Sumter Cement Company, LLC
P.O. Box 410
Branford, Fl 32008

RECEIVED
JUN 16 2005
BUREAU OF AIR REGULATION

June 15, 2005

Ms. Trina Vielhauer
Division of Air Resources
Department of Environmental Protection
2600 Blair Stone Road, MS # 5500
Tallahassee, Florida 32399-2400

SUBJECT: **Construction Permit Application – New Kiln Project**
Sumter Cement Company, LLC – Center Hill Plant, Sumter County

Dear Ms Vielhauer:

Please find included in this package Sumter Cement Company's (SCC) Application for construction of a state-of-the-art New Kiln Line located in the city of Center Hill, Florida. SCC is operated entirely by Votorantim Cementos. Votorantim Cementos as you are aware also operates Suwannee American Cement (SAC) cement plant in Branford, Florida. The new SCC Center Hill plant and the SAC Branford plant will be both fully controlled and operated by Votorantim Cementos. Although the two cement plants will operate under different names both will share the valuable resources, information, and the vast knowledge provided by Votorantim Cementos as well as the experiences of SAC. As you are aware SAC has worked with the Department to achieve the highest environmental performance possible while producing the highest quality cement in the market at the existing facility located in Branford, FL. SAC's highest standards for environmental performance and quality will also be implemented at the SCC plant as well.

SAC has demonstrated its commitment to environmental performance by having the first and only cement plant in Florida to receive accreditation for our Environmental Management System (ISO 14000) in accordance with the International Organization of Standardization (ISO) at the Branford Plant. SAC has also voluntarily installed and tested innovative control technologies such as Selective Non-Catalytic Reduction (SNCR) for emission reductions at the Branford Plant. This knowledge and willingness to be at the forefront of environmental control technologies will be continued and expanded upon at the new SCC Center Hill Plant.

SCC looks forward to meeting and surpassing these environmental achievements and excellent performance in the future at the proposed new plant in Center Hill, Fl.

The following information is provided for the Departments review:

- Detailed Best Available Control Technology (BACT) Evaluation,

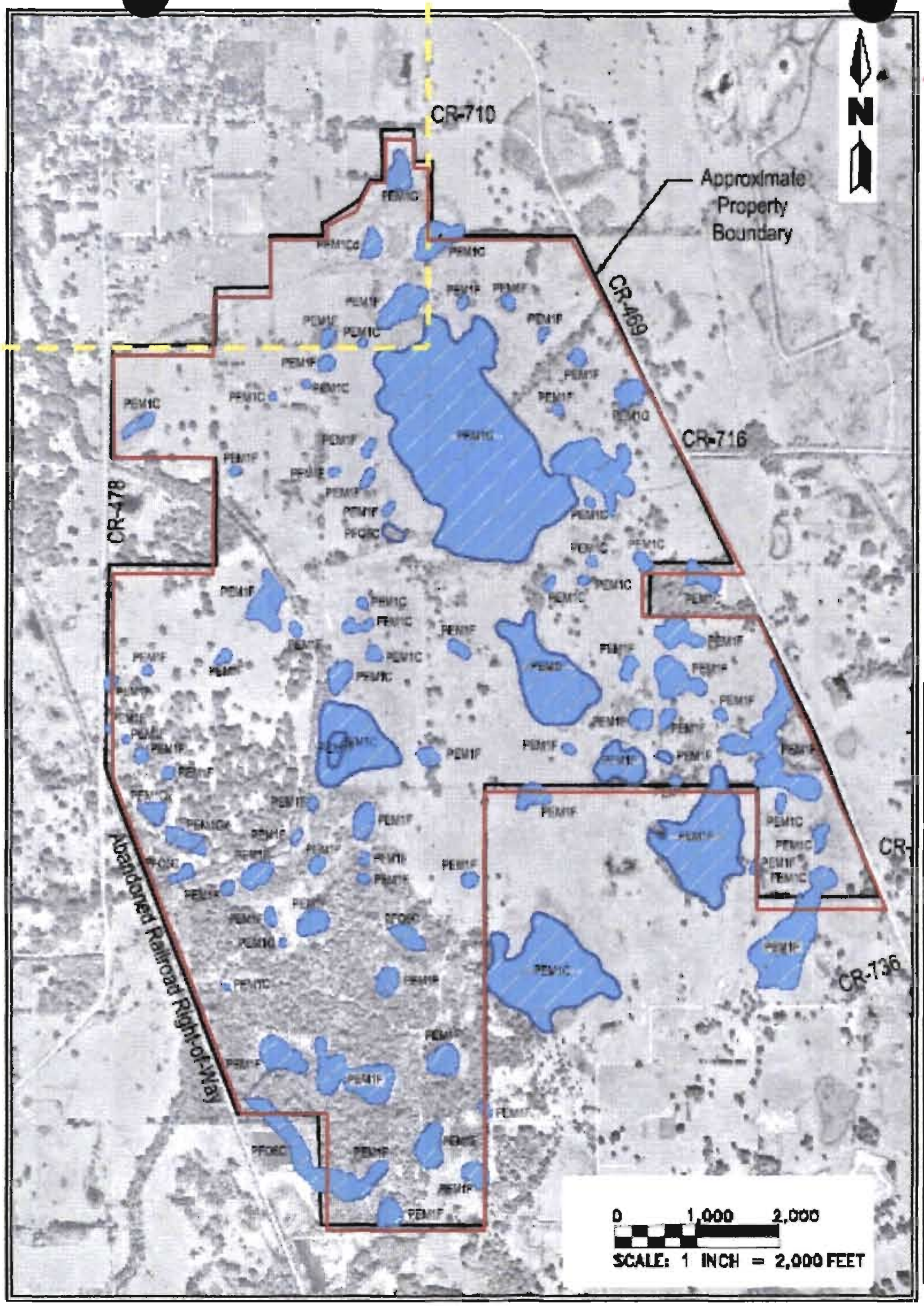
- Preliminary Modeling Report and Modeling Information for all required modeling,
- Permit Application with Supporting Information,
- Preliminary Facility Plot Plain and Process Flow Diagram, and
- Check for $7,500 for required Application Fees.

SCC welcomes the opportunity to working with the Department on this Project and if you or anyone at the Department should have any questions or require any additional information, please feel free to contact me anytime directly at (386) 935-5000 or Joe Horton at (386) 935-5039.

Sincerely,

Dan Fritz
CEO/President
Sumter Cement Company

CC: Al Linero – DEP
Cleve Holliday – DEP
Celso Martini – SAC w/o Attachments
Tom Messer – SAC w/o Attachments
Joe Horton – SAC w/o Attachments

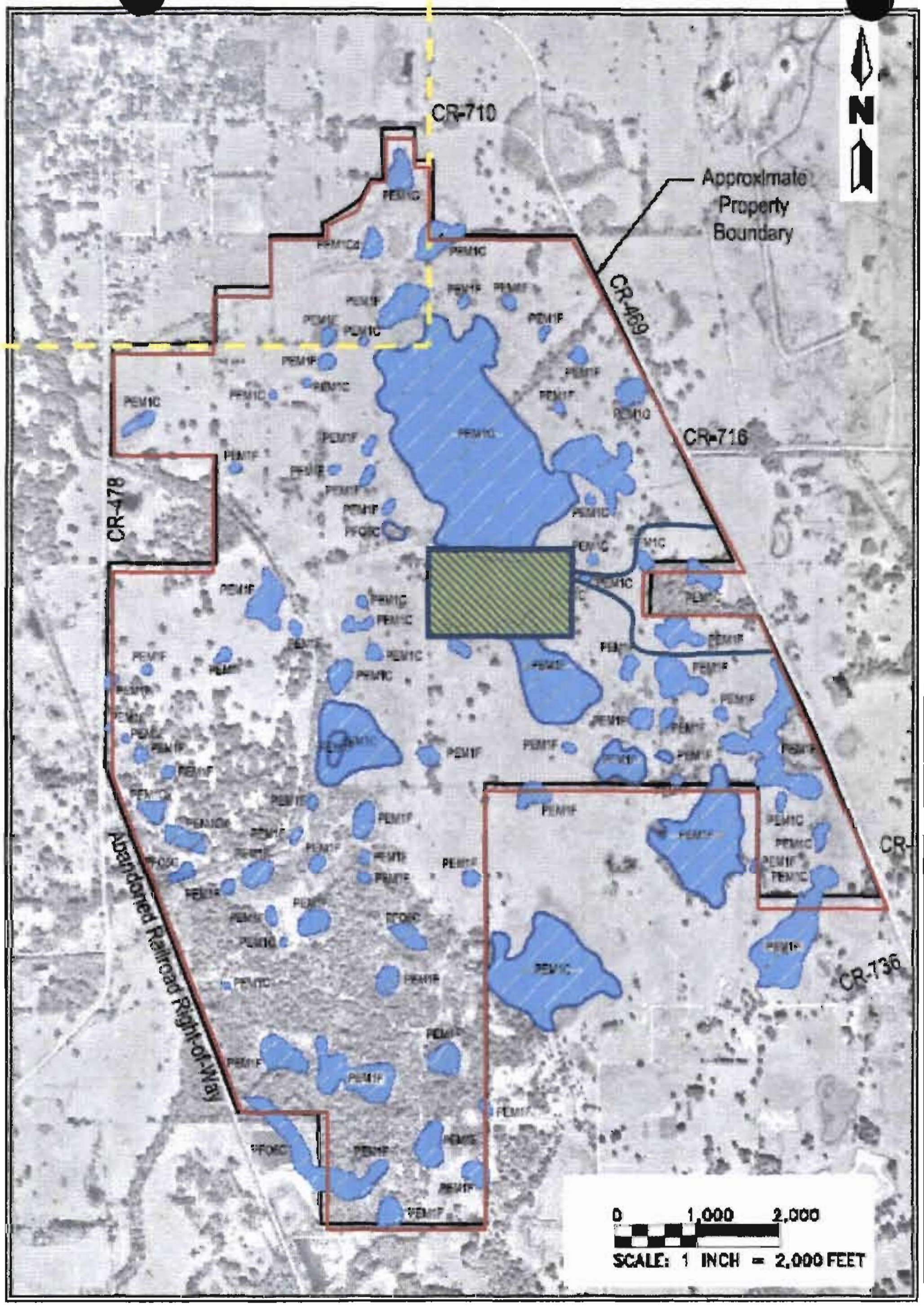


Plant & Quarry Location

- The approximately ±359.9 acres of wetlands are highlighted. Position the plant and quarry to avoid and persevere the maximum amount of wetlands onsite.

- Position the plant as far from property boundaries as possible to minimize offsite impacts and provide a visual buffer, also split traffic patterns to minimize fugitive emissions for modeling.

	Identified wetland requiring mitigation if distributed or included in quarry permit.
	Property boundary – 1473 Acres
	Center Hill – City Limits
	Proposed Plant Site (50 Acres) – 1000' from property boundary
	Entrance and Exit Roads to and from Plant Site.
	Wetlands preserved and not included in quarry plan. Preserves approximately 125 acres of wetlands.
	Area where wetlands could be created to offset isolated wetlands used in the quarry plan
	Possible site for City Park
	Quarry Area – Reserves of approximately 1000 acres
	Additional area that could be used as Quarry – Area would require additional wetland permitting and area



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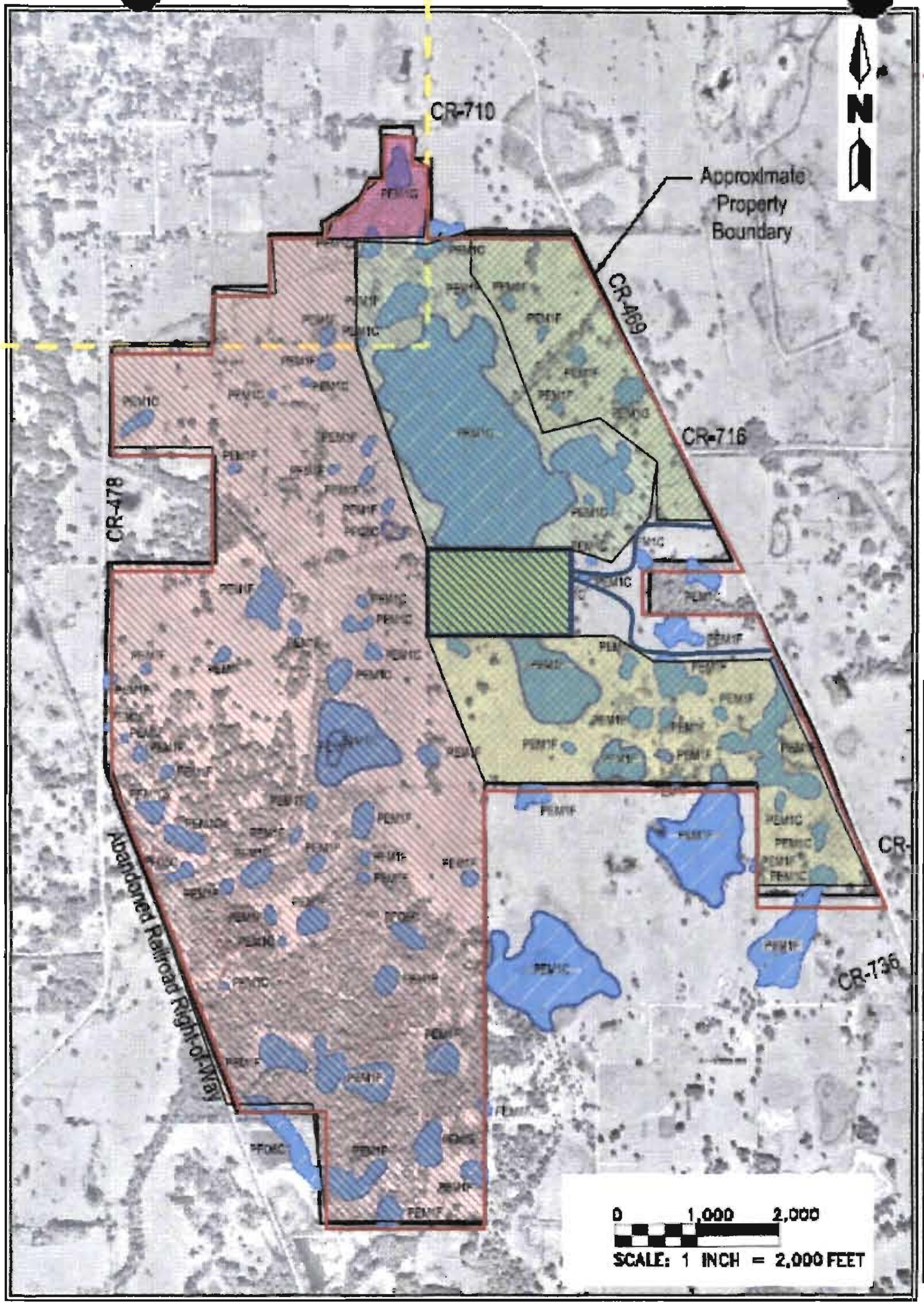

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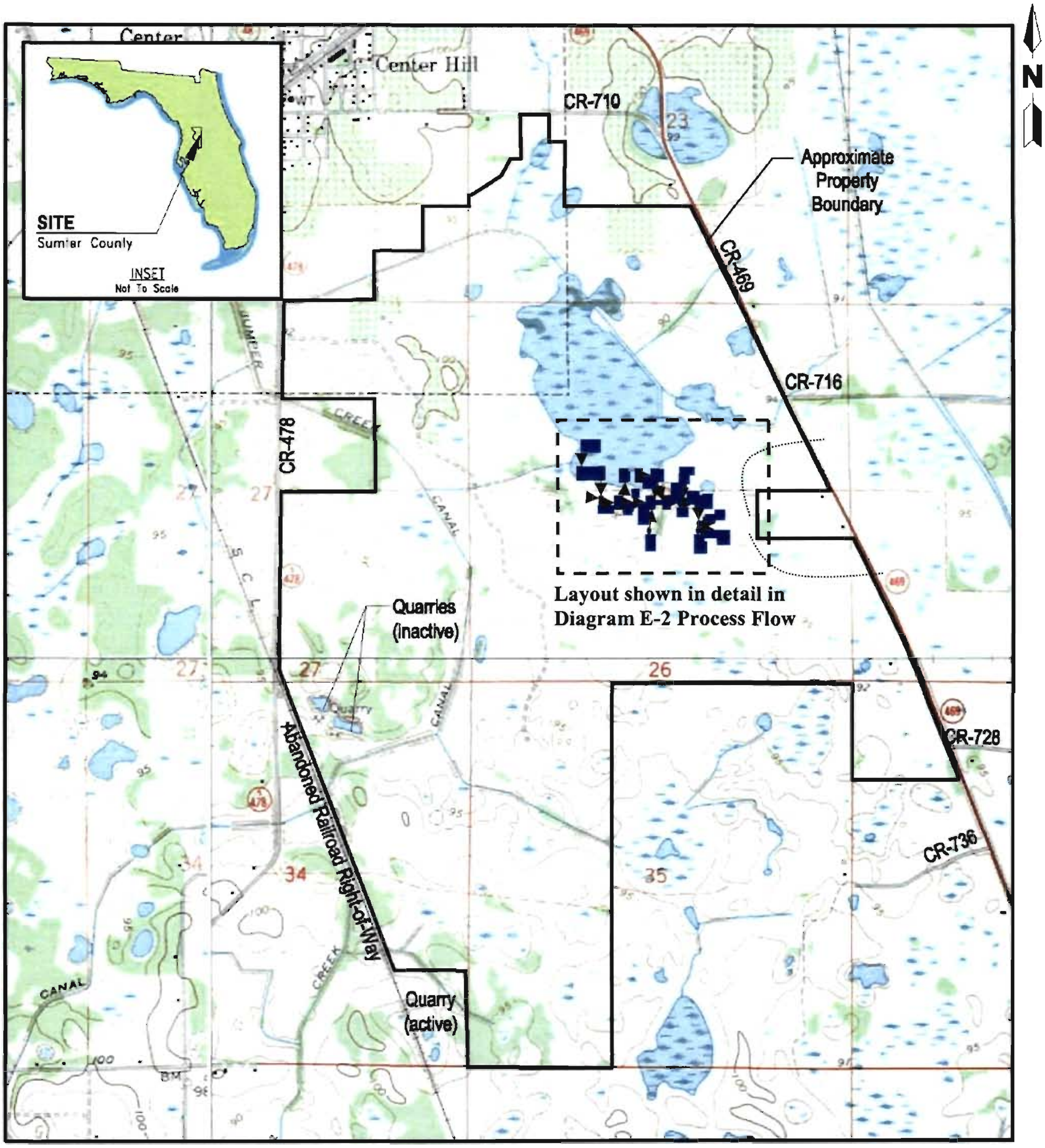
Diagram E-1

SUMTER CEMENT COMPANY - PRELIMINARY SITE LAYOUT

■ - Building Layout



SOURCE: USGS Quadrangles

BUSHNELL, FLA.	CENTER HILL, FLA.	MASCOTTE, FLA.	WEBSTER, FLA.
1958, revised 1984	1969	1969	1958

Maps and data Copyright 2003 Maptech

LEGEND

CR County Road

0 1,000 2,000

SCALE: 1 INCH = 2,000 FEET

SITE VICINITY MAP

NO.	DATE	REVISIONS
0	Mar-05	Initial Submittal

DESIGNED	DRAWN	CHECKED	DATE
HH	BB		

P:\CAD\COMMERCIAL\ANDERSON_COLUMBIA\SUMTER\PH1\DG-1.DWG BB-89 03/03/05 13:42:19

MACTEC
Engineering and Consulting, Inc.
Tallahassee, Florida
850-656-1293

GRAHAM PROPERTY
PHASE I ENVIRONMENTAL SITE ASSESSMENT
CENTER HILL, SUMTER COUNTY PROJECT
SUMTER COUNTY, FLORIDA

SUWANNEE AMERICAN CEMENT

FIGURE
1

Permit-To-Construct Application for a Planned New Portland Cement Plant

Submitted By:

Sumter Cement Company, LLC
P.O. Box 410
Branford, Flordia 32008

Submitted To:

Florida Department of Environmental Protection
2600 Blair Stone Road, MS#5500
Tallahassee, Florida 32399-2400

June 2005

Prepared By:

SPECTRUM environmental sciences, inc.
97 Thomas Johnson Drive, Suite 200
Frederick, MD 21702

Table of Contents

1.0 Introduction

Sumter Cement Company, LLC Company (SCC) is proposing to build a new Portland cement plant in the town of Center Hill located in Sumter County, Florida. SCC will be operated by Votorantim Cementos. Votorantim Cementos also operates Suwannee American Cement (SAC) which has a cement plant in Branford, Florida. The operations of the new SCC Center Hill Plant (Plant) and the SAC Branford Plant will be both fully controlled by Votorantim Cementos. The two cement plants, although with different names, will share the valuable resources, information, and the vast experience and knowledge provided by Votorantim Cementos. The Plant will perform quarrying and crushing of raw materials and processing of these materials into Portland cement. The Plant will operate with a state-of-the-art in-line raw mill and preheater/precalciner (PH/PC) kiln system and include the latest technologies for emission controls.

This permit-to-construct (PTC) application is composed of six sections including the Introduction. Section 2 presents the "Project Description" which provides an overview of the proposed plant. Section 3 presents the required Florida Department of Environmental Protection (FDEP) "Application for Air Permit – Long Form". Section 4 presents the air emission calculation methodology utilized to prepare the potential-to-emit (PTE) air emission inventory which is provided in Appendix A. Two-year average actual emissions are not applicable since this will be a new facility. Additionally for the same reasons stated above, there are no applicable contemporaneous air emission changes. Section 5 presents the New Source Review (NSR) applicability analysis. Section 6 presents an analysis of regulatory applicability.

Appendix A presents a detailed air emissions inventory associated with potential-to-emit (PTE) emissions from the preliminary design of the proposed new Plant. Appendix B presents a Best Available Control Technology (BACT) Analyses. Appendix C provides the results of the preliminary NO_x, TSP, and PM_{10} air quality dispersion modeling study. Appendix D presents the preliminary results of the NO_x, TSP, PM_{10}, and $PM_{2.5}$ secondary impact analysis. Appendix E provides process flow diagrams and drawings. Appendix F presents the Good Engineering Practice (GEP) Stack Height Analysis. Appendix G provides the modeling protocol and Appendix H presents the Florida Professional Engineer's seal for this application. Upon completion of detailed engineering, which is currently ongoing, additional information such as complete modeling analysis for all emission points and fugitive emissions as well as process flow diagrams and facility layouts will be provided to supplement this Application.

2.0 Project Description

SCC plans to construct a new dry process Portland cement plant capable of producing approximately 1.5 million short tons of clinker per year. The Plant will be located approximately one mile east of Center Hill, Florida. The Plant will perform quarrying and crushing of raw materials, and processing of these materials into Portland cement. The Plant will operate with a single cement production system which includes a preheater/precalciner kiln with an in-line raw mill. The components of this system are described in detail below and consist of equipment to quarry and crush limestone (Quarry Crushing), prepare raw material into pyro-process kiln feed (Raw Grinding), process kiln feed into clinker (Clinker Burning), cool the clinker (Clinker Cooling), process clinker into cement (Finish Grinding), and prepare raw fuel for combustion (Fuel Grinding). Once the final cement is produced it will be distributed by both truck and rail. SCC will use reasonable precautions to control unconfined emissions. For a listing of these precautions see Appendix A.

- **Quarry Crushing**

Limestone will be quarried on the Plant property; other raw materials, such as sand (or other silica sources), iron ore (or other iron sources), and fly ash (or other alumina sources) will be received from off-site sources and stored within the enclosed Raw Material Storage Building. The limestone will be processed by a primary crusher and then conveyed to a Limestone Storage Shed.

- **Raw Grinding**

The raw materials will be conveyed from their storage areas mentioned above by completely enclosed conveyors to Pre-Blending Silos and then into a Raw Grinding system, where the combined materials are dried and pulverized. The powdery material, referred to as kiln feed, will then be conveyed to a Blending Silo for temporary storage. Process air from the raw mill will be vented out through the main stack, which is also used by the preheater/precalciner kiln system.

- **Clinker Burning**

From the Blend Silo, the kiln feed will be conveyed into a dry process preheater/precalciner and rotary kiln for pyro-processing into cement clinker nodules. The kiln feed will then be introduced at the upper stages of the preheater and travel through the preheater and calciner finally entering the end of the kiln where it will travel downhill via the kiln rotation and gravity. Fuel will be fired in the calciner and at the lower end of the kiln and the resulting combustion gases will travel countercurrent to the feed via an induced draft fan. Kiln gases will be vented to the main stack shared with the Raw Mill system.

Fuels to be used in the pyroprocessing system include fuel oil, natural gas, coal, petroleum coke, and whole or chipped tires. Also, non-hazardous liquids (e.g., on-spec used oil; up to 50 percent of total heat input) may be burned in the kiln and/or precalciner. Non-hazardous solids (e.g., plastic, filter fluff, wood waste; up to 50 percent of total heat input) may be burned in the precalciner. The Plant may include a whole tire system and a tire gasification system that will use heat from the pyroprocessing system to decompose tires to gas, coke, and wire which will be used in the kiln and pyroprocessing system in an enclosed process.

As the kiln feed is gravity-conveyed through the preheater and calciner it will be progressively heated and undergo calcination. As the kiln feed enters the kiln it will travel through the sintering zone of the process. When the material reaches the hot end of the kiln it will have completed its chemical transformation into Portland cement clinker nodules, typically sized between ½-inch and 2-inch in diameter. The clinker nodules will be deposited directly from the hot-end of the kiln into the Clinker Cooler system. The kiln system will have a preliminary capacity of 306 tons/hour of material fed to the preheater (dry basis) and 180 tons/hour of clinker production.

- **Clinker Cooling**

Clinker discharged from the kiln passes to a Clinker Cooler system, which will vent to its own exhaust stack. The cooled clinker will be conveyed to clinker storage silos that will feed the Finish Grinding process.

- **Finish Grinding**

In the Finish Grinding process, gypsum will be inter-ground with clinker to produce cement. Gypsum will be received at the plant by truck and stored in a Gypsum Storage Building. The gypsum will then be conveyed by enclosed conveyors to a Gypsum Storage Silo. Clinker and gypsum extracted from their respective storage silos, will be fed in predetermined amounts into one of two Finish Grinding Mills. The Finish Mills will have a combined preliminary capacity of 204 tons/hour of Portland cement production. The ground clinker and gypsum particles mix, or Portland cement, produced by the Finish Mills will then be conveyed to Cement Storage Silos. The Cement Silos will feed the Portland cement to one of three truck load outs or a rail load out for distribution.

- **Fuel Grinding**

The Plant will also include a coal processing operation that will crush approximately 214,000 tons of coal and petroleum coke annually. The coal/coke will be delivered by truck and stored in a Coal Storage Building and fed by front end loaders and enclosed conveyors to the Coal Mill for drying and grinding. The Coal Mill will use cooler gas for the drying process and will not be a source of combustion. Ground fuel will be stored in the Fine Coal Storage Building and conveyed from there to the kiln system.

Emissions units addressed by this permitting action are:

EU ID	Description
CH-1	Primary Crushing and Associated Conveyors
CH-2	Raw Material Processing and Storage – controlled by baghouses
CH-3	Raw Material Conveying – conveyor transfer points
CH-4	Preheater/Precalciner Kiln System with In-Line Raw Mill
CH-5	Clinker Cooler
CH-6	Clinker and Cement Processing – controlled by baghouses
CH-7	Coal Mill System
CH-8	Coal Conveying – conveyor transfer points
CH-10	Storage Piles
CH-11	Paved and Unpaved Roads

Additionally, there will be a diesel emergency generator (CH-9). The total amount of diesel fuel to be burned in the new emergency generator will not exceed 32,000 gal/yr and thus it is exempt from permitting pursuant to 62-210.300(3)(a)20 F.A.C..

The vendors for the new equipment have not yet been selected. Therefore, the application does not include detailed process flow diagrams (PFDs), information on process and control equipment manufacturers, or continuous emission monitoring systems (CEMS). A simplified PFD is provided in Appendix E. To the extent requested by the DEP, this information will be provided to the DEP once the equipment bids have been approved. The CEMS and stack sampling facilities will meet all the applicable requirements in 40 CFR Parts 60 and 63.

3.0 Permit-To-Construct Application Forms

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 a proposed project:

- subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- at an existing federally enforceable state air operation permit (FESOP) or Title V permitted facility.

Air Operation Permit – Use this form to apply for:

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

Air Construction Permit & Revised/Renewal Title V Air Operation Permit (Concurrent Processing Option) – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **Sumter Cement Company, LLC**	
2. Site Name: **Center Hill Plant**	
3. Facility Identification Number:	
4. Facility Location... Street Address or Other Locator: **Country Road 469** City: **Center Hill** County: **Sumter** Zip Code: **33514**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☐ Yes ☒ No

Application Contact

1. Application Contact Name: **Joe Horton**
2. Application Contact Mailing Address... Organization/Firm: **Sumter Cement Company, LLC** Street Address: **P.O. Box 410** City: **Branford** State: **FL** Zip Code: **32008**
3. Application Contact Telephone Numbers... Telephone: (**386**) **935 - 5039** ext. Fax: (**386**) **935 - 5080**
4. Application Contact Email Address: **jbhorton@suwanneecement.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	6-16-05
2. Project Number(s):	1190041-001-AC
3. PSD Number (if applicable):	PSD-FL-358
4. Siting Number (if applicable):	

APPLICATION INFORMATION

Purpose of Application

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

Air Construction Permit

[x] Air construction permit.

Air Operation Permit

[ ] Initial Title V air operation permit.

[ ] Title V air operation permit revision.

[ ] Title V air operation permit renewal.

[ ] Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.

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

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

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

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

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

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

Application Comment

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
CH-1	Primary Crusher and Associated Conveyors	AC1A	
CH-2	Raw Material Processing and Storage	AC1A	
CH-3	Raw Material Handling	AC1A	
CH-4	Preheater/Precalciner Kiln and In-line Raw Mill	AC1A	
CH-5	Clinker Cooler	AC1A	
CH-6	Clinker and Cement Processing	AC1A	
CH-7	Coal Mill System	AC1A	
CH-8	Coal Conveying	AC1A	
CH-10	Storage Piles	AC1A	
CH-11	Paved and Unpaved Roads	AC1A	

Application Processing Fee

Check one: [x] Attached - Amount: $ 7,500.00 [ ] Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

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

1.	Owner/Authorized Representative Name : **Dan Fritz - CEO/President**
2.	Owner/Authorized Representative Mailing Address... Organization/Firm: **Sumter Cement Company, LLC** Street Address: **P.O. Box 410** City: **Branford** State: **FL** Zip Code: **32008**
3.	Owner/Authorized Representative Telephone Numbers... Telephone: (**386**) **935 - 5000** ext. Fax: (**386**) **935 - 5080**
4.	Owner/Authorized Representative Email Address: **drfritz@vcnainc.com**
5.	Owner/Authorized Representative Statement: *I, the undersigned, am the owner or authorized representative of the facility 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 requirements identified in this application to which the facility 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.* Daniel R Fritz — Signature 6/15/05 — Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **Porter Rivers, III** Registration Number: **FL 41175**	
2. Professional Engineer Mailing Address... Organization/Firm: **B.P. Barber & Associates, Inc.** Street Address: **P.O. Box 1116** City: **Columbia** State: **SC** Zip Code: **29202-1116**	
3. Professional Engineer Telephone Numbers... Telephone: **(803) 254-4400** ext. Fax: **(803) 771-6676**	
4. Professional Engineer Email Address: **privers@bpbarber.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 **[X]**, *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] Porter Rivers, III — Signature

6/13/05 — Date

(seal) NO. 41175 STATE OF

* Attach any exception to certification statement.

Professional Engineer Certification

1. Professional Engineer Name: **A Sealed PE Certification is provided in Appendix H.** Registration Number:	
2. Professional Engineer Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:	
3. Professional Engineer Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -	
4. Professional Engineer Email Address:	
5. Professional Engineer Statement:	

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☐, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

______________________________ ______________

Signature Date

(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) **404.171** North (km) **3167.472**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) **28 / 37 / 50** Longitude (DD/MM/SS) **-81 / 58 / 49**	
3. Governmental Facility Code: **0**	4. Facility Status Code: **C**	5. Facility Major Group SIC Code: **32**	6. Facility SIC(s): **3241**
7. Facility Comment : **Facility coordinates are based on the approximate assumed location of the new plant.**			

Facility Contact

1. Facility Contact Name: **Joe Horton**
2. Facility Contact Mailing Address... Organization/Firm: **Sumter American Cement, LLC** Street Address: **P.O. Box 410** City: **Branford** State: **FL** Zip Code: **32008**
3. Facility Contact Telephone Numbers: Telephone: (**386**) **935 - 5039** ext. Fax: (**386**) **935 - 5080**
4. Facility Contact Email Address: **jbhorton@suwanneecement.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 Email 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:			

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
CO	A	N
H106 (HCL)	A	N
NOX	A	N
PM	A	N
PM10	A	N
PM2.5	A	N
SO2	A	N
VOC	A	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 No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap
Not Applicable					

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) [x] Attached, Document ID: **Diagram E-1** [ ] Previously Submitted, Date:______
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) [x] Attached, Document ID: **Diagram E-2** [ ] Previously Submitted, Date:_______
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) [x] Attached, Document ID: **Section 2** [ ] Previously Submitted, Date:_______

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: [x] Attached, Document ID: **Diagram E-1** [ ] Not Applicable (existing permitted facility)
2. Description of Proposed Construction or Modification: [x] Attached, Document ID: **Section 2**
3. Rule Applicability Analysis: [x] Attached, Document ID: **Section 6**
4. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.): [x] Attached, Document ID: **Section 2** [ ] Not Applicable (no exempt units at facility)
5. Fugitive Emissions Identification (Rule 62-212.400(2), F.A.C.): [x] Attached, Document ID: **Appendix A** [ ] Not Applicable
6. Preconstruction Air Quality Monitoring and Analysis (Rule 62-212.400(5)(f), F.A.C.): [ ] Attached, Document ID:_________ [ ] Not Applicable **Not yet completed - Modeling Protocol provided in Appendix G.**
7. Ambient Impact Analysis (Rule 62-212.400(5)(d), F.A.C.): [ ] Attached, Document ID:_________ [ ] Not Applicable **Not yet completed - Modeling Protocol provided in Appendix G.**
8. Air Quality Impact since 1977 (Rule 62-212.400(5)(h)5., F.A.C.): [ ] Attached, Document ID:_________ [ ] Not Applicable **Not yet completed - Modeling Protocol provided in Appendix G.**
9. Additional Impact Analyses (Rules 62-212.400(5)(e)1. and 62-212.500(4)(e), F.A.C.): [ ] Attached, Document ID:_________ [ ] Not Applicable **Not yet completed - Modeling Protocol provided in Appendix G.**

10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): ☐ Attached, Document ID:_________ ☐ Not Applicable **Not yet completed - Modeling Protocol provided in Appendix G.**

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.): ☐ Attached, Document ID:_________ ☐ Not Applicable (no exempt units at facility)

Additional Requirements for Title V Air Operation Permit Applications

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 On site 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

Additional Requirements Comment

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Primary Crusher and Associated Conveyors

3. Emissions Unit Identification Number: **CH-1**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **The limestone processed by the crusher and subsequent transfer equipment is mined below the water table and has a high moisture content, so no control is necessary.**
2. Control Device or Method Code(s): **N/A**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **2,517,000 Tons/Year**
2. Maximum Production Rate:
3. Maximum Heat Input Rate: million Btu/hr
4. Maximum Incineration Rate: pounds/hr tons/day
5. Requested Maximum Operating Schedule: **24** hours/day **7** days/week **52** weeks/year **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons limestone.**

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: **CH-1-1 thru CH-1-6**	2. Emission Point Type Code: **4**

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:
CH-1-1 – Loader to Primary Crusher
CH-1-2 – Primary Crusher Operation
CH-1-3 – Limestone Quarry Conveyors (11)
CH-1-4 – Base Rock Quarry Conveyors (3)
CH-1-5 – Limestone Quarry Conveyor
CH-1-6 – Enclosed Limestone Conveyor

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:
Not Applicable

5. Discharge Type Code: **F- Fugitive**	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: 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:

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 3

1. Segment Description (Process/Fuel Type): **Raw Material Unloading**		
2. Source Classification Code (SCC): **30500607**	3. SCC Units: **Tons Material Unloaded**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **See Appendix A**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment 2 of 3

1. Segment Description (Process/Fuel Type): **Primary Crushing**		
2. Source Classification Code (SCC): **30500609**	3. SCC Units: **Tons Material Processed**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **2,517,000 Short Tons**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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

Segment Description and Rate: Segment 3 of 3

1. Segment Description (Process/Fuel Type): **Raw Material Transfer**		
2. Source Classification Code (SCC): **30500612**	3. SCC Units: **Tons Material Handled**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **See Appendix A**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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	**N/A**	**N/A**	**EL**
PM_{10}	**N/A**	**N/A**	**EL**
$PM_{2.5}$	**N/A**	**N/A**	**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: **N/A**
3. Potential Emissions: **0.96** lb/hour **4.21** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM10**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **0.44** lb/hour **1.95** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **0.44** lb/hour **1.95** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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 __ of __

1. Basis for Allowable Emissions Code: **Not Applicable**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

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:
Method 22/9

5. Visible Emissions Comment:
Based on 40 CFR 60.672 (Subpart OOO)

Limit applies to transfer points on belt conveyors.

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE15**	2. Basis for Allowable Opacity: ☒ Rule ☐ Other

3. Allowable Opacity:
Normal Conditions: **15 %** Exceptional Conditions: %
Maximum Period of Excess Opacity Allowed: min/hour

4. Method of Compliance:
Method 22/9

5. Visible Emissions Comment:
Based on 40 CFR 60.672(c) (Subpart OOO)

Limit applies to the crusher (CH-1-2).

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code: **Not Applicable**	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] Previously Submitted, Date: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] To be Submitted, Date (if known): ________
   Test Date(s)/Pollutant(s) Tested: ________
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) [x] Attached, Document ID: **Appendix B** [ ] Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) [x] Attached, Document ID: **Appendix F** [ ] Not Applicable
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) [ ] Attached, Document ID: ___________ [x] Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

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

5. Acid Rain Part Application
[ ] Certificate of Representation (EPA Form No. 7610-1)
  [ ] Copy Attached, Document ID:_
[ ] Acid Rain Part (Form No. 62-210.900(1)(a))
  [ ] Attached, Document ID:___________
  [ ] Previously Submitted, Date:_________
[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
  [ ] Attached, Document ID:___________
  [ ] Previously Submitted, Date:_________
[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
  [ ] Attached, Document ID:___________
  [ ] Previously Submitted, Date:_________
[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
  [ ] Attached, Document ID:___________
  [ ] Previously Submitted, Date:_________
[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
  [ ] Attached, Document ID:___________
  [ ] Previously Submitted, Date:_________
[ ] Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
  [ ] Attached, Document ID:___________
  [ ] Previously Submitted, Date:_________
[ ] Not Applicable

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Raw Material Processing and Storage

3. Emissions Unit Identification Number: **CH-2**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Fabric Filter High Temperature (T > 250F) – CH-2-1, CH-2-5** **Fabric Filter Medium temperature (180F < T < 250F) – CH-2-2, CH-2-3** **Fabric Filter Low Temperature (T < 180F) – CH-2-4, CH-2-6**
2. Control Device or Method Code(s): **016, 017, 018**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **2,543,000 Tons**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons dry Kiln Preheater Feed.**	

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: **CH-2-1 thru CH-2-6**		2. Emission Point Type Code: **3**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **CH-2-1 – Kiln Feed Transport** **CH-2-2 – Blend Silo Inlet** **CH-2-3 – Blend Silo Outlet** **CH-2-4 – Hydrated Lime Silo** **CH-2-5 – Off Spec. Feed Handling** **CH-2-6 – Fly Ash Silo**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**		
5. Discharge Type Code: **See Appendix A**	6. Stack Height: Feet **See Appendix A**	7. Exit Diameter: feet **See Appendix A**
8. Exit Temperature: °F **See Appendix A**	9. Actual Volumetric Flow Rate: acfm **See Appendix A**	10. Water Vapor: % **See Appendix A**
11. Maximum Dry Standard Flow Rate: Dscfm **See Appendix A**		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: **All required information is provided in Appendix A.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Raw Material Transfer**		
2. Source Classification Code (SCC): **30500612**	3. SCC Units: **Tons Material Handled**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **2,543,000 Tons**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Maximum processing rate is short tons dry Kiln Preheater Feed.**		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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, 017, 018**	**N/A**	**EL**
PM_{10}	**016, 017, 018**	**N/A**	**EL**
$PM_{2.5}$	**016, 017, 018**	**N/A**	**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: **99.95%**
3. Potential Emissions: **2.63** lb/hour **11.52** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.01 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **99.95%**
3. Potential Emissions: **2.24** lb/hour **9.79** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0085 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **99.95%**
3. Potential Emissions: **2.24** lb/hour **9.79** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0085 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM - 0.01 gr/dscf**	4. Equivalent Allowable Emissions: **2.63** lb/hour **11.52** tons/year
5. Method of Compliance: **Initial Stack Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable equals potential.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM_{10} - 0.0085 gr/dscf**	4. Equivalent Allowable Emissions: **2.24** lb/hour **9.79** tons/year
5. Method of Compliance: **Initial Stack Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable equals potential.** **$PM_{2.5}$ emissions conservatively assumed to equal PM_{10} emissions.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: [x] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **Based on 40 CFR 63.1348 (Subpart LLL) – BACT is more stringent.**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE05**	2. Basis for Allowable Opacity: [ ] Rule [x] Other
3. Allowable Opacity: Normal Conditions: **5** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **VE is BACT, SCC has voluntarily elected to be more stringent than RULE. See Table 6-1 in Appendix B for a summary of all VE BACT limits.**	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code: **Not Applicable**	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] Previously Submitted, Date: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] To be Submitted, Date (if known): ________
   Test Date(s)/Pollutant(s) Tested: ________
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) [x] Attached, Document ID: **Appendix B** [ ] Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) [x] Attached, Document ID: **Appendix F** [ ] Not Applicable
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) [ ] Attached, Document ID: ____________ [x] Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

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

5. Acid Rain Part Application
[ ] Certificate of Representation (EPA Form No. 7610-1)
  [ ] Copy Attached, Document ID:_
[ ] Acid Rain Part (Form No. 62-210.900(1)(a))
  [ ] Attached, Document ID:____________
  [ ] Previously Submitted, Date:_________
[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
  [ ] Attached, Document ID:____________
  [ ] Previously Submitted, Date:_________
[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
  [ ] Attached, Document ID:____________
  [ ] Previously Submitted, Date:_________
[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
  [ ] Attached, Document ID:____________
  [ ] Previously Submitted, Date:_________
[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
  [ ] Attached, Document ID:____________
  [ ] Previously Submitted, Date:_________
[ ] Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
  [ ] Attached, Document ID:____________
  [ ] Previously Submitted, Date:_________
[ ] Not Applicable

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Raw Material Conveying

3. Emissions Unit Identification Number: **CH-3**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **A 90% control efficiency is applied to applicable sources to account for reduction of fugitives due to enclosed conveyor transfer points, enclosed bins, and below ground transfer.** **A 60% control efficiency is applied to applicable sources to account for reduction of fugitives due to building enclosures.**
2. Control Device or Method Code(s): **N/A**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **2,543,000 Tons**		
2. Maximum Production Rate:		
3. Maximum Heat Input Rate: million Btu/hr		
4. Maximum Incineration Rate: pounds/hr tons/day		
5. Requested Maximum Operating Schedule:	**24** hours/day	**7** days/week
	52 weeks/year	**8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons dry Kiln Preheater Feed.**		

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: **CH-3-1 thru CH-3-20**	2. Emission Point Type Code: **4**

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:

CH-3-1 – Transfer to Pile	**CH-3-11 – Fly Ash Pile to Reclaim**
CH-3-2 – Piles to reclaim belts	**CH-3-12 – Reclaim to Fly Ash Conveyor**
CH-3-3 – Reclaim belts to Conveyor	**CH-3-13 – Limestone Conveying**
CH-3-4 – Iron Ore Loader to Hopper	**CH-3-14 – Belt to Belt Transfer**
CH-3-5 – Sand Loader to Hopper	**CH-3-15 – Sand Conveying**
CH-3-6 – Hopper Belt Transfer	**CH-3-16 – Iron Ore Conveying**
CH-3-7 – Belt to Belt Transfer	**CH-3-17 – Fly Ash Conveying**
CH-3-8 – Truck to Fly Ash Hopper	**CH-3-18 – Raw Mix Conveying**
CH-3-9 – Fly Ash Hopper Belt Transfer	**CH-3-19 – Loader to Gypsum Hopper**
CH-3-10 – Transfer to Fly Ash Pile	**CH-3-20 – Gypsum Hopper Belt to Elevator**

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:
N/A

5. Discharge Type Code: **F- Fugitive**	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: 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:

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Raw Material Transfer**		
2. Source Classification Code (SCC): **30500612**	3. SCC Units: **Tons Material Handled**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **2,543,000 Tons**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Maximum processing rate is short tons dry Kiln Preheater Feed.**		

Segment Description and Rate: Segment _ of _

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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	**N/A**	**N/A**	**EL**
PM_{10}	**N/A**	**N/A**	**EL**
$PM_{2.5}$	**N/A**	**N/A**	**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: **N/A**
3. Potential Emissions: **0.13** lb/hour **0.67** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **N/A**
3. Potential Emissions: **0.06** lb/hour **0.31** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **0.06** lb/hour **0.31** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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 __ of __

1. Basis for Allowable Emissions Code: **Not Applicable**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: [x] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: **10%** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **Based on 40 CFR 63.1348 (Subpart LLL) - BACT is more stringent.**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE05**	2. Basis for Allowable Opacity: [ ] Rule [x] Other
3. Allowable Opacity: Normal Conditions: **5 %** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **VE is BACT, SCC has voluntarily elected to be more stringent than RULE. See Table 6-1 in Appendix B for a summary of all VE BACT limits.**	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code: **Not Applicable**	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] Previously Submitted, Date: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] To be Submitted, Date (if known): ________
   Test Date(s)/Pollutant(s) Tested: ________
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: **Appendix B** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☒ Attached, Document ID: **Appendix F** ☐ 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

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
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID:_ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Not Applicable

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Preheater/Precalciner Kiln System with In-Line Raw Mill

3. Emissions Unit Identification Number: **CH-4**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Fabric Filter Medium temperature (180F < T < 250F) – CH-4-1**
2. Control Device or Method Code(s): **017**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **1,500,000 Tons**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons clinker.**	

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: **CH-4-1**		2. Emission Point Type Code: **1**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **CH-4-1 – Preheater/Precalciner Kiln with In-Line Raw Mill**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**		
5. Discharge Type Code: **V**	6. Stack Height: Feet **325**	7. Exit Diameter: feet **11.0**
8. Exit Temperature: °F **228**	9. Actual Volumetric Flow Rate: acfm **322,072**	10. Water Vapor: **14** %
11. Maximum Dry Standard Flow Rate: Dscfm **212,234**		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: **All required information is also provided in Appendix A.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Preheater/Precalciner Kiln**		
2. Source Classification Code (SCC): **30500623**	3. SCC Units: **Tons Clinker Produced**	
4. Maximum Hourly Rate: **180 Short Tons Clinker**	5. Maximum Annual Rate: **1,500,000 Short Tons Clinker**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Includes In-Line Raw Mill**		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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
CO	**N/A**	**N/A**	**EL**
FL	**N/A**	**N/A**	**EL**
H106	**N/A**	**N/A**	**EL**
NO_x	**140, 205**	**N/A**	**EL**
PM	**017**	**N/A**	**EL**
PM_{10}	**017**	**N/A**	**EL**
$PM_{2.5}$	**017**	**N/A**	**EL**
SO_2	**N/A**	**N/A**	**EL**
VOC	**N/A**	**N/A**	**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: **CO**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **720.98** lb/hour **3,000.0** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **4.0 lb/ton Clinker** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **FL**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **0.00** lb/hour **0.68** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **9.00E-4 lb/ton clinker** Reference: **AP-42 Table 11.6-9**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **H106 – Hydrogen Chloride**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **25.23** lb/hour **105.00** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor **0.14 lb/ton clinker** Reference: **AP-42 Table 11.6-9**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **351.48** lb/hour **1,462.50** 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 clinker** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **99.95%**
3. Potential Emissions: **39.72** lb/hour **165.30** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.13 lb/ton dry feed** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **99.95%**
3. Potential Emissions: **33.61** lb/hour **139.87** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.11 lb/ton dry feed** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **$PM_{2.5}$**	2. Total Percent Efficiency of Control: **99.95%**
3. Potential Emissions: **33.61** lb/hour **139.87** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.11 lb/ton dry feed** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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: **N/A**
3. Potential Emissions: **48.67** lb/hour **202.50** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.27 lb/ton clinker** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **N/A**
3. Potential Emissions: **21.63** lb/hour **90.00** 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 clinker** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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 7

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM – 0.13 lb/ton dry feed**	4. Equivalent Allowable Emissions: **39.72** lb/hour **165.30** tons/year
5. Method of Compliance: **Annual Compliance Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT, SCC has voluntarily elected to be more stringent than RULE**	

Allowable Emissions Allowable Emissions 2 of 7

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM – 0.3 lb/ton dry feed**	4. Equivalent Allowable Emissions: **N/A** lb/hour tons/year
5. Method of Compliance: **Compliance by satisfying BACT Limit.**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on 40 CFR 63.1343 (Subpart LLL) – BACT is more stringent.**	

Allowable Emissions Allowable Emissions 3 of 7

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM10 – 0.11 lb/ton dry feed**	4. Equivalent Allowable Emissions: **33.61** lb/hour **139.87** tons/year
5. Method of Compliance: **Annual Compliance Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT. PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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 4 of 7

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **NO_x – 1.95 lb/ton clinker**	4. Equivalent Allowable Emissions: **351.48** lb/hour **1,462.50** tons/year
5. Method of Compliance: **CEMS, 30-day rolling average**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT.**	

Allowable Emissions Allowable Emissions 5 of 7

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **CO – 4.0 lb/ton clinker**	4. Equivalent Allowable Emissions: **720.98** lb/hour **3,000.0** tons/year
5. Method of Compliance: **CEMS, 30-day rolling average**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT**	

Allowable Emissions Allowable Emissions 6 of 7

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **VOC – 0.12 lb/ton clinker**	4. Equivalent Allowable Emissions: **21.63** lb/hour **90.00** tons/year
5. Method of Compliance: **CEMS, 30-day rolling average**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT.**	

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 7 of 7

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **SO_2 – 0.27 lb/ton clinker**	4. Equivalent Allowable Emissions: **48.67** lb/hour **202.50** tons/year
5. Method of Compliance: **CEMS, 30-day rolling average**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT.**	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: [x] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **COMS**	
5. Visible Emissions Comment: **Based on 40 CFR 63.1343 (Subpart LLL) - BACT is more stringent.**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: [ ] Rule [x] Other
3. Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **COMS**	
5. Visible Emissions Comment: **VE is BACT, SCC has voluntarily elected to be more stringent than RULE.** **See Table 6-1 in Appendix B for a summary of all VE BACT limits.**	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 1 of 3

1. Parameter Code: **EM - Emission**	2. Pollutant(s): **PM, VE**
3. CMS Requirement:	[x] Rule [ ] Other
4. Monitor Information... Manufacturer: **TBD** Model Number: **TBD**	Serial Number: **TBD**
5. Installation Date: **TBD**	6. Performance Specification Test Date: **TBD**
7. Continuous Monitor Comment: **COMS required for PSD, 40 CFR 63.1350**	

Continuous Monitoring System: Continuous Monitor 2 of 3

1. Parameter Code: **EM - Emission**	2. Pollutant(s): **NOX, SO2, THC, CO**
3. CMS Requirement:	[x] Rule [ ] Other
4. Monitor Information... Manufacturer: **TBD** Model Number: **TBD**	Serial Number: **TBD**
5. Installation Date: **TBD**	6. Performance Specification Test Date: **TBD**
7. Continuous Monitor Comment: **CEMS required for PSD, 62-212.400 F.A.C.**	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 3 of 3

1. Parameter Code: **TEMP – Flue Gas Temperature**	2. Pollutant(s):
3. CMS Requirement:	[x] Rule [ ] Other
4. Monitor Information... Manufacturer: **TBD** Model Number: **TBD**	Serial Number: **TBD**
5. Installation Date: **TBD**	6. Performance Specification Test Date: **TBD**
7. Continuous Monitor Comment: **Monitoring of Temperature at inlet to PM control device required by 40 CFR 63.1344.**	

Continuous Monitoring System: Continuous Monitor __ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
[ ] Attached, Document ID: ______ [ ] Previously Submitted, Date ______
[x] Not Applicable

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: ______ [ ] Previously Submitted, Date ______
[x] Not Applicable

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: ______ [ ] Previously Submitted, Date ______
[x] Not Applicable

6. Compliance Demonstration Reports/Records
[ ] Attached, Document ID: ______
Test Date(s)/Pollutant(s) Tested: ______
[ ] Previously Submitted, Date: ______
Test Date(s)/Pollutant(s) Tested: ______
[ ] To be Submitted, Date (if known): ______
Test Date(s)/Pollutant(s) Tested: ______
[x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) [x] Attached, Document ID: **Appendix B** [ ] Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) [x] Attached, Document ID: **Appendix F** [ ] Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) [x] Attached, Document ID: ____________ [ ] Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

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	
5. Acid Rain Part Application [ ] Certificate of Representation (EPA Form No. 7610-1) [ ] Copy Attached, Document ID:_ [ ] Acid Rain Part (Form No. 62-210.900(1)(a)) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Not Applicable	

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Clinker Cooler

3. Emissions Unit Identification Number: **CH-5**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Fabric Filter High Temperature (T > 250F) – Emission Point CH-5-1**
2. Control Device or Method Code(s): **016**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **1,500,000 tons/year**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons clinker.**	

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: **CH-5-1**	2. Emission Point Type Code: **1**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **CH-5-1 - Clinker Cooler**	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**	

5. Discharge Type Code: **V**	6. Stack Height: Feet **214**	7. Exit Diameter: feet **7.0**
8. Exit Temperature: °F **300**	9. Actual Volumetric Flow Rate: acfm **227,400**	10. Water Vapor: **10** %

11. Maximum Dry Standard Flow Rate: Dscfm **142,185**	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:

All information is also provided in Appendix A.

