity with the existing certified COMS; and the fuel feed rates, kiln feed rates, clinker production rate and baghouse inlet temperature with the existing continuous monitoring systems. Mercury emissions shall be determined by material balance.
- *Stack Tests*:
  - The permittee shall conduct a stack test to determine PM emissions while co-firing coal with one of the agricultural byproducts with the raw mill up.
  - The permittee shall conduct stack tests to determine emissions of the dioxins/furans, while co-firing coal with TDF in the cement kiln with the raw mill up. If a trial of TDF is not conducted, then permittee shall conduct the dioxins/furans stack test on one of the other alternative fuels in this order: roofing shingles, clean woody biomass or carpet-derived fuel.
  - The permittee shall conduct stack tests to determine emissions of the HCl while co-firing coal with TDF in the cement kiln with the raw mill up. If a trial of TDF is not conducted, then permittee shall conduct the HCl stack test on one of the other alternative fuels in this order: roofing shingles, clean woody biomass or carpet-derived fuel.
  - The permittee shall conduct two separate stack tests to determine total PM and the following metal emissions while co-firing coal with TDF with the raw mill up: arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver and zinc. One stack test shall be conducted when the raw mill is up and one stack test when the raw mill is down for these metals. In addition, the permittee shall obtain a representative sample of the baghouse dust generated and the clinker produced during each test run and have it analyzed for the same metals. If a trial of TDF is not conducted, then permittee shall conduct the stack test for metals on one of the other alternative fuels in this order: roofing shingles, clean woody biomass or carpet-derived fuel.
  - The permittee shall conduct a stack test to determine the presence of pesticides in the exhaust while co-firing coal with non-chlorinated agricultural plastics.
- *Process Monitoring*: For the trial, the plant will monitor: the sampling and analysis procedures used; the analytical results of the alternative fuel materials, the fuel feed rates, the kiln feed rates, the clinker production rates, pre-calciner temperature and the baghouse inlet temperature.
- *Records*: In addition to plant operation and production data, the permittee shall maintain records of the monitoring and emissions data required by the permit, including, but not limited to: the sampling and analysis procedures used; the analytical results of each alternative fuel materials; each fuel feed rate; the kiln production and process data; the emissions monitoring data; the baghouse inlet temperature; times, and any specific problems that occurred during the trial and the cause of the problem.
- *Trial Burn Summary Report*: Within 90 days of completing each temporary trial of alternative fuel material, the permittee shall submit a report to the Bureau of Air Regulation and the Compliance Authority summarizing: the sampling and analysis procedures used; the analytical results of the alternative fuel materials; a comparison of the heating value of each material determined by fuel analyses with that determined by the amount of coal displaced; the kiln production and process data; pre-calciner temperature; the emissions monitoring data; the baghouse inlet temperature; a conclusion as to the feasibility and

practicality of firing the material as an alternative fuel; an estimate of the fuel costs that could be avoided by firing the material; the appropriate quality assurance/quality control (QA/QC) procedures used to produce a high-quality alternative fuel (i.e., low in contaminants, high in heating value, free of scrap metals and properly sized); any specific problems that occurred during the trial and the cause of the problem; and problems with unloading storing or handling the material; problems with the material size and any re-processing conducted on site; recommendations to improve handling, storage and firing the alternative fuel material; and an assessment of the suitability of the material as a permanent alternative fuel for the plant. The report shall include a statistical analysis of the analytical data for the alternative fuel material and the emissions monitoring data. The report shall also include the comparison of the contaminants in and emissions of the alternative fuel material with the contaminants in and emissions from traditional fuels to meet the legitimacy criteria in 40 CFR 241.3(d)(1).

4. CONCLUSION

The short-term trial burns will allow the development of QA/QC procedures to determine whether it is feasible for the plant to handle and fire each material. The alternative fuels are limited in amounts and each will be fired over a maximum of 60 operational days. Actual emissions from firing the alternative fuels are not expected to increase significantly above the baseline emissions. The applicant will be required to comply with all existing valid permit conditions.

