CEMEX CONSTRUCTION MATERIALS FLORIDA, LLC

BROOKSVILLE SOUTH CEMENT PLANT

FACILITY ID: 0530021

Kiln No. 2 (EU 044)

AIR CONSTRUCTION PERMIT APPLICATION

SHORT-TERM TRIAL TESTING OF ENGINEERED FUEL

SUBMITTED May 24, 2011

RECEIVED
MAY 26 2011
BUREAU OF
AIR REGULATION

307-11-07

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

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KA 307-11-07
May 24, 2011

Mr. Jeff Koerner
Bureau of Air Regulation
Florida Dept. of Environmental Regulation
2600 Blair Stone Road, MS 5500
Tallahassee, Florida 32399-2400

RE: ***AC Permit Application: Modification of 0530021-031-AC***
Request to Add Engineered Fuel and other minor changes
CEMEX Construction Materials Florida, LLC

Dear Mr. Koerner:

Enclosed please find four (4) copies of application to modify the existing permit 0530021-031-AC to include short term trial testing of engineered fuel in the Kiln No. 2 system at the CEMEX Construction Materials, LLC, Brooksville South Cement Plant. The engineered fuel is requested to be trial tested to replace conventional fossil fuels such as coal or petroleum coke. As the application discusses, engineered fuel markets are well established throughout many developed countries and have shown significant environmental benefits for reduced air pollution and resource conservation. As well, engineered fuels reduce the variability of fuel properties of other common alternative fuels, such as moisture in biomass, to create a much more consistent and controlled fuel. This consistency and control allows a more efficient combustion of the fuel and thereby further reducing air pollutants, reducing negative impacts of the fuel on the kiln system and ensures optimum product quality. CEMEX is proud to be a leader in innovative and environmentally progressive techniques to establish the value to reduce, re-use, and recycle recovered materials. We look forward to working with you to move this proposed project to a reality.

Please feel free to contact me at (352) 377-5822 or mlee@kooglerassociates.com if you have any questions regarding this submittal. I sincerely appreciate your time and consideration for this innovative project.

Best Regards,

Max Lee, Ph.D., P.E.
KOOGLER AND ASSOCIATES, INC.

cc: George Townsend, CEMEX
Lillian Deprimo, CEMEX (email only)

Enc:

Department of Environmental Protection

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: **CEMEX Construction Materials Florida, LLC**	
2. Site Name: **Brooksville South Cement and Power Plant**	
3. Facility Identification Number: **0530021**	
4. Facility Location... Street Address or Other Locator: **10311 Cement Plant Road** City: **Brooksville** County: **Hernando** Zip Code: **34601**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: **Maxwell R. Lee, Ph. D, P. E.**
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. **13** Fax: **(352) 377-7158**
4. Application Contact E-mail Address: **mlee@kooglerassociates.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 5/26/11	3. PSD Number (if applicable):
2. Project Number(s): 0530021-035-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

This application requests to modify the current permit, 0530021-031-AC to include an additional material, engineered fuel, in the list of materials. As well, CEMEX request to remove the requirement to analyze for fluorine, and remove the requirement in the summary report (sp. Cond. 18) to evaluate fuel costs and comparison per 40 CFR 241.3(d)(1). Details of the project are provided in Appendix 1. Appendix 2 includes example material analysis of Eng. Fuel.

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
044	Kiln No. 2/Preheater/Precalciner/Clinker Cooler	NA	NA

Application Processing Fee

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

Owner/Authorized Representative Statement

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

1. Owner/Authorized Representative Name :
   Jim Daniel, Cement Plant Manager
2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: **CEMEX Construction Materials Florida, LLC**
   Street Address: **10311 Cement Plant Road**
   City: **Brooksville** State: **Florida** Zip Code: **34601**
3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(352) 799-7881** ext. Fax: **(352) 540-4794**
4. Owner/Authorized Representative E-mail Address: **jdaniel@cemexusa.com**
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: 5/19/11

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:

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):

- [X] 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 or CAIR source.

3. Application Responsible Official Mailing Address...
Organization/Firm: **CEMEX Construction Materials Florida, LLC**
Street Address: **10311 Cement Plant Road**
City: **Brooksville** State: **Florida** Zip Code: **34601**

4. Application Responsible Official Telephone Numbers...
Telephone: **(352)799-7881** ext. Fax: **(352) 540 -4794**

5. Application Responsible Official E-mail Address: **jdaniel@cemexusa.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

Professional Engineer Certification

1. Professional Engineer Name: **Maxwell R. Lee, Ph. D, P. E.**
   Registration Number: **58091**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Koogler & Associates**
   Street Address: **4014 NW 13th Street**
   City: **Gainesville** State: **FL** Zip Code: **32609**
3. Professional Engineer Telephone Numbers...
   Telephone: **(352) 377 - 5822** ext. **13** Fax: **(352) 377-7158**
4. Professional Engineer E-mail Address: **mlee@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 5/25/11
Date

(seal)

* Attach any exception to certification statement.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **360.0** North (km) **3162.5**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **32**	6. Facility SIC(s): **3241**
7. Facility Comment :			

Facility Contact

1. Facility Contact Name: **George Townsend, Environmental Manager**
2. Facility Contact Mailing Address... Organization/Firm: **CEMEX Construction Materials Florida, LLC** Street Address: **10311 Cement Plant Road** City: **Brooksville** State: **Florida** Zip Code: **34601**
3. Facility Contact Telephone Numbers: Telephone: **(325) 799-7881** ext. Fax: **(352) 799-6088**
4. Facility Contact E-mail Address: **gtownsend@cemexusa.com**

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official E-mail Address:

FACILITY INFORMATION

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. ☒ Title V Source	
4. ☒ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☒ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. ☒ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. ☒ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:	

The Cement Plant is subject to;
40 CFR 60 Subpart F: Standards of Performance for Portland Cement Plants (superceded by 40 CFR 63, Subpart LLL);
40 CFR 60, Subpart Y: Standards of Performance for Coal Preparation Plants; and
40 CFR 63 Subpart LLL: National Emission Standards for Hazardous Air Pollutants from the Portland Cement Industry.

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
PM	**A**	**N**
PM_{10}	**A**	**N**
SO_2	**A**	**N**
NO_x	**A**	**N**
CO	**A**	**N**
HAPs	**A**	**N**
D/F	**B**	**N**
H114	**B**	**N**
SAM	**B**	**N**
FL	**B**	**N**

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility-Wide Cap [Y or N]? (all units)	3. Emissions Unit ID's Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1.	Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID:_____ ☒ Previously Submitted, Date: **Nov. 2010**
2.	Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID:_____ ☒ Previously Submitted, Date: **Nov. 2010**
3.	Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID:_____ ☒ Previously Submitted, Date: **Nov. 2010**

Additional Requirements for Air Construction Permit Applications

1.	Area Map Showing Facility Location: ☐ Attached, Document ID:_____ ☒ Not Applicable (existing permitted facility)
2.	Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): ☒ Attached, Document ID: **1**
3.	Rule Applicability Analysis: ☒ Attached, Document ID: **1**
4.	List of Exempt Emissions Units: ☐ Attached, Document ID:_____ ☒ Not Applicable (no exempt units at facility)
5.	Fugitive Emissions Identification: ☒ Attached, Document ID: **1** ☐ Not Applicable
6.	Air Quality Analysis (Rule 62-212.400(7), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable
7.	Source Impact Analysis (Rule 62-212.400(5), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable
8.	Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable
9.	Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable
10.	Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for FESOP Applications - NA

1. List of Exempt Emissions Units:
   ☐ Attached, Document ID:_____ ☐ Not Applicable (no exempt units at facility)

Additional Requirements for Title V Air Operation Permit Applications - NA

1. List of Insignificant Activities: (Required for initial/renewal applications only)
   ☐ Attached, Document ID:_____ ☐ Not Applicable (revision application)

2. Identification of Applicable Requirements: (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought)
   ☐ Attached, Document ID:_____
   ☐ Not Applicable (revision application with no change in applicable requirements)

3. Compliance Report and Plan: (Required for all initial/revision/renewal applications)
   ☐ Attached, Document ID:_____
   Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.

4. List of Equipment/Activities Regulated under Title VI: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID:_____
   ☐ Equipment/Activities Onsite but Not Required to be Individually Listed
   ☐ Not Applicable

5. Verification of Risk Management Plan Submission to EPA: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID:_____ ☐ Not Applicable

6. Requested Changes to Current Title V Air Operation Permit:
   ☐ Attached, Document ID:_____ ☐ Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Facilities Subject to Acid Rain, CAIR, or Hg Budget Program

1. Acid Rain Program Forms:

   Acid Rain Part Application (DEP Form No. 62-210.900(1)(a)):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☒ Not Applicable (not an Acid Rain source)

   Phase II NO_X Averaging Plan (DEP Form No. 62-210.900(1)(a)1.):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☒ Not Applicable

   New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☒ Not Applicable

2. CAIR Part (DEP Form No. 62-210.900(1)(b)):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☒ Not Applicable (not a CAIR source)

Additional Requirements Comment

The Power Plant Boiler (EU 018) ONLY, is subject to CAIR. EU 018 is separately owned (Arroyo Energy) and operated (operator is Central Power & Lime) from Cemex.

EMISSIONS UNIT INFORMATION
Section [1] of [1]

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION
Section [1] of [1]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

☐ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

☒ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Kiln No.2/Preheater/Precalciner/Clinker Cooler/Raw Mill

3. Emissions Unit Identification Number: **044**

4. Emissions Unit Status Code: **A**	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: **32**

8. Federal Program Applicability: (Check all that apply)

☐ Acid Rain Unit

☐ CAIR Unit

9. Package Unit:
Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

EMISSIONS UNIT INFORMATION
Section [1] of [1]

Emissions Unit Control Equipment/Method: Control **1** of **3**

1. Control Equipment/Method Description: **Baghouse – High Temperature**
2. Control Device or Method Code: **016**

Emissions Unit Control Equipment/Method: Control **2** of **3**

1. Control Equipment/Method Description: **Selective Noncatalytic Reduction (SNCR)**
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control **2** of **3**

1. Control Equipment/Method Description: **Staged Combustion**
2. Control Device or Method Code: 025

EMISSIONS UNIT INFORMATION
Section [1] of [1]

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **206.3 TPH (1-hr); 4,620 TPD; 1,686,300 TPY dry preheater feed & flyash rate**	
2. Maximum Production Rate: **125 TPH (1-hr); 2,800 TPD; 1,022,000 tons/consecutive 12-mo. clinker**	
3. Maximum Heat Input Rate: **390** million Btu/hr **(pyroprocessing system)**	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8,760** hours/year
6. Operating Capacity/Schedule Comment:	

EMISSIONS UNIT INFORMATION
Section [1] of [1]

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **Kiln 2**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Equipment ID 331.BF300**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **318** feet	7. Exit Diameter: **10.1** feet
8. Exit Temperature: **270** °F	9. Actual Volumetric Flow Rate: **311,000** acfm	10. Water Vapor: **12.2** %
11. Maximum Dry Standard Flow Rate: **194,000** dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment:		

EMISSIONS UNIT INFORMATION
Section [1] of [1]

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; Natural Gas; Cement Kiln/Dryer – Kiln and Precalciner**		
2. Source Classification Code (SCC): **3-90-006-02**	3. SCC Units: **Million Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.432**	5. Maximum Annual Rate: **3,784.3**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **Negligible**	8. Maximum % Ash: **Negligible**	9. Million Btu per SCC Unit: **1,050**
10. Segment Comment: **The annual rate is based on the hourly rate and 8,760 hr/yr.**		

Segment Description and Rate: Segment 2 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; Mineral Products; Cement Manufacturing (Dry Process); Raw Material Grinding and Drying – Raw Mill**		
2. Source Classification Code (SCC): **3-05-006-13**	3. SCC Units: **Tons Processed (DRY BASIS)**	
4. Maximum Hourly Rate: **225 (dry)**	5. Maximum Annual Rate: **1,971,000 (dry)**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **The kiln shall not process more than 225 tons per hour of dry preheater feed and dry flyash and shall not exceed 5,400 tons in any 24-hr period (24-hr average). Process and production rates shall be further limited to 1,971,000 tons of dry preheater feed and dry flyash in any consecutive 12-mo period (5,400 tons/day).**		

EMISSIONS UNIT INFORMATION
Section [1] of [1]

D. SEGMENT (PROCESS/FUEL) INFORMATION (CONTINUED)

Segment Description and Rate: Segment 3 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; Mineral Products; Cement Manufacturing (Dry Process); Preheater Kiln**		
2. Source Classification Code (SCC): **3-05-006-22**	3. SCC Units: **Tons Processed**	
4. Maximum Hourly Rate: **206.3**	5. Maximum Annual Rate: **1,686,300**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **The kiln shall not process more than 206.3 tons per hour of dry preheater feed and dry flyash and shall not exceed 4,620 tons in any 24-hr period (24-hr average). Process and production rates shall be further limited to 1,686,300 tons of dry preheater feed and dry flyash in any consecutive 12-mo period (4,620 tons/day) and 1,022,000 tons of clinker in any consecutive 12-mo period (2,800 tons/day).**		

Segment Description and Rate: Segment 4 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; Bituminous Coal; Cement Kiln Dryer (Bituminous Coal)**		
2. Source Classification Code (SCC): **3-90-002-01**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **20.0**	5. Maximum Annual Rate: **175,200**	6. Estimated Annual Activity Factor:
7. **Maximum** % Sulfur: **1.0**	8. **Maximum** % Ash: **10**	9. Million Btu per SCC Unit: **26**
10. Segment Comment: **Annual rate is based on the hourly rate and 8,760 hr/yr.**		

EMISSIONS UNIT INFORMATION
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D. SEGMENT (PROCESS/FUEL) INFORMATION (CONTINUED)

Segment Description and Rate: Segment **5** of **11**

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; Distillate Oil; Cement Kiln/Dryer – No. 2 Fuel Oil**		
2. Source Classification Code (SCC): **3-90-005-02**	3. SCC Units: **Thousand Gallons Burned**	
4. Maximum Hourly Rate: **3.08**	5. Maximum Annual Rate: **26,980.8**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **1.5**	8. Maximum % Ash: **N/A**	9. Million Btu per SCC Unit:
10. Segment Comment: **No. 2 fuel oil is used primary for startup/preheating of the Cement Kiln.**		

Segment Description and Rate: Segment **6** of **11**

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; On-spec Oil; Cement Kiln/Dryer**		
2. Source Classification Code (SCC): **3-90-004-02**	3. SCC Units: **Thousand Gallons Burned**	
4. Maximum Hourly Rate: **3.08**	5. Maximum Annual Rate: **26,980.8**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **1.5**	8. Maximum % Ash: **N/A**	9. Million Btu per SCC Unit: **26**
10. Segment Comment: **Residual oil is used for startup/preheating of the Cement Kiln.**		

EMISSIONS UNIT INFORMATION
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D. SEGMENT (PROCESS/FUEL) INFORMATION (CONTINUED)