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Clinker Cooler**		
2. Source Classification Code (SCC): **30500614**	3. SCC Units: **Tons Clinker Processed**	
4. Maximum Hourly Rate: **180 Short Tons Clinker**	5. Maximum Annual Rate: **1,500,000 Short Tons Clinker**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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**	**N/A**	**EL**
PM_{10}	**016**	**N/A**	**EL**
PM2.5	**016**	**N/A**	**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: **99.95%**
3. Potential Emissions: **21.39** lb/hour **89.01** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.07 lb/ton dry feed** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **99.95%**
3. Potential Emissions: **18.33** lb/hour **76.29** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.06 lb/ton dry feed** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **99.95%**
3. Potential Emissions: **18.33** lb/hour **76.29** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.06 lb/ton dry feed** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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 3

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM – 0.07 lb/ton dry feed**	4. Equivalent Allowable Emissions: **21.39** lb/hour **89.01** tons/year
5. Method of Compliance: **Annual Compliance Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT, SCC has voluntarily elected to be more stringent than RULE.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM – 0.10 lb/ton dry feed**	4. Equivalent Allowable Emissions: **N/A** lb/hour tons/year
5. Method of Compliance: **Compliance by satisfying BACT Limit.**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on 40 CFR 63.1345 (Subpart LLL) – BACT is more stringent.**	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM_{10} – 0.06 lb/ton dry feed**	4. Equivalent Allowable Emissions: **18.33** lb/hour **76.29** tons/year
5. Method of Compliance: **Annual Compliance Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Limit is BACT.**	

G. VISIBLE EMISSIONS INFORMATION

Complete 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: [x] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **COMS**	
5. Visible Emissions Comment: **Based on 40 CFR 63.1345 (Subpart LLL)**	

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:	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 1 of 1

1. Parameter Code: **EM - Emission**	2. Pollutant(s): **PM, VE**
3. CMS Requirement:	[x] Rule [ ] Other
4. Monitor Information... Manufacturer: **TBD** Model Number: **TBD**	Serial Number: **TBD**
5. Installation Date: **TBD**	6. Performance Specification Test Date: **TBD**
7. Continuous Monitor Comment: **COMS required for PSD, 40CFR 63.1350.**	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
[ ] Attached, Document ID: ________ [ ] Previously Submitted, Date ________
[x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
[x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
[x] Not Applicable

6. Compliance Demonstration Reports/Records
[ ] Attached, Document ID: ________
Test Date(s)/Pollutant(s) Tested: ________________
[ ] Previously Submitted, Date: ______
Test Date(s)/Pollutant(s) Tested: ________________
[ ] To be Submitted, Date (if known): ________
Test Date(s)/Pollutant(s) Tested: ________________
[x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: **Appendix B** ☐ Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☒ Attached, Document ID: **Appendix F** ☐ 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

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	
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID:_ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID:__________ ☐ Previously Submitted, Date:________ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID:__________ ☐ Previously Submitted, Date:________ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID:__________ ☐ Previously Submitted, Date:________ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID:__________ ☐ Previously Submitted, Date:________ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID:__________ ☐ Previously Submitted, Date:________ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID:__________ ☐ Previously Submitted, Date:________ ☐ Not Applicable	

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Clinker and Cement Processing

3. Emissions Unit Identification Number: **CH-6**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description:

Fabric Filter High Temperature (T > 250F) – CH-6-1, CH-6-4

Fabric Filter Medium temperature (180F < T < 250F) – CH-6-5, CH-6-6, CH-6-7, CH-6-9, CH-6-10, CH-6-11, CH-6-12, CH-6-14

Fabric Filter Low Temperature (T < 180F) – CH-6-2, CH-6-3, CH-6-8, CH-6-13, CH-6-15, CH-6-16, CH-6-17, CH-6-18, CH-6-19, CH-6-20, CH-6-21

2. Control Device or Method Code(s): **016, 017, 018**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **1,500,000 Tons**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons clinker.**	

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: **CH-6-1 thru CH-6-21**	2. Emission Point Type Code: **3**

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:

CH-6-1 – Clinker Pan Conveyor
CH-6-2 – Clinker Transport
CH-6-3 – Clinker Transport
CH-6-4 – Clinker Silos
CH-6-5 – FM #1 Clinker Silo Outlet Conv.
CH-6-6 – Finish Mill #1 Separator
CH-6-7 – Finish Mill #1 BH
CH-6-8 – FM #1 Fringe Cement Bin
CH-6-9 – Finish Mill #1 Baghouse No. 3
CH-6-10 – FM #2 Clinker Silo Outlet Conv.
CH-6-11 – Finish Mill #2 Separator
CH-6-12 – Finish Mill #2 BH
CH-6-13 – FM #2 Fringe Cement Bin
CH-6-14 – Finish Mill # 2 Baghouse No. 3
CH-6-15 – FM #1 Cement Transport Conv.
CH-6-16 – FM #2 Cement Transport Conv.
CH-6-17 – Cement Silos
CH-6-18 – Truck Load-out No. 1
CH-6-19 – Truck Load-out No. 2
CH-6-20 – Truck Load-out No. 3
CH-6-21 – Rail Load-out

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:
N/A

5. Discharge Type Code: **See Appendix A**	6. Stack Height: Feet **See Appendix A**	7. Exit Diameter: feet **See Appendix A**
8. Exit Temperature: °F **See Appendix A**	9. Actual Volumetric Flow Rate: acfm **See Appendix A**	10. Water Vapor: % **See Appendix A**

11. Maximum Dry Standard Flow Rate: Dscfm **See Appendix A**	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:

All required information is provided in Appendix A.

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 4

1. Segment Description (Process/Fuel Type): **Clinker Transfer**		
2. Source Classification Code (SCC): **30500616**	3. SCC Units: **Tons Cement Produced**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **1,500,000 Short Tons Clinker**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment 2 of 4

1. Segment Description (Process/Fuel Type): **Clinker Grinding**		
2. Source Classification Code (SCC): **30500617**	3. SCC Units: **Tons Cement Produced**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **1,500,000 Short Tons Clinker**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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

Segment Description and Rate: Segment 3 of 4

1. Segment Description (Process/Fuel Type): **Cement Silos**		
2. Source Classification Code (SCC): **30500618**	3. SCC Units: **Tons Cement Produced**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **1,694,000 Short Tons Cement**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment 4 of 4

1. Segment Description (Process/Fuel Type): **Cement Load Out**		
2. Source Classification Code (SCC): **30500619**	3. SCC Units: **Tons Cement Produced**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **1,694,000 Short Tons Cement**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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, 017, 018**	**N/A**	**EL**
PM_{10}	**016, 017, 018**	**N/A**	**EL**
PM2.5	**016, 017, 018**	**N/A**	**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: **99.95%**
3. Potential Emissions: **39.71** lb/hour **173.94** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.01 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **99.95%**
3. Potential Emissions: **33.76** lb/hour **147.85**tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0085 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **99.95%**
3. Potential Emissions: **33.76** lb/hour **147.85**tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0085 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM – 0.01 gr/dscf**	4. Equivalent Allowable Emissions: **39.71** lb/hour **173.94** tons/year
5. Method of Compliance: **Initial Stack Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable equals potential.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM_{10} – 0.0085 gr/dscf**	4. Equivalent Allowable Emissions: **33.76** lb/hour **147.85** tons/year
5. Method of Compliance: **Initial Stack Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable equals potential.**	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: [x] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **Based on 40 CFR 63.1348 (Subpart LLL)** **Limit is for Finish Mill Ball Mill and Air Separator Stacks only (CH-6-6, CH-6-7, CH-6-11, and CH-6-12) – BACT is more stringent for all other Finish Mill sources.**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE05**	2. Basis for Allowable Opacity: [ ] Rule [x] Other
3. Allowable Opacity: Normal Conditions: **5** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **VE is BACT, SCC has voluntarily elected to be more stringent than RULE.** **See Table 6-1 in Appendix B for a summary of all VE BACT limits.** **Limit is for all Finish Mill Sources other than Finish Mill Ball Mill and Air Separator Stacks.**	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code: **Not Applicable**	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] Previously Submitted, Date: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] To be Submitted, Date (if known): ________
   Test Date(s)/Pollutant(s) Tested: ________
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: **Appendix B** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☒ Attached, Document ID: **Appendix F** ☐ 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

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
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID:_ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID:___________ ☐ Previously Submitted, Date:_________ ☐ Not Applicable

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Coal Mill System

3. Emissions Unit Identification Number: **CH-7**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Fabric Filter Low Temperature (T < 180F) – CH-7-1, CH-7-2**
2. Control Device or Method Code(s): **018**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **214,000 Tons**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons coal.**	

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: **CH-7-1, CH-7-2**	2. Emission Point Type Code: **3**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **CH-7-1 – Coal Mill No. 1 & 2 BH** **CH-7-2 - Pulverized Coal Bin**	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**	

5. Discharge Type Code: **See Appendix A**	6. Stack Height: Feet **See Appendix A**	7. Exit Diameter: feet **See Appendix A**
8. Exit Temperature: °F **See Appendix A**	9. Actual Volumetric Flow Rate: acfm **See Appendix A**	10. Water Vapor: % **See Appendix A**

11. Maximum Dry Standard Flow Rate: Dscfm **See Appendix A**	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: **All information is provided in Appendix A.**	

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Coal and Petcoke Crushing and Conveying**			
2. Source Classification Code (SCC): **30500621**		3. SCC Units: **Tons Material Processed**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **214,000 Short Tons Coal**		6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:		9. Million Btu per SCC Unit:
10. Segment Comment:			

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):			
2. Source Classification Code (SCC):		3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:		6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:		9. Million Btu per SCC Unit:
10. Segment Comment:			

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	**018**	**N/A**	**EL**
PM_{10}	**018**	**N/A**	**EL**
PM2.5	**018**	**N/A**	**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: **99.95%**
3. Potential Emissions: **2.68** lb/hour **11.74** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.01 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **99.95%**
3. Potential Emissions: **2.28** lb/hour **9.98** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0085 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **99.95%**
3. Potential Emissions: **2.28** lb/hour **9.98** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0085 gr/dscf** Reference: **Grain Loading**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM10 emissions.**	

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 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM – 0.01 gr/dscf**	4. Equivalent Allowable Emissions: **2.68** lb/hour **11.74** tons/year
5. Method of Compliance: **Initial Stack Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable equals potential.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **PM_{10} – 0.0085 gr/dscf**	4. Equivalent Allowable Emissions: **2.28** lb/hour **9.98** tons/year
5. Method of Compliance: **Initial Stack Test**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable equals potential.**	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: [x] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **40 CFR 60.252 (Subpart Y) – BACT is more stringent.**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE05**	2. Basis for Allowable Opacity: [ ] Rule [x] Other
3. Allowable Opacity: Normal Conditions: **5** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **VE is BACT, SCC has voluntarily elected to be more stringent than RULE. See Table 6-1 in Appendix B for a summary of all VE BACT limits.**	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 1 of 1

1. Parameter Code: **TEMP**	2. Pollutant(s):
3. CMS Requirement:	[x] Rule [ ] Other
4. Monitor Information... Manufacturer: **TBD** Model Number: **TBD**	Serial Number: **TBD**
5. Installation Date: **TBD**	6. Performance Specification Test Date: **TBD**
7. Continuous Monitor Comment: **Per 40 CFR 60.253 (Subpart Y), the temperature of the gas stream at the exit of the thermal dryer will be monitored on a continuous basis.**	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] Previously Submitted, Date: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] To be Submitted, Date (if known): ________
   Test Date(s)/Pollutant(s) Tested: ________
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) [x] Attached, Document ID: **Appendix B** [ ] Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) [x] Attached, Document ID: **Appendix F** [ ] Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) [ ] Attached, Document ID: ___________ [x] Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

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	
5. Acid Rain Part Application [ ] Certificate of Representation (EPA Form No. 7610-1) [ ] Copy Attached, Document ID:_ [ ] Acid Rain Part (Form No. 62-210.900(1)(a)) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Not Applicable	

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Coal Conveying

3. Emissions Unit Identification Number: **CH-8**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **A 90% control efficiency is applied to applicable sources to account for reduction of fugitives due to enclosed conveyor transfer points, enclosed bins, and below ground transfer.** **A 60% control efficiency is applied to applicable sources to account for reduction of fugitives due to building enclosures.**
2. Control Device or Method Code(s): **N/A**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **214,000 Tons**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	**7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum process rate is short tons coal.**	

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: **CH-8-1 thru CH-8-7**	2. Emission Point Type Code: **4**

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:
CH-8-1 – Truck to Hopper
CH-8-2 – Hopper Belt Transfer
CH-8-3 – Loader to Hopper
CH-8-4 – Belt to Elevator
CH-8-5 – Elevator to Coal Bins
CH-8-6 – Elevator to Coal Conveyor
CH-8-7 – Coal conveyor to Coal Bins

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:
N/A

5. Discharge Type Code: **F- Fugitive**	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: 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:

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Coal and Petcoke Crushing and Conveying**		
2. Source Classification Code (SCC): **30500621**	3. SCC Units: **Tons Material Processed**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **214,000 Short Tons Coal**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment _ of _

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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	**N/A**	**N/A**	**EL**
PM_{10}	**N/A**	**N/A**	**EL**
PM2.5	**N/A**	**N/A**	**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: **N/A**
3. Potential Emissions: **0.01** lb/hour **0.52** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **N/A**
3. Potential Emissions: **0.01** lb/hour **0.024** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **$PM_{2.5}$**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **0.01** lb/hour **0.024** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM_{10} emissions.**	

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 _ of _

1. Basis for Allowable Emissions Code: **Not Applicable**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _ of _

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: [x] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: **20%** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **40 CFR 60.252 (Subpart Y) – BACT is more stringent.**	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE05**	2. Basis for Allowable Opacity: [ ] Rule [x] Other
3. Allowable Opacity: Normal Conditions: **5 %** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Method 22/9**	
5. Visible Emissions Comment: **VE is BACT, SCC has voluntarily elected to be more stringent than RULE. See Appendix B Table B-1 for a complete list of all BACT limits.**	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code: **Not Applicable**	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: ________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] Previously Submitted, Date: ________
   Test Date(s)/Pollutant(s) Tested: ________
   [ ] To be Submitted, Date (if known): ________
   Test Date(s)/Pollutant(s) Tested: ________
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) [x] Attached, Document ID: **Appendix B** [ ] Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) [x] Attached, Document ID: **Appendix F** [ ] Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) [ ] Attached, Document ID: ____________ [x] Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

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	
5. Acid Rain Part Application [ ] Certificate of Representation (EPA Form No. 7610-1) [ ] Copy Attached, Document ID:_ [ ] Acid Rain Part (Form No. 62-210.900(1)(a)) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) [ ] Attached, Document ID:____________ [ ] Previously Submitted, Date:__________ [ ] Not Applicable	

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Storage Piles

3. Emissions Unit Identification Number: **CH-10**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone , Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description:

Enclosure Control Efficiency of 60% to account for reduction of emissions due to building enclosure is applied to:
CH-10-3 – Raw Limestone Storage
CH-10-4 – Sand Storage
CH-10-5 – Iron Ore Storage
CH-10-6 – Fly Ash Storage
CH-10-7 – Gypsum Storage
CH-10-8 – Coal Auxiliary Storage

The following storage piles have no controls applied:
CH-10-1 – Crushed Limestone Pile
CH-10-2 – Base Rock Pile

2. Control Device or Method Code(s): **054 / None**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **See Comment Below**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum Material Throughput (Short Tons/Year):** **CH-10-1 – Crushed Limestone Pile 2,517,000** **CH-10-2 – Base Rock Pile 79,000** **CH-10-3 – Raw Limestone Storage 2,438,000** **CH-10-4 – Sand Storage 57,000** **CH-10-5 – Iron Ore Storage 57,000** **CH-10-6 – Fly Ash Storage 356,000** **CH-10-7 – Gypsum Storage 107,000** **CH-10-8 – Coal Auxiliary Storage 27,000**	

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: **CH-10-1 thru CH-10-8**	2. Emission Point Type Code: **4**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Not Applicable**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **Not Applicable**		
5. Discharge Type Code: **F- Fugitive**	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: 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:		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Raw Material Piles**		
2. Source Classification Code (SCC): **30500608**	3. SCC Units: **Tons Material Stored**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **See Section B**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment _ of _

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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	**054 / None**	**N/A**	**EL**
PM_{10}	**054 / None**	**N/A**	**EL**
PM2.5	**054 / None**	**N/A**	**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: **N/A**
3. Potential Emissions: **1.13** lb/hour **4.95** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **N/A**
3. Potential Emissions: **0.56** lb/hour **2.47** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **0.56** lb/hour **2.47** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM_{10} emissions.**	

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 __ of __

1. Basis for Allowable Emissions Code: **Not Applicable**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation _ of _

1. Visible Emissions Subtype: **Not Applicable**	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:	

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:	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code: **Not Applicable**	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: ______ [ ] Previously Submitted, Date ______
   [x] Not Applicable

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: ______ [ ] Previously Submitted, Date ______
   [x] Not Applicable

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: ______ [ ] Previously Submitted, Date ______
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: ______
   Test Date(s)/Pollutant(s) Tested: ______
   [ ] Previously Submitted, Date: ______
   Test Date(s)/Pollutant(s) Tested: ______
   [ ] To be Submitted, Date (if known): ______
   Test Date(s)/Pollutant(s) Tested: ______
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) [x] Attached, Document ID: **Appendix B** [ ] Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) [x] Attached, Document ID: **Appendix F** [ ] Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) [ ] Attached, Document ID: ___________ [x] Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

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	
5. Acid Rain Part Application [ ] Certificate of Representation (EPA Form No. 7610-1) [ ] Copy Attached, Document ID:_ [ ] Acid Rain Part (Form No. 62-210.900(1)(a)) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) [ ] Attached, Document ID:___________ [ ] Previously Submitted, Date:_________ [ ] Not Applicable	

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 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 for air permit. 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 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/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. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** 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 construction permitting and insignificant emissions units 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.

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:
Paved and Unpaved Roads

3. Emissions Unit Identification Number: **CH-11**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C - Construction	**TBD**	**TBD**	**32 – Stone, Clay, Glass & Concrete Products**	☐ Yes ☒ No

9. Package Unit:
Manufacturer: **TBD** Model Number: **TBD**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Paved Roads – Silt loading of 0.15 g/m2 or less will be maintained by use of vacuum sweeping.** **Unpaved Roads - A control efficiency of 95% was used to account for high natural surface moisture in the quarry and/or watering. This control efficiency also reflects the slow travel speed of the loaders (<10 mph).**
2. Control Device or Method Code(s): **N/A**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **See Appendix A**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8760** hours/year
6. Operating Capacity/Schedule Comment:	

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: **Paved and Unpaved Roads**		2. Emission Point Type Code: **4**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Not Applicable**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **Not Applicable**		
5. Discharge Type Code: **F- Fugitive**	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: 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:		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Stone Quarrying - Hauling**		
2. Source Classification Code (SCC): **30502011**	3. SCC Units: **Miles Vehicle Traveled**	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: **See Appendix A**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment _ of _

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

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	**N/A**	**N/A**	**EL**
PM_{10}	**N/A**	**N/A**	**EL**
PM2.5	**N/A**	**N/A**	**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: **N/A**
3. Potential Emissions: **10.99** lb/hour **48.14** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **N/A**
3. Potential Emissions: **2.35** lb/hour **10.31** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **PM2.5**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **2.35** lb/hour **10.31** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Appendix A** Reference: **AP-42 / FIRE**	7. Emissions Method Code: **3**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **PM2.5 emissions conservatively assumed to equal PM_{10} emissions.**	

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 __ of __

1. Basis for Allowable Emissions Code: **Not Applicable**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation _ of _

1. Visible Emissions Subtype: **Not Applicable**	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:	

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:	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code: **Not Applicable**	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

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: **Diagram E-2** [ ] 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)
   [ ] Attached, Document ID: __________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: __________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

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: __________ [ ] Previously Submitted, Date ________
   [x] Not Applicable

6. Compliance Demonstration Reports/Records
   [ ] Attached, Document ID: __________
   Test Date(s)/Pollutant(s) Tested: ______________________________
   [ ] Previously Submitted, Date: _______
   Test Date(s)/Pollutant(s) Tested: ______________________________
   [ ] To be Submitted, Date (if known): __________
   Test Date(s)/Pollutant(s) Tested: ______________________________
   [x] 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

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: **Appendix B** ☐ Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☒ Attached, Document ID: **Appendix F** ☐ 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

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	
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID:_ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID:____________ ☐ Previously Submitted, Date:_________ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID:____________ ☐ Previously Submitted, Date:_________ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID:____________ ☐ Previously Submitted, Date:_________ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID:____________ ☐ Previously Submitted, Date:_________ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID:____________ ☐ Previously Submitted, Date:_________ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID:____________ ☐ Previously Submitted, Date:_________ ☐ Not Applicable	

4.0 Emission Calculation Methodology

The following methodologies were used to calculate emissions for the various sources in the potential inventory.

4.1 Grain Loading Methodology

The PTE particulate emissions for all new process sources equipped with a baghouse were calculated on an outlet grain loading (GL) basis. The following method was used for emission calculations:

$$GL(\frac{gr}{dscf}) \times Flow(\frac{dscf}{\min}) \times \frac{lb}{7000gr} \times \frac{60\min}{hr} = emissions(\frac{lb}{hr})$$

$$emissions(\frac{lb}{hr}) \times \frac{hr}{yr} \times \frac{ton}{2000lb} = emissions(\frac{ton}{yr})$$

It was assumed for all baghouse controlled sources that PM_{10} is 85 percent of PM and that $PM_{2.5}$ is equal to PM_{10}.

4.2 Throughput Methodology

For point sources where the emission factor is based on the throughput and for fugitive process sources the following method was used for emission calculations:

$$EF(\frac{lb}{ton}) \times TP(\frac{ton}{hr}) \times \left(1 - \frac{CE}{100}\right) = emissions(\frac{lb}{hr})$$

$$emissions(\frac{lb}{hr}) \times \frac{hr}{yr} \times \frac{ton}{2000lb} = emissions(\frac{ton}{yr})$$

Where:
EF = emission factor
TP = Throughput
CE = control efficiency

The conversion between TSP and PM_{10} is stated within the inventory. It was assumed that $PM_{2.5}$ is equal to $PM_{10.}$

4.3 Storage Pile Methodology

There are two components of the storage pile emission calculations: emissions generated from material transfer to piles and emissions generated from wind erosion. The components are calculated separately and then added together to determine the total emissions from each storage pile.

Material Transfer to Piles

The first component to the storage pile emissions is the batch drop component, which accounts for the transfer of material to the storage pile. The constants and equation can be found in AP-42 Section 13.2.4-3 (Aggregate Handling and Storage Piles).

Emission Factor Equation:

$$k \times 0.0032 \times \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} = EF(\frac{lb}{ton})$$

Where:
k = particle size multiplier
U = mean wind speed (mph)
M = material moisture content (%)
EF = emission factor (lb/ton)

The emission factor is then multiplied by the amount of material added to the storage pile.

$$EF(\frac{lb}{ton}) \times TP(\frac{ton}{yr}) \times \left(1 - \frac{CE}{100}\right) \times \frac{ton}{2000lb} = emissions(\frac{lb}{yr})$$

Where:
CE = Control efficiency
EF = Emission Factor
TP = Throughput

$PM_{2.5}$emissions are assumed to equal PM_{10} emissions.

Wind Erosion

The second component of storage pile emissions is wind erosion emissions. The calculations for wind erosion are based on the EPA document *Control of Open Fugitive Dust Sources*, EPA-450/3-88-008, pg. 4-17.

Emission Factor Equation:

$$1.7 \times \left(\frac{s}{1.5}\right) \times \left(\frac{f}{15}\right) \times \left(\frac{365-p}{235}\right) \times \left(1 - \frac{CE}{100}\right) = EF(\frac{Tons}{Year})$$

Emission Calculation Equation:

$$A \times n \times EF \times \left(\frac{lb}{2000Tons}\right) = E(\frac{Tons}{Year})$$

Where:
s = Silt Content of the aggregate (%)
f = Percent of time that the unobstructed wind speed exceeds 12 mph at the mean pile height

p = Number of days with >= 0.01 inches of precipitation per year
CE = control efficiency
EF = Emission Factor
A = Size of the pile (acres)
n = Number of days per year the pile is continuously active

PM_{10} emissions are assumed to be 50% of TSP emissions. $PM_{2.5}$emissions are assumed to equal PM_{10} emissions.

4.4 Haul Road Methodology

Haul road emissions were calculated using the updated versions of AP-42 Section 13.2.1 and 13.2.2 (December 2003). All source parameters were provided by SCC.

Paved Roads
Emission Factor Equation:

$$\left[k \times \left(\frac{sL}{2}\right)^{0.65} \times \left(\frac{W}{3}\right)^{1.5} - C\right] \times \left(1 - \frac{P}{4N}\right) = E(\frac{lb}{VMT})$$

Where:
k = particle size multiplier
sL = road surface silt loading (g/m^2)
W = mean weight of vehicles traveling the road (tons)
P = no. of days with at least 0.01 inches of precipitation
N = number of days in averaging period
E = emission factor

Emission Calculation Equations:

$$E(\frac{lb}{VMT}) \times \frac{VMT}{trip} \times \frac{trip}{hr} \times \left(1 - \frac{CE}{100}\right) = emissions(lb/hr)$$

$$E(\frac{lb}{VMT}) \times \frac{VMT}{trip} \times \frac{trip}{yr} \times \frac{ton}{2000lb} \times \left(1 - \frac{CE}{100}\right) = emissions(ton/yr)$$

Where:
VMT = vehicle miles traveled
CE = control efficiency

Unpaved Roads
Emission Factor Equation:

$$k \times \left(\frac{s}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b} \times \frac{365-p}{365} = E(\frac{lb}{VMT})$$

Where:
k = particle size multiplier
s = road surface silt content (%)
W = mean weight of vehicles traveling the road (tons)
a,b = particle size constants
p = number of days with at least 0.01 inches of precipitation

Emission Calculation Equations:

$$E(\frac{lb}{VMT}) \times \frac{VMT}{trip} \times \frac{trip}{hr} \times \left(1 - \frac{CE}{100}\right) = emissions(lb/hr)$$

$$E(\frac{lb}{VMT}) \times \frac{VMT}{trip} \times \frac{trip}{yr} \times \frac{ton}{2000lb} \times \left(1 - \frac{CE}{100}\right) = emissions(ton/yr)$$

Where:
VMT = vehicle miles traveled
CE = control efficiency

5.0 New Source Review Applicability Analysis

A facility-wide New Source Review applicability analysis was performed and is provided in Table 5-1. The preliminary facility-wide NSR applicability analysis provides preliminary estimates of potential-to-emit (PTE) emissions associated with the Plant, net emission changes, and a comparison of the net emission changes to *de minimus* levels. As shown by Table 5-1, the facility has net emission changes above *de minimus* emission levels for PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, and VOC. All other regulated pollutants have a net emission change below *de minimus* emission levels.

TABLE 5-1
Facility-Wide New Source Review Applicability

NSR REGULATED POLLUTANT	NEW PLANT POTENTIAL-TO-EMIT ANNUAL EMISSIONS (TONS/YEAR)	EXISTING PLANT ACTUAL 2-YEAR AVERAGE ANNUAL EMISSIONS (TONS/YEAR)	NET CHANGE IN FACILITY-WIDE ANNUAL EMISSIONS DUE TO PLANT MODIFICATION (TONS/YEAR)	PRE-PROJECT 5-YEAR CONTEMPORANEOUS EMISSION CHANGES (TONS/YEAR)	POST-PROJECT NET EMISSION INCREASES INC. NETTING EMISSIONS (TONS/YEAR)	NSR DE MINIMUS EMISSIONS (TONS/YEAR)	EXCEEDS DE MINIMUS EMISSIONS AND REQUIRES NSR REVIEW? YES OR NO
PM	496	0.0	496	0	496	25	YES
PM_{10}	397	0.0	397	0	397	15	YES
$PM_{2.5}$	397	0.0	397	0	397	15	YES
SO_2	203	0.0	203	0	203	40	YES
NO_x	1465	0.0	1,465	0	1,465	40	YES
CO	3000	0.0	3,000	0	3,000	100	YES
VOCS	90	0.0	90	0	90.1	40	YES
LEAD	0.06	0.0	0.06	0	0.06	0.6	NO
BERYLLIUM	0.00018	0.0	0.00018	0	0.00018	0.0004	NO
MERCURY	0.0867	0.0	0.087	0	0.09	0.1	NO
FLUORIDES	0.68	0.0	0.68	0	0.68	3	NO
DIOXINS / FURANS	2.18E-07	0.0	2.18E-07	0	2.18E-07	3.50E-06	NO
SULFURIC ACID MIST	*	*	*	0	*	7	NO
HYDROGEN SULFIDE	*	*	*	0	*	10	NO
TOTAL REDUCED SULFUR	*	*	*	0	*	10	NO
REDUCED SULFUR COMPOUNDS	*	*	*	0	*	10	NO

NOTES:
1. * INDICATES THAT THESE POLLUTANTS ARE NOT EMITTED FROM THE PRODUCTION OF PORTLAND CEMENT.
2. POTENTIAL-TO-EMIT EMISSIONS LISTED ABOVE ARE BASED ON THE CENTER HILL PLANT PRODUCING 1,500,000 STONS OF CLINKER PER YEAR.
3. POTENTIAL-TO-EMIT EMISSIONS ARE BASED ON THE NEW KILN SYSTEM USING AN EMISSION FACTOR OF 0.27 LB/TON FOR SO2, 1.95 LB/TON FOR NOX, 0.12 LB/TON FOR VOC, AND 4.00 LB/TON FOR CO.
4. THE BERYLLIUM EMISSION FACTOR IS BASED ON DECEMBER 9-12, 2003 STACK TEST DATA FROM A SIMILAR POLYSIUS PREHEATER/PRECALCINER PLANT CONDUCTED DURING NORMAL OPERATION. THE AP-42 EMISSION FACTOR WAS NOT USED SINCE IT WAS FROM A 1993 STACK TEST FOR AN OLDER PLANT BURNING HAZARDOUS WASTE DERIVED FUEL.
5. THE MERCURY EMISSION FACTOR BASED ON DATA AND STACK TESTING FROM THE SIMILAR SAC PLANT IN BRANFORD, FL.

6.0 Regulatory Applicability

6.1 New Source Performance Standards (NSPS) – 40 CFR Part 60

The processing of limestone (e.g., crushers, screens, conveyor transfer points [except to a pile], and storage bins) from the quarry to the raw mill storage bins are subject to NSPS Subpart OOO (Nonmetallic Mineral Processing Plant.) Fugitive emissions from the crushers are limited to 15 percent opacity and 10 percent from other affected sources.

The coal handling and crushing equipment is subject to NSPS Subpart Y (Coal Preparation Plants.) The opacity from affected sources is limited to 20 percent and the coal mill baghouse is limited to 0.01 grains/dscf. However, SCC has elected to impose a 5 percent opacity limit as BACT.

The Plant will install, calibrate, maintain and continuously operate monitoring devices for the measurement of the temperature of the gas stream at the exit of the thermal dryer on a continuous basis. The monitoring device will be certified by the manufacturer to be accurate within ± 1.7 °C. This is a requirement of NSPS Subpart Y

There will be no storage tanks that would be subject to NSPS Subpart Kb.

6.2 National Emission Standards for Hazardous Air Pollutants (NESHAP) – 40 CFR Part 63

The Plant will be a major source of hazardous air pollutants (HAP) and therefore subject to NESHAP Subpart LLL (Portland Cement Manufacturing Plants.) Since the Plant will be a greenfield plant, the following emission limits are applicable:

The kiln is subject to emission limits for:

- Particulate matter (PM) - 0.30 lb/ton of dry feed. SCC has elected to impose a limit of 0.13 lb/ton of dry feed as BACT
- Dioxins and furans (D/F) – 0.40 ng/dscm (TEQ) corrected to seven percent oxygen when, the average of the Method 23 performance test run average temperatures at the inlet to the particulate matter control device is 204 °C or less, and
- Opacity - limit of 20 percent. SCC has elected to impose a 10 percent opacity limit as BACT.

The clinker cooler stack is subject to emission limits for:

- PM - 0.10 lb per ton of dry feed. SCC has elected to impose a limit of 0.07 lb/ton of dry feed as BACT.
- Opacity – limit of 10 percent

Since the SCC Plant will operate a greenfield inline raw mill, the following total hydrocarbon limit (THC) will be imposed on the main kiln stack since the inline raw mill will exhaust through the kiln stack.

- THC limit of 50 ppmvd, as propane, corrected to 7 percent oxygen

The Finish Mill Ball Mill and Air Separator Stacks (CH-6-6, CH6-7, CH 6-11, and CH 6-12) only are subject to emission limits for:

- Opacity – limit of 10 percent

All other Plant point sources and fugitive sources except those associated with the quarry are subject to an opacity limit of 10 percent. However, SCC has elected to impose a more stringent 5 percent opacity limit as BACT for these sources. The Plant must be in compliance with these limits upon startup of the new equipment.

As required by 40 CFR 63.6(e)(3) and 63.1350(a), SCC is developing an Operation and Maintenance (O & M) Plan and a Startup, Shutdown, and Malfunction (SSM) Plan for the Plant. These plans will provide procedures for: proper operation and maintenance of the emission units and their control devices; corrective actions and measures to be taken to minimize emissions in cases of startup, shutdown, or malfunction; and procedures used in inspecting and monitoring the emission units and control equipment.

6.3 New Source Review (NSR)

The Plant is considered a major facility under 62.212 F.A.C.. For new major sources that result in a significant net emission increase as set forth in Table 212.400-2, Rule 212.400 requires the following:

1. A Best Available Control Technology (BACT) analysis for each pollutant with a significant net emissions increase ($PM_{2.5}$, PM, PM_{10}, SO_2, CO, NO_x and VOC.)

2. An analysis of impacts on Federal Class I areas, including Class I PSD increments and air quality related values.

3. A demonstration of compliance with the National Ambient Air Quality Standards (NAAQS) and Class II PSD increments, as applicable.

4. An additional impacts analysis (potential impacts on soil, vegetation, visibility and secondary growth).

These analyses are contained in separate reports as appended to this Application.

As set forth in a March 1, 2000 DEP Policy Memorandum, Florida's air toxics program is based on the application of 40 CFR Parts 61 and 63, adopted by reference. The Air Reference Concentrations for air toxics previously used by the DEP in evaluating air permit applications do not implement any statutory authority and are no longer used in evaluation of air permits.

6.4 Florida Emission Limiting Rules

A number of provisions of Florida's air rules are applicable to the Plant, although in most cases they are less stringent than the NSPS, NESHAP or BACT requirements. Applicable provisions of F.A.C. Chapter 62 include:

- 296.320(4)(a) – Process Weight Limits
- 296.320(4)(b) – General Visible Emissions Standards
- 296.320(4)(c) - Unconfined Emissions of Particulate Matter
- 296.407 – Portland Cement Plants
- 296.701 (1) and (2) – Portland Cement Plants, Kilns and Clinker Cooler

6.5 Requested Permit Limits

The permit limits, including the regulatory basis and the associated testing and monitoring requirements, being required by the Plant are discussed below. Where there are multiple regulatory basis (e.g., BACT, NESHAP, PSD increment compliance, etc.) the most restrictive limit will be applicable to ensure compliance with other applicable regulations. SCC requests elimination of multiple redundant forms of emission limits and throughput limits. The kiln emission limits provided below are applicable for all combinations of virgin and non-hazardous fuel to be burned.

6.5.1 Kiln/Raw Mill/Cooler Emission Limits

- **PM** – 0.13 lb/ton dry preheater feed as determined by annual Method 5 test (BACT),

- **PM_{10}** - 0.11 lb/ton dry preheater feed as determined by annual Method 201 test (BACT),

- **Opacity** – 10 percent as measured by COM (BACT),

- **CO** – 4.0 lb/ton of clinker are determined by biennial Method 10 test (BACT.)

- **VOC** – 0.12 lb/ton of clinker, 30-day rolling average, as determined by CEM meeting Performance Specification 4A (BACT), THC limit of 50 ppmvd, as propane, corrected to 7 percent oxygen

- **SO_2** – 0.27 lb/ton of clinker, 30-day rolling average, as measured by CEM meeting Performance Specification 2 (BACT). This average time is appropriate to account for the sulfur variability in the raw materials and the short-term increase in SO_2 emissions when the raw mill is down and during upset conditions in the kiln.

- **NO_x** – 1.95 lb/ton of clinker, 30-day rolling average, as measured by CEM meeting Performance Specification 2 (BACT.) This averaging time is appropriate to account for the inherent variability in NO_x emissions from cement kilns and is consistent with EPA's State Implementation Plan (SIP) call guidance for cement kilns (which is based on 8 hour ozone concentrations.) Averaging times for NO_x air quality concentrations (NAAQS and PSD increments) are based on annual concentrations.

  SCC requests that the above emission limit exclude period of startup, shutdown, and malfunction which are properly justified as such and reported to the DEP as well as exclusion of periods of SNCR malfunctions. SCC also requests that for the first year of operation, the NO_x emission limit be set at 3.0 lb/ton of clinker to allow shake-down and optimization of the kiln system.

- **Dioxin/Furans** – 0.40 ng/dscm (TEQ) corrected to 7 percent oxygen as measured by Method 23 initially and then measured every 30 months thereafter (NESHAP.)

6.5.2 Miscellaneous Baghouses

- **PM** – 0.01 gr/dscf as determined by initial Method 5 test on selected baghouses (BACT) and subsequent implementation of 5 percent opacity limit (see below.)

- **PM_{10}** – 0.0085 gr/dscf as determined by initial Method 201 test on selected baghouses (BACT.)

- **Opacity** – 5 percent as determined by initial testing and then tested every 5 years using Method 9 testing requirements stipulated in 40 CFR 63.1450 (BACT.)

6.6 Throughput Limits

Throughput limits are needed to limit the potential-to-emit (PTE) for sources that are subject to lb/ton emission limits and for sources that are not effectively limited by the emission limits outlined above (e.g., fugitive process sources.) Throughput limits are not needed for other miscellaneous sources. For example, the grinding and handling of cement, PM is controlled by baghouses permitted at 0.01 gr/dscf for 8,760 hr/yr. This defines the PTE emissions for these sources and thus a cement throughput limit is not necessary or appropriate. Baghouses that are permitted on a grain loading basis are throughput blind. Therefore, the only requested throughput limits are as follows:

- Primary Crusher and associated conveyors: 2,517,000 tons/yr, rolling 12-month average.

- Kiln and cooler system: 1,500,000 tons/yr clinker, rolling 12-month average 180 tons/hr clinker. The feed to clinker ratio is relatively fixed within a narrow range; separate kiln feed limits would be redundant.

- Coal Mill: No throughput limit. PTE is fixed by grain loading and hours. Coal handling fugitives are very small (PM = 0.05 tons/yr) and do not warrant a throughput limit.

APPENDIX A
PTE Air Emissions Inventory

TABLE A-1
Potential Plant-Wide Emission Totals

EU No.	EU Description	PM tons/yr	PM_{10} tons/yr	PM2.5 tons/yr	SO_2 tons/yr	NO_X tons/yr	CO tons/yr	VOC tons/yr	HCl tons/yr	Lead tons/yr	Mercury tons/yr	Beryllium tons/yr	Dioxin/Furans tons/yr	Fluorides tons/yr
CH-1	Primary Crushing & Associated Conveyors	4.21	1.95	1.95										
CH-2	Raw Material Processing and Storage	11.52	9.79	9.79										
CH-3	Raw Material Conveying	0.67	0.31	0.31										
CH-4	Kiln System with In-Line Raw Mill	165.30	139.87	139.87	202.50	1,462.50	3,000.00	90.00	105.00	0.056	0.087	0.0002	2.18E-07	0.675
CH-5	Clinker Cooler	89.01	76.29	76.29										
CH-6	Clinker & Cement Processing	173.94	147.85	147.85										
CH-7	Coal Mill System	2.68	9.98	9.98										
CH-8	Coal Conveying	0.05	0.02	0.02										
CH-9	Emergency Generator (See Note 1)	0.07	0.06	0.06	0.55	2.31	0.43	0.08						
CH-10	Storage Piles	4.95	2.47	2.47										
CH-11	Paved and Unpaved Roads	48.09	10.30	10.30										
	Pollutant Totals	496.27	396.94	396.94	203.05	1,464.81	3,000.43	90.08	105.000	0.056	0.087	0.0002	2.18E-07	0.675

Legend
Point Sources
Fugitive Sources

NOTE 1 : Emergency Generator is exempt from being included in the Permit to Construct Application as it will use less than 32,000 gallons of diesel per year (Per Rule 62-210.300(3)(a)20

TABLE A-2
Potential Throughput Data for Center Hill Plant

Material	Center Hill Throughput (tons/yr)	Center Hill Hourly Rates (tons/hr)	Comments
Limestone crushed	2,517,000	NA	
Base Rock	79,000	NA	
Limestone - raw material	2,438,000	NA	
Sand	57,000	NA	
Iron Ore	57,000	NA	
Fly Ash	356,000	NA	
Coal Mill	214,000	NA	
Coal Auxillary Storage	27,000	NA	
Raw Mill	2,543,000	NA	
Kiln 2 Preheater Feed	2,543,000	306	Assumes 95% uptime
Clinker	1,500,000	180	Assumes 95% uptime
Gypsum	107,000	NA	
Cement (FM)	1,694,000	204	Assumes 95% uptime

June 2005

TABLE A-3
Potential Particulate Emissions from Point sources

Stack Parameters >>

EU No.	EP No.	Description	Flow ACFM	Temp. deg F	Moisture %	Flow DSCFM	Operating Hours	PM gr/dscf	PM-10 gr/dscf	PM-2.5 gr/dscf	PM lb/hr	PM tons/yr	PM-10 lb/hr	PM-10 tons/yr	PM-2.5 lb/hr	PM-2.5 tons/yr	Height ft	Diam. ft	Velocity fpm	Orien-tation
CH-2	CH-2-1	Kiln Feed Transport	4,300	300	2%	2,928	8,760	0.01	0.0085	0.0085	0.25	1.10	0.21	0.93	0.21	0.93	56	1.0	5475	H
	CH-2-2	Blend Silo Inlet	21,400	200	2%	16,778	8,760	0.01	0.0085	0.0085	1.44	6.30	1.22	5.35	1.22	5.35	242	2.2	5630	H
	CH-2-3	Blend Silo Outlet	2,900	200	2%	2,274	8,760	0.01	0.0085	0.0085	0.19	0.85	0.17	0.73	0.17	0.73	50	1.0	3692	H
	CH-2-4	Hydrated Lime Silo	3,900	140	2%	3,363	8,760	0.01	0.0085	0.0085	0.29	1.26	0.25	1.07	0.25	1.07	35	1.2	3448	H
	CH-2-5	Off Spec. Feed Handling	2,900	300	2%	1,974	8,760	0.01	0.0085	0.0085	0.17	0.74	0.14	0.63	0.14	0.63	50	1.0	3692	H
	CH-2-6	Fly Ash Silo	3,900	140	2%	3,363	8,760	0.01	0.0085	0.0085	0.29	1.26	0.25	1.07	0.25	1.07	120	1.2	3448	H
CH-4	CH-4-1	Preheater/Precaliner Kiln with In-Line Raw Mill	322,072	228	14%	212,234	8,760	N/A	N/A	N/A	39.7	165.30	33.6	139.87	33.6	139.87	325	11.00	3389	V
CH-5	CH-5-1	Clinker Cooler	227,400	300	10%	142,185	8,760	N/A	N/A	N/A	21.4	89.01	18.3	76.29	18.33	76.29	214	7.0	5909	V
CH-6	CH-6-1	Clinker Pan Conveyor	4,300	300	2%	2,928	8,760	0.01	0.0085	0.0085	0.25	1.10	0.21	0.93	0.21	0.93	37	1.0	5475	H
	CH-6-2	Clinker Transport	8,600	90	2%	8,091	8,760	0.01	0.0085	0.0085	0.69	3.04	0.59	2.58	0.59	2.58	82	1.0	10950	H
	CH-6-3	Clinker Transport	6,400	90	2%	6,021	8,760	0.01	0.0085	0.0085	0.52	2.26	0.44	1.92	0.44	1.92	10	1.1	6734	H
	CH-6-4	Clinker Silos	16,200	300	2%	11,030	8,760	0.01	0.0085	0.0085	0.95	4.14	0.80	3.52	0.80	3.52	192	1.1	17047	H
	CH-6-5	FM #1 Clinker Silo Outlet Conveyor	8,600	212	2%	6,622	8,760	0.01	0.0085	0.0085	0.57	2.49	0.48	2.11	0.48	2.11	19	1.1	9049	H
	CH-6-6	Finish Mill #1 Separator	182,800	198	3%	142,284	8,760	0.01	0.0085	0.0085	12.20	53.42	10.37	45.40	10.37	45.40	175	4.0	14547	V
	CH-6-7	Finish Mill #1 BH	49,800	198	4.6%	38,123	8,760	0.01	0.0085	0.0085	3.27	14.31	2.78	12.17	2.78	12.17	175	3.0	7045	V
	CH-6-8	FM #1 Fringe Cement Bin	5,700	130	2%	4,999	8,760	0.01	0.0085	0.0085	0.43	1.88	0.36	1.60	0.36	1.60	65	1.4	3703	H
	CH-6-9	Finish Mill #1 Baghouse No. 3	8,600	200	2%	6,742	8,760	0.01	0.0085	0.0085	0.58	2.53	0.49	2.15	0.49	2.15	47	1.4	5587	H
	CH-6-10	FM #2 Clinker Silo Outlet Conveyor	8,600	212	2%	6,622	8,760	0.01	0.0085	0.0085	0.57	2.49	0.48	2.11	0.48	2.11	19	1.1	9049	H
	CH-6-11	Finish Mill #2 Separator	182,800	198	3%	142,284	8,760	0.01	0.0085	0.0085	12.20	53.42	10.37	45.40	10.37	45.40	175	4.0	14547	V
	CH-6-12	Finish Mill #2 BH	49,800	198	4.6%	38,123	8,760	0.01	0.0085	0.0085	3.27	14.31	2.78	12.17	2.78	12.17	175	3.0	7045	V
	CH-6-13	FM #2 Fringe Cement Bin	5,700	130	2%	4,999	8,760	0.01	0.0085	0.0085	0.43	1.88	0.36	1.60	0.36	1.60	65	1.4	3703	H
	CH-6-14	Finish Mill #2 Baghouse No. 3	8,600	200	2%	6,742	8,760	0.01	0.0085	0.0085	0.58	2.53	0.49	2.15	0.49	2.15	47	1.4	5587	H
	CH-6-15	FM #1 Cement Transport Conveyor	4,300	130	2%	3,771	8,760	0.01	0.0085	0.0085	0.32	1.42	0.27	1.20	0.27	1.20	54	1.0	5475	H
	CH-6-16	FM #2 Cement Transport Conveyor	4,300	130	2%	3,771	8,760	0.01	0.0085	0.0085	0.32	1.42	0.27	1.20	0.27	1.20	54	1.0	5475	H
	CH-6-17	Cement Silos	14,300	130	2%	12,541	8,760	0.01	0.0085	0.0085	1.07	4.71	0.91	4.00	0.91	4.00	195	2.0	4552	H
	CH-6-18	Truck Load-out No. 1	4,300	130	2%	3,771	8,760	0.01	0.0085	0.0085	0.32	1.42	0.27	1.20	0.27	1.20	29	1.0	5475	H
	CH-6-19	Truck Load-out No. 2	4,300	130	2%	3,771	8,760	0.01	0.0085	0.0085	0.32	1.42	0.27	1.20	0.27	1.20	39	1.0	5475	H
	CH-6-20	Truck Load-out No. 3	4,300	130	2%	3,771	8,760	0.01	0.0085	0.0085	0.32	1.42	0.27	1.20	0.27	1.20	39	1.0	5475	H
	CH-6-21	Railcar Load-out	7,200	130	2%	6,315	8,760	0.01	0.0085	0.0085	0.54	2.37	0.46	2.02	0.46	2.02	57	1.0	9167	H
CH-7	CH-7-1	Coal Mill No. 1 & 2 BH	35,600	150	6.5%	28,811	8,760	0.01	0.0085	0.0085	2.47	10.82	2.10	9.19	2.10	9.19	100	3.0	5036	V
	CH-7-2	Pulverized Coal Bin	2,900	150	2%	2,460	8,760	0.01	0.0085	0.0085	0.21	0.92	0.18	0.79	0.18	0.79	60	1.0	3692	H
										POLLUTANT TOTALS	106.14	451.50	90.22	383.78	90.22	383.78				

TABLE A-4
Potential Emissions from the Kiln System, Clinker Cooler, and Emergency Generator

Hourly Emissions:

EU No.	EU Description	Kiln Feed lbs/hr	Clinker lbs/hr	PM lbs/hr	PM_{10} lbs/hr	$PM_{2.5}$ lbs/hr	SO2 lbs/hr	NO_X lbs/hr	CO lbs/hr	VOC lbs/hr	HCl lbs/hr	Lead lbs/hr	Mercury lbs/hr	Dioxin/Furan lbs/hr	Beryllium lbs/hr	Fluorides lbs/hr
CH-4	New Kiln System	306	180.2	39.72	33.61	33.61	48.67	351.48	720.98	21.63	25.23	0.014	0.021	0.00	0.00	0.00
CH-5	Clinker Cooler	306	180.2	21.39	18.33	18.33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

EU No.	EU Description	Size	Fuel Rate gal/hr	Heat Input MMBtu/hr	Output hp-hr	PM lbs/hr	PM_{10} lbs/hr	$PM_{2.5}$ lbs/hr	SO2 lbs/hr	NO_X lbs/hr	CO lbs/hr	VOC lbs/hr
CH-9	Emergency Generator	750 kW	54.8	7.51	1,006	0.48	0.43	0.43	3.79	15.90	2.97	0.55

Annual Emissions:

EU No.	EU Description	Kiln Feed tons/yr	Clinker tons/yr	PM tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr	SO2 tons/yr	NO_X tons/yr	CO tons/yr	VOC tons/yr	HCl tons/yr	Lead tons/yr	Mercury tons/yr	Dioxin/Furan (tons/yr)	Beryllium tons/yr	Fluorides tons/yr
CH-4	New Kiln System	2,543,000	1,500,000	165.30	139.87	139.87	202.50	1,462.50	3,000.00	90.00	105.00	0.056	0.087	0.0000	0.0002	0.675
CH-5	Clinker Cooler	2,543,000	1,500,000	89.01	76.29	76.29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

EU No.	EU Description	Operating Hours	Fuel Rate gal/yr	Heat Input MMBtu/yr	Output hp-hr/yr	PM tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr	SO2 tons/yr	NO_X tons/yr	CO tons/yr	VOC tons/yr
CH-9	Emergency Generator	291	15,947	2,185	292,673	0.07	0.06	0.06	0.55	2.31	0.43	0.08

Notes: The emergency generators operate during testing and power outages only.
In the event of a power outage, fuel to the kiln is cut off and the generator is the only combustion source operating.
Generators are diesel fuel-fired. Assume 137,000 Btu/gal heat value of fuel and sulfur content of 0.5 percent.
Total diesel fuel consumed by both emergency generators will not exceed 32,000 gal/yr (permit exemption level).

