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JUL 12 2012

DIVISION OF AIR
RESOURCE MANAGEMENT

Mitchell
AB102

AC PERMIT APPLICATION
FOR
PRODUCTION RATE INCREASE
AND
AUTHORIZATION TO USE ALTERNATIVE FUELS

Project No. 1190042-009-AC

American Cement Company
4750 E C470
Sumterville, Sumter County, Florida

Sumterville Cement Plant
Facility ID No. 1190042

KOOGLER & ASSOCIATES, INC.
ENVIRONMENTAL SERVICES
4014 NW 13th STREET
GAINESVILLE, FL 32609-1923
352/377-5822 ▪ FAX/377-7158

690-11-02

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KOOGLER & ASSOCIATES, INC.
ENVIRONMENTAL SERVICES

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Department of Environmental Protection

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DIVISION OF AIR RESOURCE MANAGEMENT

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit:

- For any required purpose at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air operation permit;
- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment new source review, or maximum achievable control technology (MACT);
- To assume a restriction on the potential emissions of one or more pollutants to escape a requirement such as PSD review, nonattainment new source review, MACT, or Title V; or
- To establish, revise, or renew a plantwide applicability limit (PAL).

Air Operation Permit – Use this form to apply for:

- An initial federally enforceable state air operation permit (FESOP); or
- An initial, revised, or renewal Title V air operation permit.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **American Cement Company (ACC)**	
2. Site Name: **Sumterville Cement Plant**	
3. Facility Identification Number: **1190042**	
4. Facility Location... Street Address or Other Locator: **4750 E C470** City: **Sumterville** County: **Sumter** Zip Code: **33585**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☐ Yes ☒ No

Application Contact

1. Application Contact Name: **John B. Koogler PhD, PE**
2. Application Contact Mailing Address... Organization/Firm: **Koogler and Associates, Inc.** Street Address: **4014 NW 13th Street** City: **Gainesville** State: **Florida** Zip Code: **32609**
3. Application Contact Telephone Numbers... Telephone: **(352) 377-5822** ext. Fax: **(352) 377-7158**
4. Application Contact E-mail Address: **jkoogler@kooglerassociates.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 7-12-12	3. PSD Number (if applicable):
2. Project Number(s): 1190042-009-AC	4. Siting Number (if applicable):

APPLICATION INFORMATION

Purpose of Application

This application for air permit is being submitted to obtain: (Check one)

Air Construction Permit

- [x] Air construction permit.
- [ ] Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).
- [ ] Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

Air Operation Permit

- [ ] Initial Title V air operation permit.
- [ ] Title V air operation permit revision.
- [ ] Title V air operation permit renewal.
- [ ] Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
- [ ] Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

- [ ] Air construction permit and Title V permit revision, incorporating the proposed project.
- [ ] Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

- [ ] I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

APPLICATION INFORMATION

AC application to increase the production capacity of the cement plant from 3000 short tons of clinker per day to 3250 short tons per day by taking advantage of built in capacity. There will be no physical plant modifications needed to accomplish this rate increase (See Attachment B). The cement production associated with this rate increase and with the intergrinding of various additives will be 1,400,000 tpy.

This AC application is also for installation, shakedown, and assessment of equipment for handling and firing of alternative fuels and for the use of several alternative fuels on a permanent basis. Handling includes transport on-site, storage, and processing. On-site processing of materials is requested.

The regulatory analysis and the project description are detailed in Attachment A.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
001	Raw Material Quarrying, Crushing, and Storage	NA	NA
002	Raw Materials, Conveying, Storage, and Processing	NA	NA
003	Pyroprocessing System	NA	NA
004	Clinker and Additives Storage and Handling	NA	NA
005	Finish Mill	NA	NA
006	Cement Handling, Storage, Packing, and Loadout	NA	NA
007	Coal and Petroleum Coke Grinding System	NA	NA
008	Fugitive Dust from Storage Piles, Paved Roads, and Unpaved Roads	NA	NA

Application Processing Fee

Check one: ☐ Attached - Amount: $_______________ ☒ Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1.	Owner/Authorized Representative Name : **Not Applicable**
2.	Owner/Authorized Representative Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3.	Owner/Authorized Representative Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4.	Owner/Authorized Representative E-mail Address:
5.	Owner/Authorized Representative Statement: *I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.* Signature Date

Application Responsible Official Certification

Complete if applying for an initial, revised, or renewal Title V air operation permit or concurrent processing of an air construction permit and revised or renewal Title V air operation permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name: **Cary O. Cohrs – President**
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): ☒ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C. ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively. ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. ☐ The designated representative at an Acid Rain source, CAIR source, or Hg Budget source.
3. Application Responsible Official Mailing Address... Organization/Firm: **American Cement Company, L.L.C.** Street Address: **4750 E CR 470, P. O. BOX 445** City: **Sumterville** State: **FL** Zip Code: **33585**
4. Application Responsible Official Telephone Numbers... Telephone: **(352) 569 - 5393** ext. Fax: **(352) 569 - 5397**
5. Application Responsible Official E-mail Address: **ccohrs@americancementcompany.com**

6. Application Responsible Official Certification:

I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.

Signature   Date 7/3/12

APPLICATION INFORMATION

Professional Engineer Certification

1.	Professional Engineer Name: **John B. Koogler Ph.D., P.E.** Registration Number: **12925**
2.	Professional Engineer Mailing Address... Organization/Firm: **Koogler and Associates, Inc.** Street Address: **4014 NW 13th Street** City: **Gainesville** State: **Florida** Zip Code: **32609**
3.	Professional Engineer Telephone Numbers... Telephone: **(352) 377-5822** ext. Fax: **(352) 377-7158**
4.	Professional Engineer E-mail Address: **jkoogler@kooglerassociates.com**
5.	Professional Engineer Statement: *I, the undersigned, hereby certify, except as particularly noted herein*, that:* *(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and* *(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.* *(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.* *(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.* *(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.* Signature Date: 7/9/2012 (seal)

* Attach any exception to certification statement.

Attachment A
Description of Proposed Projects

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INTRODUCTION

American Cement Company, LLC (American Cement) operates a Portland Cement Manufacturing facility in Sumter County, Florida. The plant consists of a modern preheater/calciner Portland cement manufacturing plant with a permitted clinker production rate of 3000 short tons per day. This application addresses three projects:

- a clinker production rate increase for the plant of about 8.3 percent; bringing the permitted production rate to 3250 short tons per day and 1,186,250 short tons per year,
- a production increase of finished cement to 1,400,000 short tons per year, and
- a request for authorization to fire alternative fuels in the kiln system.

The projects are addressed in detail in the following Sections.

PRODUCTION RATE INCREASE

The American Cement plant is a modern dry-process preheater/calciner Portland cement plant supported by a raw materials handling and raw mill system, a clinker handling system, finish grinding operations, cement storage and shipping facilities and coal handling and grinding operations. The plant was originally permitted on or about February 10, 2006 by FDEP Permit 1190042-001-AC (PSD-FL-361). The original project was subject to a PSD review and a BACT determination for NO_X, PM, PM_{10}, SO_2, CO and VOC. The plant currently operates under Permit 1190042-007-AV. The current permitted clinker production rate of the plant is 125 tons per hour of clinker, 24-hour average; or 3000 short tons per day and 1,095,000 short tons per year.

At this time, American Cement is seeking authorization to increase the clinker production capacity of the kiln from 3000 short tons per day to 3,250 short tons per day; an 8.3 percent production rate increase. The corresponding annual clinker production rate will increase to 1,186,250 short tons per year. American Cement also requests an increase in finished cement production from 1,150,000 short tons per year to 1,400,000 short tons per year; a 22 percent increase. This increase will be accomplished through the intergrinding of various additives with clinker in the finish mill. These rate increases will be accomplished by taking advantage of excess capacity designed and built into the plant. Documentation provided by American Cement and included as Attachment B to this application provides assurance of the capacity of all components of the plant, from raw material handling to cement shipping, to handle these rate increases.

It is the opinion of FDEP that construction of the plant commenced after December 2, 2005. Kiln startup was on or about May 17, 2009. Following startup, the plant was plagued by engineering and mechanical problems and by lackluster economic conditions that affected the nation. The plant operated on less than a normal schedule until October 11, 2009 when it was shut down for major repairs. The plant restarted on December 26, 2009, encountered I.D. fan problems that shut the plant down from March 1-19, 2010 and operated as dictated by economic conditions from March 19, 2010 to the present. Because of operational constraints, the initial compliance demonstration of the plant, including the initial certification of the CEMSs, was not completed until the end of March 2010. Plant operations from the time of startup through May 31, 2012 are summarized in Table 1.

In reviewing the data in Table 1, it will be noted that the operating time and clinker production of the kiln were not typical of a kiln going through a normal start-up period, followed by operations expected in a normal economic climate. During the period of record, the monthly clinker production ranged from zero to 75 percent of the permitted rate, while monthly kiln operating times ranged from zero to 100 percent of the time. The average clinker production rate for the period of record was approximately 28 percent of the permitted production rate. With this limited and irregular operating schedule, it has not been possible to establish representative baseline actual emissions as defined by Rule 62-210.200(36), F.A.C.:

> *(b) for any existing emission unit…, baseline actual emissions means the average rate, in tons per year, at which the emission 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.*

As noted and summarized in Table 1, there is only one 24-month period that the kiln operated and because of economic conditions, the operations during that period are not representative of kiln operations in a normal economy.

In spite of the abnormal operations, it will be noted from the data in Table 1 that there were monthly periods when the kiln operated 100 percent of the time, and plant records will show that there were days when the kiln operated at or near the permitted daily clinker production rate of 3000 short tons per day. It will also be noted that there were monthly periods when regulated pollutant emission factors (pounds of pollutant per ton of clinker) approached the permitted emission factors. Thus, if a representative set of operating/emission data were available for a 24-month period of time, it is reasonable to expect that the baseline emissions that the kiln is capable of operating at would approach permitted emissions.

When establishing projected actual emissions for a project, there are options presented by Rule 62-210.200(244), F.A.C. including:

> *(d) In lieu of using the methods set out in paragraphs (a) through (c) above, [the Department] may be directed by the owner or the operator to use the emission unit's potential to emit in tons per year [as projected actual emissions].*

In other words, the Department has the option, in circumstances such as those encountered by American Cement, to use the permitted emission limits of the kiln as the projected actual emissions.

Based on the precedent the Department established when reviewing the application for, and issuing Permit 0530021-033-AC on June 28, 2011, and considering the similarities in the unusual operating records of the kiln addressed in that permit and the American Cement kiln, it is requested that the Department accept the permitted emissions of the American Cement kiln as the potential to emit for the kiln, and as projected actual emissions. Under these conditions, the data summarized in Table 2 demonstrate that there will be no significant change in the emission rates of any regulated pollutant as a result of the production rate increases proposed herein, and as such, the proposed projects will not be subject to New Source Review (NSR) for the regulated pollutants SO_2, NO_X, CO, $PM/PM_{10}/PM_{2.5}$ or VOC. There will be an increase in the emissions of CO_2 from the calcination of limestone and combustion products and an increase in the emissions fugitive PM emissions from the delivery of the additional additives and alternative fuels, but these increases will be less than significant (see Table 3).

For Greenhouse gases (GHGs), 40 CFR 51.166(b)(48) states:

> *(iv) Beginning January 2, 2011, the pollutant GHGs is subject to regulation if:*
>
> > *(a) The stationary source is a new major stationary source for a regulated NSR pollutant that is not GHGs, and also will emit or will have the potential to emit 75,000[metric] tpy CO_2e or more; or*
> >
> > *(b) The stationary source is an existing major stationary source for a regulated NSR pollutant that is not GHGs, and also will have an emissions increase of a regulated NSR pollutant, and an emissions increase of 75,000 [metric]tpy CO_2e or more; and,*
>
> *(v) Beginning July 1, 2011, in addition to the provisions in paragraph (b)(48)(iv) of this section, the pollutant GHGs shall also be subject to regulation:*
>
> > *(a) At a new stationary source that will emit or have the potential to emit 100,000 [metric]tpy CO_2e; or*
> >
> > *(b) At an existing stationary source that emits or has the potential to emit 100,000 [metric]tpy CO_2e, when such stationary source undertakes a physical change or change in the method of operation that will result in an emissions increase of 75,000 metric] tpy CO_2e or more.*

Based on the above, this project is not subject to NSR for GHGs unless the project involves a physical change, or a change in the method of operation that will result in an increase in GHG emissions of 75,000 metric tons (tonnes) per year, or more. When calculating the increase in GHG emissions however, certain emissions from the combustion of biogenic materials are exempt. EPA has proposed new rules that will temporarily defer for three years GHG permitting requirements for carbon dioxide (CO_2) emissions attributable to the combustion of biomass and other biogenic fuels (see 76 Fed. Reg. 15249, Mar. 21, 2011). The deferral would apply only to CO_2 emissions from the combustion of biogenic materials and such emissions do not count towards the PSD applicability determination for GHGs. EPA has provided a non-exhaustive list of emissions that would be deferred by the rule, including, but not limited to:

- CO_2 from combustion of the biological fraction of municipal solid waste (60 percent per 40 CFR 98.33(e)(3)(iv)) or biosolids;
- CO_2 from combustion of the biological fraction of tire-derived fuel (20 percent of the CO_2 emissions per 40 CFR 98.33(e)(3)(iv)); and
- CO_2 derived from combustion of biological material, including all types of wood and wood waste, forest residue, and agricultural material.

Facilities that co-fire biogenic and fossil fuels are still required to count the fraction of CO_2 associated with fossil fuel combustion towards the PSD applicability determination. Furthermore, the deferral would not apply to GHGs other than CO_2.

The plant production rate increases will be achieved with no increase in the emission rate of any regulated pollutant and with an increase in GHG emissions that is less than 75,000 tonnes per year. This will be accomplished by decreasing the emission factors (pounds per ton of kiln feed or pounds per ton of clinker) for pollutants emitted from the pyroprocessing system (kiln, raw mill and clinker cooler) proportionately with the feed/clinker rate increase, and by limiting the production rate increase to an increase that will result in GHG emissions of less than 75,000 tonnes per year. The currently permitted and proposed emission factors and mass emission rates of regulated pollutants emitted from the kiln/raw mill/clinker cooler and other Emission Units associated with the plant are summarized in Table 2.

With all of the material handling emission units/emission points, $PM/PM_{10}/PM_{2.5}$ emissions will remain unchanged. The PM/PM_{10} BACT limits for these emission units are concentration limits established by Permits 1190042-001-AC and -003-AC. The limits are 0.01 grains per dry standard cubic foot for PM and 0.007 grains per dry standard cubic foot for PM_{10}. As stated, these concentration limits will remain the same, the air flow through the dust collectors will remain unchanged as no modifications will be made to any of the dust collector ID fans and the permitted hours of operation will not change; hence, hourly and annual permitted mass emission rates of the material handling emission units/emission points will remain unchanged.

In summary, the proposed production rate increases will be accomplished with a no change in permitted emission rates of regulated pollutants, with the exception of fugitive PM and CO_2 and these emission increases will be below the PSD threshold. The proposed changes in emissions resulting from this project are summarized in Table 2.

TABLE 1

American Cement Company, LLC - Sumterville Cement Plant
Monthly Emission and Process Totals - Start-up through May 2012

Month	Kiln Run	Kiln Down	Total	Fraction Run Time	Clinker	Fraction Clk Prod	NO_x	SO_2	CO	CO_2	VOC	(PM)	NO_x	SO_2	CO	CO_2	THC	PM
	(hours)	(hours)	(hr/mo)	(%)	(tpy)		(tpy)	(tpy)	(tpy)	(mtpy)	(tpy)	(tpy)	(lb/ton clk)	(lb/ton clk)	(lb/ton clk)	(lb/ton clk)	(lb/ton clk)	(lb/ton clk)
Permit Limit					1,095,000		1068.0	110.0	1588.0		66.0	83.8	3.00/1.95	0.20	2.90		0.12	0.153
2009					(tons/mo)	(%/mo)	(tons/mo)	(tons/mo)	(tons/mo)	(tons/mo)	(tons/mo)	(ton/mo)	(lb/ton clk)*	(lb/ton clk)*	(lb/ton clk)*	(lb/ton clk)*	(lb/ton clk)*	(lb/ton clk)*
January																		
February																		
March																		
April	Kiln Start-up May 17,2009																	
May	22	722	744	3.0%	797	0.9%												
June	256	464	720	35.6%	16,637	18.5%												
July	312	432	744	42.0%	24,985	26.9%												
August	364	380	744	48.9%	37,570	40.4%												
September	284	436	720	39.5%	25,819	28.7%												
October	184	560	744	24.7%	16,428	17.7%												
November	0	720	720	0.0%	0	0.0%												
December	0	744	744	0.0%	0	0.0%												
Annual	1422	4458	5880	24.2%	122,236	11.2%												
2010																		
January	632	112	744	84.9%	61,992	66.7%												
February	0	672	672	0.0%	0	0.0%												
March	264	480	744	35.5%	25,276	27.2%	CEMS Certification March 25-31, 2010											
April	497	223	720	69.0%	44,109	49.0%	67.7	0.0	30.3	32,715	3.6	0.6	2.96	0.001	1.30	1635	0.136	0.027
May	337	407	744	45.3%	22,710	24.4%	36.4	0.1	13.5	17,717	1.4	0.0	2.78	0.003	1.04	1720	0.099	
June	87	633	720	12.1%	2,071	2.3%	4.1	0.2	3.6	2,420	1.2	0.0	2.81	0.007	1.13	2576	0.151	
July	499	245	744	67.1%	31,118	33.5%	43.6	0.5	23.8	26,271	3.4	0.0	2.49	0.008	1.47	1862	0.128	
August	738	6	744	99.2%	58,680	63.1%	67.2	1.6	46.4	46,460	4.4	0.0	2.11	0.005	1.58	1746	0.120	
September	472	248	720	65.6%	38,123	42.4%	32.1	0.4	23.4	27,554	2.0	0.0	1.48	0.007	1.05	1594	0.082	
October	0	744	744	0.0%	0	0.0%	0.0	0.0	0.0	0	0.0	0.0						
November	678	42	720	94.2%	55,787	62.0%	54.4	0.1	32.7	45,679	3.3	0.0	1.79	0.001	1.02	1805	0.064	
December	0	744	744	0.0%	0	0.0%	0.0	0.0	0.0	0	0.0	0.0						
Annual	4204	4556	8760	48.0%	339866	31.0%	305.6	3	173.7	198815	19.2	0.6	2.3	0.0	1.2	1848	0.111	0.027
2011																		
January	45	699	744	6.0%	270	0.3%	0.65	0.09	1.42	239	0.88	0.0	2.12	0.056	1.07	1946	0.106	
February	672	0	672	100.0%	62,837	74.8%	53.16	0.28	34.61	50,131	1.97	1.5	1.76	0.009	1.11	1759	0.064	0.047
March	393	351	744	52.8%	33,027	35.5%	33.68	0.48	12.97	27,156	1.41	0.0	1.95	0.005	0.98	1813	0.086	
April	323	397	720	44.9%	20,515	22.8%	19.19	0.79	8.80	17,797	1.15	0.0	2.96	0.000	1.30	1913	0.136	
May	722	22	744	97.0%	63,961	68.8%	45.77	0.45	27.65	42,670	2.26	0.0	1.51	0.002	0.91	1471	0.070	
June	167	553	720	23.2%	13,458	15.0%	10.63	0.83	7.83	8,784	1.17	0.0	1.62	0.011	1.02	1439	0.085	
July	77	667	744	10.3%	1,342	1.4%	1.74	0.09	2.14	662	0.29	0.0	2.59	0.000	0.88	1088	0.046	
August	586	158	744	78.8%	44,848	48.2%	46.24	0.78	27.22	32,933	2.64	0.0	1.89	0.002	1.08	1619	0.077	
September	334	386	720	46.4%	28,866	32.1%	25.17	0.14	18.60	24,115	1.09	0.0	1.48	0.002	1.11	1842	0.064	
October	404	340	744	54.3%	41,092	44.2%	47.19	0.51	21.35	29,532	2.04	0.0	2.29	0.000	1.02	1585	0.083	
November	6	714	720	0.8%	0	0.0%	0.02	0.00	0.43	11	0.18	0.0						
December	706	38	744	94.9%	51,067	54.9%	48.36	0.51	33.22	36,006	4.08	0.0	1.91	0.002	0.94	1555	0.078	
Annual	4435	4325	8760	50.6%	361284	33.0%	331.8	5.0	196.2	270038	19.2	1.5	2.01	0.008	1.04	1639	0.081	0.047
2012																		
January	736	8	744	98.9%	60,478	65.0%	47.21	0.45	33.75	46,368	2.61	0.0	1.56	0.015	1.12	1690	0.09	
February	190	506	696	27.3%	17,511	20.1%	17.09	0.02	8.21	11,001	0.94	0.0	1.95	0.003	0.94	1385	0.11	
March	0	744	744	0.0%	0	0.0%	0.00	0.00	0.00	0	0.00	0.0						
April	566	154	720	78.6%	36,813	40.9%	41.37	0.30	23.86	30,111	1.93	0.0	2.25	0.016	1.30	1803	0.10	
May	634	110	744	85.2%	60,416	65.0%	61.50	0.73	38.33	45,521	2.64	0.0	2.04	0.024	1.27	1661	0.09	
YTD	2,126	1,522	3,648	58.3%	175,218	38.2%	167.2	1.5	104.1	133,001.4	8.1	0.0	1.95	0.014	1.15	1634	0.10	

* - Block monthly averages presented for illustrative purposes; not for compliance.