Segment Description and Rate: Segment 7 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; Mineral Products; Cement Manufacturing (Dry Process); Clinker Cooler**		
2. Source Classification Code (SCC): **3-05-006-14**	3. SCC Units: **Tons Processed**	
4. Maximum Hourly Rate: **125**	5. Maximum Annual Rate: **1,095,000**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **The kiln shall not produce more than 125 tons of clinker per hour, and 2,800 tons in any 24-hr period (24-hr average). Process and production rates shall be further limited to 1,686,300 tons of dry preheater feed and dry flyash in any consecutive 12-mo period (4,620 tons/day) and 1,022,000 tons of clinker in any consecutive 12-mo period (2,800 tons/day).**		

Segment Description and Rate: Segment 8 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; Coke; General: Coke**		
2. Source Classification Code (SCC): **3-90-008-99**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **14.7**	5. Maximum Annual Rate: **128,436**	6. Estimated Annual Activity Factor:
7. **Typical** % Sulfur: **0.5-1.0**	8. **Typical** % Ash: **0.5-5.0**	9. Million Btu per SCC Unit: **26.6**
10. Segment Comment: **Heat value based on AP-42, Appendix A. Annually rate based on hourly rate and 8,760 hr/yr.**		

EMISSIONS UNIT INFORMATION
Section [1] of [1]

D. SEGMENT (PROCESS/FUEL) INFORMATION (CONTINUED)

Segment Description and Rate: Segment 9 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; Solid Waste; Whole Tires (TDF)**		
2. Source Classification Code (SCC): **3-90-012-99**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **4.3**	5. Maximum Annual Rate: **37,668**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **28**
10. Segment Comment: **Annual rate based on hourly rate and 8,760 hr/yr.**		

Segment Description and Rate: Segment 10 of 11

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; Liquified Petroleum Gas; Propane**		
2. Source Classification Code (SCC): **3-90-010-99**	3. SCC Units: **Thousand Gallons Burned**	
4. Maximum Hourly Rate: **4.3**	5. Maximum Annual Rate: **37,668**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **90.5**
10. Segment Comment: **Heat value based on AP-42, Appendix A. Annually rate based on hourly rate and 8,760 hr/yr.**		

EMISSIONS UNIT INFORMATION
Section [1] of [1]

D. SEGMENT (PROCESS/FUEL) INFORMATION (CONTINUED)

Segment Description and Rate: Segment 11 of 11 **UPDATED SEGMENT**

1. Segment Description (Process/Fuel Type): **Industrial Processes; In-Process Fuel Use; Alternative Materials**		
2. Source Classification Code (SCC): **3-90-012-99**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **See Appendix 1**	5. Maximum Annual Rate: **See Appendix 1**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **See Appendix 1**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **See Appendix 1.**
10. Segment Comment: **Segment represents temporary trial burn of limited quantity of non-hazardous fuels: See Appendix 1 for list of fuels and details.**		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	**016**		**EL**
PM_{10}	**016**		**EL**
SO_2			**EL**
NO_x	**107/025**		**EL**
CO			**EL**
VOC			**EL**
H114 (Mercury)			**EL**

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **28.8** lb/hour **117.6** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.136 lb/ton of kiln feed, 0.23 lb/ton of clinker** Reference: **Permit No. 0530021-021-AV**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **125 ton/hr x 0.23 lb/ton = 28.8 lb/hr** **1,022,000 ton/yr x 0.23 lb/ton = 235,060 lb/yr = 117.6 ton/yr**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: Note: The above emissions are based on coal combustion as permitted under the current permit. See Appendix 1 for the expected change of emissions due to the use of engineered fuel.	

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POLLUTANT DETAIL INFORMATION
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Particulate Matter – PM

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.136 lb/ton of kiln feed**	4. Equivalent Allowable Emissions: **28.1** lb/hour **114.7** tons/year
5. Method of Compliance: **EPA Method 5**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0530021-021-AV and BACT. Applies to the preheater feed.**	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **25.0** lb/hour **102.3** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.118 lb/ton of kiln feed, 0.20 lb/ton of clinker** Reference: **Permit No. 0530021-021-AV**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **125 ton/hr x 0.20 lb/ton = 25.0 lb/hr** **1,022,000 ton/yr x 0.20 lb/ton = 204,400 lb/yr = 102.3 ton/yr**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Note: The above emissions are based on coal combustion as permitted under the current permit. See Appendix 1 for the expected change of emissions due to the use of engineered fuel.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.118 lb/ton of kiln feed**	4. Equivalent Allowable Emissions: **24.3** lb/hour **99.5** tons/year
5. Method of Compliance: **EPA Method 5**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0530021-021-AV and BACT. Applies to the preheater feed.**	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **28.8** lb/hour **117.6** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.23 lb/ton of clinker** Reference: **Permit No. 0530021-021-AV**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **125 ton/hr x 0.23 lb/ton = 28.8 lb/hr** **1,022,000 ton/yr x 0.23 lb/ton = 235,060 lb/yr = 117.6 ton/yr**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Note: The above emissions are based on coal combustion as permitted under the current permit. See Appendix 1 for the expected change of emissions due to the use of engineered fuel.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.23 lb/ton of clinker**	4. Equivalent Allowable Emissions: **28.8** lb/hour **117.6** tons/year
5. Method of Compliance: **EPA Method 6 or 6C, and SO_2 CEMS.**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0530021-021-AV and BACT.**	

EMISSIONS UNIT INFORMATION
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POLLUTANT DETAIL INFORMATION
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Nitrogen Oxides – NO_x

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NO_x**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **243.75** lb/hour **996.7** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **1.95 lb/ton of clinker** Reference: **Permit No. 0530021-021-AV**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **125 ton/hr x 1.95 lb/ton = 243.75 lb/hr** **1,022,000 ton/yr x 1.95 lb/ton = 1,992,900 lb/yr = 996.7 ton/yr**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Note: The above emissions are based on coal combustion as permitted under the current permit. See Appendix 1 for the expected change of emissions due to the use of engineered fuel.**	

EMISSIONS UNIT INFORMATION
Section [1] of [1]
EU 044 – Kiln No. 2

POLLUTANT DETAIL INFORMATION
Page [4] of [7]
Nitrogen Oxides – NO_x

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1.95 lb/ton of clinker**	4. Equivalent Allowable Emissions: **243.75** lb/hour **996.5** tons/year
5. Method of Compliance: **EPA Method 7 or 7E, and NO_x CEMS.**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0530021-021-AV and BACT. The annual emission rate of 996.5 ton/yr applies after 180 days.**	

EMISSIONS UNIT INFORMATION
Section [1] of [1]
EU 044 – Kiln No. 2

POLLUTANT DETAIL INFORMATION
Page [5] of [7]
Carbon Monoxide – CO

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **450** lb/hour **1,840** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **3.6 lb/ton of clinker** Reference: **Permit No. 0530021-021-AV**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **125 ton/hr x 3.6 lb/ton = 450 lb/hr** **1,022,000 ton/yr x 3.6 lb/ton = 3,679,200 lb/yr = 1,840 ton/yr**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Note: The above emissions are based on coal combustion as permitted under the current permit. See Appendix 1 for the expected change of emissions due to the use of engineered fuel.**	

EMISSIONS UNIT INFORMATION
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POLLUTANT DETAIL INFORMATION
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Carbon Monoxide – CO

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **3.6 lb/ton of clinker**	4. Equivalent Allowable Emissions: **450** lb/hour **1,840** tons/year
5. Method of Compliance: **Method 10 or 10A, and CO CEMS.**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0530021-021-AV and BACT. The annual emission rate of 1,840 ton/yr includes 30-day average for first 180 days.**	

EMISSIONS UNIT INFORMATION
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EU 044 – Kiln No. 2

POLLUTANT DETAIL INFORMATION
Page [6] of [7]
Volatile Organic Compounds – VOC

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **15.0** lb/hour **61.3** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.12 lb/ton of clinker** Reference: **Permit No. 0530021-021-AV**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **125 ton/hr x 0.12 lb/ton = 15.0 lb/hr** **1,022,000 ton/yr x 0.12 lb/ton = 122,640 lb/yr = 61.3 ton/yr**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Note: The above emissions are based on coal combustion as permitted under the current permit. See Appendix 1 for the expected change of emissions due to the use of engineered fuel.**	

EMISSIONS UNIT INFORMATION
Section [1] of [1]
EU 044 – Kiln No. 2

POLLUTANT DETAIL INFORMATION
Page [6] of [7]
Volatile Organic Compounds – VOC

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions **1** of **1**

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.12 lb/ton of clinker**	4. Equivalent Allowable Emissions: **15.0** lb/hour **61.3** tons/year
5. Method of Compliance: **Method 25 or 25A, and VOC CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0530021-021-AV and BACT.**	

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EU 044 – Kiln No. 2

POLLUTANT DETAIL INFORMATION
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Mercury – H114

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **H114**	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour **0.061** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **41 µg/dscm** Reference: **NESHAP Subpart LLL**	7. Emissions Method Code: **0**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Annual limit of 122 lb/yr based on BACT**	

EMISSIONS UNIT INFORMATION
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POLLUTANT DETAIL INFORMATION
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Mercury – H114

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour **0.061** tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Subpart LLL. Per recent Subpart LLL revision, this existing kiln will be subject to limitations accordingly. The current limitations of Section 3(12) of Permit No. 0530021-021-AV are superseded by this revised NESHAP.**	

EMISSIONS UNIT INFORMATION
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G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation **1** of **1**

1. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: ☒ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Opacity CEMS**	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation __ of ___

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

EMISSIONS UNIT INFORMATION
Section [1] of [1] **EU 044 – Kiln No.2**

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor **1** of **8**

1. Parameter Code: **EM**	2. Pollutant(s): **CO**
3. CMS Requirement:	☐ Rule ☒ Other
4. Monitor Information... Manufacturer: **ABB** Model Number: **URAS 26**	Serial Number: **04731961/5007**
5. Installation Date: **4/25/2008**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment: **required by BACT**	

Continuous Monitoring System: Continuous Monitor **2** of **8**

1. Parameter Code: **EM**	2. Pollutant(s): **CO_2**
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **ABB** Model Number: **URAS 26**	Serial Number: **0240326926/100**
5. Installation Date: **3/3/2010**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment: **required by GHG Rule, 40 CFR 98**	

EMISSIONS UNIT INFORMATION
Section [1] of [1] **EU 044 – Kiln No.2**

H. CONTINUOUS MONITOR INFORMATION (CONTINUED)

Continuous Monitoring System: Continuous Monitor **3** of **8**

1. Parameter Code: **EM**	2. Pollutant(s): **NO, NO_2, SO_2**
3. CMS Requirement:	☐ Rule ☒ Other
4. Monitor Information... Manufacturer: **ABB** Model Number: **Limas 11 UV**	Serial Number: **04731961/5001**
5. Installation Date: **4/25/2010**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment: **required by BACT**	

Continuous Monitoring System: Continuous Monitor **4** of **8**

1. Parameter Code: **EM**	2. Pollutant(s): **THC**
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **ABB** Model Number: **Multi-FID 14**	Serial Number: **04731961/6010**
5. Installation Date: **4/25/2010**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment: **required by Subpart LLL**	

EMISSIONS UNIT INFORMATION
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H. CONTINUOUS MONITOR INFORMATION (CONTINUED)

Continuous Monitoring System: Continuous Monitor **5** of **8**

1. Parameter Code: **FLOW**	2. Pollutant(s):
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **Durag** Model Number: **D-FL 200 G**	Serial Number: **432176**
5. Installation Date: **4/25/2010**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment: **required by GHG Rule, 40 CFR 98 and BACT**	

Continuous Monitoring System: Continuous Monitor **6** of **8**

1. Parameter Code: **VE**	2. Pollutant(s): **Opacity**
3. CMS Requirement:	☐ Rule ☒ Other
4. Monitor Information... Manufacturer: **Durag** Model Number: **D-R 290**	Serial Number: **432024**
5. Installation Date: **4/25/2010**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment: **required by BACT**	

EMISSIONS UNIT INFORMATION
Section [1] of [1] **EU 044 – Kiln No.2**

H. CONTINUOUS MONITOR INFORMATION (CONTINUED)

Continuous Monitoring System: Continuous Monitor **7** of **8**

1. Parameter Code: **EM**	2. Pollutant(s): **H_2O**
3. CMS Requirement:	☐ Rule ☒ Other
4. Monitor Information... Manufacturer: **NEO Monitors** Model Number: **Laser Gas II**	Serial Number: **10075**
5. Installation Date: **4/25/2010**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor **8** of **8**

1. Parameter Code: **EM**	2. Pollutant(s): **O_2**
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **ABB** Model Number: **URAS 26**	Serial Number: **04731961/5007**
5. Installation Date: **4/25/2008**	6. Performance Specification Test Date: **3/19/2010**
7. Continuous Monitor Comment: **required by LLL for oxygen correction**	

EMISSIONS UNIT INFORMATION
Section [1] of [1]

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [x] Attached, Document ID: **App.1** [ ] Previously Submitted, Date _____

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [x] Attached, Document ID: **App. 1** [ ] Previously Submitted, Date _____

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [ ] Attached, Document ID: _____ [X] Previously Submitted, Date **Nov. 2010**

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [ ] Attached, Document ID: _____ [ ] Previously Submitted, Date _____
   [x] Not Applicable (construction application)

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [ ] Attached, Document ID: _____ [X] Previously Submitted, Date **Nov. 2010**
   [ ] Not Applicable

6. Compliance Demonstration Reports/Records:
   [ ] Attached, Document ID: _____
   [x] Previously Submitted, Date: **2010**
   Test Date(s)/Pollutant(s) Tested: **3/19 (VE, VOC), 4/28 (NO_x, SO_2, CO), 6/17 (PM), 6/13 (Hg)**
   [ ] To be Submitted, Date (if known): _____
   [ ] Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   [ ] Attached, Document ID: _____ [x] Not Applicable

EMISSIONS UNIT INFORMATION
Section [1] of [1]

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): ☐ Attached, Document ID: _____ ☒ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): ☐ Attached, Document ID: _____ ☒ Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications - NA

1. Identification of Applicable Requirements: ☐ Attached, Document ID: _____
2. Compliance Assurance Monitoring: ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Alternative Methods of Operation: ☐ Attached, Document ID: _____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading): ☐ Attached, Document ID: _____ ☐ Not Applicable

Additional Requirements Comment

APPENDIX 1

DESCRIPTION OF PROPOSED PROJECT

INTRODUCTION

CEMEX Construction Materials Florida, LLC (CEMEX) owns and operates a cement plant located in Brooksville, Florida, designated as Brooksville South. The cement plant consists of two dry-process kilns capable of producing 688,900 tons per year (TPY) of clinker in Kiln No. 1 and 1,022,000 TPY clinker in Kiln No. 2. Cement Kiln No. 2, designed by FL Smidth, is the focus of this project. The kiln is currently allowed to use coal, natural gas, petroleum coke, propane, No. 2 fuel oil, on-specification used oil, flyash, and whole tires as fuels. The air permit, 0530021-031-AC, is expected to be final in the next few days and this permit allows CEMEX to trial test a number of specific materials. The materials include non-chlorinated agricultural plastics, tire-derived fuel including tire fluff, manufacturer reject roofing shingles, clean woody biomass, agricultural fibrous organic byproducts, pre-consumer reject paper, carpet-derived fuel and on-specification (on-spec) oil generated off-site. In addition, the permit allows these materials, once successfully trial tested, to be combined and further tested up to the tonnage limits allowed in the air permit.