Emissions Basis:

Proposed Kiln

Pollutant	Emission Factor	Emission Factor Units	Source of Emission Factor
PM	0.13	lb/ton dry feed	Proposed BACT
PM_{10}	0.11	lb/ton dry feed	Proposed BACT
PM2.5	0.11	lb/ton dry feed	Assumed to equal PM10
SO_2	0.27	lb/ton clinker	Proposed BACT
NO_X	1.95	lb/ton clinker	Proposed BACT
CO	4.00	lb/ton clinker	Proposed BACT
VOC	0.12	lb/ton clinker	Proposed BACT
(annual)	0.1400	lb/ton clinker	AP-42 Table 11.6-9
Lead	7.50E-05	lb/ton clinker	AP-42 Table 11.6-9
Mercury	1.16E-04	lb/ton clinker	Based on Stack Test Data from similar SAC Plant in Brandford, FL.
Beryllium	2.41E-07	lb/ton clinker	Similar PH/PC Plant Stack Test Dec. 9-12, 2003
Fluorides	9.00E-04	lb/ton clinker	AP-42 Table 11.6-9
Dioxin/ Furans	2.90E-10	lb/ton clinker	AP-42 Table 11.6-9

Clinker Cooler

Pollutant	Emission Factor	Emission Factor Units	Source of Emission Factor
PM	0.07	lb/ton dry feed	Proposed BACT
PM10	0.06	lb/ton dry feed	Proposed BACT
PM2.5	0.06	lb/ton dry feed	Assumed to equal PM10

Emergency Generator

Pollutant	Emission Factor	EF Units	Source of EF
PM	0.215	lb/hp-hr	Generator specifications
PM_{10}	0.0573	lb/MMBtu	AP-42 Table 3.4-2
$PM_{2.5}$	0.0573	lb/MMBtu	Assumed to equal PM10
SO_2	0.505	lb/MMBtu	AP-42 Table 3.4-1
NO_X	7.17	lb/hp-hr	Generator specifications
CO	1.34	lb/hp-hr	Generator specifications
VOC	0.25	lb/hp-hr	Generator specifications

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TABLE A-5
Potential Particulate Emissions from Fugitive Sources

Source Number	Segment Number	Description	Material	Material Information			Emission Factor (lb/ton)	Emission Factor Reference	Number of Transfer Points	Control Efficiency (%)[1]	Control Type	Annual PM Emissions (tons/year)	PM10 Fraction	Annual PM10 Emissions (tons/year)	Annual PM2.5 Emissions (tons/year)	Hourly PM Emissions (lb/hr)	Hourly PM10 Emissions (lb/hr)	Hourly PM2.5 Emissions (lb/hr)
				Annual Qty (ton/yr)	Hourly Rate (ton/hr)	Moisture Content (%)												
CH-1	CH-1-1	Loader to Primary Crusher	Limestone	2,517,000	287	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.205	0.47	0.096	0.096	0.05	0.02	0.02
	CH-1-2	Primary Crusher Operation	Limestone	2,517,000	287	17	1.20E-03	AP-42 Table 11.19.2-2, 8/04	1			1.510	0.45	0.680	0.680	0.34	0.16	0.16
	CH-1-3	Limestone Quarry Conveyors	Limestone	2,517,000	287	17	1.63E-04	AP-42 Section 13.2.4, 1/95	11			2.258	0.47	1.061	1.061	0.52	0.24	0.24
	CH-1-4	Base Rock Quarry Conveyors	Base Rock	79,000	9	17	1.63E-04	AP-42 Section 13.2.4, 1/95	3			0.019	0.47	0.009	0.009	0.00	0.00	0.00
	CH-1-5	Limestone Quarry Conveyor	Limestone	2,438,000	278	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.199	0.47	0.093	0.093	0.05	0.02	0.02
	CH-1-6	Enclosed Limestone Conveyor	Limestone	2,438,000	278	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.020	0.47	0.009	0.009	0.00	0.00	0.00
										Sub Total		4.212		1.949	1.949	0.96	0.44	0.44
CH-3	CH-3-1	Transfer to Pile	Limestone	2,438,000	278	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.020	0.47	0.009	0.009	0.00	0.00	0.00
	CH-3-2	Piles to reclaim belts	Limestone	2,438,000	278	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.167	0.47	0.079	0.079	0.04	0.02	0.02
	CH-3-3	Reclaim belts to Conveyor	Limestone	2,438,000	278	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.167	0.47	0.079	0.079	0.04	0.02	0.02
	CH-3-4	Iron Ore Loader to Hopper	Iron Ore	57,000	7	6.5	6.27E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.007	0.47	0.003	0.003	0.00	0.00	0.00
	CH-3-5	Sand Loader to Hopper	Sand	57,000	7	16	1.78E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.002	0.47	0.001	0.001	0.00	0.00	0.00
	CH-3-6	Hopper Belt Transfer	Sand	114,000	13	11.25	2.91E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.002	0.47	0.001	0.001	0.00	0.00	0.00
	CH-3-7	Belt to Belt Transfer	LS, Iron, Sand	2,552,000	291	10.1	3.40E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.043	0.47	0.020	0.020	0.01	0.00	0.00
	CH-3-8	Truck to Fly Ash Hopper	Fly Ash	356,000	41	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1			0.021	0.47	0.010	0.010	0.00	0.00	0.00
	CH-3-9	Fly Ash Hopper Belt Transfer	Fly Ash	356,000	41	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.002	0.47	0.001	0.001	0.00	0.00	0.00
	CH-3-10	Transfer to Fly Ash Pile	Fly Ash	356,000	41	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.008	0.47	0.004	0.004	0.00	0.00	0.00
	CH-3-11	Fly Ash Pile to reclaim	Fly Ash	356,000	41	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.008	0.47	0.004	0.004	0.00	0.00	0.00
	CH-3-12	Reclaim to Fly Ash Conveyor	Fly Ash	356,000	41	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.002	0.47	0.001	0.001	0.00	0.00	0.00
	CH-3-13	Limestone Conveying	Limestone	2,438,000	278	10	3.43E-04	AP-42 Section 13.2.4, 1/95	2	90%	Enclosure	0.084	0.47	0.039	0.039	0.01	0.00	0.00
	CH-3-14	Belt to Belt Transfer	Sand	114,000	13	11.25	2.91E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.002	0.47	0.001	0.001	0.00	0.00	0.00
	CH-3-15	Sand Conveying	Sand	57,000	7	16	1.78E-04	AP-42 Section 13.2.4, 1/95	2	90%	Enclosure	0.001	0.47	0.000	0.000	0.00	0.00	0.00
	CH-3-16	Iron Ore Conveying	Iron Ore	57,000	7	6.5	6.27E-04	AP-42 Section 13.2.4, 1/95	2	90%	Enclosure	0.004	0.47	0.002	0.002	0.00	0.00	0.00
	CH-3-17	Fly Ash Conveying	Fly Ash	356,000	41	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	2	90%	Enclosure	0.004	0.47	0.002	0.002	0.00	0.00	0.00
	CH-3-18	Raw Mix Conveying	Raw Mix	2,908,000	332	10	3.43E-04	AP-42 Section 13.2.4, 1/95	2	90%	Enclosure	0.100	0.47	0.047	0.047	0.01	0.01	0.01
	CH-3-19	Loader to Gypsum Hopper	Gypsum	107,000	12	8.5	4.31E-04	AP-42 Section 13.2.4, 1/95	1			0.023	0.47	0.011	0.011	0.01	0.00	0.00
	CH-3-20	Gypsum Hopper Belt to Elevator	Gypsum	107,000	12	8.5	4.31E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.002	0.47	0.001	0.001	0.00	0.00	0.00
										Sub Total		0.669		0.315	0.315	0.131	0.062	0.062
CH-8	CH-8-1	Truck to Hopper	Coal	214,000	24	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.020	0.47	0.009	0.009	0.00	0.00	0.00
	CH-8-2	Hopper Belt Transfer	Coal	214,000	24	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.005	0.47	0.002	0.002	0.00	0.00	0.00
	CH-8-3	Loader to Hopper	Coal	27,000	3	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1			0.006	0.47	0.003	0.003	0.00	0.00	0.00
	CH-8-4	Belt to Elevator	Coal	241,000	28	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.006	0.47	0.003	0.003	0.00	0.00	0.00
	CH-8-5	Elevator to Coal Bins	Coal	214,000	24	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.005	0.47	0.002	0.002	0.00	0.00	0.00
	CH-8-6	Elevator to Coal Conveyor	Coal	214,000	24	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.005	0.47	0.002	0.002	0.00	0.00	0.00
	CH-8-7	Coal Conveyor to Coal Bins	Coal	214,000	24	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.005	0.47	0.002	0.002	0.00	0.00	0.00
										Sub Total		0.052		0.024	0.024	0.01	0.01	0.01
										Total		4.934		2.289	2.289	1.10	0.51	0.51

Notes: A control efficiency of 60% was used to account for reduction of fugitives due to building enclosures

A control efficiency of 90% was used to account for reduction of fugitives due to enclosed conveyor transfer points, enclosed bins, and below ground transfer

TABLE A-6
Potential Particulate Emissions from Storage Piles

ID NO.	Description	Material	Surface Area (Acres)	Active Days (n) (days/yr)	Silt Content (s) percent	Material Moisture (%)	Material Throughput (T/yr)	Average Wind Speed (mph)	Wind Speed > 12 mph (f) percent	Rain Days (p) (days/yr)	Enclosure Control Efficiency (%)	TSP Transfer Factor (lb/Ton)	TSP Transfer Emissions (T/yr)	TSP Wind Emissions (T/yr)	PM10 Transfer Factor (lb/Ton)	PM10 Transfer Emissions (T/yr)	PM10 Wind Emissions (T/yr)	TSP Total Emissions (T/yr)	PM10 Total Emissions (T/yr)	TSP Hourly Emissions (lb/hr)	PM10 Hourly Emissions (lb/hr)
CH-10-1	Crushed Limestone Pile	Limestone	3.0	365	3.9	17	2,517,000	6.4	10.18	129	0	1.63E-04	0.21	1.65	7.72E-05	0.10	0.82	1.85	0.92	0.423	0.210
CH-10-2	Base Rock Pile	Limestone	3.0	365	3.9	17	79,000	6.4	10.18	129	0	1.63E-04	0.01	1.65	7.72E-05	0.00	0.82	1.66	0.83	0.378	0.189
CH-10-3	Raw Limestone Storage	Limestone	2.0	365	3.9	17	2,438,000	6.4	10.18	0	60	1.63E-04	0.08	0.68	7.72E-05	0.04	0.34	0.76	0.38	0.173	0.086
CH-10-4	Sand Storage	Sand	0.2	365	2.6	16	57,000	6.4	10.18	0	60	1.78E-04	0.00	0.05	8.40E-05	0.00	0.02	0.05	0.02	0.011	0.005
CH-10-5	Iron Ore Storage	Iron Ore	0.2	365	3.8	6.5	57,000	6.4	10.18	0	60	6.27E-04	0.01	0.07	2.96E-04	0.00	0.03	0.07	0.04	0.017	0.008
CH-10-6	Fly Ash Storage	Fly Ash	0.5	365	8.0	21.5	356,000	6.4	10.18	0	60	1.17E-04	0.01	0.35	5.55E-05	0.00	0.17	0.36	0.18	0.082	0.041
CH-10-7	Gypsum Storage	Gypsum	0.2	365	3.9	8.5	107,000	6.4	10.18	0	60	4.31E-04	0.01	0.07	2.04E-04	0.00	0.03	0.08	0.04	0.018	0.009
CH-10-8	Coal Auxiliary Storage	Coal	0.3	365	4.6	8	27,000	6.4	10.18	0	60	4.69E-04	0.00	0.12	2.22E-04	0.00	0.06	0.12	0.06	0.028	0.014
												TOTALS	0.32	4.63		0.15	2.31	**4.95**	**2.47**	**1.13**	**0.56**

NOTES: PM2.5 emissions are assumed to equal PM10 emissions.
Above emissions include both material transfer onto the piles and wind erosion from the piles.

Material transfer to piles
TSP transfer factors from AP-42 Section 13.2.4-3 (Aggregate Handling and Storage Piles, 1/95).

E = k * 0.0032 * (U/5)^1.3 / (M/2)^1.4

E = transfer emission factor (lb/ton)
k = particle size multiplier — k (<30 um) = 0.74
U = mean wind speed (mph) — k (<10 um) = 0.35
M = material moisture content (%)

Wind Erosion
Reference: Control of Open Fugitive Dust Sources, EPA-450/3-88-008, p. 4-17

Ef = 1.7*(s/1.5)*(f/15)*((365-p)/235)*(1-(C/100)) — TSP (lbs/acre/day) — PM10 fraction = 0.5
E = A*n*Ef/2000 — TSP (tons/yr)

Typical silt contents of materials from AP-42 Table 13.2.4-1

s = Silt content of the aggregate (%)
f = Percent of time that the unobstructed wind speed exceeds 12 mph at the mean pile height
p = Number of days with >= 0.01 in. of precipitation per year
C = Overall control efficiency (%)
A = Size of the pile (acres)
n = Number of days per year the pile is continuously active

TABLE A-7
Potential Particulate Emissions from Paved and Unpaved Roads

Paved Road Emission Summary

Segment No.	Segment Length (mi)	Silt Loading (g/m2)	Maximum Annual Emissions: Material Trips (#/yr)	Total Mileage (Mi/yr)	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	Hourly Emissions: TSP Emissions (lb/hr)	PM10 Emissions (lb/hr)
CH-11-1A	0.71	0.15	146,642	104,702	0.24	0.05	12.44	2.41	2.840	0.550
CH-11-1	0.71	0.15	146,642	104,702	0.24	0.05	12.44	2.41	2.840	0.550
CH-11-2	0.05	0.15	56,215	5,734	0.06	0.01	0.18	0.03	0.041	0.008
CH-11-3	0.27	0.15	56,215	19,164	0.11	0.02	1.08	0.21	0.247	0.047
CH-11-4	0.36	0.15	41,975	14,985	0.01	0.00	0.04	0.01	0.010	0.001
CH-11-5	0.34	0.15	14,240	9,683	0.38	0.07	1.86	0.36	0.425	0.083
CH-11-6	0.15	0.15	146,642	22,436	0.24	0.05	2.67	0.52	0.609	0.118
CH-11-7	0.03	0.15	90,427	3,845	0.23	0.04	0.44	0.09	0.101	0.020
CH-11-8	0.12	0.15	85,160	12,205	0.23	0.04	1.37	0.27	0.314	0.061
CH-11-9	0.14	0.15	67,760	9,215	0.38	0.07	1.77	0.34	0.405	0.079
CH-11-10	0.10	0.15	17,400	3,550	0.38	0.07	0.68	0.13	0.156	0.030
CH-11-11	0.14	0.15	4,280	1,164	0.38	0.07	0.22	0.04	0.051	0.010
CH-11-12	0.03	0.15	4,560	310	0.38	0.07	0.06	0.01	0.014	0.003
CH-11-13	0.19	0.15	8,560	1,601	0.38	0.07	0.31	0.06	0.070	0.014
CH-11-14	0.36	0.15	5,267	3,760	0.28	0.06	0.54	0.10	0.122	0.024
CH-11-15	0.46	0.15	5,267	2,417	0.28	0.06	0.34	0.07	0.079	0.015
CH-11-16	0.05	0.15	14,267	1,455	0.41	0.08	0.30	0.06	0.068	0.013
CH-11-17	0.20	0.15	3,600	734	0.41	0.08	0.15	0.03	0.034	0.007
CH-11-18	0.10	0.15	15,200	1,550	0.41	0.08	0.32	0.06	0.073	0.014
TOTAL	**3.35**			**323,214**			**37.23**	**7.21**	**8.50**	**1.65**

Unpaved Road Emission Summary

Segment No.	Trip Length (mi)	Silt Content (%)	Maximum Annual Emissions: Material Trips (#/yr)	Total Mileage (Mi/yr)	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	Hourly Emissions: TSP Emissions (lb/hr)	PM10 Emissions (lb/hr)
CH-11-19	0.19	8.3	335,600	62,757	6.77	1.92	10.62	3.02	2.424	0.689
CH-11-20	0.14	8.3	10,533	1,433	6.77	1.92	0.24	0.07	0.055	0.016
TOTAL	**0.32**			**64,190**			**10.86**	**3.09**	**2.48**	**0.71**

	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	TSP Emissions (lb/hr)	PM10 Emissions (lb/hr)
TOTAL PAVED AND UNPAVED EMISSIONS	**48.09**	**10.30**	**10.98**	**2.35**

NOTE : PM2.5 EMISSIONS ARE ASSUMED TO EQUAL PM10 EMISSIONS.

TABLE A-8
Paved Roads Emission Worksheet

Segment No	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
1A	0.71	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	214,000	8,560	0	6,112	6,112	168,076				
1A	0.71	Flyash	0.15	15	25	40	27.5		X	27.5	25	356,000	14,240	0	10,167	10,167	279,602				
1A	0.71	Sand, Iron Ore	0.15	15	25	40	27.5		X	27.5	25	114,000	4,560	0	3,256	3,256	89,536				
1A	0.71	Gypsum	0.15	15	25	40	27.5		X	27.5	25	107,000	4,280	0	3,056	3,056	84,038				
1A	0.71	Cement	0.15	15	25	40	27.5	X		27.5	25	1,694,000	67,760	48,381	0	48,381	1,330,468				
1A	0.71	Base Rock (Limestone)	0.15	15	15	30	22.5	X		22.5	15	79,000	5,267	3,760	0	3,760	84,609				
1A	0.71	Employee Vehicles	0.15	1.75	0	1.75	1.75	X		1.8	0	41,975	41,975	29,970	0	29,970	52,448				
1A	0.71	SUBTOTAL	0.15							19.9			146,642	82,111	22,591	104,702	2,088,776	0.24	0.05	12.44	2.41

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
1	0.71	Coal/Fuels	0.15	15	25	40	27.5	X		27.5	25	214,000	6,560	6,112	0	6,112	168,076				
1	0.71	Flyash	0.15	15	25	40	27.5	X		27.5	25	356,000	14,240	10,167	0	10,167	279,602				
1	0.71	Sand, Iron Ore	0.15	15	25	40	27.5	X		27.5	25	114,000	4,560	3,256	0	3,256	89,536				
1	0.71	Gypsum	0.15	15	25	40	27.5	X		27.5	25	107,000	4,280	3,056	0	3,056	84,038				
1	0.71	Cement	0.15	15	25	40	27.5		X	27.5	25	1,694,000	67,760	0	48,381	48,381	1,330,468				
1	0.71	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	79,000	5,267	0	3,760	3,760	84,609				
1	0.71	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	41,975	41,975	0	29,970	29,970	52,448				
1	0.71	SUBTOTAL	0.15							19.9			146,642	22,591	82,111	104,702	2,088,776	0.24	0.05	12.44	2.41

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
2	0.05	Flyash	0.15	15	25	40	27.5	X	X	27.5	25	356,000	14,240	726	726	1,452	39,943				
2	0.05	Employee Vehicles	0.15	1.75	0	1.75	1.75	X	X	1.8	0	41,975	41,975	2,141	2,141	4,281	7,493				
2	0.05	SUBTOTAL	0.15							8.3			56,215	2,867	2,867	5,734	47,436	0.06	0.01	0.18	0.03

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
3	0.27	Flyash	0.15	15	25	40	27.5	X	X	27.5	25	356,000	14,240	3,873	3,873	7,747	213,030				
3	0.27	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	41,975	41,975	0	11,417	11,417	19,980				
3	0.27	SUBTOTAL	0.15							12.2			56,215	3,873	15,290	19,164	233,011	0.11	0.02	1.08	0.21

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)

TABLE A-8
Paved Roads Emission Worksheet

4	0.36	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	41,975	41,975	0	14,985	14,985	26,224				
4	0.36	SUBTOTAL	0.15							1.8			41,975	0	14,985	14,985	26,224	0.01	0.00	0.04	0.01

Segment No	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
5	0.34	Flyash	0.15	15	25	40	27.5	X	X	27.5	25	356,000	14,240	4,842	4,842	9,683	266,288				
5	0.34	SUBTOTAL	0.15							27.5			14,240	4,842	4,842	9,683	266,288	0.38	0.07	1.86	0.36

Segment No	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
6	0.15	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	214,000	8,560	0	1,310	1,310	36,016				
6	0.15	Flyash	0.15	15	25	40	27.5		X	27.5	25	356,000	14,240	0	2,179	2,179	59,915				
6	0.15	Sand, Iron Ore	0.15	15	25	40	27.5		X	27.5	25	114,000	4,560	0	698	698	19,186				
6	0.15	Gypsum	0.15	15	25	40	27.5		X	27.5	25	107,000	4,280	0	655	655	18,008				
6	0.15	Cement	0.15	15	25	40	27.5		X	27.5	25	1,694,000	67,760	0	10,367	10,367	285,100				
6	0.15	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	79,000	5,267	0	806	806	18,131				
6	0.15	Employee Vehicles	0.15	1.75	0	1.75	1.75	X		1.8	0	41,975	41,975	6,422	0	6,422	11,239				
6	0.15	SUBTOTAL	0.15							19.9			146,642	6,422	16,014	22,436	447,595	0.24	0.05	2.67	0.52

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
7	0.03	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	214,000	8,560	291	291	582	16,007				
7	0.03	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	114,000	4,560	155	155	310	8,527				
7	0.03	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	107,000	4,280	146	146	291	8,004				
7	0.03	Cement	0.15	15	25	40	27.5	X		15.0	25	1,694,000	67,760	2,304	0	2,304	34,558				
7	0.03	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22.5	15	79,000	5,267	179	179	358	8,058				
7	0.03	SUBTOTAL	0.15							19.5			90,427	3,075	771	3,845	75,154	0.23	0.04	0.44	0.09

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
8	0.12	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	214,000	8,560	1,019	1,019	2,037	56,025				
8	0.12	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	114,000	4,560	543	543	1,085	29,845				
8	0.12	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	107,000	4,280	509	509	1,019	28,013				
8	0.12	Cement	0.15	15	25	40	27.5	X		15.0	25	1,694,000	67,760	8,063	0	8,063	120,952				
8	0.12	SUBTOTAL	0.15							19.2			85,160	10,134	2,071	12,205	234,835	0.23	0.04	1.37	0.27

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
9	0.14	Cement	0.15	15	25	40	27.5		X	27.5	25	1,694,000	67,760	0	9,215	9,215	253,422				
9	0.14	SUBTOTAL	0.15							27.5			67,760	0	9,215	9,215	253,422	0.38	0.07	1.77	0.34

TABLE A-8
Paved Roads Emission Worksheet

Segment No	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
10	0.10	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	214,000	8,560	873	873	1,746	48,022				
10	0.10	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	114,000	4,560	465	465	930	25,582				
10	0.10	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	107,000	4,280	437	437	873	24,011				
10	0.10	SUBTOTAL	0.15							27.5			17,400	1,775	1,775	3,550	97,614	0.38	0.07	0.68	0.13

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
11	0.14	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	107,000	4,280	582	582	1,164	32,014				
11	0.14	SUBTOTAL	0.15							27.5			4,280	582	582	1,164	32,014	0.38	0.07	0.22	0.04

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
12	0.03	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	114,000	4,560	155	155	310	8,527				
12	0.03	SUBTOTAL	0.15							27.5			4,560	155	155	310	8,527	0.38	0.07	0.06	0.01

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
13	0.19	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	214,000	8,560	0	1,601	1,601	44,020				
13	0.19	SUBTOTAL	0.15							27.5			8,560	0	1,601	1,601	44,020	0.38	0.07	0.31	0.06

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
14	0.36	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22.5	15	79,000	5,267	1,880	1,880	3,760	84,609				
14	0.36	SUBTOTAL	0.15							22.5			5,267	1,880	1,880	3,760	84,609	0.28	0.06	0.54	0.10

Segment No	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
15	0.46	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	79,000	5,267	0	2,417	2,417	54,392				
15	0.46	SUBTOTAL	0.15							22.5			5,267	0	2,417	2,417	54,392	0.28	0.06	0.34	0.07

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
16	0.05	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75	X	X	28.8	7.5	107,000	14,267	728	728	1,455	41,837				
16	0.05	SUBTOTAL	0.15							28.8			14,267	728	728	1,455	41,837	0.41	0.08	0.30	0.06

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
17	0.20	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75		X	28.8	7.5	27,000	3,600	0	734	734	21,114				
17	0.20	SUBTOTAL	0.15							28.8			3,600	0	734	734	21,114	0.41	0.08	0.15	0.03

TABLE A-8
Paved Roads Emission Worksheet

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Truck Weights Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	Truck Trips Loaded	Truck Weight	Material Net (Tons)	Material (T/yr)	Material Trips (#/yr)	Empty Mileage (Mi/yr)	Loaded Mileage (Mi/yr)	Total Mileage (Mi/yr)	Weight x Mileage	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)
18	0.10	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75		X	28.8	7.5	57,000	7,600	0	775	775	22,287				
18	0.10	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75		X	28.8	7.5	57,000	7,600	0	775	775	22,287				
18	0.10	SUBTOTAL	0.15							28.8			15,200	0	1,550	1,550	44,574	0.41	0.08	0.32	0.06
		GRAND TOTAL														218,512				37.23	7.21

Notes:

Emissions based on AP-42 Section 13.2.1 (12/03), Equation (2)

E = [k * (sL/2)^0.65 * (W/3)^1.5 - C] * (1 - P/4N)

where E = emission factor, lb/VMT — k (PM-30) = 0.082 lb/VMT

k = particle size multiplier — k (PM-10) = 0.016 lb/VMT

sL = road surface silt loading, g/m^2

W = average vehicle weight, tons — C (PM-30) = 0.00047 lb/VMT

C = 1980's vehicle exhaust, brake & tire wear, lb/VMT — C (PM-10) = 0.00047 lb/VMT

P = number of days with >= 0.01 in precipitation

N = number of days in the averaging period (365) — P = 129 days (Gainesville average)

Silt loading of 0.15 g/m2 or less will be maintained by use of vacuum sweeping

TABLE A-9
Unpaved Roads Emission Worksheet

Segment No.	Material Hauled	Annual Material Throughput (tons)	Total Miles (Round Trip)	Average Load per Vehicle (tons)	Unloaded Vehicle Weight (tons)	Mean Vehicle Weight (tons) (W)	Surface Material Silt Content (%) (s)	VMT (miles/ year)	PM Emission Factor (lb/VMT)[1]	PM10 Emission Factor (lb/VMT)[1]	Control Efficiency (%)[2]	PM Emissions (tons/year)	PM10 Emissions (tons/year)
19	Front End Loaders-Limestone	2,517,000	0.19	7.5	25	28.75	8.3	62,757	6.77	1.92	95%	10.62	3.02
20	Front End Loader-Base Rock	79,000	0.14	7.5	25	28.75	8.3	1,433	6.77	1.92	95%	0.24	0.07
										Total Emissions		10.86	3.09

Notes:

E = k * (s/12)^a * (W/3)^b * (365 - P)/365 — for industrial unpaved roads

where E = emission factor, lb/VMT
k = particle size multiplier
s = surface material silt content, %
W = average vehicle weight, tons
P = number of days with >= 0.01 in precipitation
a, b = constants for specific partical size

Constant	PM-30	PM-10
k	4.9	1.5
a	0.7	0.9
b	0.45	0.45

P = 129 days (Gainesville average)

[1] Based on AP-42 Section 13.2.2 (12/03), Equations (1a) & (2). Silt content based on default stone quarrying haul road (Table 13.2.2-1).
[2] A control efficiency of 95% was used to account for high natural surface moisture in the quarry and/or watering at an equivalent moisture ratio of 5 (Figure 13.2.2-2). This control efficiency also reflects the slow travel speed of the loaders (<10 mph).

Assumes average round trip distance for limestone loader is 600 ft and for base rock loader is 400 ft.

TABLE A-10
Traffic Inputs for Paved and Unpaved Roads

Material	Amount of Material		Truck/Loader Weight (Empty)		Truck/Loader Capacity		Total Trips
Cement	1,694,000	tons/year	15	tons	25	tons	67,760
Fly Ash	356,000	tons/year	15	tons	25	tons	14,240
Sand	57,000	tons/year	15	tons	25	tons	2,280
Iron Ore	57,000	tons/year	15	tons	25	tons	2,280
Coal	214,000	tons/year	15	tons	25	tons	8,560
Gypsum	107,000	tons/year	15	tons	25	tons	4,280
Employee Traffic	115	employees/day	3,500	lbs	1	employee	41,975
Front End Loader 1 Sand	57,000	tons/year	25	tons	7.5	tons	7,600
Front End Loader 2 Iron Ore	57,000	tons/year	25	tons	7.5	tons	7,600
Front End Loader 3 Gypsum	107,000	tons/year	25	tons	7.5	tons	14,267
Front End Loader 4 Coal	27,000	tons/year	25	tons	7.5	tons	3,600
Quarry							
Front End Loaders Limestone	2,517,000	tons/year	25	tons	7.5	tons	335,600
Base Rock (Limestone)	79,000	tons/year	25	tons	7.5	tons	10,533

APPENDIX B
BACT Analyses

BEST AVAILABLE CONTROL TECHNOLOGY ANALYSES
IN SUPPORT OF A PSD PERMIT APPLICATION
SUMTER CEMENT COMPANY, LLC
NEW CENTER HILL, FLORIDA PLANT

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SECTION 1

INTRODUCTION

The Sumter Cement Company, LLC (SCC) plans to construct a new dry process preheater/precalciner Portland cement kiln system and associated equipment to be located in Center Hill, Florida. SCC is operated by Votorantim Cementos in the same manner as the Suwannee American Cement (SAC) plant in Branford, Florida. The kiln system will result in new emissions of particulate matter (PM), PM less than 10 microns in diameter (PM_{10}), PM less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxide (NO_x), and volatile organic compound (VOC) that will exceed the significant emission rates specified at 62-212, F.A.C. Table 212.400-2. Because the Center Hill site is in attainment with the National Ambient Air Quality Standards (NAAQS) for the above pollutants, the new plant will be subject to the Best Available Control Technology (BACT) requirements under Florida's PSD rules at 62-212.400 F.A.C. for each of these pollutants.

The kiln system will have a preliminary capacity of 306 tons/h of raw material fed to the preheater (dry basis) and 180 tons/h of clinker production. The two finish mills will have a combined capacity of 204 tons/h of Portland cement production. Annual production will be 2,543,000 tons per year of material fed to the preheater (dry basis) and 1,500,000 tons per year of clinker produced. The two finish mills will result in 1,694,000 tons per year of Portland cement production. The raw materials and additives used in the new kiln system include limestone (or other calcium carbonate sources), fly ash (or other alumina sources), sand (or other silica sources), and iron (or other iron sources). Fly ash may be injected into the calciner.

Fuels to be used in the pyroprocessing system are natural gas, fuel oil, coal, petroleum coke, and whole or chipped tires. Nonhazardous liquids (e.g., on-spec used oil; up to 50 percent of total heat input) may be burned in the kiln and/or calciner. Nonhazardous solids (e.g., plastic, filter fluff, wood waste; up to 50 percent of total heat input) may be burned in the calciner. The plant may include a whole tire injection system as well as a tire gasification system that will use heat from the pyroprocessing system to decompose tires to gas, coke, and wire. This will be used in the kiln and pyroprocessing system in an enclosed process. As discussed in the following sections of this report, use of the above alternative fuels is not expected to have a negative impact on emissions or affect the ability to comply with the emission limits proposed herein.

The plant will also include a coal processing operation that will crush approximately 214,000 tons of coal and petroleum coke annually. Equipment at the new plant will also include raw material storage bins, clinker storage silos, cement storage silos, and associated conveyor systems.

Emissions units (EU) addressed by this permitting action are:

EU ID	Description
CH-1	Primary Crushing and Associated Conveyors
CH-2	Raw Material Processing and Storage – controlled by baghouses
CH-3	Raw Material Conveying – conveyor transfer points
CH-4	Preheater/Precalciner Kiln System with In-Line Raw Mill
CH-5	Clinker Cooler
CH-6	Clinker and Cement Processing – controlled by baghouses
CH-7	Coal Mill System
CH-8	Coal Conveying – conveyor transfer points
CH-10	Storage Piles
CH-11	Paved and Unpaved Roads

Case-by-case determinations of BACT are required, and this report provides all information necessary for the DEP to determine that the technologies proposed for the emissions units represent the application of BACT as required. In making the BACT determination, DEP shall give consideration to:

- Any U.S. Environmental Protection Agency (EPA) determination of BACT pursuant to Section 160 of the Clean Air Act (CAA), and any emission limitation contained in 40 CFR Part 60 (Standards of performance for New Stationary Sources) or 40 CFR Parts 61 and 63 [National Emission Standards for Hazardous Air Pollutants (NESHAP).]
- All scientific, engineering and technical material and other information available to DEP.
- The emission limiting standards or BACT determinations of any other state.
- The social and economic impact of the application of such technology.

The PSD control technology review requires that all applicable Federal and State emission limiting standards be met and that BACT be applied to the source. The BACT requirements are applicable to all regulated pollutants subject to a PSD review. BACT is defined by Rule 62-212, F.A.C., as an emission limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which DEP on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant. If the DEP determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice or operation. Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means that achieve equivalent results.

The BACT review analyzes the control systems used in the design of a proposed facility. The BACT, at a minimum, has to comply with the applicable New Source Performance Standards (NSPS) and NESHAP for the source. The BACT analysis requires the evaluation of the available air pollution control methods including a cost-benefit analysis of the alternatives. The cost-benefit analysis includes consideration of materials, energy, and economic penalties associated with the control systems, as well as environmental benefits derived from the alternatives. The top-down approach requires a technology evaluation to start with the most stringent control alternative, and justify its rejection or acceptance as BACT. Rejection of control alternatives may be based on technical or economical unfeasibility, physical differences, location differences, and environmental or energy impact differences when comparing a proposed project with a project previously subject to that BACT.

SECTION 2

CONTROL TECHNOLOGY ANALYSIS: PARTICULATE MATTER ($PM/PM_{10}/PM_{2.5}$)

The various physical and chemical processes at a cement plant generate particulate matter ($PM/PM_{10}/PM_{2.5}$) composed of finely dispersed solids. Control of particulate matter emissions is achieved by the collection of particles from the facility's stack emissions and by the prevention of generation of particles from fugitive emission sources. Common control devices for stack gases include fabric filters (baghouses) and electrostatic precipitators (ESP). Baghouses and ESPs are considered equivalent for particulate control, with both types of devices achieving removal efficiencies of over 99.9 percent. ESP's and baghouses are used extensively as control devices at cement plants. Baghouses are used to control PM emissions from most material processing operations at a cement plant.

Inertial separators (cyclones) can have efficiencies over 90 percent within narrow particle size ranges, but their overall efficiencies are generally less than 85 percent. Inertial separators have not been demonstrated as effective controls at cement plants, but they are used extensively as process devices to recover product (meal) at cement plants. The use of cyclones as process devices at cement plants serves to enhance the overall control efficiency of the system by reducing large abrasive particles.

ESPs and baghouses are considered as BACT for particulate collection controls for cement plants. The proposed facility will have baghouses for the kiln system and for all controlled material processing operations. A baghouse was selected for the kiln system rather than an ESP to avoid ESP trips caused by process CO spikes. In all cases, the collected fines will be returned to the process.

The cooler gas will exit the clinker cooler through the clinker cooler stack and be controlled by either an ESP or a baghouse. Cooler gas is ambient air used to cool the clinker, meaning CO spikes causing ESP trips are not possible.

A current review of cement plant permits issued world-wide did not reveal $PM/PM_{10}/PM_{2.5}$ emission limits more stringent than the limits proposed herein as BACT. The kiln and cooler emission limits are based on lb/ton dry kiln feed, and the miscellaneous process baghouse emission limits are based on outlet grain loading (gr/dscf). The proposed BACT emission limits are summarized in Section 6, Table 6-1. Also, Visible Emission (VE) limits for the four source groupings listed under Particulate Matter (PM) in Table 6-1 are proposed as BACT. It should be noted that SCC has elected to propose VE BACT limits for a majority of the plant point and fugitive sources at a lower limit than those specified by applicable Federal and Florida State regulations.

SECTION 3

BACT ANALYSIS FOR SO_2

3.1 Description of Pyroprocessing System

SCC proposes to construct a modern pyroprocessing system employing a 3- to 5-stage preheater, staged combustion calciner with or without separate combustion chamber (depending on vendor selection), in-line raw grinding mill, and a baghouse for PM control. The nominal fuel split between the calciner and main kiln burner is 55/45. The general sulfur circulation for this type of system is shown in Figure 1, except that SCC will not employ a bypass.

The rotary kiln section is a long, cylindrical, slightly inclined furnace lined with refractory to protect the steel shell and retain heat within the kiln. The raw material mix enters the kiln at the elevated end, and the combustion fuels generally are introduced into the lower end of the kiln in a countercurrent manner. The materials are continuously and slowly moved to the lower end by rotation of the kiln. As they move down the kiln, the raw materials are changed to cementations or hydraulic minerals as a result of the increasing temperature and chemical reaction within the kiln.

The preheater section consists of cyclone-type vessels arranged vertically, in series, and are supported by a structure known as the preheater tower. The first or highest stage of the preheater typically consists of dual parallel cyclones. Hot exhaust gases from the calciner and rotary kiln pass countercurrently through the downward-moving raw materials in the preheater vessels.

Compared to the simple rotary kiln, the heat transfer rate is significantly increased, the degree of heat utilization is greater, and the process time is markedly reduced by the intimate contact of the solid particles with the hot gases. The improved heat transfer allows the length of the rotary kiln to be reduced. The last or lowest vessel in the series is the precalciner, where a significant amount of thermal energy is introduced, as noted above.

The in-line precalciner system offers ideal conditions for adsorption of SO_2 from the kiln (from both the fuel and sulfur compounds in the mix) due to the high amount of free CaO and a temperature of approximately 1650°F in the calciner. The absorbed SO_2 is mostly converted to calcium sulfate through the following reactions:

$$CaO + SO_2 \rightarrow CaSO_3$$

$$CaSO_3 + \frac{1}{2} O_2 \rightarrow CaSO_4.$$ [1]

Also, SO_2 exiting the kiln system is additionally absorbed into the raw meal in the raw grinding mills.

[1] An Overview of the Formation of SO_x and NO_x in Various Pyroprocessing Systems, Peter Nielson and Ove Lar Jepssen, F. L. Smidth Co.

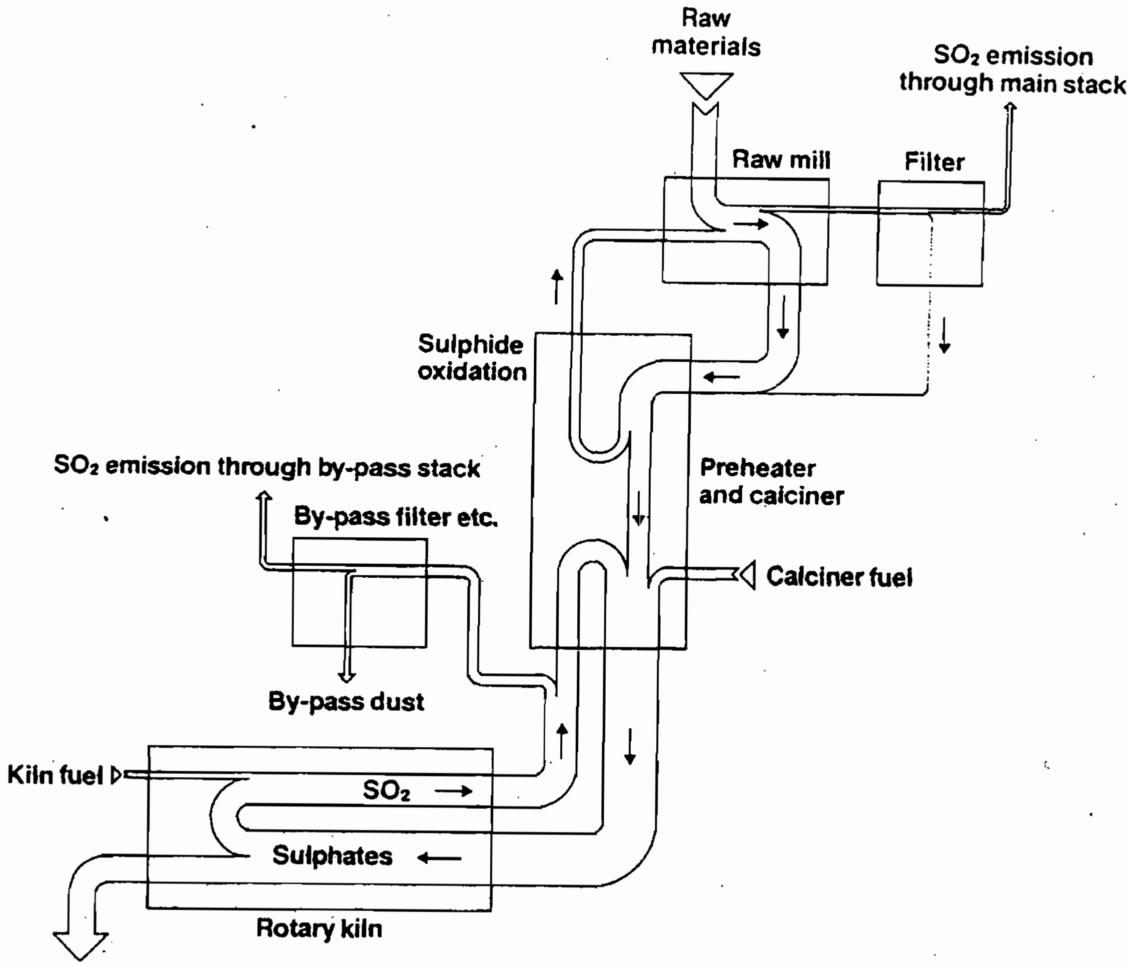

Figure 1. Sulfur Circulation in Preheater/Precalciner Kiln System

Sodium sulfate and potassium sulfate are also produced as a result of fuel burning (to a lesser extent). The sulfate compounds are incorporated into the clinker product and in the dust collected by the baghouse (all of which will be recycled to the process). Because of the above inherent process controls and the fact that sulfur input to the kiln system from fuel is less than the sulfur introduced in the feed material, SO_2 emissions from the main stack are quite insensitive to use of higher sulfur fuels such as petroleum coke. Use of higher sulfur fuels will not cause a "break through" in the kiln system nor do they affect the BACT determination or the ability to comply with the requested BACT emission limit.

The generic sulfur circulation includes a bypass for sulfur removal as alkali sulfate salts. The SCC kiln system will be low in alkali and meal sulfur and a bypass is not included in the design. This inherently low-emitting process, in addition to the low sulfur raw materials used by SCC, is expected to achieve an SO_2 emission rate of 0.27 lb/ton of clinker. There are three available add-on SO_2 control technologies which are described below.

3.2 Wet Scrubbing

3.2.1 Description of Technology

Wet scrubbing can be an effective add-on control technology for SO_2 removal using an aqueous alkaline solution. SO_2 is removed from the exhaust gases by scrubbing because it can be readily neutralized by alkaline solution and is highly soluble in aqueous solutions. A wet scrubber has been shown to provide SO_2 control in excess of 90 percent under optimal operating conditions. Cyclonic spray towers generally achieve control efficiencies at the higher end of the range. Wet scrubbing can also remove particulate matter, some volatile organic compounds (VOCs), and acid gases. As applied to cement plants, the scrubber is located after the primary PM control device and minimal additional particulate is removed. The solids in mist carryover from the scrubber can in some cases be greater than the inlet particulate loading from the fabric filter. In theory, wet scrubbing produces a calcium sulfate ($CaSO_4$) byproduct, typically referred to as synthetic gypsum. However, in practice, not all cement plants that have utilized wet scrubbing have been successful in obtaining useable synthetic gypsum. If the cement plant can reclaim the scrubber sludge as synthetic gypsum and reincorporate it in the finish grinding process as synthetic gypsum, the overall environmental benefits associated with a wet scrubber can be considerable.

3.2.2 Theory of Abatement

Application of a wet scrubber requires passing the exhaust gases through a particulate control device to reduce the dust load and recover meal. Next, the exhaust gas is cooled by spraying quench water or a slurried reagent (such as slaked lime or finely ground limestone) in an absorption chamber. SO_2 is scrubbed from the exhaust gas by the reaction with the slurried lime [$Ca(OH)_2$] or limestone (calcium carbonate). The $Ca(OH)_2$ or calcium carbonate reacts with the SO_2 to form synthetic gypsum ($CaSO_4 - 2H_2O$). In theory, the synthetic gypsum precipitates into small crystals that are dewatered. The dewatered synthetic gypsum can then be used to supplement purchased gypsum in the production of cement and represents a potential beneficial reuse of byproduct materials. However, if the gypsum cannot be effectively crystallized, as has been the experienced by some cement plants utilizing wet scrubbing systems, the scrubber sludge must be disposed of at considerable cost.

3.2.3 Applicability of Wet Scrubbing

At the present time there have been six cement plants permitted to employ wet scrubbing technology for abatement of SO_2 in North American. Five are operational. The following describes the operations of four of these plants.

ESSROC, Nazareth, Pennsylvania – A wet scrubber was installed on a preheater kiln to reduce SO_2 by 20 to 25 percent to comply with a PADEP SO_2 emission limit. The scrubber was an early design with two units in parallel, and only had an availability of 65 percent of kiln operating hours. Chronic fouling of demisters, piping, and nozzles occurred and the scrubbers were discontinued with conversion of the kiln to a precalciner design during an expansion project.

Holcim, Midlothian, Texas – Scrubbers were installed on two kiln lines in an effort to increase production and avoid PSD permitting. The units are a more advanced design and have removal efficiencies of between 70 to 90 percent. Availability of the units is 90 percent or less of the kiln run time.

TXI, Midlothian, Texas – A scrubber was installed as part of an upgrade of the plant from a wet kiln operation (4 units) to a new preheater/precalciner line. No data are available on the performance but it is expected that it is similar to the Holcim experience. This scrubber is located between the kiln fabric filter and a regenerative thermal oxidizer (RTO) used for carbon monoxide (CO)/VOC control.

Holcim, Dundee, Michigan – Two scrubbers were installed on the two wet kilns for removal of SO_2 prior to control of hydrocarbon emissions using an RTO. The SO_2 is converted to sulfur trioxide (SO_3) in the RTO, causing corrosion and a visible condensing aerosol in the combustion process. The plant installed the RTO to meet stack opacity and odor limitations and the scrubbers were required for the RTO to function properly.

Environmental Impacts
The use of wet scrubbers can have an adverse environmental impact by generating solid waste requiring landfill disposal (if a usable synthetic gypsum cannot be produced), and require treatment and disposal of liquid blowdown containing dissolved solids (alkali salts).

In addition, saturation of the gas stream results in evaporation of large quantities of fresh water which has an impact on the supply in the area.

Energy Impacts
The static pressure drop through the wet scrubber and demister increases the electrical energy demand for the project and has an adverse impact on energy usage at the site. In addition, the need to reheat stack gases for dispersion and corrosion prevention has a significant energy impact.

Product Impacts
The wet scrubber does not have an adverse process impact if the waste is landfilled, but it can have an impact if synthetic gypsum is returned to the process. Changes in process quality cannot be predicted until after scrubber startup in that the quality of synthetic gypsum is site specific.

3.3 Wet Absorbent Addition

3.3.1 Description of Technology

Wet absorbent addition to the process gas stream can reduce high levels of SO_2 emissions in dry cement kiln systems. Lime or hydrated lime can be used for this purpose. Various types of wet absorbent systems have been used on dry kilns, with lime slurry addition being the most effective.

Wet absorbent addition is limited to kiln systems where the lime slurry droplet can evaporate to dryness before entering the particulate control device. This eliminates use on wet kilns where flue gas temperatures are too low for rapid evaporation and flue gas moisture is near moisture saturation levels.

3.3.2 Theory of Abatement

It should be noted that the limestone in the kiln feed and calcium oxide in kiln dust act as natural absorbents of some of the SO_2 emissions produced from fuel combustion and pyritic sulfur in the feed. Further, good burner design and proper operation of the kiln will chemically absorb sulfur into the clinker. Additional SO_2 reduction can be achieved by absorbent addition into the process gas stream.

With wet absorbent addition, calcium oxide (CaO) or calcium hydroxide [$Ca(OH)_2$] slurry is injected into the process gas stream. Solid particles of calcium sulfite ($CaSO_3$) or calcium sulfate ($CaSO_4$) are produced, which are removed from the gas stream along with excess reagent by a particulate matter control device. The SO_2 removal efficiency varies widely depending on the point of introduction into the process according to the temperature, degree of mixing, properties of the absorbent (i.e., size, surface area, etc.), and retention time.

3.3.3 Applicability of Wet Absorption Addition

In a dry process cement kiln system, the gases contain a low concentration of water vapor at an elevated temperature and must be cooled and humidified prior to entering the baghouse or ESP. Lime or calcium hydrate slurry can be introduced with the spray cooling water. Flue gas temperatures are reduced through the heat absorbed as sensible heat from evaporation of water. These temperatures are defined by the system design, kiln heat balance, amount of air inleakage, and radiant and convective heat losses. The conditions present are optimal for proper operation of the kiln.

For slurry injection to succeed as an SO_2 absorption control method several conditions must occur. These include:

1. Generation of spray droplets of sufficient surface area to adsorb SO_2 (typically 150 to 250 μm).

2. Droplets exist for sufficient duration to allow absorption and reaction (typically 3 to 5 s).

3. Sufficient reagent present in the droplet to maintain excess absorbent during droplet life.

4. Activity of hydrate particle in the droplet sufficient to replenish dissolved solids in the liquid as SO_2 consumes reagent (i.e., particle size, reactivity, etc.)

5. When used in conjunction with a dry particulate collection device, the droplet must evaporate to dryness prior to entering the device.

An analysis of the heat balance for the dry process kiln determines if there is sufficient sensible heat available in the gas streams to allow evaporation of injected water containing hydrate slurry. Hydrate solids may be introduced in the conditioning water as suspended/dissolved solids. The normal solids content in the water can be as high as 5 percent solids by weight using air atomizing spray nozzles. The generation of small droplets and fine hydrate particle size allows effective absorption of SO_2 and reaction to form sulfates. SO_2 removal effectiveness can vary between 50 and 90 percent depending on residence time and hydrate surface area.

The lower SO_2 removal estimates have been documented in applications where the conditioning towers, duct arrangement, and particulate control devices are not adequate for injection of lime slurry. The constraints of the system result in wet bottoms in the conditioning towers and build up on ducts and baghouse walls. These conditions limit the hydrate slurry injection rates and the removal efficiency.

The higher SO_2 removal estimates have been documented at greenfield installations in which optimum designs have been implemented. In these designs larger conditioning towers and longer straight runs of ductwork are used along with control device gas distribution systems.

Environmental Impacts
No adverse environmental impacts are expected from the use of wet absorption at this location.

Energy Impacts
The change in energy required to implement wet slurry injection is minimal and does not result in adverse energy impact.

Process Impacts
The injection of wet slurry is not expected to have significant process impact in that it would only be used during mill-down periods and the addition of $Ca(OH)_2$ will not affect the Ca/S molar ratio significantly.

3.4 Dry Absorbent Addition

3.4.1 Description of Technology

Dry absorbent addition to the process gas stream or in an add-on control device (dry scrubber) can reduce high levels of SO_2 emissions. Lime, calcium hydrate, limestone, or soda ash could be used for this purpose. Various types of dry absorbent systems have been used on wet and dry cement kilns and one end-of-pipe dry scrubber has been installed on a kiln in Switzerland. SAC currently utilizes a dry absorbent injection system utilizing hydrated lime injection for SO_2 control during raw mill down or upset conditions.

3.4.2 Theory of Abatement

It should be noted that the calcium oxide in kiln dust and limestone in the kiln feed acts as a natural absorbent of some of the SO_2 emissions produced from fuel combustion and pyritic decomposition. Further, good burner design and proper operations of the kiln will chemically bond sulfur into the clinker. Additional SO_2 reduction can be achieved by dry absorbent addition into the process gas stream.

With absorbent addition, dry CaO or $Ca(OH)_2$ is injected into the process gas stream. Solid particles of $CaSO_3$ or $CaSO_4$ are produced, which are removed from the gas stream along with excess reagent by a particulate matter control device in the process flow. The SO_2 removal efficiency varies widely depending on the point of introduction into the process according to the temperature, degree of mixing, and retention time.

The single known application of an add-on dry scrubber uses a venturi reactor column to produce a fluidized bed of dry slaked lime and raw meal. As a result of contact between the exhaust gas and the absorbent, as well as the long residence time and low temperature characteristic of the system, SO_2 is efficiently absorbed by this system. An additional application injects $Ca(OH)_2$ in the gas stream after the preheater first stage cyclone.

3.4.3 Applicability of Dry Absorbent Addition

The addition of dry absorbent to flue gas streams has been used at Roanoke Cement in Troutville, Virginia and has been proposed at several new cement plants. Effectiveness and cost are specific to each application and depend on the gas stream conditions and residence time available for reaction.

Typically the molar ratio (Ca/S) for absorption is on the order of 3.0 to 15.0 and requires approximately 2 seconds for completion. Initial surface reactions occur in the first 0.1 s and the coating retards reaction with the bulk of the particle. For increased effectiveness a very fine particle is required or a high Ca/S ratio. Typical removal efficiency is between 20 and 50 percent depending on gas stream conditions.

For the process to be implemented, hydrate would be received by truck, pneumatically conveyed to a storage silo, and then injected through nozzles into the gas stream. Complete and uniform distribution and mixing in the gas stream are necessary. The best location for injection will be determined by SCC to allow for adequate residence time for reaction.

Environmental Impacts
No adverse environmental impacts are expected from the use of dry absorption at this location.

Energy Impacts
The change in energy required to implement dry adsorption is minimal and does not result in adverse energy impact.

Process Impacts

The injection of dry absorbent is not expected to have a significant process impact because in general it would only be used during mill-down periods and the addition of $Ca(OH)_2$ will not affect the Ca/S molar ratio significantly.

3.5 Review of Recent Permit Limits

Table 3-1 summarizes the SO_2 BACT determinations made for cement kilns since 2000.

TABLE 3-1. SUMMARY OF RECENT SO_2 BACT DETERMINATIONS FOR CEMENT KILNS (2000-PRESENT)

Company	Location	Kiln Type	Permit Date	Technology Applied and $/Ton	Removal (%)	In Operation (Yes/No)	Limit (lb/ton clinker)	Rejected Technology and $/Ton
CEMEX	Demopolis, AL	PC (mod)	09/13/02	Low S coal	NA	Yes	1.14	WS - $10,327
Florida Rock Industries	Newberry, FL	PC (new)	App. 11/8/04	Process - NA	NA	No	0.28 (proposed)	WS - $20,453
GCC Dacotah	Rapid City, SD	PC (mod)	04/10/03	Process - NA	NA	Yes	2.16	Fuel or raw mix S limits
Holcim	Holly Hill, SC	PC (new)	12/22/99	Process - NA	NA	Yes	3.26	
Holcim	Artesia, MS	WET (mod)	See Note 1	No BACT limit for SO2		Yes		
Holcim (Devil's Slide)	Morgan, UT	PC (mod)	11/20/02	No BACT limit for SO2		Yes		
Holcim	Theodore, AL	PC (mod)	02/04/03	Limit not based on BACT	NA	Yes	0.13	
Holcim	Lee Island, MO	PC (new)	06/08/04	Lime spray drying - mill off	93	No	1.26	WS - $13,225
Lafarge	Davenport, IA	PC (mod)	11/09/99	Process	NA	Yes	7.62	
Lehigh Portland Cement	Mason City, IA	PC (mod)	12/11/03	Wet Scrubbing	90	Yes	1.01	
Lone Star Industries	Cape Girardeau, MO	PC (new)	See note 1		NA	No		
Monarch Cement	Humboldt, KS	2PC (mod)	01/27/00	Process - NA	NA	Yes	1.10	WS - $10,345 Lo S Fuel, WAA, DAA
North Texas Cement	Whitewright, TX	PC (new)	03/04/99	Wet Scrubbing	85	No[2]	2.75	
St. Lawrence Cement	Hudson, NY	PC (new)	See Note 1	Dry & wet scrubbing		No	0.65	
Suwanee American Cement	Branford, FL	PC (new)	06/01/00	Process	NA	Yes	0.27	WS - $29,700 DAA - $7,400
Rinker/Florida Crushed Stone	Brooksville, FL	PC (new)	App. 12/04	Process -NA	NA	No	0.23 (proposed)	

Notes:
1. Permit under negotiation
2. May never be built

3.6 Summary of Impact Analysis

Table 3-2 presents a summary of the cost analysis for each of the above control options. The detailed calculations are presented in Appendix A.

TABLE 3-2. SUMMARY OF IMPACT ANALYSIS FOR SO_2

Method	% removal	SO_2 Removed, tons/yr	Capital Costs, MM$	Annualized Cost, 1000 $	Cost Effectiveness $/ton	Impacts		
						Environmental	Product	Energy
Wet Scrubbing*	71.0	144	27.5	8,799.0	61,195	Yes	No	Yes
Wet Absorbent**	40	8.1	3.06	710.5	87,712	No	No	No
Dry Absorbent	60.5	122	1.98	676.5	5,523	No	No	No

*Expected control efficiency for wet scrubbing is 70 percent with raw mill on and 80 percent with raw mill off.

**Wet absorbent would only be added when the raw mill is off due to water spray limitations.

3.7 Selection of BACT

Wet scrubbing and wet absorbent addition can be rejected on a cost effectiveness basis. When the raw mill is on, SCC proposes as BACT for SO_2 the inherently low-emitting process of using dry absorbent coupled with the use of low-sulfur raw materials. When the raw mill is down, hydrated lime injection will be used as necessary, to reduce SO_2 emissions. The requested BACT emission limit is 0.27 lb/ton of clinker, 30-day rolling average, as measured by a continuous emission monitor (CEM). This averaging time is appropriate to account for the sulfur variability in the raw materials and the short-term increase in SO_2 emissions when the raw mill is down and during some upset conditions in the kiln. Because the basis for the emission limit is BACT and not attainment of the National Ambient Air Quality Standards (NAAQS) for SO_2, a shorter term emission limit (e.g., 3 or 24 hours) is not necessary. This is true for the other pollutants (NO_x, CO, and VOC) as well.

SECTION 4

BACT ANALYSIS FOR NO_x

4.1 NO_x Formation and Control Mechanisms

This section discusses the mechanisms of NO_x formation and control for precalciner cement kilns as currently applicable to the proposed SCC Center Hill plant.

4.1.1 NO_x Formation Theory

NO_x is formed as a result of reactions occurring during combustion of fuels in the main kiln and precalciner vessel of a traditional preheater/precalciner cement kiln. NO_x is produced through three mechanisms during combustion 1) fuel NO_x, 2) thermal NO_x, and 3) "prompt" NO_x.

Fuel NO_x is the NO_x that is formed by the oxidation of nitrogen and nitrogen complexes in fuel. In general, approximately 60 percent of fuel nitrogen is converted to NO_x. The resulting emissions are primarily affected by the nitrogen content of fuel and excess O_2 in the flame. Nitrogen in the kiln feed may also contribute to NO_x formation although to a much smaller extent.

Thermal NO_x is the most significant NO_x mechanism in kiln combustion. The rate of conversion is controlled by both excess O_2 in the flame and the temperature of the flame. In general, NO_x levels increase with higher flame temperatures that are typical in the kiln burning zone.

"Prompt NO_x" is a term applied to the formation of NO_x in the flame surface during luminous oxidation. The formation is instantaneous and does not depend on flame temperature or excess air. This formation may be considered the baseline NO_x level that is present during combustion and is relatively small compared to the other two mechanisms.

Thermal NO_x formation can be expressed by two important reactions of the extended Zeldovich mechanism:

$$O + N_2 \rightarrow NO + N(slow)$$

$$N + O_2 \rightarrow NO + O(fast)$$

At high temperature and excess O_2, a higher concentration of O radicals (or H radicals) is present and therefore NO_x forms more rapidly. At lower temperatures, an equilibrium reaction of NO with O_2 further results in NO_2 formation. Fuel NO_x is formed by the reaction of nitrogen in the fuel with available oxygen.