Table 2

American Cement Company, LLC Sumterville Cement Plant
Current and Proposed Emission Limits and Emission Rates

Emission Unit No.	Name	Description	Emission Point No.	Pollutant	Current @ 3000 tpd and 1,095,000 tpy Clk (Emission Factor)		Current (lb/hr)	Current (tpy)	Proposed @ 3250 tpd and 1,186,250 tpy Clk (Emission Factor)		Proposed (lb/hr)	Proposed (tpy)	Increase (tpy)	Significant
EU 001	Raw Material Quarrying, Crushing, and Storage	Includes raw material processing from quarry up to raw material storage, and additives handling from delivery to storage	Crusher	VE	15	%	No Limit	No Limit	15	%	No Limit	No Limit	NA	No
			All Other	VE	10	%	No Limit	No Limit	10	%	No Limit	No Limit	NA	No
EU 002	Raw Material Conveying, Storage and Processing	From raw material and additives storage to preheater; Including conveyance of raw materials and raw meal to and from raw mill, and blend silo	F-10	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)	2.16/1.52	9.5/6.6	0.01/0.007/5	(gr/dscf)(%)	2.16/1.52	9.5/6.6	0	No
			G-07											
			G-10											
			E-38											
			H-08											
EU 003	Kiln, Preheater/Calciner, Raw Mill and Clinker Cooler	Pyroprocessing System	E-19	PM	0.153	(lb/ton clk)	19.13	83.8	0.140	(lb/ton clk)	19.13	83.8	0	No
				PM10	0.153	(lb/ton clk)	19.13	83.8	0.140	(lb/ton clk)	19.13	83.8	0	No
				NOx	1.95	(lb/ton clk)	243.8	1068	1.80	(lb/ton clk)	243.8	1068	0	No
				SO2	0.20	(lb/ton clk)	25.0	109.5	0.185	(lb/ton clk)	25.0	109.5	0	No
				CO	2.90	(lb/ton clk)	362.5	1588	2.67	(lb/ton clk)	362.5	1588	0	No
				VOC	0.12	(lb/ton clk)	15.0	65.7	0.110	(lb/ton clk)	15.0	65.7	0	No
				Hg	41	(ug/dscm @7% O2)	41 ug/dscm @ 7% o@		41	(ppm@7%O2)	41 ug/dscm @ 7% o@		0	No
					122	(lb/yr)	112 lb/yr		122	(lb/yr)	112 lb/yr		0	No
				VE	10	(%)	10%		10	(%)	10%		0	No
				CO2	1705*	(lb/ton clk)*		846,700 tonne/yr	1705*	(lb/ton clk)*		917,259 tonne/yr	70,559 tonne/yr	No
EU 004	Clinker and Additives Storage and Handling	Includes clinker handling from cooler to silo and clinker and additives handling from storage to the finish mill	L-03	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)	0.84/0.59	3.7/2.6	0.01/0.007/5	(gr/dscf)(%)	0.84/0.59	3.7/2.6	0	No
			L-06	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
			M-08	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
			DC-1	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
			DC-2	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
EU 005	Finish Mill	Clinker Grinding	N-93	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)	12.65/8.86	55.4/38.8	0.01/0.007/5	(gr/dscf)(%)	12.65/8.86	55.4/38.8	0	No
			N-94	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
EU 006	Cement Handling, Storage, Packing and Loadout	Includes cement conveyance to silos, cement silos, loadout to trucks and cement bagging	N-91	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)	3.36/2.35	14.7/10.3	0.01/0.007/5	(gr/dscf)(%)	3.36/2.35	14.7/10.3	0	No
			Q-25	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
			Q-26	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
			Q-14	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
			Q-17	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
			R-12A	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
EU 007	Coal and Pet Coke Grinding	Includes coal/coke handling from truck and rail unloading to the pulverized fuel bin	S-22	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)	2.41/1.68	10.5/7.4	0.01/0.007/5	(gr/dscf)(%)	2.41/1.68	10.5/7.4	0	No
			S-26	PM/PM10/VE	0.01/0.007/5	(gr/dscf)(%)			0.01/0.007/5	(gr/dscf)(%)				
EU 008	Fugitive PM	Fugitive dust from roads and storage piles (see Table 3)		PM/PM10/PM2.5			No Limit	No Limit			See Attachment A for PM/PM10/PM2.5 Emissions from Alt Fuel and Additives Handling		13.1/2.7/0.6	No
EU 009	Emergency Generator	RICE					No Limit	No Limit			No Limit	No Limit	0	No

* - See Table 1

USE OF ALTERNATIVE FUELS

American Cement is also requesting authorization for the construction of mechanical and pneumatic alternative fuels handling and feed systems for the calciner and kiln burners; the installation of a new multi-fuel kiln burner system; and the processing equipment for a variety of alternative fuels which may include, but are not limited to, Tire-Derived Fuel (TDF), plastics, roofing materials, cellulosic biomass, agricultural biogenic materials, carpet-derived fuel, biodiesel and biosolids. The biodiesel is intended to be used primarily as an additive to other alternative fuels to improve the uniformity of burning characteristics of these fuels.

The facility is currently permitted by Permit No. 1190042-007-AV to burn the following fuels: coal, petroleum coke, whole or chipped tires, natural gas, No. 2 fuel oil and on-specification used oil. The proposed project will expand the types of fuels that can be fired to the pyroprocessing system. As discussed herein, the characteristics of the proposed fuels are assessed to provide the Department reasonable assurance that use of these fuels will not result in a significant net emissions increase of any regulated pollutant. The potential impact of Alternative Fuels is discussed in detail in this attachment for three areas of concern:

- Air Emissions,
- Kiln Structure, and
- Clinker Quality

Of greatest importance for this permit application is the potential impacts of the proposed fuels on Air Emissions. The section of this Attachment addressing potential air emission impacts details the pollutants of concern to FDEP and demonstrates the relative independence of emissions from fuel type. Supporting this comment, EPA stated on May 17, 2011 in the Federal Register, "...burning alternative fuels (whether classified as solid wastes or not) does not appreciably affect cement kiln HAP's emissions."[1]

In this permit application, the proposed fuel types will be reviewed for the purposes of PSD and NSPS applicability. Subsequent to construction and shakedown of the firing system and processing equipment, American Cement will track annual emissions per Rule 62-212.300(1)(e), F.A.C. to demonstrate no significant change in emissions as a result of using Alternative Fuels.

[1] Fed. Reg. Vol 76. No. 95, page 28322

As discussed in the regulatory analysis, this project will comply with all federal, state, and local regulations.

As noted above, American Cement requests the construction of mechanical and pneumatic Alternative Fuels handling and feed systems for the calciner and kiln burner; installation of a new or modified multi-fuel main kiln burner system; and the preparation and firing of a variety of alternative fuels (AF) including combinations of Engineered Fuel (EF), plastics, roofing materials, cellulosic biomass, agricultural organic byproducts, carpet-derived fuel and biosolids. As previously stated, American Cement is already permitted to fire Tire Derived Fuel (TDF).

The following points are made to demonstrate the value of this project, not only to American Cement but to Florida and to the environment. The project provides the following benefits:

1. Increases the availability and stability of energy sources through the use of locally generated, processed, and transported energy sources as compared to conventional fuels (e.g., coal which can be transported from around the world to cement plants).
2. Promotion of related recycling and recovery business activities (e.g., employment, taxable income) in the State.
3. Reduction of greenhouse gas emissions by reducing landfilled biogenic material, reducing material transportation, and reducing methane emissions from landfilled materials.
4. Increases demand for recovered materials as fuel encourages recovery versus landfilling. This matches Florida's efforts to increase waste diversion for re-use or recycling,[2]
5. Promotion of a more diverse energy supply which improves the viability of American Cement and the alternative fuels market suppliers.

The practice of using Alternative Fuels in cement kilns for over 40 years is well documented. Both the EPA and European Union continue to promote the use of alternative fuels for cement kilns as an alternative to fossil fuels.[3,4] Portland cement plants have entirely different operating characteristics than incinerators. A Portland cement plant can produce a marketable product

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[2] http://www.dep.state.fl.us/waste/recyclinggoal75/default.htm (last visited April 18. 2011)
[3] EPA Cement Sector Report, Trends in Beneficial Use of Alternative Fuels and Raw Materials. October 2008.
[4] Cement, Lime and Magnesium Oxide Manufacturing Facilities, May 2010 http://eippcb.jrc.ec.europa.eu

through efficient thermal combustion of Alternative Fuels that not only utilize materials for their heat content, but the ash also supplies essential ingredients (silica, aluminum, calcium, iron, etc.) for the final product. The use of alternative materials in cement production is a safe and effective way of eliminating a significant quantity of potentially landfilled material, as well as reducing environmental impacts associated with the mining and transport of fossil fuels. Likewise, greenhouse gas emissions (e.g., methane gas produced as a byproduct of anaerobic decomposition) are reduced by eliminating landfilling. The greenhouse gas potential of methane is 21 times greater than that of the carbon dioxide produced during combustion. A recent EPA-funded study indicates that there are overall environmental air emissions benefits to waste combustion compared to landfilling with gas reclamation[5].

American Cement views its effort to promote the beneficial reuse of Alternative Fuels in cement production to be in concert with the guidance of the EPA[6] and European IPPC Bureau[7]. The World Business Council for Sustainable Development ranks the United States as 13th in the list of countries replacing conventional fuels with alternative fuels including countries such as Germany and Switzerland[8]. In 2010, German cement plants replaced conventional fuels with alternative fuels by 61 percent[9] on average.

Because the PSD applicability will be verified by annually tracking emissions per Rule 62-212.300(1)(e), F.A.C., the proposed feed equipment and fuels should not require a test burn for air permitting purposes. This application for the use of Alternative Fuels presumes there will be no increase in emissions because of the similarities of the characteristics of the Alternative Fuels and the traditional fuels they will replace. As a result, the tracking requirements cited above will replace the requirements of 62-212.400(4) through (12), F.A.C. American Cement proposes the following monitoring, reporting and recordkeeping provisions.

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[5] Rosenthal, E. *Europe Finds Clean Energy in Trash, but U.S. Lags*. 2011 [cited 2011 3/10/2011]; Available from: http://www.nytimes.com/2010/04/13/science/earth/13trash.html?_r=1

[6] International, I. *Trends in Beneficial Use of Alternative Fuels and Raw Materials*. 2008; Available from: http://www.epa.gov/sectors/pdf/cement-sector-report.pdf.

[7] Cement, Lime and Magnesium Oxide Manufacturing Facilities, May 2010, Table 4.16, http://eippcb.jrc.ec.europa.eu

[8] Development, W.B.C.f.S., *Guidelines for the Selection and Use of Fuels and Raw Materials in the Cement Manufacturing Process*, 2005, http://www.wbcsd.org/DocRoot/Vjft3qGjo1v6HREH7jM6/tf2-guidelines.pdf (last visited April 2, 2011)

[9] Verein Deutsche Zementindustrie, Environmental Data of the German Cement Industry 2009, http://www.vdz-online.de/uploads/media/Environmental_data_2010.pdf (last visited December 2, 2011)

a. The permittee shall monitor the emissions of any PSD pollutant that the Department identifies could increase as a result of the construction or modification and that is emitted by any emissions unit that could be affected; and, using the most reliable information available, calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of 10 years following resumption of regular operations after the change. Emissions shall be computed in accordance with the provisions in Rule 62-210.370, F.A.C.
b. The permittee shall report to the Department within 60 days after the end of each calendar year during the reporting period the unit's annual emissions during the calendar year that preceded submission of the report.
c. The information required to be documented and maintained pursuant to subparagraphs 62-212.300(1)(e)1 and 2, F.A.C., shall be submitted to the Department, which can make it available for review to the general public.

For this project, American Cement requests that the permit require the annual reporting of actual emissions for the following pollutants: nitrogen oxides (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO), total hydrocarbons (THC) and mercury (Hg) based on data from the existing continuous emissions monitoring systems (CEMS); and particulate matter (PM) based on annual compliance test data. Note that with the implementation of the requirements of the 2010 revisions of 40 CFR 60, Subpart LLL in September 2015, the plant will also have CEMS for hydrochloric acid (HCl) and PM. While PSD rules require the proposed tracking of emissions, the information provided herein fully supports the argument that emissions are not expected to significantly increase due to this project. The regulated pollutants from the plant are addressed below in separate sections for each category of Alternative Fuel.

Further, American Cement also requests that acceptance for the Alternative Fuels be based on the general characteristics of the fuels; and not on a fuel from a specific fuel vendor or fuel from a specific geographic location. In other words, the Alternative Fuels should be accepted on the same basis as the conventional fuels that are presently permitted for use by American Cement.

REGULATORY CLASSIFICATION

The facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant exceed 100 tons per year.

The facility is within an industry included in the list of the 28 Major Facility Categories (Rule 62-210.200, F.A.C.). Because emissions are greater than 100 tons per year for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-212-400, *Prevention of Significant Deterioration (PSD).*

The original project was subject to the provisions of Rule 62-212.400, F.A.C., *Prevention of Significant Deterioration (PSD)*, because emissions were greater than 100 tons per year for at least one criteria pollutant. The current projects are not subject to the Rule as the projects are not classified as a modification (Rule 62-210.200, F.A.C.) and/or the emission rate increases will not exceed the PSD thresholds.

The Department has determined this facility is major source of hazardous air pollutants (HAPs) and is therefore subject to 40 CFR 63, Subpart LLL, *National Emissions Standard for Portland Cement Manufacturing (Subpart LLL).* As such, the plant is currently subject to Subpart LLL promulgated December 6, 2006, and is considered by the Department to be a *New Source* under the Subpart as it is the opinion of the Department that construction of the plant commenced after December 2, 2005. Neither the rate increase proposed herein, nor the use of alternative fuels will alter this classification or the applicability of this Subpart. The plant is also subject to Subpart LLL promulgated October 10, 2010 and will be an *Existing Source* under this Subpart when it becomes effective in September 2015.

The emissions units included in this project are subject to regulation under the New Source Performance Standards (NSPS), 40 CFR 60 Subpart A, *General Provisions*; Subpart F, *Standards of Performance for Portland Cement Plants*; Subpart Y *Standards of Performance for Coal Preparation Plants* and Subpart OOO, *Non-metallic Mineral Processing.* The amendments to the NSPS published in October, 2010 will not affect this project as there will be no increases in the hourly emission rates of regulated pollutants (PM, SO_2 and NO_X).

The Emission Units are also subject to the requirements of the state rules, particularly Rule 62-212.400, F.A.C., *Prevention of Significant Deterioration*. Additionally, the plant is subject to the test methods of 40 CFR 60, Appendix A, *Test Methods*; 40 CFR 63, Appendix A, *Test Methods*; 40 CFR 61, Appendix M, *Recommended Test Methods for State Implementation Plans*; and 40 CFR 61, Appendix B, *Test Methods*.

BACT DETERMINATIONS

Permits 1190042-001 and 003-AC included BACT emission limits for PM/PM_{10}, SO_2, NO_X, CO and VOC for the kiln/raw mill/clinker cooler and PM/PM_{10} emission limits for several material handling/processing Emission Units. These same limits were carried over into Permit 1190042-007-AV and equivalent or more stringent limits are proposed for the current project (See Table 2 for a summary of currently permitted and proposed emission limits).

PM/PM_{10} – PM/PM_{10} emissions from the kiln/raw mill/clinker cooler baghouse (Kiln Baghouse) were limited by BACT to 0.153 pounds per ton of clinker (reported as PM_{10}); or to an equivalent of 0.30 pounds per ton kiln feed (dry basis). As the clinker production rate increase proposed for this project is 8.3 percent (from 3000 short tons per day to 3,250 short tons per day), the PM/PM_{10} emission rates will be reduced by 8.3 percent; resulting in no net change in permitted PM/PM_{10} emissions. The PM/PM_{10} emission limit proposed for the kiln/raw mill/clinker cooler for this project is 0.140 pounds of PM/PM_{10} per ton of clinker. The corresponding mass PM/PM_{10} emission rate both as currently permitted and as proposed for this project is 19.13 pounds of PM_{10} per hour and 83.8 tons per year. Compliance test data from April, 2010 and February, 2011 have demonstrated that the PM/PM_{10} emission limit proposed for this project can be achieved by the kiln baghouse. There will be no increase in $PM/PM_{10}/PM_{2.5}$ emissions as a result of firing Alternative Fuels. This statement will be addressed in detail in subsequent sections of this Attachment.

With the other Emission Units (EU-002 through EU-006, excluding the pyroprocessing system [EU-003]), the BACT emission limits for PM/PM_{10} were concentration limits. These limits were 0.01 grains per dry standard cubic foot for PM and 0.007 grains per dry standard cubic foot for

PM_{10}. These emission limits, and the corresponding mass emission limits, will remain unchanged for this project. As previously stated, the concentration limits will remain unchanged, the corresponding mass emission limits will remain unchanged as there will be no change or modification to any of the dust collector ID fans and the permitted hours of operation will remain unchanged.