CEMEX requests the following modifications:

1) Modify the air permit to include engineered fuel (EF) as an additional material to be included in the AC permit, 0530021-031-AC.

2) Remove fluorine analysis based on the reasoning that fluorine, which is presumed to result in hydrogen fluoride emissions, has been reviewed by EPA through the NESHAP rules (40 CFR 63 Subpart LLL) and determined to not warrant regulation.

3) In the summary reporting requirement (Sp. Cond. 18), remove the requirement to report fuel costs. Fuel costs are confidential business information and do not relate to regulation of air emissions.

4) In the summary reporting requirement (Sp. Cond. 18), remove the requirement to report a comparison per the legitimacy criteria in 40 CFR 241.3(d)(1). On May 16, 2011, EPA stayed the CISWI rule (issued March 21, 2011) until an undefined future date. Because the CISWI rule has been stayed, the identification of materials as fuels or solid waste via a comparison per 40 CFR

241.3(d)(1) is meaningless as it is only applicable to determine a unit is subject to the CISWI rule. Furthermore, the DEP has yet to implement neither the stayed CISWI rule nor 40 CFR 241.

The following information applies to the inclusion of EF into the current permit.

During these trials, no permit limit will be exceeded. As such, no requests for an increase in either production limits or other limitations are being made by this permit. Brooksville South shall operate under and at all times within the constraints specified by its existing permits. If the co-firing of any fuel results in emissions exceeding current permitted limits, co-firing shall cease immediately. If EF is evaluated and determined to be feasible and acceptable to the regulatory requirements of the Department of Environmental Protection (DEP), a new construction permit will be submitted to establish long-term testing limitations and to construct a more permanent system.

ENGINEERED FUEL

This material will be composed of the fractions of the materials that are currently authorized in the current permit and other known sorted and processed materials. Each supplier of engineered fuel can provide to FDEP a list of expected sources of materials used to create the engineered fuel. The supplier can submit to FDEP information of their material sources and a certification that their material meets the specifications listed in the Criteria for Supplied Materials. In addition, the supplier must certify that materials are not hazardous or radioactive waste.

EF is a designed fuel that must meet specific material composition and characteristics specifications that will ensure the fuel to both meet the rigorous requirements of an acceptable fuel for the kiln operation to produce high quality cement and to satisfy all local state and federal regulatory requirements. A primary function of this air construction permit is to establish criteria to evaluate EF as a viable alternative fuel. As such, this document proposes the acceptance specifications and regulatory procedures for engineered fuels to be used to evaluate the EF supply via supplier quality assurance and material analysis procedures and CEMEX bulk sampling procedures and material analysis. EF must meet the established requirements that are approved by FDEP in the AC permit. Each EF supplier will be required to meet specific quality assurance criteria for the fuel material sampling and analysis as described in the air construction permit issued by FDEP for this trial burn and the Appendix to the permit, "Criteria for Supplied Materials"

These documents will become part of the contractual agreement between CEMEX and the fuel supplier. The contractual agreement will specify that the following documents must be adhered to by suppliers

CEMEX believes this project is beneficial to the operation of the cement plant, as well as to the State of Florida for the following reasons:

1. Promotion of more diverse energy supplies to include alternative fuels.
2. Increase in the availability and stability of energy sources through the use of locally generated, processed, and transported energy sources in comparison to fossil fuels (e.g., coal which is typically transported from the Appalachia mountains or overseas).
3. Reduction of greenhouse gas emissions by re-using and reducing landfilled material.
4. Increase in the demand for recovered materials for alternative fuels, which encourages an increase in processing versus landfilling. This matches the goals of the State of Florida efforts to increase waste diversion for re-use or recycling:

http://www.dep.state.fl.us/waste/recyclinggoal75/default.htm.

5. Promotion of related recycling business activities (i.e., employment and taxable revenue) in the State of Florida.
6. Incorporation of all fuel ash into cement product.

In comparison to using individual material types, engineered fuel is composed of several individual material sources to generate fuel having more consistent and controllable properties. Thus, EF can be designed to closely resemble the desired combustion properties of fossil fuels but using recovered materials. Efficient thermal combustion of EF in a kiln can provide an alternative use for these recovered materials and byproducts, as well as supplying a minor component to the cement making process from small amounts of noncombustible material (e.g., sand) from the ash generated from EF. Note that the CEMEX cement kiln consumed all of the fuel ash that is leftover from combustion in the kiln. The use of such alternative materials in EF reduces a substantial amount of landfilled waste, as well as reduces environmental taxes associated with fossil fuel mining, transport, and combustion.

Another environmental benefit is that when the EF is oxidized as fuel in a combustion environment, greenhouse gas emissions are effectively reduced when compared to the landfill process.

Decomposition in a landfill generates methane, a powerful greenhouse gas. The greenhouse gas potential of methane is 21 times greater than that of the carbon dioxide produced during combustion. As such, combusting EF in a kiln can reduce GHG emissions 95 percent. A significant recent EPA and European Union Commission study indicates the clear environmental benefits of combusting waste compared to landfilling with gas reclamation.[1] As such, EPA documentation supports the use of alternative materials for engineered fuels in cement production. CEMEX views its effort to promote the beneficial use of these engineered fuels in cement production to be in concert with the guidance of the EPA[2] and World Business Council on Sustainable Development.[3]

BACKGROUND

While the U.S. cement industry is slowly replacing fossil fuels with alternative fuels, worldwide use of alternative fuels in cement production is far greater than alternative fuel use in the United States. In 2009, German cement kilns used an average of 58 percent alternative fuels as shown in the following table[4]. Some of these kilns are reaching near 90 percent or greater alternative fuel usage.

[1] NY Times, April 12, 2010. "Europe Finds Clean Energy in Trash, but U.S. lags.' Elisabeth Rosenthal.

[2] 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. (last visited April 2, 2011)

[3] 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)

[4] Verein Deutsche Zementindustrie, Environmental Data of the German Cement Industry 2009, http://www.vdz-online.de/uploads/media/Environmental_data_2009.pdf (last visited April 2, 2011)

Table 1. German Consumption of Alternative Fuels in 2009.

Alternative fuel	1,000 t/a	MJ/kg
Tyres	245	28
Waste oil	73	29
Fractions of industrial and commercial waste:	-	-
- Pulp, paper and cardboard	175	4
- Plastics	556	22
- Packaging	1	21
- Wastes from the textile industries	9	18
- Others	911	20
Meat and bone meal and animal fat	204	18
Mixed fractions of municipal waste	188	17
Scrap wood	13	13
Solvents	81	23
Fuller earth	0	9
Sewage sludge	263	4
Others, such as:	78	9
- oil mud		
- organic distillation residues		

The U.S. ranks behind many developed countries in the use of alternative fuels ranking 13th in a list of countries for the fraction of alternative fuels used in cement production.[3] The EPA strongly promotes the use of alternative fuels,

> *"The overall objective of the* [EPA] *study is to promote increased utilization of beneficial use materials in cement kilns by identifying trends and cost, technical, supply/logistics, and regulatory barriers to increased utilization of these materials. Alternative fuels considered in this study include petroleum refinery spent catalyst and clarified slurry oil sediments (CSOS), scrap paper/wood, construction and demolition (C&D) debris, scrap tires, wastewater treatment sludge (biosolids), plastics, and emerging materials including scrap carpet and automobile shredder residue (ASR).* [2]

A number of permitting activities have recently been approved by FDEP for various individual materials. These permits include:

Table 2. FDEP-approved Alternative Fuels for Cement Kilns

Company	Facility	Alternative fuels approved
Suwannee American Cement	Branford Cement Plant	· Agricultural Film · Tire Derived Fuel · Reject Roofing Shingles · Used Roofing Shingle Scraps · Clean Woody Biomass · Agricultural Byproducts · Pre-consumer Paper · Post-consumer Paper · Carpet Derived Fuel · Auto derived fuel
Cemex	Miami cement plant	· Tirefluff · Biomass · Whole Tires
Florida Rock Industries	T. S. Baker Cement plant, Kiln 1 and 2	· Tires · Pre-consumer paper
Cemex	Brooksville, FL - North	· rice hulls corn husks · cotton gin wastes · sugar cane bagasse · Sawdust · Clean wood chips · Paper and cardboard · Non-chlorinated plastics · Citrus peel waste · Tire Derived Fuel · Carpet Derived Fuel
Cemex	Brooksville South, Kiln 1	· Whole tires
Cemex	Brooksville South, Kiln2	· Agricultural Film · Tire Derived Fuel · Reject Roofing Shingles · Biomass · Agricultural Byproducts · Pre-consumer Reject Paper · Carpet Derived Fuel · Alternative fuel Mix
Titan America	Miami, FL	· Whole Tires · Municipal Sludge

RULE ANALYSIS

Federal rules:

40 CFR 60, Subpart OOO: Standards of Performance for Nonmetallic Mineral Processing Plants;

40 CFR 63, Subpart LLL: National Emission Standards for Hazardous Air Pollutants from Portland Cement Industry.

Not applicable - NSPS Subpart CCCC (2000 CISWI rule (40 CFR 60.2000- 60.2265) for existing kiln units). The facility is not and will not be subject, because of this project, to this rule. The rule specifically exempts cement kilns.

Not applicable - NSPS Subpart DDDD (40 CFR 60.2500-60.2875).

The EPA recently issued the CISWI rule on March 21, 2011 and subsequently the EPA stayed the rule on May 16, 2011 removing specific timelines for applicability. The EPA also issued the "Identification of Non-Hazardous Secondary Materials" (NHSM) rule in 40 CFR 241 on March 21, 2011 by which owner/operators were given means to determine if a material is a solid waste or fuel/ingredient. However, the Identification Rule is rendered a regulation without an applicable standard until the CISWI rule is final. Furthermore, the FDEP has not incorporated either NSPS Subpart DDDD nor 40 CFR 241 rules into the Florida Administrative Code. As such, the determination of EF will be made by the owner/operator of this facility (i.e., CEMEX) as required for determinations of solid waste based on the EPA issuance and removal of the stay of the CISWI rule. Florida is not expected to revise its rules to incorporate these rules in the near future.

State rules:

Rule 62-296.407, F.A.C., applies to Portland cement plants. However, the PM emission limit in this rule is above the current permitted limit for PM.

Local rules:

There are no local regulations for cement plant air emissions other than annual permitting.

DRY PROCESS KILN SYSTEM COMBUSTION

The primary function of a kiln is to produce clinker product, not combust fuel. Of the many chemical reactions that occur in the kiln, the primary chemical reaction within a kiln is the calcination of limestone to lime which requires intense amounts of heat. Thus, a kiln must employ significant amounts of heat to drive the reactions to convert raw materials into clinker. Clinker is the main ingredient in cement. Because the pyroprocessing process to produce clinker in a dry process kiln is a complex thermochemical process that is dependent on time, temperature, air/solid mixing, and temperature, cement manufacturing is unlike other combustion processes that use alternative fuels, such as boilers that are simply used for energy recovery. The combustion process in a kiln is a tightly controlled process that must result in specific chemical reactions occurring at specific temperatures and specific time periods to make high quality clinker. The following graph shows the general temperature and time ranges needed throughout a dry-process calciner, kiln and cooler required to produce quality cement.

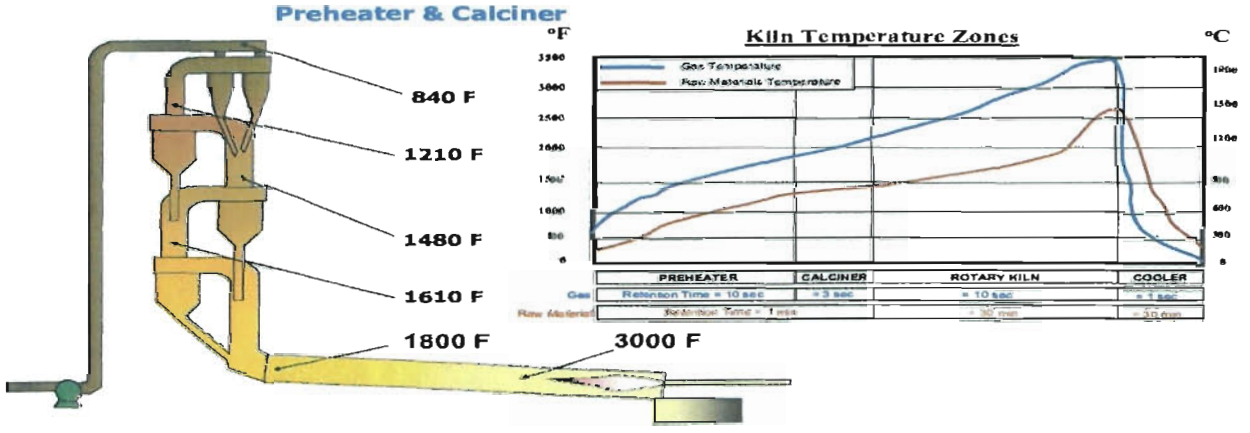


Figure 1. Time and Temperature Distribution in preheater/precalciner kiln.

Cement product specifications by ASTM International and Department of Transportation standards demand this level of control of the kiln operation to create an acceptable product. In comparison to a municipal solid waste combustors or a waste to energy facility, cement production demands that the fuel characteristics of a fuel are accurately known to ensure accurate control of the kiln operation. For perspective of the required quality assurance and control of cement production the raw materials, clinker and cement are analyzed using X-ray fluorescence (XRF) and X-ray diffraction (XRD) and scanning electron microscopy. These techniques are used at regular intervals (typical analyses are repeated every

several minutes), day in, day out and are the principal means of controlling composition of raw materials, the raw feed, clinker and cement.

CRITICAL PARAMETERS TO QUALITY CEMENT

The following discussion provides some details of cement production for why the combustion process and the fuel in a cement kiln must be tightly controlled.[5]

The ease of combination ("combinability", or "burnability") is about how easily the raw materials react with each other to produce the clinker minerals.

Clinker composition is evidently one of the key factors which determine cement quality. Composition is controlled mainly by suitable blending of raw materials, but there are limitations to what can be achieved.

Before considering these limitations, a summary of the clinkering process, and of the role of the liquid phase, may be useful.

The essential reactions in making Portland cement are the calcination of limestone to produce lime (calcium oxide) and the combination of this lime with silica to make belite [C_2S] and, especially, alite [C_3S].