In a precalciner kiln, fuel combustion occurs at two locations and each follows a separate mechanism in the formation of NO_x (i.e., thermal NO_x dominates in the kiln burning zone and fuel NO_x dominates in the precalciner). For this reason, the effects of process operation on final NO_x levels are complex and do not necessarily conform to conventional understanding of combustion as defined through steam generation technology. Experience with various cement kilns also has shown that actual NO_x emissions are highly site specific.

4.1.2 Fuel Effects

Fuel type has an effect on NO_x emissions. For example, data from combustion simulations and field trials indicate combustion of coal produces significantly lower NO_x than natural gas combustion in a main kiln burner. In general, substituting fuels with higher Btu content will reduce NO_x emissions in part because fuel efficiency is increased and less total fuel is consumed.

4.1.3 Main Kiln Firing

In the rotary kiln section, the purpose of combustion is to increase material temperature to a level that will allow calcined meal to become viscous (liquid) and form calcium silicates. The temperature required for "burning" depends on cement type and meal properties and is in excess of 2550°F. Some meal types require a higher flame temperature than others to achieve the material temperature required to initiate fusion.

Cement kilns are distinct from conventional combustion sources such as steam generation in that the combustion chamber is a confined space that is refractory lined. This radiates energy back into the flame, thereby increasing the flame temperature. At given excess air levels, a confined flame will usually produce higher NO_x emissions than an open flame such as a boiler fire box.

NO_x levels from kiln firing are also strongly related to fuel type, flame shape, and peak flame temperature. At higher peak flame temperatures, more thermal NO_x is formed. Flame shape is also related to the percentage of primary air used in combustion in the kiln. High levels of primary air increase NO_x formation by providing excess O_2 in the hottest portion of the flame. Experience has indicated that a long flame and low primary air volume can minimize NO_x formation in the main kiln. However, in order to obtain high quality clinker with the best microstructure, a relatively short, strong, and steady flame is necessary. In addition, too long of a flame may also cause kiln rings and lead to incomplete fuel combustion.

4.1.4 Precalciner Firing

A secondary firing zone is the precalciner vessel. Fuel is introduced and burned in situ with the preheated raw meal. Under these conditions, heat released by fuel oxidation is extracted by meal decarbonization. The efficient use and transfer of energy reduces the peak temperature in the vessel. Normal temperatures are between 1650° and 1800°F. This lower temperature and operation at reduced excess air levels reduces the formation of NO_x. Thermal NO_x is minimized and fuel NO_x predominates.

NO_x formed in the main kiln combustion passes through the precalciner and the gases are cooled slowly in the preheater cyclones. NO_x formation is an endothermic process and as gases cool, NO_x tends to revert to N_2 and O_2. This decomposition process is rapid at elevated temperatures but decreases at temperatures below approximately 1300°F. In effect, if the flue gases can be slowly cooled to 1300°F over an extended period, a progressive decrease in NO_x concentration occurs. This process occurs in the preheater after other combustion radicals (OH^-, H^+, O^-, etc.) have been eliminated.

The available control technologies for NO_x are discussed below.

4.2 Selective Non-Catalytic Reduction

4.2.1 Description of Technology

Selective non-catalytic reduction (SNCR) involves the injection of an ammonia-containing solution into the preheater tower to reduce NO_x within the optimum temperature range of 800° to 1090°C. Because the optimum temperature range must be present for a sufficient time period to allow the reaction to occur, SNCR is only a viable technology on some preheater or precalciner kiln designs. The ammonia-containing solution may be supplied in the form of anhydrous ammonia, aqueous ammonia, or urea.

4.2.2 Theory of Abatement

SCNR involves the following primary reactions:

$$NH_3 + OH^- \rightarrow NH_2 + H_2O$$
$$2NH_3 + O^{2-} \rightarrow 2NH_2 + H_2O$$
$$NH_3 + H^+ \rightarrow NH_2 + H_2$$

Following NH_2 formation by any of the above mechanisms, reduction of NO occurs:

$$NH_2 + NO \rightarrow N_2 + H_2O$$

At temperatures lower than 800°C, reaction rates are slow, and there is potential for significant amounts of ammonia to exit or "slip" through the system. This ammonia slip may result in a detached visible plume at the main stack, as the ammonia will combine with sulfates and chlorides in the exhaust gases to form inorganic condensable salts. The condensable salts can become a significant source of condensable PM emissions that cannot be controlled with a baghouse or ESP. Ammonium sulfate aerosols would be a concern under upcoming programs to deal with $PM_{2.5}$ and regional haze. In addition, there may be health and safety issues with on-site ammonia generation.

At temperatures within the optimal temperature range, the above reactions proceed at normal rates. However, as noted in the literature as well as by vendors, a minimum of 5 ppm ammonia slip may still occur as a side effect of the SNCR process.

At temperatures above 1090°C, the necessary reactions do not occur. In this case, the ammonia or urea reagent will oxidize and result in even greater NO_x emissions. In addition, SNCR secondary reactions can form a precipitate, resulting in preheater fouling and kiln upset. Ammonia reagent may react with sulfur in kiln gases to form ammonium sulfate. Ammonium sulfate in the preheater can create a solids buildup. Ammonium sulfate in the kiln dust recycle stream may adversely affect the kiln operation.

The optimal temperature window for application of the SNCR process occurs somewhere in the preheater system. Fluctuations in the temperature at various points in the preheater are common during normal cement kiln operation. Therefore, selecting one zone for SNCR application in the preheater cannot reliably assure consistent results. Alternatively, selecting multiple zones of injection creates significantly increased complexity to an already complex chemical process.

4.2.3 Applicability of SNCR

SNCR has been employed at a number of European cement plants for NO_x reduction. SCC has also tested and installed SNCR at its Branford, Florida plant in conjunction with multi-stage combustion (MSC) and without MSC utilized. The results from this installation at the Branford Plant showed promising results in controlling NO_x emissions to approximately 2.0 lb/ton. In Europe, the chemical of choice for ammonia reagent is photowater. Photowater is a waste produced during development of film, which contains approximately 5.0 percent ammonia and is classified as a hazardous waste in the U.S. The availability and classification of the waste make it a low cost alternative to other ammonia or urea reagents for NO_x control in Europe.

In the U.S., either ammonia solution or urea is available for use in a SNCR system. SCC tested SNCR with use of an ammonia solution. A driving force for the use of SNCR in Europe is the alternate fuels usage allowed with lower NO_x limits. Facilities that can meet a limit of 500 mg/Nm^3 @ 10 percent oxygen (approximately 2.5 to 2.8 lb/ton) are allowed to utilize upwards of 50 to 75 percent alternate fuels which results in favorable cost benefits.

The requirements for SNCR include an optimum temperature range (i.e., 800° to 1090°C) and the presence of an oxidizing atmosphere. At the low flue gas temperature the reaction rate is slow and ineffective. Ammonia introduced will not react and will be lost as gas. Some of the ammonia will react with SO_2 in the conditioning tower forming ammonium sulfate $(NH_4)_2SO_4$ which is a submicron aerosol. This aerosol may form a visible emission at the stack.

Because the raw materials at the plant site can contain naturally occurring carbon (i.e., bitumen and kerogens), pyrolysis of organics occurs in the preheater tower producing CO. This results in a reducing atmosphere. The current control practice is to limit oxygen at the calciner exit to reduce NO_x. SNCR requires an oxidizing atmosphere and the two conditions are opposed in theory. CO emissions are expected to increase as NO_x is reduced. Data from preliminary testing in Europe and at SCC on MSC/SNCR systems indicate an increase in CO emissions of 5 to 20 percent is possible.

In addition, ammonia emitted as gas in the plume will react with SO_2 or HCl in the condensed water vapor plume forming a highly visible plume under certain weather conditions. A similar plume has been noted as result of naturally occurring ammonia in the kiln feed at the following plants:

- Votorantim's St. Mary's plant;
- Glens Falls, New York;
- Permanente, California;
- Redding, California;

- Ravena, New York;
- Midlothian, Texas;
- Mississauga, Ontario;
- Edmonton, Alberta; and
- Exshaw, Alberta

Direct mixing of urea with feed would not be effective in system designs where the feed is injected into the gas stream at the inlet of the first stage preheater for meal preheating. At this location flue gas temperatures are too low for the reaction to affect NO_x but sufficiently high to decompose the urea to ammonia, CO_2, and water vapor.

SCC has conducted trials on the kiln system in Branford to determine the effectiveness of SNCR and determine the required reagent injection rate. This short-term data has indicated no significant conflict with the reducing atmosphere. Some ammonia slip was noted during the testing but only for small periods while the raw mill was down, even during periods with no ammonia injection. Further long-term operations are needed to completely understand the ammonia cycle and ammonia slip. The testing has initially indicated that SNCR can be successfully applied without the formation of a visible plume. It should be noted that CO emissions showed a moderate increase during the testing. The trials indicate a NO_x emission reduction from a baseline (No MSC) of 2.8 lb/ton clinker to 2.5 lb/ton of clinker using only MSC and to 2.0 lb/ton clinker with use of SNCR.

SNCR in combination with a staged combustion principle has been demonstrated as a means of reducing NO_x. Although SNCR and staged combustion can in theory conflict, testing and operations at SCC have shown that the use of staged combustion can help to reduce the initial NO_x that is subsequently reduced by SNCR. Any reduction in initial the concentration of NO_x prior to introduction to the SNCR will result in a minimization of reagent used by the SNCR to reduce the NO_x. This results in cost savings and makes the SNCR a more effective means of reducing NO_x emissions. Low NO_x burners and kiln firing rates can also be used in conjunction with SNCR to help reduce the NO_x subsequently reduced by SNCR. In testing conducted at SCC, SNCR in conjunction with low NO_x burners and staged combustion principles, resulted in NO_x emissions at or around 1.95 lb/ton clinker. Another advantage using the SNCR in conjunction with staged combustion is it allows running in an oxidizing condition that helps to avoid buildup in the riser duct. This allows having a much more stable operation in the kiln and fewer process upsets.

4.3 Selective Catalytic Reduction

4.3.1 Description of Technology

Selective catalytic reduction (SCR) is a process that uses ammonia in the presence of a catalyst to reduce NO_x. The catalyst is typically vanadium pentoxide, zeolite, or titanium dioxide. The SCR process has been proven to reduce NO_x emissions from combustion sources such as incinerators and boilers used in electric power generation plants but not in cement kilns. No full-scale application of SCR on a Portland cement plant exists anywhere in North America.

4.3.2 Theory of Abatement

The NO_x-containing exhaust gas is injected with anhydrous ammonia and passed through a catalyst bed to initiate the catalytic reaction. As the catalytic reaction is completed, NO_x is reduced to nitrogen and water. The critical temperature range required for the completion of this reaction is 300° to 450°C, which is higher than the typical cement kiln ESP or baghouse exit gas temperature. Technical application of SCR requires the catalyst to be placed prior to the gas conditioning tower (dirty side) or after the particulate control device (clean side). Placement at the preheater exit satisfies the temperature requirements, but subjects the catalyst to the re-circulating dust load and potential fouling. Location at the baghouse exit requires reheating of the gases to the required temperature for catalyst activation.

Dirty Side Application

Installation of the catalyst before the pollution control device (i.e., dirty side) increases the potential for fouling from meal/re-circulating dust load, but requires a less significant reheating of the gas stream. The most prohibitive disadvantage of the SCR process in this location is fouling of the SCR catalyst. The high dust loading in cement kiln gases may plug the catalyst and render it ineffective. Minor impurities in the gas stream, such as compounds or salts of sulfur, arsenic, calcium, and alkalis, may deactivate the catalyst very rapidly, strongly affecting the efficiency and system availability as well as increasing the waste catalyst disposal volume.

Continual fouling of the SCR catalyst would render it inoperative as a NO_x control option. Ammonia injected to an SCR system with a fouled catalyst would pass unreacted through the system (i.e., ammonia slip). The unreacted ammonia would combine with sulfates and chlorides in the exit gases, forming inorganic condensable salts, which result in a detached visible plume and a significant increase in condensable PM_{10} emissions. In addition, SCR on power plants have been shown to convert SO_2 to SO_3 as a secondary reaction. SO_3 will react with CaO between preheater stages forming gypsum ($CaSO_4$), which can plug the tower and cause kiln shutdown.

Clean Side Application

Installation of the catalyst after the pollution control device (i.e., clean side) reduces the potential for fouling from meal/re-circulating dust load, but requires significant reheating of the gas stream. This can be significant if combined with wet scrubbing prior to the NO_x control. SO_2 removal is required to prevent conversion of SO_2 to SO_3 in the catalyst bed which would increase SO_3 emission if the NO_x control were the last system in the gas train.

Placement of the SCR catalyst between the fabric filter and scrubber would not reduce the SO_3 emissions if the SO_3 hydrates and condenses in the scrubber quench. H_2SO_4 aerosols are submicron and therefore not collected in wet scrubbers designed for SO_2 removal.

4.3.3 Applicability of SCR

SCR systems are currently being installed on electric utility boilers in North America for NO_x control. These systems use up to three catalyst beds with ammonia gas injection before each bed. Temperature is controlled by placing the reactor beds between the boiler outlet and air heater. For most applications the boilers are base load units with little or no load variation. This allows a stable temperature profile for optimum function and injection of ammonia. Ammonia is typically generated by the thermal decomposition of urea in a water solution under pressure.

The optimum temperature for reaction is 300° to 450°C. In the presence of the catalyst, the NO_x is reduced to N_2 by reaction with ammonia. For the reaction to occur the ammonia must be present in excess molar ratio. Typical usage in utility applications is 1.05 - 1.10 to 1.0 (NH_3/NO_x). The excess ammonia required produces "ammonia slip" of between 10 and 15 ppm in the flue gases.

Recent studies of the use of SCRs at major utilities have indicated that some SO_2 present in the flue gases is oxidized to SO_3 during the process. The rate of conversion can increase SO_3 by 15 to 100 ppm depending on catalyst composition, temperature, and SO_2 concentration. It has also been noted that the catalyst life is greatly reduced by the presence of SO_3 in the gas stream. The slippage of ammonia and formation of SO_3 has resulted in an intense visible plume as ammonia reacts with SO_2 in the flue gases and when SO_3 condenses forming acid aerosols ($H_2SO_4 \bullet 2H_2O$).

The application of SCR on cement kilns is fundamentally different than utility boilers due to their differences in gas composition, dust loading, and chemistry. EPA's, "*Alternative Control Techniques (ACT) Document for NO_x Emissions from Cement Manufacturing*" (pages 6-32, 6-36, and 6-37), acknowledges that there are no installations of SCR technology in cement plants in the United States, however EPA concludes that SCR technology is technically feasible based on technology transfer from utility boiler and gas turbine applications. The ACT document indicates a control efficiency of 80 percent for using SCR technology. However, this assumed efficiency is unproven for use in cement kilns.

There is one installed SCR unit in Europe on a preheater cement kiln and several pilot studies. The one installed unit is experimental and has had some operational problems concerning catalyst deactivation and fouling. The application of SCR to "dirty side" kiln gases is still in an experimental stage. Currently the one full scale SCR unit is still testing for long-term catalyst optimization. Extensive data from the experimental test is not available but the facility currently meets the regulatory limit of 500 mg/m^3 at 10 percent oxygen. Similar or better results can be achieved with more proven technologies such as SNCR or staged combustion. The use on "clean side" application may be technically feasible but has a high energy cost to reheat the gases.

The most serious issues yet to be resolved are catalyst life, poisoning of the catalyst, fouling of the bed, system resistance, ability to correctly inject ammonia at proper molar ratio under non-steady state conditions, and creation of detached plume. Additionally, inexperience with SCR limits the availability of such a technology without long-term testing to determine the applicability and long-term reductions of NO_x associated with the production of Portland cement.

4.4 Indirect Firing and Low NO_x Burners

4.4.1 Description of Technology

Indirect firing systems (a low NO_X technology) can be used on the precalciner and rotary kiln burner systems. This technology functions by grinding the fuel and collecting the pulverized fuel with a baghouse and receiving bin. The fuel is then fired using a dense phase conveying system that limits the volume of air necessary to transport fuel to the burner. This design reduces primary air injected with fuel.

The indirect-firing process allows the flame to be fuel rich, which reduces the oxygen available for NO_x formation. In some cases it can also result in higher flame temperatures because the heat release occurs with less combustion gases (i.e., excess air).

Low NO_x burners in general are not as effective when used on the rotary kiln section of a preheater-precalciner kiln system because gases containing the thermal NO_x formed in the main kiln section are gradually cooled as they move through the system resulting in NO_x reduction (as previously discussed), and subsequently the gases pass through the precalciner burning zone and preheater cyclones where they are further reduced. NO_x contained in the alkali bypass gases, however, would not be subject to this reduction.

4.4.2 Theory of Abatement

The indirect-firing process allows the flame to be fuel rich, which reduces the oxygen available for NO_x formation. In some cases it can also result in higher flame temperatures because the heat release occurs with less combustion gases (i.e., excess air).

Indirect firing with a low NO_x burner attempts to create two combustion zones, primary and secondary, at the end of the main burner pipe. In the high-temperature primary zone, combustion is initiated in a fuel-rich environment in the presence of a less than stoichiometric oxygen level. The submolar level of oxygen at the primary combustion site minimizes NO_x formation. The presence of CO in this portion of the flame also chemically reduces some of the NO_x that is formed.

In the secondary zone, combustion is completed in an oxygen-rich environment. The temperature in the secondary zone is much lower than in the first; therefore, lower NO_x formation is achieved as combustion is completed.

4.4.3 Applicability of Indirect Firing and Low NO_x Burners

Indirect-firing and a low NO_x main kiln burner will be used by the SCC Center Hill Plant kiln. The emission levels achieved with indirect firing are defined by the burnability of the mix, amount of conveying air required, and design of the burner. In kiln systems where the mix is difficult to burn (crystalline silica, quartz, high lime/silica ratio, etc.) or where high excess air is required, the NO_x levels are generally higher and this technology is more effective in such situations. In general, the expected NO_x reduction ranges from 0 to 30 percent from baseline levels at the same mix design and excess air levels.

4.5 Semi-Direct Firing and Low NO_x Burners

4.5.1 Description of Technology

Semi-direct firing practice involves the separation of pulverized fuel from the mill sweep air using a cyclone separator. The fuel is placed in a small feeder bin from which it is metered to the kiln burner pipe. The exhaust gases of the cyclone are used to transport the fuel from the bin discharge. Advantages in the design are that a portion of the sweep air can be returned to the mill or exhausted to the atmosphere and that minor variations in fuel delivery rate are eliminated. The major advantage for NO_x abatement is that the volume of primary air can be marginally reduced (i.e., 20 to 25% of combustion air). The system is similar to mill recirculation but can include partial sweep air discharge.

4.5.2 Theory of Abatement

The theory of abatement is similar to indirect firing as described in Section 4.4.2; however, primary air volume will be higher than indirect firing.

4.5.3 Applicability of Semi-Direct Firing and Low NO_x Burners

Semi-direct firing would not reduce NO_x emissions below current levels and is therefore not applicable. Indirect firing will be used on the SCC kiln.

4.6 Mill Air Recirculation

4.6.1 Description of Technology

A method to reduce primary air usage involves returning a portion of the coal mill sweep air (30 to 50%) to the coal mill inlet. By returning sweep air, the volume of air used to convey pulverized fuel to the burner pipe is reduced. The amount of the return air possible depends on the mill grinding rate (i.e., percent of utilization), volatile content of fuel, moisture in the fuel, grindability of the fuel, and the final conveying air temperature achieved. The reduction in primary air allows the use of low NO_x burner technology that further reduces NO_x formation. The use of mill air recirculation can achieve primary combustion air between 15 and 25 percent but is highly variable. Kilns operating with a hard burning mix do not typically achieve high NO_x reductions. Also, recirculation is not possible for fuels containing high free moisture (i.e., fuels stored outdoors exposed to weather).

4.6.2 Theory of Abatement

The theory of abatement is similar to indirect firing as described in Section 4.4.2.

4.6.3 Applicability of Mill Air Recirculation

This technology applies to coal/coke direct-fired kilns not currently using a fuel-rich primary combustion technology. Since the SCC Center Hill kiln will be indirect-fired, this technology is not applicable.

4.7 Mid-Kiln Firing

4.7.1 Description of Technology

Mid-kiln firing (MKF) is a potential NO_x reduction technology that involves injecting solid fuel into the calcining zone of a rotating long kiln using a specially designed feed injection mechanism. The technology is applicable to conventional wet process and long dry kilns. The fuel used is generally whole tires, although containerized waste fuels have also been used at some plants. Fuel is injected near the mid-point of the kiln, once per kiln revolution, using a system consisting of a "feed fork," pivoting doors, and a drop tube extending through the kiln wall.

Another form of mid-kiln firing has been used for certain preheater and preheater/precalciner kiln systems. Whole tires are introduced into the riser duct using a specially designed feed mechanism (drop chute with air lock or thermal suspension). This creates an additional secondary firing zone in which the solid fuel is burned in contact with the partially calcined meal. Combustion is initiated in the riser duct (located midway between the calciner and rotary kiln sections of the kiln system) and is completed within the rotary kiln section in a reducing atmosphere away from the elevated temperatures of the main kiln burner. NO_x formation is inherently lower in this area, and NO_x formation may be further reduced due to improvements in fuel efficiency and the shifting of fuel burning requirements (e.g., less fuel must be burned at the main kiln burner).

4.7.2 Theory of Abatement

MKF is a staged combustion technology that allows part of the fuel to be burned at a material calcination temperature of 600° to 900°C, which is much lower than the clinker burning temperature of 1200° to 1480°C, thus reducing the potential for thermal NO_x formation. By adding fuel in the main flame at mid-kiln, MKF changes both the flame temperature and flame length. These changes may reduce thermal NO_x formation by burning part of the fuel at a lower temperature and by creating reducing conditions at the solid waste injection point that may destroy some of the NO_x formed upstream in the kiln burning zone. MKF may also produce additional fuel NO_x depending upon the nitrogen content of the fuel. The additional fuel NO_x, however, is typically insignificant relative to thermal NO_x formation. The discontinuous fuel feed from MKF can also result in increased CO. To control CO emissions, the kiln may require an increase in combustion air, which can decrease production capacity.

Test data showing NO_x reduction levels for long dry and wet kilns were compiled for the EPA in the report "*NO_x Control Technology for the Cement Industry*" (EC/R Inc., 2000). Tests conducted on three wet process kilns using MKF technology showed an average reduction in NO_x emissions of 40 percent, with a range from 28 to 59 percent.

4.7.3 Applicability of MKF

As discussed above, mid-kiln firing in the form of riser duct firing is potentially applicable at the SCC Center Hill Plant. The major concerns in applying this combustion practice include:

1. Community acceptance of tire burning.
2. Reduced sulfur retention in the clinker resulting in increased SO_2 emissions.
3. Adverse product quality impacts.

These issues are addressed in detail in the following discussion.

Community Acceptance

The ability to implement tire burning is strongly dependent on the acceptance of the local community. Historically, public acceptance of tires as an alternate or supplemental fuel has been influenced by negative implications of open tire burning and generation of hazardous products of incomplete combustion. This inference must be overcome through public education, meetings, and involvement in the regulatory process.

Increased SO_2 Emissions

For sulfur to be retained in the clinker, the sulfur must combine with alkali forming an alkali salt (Na_2SO_4, K_2SO_4) or with calcium forming calcium sulfate ($CaSO_4$). In most kiln systems sulfur inputs exceed the capacity of available alkali (i.e., alkali/sulfur ratio less than 1.0). When this occurs excess sulfur can only be retained by forming calcium sulfate. Calcium sulfate can only be formed under oxidizing conditions, and under reducing conditions calcium sulfite ($CaSO_3$) is produced. $CaSO_3$ is unstable at burning zone temperatures and reverts to CaO and SO_2. For sulfur to be retained, excess oxygen at the kiln exit must be maintained above a minimum concentration. The creation of a reducing zone at mid-kiln will reduce sulfination of clinker and potentially increase SO_2 emissions. This conflicts with the ability to decrease SO_2 emissions concurrently with NO_x reduction.

Product Quality Impacts

The introduction of whole tires to the system changes the chemistry of the system. Tires contain iron, which must be considered in the mix design. When tires are being burned, the mix is adjusted to allow for the addition of iron as part of the fuel. If an interruption in tire usage occurs, the mix cannot be immediately changed to accommodate for the loss of iron in the mix. The kiln feed will require a higher fusion temperature (loss of flux) and the kiln will go raw (upset condition) and most likely will flush. This is a serious concern for production and safety. A flush in the kiln produces a rapid influx of hot meal into the cooler, pressurizing the system, and producing hot gases in the cooler area.

4.8 Multi-Staged Combustion (MSC)

4.8.1 Description of Technology

MSC is a combustion technology that is currently used with preheater/precalciner kilns to reduce NO_x generation by all major kiln vendors. MSC, which includes the use of two or more staged air, feed, or fuel burning locations to create low NO_x burning zones, is supplied by one or more vendors as NO_x control technology on modern preheater/precalciner cement kilns. MSC is also considered a common technology as it has been used for many years throughout the cement industry. However, based on actual experience in European cement plants, NO_x reduction in MSC can be adversely impacted if the raw feed contains high pyritic sulfur. This is not a problem for the SCC Center Hill Plant. Another form of MSC combines high temperature combustion and re-burning without staging air or fuel in the calciner. This technology creates one high temperature reducing zone by injection of all of the calciner fuel into one reducing zone at the bottom of the calciner. The reducing zone is followed immediately by an oxidizing zone where all the tertiary air is introduced into the calciner. Splitting of feed or staged feed is used to control the temperatures and help in creating and controlling the high temperature reducing zone. However, this form of staged combustion does not utilize splitting of tertiary air to stage air flow.

4.8.2 Theory of Abatement

MSC takes place in and around the precalciner and is accomplished in several ways depending on the system design. The purpose of staged combustion is to burn fuel in two stages, i.e., primary and secondary. Staged air combustion suppresses the formation of NO_x by operating under fuel-rich, reducing conditions (less than stoichiometric oxygen) in the flame or primary zone where most of the NO_x is potentially formed. This zone is followed by oxygen-rich conditions in a downstream, secondary zone where CO is oxidized at a lower temperature with minimal NO_x formation.

To delineate the NO_x control mechanisms of SC, the combustion chemistry of NO_x formation by virtue of fuel nitrogen should be examined. Fuels introduced to the primary combustion zone undergo a pyrolysis that liberates nitrogen originally bound in the fuel. Nitrogen-bearing products that are gaseous will again pyrolize to form HCN and NH_i radicals. With NO and oxygen radicals (OX) already present in the gas stream, the NH_i will react as such:

$$NH_i + OX \rightarrow NO + \ldots$$

$$NH_i + NO \rightarrow N_2 + \ldots$$

Because the primary stage of MSC is a high-temperature (1150° to 1200°C) reducing environment where CO is prevalent and oxygen radicals are relatively scarce, NH_i radicals can scavenge oxygen from NO as shown in the second equation. This phenomenon is the basis for successful NO_x reduction in MSC kilns.

Research and actual emission monitoring on preheater/precalciner cement kilns have shown that MSC technology applied to the area of the precalciner works to effectively lower NO_x emissions per unit clinker produced. Although potential disadvantages to MSC may exist, experience has shown that when included as part of the kiln system design, it will produce a reduction in NO_x emissions with minimal process problems. The MSC control option is capable of reducing NO_x emissions by 10 to 50 percent, depending on the site-specific kiln operating parameters (i.e., kiln feed burnability).

MSC can have limitations under specific conditions which affect the potential NO_x control effectiveness. In kiln systems that use a mix that is characteristic of a high sulfur to alkali molar ratio, the volatility of sulfur is increased due to the strong reducing conditions in MSC and the relatively low O_2 content in the system. Operationally, this causes severe preheater plugging to occur due to significant sulfur deposition associated with MSC operation. As a result, the required conditions needed for optimum MSC operation (low excess oxygen), conflict with the goal of preventing sulfur deposition and minimizing operational problems. These problems have been documented in Europe and at U.S. cement production facilities. A high S/alkali molar feed ratio prevents the achievement of maximum NO_x reduction using MSC.

Another type of MSC technology involves creating a reducing zone by introduction of all of the calciner fuel into an oxygen deficient zone. F. L. Smidth describes the process of NO_x reduction as the following:

> *"The combustion of coal or pet coke in a calciner may be viewed as consisting of five stages : heating; pyrolysis; ignition; reaction between components in the gas phase; and reaction of char and soot. The gaseous reactants, char and soot are formed when the coal is heated whereby it is pyrolysed. The three pyrolysis products contain the nitrogen introduced to the calciner with the fuel. In the gases the nitrogen is present as N_2, HCN, NH_3 and a small fraction of NO; the rest of the nitrogen is still bound in the soot and char. In addition to the nitrogen-containing compounds, H_2S, H_2, CO, CH_4, and CxHy or its radicals are also present in the gases. The pyrolysis takes place at the very bottom of the reduction zone immediately after the introduction of the coal".*
>
> *"NO_x reduction by re-burning in the calciner is caused by a sequence of reactions involving gases, soot and char from the coal pyrolysis, as well as catalytic effects of raw meal and char."*

4.8.3 Applicability of MSC

A form of MSC (i.e., reducing zone) will be used on the SCC Center Hill kiln in combination with indirect firing, low NO_x burners, and SNCR. The use of multi-staged combustion, low NO_x burners, and indirect firing will assist in reducing NO_x prior to the SNCR system and help to minimize the amount of reagent needed to reduce the NO_x.

4.9 Technically Feasible Options

Based on the preceding discussion, the technically feasible options are considered to be:

- SNCR (currently planned)
- SCR
- Indirect Firing and Low NO_x Burners (currently planned)
- Mid-Kiln (Riser Duct) Firing (optional)
- MSC (currently planned).

4.10 Review of Recent Permit Limits

Table 4-2 summarizes the NO_x BACT determinations made for cement kilns since 2000.

4.11 Summary of Impact Analysis

Table 4-1 presents a summary of energy, environmental, and economic analyses of the SNCR and SCR control options.

The detailed cost calculations are presented in Appendix B.

TABLE 4-1. SUMMARY OF IMPACT ANALYSIS FOR NO_x

Method	% removal *	NO_x, removed tons/yr	Capital Costs, MM$	Annualized Cost, 1000 $	Cost Effectiveness $/ton NO_x	Impacts		
						Environmental	Product	Energy
SCR	32	600	4.60	9,196	15,325	Yes	No	Yes
SNCR	22	413	1.52	1,116	2,706	Yes	No	No

*Assumes NO_x reduction from kiln system employing indirect firing, low NO_x burners, and MSC.

4.12 Selection of BACT

SCC proposes as BACT the use of indirect firing, low-NO_x burners, MSC, and SNCR. The requested BACT emission limit is 1.95 lb/ton of clinker, 30-day rolling average, as measured by CEM. This averaging time is appropriate to account for the variability in NO_x emissions from cement kilns and is consistent with EPA's NO_x State Implementation Plan (SIP) call guidance for cement kilns. Mid-kiln firing may be used as a fuel burning option it is not considered BACT because it is not expected to reduce NO_x emissions significantly when combined with the above proposed combination of control technologies.

TABLE 4-2. SUMMARY OF RECENT NOX BACT DETERMINATIONS FOR CEMENT KILNS (2000-PRESENT)

Company	Location	Kiln Type	Permit Date	Technology Applied and $/Ton	Removal (%)	In Operation (Yes/No)	Limit (lb/ton clinker)	Rejected Technology and $/Ton
CEMEX	Demopolis, AL	PC (mod)	9/13/2002	No BACT limit for NOx	NA	Yes		
Florida Rock Industries	Newberry, FL	PC (new)	App. 11/8/04	Lo Nox, MSC, SNCR	20% (SNCR)	No	2.00 (proposed)	SCR
GCC Dacotah	Rapid City, SD	PC (mod)	04/10/03	Lo Nox, MSC	NA	Yes	5.52	FGR, MKF, Lo NOx, TDF, SCR, SNCR
Holcim	Holly Hill, SC	PC (new)	12/22/99	Lo NOx, MSC	NA	Yes	4.33	
Holcim	Artesia, MS	WET (mod)	See Note 1	Good combustion practices	NA	Yes	11.20	FGR, Lo NOx, staged combustion, SNCR, SCR
Holcim (Devil's Slide)	Morgan, UT	PC (mod)	11/20/02	Lo NOx, MSC	NA	Yes	4.55	FGR, Lo NOx, staged combustion, SNCR, SCR
Holcim	Theodore, AL	PC (mod)	02/04/03	Limit not based on BACT	NA	Yes	3.33	
Holcim	Lee Island, MO	PC (new)	06/08/04	Lo NOx, MSC [3]	30	No	3.00 (year 1 & 2) 2.80 (after year 2)	SCR
Lafarge	Davenport, IA	PC (mod)	11/09/99			Yes	4.00	
Lehigh Portland Cement	Mason City, IA	PC (mod)	12/11/03	Lo NOx, SNCR	NA	Yes	2.85 [5]	
Lone Star Industries	Cape Girardeau, MO	PC (new)	See note 1			No		
Monarch Cement	Humboldt, KS	2PC (mod)	01/27/00	Good combustion practices	NA	Yes	4.21	FGR, Lo NOx, staged combustion, SNCR, SCR
North Texas Cement	Whitewright, TX	PC (new)	03/04/99	Lo NOx, MSC	NA	No[2]	3.87	SNCR
St. Lawrence Cement	Hudson, NY	PC (new)	See Note 1	Lo NOx, MSC	NA	No	3.60	
Suwanee American Cement	Branford, FL	PC (new)	06/01/00	MSC - $360	NA	Yes	3.80 (year 1) 2.90 (after year 1)	SNCR - $1251
Rinker/Florida Crushed Stone - Kiln 2	Brooksville, FL	PC (new)	App. 12/04	Lo NOx, MSC, SNCR	28% (SNCR)	No	1.95 (proposed)[4]	SCR - $16,712

Notes:
1. Permit under negotiation
2. May never be built
3. SNCR required as Innovative Control Technology after year 2
4. Does not include periods of start-up and non-routine operations. Effective limit on an annual basis is 2.2 lb/ton of clinker
5. Does not apply during periods of startup, shutdown, and malfunction

SECTION 5

BACT ANALYSIS FOR CO AND VOC

CO and VOC emissions from cement kiln pyroprocessing systems generally occur from two separate and distinct processes in the system: 1) products of incomplete combustion of fuel and 2) decomposition of organic material in the kiln feed. Each CO and VOC formation process occurs under uniquely different conditions and are defined by the process technology and feed materials.

CO and VOC from Kiln Feed

For the purpose of this discussion, the pyroprocessing technology is confined to the preheater/precalciner design. In this design, raw meal is introduced to the exhaust gas stream from the preheater and preheated through a series of cyclones (stages) in a countercurrent flow design. In the process of heating, organic materials naturally occurring in the feed (kerogen and bitumin) are progressively heated and they begin to thermally degrade. The heating at relatively low temperature and at a low oxygen atmosphere results in complex organic molecules to be cracked, recombined, and re-ordered until the species are reduced to short-chain VOC's, CO, and/or carbon dioxide (CO_2). During the pyrolytic process, a significant fraction of the organic carbon is fully oxidized to CO_2.

Depending on the nature of the organics present in the feed materials, the location of the thermal decomposition in the preheater varies along with the degree of complete oxidation. The presence of light hydrocarbon species in the meal typically results in VOC and condensable hydrocarbons in the kiln preheater gases, but the CO concentrations are low. Conversely, complex hydrocarbons generally produce CO during decomposition, but low concentrations of VOC.

Depending on the geological strata of the feed materials, the composition and concentration of organic materials in the kiln feed (meal) may vary significantly. The spatial distribution within the deposit is both lateral and vertical, and cannot be mitigated by selective mining or material substitution. The level of contaminants in the kiln feed is unique to each site and results in site-specific CO and VOC emission rates.

The rate of conversion of meal carbon to CO_2 is influenced by the temperature profile of the preheater, the organic content of the kiln feed, and the composition of the organics in the kiln feed. Recent studies do not indicate that the oxygen content of the flue gases influences the CO emission rate. Papers published in Zement-Kalk-Gips also support the same conclusion. The temperature of the preheater stages is defined by the kiln and mix designs (C_3S, silica, etc.) and cannot be modified sufficiently to complete oxidation of CO and VOC in the preheater.

SCC is currently testing injection of fly ash at the Branford Plant into the calciner to avoid exposure of organic material present in fly ash to low temperatures and the progressive heating as it travels through the upper regions of the preheater tower. SCC intends to have the ability to inject some portion of fly ash into the calciner region of the Center Hill new kiln system. Typical fly ash contains organic compounds not combusted in the original combustion process (power generation) which are complex hydrocarbons. By injecting directly into the calciner, these complex hydrocarbons are exposed to conditions which can greatly reduce the VOC and CO emissions by more completely combusting and destroying the hydrocarbons due to exposure to the high temperatures present in the calciner. Operational and quality factors may limit the amount of fly ash that can be introduced in this manner, but SCC intends to optimize the use of fly ash injection into the calciner region and install equipment to allow for this process in the new kiln system.

5.2 CO and VOC from Incomplete Combustion

CO and VOC may also be produced as a product of incomplete combustion of fuel in the precalciner vessel. Modern precalciners burn fuel in suspension with meal. The precalciner vessel is designed to decarbonize (or calcine) the raw feed simultaneously with the combustion of fuel in suspension. This design allows use of liquid, gaseous, and solid fuels over a range of heat values and qualities (ash, moisture, etc.). Because of the continuous generation of thermal energy (combustion) and consumption of thermal energy due to the decarbonization, the temperatures are stabilized and the thermal variation is minimized. This process results in reduced thermal NO_x and promotes de-NO_x of kiln gases entering the precalciner. With this design, however, it is impossible to eliminate all CO that is normally associated with fuel combustion in a conventional combustion device such as a boiler. Typical CO concentrations after the precalciner and lowest preheater cyclone exit are between 250 and 1500 ppm and VOC is low (i.e., 5 to 10 ppm).

The SCC design for NO_x control generates a reducing atmosphere zone to enhance NO_x reduction. CO generation will also be increased in this zone. The design functions in a similar manner to staged combustion in boilers. Theoretically, CO is not directly involved in the chemical reactions to reduce NO_x. An oxygen deficiency zone is needed to create more NHi radicals to reduce NO_x. CO is the result of this reducing atmosphere.

5.3 Review of Kiln Permit Limits

Review of literature and the BACT/LAER Clearinghouse indicates that proper design and operation (i.e., good combustion practice) represents BACT for CO and VOC in Portland cement kilns. Properly controlled combustion in the kilns minimizes CO and VOC formation by ensuring that temperatures and O_2 availability are adequate for complete combustion. CO and VOC emissions will primarily result from the decomposition of organic matter naturally contained in the raw material. A properly designed and operated cement kiln acts as a thermal oxidizer, converting 95 percent of the CO that is generated to CO_2. For the SCC kiln, the operating conditions of temperatures and a relative high excess O_2 availability are ideally suited for CO control.

The reducing atmosphere zone required for NO_x control will generate relatively high CO at the bottom of the precalciner. However, the extended combustion ducts on top of the precalciner and a final mixing zone increase the gas retention time and strongly enhance the mixing of the gas from the precalciner and the tertiary air with high oxygen content. These can enhance the combustion process and reduce CO to lower levels at the lower preheater stage exit. This is considered good combustion practice for burning fuel in a precalciner.

A review of plants identified in the BACT/LAER Clearinghouse indicated that the documentation is incomplete and that several facilities have been constructed under the Federal PSD program or State-only BACT requirements. Considering the incompleteness of the data, a State-by-State review of recently permitted precalciner facilities was conducted. Table 5-1 summarizes the CO emission limits for precalciner kilns and Table 5-2 summaries the VOC emission limits for precalciner kilns.

A total of 46 permits for precalciner kilns were identified many which have specific CO and VOC limits (i.e., lb/h or tons/yr). Where sufficient data were available, emissions were expressed in both annual average lb/h and lb/ton of clinker basis for comparison. The permits consist of both BACT determinations and voluntary limits imposed to avoid PSD. With the exception of two facilities, all plants were indicated to operate using "good combustion practice."

The range of CO emissions for good combustion practice is site-specific and is between 1.03 and 15.83 lb/ton of clinker. The range of VOC emissions for good combustion practices is also site-specific and ranges between 0.06 and 2.0 lb/ton of clinker.

The one plant identified as using post-control technology is TXI Operations, Midlothian, Texas, which listed a regenerative thermal oxidizer (RTO) for CO and VOC abatement. Post-control was voluntarily implemented to avoid PSD review during plant expansion. The expected uncontrolled CO emission rate was estimated to be 6.8 lb/ton. No estimate of the uncontrolled VOC emission rate is available.

Due to the technical difficulties in maintaining continuous operation of the RTO, TXI has submitted a revised permit application to remove the RTO and operate with a PSD permit employing good combustion practices. The RTO may be required for VOC control during the ozone season as a part of an attainment plan for the area.

An RTO was installed at Holcim Dundee, Michigan for odor and visible emission (condensable hydrocarbon) control but has been discontinued due to high maintenance and system failure. This system was installed on two wet cement kilns.

5.4 Available Control Technologies

Post combustion of volatile organics from painting, printing, and organic chemical processes is an accepted and proven technology. This control option is applied to clean gas streams containing minimal amounts of particulate matter. The processes include direct flame incineration and catalytic oxidation. Because of the presence of chlorides, phosphorus compounds, sulfur, and metals in the gas stream, catalytic oxidation is considered technically infeasible for control of CO and VOC in cement operations (due to catalyst fouling).

The arrangement of equipment used for direct incineration varies in the method of heat recovery to reduce fuel cost but not in the destruction processes. In general, the gas stream temperature must be increased above the auto ignition temperature with sufficient mixing and oxygen available for oxidation. Typical temperature for destruction of CO is 1500°F or greater with an outlet oxygen content of greater than 3.5 percent.

Gases from the combined mill exhaust and bypass contain 12.5 percent oxygen at a temperature of 220°F. These gases must be raised to greater than 1500°F using combustion of natural gas. A thermal model of the process provides the heat input requirements for three methods of operation:

1. Direct-fired, no heat recovery
2. Direct-fired, recuperative heat recovery
3. Direct-fired regenerative heat recovery.

There are no cement plants currently operating using direct-fired afterburner or a recuperative type afterburner. There are, however, two plants which have employed a regenerative type afterburner (RTO). These are at TXI, Midlothian, Texas and Holcim, Inc., Dundee, Michigan. The TXI operation is a precalciner and the Dundee operation is a wet process kiln (2 units).

TXI, Midlothian, Texas

The system was installed during a plant expansion and was used to reduce CO and VOC emissions below a *de minimus* increase and therefore avoid PSD review. No BACT analysis was conducted and the Texas Natural Resource Conservation Commission (TNRCC) does not consider the use of an RTO as BACT under State or Federal requirements. The unit has experienced significant operational difficulties including higher than anticipated heat exchanger fouling and pressure drop. This has increased afterburner fuel costs and decreased kiln capacity. It should be noted that the uncontrolled CO emissions rate for the plant is between 5 and 8 lb/ton of clinker and a significant fraction of the heat input is from self-fueling that reduces fuel cost. It is also important that the plant operates a fabric filter for primary particulate control and a sulfur dioxide (SO_2) scrubber for SO_2 removal prior to the RTO. This unit is in the process of being decommissioned due to the high heat input, heat exchanger foaling and impact on the process.

Holcim, Dundee, Michigan

Holcim operated two RTO systems on the exhaust of two wet process cement kilns. The mix used to produce the slurry for kiln feed contains a high concentration of kerogen. Kerogen and bitumen are organic species found in oil shale and precursors to petroleum deposits. The introduction of these species under progressive heating conditions such as a wet kiln result in fractional distillation of heavy hydrocarbons with minimal oxidation. Historically, the Dundee kilns have emitted condensable hydrocarbons, which formed visible plumes and an objectionable odor. In an effort to control these problems, the plant installed an RTO. The design was modified from the TXI configuration to include an open type (checker) heat exchanger that was expected to have less potential for fouling. The unit has been effective in control of visible emissions (VE) and odor but has experienced poor heat recovery, high fuel costs, and unusual maintenance problems. In some cases under high hydrocarbon loads, the unit has experienced

TABLE 5-1. CARBON MONOXIDE (CO) LIMITS FOR PRECALCINER KILNS

Facility Name	Plant Name	Facility Location	Facility Status	Annual average emissions (lb/h)	Annual average emissions (lb/ton clinker)	Control Technology*
Alamo Cement Company	1604	San Antonio, TX	Existing	460.00	4.14	GC
Ash Grove Cement Company	Chaunte	Chanute, KS	Existing	321.69	1.66	GC
Ash Grove Cement Company	Durkee	Durkee, OR	Existing	490.00	4.34	GC
Ash Grove Cement Company	Louisville	Louisville, NE	Existing	NL	NL	GC
Ash Grove Cement Company	Leamington	Nephi, UT	Existing	502.27	4.88	GC
Ash Grove Cement Company	Seattle	Seattle, WA	Existing	537.21	6.27	GC
Blue Circle Cement, Inc.	Harleyville	Harleyville, SC	Existing	1209.59	9.68	GC
Calaveras Cement Company	Redding	Redding, CA	Existing	1156.85	15.83	GC
Calaveras Cement Company	Tehachapi	Tehachapi, CA	Existing	900.00	11.86	GC
California Portland Cement	Mojave	Mojave, CA	Existing	183.50	2.85	GC
California Portland Cement	Arizona Portland	Rillito, AZ	Existing	1157.31	4.41	GC
Capitol Aggregates, Inc.	Capitol Cement Division	San Antonio, TX	Existing	622.50	7.47	GC
Capitol Cement Corporation	Capitol Cement Corporation	Martinsburg, WV	Withdrawn	468.75	2.50	GC
Sunbelt Cement, Inc. (prev Cemex USA)	Balcones	New Braunfels, TX	Existing	497.72	4.52	GC
Continental Cement Co., Inc.	Continental Cement Co., Inc.	Hannibal, MO	Withdrawn	ND	ND	
CSR/Rinker Materials, Inc.		Miami, FL	Existing	412.40	3.01	GC
ESSROC	Nazareth	Nazareth,PA	New - Not Constructed	1364.06	4.50	GC
Florida Crushed Stone - Kiln 1		Brooksville, FL	Existing	208.33	2.00	GC
Florida Rock Industries, Inc.		Brooksville, FL	Proposed	292.92	3.60	GC
Florida Rock Industries, Inc.	Thompson S. Baker Plant	Newberry, FL	Existing	294.20	3.62	GC
Florida Rock Industries, Inc.	Thompson S. Baker Plant	Newberry, FL	Proposed	450.00	3.60	GC
Hanson Permanente Cement	Permanente	Cupertino, CA	Existing	1008.72	4.72	GC
Holcim (US)	Portland	Florence, CO	Existing	1940.64	6.80	GC
Holcim (US)	Holly Hill	Holly Hill, SC	Constructed	2739.73	6.00	GC
Holcim (US)		Lee Island, MO	Proposed	26.48	0.40	GC
Holcim (US)	Fort Collins	Laport, CO	Existing	811.99	5.33	GC
Holcim (TEXAS)LP	Holcim (TEXAS)LP	Midlothian, TX	Existing-Modification	811.99	5.33	GC
Holcim (TEXAS)LP	Holcim (TEXAS)LP	Midlothian, TX	Existing-Modification	620.00	5.05	GC
Holcim (US)	Devil's Slide	Morgan, UT	Existing	NL	NL	GC
Holcim (US)	Theodore	Theodore, AL	Existing	1325.00	10.60	GC
Kosmos Cement Company	Kosmosdale	Louisville, KY	Existing	313.00	2.15	GC
Lafarge Corporation	Davenport	Buffalo, IA	Existing	192.24	1.64	GC
Lafarge Corporation	Sugar Creek	Sugar Creek, MO	Existing	ND	ND	
Lehigh Portland Cement	Union Bridge	Union Bridge, MD	Existing	NL	NL	GC
Lehigh Portland Cement	Mason City	Mason City, IA	Existing - Prop. Mod.	NL	NL	GC
Lone Star Industries	Cape Girardeau	Cape Girardeau, MO	Existing	ND	ND	
Lone Star Industries	Cape Girardeau	Cape Girardeau, MO	New - Not Constructed	552.97	3.02	GC
Lone Star Industries	Greencastle	Greencastle, IN	Existing			

TABLE 5-1. CARBON MONOXIDE (CO) LIMITS FOR PRECALCINER KILNS (CONTINUED)

Facility Name	Plant Name	Facility Location	Facility Status	Annual average emissions (lb/h)	Annual average emissions (lb/ton clinker)	Control Technology*
Mitsubishi Cement Corporation	Cushenbury	Lucerne Valley, CA	Existing			
National Cement Company of Alabama	Ragland	Ragland, AL	Existing	384.00	2.71	GC
National Cement Company of California	Lebec	Lebec, CA	Existing	ND	ND	
North Texas Cement Company		Whitewright, TX	New - Not Constructed	ND	2.00	GC
Phoenix Cement	Clarkdale	Clarkdale, AZ	New - Not Constructed	ND	ND	GC
RC Cement Company, Inc.	Hercules Cement Company	Stockertown, PA	New - Not Constructed	254.06	2.11	GC
Rio Grande Portland Cement		Pueblo, CO	New - Not Constructed	NL	NL	GC
RMC Pacific Materials	Santa Cruz	Davenport, CA	Existing	494.67	3.00	GC
Roanoke Cement Company	Roanoke Cement Company	Cloverdale, VA	Existing-Modification	783.48	2.59	GC
Saint Lawrence Cement		Hudson, NY	Proposed	248.00	2.77	GC
Signal Mountain Cement		Chattanoga, TN	Existing	179.91	2.14	GC
Southdown, Inc.	Charlevoix	Charlevoix, MI	Existing	1187.50	12.42	GC
Southdown, Inc.	Clinchfield	Clinchfield, GA	Existing	NL	NL	GC
Southdown, Inc.	Knoxville Plant	Knoxville, TN	Existing	98.21	1.32	GC
Southdown, Inc.	Lyons	Lyons, CO	Existing	ND	ND	
Southdown, Inc.	Victorville Cement	Victorville, CA	Existing	378.00	3.60	GC
Suwannee American Cement		Branford, FL	Existing	369.61	1.77	GC
Tarmac America, Inc.	Pennsuco Cement	Medley, FL	Existing	ND	ND	GC
Texas Industries	Hunter Plant	New Braunfels, TX	Existing	375.00	1.50	GC
Texas Industries (Riverside Cement)	Oro Grande	Oro Grande, CA	New - Not Constructed	1262.10	9.37	GC
Texas-Lehigh Cement Company	Buda	Buda, TX	Existing	84.42	0.34	RTO
TXI Operations, L.P.	Midlothian	Midlothian, TX	Existing			

* GC = Good Combustion, RTO = Regenerative Thermal Oxidizer

TABLE 5-2. VOLATILE ORGANIC COMPOUND (VOC) EMISSION LIMITS FOR PRECALCINER KILNS

Facility Name	Plant Name	Facility Location	Facility Status	Annual average emissions (lb/h)	Annual average emissions (lb/ton-clinker)	Control Technology*
Alamo Cement Company	1604	San Antonio, TX	Existing	15.0	0.14	GC
Ash Grove Cement Company	Chaunte	Chanute, KS	Existing	12.1	0.06	GC
Ash Grove Cement Company	Durkee	Durkee, OR	Existing	NL	NL	GC
Ash Grove Cement Company	Louisville	Louisville, NE	Existing	NL	NL	GC
Ash Grove Cement Company	Leamington	Nephi, UT	Existing	NL	NL	GC
Ash Grove Cement Company	Seattle	Seattle, WA	Existing	NL	NL	GC
Blue Circle Cement, Inc.	Harleyville	Harleyville, SC	Existing	24.2	0.18	GC
Calaveras Cement Company	Redding	Redding, CA	Existing	4.0	0.05	GC
Calaveras Cement Company	Tehachapi	Tehachapi, CA	Existing	45.1	0.59	GC
California Portland Cement	Mojave	Mojave, CA	Existing	18.4	0.28	GC
California Portland Cement	Arizona Portland	Rillito, AZ	Existing	NL	NL	GC
Capitol Aggregates, Inc.	Capitol Cement Division	San Antonio, TX	Existing	75.3	0.90	GC
Capitol Cement Corporation	Capitol Cement Corporation	Martinsburg, WV	Withdrawn	13.8	0.08	GC
Sunbelt Cement, Inc. (prev Cemex USA)	Balcones	New Braunfels, TX	Existing	18.4	0.16	GC
Continental Cement Co., Inc.	Continental Cement Co., Inc.	Hannibal, MO	Withdrawn	ND	ND	
CSR/Rinker Materials, Inc.		Miami, FL	Existing	13.7	0.10	GC
ESSROC	Nazareth	Nazareth,PA	New - Not Constructed			GC
Florida Crushed Stone - Kiln 1		Brooksville, FL	Existing	ND	ND	GC
Florida Rock Industries, Inc.		Brooksville, FL	Proposed	9.8	0.12	GC
Florida Rock Industries, Inc.	Thompson S. Baker Plant	Newberry, FL	Existing	9.8	0.12	GC
Florida Rock Industries, Inc.	Thompson S. Baker Plant	Newberry, FL	Proposed	15.0	0.12	GC
Hanson Permanente Cement	Permanente	Cupertino, CA	Existing	44.9	0.21	GC
Holcim (US)	Portland	Florence, CO	Existing	77.1	0.27	GC
Holcim (US)	Holly Hill	Holly Hill, SC	Constructed	170.8	0.25	GC
Holcim (US)		Lee Island, MO	Proposed	6.1	0.09	GC
Holcim (US)	Fort Collins	Laport, CO	Existing	99.9	0.66	GC
Holcim (TEXAS)LP	Holcim (TEXAS)LP	Midlothian, TX	Existing-Modification	99.9	0.66	GC
Holcim (TEXAS)LP	Holcim (TEXAS)LP	Midlothian, TX	Existing-Modification	7.5	0.09	GC
Holcim (US)	Devil's Slide	Morgan, UT	Existing	NL	NL	GC
Holcim (US)	Theodore	Theodore, AL	Existing	40.0	0.32	GC
Kosmos Cement Company	Kosmosdale	Louisville, KY	Existing	NL	NL	GC
Lafarge Corporation	Davenport	Buffalo, IA	Existing	NL	NL	GC
Lafarge Corporation	Sugar Creek	Sugar Creek, MO	Existing			
Lehigh Portland Cement	Union Bridge	Union Bridge, MD	Existing	NL	NL	GC
Lehigh Portland Cement	Mason City	Mason City, IA	Existing - Prop. Mod.	NL	NL	GC
Lone Star Industries	Cape Girardeau	Cape Girardeau, MO	Existing	ND	ND	
Lone Star Industries	Cape Girardeau	Cape Girardeau, MO	New - Not Constructed	5.1	0.03	GC
Lone Star Industries	Greencastle	Greencastle, IN	Existing			

TABLE 5-2. VOLATILE ORGANIC COMPOUND (VOC) EMISSION LIMITS FOR PRECALCINER KILNS (CONTINUED)

Facility Name	Plant Name	Facility Location	Facility Status	Annual average emissions (lb/h)	Annual average emissions (lb/ton clinker)	Control Technology*
Mitsubishi Cement Corporation	Cushenbury	Lucerne Valley, CA	Existing			
National Cement Company of Alabama	Ragland	Ragland, AL	Existing	10.0	0.07	GC
National Cement Company of California	Lebec	Lebec, CA	Existing			
North Texas Cement Company		Whitewright, TX	New - Not Constructed	NL	NL	GC
Phoenix Cement	Clarkdale	Clarkdale, AZ	New - Not Constructed	0.0	0.12	GC
RC Cement Company, Inc.	Hercules Cement Company	Stockertown, PA	New - Not Constructed	6.0	0.05	GC
Rio Grande Portland Cement		Pueblo, CO	New - Not Constructed	NL	NL	GC
RMC Pacific Materials	Santa Cruz	Davenport, CA	Existing	329.8	2.00	GC
Roanoke Cement Company	Roanoke Cement Company	Cloverdale, VA	Existing-Modification	30.3	0.10	GC
Saint Lawrence Cement		Hudson, NY	Proposed	10.7	0.12	GC
Signal Mountain Cement		Chattanoga, TN	Existing	13.7	0.16	GC
Southdown, Inc.	Charlevoix	Charlevoix, MI	Existing	50.0	0.52	GC
Southdown, Inc.	Clinchfield	Clinchfield, GA	Existing	NL	NL	GC
Southdown, Inc.	Knoxville Plant	Knoxville, TN	Existing	34.2	0.46	GC
Southdown, Inc.	Lyons	Lyons, CO	Existing			
Southdown, Inc.	Victorville Cement	Victorville, CA	Existing	12.6	0.12	GC
Suwannee American Cement		Branford, FL	Existing	39.3	0.19	GC
Tarmac America, Inc.	Pennsuco Cement	Medley, FL	Existing	ND	ND	GC
Texas Industries	Hunter Plant	New Braunfels, TX	Existing	15.0	0.07	GC
Texas Industries (Riverside Cement)	Oro Grande	Oro Grande, CA	New - Not Constructed	NL	NL	GC
Texas-Lehigh Cement Company	Buda	Buda, TX	Existing	5.8	0.02	RTO
TXI Operations, L.P.	Midlothian	Midlothian, TX	Existing			

* GC = Good Combustion, RTO = Regenerative Thermal Oxidizer

over temperature due to uncontrolled self-fueling. The units were installed to replace existing carbon injection systems for hydrocarbons and did not go through PSD or a BACT analysis. As a result of the failure of the mechanical system, they have been discontinued.