The Brooksville South Cement Plant is currently in compliance with the terms and conditions of its Title V air operation permit. As previously mentioned, the plant resolved the mercury issue at Kiln 2 by implementing a dust shuttling program to retain mercury captured in the baghouse dust by adding it to the final cement product. Preliminary information indicates that initial stack testing demonstrated compliance with the mass emissions rate (lb/hour), but not the dust outlet loading (grains/dscf). This may be due to the as-built design, which uses a large baghouse rather than a cyclone pre-cleaner followed by a smaller baghouse. Subsequent stack tests show the cement clinker baghouse to be in compliance.

Based on reasonable assurance provided by the applicant, the project:

- Will not result in significant emissions increases requiring PSD preconstruction review, and
- Will not violate the terms and conditions of the current Title V air operation permit.

Table E. Emissions Standards in the Title V Air Operation Permit for the Brooksville South Cement Plant Kiln 2.

POLLUTANT	EMISSION LIMIT		AVERAGING TIME	BASIS
PM	0.136 lb/ton of dry preheater feed; 0.23lb/ton of clinker	28.8 lb/hr	3 hours [3]	BACT
PM_{10}	0.118 lb/ton of dry preheater feed; 0.20 lb/ton of clinker	25.0 lb/hr	3 hours [3]	BACT
SO_2	0.23 lb/ton of clinker	28.8 lb/hour	24 hours [4]	BACT
NO_X	1.95 lb/ton of clinker [1]	243.75 lb/hour [1]	30 days	BACT
CO	3.6 lb/ton of clinker	450.0 lb/hour	24 hours [5]	BACT
VOC	0.12 lb/ton of clinker [2]	15.0 lb/hour [2]	30 days [6]	BACT
VE	10% opacity	---	6 minutes [7]	BACT
Mercury	41 µg/dscm[8]	--		Subpart LLL[8]
	---	122 lb/yr	Annual	Avoid PSD

[1] NO_X emissions shall not exceed 2.4 lb/ton of clinker and 306.25 lb/hour (30 day rolling average) during the first 180 operating days after initial startup. After the 180 operating days after initial plant startup, emissions of NO_X shall not exceed the limits shown in the table.

[2] VOC emissions shall be expressed as propane.

[3] The averaging times for PM and PM_{10} correspond to the required length of sampling for the initial and subsequent emission tests.

[4] The averaging time for SO_2 shall be a rolling average that shall be recomputed every hour from the individual hourly averages for the current hour and the preceding 23 hours.

[5] The CO emissions limit will have a 30-day averaging period for the first 180 days after initial startup; thereafter, the CO limits will be a 24-hour limit. The averaging time for CO shall be a rolling average that shall be recomputed every hour from the individual hourly averages for the current hour and the preceding 23 hours.

[6] The averaging time for VOC shall be a 30-day block average specified in 40 CFR 63.1350(h).

[7] The averaging time for visible emissions shall be a 6-minute block average that shall be computed from a minimum of one measurement every 15 seconds. The 6 minute block averages shall start at the beginning of each hour.

[8] Micrograms per dry standard cubic meter (µg/dscm) per 76518 Federal Register / Vol. 71, No. 244 / Wednesday, December 20, 2006 / Rules and Regulations. "As an alternative to meeting the 41 µg/dscm standard you (the operator) may route the emissions through a packed bed or spray tower wet scrubber with a liquid-to-gas ratio of 30 gallons per 1000 actual cubic feet per minute or more and meet a site-specific emissions limit based on the measured performance of the wet scrubber".

These emission limits, along with annual production limits, effectively limit annual emissions to: PM, 117.6; PM_{10}, 102.3; SO_2, 117.6; NO_X, 996.7 (after 180 days); CO, 1,840 (including 30-day average for first 180 days); and VOC, 61.3 tons per year. First year NO_X emissions are effectively limited to 1,595.4 tons per year. These emission limits are based on 2,800 tons per day and 1,022,000 tons per year of clinker production.

A draft permit will be issued to authorize and regulate the short-term trials of alternative fuel materials.

5. 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. Christy DeVore, project engineer, and Jeff Koerner, supervisor, jointly reviewed the application and prepared the draft permit documents. Additional details of this analysis may be obtained by contacting the project engineer at the Department's Bureau of Air Regulation at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.