Importance of the liquid phase in clinkering

During clinkering, the clinker contains solid phases and a liquid phase. The bulk of the clinker remains as a solid. At the highest temperatures reached by the clinker, perhaps only about 25% of the clinker is a liquid. The solid phases are mainly alite, belite and free lime.

The liquid is vital in that it acts a flux, promoting reactions by ion transfer; without the liquid phase, combinability would be poor and it would be very difficult to make cement.

The liquid phase is composed largely of oxides of calcium, iron and aluminium, with some silicon and other minor elements. As the clinker leaves the kiln and cools, crystals of aluminate and ferrite form from the liquid.

Combination

The combinability of a raw mix will depend largely on:

- The fineness of the raw materials - fine material will evidently react more readily than will coarser material, so finer material makes for better combinability.

[5] Winter, Nick, Understanding Cement.. WHD Microanalysis Consultants Limited, U.K. http://www.understanding-cement.com/combinability.html (last visited April 2, 2011)

- Lime Saturation Factor - higher LSF mixes are more difficult to combine than are lower LSF mixes, so a higher LSF makes for poorer combinability.

- Silica Ratio - mixes of higher SR are more difficult to combine because there is less liquid flux present, so a higher SR makes for poorer combinability.

- Alumina Ratio - mixes of AR approximately equal to 1.4 will be easier to burn than if the AR is higher or lower. This is because at an AR of about 1.4, there is more clinker liquid at a lower temperature and combinability is optimised. (Minor constituents such as MgO can alter this optimum AR).

- The intrinsic reactivity of the raw materials - some types of silica, for example, will react more easily than will others.

Ideally, a cement producer would like to control all three clinker compositional parameters, LSF, SR and AR. That would define the approximate proportions of the four main minerals in the clinker.

Blending and proportioning

Suppose the cement producer has a source of limestone and a source of clay and that he knows the chemical composition of each.

He can blend the limestone and clay in the correct proportions to give whatever value for LSF he likes, say 98%. However, the SR and AR will then be fixed by whatever the composition of the raw materials determines them to be. Although there will probably be some SiO_2, Al_2O_3 and Fe_2O_3 in the limestone, these oxides will be mainly contributed by the clay. In this example, therefore, it is the clay composition which will largely determine SR and AR.

In general terms, two types of raw material, such as limestone and clay, can be proportioned to fix any one parameter only, say the LSF.

To fix x parameters, x+1 materials of suitable composition are needed, so to control all three parameters, LSF, SR and AR, a cement works needs to blend four different materials of suitable composition. On a coal-fired works, the composition of the coal ash also needs to be allowed for, since the ash falls onto the part-reacted feed and combines with it.

In practice, a works may have 5 or 6 raw materials in order to control composition.

Alite is the clinker mineral that contributes most to strength in concrete, especially earlier strengths. Therefore, where high early strengths are important, the cement producer may want to maximise the alite content; it might appear logical that he would want all the silicates to be present as alite, with no belite present in the clinker. This may be so but often it isn't quite that simple.

Optimum burning regime

For a given mix, there will be an optimum burning regime. Under-burning will not combine most of the lime to make alite. However, over-burned clinker is likely to contain silicates that are less hydraulically reactive - they react more slowly with water. Harder burning, at a higher temperature or a longer period of time or both, may therefore combine more free lime but at the expense of silicate reactivity.

If the manufacturer tries to increase the alite content too far, he may produce a clinker that has more alite, but less-reactive alite. Overall, the clinker may produce better strengths with a slightly lower proportion of more reactive alite.

Effect of coal ash

Where coal is the fuel for the kiln, the raw mix composition has also to take into account the effect of coal ash, as much of the ash will become incorporated into the clinker. The quantity of ash is enough to have a significant effect on clinker composition - ash may represent perhaps 2%-3%, or more, of the clinker

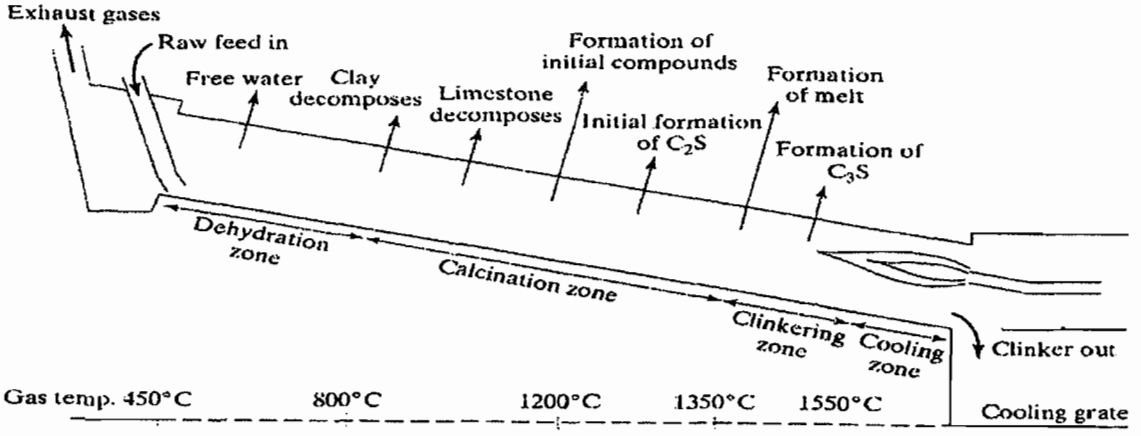


Figure 2. General Kiln Pyroprocesssing Chemical Reactions of Raw Materials.

Note that in a precalciner kiln the above reactions up to 1200 °C such that only the final stage of the clinker zone need be completed in the kiln with the primary burner.

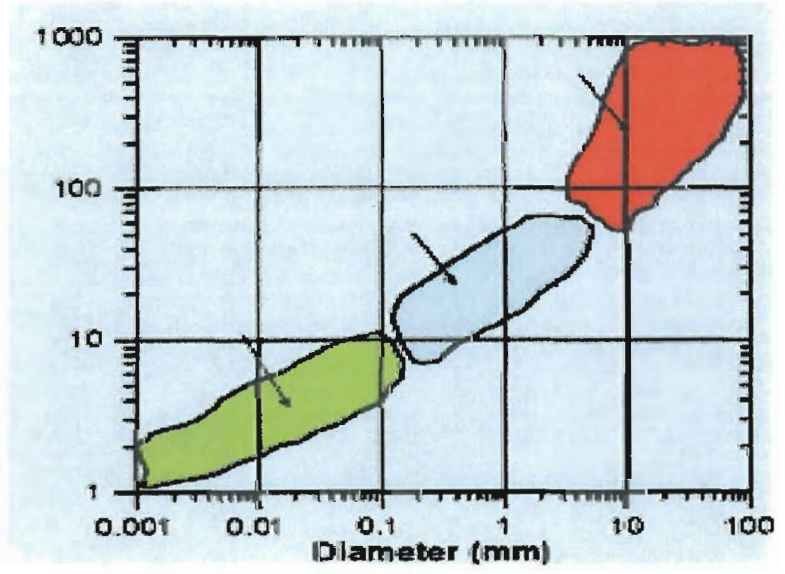
Coal and pet coke comprise over 85 percent of the fuels used currently in the U.S. cement industry[6]. Coal and pet coke are historically the fuels of choice, not for cost, but primarily for predictable fuel combustion properties. Alternative fuels that are out of balance to the thermal distribution and chemistry of the kiln system, can cause serious thermal, mechanical, and chemical damage to the kiln system.

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

For example, highly variable heat content and fuel mass flow can cause local overheating and redox reactions. The potential for increased thermal stresses in the kiln can damage the anchor and furnace shell. Variable alkali, chlorine, or sulfur content of a fuel can cause kiln refractory damage and possibly alkali bursting. As well, the mechanical behavior of particle size of fuels plays an important role in thermal distribution that must be considered.

As shown below, as the particle size of the alternative fuel greatly affects the combustion process. Mixing of fuels having various particle sizes allows for a more controlled burn. If the fuel has highly variably properties, the cement product can be ruined and the value of both cement and fuel is worthless. Clearly, if the fuel causes damage to the kiln or disrupts cement quality, alternative fuels can be rendered worthless.

Figure 3. Burnout time (seconds) versus fuel particle size (mm)



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

In summary, a kiln functions to make cement, not to burn fuel.

The discussion above of the optimum burning regime and the effect of coal ash clearly shows the need to use a fuel that has constant and controllable composition and characteristics. The single material fuels permitted by FDEP up to now have many benefits to replace fossil fuels. But these single material

fuels usually lack the needed constant and controllable composition and characteristics required for greater fuel substitution fractions materials, if not carefully controlled will damage the kiln.

For example, biomass has been shown to be an effective replacement of fossil fuel. However, the variability of the moisture content (typically ranging from 10 to 50 percent) is a detracting feature; its inherent impact of the effective heat content of the biomass, the resulting fluctuations of the exhaust gas flow from evaporated moisture, and the changing flame structure (i.e., thermal distribution). Thus, while biomass is a viable alternative fuel, its variabilities limit its percent replacement. As discussed in THE CRITICAL PARAMETERS OF QUALITY CEMENT, the thermal distribution and fuel chemistry is critical to quality cement.

ENGINEERED FUELS PROGRAM

Engineered fuel solves the shortfalls of these other materials. Engineered fuel specifications can meet the demands for quality cement and also be specified to meet the demands of air permitting. It is clear from the use of engineered fuel use in many other countries that a fuel that is derived from several raw materials can have a constant and controllable composition and the percent of engineered fuel can be greater than 90 percent[7] [8] [9] [10] [11] [12].

TRIAL TESTING AT CEMENT

CEMEX proposes that each engineered fuel for trial testing will be subjected to a maximum test period of 90 days and will be evaluated at varying rates of consumption. A proposed schedule of testing the

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[7] Zieri, Wilfred. A Practical Guide to Alternative Fuels. WORLD CEMENT, November 2008.

[8] Holpert, M. and Wolf, B. True Optimisation. July, 2009. ICR

[9] Adam, Alexander, Lafarge's new kiln line. February, 2010, ICR.

[10] http://www.cemweek.com//news/sustainable-development/12553-cemex-achieves-100-alternative-fuel-target (last visited April 2, 2011)

[11] http://www.cemex.com/SustainableDevelopment/cases/GermanyAlternativeFuels.aspx (last visited April 2, 2011)

[12] http://www.cemweek.com//news/sustainable-development/12507-spain-cemex-secures-permit-to-burn-organic-waste (last visited April 2, 2010)

fuel for five heat input loads of 10, 20, 30, 40, 50 percent is included in Table 3. EF will be fired at the back end of the kiln and the back end normally burns up to 60 percent of the total fuel input. The EF will require a minimum 7 days prior notification to the DEP for each new supplier of fuel. CEMEX proposes to be testing by the following schedule. While the suggested periods are guidelines they are not expected to be limiting, similar to the current AC permit describes. The notice will contain the name of material supplier(s) facility contact person, supplier address and phone number and anticipated testing schedule including test start date.

TABLE 3. PROPOSED SCHEDULE OF TRIAL TESTING

CEMEX CONSTRUCTION MATERIALS FLORIDA, LLC – BROOKSVILLE SOUTH CEMENT PLANT

Fuel/Material	Heat Values (wet basis) (Btu/lb)	Heat Values (wet basis) (mmBtu/ton)	Moisture (Percent)	References
Coal	13,350	26.7	4.20%	Based on 2010 monthly analysis
1) Engineered Fuel	6,220	12.44	11.4%	Appendix 2 -example material analysis

	Heat Input Replaced (Percent)	Heat Rate of Firing Total (mmBtu/hr)	Heat Rate of Firing Coal (mmBtu/hr)	Heat Rate of Firing Alt. Fuel (mmBtu/hr)
60 Day Comparative Coal-Only Firing	0%	390	390	0
Esimated 10 Day Trial Burn Period No. 1	10%	390	351	39
Esimated 10 Day Trial Burn Period No. 2	20%	390	312	78
Esimated 10 Day Trial Burn Period No. 3	30%	390	273	117
Esimated 10 Day Trial Burn Period No. 4	40%	390	234	156
Esimated 10 Day Trial Burn Period No. 5	50%	390	195	195

	Mass Rate of Firing Coal (ton/hr)	Mass Rate of Firing Coal (ton/period)	Mass Rate of Firing Alternate Fuel (ton/hr)	Mass Rate of Firing Alternate Fuel (ton/period)	Total Req'd Alt Fuel (tons)	Requested Alt Fuel (tons)
Coal Firing at max. permitted rate	14.6	21,033.7	0.0	0.0	0.0	0
Engineered Fuel, 10 days at 10%	13.1	3,155.1	3.1	752.4	--	--
Engineered Fuel, 10 days at 20%	11.7	2,804.5	6.3	1,504.8	--	--
Engineered Fuel, 10 days at 30%	10.2	2,453.9	9.4	2,257.2	--	--
Engineered Fuel, 10 days at 40%	8.8	2,103.4	12.5	3,009.6	--	--
Engineered Fuel, 10 days at 50%	7.3	1,752.8	15.7	3,762.1	11,286.2	11,500

MONITORING AND TESTING

Emissions monitoring for each material tested shall consist of the following monitoring and stack testing:

- NO_x – CEM Data
- SO_2 – CEM Data
- VOC (as THC) – CEM Data
- Opacity – CEM Data
- PM – Stack testing as required. PM should not be affected based on analysis below.
- CO – CEM Data
- Hg – Materials Balance

A monitoring/testing protocol will be submitted for approval prior to emissions testing. Submittal of all stack test reports in a summary report of the trial period will be within 90 days of the completion of the trial testing.

SUMMARY REPORT INFORMATION

The following minimum records will be obtained for all tests:

- Engineered fuel analysis
- Emissions monitoring results
- Average fuel feed rates (tons or gallons/hour)
- Average kiln feed rates (tons/hour)
- Average clinker production (tons/hour)
- Total engineered fuel consumption (tons/hour)
- Baghouse inlet temperature

TRANSPORT, HANDLING, STORAGE, AND INJECTION

Similar to the currently allowed test materials, engineered fuels will be transported to the facility by covered truck and stored in trailers or under cover on top of a paved or compacted clay surface. CEMEX expects to only store the material in trailers. If engineered fuel is stored under cover, engineered fuels will be deposited in separate piles totaling no more the 1,000 tons and visibly marked. Using heating value, along with the permitted heat capacity and the time constraint of a 90 day trial period for coal substitution fraction (intervals of 10, 20, 30, 40, and 50 percent), the required tonnage was derived for each engineered fuel. This is reflected in Table 3 as a requested amount of material tonnage. No more than 1,000 tons of engineered fuel will be stored at any one time. For this test trial, the engineered fuel will be supplied to the facility in a manner suitable for pneumatic injection into the pyroprocessing system through a temporary feeding system at the base of the precalciner tower. The engineered fuel will be transported by front end loader from the storage area to a hopper which feeds the temporary injection system. Dust suppression will consist of water sprays. Any stored engineered fuel having nuisance odors will be removed from the site. A review of solid waste rule requirements will be conducted and addressed for temporary storage. Emissions from on-site material transport, storage, processing, and handling are provided in Table 4.