Controlled emissions are 0.12 lb/ton kiln feed, which is approximately twice that of the TXI facility. It would be expected that fouling would occur at a significantly higher rate resulting in high downtime for cleaning and/or high fuel impact due to reduced heat recovery. In most cases optimal heat recovery allows heat be returned to the inlet of the preheater with incoming flue gases with an outlet gas temperature no greater than 150EF above the inlet. When the recovery surfaces are fouled, the outlet gas temperature increases, which decreases the amount of heat recovered. In order to maintain combustion set points more fuel must be fired. As the flue gas volume increases, as the result of additional fuel, heat exchanger efficiency decreases further and the total system degrades in performance.

As the system decreases in efficiency, manual cleaning of the heat exchanger surfaces is required. The deposits are composed of calcium oxide and calcium sulfate, which are hard to remove. In addition, when an ESP is used there is the potential for periodic deenergization due to CO spikes in the process, wire breaks or process upsets. These events would overload the heat exchanger and prevent proper operation of the system.

There is also the partial conversion of SO_2 in the gas stream to sulfur trioxide (SO_3) during the oxidation process. Concentration of SO_2 and CO are both high at the preheater outlet and flue gas oxygen after the grinding mills is greater than 10 percent (volume basis). These conditions result in a high kinetic energy reaction to further oxidize SO_2 to SO_3. This occurs in oil-fired boilers, which produces sulfate plumes. The exact conversion rate is not predictable, but only a few ppm in the stack gases will result in a visible aerosol when the stack gases cool below the acid dew point (i.e., 285EF). SO_3 aerosols have a monodisperse particle distribution near 0.5 μm and therefore exhibit a high light attenuation (i.e., opacity).

5.5 Summary of Impacts Analysis

Table 5-3 presents a summary of the cost analysis for an RTO to control CO and VOC. Other options such as direct and recuperative designs would have significantly higher fuel costs and therefore a higher cost per ton abated. For this reason a detailed analysis has not been completed for these scenarios. Two scenarios were analyzed for CO. Case A assumed 95 percent removal efficiency reflecting optimum CO removal on a long-term basis. Case B assumes 79.1 percent removal efficiency to achieve 100 ppm in the exit gases. The detailed calculations are presented in Appendix C.

TABLE 5-3. SUMMARY OF IMPACT ANALYSIS FOR CO AND VOC

Method	% removal	Pollutant removed tons/yr	Capital Costs, MM$	Annualized Cost, 1000 $	Cost Effectiveness $/ton	Impacts		
						Environmental	Product	Energy
RTO/CO	95	2,850.3	33.8	14,276	5,009	Yes	No	Yes
RTO/CO	79.1	2,373.7	33.8	14,323	6,034	Yes	No	Yes
RTO/VOC	95	85.5	33.8	6,999	166,953	Yes	No	Yes

5.6 Selection of BACT

The addition of an RTO to reduce CO and VOC can be rejected on a cost effectiveness basis and negative environmental impacts. SCC proposes as BACT the use of good combustion practices for these pollutants. The requested BACT emission limits are: CO – 4.0 lb/ton clinker and VOC – 0.12 lb/ton clinker, 30-day rolling average. Compliance with the VOC limit would be demonstrated using a CEM. Compliance with the CO limit would be by annual source test.

SECTION 6

SUMMARY OF PROPOSED BACT EMISSION LIMITS

The proposed BACT controls and limits are summarized in Table 6-1. The pollutants PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, and VOC are subject to BACT.

TABLE 6-1. PROPOSED BACT LIMITS[1]

Pollutant	Operation	Emission Limit	VE, %	Control
Particulate Matter (PM)	Kiln/raw mill/clinker cooler/finish mill	0.13 lb/ton dry preheater feed	10	Baghouse
	ball mill and air separator stacks	0.01 gr/dscf	5	Baghouses
	All other plant point sources		5	BMP
	All plant fugitive sources except for Quarry sources		10	BMP
	Quarry fugitive sources except crusher		15	BMP
	Quarry fugitive from crusher			
Particulate Matter (PM_{10} and $PM_{2.5}$)	Kiln/raw mill/cooler Material processing Process fugitives	0.11 lb/ton dry preheater feed 0.0085 gr/dscf NA	10 5 10	Baghouse Baghouses BMP
Sulfur Dioxide (SO_2)	Kiln	0.27 lb/ton clinker, 30-day rolling average	NA	Process, hydrated lime injection
Nitrogen Oxides (NO_x)	Kiln	1st year: 3.0 lb/ton clinker[2,3], 30-day rolling average 2nd year and thereafter: 1.95 lb/ton clinker[2], 30-day rolling average	NA	SNCR, MSC, Low NO_x burner, and indirect firing
Carbon Monoxide (CO)	Kiln	4.0 lb/ton clinker, 30-day rolling average	NA	Good combustion
Organic Compounds (VOC)	Kiln	0.12 lb/ton clinker, 30-day rolling average	NA	Good combustion

[1]Emission limits apply to all combinations of fuel being burned.
[2]Excludes start-up, shutdown, and malfunction as approved by the Department
[3]Allows for shakedown and optimization of SNCR system

APPENDIX A

COST CALCULATIONS FOR SO_2

KILN PRODUCTION AND SO_2 DATA

PLANT NAME	KILN NO.	PRODUCTION T/YR	CAPACITY T/YR	CLINKER MAX T/HR	CLINKER AVG T/HR	OPERATION HR/YR	SO2 T/YR	SO2 LB/TON	SO2 AVG LB/HR	SCRUBBER SO2 AVG PPM	STACK GASES - ACFM KILN	STACK GASES - ACFM QUENCHED
SCC CENTER HILL	1	1,500,121	1,500,121	180.2	180.2	8,322	203	0.27	48.7	64.2	227,273	164,059

SUMMARY OF SO_2 CONTROL COST DATA

PLANT NAME	KILN NO.	BASELINE SO2 EMISSIONS T/YR	BASELINE SO2 EMISSIONS LB/TON	CONTROL TECHNOLOGY	EXPECTED REMOVAL %	EXPECTED REMOVAL T/YR	CAPITAL COST $	ANNUAL COST $/YR	CONTROL COST $/TON SO2	UNIT COST $/TON CLINKER
SCC CENTER HILL	1	203	0.27	DRY ABSORBENT ADDITION	60.5	122	1,981,620	676,511	5,523	0.45
		203	0.27	WET ABSORBENT ADDITION*	40	8.1	3,056,400	710,523	87,712	0.47
		203	0.27	WET SCRUBBER**	71.0	144	27,462,404	8,798,986	61,195	5.87

NOTES: * WET ABSORBENT WOULD ONLY BE ADDED WHEN THE RAW MILL IS OFF DUE TO WATER SPRAY RATE LIMITATION.
** EXPECTED CONTROL EFFICIENCY FOR WET SCRUBBER IS 70% WITH RAW MILL ON AND 80% WITH RAW MILL OFF.

EXPECTED SO_2 CONCENTRATION AT CONTROL POINT

PLANT NAME	KILN NO.	WET SCRUBBER INLET PPM	WET LIME PPM	WET LIME LOCATION	DRY LIME PPM	DRY LIME LOCATION
SCC CENTER HILL	1	64.2	38	CT/MILL DOWN	38	DOWNCOMER

SUMMARY OF CONTROL OPTIONS
SO_2 EMISSION FACTORS

PLANT NAME	KILN NO.	CURRENT LB/TON	WET SCRUBBER LB/TON	WET LIME LB/TON	DRY LIME LB/TON
SCC CENTER HILL	1	0.27	0.08	0.26	0.11

SUMTER CEMENT COMPANY LLC
DESIGN DATA

PRODUCTION	3,924	MT/D	4,325.3	ST/D
EQUIVALENT	346.8	Days/yr	346.8	Days/yr
	1,360,901	Tonnes/yr	1,500,121	ST/YR
PLANT CAPACITY	95.0	%	180.22	ST/HR
SO2 FACTOR	0.14	Kg/Tonne	0.27	LB/TON
SO2 ANNUAL EMISSIONS	183.7	Tonnes/yr	202.5	TON/YR
AVERAGE HOURLY	22.1	Kg/HR	48.7	LB/HR
MAX HOURLY MILL-IN			46.2	LB/HR
MAX HOURLY MILL-OUT			92.5	LB/HR
RATIO			2	
OPERATING HOURS	8,322			
MILL-IN	7,884			
MILL-DOWN	438			

CENTER HILL	
1,500,000	STY
1,360,791	MTY
3,924	MTD

Ca(OH)2 ABSORBENT INJECTION FOR SO2 ABATEMENT (LIME SLURRY)

MILL DOWN ONLY

INLET GAS STREAM
INLET GASES FROM KILN PREHEATER CYCLONE

	194,518	NM3/HR	125,317	SCFM
	488,470	M3/HR	293,119	ACFM
H2O	14,256	NM3/HR	9,184	WSCFM
DRY GAS	180,262	NM3/HR	116,133	DSCFM
TEMPERATURE	412.78	C	775	F

SPECIES	%	NM3/HR	SCFM	LB/MIN	KG/MIN	Cp BTU/LB-F	Cp KJ/Kg-K	h BTU/MIN	h KJ/MIN
H2O	7.33	14256.2	8961.8	418.6	190.3	1408.0	674.6	589,381	559
CO2	21.23	41286.5	25953.8	2966.2	1348.3	0.2347	0.0625	517,134	491
O2	3.00	5835.5	3668.3	304.4	138.4	0.2218	0.0590	50,157	48
N2	68.35	132945.1	83573.0	6069.2	2758.7	0.2545	0.0677	1,147,760	1089
SO2	0.01	14.4	4.6	0.8	0.4	0.2347	0.0625	134	0
NO	0.00	0.0	0.0	0.0	0.0	0.2347	0.0625	0	0
CO	0.09	180.5	113.5	8.2	3.7	0.2347	0.0625	1,437	1
TOTAL	100	194518	122280	9767	4440			2,306,004	2188

WATER ADDED	SO2	37.97	PPM
FLOW		15.92	TONNE/HR
		265.36	KG/MIN
		70.00	GPM
		583.80	LB/MIN
QUENCHED TEMPERATURE		253	C
		488	F

SPECIES	%	NM3/HR	SCFM	LB/MIN	KG/MIN	Cp BTU/LB-F	Cp KJ/Kg-K	h BTU/MIN	h KJ/MIN
H2O	15.92	34139	21461.0	1002.4	455.6	1277.0	611.8	1,280,037	1214
CO2	22.90	41287	25953.8	2966.2	1348.3	0.2214	0.059	299,389	284
O2	3.24	5835	3668.3	304.4	138.4	0.2189	0.058	30,372	29
N2	73.76	132945	83573.0	6069.2	2758.7	0.2514	0.067	695,386	660
SO2	0.00	4	2.8	0.5	0.2	0.2214	0.059	47	0
NO	0.00	0	0.0	0.0	0.0	0.2214	0.059	0	0
CO	0.10	181	113.5	8.2	3.7	0.1990	0.053	748	1
TOTAL	100	214391	134772	10351	4705			2,305,978	2188

DIFFERENCE -26

OPERATION	438	HR/YR	MILL-DOWN
PRODUCTION	3,924	TONNES/DAY	
	163.49	TONNES/HR	
SO2 UNCONTROLLED	0.5656	KG/TONNE	
	42.0333	KG/HR	
	92.4732	LB/HR	
	20.2516	T/YR	MILL-DOWN

SO2 REMOVED	16.8133	KG/HR	
	36.9893	LB/HR	
	0.1028	KG/KG CLINKER	
	8.101	T/YR	
CONTROLLED SO2	25	KG/HR	
	55.48	LB/HR	
	12.15	T/YR	
LIME INJECTION RATE	2.5	LB Ca/LB S	
	116	LB/HR Ca	
	214	LB/HR Ca(OH)2	
H2O	35028	LB/HR	
	30660	GAL/YR	
TOTAL	35242	LB/HR	
SLURRY SOLIDS	0.61	%	
PARTICLE SIZE	25	um	
SO2 REMOVAL EFFICIENCY	40	%	AVERAGE
	100	%	AVAILABILITY
	40	%	ANNUAL
GYPSUM FORMATION	79	LB/HR	
LIME REACTED	43	LB/HR	
UNREACTED LIME	72	LB/HR	
LOADING TO BAGHOUSE	151	LB/HR	
BAGHOUSE REMOVAL	100	%	
COLLECTED DUST	151.0	LB/HR	
WASTE DUST	0	T/YR	RETURNED
LIME USED	47	T/YR	
	2.034	LOADS/YR	
TRUCKS	170.53	DAYS	

STEAM ENTHALPY AT ATMOSPHERIC PRESSURE

	A0	A1	A2	C
H2O	4.5630E-01	1.6660E-05	2.2320E-07	1.0690E+03

ESTIMATED COST OF EQUIPMENT SLURRY INJECTION

ITEM	BASE	FACTOR	INSTALLATION	SUBTOTAL	TOTAL
SKID/VALVE RACK					
LANCES/NOZZLES					
PIPING					
INSTRUMENTS					
MIX TANK					
SILO/BH					
REAGENT PUMPS					
AGGITATOR					
WEIGHT FEEDER					
UNLOADING PANEL					
PLC					
SOFTWARE					
N2 SYSTEM					
SUBTOTAL	1375000	0.75	1031250	2406250	
FREIGHT	10000				
TOTAL	1385000		1031250	2416250	**2416250**
DUCTS	0	4	0	0	
CYCLONE	0	0.5	0	0	
AIRLOCKS	0	0.2	0	0	
BIN	0	0.2	0	0	
F-K PUMP	0	0.2	0	0	
PIPING	0	2	0	0	
DIVERTER VALVES	0	0.1	0	0	
SILO	0	4	0	0	
LOAD OUT	0	0.2	0	0	
SUBTOTAL	0		0	0	
FREIGHT	0				
TOTAL	0		0	0	**0**
INSTALLED COST					**2416250**

COST ESTIMATE
SPRAY DRYING IN CT TOWER (LIME SLURRY ABSORBENT)

PLANT SIZE		CURRENT CAPACITY	1,500,121	TON/YR
			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	REAGENT SYSTEM	LANCES,NOZZLES		
		VALVES,PUMPS		
		DUCTWORK		
		CYCLONE,BINS		
		ELECTRICAL		
		PIPING		
		MISCELLANEOUS EQUIPMENT		
				1,375,000
	EQUIPMENT	TOTAL		1,375,000
	OTHER	INSTRUMENTS		
		TAXES	0.06	82,500
		FREIGHT		10,000
		TOTAL		1,467,500
	INSTALLATION	FOUNDATIONS		
		ERECTION		
		ELECTRICAL		
		DUCTING		
		INSULATION		
		SITE PREPARATION		
		TOTAL		1,031,250
DIRECT COSTS		TOTAL		2,498,750
INDIRECT COSTS		ENGINEERING/DESIGN	0.10	146,750
		CONST/FIELD EXPENSE	0.10	146,750
		CONTR.FEE	0.05	73,375
		START-UP	0.02	29,350
		PERFORMANCE TEST	0.01	14,675
		CONTINGENCIES	0.10	146,750
		TOTAL		557,650
RETROFIT PREMIUM (N/A)				0
TOTAL CAPITAL COST				3,056,400

COST ESTIMATE
SPRAY DRYING IN CT TOWER (LIME SLURRY ABSORBENT)

OPERATING COST(DIRECT)

UTILITIES			
	TRANSFER PUMP	5.00	BHP
	REAGENT PUMP	2.00	BHP
	AGGITATOR MOTOR	10.00	BHP
	BLOWER COMPRESSOR	100.00	BHP
	CONNECTED LOAD	117.00	BHP
	POWER	87.25	KWHr
	HOURS OPERATED	438	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	1,620	$/YR
REAGENT	REAGENT USAGE	47	T/YR
	COST	60.00	$/TON
	ANNUAL COST	2,807	$/YR
WASTE DISPOSAL	CKD	0	TON/YR
		0.00	$/TON
	COST	0	$/YR
WATER USAGE	DISCHARGE	30660	GAL/YR
	COST	0.00	$/MMGAL
	ANNUAL COST	0	$/YR
MAINTENANCE LABOR & MATERIALS			
	5% OF DIRECT CAPITAL COST	124,938	$/YR

MAINTENANCE	LABOR	HR/YR	500
	COST	$/HR	25.96
	COST	$/YR	12,980
LABOR	LABOR	HR/YR	500
	COST	$/HR	18.00
	COST	$/YR	9,000
SUPERVISOR	LABOR	HR/YR	200
	COST	$/HR	39.54
	COST	$/YR	7,908
FUEL SAVINGS		$/YR	$0
TOTAL DIRECT OPERATING COST		$/YR	$159,252

COST ESTIMATE
SPRAY DRYING IN CT TOWER (LIME SLURRY ABSORBENT)

OPERATING COST(INDIRECT)	OVERHEAD	%	44.00
		$/YR	13,151
	PROPERTY TAX	%	1.46
		$/YR	44,592
	INSURANCE	%	1.00
		$/YR	30,564
	ADMINISTRATION	%	2.00
		$/YR	61,128
	CAPITAL RECOVERY	%-INTEREST	10.00
		LIFE-YEARS	15.00
		FACTOR	0.131474
		$/YR	401,836
TOTAL INDIRECT OPERATING COST		$/YR	551,271
TOTAL ANNUAL COST		$/YR	710,523
ANNUAL EMISSIONS REDUCTION		TON/YR	8.10
COST BENEFIT		$/TON	87,712

KILN CONDITIONS MILL-DOWN

STACK			
	SCFM	LB/MIN	% WET
H2O	21683.6	1012.8	15.0
CO2	26598.6	3039.8	18.4
O2	5319.7	441.5	3.68
N2	90814.0	6599.9	62.8
SO2	9.3	1.5	0.006
NO	0.0	0.0	0.0
CO	116.3	8.5	0.080
	144541.5	11103.9	100.0

WATER INJECTED	70.00	GPM
	583.8	LB/MIN
AIR LEAKAGE	6725.3	LB/MIN
O2	1560.3	LB/MIN
N2	5165.0	LB/MIN

PREHEATER INLET			
	SCFM	LB/MIN	%
H2O	9184.4	429.0	7.3
CO2	26598.6	3039.8	21.2
O2	3759.5	441.5	3.00
N2	85649.0	6599.9	68.3
SO2	9.3	1.5	0.0
NO	0.0	0.0	0.0
CO	116.3	8.5	0.1
	125317.1	10520.1	100.0
NM3/HR	194518.2		

3 TARGET

DRY LIME INJECTION SYSTEM
(DRY SCRUBBING)

OPERATION	438	HR/YR	MILL-OUT CONDITION	
PRODUCTION	3,924	TONNES/DAY		
	163.49	TONNES/HR		
SO2 UNCONTROLLED	0.257094	KG/TONNE		
	42.03328	KG/HR		
	92.47322	LB/HR		
	20.25164	T/YR	MILL-DOWN	
				TEMP
SO2 REMOVED	60.5	%	AVE	412.8 C
	100	%	AVAILABILITY	
	60.5	%	ANNUAL	
SO2 REMOVED	25.42136	KG/HR		
	55.927	LB/HR		
	0.155488	KG/KG CLINKER		
	12.25	T/YR		
CONTROLLED SO2	17	KG/HR		
	37	LB/HR		
	8.00	T/YR	MILL-DOWN	
LIME INJECTION RATE	15	LB Ca/LB S		
	694	LB/HR Ca		
	1282	LB/HR Ca(OH)2		
GYPSUM FORMATION	119	LB/HR		
LIME REACTED	65	LB/HR		
UNREACTED LIME	628	LB/HR		
LOADING TO CYCLONE	747	LB/HR		
CYCLONE REMOVAL	0	%		
COLLECTED DUST	0.0	LB/HR		
WASTE DUST	0	T/YR	RETURNED TO PROCESS	
LIME USED	281	T/YR		
	12.2	LOADS/YR		
TRUCKS	28.42	DAYS		

DRY LIME INJECTION SYSTEM
(DRY SCRUBBING)

OPERATION	7884	HR/YR	MILL-IN CONDITION	
PRODUCTION	3,924	TONNES/DAY		
	163.49	TONNES/HR		
SO2 UNCONTROLLED	0.128547	KG/TONNE		
	21.01664	KG/HR		
	46.23661	LB/HR		
	182.2647	T/YR	MILL-IN	
				TEMP
SO2 REMOVED	60.5	%	AVE	412.8 C
	100	%	AVAILABILITY	
	60.5	%	ANNUAL	
SO2 REMOVED	12.71068	KG/HR		
	27.9635	LB/HR		
	0.077744	KG/KG CLINKER		
	110.23	T/YR		
CONTROLLED SO2	8	KG/HR		
	18	LB/HR		
	72.03	T/YR	MILL-IN	
LIME INJECTION RATE	15	LB Ca/LB S		
	347	LB/HR Ca		
	641	LB/HR Ca(OH)2		
GYPSUM FORMATION	59	LB/HR		
LIME REACTED	33	LB/HR		
UNREACTED LIME	314	LB/HR		
LOADING TO CYCLONE	374	LB/HR		
CYCLONE REMOVAL	0	%		
COLLECTED DUST	0.0	LB/HR		
WASTE DUST	0	T/YR	RETURNED TO PROCESS	
LIME USED	2526	T/YR		
	109.8	LOADS/YR		
TRUCKS	3.16	DAYS		

ESTIMATED COST OF EQUIPMENT

ITEM	BASE	FACTOR	INSTALLATION	SUBTOTAL	TOTAL
PIPING					
INSTRUMENTS					
SILO/BH					
FAN/INJECTOR					
WEIGHT FEEDER					
UNLOADING PANEL					
PLC					
SOFTWARE					
SUBTOTAL	750000	0.75	562500	1312500	
FREIGHT	10000				
TOTAL	760000		562500	1322500	**1322500**
DUCTS	150000	0.5	75000	225000	
CYCLONE	0	0.5	0	0	
AIRLOCKS	0	0.2	0	0	
BIN	0	0.2	0	0	
F-K PUMP	0	0.2	0	0	
PIPING	0	2	0	0	
DIVERTER VALVES	0	0.1	0	0	
SILO	0	4	0	0	
LOAD OUT	0	0.2	0	0	
SUBTOTAL	150000		75000	225000	
FREIGHT	10000				
TOTAL	160000		75000	235000	**235000**
INSTALLED COST					**1557500**

COST ESTIMATE
DRY LIME INJECTION (DRY SCRUBBING)

PLANT SIZE		CURRENT CAPACITY	1,500,121	TON/YR
			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	DRY SYSTEM	SILO/FILTER		
		BLOWERS		
		DUCTWORK		
		CYCLONE,BINS		
		ELECTRICAL		
		PIPING		
		MISCELANEOUS EQUIPMENT		
	EQUIPMENT	TOTAL		900,000
	OTHER	INSTRUMENTS		
		TAXES	0.06	54,000
		FREIGHT		20,000
		TOTAL		974,000
	INSTALLATION	FOUNDATIONS		
		ERECTION		
		ELECTRICAL		
		DUCTING		
		INSULATION		
		SITE PREPARATION		
		TOTAL		637,500
DIRECT COSTS		TOTAL		1,611,500
INDIRECT COSTS		ENGINEERING/DESIGN	0.10	97,400
		CONST/FIELD EXPENSE	0.10	97,400
		CONTR.FEE	0.05	48,700
		START-UP	0.02	19,480
		PERFORMANCE TEST	0.01	9,740
		CONTINGENCIES	0.10	97,400
		TOTAL		370,120
RETROFIT PREMIUM (N/A)				0
TOTAL CAPITAL COST				1,981,620

COST ESTIMATE
DRY LIME INJECTION (DRY SCRUBBING)

OPERATING COST(DIRECT)

UTILITIES	BH FAN STATIC PRESSURE	8.00	IN H2O
	FAN VOLUME	1000	ACFM
	FAN POWER	15.00	BHP
	FK PUMP STATIC PRESSURE	40.00	IN H2O
	BLOWER VOLUME	500	ACFM
	FAN POWER	50.00	BHP
	CONNECTED LOAD	65.00	BHP
	POWER	48.47	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	17,099	$/YR
REAGENT	REAGENT USAGE	2,807	TON/YR
	COST	60.00	$/TON
	ANNUAL COST	168,402	$/YR
WASTE DISPOSAL	CKD	0	TON/YR
		0.00	$/TON
	COST	0	$/YR
MAINTENANCE LABOR & MATERIALS			
	5% OF DIRECT CAPITAL COST	99,081	$/YR

MAINTENANCE	LABOR	HR/YR	500
	COST	$/HR	25.96
	COST	$/YR	12,980
LABOR	LABOR	HR/YR	500
	COST	$/HR	18.00
	COST	$/YR	9,000
SUPERVISOR	LABOR	HR/YR	200
	COST	$/HR	39.54
	COST	$/YR	7,908
FUEL SAVINGS		$/YR	$0
TOTAL DIRECT OPERATING COST		$/YR	$314,470

COST ESTIMATE
DRY LIME INJECTION (DRY SCRUBBING)

OPERATING COST(INDIRECT)	OVERHEAD	%	44.00
		$/YR	13,151
	PROPERTY TAX	%	1.46
		$/YR	28,911
	INSURANCE	%	1.00
		$/YR	19,816
	ADMINISTRATION	%	2.00
		$/YR	39,632
	CAPITAL RECOVERY	%-INTEREST	10.00
		LIFE-YEARS	15.00
		FACTOR	0.131474
		$/YR	260,531
TOTAL INDIRECT OPERATING COST		$/YR	362,041
TOTAL ANNUAL COST		$/YR	676,511
ANNUAL EMISSIONS REDUCTION		TON/YR	122.48
COST BENEFIT		$/TONNE	5,523

DESIGN BASIS FOR WET SCRUBBER SYSTEM

INLET GASES FROM KILN (MILL-OUT)

	229,957	NM3/HR	148,148	SCFM
	378,688	M3/HR	227,273	ACFM
H2O	34,494	NM3/HR	22,222	WSCFM
DRY GAS	195,464	NM3/HR	125,926	DSCFM
TEMPERATURE	176.7	C	350.0	F

MILL DOWN WORST CASE

SPECIES	%	NM3/HR	SCFM	LB/MIN	KG/MIN	Cp BTU/LB-F	Cp KJ/Kg-K	h BTU/MIN	h KJ/MIN
H2O	15.00	34493.6	21683.6	1012.8	460.4	1135.0	543.8	1,149,519	1091
CO2	18.40	42312.1	26598.6	3039.8	1381.7	0.2071	0.0551	91,087	86
O2	3.68	8462.4	5319.7	441.5	200.7	0.2158	0.0574	13,780	13
N2	62.82	144463.9	90814.0	6599.9	2999.9	0.2479	0.0660	236,731	225
SO2	0.007	17.0	9.3	1.54	0.7	0.2071	0.0551	46	0
NO	0.00	0.0	0.0	0.0	0.0	0.2071	0.0551	0	0
CO	0.09	213.1	116.3	8.5	3.8	0.2071	0.0551	253	0
TOTAL	100.00	229962	144561	11104	5047			1,491,416	1415

SATURATION	0.113	LB/LB-DA	SO2 PPM	64.2
TEMPERATURE	125.5	F		
	51.9	C		
	525.1	K		

SO2 REMOVAL	80 %	AVERAGE
	100 %	AVAILABILITY
	80 %	ANNUAL

SPECIES	%	NM3/HR	SCFM	LB/MIN	KG/MIN	Cp BTU/LB-F	Cp KJ/Kg-K	h BTU/MIN	h KJ/MIN
H2O	16.62	38956	24488.6	1143.8	519.9	1111.7	532.6	1,271,515	1206
CO2	21.65	42312	26598.6	3039.8	1381.7	0.2048	0.055	58,199	55
O2	4.33	8462	5319.7	441.5	200.7	0.2153	0.057	8,885	8
N2	73.92	144464	90814.0	6599.9	2999.9	0.2474	0.066	152,649	145
SO2	0.00	3	1.9	0.3	0.1	0.2048	0.055	6	0
NO	0.00	0	0.0	0.0	0.0	0.2048	0.055	0	0
CO	0.09	185	116.3	8.5	3.8	0.2048	0.055	162	0
TOTAL	100.00	234382	147339	11234	5106			1,491,416	1415

SO2 REMOVED	73.98	LB/HR
HR/YR	438	HR/YR
	16.20	T/YR

DIFFERENCE 0

INLET GAS VOLUME	4649	AM3/MIN
	164059	ACFM
SCRUBBER DIAMETER	5.1	M
SCRUBBER AREA	20.8	M2
VELOCITY	224.0	M/MIN
HEIGHT/DIAMETER	4.0	
HEIGHT	20.6	M
LIQUID GAS RATIO	7.13	M3/KM3
RECIRCULATION	33.1	M3/MIN
	8714.6	GAL/MIN
HEAD	21.3	M
DENSITY	1.15	
OXIDATION BLOWER	3	M3/M3

		99.45	NM3/MIN
HEAD		6.63	M
		261.0	IN WC
REAGENT FEED		0.5	M3/MIN
		131.4	GAL/MIN
HEAD		29.8	M
DENSITY		1.25	
GYPSUM SLURRY		1.7	M3/MIN
		436.4	GAL/MIN
		29.8	M
		1.25	
SLURRY DISCHARGE		0.75	M3/MIN
		197.0	GAL/MIN
		16.2	M
		1.15	
WATER MAKEUP			
GYPSUM PRODUCTION			
SO2 REMOVED		33.6	KG/HR
SULFUR		16.8	KG/HR
GYPSUM		71.7	KG/HR ANHYDRATE
		90.6	KG/HR HYDRATED
WATER		18.9	KG/HR HYDRATED
PRODUCTION		3,924	TONNE/DAY
		163.5	TONNE/HR
GYPSUM		0.55	KG/TONNE
		377	TONNE/YR
FREE MOISTURE		10	%
REAGENT USAG	CaCO3	52.8	KG/HR
		0.3	KG/TONNE
		219.8	TONNE/YR
WATER LOSS	FREE	9.1	KG/HR
	HYDRATE	18.9	KG/HR
STACK WATER LOSS		3573.1	KG/HR
BLOWDOWN	TOTAL	0.63	%
(RECIRC)	TOTAL	0.2	M3/MIN
	WATER	11.8	M3/HR
		11,716	KG/HR
SOLIDS (WEIGHT)		6.2	%
WATER MAKE-UP		15,318	KG/HR
		0.26	M3/MIN
		67.34	GPM

SO2 REMOVAL	BASELINE	0.135	KG/TONNE
	PRODUCTION	1,360,901	TONNE/YR
		184	TONNE/YR
		203	T/YR
	CONTROLLED	37	TONNE/YR
		41	T/YR
	REDUCTION	147	TONNE/YR
		162	T/YR

B. STEAM ENTHALPY AT ATMOSPHERIC PRESSURE

	A0	A1	A2	C
H2O	4.5630E-01	1.6660E-05	2.2320E-07	1.0690E+03

DESIGN BASIS FOR WET SCRUBBER SYSTEM

INLET GASES FROM KILN (MILL-IN)

	303,544	NM3/HR	195,556	SCFM	
	416,523	M3/HR	250,001	ACFM	
H2O	24,283	NM3/HR	15,644	WSCFM	
DRY GAS	279,260	NM3/HR	179,912	DSCFM	
TEMPERATURE	101.7	C	215.0	F	**MILL IN WORST CASE**

SPECIES	%	NM3/HR	SCFM	LB/MIN	KG/MIN	Cp BTU/LB-F	Cp KJ/Kg-K	h BTU/MIN
H2O	8.00	24283.5	15265.3	713.0	324.1	1100.8	527.4	784,861
CO2	20.00	60708.7	38163.2	4361.5	1982.5	0.2037	0.0542	61,887
O2	6.00	18212.6	11449.0	950.1	431.9	0.2150	0.0572	14,232
N2	65.93	200119.7	125800.8	9142.5	4155.7	0.2471	0.0658	157,396
SO2	0.003	8.5	4.6	0.77	0.4	0.2037	0.0542	11
NO	0.00	0.0	0.0	0.0	0.0	0.2037	0.0542	0
CO	0.07	213.1	116.3	8.5	3.8	0.2037	0.0542	120
TOTAL	100.00	303546	190818	15176	6898			1,018,508

SATURATION	0.050	LB/LB-DA	SO2 PPM	24.3
TEMPERATURE	96.6	F		
	35.9	C		
	509.1	K		

SO2 REMOVAL	70	%	AVERAGE
	100	%	AVAILABILITY
	70	%	ANNUAL

SPECIES	%	NM3/HR	SCFM	LB/MIN	KG/MIN	Cp BTU/LB-F	Cp KJ/Kg-K	h BTU/MIN
H2O	8.18	24862	15628.9	730.0	331.8	1098.5	526.3	801,875
CO2	21.74	60709	38163.2	4361.5	1982.5	0.2034	0.054	57,345
O2	6.52	18213	11449.0	950.1	431.9	0.2150	0.057	13,200
N2	71.67	200120	125800.8	9142.5	4155.7	0.2471	0.066	145,976
SO2	0.00	2	1.4	0.2	0.1	0.2034	0.054	3
NO	0.00	0	0.0	0.0	0.0	0.2034	0.054	0
CO	0.07	185	116.3	8.5	3.8	0.2034	0.054	111
TOTAL	100	304090	191160	15193	6906			1,018,509

SO2 REMOVED	32.37	LB/HR
HR/YR	7884	HR/YR
	127.59	T/YR

DIFFERENCE 1

INLET GAS VOLUME	5734	AM3/MIN
	202499	ACFM
SCRUBBER DIAMETER	5.7	M
SCRUBBER AREA	25.6	M2
VELOCITY	224.0	M/MIN
HEIGHT/DIAMETER	4.0	
HEIGHT	22.8	M
LIQUID GAS RATIO	7.13	M3/KM3
RECIRCULATION	40.9	M3/MIN
	10748.6	GAL/MIN
HEAD	21.3	M
DENSITY	1.15	
OXIDATION BLOWER	3	M3/M3

HEAD		122.66	NM3/MIN
		6.63	M
		261.0	IN WC
REAGENT FEED		0.5	M3/MIN
		131.4	GAL/MIN
HEAD		29.8	M
DENSITY		1.25	
GYPSUM SLURRY		1.7	M3/MIN
		436.4	GAL/MIN
		29.8	M
		1.25	
SLURRY DISCHARGE		0.75	M3/MIN
		197.0	GAL/MIN
		16.2	M
		1.15	
WATER MAKEUP			
GYPSUM PRODUCTION			
SO2 REMOVED		14.7	KG/HR
SULFUR		7.4	KG/HR
GYPSUM		31.4	KG/HR ANHYDRATE
		39.7	KG/HR HYDRATED
WATER		8.3	KG/HR HYDRATED
PRODUCTION		3,924	TONNE/DAY
		163.5	TONNE/HR
GYPSUM		0.24	KG/TONNE
		165	TONNE/YR
FREE MOISTURE		10	%
REAGENT USAGE	CaCO3	23.1	KG/HR
		0.1	KG/TONNE
		96.1	TONNE/YR
WATER LOSS	FREE	4.0	KG/HR
	HYDRATE	8.3	KG/HR
STACK WATER LOSS		463.1	KG/HR
BLOWDOWN	TOTAL	0.63	%
(RECIRCULATION)	TOTAL	0.3	M3/MIN
	WATER	14.5	M3/HR
		14,451	KG/HR
SOLIDS(WEIGHT)		6.2	%
WATER MAKE-UP		14,927	KG/HR
		0.25	M3/MIN
		65.62	GPM

SO2 REMOVAL	BASELINE	0.135	KG/TONNE
	PRODUCTION	1,360,901	TONNE/YR
		184	TONNE/YR
		203	T/YR
	CONTROLLED	55	TONNE/YR
		61	T/YR
	REDUCTION	129	TONNE/YR
		142	T/YR

B. STEAM ENTHALPY AT ATMOSPHERIC PRESSURE

	A0	A1	A2	C
H2O	4.5630E-01	1.6660E-05	2.2320E-07	1.0690E+03

h KJ/MIN
745
59
14
149
0
0
0
966

h KJ/MIN
761
54
13
138
0
0
0
966

HEAT BALANCE FOR REHEAT FLUE GASES (WET SCRUBBER)

INPUTS

FLUE GAS STREAM

	LB/MIN	KG/MIN	LB/HR	SCFM	NM3/HR	%	PPM(WET)	PPM(DRY)
CO	8.45	3.84	507.20	116.32	185.0	0.06	608.2	662.3
O2	950.12	431.87	57007.25	11448.96	18212.6	5.99		
N2	9142.50	4155.68	548549.99	125892.22	200265.2	65.83		
SO2	0.23	0.11	13.87	1.39	2.2	0.00	7.3	
NO	0.00	0.00	0.00	0.00	0.0	0.00	0.0	
H2O	729.98	331.81	43798.76	15628.86	24861.9	8.17		
CO2	4361.51	1982.50	261690.44	38163.19	60708.7	19.95		
TOTAL(WET)	15192.79	6905.81	911567.52	191250.94	304235.6	100.00		
TOTAL(DRY)	14462.81	6574.01	867768.76	175622.08	279373.8			

INLET	201619.86	ACFM
	344225.07	AM3/HR
	96.63	oF
	35.90	C

BURNER COMBUSTION AIR

	LB/MIN	KG/MIN
DRY AIR	435.8	198.08
O2	101.10	45.95
N2	334.67	152.12
H2O	9.51	4.32
WET AIR	445.28	202.40

31.69 MMBTU/HR
8.3 LB/1000BTU
435.8 LB/MIN

MOISTURE	0.0218	lb/lb DA
	0.0218	KG/KG DA
T=	70	oF
	21	C
RH	50	%

COMBUSTION AIR

	LB/MIN	KG/MIN	LB/HR	SCFM	NM3/HR
O2	101.10	45.95	6065.86	1218.61	1938.5
N2	334.67	152.12	20080.07	4605.03	7325.5
DRY GAS	435.77	198.08	26145.93	5823.64	9264.1
H2O	9.5098	4.32	570.59	203.60	323.9
TOTAL	445.28	202.40	26716.52	6027.25	9587.9

HEAT BALANCE FOR REHEAT FLUE GASES (WET SCRUBBER)

TOTAL HEATER INPUTS

	LB/MIN	KG/MIN	LB/HR	SCFM	NM3/HR	%WET	%DRY
CO	8.45	3.842	507.20	116.32	185.0	0.06	0.06
O2	1051.22	477.827	63073.11	12667.57	20151.2	6.42	6.98
N2	9477.17	4307.804	568630.07	130497.25	207590.7	66.15	71.92
SO2	0.23	0.105	13.87	1.39	2.2	0.00	0.00
NO	0.00	0.000	0.00	0.00	0.0	0.00	0.00
CO2	4361.51	1982.503	261690.44	38163.19	60708.7	19.34	21.03
TOTAL	14898.58	6772.081	893914.69	181445.72	288637.8		
H2O	739.49	336.131	44369.35	15832.46	25185.8	8.03	
TOTAL	15638.07	7108.212	938284.03	197278.19	313823.6	100.00	100.00

HHV FUELS

CO	4339	BTU/LB	
	0.0101	GJ/KG	
N.G.	22077	BTU/LB	
	0.0512	GJ/KG	

AUXILIARY FUEL RATE

N.G.	23.93	LB/MIN	
	10.88	KG/MIN	

HEAT INPUTS

CO	18,340	BTU/MIN	3.36 %
	0.019	GJ/MIN	
	2,200,741	BTU/HR	
	2.3196	GJ/HR	
N.G.	528,201	BTU/MIN	96.64 %
	0.557	GJ/HR	
	31,692,035	BTU/HR	
	33.403	GJ/HR	
TOTAL	546,540	BTU/MIN	
	0.576	GJ/HR	
	33,892,775	BTU/HR	
	35.723	GJ/HR	

HEAT BALANCE FOR REHEAT FLUE GASES (WET SCRUBBER)

FUEL ANALYSIS

	CO %	N.G.%
C	42.85	69.12
H	0.00	23.20
O	57.15	1.58
N	0.00	5.76
S	0.00	0.34
TOTAL	100.00	100.00

OXYGEN REQUIRED

	GASES		N.G.		TOTAL	
	LB/MIN	KG/MIN	LB/MIN	KG/MIN	LB/MIN	KG/MIN
C-CO2	0.00	0	43.99	20.00	43.99	19.995
CO-CO2	2.41	1.10	0.00	0	2.41	1.095
H2-H2O	0.00	0	44.07	20.03	44.07	20.033
S-SO2	0.00	0	0.08	0.04	0.08	0.037
N-NO	0.00	0	3.15	1.43	3.15	1.431
NET	2.41	1.10	91.29	41.50	93.70	42.591
O2 BOUND	4.83	2.20	0.38	0.17	5.21	2.368
O2 EXCESS					-88.49	-40.224
COMBUSTION AIR					1051.22	477.827
NET O2 EXCESS					962.73	437.603

CO REMOVAL 50.00 %

FLUE GAS PRODUCTS

	FLUE GASES	NG	INPUT	TOTAL	TOTAL	FLOW				
	LB/MIN	LB/MIN	LB/MIN	LB/MIN	KG/MIN	SCFM	NM3/HR	%DRY	%WET	PPM DRY
CO2	6.63	60.53	4361.51	4428.66	2013.03	38801.72	61724.5	21.44	19.61	
CO	0.00	0.00	4.23	4.23	1.92	58.16	92.5	0.03	0.03	321.4
H2O	0.00	49.62	739.49	789.11	358.69	16894.89	26875.8		8.54	
N2	0.00	0.00	9477.17	9476.93	4307.69	130508.68	207608.9	72.12	65.96	
O2 EXCESS	0.00	0.00	962.73	962.73	437.60	11596.04	18446.6	6.41	5.86	
SO2	0.00	0.16	0.23	0.39	0.18	2.37	3.8	0.00	0.00	13.1
NO	0.00	0.51	0.00	0.51	0.23	4.29	6.8	0.00	0.00	23.7
TOTAL	6.63	110.82	15545.35	15662.56	7119.35	197866.16			100.00	
TOTAL(DRY)						180971.27		100.00		

HEAT BALANCE FOR REHEAT FLUE GASES (WET SCRUBBER)

MASS BALANCE

36.4 PPM NOX

	LB/MIN	KG/MIN
SOURCE GASES	15192.79	6905.814538
COMBUSTION AIR	445.28	202.3978477
N.GAS	23.93	10.87517193
TOTAL	15661.99	7119.087557
COMBUSTION PRODUCTS	15662.56	7119.346636
DIFFERENCE	0.00	0.00 %

INPUT ENTHALPY FLUE GASES

	Cp-BTU/LB-oF	Cp KJ/Kg-K	T-oF	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN
N2	0.2471	0.066	96.63	9142.50	4155.681776	145975.91	138
O2	0.2150	0.057	96.63	950.12	431.873131	13199.51	13
CO	0.2034	0.054	96.63	8.45	3.842424242	111.14	0
CO2	0.2034	0.054	96.63	4361.51	1982.503325	57344.52	54
SO2	0.1283	0.034	96.63	0.23	0.105083206	1.92	0
NO	0.2034	0.054	96.63	0.00	0	0.00	0
H2O	1098.5	526.2766	96.63	729.98	331.8087981	801875.05	761
TOTAL				15192.79	6905.814538	1,018,508	966

INPUT ENTHALPY PRIMARY AIR

	Cp-BTU/LB-oF	Cp KJ/Kg-K	T-oF	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN
N2	0.2468	0.066	70.00	334.67	152.1217657	3138.27	3
O2	0.2147	0.057	70.00	101.10	45.95345007	824.81	1
H2O	1086.3	520.5	70.00	9.51	4.322631939	10330.87	10
TOTAL				445.28	202.3978477	14294	14
TOTAL GASES						1032802	980

	BTU/LB	GJ/KG	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN
CO	4339.0	0.01	4.23	1.921212121	18340	17
NAT. GAS	22077	0.05	23.93	10.87517193	528201	501
FUEL TOTAL					546540	519

TOTAL		1,579,342
RADIATION LOSSES	2.00	31,587
NET ENTHALPY FLUE GASES		1,547,755

HEAT BALANCE FOR REHEAT FLUE GASES (WET SCRUBBER)

OUTPUT ENTHALPY

	Cp-BTU/LB-oF	Cp KJ/Kg-K	T-oF	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN	% wt	SCFM	NM3/HR	PPM(WET)
N2	0.2484	0.066	215.00	9476.93	4307.7	430734	409	60.51	130497.3	207590.8	
O2	0.2162	0.058	215.00	962.73	437.6	38081	36	6.15	11600.9	18454.3	
CO2	0.2089	0.056	215.00	4428.66	2013.0	169294	161	28.28	38750.8	61643.5	
CO	0.2089	0.056	215.00	4.23	1.9	162	0	0.03	58.2	92.5	294.02
SO2	0.1381	0.037	215.00	0.39	0.2	10	0	0.00	2.4	3.8	
NO	0.2089	0.056	215.00	0.51	0.2	20	0	0.00	4.3	6.8	
H2O	1152.51	552.2	215.00	789.11	358.7	909457	863	5.04	16894.9	26875.8	
TOTAL				15662.56	7119.3	1547757	1468	100	197808.6	314667.4	

NET DIFFERENCE 1

REHEAT TEMPERATURE	**215.0 °F**	NOX EF=	83.00 LB/MMFT3
	101.7 **°C**	NOX	10.52 T/YR
N.GAS USAGE	23.93 **LB/MIN**		
N.GAS USAGE	10.88 **KG/MIN**	CO EF=	61.00 LB/MMFT3
N.GAS USAGE	31.69 **MMBTU/HR**	CO	7.73 T/YR
	33.40 **GJ/HR**		
		SO2 EF=	0.60 LB/MMFT3
FLUE GAS OXYGEN	6.41 **%**	SO2	0.08 T/YR
INLET FUEL CONCENTRATION	2.77 **BTU/SCF**		

FLUE GAS VOLUME SUMMARY @ COMBUSTOR

	DSCFM	NM3/HR	WSCFM	NM3/HR	ACFM	AM3/HR
INLET	175622	279374	191251	304236	244497	417396
OUTLET	180971	287883	197866	314759	252954	431834

STEAM ENTHALPY AT ATMOSHERIC PRESSURE

	A0	A1	A2	C
H2O	4.563E-01	1.666E-05	2.232E-07	1.069E+03

COST ESTIMATE
WET SCRUBBER

PLANT SIZE		CURRENT CAPACITY	1,500,121	TON/YR
			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	SCRUBBER COMPOMENTS	SCRUBBER		4,000,000
		VALVES,PUMPS		80,000
		DUCTWORK		350,000
		CIVIL		700,000
		ELECTRICAL		750,000
		N.GAS SERVICE		750,000
		ID FAN		600,000
		SLUDGE TREATMENT		2,200,000
		MISCELLANEOUS EQUIPMENT		300,000
		STACK/REHEAT		1,500,000
	EQUIPMENT	TOTAL		11,230,000
	OTHER	INSTRUMENTS	0.05	561,500
		TAXES	0.06	673,800
		FREIGHT	0.08	898,400
		TOTAL		13,363,700
	INSTALLATION	FOUNDATIONS	0.05	668,185
		ERECTION	0.15	2,004,555
		ELECTRICAL	0.10	1,336,370
		DUCTING	0.10	1,336,370
		INSULATION	0.10	1,336,370
		SITE PREPARATION	0.10	1,336,370
		TOTAL	0.60	8,018,220
DIRECT COSTS		TOTAL		21,381,920
INDIRECT COSTS		ENGINEERING/DESIGN	0.10	1,336,370
		CONST/FIELD EXPENSE	0.10	1,336,370
		CONTR.FEE	0.08	1,002,278
		START-UP	0.02	267,274
		PERFORMANCE TEST	0.01	133,637
		CONTINGENCIES	0.15	2,004,555
		TOTAL		6,080,484
RETROFIT PREMIUM (N/A)				0
TOTAL CAPITAL COST				27,462,404

COST ESTIMATE
WET SCRUBBER

OPERATING COST(DIRECT)

UTILITIES	ID FAN STATIC PRESSURE	12.00	IN H2O
	FAN VOLUME	244497	ACFM
	FAN POWER	662.24	BHP
	FAN STATIC PRESSURE	5.00	IN H2O
	COMBUSTION FAN VOLUME	6027	ACFM
	FAN POWER	6.80	BHP
	RECIRCULATION PUMPS(4)	1375	BHP
	REAGENT PUMP	71.50	BHP
	AGGITATOR MOTOR	185.00	BHP
	PULSE PUMP	285.00	BHP
	BLOWER COMPRESSOR	285.00	BHP
	CONNECTED LOAD	2870.54	BHP
	POWER	2140.56	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	755,125	$/YR
	N.GAS(FLUE GAS REHEAT)	33.40	GJ/HR
	COST	6.266	$/GJ
	ANNUAL COST	1,741,851	$/YR
REAGENT	REAGENT USAGE	219.77	TON/YR
	COST	25.00	$/TON
	ANNUAL COST	5,494	$/YR
WASTE DISPOSAL	GYPSUM	377	TON/YR
		65.00	$/TON
	COST	24519	$/YR
WATER TREATMENT	DISCHARGE	97812	M3/YR
	COST	2.00	$/M3
	ANNUAL COST	195623	$/YR
MAINTENANCE LABOR & MATERIALS			
	5% OF DIRECT CAPITAL COST	1,069,096	$/YR

MAINTENANCE	LABOR	HR/YR	2000
	COST	$/HR	25.96
	COST	$/YR	51,920
LABOR	LABOR	HR/YR	2000
	COST	$/HR	18.00
	COST	$/YR	36,000
SUPERVISOR	LABOR	HR/YR	800
	COST	$/HR	39.54
	COST	$/YR	31,632
FUEL SAVINGS		$/YR	$0
TOTAL DIRECT OPERATING COST		$/YR	$3,911,260

COST ESTIMATE
WET SCRUBBER

OPERATING COST(INDIRECT)	OVERHEAD	%	44.00
		$/YR	52,603
	PROPERTY TAX	%	1.46
		$/YR	400,665
	INSURANCE	%	1.00
		$/YR	274,624
	ADMINISTRATION	%	2.00
		$/YR	549,248
	CAPITAL RECOVERY	%-INTEREST	10.00
		LIFE-YEARS	15.00
		FACTOR	0.131474
		$/YR	3,610,586
TOTAL INDIRECT OPERATING COST		$/YR	4,887,726
TOTAL ANNUAL COST		$/YR	8,798,986
ANNUAL EMISSIONS REDUCTION		TON/YR	143.79
COST BENEFIT		$/TON	61,195

PLANT COSTS

POWER COST	0.04239 $/KWH	
PROPERTY TAX RATE	2.4316 $/100 @ 60%	
	1.4590 %	
CAPITAL RECOVERY RATE	10 %	
LABOR COSTS		
SUPERVISOR	39.54 $/HR	
KILN OPERATOR	33.17 $/HR	
1ST CLASS MAINTENANCE	25.96 $/HR	
1ST CLASS ELECTRICIAN	25.96 $/HR	
1ST CLASS WELDER	25.96 $/HR	
GENERAL LABOR	18.00 $/HR	
NATURAL GAS	6.27 $/GJ	5.945 $/MMBTU
FUEL OIL	0.00 $/GJ	$/MMBTU
COAL	3.71 $/GJ	3.52 $/MMBTU
COKE	0.00 $/GJ	$/MMBTU
CKD DISPOSAL	0.00 $/TONNE	0 $/TON
SOLID WASTE DISPOSAL	58.97 $/TONNE	65 $/TON
MICROFINE LIME	54.43 $/TONNE	60 $/TON
LIMESTONE	22.68 $/TONNE	25 $/TON
WATER COST	0 $/M3	0 $/MM gal
WATER TREATMENT	2.00 $/M3	7571 $/MM gal

APPENDIX B

COST CALCULATIONS FOR NO_x

KILN PRODUCTION AND NOx DATA
SCC CENTER HILL PLANT

PLANT NAME	KILN NO.	PRODUCTION T/YR	CAPACITY T/YR	CLINKER MAX T/HR	CLINKER AVG T/HR	OPERATION HR/YR	UNCONTROLLED NOx T/YR	UNCONTROLLED NOx LB/TON	NOx AVG LB/HR
SCC CENTER HILL	1	1,500,179	1,500,179	180.2	180.2	8,322	1,875	2.50	450.7

SUMMARY OF NOx CONTROL COST DATA
SCC CENTER HILL PLANT

PLANT NAME	KILN NO.	BASELINE NOx EMISSIONS T/YR	BASELINE NOx EMISSIONS LB/TON	CONTROL TECHNOLOGY	EXPECTED REMOVAL %	EXPECTED REMOVAL T/YR	CAPITAL COST $	ANNUAL COST $/YR	CONTROL COST $/TON NOx	UNIT COST $/TON CLINKER
SCC CENTER HILL	1	1,875	2.50	SCR*	32	600	4,598,000	9,196,351	15,325	6.13
		1,875	2.50	SNCR	22	413	1,519,560	1,116,188	2,706	0.74

NOTES: * SCR ANNUAL OPERATING COST INCLUDES ADDED NATURAL GAS FUEL COMBUSTION FOR REHEATING CLEAN SIDE GASES TO OPTIMUM CATALYST TEMPERATURE (340 DEG C) FOR NOX REDUCTION, AND REPLACEMENT OF CATALYST EVERY 3 YEARS.