Fugitive emissions from raw materials handling and conveying will be minimized by inherent moisture and by the application of water as needed for the suppression of unconfined emissions of PM. Unpaved roads will be sprayed by water truck and/or water sprays. Paved roads will be cleaned by vacuum sweeper truck as required to prevent the accumulation of unconfined PM and the emissions of such PM. Material stockpiles will be managed to limit PM emissions generated by wind erosion. Fugitive PM emissions from the delivery of the additional additives necessary for the clinker production increase and annual cement production increase from intergrinding are quantified in Table 3. The expected increases are not significant.

Fugitive PM emissions from the receiving, processing and handling of Alternative Fuels are addressed in a subsequent section of this Attachment.

SO_2 – The permitted mass emission limits for SO_2 for the kiln will remain unchanged at 25.0 pounds per hour and 110 tons per year. To compensate for the increased kiln throughput, the SO_2 emission factor will be reduced from 0.20 pounds per ton of clinker to 0.183 pounds per ton of clinker. CEMS data through May 2012 (see Table 1) has demonstrated that the proposed SO_2 emission factor is readily achievable.

The use of Alternative Fuels is not expected to have any effect on SO_2 emissions. This matter is addressed in detail in a subsequent section of this Attachment.

NO_X – The mass NO_X emission limits for the kiln system will remain unchanged at 243.8 pounds per hour and 1068 tons per year. To compensate for the increased kiln throughput, the NO_X emission factor will be reduced from 1.95 pounds per ton of clinker to 1.79 pounds per ton of clinker.

As NO_X emissions from the kiln system are controlled with SNCR, the proposed NO_X emission factor of 1.79 pounds per ton of clinker can be achieved by increasing the ammonia/NO_X molar ratio as necessary and/or by being more aggressive with staged combustion in the precalciner.

The use of Alternative Fuels is not expected to have any effect on NO_X emissions. This matter is addressed in detail in a subsequent section of this Attachment.

CO – The mass emission limits for CO for the kiln will remain unchanged at 362.5 pounds per hour and 1588 tons per year. To compensate for the increased kiln throughput, the CO emission factor will be reduced from 2.9 pounds per ton of clinker to 2.66 pounds per ton of clinker. CO emissions from the kiln system are controlled by combustion practices and more specifically by controlling the excess oxygen at the back end of the kiln. The oxygen levels at the back of the kiln can be increased as necessary to achieve the CO emission limit and any excess NO_X emissions generated by the increased oxygen can be compensated for with the SNCR system.

The use of Alternative Fuels is not expected to have any effect on CO emissions. This matter is addressed in detail in a subsequent section of this Attachment.

VOC- The mass VOC emission limits for the kiln system will remain unchanged at 15.0 pounds per hour and 66 tons per year. To compensate for the increased kiln throughput, the VOC emission factor will be reduced from 0.12 pounds per ton of clinker to 0.11 pounds per ton of clinker. As VOC emissions from the kiln system are a function of organics in the preheater feed, VOC emissions at the increased production rate can be controlled by raw materials selection.

The use of Alternative Fuels is not expected to have any effect on VOC emissions. This matter is addressed in detail in a subsequent section of this Attachment.

MERCURY – Mercury mass emissions for the kiln will remain unchanged at 122 pounds per year. This mass emission limit was established by Permit and is demonstrated by material balance. In addition, the mercury emissions from the kiln system are limited by 40 CFR 63, Subpart LLL (effective December, 2006) to 41 micrograms per dry standard cubic meter at 7 percent oxygen; both with the raw mill operating and the raw mill down. This concentration limit will remain in effect until September 2015 at which time the plant will be subject to Subpart LLL as revised in 2010. Under the revised standard, the facility will be designated as an existing facility (constructed prior to June 16, 2008).

The concentration limit of 41 micrograms per dry standard cubic meter and the mass emission limit of 122 pounds per year can be achieved at the increased clinker production level by raw material selection, by kiln baghouse temperature control and by kiln dust management.

The use of Alternative Fuels is not expected to have any effect on mercury emissions. This matter is addressed in detail in a subsequent section of this Attachment.

VISIBLE EMISSIONS – The visible emission limit for the kiln system will remain unchanged at 10 percent. This limit was established as BACT by Permit.

NEW SOURCE REVIEW APPLICABILITY

New Source Review requires that the construction of new facilities or modifications to existing facilities be evaluated to determine if there will be a significant net increase in the emission rate of any regulated air pollutant. Significant emission rate increases are defined as:

Pollutant	Significant Emission Rate Increase
PM	25
PM_{10}	15
$PM_{2.5}$	10
SO_2	40
VOC	40
NO_X	40
CO	100

As the plant is classified as an existing facility, it must be determined if the proposed production rate increase qualifies as a *modification*. Rule 62-210.200(199), F.A.C., defines *Modification* as:

Any physical change in, or change in the method of operation of, or additional to a facility which would result in an increase to the actual emissions of any air pollutant subject to regulation under the Act including any not previously emitted, from any emission unit or facility.

As described in previous sections, there are no physical changes associated with the proposed rate increase that would trigger the project being defined as a modification. Furthermore, there will be no changes in the method of operation from a physical or operational standpoint. However, the increased throughput rate of raw materials, the use of Alternative Fuels and/or the installation of Alternative Fuels equipment could be construed to be a change in "the method of operation."

If this determination is made by the reviewing agency, baseline actual emissions must be compared with projected actual emissions to determine if there is a significant emission rate increase in any regulated pollutant.

To evaluate baseline operations, American Cement has summarized monthly operating times, production rates and emission rates. These data are summarized in Table 1 and cover the period from startup (May 2009) through May 2012. The period of time for which certified Continuous Emission Monitoring data are available is the period April 2010-May 2012; a 25-month period of time. It will be noted that there are only 25 months of operating data where the plant operated at a meaningful production rate because of economic conditions. The operations and emissions during this period are not adequate to establish baseline actual emissions.

During this period of operation, the monthly clinker production ranged from zero to about 75 percent of permitted capacity; although monthly kiln operating times did reach 100 percent. The average clinker production rate for the period of record was 28 percent. With this limited and irregular operating schedule, it is virtually impossible to establish representative baseline actual emissions as defined by Rule 62-210.200(36), F.A.C.:

(b) for any existing emission unit…, baseline actual emissions means the average rate, in tons per year, at which the emission 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.

In spite of the abnormal operations, it will be noted from the data in Table 1 that there were monthly periods when clinker production rate was within 75 percent of the permitted clinker production rate. It will also be noted that there were monthly periods when the regulated pollutant emission factors (pounds of pollutant per ton of clinker) approached the permitted emission factors. Thus, if a representative set of operating/emission data were available for an extended period of time, it is reasonable to expect that the baseline emissions that the plant was capable of operating at would approach permitted emissions.

When establishing projected actual emissions, there are options presented by Rule 62-210.200(244), F.A.C. including:

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

In other words, the Department has the option, in circumstances such as those encountered by American Cement, to use the permitted emission limits for the plant as the projected actual emissions.

Based on the precedent the Department established when reviewing the application for, and issuing Permit 0530021-033-AC on June 28, 2011, and considering the similarities in the abnormal operating records of the kiln addressed in that permit and the American Cement kiln, it is requested that the Department accept the permitted emissions of the American Cement kiln as the potential to emit for the kiln, and as projected actual emissions. This being the case, the data summarized in Table 2 demonstrate that there will be no change in the emission rates of any regulated pollutant except CO_2 and fugitive PM; and the increases in these emissions will be less than significant. As such, the proposed project is not subject to New Source Review.

SUMMARY

By this application, American Cement is requesting authorization for an 8.3 percent clinker production rate increase, a 22 percent increase in finished cement production and authorization to fire Alternative Fuels in the kiln system. These projects will not increase the annual emission rate of any regulated air pollutant; except for less than significant increases in fugitive PM emissions and CO_2 emissions. Similarly, the projects will not increase the hourly emission rates of PM, SO_2 or NO_X, hence the projects will not trigger any new or additional NSPS requirements.

In the following sections, the use of Alternative Fuels is addressed in detail both from regulatory and technical standpoints. Included in these sections are the rationales for claiming Alternative Fuels will not increase either annual or hourly pollutant emission rates.

As the plant has operated approximately 25 months, the Department, in accordance with Rule 62-210.200(244), F.A.C., is requested to accept the currently permitted emission limits for the Emission Units associated with the plant as the Projected Actual Emissions for the plant. If this request is granted, and as summarized in Table 2, the proposed projects will be accomplished with no change annual emission rates of regulated pollutants with the exception of fugitive PM CO_2, and these increases will be less than significant. Thus, the projects will not be subject to New Source Review.

ALTERNATIVE FUELS REGULATORY APPLICABILITY ANALYSIS

FEDERAL REGULATORY APPLICABILITY ANALYSIS

1. **GREENHOUSE GAS TAILORING RULE FOR PSD ANALYSIS, 40 CFR 51, 52, 70, and 71 – *Applicable***

   Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule

The EPA established the criteria for PSD review of greenhouse gases for construction projects in the Federal Register on June 3, 2010. For American Cement, the GHG emissions from this project would be considered "subject to regulation" as the facility has potential emissions of greater than 100,000 tpy of CO2e and if the construction increases emissions of GHGs by 75,000 tpy CO2e or more.

40 CFR 51.166(b)(48)(v) - Beginning July 1, 2011, in addition to the provisions in paragraph (b)(48)(iv) of this section, the pollutant GHGs shall also be subject to regulation:

(b) At an existing stationary source that emits or has the potential to emit 100,000 tpy CO2e, when such stationary source undertakes a physical change or change in the method of operation that will result in an emissions increase of 75,000 tpy CO2e or more.

Based on the analyses presented herein, the Alternative Fuels project is not subject to regulation of GHGs as there will not be an emissions increase of 75,000 tpy CO2e or more.

It is important to note that the EPA deferred determination of PSD applicability for CO_2 for combustion of biogenic materials until after July 20, 2014 per 40 CFR 51.166, 52.21, 70.2(2) and 71.2(2) (all amended July 20, 2011). 40 CFR 71.2(2) states:

For purposes of this paragraph, prior to July 21, 2014, the mass of the greenhouse gas carbon dioxide shall not include carbon dioxide emissions resulting from the combustion or decomposition of nonfossilized and biodegradable organic material originating from plants, animals, or micro-organisms (including products, by-products, residues and waste from agriculture, forestry and related industries as well as the nonfossilized and biodegradable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material).

Based on this deferment, American Cement has established the biogenic CO_2 emissions from alternative fuels and noted that portion of GHG emissions that is deferred by the EPA rule.

A related rule, 40 CFR 98, should also be mentioned. EPA now requires continuous monitoring of CO_2 from cement plants and annual reporting of all GHG emissions per this rule. This rule also requires that cement plants report the fraction of GHG emissions from biogenic sources. It should be noted that 40 CFR 98 establishes a default value of 20 percent as the fraction of GHG emissions from TDF firing that are considered biogenic emissions (40 CFR 98.33(e)(3)(iv)). This default value coincides well with values provided in the European Union.

2. NESHAP 63 Subpart LLL (Cement MACT), 40 CFR 63.1340-63.1358

– Applicable

National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry

The Cement MACT establishes emission limits that must be met, but it does not limit the types of materials that can be used or fired in the kiln, other than clarification that if a kiln were to burn hazardous waste, it would be subject to and regulated under Subpart EEE instead of Subpart LLL.[10] American Cement has no intention to use "hazardous waste" as a fuel, so Subpart EEE will not apply. Again, Subpart LLL establishes emission limits and does not prohibit the use of non-hazardous discarded materials such as, municipal solid waste, refuse-derived waste, or any other form of solid waste as a fuel. As stated above, the use of solid waste does not trigger any other NSPS or NESHAP standards. The Cement MACT requirements apply to the American Cement kiln, and these requirements are already established in the current Title V permit.

New provisions of Subpart LLL, based on revisions to the NESHAP promulgated by EPA in 2010 will apply to the kiln beginning in September 2015 (See 75 Federal Register 54970, September 9, 2010). These revisions will not impact the use of Alternative Fuels.

3. NSPS Subpart CCCC (2000 CISWI and 2011 New Unit CISWI), 40 CFR 60.2000-60.2265

– Not Applicable

Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction is Commenced After November 30, 1999 or for Which Modification or Reconstruction is commenced on or After June 1, 2001

EPA's rules for Commercial and Industrial Solid Waste Incineration (CISWI) Units were first promulgated on December 1, 2000 (60 Federal Register 75338), and in 2001 EPA granted a request for reconsideration and voluntarily remanded the rule, which the court granted without vacatur. This rule was never stayed and remains in effect. Subpart CCCC, as promulgated in 2000, specifically provides that cement kilns regulated under 40 CFR 63, Subpart LLL are

[10] Subpart LLL addresses the use of fly ash a fuel but does not prohibit its use. Under 40 CFR 63.1346(f), the mercury content of fly ash may be restricted to ensure that mercury levels do not increase above baseline levels. Following September 9, 2015, this restriction will no longer apply as cement plants will be required to assure compliance with a mercury CEMS. Subpart LLL does not restrict any other type of fuel.

exempt from compliance with the CISWI rules under Subpart CCCC (40 CFR 60.2020(l)). Cement kilns subject to the Cement MACT, like the American Cement kiln, are exempt from the 2000 version of Subpart CCCC.

EPA subsequently revised the rules in 2005. Those revisions were then challenged, resulting in the D.C. Circuit Court of Appeals vacating and remanding the "CISWI definitions rule" in 2007. As a result of the 2007 remand, EPA revised Subpart CCCC in 2011 (76 Federal Register 15704, March 21, 2011), and the new Subpart CCCC requirements became effective on May 20, 2011. EPA's preamble specifically provides that only "incinerators" and "small remote incinerators" remain subject to the standards in the 2000 Subpart CCCC rules (See 76 Federal Register 15711, col. 2). EPA states that CISWI units falling within other subcategories, including cement kilns, *"will not in any case"* be subject to the 2000 Subpart CCCC CISWI standards.

Under the new, 2011 version of Subpart CCCC, new, modified, reconstructed cement kilns will no longer be exempt from the CISWI rules. Paragraph (l) of 40 CFR 60.2020 that established the exemption from Subpart CCCC is now "reserved." Waste-burning cement kilns constructed prior to June 4, 2010, are not considered to be "new" units and are therefore not subject to the 2011 Subpart CCCC standards (unless they are subsequently modified or reconstructed). Waste-burning cement kilns constructed prior to June 4, 2010, are considered to be "existing" units subject to the 2011 version of NSPS Subpart DDDD (and not the 2000 or 2011 versions of Subpart CCCC). As explained in more detail below, if the American Cement kiln were to use solid waste (not engineered or alternative fuels) after Subpart DDDD becomes applicable and enforceable in Florida, then standards established pursuant to Subpart DDDD could apply (but not Subpart CCCC—unless the kiln is modified or reconstructed after September 21, 2011).

4. NSPS SUBPART DDDD (CISWI, EXISTING UNITS), 40 CFR 60.2500-60.2875 – *Not Applicable*

Emissions Guidelines (EG) and Compliance Times for Commercial and Industrial Solid Waste Incineration Units

Under the 2000 version of Subpart DDDD, which is applicable in Florida, cement kilns are specifically exempt (along with 14 other source categories). The 2011 version of Subpart DDDD will not apply to waste-burning kilns in Florida until the FDEP undertakes rulemaking to incorporate the provisions of Subpart DDDD into its rules; the Department submits a state plan to or seeks delegation from EPA; and EPA subsequently approves the plan or grants delegation. The new version of the rule, applicable to existing waste-burning kilns, does not apply directly to sources, and it is not anticipated that the requirements will be effective in Florida for at least two to five more years.

NSPS Subpart DDDD establishes "emission guidelines" and compliance schedules for the control of emissions from existing CISWI units. This NSPS does not establish standards that apply directly to emission units because "NSPS" standards are to be established for new units. Because Subpart DDDD is intended to apply to "existing" and not "new" units, the rule is considered a "guideline" for states. Unlike most NSPS standards, Subpart DDDD applies to state air quality programs instead of to emission units. A state may submit a request for delegation of Subpart DDDD or a state may develop its own "state plan" to implement Subpart DDDD. The rule requires state plans to be submitted by March 21, 2012, for CISWI units other than incinerator units (e.g., waste-burning kilns) that commenced construction on or before June 4, 2010 (40 CFR 60.2524).

Regardless of whether a state develops its own plan or simply requests delegation by March 21, 2012, the deadline for compliance may not be later than March 21, 2016, or three years after the effective date of EPA's approval of the state plan, whichever occurs first. Because the 2011 version of Subpart DDDD was promulgated by EPA only recently, the FDEP has not yet taken steps to develop a state plan or to seek delegation of Subpart DDDD. Either of these actions would require notice and comment rulemaking under Chapter 120, Florida Statutes.

As stated above, the 2000 version of Subpart DDDD, which applies in Florida, exempts 15 different types of operations, including cement kilns. The American Cement kiln is therefore not subject to this version of Subpart DDDD. Under the 2011 version of Subpart DDDD, waste-burning cement kilns that were constructed after November 30, 1999, and before June 4, 2010, will be required to comply with the standards and requirements for "existing units" established under Subpart DDDD – as implemented by the state. As long as the American Cement kiln does not burn solid waste, it will not be subject to Subpart DDDD. If the kiln were to begin using solid waste as a fuel, then Subpart DDDD could apply once Florida adopts the rules and its approved plan or delegation is in place. At this time however, the American Cement kiln is not subject to Subpart DDDD regardless of the fuel it uses.

5. SOLID WASTE DEFINITION: 40 CFR 241; ALTERNATIVE FUELS PROPOSED FOR AMERICAN CEMENT KILN ARE NOT SOLID WASTE

Non-Hazardous Secondary Materials That Are Solid Waste When Used as a Fuel or Ingredient

EPA recently promulgated new rules for determining whether non-hazardous secondary materials are solid waste or not when used as fuels or ingredients in combustion units, including cement kilns (40 CFR 241.3). The new rules provide that non-hazardous secondary material is *not* solid waste when combusted as a fuel or used as an ingredient if the material is sufficiently processed and it meets a "legitimacy" test. Under the legitimacy criteria, the processed material must be managed as a valuable commodity, storage of the material must not exceed reasonable time frames, and the material must be managed and adequately contained. In addition, the material must have a meaningful heating value if used as a fuel and must provide a useful contribution to the production or manufacturing process if used as an ingredient. Lastly, the material "must contain contaminants or groups of contaminants at levels comparable in concentration to or lower than those in traditional fuels which the combustion unit is designed to burn. In determining which traditional fuels a unit is designed to burn, persons can choose a traditional fuel that can be or is burned in the particular type of combustion unit, whether or not the combustion unit is permitted to burn that traditional fuel. In comparing contaminants between traditional fuels and a non-hazardous secondary material, persons can use ranges of traditional fuel contaminant levels compiled from national surveys, as well as contaminant level data from the specific traditional fuel being replaced. Such comparisons are to be based on a direct comparison of the contaminant levels in both the non-hazardous secondary material and traditional fuels prior to combustion."[11]

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[11] 40 CFR 241.3(d)(iii).