Engineered fuels are designed to match the properties specifications of traditional fuels for which the system was designed. The specifications include particle size, moisture, heat content, volatility, sulfur, chlorine, lead, and mercury content. These parameters can affect the quality of combustion. There other parameters that deal with clinker quality such as magnesium, potassium, phosphorous that are unrelated to combustion yet are critical to operating the system.

On-site processing, as currently allowed in the air permit, is requested. This on-site grinding, if needed, allows CEMEX the option to control the materials particle size which may need to be altered based on the results of trial tests. CEMEX does not plan to grind material on-site on a regular basis as engineered fuel is planned to arrive at the site sized to the needed dimensions.

The feeder system shown in Figure 3 was used for the recent CEMEX Miami biomass trials (0250014-031-AC) and a similar type system is expected to be used for these trials. The system is a compact and simple design as an alternative fuel feeding system capable of handling many kinds of fuels with varying densities and physical properties. The system is composed of: two 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 precalciner.

Covered trucks unload sized biomass into the offloading ports as shown in Figure 4. Figure 4 shows a truck offloading materials to one port and another port is shown to be empty. Having two ports allowed for near continual input of biomass that is sequentially offloaded from each truck.

Figure 5 shows the feeder screw conveyors system at the bottom of the offload ports that feed the biomass to the metering system that is located at the top of the angled conveyor, followed by a pneumatic blower which blows the biomass up to the injection porthole. Figure 6 shows the conveyor from the offloading ports to the metering system. Figure 7 shows the pneumatic blower system from the metering system. The porthole installed in the precalciner tower matches the pneumatic system sizing, which is 8-inch in diameter. Figure 8 is the schematic of the blower system with an optional enclosed hopper system (typically needed for wet slurries) attached to the feeder system. Such a hopper system will not be needed for these materials. Figure 9 shows the proposed location where the feeder system will be located next to the Kiln 2 precalciner.

FIGURE 3. SCHENK FEEDER SYSTEM OF THE BIOMASS AT THE MIAMI CEMENT PLANT

FIGURE 4. TWO OFFLOADING PORTS OF THE SCHENCK FEEDER SYSTEM

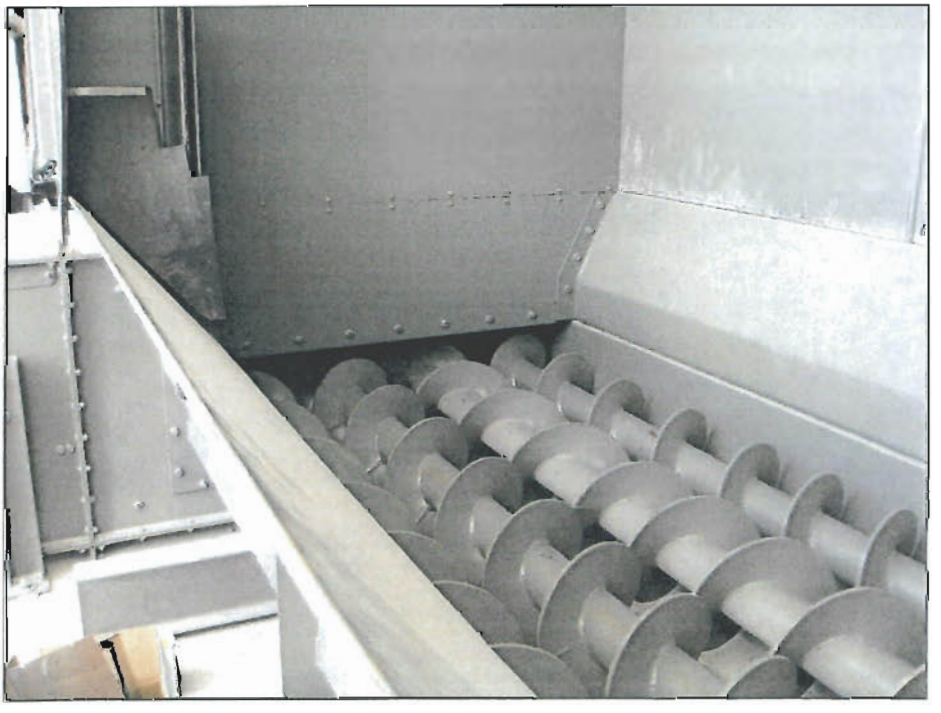

FIGURE 5. SCREW CONVEYOR IN BOTTOM OF OFFLOADING PORTS.

FIGURE 6. CONVEYORS COMING FROM OFFLOADING PORTS TO METERING SYSTEM.

FIGURE 7. PNEUMATIC BLOWER FROM METERING SYSTEM TO INJECTION PORTHOLE.

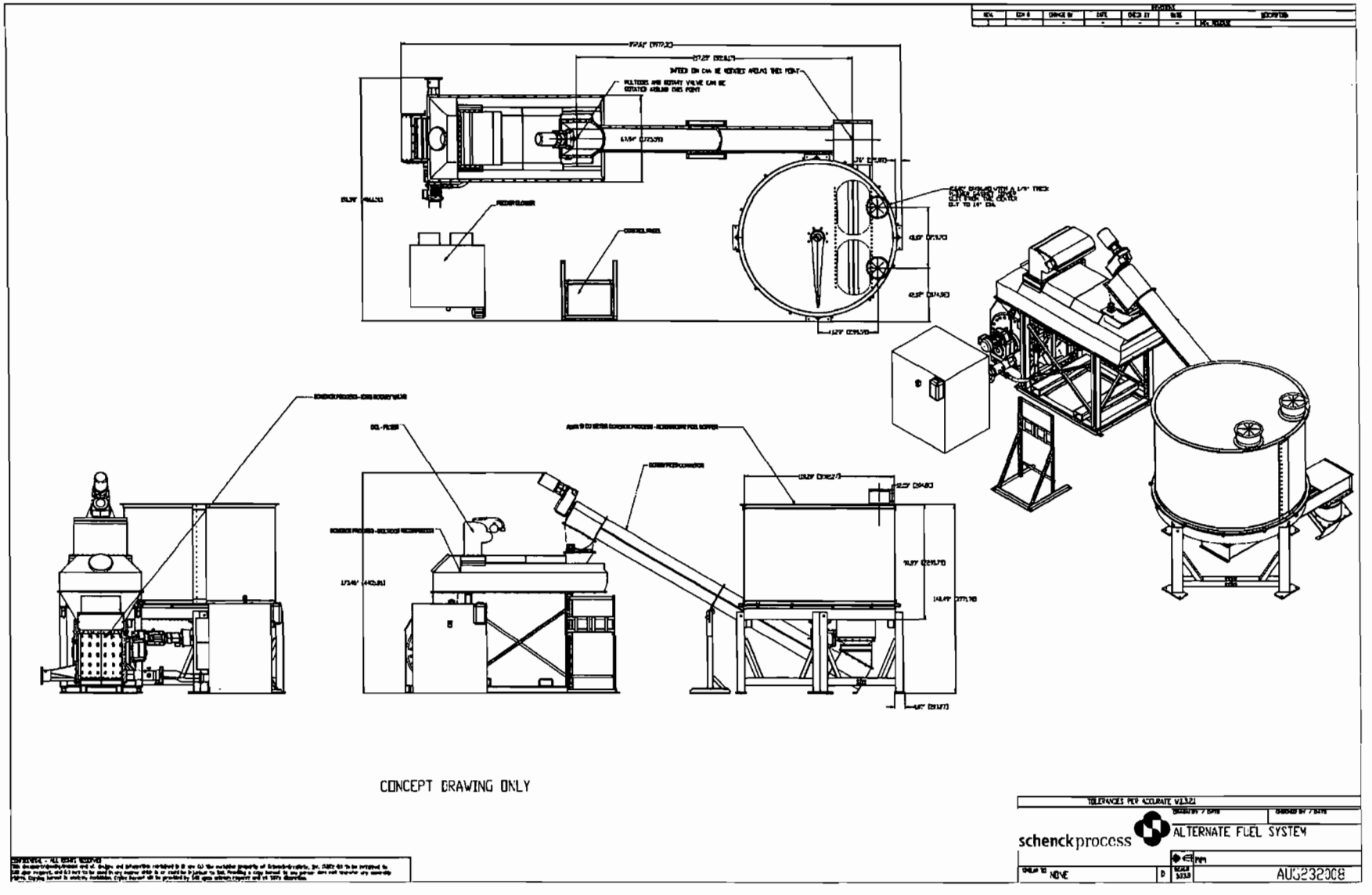

FIGURE 8. SCHENCK FEEDER SYSTEM WITH OPTIONAL ENCLOSED FEED HOPPER FOR "PIG" TANK OFFLOAD.

TABLE 4. FUGITIVE EMISSIONS ESTIMATE – TRANSPORT, STORAGE, PROCESSING , AND HANDLING

CEMEX CONSTRUCTION MATERIALS FLORIDA, LLC – BROOKSVILLE SOUTH CEMENT PLANT

Emissions Estimate of Alternative Fuel Grinding/Handling/Injecting
Created: April 12/2011, modified May 16, 2011
Cemex Construction Materials Florida, LLC, Brooksville cement plant

STEP	Action/Tasks	generic description	miles	% of Total Throughput	PM Emission Factor [b]	PM_{10} Emission Factor [b]	PM Emissions tons	$PM_{10}/PM_{2.5}$ Emissions tons	Emission Factors [c]	hours	SO2 Emissions tons	CO Emissions tons	NOx+NMHC Emissions tons
	Receive materials by covered truck. Fugitive emissions: 1.4 miles per round trip x 70,900 tons/15 tons/trip (conservative estimated density). Assume PM10												
1	= PM. EF = 0.524 lb/VMT (see initial submittal)	transporting	6617	100	0.524 lb/VMT		1.734	1.734					
2	Store under cover (to prevent stormwater runoff and fugitives).			*negligible when stored under cover (West Hall building)*									
3	Load material by frontend loader into optional grinder hopper. [a]	loading		100	8.74E-05 lb/ton	4.134E-05 lb/ton	0.00310	0.00147					
4	Grinder [b]	grinding		100	0.0012 lb/ton	0.00054 lb/ton	0.04254	0.01914					
	Grinder engine emissions	engine					0.04768	0.01656	0.15 gr/bhp.hr				
	630 horse power engine operating for 1418 hours (70,900 tons @ 50 tons/hr)								0.929 gr/bhp.hr	1418	0.872		
									3.7 gr/bhp.hr	1418		3.475	
									3.0 gr/bhp.hr	1418			2.864
	Screen [a]	screening		100	0.00014 lb/ton	0.000046 lb/ton	0.00496	0.00163					
	Screener engine emissions	engine					0.06358	0.02208	0.2 gr/bhp.hr				
	100 horse power engine operating for 1418 hours (70,900 tons @ 50 tons/hr)								0.929 gr/bhp.hr	1418	0.145		
									2.6 gr/bhp.hr	1418		0.407	
									3.0 gr/bhp.hr	1418			0.470
	Half (1/2) inch or less material transported to precalciner staging area, 1000 ft/trip x 70,900 tons/15 tons/trip (estimated average density) x 1 mile/5280ft.												
5	EF = 0.524 lb/VMT (see initial submittal)	transporting	895	100	0.524 lb/VMT		0.235	0.235					
6	Prepared material loaded by frontend loader into the pneumatic feed hopper. [^]	loading without cover		100	8.74E-05 lb/ton	4.134E-05 lb/ton	0.00310	0.00147					
7	Pneumatic biomass feeder system emissions	electric engine											
						Total =	**2.133**	**2.031**			**1.018**	**3.882**	**3.334**

Based on process rates of: *total =* **70,900** tons of alternative fuels

Notes:

[a] This screen will operate as a wet screen most of the time. However since it may operate without water sprays, emissions are calculated for this emissions point as a dry source. PM Emissions factor calculated below.

[b] Emission factors of screening, crushing, and conveying based on AP-42 Table 11.19.2-2. Alternate fuel PM factors assumed to have similar emissions as aggregate operation. Controlled emission factors are used since the moisture content of the raw materi

c Shredding at minimum of 50 tn/hr of biomass having diesel engine maximum size 630 (grinder) and 100 (screen) horse power. Total shredding hours as stated above. 100 and 630 HP Tier 3 engine emission factors stated below. SO2 EF based on AP-42, 3.3-1 emission factor = 0.929gr/bhp*hr-SOx.

Engine Power	Tier		Year	CO	HC	NMHC +NOx	NOx	PM
(100 ≤ hp < 175)	Tier 2		2003	3.70	-	4.90	-	0.22
	Tier 3		2007	3.70	-	3.00	-	-†
(600 ≤ hp < 750)	Tier 2		2002	2.60	-	4.80	-	0.15
	Tier 3		2006	2.60	-	3.00	-	-†

FIGURE 9. LOCATION OF THE PROCESSING AREA NEXT TO THE KILN 2 PRECALCINER.

BEST MANAGEMENT PRACTICES

The following best management practices are proposed for the trial tests of engineered fuel at the CEMEX Brooksville South Cement Plant.

Table 5. BEST MANAGEMENT PRACTICES (BMP) PLAN FOR MINIMIZATION OF FUGITIVE DUST, PILE MANAGEMENT, AND FIRE PREVENTION

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 2) Periodic equipment maintenance shall be performed to maintain offloading locations and associated drop point integrity. Appropriate plant records shall be maintained on transportation equipment maintenance performed. 3) Daily observations of the off/up-loading and transportation and associated drop point integrity to identify any equipment abnormalities 4) Plant personnel shall be trained on identification of warning signs for potential equipment malfunction 5) Signs shall be posted identifying potential warning signs of equipment malfunction 6) Plant personnel shall visually observe truck offloading operations and if excessive fugitive dust is detected appropriate fugitive dust minimization techniques shall be implemented including water spray. Plant personnel shall be trained on procedures for defining and minimizing excessive dust from the truck unloading operations.
Storage Pile Management	1) Storage areas shall be managed to avoid excessive wind erosion. The material will be stored in the Proposed storage area, only, which is covered and protected from wind 2) Mechanical moving by front end loaders and other supporting equipment shall be minimized on high wind event days. 3) Daily visual observations of the storage area shall be performed and if conditions are right for fugitive dust formation, procedures from the fugitive dust plan shall be implemented including water spray

Fire Prevention/ Spontaneous Combustion Minimization	1) The current Emergency Response Plan includes: a. Requirement to train onsite personnel to handle incipient fires and training on the identification of potential fire hazards; and b. Install and maintain equipment for plant personnel to handle incipient fires 2) Daily observations of the storage area shall be performed by plant personnel to identify potential fire hazards. Plant personnel shall be trained on identification of potential fire hazards. 3) Compaction of engineered fuel in the storage areas shall be minimized
Quality Assurance of Engineered Fuels	1) The engineered fuel will be delivered to the Plant in vehicles designed to prevent release 2) For each shipment, the permittee shall record the date, quantity and a description of the engineered fuel received. 3) The permittee shall inspect each shipment. If the permittee identifies any such material that is not the expected material, the material shall be rejected and returned to the supplier. Rejected materials shall be moved off site in a logistically reasonable time period. 4) The permittee shall maintain records of rejected shipments and disposition thereof. Such records shall be made available to the Department upon request.