SUMTER CEMENT COMPANY LLC
DESIGN DATA

PRODUCTION	3,924	MT/D	4,325.4	ST/D
	346.8	Days/yr	346.8	Days/yr
	1,360,953	Tonnes/yr	1,500,179	ST/YR
PLANT CAPACITY	95.0	%	180.23	ST/HR
NOx FACTOR (MSC ONLY)	1.25	Kg/Tonne	2.50	LB/TON
NOx ANNUAL EMISSIONS	1,701.2	Tonnes/yr	1,875.2	TON/YR
	204.4	Kg/HR	450.7	LB/HR
OPERATING HOURS	8,322			

CENTER HILL	
1,500,000	STY
1,360,791	MTY
3,924	MTD

COST ESTIMATE
SNCR NOX CONTROL OPTION

			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	BASIC	UREA/AMMONIA INJECTION UNIT		600,000
	EQUIPMENT	TOTAL		600,000
	OTHER	INSTRUMENTS		60,000
		TAXES	0.06	36,000
		FREIGHT	0.10	60,000
		TOTAL		756,000
	INSTALLATION	FOUNDATIONS	0.08	60,480
		ERECTION	0.14	105,840
		ELECTRICAL	0.10	75,600
		PIPING	0.15	113,400
		INSULATION	0.01	7,560
		SITE PREPARATION	0.05	37,800
		TOTAL	0.53	400,680
DIRECT COSTS		TOTAL		1,156,680
INDIRECT COSTS		ENGINEERING/DESIGN	0.10	75,600
		CONST/FIELD EXPENSE	0.10	75,600
		CONTR.FEE	0.05	37,800
		START-UP	0.02	15,120
		PERFORMANCE TEST	0.01	7,560
		CONTINGENCIES	0.20	151,200
		TOTAL		362,880
RETROFIT PREMIUM (N/A)				0
TOTAL CAPITAL COST				1,519,560

COST ESTIMATE
SNCR NOX CONTROL OPTION

OPERATING COST(DIRECT)

UTILITIES	PUMP PRESSURE	80.00	PSIG
	LIQUOR DENSITY	11.00	LB/GAL
		1.32	SG
		0.0122	FT3/LB
	PUMP VOLUME	20	GPM
		13200	LB/HR
	PUMP HORSEPOWER	124.00	BHP
	CONNECTED LOAD	124.00	BHP
	POWER	92.47	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	32,620	$/YR
	NATURAL GAS	0.00	MMBTU/HR
	COST	5.945	$/MMBTU
	ANNUAL COST	0	$/YR
REAGENTS	UTILIZATION	0.70	
	MOLAR RATIO	1.00	
	USAGE	769	T/YR
	UNIT COST	0.12	$/LB
	COST	$184,494	
MAINTENANCE LABOR & MATERIALS			
	5% OF DIRECT CAPITAL COST	75,978	$/YR

MAINTENANCE	LABOR	HR/YR	1000
	COST	$/HR	25.96
	COST	$/YR	25,960
OPERATOR	LABOR	HR/YR	8760
	COST	$/HR	33.17
	COST	$/YR	290,569
SUPERVISOR	LABOR	HR/YR	1752
	COST	$/HR	39.54
	COST	$/YR	69,274
TOTAL DIRECT OPERATING COST			678,895

COST ESTIMATE
SNCR NOX CONTROL OPTION

OPERATING COST(INDIRECT)	OVERHEAD	%	44.00
		$/YR	169,753
	PROPERTY TAX	%	1.46
		$/YR	22,170
	INSURANCE	%	1.00
		$/YR	15,196
	ADMINISTRATION	%	2.00
		$/YR	30,391
	CAPITAL RECOVERY	%-INTEREST	10.00
		LIFE-YEARS	15.00
		FACTOR	0.131474
		$/YR	199,782
TOTAL INDIRECT OPERATING COST			437,292
TOTAL ANNUAL COST		$/YR	$1,116,188
EXPECTED NOx		LB/TON	1.95
		T/YR	1463
REDUCTION		T/YR	413
		%	22
		$/TON	$2,706
		$/TON-CLK	$0.74

HEAT BALANCE FOR REHEAT FLUE GASES (SCR)

INPUTS

FLUE GAS STREAM

	LB/MIN	KG/MIN	LB/HR	SCFM	NM3/HR	%	PPM(WET)	PPM(DRY)
CO	8.45	3.84	507.20	116.32	185.0	0.06	608.2	662.3
O2	950.12	431.87	57007.25	11448.96	18212.6	5.99		
N2	9142.50	4155.68	548549.99	125892.22	200265.2	65.83		
SO2	0.16	0.07	9.76	0.98	1.6	0.00	5.1	
NO	0.00	0.00	0.00	0.00	0.0	0.00	0.0	
H2O	729.98	331.81	43798.55	15628.78	24861.8	8.17		
CO2	4361.51	1982.50	261690.44	38163.19	60708.7	19.95		
TOTAL(WET)	15192.72	6905.78	911563.20	191250.45	304234.9	100.00		
TOTAL(DRY)	14462.74	6573.97	867764.65	175621.67	279373.1			

INLET	244496.32	ACFM
	417471.36	AM3/HR
	215.00	oF
	101.67	C

BURNER COMBUSTION AIR

	LB/MIN	KG/MIN
DRY AIR	1901.1	864.16
O2	441.07	200.48
N2	1460.08	663.67
H2O	20.74	9.43
WET AIR	1921.89	873.59

138.27	MMBTU/HR
8.3	LB/1000BTU
1901.1	LB/MIN

MOISTURE	0.0109	lb/lb DA
	0.0109	KG/KG DA
T=	70	oF
	21	C
RH	50	%

COMBUSTION AIR

	LB/MIN	KG/MIN	LB/HR	SCFM	NM3/HR
O2	441.07	200.48	26463.99	5316.54	8457.4
N2	1460.08	663.67	87604.93	20090.73	31959.7
DRY GAS	1901.15	864.16	114068.92	25407.28	40417.1
H2O	20.7446	9.43	1244.67	444.14	706.5
TOTAL	1921.89	873.59	115313.59	25851.42	41123.6

HEAT BALANCE FOR REHEAT FLUE GASES (SCR)

TOTAL HEATER INPUTS

	LB/MIN	KG/MIN	LB/HR	SCFM	NM3/HR	%WET	%DRY
CO	8.45	3.842	507.20	116.32	185.0	0.05	0.06
O2	1391.19	632.358	83471.24	16765.50	26670.0	7.72	8.34
N2	10602.58	4819.355	636154.92	145982.95	232224.8	67.24	72.62
SO2	0.16	0.074	9.76	0.98	1.6	0.00	0.00
NO	0.00	0.000	0.00	0.00	0.0	0.00	0.00
CO2	4361.51	1982.503	261690.44	38163.19	60708.7	17.58	18.98
TOTAL	16363.89	7438.133	981833.56	201028.94	319790.2		
H2O	750.72	341.237	45043.23	16072.92	25568.3	7.40	
TOTAL	17114.61	7779.370	1026876.79	217101.87	345358.4	100.00	100.00

HHV FUELS

CO	4339	BTU/LB
	0.0101	GJ/KG
N.G.	22077	BTU/LB
	0.0512	GJ/KG

AUXILIARY FUEL RATE

N.G.	104.38	LB/MIN
	47.45	KG/MIN

HEAT INPUTS

CO	0	BTU/MIN	0.00 %
	0.000	GJ/MIN	
	2,200,741	BTU/HR	
	2.3196	GJ/HR	
N.G.	2,304,423	BTU/MIN	100.00 %
	2.429	GJ/HR	
	138,265,356	BTU/HR	
	145.732	GJ/HR	
TOTAL	2,304,423	BTU/MIN	
	2.429	GJ/HR	
	140,466,097	BTU/HR	
	148.051	GJ/HR	

HEAT BALANCE FOR REHEAT FLUE GASES (SCR)

FUEL ANALYSIS

	CO %	N.G.%
C	42.85	69.12
H	0.00	23.20
O	57.15	1.58
N	0.00	5.76
S	0.00	0.34
TOTAL	100.00	100.00

OXYGEN REQUIRED

	GASES		N.G.		TOTAL	
	LB/MIN	KG/MIN	LB/MIN	KG/MIN	LB/MIN	KG/MIN
C-CO2	0.00	0	191.91	87.23	191.91	87.234
CO-CO2	0.00	0.00	0.00	0	0.00	0.000
H2-H2O	0.00	0	192.28	87.40	192.28	87.399
S-SO2	0.00	0	0.35	0.16	0.35	0.161
N-NO	0.00	0	13.74	6.24	13.74	6.245
NET	0.00	0.00	398.29	181.04	398.29	181.039
O2 BOUND	4.83	2.20	1.65	0.75	6.48	2.946
O2 EXCESS					-391.81	-178.093
COMBUSTION AIR					1391.19	632.358
NET O2 EXCESS					999.38	454.264

CO REMOVAL 0.00 %

FLUE GAS PRODUCTS

	FLUE GASES	NG	INPUT	TOTAL	TOTAL	FLOW				
	LB/MIN	LB/MIN	LB/MIN	LB/MIN	KG/MIN	SCFM	NM3/HR	%DRY	%WET	PPM DRY
CO2	0.00	264.06	4361.51	4625.57	2102.53	40526.93	64468.9	20.40	18.47	
CO	0.00	0.00	8.45	8.45	3.84	116.32	185.0	0.06	0.05	585.4
H2O	0.00	216.49	750.72	967.22	439.64	20708.08	32941.7		9.44	
N2	0.00	0.00	10602.58	10602.34	4819.25	146006.99	232263.1	73.48	66.55	
O2 EXCESS	0.00	0.00	999.38	999.38	454.26	12037.55	19148.9	6.06	5.49	
SO2	0.00	0.71	0.16	0.87	0.40	5.25	8.4	0.00	0.00	26.4
NO	0.00	0.51	0.00	0.51	0.23	4.29	6.8	0.00	0.00	21.6
TOTAL	0.00	481.78	16722.81	17204.35	7820.16	219405.41			100.00	
TOTAL(DRY)						198697.33		100.00		

HEAT BALANCE FOR REHEAT FLUE GASES (SCR)

MASS BALANCE 33.1 PPM NOX

	LB/MIN	KG/MIN	
SOURCE GASES	15192.72	6905.781818	
COMBUSTION AIR	1921.89	873.5878185	
N.GAS	104.38	47.4459762	
TOTAL	17218.99	7826.815612	
COMBUSTION PRODUCTS	17204.35	7820.158156	
DIFFERENCE	0.09	0.09	%

INPUT ENTHALPY FLUE GASES

	Cp-BTU/LB-oF	Cp KJ/Kg-K	T-oF	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN
N2	0.2484	0.066	215.00	9142.50	4155.681776	415533.89	394
O2	0.2162	0.058	215.00	950.12	431.873131	37582.46	36
CO	0.2089	0.056	215.00	8.45	3.842424242	323.14	0
CO2	0.2089	0.056	215.00	4361.51	1982.503325	166726.77	158
SO2	0.1381	0.037	215.00	0.16	0.073935266	4.11	0
NO	0.2089	0.056	215.00	0.00	0	0.00	0
H2O	1152.5	552.1551	215.00	729.98	331.807226	841301.59	798
TOTAL				15192.72	6905.781818	1,461,472	1387

INPUT ENTHALPY PRIMARY AIR

	Cp-BTU/LB-oF	Cp KJ/Kg-K	T-oF	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN
N2	0.2468	0.066	70.00	1460.08	663.6737078	13691.57	13
O2	0.2147	0.057	70.00	441.07	200.4847659	3598.49	3
H2O	1086.3	520.5	70.00	20.74	9.429344817	22535.64	21
TOTAL				1921.89	873.5878185	39826	38
TOTAL GASES						1501298	1424

	BTU/LB	GJ/KG	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN
CO	4339.0	0.01	0.00	0	0	0
NAT. GAS	22077	0.05	104.38	47.4459762	2304423	2186
FUEL TOTAL					2304423	2186

TOTAL		3,805,720
RADIATION LOSSES	2.00	76,114
NET ENTHALPY FLUE GASES		3,729,606

HEAT BALANCE FOR REHEAT FLUE GASES (SCR)

OUTPUT ENTHALPY

	Cp-BTU/LB-oF	Cp KJ/Kg-K	T-oF	LB/MIN	KG/MIN	h-BTU/MIN	h KJ/MIN	% wt	SCFM	NM3/HR	PPM(WET)
N2	0.2531	0.067	644.00	10602.34	4819.2	1642169	1558	61.63	145994.3	232242.8	
O2	0.2204	0.059	644.00	999.38	454.3	134826	128	5.81	12042.6	19156.9	
CO2	0.2286	0.061	644.00	4625.57	2102.5	647200	614	26.89	40473.7	64384.3	
CO	0.2286	0.061	644.00	8.45	3.8	1183	1	0.05	116.3	185.0	530.30
SO2	0.1736	0.046	644.00	0.87	0.4	93	0	0.01	5.3	8.4	
NO	0.2286	0.061	644.00	0.51	0.2	72	0	0.00	4.3	6.8	
H2O	1348.27	645.9	644.00	967.22	439.6	1304063	1237	5.62	20708.1	32941.7	
TOTAL				17204.35	7820.2	3729606	3539	100	219344.5	348925.9	

NET DIFFERENCE 0

REHEAT TEMPERATURE	**644.0 °F**		NOX EF=	83.00 LB/MMFT3
	340.0 **°C**		NOX	45.92 T/YR
N.GAS USAGE	104.38 **LB/MIN**			
N.GAS USAGE	47.45 **KG/MIN**		CO EF=	61.00 LB/MMFT3
N.GAS USAGE	138.27 **MMBTU/HR**		CO	33.74 T/YR
	145.73 **GJ/HR**			
			SO2 EF=	0.60 LB/MMFT3
FLUE GAS OXYGEN	6.06 **%**		SO2	0.33 T/YR
INLET FUEL CONCENTRATION	10.61 **BTU/SCF**			

FLUE GAS VOLUME SUMMARY @ COMBUSTOR

	DSCFM	NM3/HR	WSCFM	NM3/HR	ACFM	AM3/HR
INLET	175622	279373	191250	304235	399887	682673
OUTLET	198697	316081	219405	349023	458757	783173

STEAM ENTHALPY AT ATMOSHERIC PRESSURE

	A0	A1	A2	C
H2O	4.563E-01	1.666E-05	2.232E-07	1.069E+03

COST ESTIMATE
SCR NOX CONTROL OPTION

			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	BASIC	SCR UNIT		2,000,000
	EQUIPMENT	TOTAL		2,000,000
	OTHER	INSTRUMENTS		100,000
		TAXES	0.06	120,000
		FREIGHT	0.10	200,000
		TOTAL		2,420,000
	INSTALLATION	FOUNDATIONS	0.08	193,600
		ERECTION	0.14	338,800
		ELECTRICAL	0.10	242,000
		PIPING	0.15	363,000
		INSULATION	0.01	24,200
		SITE PREPARATION	0.02	48,400
		TOTAL	0.50	1,210,000
DIRECT COSTS		TOTAL		3,630,000
INDIRECT COSTS		ENGINEERING/DESIGN	0.10	242,000
		CONST/FIELD EXPENSE	0.05	121,000
		CONTR.FEE	0.03	72,600
		START-UP	0.01	24,200
		PERFORMANCE TEST	0.01	24,200
		CONTINGENCIES	0.20	484,000
		TOTAL		968,000
RETROFIT PREMIUM (N/A)				0
TOTAL CAPITAL COST				4,598,000

COST ESTIMATE
SCR NOX CONTROL OPTION

OPERATING COST(DIRECT)

UTILITIES	PUMP PRESSURE	80.00	PSIG
	LIQUOR DENSITY	11.00	LB/GAL
		1.32	SG
		0.0122	FT3/LB
	PUMP VOLUME	20	GPM
		13200	LB/HR
	PUMP HORSEPOWER	124.00	BHP
	CONNECTED LOAD	124.00	BHP
	POWER	92.47	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	32,620	$/YR
	NATURAL GAS	138.27	MMBTU/HR
	COST	5.945	$/MMBTU
	ANNUAL COST	6,840,580	$/YR
REAGENTS	UTILIZATION	0.70	
	MOLAR RATIO	1.00	
	USAGE	1118	T/YR
	UNIT COST	0.12	$/LB
	COST	$268,355	

MAINTENANCE LABOR & MATERIALS

15% OF DIRECT CAPITAL COST 689,700 $/YR

(INCLUDES CATALYST REPLACEMENT EVERY 3 YEARS)

MAINTENANCE	LABOR	HR/YR	1000
	COST	$/HR	25.96
	COST	$/YR	25,960
OPERATOR	LABOR	HR/YR	8760
	COST	$/HR	33.17
	COST	$/YR	290,569
SUPERVISOR	LABOR	HR/YR	1752
	COST	$/HR	39.54
	COST	$/YR	69,274
TOTAL DIRECT OPERATING COST			8,217,059

COST ESTIMATE
SCR NOX CONTROL OPTION

OPERATING COST(INDIRECT)	OVERHEAD	%	44.00
		$/YR	169,753
	PROPERTY TAX	%	1.46
		$/YR	67,083
	INSURANCE	%	1.00
		$/YR	45,980
	ADMINISTRATION	%	2.00
		$/YR	91,960
	CAPITAL RECOVERY	%-INTEREST	10.00
		LIFE-YEARS	15.00
		FACTOR	0.131474
		$/YR	604,516
TOTAL INDIRECT OPERATING COST			979,293
TOTAL ANNUAL COST		$/YR	$9,196,351
EXPECTED NOx		LB/TON	1.70
		T/YR	1275
REDUCTION		T/YR	600
		%	32
		$/TON	$15,325
		$/TON-CLK	$6.13

PLANT COSTS

POWER COST	0.04239 $/KWH	
PROPERTY TAX RATE	2.4316 $/100 @ 60%	
	1.4590 %	
CAPITAL RECOVERY RATE	10 %	
LABOR COSTS		
SUPERVISOR	39.54 $/HR	
KILN OPERATOR	33.17 $/HR	
1ST CLASS MAINTENANCE	25.96 $/HR	
1ST CLASS ELECTRICIAN	25.96 $/HR	
1ST CLASS WELDER	25.96 $/HR	
GENERAL LABOR	18.00 $/HR	
NATURAL GAS	6.27 $/GJ	5.945 $/MMBTU
FUEL OIL	0.00 $/GJ	$/MMBTU
COAL	3.71 $/GJ	3.52 $/MMBTU
COKE	0.00 $/GJ	$/MMBTU
CKD DISPOSAL	0.00 $/TONNE	0 $/TON
SOLID WASTE DISPOSAL	58.97 $/TONNE	65 $/TON
MICROFINE LIME	54.43 $/TONNE	60 $/TON
LIMESTONE	22.68 $/TONNE	25 $/TON
WATER COST	0.00 $/M3	0 $/MM gal
WATER TREATMENT	2.00 $/M3	7571 $/MM gal

APPENDIX C

COST CALCULATIONS FOR CO/VOC

SUMMARY OF EMISSIONS FOR RTO CONTROL OPTIONS
SCC CENTER HILL PLANT

POLLUTANT	DESIGN CASE	CONTROL OPTION	REMOVAL EFFIC. %	INLET RATE LB/HR	OUTLET RATE LB/HR	OUTLET CONC. PPM	ACTUAL HOURS HRS/YR	POLLUTANT EMITTED TON/YR	TOTAL REMOVED TON/YR
CO	0	PROCESS	NA	721.1	721.1	687.1	8322	3,000.4	NA
CO	A	RTO	95.0	721.1	36.1	34.5	8322	150.0	2,850.3
CO	B	RTO	79.1	721.1	150.6	144.1	8322	626.7	2,373.7
VOC	0	PROCESS	NA	21.6	21.63	NA	8322	90.0	NA
VOC	A	RTO	95.0	21.6	1.08	NA	8322	4.5	85.5

CASE NOTES

0	COMBUSTION PROCESS OPTIMIZATION (CURRENT KILN DESIGN)
A	RTO DESIGN AT 95% OPTIMUM CO REMOVAL EFFICIENCY
B	RTO DESIGN ACHIEVING 100 PPM CO IN EXIT GASES

COST ANALYSIS FOR RTO CONTROL OPTIONS
SCC CENTER HILL PLANT

POLLUTANT	DESIGN CASE	REMOVAL EFFIC. %	INT. RATE %	ECON. LIFE YRS	BASE EMISSIONS TON/YR	NET REMOVED TON/YR	TOTAL CAPITAL COST $	DIRECT OPERATING COST $/YR	TOTAL ANNUALIZED COST $	COST/TON REMOVED $/TON
CO	A	95.0	10	10	3,000.4	2,850.3	33,760,123	6,999,117	14,276,205	5,009
CO	B	79.1	10	10	3,000.4	2,373.7	33,760,123	7,045,546	14,322,634	6,034
VOC	A	95.0	10	10	90.0	85.5	33,760,123	6,999,117	14,276,205	166,953

NOTES

DESIGN OF RTO IS BASED ON CO REMOVAL
THE 95% CO REMOVAL EFFICIENCY REPRESENTS DESIGN CASE "A" AT OPTIMUM CO REMOVAL EFFICIENCY
THE 79.1% CO REMOVAL EFFICIENCY REPRESENTS DESIGN CASE "B" ACHIEVING 100 PPM CO IN EXIT GASES
THE VOC REMOVAL EFFICIENCY FOR BOTH CASES IS ASSUMED TO BE 95%

RTO EQUIPMENT ESTIMATED COST BASIS

COMPARIBLE UNIT	TXI MIDLOTHIAN, TEXAS RTO*	
NO. OF MODULES	11	
OPERATING MODULES	9	
TOTAL FLOW	540,000	SCFM
FLOW PER MODULE	60,000	SCFM
COMBUSTION TEMP	1,500	DEG F
THERMAL EFFICIENCY	95	%
HEAT INPUT	43	MMBTU/HR
CLINKER PRODUCTION	6,000	TONS/DAY
CAPITAL COST (RTO ONLY)	18,000,000	$

ROANOKE CEMENT RTO PRELIMINARY DESIGN		
NO. OF MODULES	7	
OPERATING MODULES	5	
TOTAL FLOW	254,199	SCFM
FLOW PER MODULE	50,840	SCFM
CLINKER PRODUCTION	4,325	TONS/DAY
ESTIMATED CAPITAL COST (RTO ONLY)	12,000,000	$

CAPITAL COST SCALED USING NUMBER OF MODULES REQUIRED FOR FLOW VOLUME

*TXI RTO DESIGN AND COST DATA FROM MARK HILL, PLANT MANAGER (TELEPHONE COMMUNICATION 7/26/00)

FLUE GAS VOLUME ESTIMATE

	SCFM	LB/MIN	%DRY	%WET
CO	188	12.0	0.09	0.07
O2	19062	1581.9	8.82	6.00
N2	209489	15213.4	96.95	65.94
SO2	5	0.81	0.00	0.00
NO	0	0.0	0.00	0.00
H2O	25415	1187.1		8.00
CO2	63	7.2	0.03	20.00
TOTAL	**254222**	18002.4	105.89	100.01

flowrate adj. factor
1.62461

	MILL ON	WORST CASE
FLOW	325,000	ACFM
	254,222	WSCFM
	216,089	DSCFM
TEMP	215	oF

ALLOWABLES		4325.4	T/D	
		180.23	T/HR	
		1,500,179	T/YR	
	SO2	202.52	T/YR	
		0.27	LB/TON	ANNUAL AVERAGE
		48.7	LB/HR	ANNUAL AVERAGE
				SHORT TERM
	CO	3000.36	T/YR	
		4.00	LB/TON	ANNUAL AVERAGE
		721.1	LB/HR	ANNUAL AVERAGE
		1081.6	LB/HR	SHORT TERM @1.5X
	VOC	90.01	T/YR	
		0.12	LB/TON	ANNUAL AVERAGE
		21.63	LB/HR	ANNUAL AVERAGE

HEAT BALANCE FOR RTO - CASE A

INPUTS

FLUE GAS STREAM

	LB/MIN	LB/HR	SCFM	% WET	PPM(WET)	PPM(DRY)
CO	12.02	721.07	165.36	0.07	650.5	722.8
O2	1581.87	94912.28	19061.55	4.00		
N2	15213.40	912804.29	209488.59	82.41		
SO2	0.81	48.67	4.89	0.00	19.2	
NO	0.00	0.00	0.00	0.00	0.0	
H2O	1187.08	71224.84	25415.40	10.00		
CO2	7.24	434.47	63.36	0.02		
TOTAL(WET)	18002.43	1080145.62	254199	100.00		
TOTAL(DRY)	16815.35	1008920.78	228784			

STACK	324970	ACFM
	215	oF

BURNER COMBUSTION AIR

	LB/MIN	
DRY AIR	889.7	
O2	206.4	
N2	683.3	
H2O	9.7	
WET AIR	899.4	
MOISTURE	0.0109	lb/lb DA
T=	70	oF
RH	50	%

64.70	MMBTU/HR
8.3	LB/1000BTU
889.7	LB/MIN

COMBUSTION AIR

	LB/MIN	LB/HR	SCFM
O2	206.40	12383.96	2487.90
N2	683.25	40995.17	9401.56
DRY GAS	889.65	53379.13	11889.46
H2O	9.7075	582.45	207.84
TOTAL	899.36	53961.58	12097.30

HEAT BALANCE FOR RTO - CASE A

TOTAL OXIDIZER INPUTS

	LB/MIN	LB/HR	SCFM	%WET	%DRY	PPM(DRY)
CO	12.02	721.07	165.36	0.06	0.07	687.1
O2	1788.27	107296.23	21549.45	8.09	8.95	
N2	15896.66	953799.46	218890.14	82.20	90.95	
SO2	0.81	48.67	4.89	0.00	0.00	20.31
NO	0.00	0.00	0.00	0.00	0.00	0
CO2	7.24	434.47	63.36	0.02	0.03	
TOTAL	17705.00	1062299.90	240673.21			
H2O	1196.79	71807.30	25623.24	9.62		
TOTAL	18901.79	1134107.20	266296.45	100.00	100.00	

HHV FUELS

CO	4339	BTU/LB
N.G.	22077	BTU/LB

AUXILIARY FUEL RATE

N.G.	48.85	LB/MIN

HEAT INPUTS

CO	49,538	BTU/MIN	4.39 %
	2,972,272	BTU/HR	
N.G.	1,078,366	BTU/MIN	95.61 %
	64,701,970	BTU/HR	
TOTAL	1,127,904	BTU/MIN	
	67,674,242	BTU/HR	

FUEL ANALYSIS

	CO %	N.G.%
C	42.85	69.12
H	0.00	23.20
O	57.15	1.58
N	0.00	5.76
S	0.00	0.34
TOTAL	100.00	100.00

HEAT BALANCE FOR RTO - CASE A

OXYGEN REQUIRED

	GASES LB/MIN	N.G. LB/MIN	TOTAL LB/MIN
C-CO2	0.00	89.81	89.81
CO-CO2	6.51	0.00	6.51
H2-H2O	0.00	89.98	89.98
S-SO2	0.00	0.17	0.17
N-NO	0.00	6.43	6.43
NET	6.51	186.38	192.89
O2 BOUND	6.87	0.77	7.64
O2 EXCESS			-185.25
COMBUSTION AIR			1788.27
NET O2 EXCESS			1603.02

DESTRUCTION EFFICIENCY	95.00 %	CLINKER RATE	180.23 TON/HR
OPERATING HOURS	8322 HR/YR	EMISSION FACTOR	0.20 LB/TON
LB/HR ABATED	685.01 LB/HR	LB/HR EMITTED	36.05 LB/HR
TON/YR ABATED	2850.34 TON/YR	TON/YR EMITTED	150.02 TON/YR

FLUE GAS PRODUCTS

	GASES	N.G.	INPUT	TOTAL	SCFM	%DRY	%WET	PPM DRY
CO2	17.91	123.57	7.24	148.72	1302.97	0.54	0.49	
CO	0.00	0.00	0.60	0.60	8.27	0.00	0.00	34.5
H2O	0.00	101.31	1196.79	1298.10	27792.28		10.40	
N2	0.00	0.00	15896.66	15896.42	218912.76	91.39	81.89	
O2 EXCES	0.00	0.00	1603.02	1603.02	19308.41	8.06	7.22	
SO2	0.00	0.33	0.81	1.14	6.88	0.00	0.00	28.7
NO	0.00	0.51	0.00	0.51	4.29	0.00	0.00	17.9
TOTAL	17.91	225.72	18705.12	18948.51	267335.87		100.00	
TOTAL(DRY)					239543.59	100.00		

MASS BALANCE — 27.5 PPM NOX

SOURCE GASES	18002.43 LB/MIN
COMBUSTION AIR	899.36 LB/MIN
N.GAS	48.85 LB/MIN
TOTAL	18950.63 LB/MIN
COMBUSTION PRODUCTS	18948.51 LB/MIN
DIFFERENCE	0.01 %

INPUT ENTHALPY FLUE GASES

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2484	215.00	15213.40	691,461
O2	0.2162	215.00	1581.87	62,572
CO	0.2089	215.00	12.02	459
CO2	0.2089	215.00	7.24	277
SO2	0.1381	215.00	0.81	21
NO	0.2089	215.00	0.00	0
H2O	1152.5	215.00	1187.08	1,368,118
TOTAL			18002.43	2,122,907

HEAT BALANCE FOR RTO - CASE A

ENTHALPY PREHEATED INPUT STREAM

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2614	1400.00	15213.40	5440240.57
O2	0.2280	1400.00	1581.87	493391.99
CO	0.2634	1400.00	12.02	4330.38
CO2	0.2634	1400.00	7.24	2609.20
SO2	0.2362	1400.00	0.81	262.14
NO	0.2634	1400.00	0.00	0.00
H2O	1693.2	1400.00	1187.08	2010014.38
TOTAL			18002.43	7,950,849

AVERAGE TEMPERATURE	1400
HEAT GAIN REHEAT	5,827,941

INPUT ENTHALPY PRIMARY AIR

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2468	70.00	683.25	6407.04
O2	0.2147	70.00	206.40	1683.93
H2O	1086.3	70.00	9.71	10545.67
TOTAL			899.36	18637

TOTAL GASES	7,969,485

	BTU/LB	LB/MIN	h-BTU/MIN
CO	4339.0	11.42	49538
NAT. GAS	22077	48.85	1078366
FUEL TOTAL			1127904

TOTAL		9,097,389
RADIATION LOSSES	2.00	181,948
NET ENTHALPY FLUE GASES		8,915,442

OUTPUT ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	SCFM	PPM(WET)
N2	0.2625	1500.00	15896.42	6,125,685	83.89	218893.69	
O2	0.2290	1500.00	1603.02	538,891	8.46	19316.43	
CO2	0.2680	1500.00	148.72	58,508	0.78	1301.26	
CO	0.2680	1500.00	0.60	236	0.00	8.27	30.93
SO2	0.2445	1500.00	1.14	410	0.01	6.89	25.77
NO	0.2680	1500.00	0.51	201	0.00	4.26	15.94
H2O	1738.87	1500.00	1298.10	2,257,228	6.85	27792.28	
TOTAL			18948.51	8,981,161	100	267323.074	

NET DIFFERENCE	65719

HEAT BALANCE FOR RTO - CASE A

COMBUSTION TEMPERATURE	1500 **oF**	NO	0.51 LB/MIN
N.GAS USAGE	48.85 **LB/MIN**	NO	30.72 LB/HR
N.GAS USAGE	64.70 **MMBTU/HR**	NOX AS NO2	47.11 LB/HR
			0.73 LB/MMBTU

FLUE GAS OXYGEN 8.06 **%**

INLET FUEL CONCENTRATION 4.24 **BTU/SCF**

FLUE GAS VOLUME SUMMARY @ COMBUSTOR

	DSCFM	WSCFM	ACFM
INLET	228783.75	254199.15	895474.26
OUTLET	239543.59	267335.87	992383.15
STACK	239543.59	267335.87	440351.26

STACK ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	PPM(WET)
N2	0.2505	409.71	15896.42	1504113.98	83.89	
O2	0.2181	409.71	1603.02	132054.00	8.46	
CO2	0.2178	409.71	148.72	12236.86	0.78	
CO	0.2178	409.71	0.60	49.44	0.00	31.71
SO2	0.1542	409.71	1.14	66.60	0.01	
NO2	0.2178	409.71	0.51	42.13	0.00	
H2O	1241.36	409.71	1298.10	1611402.92	6.85	
TOTAL			18948.51	3,259,966	100	

FINAL ENTHALPY	3,153,220
DIFFERENCE	-106,746
STACK TEMPERATURE	410 oF
GAIN	195 oF

B. STEAM ENTHALPY AT ATMOSHERIC PRESSURE

	A0	A1	A2	C
H2O	4.563E-01	1.666E-05	2.232E-07	1.069E+03

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE A

			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	BASIC	OXIDIZER UNIT		12,000,000
		ID FAN,MOTOR,ETC.		500,000
		DUCTWORK		100,000
	EQUIPMENT	TOTAL		12,600,000
	OTHER	INSTRUMENTS	0.01	126,000
		TAXES	0.06	756,000
		FREIGHT	0.10	1,260,000
		TOTAL		14,742,000
	INSTALLATION	FOUNDATIONS	0.08	1,179,360
		ERECTION	0.12	1,769,040
		ELECTRICAL	0.03	442,260
		PIPING	0.03	442,260
		INSULATION	0.02	294,840
		SITE PREPARATION	0.02	294,840
		TOTAL	0.30	4,422,600
DIRECT COSTS		TOTAL		19,164,600
INDIRECT COSTS		ENGINEERING/DESIGN	0.10	1,474,200
		CONST/FIELD EXPENSE	0.10	1,474,200
		CONTR.FEE	0.05	737,100
		START-UP	0.01	147,420
		PERFORMANCE TEST		10,000
		CONTINGENCIES	0.05	737,100
		TOTAL		4,580,020
RETROFIT PREMIUM (N/A)				0
TOTAL CAPITAL COST				23,744,620

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE A

33,760,123

OPERATING COST(DIRECT)

UTILITIES	FAN STATIC PRESSURE	12.10	IN H2O
	FAN VOLUME	440351	ACFM
	FAN	1202.52	BHP
	FAN STATIC PRESSURE	5.00	IN H2O
	FAN VOLUME	12097	ACFM
	FAN	13.65	BHP
	CONNECTED LOAD	1216.17	BHP
	POWER	906.90	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	319,927	$/YR
	NATURAL GAS	64.70	MMBTU/HR
	COST	5.945	$/MMBTU
	ANNUAL COST	3,201,084	$/YR
MAINTENANCE LABOR & MATERIALS			
	5% OF DIRECT CAPITAL COST	958,230	$/YR

MAINTENANCE	LABOR	HR/YR	2000
	COST	$/HR	25.96
	COST	$/YR	51,920
OPERATOR	LABOR	HR/YR	7879
	COST	$/HR	33.17
	COST	$/YR	261,346
SUPERVISOR	LABOR	HR/YR	3293
	COST	$/HR	39.54
	COST	$/YR	130,205
TOTAL DIRECT OPERATING COST			4,922,712

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE A

ADJUSTED TOTAL DIRECT OPERATING COST			6,999,117
OPERATING COST(INDIRECT)	OVERHEAD	%	44.00
		$/YR	195,128
	PROPERTY TAX	%	1.46
		$/YR	346,425
	INSURANCE	%	1.00
		$/YR	237,446
	ADMINISTRATION	%	2.00
		$/YR	474,892
	CAPITAL RECOVERY	%-INTEREST	10.00
		LIFE-YEARS	10.00
		FACTOR	0.162745
		$/YR	3,864,328
TOTAL INDIRECT OPERATING COST			5,118,218
ADJUSTED TOTAL INDIRECT OPERATING COST			7,277,087
TOTAL ANNUAL COST		$/YR	10,040,931
ADJUSTED TOTAL ANNUAL COST			14,276,205
EMISSIONS REDUCTION		T/YR	2850.34

HEAT BALANCE FOR RTO - CASE B

INPUTS

FLUE GAS STREAM

	LB/MIN	LB/HR	SCFM	%	PPM(WET)	PPM(DRY)
CO	12.02	721.07	165.36	0.07	650.5	722.8
O2	1581.87	94912.28	19061.55	7.50		
N2	15213.40	912804.29	209488.59	82.41		
SO2	0.81	48.67	4.89	0.00	19.2	
NO	0.00	0.00	0.00	0.00	0.0	
H2O	1187.08	71224.84	25415.40	10.00		
CO2	7.24	434.47	63.36	0.02		
TOTAL(WET)	18002.43	1080145.62	254199	100.00		
TOTAL(DRY)	16815.35	1008920.78	228784			

STACK	324970	ACFM
	215	oF

BURNER COMBUSTION AIR

	LB/MIN
DRY AIR	898.6
O2	208.5
N2	690.1
H2O	9.8
WET AIR	908.4

65.35 MMBTU/HR
8.3 LB/1000BTU
898.6 LB/MIN

MOISTURE	0.0109	lb/lb DA
T=	70	oF
RH	50	%

COMBUSTION AIR

	LB/MIN	LB/HR	SCFM
O2	208.48	12508.66	2512.96
N2	690.13	41407.97	9496.23
DRY GAS	898.61	53916.63	12009.18
H2O	9.8053	588.32	209.93
TOTAL	908.42	54504.95	12219.11

HEAT BALANCE FOR RTO - CASE B

TOTAL OXIDIZER INPUTS

	LB/MIN	LB/HR	SCFM	%WET	%DRY	PPM(DRY)
CO	12.02	721.07	165.36	0.06	0.07	686.75023
O2	1790.35	107420.94	21574.51	8.10	8.96	
N2	15903.54	954212.27	218984.81	82.20	90.94	
SO2	0.81	48.67	4.89	0.00	0.00	20.297437
NO	0.00	0.00	0.00	0.00	0.00	0
CO2	7.24	434.47	63.36	0.02	0.03	
TOTAL	17713.96	1062837.41	240792.93			
H2O	1196.89	71813.16	25625.33	9.62		
TOTAL	18910.84	1134650.57	266418.26	100.00	100.00	

HHV FUELS

CO	4339	BTU/LB
N.G.	22077	BTU/LB

AUXILIARY FUEL RATE

N.G.	49.34	LB/MIN

HEAT INPUTS

CO	41,253 BTU/MIN		3.65 %
	2,475,198 BTU/HR		
N.G.	1,089,225 BTU/MIN		96.35 %
	65,353,490 BTU/HR		
TOTAL	1,130,478 BTU/MIN		
	67,828,688 BTU/HR		

FUEL ANALYSIS

	CO %	N.G.%
C	42.85	69.12
H	0.00	23.20
O	57.15	1.58
N	0.00	5.76
S	0.00	0.34
TOTAL	100.00	100.00

OXYGEN REQUIRED

	GASES LB/MIN	N.G. LB/MIN	TOTAL LB/MIN
C-CO2	0.00	90.71	90.71
CO-CO2	5.42	0.00	5.42
H2-H2O	0.00	90.88	90.88
S-SO2	0.00	0.17	0.17
N-NO	0.00	6.49	6.49
NET	5.42	188.26	193.68
O2 BOUND	6.87	0.78	7.65

HEAT BALANCE FOR RTO - CASE B

O2 EXCESS	-186.03
COMBUSTION AIR	1790.35
NET O2 EXCESS	1604.32

DESTRUCTION EFFICIENCY	79.11 %		CLINKER RATE	180.23 TON/HR
OPERATING HOURS	8322 HR/YR		EMISSION FACTOR	0.84 LB/TON
LB/HR ABATED	570.45 LB/HR		LB/HR EMITTED	150.61 LB/HR
TON/YR ABATED	2373.66 TON/YR		TON/YR EMITTED	626.70 TON/YR

FLUE GAS PRODUCTS

	GASES	N.G.	INPUT	TOTAL	SCFM	%DRY	%WET	PPM DRY
CO2	14.91	124.81	7.24	146.97	1287.64	0.54	0.48	
CO	0.00	0.00	2.51	2.51	34.54	0.01	0.01	144.1
H2O	0.00	102.33	1196.89	1299.22	27816.22		10.40	
N2	0.00	0.00	15903.54	15903.30	219007.51	91.38	81.88	
O2 EXCES	0.00	0.00	1604.32	1604.32	19324.04	8.06	7.22	
SO2	0.00	0.34	0.81	1.15	6.90	0.00	0.00	28.8
NO	0.00	0.51	0.00	0.51	4.29	0.00	0.00	17.9
TOTAL	14.91	227.99	18715.31	18957.97	267481.14		100.00	
TOTAL(DRY)					239664.93	100.00		

MASS BALANCE 27.5 PPM NOX

SOURCE GASES	18002.43 LB/MIN
COMBUSTION AIR	908.42 LB/MIN
N.GAS	49.34 LB/MIN
TOTAL	18960.18 LB/MIN
COMBUSTION PRODUCTS	18957.97 LB/MIN
DIFFERENCE	0.01 %

INPUT ENTHALPY FLUE GASES

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2484	215.00	15213.40	691461.35
O2	0.2162	215.00	1581.87	62571.63
CO	0.2089	215.00	12.02	459.40
CO2	0.2089	215.00	7.24	276.81
SO2	0.1381	215.00	0.81	20.50
NO	0.2089	215.00	0.00	0.00
H2O	1152.5	215.00	1187.08	1368117.67
TOTAL			18002.43	2,122,907

HEAT BALANCE FOR RTO - CASE B

ENTHALPY PREHEATED INPUT STREAM

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2614	1400.00	15213.40	5440240.57
O2	0.2280	1400.00	1581.87	493391.99
CO	0.2634	1400.00	12.02	4330.38
CO2	0.2634	1400.00	7.24	2609.20
SO2	0.2362	1400.00	0.81	262.14
NO	0.2634	1400.00	0.00	0.00
H2O	1693.2	1400.00	1187.08	2010014.38
TOTAL			18002.43	7,950,849

AVERAGE TEMPERATURE 1400

HEAT GAIN REHEAT 5,827,941

INPUT ENTHALPY PRIMARY AIR

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2468	70.00	690.13	6471.56
O2	0.2147	70.00	208.48	1700.89
H2O	1086.3	70.00	9.81	10651.86
TOTAL			908.42	18824

TOTAL GASES 7,969,673

	BTU/LB	LB/MIN	h-BTU/MIN
CO	4339.0	9.51	41253
NAT. GAS	22077	49.34	1089225
FUEL TOTAL			1130478

TOTAL		9,100,151
RADIATION LOSSES	2.00	182,003
NET ENTHALPY FLUE GASES		8,918,148

OUTPUT ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	SCFM	PPM(WET)
N2	0.2625	1500.00	15903.30	6128336.20	83.89	218988.42	
O2	0.2290	1500.00	1604.32	539327.69	8.46	19332.064	
CO2	0.2680	1500.00	146.97	57819.81	0.78	1285.9492	
CO	0.2680	1500.00	2.51	987.58	0.01	34.540594	129.14
SO2	0.2445	1500.00	1.15	411.58	0.01	6.9088383	
NO	0.2680	1500.00	0.51	201.46	0.00	4.2603612	
H2O	1738.87	1500.00	1299.22	2259171.90	6.85	27816.215	
TOTAL			18957.97	8,986,256	100	267468.36	

NET DIFFERENCE 68108

HEAT BALANCE FOR RTO - CASE B

COMBUSTION TEMPERATURE	1500 **oF**	NO	0.51 LB/MIN
N.GAS USAGE	49.34 **LB/MIN**	NO	30.72 LB/HR
N.GAS USAGE	65.35 **MMBTU/HR**	NOX AS NO2	47.11 LB/HR
			0.72 LB/MMBTU

FLUE GAS OXYGEN 8.06 **%**

INLET FUEL CONCENTRATION 4.24 **BTU/SCF**

FLUE GAS VOLUME SUMMARY @ COMBUSTOR

	DSCFM	WSCFM	ACFM
INLET	228783.75	254199.15	895474.26
OUTLET	239664.93	267481.14	992922.41
STACK	239664.93	267481.14	440942.71

STACK ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	PPM(WET)
N2	0.2505	410.41	15903.30	1507580.41	83.89	
O2	0.2181	410.41	1604.32	132408.35	8.46	
CO2	0.2179	410.41	146.97	12116.89	0.78	
CO	0.2179	410.41	2.51	206.96	0.01	132.41
SO2	0.1543	410.41	1.15	66.95	0.01	
NO2	0.2179	410.41	0.51	42.22	0.00	
H2O	1241.67	410.41	1299.22	1613202.76	6.85	
TOTAL			18957.97	3,265,625	100	

FINAL ENTHALPY	3,158,315
DIFFERENCE	-107,310
STACK TEMPERATURE	410 oF
GAIN	195 oF

B. STEAM ENTHALPY AT ATMOSHERIC PRESSURE

	A0	A1	A2	C
H2O	4.563E-01	1.666E-05	2.232E-07	1.069E+03

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE B

			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	BASIC	OXIDIZER UNIT		12,000,000
		ID FAN,MOTOR,ETC.		500,000
		DUCTWORK		100,000
	EQUIPMENT	TOTAL		12,600,000
	OTHER	INSTRUMENTS	0.01	126,000
		TAXES	0.06	756,000
		FREIGHT	0.10	1,260,000
		TOTAL		14,742,000
	INSTALLATION	FOUNDATIONS	0.08	1,179,360
		ERECTION	0.12	1,769,040
		ELECTRICAL	0.03	442,260
		PIPING	0.03	442,260
		INSULATION	0.02	294,840
		SITE PREPARATION	0.02	294,840
		TOTAL	0.30	4,422,600
DIRECT COSTS		TOTAL		19,164,600
INDIRECT COSTS		ENGINEERING/DESIGN	0.10	1,474,200
		CONST/FIELD EXPENSE	0.10	1,474,200
		CONTR.FEE	0.05	737,100
		START-UP	0.01	147,420
		PERFORMANCE TEST		10,000
		CONTINGENCIES	0.05	737,100
		TOTAL		4,580,020
RETROFIT PREMIUM (N/A)				0
TOTAL CAPITAL COST				23,744,620

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE B

ADJUSTED TOTAL CAPITAL COST 33,760,123

OPERATING COST(DIRECT)

UTILITIES	FAN STATIC PRESSURE	12.10	IN H2O
	FAN VOLUME	440943	ACFM
	FAN	1203.99	BHP
	FAN STATIC PRESSURE	5.00	IN H2O
	FAN VOLUME	12219	ACFM
	FAN	13.79	BHP
	CONNECTED LOAD	1217.78	BHP
	POWER	908.10	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	320,349	$/YR
	NATURAL GAS	65.35	MMBTU/HR
	COST	5.945	$/MMBTU
	ANNUAL COST	3,233,318	$/YR
MAINTENANCE LABOR & MATERIALS			
	5% OF DIRECT CAPITAL COST	958,230	$/YR

MAINTENANCE	LABOR	HR/YR	2000
	COST	$/HR	25.96
	COST	$/YR	51,920
OPERATOR	LABOR	HR/YR	7879
	COST	$/HR	33.17
	COST	$/YR	261,346
SUPERVISOR	LABOR	HR/YR	3293
	COST	$/HR	39.54
	COST	$/YR	130,205

TOTAL DIRECT OPERATING COST 4,955,368

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE B

ADJUSTED TOTAL DIRECT OPERATING COST			7,045,546
OPERATING COST(INDIRECT)	OVERHEAD	%	44.00
		$/YR	195,128
	PROPERTY TAX	%	1.46
		$/YR	346,425
	INSURANCE	%	1.00
		$/YR	237,446
	ADMINISTRATION	%	2.00
		$/YR	474,892
	CAPITAL RECOVERY	%-INTEREST	10.00
		LIFE-YEARS	10.00
		FACTOR	0.162745
		$/YR	3,864,328
TOTAL INDIRECT OPERATING COST			5,118,218
TOTAL ANNUAL COST		$/YR	10,073,586
ADJUSTED TOTAL ANNUAL COST		$/YR	14,322,634
EMISSIONS REDUCTION		T/YR	2373.66

PLANT COSTS

POWER COST		0.04239 $/KWH
PROPERTY TAX RATE		2.4316 $/100 @ 60%
	=	1.4590 %
CAPITAL RECOVERY RATE		10 %
LABOR COSTS		
SUPERVISOR		39.54 $/HR
OPERATOR		33.17 $/HR
1ST CLASS MAINTENANCE		25.96 $/HR
1ST CLASS ELECTRICIAN		25.96 $/HR
1ST CLASS WELDER		25.96 $/HR
GENERAL LABOR		18.00 $/HR
NATURAL GAS		5.945 $/MMBTU

APPENDIX C
NO_x, TSP, PM_{10}, and $PM_{2.5}$ Modeling Analyses

PRELIMINARY AIR QUALITY MODELING ASSESSMENT FOR SUMTER COUNTY CEMENT CENTER HILL, FLORIDA CEMENT PLANT

Prepared by:
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Prepared for:
Sumter Cement Company, LLC
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Branford, Florida 32008

June 2005

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1.0 Introduction

A preliminary air quality modeling analysis for the new 1.5 million short tons of clinker per year preheater/precalciner kiln system has been performed and the details are provided in the following Appendix. The new Center Hill Plant (Plant) is to be located in the town of Center Hill in Sumter County, Florida. The proposed Plant location; main kiln stack potential-to-emit (PTE) air emissions of SO_2, NO_x, CO, TSP, and PM_{10}; and main kiln stack characteristics were evaluated in the preliminary air quality modeling analysis. Upon completion of detailed engineering a complete modeling analysis will be completed and add to supplement the preliminary air quality modeling analysis.

Provided in Section 2.0 of this report are the details of the preliminary air quality permitting assessment. This preliminary assessment includes the following:

- A description and the results of the preliminary air quality dispersion modeling screening analysis that was conducted to determine if the PTE emissions from only the new kiln stack will exceed United States Environmental Protection Agency (U.S. EPA) and Florida Department of Environmental Protection (DEP) significance levels for air quality impacts in designated PSD Class II areas.

- Determination of the significant impact area (SIA) for SO_2, NO_x, CO, TSP, and PM_{10} from only the new kiln stack.

- Identification of the existing Florida DEP ambient air quality monitoring stations located within the modeling domain of the proposed Plant.

- An analysis of the ambient air quality monitoring data to determine if any of these ambient air quality monitoring stations can be used to represent "background" ambient air quality for the proposed Plant.

- Identification of the existing air emission sources located within the modeling domain. These existing air emission sources would represent the modeling air emission inventories associated with a National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration of Air Quality (PSD) Class II increment air quality dispersion modeling analyses.

- Identification of Federal Class I areas located within 300 kilometers of the proposed Plant.

A final refined modeling analysis is planned to be performed to assess the refined SIA and compliance with the National Ambient Air Quality Standards (NAAQS) for NO_2 and Particulate (TSP, PM_{10}, and $PM_{2.5}$ [as PM_{10}] since these are the only pollutants expected to have predicted impacts above established Significant Impact Levels (SILs). Also, PSD Class I and II increment consumption modeling analysis is also proposed to be performed for NO_2 and PM_{10}. Additionally, a screening visibility impairment modeling to assess impact to the surrounding Class I areas within 300 kilometers is also planned to be

performed upon completion of engineering for the new plant. As stated before, this information will be submitted to supplement the following Modeling Analysis.

2.0 Preliminary Air Quality Permitting Assessment

2.1 Significant Impact Area

The significant impact area (SIA) is the geographical area in which a "significant" ambient impact is predicted to occur associated with the PTE emissions of SO_2, NO_x, CO, TSP, and PM_{10} emitted from the operation of the new kiln system. Each of these pollutants, for each applicable averaging time, needs to be assessed to determine if a SIA exists. An approved U.S. EPA air quality dispersion model is required to be used to make these determinations. A SIA is established if the predicted modeled offsite maximum concentration of a pollutant and corresponding averaging time exceeds the established "significance level." Table 1 presents the established "significance levels" of air quality impacts on PSD Class II areas as presented in the U.S. EPA New Source Review Workshop Manual, Draft; October 1990.

If the screening modeling analysis indicates that the predicted highest concentration exceeds the applicable significance impact level (SIL), the distance from the proposed Plant to where the predicted impact becomes insignificant will be determined. If a SIA is predicted to occur, then the proposed Plant will likely be required by the Florida DEP to perform refined air quality dispersion modeling for that pollutant. Conversely, if a SIA is predicted not to occur, then the proposed Plant will likely not be required by the Florida DEP to perform refined air quality dispersion modeling for that pollutant.

The SIA defines the "*modeling domain.*" The modeling domain is the maximum distance (Significant Impact Distance plus 50 kilometers) from the proposed Plant that PSD Class II increment consuming and existing NAAQS air emission sources would have to be included as part of a refined modeling analysis. The modeling domain also defines the geographic area that the refined air quality dispersion modeling receptor network would have to cover.

2.2 SCREEN3 Modeling Analysis

The U.S. EPA approved SCREEN3 air quality dispersion model was used to determine the predicted maximum (first highest) offsite concentration expected from the operation of the proposed kiln system only. The air pollutants modeled were SO_2, NO_x, CO, TSP, and PM_{10}. The modeling results were used to determine whether a SIA exists for SO_2, NO_x, CO, TSP, and PM_{10}. The SCREEN3 model is the recommended model of the U.S. EPA to calculate screening-level impact estimates from stationary sources.

The SCREEN3 model is a single source model and can provide estimates of concentration for distances from the source up to 100 kilometers. The SCREEN3

model examines a full range of meteorological conditions, including all stability classes and wind speeds, to find maximum impacts. Flat terrain was assumed for this screening modeling analysis. However, simple elevated terrain up to a maximum height of 312 feet (Sugarloaf) does exist within approximately 15 miles of the proposed Plant. Table 2 presents the results of the SCREEN3 modeling analysis.

2.3 Preliminary Significant Impact Area Analysis

Table 3 presents a summary of the preliminary SIA analysis performed for the proposed kiln system only. As shown by Table 3, NO_x was the only pollutant to have a predicted highest concentration greater than the established corresponding SIL. A maximum annual NO_x concentration of 6.9 $\mu g/m^3$ was predicted to occur at a distance of 0.95 kilometers from the proposed Plant. The annual NO_x concentration did not fall below the annual NO_x significance level of 1.0 $\mu g/m^3$ until a distance of approximately 29 kilometers was reached from the proposed Plant. As shown by Table 3, all other modeled pollutants (SO_2, CO, TSP, and PM_{10}) were below their corresponding SILs. However, when all other particulate sources are accounted for and refined modeling is performed, the proposed Plant is expected to have a maximum predicted offsite concentration above the corresponding 24-hour and annual SILs for PM_{10}.

To determine the NAAQS and PSD Class II increment modeling domain for NO_x, 50 kilometers was added to the maximum NO_x SIA distance of 29 kilometers per U.S. EPA guidance. Therefore, a 79 kilometer SIA or modeling domain was calculated to represent the modeling domain for NO_x. Attachment A provides the SCREEN3 model input and output information.