Under EPA's rules, a facility would either maintain records to demonstrate that any non-hazardous secondary materials used as a fuel or ingredient do not constitute solid waste, or a facility could seek a "non-waste determination" from the EPA Administrator that a non-hazardous secondary material that is used as a fuel or ingredient is not a solid waste. Unless a facility seeks a formal determination, it is required to maintain records to verify the sufficiency of the material processing and that the use of the material met the legitimacy test. Subpart CCCC (40 CFR 60.2740(v) provides that a facility burning materials other than traditional fuels "must keep records as to how the operations that produced the material satisfy the definitions of processing in 40 CFR 241.2." Alternatively, "if the material received a non-waste determination pursuant to the petition process submitted under 40 CFR 241.3(c), the facility operator must keep a copy of the non-waste determination granted by EPA." EPA made it very clear in the preamble to the proposed definition of solid waste that facilities are to make self-determinations of whether a non-hazardous secondary material meets regulatory criteria *unless* a petition is submitted for an EPA determination. EPA believed that the self-implementing approach would "govern for the majority of situations." (75 Fed. Reg. 31860, June 4, 2010). Facilities burning tires are likewise required to maintain records, including a certification that the tires are non-waste. This "certification" is to be signed by the owner or operator of the combustion unit, or by a responsible official of the established tire collection program." There is no requirement for EPA (or a state's) pre-approval or subsequent approval.[12]

Similarly, at least for units subject to the Boiler MACT rules under 40 CFR 63 Subparts DDDDD or JJJJJ, a facility's responsible official would need to certify that the units did not use any non-hazardous secondary materials as a fuel or ingredient that would constitute a solid waste. Even under the new Boiler MACT rules, there is no requirement for agency consent or authorization prior to using the materials as a fuels or ingredients, nor is there a requirement for submittal of all supporting documentation to the permitting agency for confirmation that the materials being used are not solid waste.

Note that Florida has not yet incorporated by reference EPA's new rules establishing the test for determining whether non-hazardous secondary materials are solid waste for purposes of the air

[12] 40 CFR 63.2175(w)

emission standards. Florida has also not revised its rules to establish any different requirements for submittal of information for determinations as to whether materials being used as a fuel or ingredient are solid waste or not. Additionally and most important, EPA is retaining authority to make any *formal* non-waste determinations—this authority to make such determinations is not being delegated to the states.

The re-proposed rules are in a state of flux and could change. After FDEP has completed rulemaking to implement the re-proposed 2011 version of NSPS Subpart DDDD, after EPA has either approved the state's plan or has delegated implementation of the re-proposed 2011 version of Subpart DDDD to DEP, and after a compliance deadline has been formally established, it may be appropriate to confirm that the American Cement kiln will not be using any non-hazardous secondary material as a fuel or ingredient that would be considered a solid waste. This could be done by a responsible official certification similar to that required under CISWI and the Boiler MACT. This certification would help ensure that all applicable requirements are appropriately identified in the Title V permit for the facility. At this time however, Subpart DDDD does not apply and American Cement would not be prohibited from using a material in its cement kiln that constitutes a non-hazardous solid waste.

6. NSPS Subpart Eb (Large MWCs), 40 CFR 60.50b-60.59b

– Not Applicable

Standards of Performance for Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994 or for Which Modification or Reconstruction is Commenced After June 19, 1996

NSPS Subpart Eb regulating large municipal waste combustors does not apply to cement kilns. The federal rules specifically provide as follows: "Cement kilns firing municipal solid waste are not subject to this subpart" (40 CFR 60.50b(p)). Under this subpart, "municipal solid waste" is defined as:

> *"... household, commercial/retail, and/or institutional waste. Household waste includes material discarded by single and multiple residential dwellings, hotels, motels, and other similar permanent or temporary housing establishments or facilities. Commercial/retail waste includes material discarded by stores, offices, restaurants, warehouses, non-*

manufacturing activities at industrial facilities, and other similar establishments or facilities. Institutional waste includes material discarded by schools, nonmedical waste discarded by hospitals, material discarded by nonmanufacturing activities at prisons and government facilities, and material discarded by other similar establishments or facilities. Household, commercial/retail, and institutional waste does not include used oil; sewage sludge; wood pallets; construction, renovation, and demolition wastes (which includes but is not limited to railroad ties and telephone poles); clean wood; industrial process or manufacturing wastes; medical waste; or motor vehicles (including motor vehicle parts or vehicle fluff). Household, commercial/retail, and institutional wastes include: (1) Yard waste; (2) Refuse-derived fuel; and (3) Motor vehicle maintenance materials limited to vehicle batteries and tires except as specified in s. 60.50b(g)."

The term "refuse-derived fuel" is in turn defined as "a type of municipal solid waste produced by processing municipal solid waste through shredding and size classification. This includes all classes of refuse-derived fuel including low-density fluff refuse-derived fuel through densified refuse-derived fuel and pelletized refuse-derived fuel" (40 CFR 60.51b).

The use of any materials considered to be municipal solid waste or refuse-derived fuel, consistent with the above definitions, may therefore be used in a cement kiln without subjecting the kiln to NSPS Subpart Eb. Because cement kilns using municipal solid waste and refuse-derived fuel are not subject to Subpart Eb, American Cement's use of the proposed list of fuels in its kiln, even if the fuels would be considered municipal solid waste, would not trigger applicability of Subpart Eb.

STATE REGULATORY APPLICABILITY ANALYSIS

Florida currently has no specific rules that apply to Portland cement plants. Rule 62-296.407, F.A.C. that did apply was repealed on February 16, 2012.

LOCAL REGULATORY APPLICABILITY ANALYSIS

The Sumter County Code does not specifically regulate Portland cement plants.

ALTERNATIVE FUEL INFRASTRUCTURE AND OPERATIONS

ALTERNATIVE FUELS ACCEPTANCE

American Cement is currently authorized to fire the following fossil fuels: coal, natural gas, distillate oil, petroleum coke, on-specification used oil and whole or chipped tires. American Cement would like to clarify that the kiln is not limited to firing only "bituminous" coal, but is capable of firing other coals from any location. Also, American Cement would like to broaden the whole and chipped tire authorization to allow all tire-derived fuel.

According to the current permit, American Cement is prohibited from firing the following materials to the kiln system: hazardous wastes, petroleum contaminated soil or materials, off-specification used oil, and solid fuels other than those allowed by their permit. Based on this application, American Cement should only be prohibited from burning hazardous waste as defined in 40 CFR 261, nuclear waste and radioactive waste. American Cement will take all precautions and complete any required documentation to prevent the firing of biomedical waste and asbestos-containing materials (40 CFR 61, subpart M). If American Cement identifies delivered materials that are not authorized, the supplier will be contacted and the materials will be returned, disposed, or any other appropriate legal method of handling the material will be employed. American Cement proposes that such records be stored onsite for at least five years and available for inspection upon request.

DESCRIPTION OF ALTERNATIVE FUELS

Engineered Fuel (EF) is any AF mix (see below) that is engineered to have targeted, consistent fuel properties such as: calorific value, moisture, particle size, ash content, and volatility. The properties are established based on available AF material supply and are carefully controlled through blending materials or through separation of incombustible materials from combustible materials. American Cement intends that EF will be the primary AF material, prepared from available individual materials as listed below (such as: wood, plastic, carpet, paper, roofing material, tires, etc.) or EF may be provided by a supplier that can meet American Cement's targeted fuel quality requirements.

- *Tire-Derived Fuel (TDF)*, including whole and shredded tires with or without steel belt material including portions of tires such as tirefluff.

- *Roofing materials*, consisting of roofing shingles and related roofing materials with the bulk of the incombustible grit material separated and which is not subject to regulations as an asbestos-containing material per 40 CFR 61 subpart M.
- *Plastics*, including materials such as polyethylene plastic used in agricultural and silvicultural operations. This may include incidental amounts of chlorinated plastics. American Cement addresses the negative impact of chlorinated plastics on the kiln system and product to further ensure plastics will only have limited amount of chlorinated plastics in the sections below.
- *Agricultural Biogenic Materials*, including materials such as peanut hulls, rice hulls, corn husks, citrus peels, cotton gin byproducts, animal bedding and other similar types of materials.
- *Cellulosic Biomass-untreated*, including materials such as untreated lumber, tree stumps, tree limbs, slash, bark, sawdust, sander dust, wood chips scraps, wood scraps, wood slabs, wood millings, wood shavings and processed pellets made from wood or other forest residues.
- *Cellulosic Biomass-treated*, including preservative-treated wood that may contain treatments such as creosote, copper-chromium-arsenic (CCA), ACQ, painted wood, or resinated woods (plywood, particle board, medium density fiberboard, oriented strand board, laminated beams, finger-jointed trim and other sheet goods). American Cement requests to fire no more than 1,000 pounds per hour averaged on a 7-day basis of segregated streams of wood treated with copper-chromium-arsenic (CCA) compounds. As discussed below, CCA compounds are mostly integrated into the cement clinker product. The input rate is approximately one percent of typical kiln heat input rate.
- *Carpet-Derived Fuel*, including shredded new, reject or used carpet. The material may contain incidental related materials (e.g., tack-down strips, nails, etc.).
- *Biosolids,* including organic materials sanitized to meet EPA Class A sanitization standards and is derived from treatment processes of public treatment water systems
- *AF Mix*, including a blended combination of two or more of any of the above materials. This is separate classification from an engineered fuel since the consistency of the material may not be designed/engineered to meet specific, targeted fuel properties.

Conceptual AF Receiving, Preparation, Transport, Handling, and Storage

All Alternative Fuels will be transported to the facility by covered truck and stored in accordance with applicable regulation. Most materials such as carpet, plastic, and paper will likely be delivered in large bales, but other materials such as roofing shingles, peanut hulls, engineered fuels, sawdust, wood shavings, etc. will be delivered in bulk.

Each Alternative Fuel received will be sampled and analyzed in a manner consistent with industry standards for quality assurance and quality control to ensure that representative data are collected. At a minimum, the frequency of sampling and analysis will be consistent with the frequency of sampling and analysis of coal. All records and results of analysis will be maintained at the facility as required for currently permitted fuels.

Depending on the Alternative Fuel being processed, the fuel may be ground and may also be screened to ensure uniform particle size and/or for debris removal and/or passed over a belt magnet for metal removal. All processed materials will be stored under cover as needed, to prevent fugitive emissions and/or to keep it dry. Additionally, dust suppression in storage areas will be used as needed and any stored alternative fuel material causing nuisance odors will be removed from the site.

After processing is complete, mechanically transported materials will be moved by mobile equipment (front loader, etc.) from storage to a hopper system which feeds the material into the pyroprocessing system. Pneumatically fed materials will be transported from storage into a dosing system, and then injected into the pyroprocessing system.

The current design input heat input to the American Cement kiln is 400 mmBTU/hour. Based on a conservative presumption that the heating value of Alternative Fuel is 50 percent that of coal, the maximum annual firing rate of Alternative Fuel will be about 280,000 tons. This value is theoretical and in reality Alternative Fuel use is expected to be less due to the practicality of operations.

Based on the conceptual fuel handling outlined above, American Cement requests that the permit include the Alternative Fuel preparation equipment as a separate emissions unit; "Fuel Processing System". This Emission Unit is expected to use electric motors; hence, diesel engine emissions are not included. All applicable NESHAP and NSPS requirements for this equipment will be complied with.

Table 3 includes fugitive emissions from truck transport which is calculated based on the round-trip distance from the facility gate to the Alternative Fuel storage area. The transport and storage will be in covered trucks or containers as needed to control fugitive emissions. Nearly all materials, such as virgin biomass (typically 15 to 30 percent moisture), contain enough moisture to not require cover. The trucks will enter through the front gate and preparation of the material will occur at or near the drop-off point (the route is 1.33 miles round-trip).

AF Injection Equipment Conceptual Description

The kiln heat input of 400 mmBTU/hr is distributed approximately 60 percent to the calciner and 40 percent to the kiln burner. The calciner system will include a feeder system (Schenk Feeder or equivalent), with a nominal feed rate of 10 to 20 tons per hour depending on the handling characteristics of the Alternative Fuel. Similar systems are currently in operation at other cement plants in Florida and in the U.S. The system will be compact, of simple design and capable of handling many kinds of Alternative Fuels with varying densities and physical properties. The system conceptually will consist of offloading ports, screw conveyors to move the biomass from the offloading ports to the feed metering system and a pneumatic blower to the injection porthole in the calciner.

Covered trucks will unload sized biomass into the offloading ports. Feeder screw conveyors at the bottom of the offload ports will feed the biomass to a metering system, followed by a pneumatic blower which will blow the biomass up to the injection porthole in the calciner. The porthole installed in the calciner tower will match the pneumatic system sizing, which is nominally 8-inch in diameter.

Mechanical feed systems will also be installed for the kiln burner and the kiln burners systems will be modified. This equipment will be selected in the future. Additionally, the main kiln burner will have to be retrofitted to accommodate the co-firing of the Alternative Fuels. Conceptually the burner will be designed such that a portion of the primary air is guided in a separate tube around the main fueling vessel and near the outlet, nozzles inject the air to expand and aerate the fired fuel to ensure better burning. According to the manufacturer of this type of burner (Pillard Feuerungen GmbH), this design is capable of firing up to 80 percent alternative fuels with traditional fuels.

Given that the feeder system may have multiple entry points to the calciner to accommodate a broad range of Alternative Fuels, the calciner injection equipment is expected to have more than one injection system. The nominal firing rate of the kiln burner injection system will be designed for up to 15 tons per hour of Alternative Fuels. This tonnage is dependent on the Alternative Fuel properties and the actual feed rate will be determined through injection system assessments. The estimated time frame for completing equipment installation is undetermined at this time and is dependent on market conditions. FDEP will be provided a schedule prior to construction beginning. Following completion of equipment installation, American Cement will begin to introduce each of the requested Alternative Fuels and will need time to complete the shakedown of the equipment. American Cement therefore requests a five-year construction permit for this project.

Regardless of the phasing of equipment, American Cement requests that the permitting not specify the equipment installation schedule or sequence, but instead allow for all equipment to go through a shakedown and assessment period.

TABLE 3 FUGITIVE EMISSIONS ESTIMATE – TRANSPORT, STORAGE, HANDLING, AND PROCESSING OF ALTERNATIVE FUELS AND ADDITIVES

Step	Action/Task	Unit of Measurement	% of Total Throughput	PM Emission Factor	PM Emissions	PM_{10} Emission Factor	PM_{10} Emissions	$PM_{2.5}$ Emission Factor	$PM_{2.5}$ Emissions
1	Increased Additive Delivery; 160,000 tons @ 1.0 miles RT	6,400 miles	100%	1.12 lb/VMT	3.584 ton/yr	0.22 lb/VMT	0.704 tons/yr	0.05 lb/VMT	0.160 tons/yr
2	AF Transport to Storage; 280,000 tons @ 1.33 miles RT[a,c]	14,900 miles	100%	1.12 lb/VMT	8.344 ton/yr	0.22 lb/VMT	1.639 tons/yr	0.05 lb/VMT	0.373 tons/yr
3	Store in Covered Pile	280,000 tons	100%	*negligible, stored under cover*					
4	AF Loading to Grinding Hopper by Frontend Loader[b]	280,000 tons	100%	1.00E-04 lb/ton	0.014 ton/yr	4.60E-05 lb/ton	0.006 tons/yr	1.30E-05 lb/ton	0.002 tons/yr
5	AF Grinder[b]	280,000 tons	100%	1.20E-03 lb/ton	0.168 ton/yr	5.40E-04 lb/ton	0.076 tons/yr	1.00E-04 lb/ton	0.014 tons/yr
6	AF Screening[b]	280,000 tons	100%	2.20E-03 lb/ton	0.308 ton/yr	7.40E-04 lb/ton	0.104 tons/yr	5.00E-05 lb/ton	0.007 tons/yr
7	AF Transport to Injection System[a,c]	1,120 miles	100%	1.12 lb/VMT	0.627 ton/yr	0.22 lb/VMT	0.123 tons/yr	0.05 lb/VMT	0.028 tons/yr
8	AF Loaded into Pneumatic Hopper[b]	280,000 tons	100%	1.00E-04 lb/ton	0.014 ton/yr	4.60E-05 lb/ton	0.006 tons/yr	1.30E-05 lb/ton	0.002 tons/yr
9	AF Pneumatic Transport to Calciner	280,000 tons	100%	*negligible, fully enclosed*					
				Total:	13.1 ton/yr		2.7 ton/yr		0.59 ton/yr

Step 1	$\frac{1.00\ miles}{trip^{c}} x \frac{trip}{25\ tons} x\ 160{,}000\ tons\ additives = 6{,}400\ miles$
Step 2	$\frac{1.33\ miles}{trip^{c}} x \frac{trip}{25\ tons} x\ 280{,}000\ tons\ alt\ fuel = 14{,}900\ miles$
Step 7	$\frac{0.1\ miles}{trip} x \frac{trip}{25\ tons} x\ 280{,}000\ tons = 1{,}120\ miles$

a. Potential PM/PM10/PM2.5 emissions from truck traffic from paved roads are calculated based on AP-42, Chapter 13.2.-1.
b. Emission factors of screening, crushing, and conveying of AFs based on AP-42 Table 11.19.2-2. Alternate fuel PM factors assumed to have similar emissions to aggregate operation.
c. Trip: Round trip route from plant entrance to storage.

COST ESTIMATES

Due to the site specific criteria for an Alternative Fuel firing system, initial cost estimations for the installations are difficult to quantify. One cement plant has reported an initial investment cost of $2.6 million for the handling and receiving equipment for alternative fuels[13]. According to another report based on a plant burning alternative fuels, the investment for hardware equipment (screening and shredding) and the dosing/feeding equipment totaled nearly $4 million[14].

BEST MANAGEMENT PRACTICES FOR ALTERNATIVE FUELS

The following best management practices are proposed for the use the fuels at the American Cement Plant.

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[13] Veijonen, K. "Biomass to replace fossil fuels in cement industry Finnsementti Oy, Parainen, Finland" EUBIONET III – IEE/07/777/SI2.499477, 02/2009.

[14] MVW Lechtenberg & Partner. "Economics- How to calculate and finance your AF Project" MVW – Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH. Page 9. 24 February 2010.

BEST MANAGEMENT PRACTICES (BMP) PLAN FOR MINIMIZATION OF FUGITIVE DUST, FIRE PREVENTION, AND QUALITY ASSURANCE

Practice	Description
Minimization of Fugitive Dust	1) Drop points to storage areas shall be designed to minimize the overall exposed (or exposed to the atmosphere) drop height for materials that have the potential to create air born dust particles. 2) Periodic maintenance shall be performed to maintain offloading locations and associated drop point integrity as necessary. 3) Periodic visual observation of operations shall be performed by personnel trained on EPA Visible Emissions Method 22 and/or Method 9. If fugitive dust is detected appropriate fugitive dust minimization techniques shall be implemented.
Fire Prevention/ Spontaneous Combustion Minimization	1) The Emergency Response Plan includes: a. Annual training of onsite personnel on how to properly respond to fires and training on the identification and prevention of potential fire hazards; and b. All buildings and mobile equipment are equipped with firefighting equipment as required by all county, state, and federal codes and regulations. 2) Proper storage of recovered materials to ensure that heat generated from pile compaction does not result in spontaneous combustion. 3) All fuel areas must display appropriate signage (fire hazard warnings, no smoking, etc.) to notify personnel and visitors of any potential fire hazards to prevent accidental combustion of fuel materials. 4) All onsite welding activities require a "Hot Work Permit" to adequately process for and prevent fires as a result of welding.
Quality Assurance	1) The materials shall be delivered to the Plant with all loads properly secured, contained, and covered. 2) For each shipment of material, the permittee shall record the date, quantity and a description of the materials received and keep a record of the Bill of Lading for a minimum of two years. 3) The permittee shall inspect and sample shipments of material to ensure that delivered materials meet the respective expected selection criteria. If the permittee identifies off specification material, the supplier shall be contacted and the material shall be returned, disposed, blended, or any other appropriate legal method of handling the material shall be employed. 4) The permittee shall maintain records of off-specification deliveries and actions taken to correct such abnormalities. Such records shall be stored onsite for at least two years and available for inspection upon request.