PROJECT ESTIMATED EMISSIONS

As provided for the current permit, estimated emissions are addressed in the following sections. Baseline emissions are calculated in detail in Appendix 2 for coal using the hierarchy of data per 62-210.370, F.A.C. The coal emission factors for NO_x, SO_2, CO and THC (as VOC) are based on facility CEMs data. The actual baseline emission factor of PM is based on the average of emission tests performed since construction. Mercury emissions are based on material analysis and assume to be 100 percent emitted. Lead emissions are based on EPA Toxic Release Inventory guidance documents for metal content and 90 percent control.

It should be stressed that while emission estimates are addressed, the Brooksville South Cement Plant will not exceed any current permit limit. These short-term trials will allow CEMEX to determine if engeineered fuel, when used as supplemental fuel in the kiln system, produce emissions that are reasonably well controlled given the properties and behavior of the material. As discussed above, if a trial testing material is evaluated and determined to be feasible and acceptable to the DEP, a long-term construction permit will be submitted to establish long-term testing limitations and to construct a more permanent system.

Based on the details in the following sections, Table 6 summarizes the estimated emissions from these materials. It should be noted that even though the primary focus of these short-term tests is for feasibility determination for the recovered materials, the summary indicates that estimated emissions for any or all tests should not exceed the values of Prevention of Significant Deterioration thresholds.

Notwithstanding the calculation of estimated emissions, the following discussion is provided on current methods to control pollutant emissions applied at the Brooksville South Cement Plant.

CARBON MONOXIDE EMISSIONS

Carbon Monoxide (CO) emissions are not expected to increase since they can be controlled through the process of complete combustion. CEMEX will closely monitor the combustion of all fuel materials to ensure there is no partial combustion which could create CO emissions, as well as other constituents. The Brooksville South Cement Plant is designed for the use of alternate fuels with reduced volatile content and a large partial sizing by having the addition of a separate calciner chamber. This separate

calciner chamber is referred to as a Combustion Chamber. The Combustion Chamber allows for the introduction of alternative fuels along with kiln feed, tertiary air (ambient air/combustion air) and mixing with other fuels (fine coal) to insure proper ignition with retention in a high temperature atmosphere to initiate combustion of the alternate fuel.

In addition, the preheater is designed to extend retention time to provide long residence time at high temperatures to complete the combustion process. CEMEX will closely monitor the volatile content and particle sizing of the processed fuels along with the combustion characteristics of the preheater/calciner to insure proper combustion of all fuel. Currently, the Brooksville South Cement Plant operates with an oxygen rich combustion environment through the calciner and preheater assisting in the combustion process. CEMEX monitors CO with process monitors to insure proper combustion. Proper combustion will be maintained through process controls such as changes in the location of the introduction of tertiary air, increases in process draft and oxygen content through the process, changes in fine coal feed rates into the Combustion Chamber, and/or changes in the kiln feed rates.

Through testing and monitoring of the recovered materials prior to introduction and with combustion characteristics monitoring and process adjustments, CEMEX will be able to ensure proper and complete combustion of the alternate fuel with no generation of constituents of partial combustion, such as CO.

Nitrogen Oxide Emissions

Nitrogen Oxide (NO_x) emissions are not expected to change since they can be controlled by adjustments to the multistage combustion system timing, fuel input rates, and the selective non-catalytic reduction (SNCR) system.

Dioxin/Furans Emissions

Emissions of dioxin/furans (D/F) are not expected to change when using these alternate fuels. The formation of D/F is a function of exhaust gas residence time and particulate matter loading when the gas is at a temperature range of 700°F to 400°F. The fuel type impact on particulate matter loading is minimal (less than 10 percent) given the bulk of particulate matter originates from the raw materials. Thus, D/F testing has been determined to not be a function of chlorine content of fuels but a function of the kiln system operation.

The draft technical evaluation for this permit states,

"At high temperatures and sufficient residence times, dioxins/furans can be destroyed. Pre-heater/pre-calciner kilns like that at the Brooksville South Cement Plant have high temperatures and sufficient retention times to destroy these organic compounds. The preheater/calciner design rapidly cools the exhaust gases, which prevents dioxin/furans from reforming."

Furthermore, the Technical Evaluation states that TDF has been shown to reduce D/F emissions.

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

> "In 2008. PCA member companies completed a study on the impact of TDF firing on cement kiln air emissions. The study's data set included emission tests from 31 of the cement plants presently firing TDF. Dioxin-furan emission test results indicated that kilns firing TDF had emissions approximately one-third of those kilns firing conventional fuels – this difference was statistically significant. Emissions of particulate

In support of this position, the EPA has determined for the Portland Cement NESHAP (40 CFR 63, subpart LLL) to regulate the inlet temperature to the air pollution control device and not the chlorine content of fuels and raw materials. EPA explains that temperature is the primary method to control D/F emissions.[13] Given the evidence that D/F is a function of kiln post-combustion conditions, CEMEX maintains the position that D/F emissions from kiln system are not predominately related to chlorine content, especially at the low concentrations (less than one percent) of fuel inputs. Note that for issues of chlorine buildup, CEMEX does not expect to use any fuel with greater than 0.5 percent chlorine.

METAL EMISSIONS

The current permit requires analysis of certain metals for tire-derive fuel, shingles and biomass. While the analysis provides information of the content of materials, the emissions of such metals should be far below major HAP source levels. The potential metal emissions from the kiln system can be determined from previous studies. The German Cement Works Association, Verein Deutscher Zementwerke e. V. has calculated emission factors for the fraction of input metals from fuels. The following table shows the results that provide individual metal emission factors for fuel input (TC in %, listed in table).[4]

[13] Federal Register: September 30, 1999 (Volume 64, Number 189)], Page 52827-52876

Table 6. German Cement Works Association (VDZ). Metal Emission Factors.

Component	EF in %	TC in %
Cadmium	< 0.01 to < 0.2	0.003
Thallium	< 0.01 to < 1	0.02
Antimony	< 0.01 to < 0.05	0.0005
Arsenic	< 0.01 to 0.02	0.0005
Lead	< 0.01 to < 0.2	0.002
Chromium	< 0.01 to < 0.05	0.0005
Cobalt	< 0.01 to < 0.05	0.0005
Copper	< 0.01 to < 0.05	0.0005
Manganese	< 0.001 to < 0.01	0.0005
Nickel	< 0.01 to < 0.05	0.0005
Vanadium	< 0.01 to < 0.05	0.0005

Table 5-4: Emission factors (EF, emitted portion of the total input) and transfer coefficients (TC, emitted portion of the fuel input) for rotary kiln systems with cyclone pre-heater

Based on these emission factors, the following table provides expected capture and expected emissions. For the input concentration, the expected high range concentration from engineered fuel is based on the coal database compiled by the University of Kentucky is provided. [14] In comparison, Appendix 2 provides expected metal concentrations in EF in which concentrations are far below the stated values below.

Table 7. Comparison of expected metal emissions from coal and Engineered Fuel (EF).

HAP metals not regulated by Portland Cement NESHAP (40 CFR subpart LLL)	Emission Factor percent by weight of metal input from fuel	Expected concentrations in EF* ppm	Expected high range concentrations in coal ppm	Potential Emissions from coal (pounds) *based on 5,538 tons (~ 143,000 mmbtu)*	Potential Emissions from EF (pounds) *based on 11,500 tons (~ 143,000 mmbtu)*
Arsenic	0.0005	0.225	680	0.0364	0.0000
Cadmium	0.003	0.7	7.4	0.0024	0.0005
Chromium	0.0005	4.2	103.8	0.0056	0.0005
lead	0.002	0.175	78	0.0167	0.0001
Nickel	0.0005	0.175	199	0.0107	0.0000
Selenium ***	0.0005	0.65	17	0.0009	0.0001

* data from Envision Holding LLC, see App. 2

** Data from University of Kentucky coal database.

*** Selenium emission factor is same factor as arsenic based similar boiling points.

[14] University of Kentucky coal database. http://kgs.uky.edu/kgsweb/datasearching/Coal/Quality/QualitySearch.asp. (last visited May 17, 2011)

Based on the table above, negligible emissions of HAP metals are expected. The example EF analysis provided in Appendix 2 shows that the metal content is far below the high values assumed in the above scenario. Mercury emissions are separately addressed in the PSD analysis section of the application. Due to the high volatility of mercury all input mercury is presumed to be emitted.

Given the above metal emissions data, CEMEX does not believe HAP metal emissions, other than mercury are of concern and requests that EF be analyzed by the supplier similar to shingles or biomass for metals as in the current permit.

PARTICULATE MATTER EMISSIONS

As discussed in the comments for draft permit 0530021-031-AC, the impact of differing fuels is not a factor on the efficiency of the baghouse collection device. Efficiency of the baghouse is based on dust loading and dust loading is over 90 percent from raw materials.

Collaborative studies by EPA show that with competent test teams, the within-team Relative Standard Deviation (RSD) of a Method 5 test was 10.4 percent and the between-team RSD was 12.1 percent.[15] More recently, ASME reported that the RSD is from 5 to 11% and the accuracy of a Method 5 test (the departure of the average of three test runs from the true stack gas concentration) should be less than 14.7 percent.[16]

Given that the precision and accuracy of one standard deviation of Method 5 test results are in the range of approximately 10-15 percent of the emission rate being measured, the impact of the fuel ash content should be within the measurement error of Method 5 and we request that particulate matter testing not be a requirement.

[15] EPA document. Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III. Stationary Source Specific Methods, Section 3.16. EPA/600/4-77/027b. August 1988.

[16] Lanier, Steve. Reference Method Accuracy and Precision (ReMAP): Phase I. Precision of Manual Stack Emission Measurements. ASME report CRTD Vol. 60. Feb 2001.

TABLE 5. SUMMARY OF ESTIMATED EMISSIONS FOR ENGINEERED FUEL TESTS – MODIFIED PERMITTED MATERIALS (0530021-031-AC)
CEMEX CONSTRUCTION MATERIALS FLORIDA, LLC – BROOKSVILLE SOUTH CEMENT PLANT

	SO_2 Inc./Dec. (tons)	NO_x Inc./Dec. (tons)	CO Inc./Dec. (tons)	VOC Inc./Dec. (tons)	PM/PM10 Inc./Dec. (tons)	PM2.5[a] Inc./Dec. (tons)	Pb Inc./Dec. (lbs)	Hg Inc./Dec. (lbs)
Fugitives	revised below	revised below	revised below	revised below	revised below	revised below	revised below	revised below
Agricultural Film	0.00	0.00	0.00	0.00	0.00	0.00	-5.78	-1.47
Agricultural Waste	0.69	-2.84	8.19	0.76	2.75	1.37	-10.82	-1.20
Carpet-Derived Fuel	0.00	0.00	0.00	0.00	0.00	0.00	9.92	2.52
Clean Woody Biomass	1.20	-4.92	14.20	1.32	4.77	2.38	-18.99	-4.05
Manufacturer Reject Roofing Shingles	0.18	-20.01	0.00	1.03	0.00	0.00	20.55	-3.25
Preconsumer Paper	0.75	-3.08	8.87	0.82	2.98	1.49	-3.43	-2.93
Tire Derived Fuel	-0.08	-3.87	22.77	-0.08	-0.24	-0.12	-0.74	-5.76
On-Spec Used Oil	11.94	-2.07	-2.24	9.64	0.80	0.40	5.20	-0.71
	+							
MODIFICATION TO INCLUDE ENGINEERED FUEL								
Fugitives	1.02	3.33	3.88	3.33	2.13	1.07	0.0	0.0
Engineered Fuel	-0.08	0.66	-0.38	0.08	-0.38	-0.19	0.04	2.51
	↓	↓	↓	↓	↓	↓	↓	↓
Total	15.64	-32.80	55.30	16.90	12.80	6.40	-4.06	-14.33
	↓	↓	↓	↓	↓	↓	↓	↓
PSD Threshold	40	40	100	40	25/15	10	1200	permit: 122 lb/yr

a. PM2.5 from Fugitives in Table 2. PM2.5 from alternative fuel firing conservatively estimated at 50% of fraction of PM.

Anticipated Fuel Suppliers

CEMEX will work with reputable suppliers of engineered fuels. The following list of suppliers is provided for reference of potential suppliers anticipated to apply for approval with CEMEX.

Evergreen Recycling
http://www.evergreenrecycling.com/

ENVISION HOLDINGS (CEMEX Demopolis plant EF trial supplier)
http://www.envisionwaste.net/

VEXOR,
http://www.vexortechnology.com/

VLS Recovery Services
http://vlsrs.com/

WASTE MANAGEMENT, INC.
http://www.wm.com/

REPUBLIC SERVICES, Inc.
http://www.republicservices.com/

ESTIMATED EMISSIONS – PSD ANALYSIS

To evaluate expected emissions from this project, CEMEX has recently completed emissions testing at the CEMEX Demopolis, Alabama cement plant using EF from Envision Holdings. The data from testing at Demopolis are provided below in Table 6. The emissions data is presented for comparison of emissions with and without use of EF. The comparable percent of emission increase or decrease has been used to extrapolate to the CEMEX Brooksville south Kiln 2 kiln. Expected emissions changes due to the co-firing of Engineered Fuel are provided in Table 7.