2.4 Air Emissions Inventories

Circumscription of a circle with a radius of 79 kilometers from the proposed Plant was performed to represent the NO_x SIA. This circle encompassed 13 Florida counties. An air emissions inventory of all NO_x air emission sources that emit greater than 10 tons per year which are located in these 13 Florida counties was provided by DEP. TSP and PM_{10} emissions for the same modeling domain were also requested from the Florida DEP since it is anticipated that when other TSP and PM_{10} emission sources from the proposed Plant are accounted for, TSP and PM_{10} will likely exceed their corresponding significance level thresholds.

The Florida DEP 2002 and 2003 air emission inventories were reviewed and processed to develop an average 2002/ 2003 air emission inventory for each applicable air emission source. The air emission sources were then screened using the "*20D Rule.*" The 20D Rule is a commonly used method which is accepted by the Florida DEP to screen out air emission sources based on the individual source emissions and distance from a proposed site location. Therefore, using the 20D Rule, final NO_x, TSP, and PM_{10} air emission inventories can be developed. Each inventory will consist of individual air emission sources whose annual actual average emissions

are greater than 20 times the distance in kilometers to the proposed Plant. For example, if an individual air emission source is located 10 kilometers from the proposed Plant, its emissions would have to exceed 200 tons per year to be included as part of the final inventory.

Only NO_x and TSP had individual air emission sources remaining after the 20D screening analysis was performed. The location of these NO_x and TSP sources are depicted in Figures 1 and 2, respectively. Table 4 presents a detailed listing of these individual air emission sources. As shown by Table 4, there are six significant NO_x air emission sources and one significant TSP air emission source that are located within 79 kilometers of the proposed Plant. These sources would need to be assessed for future NAAQS and PSD Class II increment compliance. Attachment B provides a listing of the NO_x and TSP 2002 and 2003 actual air emissions inventories as provided to Spectrum by the Florida DEP.

2.5 Attainment Status

As the result of a review of the U.S. EPA and Florida DEP websites conducted on February 16, 2005, all of the 13 Florida counties contained in the modeling domain are classified as attainment for all criteria air pollutants. In fact, the entire State of Florida is classified as attainment for all criteria air pollutants.

2.6 Background Ambient Air Quality

A review of the Florida DEP website was conducted and the "*Florida Air Monitoring Report – 2003*" document was obtained from this website. From a review of this document, it was determined that:

- Four (4) Carbon Monoxide (CO) ambient air quality monitors are located within the 13 Florida county modeling domain.

- Three (3) Nitrogen Dioxide (NO_2) ambient air quality monitors are located within the 13 Florida county modeling domain.

- Sixteen (16) Particulate Matter (PM_{10}) ambient air quality monitors are located within the 13 Florida county modeling domain.

- Nine (9) SO_2 ambient air quality monitors are located within the 13 Florida county modeling domain.

Tables 5 through 8 present a summary of the ambient air quality monitoring data for CO, NO_2, PM_{10}, and SO_2, respectively from these individual monitoring sites. Data measured for the last five years (1999 – 2003) was assessed for 28 monitoring sites since four PM_{10} monitoring stations located in Orange County were not reported in the document. At the end of each of these tables, an average concentration is presented for each applicable averaging period. To be conservative in estimating

"background" ambient air quality, no monitoring locations were excluded from the analysis.

The 28 monitoring sites represent a combination of Micro, Middle, Neighborhood, and Urban spatial scales. The spatial scale is used to establish a link between the general monitoring objective and the physical location of the monitor. A description of each of these spatial scales is provided below.

- **Micro Scale**

The micro scale has dimensions from several meters to 100 meters and is used primarily for siting CO monitors near roadways and other areas of high vehicular traffic activity. Measurements on the micro scale typically include concentrations in street canyons, over sidewalks, and in areas next to major roadways. Future exclusion of micro scale sites from this analysis is recommended should refined modeling be required to be performed.

- **Middle Scale**

The middle scale has dimensions ranging from 100 to 500 meters. Many of these measurements of short-term public exposure to particulate matter and CO are on this scale. Measurements for the middle scale typically include downtown areas and areas adjacent to major roadways and parking lots. Future exclusion of middle scale sites from this analysis is recommended should refined modeling be required to be performed.

- **Neighborhood Scale**

This scale is the most widely used. The dimensions range from one-half to four kilometers. Generally, these stations represent suburban areas with moderate to high population densities. These measurements provide useful information on trends and compliance with standards. Inclusion of neighborhood scale data to represent background is recommended if no regional scale monitoring data are available should refined modeling be required to be performed.

- **Urban Scale**

The urban scale dimensions range from four to 50 kilometers. This scale represents conditions over an entire metropolitan area and is useful in assessing city-wide trends in air quality. Future exclusion of urban scale sites from this analysis is recommended should refined modeling be required to be performed.

- **Regional Scale**

The regional scale is intended to characterize areas with dimensions of several hundred kilometers. Regional scale measurements are used most often for sparsely populated areas with reasonably uniform ground cover. Such measurements provide information on background air quality. Use of regional scale data to represent background is recommended should refined modeling be required to be performed.

The preliminary analysis presented below is considered very conservative since it utilized all the monitoring data reported from the 28 monitoring sites, exclusive of spatial scale, to represent "*background*" ambient air quality. However, none of the 28 monitoring sites located in the 13 Florida county modeling domain was classified as Regional Scale. Table 9 presents a summary of the "average background concentration" when monitoring data from all 28 monitoring locations was used. As shown by Table 9, the monitoring data are presented as a percent consumed of the corresponding Florida ambient air quality standards (AAQS). These percentages range from a maximum of 46.2 percent of the Florida PM_{10} annual AAQS to a minimum of 13.4 percent consumed of the Florida 3-hour SO_2 AAQS.

Should only Neighborhood spatial scale monitoring stations be used, 10 of the 28 monitoring stations would be eliminated from the analysis. Table 10 presents the results using Neighborhood scale monitoring data only. As demonstrated by Table 10, the monitoring data are presented as a percent consumed of the corresponding Florida ambient air quality standards (AAQS). These percentages range from a maximum of 46.1 percent of the Florida PM_{10} annual AAQS to a minimum of 11.4 percent consumed of the Florida 3-hour SO_2 AAQS.

2.7 Federal PSD Class I Areas

Figure 3 presents the four PSD Class I areas that are located within 300 kilometers of the proposed Plant. The Federal Land Manager (FLM) requirements regulating the air quality and visibility impairment analyses applicable to these four PSD Class I areas were previously based on the Interagency Workgroup on Air Quality Modeling (IWAQM) guidance. The current FLM requirements regulating these analyses are now based on new Federal Land Managers Air Quality Related Values Workgroup (FLAG) guidance. The closest PSD Class I area to the proposed Plant is the Fish & Wildlife Service (FWS) Chassahowitzka National Wildlife Refuge (NWR) Area that is located 62 kilometers to the west of the proposed Plant.

Use of the U.S. EPA approved CALPUFF model run in the "*screening mode*" is planned to be performed to assess the predicted impact on PSD Class I increment consumption and visibility impairment at these four PSD Class I areas. Table 11 lists the "draft" EPA significance levels for air quality impacts in PSD Class I areas which are generally accepted by the regulatory community. Table 12 provides FLM FLAG guidance for performing a visibility impairment and deposition analysis in PSD Class I areas. Table 13 presents FLM guidance for performing a PSD Class I increment analysis and national ambient air quality standards (NAAQS) analyses in Class I areas.

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If the screening modeling analysis indicates that the predicted highest concentration exceeds the applicable significance impact level (SIL), the distance from the proposed Plant to where the predicted impact becomes insignificant will be determined. If a SIA is predicted to occur, then the proposed Plant will likely be required by the Florida DEP to perform refined air quality dispersion modeling for that pollutant. Conversely, if a SIA is predicted not to occur, then the proposed Plant will likely not be required by the Florida DEP to perform refined air quality dispersion modeling for that pollutant.

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2.3 Preliminary Significant Impact Area Analysis

Table 3 presents a summary of the preliminary SIA analysis performed for the proposed kiln system only. As shown by Table 3, NO_x was the only pollutant to have a predicted highest concentration greater than the established corresponding SIL. A maximum annual NO_x concentration of 6.9 $\mu g/m^3$ was predicted to occur at a distance of 0.95 kilometers from the proposed Plant. The annual NO_x concentration did not fall below the annual NO_x significance level of 1.0 $\mu g/m^3$ until a distance of approximately 29 kilometers was reached from the proposed Plant. As shown by Table 3, all other modeled pollutants (SO_2, CO, TSP, and PM_{10}) were below their corresponding SILs. However, when all other particulate sources are accounted for and refined modeling is performed, the proposed Plant is expected to have a maximum predicted offsite concentration above the corresponding 24-hour and annual SILs for PM_{10}.

To determine the NAAQS and PSD Class II increment modeling domain for NO_x, 50 kilometers was added to the maximum NO_x SIA distance of 29 kilometers per U.S. EPA guidance. Therefore, a 79 kilometer SIA or modeling domain was calculated to represent the modeling domain for NO_x. Attachment A provides the SCREEN3 model input and output information.

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- **Micro Scale**

The micro scale has dimensions from several meters to 100 meters and is used primarily for siting CO monitors near roadways and other areas of high vehicular traffic activity. Measurements on the micro scale typically include concentrations in street canyons, over sidewalks, and in areas next to major roadways. Future exclusion of micro scale sites from this analysis is recommended should refined modeling be required to be performed.

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This scale is the most widely used. The dimensions range from one-half to four kilometers. Generally, these stations represent suburban areas with moderate to high population densities. These measurements provide useful information on trends and compliance with standards. Inclusion of neighborhood scale data to represent background is recommended if no regional scale monitoring data are available should refined modeling be required to be performed.

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- **Regional Scale**

The regional scale is intended to characterize areas with dimensions of several hundred kilometers. Regional scale measurements are used most often for sparsely populated areas with reasonably uniform ground cover. Such measurements provide information on background air quality. Use of regional scale data to represent background is recommended should refined modeling be required to be performed.

The preliminary analysis presented below is considered very conservative since it utilized all the monitoring data reported from the 28 monitoring sites, exclusive of spatial scale, to represent "*background*" ambient air quality. However, none of the 28 monitoring sites located in the 13 Florida county modeling domain was classified as Regional Scale. Table 9 presents a summary of the "average background concentration" when monitoring data from all 28 monitoring locations was used. As shown by Table 9, the monitoring data are presented as a percent consumed of the corresponding Florida ambient air quality standards (AAQS). These percentages range from a maximum of 46.2 percent of the Florida PM_{10} annual AAQS to a minimum of 13.4 percent consumed of the Florida 3-hour SO_2 AAQS.

Should only Neighborhood spatial scale monitoring stations be used, 10 of the 28 monitoring stations would be eliminated from the analysis. Table 10 presents the results using Neighborhood scale monitoring data only. As demonstrated by Table 10, the monitoring data are presented as a percent consumed of the corresponding Florida ambient air quality standards (AAQS). These percentages range from a maximum of 46.1 percent of the Florida PM_{10} annual AAQS to a minimum of 11.4 percent consumed of the Florida 3-hour SO_2 AAQS.

2.7 Federal PSD Class I Areas

Figure 3 presents the four PSD Class I areas that are located within 300 kilometers of the proposed Plant. The Federal Land Manager (FLM) requirements regulating the air quality and visibility impairment analyses applicable to these four PSD Class I areas were previously based on the Interagency Workgroup on Air Quality Modeling (IWAQM) guidance. The current FLM requirements regulating these analyses are now based on new Federal Land Managers Air Quality Related Values Workgroup (FLAG) guidance. The closest PSD Class I area to the proposed Plant is the Fish & Wildlife Service (FWS) Chassahowitzka National Wildlife Refuge (NWR) Area that is located 62 kilometers to the west of the proposed Plant.

Use of the U.S. EPA approved CALPUFF model run in the "*screening mode*" is planned to be performed to assess the predicted impact on PSD Class I increment consumption and visibility impairment at these four PSD Class I areas. Table 11 lists the "draft" EPA significance levels for air quality impacts in PSD Class I areas which are generally accepted by the regulatory community. Table 12 provides FLM FLAG guidance for performing a visibility impairment and deposition analysis in PSD Class I areas. Table 13 presents FLM guidance for performing a PSD Class I increment analysis and national ambient air quality standards (NAAQS) analyses in Class I areas.

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1.0 Introduction

A preliminary air quality modeling analysis for the new 1.5 million short tons of clinker per year preheater/precalciner kiln system has been performed and the details are provided in the following Appendix. The new Center Hill Plant (Plant) is to be located in the town of Center Hill in Sumter County, Florida. The proposed Plant location; main kiln stack potential-to-emit (PTE) air emissions of SO_2, NO_x, CO, TSP, and PM_{10}; and main kiln stack characteristics were evaluated in the preliminary air quality modeling analysis. Upon completion of detailed engineering a complete modeling analysis will be completed and add to supplement the preliminary air quality modeling analysis.

Provided in Section 2.0 of this report are the details of the preliminary air quality permitting assessment. This preliminary assessment includes the following:

- A description and the results of the preliminary air quality dispersion modeling screening analysis that was conducted to determine if the PTE emissions from only the new kiln stack will exceed United States Environmental Protection Agency (U.S. EPA) and Florida Department of Environmental Protection (DEP) significance levels for air quality impacts in designated PSD Class II areas.

- Determination of the significant impact area (SIA) for SO_2, NO_x, CO, TSP, and PM_{10} from only the new kiln stack.

- Identification of the existing Florida DEP ambient air quality monitoring stations located within the modeling domain of the proposed Plant.

- An analysis of the ambient air quality monitoring data to determine if any of these ambient air quality monitoring stations can be used to represent "background" ambient air quality for the proposed Plant.

- Identification of the existing air emission sources located within the modeling domain. These existing air emission sources would represent the modeling air emission inventories associated with a National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration of Air Quality (PSD) Class II increment air quality dispersion modeling analyses.

- Identification of Federal Class I areas located within 300 kilometers of the proposed Plant.

A final refined modeling analysis is planned to be performed to assess the refined SIA and compliance with the National Ambient Air Quality Standards (NAAQS) for NO_2 and Particulate (TSP, PM_{10}, and $PM_{2.5}$ [as PM_{10}] since these are the only pollutants expected to have predicted impacts above established Significant Impact Levels (SILs). Also, PSD Class I and II increment consumption modeling analysis is also proposed to be performed for NO_2 and PM_{10}. Additionally, a screening visibility impairment modeling to assess impact to the surrounding Class I areas within 300 kilometers is also planned to be

performed upon completion of engineering for the new plant. As stated before, this information will be submitted to supplement the following Modeling Analysis.

2.0 Preliminary Air Quality Permitting Assessment

2.1 Significant Impact Area

The significant impact area (SIA) is the geographical area in which a "significant" ambient impact is predicted to occur associated with the PTE emissions of SO_2, NO_x, CO, TSP, and PM_{10} emitted from the operation of the new kiln system. Each of these pollutants, for each applicable averaging time, needs to be assessed to determine if a SIA exists. An approved U.S. EPA air quality dispersion model is required to be used to make these determinations. A SIA is established if the predicted modeled offsite maximum concentration of a pollutant and corresponding averaging time exceeds the established "significance level." Table 1 presents the established "significance levels" of air quality impacts on PSD Class II areas as presented in the U.S. EPA New Source Review Workshop Manual, Draft; October 1990.

If the screening modeling analysis indicates that the predicted highest concentration exceeds the applicable significance impact level (SIL), the distance from the proposed Plant to where the predicted impact becomes insignificant will be determined. If a SIA is predicted to occur, then the proposed Plant will likely be required by the Florida DEP to perform refined air quality dispersion modeling for that pollutant. Conversely, if a SIA is predicted not to occur, then the proposed Plant will likely not be required by the Florida DEP to perform refined air quality dispersion modeling for that pollutant.

The SIA defines the "*modeling domain.*" The modeling domain is the maximum distance (Significant Impact Distance plus 50 kilometers) from the proposed Plant that PSD Class II increment consuming and existing NAAQS air emission sources would have to be included as part of a refined modeling analysis. The modeling domain also defines the geographic area that the refined air quality dispersion modeling receptor network would have to cover.

2.2 SCREEN3 Modeling Analysis

The U.S. EPA approved SCREEN3 air quality dispersion model was used to determine the predicted maximum (first highest) offsite concentration expected from the operation of the proposed kiln system only. The air pollutants modeled were SO_2, NO_x, CO, TSP, and PM_{10}. The modeling results were used to determine whether a SIA exists for SO_2, NO_x, CO, TSP, and PM_{10}. The SCREEN3 model is the recommended model of the U.S. EPA to calculate screening-level impact estimates from stationary sources.

The SCREEN3 model is a single source model and can provide estimates of concentration for distances from the source up to 100 kilometers. The SCREEN3

model examines a full range of meteorological conditions, including all stability classes and wind speeds, to find maximum impacts. Flat terrain was assumed for this screening modeling analysis. However, simple elevated terrain up to a maximum height of 312 feet (Sugarloaf) does exist within approximately 15 miles of the proposed Plant. Table 2 presents the results of the SCREEN3 modeling analysis.

2.3 Preliminary Significant Impact Area Analysis

Table 3 presents a summary of the preliminary SIA analysis performed for the proposed kiln system only. As shown by Table 3, NO_x was the only pollutant to have a predicted highest concentration greater than the established corresponding SIL. A maximum annual NO_x concentration of 6.9 $\mu g/m^3$ was predicted to occur at a distance of 0.95 kilometers from the proposed Plant. The annual NO_x concentration did not fall below the annual NO_x significance level of 1.0 $\mu g/m^3$ until a distance of approximately 29 kilometers was reached from the proposed Plant. As shown by Table 3, all other modeled pollutants (SO_2, CO, TSP, and PM_{10}) were below their corresponding SILs. However, when all other particulate sources are accounted for and refined modeling is performed, the proposed Plant is expected to have a maximum predicted offsite concentration above the corresponding 24-hour and annual SILs for PM_{10}.

To determine the NAAQS and PSD Class II increment modeling domain for NO_x, 50 kilometers was added to the maximum NO_x SIA distance of 29 kilometers per U.S. EPA guidance. Therefore, a 79 kilometer SIA or modeling domain was calculated to represent the modeling domain for NO_x. Attachment A provides the SCREEN3 model input and output information.

2.4 Air Emissions Inventories

Circumscription of a circle with a radius of 79 kilometers from the proposed Plant was performed to represent the NO_x SIA. This circle encompassed 13 Florida counties. An air emissions inventory of all NO_x air emission sources that emit greater than 10 tons per year which are located in these 13 Florida counties was provided by DEP. TSP and PM_{10} emissions for the same modeling domain were also requested from the Florida DEP since it is anticipated that when other TSP and PM_{10} emission sources from the proposed Plant are accounted for, TSP and PM_{10} will likely exceed their corresponding significance level thresholds.

The Florida DEP 2002 and 2003 air emission inventories were reviewed and processed to develop an average 2002/ 2003 air emission inventory for each applicable air emission source. The air emission sources were then screened using the "*20D Rule.*" The 20D Rule is a commonly used method which is accepted by the Florida DEP to screen out air emission sources based on the individual source emissions and distance from a proposed site location. Therefore, using the 20D Rule, final NO_x, TSP, and PM_{10} air emission inventories can be developed. Each inventory will consist of individual air emission sources whose annual actual average emissions

are greater than 20 times the distance in kilometers to the proposed Plant. For example, if an individual air emission source is located 10 kilometers from the proposed Plant, its emissions would have to exceed 200 tons per year to be included as part of the final inventory.

Only NO_x and TSP had individual air emission sources remaining after the 20D screening analysis was performed. The location of these NO_x and TSP sources are depicted in Figures 1 and 2, respectively. Table 4 presents a detailed listing of these individual air emission sources. As shown by Table 4, there are six significant NO_x air emission sources and one significant TSP air emission source that are located within 79 kilometers of the proposed Plant. These sources would need to be assessed for future NAAQS and PSD Class II increment compliance. Attachment B provides a listing of the NO_x and TSP 2002 and 2003 actual air emissions inventories as provided to Spectrum by the Florida DEP.

2.5 Attainment Status

As the result of a review of the U.S. EPA and Florida DEP websites conducted on February 16, 2005, all of the 13 Florida counties contained in the modeling domain are classified as attainment for all criteria air pollutants. In fact, the entire State of Florida is classified as attainment for all criteria air pollutants.

2.6 Background Ambient Air Quality

A review of the Florida DEP website was conducted and the "*Florida Air Monitoring Report – 2003*" document was obtained from this website. From a review of this document, it was determined that:

- Four (4) Carbon Monoxide (CO) ambient air quality monitors are located within the 13 Florida county modeling domain.

- Three (3) Nitrogen Dioxide (NO_2) ambient air quality monitors are located within the 13 Florida county modeling domain.

- Sixteen (16) Particulate Matter (PM_{10}) ambient air quality monitors are located within the 13 Florida county modeling domain.

- Nine (9) SO_2 ambient air quality monitors are located within the 13 Florida county modeling domain.

Tables 5 through 8 present a summary of the ambient air quality monitoring data for CO, NO_2, PM_{10}, and SO_2, respectively from these individual monitoring sites. Data measured for the last five years (1999 – 2003) was assessed for 28 monitoring sites since four PM_{10} monitoring stations located in Orange County were not reported in the document. At the end of each of these tables, an average concentration is presented for each applicable averaging period. To be conservative in estimating

"background" ambient air quality, no monitoring locations were excluded from the analysis.

The 28 monitoring sites represent a combination of Micro, Middle, Neighborhood, and Urban spatial scales. The spatial scale is used to establish a link between the general monitoring objective and the physical location of the monitor. A description of each of these spatial scales is provided below.

- **Micro Scale**

The micro scale has dimensions from several meters to 100 meters and is used primarily for siting CO monitors near roadways and other areas of high vehicular traffic activity. Measurements on the micro scale typically include concentrations in street canyons, over sidewalks, and in areas next to major roadways. Future exclusion of micro scale sites from this analysis is recommended should refined modeling be required to be performed.

- **Middle Scale**

The middle scale has dimensions ranging from 100 to 500 meters. Many of these measurements of short-term public exposure to particulate matter and CO are on this scale. Measurements for the middle scale typically include downtown areas and areas adjacent to major roadways and parking lots. Future exclusion of middle scale sites from this analysis is recommended should refined modeling be required to be performed.

- **Neighborhood Scale**

This scale is the most widely used. The dimensions range from one-half to four kilometers. Generally, these stations represent suburban areas with moderate to high population densities. These measurements provide useful information on trends and compliance with standards. Inclusion of neighborhood scale data to represent background is recommended if no regional scale monitoring data are available should refined modeling be required to be performed.

- **Urban Scale**

The urban scale dimensions range from four to 50 kilometers. This scale represents conditions over an entire metropolitan area and is useful in assessing city-wide trends in air quality. Future exclusion of urban scale sites from this analysis is recommended should refined modeling be required to be performed.

- **Regional Scale**

The regional scale is intended to characterize areas with dimensions of several hundred kilometers. Regional scale measurements are used most often for sparsely populated areas with reasonably uniform ground cover. Such measurements provide information on background air quality. Use of regional scale data to represent background is recommended should refined modeling be required to be performed.

The preliminary analysis presented below is considered very conservative since it utilized all the monitoring data reported from the 28 monitoring sites, exclusive of spatial scale, to represent "*background*" ambient air quality. However, none of the 28 monitoring sites located in the 13 Florida county modeling domain was classified as Regional Scale. Table 9 presents a summary of the "average background concentration" when monitoring data from all 28 monitoring locations was used. As shown by Table 9, the monitoring data are presented as a percent consumed of the corresponding Florida ambient air quality standards (AAQS). These percentages range from a maximum of 46.2 percent of the Florida PM_{10} annual AAQS to a minimum of 13.4 percent consumed of the Florida 3-hour SO_2 AAQS.

Should only Neighborhood spatial scale monitoring stations be used, 10 of the 28 monitoring stations would be eliminated from the analysis. Table 10 presents the results using Neighborhood scale monitoring data only. As demonstrated by Table 10, the monitoring data are presented as a percent consumed of the corresponding Florida ambient air quality standards (AAQS). These percentages range from a maximum of 46.1 percent of the Florida PM_{10} annual AAQS to a minimum of 11.4 percent consumed of the Florida 3-hour SO_2 AAQS.

2.7 Federal PSD Class I Areas

Figure 3 presents the four PSD Class I areas that are located within 300 kilometers of the proposed Plant. The Federal Land Manager (FLM) requirements regulating the air quality and visibility impairment analyses applicable to these four PSD Class I areas were previously based on the Interagency Workgroup on Air Quality Modeling (IWAQM) guidance. The current FLM requirements regulating these analyses are now based on new Federal Land Managers Air Quality Related Values Workgroup (FLAG) guidance. The closest PSD Class I area to the proposed Plant is the Fish & Wildlife Service (FWS) Chassahowitzka National Wildlife Refuge (NWR) Area that is located 62 kilometers to the west of the proposed Plant.

Use of the U.S. EPA approved CALPUFF model run in the "*screening mode*" is planned to be performed to assess the predicted impact on PSD Class I increment consumption and visibility impairment at these four PSD Class I areas. Table 11 lists the "draft" EPA significance levels for air quality impacts in PSD Class I areas which are generally accepted by the regulatory community. Table 12 provides FLM FLAG guidance for performing a visibility impairment and deposition analysis in PSD Class I areas. Table 13 presents FLM guidance for performing a PSD Class I increment analysis and national ambient air quality standards (NAAQS) analyses in Class I areas.

Table 1
Significance Levels for Air Quality Impacts in Class II Areas
($\mu g/m^3$)

POLLUTANT	ANNUAL	24-HOUR	8-HOUR	3-HOUR	1-HOUR
SO_2	1	5	-	25	-
TSP	1	5	-	-	-
PM_{10}	1	5	-	-	-
NO_X	1	-	-	-	-
CO	-	-	500	-	2,000
O_3	-	-	-	-	See Note

NOTE:
NO SIGNIFICANT AMBIENT IMPACT CONCENTRATION HAS BEEN ESTABLISHED.

Table 2
SCREEN3 Modeling Results[1]
($\mu g/m^3$)

POLLUTANT	AVERAGING TIME				
	1-HOUR	3-HOUR	8-HOUR	24-HOUR	ANNUAL
CO	188.90	N/A	132.23	N/A	N/A
SO_2	11.80	10.62	N/A	4.72	0.86
NO_x	N/A	N/A	N/A	N/A	6.89
PM_{10}	7.83	N/A	N/A	3.13	0.57
TSP	9.21	N/A	N/A	3.68	0.67

NOTE:
1. SCREEN3 PREDICTED A MAXIMUM IMPACT FOR ALL POLLUTANTS TO OCCUR AT 0.95 KILOMETERS FROM THE PROPOSED PLANT.

Table 3
SIA Analysis
($\mu g/m^3$)

1-HOUR SIA ANALYSIS			
POLLUTANT	SCREEN3 1-HOUR	SIGNIFICANCE LEVEL 1- HOUR	SIGNIFICANCE LEVEL EXCEEDED?
CO	188.90	2,000	NO
SO_2	11.80	NO SIGNIFICANCE LEVEL	N/A
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	7.83	NO SIGNIFICANCE LEVEL	N/A
TSP	9.21	NO SIGNIFICANCE LEVEL	N/A

3-HOUR SIA ANALYSIS			
POLLUTANT	SCREEN3 3-HOUR	SIGNIFICANCE LEVEL 3- HOUR	SIGNIFICANCE LEVEL EXCEEDED?
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	10.62	25	NO
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	N/A	NO SIGNIFICANCE LEVEL	N/A
TSP	N/A	NO SIGNIFICANCE LEVEL	N/A

8-HOUR SIA ANALYSIS			
POLLUTANT	SCREEN3 8-HOUR	SIGNIFICANCE LEVEL 8- HOUR	SIGNIFICANCE LEVEL EXCEEDED?
CO	132.23	500	NO
SO_2	N/A	NO SIGNIFICANCE LEVEL	N/A
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	N/A	NO SIGNIFICANCE LEVEL	N/A
TSP	N/A	NO SIGNIFICANCE LEVEL	N/A

24-HOUR SIA ANALYSIS			
POLLUTANT	SCREEN3 24-HOUR	SIGNIFICANCE EVEL 24- HOUR	SIGNIFICANCE LEVEL EXCEEDED?
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	4.72	5	NO
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	3.13	5	NO
TSP	3.68	5	NO

ANNUAL SIA ANALYSIS			
POLLUTANT	SCREEN3 ANNUAL	SIGNIFICANCE LEVEL ANNUAL	SIGNIFICANCE LEVEL EXCEEDED?
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	0.86	1	NO
NO_x	6.89	1	YES
PM_{10}	0.57	1	NO
TSP	0.67	1	NO

Table 4
20D Rule Screened Air Emission Sources Within 79 Kilometers of Proposed Plant

NO$_x$			
SOURCE NAME	SOURCE LOCATION	DISTANCE FROM PROPOSED PLANT (KILOMETERS)	2002/2003 AVERAGE ACTUAL EMISSIONS (TONS/YEAR)
CRYSTAL RIVER POWER PLANT	CRYSTAL RIVER	70	33,227
CEMEX PORTLAND CEMENT PLANT	BROOKSVILLE	45	1,285
RINKER MATERIALS BROOKSVILLE PLANT	BROOKSVILLE	42	3,192
COVANTA LAKE WASTE-TO-ENERGY	OKEHUMPKA	15	420
CD McINTOSH JR. POWER PLANT	LAKELAND	64	6,747
SANFORD POWER PLANT	DeBARY	69	2,017
TOTAL			**46,888**

TSP			
SOURCE NAME	SOURCE LOCATION	DISTANCE FROM PROPOSED PLANT (KILOMETERS)	2002/2003 AVERAGE ACTUAL EMISSIONS (TONS/YEAR)
CRYSTAL RIVER POWER PLANT	CRYSTAL RIVER	65	1,488
TOTAL			**1,488**

Table 5
Summary of Representative CO Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPM)	
						HIGHEST 1-HOUR	HIGHEST 8-HOUR
CO	HILLSBOROUGH	TAMPA	057-1070	MICRO	2003	7.0	4.0
					2002	5.0	5.0
					2001	6.0	3.0
					2000	6.0	3.0
					1999	6.0	4.0
AVERAGE						6.0	3.8

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPM)	
						HIGHEST 1-HOUR	HIGHEST 8-HOUR
CO	HILLSBOROUGH	TAMPA	057-4004	NEIGHBORHOOD	2003	2.0	1.0
					2002	3.0	2.0
					2001	5.0	2.0
					2000	3.0	2.0
					1999	4.0	2.0
AVERAGE						3.4	1.8

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPM)	
						HIGHEST 1-HOUR	HIGHEST 8-HOUR
CO	ORANGE	ORLANDO	095-1005	MICRO	2003	3.0	2.0
					2002	5.0	3.0
					2001	4.0	2.0
					2000	5.0	3.0
					1999	9.0	4.0
AVERAGE						5.2	2.8

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPM)	
						HIGHEST 1-HOUR	HIGHEST 8-HOUR
CO	ORANGE	WINTER PARK	095-2002	NEIGHBORHOOD	2003	3.0	2.0
					2002	4.0	3.0
					2001	8.0	2.0
					2000	8.0	5.0
					1999	3.0	3.0
AVERAGE						5.2	3.0

TOTAL CO AVERAGE		4.95	2.85

Table 6
Summary of Representative NO_2 Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB) ANNUAL
NO_2	HILLSBOROUGH	SIMMONS PARK	057-0081	URBAN	2003	7.0
					2002	7.0
					2001	7.0
					2000	8.0
					1999	7.0
AVERAGE						7.2

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB) ANNUAL
NO_2	HILLSBOROUGH	TAMPA	057-1065	NEIGHBORHOOD	2003	10.0
					2002	11.0
					2001	11.0
					2000	11.0
					1999	10.0
AVERAGE						10.6

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB) ANNUAL
NO_2	ORANGE	WINTER PARK	095-2002	URBAN	2003	11.0
					2002	11.0
					2001	12.0
					2000	12.0
					1999	12.0
AVERAGE						11.6

TOTAL NO_2 AVERAGE		9.0

Table 7
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³) 24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	TAMPA	057-0030	URBAN	2003	25.0	20.0
					2002	32.0	20.0
					2001	45.0	24.0
					2000	44.0	24.0
					1999	45.0	24.0
AVERAGE						**38.2**	**22.4**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³) 24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	GIBSONTON	057-0066	NEIGHBORHOOD	2003	64.0	27.0
					2002	55.0	25.0
					2001	59.0	30.0
					2000	73.0	33.0
					1999	81.0	35.0
AVERAGE						**66.4**	**30.0**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³) 24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	NO CITY	057-0083	MIDDLE	2003	58.0	25.0
					2002	38.0	22.0
					2001	44.0	25.0
					2000	38.0	25.0
					1999	39.0	24.0
AVERAGE						**43.4**	**24.2**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³) 24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	NO CITY	057-0085	NEIGHBORHOOD	2003	37.0	20.0
					2002	33.0	19.0
					2001	53.0	24.0
					2000	35.0	23.0
					1999	35.0	20.0
AVERAGE						**38.6**	**21.2**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 7 (continued)
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	GANNON	057-0095	NEIGHBORHOOD	2003	61.0	26.0
					2002	39.0	22.0
					2001	45.0	26.0
					2000	44.0	27.0
					1999	49.0	27.0
AVERAGE						47.6	25.6

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	TAMPA	057-1002	NEIGHBORHOOD	2003	44.0	25.0
					2002	40.0	24.0
					2001	56.0	29.0
					2000	145.0	29.0
					1999	47.0	26.0
AVERAGE						66.4	26.6

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	TAMPA	057-1035	NEIGHBORHOOD	2003	52.0	23.0
					2002	56.0	24.0
					2001	52.0	25.0
					2000	66.0	26.0
					1999	51.0	25.0
AVERAGE						55.4	24.6

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	TAMPA	057-1068	NEIGHBORHOOD	2003	19.0	15.0
					2002	29.0	17.0
					2001	40.0	20.0
					2000	32.0	20.0
					1999	39.0	20.0
AVERAGE						31.8	18.4

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 7 (continued)
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	TAMPA	057-1069	NEIGHBORHOOD	2003	42.0	23.0
					2002	38.0	22.0
					2001	54.0	28.0
					2000	47.0	28.0
					1999	51.0	28.0
AVERAGE						**46.4**	**25.8**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	TAMPA	057-1070	MIDDLE	2003	56.0	27.0
					2002	47.0	27.0
					2001	59.0	28.0
					2000	50.0	30.0
					1999	47.0	28.0
AVERAGE						**51.8**	**28.0**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	BRANDON	057-2002	NEIGHBORHOOD	2003	41.0	22.0
					2002	35.0	20.0
					2001	103.0	29.0
					2000	43.0	25.0
					1999	37.0	22.0
AVERAGE						**51.8**	**23.6**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	LAKE	ASTOR PARK	069-0001	URBAN	2003	39.0	17.0
					2002	33.0	16.0
					2001	57.0	18.0
					2000	53.0	20.0
					1999	49.0	19.0
AVERAGE						**46.2**	**18.0**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 7 (continued)
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	POLK	MULBERRY	105-0010	NEIGHBORHOOD	2003	42.0	20.0
					2002	38.0	18.0
					2001	121.0	23.0
					2000	121.0	22.0
					1999	42.0	22.0
AVERAGE						**72.8**	**21.0**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	POLK	MULBERRY	105-2006	NEIGHBORHOOD	2003	49.0	20.0
					2002	78.0	21.0
					2001	59.0	21.0
					2000	45.0	23.0
					1999	50.0	22.0
AVERAGE						**56.2**	**21.4**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	SEMINOLE	SANFORD	117-1002	NEIGHBORHOOD	2003	47.0	18.0
					2002	38.0	18.0
					2001	52.0	20.0
					2000	32.0	18.0
					1999	34.0	18.0
AVERAGE						**40.6**	**18.4**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	VOLUSIA	DAYTONA BEACH	127-5002	NEIGHBORHOOD	2003	53.0	19.0
					2002	39.0	18.0
					2001	67.0	22.0
					2000	53.0	21.0
					1999	54.0	21.0
AVERAGE						**53.2**	**20.2**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

TOTAL PM_{10} AVERAGE		**50.4**	**23.1**

Table 8
Summary of Representative SO_2 Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	HILLSBOROUGH	TAMPA	057-0053	NEIGHBORHOOD	2003	44.0	11.0	4.0
					2002	46.0	15.0	4.0
					2001	44.0	16.0	4.0
					2000	66.0	20.0	4.0
					1999	71.0	18.0	5.0
AVERAGE						54.2	16.0	4.2

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	HILLSBOROUGH	TAMPA	057-0081	URBAN	2003	76.0	20.0	3.0
					2002	62.0	19.0	4.0
					2001	135.0	31.0	4.0
					2000	112.0	25.0	4.0
					1999	91.0	28.0	5.0
AVERAGE						95.2	24.6	4.0

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	HILLSBOROUGH	GANNON	057-0095	MIDDLE	2003	71.0	12.0	3.0
					2002	95.0	18.0	4.0
					2001	116.0	22.0	4.0
					2000	135.0	23.0	4.0
					1999	110.0	22.0	5.0
AVERAGE						105.4	19.4	4.0

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 8 (continued)
Summary of Representative SO_2 Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	HILLSBOROUGH	TAMPA	057-0109	NEIGHBORHOOD	2003	128.0	47.0	4.0
					2002	119.0	47.0	4.0
					2001	126.0	46.0	4.0
					2000	86.0	23.0	4.0
					1999	179.0	60.0	6.0
AVERAGE						**127.6**	**44.6**	**4.4**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	HILLSBOROUGH	TAMPA	057-1035	NEIGHBORHOOD	2003	49.0	18.0	6.0
					2002	82.0	24.0	7.0
					2001	58.0	20.0	6.0
					2000	80.0	23.0	6.0
					1999	103.0	27.0	8.0
AVERAGE						**74.4**	**22.4**	**6.6**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	HILLSBOROUGH	TAMPA	057-4004	NEIGHBORHOOD	2003	27.0	8.0	2.0
					2002	33.0	8.0	3.0
					2001	34.0	12.0	3.0
					2000	46.0	9.0	2.0
					1999	31.0	8.0	3.0
AVERAGE						**34.2**	**9.0**	**2.6**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 8 (continued)
Summary of Representative SO_2 Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	ORANGE	WINTER PARK	095-2002	NEIGHBORHOOD	2003	11.0	4.0	1.0
					2002	11.0	5.0	1.0
					2001	27.0	8.0	2.0
					2000	27.0	9.0	3.0
					1999	29.0	7.0	2.0
AVERAGE						**21.0**	**6.6**	**1.8**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	POLK	NICHOLS	105-0010	NEIGHBORHOOD	2003	34.0	15.0	5.0
					2002	37.0	10.0	4.0
					2001	47.0	17.0	5.0
					2000	62.0	18.0	5.0
					1999	52.0	19.0	7.0
AVERAGE						**46.4**	**15.8**	**5.2**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (PPB)		
						3-HOUR[1]	24-HOUR[2]	ANNUAL[3]
SO_2	POLK	MULBERRY	105-2006	NEIGHBORHOOD	2003	31.0	9.0	4.0
					2002	41.0	10.0	4.0
					2001	34.0	11.0	4.0
					2000	53.0	15.0	4.0
					1999	46.0	13.0	4.0
AVERAGE						**41.0**	**11.6**	**4.0**

NOTE:
1. REPRESENTS THE HIGHEST 2ND HIGHEST 3-HOUR AVERAGE CONCENTRATION
2. REPRESENTS THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
3. REPRESENTS THE HIGHEST ANNUAL AVERAGE CONCENTRATION

TOTAL SO_2 AVERAGE		**66.6**	**18.9**	**4.1**

Table 9
Summary of Average Background Concentration as a Percent of the Florida AAQS, Primary NAAQS, and Secondary NAAQS Using All Monitoring Data in the 13 County Modeling Domain
(µg/m³)

POLLUTANT	AVERAGING TIME	AVERAGE BACKGROUND CONCENTRATION	FLORIDA AAQS	PERCENT OF FLORIDA AAQS	PRIMARY NAAQS	PERCENT OF PRIMARY NAAQS	SECONDARY NAAQS	PERCENT OF SECONDARY NAAQS
CARBON MONOXIDE[6]	8-HOUR[3]	3,249	10,260[1]	31.7%	10,260[1]	31.7%	NONE	N/A
	1-HOUR[3]	5,643	39,900[2]	14.1%	39,900[2]	14.1%	NONE	N/A
NITROGEN DIOXIDE[7]	ANNUAL[3]	17	100	17.0%	100	17.0%	100	0.2%
PARTICULATE MATTER (PM_{10})	ANNUAL[3]	23	50	46.2%	50	46.2%	50	46.2%
	24-HOUR[4]	50	150	33.6%	150	33.6%	150	33.6%
SULFUR DIOXIDE[8]	ANNUAL[3]	11	60	17.8%	80	13.3%	NONE	N/A
	24-HOUR[5]	49	260	19.0%	365	13.5%	NONE	N/A
	3-HOUR[5]	174	1,300	13.4%	NONE	N/A	1,300	13.4%

NOTES:
1. EQUALS 9 PPM OF CO WHICH IS THE FLORIDA DEP 8-HOUR CO AAQS
2. EQUALS 35 PPM OF CO WHICH IS THE FLORIDA DEP 1-HOUR CO AAQS
3. NEVER TO BE EXCEEDED
4. NOT TO BE EXCEEDED ON MORE THAN AN AVERAGE OF ONE DAY PER YEAR OVER A THREE-YEAR PERIOD
5. NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR
6. 1 PPM CO = 1,140 $\mu g/m^3$
7. 1 PPM NO_2 = 1,880 $\mu g/m^3$
8. 1 PPM SO_2 = 2,610 $\mu g/m^3$

Table 10
Summary of Average Background Concentration as a Percent of the Florida AAQS, Primary NAAQS, and Secondary NAAQS Using Only Neighborhood Spatial Scale Monitoring Data
(μg/m^3)

POLLUTANT	AVERAGING TIME	AVERAGE BACKGROUND CONCENTRATION	FLORIDA AAQS	PERCENT OF FLORIDA AAQS	PRIMARY NAAQS	PERCENT OF PRIMARY NAAQS	SECONDARY NAAQS	PERCENT OF SECONDARY NAAQS
CARBON MONOXIDE[6]	8-HOUR[3]	2,736	10,260[1]	26.7%	10,260[1]	26.7%	NONE	N/A
	1-HOUR[3]	4,902	39,900[2]	12.3%	39,900[2]	12.3%	NONE	N/A
NITROGEN DIOXIDE[7]	ANNUAL[3]	20	100	19.9%	100	19.9%	100	0.2%
PARTICULATE MATTER (PM_{10})	ANNUAL[3]	23	50	46.1%	50	46.1%	50	46.1%
	24-HOUR[4]	52	150	34.8%	150	34.8%	150	34.8%
SULFUR DIOXIDE[8]	ANNUAL[3]	11	60	17.9%	80	13.4%	NONE	N/A
	24-HOUR[5]	47	260	18.1%	365	12.9%	NONE	N/A
	3-HOUR[5]	149	1,300	11.4%	NONE	N/A	1,300	11.4%

NOTES:
1. EQUALS 9 PPM OF CO WHICH IS THE FLORIDA DEP 8-HOUR CO AAQS
2. EQUALS 35 PPM OF CO WHICH IS THE FLORIDA DEP 1-HOUR CO AAQS
3. NEVER TO BE EXCEEDED
4. NOT TO BE EXCEEDED ON MORE THAN AN AVERAGE OF ONE DAY PER YEAR OVER A THREE-YEAR PERIOD
5. NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR
6. 1 PPM CO = 1,140 μg/m^3
7. 1 PPM NO_2 = 1,880 μg/m^3
8. 1 PPM SO_2 = 2,610 μg/m^3

Table 11
Significance Levels for Air Quality Impacts in Class I Areas[a]
($\mu g/m^3$)

POLLUTANT	ANNUAL	24-HOUR	8-HOUR	3-HOUR	1-HOUR
SO_2	1.0	0.2	-	0.1	-
PM_{10}	0.2	0.3	-	-	-
NO_2	0.1	-	-	-	-

NOTE:

a DRAFT EPA GUIDANCE BASED ON 4 PERCENT OF THE PSD CLASS I INCREMENT

Table 12
FLM Air Quality Modeling Requirements For Visibility and Deposition Class I Impact Analyses

Guidance Document
Federal Land Managers' Air Quality Related Values Workgroup (FLAG) guidance for visibility and deposition impacts (U.S. Forest Service, *Federal Land Managers' Air Quality Related Values Workgroup*, December 2000)

Procedures - Near Field Modeling Requirements	
Applicability	Applicable to sources located within 50 kilometers of a Class I Area(s)
Visible Parameters	• Contrast (C) • Color difference (delta E)
Natural Conditions	• Natural conditions should be used as benchmark
Approved Models	• VISCREEN • PLUVUE II
Screening Levels of Concern	• |C| >= 0.05 • Delta E >= 2
Decision Threshold	• Screening - |C|< 0.05 - Delta E < 2 • Refined - |C|< 0.02 - Delta E < 1

Table 12 (continued)
FLM Air Quality Modeling Requirements For Visibility and Deposition Class I Impact Analyses

Procedures - Distant/Multi-Source Modeling Requirements	
Applicability	Applicable to multiple sources or sources located greater than 50 kilometers from the Class I area(s)
Visible Parameters	• Extinction
Natural Conditions	• Natural conditions as benchmark
Approved Models	• CALMET • CALPUFF
Model Data Requirements	• 3 years of MM5 data (very labor intensive) • Offsite Emissions Inventory - FLM would like all major and minor sources - Emission rates > Short-Term includes lb/MMBTU per hour for visibility analysis > Long-term includes tons/year for deposition analysis
Levels of Concern	• $\|C\| >= 0.02$ • Delta E >= 1 • Change in extinction (delta b_{ext}) >= 10% is unacceptable • 10% > delta b_{ext} >= 5% requires further analysis
Analysis Thresholds	• De minimus threshold for further analyses - 0.4% change in extinction (single source) • Threshold requiring performing a Cumulative Analysis - 5% change in extinction (single source) OR - If a cumulative analyses has already been done
Decision Threshold	• Single source (S.S) < 0.4% • Cumulative delta b_{ext} >= 10% but S.S. delta b_{ext} < 0.4%

TABLE 13
FLM Air Quality Modeling Requirements For PSD Increment and NAAQS Analyses

Guidance Document
U.S. EPA, 40 CFR Part 51 Appendix W Guideline on Air Quality Models, 2003

Procedures	
Models to Use	• Near Field (Within 50 kilometers) - Model: ISC or AERMOD • Distant (Greater than 50 kilometers) - Model: CALMET and CALPUFF
Meteorological Data	• 5 year of meteorological data
Offsite Emissions Inventory	• All PSD sources regardless if they have a significant impact in the Class I area • All major and minor sources for NAAQS.
Emission Rates	• Short-Term - lb/MMBTU per hour for 3- hour and 24-hour averaging periods • Long-Term - tons/year for annual averaging period
Decision Threshold	• PSD Class I increments and NAAQS

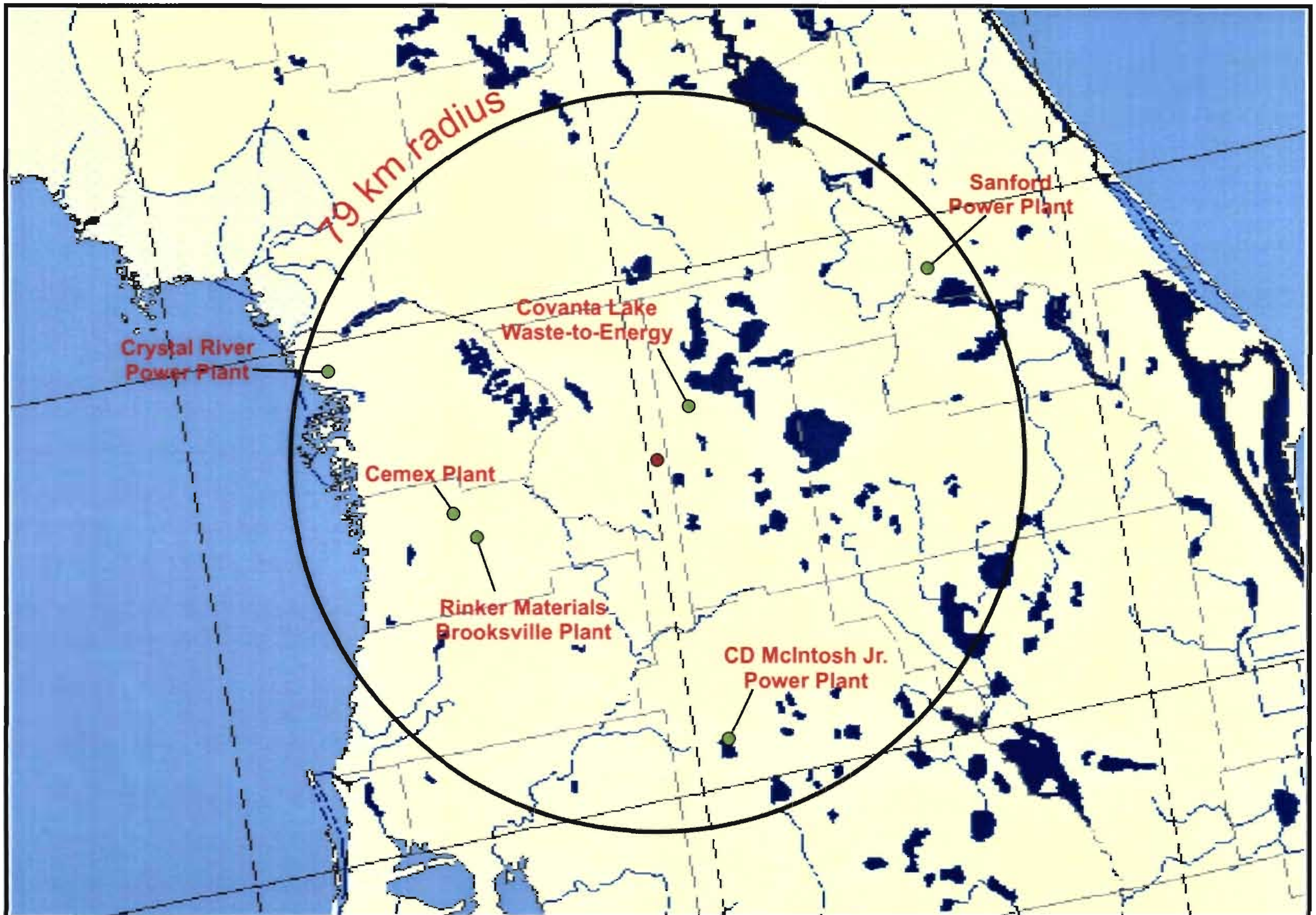


Figure 1
Significant Impact Area
NO_x Sources

0 25 50
Scale in km

Facility Location
Significant NO_x Source

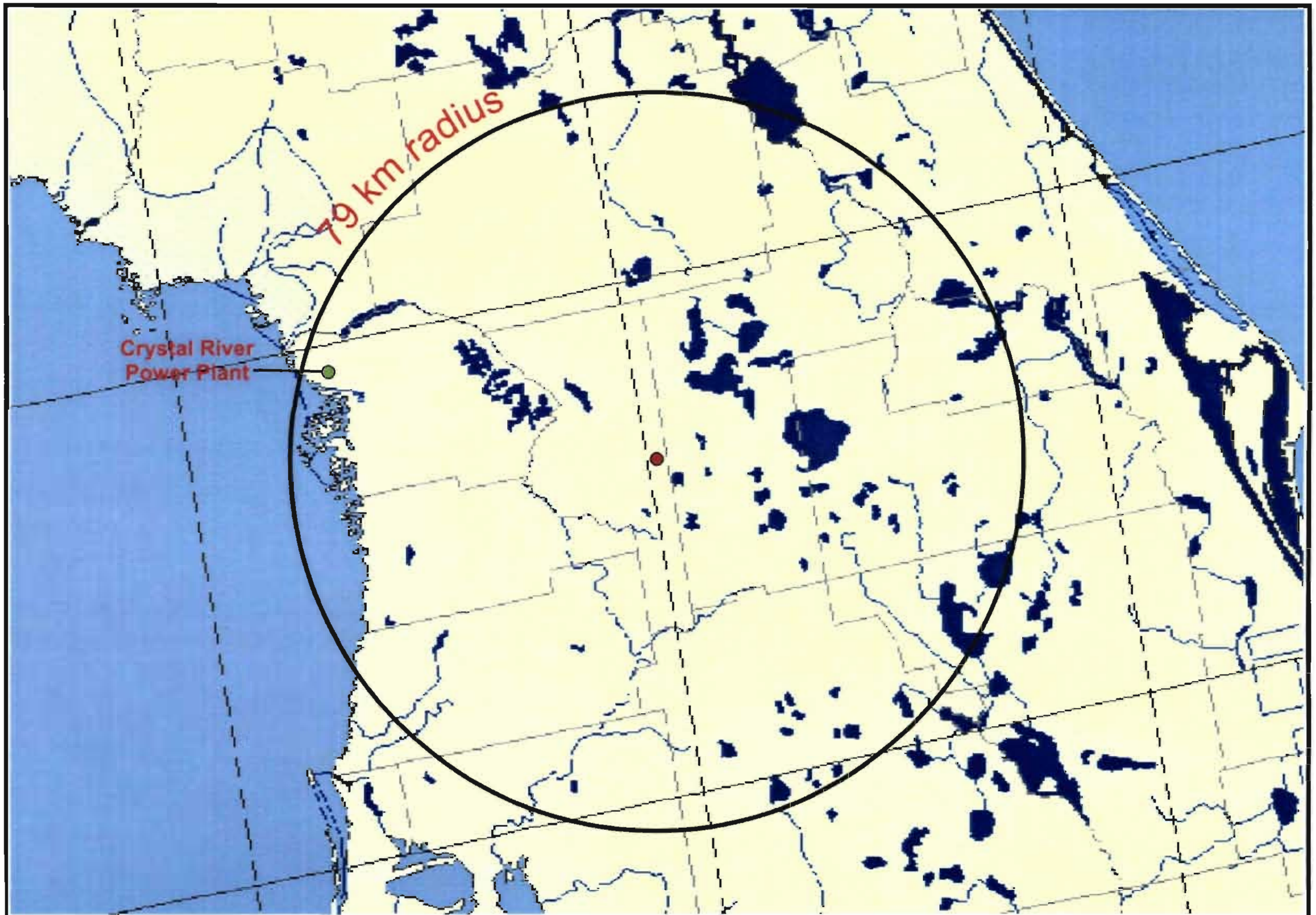


Figure 2
Significant Impact Area
TSP Sources

0 25 50
Scale in km

Facility Location
Significant TSP Source

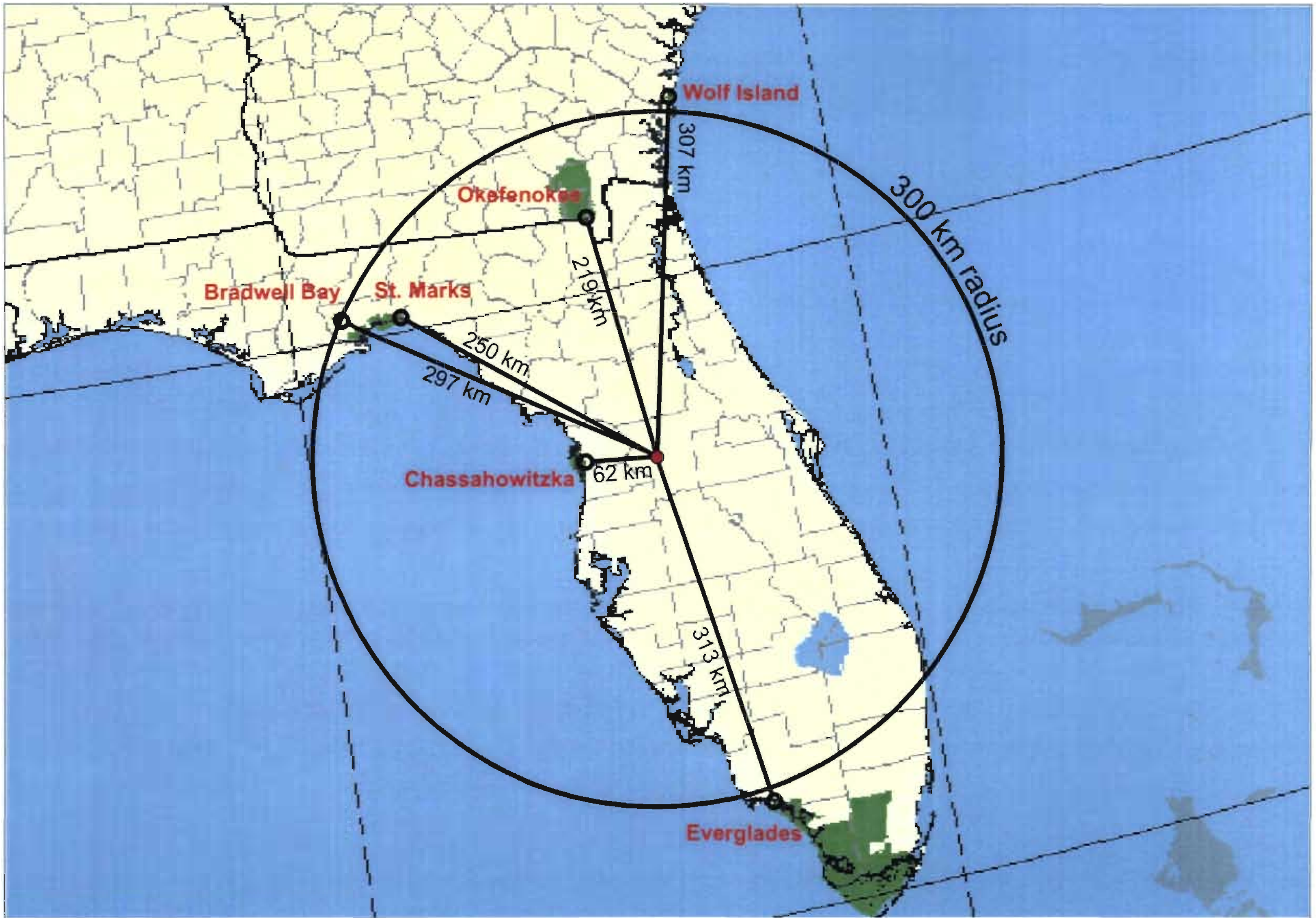


Figure 3
Surrounding
Class I Areas

0 150 300
Scale in km

Facility Location
Class I Area

Attachment A
SCREEN3 Model Input and Output

Attachment B
NO_x and TSP 2002 and 2003 Actual Air Emission Inventories

APPENDIX D

NO_x, TSP, PM_{10}, and $PM_{2.5}$ Secondary Impact Analyses

Appendix D
NO_x, TSP, PM_{10}, and $PM_{2.5}$ Secondary Impact Analyses

1.0 Additional Impacts Analysis

PSD regulations require the conduct of an analysis of impairment to visibility, soils, and vegetation that will occur as a result of the operation of the SCC air emission sources. The analysis also requires an assessment of the air quality impact projected for the surrounding area as a result of general commercial, residential, industrial, and other growth associated with the operation of the new SCC Center Hill Plant.