Monitoring and Testing

Emissions monitoring for each Alternative Fuel tested will consist of the following emission monitoring and emission testing:

- CO – CEMS Data (PSD pollutant)
- CO_2 – CEMS Data (PSD pollutant)
- NO_X – CEMS Data (PSD and NSPS pollutant)
- SO_2 – CEMS Data (PSD and NSPS pollutant)
- VOC (as THC) – CEMS Data (PSD pollutant)
- Opacity – COMS Data (surrogate for HAP per NESHAP subpart LLL)
- PM – EPA Method 5 (PSD and NSPS pollutant)
- Hg – Materials Balance (HAP per NESHAP subpart LLL)

Note that after September 9, 2015, American Cement will have a PM CEMS and opacity monitoring will no longer be required.

Submittal of all test reports as required by Title V permit will be provided in a timely manner as required by rule.

Fuel Shakedown and Alternative Fuels Assessment Periods

The air construction permit should include shakedown periods similar to that provided by FDEP in other Florida cement plant permits. These periods provide the necessary time for American Cement to adjust equipment and operations as necessary in order to find the optimal fuel feed rate, AF particle size, AF blend, etc. so that testing can be conducted under normal operations. While American Cement expects to remain in compliance with all permitted emission limits during the shakedown period, it is possible that upset conditions could occur. Any process information or emissions data collected during such upset conditions does not represent normal operations and therefore should be excluded from data used to determine expected normal operational impacts on air emissions, process operation, and material quality. Therefore, recognition of these periods in a permitting note would help ensure a common understanding that the first three months of operation after an equipment change and the first three months after each new alternative fuel category is introduced may not be representative of long-term operations.

A period of "shakedown" is requested for the Alternative Fuels handling and firing equipment to allow American Cement a time period (120 operational days) irrespective of fuel fired to ensure proper installation, as well as develop good operating practices for normal kiln operation with the equipment. An operational day, for purposes of the shakedown period, should be defined as any day in which Alternative Fuels are fired. Such shakedown periods are common for newly constructed equipment and allow a period for operators learn how to operate the equipment without the operations during that period being applicable to PSD analysis. As stated above, American Cement will comply with all permitted limits on emissions.

Separate from the handling and firing equipment systems shakedown periods mentioned above, it is requested that shakedown period be allowed for each category of Alternative Fuel described above. The Alternative Fuels assessment periods are necessary since material handling, separations, resizing, and feeder operations will be impacted by the varying physical properties of each fuel material (moisture, density, flowability, hardness, ash content, calorific value, etc.). An operational day, for purposes of the AF assessment period, will be defined as any day in which Alternative Fuels are fired. These periods will be called, "Alternative Fuels assessments" and will allow for each Alternative Fuel, a period for the operators to introduce the fuel into either the kiln burner system or the calciner to develop good operating practices that result in normal kiln operations; without the operations during that period applying to PSD tracking. As stated above, American Cement will comply with all permitted limits on emissions.

For assessment of each Alternative Fuel category American Cement proposes to take a representative as-fired sample of the fuel and have it analyzed for parameters in Table 4. These parameters are proposed to be measured for each fuel assessed. Also included in the table are target levels based on data collected by the USGS for coal. Target levels listed below are not meant to be enforceable, but are listed for purposes of comparing Alternative Fuels parameters to coal parameters. The target levels selected are based on the range of values of coal in the United States Geological Survey (USGS) database. American Cement views the target values to be a range of values that are similar to coal. Note that this database does not include the range of fossil fuels (e.g., petroleum coke) that American Cement is authorized to burn. As noted in the regulatory analysis section of this application, the EPA rule, "The Identification of Non-hazardous Secondary Materials that are solid waste" (40 CFR 241) is to be separately addressed by American Cement as required by that rule. This information is neither comprehensive nor determinative of 40 CFR 241 but does provide information of the similarity of alternative fuels to common coal sources.

TABLE 4. PROPOSED TARGET LIMITS FOR ALTERNATIVE FUELS

Parameter*	Target Levels*
Higher Heating Value	> 5000 Btu/lb
Arsenic	< 2000 ppm by weight
Cadmium	< 200 ppm by weight
Chromium	< 200 ppm by weight
Lead	< 1000 ppm by weight
Beryllium	< 20 ppm by weight
Mercury	< 0.3 ppm by weight

* Heating value is on dry basis. Concentration values are wet basis.

* Target levels are based on USGS data of coal samples. http://pubs.usgs.gov/of/2010/1196/

Parameter	Analytical Methods
Heating Value	Proximate Analysis appropriate for given fuel
Mercury	EPA 7470A/7471A

Parameter	Analytical Methods
Other Metals	EPA SW-846 or EPA Method 6010B

Other equivalent methods may be used with written approval of FDEP.

Material Analyses

For each type of Alternative Fuel authorized (except for untreated cellulosic biomass, tire-derived fuel and agricultural biogenic materials), American Cement will get analytical results of a representative sample of the fuel prior to the initial delivery of the fuel. The sample will be analyzed for the parameters in Table 4. Testing will be repeated on an annual basis with sampling repeated for materials on-site in the month of January of each year.

Reporting

American Cement will complete and submit to FDEP within 30 days following the end of each quarter a report showing:

- General description of the Alternative Fuels and quantity of materials utilized/consumed as a fuel,
- Required analytical results generated within the quarter (including repeat testing for problem shipments),
- Quarterly trend of CEMS emissions data , and
- Mercury balances or emission data as required by Permit

IMPACTS OF ALTERNATIVE FUELS

The impact of the Alternative Fuels on air emissions, kiln structure and clinker quality are addressed in the following sections. The information compares the effects of Alternative Fuels relative to fossil fuels. The presentation of the information shows that the combined impact of fuels and raw materials in a Portland cement kiln must be clearly understood to interpret the impact of Alternative Fuels. In concert with this understanding, the EPA states on May 17, 2011 in the Federal Register, "...burning alternative fuels (whether classified as solid wastes or not) does not appreciably affect cement kiln HAP's emissions."[15]

A kiln functions to make cement, not to burn fuel. Coal and pet coke comprise over 85 percent of the fuels used currently in the U.S. cement industry[16]. These fossil fuels are historically the fuels of choice, not necessarily for cost, but for predictable fuel combustion properties, predictable availability, and the fact they can be stored for long periods. Alternative Fuels on the other hand can have a wide range of physical and chemical properties such that the thermochemistry of kiln system can be put out of balance or significant damage can be caused to the kiln. For this reason, Alternative Fuels must be processed/blended to achieve a uniform thermal characteristic. This characteristic can be a heating value that is higher than that of fossil fuel or lower, but as long as there is uniformity (and a reasonable heating value; e.g., >5000 mmBTU/lb), the kiln operator can balance the kiln to burn the fuel.

Variable alkali, chloride, and/or sulfur content of a fuel can cause kiln refractory damage and possibly alkali bursting. And further, particle size of fuels plays an important role in thermal distribution within the kiln and calciner. Clearly, as the fraction of fuel substitution increases, the specifications of the alternative fuel must be well controlled and predictable. If the fuel has highly variably properties, the quality of the cement will suffer to the point that the value of both cement and fuel are worthless.

Figure 1 shows the role that AF particle size plays in the burnout time of fuel particles and how this will change the combustion time, the thermochemistry and the physical location of the heat distribution in the kiln. So, using a fuel with variable particle size will change the burnout time and will affect the thermal profile in the kiln. This shift of the flame zone can significantly impact the chemistry of the raw material conversion. The discussion above of the optimum burning regime and the effect of particle size clearly shows the need to use a fuel that has constant and controllable composition and characteristics.

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[15] Fed. Reg. Vol 76. No. 95, page 28322

[16] International, I. *Trends in Beneficial Use of Alternative Fuels and Raw Materials*. 2008; Available from: http://www.epa.gov/sectors/pdf/cement-sector-report.pdf.

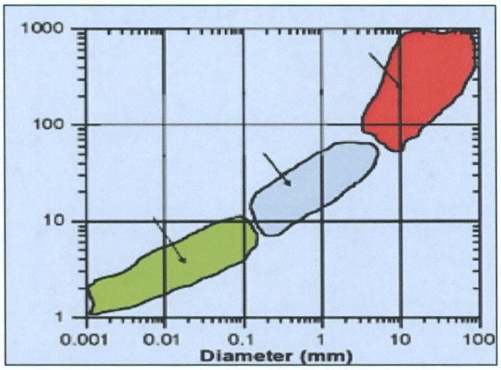

FIGURE 1. BURNOUT TIME (SECONDS) VERSUS FUEL PARTICLE SIZE (MM)

(Source: http://www.flsmidth.com/~/media/Brochures/Brochures%20for%20kilns%20and%20 firing/AlternativeFuel.ashx)

Understanding the potential impacts that Alternative Fuels can have on a kiln system demonstrates that a cement kiln is not an incinerator and that a cement kiln operator takes risks with equipment and product if the consistency and quality of fuels is not properly controlled. This is a very important distinction and demonstrates that cement kilns are not simply taking solid waste and burning it for disposal. Instead kilns are using select materials that are in a state of minimal value that have been processing sufficiently to make a valuable and useful fuel out of them. Additionally, the ash of the fuels will be blended with limestone, clay, sand, iron ore, and fly ash into a raw mix design will thermally react to produce clinker and cement.

AIR EMISSION IMPACTS

The main constituents of the exhaust gases from a cement kiln are atmospheric nitrogen (N_2), CO_2 from the calcination of $CaCO_3$ and the combustion of fuel, water vapor from the combustion process and excess oxygen. The pollutants of concern for non-hazardous fuels are as follows:[17]

- Total Hydrocarbons and Volatile Organic Compounds
- Nitrogen Oxides
- Sulfur Dioxide
- Carbon Monoxide

[17] Cement, Lime and Magnesium Oxide Manufacturing Facilities, May 2010 http://eippcb.jrc.ec.europa.eu

- Particulate matter
- Dioxins/Furans
- Metals and their compounds
- Hydrogen chloride
- Greenhouse Gases

It should be noted that while emission estimates are addressed, the American Cement will not exceed any permit limit while firing Alternative Fuels. Furthermore, in comparison to combustion for power production or incineration, American Cement must create a salable product using the combustion process. As such, the combustion must be well controlled and predictable. Upsets or erratic behavior in combustion not only affect emissions, which are of concern to American Cement, but can damage the kiln and most important create worthless product. Emissions and operational assessments based on cement manufacture are addressed in the following sections for each pollutant of concern.

VOLATILE ORGANIC COMPOUNDS

The main source of organic compound emissions in the cement manufacturing process is the raw materials as organic compounds in the preheater feed are volatilized in the preheater tower at temperatures beginning around 700-750°F. At these temperatures, the organics in the feed are volatilized rather than destroyed. The nominal temperatures ranging from 1600°F to 3000 °F that are achieved in the combustion areas of the kiln and calciner are not reached by organics in the feed. These kiln temperatures however, lead to the effective destruction of organic compounds that may be present in fuels as they are combusted. EPA suggests for effective destruction of non-halogenated compounds to be 99.99+% or greater, a temperature in excess of 1830 °F for two seconds and an oxygen concentration of 2 percent or more are required.[18] The thermal characteristics of calciner cement kilns like the one at American Cement well exceed this requirement. The American Cement kiln system has these attributes: [19, 20, 21, 22]

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[18] Mantus, E.K.; Kelly, K.E.; Pascoe, G.A.; *All Fired Up – Burning Hazardous Waste in Cement Kilns*, Environmental Toxicology International, December, 1992.

[19] EPA Cement Sector Report, Trends in Beneficial Use of Alternative Fuels and Raw Materials. October 2008.

[20] Cement, Lime and Magnesium Oxide Manufacturing Facilities, May 2010 http://eippcb.jrc.ec.europa.eu

[21] National Policy on High Temperature Thermal Waste Treatment and Cement Kiln Alternative Use, Cement Production Technology, Report No. 66011-02; Issue 2, Dr. Kare Helge Karestensen

[22] Karstensen, K.H., et. Al., "Environmentally Sound Destruction of Obsolete Pesticides in Developing Countries Using Cement Kilns." Environmental Science and Policy. 2006. Pg. 577-586.

- Gas residence times in the kiln on the order of 10 seconds at temperatures ranging from 1800 to 3000°F; in the calciner for approximately 3 seconds at temperatures ranging from 1600°F to 1800°F; in the preheater for 10 seconds at steadily changing temperatures from 1800 to 700-750°F,
- Combustion that takes place under oxidizing conditions, meaning that oxygen concentration in gasses leaving the kiln is typically in the range of 1-3 percent,
- Residence time of materials introduced at the feed end of the kiln being approximately 30 minutes, and
- The presence of extreme turbulence in the kiln, assuring complete mixing of combustible material.

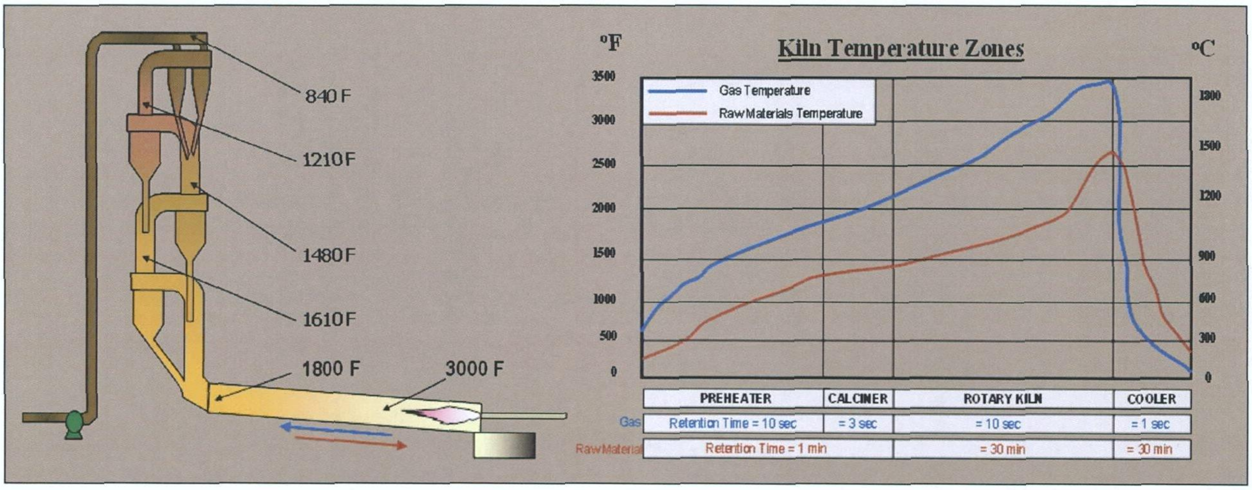

FIGURE 2. TYPICAL TEMPERATURE PROFILE IN A PREHEATER CEMENT KILN

Nitrogen Oxides

NO_X can be generated in two ways during combustion. These are thermal NO_X and fuel NO_X. Thermal NO_X is generated when molecular nitrogen and oxygen dissociate at high temperatures (above 2,370 °F) and react. This form of NO_X generation is the most pronounced in the cement industry and is reduced with a lower peak flame temperature. Fuel NO_X is generated when ionized nitrogen in the fuel is released during combustion. This is dependent on fuel type and input rate, and will vary with operating parameters. Fuel NO_X is minor when compared to thermal NO_X in cement kilns[23].

Nitrogen Oxide (NO_X) emissions are not expected to change with the use of Alternative Fuels as they can be controlled by adjustments to the multistage combustion system, fuel input rates, and the use of selective non-catalytic reduction (SNCR). Due to the generally inverse relationship between NO_X and carbon monoxide (CO) emissions, NO_X control by SNCR can also control CO emissions.

SULFUR DIOXIDE

Sulfur compounds in raw materials are present mainly as sulfates (i.e. calcium sulfate and alkali sulfates) or as sulfides (i.e. pyrite or marcasite, FeS_2). Calcium sulfates introduced to the kiln through either raw material and/or fuels are thermally stable up to temperatures of 2200 °F. This means that they will persist until the sintering zone of the rotary kiln where they are thermally decomposed and oxidized to produce sulfur dioxide (SO_2). SO_2 generated at the sintering zone will react with alkalis or calcium oxide and be incorporated into the clinker. This sulfur will not give rise to SO_2 emissions.

On the other hand, sulfides (and also other organic sulfur compounds) in the raw materials enter the preheater tower and are readily decomposed and oxidized between 750 and 1100 °F to produce SO_2 as the raw materials are heated in the preheater tower. At these temperatures, not enough calcium oxide has been generated to react with the sulfide-generated SO_2 and up to 30 percent of the total sulfide input in the raw materials may leave the preheater as SO_2.[24] This means that SO_2 emissions are predominately determined by the sulfide content of the raw materials, not by the fuel sulfur.

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[23] Neuffer, Bill, and Mike Laney. Alternative Control Techniques Document Update: NOx Emissions from New Cement Kilns. Research Triangle Park, N.C., U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards., Sector Policies and Programs Division, 2007. Print.

[24] National Policy on High Temperature Thermal Waste Treatment and Cement Kiln Alternative Use, Cement Production Technology, Report No. 66011-02; Issue 2, Dr. Kare Helge Karestensen

The fuel sulfur content for both traditional and alternative fuels has been shown to not significantly impact SO_2 emissions.[18,25,26,27] This understanding of the limited impact of fuel sulfur is further evidenced by the current Best Available Control Technology applied to all Florida cement kilns, which is the inherent natural scrubbing of sulfur by the alkaline raw material input to the kiln; not limits on the sulfur content of fuel.

Although very little effect on SO_2 emissions is seen from fuel type, typical sulfur levels in Alternative Fuels are normally less than that of coal (or the equivalent conventional fuel). Coal sulfur levels reached 31,000 ppm and average 2243 ppm according to the USGS coal database[28].

CARBON MONOXIDE

Carbon Monoxide (CO) emissions are not expected to increase with the use of Alternative Fuels since they can be controlled through the combustion process and indirectly through the use of SNCR. The requirement for an oxidizing environment in a kiln (1-3 percent O_2 in the gas stream leaving the kiln) promotes complete combustion and limits CO production.