Table 6. Comparative Emissions for Engineered Fuel at the Demopolis Cement Plant

CEMEX - Demopolis, AL cement plant
Engineered Fuel Emissions Comparison

year ==>	2003		2003 average	2004	2005		2005 average	2006	2007	2008	2009	2010	Average Emission Factor	Eng. Fuel, stack test 12/16/2010	Emissions Percent Difference
Stack testing date==>	4/24/2003	6/11/2003		3/25/2004	3/25/2005	9/22/2005		6/24/2006	6/20/2007	6/4/2008	6/25/2009	6/2/2010			
SO2															**SO2**
Stack test: lb/hr			12.0	5.4			80.2	76.0	13.7	56.5	43.9	7.8	36.9		41.3%
	10.7	13.3			18.2	142.2								15.3	
NOx															**NOx**
Stack test: lb/hr			675.1	652.1			735.8	731.1	831.7	776.5	542.1	649.2	699.2		101.6%
	705.6	644.5			782.4	689.2								710.2	
CO															**CO**
Stack test: lb/hr			599.7	527.6			695.5	685.5	681.9	648.8	651.4	660.0	643.8		98.4%
	636.3	563.2			691.9	699.1								633.3	
VOC															**VOC**
Stack test: lb/hr			92.5	72.2			71.1	75.8	66.0	68.3	77.1	84.0	75.9		108.1%
	91.1	93.9			73.5	68.7								82.0	
PM/PM10/PM2.5															**PM/PM10/PM2.5**
Stack test: lb/hr			40.3	18.72			6.7	8.60	23.50	7.25	10.17	18.35	16.7		35.6%
	not done	40.33			5.80	7.60								5.95	

TABLE 7. ESTIMATED EMISSIONS COMPARISON BETWEEN COAL AND ENGINEERED FUEL

CEMEX Construction Materials Florida, LLC – Brooksville South Cement Plant

Engineered Fuel

Material Comparison:

	Coal (wet)	Material (wet)	
Moisture Content	4.20%	11.4%	percent
Heat Content	13,350	6,220	btu/lb
Heat Content	26.7	12.4	mmbtu/ton
Max. Heat Input	390	195	mmbtu/hr
Max. Fuel Input	14.6		tons/hr
50% of Max. Fuel Input	7.30	15.7	tons/hr
Trial Amount		11,500	tons

Emissions Comparison:

		Quantity	Emission Factor	Estimated Emissions	Difference in Emissions
		(tons)	(lb/mmbtu)	(tons)	(tons)
SO_2	Test Material[a]	11,500	7.65E-04	0.05	-0.08
	Coal Equivalent[b]	5,358	1.85E-03	0.13	
NO_x	Test Material[a]	11,500	5.94E-01	42.48	0.66
	Coal Equivalent[b]	5,358	5.85E-01	41.82	
CO	Test Material[a]	11,500	3.22E-01	23.00	-0.38
	Coal Equivalent[b]	5,358	3.27E-01	23.38	
VOC	Test Material[a]	11,500	1.48E-02	1.06	0.08
	Coal Equivalent[b]	5,358	1.37E-02	0.98	
PM	Test Material[a]	11,500	2.98E-03	0.21	-0.38
	Coal Equivalent[b]	5,358	8.36E-03	0.60	

		Quantity	Metals Concentration	Percent Captured[f]	Estimated Emissions	Difference in Emissions
		(tons)	(ppm)	(%)	(lbs)	(lbs)
Hg	Test Material[e]	11,500	0.118	0%	2.71	2.51
	Coal Equivalent[d]	5,358	0.019	0%	0.20	

a. Emission Factor (EF) for EF from comparable emission changes based on CEMEX Demopolis, AL facility trials.
b. EF: Based on CEM data, stack test data, and material usage (see attached data sheet, "Emissions Factor Data")
c. Concentration based on metals analysis performed on test material
d. Concentration based on coal analysis for 2009. Assume all Hg is emitted.
e. Based on example EF from Envision Holdings analysis - App. 2.
f. Percent capture estimated the same for both fuels.

CRITERIA FOR SUPPLIED MATERIALS

CEMEX CONSTRUCTION MATERIALS FLORIDA, LLC – BROOKSVILLE SOUTH CEMENT PLANT

Similar to the current permit, Appendix E, the Quality Assurance Plan described below will be followed for sampling, collection, and analysis of engineered fuel that is received, stored, and used at the Brooksville South Cement Plant. The following changes are requested to address engineered fuel.

ENGINEERED FUEL

This material will be composed of the fractions of the materials that are currently authorized in the current permit and other known sorted and processed materials. Each supplier of engineered fuel can provide to FDEP a list of expected sources of materials used to create the engineered fuel. The supplier can submit to FDEP information of their material sources and a certification that their material meets the specifications listed in the Criteria for Engineered Fuel Suppliers. The supplier must certify that materials are not hazardous or radioactive waste.

Criteria for Material Suppliers

CEMEX Construction Materials Florida, LLC Air Permit No. 0530021-031-AC Brooksville South Cement Plant, Kiln 2 System Temporary Trials of Alternative Fuels Page E-1 The permittee shall provide each supplier with a copy of this air construction permit including the following criteria for material suppliers.

General Criteria

1. Material suppliers must use best efforts and good housekeeping practices to keep unwanted substances and incombustible materials from mixing with the alternative fuel materials.

2. All alternative fuel materials must be properly shredded and sized before being delivered to the Brooksville South Cement Plant. Each material supplier must develop QA/QC procedures to exclude foreign materials ~~(e.g., painted material, treated material, metals, soils and incombustibles)~~ from the alternative fuel materials.

3. Prior to Initial Delivery:

a. For each alternative fuel material, the material supplier must take at least eight random grab samples (approximately 1 lb). The eight grab samples must be combined and thoroughly mixed. A composite sample (approximately 2 lb) will be made from mixed grab samples. The composite sample will be split into two duplicates (approximately 1 lb each). Each sample will be labeled with the date, time, and sampling staff name. The source material will be segregated from other materials until the analytical results are received.

b. Each composite sample must be submitted to an appropriate testing lab. The duplicate sample will be retained by the material supplier, CEMEX or an independent party in case a second analysis is needed. The testing lab will analyze each composite sample for: heating value, moisture, density, volatiles, ash, sulfur, chlorine, ~~fluorine~~ and mercury. Samples of tire-derived fuel, reject roofing shingles, engineered fuel and clean woody biomass shall also be analyzed for the following metals: arsenic, cadmium,

chromium, copper and lead. The composite samples for non-chlorinated agricultural plastics shall also be analyzed for pesticides.

c. The material supplier or CEMEX must obtain the representative analytical results from the lab before the first delivery of an alternative fuel material to the Brooksville South Cement Plant. If the material supplier obtains the results, the supplier must provide a copy of the analytical results to the Brooksville South Cement Plant prior to, or along with, the first delivery of an alternative fuel material.

4. Each alternative fuel material shall be transported in covered trucks.

APPENDIX 2

Analysis Report

October 29, 2010

CEMEX INC
920 MEMORIAL CITY WAY
SUITE 100
HOUSTON TX 77024
USA

ATTN: DAWN RAMOS

Client Sample ID:	Envision/Dayton RDF/9-29-10	Sample ID By:	CEMEX Inc.
Date Sampled:	Sep 29, 2010	Sample Taken At:	----
Date Received:	Oct 4, 2010	Sample Taken By:	----
Product Description:	RDF OR TDF	P. O. #:	4503727296
		Unit Code:	CEM603

SGS Minerals Sample ID: 491-1049029-001

		Method	As Received	Dry	DAF
Moisture, Total %		ASTM E949	11.44		
Ash %		ASTM E830	16.64	18.79	
Volatile Matter %		ASTM E897	65.95	74.47	
Fixed Carbon (by diff)	%	ASTM D3172 (by diff)	5.97	6.74	
Sulfur %		ASTM D4239 Method B	0.10	0.12	
Gross Calorific Value	BTU/LB	ASTM E711	6224	7027	8654
Carbon %		ASTM D5373	37.46	42.30	
Hydrogen %		ASTM D5373	5.12	5.78	
Nitrogen %		ASTM D5373	0.25	0.29	
Oxygen (by diff) %		ASTM D5373 (by diff)	28.99	32.72	
Chlorine, Cl UG/G		ASTM D4208	1011	1141	

Tests	Result	Unit	Method
LOI, Dry @ 950°C	81.21	%	ASTM D7348

Vanessa Chambliss
Branch Manager

SGS North America Inc. | Minerals Services Division
16130 Van Drunen Road South Holland t (708) 331-2900 f (708) 333-3060 www.sgs.com/minerals

Analysis Report

October 29, 2010

CEMEX INC
920 MEMORIAL CITY WAY
SUITE 100
HOUSTON TX 77024
USA

ATTN: DAWN RAMOS

Client Sample ID:	Envision/Dayton RDF/9-29-10	Sample ID By:	CEMEX Inc.
Date Sampled:	Sep 29, 2010	Sample Taken At:	-----
Date Received:	Oct 4, 2010	Sample Taken By:	-----
Product Description:	RDF OR TDF	P. O. #:	4503727296
		Unit Code:	CEM603

SGS Minerals Sample ID: 491-1049029-001

Tests	Result	Unit	Method
ANALYSIS OF ASH			
Basis	IGNITED	—	ASTM D4326
Silicon Dioxide, SiO2	34.83	%	ASTM D4326
Aluminum Oxide, Al2O3	24.86	%	ASTM D4326
Titanium Dioxide, TiO2	1.76	%	ASTM D4326
Iron Oxide, Fe2O3	1.27	%	ASTM D4326
Calcium Oxide, CaO	21.30	%	ASTM D4326
Magnesium Oxide, MgO	1.42	%	ASTM D4326
Potassium Oxide, K2O	1.27	%	ASTM D4326
Sodium Oxide, Na2O	1.79	%	ASTM D4326
Sulfur Trioxide, SO3	1.47	%	ASTM D5016
Phosphorus Pentoxide, P2O5	0.63	%	ASTM D4326
Strontium Oxide, SrO	0.03	%	ASTM D4326
Barium Oxide, BaO	0.02	%	ASTM D4326
Manganese Oxide, MnO2	0.04	%	ASTM D4326
Undetermined	9.31	%	

Vanessa Chambliss

Vanessa Chambliss
Branch Manager

SGS North America Inc. | Minerals Services Division
16130 Van Drunen Road South Holland t (708) 331-2900 f (708) 333-3060 www.sgs.com/minerals

Analysis Report

October 29, 2010

CEMEX INC
920 MEMORIAL CITY WAY
SUITE 100
HOUSTON TX 77024
USA

ATTN: DAWN RAMOS

Client Sample ID:	Envision/Medina RDF/9-29-10	Sample ID By:	CEMEX Inc.
Date Sampled:	Sep 29, 2010	Sample Taken At:	-----
Date Received:	Oct 4, 2010	Sample Taken By:	-----
Product Description:	RDF OR TDF	P. O. #:	4503727296
		Unit Code:	CEM603

SGS Minerals Sample ID: 491-1049029-002

		Method	As Received	Dry	DAF
Moisture, Total %		ASTM E949	7.48		
Ash %		ASTM E830	12.20	13.19	
Volatile Matter %		ASTM E897	71.82	77.63	
Fixed Carbon (by diff)	%	ASTM D3172 (by diff)	8.50	9.18	
Sulfur %		ASTM D4239 Method B	0.10	0.11	
Gross Calorific Value	BTU/LB	ASTM E711	6358	6872	7916
Carbon %		ASTM D5373	39.75	42.97	
Hydrogen %		ASTM D5373	5.64	6.10	
Nitrogen %		ASTM D5373	0.46	0.49	
Oxygen (by diff) %		ASTM D5373 (by diff)	34.37	37.14	
Chlorine, Cl UG/G		ASTM D4208	2331	2519	

Tests	Result	Unit	Method
LOI, Dry @ 950°C	86.81	%	ASTM D7348

Vanessa Chambliss
Branch Manager

SGS North America Inc. | Minerals Services Division
16130 Van Drunen Road South Holland t (708) 331-2900 f (708) 333-3060 www.sgs.com/minerals

SGS

Analysis Report

October 29, 2010

CEMEX INC
920 MEMORIAL CITY WAY
SUITE 100
HOUSTON TX 77024
USA

ATTN: DAWN RAMOS

Client Sample ID:	Envision/Medina RDF/9-29-10	Sample ID By:	CEMEX Inc.
Date Sampled:	Sep 29, 2010	Sample Taken At:	-----
Date Received:	Oct 4, 2010	Sample Taken By:	-----
Product Description:	RDF OR TDF	P. O. #:	4503727296
		Unit Code:	CEM603

SGS Minerals Sample ID: 491-1049029-002

Tests	Result	Unit	Method
ANALYSIS OF ASH			
Basis	IGNITED	---	ASTM D4326
Silicon Dioxide, SiO2	22.61	%	ASTM D4326
Aluminum Oxide, Al2O3	10.35	%	ASTM D4326
Titanium Dioxide, TiO2	2.35	%	ASTM D4326
Iron Oxide, Fe2O3	1.99	%	ASTM D4326
Calcium Oxide, CaO	36.47	%	ASTM D4326
Magnesium Oxide, MgO	2.03	%	ASTM D4326
Potassium Oxide, K2O	1.93	%	ASTM D4326
Sodium Oxide, Na2O	2.56	%	ASTM D4326
Sulfur Trioxide, SO3	2.14	%	ASTM D5016
Phosphorus Pentoxide, P2O5	0.88	%	ASTM D4326
Strontium Oxide, SrO	0.03	%	ASTM D4326
Barium Oxide, BaO	0.09	%	ASTM D4326
Manganese Oxide, MnO2	0.05	%	ASTM D4326
Undetermined	16.52	%	

Vanessa Chambliss
Branch Manager

SGS North America Inc. | Minerals Services Division
16130 Van Drunan Road South Holland t (708) 331-2900 f (708) 333-3060 www.sgs.com/minerals

SGS

Analysis Report

October 29, 2010

CEMEX INC
920 MEMORIAL CITY WAY
SUITE 100
HOUSTON TX 77024
USA

ATTN: DAWN RAMOS

Client Sample ID:	EnvisionMinimrf3 RDF/9-29-10	Sample ID By:	CEMEX Inc.
Date Sampled:	Sep 29, 2010	Sample Taken At:	----
Date Received:	Oct 4, 2010	Sample Taken By:	----
Product Description:	RDF OR TDF	P. O. #:	4503727296
		Unit Code:	CEM603

SGS Minerals Sample ID: 491-1049029-003

		Method	As Received	Dry	DAF
Moisture, Total %		ASTM E949	21.64		
Ash %		ASTM E830	10.20	13.02	
Volatile Matter %		ASTM E897	63.76	81.37	
Fixed Carbon (by diff)	%	ASTM D3172 (by diff)	4.40	5.61	
Sulfur %		ASTM D4239 Method B	0.19	0.24	
Gross Calorific Value	BTU/LB	ASTM E711	6135	7829	9001
Carbon %		ASTM D5373	36.08	46.04	
Hydrogen %		ASTM D5373	5.11	6.52	
Nitrogen %		ASTM D5373	0.47	0.61	
Oxygen (by diff) %		ASTM D5373 (by diff)	26.31	33.57	
Chlorine, Cl UG/G		ASTM D4208	3799	4848	

Tests	Result	Unit	Method
LOI, Dry @ 950°C	86.98	%	ASTM D7348

Vanessa Chambliss
Branch Manager

SGS North America Inc. | Minerals Services Division
16130 Van Drunen Road South Holland t (708) 331-2900 f (708) 333-3060 www.sgs.com/minerals

Analysis Report

October 29, 2010

CEMEX INC
920 MEMORIAL CITY WAY
SUITE 100
HOUSTON TX 77024
USA

ATTN: DAWN RAMOS

Client Sample ID:	EnvisionMinimrf3 RDF/9-29-10	Sample ID By:	CEMEX Inc.
Date Sampled:	Sep 29, 2010	Sample Taken At:	------
Date Received:	Oct 4, 2010	Sample Taken By:	----
Product Description:	RDF OR TDF	P. O. #:	4503727296
		Unit Code:	CEM603