1.1 Soils and Vegetation

No sensitive soil types are known to exist within the significant impact area of the SCC Center Hill Plant. Moreover, the areas of maximum impact are generally cultivated or forested and demonstrate no obvious sensitivity to industrial air emissions.

The NAAQS for all criteria pollutants were designed to protect the public health (primary standards) and welfare (secondary standards) from known or anticipated adverse effects and include a margin of safety. Factors that were considered in designing the standards included vegetation effects, soil effects, and material damage effects. Based on preliminary modeling studies, PM_{10}, $PM_{2.5}$ and NO_2 are expected to have maximum predicted air quality impacts above the USEPA and FDEP Significant Impact Levels (SILs). The additional impact analyses for these pollutants will be assessed further when refined air quality modeling is conducted. Also, preliminary modeling results show that SO_2, CO, and Pb maximum air quality impacts to be less than the corresponding SILs for these pollutants. Thus, no adverse effects on soils or vegetation are expected from the emission of these pollutants.

1.2 Related Growth

The construction and modification of the new SCC Center Hill Plant is not expected to cause or contribute to related industrial or commercial growth that would have an impact on local ambient air quality.

1.3 Visibility

Visibility impairment impacts to the four surrounding Class I areas within 300 kilometers of the new SCC Center Hill Plant are planned to be modeled using the USEPA approved long range transport CALPUFF model Additional modeling results and attending additional air quality impacts to the surrounding Class I areas will be presented as part of the refined modeling results.

APPENDIX E
Process Flow Diagrams and Drawings

DIAGRAM E-1 – Sumter Cement Company – Preliminary Site Layout

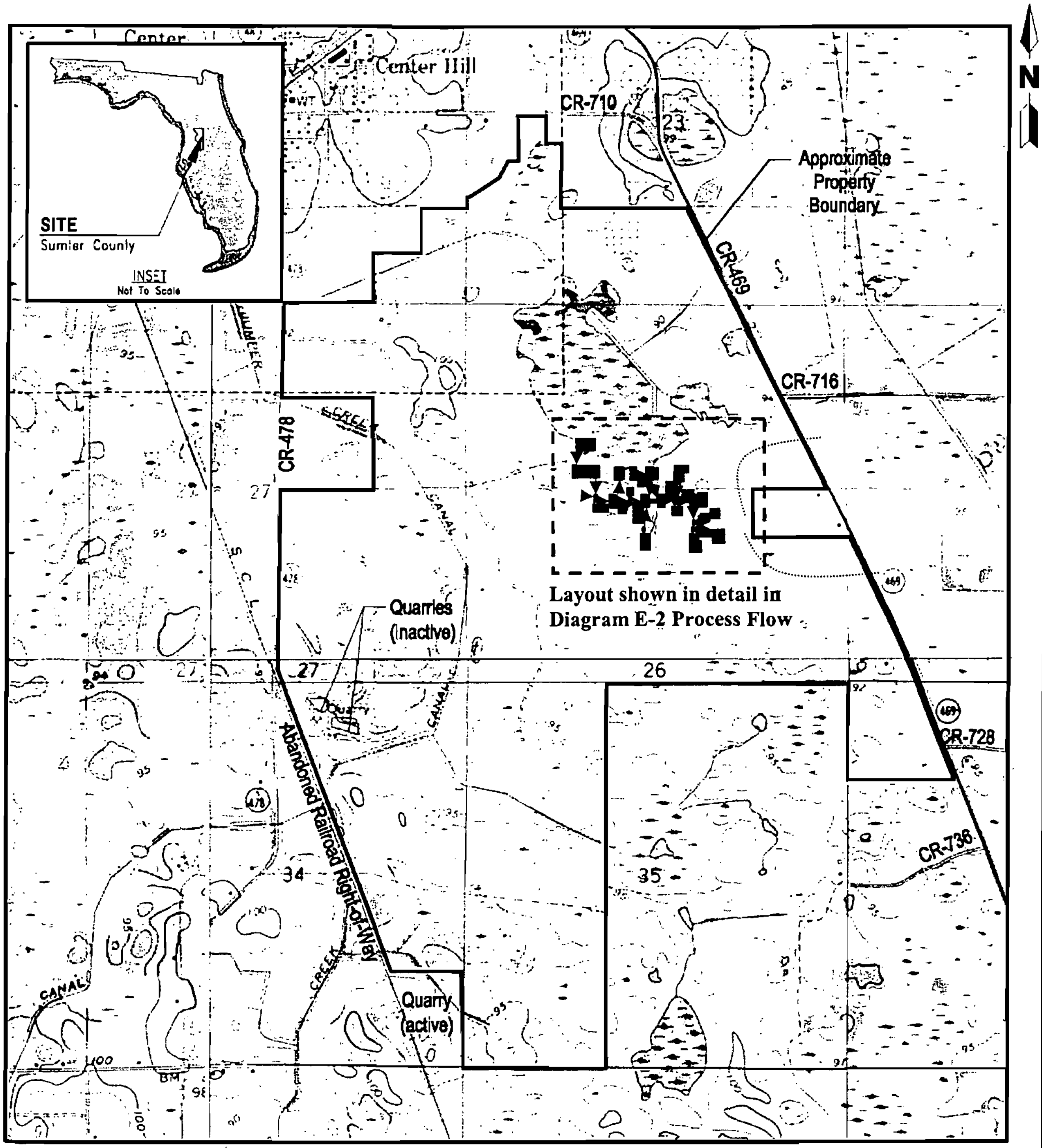
DIAGRAM E-2 – Process Flow Diagram

DIAGRAM E-3 – Preliminary Plot Plan

Diagram E-1

SUMTER CEMENT COMPANY - PRELIMINARY SITE LAYOUT

■ - Building Layout



SOURCE: USGS Quadrangles

BUSHNELL, FLA.	CENTER HILL, FLA.	MASCOTTE, FLA.	WEBSTER, FLA.
1958, revised 1984	1969	1969	1958

Maps and data Copyright 2003 Maptech

LEGEND

CR — County Road

0 1,000 2,000

SCALE: 1 INCH = 2,000 FEET

SITE VICINITY MAP

NO.	DATE	REVISIONS
0	Mar-05	*Initial Submittal*

DESIGNED	DRAWN	CHECKED	DATE
HH	BB		

MACTEC

Engineering and Consulting, Inc.
Tallahassee, Florida
850-656-1293

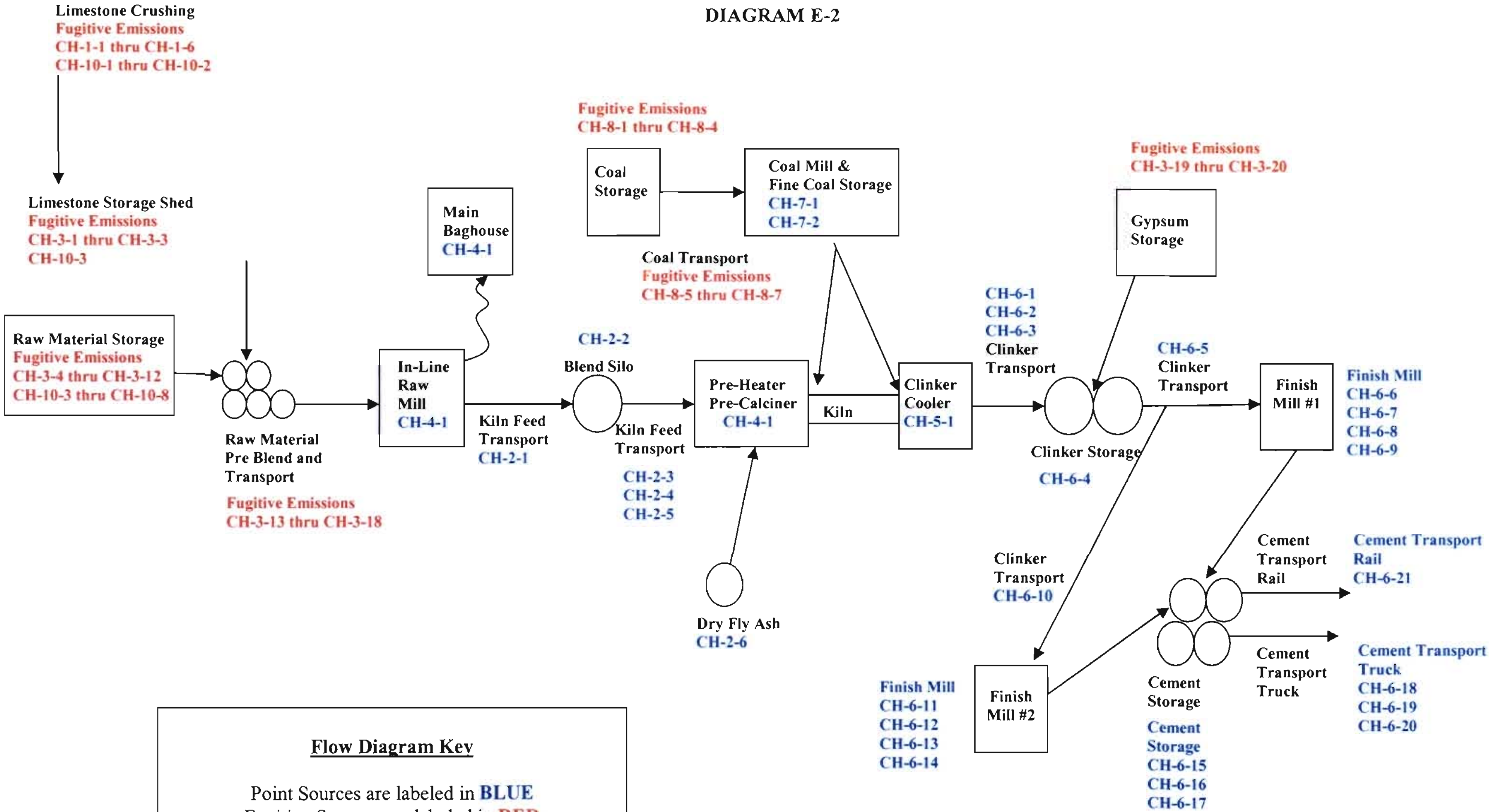
GRAHAM PROPERTY
PHASE I ENVIRONMENTAL SITE ASSESSMENT
CENTER HILL, SUMTER COUNTY PROJECT
SUMTER COUNTY, FLORIDA

SUWANNEE AMERICAN CEMENT

FIGURE: 1

CENTER HILL PLANT FLOW DIAGRAM

DIAGRAM E-2



Flow Diagram Key

Point Sources are labeled in **BLUE**
Fugitive Sources are labeled in **RED**

APPENDIX F
Good Engineering Stack Height Analysis

APPENDIX F

Good Engineering Practice Stack Height Analysis

Following U. S. EPA guidance contained in the "Guideline for Determination of Good Engineering Practice (GEP) Stack Height (Revised)" (U.S. EPA, 1985), a GEP analysis will be performed to evaluate the potential for building downwash on the stacks. Section 123 of the Federal CAA defines GEP, with respect to stack heights, as, "the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes which may be created by the source itself, nearby structures, or nearby terrain obstacles." For this analysis, the Code of Federal Regulations 40 CFR 51.100 (ii) defines nearby as "that distance up to five times the lesser of the height or the (projected) width dimension of a structure, but not greater than 0.8 km ..."

According to 40 CFR 51.100 (ii), GEP stack height means the greater of:

1. 65 m, measured from the ground level elevation at the base of the stack.

2. For stacks in existence after 12 January 1979:

   $$Hg = H + 1.5\,L$$

   Where:
   Hg = GEP stack height,
   H = height of nearby structure(s) measured from the ground level elevation at the base of the stack.
   L = lesser of height or projected width of nearby structures.

3. The height demonstrated by fluid model or field study which satisfies the definition of GEP in Section 123 of the CAA.

A GEP stack height analysis for the proposed Plant will be made based upon the appropriate EPA (1985) guideline document and dimensions of the Plant. The GEP analysis will be performed based on scaled plot plans of the facility to be provided by SCC, and using the U.S. EPA Building Profile Input Program (BPIP, Version 04112). BPIP determines, in each of the 36 wind directions (10° sectors), which building may produce the greatest downwash effects on surrounding stacks. Buildings that consist of multiple levels will be evaluated as a single building with multiple tiers. Any modeled stacks with heights less than GEP will be modeled using the direction-specific building dimensions generated by BPIP.

APPENDIX G
Modeling Protocol

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

Sumter Cement Company, LLC (SCC) is proposing to build a new Portland cement plant (Plant) in the town of Center Hill, Florida. This project will require SCC to submit a Clean Air Act Permit-to-Construct Application to the Florida Department of the Environment (FDEP).

The proposed project will be subject to the Prevention of Significant Deterioration (PSD) regulations. Since the proposed facility is expected to have emissions greater than 100 tons per year (TPY), it will be considered a major emission source under 40 CFR Part 52.21(2)(i). Therefore, for those regulated air pollutant emissions that exceed applicable significant emission threshold levels, an air quality modeling impact analysis is required.

This document outlines the proposed approach or protocol to be followed in conducting an air quality modeling analysis in order to demonstrate compliance with the applicable National Ambient Air Quality Standards (NAAQS), PSD increments, and visibility impairment at Federal Class I areas. This document has been developed to establish an agreed upon methodology for the modeling that is planned to be conducted. Section 2 of the Protocol provides a description of the proposed project and site location. Section 3 contains the projected emissions for the project. Section 4 describes the air quality model selection and input data, including the selected screening and refined air dispersion models, land use and topography, receptor grid, meteorological data, and "good engineering practice (GEP)" stack height analysis. Section 5 discusses the approach for the summarization and presentation of the air quality modeling results. Section 6 presents the references of guidelines and models referred to in this protocol.

2. PLANT LOCATION AND DESCRIPTION OF PROPOSED PROJECT

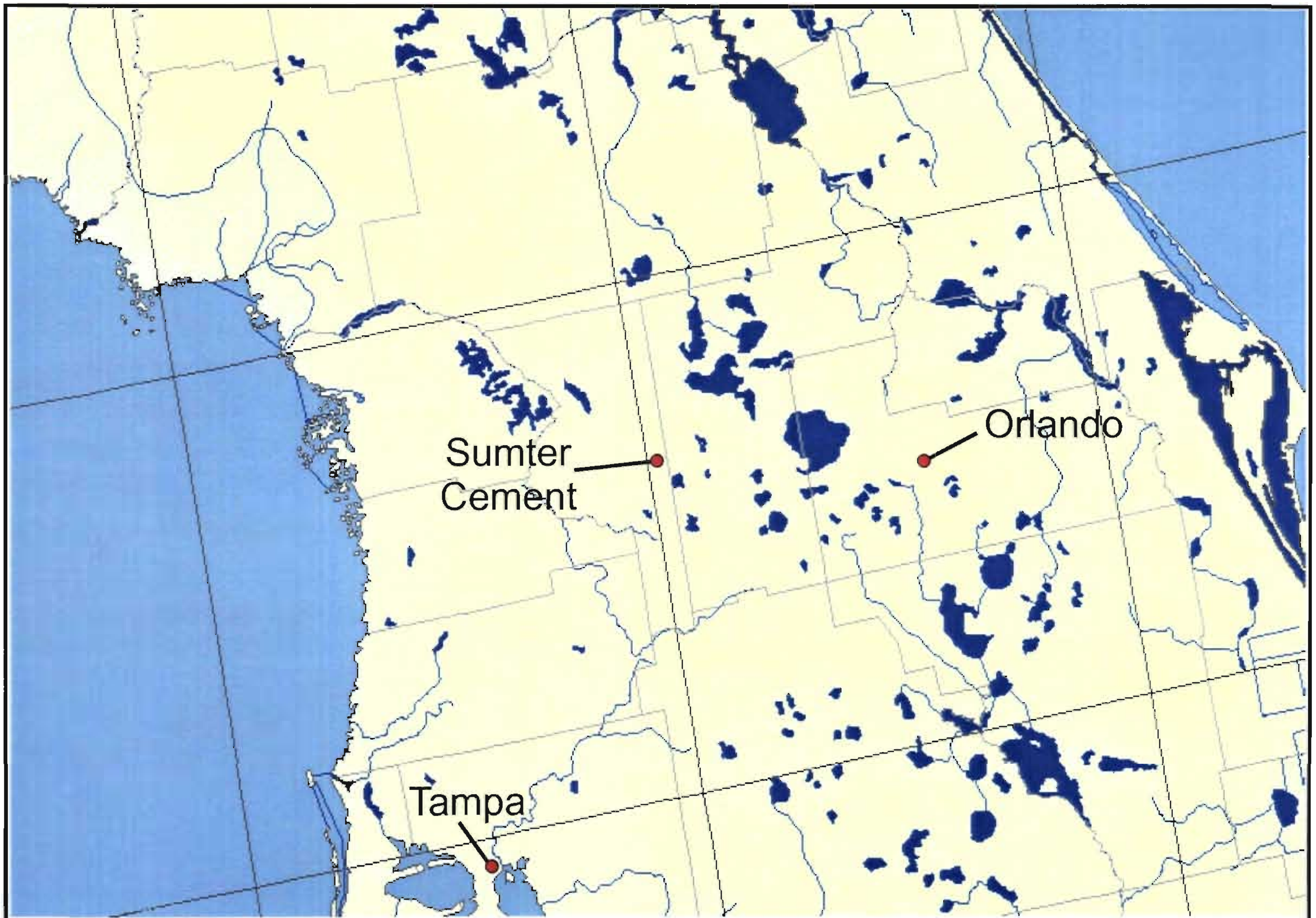
2.1 PLANT LOCATION

The Plant is located approximately 1 mile southeast of Center Hill, Florida, and is situated on an approximately 1,473-acre parcel of land. The location of the Plant is shown in Figure 2-1. The geographic coordinates for the new precalciner kiln system stack are approximately:

▪ Longitude: 81° 58' 49" W	Latitude: 28° 37' 50" N
▪ UTM Easting: 404,171 meters	Northing: 3,167,472 meters
▪ UTM Zone: 17	
(UTM = Universal Traverse Mercator)	WGS-84 Ellipsoid

The proposed project is located in a region which is classified as in attainment of the NAAQS for all criteria pollutants.

The topography of the area surrounding the proposed project site is generally flat. The base elevation of the main kiln stack is 102 ft above mean sea level (amsl), based upon the United States Geological (USGS) 1:24,000 scale topographic map of the area. The highest terrain features that are located within 50 kilometers (km) of the project site are isolated peaks of 300+ feet. There are no major distinctive terrain features in the surrounding area. Since the highest terrain in the vicinity of the plant site does not exceed the elevation of the projected main kiln stack elevation, the air dispersion modeling analysis will not include terrain elevations.



0 25 50
Scale in km

Figure 2-1
Sumter Cement Company
Area Map

SPECTRUM environmental sciences, inc

2.2 EXISTING PLANT OPERATIONS

A description of the new Plant operations is presented in Section 2.0 of the Application.

3. EMISSION INVENTORY

3.1 EMISSION ESTIMATES

Initial assessments of the Plant emission inventory have been presented in Appendix A, "PTE Air Emissions Inventory" of the Application.

As seen from Table 5-1 in the Application, there will be a significant net increase in PM_{10}, TSP, $PM_{2.5}$, SO_2, NO_x, CO, and VOC emissions. Therefore, these pollutants will require a major source review under the New Source Review (NSR) regulations, and also require that an ambient air quality impact modeling analysis be conducted.

3.2 GOOD ENGINEERING PRACTICE STACK HEIGHT

Please refer to Appendix F of the Application for the discussion on GEP Stack Height.

4. AIR QUALITY MODEL SELECTION AND INPUT DATA

The dispersion models to be used in the air quality modeling analysis of the new Plant will be approved U.S. EPA air quality dispersion models. The proposed air quality modeling analysis will initially use both screening and refined air dispersion models. The procedures used in conducting the modeling analysis will follow the requirements outlined in 40 CFR Part 51, Appendix W "Guideline on Air Quality Models" (U.S. EPA 1999) and other relevant documentation.

4.1 AIR DISPERSION MODEL SELECTION

The air quality modeling analysis will use air dispersion models to predict ambient air impacts from the proposed project. The Industrial Source Complex Short-Term 3 (ISCST3) model will be used for refined modeling. The CALPUFF air dispersion model will be used in a screening mode (CALPUFF-LITE) to evaluate the potential for long-range transport impacts at Federal Class I areas within 300 km of the Plant location. Descriptions of these models are provided in the following subsections.

4.1.1 Industrial Source Complex Model

The U.S. EPA ISCST3 (ISCST3, Version 02035) air dispersion model will be used to perform the refined air quality modeling. The ISCST3 model can predict short-term and long-term concentrations from multiple stacks in rural or urban areas. The ISCST3 air dispersion model can also account for the effects of aerodynamic downwash of a stack's plume by nearby structures. The ISCST3 air dispersion model accepts hourly meteorological data to define the conditions for plume rise, transport, and dispersion. The model estimates the concentration for each source and receptor combination for each hour.

The ISCST3 air dispersion model has various options to simulate a variety of dispersion conditions for emissions from a stack or non-stack source. The U.S. EPA has recommended various default options to be used in dispersion modeling for regulatory purposes. These recommended regulatory default options will be used in the air quality impact analysis as follows:

- Stack-tip downwash
- Final plume rise
- Buoyancy-induced dispersion (BID)
- Vertical potential temperature gradients of 0.0, 0.0, 0.0, 0.0, 0.02 and 0.035 for stability classes A through F, respectively
- Automatic treatment of calms
- Wind profile exponents of 0.07, 0.07, 0.10, 0.15, 0.35, and 0.55 for stability classes A through F, respectively
- Infinite pollutant half-life
- Upper bound value for "supersquat" buildings
- Missing data processing not used

4.1.2 CALPUFF Model

The CALPUFF air dispersion modeling system (Version 5.76) will be used to predict the air quality impacts at the four Class I areas that are within 300 km of the Plant location. The CALPUFF model will be initially used in the screening mode (CALPUFF-LITE) in a manner that is consistent with the guidance contained in the "Inter-Agency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts" (U.S. EPA 1998) and the Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Phase I Report (U.S. FS, NPS, U.S. FWS, 2000). The CALPUFF model is a non-steady state puff dispersion model. The CALPOST program post-processes the CALPUFF model outputs, calculating and summarizing visibility impacts, concentration levels, and deposition amounts. Given the nature of the terrain in Florida, the flat terrain option will be used. Other specific CALPUFF model options will be selected in accordance with regulatory guidance (U.S. EPA 1998). The technical recommendations proposed to be used in the visibility modeling are listed in Table 4-1. If the screening modeling results in predicted significant impacts to the four surrounding Class I areas, then a refined CALPUFF modeling analysis will be proposed to be conducted.

4.2 STACK CHARACTERISTICS

The stack characteristics for the Plant sources that will be used as inputs to all dispersion models are provided in Appendix A of the Application. Additional information on stack characteristics will be provided by SCC based on finalization of the engineering design of the Plant.

4.3 LAND USE

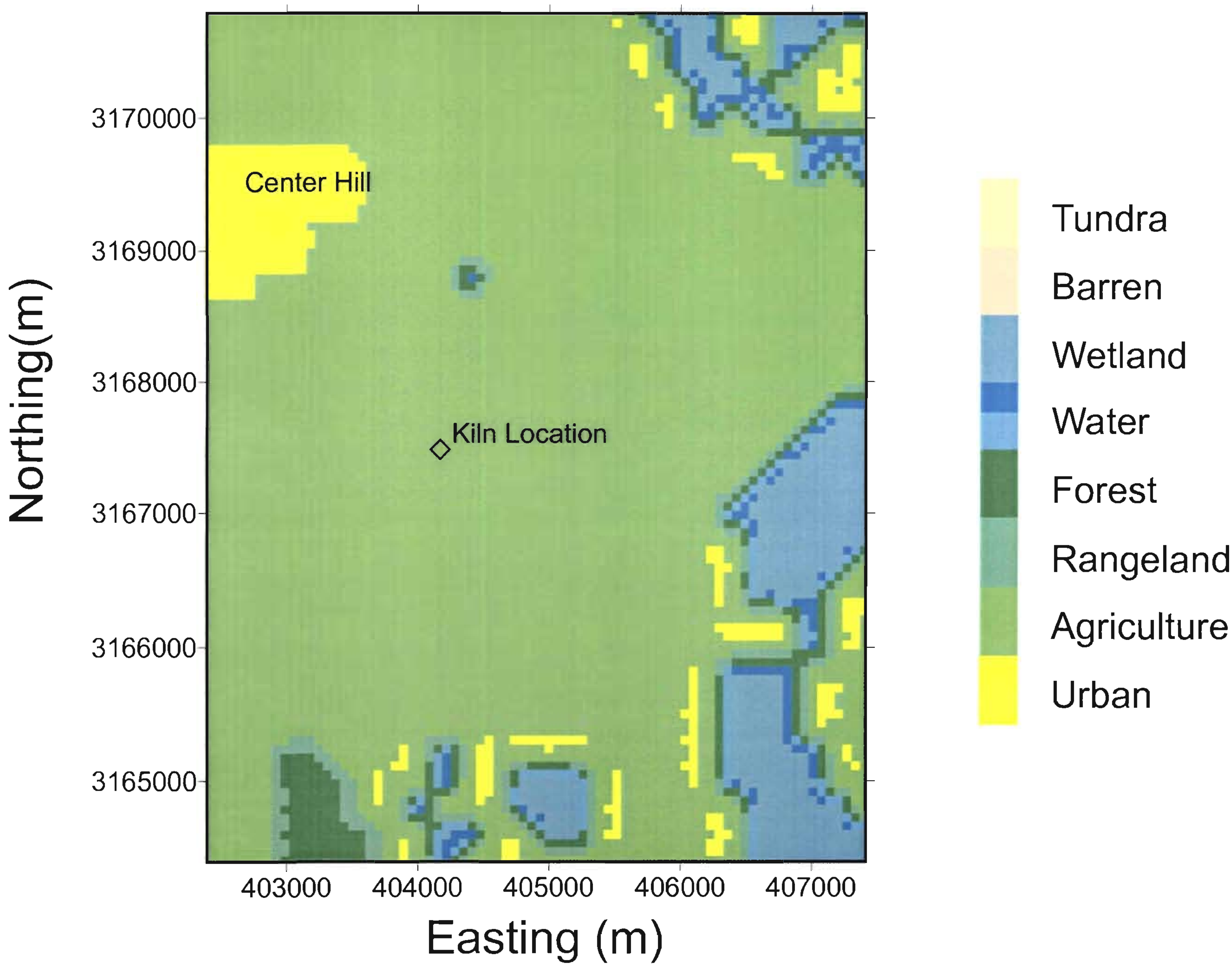
The land use classification for the area was based on a quantitative review of land use patterns surrounding the Plant. For the quantitative review, 1:250,000 scale USGS Level 2 digital land use data were used. The land use analysis followed the procedures recommended by the U.S. EPA (U.S. EPA 1999) and the typing scheme developed by Auer (Auer 1978). The Auer technique established four primary land use types: industrial, commercial, residential, and agricultural. Industrial, commercial, and compact residential areas are classified as urban, while agricultural and common residential areas are considered rural. For air quality modeling purposes, an area is defined as urban if more than 50 percent of the surface within 3 kilometers of the source falls under an urban land use type. Otherwise, the area is determined to be rural.

As shown in Figure 4-1, the quantitative land use analysis indicated that the area surrounding the Plant is predominantly rural. The residential areas shown in Figure 4-1 are conservatively assumed as urban. Based on the overall rural land use designation, rural dispersion coefficients will be used to predict the ambient air concentrations due to emissions from the stacks.

Table 4-1
Technical Characteristics of CALPUFF Modeling

For computing background light extinction: MVISBK = 6
Vertical distribution used in the near field: MGAUSS = 1 (Gaussian)
Terrain adjustment method: MCTADJ = 3 (partial plume path adjustment)
Subgrid-scale complex terrain flag: MCTSG = 0 (not modeled)
Near-field puffs modeled elongated: MSLUG = 0 (no)
Transitional plume rise modeled: MTEANS: = 0 (final rise only)
Stack tip downwash: MTIP = 1 (use stack-tip downwash)
Vertical wind shear modeled stack top: MSHEAR = 0 (vertical wind shear not modeled)
Puff splitting allowed: MSPLIT = 0 (puffs not split)
Chemical mechanism flag: MCHEM = • MCHEM = 0 (chemical transformation not modeled) is initially recommended when estimating NO_2 concentrations for comparison with the NO_2 modeling significance level that is used to determine if a cumulative impact analysis is necessary for PSD increments of NAAQS • MCHEM = 1 (MESOPUFF II chemistry scheme) for AQRV and visibility modeling
Wet removal modeled: MWET = 1 (yes)
Dry disposition modeled: MDRY = 1 (yes)
Method used to compute dispersion coefficients: MDISP = 3 (PG dispersion coefficients for RURAL areas computed using the ISCST multi-segment approximation)
Sigma-v/sigma-theta, sigma-w measurements used MTURBVW = 0 (not used)
PG sigma-y,z adj. for roughness: MROUGH = 0 (no)
Partial plume penetration of elevated inversion: MPARTL = 1 (yes)
Strength of temperature inversion provided in PROFILE.DAT extended records: MTINV = 0 (computed from measures/default gradients)
PDF used for dispersion under convective conditions: MPDF = 0 (no)
Sub-Grid TIBL module used for shore line: MSGTIBL = 0 (no)
Boundary conditions (concentration) modeled: MBCON = 0 (no)

Figure 4-1 Land Use Analysis



4.4 RECEPTOR GRID

4.4.1 ISCST3 Model Receptors

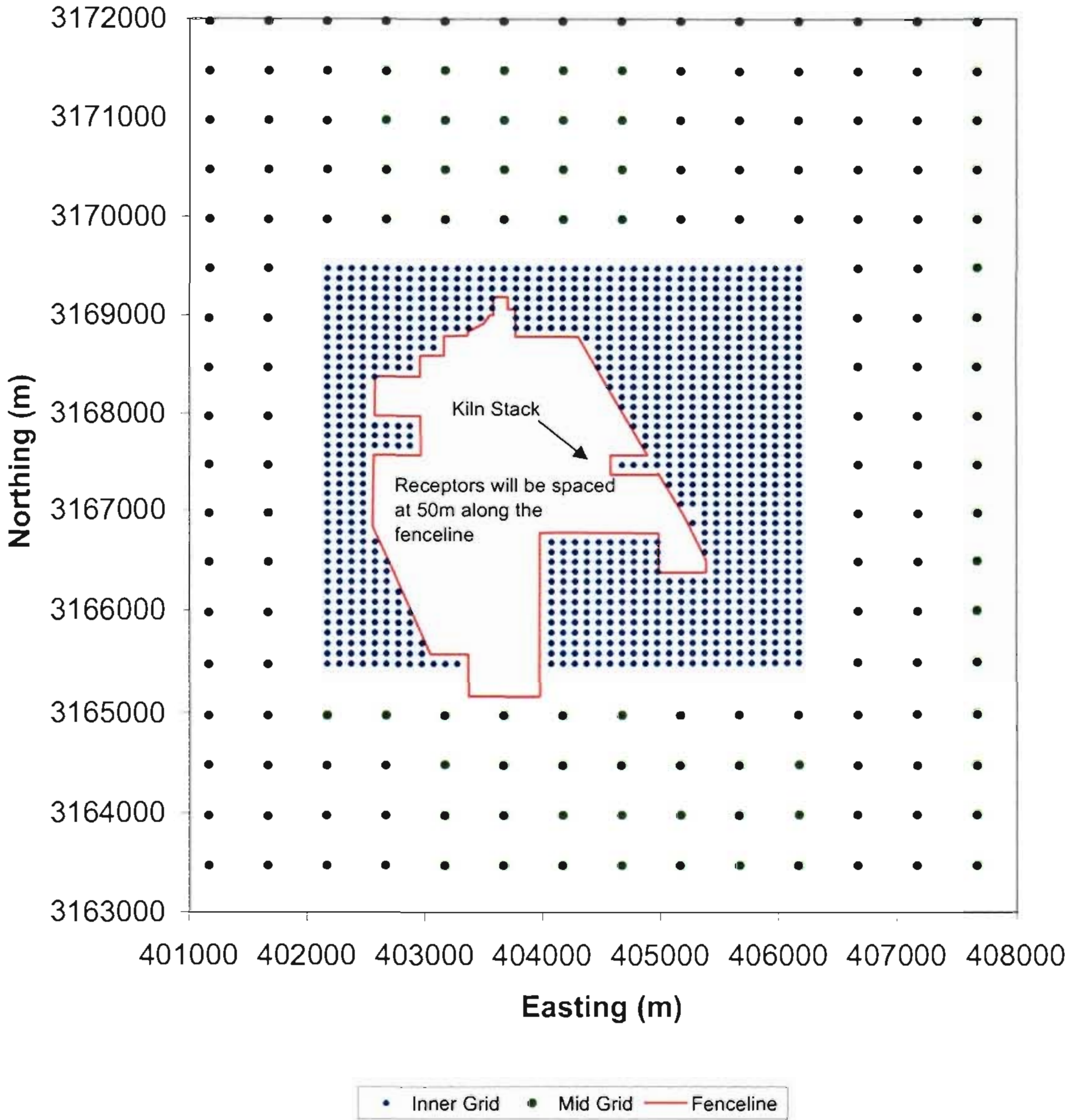
The receptor network for the ISCST3 analysis will minimally cover a square region 20-km on a side, centered on the Sumter Plant. All receptors will be referenced to the UTM coordinate system (Zone 17), using the WGS-84 Ellipsoid. A rectangular Cartesian coordinate receptor grid will be used as the main receptor grid. The main receptor grid will be centered on the new kiln stack. The following grid spacings are proposed to be used:

- 100 meters from the origin out to 2 kilometers (km)
- 500 meters from 2 km out to 5 km
- 1,000 meters from 5 km out to 10 km

In addition to the rectangular Cartesian coordinate receptor grid, a set of property line receptors will be prepared to represent the boundary of the Plant property. The property line receptors will be placed at 50 meter intervals along the boundary. Cartesian receptors that are inside the facility property will be excluded from the full receptor grid. Figure 4-2 shows an approximation of the inner portion of the full Cartesian grid, with the proposed receptor spacings.

Terrain elevations will be not be assigned to receptors included in the ISCST3 air dispersion modeling analysis. Flat terrain will be assumed.

Figure 4-2
Inner Portion of Receptor Grid



4.4.2 CALPUFF-LITE Model Receptors

For CALPUFF-LITE, it is recommended that a polar grid receptor network is used to evaluate impacts. We are proposing a polar grid with distances from the Plant that match the closest distance from the Plant to the four surrounding Class I Areas. This will result in 4 rings of receptors at a distance of 62, 219, 250, and 297 km. These rings will have a receptor for each 2 degrees (180 receptors per ring). For screening purposes, the maximum impact on a given ring is to be evaluated, regardless of direction.

4.5 METEOROLOGICAL DATA

The proposed hourly meteorological data for the ISCST3 analysis will consist of five years of recent surface data from the National Weather Service (NWS) station located at the Orlando International Airport, Florida.

The source of the upper air data to be used in mixing height calculations will be the National Weather Service (NWS) station at Tampa International Airport, Florida (Station No. 72210). Tampa is the nearest upper air station to the Plant. The surface meteorological data will be combined with coincident mixing heights derived by merging surface temperatures with the concurrent twice-daily rawinsonde data obtained from Tampa.

Missing wind speed or wind direction data will be replaced with calm data (i.e. 1 meter/sec wind speed and the same wind direction as the preceding hour). Missing temperature data will be replaced with an average of the previous valid hour and the next, non-missing hour. Multiple hours of missing temperature data will be replaced by climatological average daily temperatures. A single missing mixing height will be replaced with an average of the preceding and subsequent hours. Multiple hours of missing twice-daily mixing heights will be replaced with the monthly average mixing height. The use of the monthly average mixing height helps to incorporate into the meteorological database any monthly pattern that might exist.

The same five years of meteorological data will be used for CALPUFF-LITE as in the ISCST3 modeling, with the addition of the parameters necessary for CALPUFF to perform deposition calculations: surface roughness, friction velocity, and Monin-Obukhov length.

5. AIR QUALITY IMPACTS ANALYSIS

The air quality modeling analysis will estimate the ambient air concentrations that are predicted to occur as a result of emissions from the new SCC Plant. Air quality modeling analyses will be performed to estimate the significant impact area (SIA), the amount of PSD increment consumption, the level of compliance with the National Ambient Air Quality Standards (NAAQS), and impacts on other air quality related values (AQRVs).

5.1 SIGNIFICANCE ANALYSIS

The air quality impact analysis will initially evaluate net changes in ambient air concentrations of NO_x, PM_{10}, CO, and SO_2 from new emissions due to the project. For this analysis, $PM_{2.5}$ emissions are equal to PM_{10} emissions.

The results of this air quality modeling analysis will be compared to the PSD significance levels of:

- 1 $\mu g/m^3$ for annual average SO_2
- 5 $\mu g/m^3$ for 24-hour average SO_2
- 25 $\mu g/m^3$ for 3-hour average SO_2
- 500 $\mu g/m^3$ for 8-hour average CO
- 2,000 $\mu g/m^3$ for 1-hour CO
- 1 $\mu g/m^3$ for annual average NO_2
- 1 $\mu g/m^3$ for annual average PM_{10}
- 5 $\mu g/m^3$ for 24-hour average PM_{10}

If the proposed PSD project produces no significant impacts (i.e., at or below the ambient air significance levels), then no further analysis is required to demonstrate compliance with the NAAQS or PSD increment consumption in Class II areas. No further analysis would be required because the project, by definition, would not be expected to significantly contribute to ambient air concentrations of the modeled pollutants or consume a significant portion of their available air quality increment.

The initial significance determination will be made based on the results of the ISCST3 modeling.

If the highest modeled concentrations are above the significant impact levels (SIL), then a significant impact area (SIA) will be defined. The SIA will be defined by a circle with a radius extending from the reference origin at the facility out to the greatest radius where a receptor has a maximum concentration equal to the significance levels. Based on the extent of the SIA, further air quality modeling analyses will be conducted as described in Section 5.2.

5.2 MULTI-SOURCE IMPACT ANALYSIS

If the initial significance analysis indicates that the proposed project has significant impacts, then a multi-source impact analysis will be conducted. The multi-source impact analysis will include all sources at the Plant that emit the pollutants that have been determined to result in a modeled concentration above the significance levels. In addition, other sources of the PSD significant pollutants that are located within 50 km of the SIA will also be evaluated.

The emission inventory for the other local sources will be developed in consultation with FDEP based on a map of the area within 50 km of the SIA. The multi-source inventory will be screened to remove small insignificant sources or moderately sized sources that are located at significant distances from the facility. Sources will be included in the multi-source emission inventory if the potential emissions from the source are greater than 20 times the distance of the source to Plant. This "20D" rule was developed by the State of North Carolina's Air Permitting Unit and was originally approved by U.S. EPA Region IV. The rule has become a generally accepted approach to reduce the number of sources that explicitly need to be modeled.

The "20D" rule will only be applied to sources that are used for the NAAQS analysis. The PSD increment analysis will include all PSD increment consuming sources identified by FDEP that are located within the SIA for the respective pollutant. It is anticipated that the final multi-source emission inventory will be developed in conjunction with and approved by FDEP prior to conducting the refined multi-source air quality modeling analysis.

The final multi-source inventory will be used to assess NAAQS compliance and PSD increment consumption. The NAAQS compliance assessment will include all sources and representative background concentrations. The PSD increment consumption assessment will include only the PSD sources identified in the inventory. Both the NAAQS and PSD increment analyses will be based on the highest annual and highest, second highest short-term modeled impacts.

5.3 BACKGROUND AMBIENT AIR DATA

An assessment of available monitoring data used to establish background concentrations can be found in Section 2.6 of Appendix C in this Application.

5.4 CLASS I AREA ASSESSMENT

An assessment of potential project impacts on visibility and other air quality related values (AQRVs) in Class I areas is a requirement for PSD projects. Air quality impacts at Class I areas must be assessed under PSD regulations if they are within 300 km of the PSD source, or if the PSD source is judged to have a potential impact at Class I areas at distances beyond 300 km.

The Class I area nearest to the Plant is the Chassahowitzka National Wildlife Refuge (NWR), approximately 62 km to the west. Three other Class I areas can be found within 300 km of the planned facility. These are the Okefenokee NWR (219km), Saint Marks NWR (250 km), and the Bradwell Bay Wilderness Area (297 km). The location of these four areas relative to the Plant is shown in Figure 5-1. As shown in Figure 5-1, there are no other Class I areas within 300 km of the facility. Per recent Federal Land Managers' (FLM) discussion, the emission inventory for Class I area modeling is to be centered around the Class I area.

Figure 5-1
Surrounding
Class I Areas

5.5 SUBMITTAL OF RESULTS

A detailed air quality modeling report will be submitted to the FDEP. The air quality modeling report will include all emission information and summaries of all air dispersion modeling results. An electronic version of the air quality modeling input and output files will be submitted along with the final air quality modeling report. The electronic files submitted will also include the preprocessed meteorological data files, engineering calculation spreadsheets, and any additional supporting documentation such as plot plans and property boundaries.

6. REFERENCES

Auer 1978, Auer, Jr., A.H., – "Correlation of Land Use and Cover with Meteorological Anomalies," Journal of Applied Meteorology, 17:636-643, 1978.

U.S. EPA 1985 – "Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulations) Revised" EPA-450:4-80-023R, June 1985.

U.S. EPA 1993 – "User's Guide to the Building Profile Input Program", October 1993.

U.S. EPA 1995 –"User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volume I - User Instructions", U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 1995.

U.S. EPA 1998a – "Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts", EPA-454/R-98-019, December 1998.

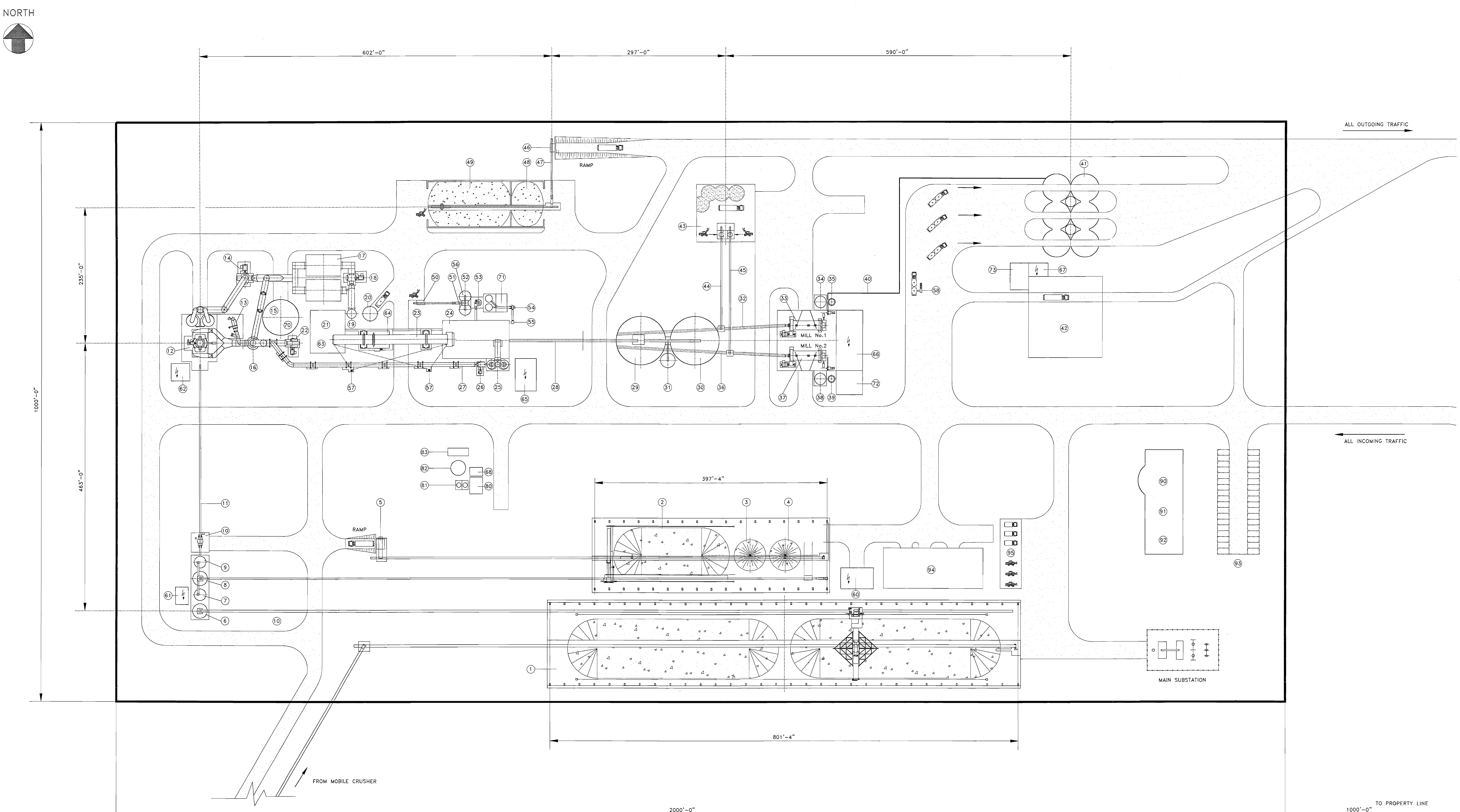
U.S. EPA 1998b – "Users Guide for the AERMOD Terrain Preprocessor (AERMAP) Revised – Draft", November 1998.

U.S. EPA 1998c – "Consequence Analysis of Using ISC-Prime Over the Industrial Source Complex Short-Term Model – Draft" Staff Report April 1998.

U.S. EPA 1999 – 40 CFR Part 51 Appendix W "Guideline on Air Quality Models (Revised)", July 1999.

APPENDIX H
P.E. Seal

1190041-001 (1)



LEGEND

1	LIMESTONE STORAGE	2x 18,000 STON (max.)
2	WET FLYASH STORAGE	1x 3,000 STON (max.)
3	SAND STORAGE	1x 750 STON (max.)
4	MILL SCALE STORAGE	1x 1,100 STON (max.)
5	SAND / MILL SCALE UNLOADING	
6	LIMESTONE BIN	
7	SAND BIN	
8	FLYASH BIN	
9	MILL SCALE BIN	
10	CROSS BELT ANALYZER "CNA"	
11	MIX TRANSPORT TO ROLLER MILL	
12	ROLLER MILL	
13	AIR HEATER	
14	ROLLER MILL EXHAUST FAN	
15	RAW MEAL SILO	14,000 STON
16	COOLING TOWER	
17	KILN / MILL BAGHOUSE	
18	EXHAUST FAN	
19	MAIN STACK	
20	DRY FLYASH SILO	2,500 STON
21	PREHEATER	
22	KILN ID FAN	
23	ROTARY KILN	
24	CLINKER COOLER	
25	COOLER DEDUSTING CYCLONES	
26	DEDUSTING FAN	
27	COOLER VENT DUCT	
28	CLINKER TRANSPORT	
29	CLINKER STORAGE SILO No.1	30,000 STON
30	CLINKER STORAGE SILO No.2	30,000 STON
31	OFF-SPEC CLINKER BIN	700 STON
32	CLINKER TRANSPORT TO MILL No.1	
33	FINISH MILL No.1	
34	FRINGE CEMENT BIN No.1	140 STON
35	CEMENT COOLER No.1	
36	CLINKER TRANSPORT TO MILL No.2	
37	FINISH MILL No.2	
38	FRINGE CEMENT BIN No.2	140 STON
39	CEMENT COOLER No.2	
40	CEMENT CONVEYING LINE TO STORAGE SILOS	
41	CEMENT STORAGE SILOS	6x 8,000 STON
42	PACKING PLANT	
43	GYPSUM STORAGE	
44	GYPSUM TRANSPORT TO MILL No.1	
45	GYPSUM TRANSPORT TO MILL No.2	
46	COAL / PET COKE UNLOADIG	
47	COAL / PET COKE BELT CONVEYOR	
48	PET COKE STORAGE	1,000 STON
49	COAL STORAGE	3,500 STON
50	COAL / PET COKE FEED HOPPER	
51	COAL STORAGE BIN	300 STON
52	PET COKE STORAGE BIN	300 STON
53	COAL MILL	
54	COAL MILL EXHAUST FAN	
55	COAL MILL EXHAUST STACK	
56	COAL FIRE DETECTION ROOM UNDER BIN	
57	KILN SCANNER	
58	TRUCK ACCESS PLATFORM	
60	ELECTRICAL EQUIPMENT ROOM	RAW MATERIAL STORAGE AREA
61	ELECTRICAL EQUIPMENT ROOM	MILL FEED BIN AREA
62	ELECTRICAL EQUIPMENT ROOM	ROLLER MILL
63	ELECTRICAL EQUIPMENT ROOM	PREHEATER
64	ELECTRICAL EQUIPMENT ROOM	ROTARY KILN
65	ELECTRICAL EQUIPMENT ROOM	CLINKER COOLER
66	ELECTRICAL EQUIPMENT ROOM	FINISH MILLS
67	ELECTRICAL EQUIPMENT ROOM	CEMENT SILOS,PACKING PLANT
68	ELECTRICAL EQUIPMENT ROOM	WATER TREATMENT PLANT
70	COMPRESSOR ROOM	RAW MEAL SILO , KILN FEED
71	COMPRESSOR ROOM	COAL MILL
72	COMPRESSOR ROOM	FINISH MILL
73	COMPRESSOR ROOM	CEMENT SILOS , PACKING PLANT
80	WATER TREATMENT	
81	COOLING TOWER	
82	FIRE WATER STORAGE TANK	
83	FIRE PUMPS	
90	CONTROL ROOM	
91	LABORATORY	
92	OFFICE	
93	PARKING	
94	WAREHOUSE , MAINTENANCE BUILDING	
95	VEHICLE STORAGE	

NOTE :

ALL DIMENSIONS ARE APPROXIMATE

PROPOSAL DRAWING ONLY

JUN 15 2005

Rev	Description	Dwn	Date	Chkd	Date	Appd	Date

Revisions

SUMTER CEMENT COMPANY, LLC
CENTER HILL PLANT , FLORIDA

POLYSIUS

Polysius Corp.
A ThyssenKrupp Technologies Company
Atlanta, Georgia

General Tolerances to ISO 2768mK
Rough Castings to ISO 8062, Group
Surface finish to ISO 1302
Avg peak to valley height Ra (μm)
Welded Construction to ISO 13920
Grade for Lengths
Grade for Angles
Third Angle Projection

Contract Name ----- | Contract No 2200-7713

PLOT PLAN
FOR NEW
4500 MTPD CEMENT PLANT

Dwn	H.S.	06-14-05
Chkd	–	–
Appd	–	–

Size E | Dwg No 110.00.10-1131076 | Rev -

Ref .... | Scale 1"=60' | Sheet 001 of 001

SUMTER CEMENT COMPANY, LLC

Center Hill, FL Plant

Attachment A & B

Modeling Files