CO emissions which may be observed during the initial evaluations of new fuels or raw materials are not based on the type of the fuel or raw material, but the extent of mixing, timing and temperature. During these initial periods of evaluation, the possibility of incomplete combustion or the kiln operating out of balance is more likely, and thus the need to have shakedown periods. American Cement closely monitors the combustion of all fuels to assure the complete combustion of the fuel, and more importantly a temperature profile that will assure a quality product. Characteristics of the Alternative Fuels, such as particle size, can affect the combustion efficiency which can impact CO emissions. Impacts on CO emissions from Alternative Fuels are a function of improper system operations and not the fuel type[9] which is the basis for the request for Alternative Fuels assessment periods. American Cement will evaluate the CO emissions and through t6he shakedown periods learn to maximize combustion efficiency and, in turn, limit CO emissions.

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[25] EPA Report No. 600/R-97-115 entitled "Air Emissions From Scrap Tire Combustion"
[26] Cement, Lime and Magnesium Oxide Manufacturing Facilities, May 2010, Figures 1.32, http://eippcb.jrc.ec.europa.eu
[27] 76 Fed. Reg. 28318, 28322 (May 17, 2011)
[28] US Coal Quality Database. USGS, 4 Apr. 2004. Web. 17 Oct. 2011. <http://energy.er.usgs.gov/coalqual.htm>.

Through monitoring and testing of the Alternative Fuels prior to introduction and with combustion characteristics monitoring and process adjustments, American Cement will ensure proper and complete combustion of Alternative Fuels to minimize generation of constituents of partial combustion, such as CO. As mentioned above, particle size will be evaluated in the process for impacts to the combustion.

PARTICULATE MATTER

Particulate matter emissions are not expected to change with the use of Alternative Fuels as over 99 percent of the PM reporting to the kiln dust collector is from raw materials and kiln dust. And further, the PM concentration in the gas stream discharged from the kiln dust collector (a baghouse at American Cement) is essentially independent of dust loading to the collector. As a result, small changes in the dust loading to the baghouse that could result from the combustion of Alternative Fuels will have no measureable impact on PM emissions.

To provide a basis for this statement, consider that the PM loading to the American Cement kiln baghouse is about eight percent of the mass of the material leaving the raw mill; the other 93 percent is removed by cyclones and transferred to the blend silo. The material entering the raw mill includes raw materials (220 tph), the kiln dust blown back from the preheater (about 15 tph) and the ash in the fuel fired to the kiln and calciner. The latter is usually considered part of the kiln dust blown back from the preheater, but for this example it will be treated separately.

At a coal firing rate of 16 tons per hour and a coal ash content of 10 percent, the PM to the raw mill from fuel ash will be about 1.6 tons per hour; resulting in a total material throughput for the raw mill of about 237 tons per hour. If eight percent of this reports to the kiln baghouse, the baghouse loading will be about 19 tons per hour; of which fuel (coal in this example) contributes about 0.13 tons per hour (eight percent of 1.6 tph). This is about 0.7 percent of the total PM loading to the baghouse.

This example provides the basis for the earlier statement that the firing of Alternative Fuels will have no measureable impact on PM emissions for a kiln system.

DIOXINS AND FURANS

EPA has long recognized that the predominate factor affecting D/F emissions from a cement kiln is the temperature of gases at the inlet to the control device and the temperature history of the gas stream in the temperature window 700°F (preheater outlet) to 400°F (the PM control device inlet.[29] Emissions of D/F are not expected to change when using Alternative Fuels due to the dependence of the formation of D/F on gas residence time in this temperature window and the fact that fuel firing is independent of the post-preheater temperature/time relationship.

Research has shown that there are no statistical significant differences in D/F emissions when comparing the use of conventional fuels and Alternative Fuels[30]. Moreover, as EPA found when establishing the MACT floor for hazardous waste burning kilns, fuel type does not have an impact on D/F formation because D/F is formed post-combustion.[31] This is consistent with EPA's recent affirmance that "burning alternative fuels . . . does not appreciably affect cement kilns' HAP emissions."[32,33] Additionally, a review of U.S, European and Australian data shows no difference in D/F emissions when comparing conventional and alternative fuels.[34,35, 36] Even the burning of hazardous wastes has been shown to not influence the formation of D/F emissions[37].

And further, FDEP states in the technical evaluation for Permit 0530021-031-AC,

> *"At high temperatures and sufficient residence times, dioxins/furans [in fuel] can be destroyed. Pre-heater/pre-calciner kilns ……………. 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."*

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[29] 63 Fed. Reg. 14182, 14196 (Mar. 24, 1998)

[30] Abad, E., Martinez, K., Caixach, J., Rivera, J., "Polychlorinated Dibenzo-p-dioxin/Polychlorinated Dibenzofuran Releases into the Atmosphere from the Use of Secondary Fuels in Cement Kilns during Clinker Formation." Environmental Science Technology. 2004. Pg. 4734-4738.

[31] 64 Fed. Reg. 52828, 52876 (Sep. 30, 1999)

[32] 76 Fed. Reg. 28318, 28322 (May 17, 2011)

[33] FDEP technical Evaluation, 0530021-031-AC draft permit.

[34] "Air Emissions Summary for Portland Cement Pyroprocessing". Portland Cement Association.R&D SN3048

[35] Cement, Lime and Magnesium Oxide Manufacturing Facilities, May 2010, Table 1.38, http://eippcb.jrc.ec.europa.eu

[36] Dioxin and The Cement Industry in Australia. Technical Note. Cement Industry Federation. July 2002.

[37] Karstensen, K.H., "Formation, release and control of dioxins in cement kilns" Chemosphere. 2008. Pg. 543-560.

American Cement operates a modern cement kiln with a proven means to quickly quench the temperature of the gas stream leaving the preheater (700-750°F) to below 400°F and thus avoid the post-combustion formation of D/F. When the raw mill is operating, the quench occurs in the raw mill, and when the raw mill is down, the quench occurs in a water quench chamber following the preheater. Annual compliance testing required by the American Cement permit has routinely demonstrated compliance with the permitted D/F emission standards:

- 0.4 nanograms (toxic equivalent) per dry standard cubic meter (corrected to 7% O_2) when the temperature at baghouse inlet 400 degree F or less.
- 0.2 nanograms (toxic equivalent) per dry standard cubic meter (corrected to 7% O_2) when the temperature at baghouse inlet greater than 400 degree F.

METALS AND THEIR COMPOUNDS

When burning Alternative Fuels, the concentrations of metals measured in the stack gas fall within the variability of traditional fuel emission values[38,39]. To explore this further, it is important to first define the possible fates of metals in the cement making process. Metals that enter a kiln, either through the raw materials or through the fuel and have the possibility of exiting the system through three separate routes; they can become part of the clinker, bind to the kiln dust or exit with the stack gases, if volatile[40]. The metals that bind with the clinker are captured become a component of the cement product. The metals bound to the kiln dust are recirculated in the kiln system and are either removed by bleeding off some kiln dust, eventually binding with the clinker and/or being discharged with the stack gases. Studies have indicated that non-volatile metals, such as arsenic, chromium, nickel and zinc are primarily captured by the clinker in the kiln[41].

It should also be noted that the behavior of metals in a kiln system is the same regardless of the source of the metals; raw materials, conventional fuel or Alternative Fuels. The following

[38] Zemba, S., Ames, M., Green, L., Botelho, M.J., Gossman, D., Linkov, I., Palma-Oliveira, J., "Emissions of metals and polychlorinated dibenxo(p)dioxins and furans (PCDD/Fs) from Portland cement manufacturing plants: Inter-kiln variability and dependence on fuel-types" Science of the Total Environment. 2011. Pg. 4198-4205.

[39] International Cement Review, *Burning Issues*, February, 2000.

[40] Conesa, J.A., Galvez, A., Mateos, F., Martin-Gullon, I., Font, R., "Organic and inorganic pollutants from cement kiln stack feeding alternative fuels" Journal of Hazardous Materials. 2008. Pg. 585-592.

[41] Richards, J., Goshaw, D., Speer, D., Holder, T., "Air Emissions Data Summary for Portland Cement Pyroprocessing Operations Firing Tire-Derived Fuels." Environmental Science Technology. 2004. Pg. 4734-4738. PCA R&D Serial No. 3050. 2008

discussion is provided only for illustrative purposed to compare metals emissions from conventional fuel firing to metals emissions during hazardous waste fuel firing. As mentioned previously, American Cement is not requesting to use hazardous wastes or materials for fuel.

A comprehensive review was conducted for comparative emissions data. The results provide an in depth comparison of emissions for a broad range of pollutants. Table 5 shows a comparison of metal emissions for various fuels. This table shows that there is no significant difference in metal emissions when burning hazardous waste compared to conventional fuels except for lead and mercury. As will be explained, lead emissions are not expected to increase with the use of Alternative Fuels. Mercury emissions are monitored through materials analysis and must remain compliant with the mercury emission limits of the 2006 and 2010 NESHAPs.

TABLE 5. COMPARISON OF KILNS METAL EMISSIONS - CONVENTIONAL AND HAZARDOUS WASTE

METAL	CK/HWF [b] vs. CK/CF [a]
Antimony	No significant difference
Arsenic	No significant difference
Barium	No significant difference
Beryllium	No significant difference
Cadmium	No significant difference
Chromium	No significant difference
Lead	CK/HWF > CK/CF [d]
Mercury	CK/HWF > CK/CF [d]
Nickel	No significant difference
Selenium	No significant difference [e]
Silver	No significant difference
Thallium	No significant difference
Vanadium	No significant difference
Zinc	No significant difference

[a] Conclusions based on a 95% confidence level (i.e., 95% confidence that the results were not obtained by random chance).
[b] CK/HWF = cement kiln burning hazardous waste fuel.
[c] CK/CF = cement kiln burning only conventional fuel (e.g., coal).
[d] CK/HWF > CK/CF = emissions from cement kiln burning hazardous waste greater than emissions from cement kiln burning only conventional fuel.
[e] Statistical trends suggest CK/HWF < CK/CF.

Metals other than lead and mercury are inherently bound in the clinker and are effectively removed from the kiln system. Volatile metals, such as mercury, primarily exit the kiln with the stack gases and are of concern. It should be remembered that these volatile metals are present in raw materials, traditional fuels and Alternative Fuels; and their presence in Alternative Fuels is typically not any greater than in conventional fuels. A summary of lead and mercury behavior in the cement manufacturing process is presented in the following sections.

MERCURY

The current permitted mercury emission limit for the American Cement kiln are limited to 122 pounds per year; but not to exceed a stack gas concentration of 41 ug/dscm (2006 NESHAP). Because of the volatile nature of this metal, it is assumed that 100 percent of all input mercury is emitted from the cement making process with the stack gases. At American Cement, mercury input (and hence emissions) are monitored by measuring the mercury concentration of all raw materials and fuels, and the use rates of these input streams. Additionally, mercury emissions are monitored with a CEMS. This monitoring, as required by permit, will continue with the use of Alternative Fuels and will provide assurance that mercury emissions will not increase with the use of Alternative Fuels.

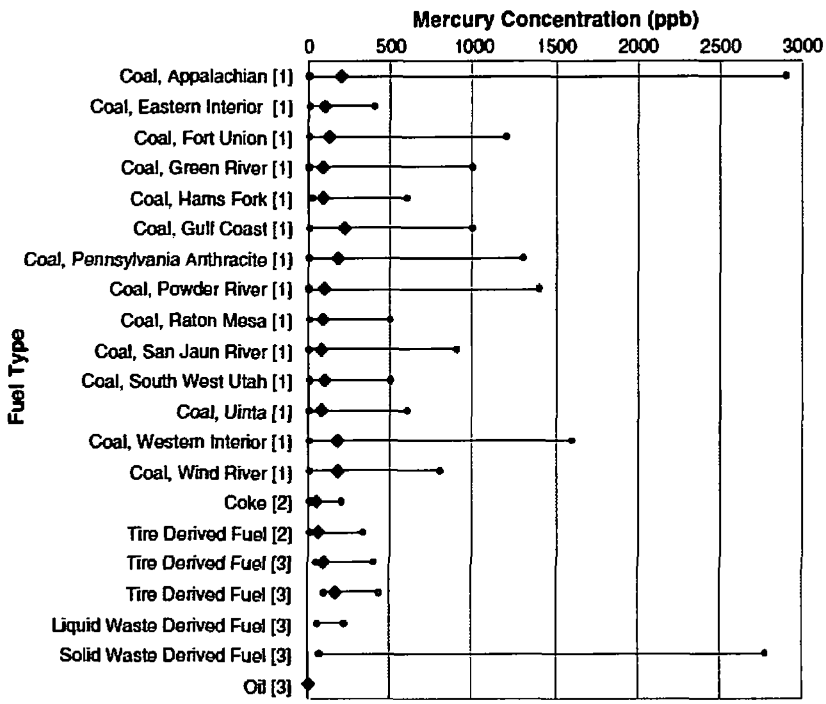

FIGURE 3. COMPARISON OF MERCURY CONCENTRATIONS IN VARIOUS CEMENT MANUFACTURING FUELS. [42]

[42] Sikkema, J.K., Alleman, J.E., Ong, S.K., Wheelock, T.D., "Mercury regulation, fate, transport, transformation, and abatement within cement manufacturing facilities: Review." Science of the Total Environment. 2011. Pg. 4167-4178.

Nonetheless, as shown in Figure 3 above, most Alternative Fuels contain concentrations of mercury that are less than coal. Even some solid waste derived fuels, which have significantly higher mercury concentrations than other alternative fuels still have concentrations on par with Appalachian Coal, which is a conventional fuel. It should also be noted that coal analyses by the USGS have shown coal samples with much higher metals; including mercury, coal, than alternative fuels.[43]

LEAD

The contribution of lead is from raw materials and fuels. The lead content of a typical limestone (80-85 percent of raw materials) is around 3 ppm[44] and the typical lead content of coal is 10 ppm (Kentucky coal)[45]. Since fuel represents approximately 10 percent of the mass input to a cement kiln and raw materials represent 90 percent, the total lead input due to fuel is significantly less than the input from raw materials. Thus, any fuel lead increase resulting from the use of Alternative Fuels should be far below the PSD threshold of 1200 pounds per year. Therefore PSD tracking for lead during the firing of Alternative Fuels is not proposed.

HYDROGEN CHLORIDE

The ratio of sulfates and chlorides to alkalis must be maintained for proper operation of the kiln (this is discussed further in a following section). The bulk of alkali input to the kiln is from raw materials, and alkali levels are low in the limestone from the American Cement quarry. Because of this, the chloride content of all fuels and raw materials used must be monitored. On the positive side, many alternative fuels, such as tires, carpet-derived fuel, paper, roofing materials, have far less chlorides than coal.

The chloride content of the fuels used in the kiln is process-limited to ensure acceptable clinker quality and limit kiln degradation. Additionally, preheater tower buildup and plugging is a function of chlorides in the gas stream. Extended periods of chloride at levels above 0.2 to 0.3 percent are expected to cause build up in the preheater tower as will be discussed in a following section.

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43 http://pubs.usgs.gov/of/2010/1196/ (last visited December 1, 2011)

44 Hill, L; Stevenson, R., Mercury and lead Content in Raw Materials. Portland Cement *Association, R&D serial No. 288.*

45 http://kgs.uky.edu/kgsweb/DataSearching/Coal/Quality/QualitySearch.asp (last visited April 18, 2011)

For these reasons, the Department has assurance that American Cement will not use Alternative Fuels in a manner that causes chloride input to deviate from the existing range; hence chloride emissions are not expected to change with the use of Alternative Fuels.

As a side note, the Portland Cement NESHAP revisions that become effective in 2015 will require HCl monitored by a CEMS.

Greenhouse Gases

Emissions of greenhouse gases (GHG or CO_2) from the pyroprocessing of raw materials in a cement kiln are inherent to cement production. Both the combustion of fuels as well as the chemical reactions necessary to produce cement result in significant GHG emissions. While the net CO_2 emissions per ton of cement has steadily decreased over the last two decades, the fact still remains that cement production releases 5-6 percent of all carbon dioxide generated by anthropogenic sources[46,47]. To date the only practical control available to cement kilns for reduced GHG emissions is the use of alternative fuels and raw materials and/or more efficient operations. In fact, the most recent GHG PSD determination for a cement plant reviewed and recommended a wide range of alternative fuels for GHG reductions[48]. The majority of GHGs originate from limestone ($CaCO_3$) calcination to CaO and CO_2. In addition to limestone calcination, fuel combustion generates GHG emissions in the form of CO_2, methane (CH4) and nitrous oxide (N_2O).

EPA now requires continuous monitoring of CO_2 from cement kilns and annual reporting of GHG emissions per 40 CFR 98. This rule requires that the cement plant GHG report include the fraction of GHG emissions from biogenic sources and 40 CFR 98.34(e) establishes a default value of 20 percent for the biogenic portion of GHG emissions from tires. Of the many reasons that the American Cement is pursuing an alternative fuels program, reduction of GHG emissions is one of the major considerations.

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[46] GNR Project. "Reporting CO2" http://www.wbcsdcement.org/GNR-2009/index.html
47 Rodrigues, F.A., Joekes, I. "Cement industry: sustainability, challenges and perspectives." Environmental Chemistry Letters. 2011. 9:151-166.
[48] NYDEC Permit ID: 4-0124-00001/00112 Facility DEC ID: 40124000, issued 05/27/2011

The PSD evaluation presented herein addresses GHGs. Note however, that the EPA deferred PSD determination of GHG emissions from biogenic sources until 2014. Regardless, the results of the PSD analysis indicate the GHG emissions from the combustion of Alternative Fuels are below PSD thresholds. It should be noted that EPA in recent BACT analysis for both cement kilns and power plants has determined that biogenic materials as alternative fuels are a primary means of reducing GHG emissions.

The use of biogenic fuels as an alternative to fossil fuels has a very important advantage when looking at GHG emissions. The reason for biogenic fuels being more beneficial than fossil fuels when considering GHG emissions is because the CO_2 released from the biogenic source was only recently removed from the atmosphere[49]; whereas CO_2 emitted from fossil fuels was removed eons ago. Through rapid photosynthesis, plants undergo a process called sequestration in which CO_2 is absorbed from the atmosphere and adds to the biomass of biogenic material. Once this process occurs roughly 50 percent of the biomass is carbon by weight. This process contributes to many biogenic fuels being considered to have zero, or reduced CO_2 emissions [64,50]. The rationale for this distinction is the CO_2 released from the biogenic fuel when burned will be consumed by other biogenic sources, which will then be fed back into the cement manufacturing process. In essence, with a consistent biogenic fuel feed and growth rate, the amount of CO_2 released and consumed will remain roughly the same.

Unlike biogenic fuels, when fossil fuels are burned their emissions remain in the atmosphere and have no way of being displaced by other fossil fuel sources. The amount of time required to generate both fuels (biogenic and fossil) also is a factor to consider since the amount of time to generate coal is drastically longer than that of biogenic fuels. The type of alternative fuel used also is important as each fuel has a different composition of biogenic material. Table 6 shows typical percent compositions of biogenic material on a mass basis for select alternative fuels.

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[49] U.S. EPA Office of Air and Radiation, *Guidance for Determining Best Available Control Technology for Reducing Carbon Dioxide Emissions from Bioenergy Production*, March 2011.
[50] Grammelis, P., Agraniotis, M., Kakaras, E., *Co-Utilization of Biomass based Fuels in Pulverized Coal Power Plants in Europe*, July, 2010, Web, Address found: http://onlinelibrary.wiley.com/doi/10.1002/9783527628148.hoc071/full.