SGS Minerals Sample ID: 491-1049029-003

Tests	Result	Unit	Method
ANALYSIS OF ASH			
Basis	IGNITED	---	ASTM D4326
Silicon Dioxide, SiO2	17.11	%	ASTM D4326
Aluminum Oxide, Al2O3	5.09	%	ASTM D4326
Titanium Dioxide, TiO2	4.90	%	ASTM D4326
Iron Oxide, Fe2O3	1.82	%	ASTM D4326
Calcium Oxide, CaO	20.64	%	ASTM D4326
Magnesium Oxide, MgO	1.95	%	ASTM D4326
Potassium Oxide, K2O	2.25	%	ASTM D4326
Sodium Oxide, Na2O	21.88	%	ASTM D4326
Sulfur Trioxide, SO3	3.36	%	ASTM D5016
Phosphorus Pentoxide, P2O5	5.02	%	ASTM D4326
Strontium Oxide, SrO	0.03	%	ASTM D4326
Barium Oxide, BaO	0.06	%	ASTM D4326
Manganese Oxide, MnO2	0.06	%	ASTM D4326
Undetermined	15.83	%	

Vanessa Chambliss
Branch Manager

Envision Waste Services, LLC
Generator's Engineered Fuel Profile

(GWP)

I. GENERAL INFORMATION

A. GENERATOR NAME:	Envision Waste Services, LLC	F. BILLING NAME:	Envision Waste Services, LLC
/co Medina County CPF			
B. GENERATOR ADDRESS:	8700 Lake Road, Seville OH 44273	G. BILLING ADDRESS	4451 Renaissance Prkwy Cleveland, OH 44128
C. GENERATOR CONTACT:	Steven M. Viny	H. BILLING CONTACT:	Steven M. Viny
D. GENERATOR EPA ID NO:	N/A	I. BILLING PHONE NO.:	216-831-1818
E. GENERATOR STATE ID NO:	N/A	J. GENERATOR PHONE NO.:	330-769-1273
		K. SALES CONTACT:	Steven M. Viny

II. MATERIAL INFORMATION-PLEASE USE FULL NAMES RATHER THAN ACRONYMS

A. NAME OF MATERIAL: Engineered Fuel

B. DESCRIBE THE PROCESS GENERATING THE MATERIAL: Physical/ Mechanical removal of organics, glass, metals,cardboard , newspaper, mix paper, and heavy plastic. Air separation performed to extract light paper/light plastic to use as Engineered Fuel.

III. PHYSICAL CHARACTERISTICS OF THE WASTE STREAM

A. FLASH POINT:	N/A	B. PH:	N/A	C. DENSITY:	2.85 lbs loose
D.COLOR/APPEARANCE	Gray	E. SOLID(%)	100%	F. ODOR:	Slightly Sweet Smell
G. PHYSICAL STATE:	Fluff	H. PHASES/LAYE	☐ Single ☐ Multiple	I. BTU VALUE	8171

IV.CHEMICAL COMPOSITION CONTITUENT - DO NOT USE GENERIC TERM (e.g. ORGANICS, SALT, SOLIDS) *ATTACHE MSDS FOR PRODUCT

See attached ultimate and approximate	ppm or %		ppm or %
analysis	ppm or %		ppm or %
	ppm or %		ppm or %
	ppm or %		ppm or %
NO ACRONYMS PLEASE USE FULL CHEMICAL NAME		TOTAL:	%

V. MATERIAL CONTENT *PLEASE INDICATE IF THE WASTE CONTAINS ANY OF THE FALLOWING (ATTACH ANALYTICAL WHERE APPLICABLE)

SULFIDE	PPM	Y ☐ N ☒	RADIOACTIVE	Y ☐ N ☒	BENZENE NESHAP WASTE?(40 CFR 61 SUBPART FF)		
CYANIDE	PPM	Y ☐ N ☒	PCB'S >50PPM?	Y ☐ N ☒		Y ☐ N ☐	
BENZENE	PPM	Y ☐ N ☒	PCB TSCA WASTE D	Y ☐ N ☒	VOC LESS THAN 500 PPMW?		
PESTICIDE/HERBICIDE		Y ☐ N ☒				Y ☐ N ☐	
EXPLOSIVE MATERIAL		Y ☐ N ☒					

VI. RCRA CHARACTERIZATION

A. THIS MATERIAL IS A ☐ WASTEWATER(<1%TOC AND < 1%TSS ☐ NONWASTEWATE(>=1%TOC OR>=1%TSS)

B. IS THIS A USEPA HAZARDOUSWASTE PER 40 CFR PART 261 262? Y ☐ N ☒

C. IF EITHER A OR B IS YES, ALL APPLICABLE WASTE CODE NUMBERS MUST BE LISTED HERE (D,F,K,P,U):

NONE

VII. ADDITIONAL INFORMATION AND HEALTH SAFETY PRECAUTIONS

GENERATOR WISHES MANAGEMENT OF THIS MATERIALS DISPOSAL BY:

☐ SUBTITLE C/D LANDFILL
☒ KILN FUEL

GENERATOR WASTE DISPOSAL PREFERENCE:

VIII. GENERATORS CERTICATION

SIGNATURE 11/12/10 DATE

The sample submitted is representative as defined in appendix1 and EPA SW-846, chapter 9. I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no diligent or willful ommissions of composition or properties exist and that all known or suspected hazards have been disclosed. I authorize waipak to obtain a sample from any waste shipment for purposes of recertification.

SIGNATURE Steven M. Viny CEO 11/12/10

NAME/TITLE DATE

MINERAL LABS, INC.

Box 549
Salyersville, Kentucky 41465
Phone (606) 349-6145

CERTIFICATE OF ANALYSIS

Company

ENVISION WASTE SERVICES, LLC
DBA ENVISION HOLDINGS
4451 RENAISSANCE PARKWAY
CLEVELAND, OH 44128

Lab No. 019063940 6688
Date Rec'd. 10/22/2009
Date Analyzed 10/22/2009

SAMPLE IDENTIFICATION AS SUPPLIED BY SAMPLER

Sampled By CUSTOMER Sampled Type:

MAIL IN
TRASH WASTE
11 TOTAL 10/19/09
UNPACTED = 2.85 LBS/CUBIC FT.
COMPACTED = 5.10 LBS/CUBIC FT.

(D3302-99)	% Moisture 3302-5	% Ash D3174-04	% Volatile D3175-02	% Fixed Carbon (Calculated)	BTU® D5865-04	% Sulfur D4239-05 (Method C)
As Rec'd.	2.18	11.61	76.18	10.03	8,171	.25
Dry Basis		11.87	77.88	10.25	8,353	.26
M.A.F.B.T.U. (Calculated)					9,479	

-FUSION TEMPERATURE OF ASH- D1857-04	Reducing	Oxidizing
Initial	2160 °F	2260 °F
Softening	2215 °F	2310 °F
Hemispherical	2260 °F	2350 °F
Fluid	2340 °F	2440 °F

Free Swelling Index No. D720-91 (2004) XXX

Grindability Index No. D409-02 XXX

D 4749-87 (2002)

SCREEN / WET SIEVE ANALYSIS TRASH	
SIZE	% WT. RETAINED
X X X X X X X X	
X X X X X X X X	
X X X X X X X X	

WEIGHT DETERMINATION

Average Light Draft	X X X	
Average Loaded Draft	X X X	
Weight of Coal Loaded	X X X	Tons

7101108 7

Submitted By

MINERAL LABS INC.

Box 549
Salyersville, Kentucky 41465
Phone (606) 349-6145

COMPANY REQUESTING ANALYSIS:	Date Analyzed:	10/22/2009
Envision Waste Services	Lab No.	019063940
	Sample Taken By:	Customer

Sample I.D.: Trash, Waste

PROXIMATE ANALYSIS	ASTM Method	As Rec'd	Dry
% Moisture	E871	2.18	
% Ash	E1755	11.61	11.87
% Volatile	E897	76.18	77.88
B.T.U.	E711	8171	8353
M.A.F.B.T.U.	Calculated	9479	
% Sulfur	E775	0.25	0.26

ELEMENTAL ANALYSIS	Method	Dry Basis (ppm)
Chlorine Whole Sample	E776	1151
Chlorine Ash	E776	565
Mercury Whole Sample	D3684	0.04

Ultimate Analysis	Method	As Rec'd	Dry
% Moisture	E871	2.18	
% Carbon	E777	43.96	44.94
% Hydrogen	E777	5.58	5.70
% Nitrogen	E778	0.32	0.33
% Sulfur	E775	0.25	0.26
% Ash	E1755	11.61	11.87
% Oxygen	By Diff.	36.10	36.90

Bulk Density	Method	lbs/Cu.ft.
Uncompacted	E873	2.85
Compacted	E873	5.10

Ash Fusion	Method	Reducing °F	Oxidizing °F
Initial	D1857	2160	2260
Softening	D1857	2215	2310
Hemispherical	D1857	2260	2350
Fluid	D1857	2340	2440

Submitted By:

MINERAL LABS INC.

Box 549
Salyersville, Kentucky 41465
Phone (606) 349-6145

COMPANY REQUESTING ANALYSIS:		
Envision Waste Services	Date Analyzed:	10/22/2009
	Lab No.	019063940
	Sample Taken By:	Customer

Sample I.D.: Trash, Waste

MINERAL ANALYSIS (AS % OXIDE)		% Wt. Ignited Basis
Silicon dioxide	SiO_2	37.71
Aluminum oxide	Al_2O_3	21.85
Titanium dioxide	TiO_2	2.99
Iron oxide	Fe_2O_3	3.80
Calcium oxide	CaO	23.11
Magnesium oxide	MgO	1.73
Potassium oxide	K_2O	2.10
Sodium oxide	Na_2O	2.10
Sulfur trioxide	SO_3	3.23
Phosphorus pentoxide	P_2O_5	0.69
Strontium oxide	SrO	0.06
Barium oxide	BaO	0.07
Manganese oxide	MnO	0.03
Undetermined		0.53

Submitted By:

Report of Analysis

Name: Cemex-Houston
Dawn Ramos
920 Memorial City Way
Suite 100
Houston, TX 77024

Sample Date: 9/29/2010
Receipt Date: 10/4/2010 11:40
Report Date: 11/5/2010

Sample ID#: 09981669
Sample Source: (None)
PO Number: 4503727284
Client Sample ID: Envision/minimrf3 RDF/9-29-10
Envision

Parameter	Sample Result	Units	MDL	Analysis Start	Analysis End (If Applicable)	Method	Analyst
Metals							
TCLP Antimony	ND	mg/L	0.014	10/29/2010 19:38		SW 6010B	ADG
TCLP Arsenic	ND	mg/L	0.019	10/29/2010 19:38		SW 6010B	ADG
TCLP Barium	0.354	mg/L	0.028	10/29/2010 19:38		SW 6010B	ADG
TCLP Beryllium	ND	mg/L	0.025	10/29/2010 19:38		SW 6010B	ADG
TCLP Cadmium	ND	mg/L	0.028	10/29/2010 19:38		SW 6010B	ADG
TCLP Chromium	ND	mg/L	0.025	10/29/2010 19:38		SW 6010B	ADG
TCLP Cobalt	ND	mg/L	0.028	10/29/2010 19:38		SW 6010B	ADG
TCLP Copper	0.186	mg/L	0.026	10/29/2010 19:38		SW 6010B	ADG
TCLP Lead	ND	mg/L	0.028	10/29/2010 19:38		SW 6010B	ADG
TCLP Manganese	0.570	mg/L	0.022	10/29/2010 19:38		SW 6010B	ADG
TCLP Mercury	0.000200	mg/L	0.0001	11/04/2010 16:25		SW 7470A	ADG
TCLP Molybdenum	ND	mg/L	0.024	10/29/2010 19:38		SW 6010B	ADG
TCLP Nickel	ND	mg/L	0.023	10/29/2010 19:38		SW 6010B	ADG
TCLP Selenium	ND	mg/L	0.026	10/29/2010 19:38		SW 6010B	ADG
TCLP Silver	ND	mg/L	0.012	10/29/2010 19:38		SW 6010B	ADG
TCLP Thallium	ND	mg/L	0.021	10/29/2010 19:38		SW 6010B	ADG
TCLP Zinc	1.10	mg/L	0.265	10/29/2010 19:38		SW 6010B	ADG
Total Antimony	ND	mg/kg	0.225	10/21/2010 13:17		SW 6010B	ADG
Total Arsenic	ND	mg/kg	0.475	10/21/2010 13:17		SW 6010B	ADG
Total Barium	63.5	mg/kg	7	10/21/2010 13:13		SW 6010B	ADG
Total Beryllium	ND	mg/kg	0.125	10/21/2010 13:17		SW 6010B	ADG
Total Cadmium	ND	mg/kg	0.7	10/21/2010 13:17		SW 6010B	ADG
Total Chromium	4.22	mg/kg	0.625	10/21/2010 13:17		SW 6010B	ADG
Total Cobalt	ND	mg/kg	0.7	10/21/2010 13:17		SW 6010B	ADG
Total Copper	114	mg/kg	3	10/21/2010 13:13		SW 6010B	ADG

Reviewed by:
Rebecca Kiser

147 11th Avenue
South Charleston,
WV 25303

ND = Not Detected
* = Above Specified Limit

Note: The test results are only valid for date sample was taken. We do not accept any liability for use of these results.

Report of Analysis

Name: Cemex-Houston
Dawn Ramos
920 Memorial City Way
Suite 100
Houston, TX 77024

Sample Date: 9/29/2010
Receipt Date: 10/4/2010 11:40
Report Date: 11/5/2010

Sample ID#: 09981669
Sample Source: (None)
PO Number: 4503727284
Client Sample ID: Envision/minimrf3 RDF/9-29-10
Envision

Parameter	Sample Result	Units	MDL	Analysis Start	Analysis End (If Applicable)	Method	Analyst
Metals							
Total Lead	ND	mg/kg	0.175	10/21/2010 13:13		SW 6010B	ADG
Total Manganese	28.0	mg/kg	0.2	10/21/2010 13:13		SW 6010B	ADG
Total Mercury	0.118	mg/kg	0.008	11/03/2010 14:32		SW 7471A	ADG
Total Molybdenum	ND	mg/kg	0.2	10/21/2010 13:13		SW 6010B	ADG
Total Nickel	ND	mg/kg	0.175	10/21/2010 13:13		SW 6010B	ADG
Total Selenium	ND	mg/kg	0.65	10/21/2010 13:13		SW 6010B	ADG
Total Silver	ND	mg/kg	0.3	10/21/2010 13:13		SW 6010B	ADG
Total Thallium	ND	mg/kg	0.4	10/21/2010 13:13		SW 6010B	ADG
Total Zinc	100	mg/kg	16.75	10/21/2010 13:17		SW 6010B	ADG

Reviewed by:
Rebecca Kiser

147 11th Avenue
South Charleston,
WV 25303

ND = Not Detected
* = Above Specified Limit

Note: The test results are only valid for date sample was taken. We do not accept any liability for use of these results.