TABLE 6. ALTERNATIVE FUELS WITH BIOGENIC MASS FRACTIONS.[51]

Alternative Fuel Source	Biogenic Mass Fraction
Recycled Tires	27
Carpet Waste	36.5
Commercial Waste – Paper	91
Commercial Waste – Plastic	0
Commercial Waste – Packaging	40
Textile Waste	70
Commercial Waste – Other	52
Animal Meals and Fats	100
Processed Municipal Waste	55
Waste Wood (Wood Scraps)	100
Sewage Sludge	100

PCBs

Polychlorinated biphenyls (PCBs) are a type of organic compound with 2 to 10 chlorine atoms attached to a biphenyl, or two joined benzene rings. These compounds are environmentally persistent and toxic. They had many uses, including, but not limited to, coolants and insulating fluids, plasticizers, pesticide extenders, sealants, and adhesives. PCBs today are restricted in use and not commonly found in non-hazardous waste materials. Because of their historical usage, these materials should be addressed as a possible contaminant in Alternative Fuels. American Cement has no intention of knowingly using Alternative Fuels that have any PCB contamination. The following information provides reasonable assurance that any de minims amount of PCBs that might inadvertently enter the kiln system will be effectively destroyed.

The EPA Toxic Substance Control Act (TSCA) specifies that for the incineration of PCBs (99.9999% destruction), a temperature of 2200°F, a residence time of two seconds, and an oxygen concentration of 2-3 percent is required.[52] Further related to the thermal destruction of PCBs, laboratory data from the University of Dayton Research Institute[53] demonstrates that

[51] Soyez, Konrad, and Hartmut Grassl. "Climate Impacts and Emission Mitigation of Industrial Production." *Climate Change and Technological Options: Basic Facts, Evaluation and Practical Solutions.* Wien: Springer, 2008. 107-21. Print.
[52] Karstensen, K.H., *Can Cement Kilns be used for PCB Disposal?,* SINTEF (undated)
[53] Rubey, W.A.; Dellinger, B., et al, *High-Temperature Gas – Phase Formation and Destruction of*

PCB-type compounds are 99.99+ percent destroyed at temperatures in excess of 1830°F with a residence time of two seconds and an oxygen concentration of 2-3 percent. The temperature and time of residence in a kiln system well exceeds these conditions required for effective destruction of PCBs and should provide assurance that any PCB material entering the kiln will be effectively destroyed.

Kiln and Process Impacts

The equipment involved in cement manufacture can be affected by the materials used in the process. The consequences of changes in material inputs include, but are not limited to, unexpected changes in production capacity, thermo stress on equipment, corrosion, and pluggage and buildups. All of these can lead to inefficient operation and/or equipment damage. The type of fuel used in the system can introduce constituents into the process that can interfere with operation as well as the chemistry of the process. For these reasons, American Cement takes all necessary measures to ensure that all raw materials and fuels are carefully monitored and meet the necessary quality specifications for fuel and raw material blends.

Production Changes

Alternative Fuels generally have a higher moisture content than traditional fuels such as coal and petroleum coke. As a result, the amount of exhaust gas produced when burning alternative fuels may increase.[54] Clinker production is often limited by the kiln I.D. fan capacity, so an increase of gas flow can result in decreased clinker production capacity. Elevated moisture in the fuel also can decrease flame temperature, which also can similarly decrease production capacity.

Thermal Stress on Equipment

Cement kilns do not have a uniform temperature profile (See Figure 2). The complex chemical reactions necessary for clinker production require several temperature zones. Because of this, the walls of a kiln are lined with various types of thermally insulating refractory (i.e. brick) in the

Polychlorinated Dibenzofurans, Chemosphere, Vol. 14, No. 10, pp 1483-94, 1985.

[54] MVW Lechtenberg & Partner. "Kiln Impact." Proc. of Workshop Alternative Fuel Project Implementation, Mülheim an Der Ruhr, Germany.

different temperature regions.[55] The use of Alternative Fuels can cause temperature fluctuations in the kiln and/or shifts in the locations of these thermal zones. The difference in heating content and particle size of these Alternative Fuels compared to traditional fuels may cause the flame in the kiln to take a different shape, shifting the location where sintering and transitioning temperatures occur. When this happens, sections of the kiln's interior lining may be subject to temperatures if they were not designed for and cracking or spalling of the brick inside the kiln can occur. [31]

CORROSION

Since the introduction of corrosive compounds through input materials is possible, Alternative Fuels will be closely monitored and screened to prevent damage to the kiln. The main constituents responsible for corrosion in a cement kiln are sulfur and chlorine. Both of these compounds readily form acid gases than can penetrate the refractory lining. The oxygen-poor environment in a cement kiln provides an opportunity for these acid gases to act as the oxygen donors and react with iron lining of the kiln. [56] Additionally, the elevated presence of alkalis inside the kiln can cause alkalis to penetrate the refractory lining and form alkali salt crystals in between the kiln shell and the brick. As these crystals form, they can damage the brick and even cause it to crack. [57] The zones subject to this form of corrosion may change when firing different fuels, so it is important for the fuel types and inputs to be carefully coordinated.

PLUGGING AND BUILDUPS

Monitoring the input of sulfur and chlorine into the cement kiln is paramount to successfully synthesizing cement product. It is necessary to maintain the proper ratio of sulfur to alkalis; otherwise there is a risk of material build-up. A build-up will occur when an excessive amount of condensed solids are formed due to out-of-balance chemical ratios of alkalis, sulfur, and chlorides. If a proper balance is not maintained, a buildup of alkali chlorides and/or alkali

[55] Potgieter, J.H., R.H.M. Godoi, and R. van Grieken. "A case study of high-temperature corrosion in rotary cement kilns." The Journal of The South African Institute of Mining and Metallurgy (Nov. 2004): 603-606. The South African Institute of Mining and Metallurgy. Web. 19 Oct. 2011. <http://www.saimm.co.za/Journal/v104n10p603.pdf>.

[56] Potgieter, J.H., R.H.M. Godoi, and R. van Grieken. "A case study of high-temperature corrosion in rotary cement kilns." The Journal of The South African Institute of Mining and Metallurgy (Nov. 2004): 603-606. The South African Institute of Mining and Metallurgy. Web. 19 Oct. 2011. <http://www.saimm.co.za/Journal/v104n10p603.pdf>.

[57] MVW Lechtenberg & Partner. "Kiln Impact." Proc. of Workshop Alternative Fuel Project Implementation, Mülheim an Der Ruhr, Germany.

sulfates can plug the preheater tower within minutes of a chemical imbalance and require the shutdown of the kiln. The following equation, known as the sulfate modulus, shows the relationship of the three primary components that affect kiln buildup.[58]

$$M = \frac{\frac{SO_3}{80}}{\frac{K_2O}{94} + \frac{Na_2O}{62} - \frac{0.5 * Cl}{35.5}} = 0.8 \; to \; 1.25$$

Impacts on Clinker Quality

When considering the effects that alternative fuels may have on human health and the environment, it is important also to remember that American Cement is manufacturing a salable product. This product must be of consistent and competitive quality; and its quality is directly affected by the raw materials and fuels used in its production. Cement manufacture is unique in Florida in that it produces no waste streams. In a preheater kiln, there are only two mechanisms for compounds to leave the system once they enter:

- Gaseous and particle emissions through the designed emission point (from the stack), and/or
- Entrained in the clinker (as product)

Gaseous and particle emissions have been discussed elsewhere in this application. This section will focus on several characteristics of clinker that can be affected by the use of Alternative Fuels, and thus set limits on certain inputs. The Department can be assured that Alternative Fuels use will be carefully monitored by American Cement in order to successfully meet the requirements to satisfactorily manufacture an acceptable clinker product while operating within permitted limits.

Clinker Formation

Deviations in temperature can affect the formation of clinker crystals inside of a rotary kiln. If heating and cooling of raw feed is too slow, clinker crystals become large and more energy is required for grinding.[59] It is important that fuel substitutions do not significantly alter

[58] Ref: Permit Application, from Permit No. 0250020-031-AC

[59] Wellington, Mark, and Sanjiv Dhanjal. *Optimising Combustion with Alternate Fuels and Monitoring with Online XRD*. Proc. Of ACFM Technical Symposium, Jakarta. Web. <http://www.fct-actech.com/documents/20060711AFCM%202006-FCT%20Conference%20paper.pdf>.

temperature conditions in the kiln. Similarly, the presence of excess sulfur in the fuel will limit gypsum addition, and produce a clinker that is more difficult to grind.[60]

Flowability

A high sulfur fuel can have several effects on the cement product. One of these effects can be the formation of alkali oxides, which can react with the moisture in the air and decrease cement flowability, making it more difficult to transport.[37]

Setting Time

One of the more important features of a cement product is its setting time. Several compounds that may be present in a fuel may adversely affect cement setting time when present in high concentrations. These include, but are not limited to, fluorine, phosphorus, and zinc.[61, 62] The use of Alternative Fuels with elevated levels of these constituents are not acceptable and will not be targeted for use in the American Cement kiln.

Appearance

Some metals, such as manganese, phosphorous have the ability to affect cement color significantly degrading the salability of the cement.[53]

Strength

Arguably the key characteristic of quality cement is its strength. This property can be affected by several different components in fuels. Fluorine, present in in high concentrations, will decrease early strength, though if limited to approximately 0.2 percent and used in conjunction with alkalis and SO_3, strength can be maximized. Metals like titanium and manganese are not volatile and will be entrained into the clinker. These metals also slightly decrease early strength. As well, zinc, copper, vanadium, and lead will slow cement hydration and reduce strength development in concentrations over 0.5 percent. Phosphorus will also reduce early strength. If excess alkalis are present in the fuel, they can enhance early strength, but may reduce late strength.[53]

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[60] Longman, P.A. *Chemistry in the Kiln.*
[52]Longman, P.A. *Chemistry in the Kiln.*
[53] MVW Lechtenberg & Partner. "Kiln Impact." Proc. of Workshop Alternative Fuel Project Implementation, Mülheim an Der Ruhr, Germany.

IMPACT OF ALTERNATIVE FUELS ON EMISSIONS

Emissions resulting from the use of Alternative Fuels are addressed in the following sections for each category of Alternative Fuel considered. Baseline emissions have been addressed in a previous section of this Attachment, and have been set equal to currently permitted emissions for reasons set forth in that Attachment.

In this section, emissions from each category of Alternative Fuel are discussed in qualitative terms and compared with expected emissions from traditional fuels. This discussion is based on a comparison of the properties of the Alternative Fuel and traditional fuels and the factors affecting emissions of each pollutant as addressed in a preceding section, and also on a comprehensive review of data from European cement kilns that show the firing of Alternative Fuels does not increase emissions of air pollutants.[5]

The conclusion of this Section is that the firing of Alternative Fuels as proposed herein will not measurably or significantly affect the emissions of any regulated pollutant. American Cement proposes to demonstrate this by tracking annual emissions in accordance with the requirements of Rule 62-212.300(1)(e), F.A.C.

ENGINEERED FUEL

Engineered fuel is comprised of materials such as those included in the list of requested fuels (e.g. clean woody biomass) and other non-hazardous materials engineered to meet a fuel design specification that will allow American Cement to assure it will meet regulatory limits and produce a quality product. American Cement will work with engineered fuel supply companies, as a contracted provider to meet the design fuel specifications.

Engineered Fuel (EF) is composed of various materials such as, but not limited to, biomass, agricultural byproducts, food processing/milling materials, animal meal, fibrous/plant waste, plastics, paper, cardboard, used animal bedding, carpet, carpet manufacturing byproducts, automotive manufacturing byproducts, wood, treated wood, creosote treated wood (railroad ties, telephone poles), clean-up debris from natural disasters, household/commercial/institutional refuse derived fuels, processed municipal solid waste, rubber, dried/sanitized biosolids (Class A, B only), recovered/reject coal, rubber, tire manufacturing byproducts, TDF, roofing shingles, construction/demolition materials, absorbents, oily contaminated materials, oil absorbents, oil filter fluff, used grease, spent carbon, carbon black, printed paper, printing byproducts, paint filter cake, synthetic materials/fibers, textiles, geotextiles, wax, hospital wastes (including sanitized infectious materials), pharmaceutical, cosmetics, confiscated drugs from law enforcement, non-hazardous industrial byproducts, post-industrial packaging film. The blending and processing of any or all of these materials may also include the addition of used oils or other non-hazardous liquids to ensure a consistent heating value, moisture, particle size, ash content, and volatility. The properties are established based on available AF material supply and are carefully controlled through blending materials or through separation of incombustible materials from combustible materials. American Cement intends that EF will be the primary Alternative Fuels material, processed from available individual materials or EF may be provided by a supplier that can meet American Cement's targeted fuel quality requirements.

EMISSIONS ANALYSIS

The emissions analysis for engineered fuel is based on the results of studies at the Castle Cement Ribblesdale Cement Plant while burning CEMFUEL. CEMFUEL is manufactured from industrial wastes such as paints and printing inks. The main constituents include solvents, working fluids (oils, lubricants, etc.), contaminated fuels, organic sludge (e.g. food industry wastes) and other organic chemical products. The emission results from this study show that emissions are comparable to that of traditional fuels and hence, no change in emissions will be expected with EFs.

TABLE 7. ENGINEERED FUEL EMISSION FACTORS

Engineered Fuel Emissions - Direct Comparison
Based on Testing Conducted at the Castle Cement, Ribblesdale Plant (CEMFUEL)

	Measured Stack Emission Factors (EF)				
	SO_2	NO_x	CO	VOC	PM
Castle Cement Baseline EF	45 mg/Nm³	513 mg/Nm³	1526 mg/Nm³	51 mg/Nm³	25 mg/Nm³
Castle Cement Alt. Fuel EF	13 mg/Nm³	420 mg/Nm³	1651 mg/Nm³	50 mg/Nm³	8 mg/Nm³
Observed Change in Emissions (%)	-71.11%	-18.13%	8.19%	-1.96%	-68.00%
*American Cement Baseline EF**	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	1.8E-2 lb/mmbtu	0.50 lb/mmbtu	1.0 lb/mmbtu	9.5E-2 lb/mmbtu	1.5E-2 lb/mmbtu

* - *Baseline EF based on permitted emission limits*

TIRE-DERIVED FUEL (TDF)

Tire-derived fuel consists of whole or shredded used tires that may have some or all of the steel belting material. TDF may also include tirefluff. Tires are readily available and have a higher heating value than coal. The high temperatures, long residence times, and inherent scrubbing that take place within a cement kiln provide an environment conducive to the efficient combustion of tires. For these reasons, firing tire-derived fuels in cement kilns has become relatively common practice in Florida and elsewhere in the U.S. and other countries. Additionally, combustion of TDF alleviates problems associated with the stockpiling or landfilling of waste tires. Use of TDF in cement kilns has already been approved for a number of Florida cement production facilities including American Cement.

Table 8 is from the FDEP Technical Evaluation for permit number 0530021-022-AC. This FDEP information indicates that tires and tire-derived fuel should either not change or reduce emissions except zinc.

EMISSIONS ANALYSIS

Emission factors for TDF are based on whole tire burning at the Tarmac Pennsuco Cement Plant. The information found in Table 9, demonstrate that no change in emissions are expected with TDF.

TABLE 8. GENERAL EXPECTED EFFECTS OF TDF ON EMISSIONS

Pollutant	Expected Effect of TDF/Scrap Tire
CO	None
SO2	None
NOx	Decrease
PM	None
Total Hydrocarbons	None
Zinc	Increase
Other Metals	None or Decrease
Dioxins/Furans	None
Benzene	Decrease
Formaldehyde	Decrease
Semi-volatiles	Decrease

The above results are consistent with a USEPA report citing that "with the exception of zinc emissions, potential emissions from TDF are not expected to be very much different from other conventional fossil fuels, as long as combustion occurs in a well-designed, well-operated, and well-maintained combustion device".[Emphasis added.] The data above is also consistent with claims of NO_X *reductions as a result of firing TDF.* [0530021-022-AC]

TABLE 9. TIRE DERIVED FUEL EMISSION FACTOR

Tire-Derived Fuel Emissions - Direct Comparison

Based on Testing Conducted at the Tarmac America LLC, Pennsuco Cement Plant (Tire Derived Fuel)

	Measured Stack Emission Factors (EF)				
	SO_2	NO_x	CO	VOC	PM
Tarmac Baseline EF	0.012 lb/ton C	1.964 lb/ton C	1.409 lb/ton C	0.125 lb/ton C	0.042 lb/ton C
Tarmac Alt. Fuel EF	0.011 lb/ton C	1.922 lb/ton C	1.534 lb/ton C	0.100 lb/ton C	0.043 lb/ton C
Observed Change in Emissions (%)	-13.88%	-2.16%	8.83%	-20.27%	3.61%
*American Cement Baseline EF**	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	5.4E-2 lb/mmbtu	0.60 lb/mmbtu	1.0 lb/mmbtu	7.7E-2 lb/mmbtu	5.0E-2 lb/mmbtu

* - *Baseline EF based on permitted emission limits*

PLASTICS

Plastics are any of a group of synthetic or natural organic materials that include many types of resins, resinoids, polymers, cellulose derivatives, casein materials, and proteins. A typical plastic is polyethylene plastic used in agricultural and silvicultural operations which may include incidental amounts of chlorinated plastics. The energy content of plastics ranges from 1.0-1.5 times that of coal. The high temperatures, long residence times, and inherent scrubbing that take place within a cement kiln and calciner provide an environment well suited to the efficient combustion of plastics. While there is a broad range of plastic compositions, it should be noted that chlorinated plastics (which can typically have up to 50 percent mass of chlorine) as fuel for cement kilns are unacceptable. As mentioned above, kiln chemistry is negatively impacted by high chlorides which can lead to plugging in the preheater, damage the kiln and effect clinker quality. The sulfate modulus described above is a calculated measure for determining an acceptable chloride level, given the sulfur and alkali levels in a kiln system.

EMISSIONS ANALYSIS

The emissions analysis for plastic is based on the results of a study done at the Lafarge Whitehall Cement Plant in Whitehall Township, PA while burning plastic derived fuel (PDF). This study was performed in 2005, for NO_x, CO and SO_2 and showed a net decrease in emissions. The results from this study show that emissions were comparable to that of traditional fuels and hence, no change in emissions is expected with PDFs.

TABLE 10. CALCULATION OF PROJECTED PLASTICS EMISSION FACTOR

Plastics Emissions - Direct Comparison

Based on Testing Conducted at the LaFarge, Whitehall Plant (Plastic Derived Fuel) and AP-42

	Measured Stack Emission Factors (EF)				
	SO_2	NO_x	CO	VOC	PM
LaFarge Baseline EF	166 lb/hr	162 lb/hr	915 lb/hr	--	1.64 lb/hr
LaFarge Alt. Fuel EF	77 lb/hr	101 lb/hr	330 lb/hr	--	2.15 lb/hr
Observed Change in Emissions (%)	-53.61%	-37.65%	-63.93%	--	31.10%
*American Cement Baseline EF***	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	2.9E-2 lb/mmbtu	0.38 lb/mmbtu	0.3 lb/mmbtu	8.8E-3 lb/mmbtu*	6.3E-2 lb/mmbtu

**Based on Table 2.5-7 from AP42, Used Plastic, Forced Air (Benzene + Toluene + Ethyl Benzene + 1-Hexene), assumed heat value of 14600 btu/lb*

*** - Baseline EF based on permitted emission limits*

AGRICULTURAL BIOGENIC MATERIALS

Agricultural biogenic materials include organic materials from agricultural operations such as peanut hulls, rice hulls, corn husks, citrus peels, cotton gin byproducts, animal bedding, etc. These materials are typically of little value to farmers but have significant heating value and raw materials (e.g., silica, iron). The materials can provide significant heat content and other constituents acceptable for kiln firing and clinker production.

EMISSIONS ANALYSIS

The emissions analysis for agricultural byproducts is based on the results of a reported study done at CEMEX's Miami Cement Plant in Miami, FL while burning woody biomass. This study, which was performed in 2010, saw a net decrease in NO_x and SO_2 and increases of CO and VOC. This study was a short term trial and had periods of startup/shutdown of the injection equipment that limited the amount of emissions data and the amount of time for the kiln operators to learn to use the equipment. The emission results from this study show that emissions were comparable to those from traditional fuels and hence, no change in emissions is expected.

TABLE 11. CALCULATION OF PROJECTED AGRICULTURAL BIOGENIC MATERIALS EMISSION FACTOR

Agricultural Biogenic Materials Emissions - Direct Comparison

Based on Testing Conducted at the CEMEX, Miami Cement Plant (Woody Biomass) and AP-42

	Measured Stack Emission Factors (EF)				
	SO_2*	NO_x*	CO*	VOC*	PM
Cemex Baseline Emission Factor (EF) =	0.041 lb/ton C	2.704 lb/ton C	542.139 lb/ton C	0.060 lb/ton C	--
Cemex Alt. Fuel Emission Factor (EF) =	0.031 lb/ton C	2.059 lb/ton C	562.359 lb/ton C	0.071 lb/ton C	--
Observed Change in Emissions (%)	-24.10%	-23.85%	3.73%	18.55%	--
*American Cement Baseline EF****	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	4.8E-2 lb/mmbtu	0.46 lb/mmbtu	0.94 lb/mmbtu	1.1E-1 lb/mmbtu	2.5E-2 lb/mmbtu**

**Based on Test period from September 2010 to November 2010*

***Based on Table 1.6-1 from AP42*

**** - Baseline EF based on permitted emission limits*

Carpet Derived Fuel

In the US, approximately 2 million tons of carpet is replaced annually. Most carpet is disposed of in landfills. Carpet is composed in part of non-chlorinated plastic and has an overall heating value similar to that of coal. Additionally, carpet contains a significant fraction (up to 30 percent by weight) of CaCO3 in the backing material. This material is a beneficial component of cement production.[63]

Emissions Analysis

The emissions analysis for carpet derived fuel is based on the results of a study done at the Lafarge Whitehall Cement Plant in Whitehall Township, PA while burning plastic derived fuel (PDF). This study, which was performed in 2005, was chosen to represent the emissions of carpet derived fuel due to its non-chlorinated plastic composition. The emission results from this study show that emissions were comparable to those from traditional fuels and hence, no change in emissions is expected.

TABLE 12. CALCULATION OF PROJECTED CARPET DERIVED FUEL EMISSION FACTOR

Carpet-Derived Fuel Emissions - Direct Comparison

Based on Testing Conducted at the LaFarge, Whitehall Plant (Plastic Derived Fuel) and AP-42

	Measured Stack Emission Factors (EF)				
	SO_2	NO_x	CO	VOC	PM
LaFarge Baseline EF	166 lb/hr	162 lb/hr	915 lb/hr	--	1.64 lb/hr
LaFarge Alt. Fuel EF	77 lb/hr	101 lb/hr	330 lb/hr	--	2.15 lb/hr
Observed Change in Emissions (%)	-53.61%	-37.65%	-63.93%	--	31.10%
*American Cement Baseline EF***	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	2.9E-2 lb/mmbtu	0.38 lb/mmbtu	0.3 lb/mmbtu	8.8E-3 lb/mmbtu*	6.3E-2 lb/mmbtu

**Based on Table 2.5-7 from AP42, Used Plastic, Forced Air (Benzene + Toluene + Ethyl Benzene + 1-Hexene), assumed heat value of 14600 btu/lb*

*** - Baseline EF based on permitted emission limits*

[63] Carpet Derived Fuel - Emissions from Combustion of Post-consumer Carpet in a cement Kiln, P Lemieux, et al. , IT3 conference 2005. Paper for presentation at the 2005 Conference on Incineration and Thermal Treatment Technologies, Galveston, TX, May 9-13, 2005

CELLULOSIC BIOMASS

American Cement is proposing two categories of cellulosic biomass. The first category is untreated cellulosic biomass, which includes materials such as peanut hulls, rice hulls, corn husks, citrus peels, cotton gin byproducts, animal bedding and other similar types of materials. The second category is treated or manufactured cellulosic biomass which does not meet the definition of untreated cellulosic biomass. For example treated cellulosic biomass could include preservative-treated wood that may contain treatments such as creosote, copper-chromium-arsenic (CCA) or ACQ, painted wood, or resinated woods (plywood, particle board, medium density fiberboard, oriented strand board, laminated beams, finger-jointed trim and other sheet goods). As a conservative measure, American Cement will limit the firing of CCA-treated lumber to 1,000 pounds per hour on a 7-operational day average. This represents about one percent of the heat input to the kiln (400 mmBTU/hr). In comparison, studies have recommended limiting CCA-treated wood to less than 10 percent of the kiln heat input, on the basis of the negative impact of chromium on cement quality; and not on air emissions. Additional information on the air emission impacts and clinker quality from firing CCA-treated wood in cement kilns is found in references.[64,65,66,67]

The potential for CCA emissions can be represented by the following example. The typical concentrations of copper, chromium and arsenic in treated lumber can range from 0.2 to 2.5 pounds per cubic foot. Using a very conservative scenario, the concentration of copper, chromium and arsenic in the CCA wood is assumed to be 2.5 pounds per cubic foot and the typical density of treated wood is 35 lbs/cubic foot.[68] This treatment rate results in copper, chromium and arsenic concentrations in treated lumber of 12,000, 21, and 19,000 mg/kg, respectively. Assuming 1000 pounds of CCA treated lumber is fired hourly, the input rate of

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64 Bernardin, G. 1995. St. Lawrence Cement. Proceedings of the CITW Life Cycle Assessment Workshop. June 20-21. Canadian Institute of Treated Wood, Ottawa, Ont.

65 Development of design criteria for integrated treatment technologies for thermal processing of end-of-life CCAtreated timber products – Vol 2. PN04.2012.Australian Govt. Forest and Wood Products Research and Development Corp.

66 Guidelines Disposal of Wastes in Cement Plants, October 2005. Swiss Agency for the Environment, Forest, and Landscapes SAEFL.

67 Millette, L. and A. Auger. 1997. Integrated management of used treated wood. Paper presented at the Workshop on Utility Poles - Environmental Issues. Madison Wisconsin, Oct. 13 and 14, 1997.

68 (http://www.floridacenter.org/publications/Ma0650892.pdf)

copper, chromium and arsenic to the kiln would be 12, 21 and 19 pounds per hour respectively. The emitted fractions of the metals is 0.0005 percent based on data presented by the German Cement Industry. Using this emission factor and amounts of metals input into the kiln, the worst case annual emissions would be less than 1.0 pounds of each CCA constituent.

EMISSIONS ANALYSIS

The emissions analysis for woody biomass is based on the results of a study done at CEMEX's Miami Cement Plant in Miami, FL while burning woody biomass. This study, which was performed in 2010, saw a net decrease in NO_x and SO_2. The results from this study show that emissions were comparable to those from traditional fuels and hence, no change in emissions is expected.

TABLE 13. CALCULATION OF PROJECTED CELLULOSIC BIOMASS EMISSION FACTOR

Cellulosic Biomass Emissions - Direct Comparison

Based on Testing Conducted at the CEMEX, Miami Cement Plant (Woody Biomass) and AP-42

	Measured Stack Emission Factors (EF)				
	SO_2*	NO_x*	CO*	VOC*	PM
Cemex Baseline Emission Factor (EF) =	0.041 lb/ton C	2.704 lb/ton C	542.139 lb/ton C	0.060 lb/ton C	–
Cemex Alt. Fuel Emission Factor (EF) =	0.031 lb/ton C	2.059 lb/ton C	562.359 lb/ton C	0.071 lb/ton C	–
Observed Change in Emissions (%)	-24.10%	-23.85%	3.73%	18.55%	–
*American Cement Baseline EF****	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	4.8E-2 lb/mmbtu	0.46 lb/mmbtu	0.9 lb/mmbtu	1.1E-1 lb/mmbtu	2.5E-2 lb/mmbtu**

*Based on Test period from September 2010 to November 2010

**Based on Table 1.6-1 from AP42

*** - *Baseline EF based on permitted emission limits*

Roofing Materials

Roofing materials have a significant heat content and raw materials that are very consistent. This material is an excellent source of raw material and energy for cement production. Roofing materials are primarily roof shingles. Such shingles are no longer manufactured with asbestos and the supplier can provide written certification of this assertion.

A series of 27,694 studies from 1994 to 2007 indicated that only 1.53 percent of the roofing shingle samples contained asbestos[69] so there is a slight probability that some small amount of asbestos could enter the kiln with Alternative Fuels. But, when introduced to a cement kiln, asbestos will be subject to temperatures in excess of 2000 °F. Studies have shown that asbestos minerals subject to temperatures in excess of 1000 °F undergo an irreversible conversion to a different crystalline phase and become non-hazardous.[70,71] This means that any asbestos containing materials present in alternative fuels will be effectively destroyed and not produce hazardous emissions once in the kiln environment.

The tar based filler of the shingles will burn similar to coal or oil, and as a result, no change in emissions is expected.

Emissions Analysis

The emissions analysis for shingles is based on the results of a study done at the Lafarge Brookfield Cement Plant in Nova Scotia, Canada while burning shingles. The emission results from this study show that emissions were comparable to those from traditional fuels and hence, no change in emissions is expected.

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[69] Innovative Waste Consulting Services, LLC. "Environmental Issues Associated With Asphalt Shingle Recycling.Web. <http://www.shinglerecycling.org/sites/www.shinglerecycling.org/files/shingle_PDF/EPA%20Shingle%20Report_Final.pdf>.

[70] Manley, Kirk. "Asbestos Abatement/Destruction Using Plasma Arc Technology." Feb. 1998. Web. 03 Nov. 2011. <http://owww.cecer.army.mil/facts/sheets/UL37.html>.

[71] Jameson, Rex. Asphalt Roofing Shingles into Energy Project. Rep. Print.

TABLE 14. CALCULATION OF PROJECTED ROOFING MATERIALS EMISSION FACTOR

Roofing Materials Emissions - Direct Comparison
Based on Testing Conducted at the LaFarge Brookfield (Shingles) Cement Plant

	Measured Stack Emission Factors (EF)				
	SO_2	NO_x	CO	VOC	PM
LaFarge's Baseline Emission Factor (EF)	42.22 ug/Nm³	37.57 ug/Nm³	20.00 ug/Nm³	1.54 ug/Nm³	2.34 ug/Nm³
LaFarge's Alt. Fuel Emission Factor (EF)	45.00 ug/Nm³	39.80 ug/Nm³	18.60 ug/Nm³	2.02 ug/Nm³	3.35 ug/Nm³
Observed Change in Emissions (%)	6.58%	5.94%	-7.00%	31.17%	43.16%
*American Cement Baseline EF***	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	6.7E-2 lb/mmbtu	0.65 lb/mmbtu	0.84 lb/mmbtu	1.3E-1 lb/mmbtu	6.9E-2 lb/mmbtu

**Test conducted with facility co-firing chipped tyres at 40% substitution, and PSP at 17% substitution*

*** - Baseline EF based on permitted emission limits*

BIOSOLIDS

Biosolids are solid or semi-solid materials that are created during the treatment of wastewater. As such, the characteristics of this material are consistent. Historically, this material is disposed of via three methods; use as a fertilizer for agriculture, landfilling and incineration[72]. Recently its use as an energy substitute in industrial processes has increasingly gained interest. When used in a cement kiln as a partial substitute for traditional fuels, the complete elimination of this waste is achieved while concurrently producing energy. The metals present in the sludge are bound in the clinker and become part of the product. And as the material is a biomass, there is a significant reduction in greenhouse gases that are emitted[73]. Results from a study in Vallcarca, Spain showed the human health risk/benefit associated with the substitution of 20 percent of a traditional cement kiln fuel with biosolids were comparable to the risk/benefits of using traditional fuel[74].

[72] Morton, E.L., "A Sustainable Use For Dried Biosolids" WEFTEC. 2006. Pg. 2060-2067.

[73] Zabaniotou, A., Theogilou, C., "Green energy at cement kiln in Cyprus- Use of sewage sludge as a conventional fuel substitute" Renewable and Sustainable Energy Reviews. 2008. Pg. 531-541.

[74] Rovira, J., Mari, M., Nadal, M., Schuhmacher, M., Domingo, J.L., "Use of sewage sludge as secondary fuel in a cement plant: human health risks" Environment International. 2011. Pg. 105-111.

EMISSIONS ANALYSIS

The emissions analysis for biosolids is based on the results of a study done at the Lafarge Cauldon Woods Plant while burning processed sewage pellets (PSP). The emission results from this study show that emissions were comparable to those from traditional fuels and hence, no change in emissions is expected.

TABLE 15. CALCULATION OF PROJECTED BIOSOLIDS EMISSION FACTOR

Biosolids Emissions - Direct Comparison

Based on Testing Conducted at the LaFarge, Cauldron Works Plant (Process Sewage Pellets)

Biosolids	Measured Stack Emission Factors (EF)				
	SO_2	NO_x	CO	VOC	PM
LaFarge Baseline Emission Factor (EF) =	59	713	1434	121	19
LaFarge Alt. Fuel Emission Factor (EF) =*	43	765	1488	132	14
Observed Change in Emissions (%)	-27.12%	7.29%	3.77%	9.09%	-26.32%
*American Cement Baseline EF***	6.3E-2 lb/mmbtu	0.61 lb/mmbtu	0.91 lb/mmbtu	9.7E-2 lb/mmbtu	4.8E-2 lb/mmbtu
American Cement Predicted Alt. Fuel EF	4.6E-2 lb/mmbtu	0.65 lb/mmbtu	0.9 lb/mmbtu	1.1E-1 lb/mmbtu	3.5E-2 lb/mmbtu

**Test conducted with facility co-firing chipped tyres at 40% substitution, and PSP at 17% substitution*

** - *Baseline EF based on permitted emission limits*

Attachment B
Letter to Florida Department of Environmental Protection with Plant Capacity Assurance

AMERICAN CEMENT COMPANY

July 3, 2012

Jeffrey Koerner, P.E.
Program Administrator
Florida Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Road, MS 5500
Tallahassee, FL 32399-2400

Dear Jeff,

In 2005, American Cement Company, LLC was issued an Air Construction permit by the Florida Department of Environmental Protection Agency to construct a Greenfield Cement Plant in Sumterville, Sumter County, Florida.

The permit was issued for a facility that would eventually produce 125 tons per hour (1,095,000 annually) of clinker.

On September 19, 2011, the department issued the proposed Title V Operating Permit subjected to review by the United States Environmental Protection Agency.

During our recent equipment supplier warranty and guarantee testing, it was obvious the kiln system, as constructed, was capable of more production. It is not unusual for Greenfield Plants to be able to produce more capacity than that originally specified by the equipment supplier.

While employed by Florida Rock Industries, Inc., where I constructed a similar system to that of American Cement Company, LLC, we requested and were granted an increase in capacity as a result of the plants ability to produce more than originally granted in the initial Title V permit.

From my own experience, and that which we have obtained during operations at our Sumterville plant, American Cement believes it can easily achieve an additional 10% production capacity through all processing areas.

We respectfully request the department to increase our clinker production capacity on an hourly rate to 137.50 stph with an annual clinker production of 1,204,500. Input capacity adjustments and throughput rate adjustments for various pieces of equipment will be made (without physical modification) in order to achieve and/or accommodate the new clinker capacity.

Additionally, we request an increase in our cement grinding capacity from a nominal 1,150,000 stpy to 1,300,000 stpy to allow for the processing of additional clinker production.

American Cement Company's facility has been designed to easily achieve the additional capacity due to equipment being oversized in many areas.

Our kiln ID fan operates with a variable frequency drive allowing for airflow adjustment as required. We currently allow only 20% of the airflow capacity to pass at full production. Given nearly 80% more airflow available, we can easily achieve an increase in production.

At full production, the kiln is loaded to only 60% of drive capacity, which again allows for more material throughput with no changes required.

The clinker coder is oversized and will easily handle 3300 tpd. Not only are the cooling fans capable of additional air capacity, the intermediate roll crusher allows for increased processing.

The coal mill is rated for 20 tph. Currently at maximum capacity, we are only grinding at 14 tph. The additional volume is sufficient to reach the higher production rate.

Based on my experiences with several Greenfield Plants and numerous other cement manufacturing facilities around the country, it is my opinion the American Cement Sumterville Plant will easily achieve 3300 stpd clinker with its current configuration.

Should you have any questions, please feel free to contact me.

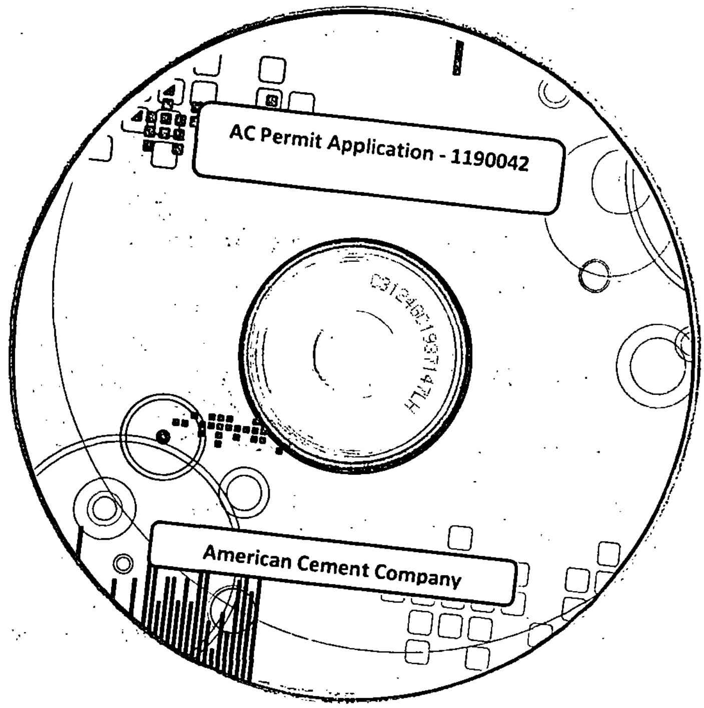
Sincerely,

AMERICAN CEMENT COMPANY, LLC

Cary O. Cohrs
President

Copy: Brian Accardo, FDEP, Tallahassee
Syed Arif, FDEP, Tallahassee

COC/wsp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